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Year XVII · June 2025

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Contents

Introduction

The beginning of 2025 was marked by elevated uncertainty related to the heightening of geopolitical and trade tensions. The beginning of April saw further market concerns after trohe new US administration announced the introduction of new tariffs on imports. Although protectionist measures had been expected, markets were surprised by their intensity and the rapid escalation of trade tensions, particularly with China. Sudden upheavals in trade relations and profound changes in international economic and financial relations spurred additional uncertainty, to which global financial markets responded with a sharp increase in volatility and asset reallocation. The values of equity indices experienced a sharp temporary fall, and financial resources started to flow out of riskier instruments, which was accompanied by the weakening of the US dollar against other major world currencies. Even though trends in the markets stabilised following the announcement of the temporary suspension of new US tariffs, increased risk aversion in financial markets and changed risk perceptions of US assets could have long-term implications for financial stability.

The deep integration of the euro area into global financial and production flows makes it extremely vulnerable to such shocks in the global environment, which also affects Croatia. By early 2025, the domestic economy had been proven resilient to elevated uncertainty in the environment, with solid economic growth, high levels of employment and real income growth. At the same time, strong domestic demand has generated cyclical upward pressures on real estate prices and credit activity, increasing systemic risks. In addition, low productivity and its weak growth, demographic challenges and high dependency on services exports continue to limit the long-term growth potential of the Croatian economy. All these factors from the domestic environment, coupled with heightened uncertainty in global financial markets and a weakened economic outlook for the remainder of the year, increase risks to financial stability in Croatia.

The prices in the Croatian residential real estate market have continued to rise at relatively high rates, while the fall in the number of purchases has come to a halt. In the previous period of strong employment and wage growth and increased optimism, demand continued to have a dominant impact on the real estate market, despite a strong increase in construction activity that boosted supply. After falling for two years, the number of real estate purchase and sale transactions stabilised in 2024. Residential real estate prices continued to grow strongly, more than most of their macroeconomic determinants, which has increased the risk of a sharp fall in prices should macrofinancial conditions deteriorate sharply. The demand for housing loans in 2025 will be influenced by a number of factors, operating in different directions. The expected slowdown in income growth and new macroprudential restrictions on consumer lending might slow down demand growth, while lower interest rates on housing loans and tax reliefs might have an opposite effect. At the same time, the increase in the tax on unused real estate could boost the supply of property in the market, reducing upward pressures on residential real estate prices.

Consumer optimism and robust growth of personal consumption support demand for consumer loans. Housing loans continued to trend up at stable and elevated rates, following the accelerated growth in real estate prices, while the number of newly granted loans in 2024

decreased from the year before. On the other hand, although the average value of non-housing loans remained unchanged, their number spiked, financially underpinning the increase in consumption. Some of these loans are used to finance expenditures arising from the purchase of a dwelling, so that around one fifth of housing loan users also take out non-housing loans within a short period of time. These loan users generally face a high total amount of debt, long repayment periods and low income, as well as more frequent problems with the repayment of their debts. More precisely, the share of non-performing loans is much lower in housing loans than in non-housing loans. Within the category of housing loans, this share is significantly lower in the case of consumers who do not also have non-housing loans.

In order to mitigate financial stability risks associated with rising household borrowing, the Croatian National Bank will limit consumer lending criteria from 1 July 2025. New macroprudential measures prescribe the maximum permissible debt-to-maturity ratios when granting new housing and non-housing loans to consumers. The aim is to prevent excessive easing of lending criteria and to strengthen the financial resilience of households to any possible adverse macroeconomic developments. In the current macroeconomic circumstances, the measures are expected to slightly slow down the growth of general-purpose cash loans and should not have a significant impact on housing lending. In view of the accelerated growth in personal consumption, these measures will also contribute to the easing of inflationary pressures associated with increased demand.

Lending to non-financial corporations accelerated amid falling interest rates and strong demand. For now, the good expected business results for 2024 and the fall in interest rates are alleviating the loan servicing burden for enterprises, while the improvement in business indicators for new clients additionally contributes to the reduction of credit risk for banks. However, due to growing uncertainty, risks to the operations of corporates are elevated, so any sudden shock can lead to operational delays and rising operating costs, and indirectly hamper the orderly servicing of debt.

Bank operations are characterised by persistently high profitability, even though it probably peaked last year, and low credit risk, but with an increasing accumulation of interest rate risk. The previous cuts in key ECB interest rates are likely to continue to be passed on to bank lending interest rates, reducing net interest income, the main source of profit growth in the previous few years, amid the already low cost of funding sources. At the same time, the several-year trend of longer average maturity of the loan portfolio, coupled with increasing number of loans granted at fixed interest rates, increased the maturity mismatch between assets and liabilities and led to a rise in interest rate risk. In addition, the increase in foreign assets has exacerbated banks' vulnerability to external shocks, while the increase in exposure to the government, especially through new investments in government bonds, has heightened their susceptibility to changes in fiscal position. All this could dampen interest margins and further reduce profitability in the event of sudden changes in financial markets, especially in the case of simultaneous rise in credit risks. In addition to these risks, banks are also exposed to some non-classical banking risks. Operational risks related to cybersecurity pose an increasing threat to banks and require additional investments in digital resilience and security infrastructure. At the same time, due

to its geographical characteristics, Croatia is exposed to growing physical climate risks such as floods, droughts and fires, while transition risks associated with the adaptation of the economy to climate objectives are currently decreasing, even though this trend might reverse if fossil fuel consumption continues to rise.

Amid elevated risks and heightened global uncertainty, the macroprudential policy of the Croatian National Bank remains focused on preserving the stability of the financial system by maintaining adequate capital buffer levels and applying other measures to mitigate systemic risks. Given the increasingly frequent and severe shocks that are not necessarily linked to the financial cycle, it is particularly important to strengthen the capital position of the banking sector pre-emptively and in a timely manner , in order to ensure the sector's resilience to such events. Owing to the previous build-up of capital buffers, domestic banks now have a substantial capital base that allows them to withstand even the potentially large losses related to extremely adverse macrofinancial scenarios. In addition, new macroprudential restrictions on consumer lending criteria constitute a structural and permanent component of the CNB's macroprudential policy and complement the capital-based macroprudential policy measures, jointly mitigating systemic risks to financial stability.

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I Risks to financial stability

A Macroeconomic environment

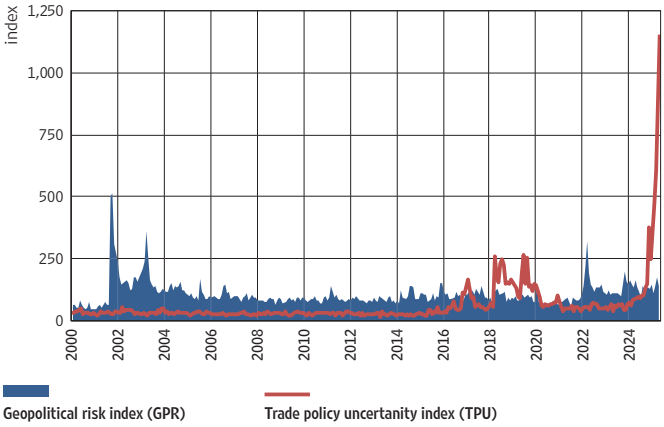
The rise in trade tensions, fuelled by sudden and significant changes in trade policies around the world, has spurred global apprehensions of a further escalation of the trade war and triggered heightened volatility in global financial markets. Against this background, the outlook for global economic growth has deteriorated. This, together with the possible fragmentation of world trade, is the most important source of risk to global financial stability. In the European context, the strengthening of protectionist trade barriers can lead to further industrial slowdown, increased trade costs and a slump in foreign demand, which increases risks for open economies that are strongly integrated into export chains, as Croatia is in the EU.

A.1 Risks in the international environment

A sharp shift in US foreign trade policy has increased risks to global financial stability. On 2 April 2025, the US administration announced a strategy of so-called "reciprocal" tariffs, with a base rate on imports of 10% and higher rates for some countries. These measures caused concern about the possible escalation of the trade war and a sharp increase in uncertainty regarding developments in trade policies in the world (Figure A.1), which, in addition to the continued wars in Ukraine and the Middle East, sparked global uncertainty (see Box 1 The effect of rising geopolitical uncertainties on financial stability). Although most of the higher "reciprocal" tariffs have been temporarily suspended for 90 days due to bilateral negotiations, the 10% base rate remains in place, along with the previously imposed tariffs on aluminium, steel and cars and tariffs on certain imports from Canada and Mexico. A further escalation of trade turmoil could further destabilise global economic relations in both the real and financial sectors, and increase risks, particularly in activities susceptible to disruptions in international supply chains and rising import costs.

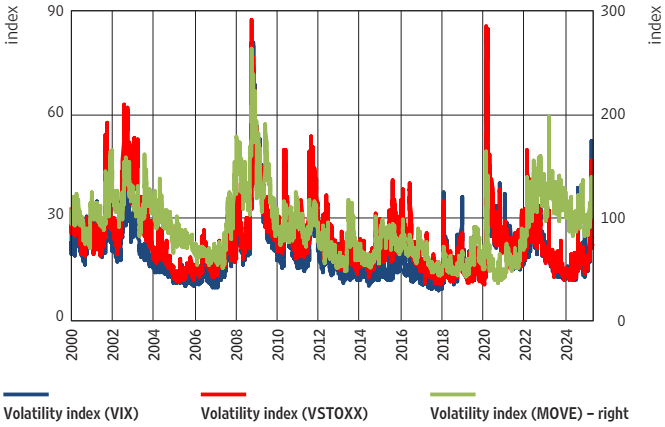
Rising uncertainty has spilled over to global financial markets, causing increased volatility and strong market shifts. After surging in 2024, leading global equity indices fell markedly in April 2025, with US and European equity market volatility indices reaching their highest levels since the start of the COVID-19 pandemic. However, such a reaction was temporary, and the equity market had largely recovered by early May, returning to end-March levels. Bond markets also experienced increased oscillations, reflecting increased risk perception and a slump in investor confidence (Figures A.2, A.3 and A.4). Such developments, coupled with a possible reorientation of international capital flows and an increased risk of currency and interest rate fluctuations, could adversely affect the balance sheets of financial institutions through a fall in portfolio values, an increase in financing costs and a reduced propensity to lend.

Figure A.1 Trade uncertainty and geopolitical turmoil are the most significant sources of risk to global financial stability



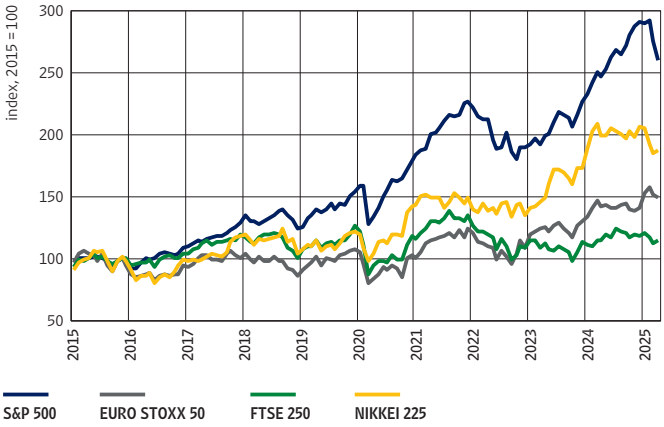
Notes: The geopolitical risk index reflects the results of an automated text-search of the electronic archives of ten newspapers (1985 – 2019 = 100). The trade policy uncertainty risk index reflects the results of an automated text-search of seven newspapers (100 = 1% of newspaper articles contains a reference to trade uncertainty).
Source: matteoiacoviello.com.

Figure A.2 Growing volatility in the capital market



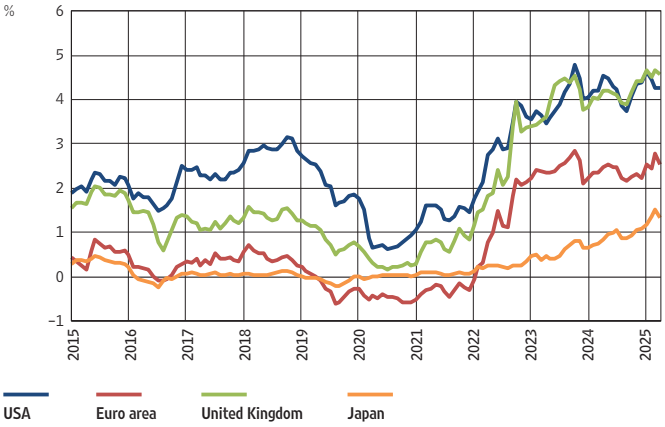
Notes: VIX is a measure of expected implicit volatility in the S&P500 options, while VSTOXX reflects the expected volatility extracted from EURO STOXX 50 options. The MOVE index measures the expected volatility in the US government bond market.
Source: Bloomberg.

Figure A.3 Sharp decline in leading global equity indices



Source: Bloomberg.

Figure A.4 Elevated uncertainty was also reflected in long-term bond yields



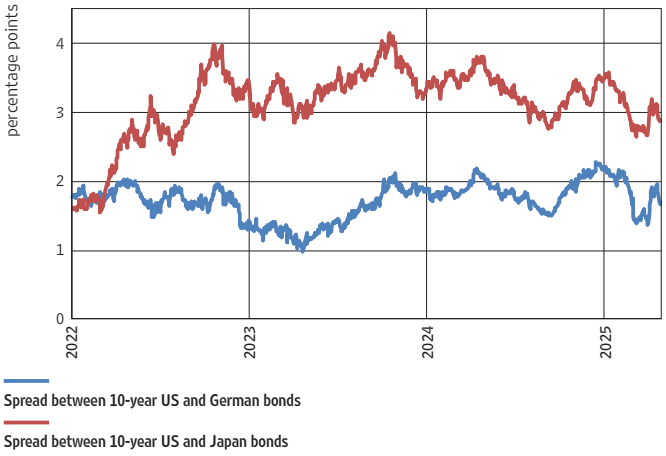
Source: Bloomberg.

Increased volatility reflects changes in risk perception and expected yields in markets and an increase in uncertainty about future economic and political developments in the USA. April 2025 saw a widening of yield spreads between 10-year US and German and US and Japanese government bonds (Figure A.5). Such trends can partly be attributed to the gradual closure of the so-called basis trade strategies[1], which increased pressures on the US government bond market, and were additionally spurred by the rise in uncertainty regarding US trade policy. At the same time, the strong depreciation of the US dollar against the basket of currencies of major trading partners in April (Figure A.6), including the depreciation against the Swiss franc, Japanese yen,

1 Basis trade strategy is a form of arbitration by which investors seek to take advantage of the difference between the price of a bond forward contract and the market price of the bonds.

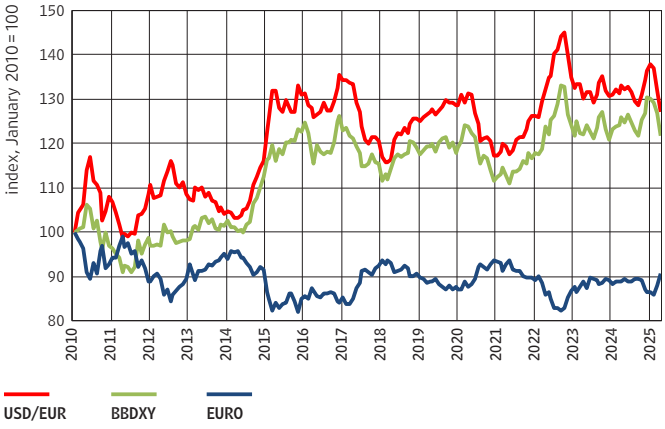
euro and pound sterling, raised questions about the status of the US dollar as the dominant "safe haven", but the slight recovery in May suggests that the market retained confidence in the US dollar as the dominant reference currency. Increased caution on the part of investors and a shift in risk perception also influenced the price of gold in the global market, which reached its historical peak in April.

Figure A.5 The yield spread between US and German (Japanese) long-term bonds has widened again



Source: Bloomberg.

Figure A.6 US dollar depreciated noticeably versus most other currencies



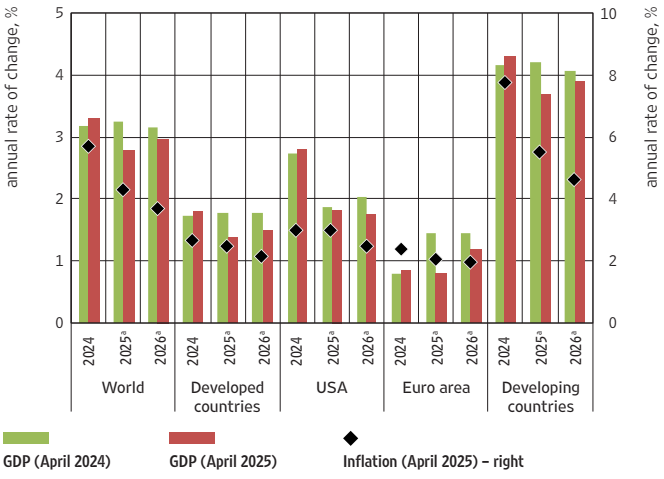
Notes: BBDXY (EURO) tracks the performance of the US dollar (euro) versus the basket of currencies of the major trading partners. The rise in the index suggests the appreciation of the US dollar (euro). USD/EUR tracks the performance of the euro against the US dollar, with the rise in the index indicating US dollar appreciation.
Source: Bloomberg.

Expectations for global economic growth have been revised down (Figure A.7). The US protectionist shift has increased geoeconomic fragmentation, which can have a negative impact on trade, investment and production integration. Trade tensions create regulatory uncertainty and reduce the private sector's propensity for long-term investment, which could undermine the efficiency of global resource allocation and weigh on potential economic growth. Uncertainty is further escalating ahead of the expiry of the 90-day suspension of "reciprocal" tariffs, and there is a possibility that major trading partners will impose retaliatory measures. This increases the risk of multilateral escalations and a further decline in the volume of world trade.

The European economy, integrated into global supply chains and oriented towards exports, is vulnerable to trade disruptions. Although economic growth in the euro area accelerated slightly in 2024 from the year before, expectations of stronger economic recovery this year have deteriorated. The manufacturing sector is weighed down by reduced demand and high input costs, especially energy costs, the still present pass-through of the effects of the last cycle of monetary policy tightening and challenges related to the slow implementation of new technologies. The strengthening of trade barriers poses an additional direct threat to the sector's recovery, which increases the risk of a deeper and more protracted industrial slowdown, especially in energy-intensive industries. Against this background, the level of economic sentiment in the euro area has continued to move much below its long-term average, with subdued expectations regarding future economic growth (Figure A.8). For small, open economies such as Croatia, strongly linked to the German, Italian and Austrian markets, such developments increase risk exposure.

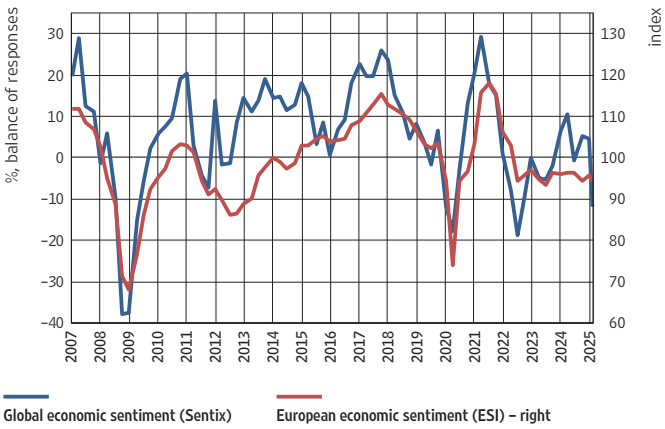
However, the possible favourable effects of a sudden reversal of US foreign trade policy on the EU and Croatia might partially buffer the negative repercussions. The withdrawal of the USA, that is, its reduced role in the global trade order, opens up space for the EU to become a more stable and secure global partner, which can lead to new trade linkages and inflows of capital to Europe. The reduced attractiveness of the US financial market might temporarily increase the demand for safe assets in the euro area, which could additionally lower funding costs, including for Croatia. Global trade fragmentation could foster a stronger development of the EU's internal market and strategic industries, especially in energy, technology and defence. On the other hand, rising global uncertainty weighs on investment sentiment and increases volatility, which might delay private sector investment decisions. Against this background, a credible and coordinated economic policy in the EU is key to preserving stability and trust.

Figure A.7 Expectations for global economic growth have been revised down



a Forecast
Source: IMF (WEO, April 2025 / April 2024).

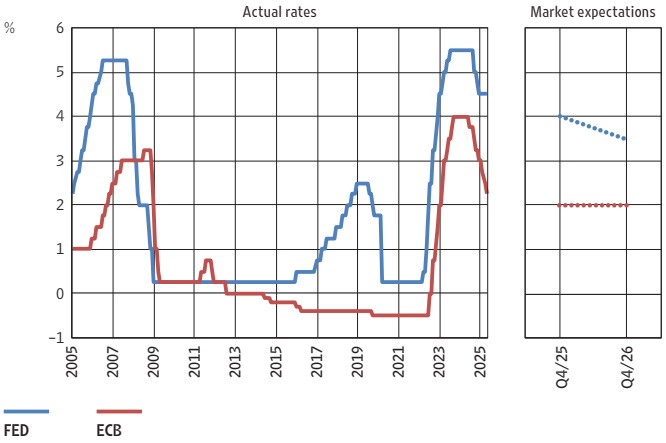
Figure A.8 Economic sentiment remains low



Notes: The sentiment indicator (Sentix) monitors investors' sentiment on a global level, their expectations and estimates of the current economic situation. It is based on a survey and its value may range between –100 and 100. Positive values point to a positive assessment of the economic situation and vice versa. ESI indicator monitors economic sentiment in the EU, where values above 100 point to economic sentiment better than the actual long-term average.
Sources: Bloomberg, European Commission.

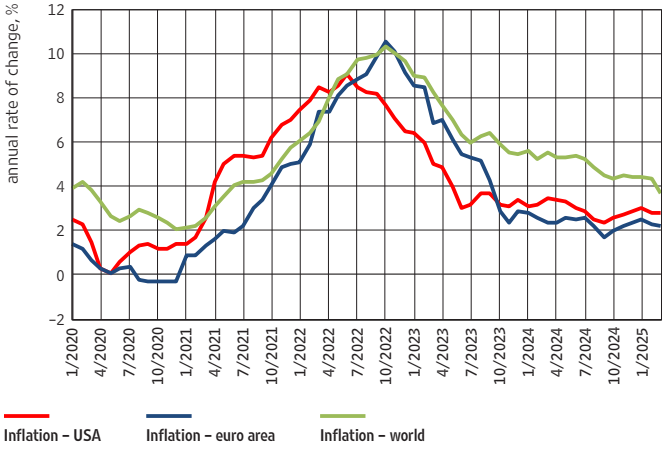
Elevated global uncertainty has further limited monetary policy manoeuvring room. In the last cycle of monetary easing, which started in 2024, the Fed reduced its benchmark rate three times, from 5.5% to 4.5% (upper bound), while the Governing Council of the ECB lowered the deposit facility rate (currently a relevant indicator of ECB monetary policy) seven times, from 4% to 2.25% (Figure A.9). Despite the continued downward trend in headline inflation, price pressures in the services sector remained pronounced, while headline inflation in both the USA and the euro area remained slightly above the 2% target (Figure A.10). The introduction of trade barriers further complicates the conditions in which monetary policy is implemented, as it operates through two opposite channels. On the one hand, trade barriers can slow down economic activity, which has a disinflationary impact and reduces the need to maintain a restrictive monetary framework. On the other hand, higher import costs may spur additional inflation pressures, which might delay the continuation of monetary easing.

Figure A.9 Monetary policy easing could be halted, depending on inflation dynamics and developments in other indicators



Notes: The figure shows the Fed's benchmark rate (upper bound) and the ECB's deposit facility rate. Market expectations are from April 2025.
Source: Bloomberg.

Figure A.10 Price pressures remain despite a slowdown in inflation



Source: Bloomberg.

A.2 Risks in the domestic environment

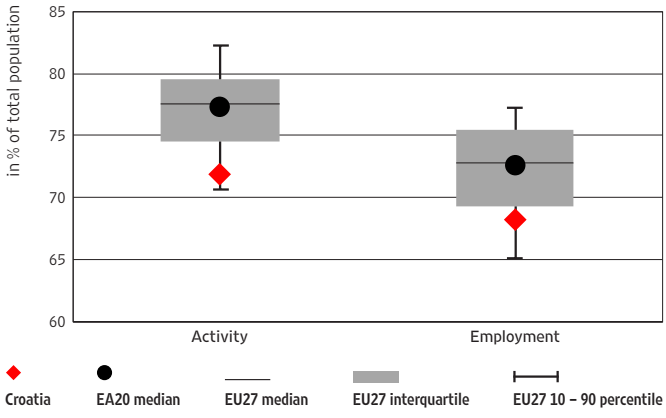
The main risks to financial stability stemming from the domestic macroeconomic environment are associated with the intensification of the financial cycle, with strong lending to households and the rise in residential real estate prices. Although improved macroeconomic conditions in the domestic environment, including the continued economic expansion and a robust labour market characterised by rising wages and employment growth, have had a stabilising effect, they have also encouraged strong lending to households and a further rise in prices in the real estate market (see Chapters B and C), which contributes to the accumulation of imbalances and can increase the vulnerability of the economy to potential shocks. In addition, strong construction activity, while supporting economic growth, increases banks' exposure to the construction sector, further concentrating cyclical risks associated with the real estate market. In such circumstances, in addition to the risks stemming from the rise in global trade tensions, especially through indirect channels such as a weaker economic activity in the main trading partners, the overall exposure of the system to systemic risks, although rising, is still assessed as moderately elevated.

Structural weaknesses of the domestic economy remain largely unchanged and mostly relate to deficiencies in the labour market. Although the unemployment rate in Croatia has remained at historically low levels and total employment is rising, both the employment rate and the activity rate are still among the lowest in the EU (Figure A.11). Structural gaps in the labour market are further manifested in a pronounced mismatch between labour supply and demand, mostly in sectoral and qualification determinants, which are also affected by adverse demographic trends. Such developments hamper the filling of vacant positions in some activities, reduce the efficiency of resource allocation and limit the growth potential of the Croatian economy in the long term.

Domestic economic growth prospects remain favourable, but risks stemming from developments in the international environment are increasing. Despite the weaker performance of the main trading partners and rising global uncertainty, the Croatian economy expanded at a robust pace in 2024, with Croatia being among top-performing EU member states. This was primarily due to strong domestic demand, stimulating fiscal policy and strong investment activity in the private sector (Figure A.12). However, although economic sentiment in Croatia still remains above its long-term average, early 2025 saw a mild deterioration, especially in trade and services, which might indicate that global trade tensions have started spilling over to Croatia (Figure A.13). Such trends, should they continue, could weigh on export activity, including tourism revenues, which would worsen the prospects for economic growth.

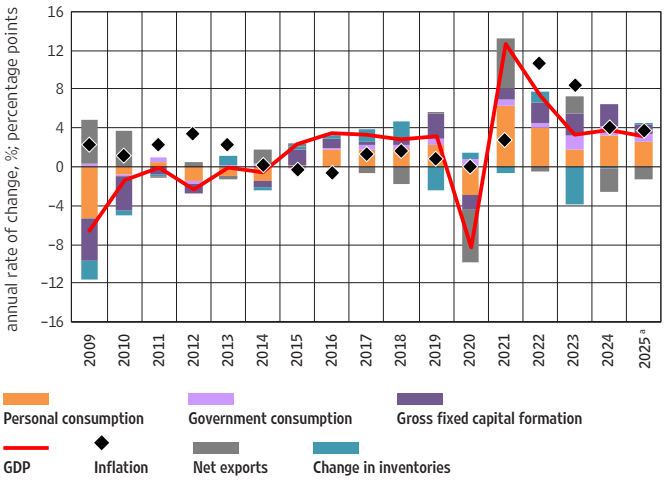
Inflation continued to abate gradually, while total inflation risks are assessed as balanced. The average annual inflation rate in 2024 fell by more than a half from the year before, but remained elevated in early 2025, affected by current inflation pressures in the services segment and by energy prices after the withdrawal of fiscal support (Figure A.14). Services, the main generator of inflation pressures, reflect strong domestic demand and continued wage growth, amid still favourable developments in the labour market. Geopolitical tensions, increased trade barriers and stronger than expected wage growth might slow down disinflation processes and, under a less favourable scenario, accelerate the growth of inflation. On the other hand, the weakening of economic activity or a further fall in energy prices might contribute to its further slowdown.

Figure A.11 Employment and activity rates are lower than in most EU member states



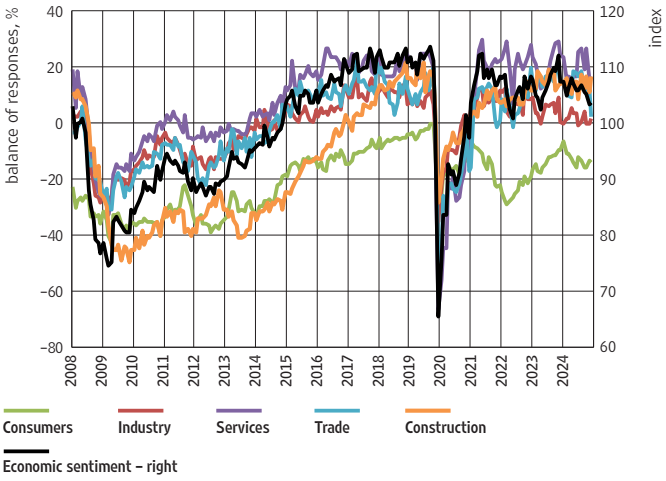
Note: The figure shows rates for 2024.
Source: Eurostat.

Figure A.12 A strong economic rebound continued in 2024



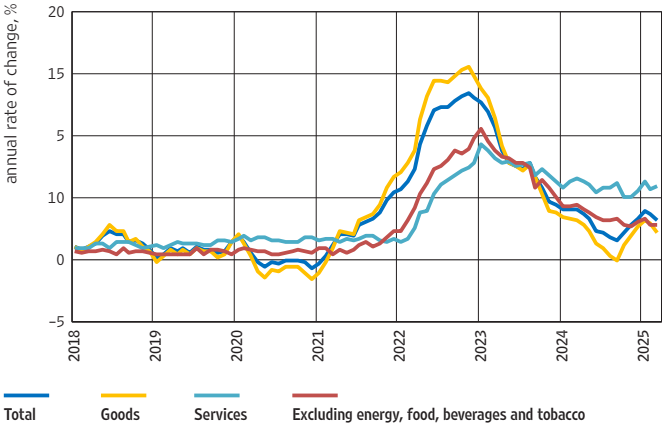
[a] CNB's forecast from March 2025.
Note: The figure shows contributions to GDP growth, the annual rates of change in real GDP and the average annual rates of change in the consumer price index (CPI).
Sources: CBS and CNB.

Figure A.13 A slight deterioration in economic sentiment in early 2025



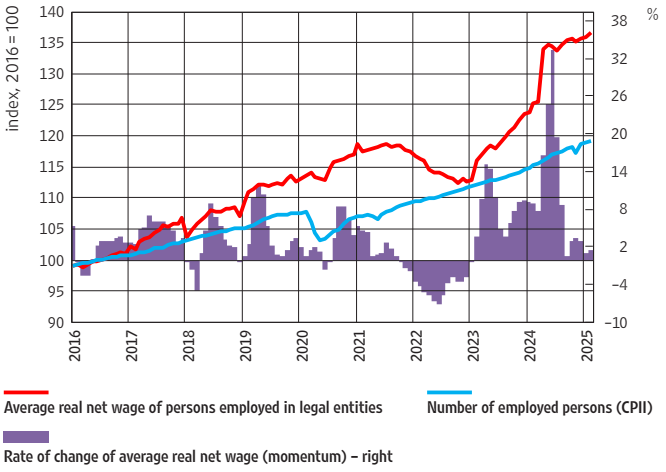
Source: European Commission.

Figure A.14 Rising service prices remain the main source of inflation pressures



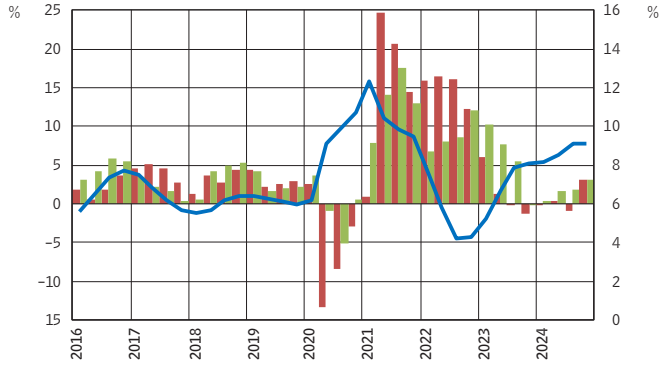
Note: The figure shows annual rates of change in the consumer price index (CPI).
Source: CNB.

Figure A.15 Real wages growth slowed down in the second half of 2024



Notes: Data are seasonally and calendar adjusted. The momentum refers to the quarterly rate of change, expressed at an annual level.
Sources: CBS, CNB and CPII.

Figure A.16 Savings rate remained elevated in 2024



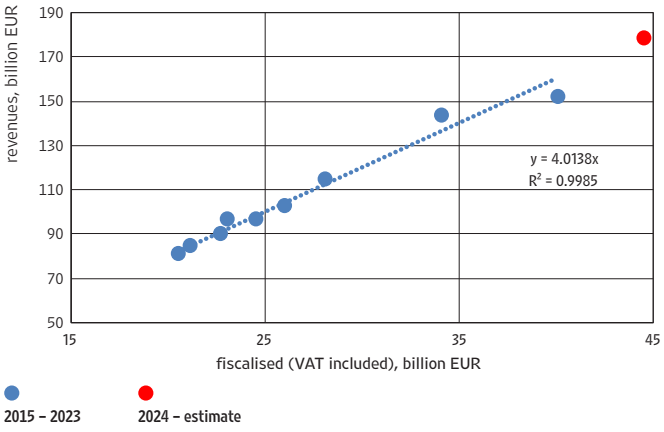
Notes: Quarterly disposable income values have been estimated using the Chow-Lin method and a series of employee compensation and gross operating surplus and mixed income as indicators. Official annual data on disposable income are available until 2023, while data for 2024 are estimated. The savings rate is calculated as the ratio of the moving annual sums of the estimated nominal amount of savings and estimated disposable income and excludes adjustments for changes in pension rights. Disposable income and final household consumption are deflated using the final consumption deflator and expressed in base prices in 2020.
Sources: Eurostat and CNB calculations.

The growth in household savings, driven by a robust labour market, contributes to the resilience of households. In addition to the continued employment growth in 2024, real wages also trended up and were 10% higher in December 2024 than in the same period of the previous year (Figure A.15). Wage growth was more pronounced in the first half of the year, mostly due to the reform of the public sector wage system. Although wage growth slowed down in the second half of the year, wages still remained at much higher levels than before, and wage growth is expected to continue in 2025 and 2026, albeit at a slower pace (see Macroeconomic Developments and Outlook No 17, section Macroeconomic variable projections). In view of the available estimates, which

suggest that the growth of disposable income outpaced the growth of final consumption in 2024, saving rates increased further and surpassed the pre-pandemic average (Figure A.16).

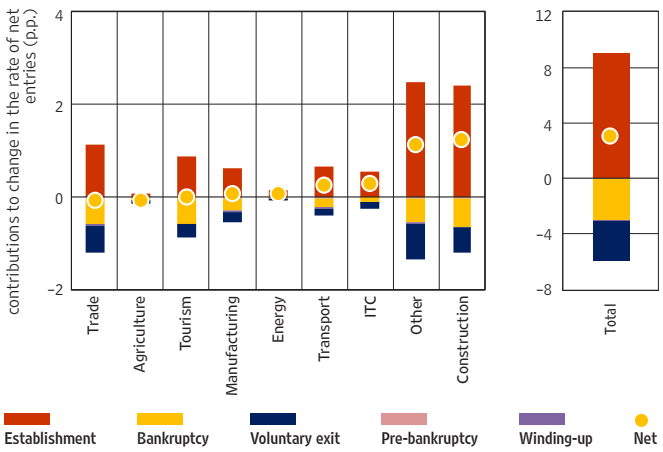
The continued strong expansion of economic activity has had a favourable effect on the operations of non-financial corporations. The business activity of non-financial corporations is estimated to have remained at a high level, as the amount of fiscalised receipts grew by about 11% in 2024 (Figure A.17). The favourable business environment was further supported by an increase in the number of start-ups (the net entries of enterprises grew by 3% in 2024[2]), with a more pronounced contribution from the construction and services sectors (Figure A.18). Growth in corporate income, coupled with a gradual fall in lending rates in the second half of the year, contributed to the reduction in the existing debt repayment burden (see Chapter C).

Figure A.17 Operating revenues of enterprises are estimated to have grown strongly in 2024



Sources: Tax Administration and CNB.

Figure A.18 The rise in the net entries of enterprises continued in 2024



Notes: The figure shows contributions to change in the rate of net entries of enterprises, which stood at 3% in 2024. The term Tourism represents accommodation and food services activities
Sources: CNB and Commercial Court Registry.

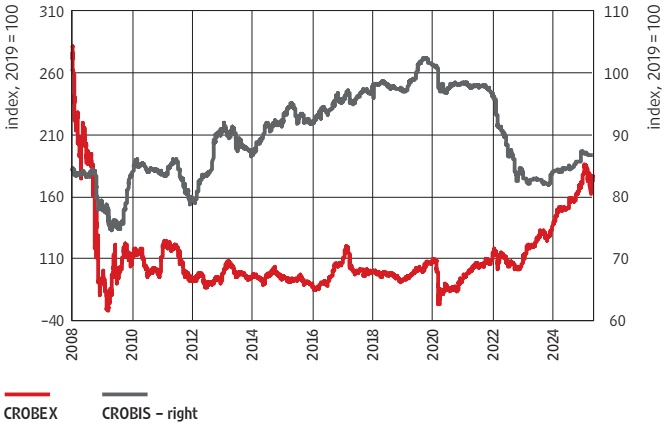
Although geopolitical turmoil and rising uncertainty have so far not affected corporate operations, volatility in the domestic equity market has increased slightly. Due to continued growth in economic activity, good business results and favourable investor sentiment, the value of the CROBEX continued to grow in 2024, and in October exceeded the level of 3,000 points for the first time since 2008 (Figure A.19). This trend reversed temporarily in early 2025, when, under the influence of heightened global uncertainty, the domestic equity market also sank noticeably. However, the value of the CROBEX recovered by mid-May. Structural weaknesses in the domestic equity market remained unchanged, characterised by the continued high concentration and low liquidity with a limited number of active issues and a small number of active investors.

The domestic bond and money markets remained stable despite heightened foreign risks, with a still low level of financial stress (Figure A.20). Amid strong demand for government bonds, the bond market remained stable, with a low risk premium and favourable borrowing

2 The net entries of enterprises are defined as the difference between entries (establishment) of enterprises and exits (bankruptcy, pre-bankruptcy, winding-up and voluntary exit) of enterprises from the market.

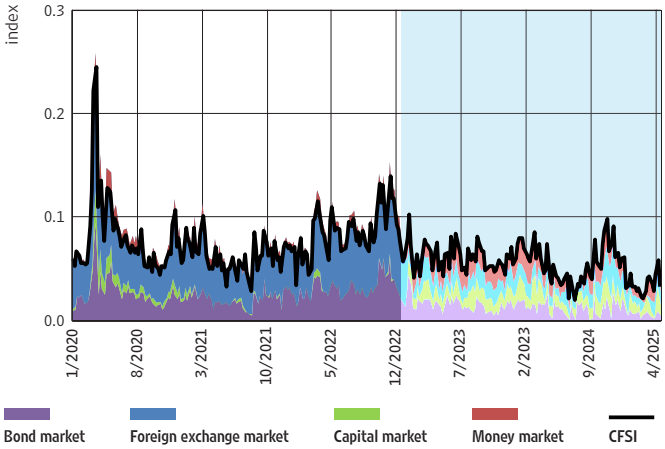
conditions (Table A.1). No major deviations were observed in the money market, with activity remaining low due to the limited need for interbank financing in the conditions of high system liquidity. Structural characteristics of domestic financial markets, such as low development, illiquidity and shallowness, may create an impression of stability in a period of reduced market activity. However, due to the connection with developments in international markets, they can result in increased volatility in the event of sudden changes.

Figure A.19 The value of the CROBEX fell temporarily in April, after more than two years of steady growth



Source: Zagreb Stock Exchange

Figure A. 20 The Croatian financial stress index held steady at low levels



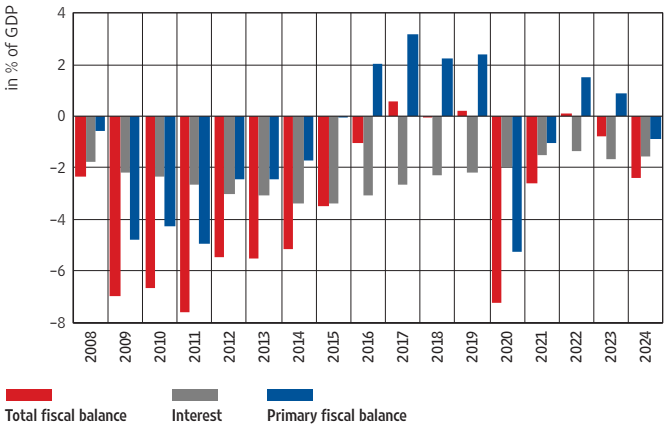
Notes: The old CFSI is shown for the period up to 31 December 2022. A new and revised CFSI (for methodology description see Financial stability No 24) is shown by the shaded area as of 1 January 2023.
Source: CNB.

The fiscal position reflects a deterioration in the general government balance, but also a continued decline in the public debt-to-GDP ratio. The general government balance deteriorated considerably over the previous year, with the decomposition of the balance pointing to a negative change in the structural primary balance, reflecting an expansionary fiscal impulse, with a slightly negative contribution from the cyclical component (Figure A.21). Nevertheless, the public debt-to-GDP ratio continued to decline, mainly due to the sharp rise in nominal GDP, and had fallen to levels below the Maastricht convergence criterion of 60% by the end of 2024 (Figure A.22). The maturity structure of public debt remained favourable, while the share of long-term debt with a variable interest rate in total long-term debt decreased slightly, further alleviating the sensitivity of debt to changes in market interest rates (Figure A.23). Long-term government bonds are still issued at a relatively low cost, reflecting Croatia's improved credit rating[3] and the still low level of country risk premium measured by credit default swap (CDS) (Figure A.24 and Table A.1). Fiscal challenges are mostly associated with the growth of budget expenditures, especially those related to public wages and pensions, but also of future defence expenditures. These challenges, together with the already high exposure of banks to the central

3 In September 2024, the S&P credit rating agency raised Croatia's long-term rating to A– with a positive outlook. The remaining two leading agencies also upgraded Croatia's rating to an equivalent level, with a stable outlook.

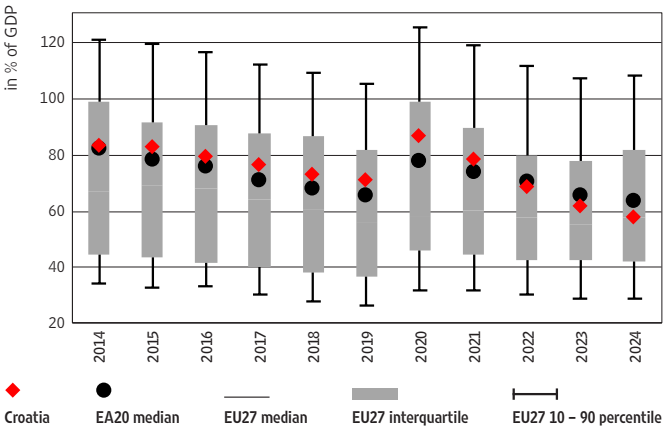
government, point to a pronounced risk of a banking-sovereign nexus, i.e. the risk of difficulties in the financial sector due to the weakening of the fiscal position of the government.

Figure A.21 General government balance deteriorated considerably in 2024



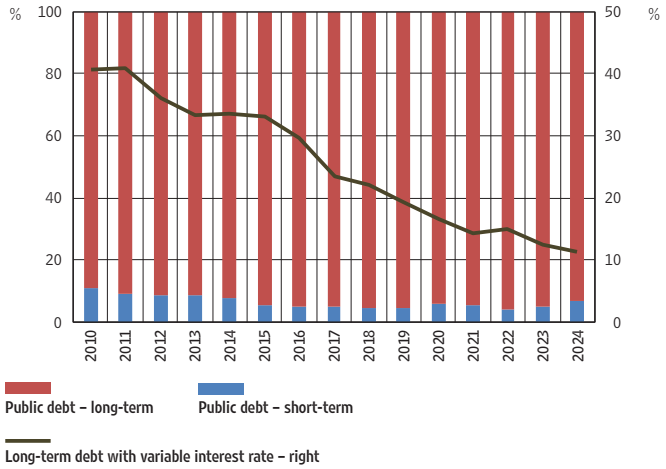
Source: CNB.

Figure A.22 Public debt-to-GDP ratio continued its downward trend



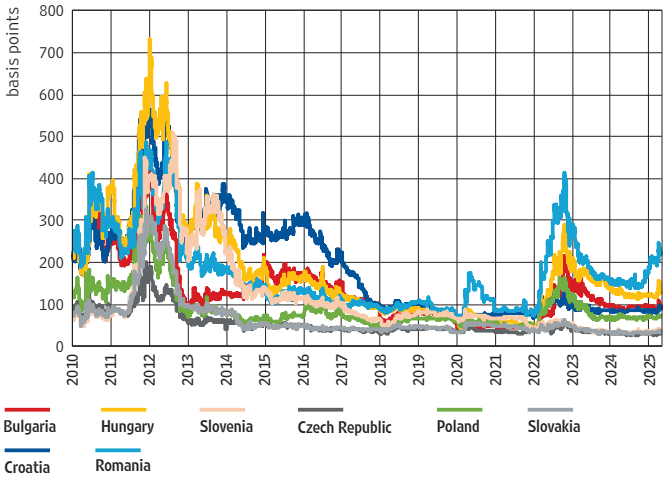
Source: Eurostat.

Figure A.23 The maturity and interest rate structure of public debt remained favourable



Source: CNB.

Figure A.24 Country's risk premium measured by CDS is low



Source: Bloomberg.

Table A.1 Matured and issued bonds in 2024 and the first months of 2025

Year	Matured bonds						Issued bonds					
	Amount	Currency	Interest rate	Date of issue	Date of maturity	Maturity in years	Amount	Currency	Interest rate	Date of issue	Date of maturity	Maturity in years
Domestic												
2024	1,400,000,000	EUR	5.750	10/7/2013	10/7/2024	11	1,250,000,000	EUR	3.500	12/7/2024	12/7/2034	10
	3,500,000,000	HRK	0.250	27/11/2019	27/11/2024	5						
2025	5,000,000,000	HRK	0.250	3/3/2020	3/3/2025	5	1,250,000,000	EUR	3.000	10/3/2025	10/3/2030	5
International												
2024	1,750,000,000	USD	6.000	26/11/2013	26/1/2024	10	1,500,000,000	EUR	3.375	12/3/2024	12/3/2034	10
2025	1,500,000,000	EUR	3.000	11/3/2015	11/3/2025	10	2,000,000,000	EUR	3.250	11/2/2025	11/2/2037	12

Note: The table shows bonds with a maturity of five years and more.
Source: Ministry of Finance.

Box 1
The effect of rising geopolitical uncertainties

Elevated geopolitical uncertainties seriously threaten global economic growth and financial stability. Conflicts, trade barriers and political tensions fuel geopolitical fragmentation, which includes weakening of international cooperation, shifting of supply chains and reduced trade and financial linkages. Geopolitical risks operate through three main channels: increased volatility in financial markets, negative impact on the real economy and security and operational threats. Since these risks are difficult to predict and quantify, their monitoring requires a combined approach, based on a broad set of indicators and expert knowledge. In this context, strengthening the resilience of the financial system through macroprudential tools, such as capital buffers, can play a key role in mitigating adverse effects and preserving stability amid high uncertainty.

Elevated geopolitical uncertainty poses a serious threat to global economic growth and the stability of the financial markets. In a world strongly interconnected by global trade, investment and international cooperation, geopolitical tensions are increasingly affecting economic and financial developments. Wars, trade barriers and political divisions have redefined global rules, bringing the uncertainty that slows economic growth and destabilises markets.

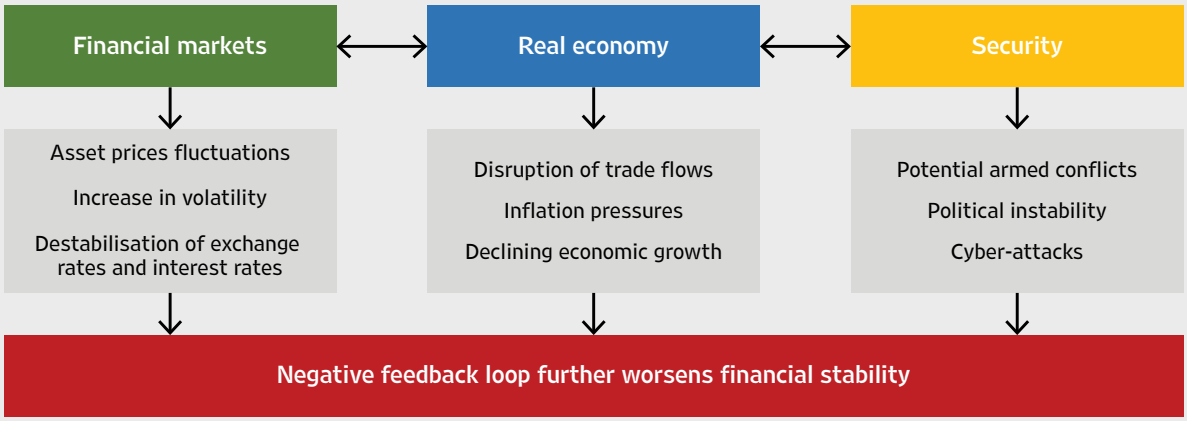
Global economic and financial cooperation faces challenges due to growing geopolitical fragmentation. This process manifests itself through the reduction of trade links, the relocation of supply chains within national borders or towards friendly countries, the politicisation of international investment and a stronger use of "regional" currencies. This long-term trend, which is not only a consequence of transient geopolitical crises, leads to the weakening of international cooperation and stability, which increases uncertainty in the global economy. This process also encourages countries and regions to strengthen control over economic and financial flows, which may further increase geopolitical uncertainty and challenges to global stability.

The impact of geopolitical tensions on financial stability is transmitted through three interlinked channels[1]: financial markets, the real economy and security concerns. In financial markets, tensions cause bouts of volatility, changes in asset prices and instability of capital flows, exchange rates and interest rates. These trends can have an additional negative impact on the real economy, which is also directly affected by geopolitical uncertainties that distort trade flows, fuel inflationary pressures and weigh on economic growth, with a negative impact on investments, consumption and savings. In terms of security and operational risks, armed conflicts, political instability and cyberattacks can threaten financial infrastructure, cause service disruptions and increase the overall vulnerability of the financial system. These channels are intertwined and can

1 For more information, see Dieckelmann, D., et al. "Turbulent Times: Geopolitical Risk and Its Impact on Euro Area Financial Stability" Financial Stability Review, European Central Bank, May 2024, Special Feature A.:
Buch, C. (2024). "Global rifts and financial shifts: Supervising banks in an era of geopolitical instability", 8th ESRB annual conference on "New Frontiers in Macroprudential Policy"

generate a negative feedback loop, which further amplifies threats to financial stability and worsens macroeconomic conditions.

Figure 1 Channels through which geopolitical uncertainties affect financial stability



Source: CNB.

The complexity and severity of these threats call for systematic monitoring of geopolitical risk. The mentioned risks include political, economic, military and social threats arising from international relations and changes in the global balance of power. They tend to build up during major conflicts and crises. In the light of the process of globalisation in recent decades, economies and societies have become more connected, and local uncertainties now more easily and quickly spill over into global disruptions, making the international system more vulnerable. Therefore, the ability to accurately measure and understand these threats has become crucial for making informed decisions. However, geopolitical risks differ from traditional risks as they cannot be easily calculated using standard methods. They are unpredictable in terms of probability and consequences, and they arise outside the financial system. Unlike traditional risks, which are based on historical data and economic indicators, geopolitical risks are hard to model and quantify.

The most widespread indicator used in measuring geopolitical risk is the geopolitical risk index, developed by Caldare and Iacoviella (2022)[2]. This index (GPR index, see Figure A.1) is based on an analysis of the frequency of news reports on geopolitical events, but has its limitations. Reliance on Anglo-Saxon sources of information can lead to media bias, while a delay in reacting to real events reduces its predictive value. In addition, all geopolitical events are treated in the index as if they were equally disruptive, regardless of their real severity, which can result in a distorted assessment of overall risks.

By combining different sources of information into more comprehensive indicators, it is possible to get a more complete picture of geopolitical risks. In order to compensate for the limitations of the GPR index, it is necessary to include in the analysis a set of additional indicators that combine information and analytical data from different sources. These include BlackRock's

2 Caldara, Dario and Matteo Iacoviello (2022), "Measuring Geopolitical Risk," American Economic Review, April, 112(4), pp. 1194-1225.

Geopolitical Risk Indicator (BGRI), which combines data from news sources with market developments and investment sentiment, and the World Uncertainty Index (WUI), which measures the total level of global economic uncertainty in political and economic discourse based on a language analysis. Unlike indices such as GPR and BGRI, which focus only on geopolitical risks, WUI has a broader scope as it includes a broader scope of uncertainty and is not limited to geopolitical sources only. Also, companies like Coface: Country Risk Barometer and S&P Capital IQCountry Risk Ratings provide country risk scores that also include political stability, conflict risks and regulatory uncertainties. These indicators take into account factors such as internal political tensions, election cycles, the risk of violent conflict and possible legislative changes that may affect the investment and business environment. For a more detailed assessment of security and military threats, specialised indicators are used, such as the Global Conflict Risk Index (GCRI) and the Global Militarization Index (GMI), which quantify the level of military tensions and risks of escalation of conflicts through indicators such as military mobilisation, territorial disputes, engagement in military alliances and the level of military expenditures.

Managing geopolitical risks requires an approach that goes beyond traditional analytical frameworks. Methods should be developed that capture predictable challenges, as well as risks that emerge outside standard analytical scenarios. Since it is difficult to precisely determine the form and intensity of their effects in advance, approaches based on the development of multiple alternative potential scenarios are used. Such scenarios allow for a better understanding of possible directions in which crises might develop, help to identify vulnerabilities within the financial system and facilitate timely decision-making amid elevated uncertainty.

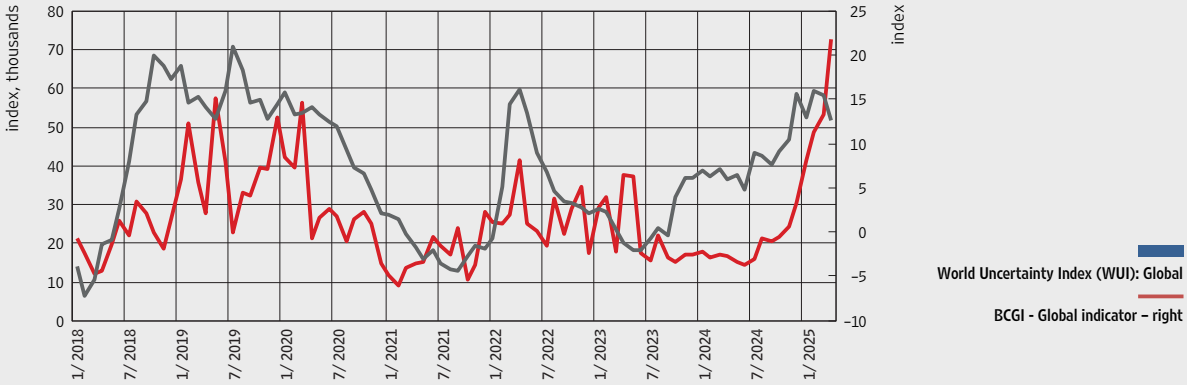
The effects of geopolitical risks on financial stability can be mitigated by strengthening banks' resilience to unforeseen shocks in a timely manner, with macroprudential policy instruments playing a key role. A precautionary build-up of capital and liquidity buffers allows shocks to be absorbed more easily, with less need for additional central bank or government interventions. Capital buffers set at the level of the banking system as a whole are particularly appropriate, as they are commensurate with the geopolitical risks that can affect a large number of banks at the same time. Such widely-used instruments include the systemic risk buffer and the countercyclical capital buffer, which can be calibrated in such a way that, in addition to the current macrofinancial vulnerabilities, they also take into account geopolitical risks, uncertainty and potential future shocks. One of the ways in which a countercyclical buffer can be applied pre-emptively and regardless of the level of cyclical risks is through a positive neutral rate (see Box 6 Early resilience building: the countercyclical capital buffer), which allows for a better management of uncertainty and a proactive response to a wide range of threats to financial stability. In addition, some EU member states, including Croatia, cover elevated geopolitical risks and the resulting uncertainty, in addition to other risk factors, with a systemic risk buffer.

Table 1 Additional indicators of geopolitical risks

Indicator	Description	Source
Geopolitical Risk Indicator (BGRI)	Combines news reports, market data and investment sentiment analysis.	BlackRock
World Uncertainty Index (WUI)	Measures the level of uncertainty in political and economic rhetoric by analysing economic reports.	NBER
Coface (Country Risk Barometer)	Assesses country risk by observing political stability, conflict risk and regulatory threats.	Coface
S&P Capital IQ (Country Risk Ratings)	Establishes country scores by analysing political stability, conflict risks and legislative threats.	S&P Global
Global Conflict Risk Index (GCRI)	Assesses the risk of conflicts in regions, including military mobilisations and political tensions.	European Commission (JRC)
Global Militarization Index (GMI)	Measures the level of militarisation by observing military spending, military equipment and the number of soldiers in relation to the population.	Bonn International Center for Conversion (BICC)

Source: CNB's analysis.

Figure 2 Various geopolitical risk indicators are relatively harmonised



Notes: The World Uncertainty Index (WUI) is calculated based on the share of the word "uncertain" (and its variations) in the Economist Intelligence Unit (EIU) country reports. This share is then multiplied by 1,000,000 for ease of reference. The BlackRock Geopolitical Risk Indicator (BGRI) tracks the relative frequency of brokerage reports (via the Refinitiv platform) and financial news (Dow Jones News) related to specific geopolitical risks. Quantitative analysis is accompanied by a sentiment analysis, to determine whether the tone of the content is positive or negative. On this basis, each risk is assigned a score that reflects the level of market attention, compared to a five-year historical average.

Sources: BlackRock Investment Institute, worlduncertaintyindex.com.

B Risks in the real estate market

The number of real estate purchase transactions stabilised in 2024 and the growth of residential real estate prices slowed down slightly, although they continued to grow more strongly than in other EU member states. The commercial real estate market continues to be characterised by high demand and limited supply, underpinning the rise in prices and low vacancy rates. Construction activity in Croatia has continued its strong upward trend, spurred by robust domestic demand and increased optimism, which might slightly alleviate upward pressures on residential real estate prices. On the other hand, the decrease in interest rates could support the rise in prices, boosting domestic and foreign demand. Changes in housing policy will also affect market prospects, with tax reliefs supporting demand and tax on unused properties boosting supply.

B.1 Residential real estate market

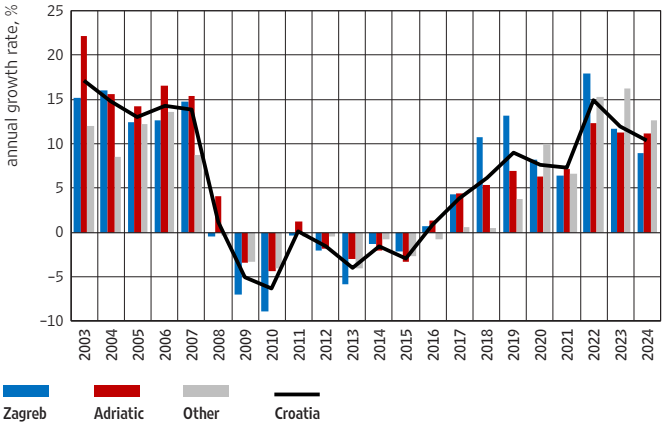
House price growth slowed down slightly in 2024, from an elevated level. Robust economic growth and strong wage growth supported demand for residential real estate, so that in 2024, their prices rose by 10.4% on average, slightly less than the 11.9% of 2023 (Figure B.1). On an annual level, residential real estate prices grew more slowly in all regions, mostly in the City of Zagreb and the rest of Croatia, while on the Adriatic coast the slowdown in growth was less pronounced. A rise in asking prices for real estate on property listing websites[4] suggests a continued strong growth in realised prices in the first half of 2025.

The recovery in demand in an environment of supportive financing conditions spurred a resurgence in residential real estate prices in the European Union as well. After falling by a slight 0.3% in 2023, real estate prices in the European Union rose by an average of 3.3% in 2024 (see Figure B.2). However, heterogeneity across countries remains high, with prices continuing to fall in North-Western Europe, which is attributable to the worsening economic outlook. On the other hand, in addition to Croatia, very strong increases in prices were recorded in Bulgaria, Poland and Hungary.

The number of purchase and sale transactions stabilised in 2024 after two consecutive years of decline, while their total value continued to rise. Having fallen by 6.3% in 2023, the number of residential real estate purchases stabilised in 2024, at a level down 12.5% from the levels recorded in 2021 (Figure B.3). Market activity continued to decline in Zagreb and on the Adriatic coast, while it increased in the rest of the country. At the same time, the total value of residential real estate purchases continued to grow, spurred by the increase in prices, at an annual rate of 11.8%, which is slightly faster than in the previous year (3.9%).

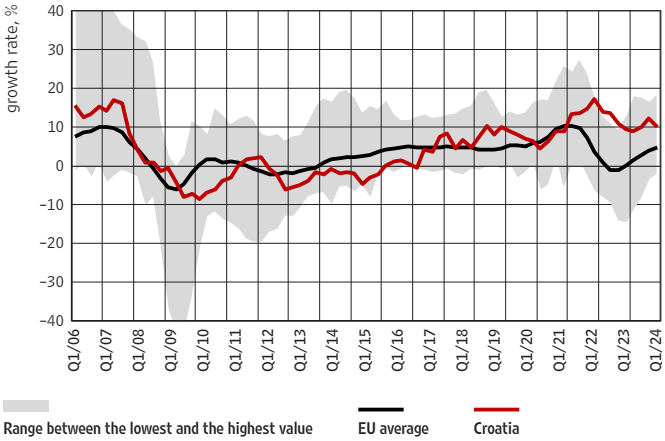
4 The asking price index was constructed according to data obtained from www.njuskalo.hr. The asking price index was assessed by applying the hedonic regression approach, in which the logarithm of the listed residential property price is explained by real estate characteristics and time effects, which represent the part of the price not related to real estate characteristics, which allows for a direct comparison. For more details on hedonic regression, see Surveys S-37 – D. Kunovac and K. Kotarac (2019): Residential Property Prices in Croatia.

Figure B.1 Despite a slowdown, residential real estate prices in Croatia continued to rise steeply



Note: For details on the construction of the nominal index, see Kunovac and Kotarac (2019): Residential property prices in Croatia.
Source: CBS.

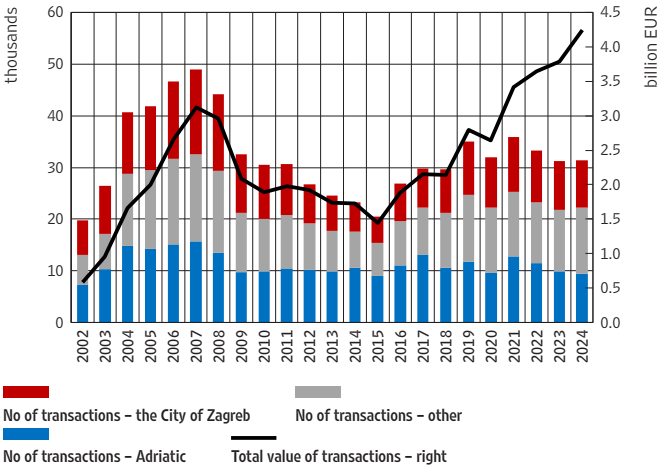
Figure B.2 Croatia is among the top EU member states in terms of the increase in residential real estate prices



Note: Grey shaded area represents the range between the lowest and the highest value of annual rates of change of residential real estate prices in EU member states.
Source: Eurostat.

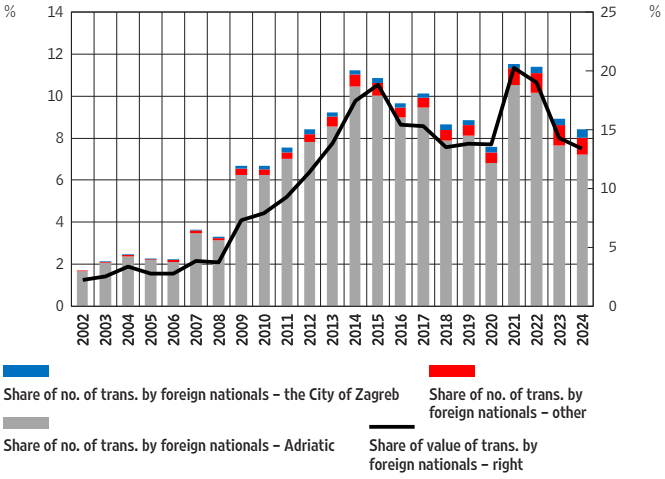
Activity of non-residents in the Croatian real estate market continued to decline, but at a much slower pace than in previous years. The number of purchases by non-resident buyers went down by around 5%. On the Adriatic coast, where foreign demand is the most pronounced, the number of purchases also decreased by about 5%, which is significantly less than the drop of 30% in 2023. Accordingly, the share of purchases by non-residents in the total number of purchases also continued to decrease, standing at 7.2% in 2024 in terms of the number of transactions, or 13.4% in terms of the total value (Figure B.4).

Figure B.3 The decline in the number of transactions stopped, while their total value continued to grow



Source: Tax Administration database.

Figure B.4 The share of non-resident buyers continued to fall in parallel with the decline in the number of purchases on the Adriatic coast

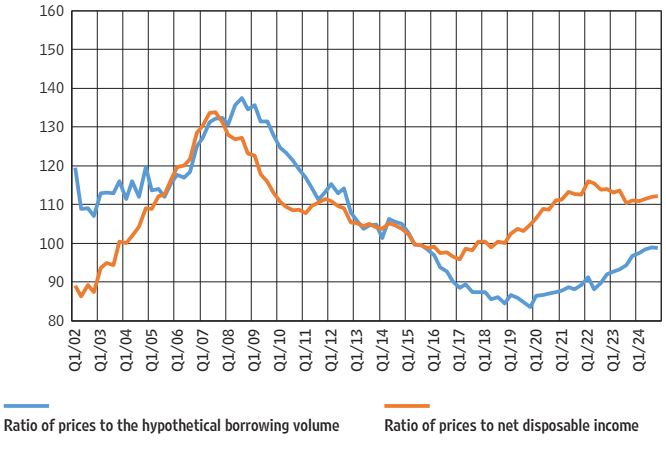


Sources: Tax Administration database and Eurostat.

A strong growth of residential real estate prices in the domestic market did not significantly change the aggregate indicators of their affordability. The several-year downward trend in

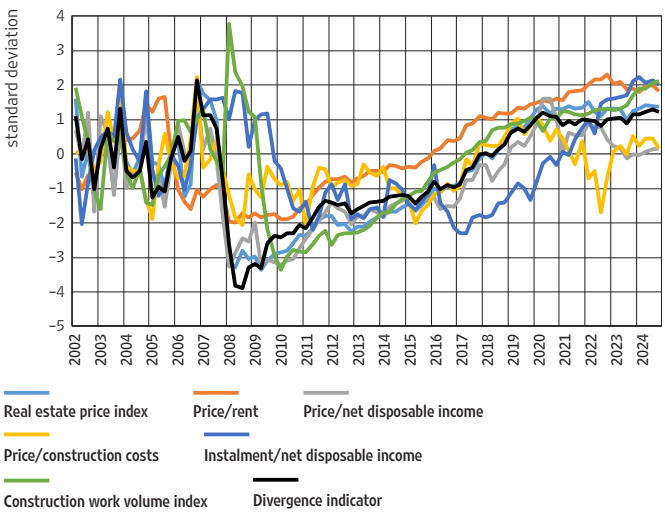
housing affordability came to a halt in 2023 because the net disposable income grew faster than real estate prices, while their relatively stable ratio remained unchanged in 2024 (Figure B.5). However, due to the rise in interest rates, loan-financed affordability declined further until mid-2024, as higher borrowing costs limited the available volume of loans[5] relative to market prices, after which the ratio stabilised. The reduction in interest rates on housing loans that started in early 2025 will have a favourable impact on loan affordability. At the same time, income growth has decelerated, so that the rise in real estate prices will likely have a decisive influence on the affordability indicators in 2025 too.

Figure B.5 Housing affordability did not change significantly in 2024



Note: Ratio of real estate price to the hypothetical borrowing volume has been calculated in line with Hertich, M. (2019): https://www.bundesbank.de/en/publications/research/discussion-papers/a-novel-housing-price-misalignment-indicatorfor-germany-806946
Sources: CBS, Eurostat and CNB.

Figure B.6 Residential real estate prices are rising faster than most of their fundamentals



Notes: The figure shows standardised cyclical components of various indicators relevant for the developments in real estate prices obtained using a one-sided recursive Hodrick-Prescott filter (λ = 400,000) included in the composite divergence indicator. The construction work volume index refers to buildings
Sources: CBS, Tax Administration, Eurostat and CNB.

The residential real estate market in Croatia has remained in an expansionary phase, with a relatively high price rise relative to most macroeconomic determinants. The debt service-to-income ratio remains elevated, but its decrease could be spurred by lower financing costs, while the intensive growth in construction activity contributes to the alleviation of price pressures (Figure B.6). Despite rising rates of growth of residential real estate rental prices in 2024, they are still growing at a slower pace than real estate prices. The decrease in interest rates on housing loans, started in early 2025, could boost domestic demand and thus strengthen upward price pressures. The recovery of demand in European real estate markets, driven by more favourable financing conditions, suggests the possibility of a recovery in foreign demand and demand for domestic real estate. Finally, the new housing policy measures will also affect the residential real estate market, with property tax exemptions and tax refunds for real estate purchase of newly built buildings for younger clients spurring demand, and the introduction of the real estate tax

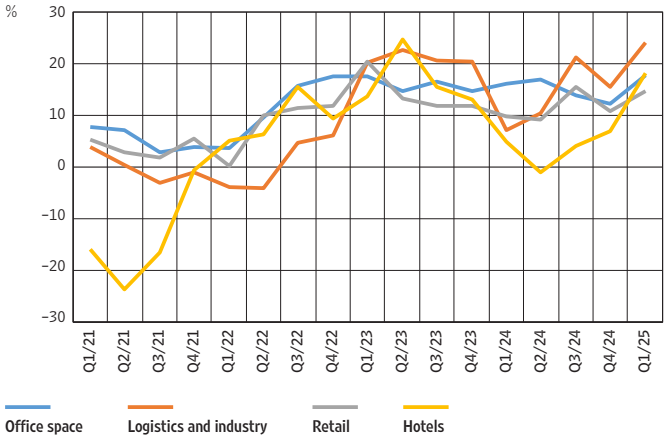
5 The maximum loan amount households with average incomes could get for the purchase of residential property of 50 square metres under the given market conditions.

possibly strengthening the supply of currently unused residential real estate properties. However, the continued rapid growth of prices relative to macroeconomic determinants increases the likelihood of the materialisation of the risk of falling prices, especially in the context of a potential deterioration in macroeconomic conditions and a stronger spillover of adverse geopolitical events to domestic economic developments.

B.2 Commercial real estate market

Commercial real estate asking prices have continued to grow at an elevated rate. Data from property-listing websites, which include all types of real estate in Croatia, point in particular to an acceleration in the growth of real estate prices in the segment of logistics and industrial space and in the segment of hotel accommodation (Figure B.7). The increase in asking prices of office and retail spaces has been stable for a long time at a level of above 10%, which is, among other things, the result of the constrained supply of such space. Regulatory changes[6] allowing pension funds to invest more in commercial real estate in Croatia as of early 2024 have the potential to further boost market demand and contribute to additional upward pressure on prices.

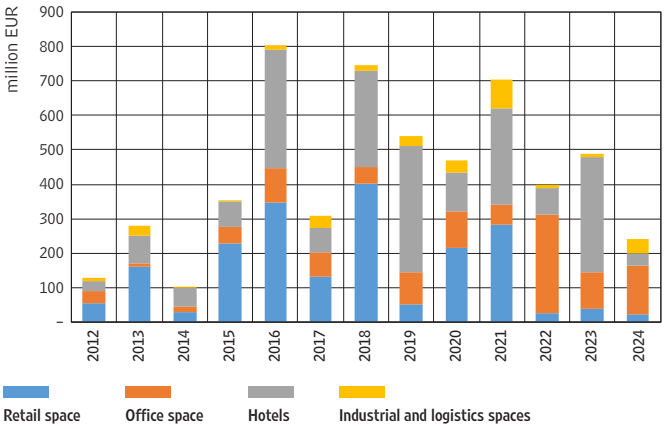
Figure B.7 Commercial real estate asking prices on property listing websites have continued to grow



Notes: Asking prices of commercial real estate on property-listing websites relate to a wider sample of real estate than the data collected from real estate agencies. In addition to prime real estate, they also include commercial premises in other segments and in various locations in Croatia

Sources: CNB calculations and Njuškalo.

Figure B.8 Decrease in the number of transactions in the commercial real estate market



Note: The assessment does not cover total transactions but only investment deals, and does not include investments in construction.

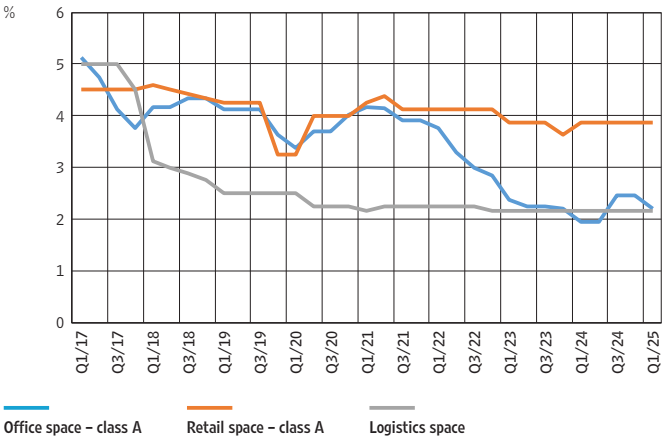
Source: Colliers.

Although the total value of transactions in the commercial real estate market decreased in 2024, it increased noticeably in the office space segment. According to available estimates by an agency (Figure B.8), total commercial real estate turnover halved in 2024 relative to 2023, which reflects a slump in activity in the segment of hotels and retail space. At the same time, investment activity in the segment of office, industrial and logistics space increased. Due to the very shallow commercial real estate market in Croatia, the decline in the volume of transactions

6 Act on Amendments to the Mandatory Pension Funds Act, Ordinance on permitted investments and additional investment limitations relating to mandatory pension funds

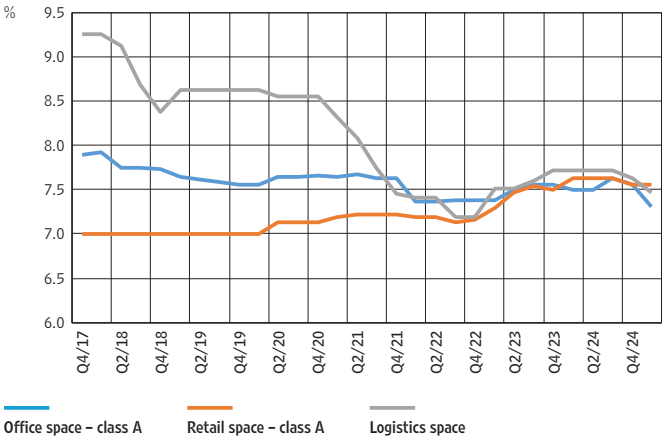
does not necessarily point to a fall in demand but to constrained supply in the mentioned market segments.

Figure B.9 A drop in the vacancy rate points to a limited supply of commercial premises



Note: Data refer to the City of Zagreb and its surroundings.
Sources: CBRE, Colliers and CW CBS International.

Figure B.10 Yields in the market of prime commercial premises



Note: Data refer to the City of Zagreb and its surroundings.
Sources: CBRE, Colliers and CW CBS International.

Prime commercial real estate market is still marked by robust demand and constrained supply. According to data obtained from real estate agencies, the vacancy rate held steady in the segment of logistics and prime retail spaces, while the availability of prime office space stabilised at a low level, following a significant decrease in the post-pandemic years (Figure B.9). The vacancy rate in the segments of prime office space and logistics space still stands at around 2%, while the availability of retail space is somewhat higher.

At the beginning of 2025, yields on investments in prime commercial real estate edged down, under the influence of a slow growth in rents relative to growth in the value of commercial real estate. The fall in yields was more pronounced in the segments of office and logistics space, while it was somewhat more moderate in the segment of retail space (Figure B.10). Although the market is characterised by strong demand and limited supply, rents of commercial premises in prime locations grew moderately in the same period.

The commercial real estate market is still in the upward phase of the cycle, but remains vulnerable to possible sudden changes. Low vacancy rates of office space and a moderate increase in rents in all segments signal a favourable outlook for the sector. However, due to the relative shallowness and low liquidity of the market, it remains vulnerable to sudden shocks, which could disrupt the operations of companies exposed to this market and potentially cause a significant fall in commercial real estate prices.

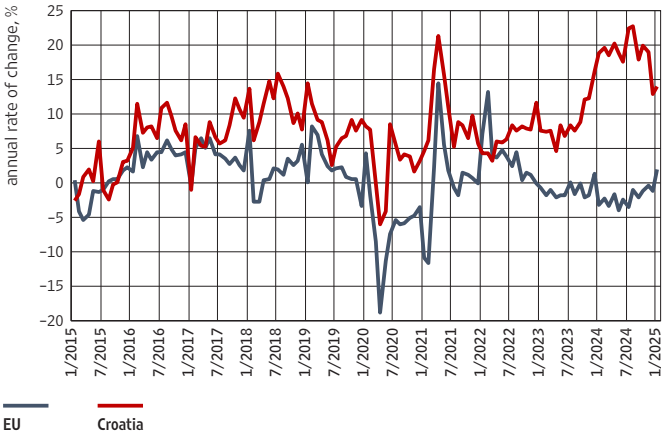
B.3 Activities related to the real estate market

Construction activity in Croatia has continued to grow at very high rates, driven by robust domestic demand and strong optimism. The growth in the volume of construction works in Croatia accelerated sharply in 2024, to 19.1% from 8.9% in 2023. On the other hand, construction

activity in the EU, after a slight decrease in the mentioned period, only started to recover slightly in early 2025 (Figure B.11). Business confidence indicators for domestic construction remained well above their long-term average, supporting increased construction activity.

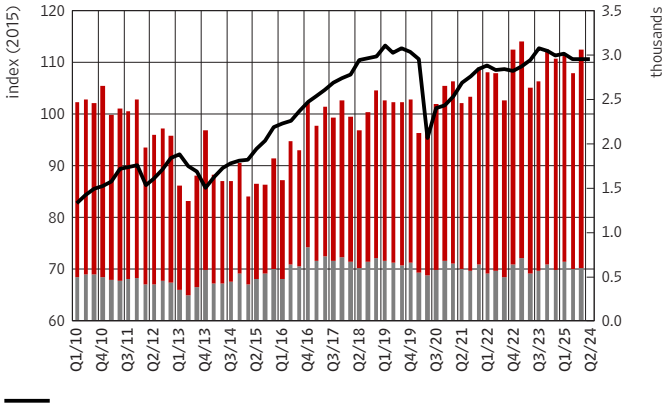
In addition to the ongoing activities related to post-earthquake reconstruction, construction of new buildings also increased, with a rise in the number of issued building permits. Although the rise in the volume of construction works can partly be attributed to post-earthquake reconstruction, the number of reconstruction permits remained stable. On the other hand, the increase in the number of building permits for the construction of new real estate points to the continued strengthening of construction activity, which might somewhat alleviate upward pressures on residential real estate prices (Figure B.12).

Figure B.11 Construction activity in Croatia accelerated strongly, in contrast to the EU, where the decline stopped only at the beginning of 2025



Note: The figure shows the annual rate of change in the volume index of construction works (buildings).
Sources: Eurostat and CBS.

Figure B.12 The number of issued building permits has continued to grow

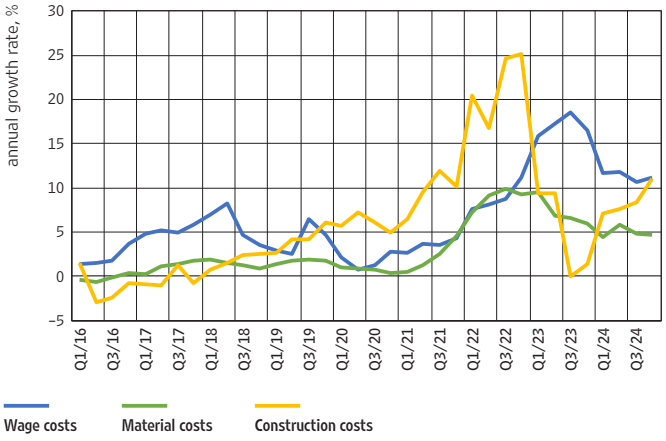


Source: CBS.

Although the rise in the construction costs of new buildings slowed down slightly, it is still much steeper than in the pre-pandemic period. The growth in the prices of construction materials continued to slow down slightly after the sharp post-pandemic jump caused by logistical disruptions (Figure B.13). At the same time, the rise in labour costs also continued to decelerate, although they remained high amid persistent labour shortages and robust wage growth.

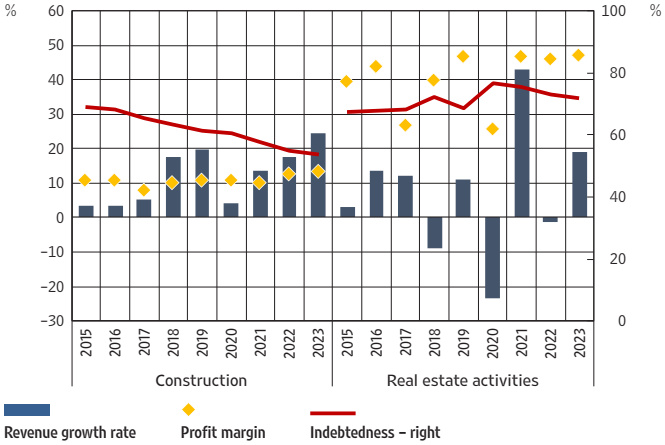
Strong growth in real estate prices had a favourable impact on corporate business performance in activities related to real estate (Figure B.14). In recent years, enterprises in the construction sector have recorded a steady growth in income, with stable profit margins at the level of 13%, and have managed to reduce their debts. On the other hand, real estate companies have much more volatile operating revenues but also higher profit margins, and are considerably more dependent on external financing, which makes them more vulnerable to possible changes in the real estate market cycle.

Figure B.13 Cost pressures have continued to rise more strongly than in the pre-pandemic period



Source: CBS.

Figure B.14 The price increase was reflected in satisfactory business results in construction



Notes: Profit margin refers to EBITDA margin, that is, the ratio of earnings before interest, taxes, depreciation and amortisation and revenue. Indebtedness refers to the ratio of total debt (sum of short-term and long-term liabilities) to total assets.
Source: FINA.

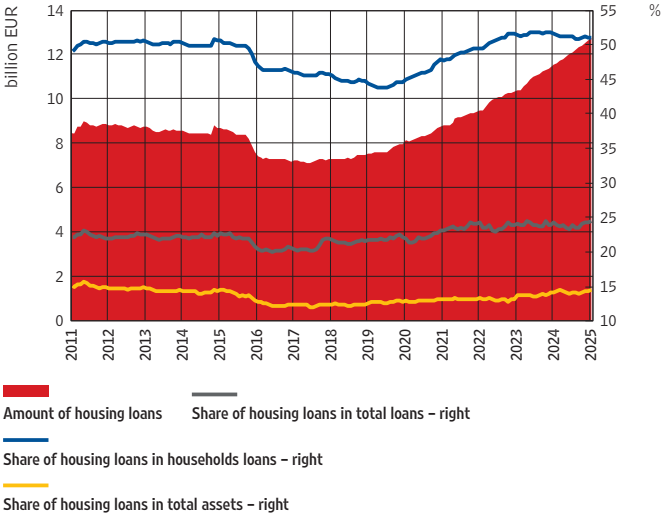
B.4 Exposure of banks to the real estate market

Due to the large share of banks' direct and indirect exposure to it, the real estate market is one of the most significant sources of possible shocks to the stability of the financial system. The most important source of direct exposure is the housing loan portfolio. Non-housing loans to households used for renovation, equipping or purchase of real estate pose an additional, indirect exposure, because their repayment may also depend on the developments in the real estate market. In recent years, in addition to directly financing construction and development projects, in the corporate segment banks are also exposed to firms in various activities that use their own real estate as collateral for loans, which makes them indirectly vulnerable to real estate market developments. In addition to direct exposures, due to the significant share of construction and real estate activities in the total number of employed persons and gross value added, noteworthy are also indirect channels through which adverse developments in the real estate market can spill over to credit institutions.

B.4.1 Exposure of banks to the residential real estate market

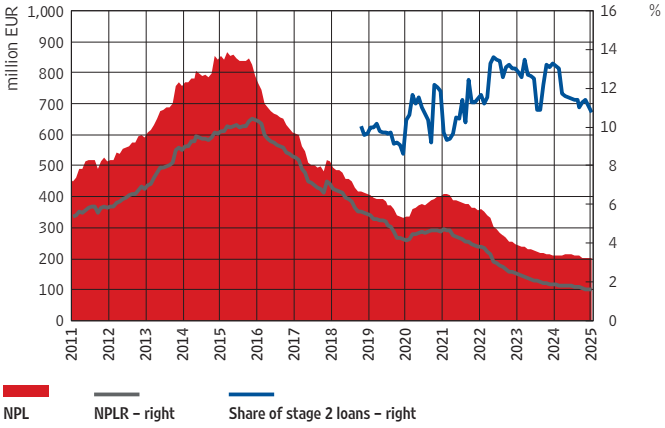
Housing loans have continued to grow strongly and have increased the share in bank assets, with a significant improvement in quality. Since 2018, housing loans have recorded a strong growth at stable annual rates of around 10%, increasing their share in total assets (Figure B.15). At the end of 2024, they accounted for more than half of all loans to households and around a quarter of total loans. At the same time, the share of non-performing housing loans decreased to only 1.7%, which is significantly lower than the share of more than 10% recorded ten years ago (Figure B.16). Although the overall quality of the portfolio improved visibly, more than 10% of housing loans are still categorised as loans with increased credit risk (stage 2 loans).

Figure B.15 Housing loans have remained the main source of bank exposure



Note: Total assets refer to gross assets.
Source: CNB.

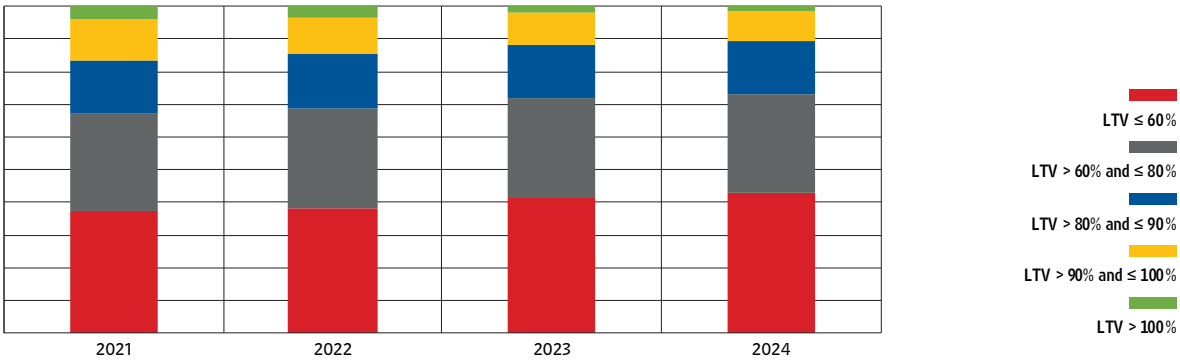
Figure B.16 The quality of housing loans is at a record-high level



Source: CNB.

Although the value of the pledged real estate is quite high relative to the amount of housing loans, it is sensitive to market changes. The average loan-to-value (LTV) ratio was 64% at the end of 2024, with almost three quarters of housing loans having the LTV ratio below 80% (Figure B.17). However, for the remaining part of the housing loan portfolio, and especially for 10% of loans with LTV above 90%, the probability of the loan amount exceeding the value of collateral would increase significantly in the event of the outbreak of a crisis and a sharp fall in prices. Coupled with low liquidity during the crisis episode, this would make it much more difficult or even impossible for banks to collect debts.

Figure B.17 More than a quarter of loans are loans with LTV above 80%



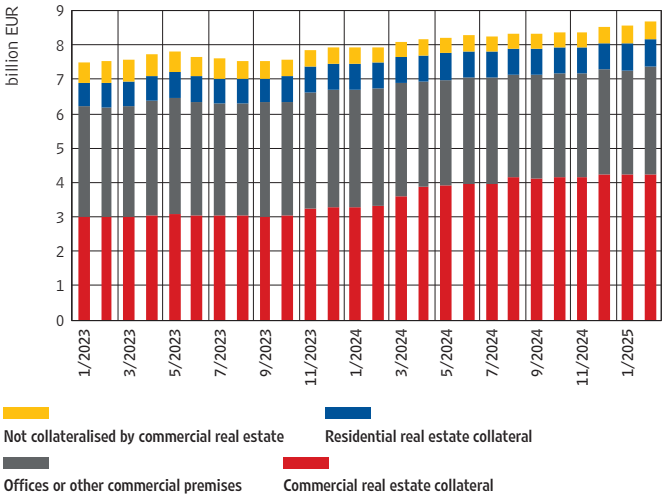
Source: CNB.

B.4.2 Exposure of banks to the commercial real estate market

Although the direct exposure of banks to corporates whose operations depend on the real estate market is relatively low, commercial real estate is often used as collateral. Corporate

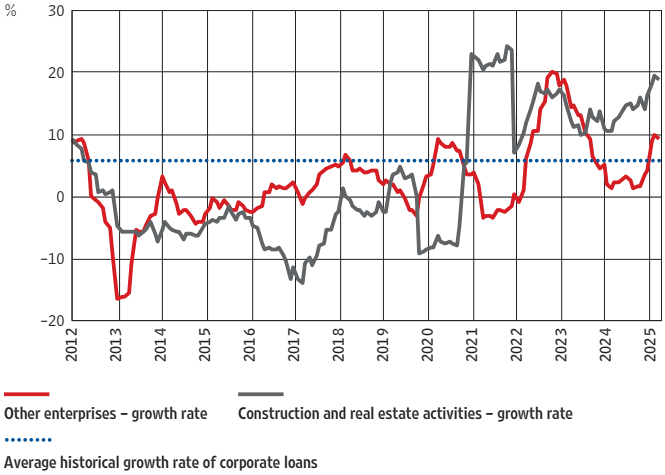
loans in the construction and real estate sectors account for about 20% of total corporate loans, while an additional 39% are loans collateralised by commercial real estate, regardless of the debtor's activity. This creates an indirect, albeit significant, exposure of the financial system to the commercial real estate market[7]. Such collateral is often used to finance investments in plant, equipment and real estate, while exposures without commercial real estate collateral are mostly associated with working capital financing and are characterised by shorter maturities.

Figure B.18 Most collateral relates to commercial real estate and offices or other commercial premises



Source: CNB.

Figure B.19 The growth of loans to construction and real estate sectors was much faster than that of other corporate loans



Notes: The average historical growth rate shows the geometric mean of annual growth rates. It is calculated on the basis of the stock of the credit portfolio from 31 December 1999 to 31 December 2024.
Source: CNB.

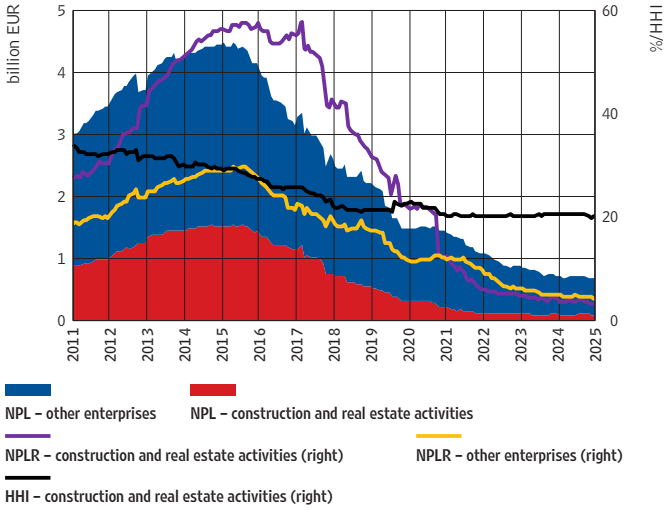
Banks' direct exposure to the real estate market has increased relatively strongly, much more than the growth in total corporate loans (Figure B.19). The rise in banks' credit exposure to the real estate sector reflects a strong expansion in construction, driven by increased demand, particularly for residential construction. Corporate loans in these activities often involve large amounts and long maturities and are highly sensitive to market cycles and macroeconomic developments. Experience from previous crises shows that a decline in market activity and a fall in real estate prices can quickly generate losses and exert pressure on banks' balance sheets (Figure B.20). The structure of exposures is more diversified in the current credit cycle than in the cycle of the 2000s, which was marked by a concentration on residential construction. This cycle is marked not only by lending for construction, but also, considerably, by loans advanced for real estate rental and management activities. While this diversification may reduce sectoral risk concentration, banks remain vulnerable to cyclical real estate market fluctuations and macroeconomic changes.

The quality of loans related to the commercial real estate market continued to improve, but this segment remained riskier than other placements. The improvement in asset quality in the

7 For more information, see Box 1 Analysis of banks' exposures to non-financial corporations associated with commercial real estate, Macroprudential Diagnostics No 22.

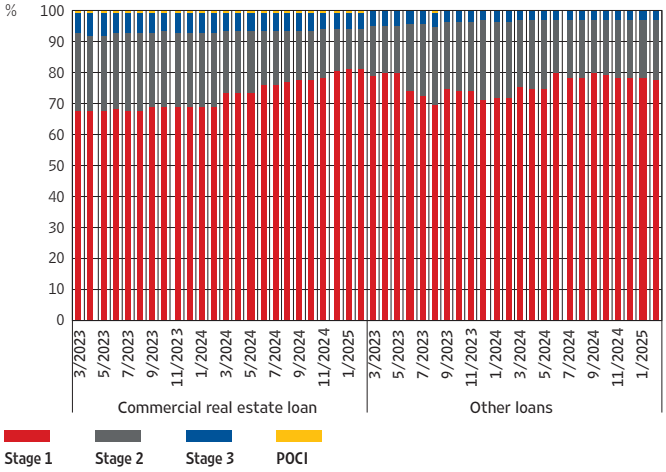
portfolio of commercial real estate loans is reflected in the decrease in the share of stage 2 and stage 3 exposures (Figure B.21). However, despite positive developments, the level of credit risk remains higher than that of other types of credit placements.

Figure B.20 Loans to construction and real estate are subject to sharp deterioration in times of crises



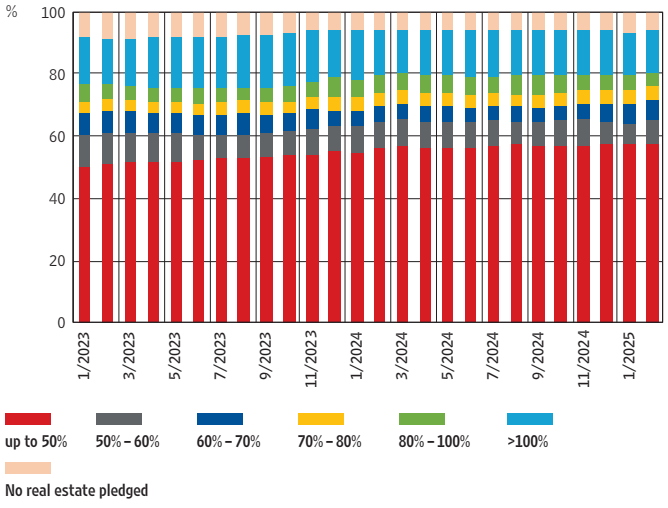
Notes: The HHI has been calculated based on market shares per loan exposure of the following activities:
F – Building construction, Construction of roads and railways, Other construction work; L – Buying and selling of own real estate, Rental and operating of own or leased real estate, Real estate activities on a fee or contract basis. The share of each activity is squared and summed, and the HHI is scaled to a range from 0 to 100 for ease of interpretation. A higher HHI indicates a higher concentration of credit exposure in a smaller number of activities.
Source: CNB.

Figure B.21 The quality of commercial real estate loans is increasing, but is still lower than for other loans



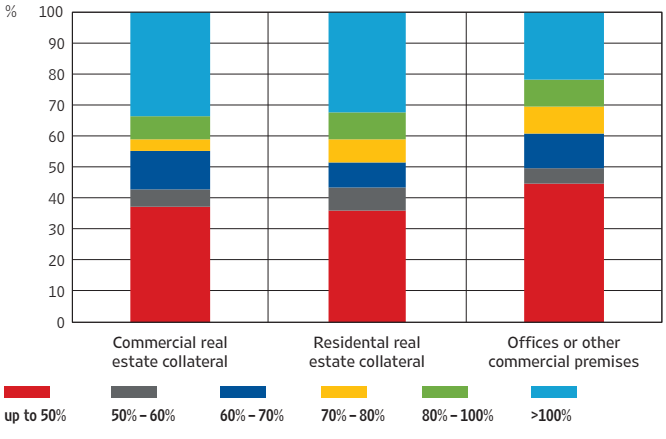
Note: Purchased or originated credit-impaired financial assets (POCI) refer to claims that already had impairment characteristics at the time of acquisition or initial recognition.
Source: CNB.

Figure B.22 Almost a quarter of commercial real estate loans are loans with LTV above 80% or loans without collateral



Source: CNB.

Figure B.23 LTV ratios of CRE placements at origination are heterogeneous, depending on the type of collateral



Note: LTV for granted loans refers to loans granted from January 2024 to March 2025.
Source: CNB.

Although loans related to commercial real estate market are the mostly highly collateralised, there is a segment of the portfolio that has an increased risk. The loan-to-value (LTV)

analysis at origination indicates a pronounced heterogeneity in credit standards depending on the type of collateral and the sectoral affiliation of the debtor (**Figure B.23**). Loans secured by residential real estate were granted with an LTV somewhat high on average relative to loans secured by office space or commercial real estate (from 5 to 10 percentage points). Although the average (around 50%) and median values (around 40%) of the LTV in newly granted loans related to the commercial real estate market are relatively low, the portfolio still contains a significant share of loans with the elevated ratio. More precisely, around one third of newly granted loans in 2024 and early 2025 secured by commercial real estate had an LTV above 100%. Such a portfolio structure shows that some segments of the system are more vulnerable to market shocks. In the scenario of deterioration of the macroeconomic environment or the need for forced collection of receivables, loans with an increased LTV ratio represent a significant source of potential losses for credit institutions.

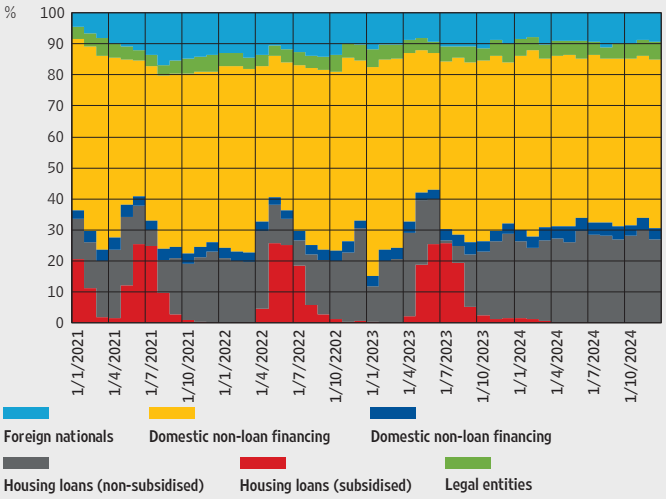
Box 2
Loan-financed purchases of residential real estate

Loan financing for real estate purchases is one of the channels of interdependence between the financial system and the real sector and can be a key source of risk to financial stability. In this context, it is of the utmost importance to quantify the volume of residential real estate purchases financed by loans, as well as to analyse their other characteristics. The results suggest that the share of purchases of residential real estate financed by loans in the period from 2021 to 2024 was around 30%. A low level of loan financing means limited exposure of banks to the real estate market and reduced vulnerability of the real estate market and the real economy to potential disruptions in the financial sector.

The share of residential real estate purchases financed by loans in the past four years is estimated at an average of around 30%. In the months when the housing loan subsidy programme was in place, this share significantly surpassed the multi-annual average, and it particularly grew during the sixth (2021), seventh (2022) and eighth (2023) round of the housing loan subsidy programme, when it reached around 40% in some months. After the termination of the programme, the share stabilised at around 30% and had risen only slightly by the end of 2024 (Figure 1). If the distribution is observed by type of loan, most transactions (81%) are financed only by housing loans (Figure 2), around 10% of loan-financed purchases are financed only by non-housing loans, while the remaining 9% are financed by a combination of housing and non-housing loans. Of course, it may be that non-housing loans are to a larger extent used for renovating the real estate purchased from own funds than for real estate purchase, but the real purpose of non-housing loans cannot be discerned from the available data. These data point to a non-negligible role of non-housing loans in the purchase and renovation of real estate, even though the amounts of these loans are considerably smaller and their maturities are shorter than those of housing loans.

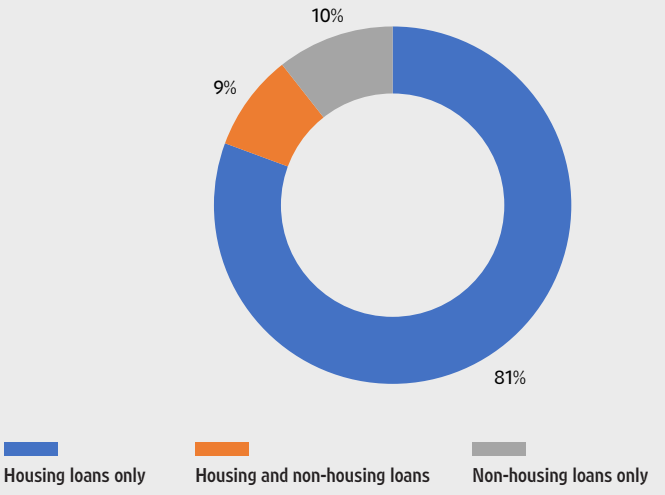
Domestic natural persons predominate in purchases of residential real estate not financed by a loan, while only a small portion of such purchases is accounted for by non-residents and legal entities (Figure 1). The purchases by domestic natural persons without loan financing account for the largest share of total purchases, which averages 55%. The share of purchases in which the buyers are legal entities was stable throughout the period, with an average of slightly above 4%. An increase was observed in the share of non-residents in the post-pandemic period, with a slight decrease in the last two years (see Chapter B.1).

Figure 1 After the end of the housing loan subsidy programme, the share of loan financing stabilised



Note: The category "Domestic non-loan financing" is a residual category (total minus other categories).
Sources: CNB (consumer lending standards) and Tax Administration.

Figure 2 Loan-financed transactions in the real estate market include both housing and non-housing loans

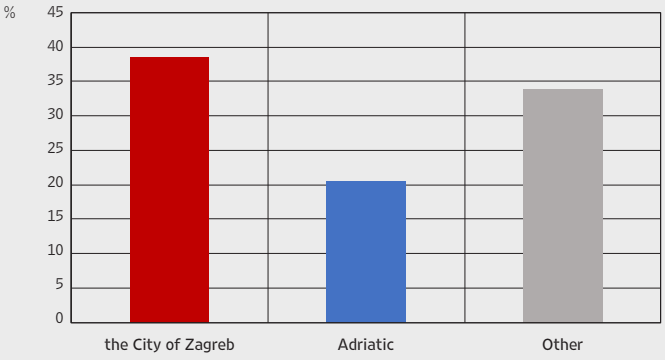


Sources: CNB (consumer lending standards) and Tax Administration.

The analysis of the regional distribution of loan financing reveals pronounced differences between the Adriatic coast and continental Croatia (Figure 3). In the coastal area, there are larger numbers of foreign buyers and purchases for tourist rental that are more often financed by own funds, the share of loan financing being thus generally lower. On the other hand, the real estate market in Zagreb is largely characterised by loan financing, since a large share of the real estate is purchased for dwelling purposes. The geographical distribution of loan-financed real estate purchases by counties confirms these differences (Figure 4). All coastal counties have relatively low shares of loan financing, and the lowest values are recorded in Istria County (14.8%), Šibenik-Knin County (16.8%) and Zadar County (18.4%). By contrast, the highest shares of loan-financed purchases are recorded in inland counties, especially in the County of Međimurje (41.1%), the City of Zagreb (38.7%) and Zagreb County (38.1%).

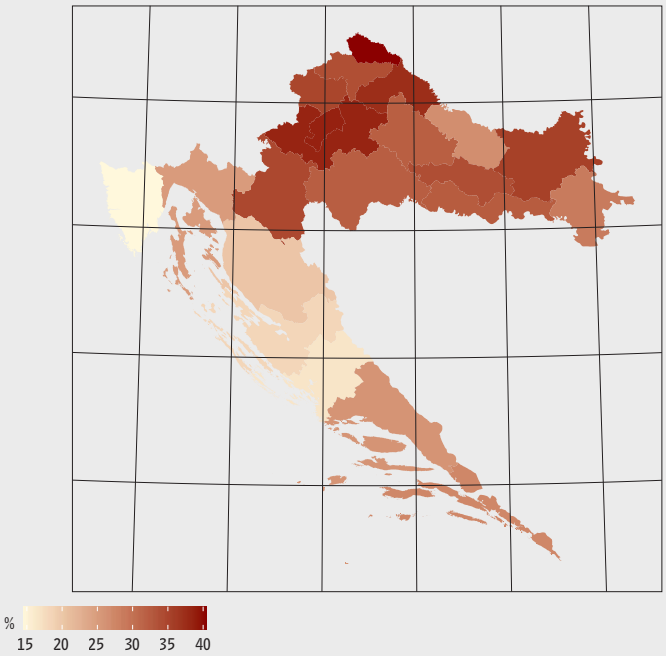
Characteristics of real estate purchased by loans and own funds show some differences, but they are not particularly pronounced. The structural analysis of real estate characteristics (Table 1) shows that loans are more frequently used for the purchase of apartments (33.6% of total apartment purchases) than for the purchase of houses (26.3%), with loan-financed apartments being larger on average (64.1m^2) than those purchased with own funds (59.3 m^2). The opposite is true for houses – those purchased without a loan are larger on average (143.4 m^2) than those purchased by a loan (137.9 m^2). Differences are also present in the average year of construction. Real properties purchased by loan are slightly newer (the average year of construction is 1984), while those that are not loan-financed were built around 1980, on average.

Figure 3 The share of loan-financed purchases by regions



Sources: CNB (consumer lending standards) and Tax Administration.

Figure 4 Share of loan-financed purchases by counties



Sources: CNB (consumer lending standards) and Tax Administration.

Table 1 Structure of real estate financing by real estate characteristics

Type of real estate	Share of loan -financed purchases	Surface (m²)		Year of construction	
		Loan-financed	Non-loan financed	Loan-financed	Non-loan financed
Apartment	33.6%	64.1	59.3	1984	1980
House	26.3%	137.9	143.4		

Sources: CNB (consumer lending standards) and Tax Administration.

A less pronounced role of financing residential real estate purchases by loans is also reflected in the low housing loans-to-GDP ratio, which implies lower financial stability risks. Such a financing structure mitigates the pass-through of shocks between the residential real estate market and the financial system, and contributes to financial stability in a broader economic context. However, the structural characteristics of the domestic real estate market, which are reflected in regional differences in the distribution of loan-financed transactions, as well as the non-negligible use of non-housing loans in the purchase of residential real estate, point to possible pockets of vulnerability that must be monitored.

Methodology

The share of loan-financed transactions in the residential real estate market in Croatia cannot be measured directly, but it can be estimated by linking various microdata. To this end, data on loans disbursed to consumers, available to the CNB through reporting pursuant to the Decision on consumer lending criteria and household deposits[1] for the period from 2021 onwards, have been linked with data from the records of the Tax Administration of the Ministry of Finance on purchases and sales of residential real estate. In both data sources, personal information on loan debtors and residential real estate buyers was anonymised according to a unique key before processing, which allowed for their merging. This made it possible to estimate the share of loan financing with a relatively high level of reliability, by identifying individual real estate transactions whose buyers also took out loans within a short period of time. Where there are several possible links between the disbursement of the loan to the consumer and the purchase of real estate, the criterion of the minimum difference between the purchase price and the value of the loan collateral (residential real estate) has been applied in order to avoid double counting of transactions. In a case in which a loan is not collateralised by residential real estate, the total value of the principal is used. Loans are categorised as housing and non-housing loans. Housing loans include all loans intended for the acquisition of real estate, as well as loans secured by residential real estate. All loans that do not meet these criteria, with the exception of credit cards and overdrafts, are classified as non-housing loans. Due to a possible time lag between loan disbursement and the purchase of real estate, purchases where the loan was disbursed within three months before or after the transaction are considered to be loan-financed purchases in the analysis. This limit has been set based on the analysis of contribution margin by including an additional month, which shows that after the third month, the probability that the disbursed loan is directly related to the purchase of the real estate is significantly reduced. In addition, a minimum loan-to-value ratio of 20% has been introduced. Although general-purpose loans are used for various purposes, some of them are sometimes also used to cover the costs associated with the purchase of real estate. However, such amounts are generally small and rarely exceed the given threshold. On the other hand, housing loans almost always exceed 20% of the real estate value because they are directly intended for financing the purchase. It is also possible that housing loans with low LTV ratios refer to housing loans for renovation. The introduction of this threshold has significantly reduced the risk that the analysis also includes general-purpose loans not intended for co-financing of the purchase, while it also enabled almost the entire scope of housing loans to be taken into consideration.

[1]Official Gazette 36/2020, 116/2021, 34/2022, 123/2022, 66/2023 and 80/2025.

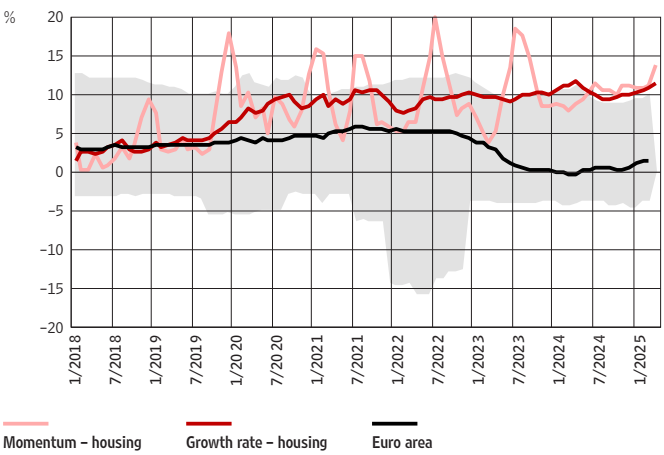
C The risks of lending to the private non-financial sector

Lending to the private sector accelerated in 2024. Driven by a robust labour market and, since early 2025, by a slight fall in interest rates, loans to households continued to grow strongly, with relatively loose credit standards. In addition, a halt in the several-year decline in total indebtedness of the household sector and difficulties in the repayment of some of the non-housing loans that occur relatively quickly after their granting, highlight the vulnerability of indebted households. The growth of loans to non-financial corporations accelerated in the second half of 2024, in parallel with stronger investment activity. Strong revenue growth, coupled with the beginning of a downward trend in interest rates on loans, supports the orderly servicing of this sector's debt, so that corporate solvency risk remained low. However, further escalation of global geopolitical and trade tensions could lead to difficulties in corporate operations and a significant slowdown or decrease in household income, which would weigh on their repayment capacity.

C.1 A sharp growth in household loans under accommodative criteria

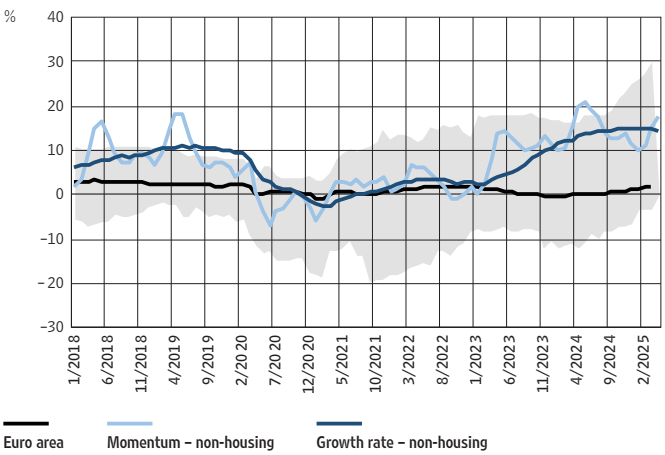
The growth of loans to households accelerated slightly in the second half of 2024 and early 2025, with a more pronounced growth in non-housing loans. The annual growth rate of total loans to households reached 11.6% at the end of April 2025, which is a slight acceleration from 2024. This was primarily due to housing loans, the annual growth of which accelerated from around 10% in 2024 to 11.6% in April 2025, while non-housing loans edged down, from 16% to 15.3%. As a result, Croatia recorded one of the highest growth rates of loans to households in the euro area, given that housing and non-housing loans have grown only slightly in most euro area countries (by an average of 1.5% in March 2025).

Figure C.1 Housing loans have continued to accelerate from mid-2024, on top of their already high growth



Notes: The figure shows the 12-month transaction-based rate of change, which excludes exchange rate, price and other changes. The momentum refers to the transaction-based quarterly rate of change, expressed at an annual level. The grey area denotes the difference between the highest and the lowest growth rate in the euro area.
Source: CNB.

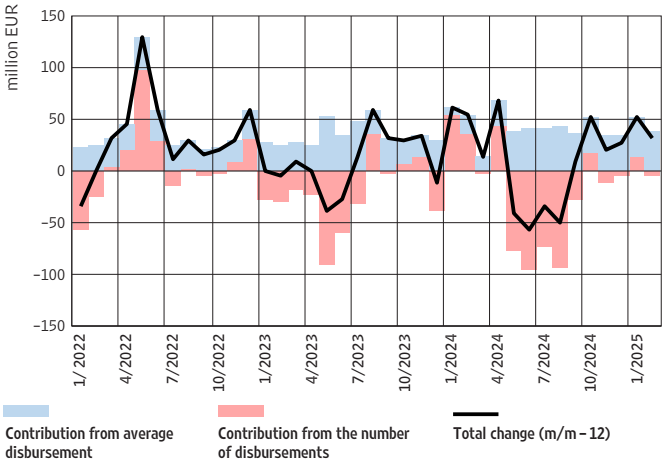
Figure C.2 Growth in non-housing loans stabilised at a high level



Notes: The figure shows the 12-month transaction-based rate of change, which excludes exchange rate, price and other changes. The momentum refers to the transaction-based quarterly rate of change, expressed at an annual level. The grey area denotes the difference between the highest and the lowest growth rate in the euro area. Consumer and other loans were used to calculate the euro area growth rate.
Source: CNB.

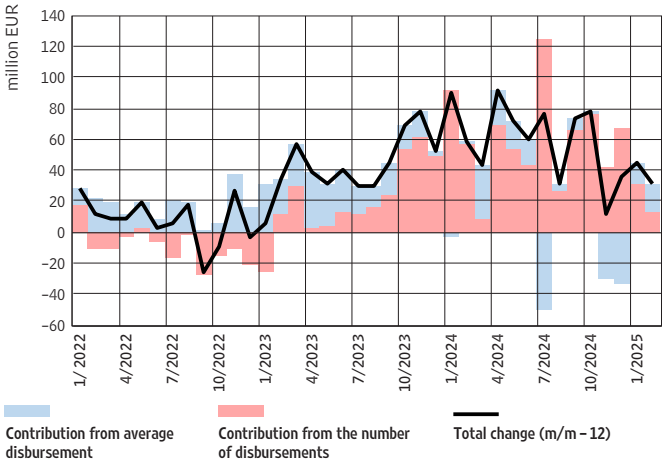
The growth in the amount of newly granted housing loans in 2024 mostly reflected a higher average principal, and an increased number of disbursements in the case of non-housing loans. The average new housing loan amount increased significantly, from around EUR 100 thousand in the last quarter of 2023 to EUR 120 thousand in the last quarter of 2024. The number of disbursed housing loans went down, from 25.6 thousand in 2023 to 23.2 thousand in 2024, which suggests that the growth in the amount of newly granted housing loans is primarily based on the increase in the amount of individual placements, and not on a larger number of new loans (Figure C.3). By contrast, the number of disbursed non-housing loans increased considerably, from 315 thousand in 2023 to around 400 thousand in 2024, partly due to the closing of current account overdrafts (Figure C.4). The average non-housing loan amount remained almost unchanged over the same period and stood at slightly below EUR 9 thousand.

Figure C.3 The increase in the amount of new housing loans in 2024 was due to a higher average principal



Source: CNB (consumer lending standards).

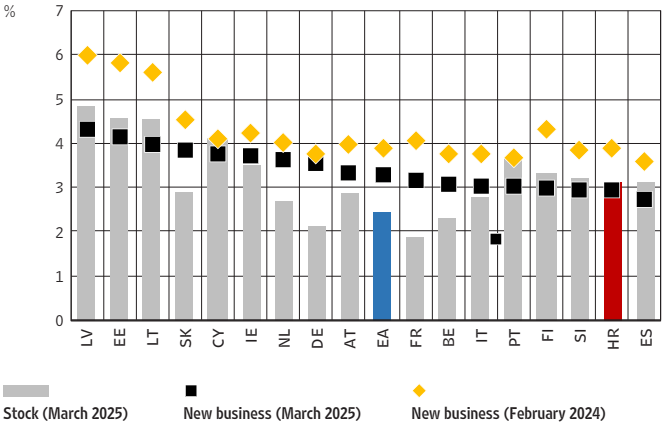
Figure C.4 The growth in the volume of new non-housing loans in 2024 reflects a higher number of disbursements



Source: CNB (consumer lending standards).

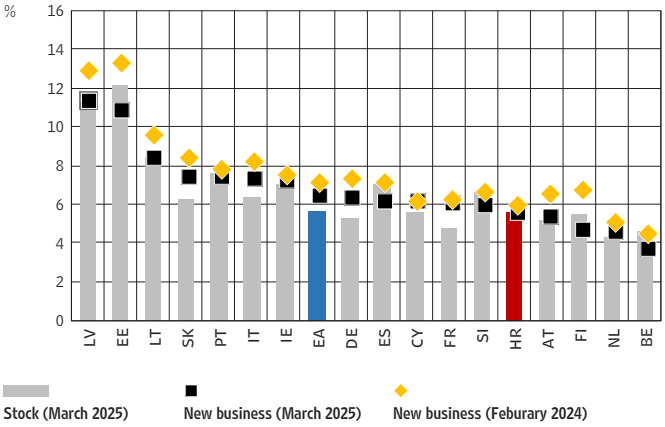
Interest rates on new housing and cash loans started to decline at the beginning of 2025. The fall in the average interest rate was particularly pronounced in new housing loans. Interest rates on new housing loans stood at 3% in March 2025, down by 0.9 percentage points from the levels recorded at the peak of interest rate growth cycle in February 2024 (Figure C.5). At the same time, the decrease in interest rates on new non-housing loans was more moderate, with interest rates standing at 5.7% in March 2025, down by 0.3 percentage points from the levels recorded in early 2024 (Figure C.6). Relative to other euro area countries, Croatia's interest rates on new housing and non-housing loans are well below the euro area average. Furthermore, banks still continue to grant new housing and non-housing loans almost exclusively at fixed interest rates. Consequently, the share of loans with a fixed interest rate over the entire period of repayment in the structure of the total portfolio has grown, so that at end-2024, almost one third of housing loans had been granted at fixed interest rates, while for non-housing loans this share stood at around 80%.

Figure C.5 Interest rates on new housing loans decreased in early 2025 and are among the lowest in the euro area



Source: ECB MIR.

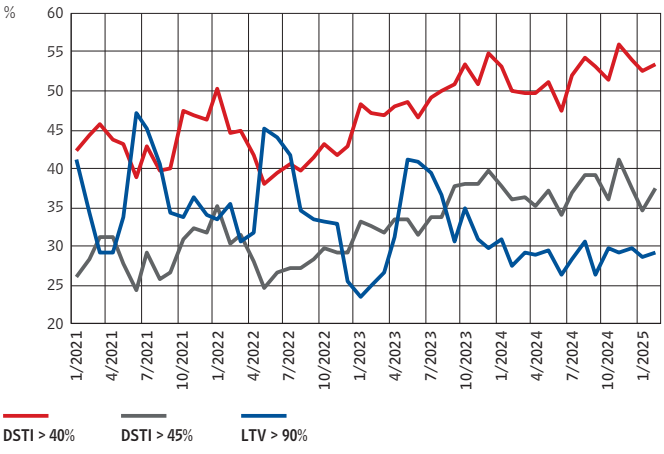
Figure C.6 Interest rates on non-housing loans fell slightly in the first quarter of 2025



Source: ECB MIR.

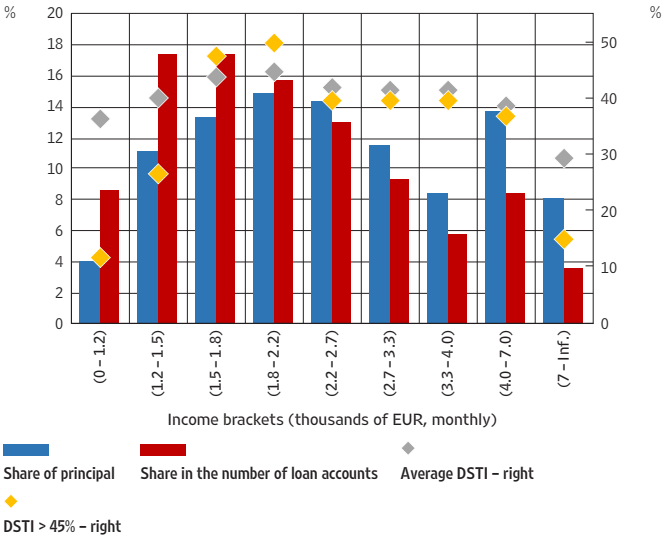
The decline in interest rates in early 2025 contributed to increased demand for housing and non-housing loans. Bank lending survey results for the first quarter of 2025 point to an increase in demand for household loans, primarily as a result of a fall in interest rates on new loans, which is particularly pronounced in the segment of housing loans, the demand for which had been slowed down in the previous two years by their high level. In addition, the consumption of durable goods (e.g. cars) is an important driver of growth in demand for non-housing loans, with a portion of non-housing loans probably also being used for other purposes, such as real estate renovation or relatively small investments in economic activity.

Figure C.7 The share of housing loans with high DSTI ratios increased in 2024



Source: CNB (consumer lending standards).

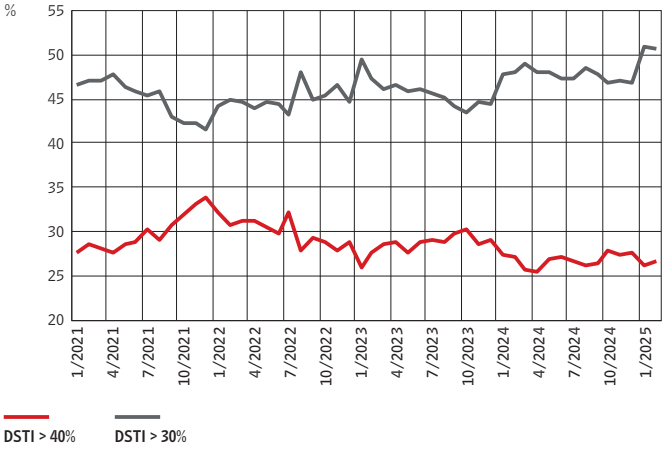
Figure C.8 Housing loans are most often taken out by debtors with above-average incomes



Note: The figure shows data for 2024.
Source: CNB (consumer lending standards).

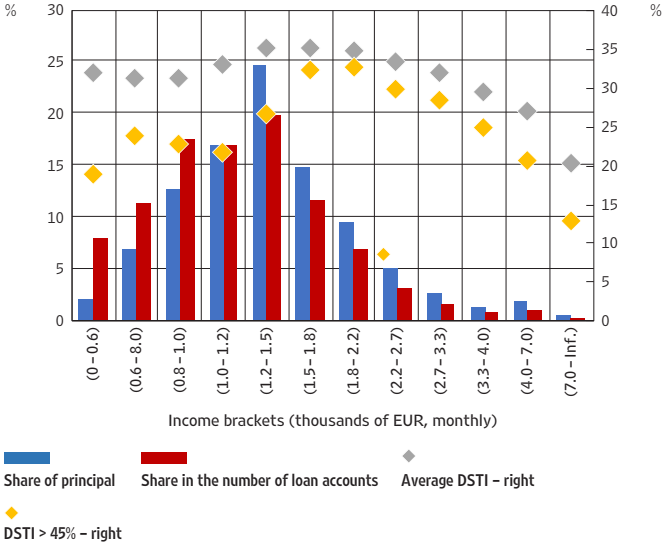
New housing loans continued to be granted in 2024 on lenient lending criteria, which increases their riskiness. The average debt service-to-income ratio (DSTI) has grown gradually since mid-2022, when it stood at around 38%, to around 41% in 2024. At the same time, the share of loans that are considered more risky due to their DSTI ratio (DSTI > 45%) also grew gradually and stood at around 38% at the end of 2024 (Figure C.7). The debt-to-income ratio (DTI), which shows how many annual incomes are required to cover the principal of the loan, remained broadly unchanged in 2024, at around 6.5. Furthermore, the loan-to-value (LTV) ratio also remained unchanged in the same period and averaged around 76%, while the share of loans with LTV ratios exceeding 90% stood at a level slightly below 30%.

Figure C.9 With regard to new non-housing loans, the share of loans with DSTI above 40% remained broadly unchanged



Source: CNB (consumer lending standards).

Figure C.10 Non-housing loans are most often taken out by debtors with average and below-average incomes



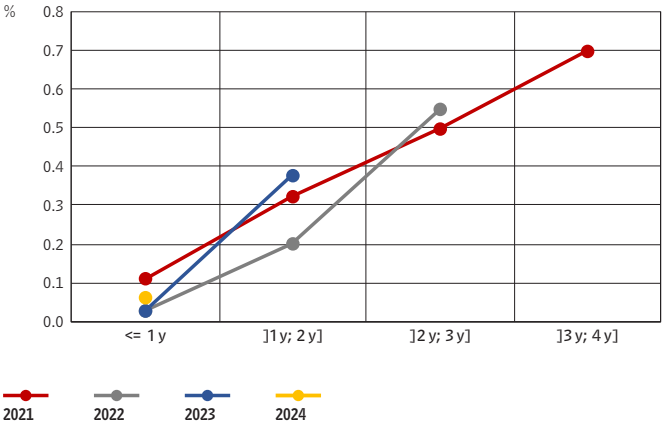
Note: The figure shows data for 2024.
Source: CNB (consumer lending standards).

The lending conditions for new non-housing loans did not change significantly in 2024. The average debt service-to-income ratio (DSTI) decreased slightly and stood at around 33.5% at the end of 2024, down from 34.1% in the previous year. At the same time, the share of non-housing loans with a DSTI ratio above 40% remained broadly unchanged in 2024 and was around 28% at the end of the year (Figure C.9). Debt-to-income ratio (DTI) also remained stable at the level of around 2.2. Non-housing loans are mostly granted to consumers with income that is close to the average wage, with a significant share of lower incomes. Thus, around three quarters of disbursed non-housing loans were granted to debtors with a monthly income of up to EUR 1,500, 54% of whom had incomes of less than EUR 1,200 (Figure C.10). As a rule, the average DSTI ratio has grown in parallel with income, to a level of between EUR 1,500 and EUR 1,800, and is gradually decreasing for higher incomes. On the other hand, housing loans are most often contracted by consumers with somewhat larger incomes, often including the income of co-debtors. Thus, 56% of loans, that is 71% of the entire principal, has been disbursed to consumers with incomes higher than EUR 1,800 (Figure C.8). With regard to housing loans, the highest DSTI ratios are recorded

at the income level of between EUR 1,800 and EUR 2,200, and at this income level every other newly granted housing loan has a DSTI higher than 45%.

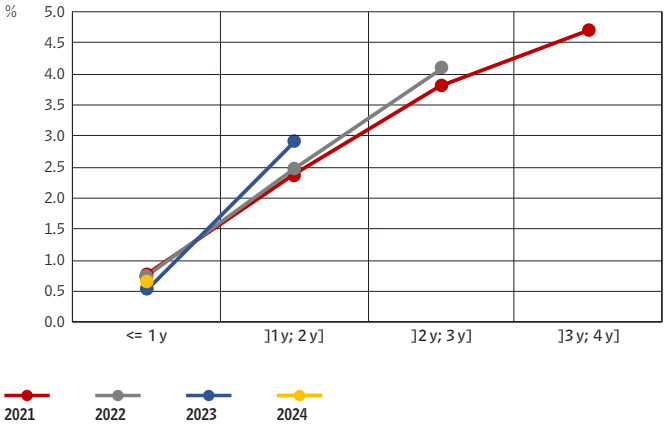
Repayment problems occur much faster with non-housing than with housing loans. Between 2.5% and 3% of all cash and other non-housing loans disbursed from 2021 onwards have faced late repayments in the first two years, while in the following year this share increases by additional 1.5 p.p. (Figure C.12). On the other hand, housing loans deteriorate more slowly, so that only between 0.2% and 0.4% of consumer loans experience repayment difficulties in the first two years, with this share growing by an additional 0.2 to 0.3 p.p. in each subsequent repayment year (Figure C.11). Several factors contribute to a faster deterioration of non-housing loans. These loans are often granted to lower-income consumers, who are therefore more vulnerable to income shocks. Furthermore, these loans are mostly granted without high-value collateral, which may reduce the incentive for debtors to repay them in an orderly manner. This also reflects the lending policies of banks, which are ready to take on a slightly higher level of risk due to the higher interest rates on non-housing than on housing loans. In addition, the optimistic expectations of some consumers, combined with the simplicity of the granting process, may in a number of cases lead to commitments going beyond their actual future repayment capacity. Given that late repayments of non-housing loans are relatively quick to occur in the conditions of high employment and strong wage growth, there is a risk that the expected slowdown in wage growth could further accelerate the deterioration in the quality of these loans.

Figure C.11 Late repayments of housing loans are rare



Notes: The figure shows the share of housing loans classified into "B" and "C" risk categories. The X-axis shows the time elapsed since the loan was disbursed.
Source: CNB.

Figure C.12 A portion of non-housing loans quickly face difficulties in repayment

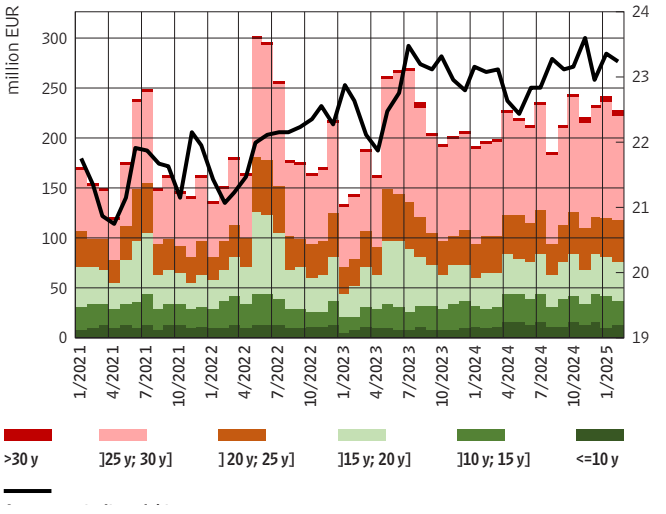


Notes: The figure shows the share of non-housing loans classified into "B" and "C" risk categories. The X-axis shows the time elapsed since the loan was disbursed.
Source: CNB.

The share of housing and non-housing loans with long-term maturities stabilised in 2024 and early 2025. At the beginning of 2025, around half of the total amount of housing loans were granted with maturity over 25 years, which is an increase in this share of around 10 p.p. since 2022 (Figure C.13). On the other hand, the average maturity of non-housing loans even decreased slightly, under the influence of increased refinancing of current account overdraft facilities (Figure C.14). Nevertheless, a still high share of the principal of non-housing loans is granted with a relatively long maturity, so that at the beginning of 2025, the share of new loans granted for

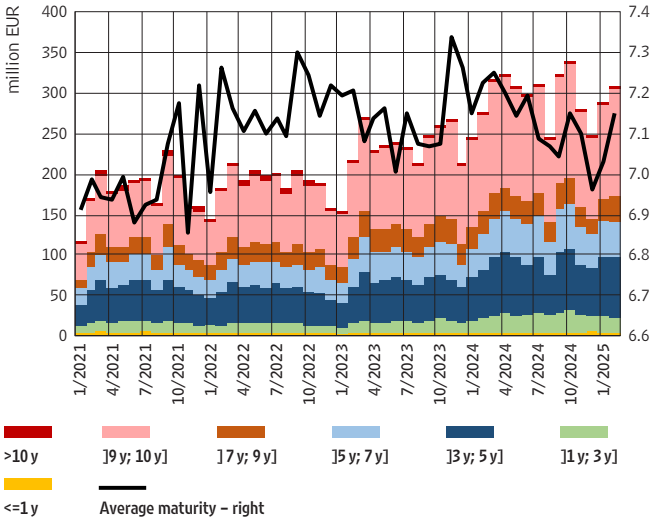
a period of over 9 years stood at slightly more than 40%. Late repayments are somewhat more frequent in loans with longer maturities, so that the probability of late repayments is almost twice as high for loans granted with the maximum maturity as for loans with relatively short original maturities (Figures C.15 and C.16).

Figure C.13 An increase in the share of housing loans with maturity of more than 25 years



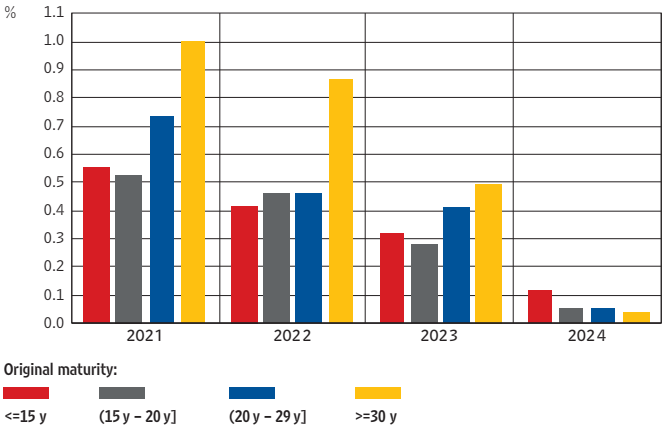
Source: CNB (consumer lending standards).

Figure C.14 Despite a slight decrease in average maturity, a significant share of non-housing loans are granted with maturity of 10 years



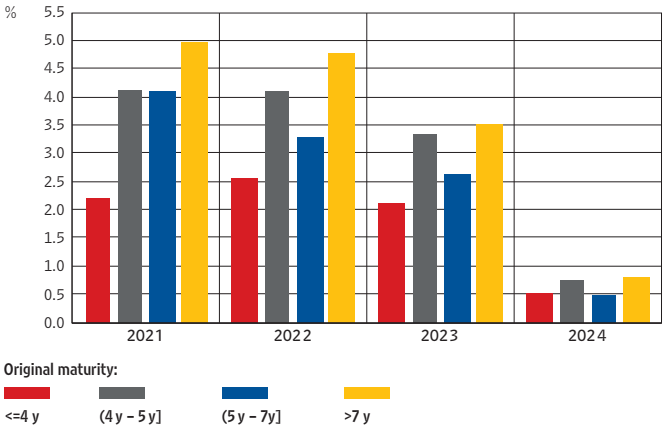
Source: CNB (consumer lending standards).

Figure C.15 The probability of late repayments of housing loans increases with maturity



Notes: The figure shows a share of housing loans classified into "B" and "C" risk categories as at 31 December 2024. The X-axis shows the year of disbursement. The ceilings of the original maturity bands are determined by the quartiles of the distribution of the original maturity of housing loans. For loans disbursed in 2023 and 2024, the ceiling of the 2nd and 3rd quartiles is 22 years.
Source: CNB.

Figure C.16 The share of non-housing loans facing late repayments is higher for loans with longer original maturity

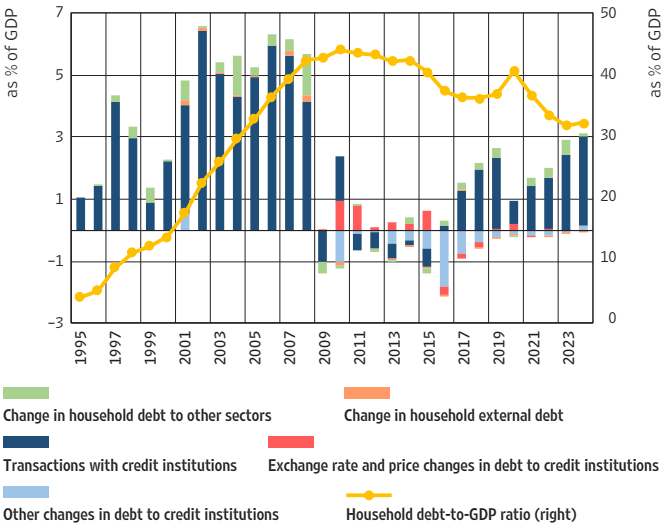


Notes: The figure shows a share of housing loans classified into "B" and "C" risk categories as at 31 December 2024. The X-axis shows the year of disbursement. The ceilings of the original maturity bands are determined by the quartiles of the distribution of the original maturity of non-housing loans. Loans that mature in 2025 are not included.
Source: CNB.

The decline in indebtedness recorded in previous years came to a halt in 2024, while total relative indebtedness of the household sector remained relatively low. Despite the continued growth in nominal income, rising household borrowing, coupled with a net increase in

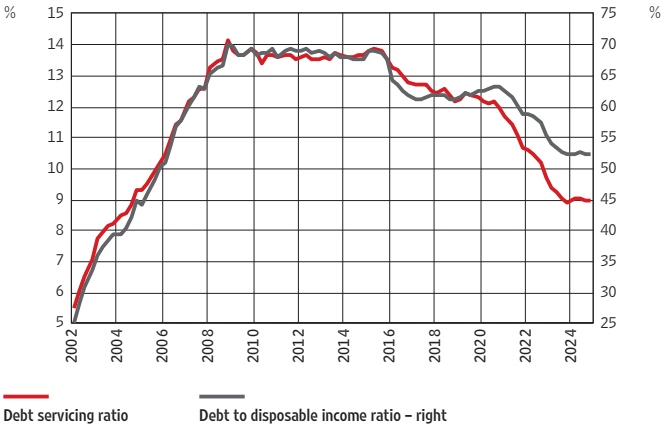
loans, which reached roughly 3% of GDP, slightly pushed up the household debt-to-GDP ratio (Figure C.17). In addition, as cash loans accelerated sharply in mid-2023, the several-year decline in the aggregate debt service-to income and debt-to-income ratios of the household sector came to a halt (Figure C.18). If the strong growth of loans continues in the forthcoming period and nominal income continues to decelerate, the value of these ratios could begin to increase.

Figure C.17 Net increase in loans in 2024 stood at 3% of GDP, while the debt-to-GDP ratio increased slightly



Note: Changes in debt to other sectors and the rest of the world are shown as the difference between the end of the previous year and relativised as a share in GDP.
Sources: CNB and Eurostat.

Figure C.18 The fall in household sector debt indicators came to a halt due to the strong growth in loans



Notes: Quarterly disposable income values have been estimated using the Chow-Lin method and a series of employee compensation and gross operating surplus and mixed income as indicators. Official annual data on disposable income are available until 2023, while data for 2024 are estimated.
Sources: CNB and Eurostat.

Box 3
Two instalments, one debt: How households combine housing and non-housing loans

Taking out both a housing and a non-housing loan at the same time is a specific form of borrowing by households that generally increases their indebtedness and riskiness. This box examines how many debtors take out both types of loans at the same time and how they differ from other debtors. The results have shown that debtors who take out both types of loans at the same time have, on average, lower incomes, while their loans are of longer maturity and have higher DSTI and LTV ratios, which makes them more vulnerable to adverse shocks and increases the likelihood of repayment difficulties in such conditions.

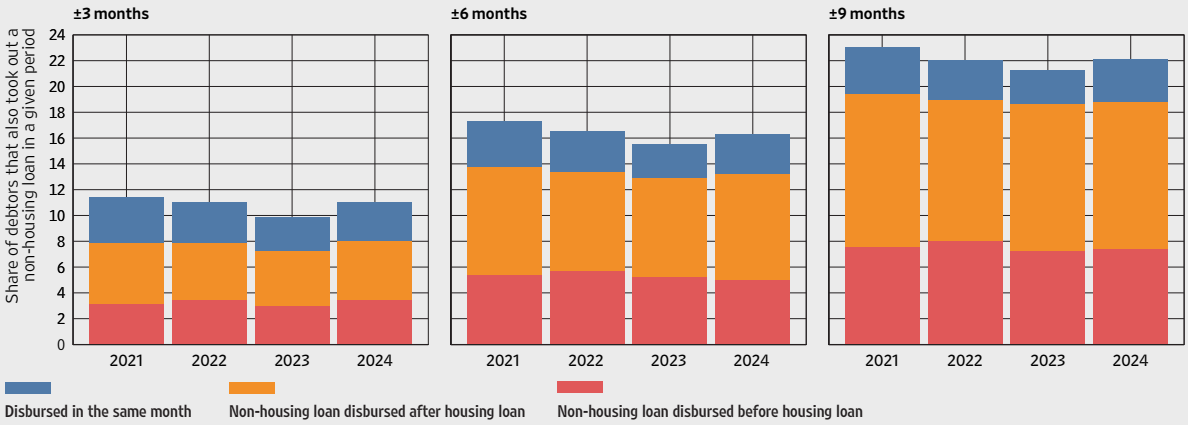
In certain situations, taking out both non-housing[1] and housing loans at the same time may pose a risk to financial stability. Due to higher overall indebtedness, debtors who have taken out both types of loans in parallel may be more susceptible to economic shocks, especially in the case of a high debt service-to-income (DSTI) ratio. It is therefore useful to identify and analyse this group of debtors in order to assess their share, the conditions under which they borrow and the possible consequences of this form of borrowing to financial stability.

Between 11% and 22% of debtors with housing loans simultaneously take out a non-housing loan. The purpose of the simultaneously disbursed non-housing loans may or may not necessarily be related to the acquisition of real estate[2]. In most cases, non-housing loans were disbursed in either the same month as the housing loan or a few months later (Figure 1), which may indicate that such loans are used to cover additional costs related to the purchase and renovation of real estate. However, roughly a third of non-housing loans have been disbursed before housing loans, which suggests that these funds are possibly also used to finance their own participation in the purchase of residential real estate. According to data collected by banks from clients, almost 80% of debtors with housing loans acquire real estate for their own dwelling purposes, including debtors who take out both types of loans in parallel. This means that they do not purchase real estate with the aim of generating income, e.g. from renting, but instead use it to meet their own housing needs. Furthermore, slightly more than 70% of debtors take out both types of loans in parallel at the same bank (Figure 2). In addition to consumers showing a tendency to remain in their banks, partly due to their tendency to remain in a familiar environment and to avoid additional costs or uncertainty, it may also be that they use the pre-agreed "top-up" amount on their existing housing loans, limited by the implicit DSTI ratio, in accordance with regulatory rules.

1 Non-housing loans are loans to consumers that do not include housing loans, credit card loans and overdrafts.

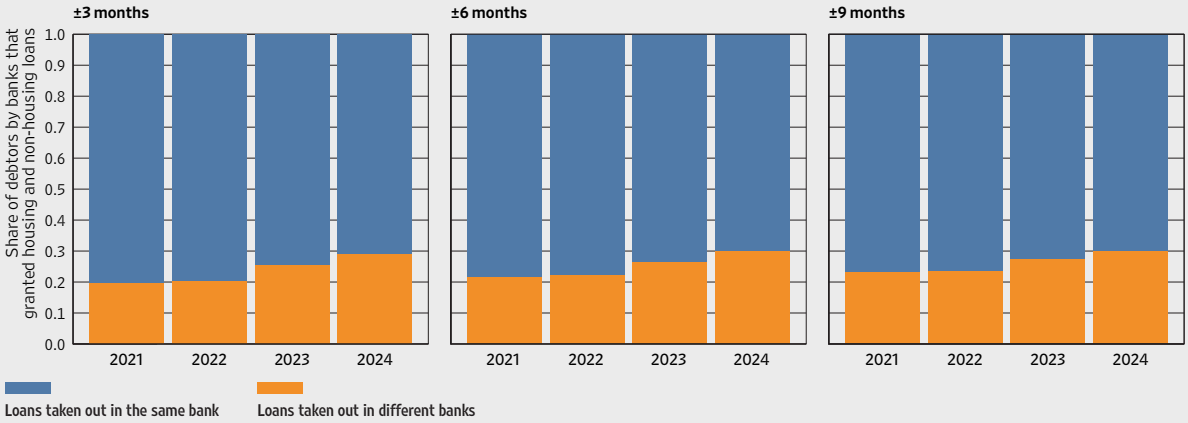
2 For each month in which housing loans were disbursed, the analysis identified debtors to whom a non-housing loan was disbursed in the selected period before and after the month in which a housing loan was disbursed (e.g. three months before or after housing loan disbursement). If such disbursement was made, this meant that debtors took out both types of loans at the same time. This was observed through three different time span assumptions (three, six and nine months).

Figure 1 Between 11% and 22% of debtors with housing loans take out non-housing loans in parallel



Source: CNB (consumer lending standards).

Figure 2 Slightly more than 70% of debtors took out both types of loans in the same bank



Source: CNB (consumer lending standards).

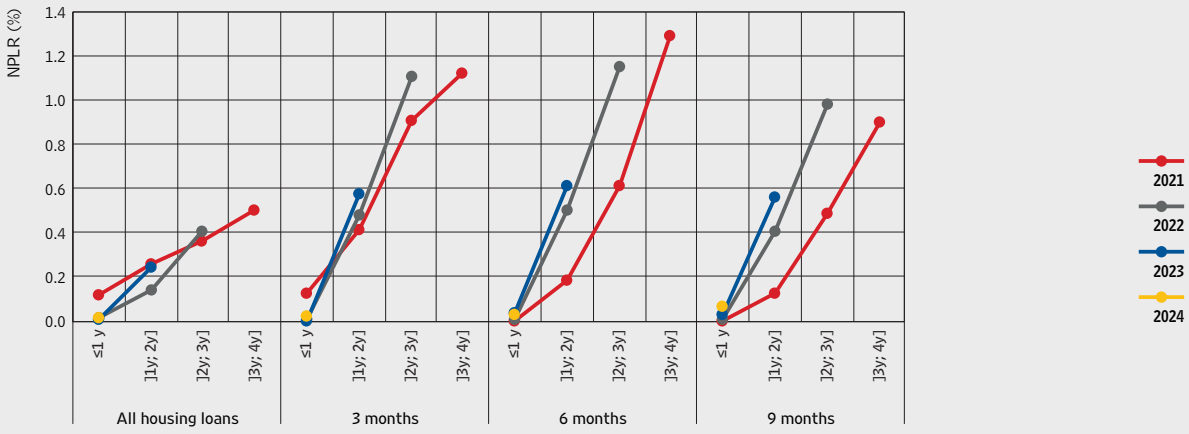
Debtors taking out both housing and non-housing loans at the same time have weaker creditworthiness and are more indebted. Their income is around EUR 2,500 on average, which is around EUR 500 less than the average income of debtors who take out housing loans only, and their loans are granted under looser credit standards. Thus, their DSTI ratio stands at around 3 p.p., while the LTV ratio is by around 5 p.p. higher than that of debtors with only a housing loan (Table 1). In addition, the share of loans with the DSTI ratio above 45% is on average around 10 p.p. higher with debtors who take out both types of loans at the same time. Also, despite almost identical average principal amounts, the maturities of loans held by debtors that took out both types of loans are considerably longer (slightly more than two years longer, on average), which enables them to reduce the DSTI ratio or to increase the total amount of principal with a certain DSTI ratio, in order to maximise the amounts of loans that the bank is willing to grant them in accordance with its own credit policy.

Table 1 Lending indicators for debtors taking out housing and cash loans in parallel

	New business – housing loans (million EUR)	New business – non-housing loans (million EUR)	Number of housing loan accounts (in thousands)	Number of debtors with housing loans (in thousands)	Average housing loan (in thousands of EUR)	DSTI – housing loans	Share of DSTI > 45% for housing loans	LTV	Maturity – housing loans	Income – housing loans
3 months										
Housing loans only	1,957.0	–	19.4	18.5	100.7	40.4%	35.0%	77.9%	22.6	2,944.6
Housing and non-housing loans	214.7	35.4	2.2	2.1	97.6	43.5%	43.6%	83.9%	25.0	2,596.1
6 months										
Housing loans only	1,849.6	–	18.3	17.5	101.0	40.3%	34.6%	77.6%	22.5	2,969.3
Housing and non-housing loans	322.1	50.8	3.3	3.2	97.2	43.3%	43.0%	83.1%	24.6	2,570.5
9 months										
Housing loans only	1,754.2	–	17.3	16.5	101.4	40.1%	34.1%	77.5%	22.4	2,998.2
Housing and non-housing loans	417.5	64.7	4.3	4.1	96.5	43.3%	43.3%	82.3%	24.5	2,540.3

Note: The figure shows data for debtors to whom housing loans were disbursed in the period between March 2023 and March 2024, under three assumptions about the time span between the disbursement of the housing loan and non-housing loan (three, six and nine months).
Source: CNB (consumer lending standards).

Figure 3 Housing loans taken out in parallel with non-housing loans are more likely to deteriorate



Source: CNB (consumer lending standards).

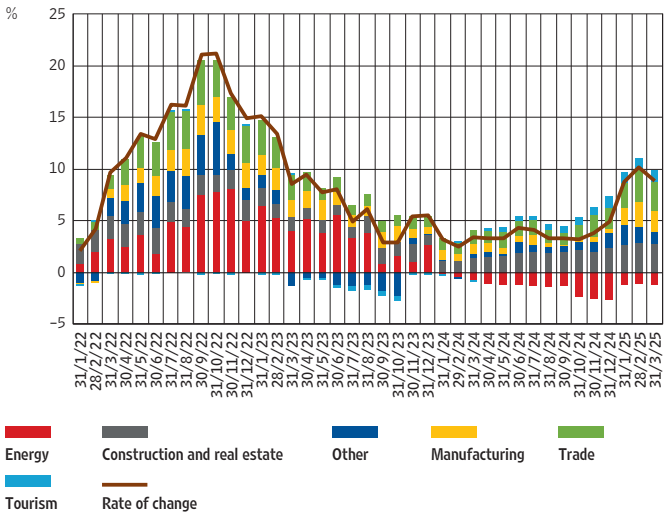
Housing loans taken out by debtors in parallel with non-housing loans are more prone to deterioration. In 2024, the share of non-performing housing loans in the cohort of loans granted in 2021 averaged around 0.5%, while in the segment of housing loans taken out in parallel with non-housing loans which were disbursed in the period of six months before or after the disbursement of the housing loan, the average share of non-performing loans was twice as high (approximately 1.3%) (Figure 3).

C.2 Low credit risk in non-financial corporations, with a rise in risk

Owing to good business performance of corporates[8], their relative indebtedness held steady in 2024, despite increased borrowing from banks. As in 2023, corporate loans grew by 6.4% in 2024[9], with most of the growth being generated in the second half of the year. The growth accelerated further in the first quarter of 2025, to 12.2%. The main source of accelerated growth in loans to private non-financial corporations was lending to corporates active in the construction and real estate sectors, with a rise in lending to enterprises in the manufacturing and trade sectors. At the same time, public enterprises in the energy sector gradually reduced the indebtedness accumulated in the recent period of price spikes and uncertainty regarding the availability of energy products (Figure C.19).

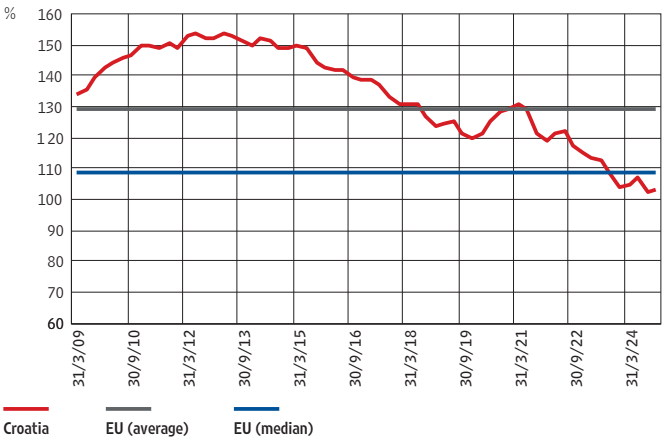
Good actual and expected business performance of non-financial corporations contribute to capital growth, which keeps their solvency risk at a low level. The growth of corporate capital, based on profits generated in 2023 and good business performance in 2024, safeguards enterprises against a sudden deterioration of the business environment. The use of capital to finance part of business activities reduces the need for borrowing, which contributed to a level of corporate indebtedness in Croatia that is low relative to the EU (Figure C.20).

Figure C.19 Construction and real estate activities contributed the most to the growth in loans to non-financial corporations



Note: Columns show contributions to the annual growth rate of loans to non-financial corporations.
Source: CNB.

Figure C.20 The indebtedness of the non-financial corporations sector in Croatia fell below the EU average



Notes: The figure shows the unconsolidated debt-to-GDP ratio. Unconsolidated debt includes liabilities arising from loans, debtors' loans and trade credits to other corporations.
Source: Eurostat.

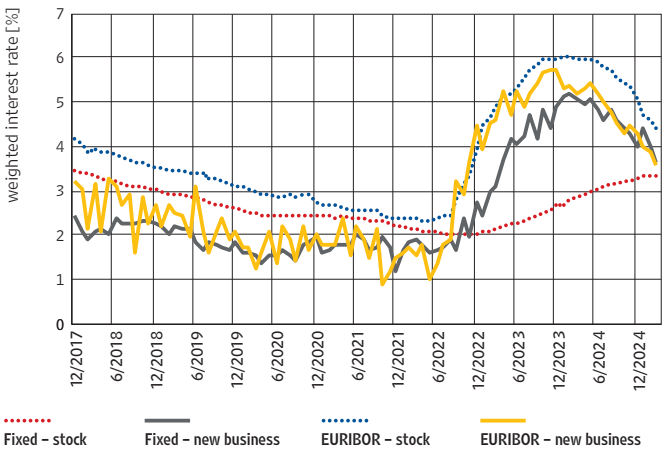
In addition to good business performance, the decrease in interest rates on loans that began in the second quarter of 2024 also made it easier for corporates to service their debt. In

8 The annual data for 2024 obtained from FINA on the operations of non-financial corporations were not available at the time of publication. However, business activity and consequently corporate performance may be assessed by the data on fiscalised receipts in 2024, which grew by around 11%. Also, trends in gross operating surplus suggest that margins were slightly lower than in the record-breaking year of 2023, but also that profitability remained high.

9 The growth rate of corporate loans would be 8.2% for 2024 if the effect of repayment of a syndicated loan by a large public enterprise at the beginning of 2024 is excluded.

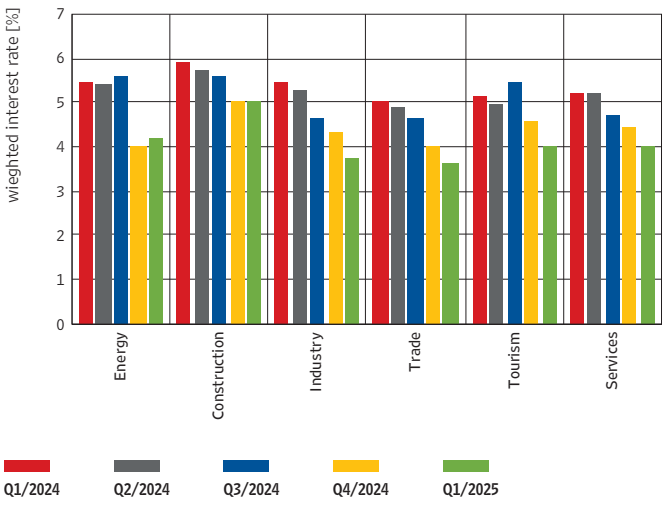
the period from May 2024 to February 2025, interest rates on newly granted loans contracted at variable interest rates linked to the EURIBOR declined by around 1.5 p.p., while the decline in interest rates on loans granted at fixed interest rates was slightly smaller and stood at around 1.2. p.p. Depending on the type of reference parameters applicable to loans granted at variable interest rates and the remaining maturity, the fall in market rates started to spill over to those on the stock of loans (Figure C.21). The decline in interest rates on newly granted loans was recorded in all activities but was least pronounced in the construction sector[10] (Figure C.22).

Figure C.21 Interest rates on new corporate loans started to decrease in mid-2024, which was also reflected in interest rates on the stock of loans



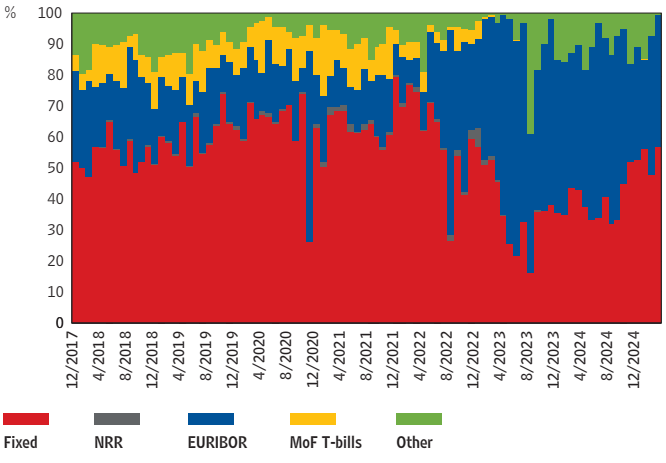
Source: CNB.

Figure C.22 The weakest fall in interest rates on new loans was recorded in construction



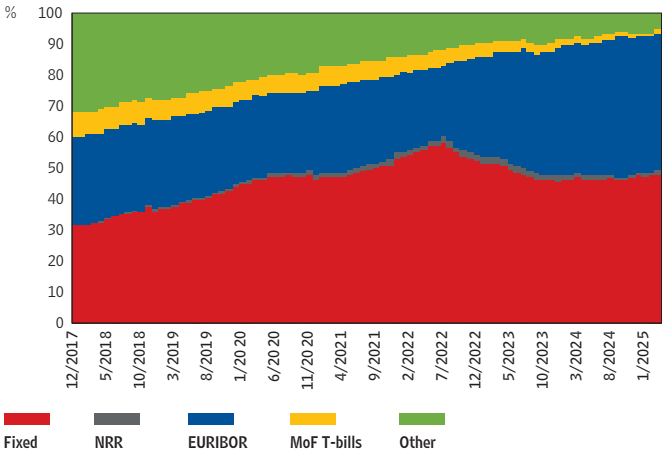
Source: CNB.

Figure C.23 Loans with a fixed interest rate linked to EURIBOR dominate newly granted corporate loans



Source: CNB.

Figure C.24 Portfolio of loans to non-financial corporations is divided into loans granted at fixed interest rate and loans linked to EURIBOR



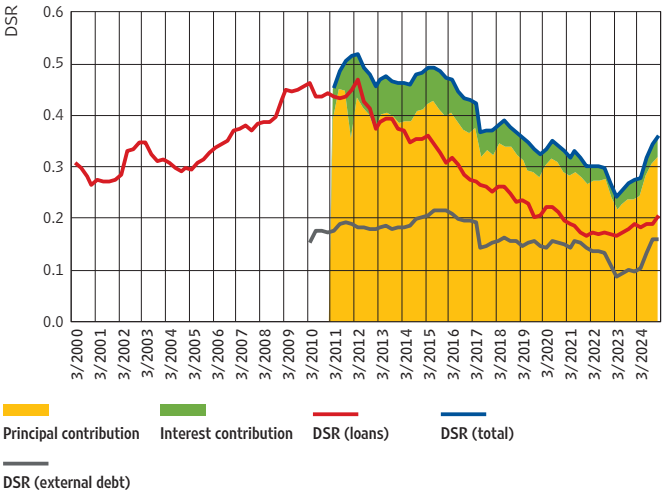
Source: CNB.

10 Loans to construction sector are cyclically sensitive and less collateralised.

An increase in the share of a fixed interest rate in the structure of corporate loans reduces their financing risks. Loans with fixed interest rates and those with variable interest rates linked to EURIBOR are equally represented in newly granted corporate loans (Figure C.23). This is due to increased granting of loans with a fixed interest rate over the past two years, which accounted for around 40% of all loans granted to corporates at the end of 2024. The large presence of fixed interest rates makes loan repayment costs predictable, thus helping corporations to manage interest rate risk (Figure C.24).

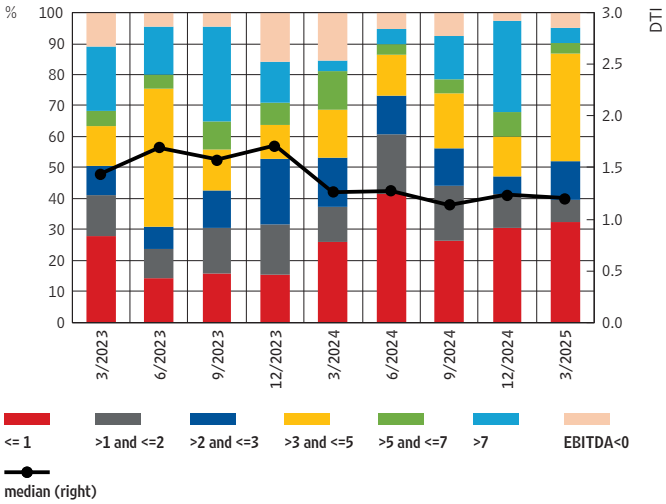
The debt repayment burden of corporates probably continued to increase in 2024 due to loan growth and a slight fall in gross operating surplus, even though it remained relatively low. Owing to relatively short average loan maturities, monetary policy is transmitted faster to interest rates on loans to non-financial corporations than to those on loans to households (Figure C.25). Therefore, the current environment of falling interest rates makes it easier for corporates to service their debt, which might further facilitate the increase in the quality of the average corporate client of banks in the future (Figure C.26). However, the escalation of geopolitical tensions and trade conflicts has led to an increase in risks for non-financial corporations. Thus, should extremely adverse scenarios materialise, the corporate sector might simultaneously face a decline in business activity and financing difficulties, which would be a double shock to the debt repayment burden.

Figure C.25 Debt repayment burden continued its upward trend in 2024



Sources: CNB and CBS.

Figure C.26 Riskiness of debtors with newly granted loans declined



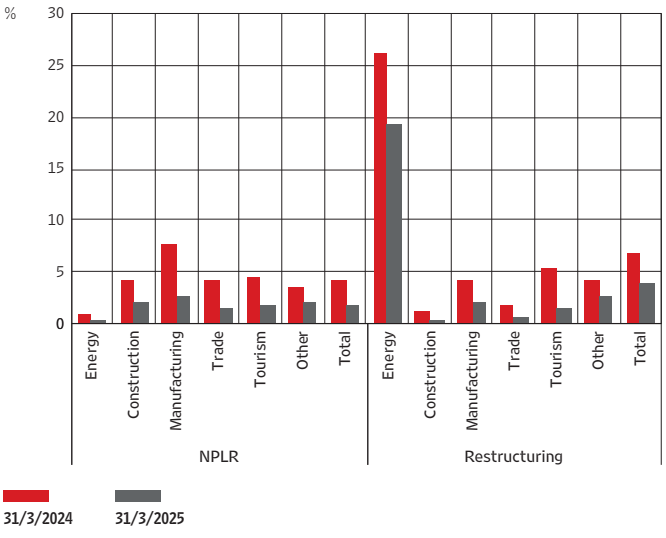
Notes: The figure shows corporate indebtedness, measured by the debt-to-EBITDA ratio, for enterprises that were granted a new loan in the period shown. Corporate debt includes all long-term and short-term interest-bearing liabilities and loans and deposit liabilities. The data on corporate debt and EBITDA are obtained from the financial reports for 2022 and 2023.
Sources: CNB and FINA.

Amid good corporate business performance, credit risk indicators for corporate loans remained low. The share of non-performing loans decreased in all activities in 2024, while loans with forbearance measures increased only in the energy sector, due to the restructuring of the exposure of some public enterprises (Figure C.27). Also, according to the results of the bank lending survey, corporate demand for loans, which increased at the end of 2024, was influenced not only by the fall in interest rates, but also by accelerated investment activity and the need to

finance inventories and working capital in a period of rapid economic growth, which are deemed to be "healthy" motives for borrowing and contribute to credit risk being lower in the future. However, a sudden deterioration in the macroeconomic environment can halt investment activity of corporates and, in extreme cases, lead to the abandonment of projects, which might generate losses and stranded assets.

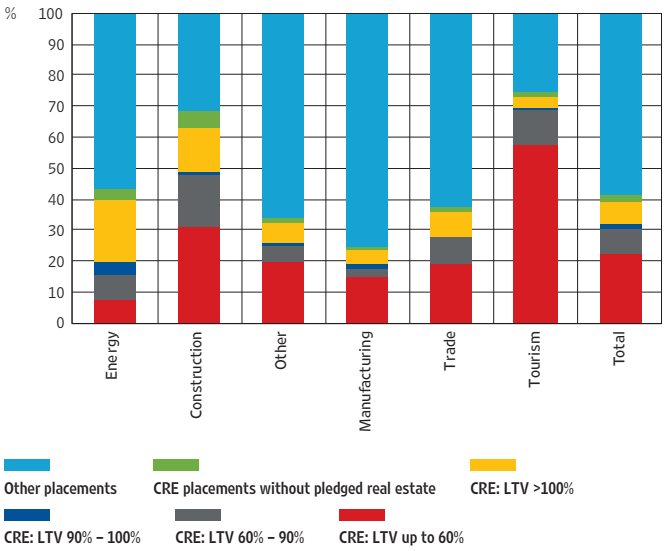
In the event of credit risk materialisation, the collection of receivables will significantly depend on the market value of the pledged commercial real estate. Commercial real estate is used as collateral in approximately 40% of all loans granted to corporates. The loan-to-value (LTV) ratio of these loans has remained stable at around 72%. In 2024, loans were granted at a slightly lower average LTV of 68%, which further reduced risks for creditors. However, there are large differences across activities related to the coverage of loans by collateral. The share of new loans with an LTV above 90%, which can be regarded as the marginal level of elevated risk, was the highest in energy and construction activities in 2024, while the share of new loans with LTV below 60%, that is, those where the value of real estate significantly exceeds the value of loan, was the highest in tourism (Figure C.28).

Figure C.27 Non-performing loans and loans with forbearance measures have been on a declining path over the past year, with the exception of the energy sector



Notes: The NPLR is the share of loans in stage 3, that is, those loans that generated loss, in total loans. The forbearance measures include the following types of changes in the loan agreement: instruments with amended interest rate to below market conditions, instruments with other amended conditions, refinancing – full or partial debt refinancing.
Source: CNB.

Figure C.28 Some 40% of newly granted corporate placements is accounted for by CRE placements



Notes: CRE placements are placements extended for the acquisition of commercial real estate or secured by commercial real estate. The term Tourism represents accommodation and food services activities. Newly granted placements are those granted in the period from 1 April 2024 to 31 March 2025.
Source: CNB.

Good corporate business performance, coupled with a fall in interest rates, has reduced short-term risks for non-financial corporations. However, due to growing geopolitical uncertainty, the total risks to their operations remained unchanged. Despite the currently high quality of loans and improved customer fundamentals, further escalation of geopolitical and trade tensions might weigh on corporates' capacity to service their fast growing debt. Supply chain disruptions can cause additional cost pressures, i.e. higher input prices, on top of the already

high labour costs. These business challenges, together with the politicisation of exports of critical raw materials, can also slow down the green transition of corporates and hamper efforts to mitigate transition risk in the economy, while at the same time physical climate risks are increasingly causing asset damage, operational disruptions and a decline in business efficiency in some activities (see Box 4 Physical climate risk in Croatia and Box 5 Transition climate risk in Croatia).

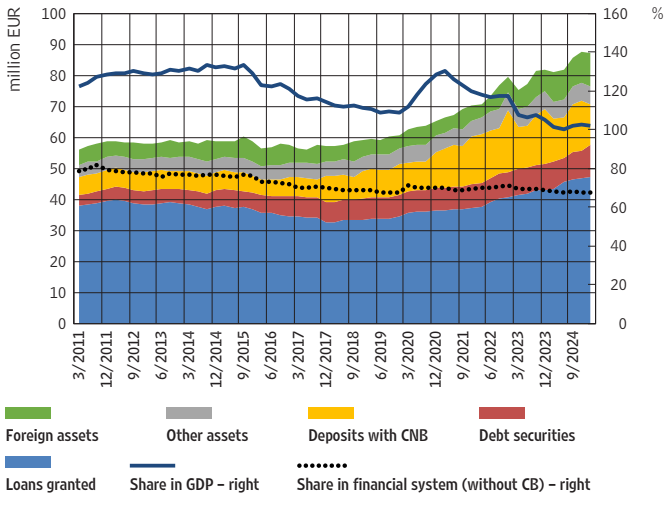
D Risks to credit institutions' operations

Despite the high profitability of banks consequent upon high interest rates, strong lending activity and low credit risk, their business environment is becoming increasingly challenging. A decrease in lending interest rates and the narrowing of net interest margin, which follow the easing of the ECB's monetary policy restrictiveness, will result in a gradual decline in profitability. Deposit interest rates are also on the decrease, reducing the costs of bank funding and offsetting to some extent the negative effect of a decrease in interest income on profitability. However, the high level of uncertainty, accompanied by growing volatility in financial markets and the expected slowdown in global economic growth could affect the domestic economy and have a negative impact on the financial sector. Credit institutions also face challenges related to cybersecurity and climate transition, which increase operating costs in the short term, but in the long term contribute to strengthening their resilience.

D.1 Accelerated growth of lending to domestic sectors and increase in investments in debt securities and foreign assets

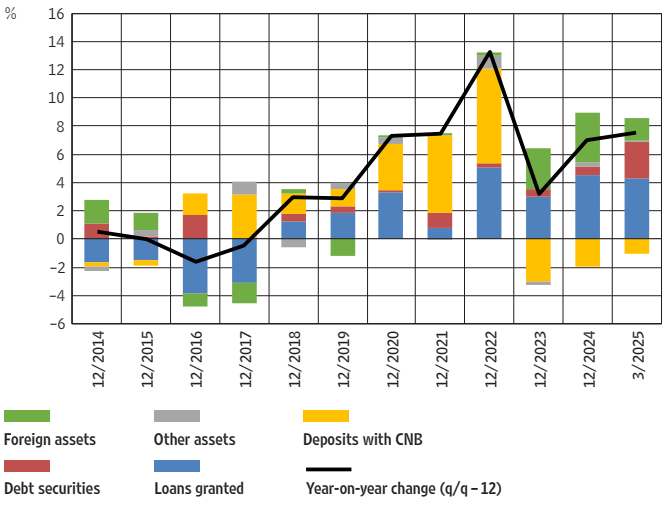
Banking sector assets increased sharply in 2024 and continued to grow in early 2025 (Figure D.1). Banking sector assets totalled EUR 87.3bn at the end of March 2025, growing at an annual rate of 7.5%, due to accelerated corporate and household lending (for more information see chapter C The risks of lending to the private non-financial sector), but also to a significant increase in investments in debt securities and foreign assets, which offset a decrease in highly liquid assets with the central bank (Figure D.2). This reallocation, by which banks reduce highly liquid deposits with the central bank and increase exposure to longer-term and less liquid forms of assets with higher yields, is primarily motivated by their efforts to ease the negative impact of the ECB's benchmark interest rates on interest income.

Figure D.1 Although banking sector assets grow, their share in total financial system assets decreases



Source: CNB.

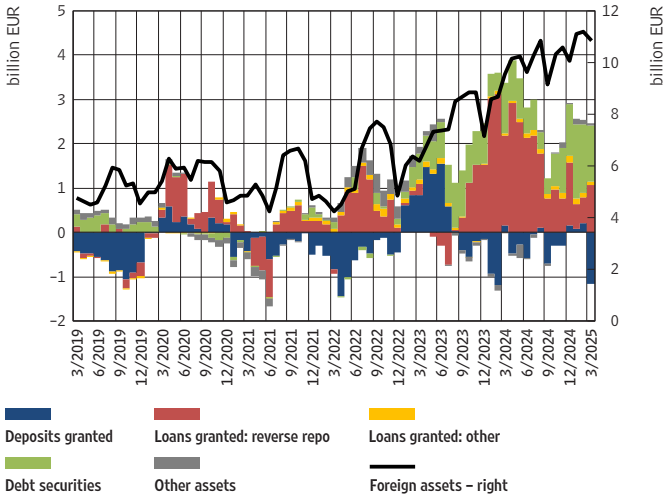
Figure D.2 Loans granted, debt securities and foreign assets are major drivers of change in assets



Note: The figure shows the annual rate of change in asset components.
Source: CNB.

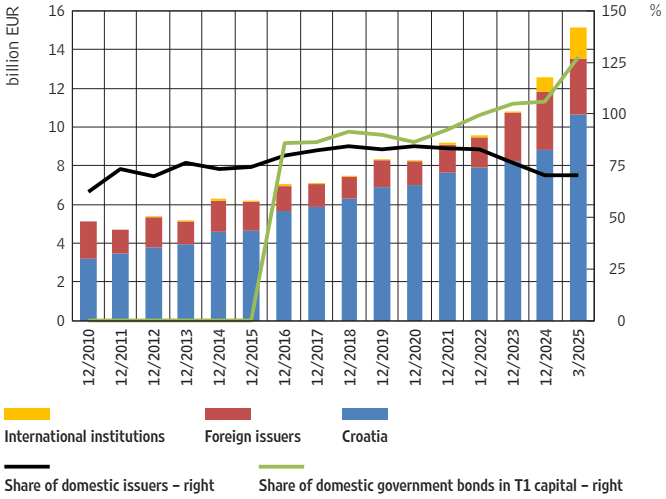
The growth of foreign assets of banks increases their exposure to developments in international markets. The banking system, net foreign creditor since 2016, further strengthened this position in 2024 due to a surge in foreign assets (50% annually), with these assets exceeding EUR 11bn several times in 2025. The main drivers of foreign asset growth were placements to debt securities and short-term reverse repo transactions, mainly to parent banks (Figure D.3). Such a rise in foreign financial ties increases the vulnerability of domestic banks to shocks from foreign markets, which, amid heightened market tensions, can act as a significant channel for risk transmission.

Figure D.3 Foreign asset growth is driven by investments in debt securities and reverse repo loans



Note: The figure shows the annual rate of change in asset components.
Source: CNB.

Figure D.4 Growth of investments in domestic debt securities



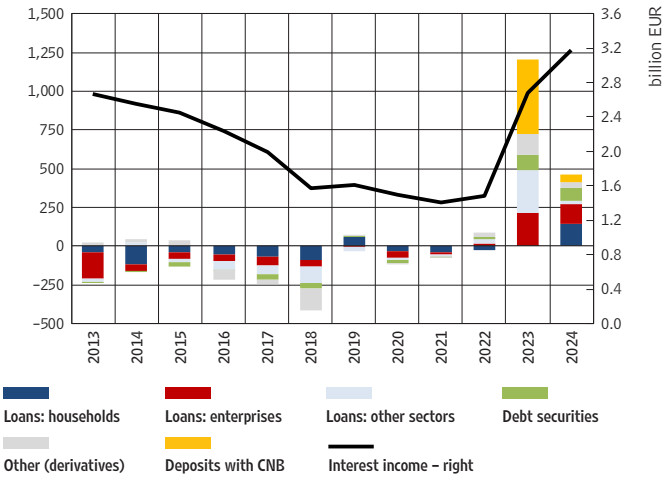
Source: CNB.

The growth of investments in domestic government bonds additionally increases the already large exposure of banks to the central government. The banking sector's total exposure to government bonds exceeded EUR 15bn at the end of March 2025, amounting to more than 17% of total assets. The growth of investments in domestic government securities, which exceeded the common equity tier 1 (CET1) capital level as early as at the end of 2023 to stand at about 120% of CET1 in March 2025 (Figure D.4), deepens the interdependence of fiscal sustainability and financial stability, which is especially important in the context of the 2024 budget deficit growth caused by wage expenditures. In addition, despite a drop in the debt-to-GDP ratio, given the announced needs for larger defence investments, the deterioration of fiscal indicators may have an increasing impact on the financial sector.

Bank interest income grew in 2024 as a result of accelerated lending and elevated interest rates, but its growth dynamics decelerated considerably. The growth of interest income was equally affected by credit growth and by increases in interest rates on corporate and household loans (Figure D.5), coupled with higher yields on the increased bond portfolio. Central bank income also rose, albeit at a considerably more moderate dynamics than in 2023. As the ECB started to reduce key interest rates in mid-2024, continuing this in early 2025, the share of income

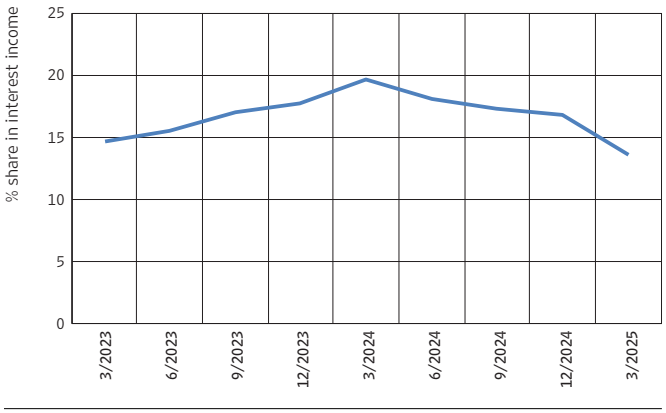
from overnight deposits in the total interest income of banks started to drop (Figure D.6), which prompted banks to diversify and shift part of this portfolio to market instruments with higher yields.

Figure D.5 Income from interest-bearing assets continues to grow



Note: The figure shows the annual rate of change in asset components.
Source: CNB.

Figure D.6 Share of central bank income in total interest income decreases



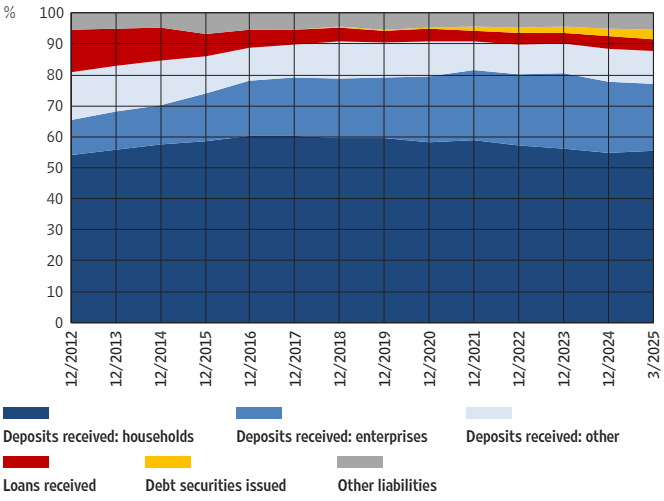
Source: CNB.

D.2 Reduction in the financing costs of credit institutions

Private sector deposits are still the main source of bank funding, although increasingly less important. Following a brief slowdown in 2023, household deposits, the largest component of the liability structure, continued their steady, years-long growth (Figure D.7). Loans received and debt securities issued (Figure D.8) also increased, the latter mainly due to compliance with regulatory requirements, the MREL in particular, whereas some institutions also issued debt instruments recognised as additional capital.

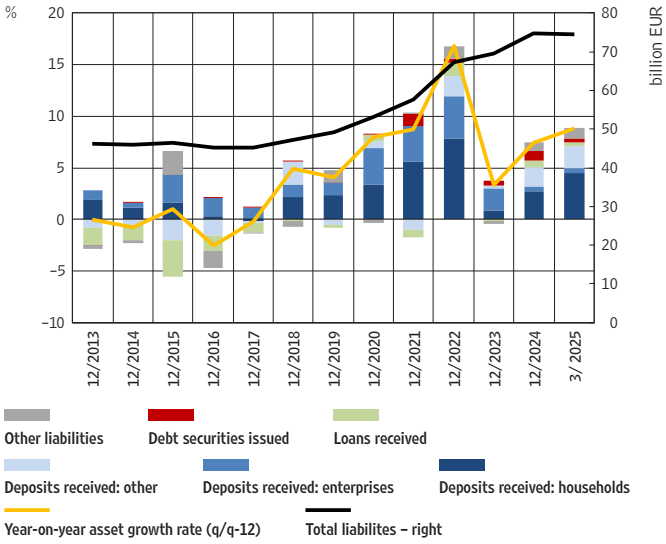
After two years of growth, the bank funding cost started to decrease in mid-2024, in agreement with a turn in the ECB's monetary policy. This cost had initially grown on the back of increases in market interest rates and the rising share of time deposits (Figure D.), but the reduction of the ECB's key interest rates prompted an adjustment in interest rates on new time deposits and the stabilisation of the deposit structure. As a result, cost-side pressures on banks decreased, while the funding cost dropped slightly and may continue the trend in 2025.

Figure D.7 Liability structure has remained stable, with the share of debt instruments edging up further



Source: CNB.

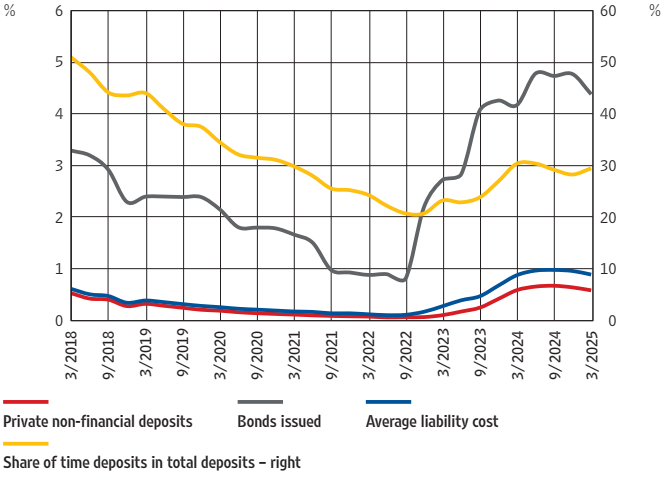
Figure D.8 Household deposits remain the main drivers of liability growth



Source: CNB.

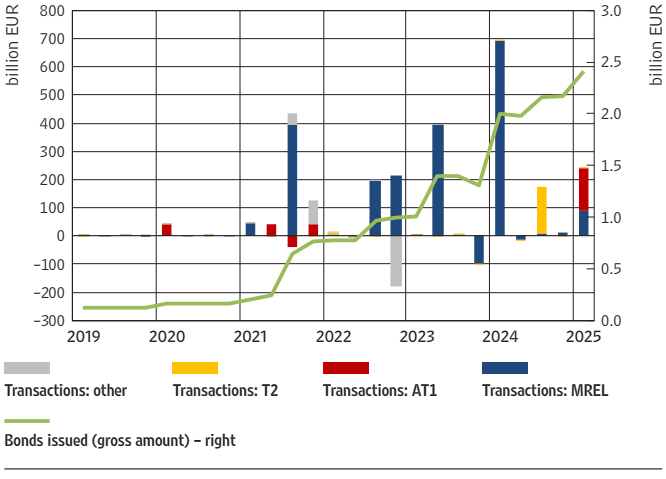
The amount of debt securities issued increased sharply in 2024 (Figure D.10). In the first half of 2024, banks mainly issued MREL instruments, focusing more on instruments recognised as additional capital in the second half of the year (Figure D.10). This trend continued in early 2025, in the context of compliance with regulatory requirements and the capital structure optimisation. Further action on the capital structure will depend on bank strategies and plans to replace existing MREL instruments. Although the issuance of MREL instruments contributes to bank resolvability, these instruments are more expensive than traditional deposits, while replacing the more expensive CET1 capital with the cheaper Tier 2 capital obligates banks to pay fixed fees, which can prove to be an additional burden in a potentially unfavourable environment.

Figure D.9 Cost of liabilities and the share of time deposits started to decrease



Source: CNB.

Figure D.10 Increase in the issues of MREL instruments and additional own funds

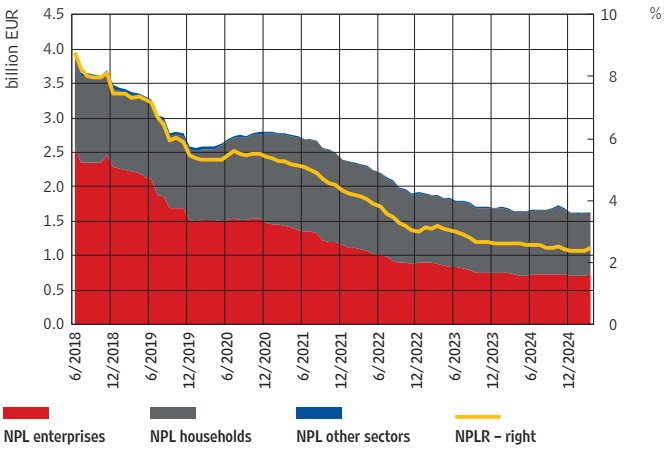


Source: CNB.

D.3 Continued improvement in credit institutions' asset quality

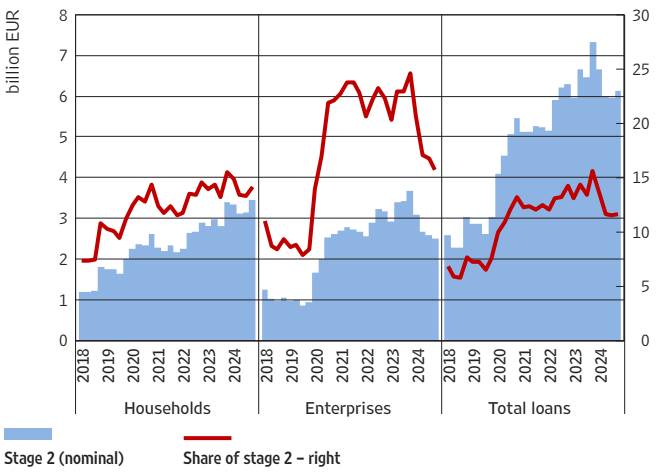
Credit institutions' asset quality continued to improve in 2024 (Figure D.11). As a result of good business results of enterprises and the strong growth of real wages, which supported the loan repayment capacity, the non-performing loan ratio (NPLR) fell to a historical low of 2.4% at the end of 2024. The NPLR decreased due to a fall in the nominal amount of non-performing loans and the growth of total credit exposure, caused equally by the corporate sector and the household sector. However, although standing at a historical low, the NPLR in Croatia still exceeds the euro area average, while the coverage of these loans is higher.

Figure D.11 Non-performing loan ratio at a historical low



Source: CNB.

Figure D.12 Stage 2 loans decreased in 2024



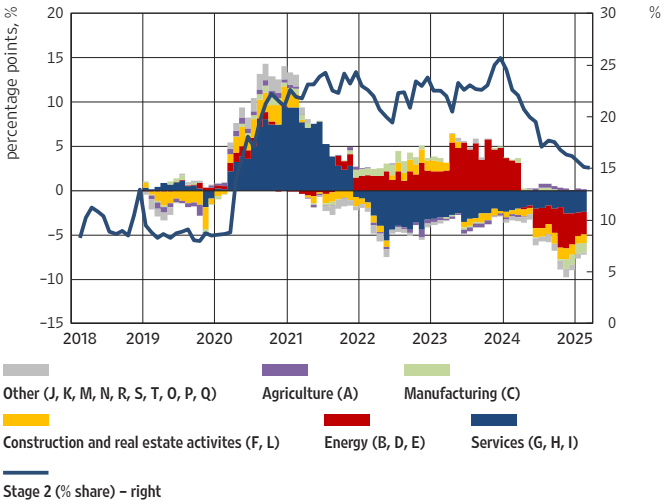
Source: CNB.

After growing steadily for a long period, loans with a significant increase in credit risk (stage 2 loans) reversed the trend in 2024. The corporate sector recorded the sharpest decrease in stage 2 loans (Figure D.12): their nominal amount fell by almost one third and their share in total loans by 9 percentage points (Figure D.13). All economic activities recorded a fall, the steepest in energy and tourism, the key determining factors being the higher repayment of liabilities and the reclassification of loans from stage 2 to stage 1 and, of a small number, to stage 3. The concentration of stage 2 loans increased (Figure D.14). The amount of stage 2 loans in the household sectors remained unchanged, but, due to loan growth, their share in total loans fell by 1.5 percentage points. In addition, the cure rate has been growing since 2021, whereas the deterioration rate fell in 2024 (Figure D.16).

The heightened level of geopolitical and economic uncertainty could adversely affect economic activity, indirectly leading to a deterioration in the loan portfolio quality. Activities such as tourism, hotels and restaurants and trade could face a decline in foreign demand and

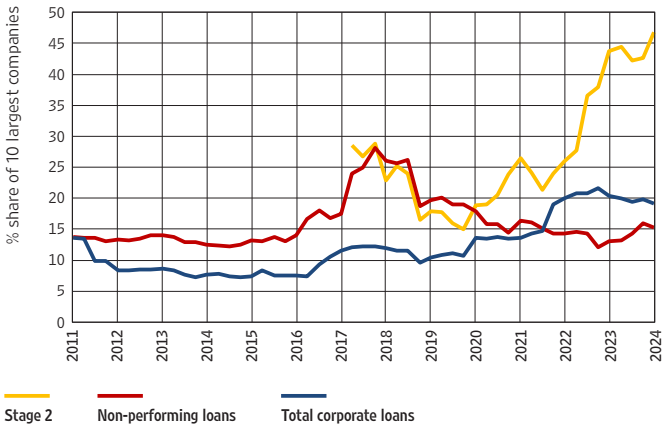
bottlenecks in supply chains, while export-oriented activities could face a decrease in demand due to weakened global trade, with a possible simultaneous increase in energy costs. Also, the high growth rates of lending to cyclical sectors, such as construction and real estate activities, further increase the vulnerability of asset quality to macroeconomic shocks.

Figure D.13 Decrease in share of stage 2 loans primarily influenced by developments in services and energy sectors



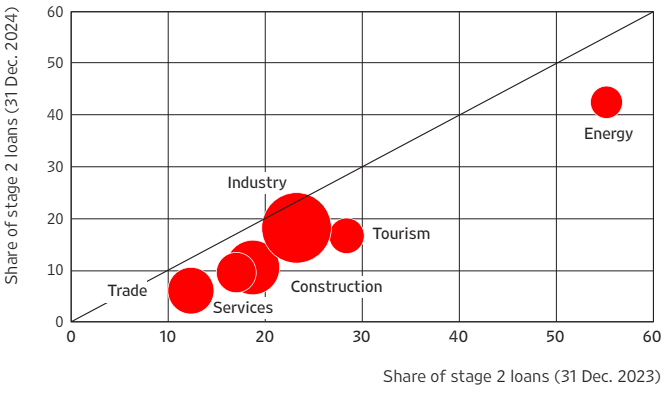
Source: CNB.

Figure D.14 High concentration of stage 2 corporate loans



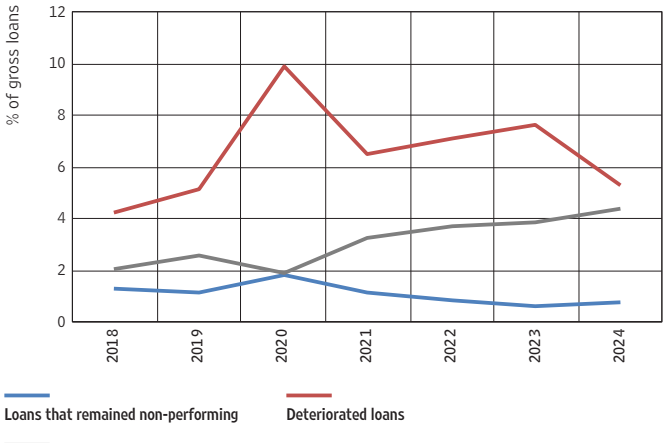
Source: CNB.

Figure D.15 Share of stage 2 loans in all activities decreased in 2024



Notes: The circles positioned below the line at an angle of 45 degrees mark a decrease in the share of stage 2 at the end of 2024 from the end of 2023. The size of each circle is proportionate to the amount of exposure in each particular activity. The industry sector includes activities A, B, C and E, the energy sector includes activity D, the construction and real estate activities sector includes activities F and L, the trade sector activity G, the tourism sector activity I and the services sector includes activities H, J, M, N, O, P, Q, R and S.
Source: CNB.

Figure D.16 Difference between deteriorated and cured loans decreases

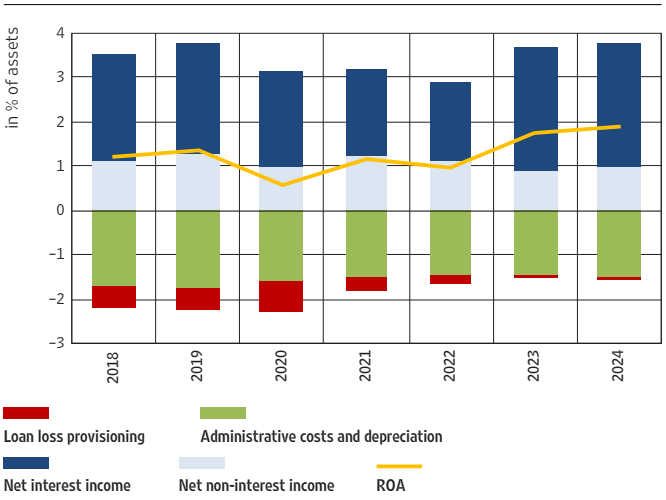


Notes: Cured loans are those that were reclassified from stage 2/3 to stage 1 and from stage 3 to stage 2. Deteriorated loans are those that were reclassified from stage 1/2 to stage 3 and from stage 2 to stage 3.
Source: CNB.

D.4 Credit institutions' profitability has reached a historical high, showing indications of a possible reversal

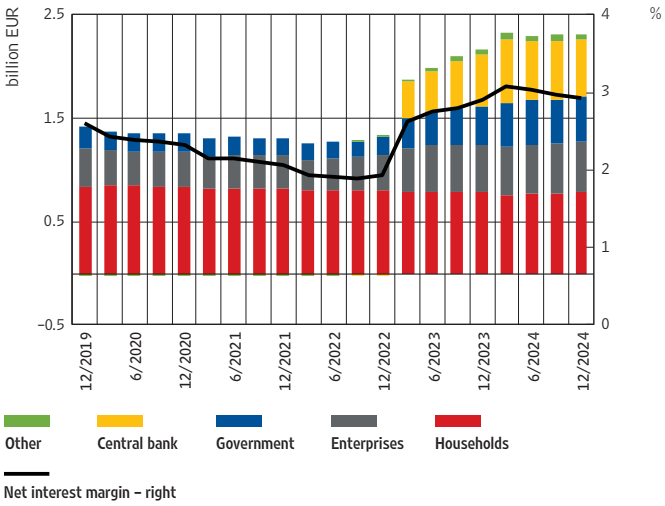
Higher interest rates and a favourable macroeconomic environment in 2024 supported the profitability of credit institutions. Profitability peaked at mid-2024, with return on assets reaching 1.9% annually, a rise of 0.1 percentage points from 2023. (Figure D.17). The growth of net interest income was generated by banks' operations within all sectors but primarily by interest income from reserves with the central bank. An increase was also recorded in all items of net non-interest income, in particular in gains on financial liabilities trading, dividend income and net fee and commission income. Operating expenses also grew relatively slightly, primarily due to an increase in labour costs in an environment of elevated inflation and additional investments in digitalisation, while value impairment expenses remained relatively low.

Figure D.17 Credit institutions' profitability reached a record high in 2024



Source: CNB.

Figure D.18 Net interest income peaked in the first half of 2024



Note: Net interest margin is the ratio of net interest income to average interest-bearing assets.
Source: CNB

Net interest margin had grown considerably since early 2023 amid a sharp rise in interest income and a relatively mild increase in the funding cost (Figure D.18), but the trend reversed at mid-2024. Under the influence of strong credit growth, higher average interest rates and a moderate rise in deposit rates, net interest income from household and corporate placements continued to grow in the period from March to December 2024, maintaining a steadily high net interest margin. In contrast, due to a decrease in the deposit facility rate, net interest income from placements to the central bank decreased and was the main reason for the reduction of net interest margin.

Banks' profitability is expected to decline gradually, but remain well above the average of the last decade. As a result of a downward trend in market rates, which started to spill over to new corporate loans in mid-2024 and to new household loans at the beginning of 2025, especially in the dominant segment of housing lending at fixed interest rates, net interest income is expected to fall. In addition, the announced macroprudential policy measures could subdue lending

activity in the short term, but the reduction of risk costs and the strengthening of financial stability could lower credit risk in the long term. The key factors for the maintenance of the long-term profitability of credit institutions will be their cost management and asset quality.

At a time of accelerated digitalisation and growing geopolitical uncertainty, cyberattacks are a growing threat to financial stability. Digitalisation has increased the operational efficiency of credit institutions, but at the same time has created complex and interconnected systems, increasingly exposed to sophisticated cyber threats. In the aftermath of the pandemic, the number of attacks more than doubled with increasing damage inflicted, moving cyber risks from the category of classic operational risk to that of serious systemic threat. Interconnections between financial institutions further increase the likelihood of negative effects being transmitted to the wider system, in particular in the event of incidents leading to disruptions in critical functions such as payment operations. However, unlike traditional financial risks, which can often be predicted using early warning indicators, cyber-attacks usually occur suddenly, without clear prior signals, which makes it difficult to prepare effectively and react in a timely manner, i.e. limit damage. Regulators have identified cybersecurity as a source of growing financial stability risks and responded with a number of initiatives, including the Digital Operational Resilience Act (DORA)[11].

Climate risks are important structural challenges to the stability of credit institutions. Due to continued adverse climate changes, physical climate risk in Croatia has continued to increase as more frequent extreme weather events, such as floods, droughts and fires, lead to increasing damage to households and enterprises (see Box 4 Physical climate risk in Croatia). In contrast, transition climate risk in Croatia is decreasing, because of investments in renewable energy sources. However, in times of global geopolitical uncertainty, the risk of a slowdown of the green transition is also increasing, which may increase risk to the operation of enterprises and pose new challenges to financial stability (see Box 5 Transition climate risk in Croatia).

11 The Digital Operational Resilience Act is a European regulatory framework that applies from 17 January 2025 and aims to strengthen the ability of financial institutions to resist, respond to and recover in a timely manner from information and communication technology (ICT) disruptions, including cyber-attacks and technical failures. DORA adopts a unified approach to operational risk management in the EU and covers more than 20 types of financial entities, including banks, insurers, investment firms and ICT service providers.

Box 4
Physical climate risk in Croatia

The intensification of climate change exacerbates the degradation of the human environment and overall economy, posing a growing risk to financial stability. In addition to adverse global and climate developments, Croatia's geographic specificities also increase its exposure to physical climate risks. The identification and quantification of these risks is therefore a necessary step for the preservation of financial stability. Based on the currently available data and methodologies, physical climate risk to financial stability in Croatia is assessed as material, especially taking into account the persistence of adverse climate changes and the fact that all credit institutions' placements are to some degree exposed to this risk.

Physical climate risks are associated with direct and indirect damage resulting from climate change and extreme weather events[1]. In addition to long-term changes such as rising sea levels, prolonged droughts and changing precipitation patterns, these risks include acute risks such as storms, floods and fires. The consequences of such climate events include damage to property, infrastructure and natural resources, but also a decrease in labour productivity (e.g. due to extreme temperatures leading to limitations in business processes). In addition, physical risks often have secondary macroeconomic effects, such as rising food and energy prices that exacerbate inflationary pressures and worsen the financial position of households and enterprises. This analysis focuses on physical climate risk, which differs from transition climate risk in that it results from the material consequences of climate changes rather than from changes in policies, technology or market conditions linked to decarbonisation. However, these risks are closely linked, as a delayed or insufficient transition to a low-carbon economy increases the likelihood and intensity of physical consequences, such as extreme weather events.

Credit institutions are mostly indirectly affected by physical climate risks[2], through the weakened financial position of clients. Decreased creditworthiness of borrowers leads to increases in incurred and expected losses for lenders and in value impairment expenses and, consequently, to lower profitability. At the same time, however, as a result of climate-related events or increased risk perception, credit institutions are finding it increasingly difficult to attract new clients that have growth potential or eligible collateral. In such an environment, where climate risks are increasingly affecting the economy and the financial system, their identification, quantification and effective management are becoming a necessary prerequisite for preserving financial stability.

1 According to the EU Environment Agency (Copernicus), 2024 was the warmest year on record and the first in which the average temperature was more than 1.5 degrees higher than in the pre-industrial period. Also, according to data released by the Croatian Firefighting Association, close to 27,000 hectares of forests and vegetation were burned in 2024, an increase of more than 400% compared to 2023.

2 Given the low share of banks' physical assets (the share of tangible and acquired assets is lower than 1%), physical climate risk poses a lower direct threat.

Since extreme physical events are rare, have strong consequences and require the inclusion of new dimensions into analyses, physical climate risk modelling is a challenging exercise. Although there are some similarities with the transition climate risk score, the physical climate risk score is conceptually closer to the risks of occasional (rare) events, such as operational and geopolitical shocks. Also, due to the continuous change of the climate environment, such as earth warming or sea level rise, past events do not necessarily provide a good sample for the analysis and prediction of the future, which is why it is necessary to use specialized data sources and adapt methods. Finally, given the specificity of this risk, in order to take into account the geographical specificities of the subject of analysis, spatial analyses are needed, for which there is often a lack of experience and data.

In order to analyse physical climate risk in Croatia, it is important to understand the country's strong geographic variety, which exposes it to various calamities: storms, floods, heat waves and fires. The coastal areas, especially Dalmatia, are increasingly affected by forest fires and storms, which jeopardise tourism, property and infrastructure. Inland Croatia, especially Slavonia and Posavina, is threatened by floods and torrential waters as well as by increasingly frequent storms and extreme temperatures, which adversely affect agriculture and the health of the population.

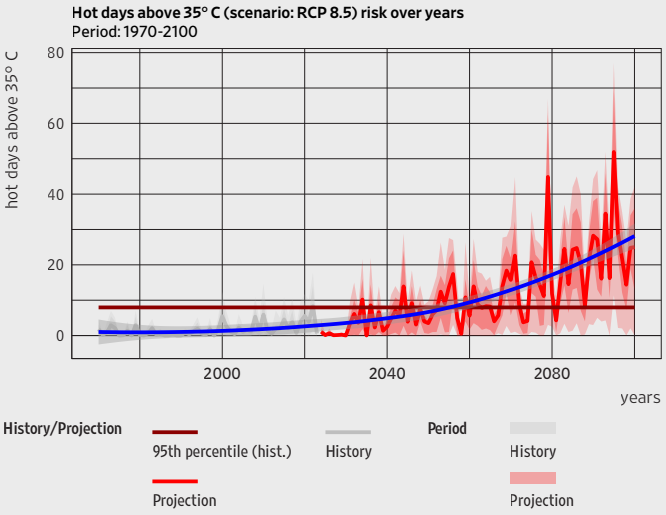
The assessment of physical climate risks for Croatia is based on an extensive dataset that includes climate and spatial data, reported damage from climate hazards and an assessment of the impact on financial stability and the regional distribution of banks' exposures. Climate data have been obtained from the Copernicus database[3] and linked to geographical data on Croatia[4] at the municipality level, which enables an analysis of the exposure of specific locations to climate changes. The analysis used 29 climate variables with historical values from 1970 and projections until 2100 according to the RCP 4.5 scenario (mid-century stabilisation of greenhouse gas emissions) and the RCP 8.5 scenario (continued growth of emissions without limits; Figures 1 and 2).[5]

3 Copernicus is Europe's leading climate change monitoring programme (https://cds.climate.copernicus.eu/datasets/sis-ecde-climate-indicators?tab=download). The global model MPI-ESM-LR and the regional model RCA4 were used. The following scenarios were used: Historical, RCP4.5 and RCP8.5, Origin: Projections, Reanalysis; https://climate-adapt.eea.europa.eu/en/metadata/indicators/river-flood.

4 https://ec.europa.eu/eurostat/web/gisco

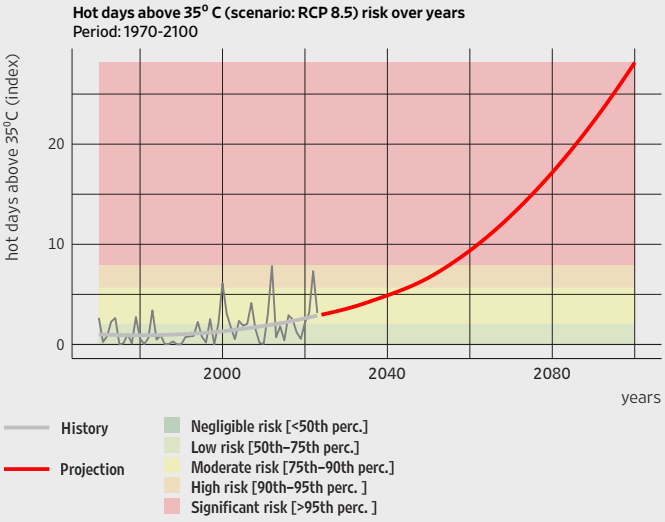
5 Time series are smoothed with a nonlinear regression model (LOESS) to eliminate oscillations and preserve the trend.

Figure 1 Presentation of a meteorological variable: the number of days in a year with temperatures above 35°C according to RCP 8.5 scenario



Note: The projection is smoothed using local polynomial smoothing (LOESS).
Sources: Copernicus and CNB calculations

Figure 2 Presentation of a risk level assessment and the projection of hot days above 35°C



Note: The projection is smoothed using local polynomial smoothing (LOESS).
Sources: Copernicus and CNB calculations.

A crucial step in the analysis of physical climate risks is the linking of specific geolocations and the specific exposures of credit institutions. As data on placements are not available for lower geographical units, the analysis was carried out at the municipal level, where for each municipality the risk of a physical climate event is classified into five categories, ranging from a negligible (below the 50th percentile) to a significant one (above the 95th percentile).[6] To aggregate related risks, the variables for each geographical unit are grouped into four sub-indices[7] of climate risk according to the two scenarios described: 1) the index of storms is based on precipitation, extreme precipitation and strong wind; 2) the index of fires includes dry days, wind and historical data on fires; 3) the index of heat waves is based on temperatures above 35°C and the length of heat periods; 4) the index of floods includes extreme precipitation and flood recurrence intervals. Finally, to calculate a comprehensive vulnerability index (CRVA[8]), four sub-indices are weighted by the amount of reported damage from natural disasters at the county level in order to obtain an index that can be associated with individual loans.[9] In order to assess the exposure of banks to physical climate risk, CRVA indices are linked to the values of collateral and loans by administrative units, based on the postal code of the cadastral municipality or the domicile of the borrower (Figures 3 and 4).

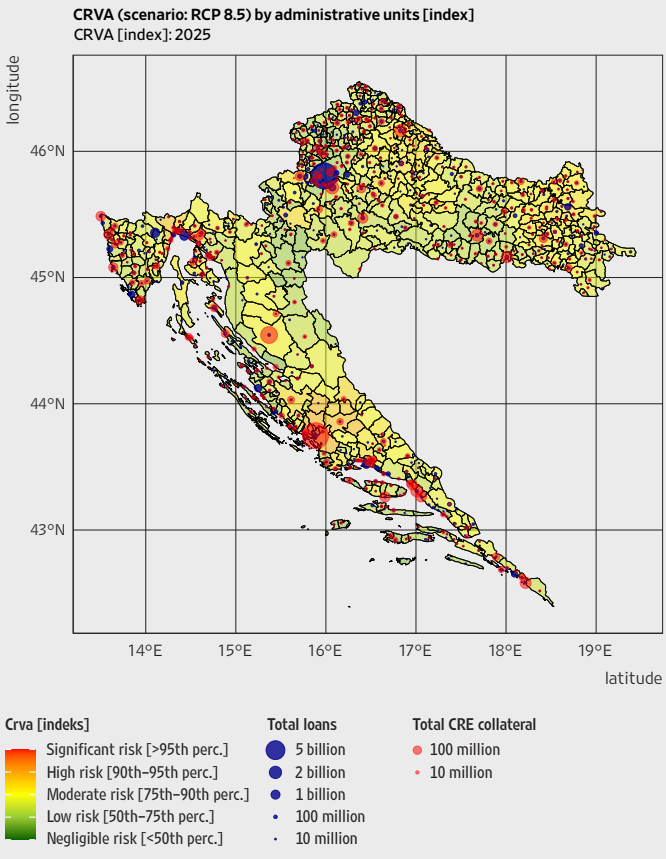
6 Specifically, risk is classified into five categories: 1 - negligible risk (values below the 50th percentile), 2 - low risk (values between the 50th and 75th percentile), 3 - moderate risk (values between the 75th and 90th percentile), 4 - high risk (values between the 90th and 95th percentile) and 5 - significant risk (values above the 95th percentile).

7 Meteorological variables have been selected according to the availability of data and the consistency of meteorological models applied.

8 Climate Risk Vulnerability Assessment

9 Due to differences in data granularity, the same weight is applied to all municipalities and cities within a county. Source: https://mfin.gov.hr/istaknute-teme/koncesije-i-drzavne-potpore/prirodne-nepogode/prijavljene-stete-po-vrstama-prirodnih-nepogoda-po-zupanijama/3050

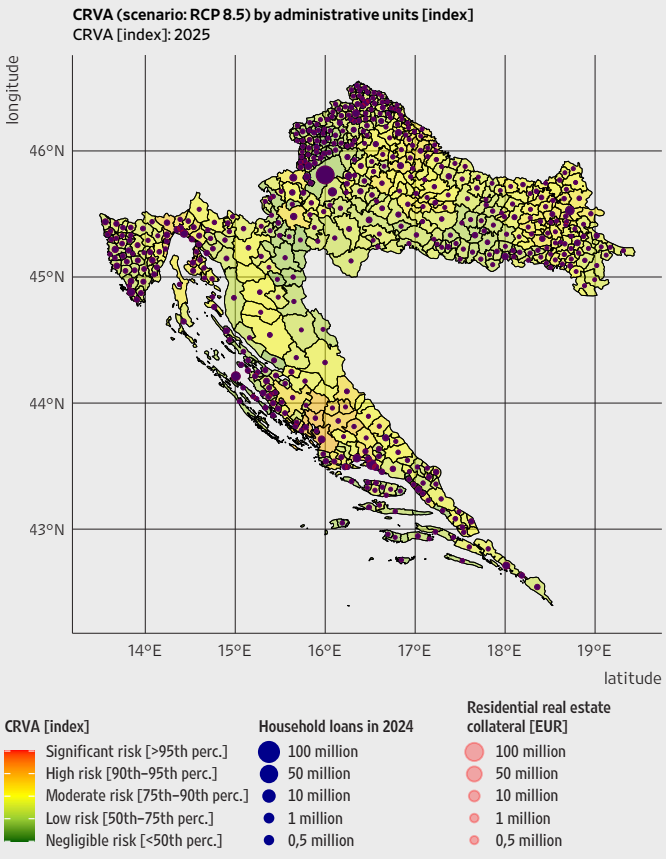
Figure 3 Geolocations of loans to non-financial corporations and corresponding collaterals



Note: The figure shows the estimate of the physical climate risk index (CRVA) by administrative units (cities and municipalities) and the locations of the head offices of borrowers and the corresponding commercial real estate collateral. The sizes of circles mark the amounts of loans and the collateral pledged on a logarithm scale due to the large range of the values.

Source: CNB calculations based on Copernicus and CNB data.

Figure 4 Geolocations of housing loans to households and corresponding collaterals

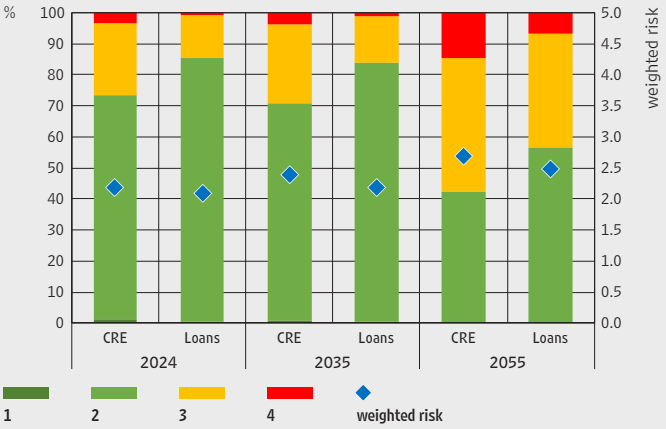


Note: The figure shows the estimate of the physical climate risk index (CRVA) by administrative units (cities and municipalities) and the locations of the head offices of borrowers and the corresponding residential real estate collateral. The sizes of circles mark the amounts of loans and the collateral pledged on a logarithm scale due to the large range of the values.

Source: CNB calculations based on Copernicus and CNB data.

Based on the calculated CRVA index for the geographical unit and the spatial allocation of loans, the vulnerability of individual loans to physical climate risk was determined. In the case of non-financial corporations, the corresponding collateral is commercial real estate, while in the case of household loans, the corresponding collateral is residential real estate (Figures 5 and 6). Household loans and housing loan collateral exhibit similar degrees of vulnerability, given that housing loans are in most cases granted for the purchase of real estate that is also used as collateral, while being physically present in the same locations where the borrowers reside. In contrast, loans to non-financial corporations show a larger potential for spatial divergence as the head office of an enterprise and the location of collateralised tangible assets are not necessarily at the same address (as represented by the mismatch of red and blue circles in Figure 3), which makes the assessment of exposure more difficult.

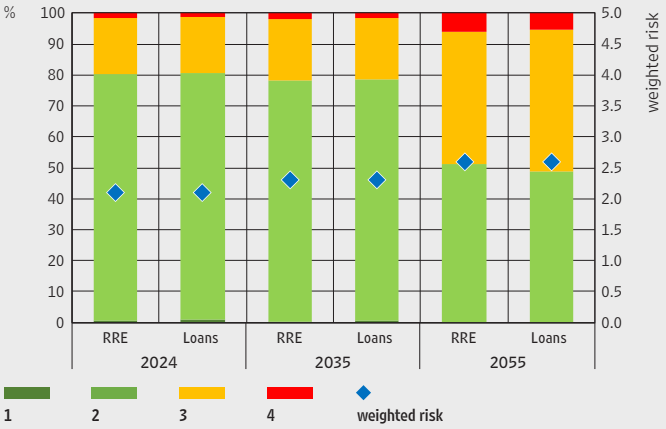
Figure 5 Loans to non-financial corporations and corresponding collateral by the levels of CRVA risk



Note: The figure shows a projection of exposure of collateral of commercial real estate (CRE) and loans to non-financial corporations by physical climate risk indices (CRVA) for 2024 and the projections of CRVA indices for 2035 and 2055.

Source: CNB calculations based on Copernicus and CNB data.

Figure 6 Housing loans to households and corresponding collaterals by the levels of CRVA risk

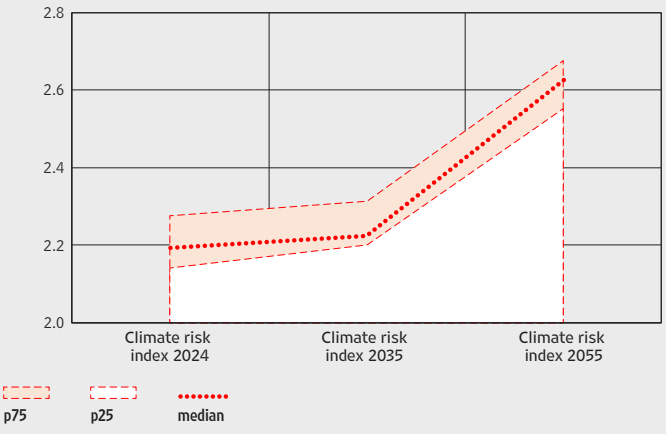


Note: The figure shows a projection of exposure of collateral of residential real estate (RRE) and loans to non-financial corporations by physical climate risk indices (CRVA) for 2024 and the projections of CRVA indices for 2035 and 2055.

Source: CNB calculations based on Copernicus and CNB data.

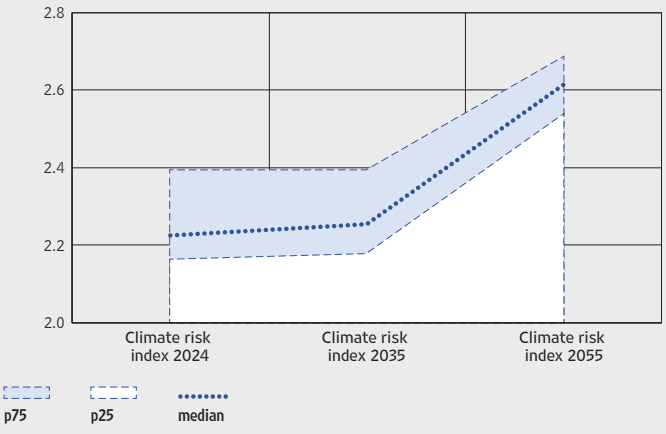
The results obtained can be used for the analysis of the future indirect impact of climate changes on the operation of credit institutions. Judging by the expected trajectory of climate events and assuming an unchanged structure of placements and the absence of a robust climate policy, the climate risk for banks in Croatia could increase. Due to the impact of climate change, the interquartile range of the CRVA index for banks in Croatia would increase in the following 30 years from 2.1-2.3 to 2.6-2.7 for corporate loans and from 2.2-2.4 to 2.5-2.7 for housing loans (Figures 7 and 8). Also, if the concentration of the housing stock and the business activity of enterprises in larger cities were to increase in the meantime, physical climate risk would become more concentrated in a smaller number of geographical locations, which would increase the severity of a possible shock.

Figure 7 Distribution and expected path of physical climate risk for loans to non-financial corporations, by banks



Source: CNB calculations.

Figure 8 Distribution and expected path of physical climate risk for housing loans, by banks



Source: CNB calculations.

To conclude, in contrast with transition climate risk (for more details see Box 5 Transition climate risk in Croatia), physical climate risk in Croatia has continued to grow. Continuing climate changes increase the exposure of households and enterprises to physical climate risk, which is indirectly transferred to credit institutions, despite their efforts to mitigate climate risks. This analysis of physical climate risks is only the first step, as the comprehensive quantification of physical climate risk requires further action, including a thorough assessment of the current coverage of this risk in the balance sheets of credit institutions. Better quality of physical risk assessment can also be achieved by improving the geolocation data granularity, especially regarding estimates of exposure to physical climate risk of remote branches and production facilities.[10] Considering that major physical climate events can materialise very rapidly, a timely and precise management of these risks is a key precondition for the preservation of financial stability.

10 The stepped-up cooperation with the Croatian Meteorological and Hydrological Service, aimed at the improved and methodologically more comprehensive construction of climate risk indices in the future, will create preconditions for more precise analyses.

Box 5
Transition climate risk in Croatia

Transition climate risk, for a standard way of referring to the potential economic consequences of climate transition is at a moderate level in Croatia, with a tendency to decline. The high share of renewable sources in electricity production and the continuous decline in the energy intensity of the economy contribute to lower carbon intensity, thus reducing exposure to transition risk. A lower transition risk in the balance sheets of the non-financial sector results in a lower credit risk of banks, which has a favourable effect on financial stability. On the other hand, the current rise in geopolitical uncertainties and the likelihood of sudden shocks can make it more difficult to continue the climate transition, due to the unavailability of materials, but also to a drop in the propensity to invest, which can increase the vulnerability of the economy. Continued efforts to reduce the transition risk in Croatia, still a favourable environment for investments, provide an important channel for the reduction of exposure to future shocks.

Transition climate risk is the risk of adverse economic consequences from a delayed, slowed down or inadequate transformation of an economy aimed at reducing a negative impact on climate and the environment. Triggers for transition climate risk include changes in legislation, technology and market preferences that may hinder or prevent the continued operation of enterprises depending on carbon-intensive business models. Enterprises that fail to implement the climate transition of their business operations gradually lose competitiveness and become zombie enterprises, that is, enterprises with unsustainable business models. Their continued presence in the market result in an inefficient allocation of capital, an increase in credit risk for financial institutions and a slowdown in economic growth.

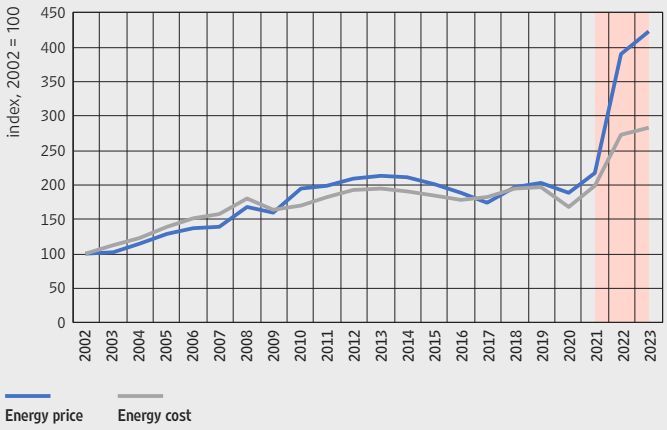
Transition climate risk, especially due to its intertwining with physical climate risk and geopolitical risks, is an important source of systemic risk. Changes in the environment can have a major negative effect on enterprises and indirectly also on the balance sheets of banks and investors. In addition, the interaction of transition risk and other risks can lead to their mutual reinforcement. Transition and physical climate risks are linked because they stem from the same cause, climate change, so if the transition is delayed or implemented unevenly, physical risks become higher and more frequent. Conversely, physical climate events will cause the greatest damage to energy-insecure enterprises (dependent on one form of energy from only one supplier). At the same time, geopolitical risks can lead to the strategic use of critical materials necessary for the climate transition and increase transition risks. (for more details on physical climate risk see Box 4 Physical climate risk in Croatia)

The energy crisis of 2022 provides a good example of an event that can trigger transition risk. Energy prices rose sharply in 2022 as a result of geopolitical tensions (Figure 1). As energy is one of the basic inputs in production, the increase in its price led to an increase in production costs. This increase then spilled over to the growth of prices of intermediate and final goods, which contributed to the overall growth of consumer prices (inflation). The increase in energy prices

due to the tightening of climate policy measures (increase in the price of emission permits or the introduction of a carbon tax, that is, the abolition of subsidies for fossil fuel energy) could have a similar effect. The increasingly antagonistic geopolitical environment in 2025 could trigger similar developments, while also raising the issue of the use of energy sources and critical materials as a new form of warfare.

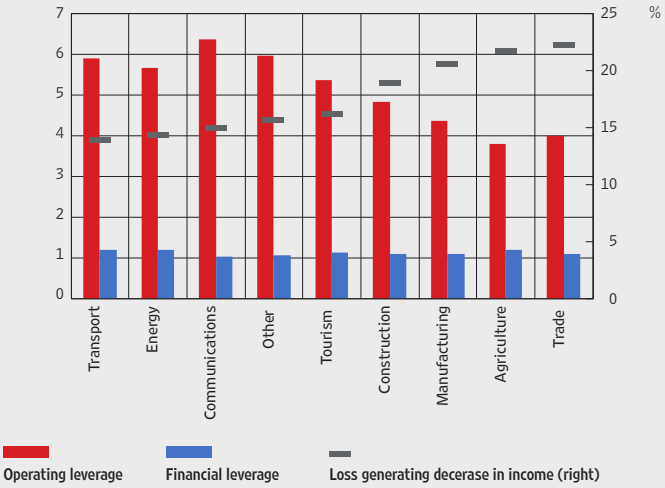
Transition risk is primarily transmitted to the financial system through the balance sheets of enterprises, especially those with high operating leverage. Such enterprises have high fixed costs, which makes them vulnerable to a decrease or halt in business operations or income. When faced with a transition shock, such as regulatory changes in the form of rising emission costs or changes in market demand, their ability to adapt is limited. A fall in income in the conditions of high operating leverage quickly leads to a fall in profits, illiquidity or insolvency (Figure 2).

Figure 1 Energy crisis in 2022 resulted in a sharp increase in energy prices for enterprises



Note: The cost of energy is a supplementary item in the annual reports collected and published by FINA.
Source: FINA

Figure 2 Due to the effect of operating leverage, a fall in income exceeding 15% results in losses for enterprises.



Note: The decrease in income that generates loss is the point at which the effects of operating leverage (fixed costs) and financial leverage (interest expense) result in negative net profit. The calculation refers to 2023.
Source: FINA

The key indicator for the identification of transition climate risk is carbon intensity, that is, the amount of carbon emission per unit of output of an enterprise. This indicator depends on a number of factors: a) productivity and efficiency of enterprises, b) specificity of activities, c) availability of energy products, etc. In technical terms, carbon intensity is a product of energy intensity (the required amount of energy per unit of output) and the average emission factor (the amount of CO_2 per unit of energy consumed) [1]. The purpose of green transition is precisely to act on both factors: reduce the energy intensity of enterprises on the one hand and, on the other,

1 To simplify, carbon intensity is in practice often approximated by the ratio of CO2 to enterprise revenue. Such an approach can result in significant errors because of a number of variables that are not related to CO2 intensity (input prices, output prices, technological changes, etc.) can affect enterprise revenue. Therefore, it is necessary to modify this indicator by using physical indicators, or its approximation, energy and enterprise output.

stimulate the availability of energy products with a lower emission factor (such as electricity obtained from renewable sources).

Carbon intensity of enterprises can be shown by the following formulas[2]:

$$\frac{CO_2}{Q} = \frac{E}{Q} \times \frac{CO_2}{E}$$

$$\frac{E}{Q} = T \cdot \left(\sum_{i=1}^{3} \frac{s_i}{p_i} \right) \cdot \frac{1}{\frac{R}{1+\pi_t}}$$

where:

$\frac{CO_2}{Q}$ – CO2 emissions per unit of output

$\frac{E}{Q}$ – energy intensity (energy consumption per unit of output)

$\frac{CO_2}{E}$ – CO_2 emissions per unit of energy

T – total energy cost

s_i – share of input i in total consumption

p_i – price of input i

R – enterprise nominal income

μ_t – inflation rate in year t

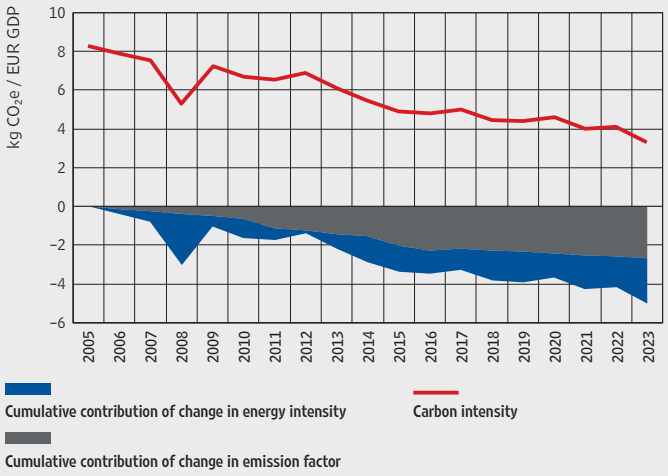
$i = 1,\ 2,\ 3$ – inputs: labour, capital, energy

The analysis carried out suggests that carbon intensity in Croatia is continuously decreasing, which has a beneficial effect on reducing transition climate risk and strengthens the resilience of the economy in the context of climate and energy challenges. This trend is not only important from an environmental perspective, but also significantly contributes to financial stability and the strategic position of the country. Specifically, a lower emission burden of enterprises reduces their exposure to regulatory costs and market pressures related to emissions, but at the same time it also means a lower dependence on fossil energy imports, which is especially important in the conditions of increasing geopolitical tensions and possible instability in energy markets. At the same time, due to the large share of hydro energy and energy from the Krško nuclear power plant, Croatia has a lower average emission factor in the production of electricity. The growth of the share of these low-carbon sources, coupled with the growth of renewable sources, is leading to a decline in the average emission factor of electricity in Croatia[3] (Figures 3 and 4).

2 The register of pollutants contains explicit CO_2 emissions for a small number of enterprises in Croatia. As the intention is to cover a sample of enterprises operating in Croatia that is as large as possible, data from this register have not been used. Also, since neither the amount of CO2 nor the amount of energy used is available for individual enterprises in Croatia, this analysis uses data on the energy cost of an individual enterprise, which is corrected with the structure of energy products use by activities and energy products prices in order to obtain real trends in energy used.

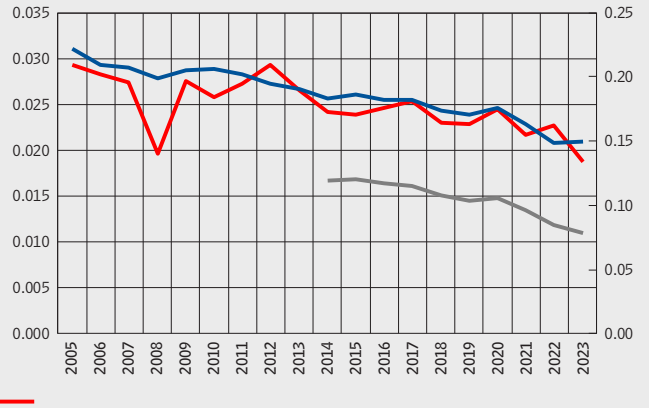
3 In comparison with some other member states that continue to strongly rely on coal and gas, Croatia has a greater use of favourable natural conditions and its own energy sources to reduce the emission factor. Although solar energy still accounts for less than 5% of total production in Croatia, the share of wind farms is increasing, and total investment in renewable energy sources is growing. Also, in the corporate sector, especially among larger enterprises, there is increasing investment in energy efficiency, ESG standards and renewable sources, which is further encouraged by European funds and regulatory requirements.

Figure 3 Carbon intensity in Croatia is steadily decreasing



Note: For the calculation of the emission factor, the factors published by the CBS were used, adjusted by factors per country from which part of the energy is imported.
Sources: FINA, CBS - RESC report on Croatia's electroenergetic conditions (https://oie.hr/wp-content/uploads/2024/04/OIEH_EEizvjesce_2023.pdf), authors' calculations.

Figure 4 Assessment of energy efficiency of enterprises is in line with those based on other sources



Note: The comparison of energy intensity trends from several sources is necessary for the further analysis of transition risk as it justifies the use of the demonstrated CNB's methodology.
Sources: Eurostat, Fina and authors' calculations.

The decline in energy intensity, that is, the increase in energy productivity[4] in Croatia in the last ten years has primarily been influenced by enterprises from the upper distribution classes. The results of an econometric analysis[5] indicate that the main cause of the fall in energy intensity in Croatian enterprises was the increase in output, that is, with the increase in output, energy consumption per unit of output falls significantly (Figure 5). This means that there is a strong effect of economies of scale in energy at lower levels of business, although it is predominantly a variable input. But it should also be borne in mind that enterprises that grow in size benefit from economies of volume that stimulate productivity. At the same time, economic growth proved to be a factor increasing energy intensity, which may mean that in the periods of growth the focus on cost optimization decreases, but also that more energy-intensive sectors (transport, construction) are activated.

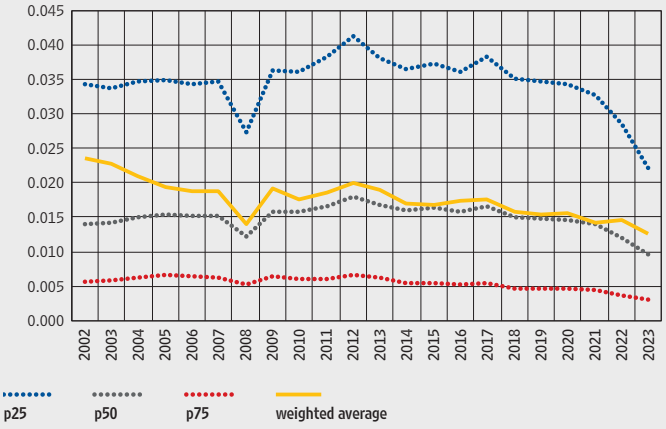
Differences in energy intensity between activities are considerable. Transport companies in Croatia are the most exposed to transition risk (Figure 6), a consequence of the dominance of road transport, which, despite recent developments, still relies on the internal combustion engine. As for other activities, manufacturing and construction have a higher energy intensity due

4 Energy productivity is the inverse of energy intensity.

5 The fixed-effect model shows that enterprises that increase output simultaneously reduce energy consumption per unit of output. The real income of an enterprise has a coefficient of -0.25 and is statistically very significant ($p < 0.01$), which means that an increase in output of 1% results in an average decrease in energy consumption per unit of output of about 0.25%. This result shows the existence of economies of scale – a larger-scale production enables a more rational use of energy. Economic growth has a positive and also very significant coefficient of 0.12. This suggests that in the years of economic growth enterprises, assuming the same output, consume on average more energy per unit of output. The model also includes weather effects that are additionally controlled for the years with specific shocks or trends at the level of the whole economy, such as crises, disruptions in energy markets or regulatory changes.

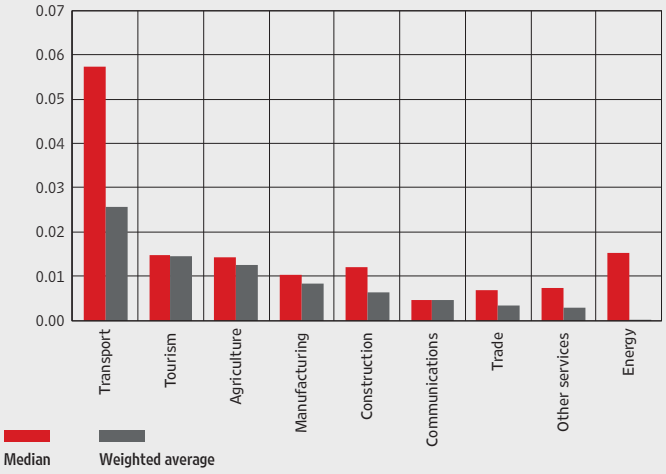
to the nature of business operations and tourism and agriculture due to the dominance of small enterprises and the inability to realize economies of volume.

Figure 5 Energy intensity recorded the largest decline in the last five years in enterprises with the highest energy intensity



Source: FINA

Figure 6 Energy intensity of enterprises by activities, 2023



Source: FINA

Financial stability requires a very careful monitoring of transition risk in the balance sheets of credit institutions. Banks are exposed to transition risk at two levels: a) directly (due to regulatory requirements and a potential loss of market if they fail to comply) and b) indirectly (due to potential credit losses caused by client transition risk).[6] Assuming that a client cannot influence the emission factor of its production and that an enterprise's investment in reducing transition risk (better organization of business operations, renewable energy sources) will be reflected in its individual energy productivity, the previously shown energy intensity of the enterprise is used to assess the indirect transition risk of banks. In doing so, in order to take into account the fact that enterprises from different activities have different energy intensities, for each enterprise its percentile in the distribution of all enterprises and within a specific activity is calculated. The next step analyses the position of bank clients in these distributions.

The greenness indicator[7] of an enterprise is calculated from the distributions of energy intensity, using the following formulas:

$$Z_j^{svi} = 1 - \frac{r_j}{N}$$

$$Z_j^{(d)} = 1 - \frac{r_j^{(d)}}{N_d}$$

where:

$Z_j^{svi} \in [0,1]$ – greenness of enterprise j in relation to all enterprises

6 Banks can also be exposed to transition risk through their assets, but banks' tangible assets are small.

7 The greenness indicator is based solely on energy intensity, without considering other factors such as technology investments, certifications, ESG ratings or engagement in green projects, which are not available for all enterprises.

$Z_j^{(d)} \in [0,1]$ – greenness of enterprise j in relation to enterprises in the same activity d

r_j – rank of enterprise j in the ascending order according to energy intensityti ($\frac{E}{Q}$)

$r_j^{(d)}$ – rank of enterprise j within activity d

N – number of all enterprises

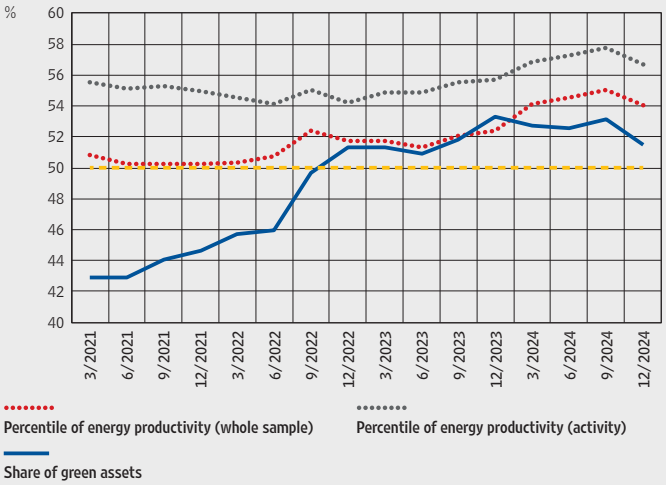
N_d – number of all enterprises in activity d

On average, banks' corporate clients have lower energy intensity, i.e. they are greener than other enterprises, which clearly demonstrates a growth trend. Banks' corporate clients are above the 50th percentile of defined greenness. This trend has strengthened in recent years, to the benefit of financial stability. The reasons for these movements are multiple: a) the constant growth of enterprises enables them to benefit from economies of volume, b) bank loans increasingly contain "green" requirements, which channels the investments financed by bank loans, c) enterprises themselves see the benefits of reducing transition risk, which was especially emphasized after the energy crisis in 2022 (Figure 7).

The greenness of enterprises, bank clients, is a mark of their quality. As with other productivity indicators, energy productivity mirrors good business practices. It is not surprising, then, that enterprises with greater energy productivity also have better business results, more capital, higher revenue growth, as well as higher value. On the one hand, better management of inputs, including energy, is bound to be reflected in business performance and higher growth potential. However, on the other hand, better energy productivity is one of the indicators of enterprise productivity, and since energy is intertwined with all business stages of the enterprise, this correlation is not surprising[8] (Figure 8).

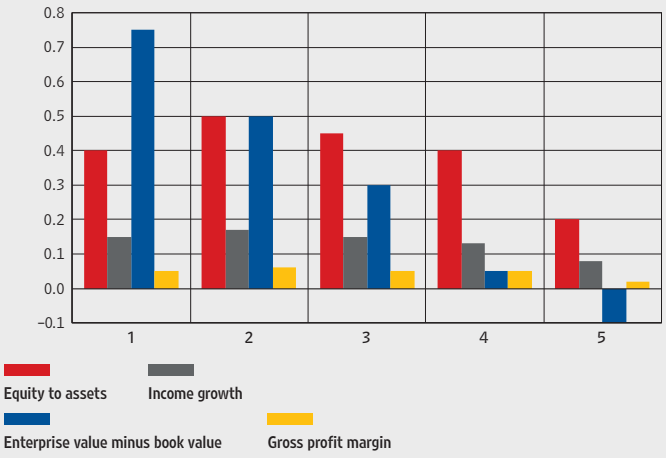
8 The inclusion of energy and emission intensity indicators in the analysis of individual bank clients (client creditworthiness assessments, collateral valuation, stress tests) can therefore improve the quality of the analysis and risk management.

Figure 7 Greenness indicator of banks' corporate clients increases, weighted average



Note: The share of green assets is a control indicator, calculated according to the taxonomy proposed by Battiston et al., 2017: A climate stress-test of the EU financial system, Nature Climate Change 7, pp. 283-288. The percentiles of clients' enterprises are weighted with loan amounts.
Source: FINA.

Figure 8 Energy intensity of an enterprise is a characteristic of its fundamental weakness, by quantiles of energy intensity, in 2023.



Note: The value of enterprises was calculated by means of the Gordon growth model. In the 5th quartile the difference is - 0.3.
Source: FINA.

In conclusion, while transition risk in Croatia is moderate and on a downward path, rising geopolitical and trade tensions could jeopardise the green transition and reverse the significant advances made in recent years. Continued reduction of the transition risk in enterprises currently means lower energy costs and less uncertainty in the event of a shock similar to that of 2022. Moreover, the diminution of corporate transition risk reduces credit risk, thus enhancing the prospects for credit institutions to lend to a wider client base. However, the critical materials needed for the green transition and other minerals essential for the production of batteries, solar panels, wind turbines and electric vehicles are unevenly distributed around the world,[9] which in a period of trade tensions can result in the price increase or unavailability of these important inputs. This may result in a slowdown in global efforts to reduce CO_2 emissions and achieve climate goals and lead to a reversal of the favourable trend so far and to a new increase in transition risk that might spill over into higher credit risk of banks. Continued efforts to reduce the transition risk in Croatia, in the still favourable environment for investments, provide an important channel for the reduction of exposure to future shocks and initiatives such as fiscal support for the transition, together with climate risk disclosure obligations and fostering green lending can further contribute to achieving better outcomes.

9 Global production of materials required for green transition (lithium, cobalt, nickel, copper and rare earths: neodymium, dysprosium, lanthanum) is concentrated in a limited number of countries, primarily China, Russia, Australia, the DR Congo and South America.

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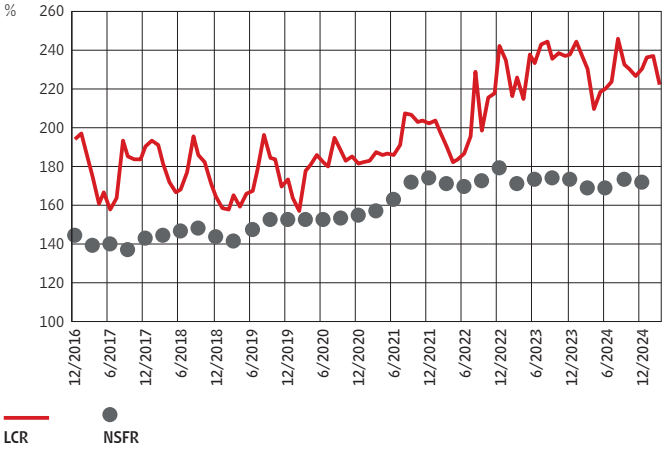
II Resilience of credit institutions

In 2024, credit institutions in Croatia continued to maintain high liquidity ratios along with further growth in highly liquid assets. Since credit institutions primarily base their funding on stable sources, including stable private sector deposits and own funds, their key liquidity indicators still considerably exceed minimum regulatory requirements. Despite increased lending activity, which increases exposure to credit risks and reduces the level of excess capital, the domestic banking system has remained resilient and able to withstand possible shocks, as confirmed by the results of the stress test.

A Liquidity

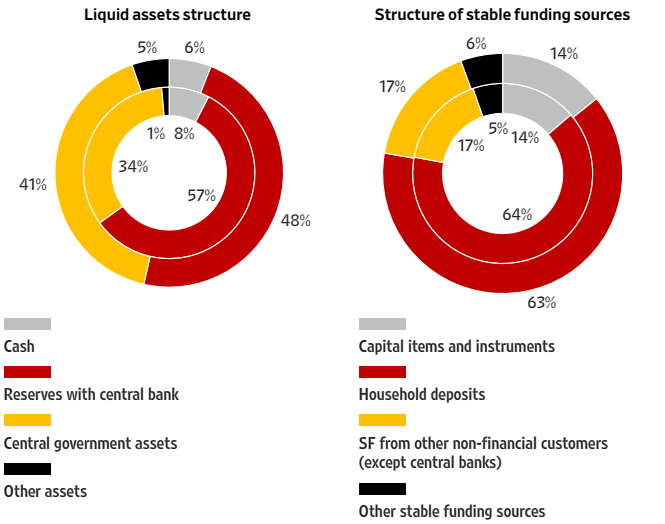
Credit institutions have continued to maintain high liquidity ratios, coupled with steady growth of highly liquid assets. The liquidity coverage ratio (LCR) at the system level exceeded 222% at the end of March 2025 (Figure II.1), with all banks exceeding the regulatory thresholds of 100% by a large margin. As regards the structure of highly liquid assets, the bulk of the funds is still accounted for by deposits held with the central bank, although their share has decreased. Central government securities increased from approximately one third to almost two fifths of total highly liquid assets (Figure II.2). Net cash outflows have also increased, primarily due to the growth of non-operating deposits.[1].

Figure II.1 Liquidity coverage ratio and stable funding ratio remained high



Note: The LCR (liquidity coverage ratio) and the NSFR (net stable funding ratio) are the key indicators of credit institutions' liquidity resilience.
Source: CNB.

Figure II.2 Cash and reserves with the central bank are the most significant source of liquidity



Notes: The inner ring of each chart refers to values of December 2023, while the outer ring shows values in 2024. SF stands for sources of funding.
Source: CNB.

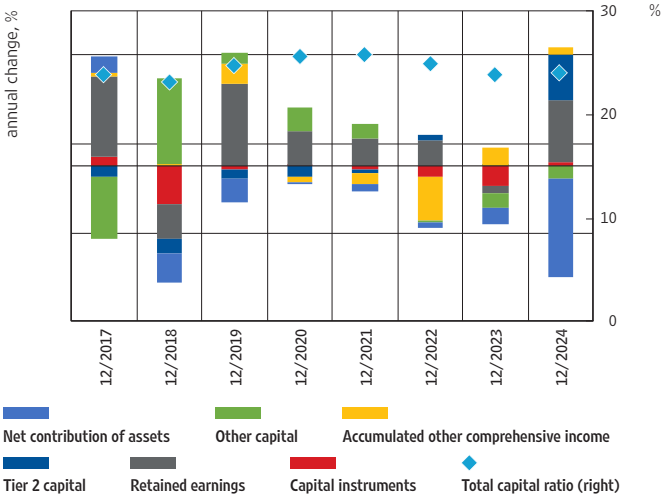
1 Non-operating deposits are deposits that are unrelated to the core business of bank clients, e.g. deposits from large corporations, investment funds or financial institutions not related to day-to-day operations.

Banks mostly rely on stable, long-term funding sources, which provide a solid basis for sustainable operations. The net stable funding ratio (NSFR) was 173.4%, which confirms the high level of funding sources' stability (Figure II.1). In addition to private non-financial sector deposits, which remain the most important and reliable source of long-term funding, banks' own funds are still an important component that ensures structural safety (Figure II.2).

B Capital position of credit institutions

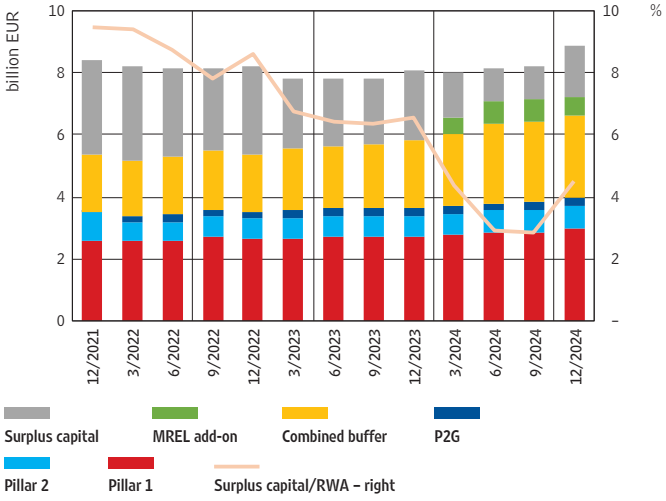
The capitalisation of the banking system has remained high, exceeding minimum and macroprudential regulatory requirements, which additionally increases banks' resilience. The total capital ratio of 23.9% at the end of 2024 has held steady, reflecting the balanced growth of capital and risk exposure. Banks have additionally strengthened their Common Equity Tier 1 (CET1) capital by retaining a small part of the profit from the previous period, while some of them have already paid out dividends and some are planning to do so in the remaining part of the year. Tier 2 (T2) capital was increased in the previous year by the issuance of bonds and subordinate instruments. As regards exposure, the growth of total risks was primarily a consequence of intensified lending activity, especially to the household sector in the segment of unsecured cash loans and non-financial corporations, which, coupled with exposure growth, has increased the average credit risk weight.

Figure II.3 Capitalisation of the banking system did not change considerably



Source: CNB.

Figure II.4 Credit institutions have sizeable capital surpluses



Notes: Pillar 1 – minimum capital requirements; Pillar 2 – own funds requirements, P2G – Pillar 2 guidance; MREL – minimum requirement for own funds and eligible liabilities. MREL add-on refers to the capital requirement on top of prudential requirements, which is necessary to meet the MREL requirement.
Source: CNB.

Banks' capital surpluses still considerably exceed their own funds requirements, which strengthens their ability to withstand potential shocks. However, their excess capital relative to the regulatory capital requirement decreased in the previous year from 6.5% to 4.5%. This

decrease resulted from the growth of bank assets, the increased combined capital buffer requirement and the start of the full application of the final MREL (**Minimum Requirement for Own Funds and Eligible Liabilities**) on 1 January 2024. Compliance with the MREL ensures that banks maintain a sufficient amount of capital and liabilities in the form of eligible instruments, which, if necessary, can enable the implementation of the chosen resolution strategy without any fiscal costs. Compliance with the final MREL by employing capital at the banking system level reduced the excess capital by 1.5 percentage points. However, the MREL can be met not only by capital but also by eligible liabilities[2], which eases pressures on capital. In 2024 and in early 2025, banks issued new debt instruments eligible under the MREL, thus ensuring additional loss-absorbing capacity and improving resilience to shocks (see chapter C.I).

C Solvency testing of credit institutions[3]

The credit institutions' stress testing exercise shows that, given the current level of capitalisation, credit institutions are capable of withstanding the materialisation of risks under a hypothetical adverse scenario considered unlikely but conceivable. The exercise encompasses a three-year horizon and analyses the capital level under two different economic scenarios in the period from the beginning of 2025 to the end of 2027. The total capital requirements ratio at the end of this stress test horizon is approximately at the same level as in the test conducted in the previous year. The results show that accumulated capital surpluses in the system are sufficient to absorb the effects of unfavourable developments, even under the unlikely adverse scenario, although, in the same way as in the previous years, the response of credit institutions to stress is very heterogeneous. In addition, the time limit for the compliance with the MREL, which banks can and to a large extent do meet by relying on the existing capital surpluses or by issuing MREL eligible instruments, ended in late 2023, so that these elements are also taken into account within total own funds requirements. It should be noted that baseline and adverse scenarios used in this year's stress testing were finalised on 1 March 2025, when interest rates were much higher than they are now. Should current market expectations regarding a further reduction in interest rates be taken into account, this would reduce net interest income and bank profits and, in turn, total capital ratios relative to those comprised by this test. The test results should therefore be interpreted as somewhat optimistic regarding the current situation.

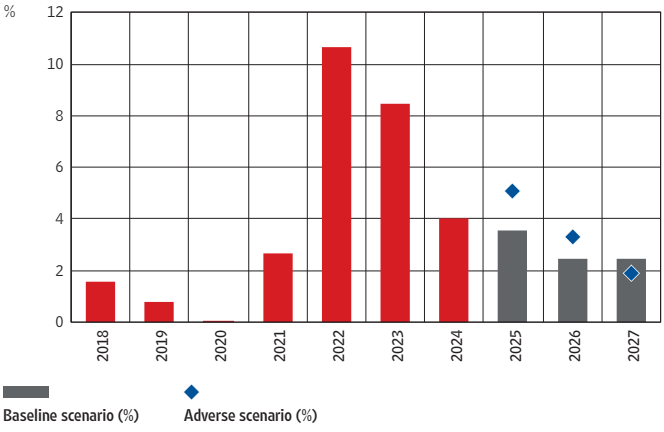
2 Eligible liabilities are debt instruments that are not included in own funds and can be used to meet the MREL. In order to be eligible, they must comply with the strictly defined regulatory conditions laid down in the CRR (Article 72b), SRMR (Article 12c) and BRRD (Articles 45b and 55) and may not be exempted from the bail-in tool. This means that in the event of the resolution of an institution those instruments may be written down or converted into equity.

3 Stress testing of credit institutions examines credit institutions' resilience (solvency) during hypothetical, extremely unfavourable macroeconomic and financial developments that pose unlikely but possible systemic risks, which, if materialised, are deemed relevant for the operation of the banking sector in Croatia. Even though stress testing is not a projection of unfavourable developments expected in the financial sector, it contributes to a timely assessment of systemic risks and the maintenance of stability.

C.1 Macroeconomic scenarios for stress testing

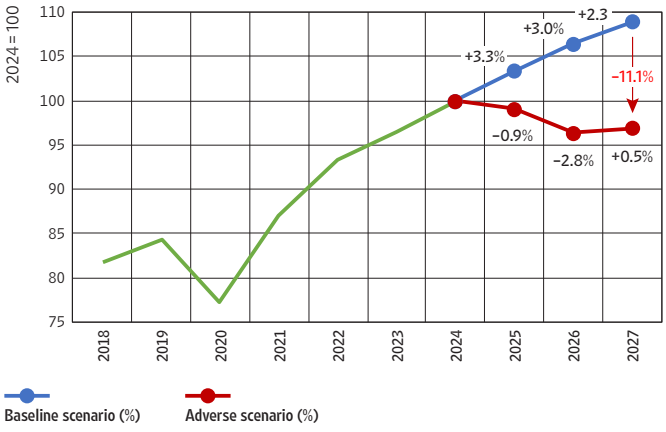
The stress testing of credit institutions in the period from 2025 to 2027 is carried out based on two different scenarios, that is, the baseline scenario and the adverse scenario. Under the baseline scenario,[4] domestic economic activity growth could slow down gradually, primarily as a result of the expected slowdown in growth in personal consumption, influenced by a milder growth in real wages. While the contribution of domestic demand decreases, foreign demand is expected to increase its contribution to real GDP growth, due to the lessening of the effects of restrictive monetary policy in the euro area. Real GDP could grow at a cumulative rate of 9.0% in the period from 2025 to 2027. The average annual consumer price inflation rate in the domestic market could continue to decrease, mostly reflecting the expected decline in core inflation, which was more persistent in 2024 than other inflation components, mainly due to elevated services inflation. Residential real estate price growth could also decelerate in 2025, but remain at a relatively high level, supported by robust demand and a strong labour market, although with a slowdown in wage growth. As regards funding conditions, lending and deposit rates are expected to decline further as the effects of previous monetary policy tightening fade away. In addition, the effect of reduced nominal interest rates on housing loans offered by some systemically important credit institutions in early 2025 is also taken into account, which mitigated the projection of growth in interest rates on housing loans (Figure II.7).

Figure II.5 Developments in consumer price inflation under baseline and adverse scenarios



Sources: CBS, CNB's December 2024 macroeconomic projections for the baseline scenario and the simulation of the macroeconomic model PACMAN for the adverse scenario.

Figure II.6 Developments in real GDP under baseline and adverse scenarios



Sources: CBS, CNB's December 2024 macroeconomic projections for the baseline scenario and the simulation of the macroeconomic model PACMAN for the adverse scenario.

The adverse scenario is based on an assumption of sharply escalating geopolitical tensions, which would deepen geo-economic polarisation and have an adverse effect on global value chains and trade fragmentation. At the global level, such developments would particularly adversely affect export-oriented countries and countries more exposed to geopolitical tensions. Although Croatia's participation in global value chains is limited, its main trading partners could be strongly affected under such a scenario, which would in turn spill over to the domestic economy

4 Based on the CNB's December 2024 macroeconomic projection.

due to a decrease in foreign demand. In addition, strong negative and persistent confidence shocks in Croatia could result in a further decrease in domestic demand and economic activity. The continued deterioration of the macroeconomic environment would lead to a decline in employment and investments, and ultimately to a strong rise in the unemployment rate. Furthermore, geopolitical tensions could initially increase the prices of energy products and other raw materials, creating supply-side inflationary pressures. However, they would be subsequently alleviated by reduced demand and limited second-round effects generated by a decrease in employment, with the result that inflation would return to 2% in 2027. At the beginning of the projection horizon, the build-up of inflationary pressures would shift market expectations in the direction of higher short-term risk-free interest rates. Also, the rise in general uncertainty and the probability of a global recession could cause negative reactions in global financial markets, resulting in declining asset prices, increasing volatility and growing risk premiums. These effects could spill over to elevated lending interest rates on household and corporate loans while tighter funding conditions would additionally erode consumption. This would also have the effect of sharply reducing residential real estate prices, which would not be able to recover by the end of the stress-test horizon (Table II.1). Such a strong materialisation of macrofinancial risks would have an adverse impact on banks, mainly in terms of reducing their asset quality.

Table II.1 Main features of baseline and adverse macroeconomic scenarios

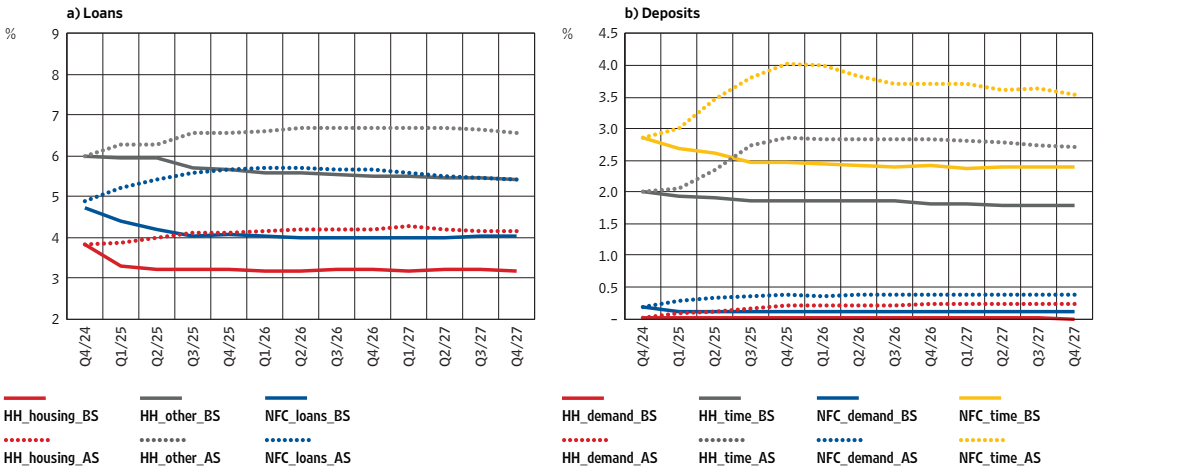
	Initial value	Baseline scenario			Adverse scenario		
	2024	2025	2026	2027	2025	2026	2027
International environment							
GDP EA (annual rate of change, %)	0.9	1.4	1.6	1.5	−2.3	−4.2	0.0
EURIBOR 3M, %	3.6	2.1	2.0	2.2	3.4	3.1	3.0
Macroeconomic developments							
GDP (annual rate of change, %)	3.7	3.3	3.0	2.3	−0.9	−2.8	0.5
Personal consumption (annual rate of change, %)	6.0	4.9	3.5	2.7	−0.8	−5.6	0.1
Investments (annual rate of change, %)	11.9	4.3	3.3	−0.7	−6.8	2.4	−0.4
Unemployment rate (%)	4.9	4.7	4.5	4.4	6.1	8.4	6.2
Real estate prices (annual rate fo change, %)	10.6	9.7	7.4	5.2	0.6	−7.1	−6.8
Inflation (%)	4.0	3.5	2.5	2.5	5.1	3.3	1.9
Financing conditions							
Yield on government bonds	3.3	3.3	3.3	3.3	5.2	4.8	4.5
Lending rates on new business of households, housing loans	3.8	3.2	3.2	3.2	4.0	4.2	4.2
Lending rates on new business of corporates	5.0	4.2	4.0	4.0	5.5	5.7	5.5
Deposit rates on new business of households, time deposits	2.0	1.9	1.8	1.8	2.2	2.2	2.2
Deposit rates on new business of corporates, time deposits in EUR	3.2	2.6	2.4	2.4	3.2	3.2	3.0

Izvori: DZS; HNB; EBA; Eurostat; ESB; Makroekonomske projekcije HNB-a, prosinac 2024. za temeljni scenarij, makroekonomski scenarij EBA-e za inozemno okružje i simulacija makroekonomskog modela PACMAN za domaća makroekonomska kretanja u stresnom scenariju

C.2 Results of the baseline and adverse scenarios

Following record-high profitability in 2024, a gradual decline in net interest margin could be expected in the stress testing horizon, with an unfavourable effect on net interest income[5]. Under the baseline scenario, the spread between lending and deposit interest rates could narrow, i.e. net interest margin for households and enterprises could decrease, negatively influencing net interest income. On the other hand, under the adverse scenario, the materialisation of interest rate risk reduces the total net interest income by lowering performing exposures. The economic contraction leads to a further decrease in net fee and commission income.[6] Net operating earnings under the adverse scenario are additionally eroded by value impairment resulting from the growth of non-performing loans. Under both scenarios, administrative expenses are assumed to grow in line with the growth of wage costs, which are assumed to follow the inflation rate from the previous year, and the increase in other administrative expenses by linear progression.

Figure II.7 Projection of interest rates on new business



Note: Interest rates on corporate time deposits include only deposits in euro.
Source: CNB.

The total non-performing loans ratio (NPLR)[7] under the baseline scenario could continue its downward trend and drop to 1.6% at the end of 2027, from 2.4% at the end of 2024.

5 The corporate and household net interest income is estimated, depending on the model estimate of the movements of interest rates on new household and corporate loans. Interest rates on new business were estimated using the ARDL (autoregressive distributed lag) model in the manner that independent variables, along with the autoregressive component, were all the possible combinations of 3 variables from the set (K = 6 or 7) of explanatory variables, which simulated the movement under the baseline and adverse scenarios. The models were aggregated in the posterior model by the BACE (Bayesian averaging of classical estimates) technique, where for each individual model the weight from the obtained model set was used (Sala-i-Martin, 2004).

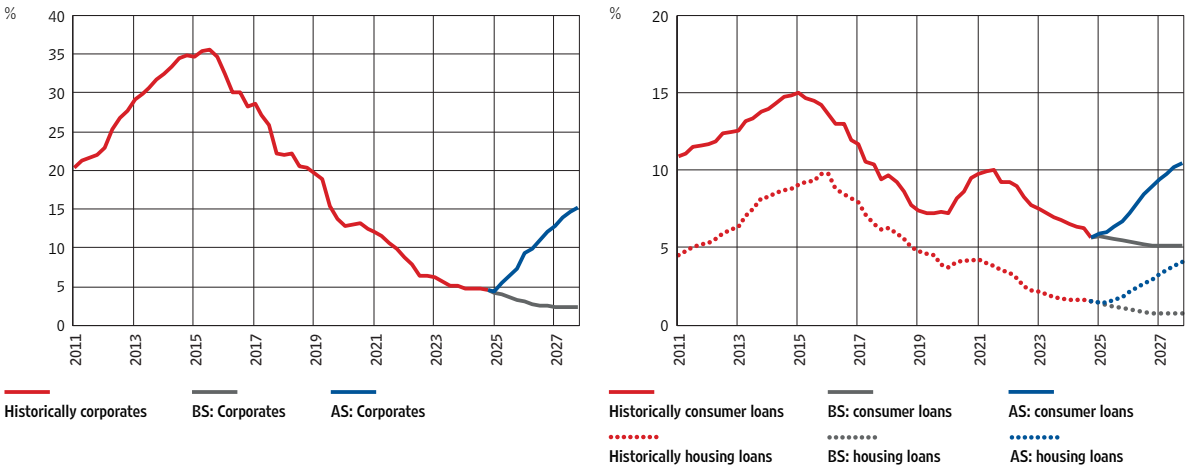
6 Fee and commission income was modelled in proportion to bank assets using the dynamic panel by the generalised method of moments, in which macroeconomic variables were included as explanatory variables. Fee and commission expenses were assessed as a historical percentage of fee and commission income.

7 The existing models for forecasting non-performing loans were upgraded (see Financial Stability No. 22, Box 6), so that instead of the common averaging of the results of ten selected models with the smallest RMSE value from the set of estimated models, the BACE method (Bayesian averaging of classical estimates, see Sala-i-Martin et al., 2004) was employed, aggregating all the estimated models into a single posterior model by applying a method which is an approximation of Bayesian model averaging (BMA).

Given the favourable economic developments, easing inflationary pressures and strong growth of real estate prices, the NPLR is expected to drop in a three year period under the baseline scenario by 0.9 and 0.6 percentage points, respectively, as regards housing and consumer loans and by 2.1 percentage points as regards non-financial corporations (Figure II.8).

Under the hypothetical adverse scenario loan quality is expected to deteriorate, with the total NPLR potentially reaching 6.2% by the end of 2027. The growth of the NPLR is driven by the strong contraction of economic activity in the domestic and foreign markets, an increase in interest rates and a plunge in real estate prices. Simulated NPLR growth in the three-year period is weaker as regards household loans (2.5 percentage points and 4.8 percentage points for housing and cash loans, respectively) and slightly stronger as regards loans to non-financial corporations (10.7 percentage points). This is the result of a historical pattern, where negative economic developments first strongly impact the corporate sector, which then spills over to the household sector with a time lag through the labour market and an increase in unemployment. In the household sector, the increase in non-performing loans is first manifested in consumer loans and only later, and at a slower pace, in housing loans.

Figure II.8 Developments in total NPLR under baseline and adverse scenarios



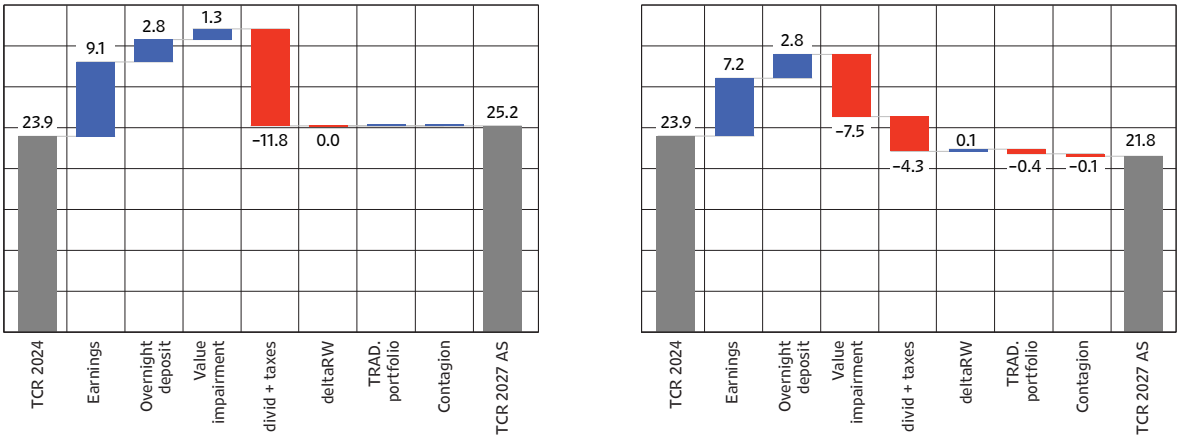
Source: CNB.

Apart from the unfavourable impact of higher non-performing placements on the growth of value impairments and provisions, the adverse scenario also projects additional expenses for placements that have not yet become non-performing. The increase in value impairments for expected credit loss (stage 2 of credit risk) is the most pronounced in the first year of the adverse scenario, when there are the first signs of deterioration in economic developments and interest rate growth, while the growth of value impairments and provisions for non-performing placements (stage 3 of credit risk) is the strongest in the second year. The recovery in the third year brings about a slight improvement, that is, a decline in value impairments.

C.3 Assessment of banking system stability

The baseline scenario assumes that the capital ratio increases from 23.9% at the end of 2024 to 25.2% at the end of 2027 as a result of retaining a part of credit institutions' profits that could be generated in this period. Both scenarios assume that credit institutions pay out the announced amount of dividends totalling EUR 1.1bn in 2025. In the following years, providing that credit institutions have generated profit in the current year, a dividend payment in the amount of 80% of profit after tax generated in the previous calendar year is assumed, which means that only a small portion of earnings is included in capital. In a situation when a bank dips into capital buffers, the assumed amount of dividend payment is limited[8] in accordance with regulations.

Figure II.9 Decomposition of change in the capital ratio under baseline and adverse scenarios, from the end of 2024 to 2027



Note: TCR 2027. BS denotes the total capital ratio under the baseline scenario and TCR 2027 AS denotes the adverse scenario. In the adverse scenario, deviation from the baseline scenario is observed.
Source: CNB.

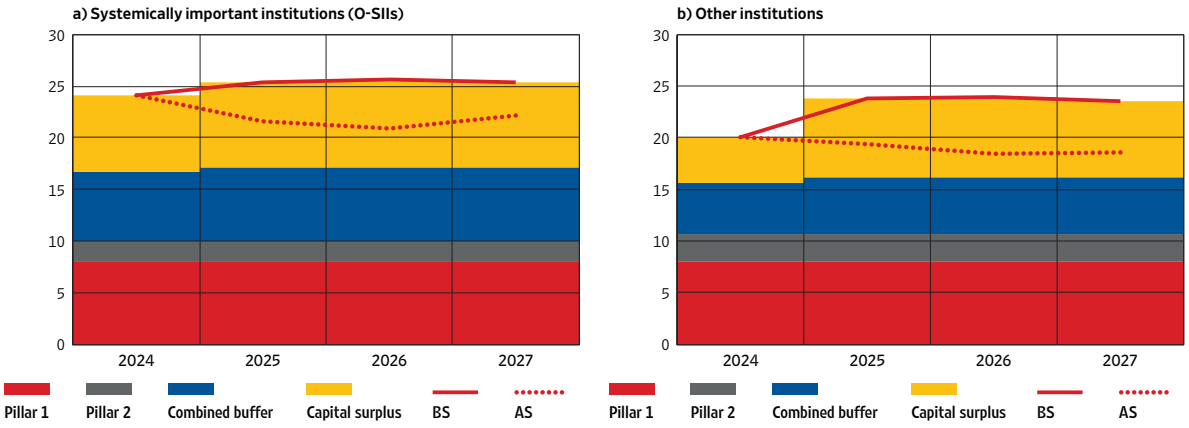
Under the adverse scenario, the total capital ratio of credit institutions declines sharply in the first two years of the analysed period only to recover subsequently, reaching 21.8% at the end of 2027. The differences in the estimated solvency of credit institutions under the adverse and baseline scenarios largely arise from additional value impairments generated by credit risk materialisation under the conditions of economic crisis. This also leads to a decrease in net interest income due to the lower debt repayment capacity of bank clients. Furthermore, the assumed rise in yields on government bonds under the adverse scenario reduces their market value, which has a negative effect on capital, although this effect is relatively moderate due to the relatively large share of instruments in held-to-maturity portfolios that are not carried at their fair value. There are also indirect negative effects of the crisis caused by interbank contagion, that is, credit institutions' exposures to institutions in difficulties that do not meet supervisory capital requirements.

According to the stress test results, the domestic banking system is highly resilient, with a certain degree of heterogeneity among institutions (Figure II.10). At the end of the observed horizon the total SREP capital ratio (TSCR) was met at the system level, which confirms that in

8 Article 141 of the Capital Requirements Directive (CRD VI) prescribes that institutions that fail to meet their combined buffer requirement may pay out the maximum distribution amount (MDA) according to the defined regulatory formula.

recent years, marked by high profitability, banks have strengthened their capital positions, due, among other things, to macroprudential measures aimed at increasing banks' capital buffers. All systemically important credit institutions have relatively good results under the adverse scenario as well, because accumulated capital surpluses efficiently absorb the effect of potential unfavourable macroeconomic developments. The majority of small credit institutions earned significant profits in 2024 and strengthened their capital positions, which proved to be sufficient to absorb the effects of several years of unfavourable economic trends, so that at the system level they did not use their combined capital buffers over the whole test horizon. However, high losses of some banks in adverse macroeconomic conditions would mean that five credit institutions would utilise combined capital buffers and one of them would also breach the own funds requirement (Pillar 2).

Figure II.10 Capital ratio under baseline and adverse scenarios with respect to prudential capital requirements

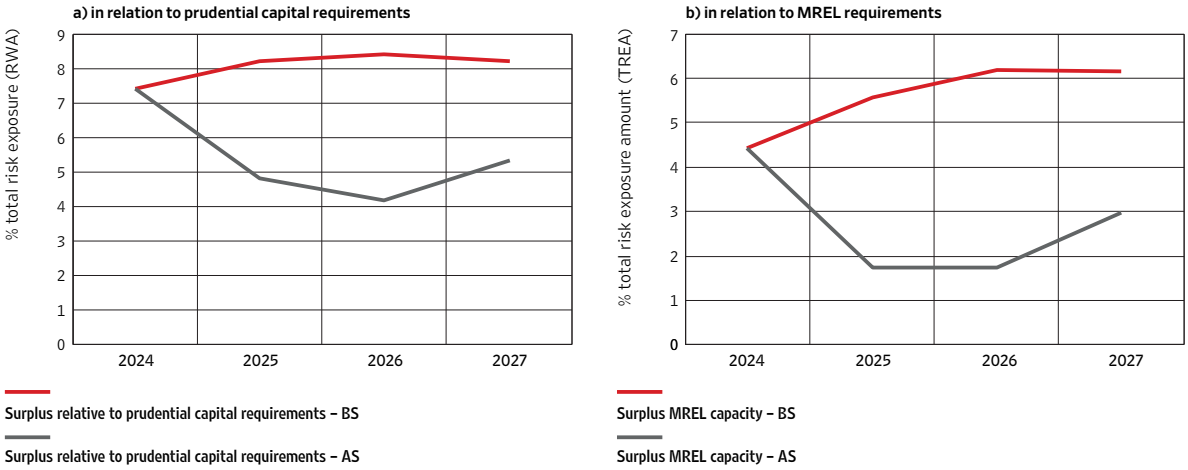


Notes: Pillar 1 – minimum capital requirements; Pillar 2 – own funds requirements appropriate to overall system average; the combined buffer consists of SRB – systemic risk buffer; CCoB – capital conservation buffer; O-SII buffer – capital buffer for other systemically important institutions; CCyB – countercyclical capital buffer; TCRBS – total capital ratio under the baseline scenario; TCRAS – total capital ratio under the adverse scenario. Capital surplus is defined as the difference between the total capital ratio of a credit institution and the sum total of prudential capital requirements for that credit institution, i.e. as the TCR – (Pillar 1 + Pillar 2 + CCoB + SRB + O-SII buffer + CCyB).
Source: CNB.

This year's stress test results are somewhat better than the previous year's results, partly as a result of an additional increase in bank profits, but also due to changes in the risk profile. In the conditions of steadily rising interest rates, credit institutions generate high net interest income. The historically low level of non-performing loans and their high coverage by value adjustments additionally improve a good starting position to absorb the effects of credit quality deterioration. Most debt securities are classified in held-to-maturity portfolios, without direct effects on capital, as this provides banks with stability and predictability due to the measurement of prices at amortised cost instead of fair value. Although these changes seem to increase the system security, there is also a possibility of potential losses should these financial instruments be sold. Therefore, it is crucial for credit institutions to maintain caution and develop strategies for efficient risk management to ensure sustainable growth and stability even in unpredictable market conditions.

In addition to prudential capital requirements, the banking system meets the final MREL[9] under the adverse scenario (Figure II.11.b). An examination of the amount of capital and eligible instruments that banks had at the end of 2024, with an autonomous capital increase in the simulated scenarios, shows that the banking system, both in the baseline and the adverse scenario, meets the final MREL target and combined capital buffer requirement, which banks are also required to maintain.

Figure II.11 Capital surpluses in the system under baseline and adverse scenarios



Note: Capital surplus is defined as the difference between the total capital ratio of a credit institution and the sum total of prudential capital requirements for that credit institution, i.e. as the TCR – (Pillar 1 + Pillar 2 + CCoB + SRB + O-SII buffer + CCyB).
Source: CNB.

Note: Surplus MREL capacity means own funds and eligible liabilities that exceed the MREL and combined buffer requirements.
Source: CNB.

The solvency test has shown that the banking system is capable of withstanding unforeseen hypothetical shocks, confirming the importance of maintaining adequate capital buffers. High capitalisation of banks is a key factor in protecting the system and enabling it to overcome rare, but possible crisis situations caused by a sharp downturn in economic activity, coupled with strong inflationary pressures and tightened global funding conditions. As capital buffers play a key role, their build-up has additionally increased the resilience of the banking system in recent years and created additional room for macroprudential policy to act in times of crisis in order to alleviate the potential negative effect on credit activity. In addition, any capital surplus that banks voluntarily maintain above legal requirements provides them with additional stability and capacity to adjust in crisis situations. Further maintenance of the high levels of capitalisation will be crucial for preserving the stability and resilience of the banking system in the future.

9 Minimum requirement for own funds and eligible liabilities.

III. Implementation of macroprudential policy

The exposure of the financial system of the Republic of Croatia to systemic risks has increased amid heightened global uncertainty stemming from increased geopolitical and trade tensions. At the same time, strong lending activity growth in the domestic economy and a further increase in real estate prices have additionally exacerbated cyclical vulnerabilities to potential adverse economic and financial scenarios. In an environment of increased risks and uncertainty, the scope of the CNB's macroeconomic policy, focused so far on maintaining the established capital buffers, has been widened to include restrictions on consumer lending criteria. By the continued application of a combined capital buffer commensurate with systemic risks to financial stability, the CNB continues to contribute to the preservation of the resilience of the banking sector. Tightening of consumer lending criteria is expected to increase household resilience to the potential materialisation of systemic risk or unexpected economic shocks, thus alleviating risks to financial stability.

A Restrictions on consumer lending criteria

In 2025, the CNB for the first time imposed macroprudential restrictions on consumer lending criteria in order to mitigate risks to financial stability related to increased household lending (see chapter I.C.1.). Applying to all new housing and non-housing consumer loans as of 1 July 2025, the Decision on consumer lending criteria imposes caps on the monthly debt service to income (DSTI) ratio, the loan to value (LTV) ratio and the loan maturity. The DSTI ratio for housing loans is capped at 45% and for non-housing loans at 40%, whereas the LTV for loans with a pledge of immovable property is capped at 90% There are also exemptions: credit institutions will still be allowed to quarterly grant up to 20% of the amount of housing loans and up to 10% of the amount of non-housing loans to consumers above DSTI caps, as well as 20% of the amount of loans above LTV caps, based on their own assessment. The exceptions in granting housing loans will largely (three quarters of total exemptions) be allowed for consumers applying for a loan to address their housing needs. The maturity of housing loans and loans collateralised by immovable property is limited to thirty years, while the maturity of other non-housing loans is limited to ten years.

In addition to the new macroprudential lending restrictions, an implicit debt to income (DSTI) ratio has also been in effect for housing loanXs to consumers 2018. The latter restriction is set out in the Foreclosure Act, which specifies the amount of salary exempt from seizure, and the supervisory Decision on the additional criteria for the assessment of consumer creditworthiness. The Decision requires credit institutions to assess consumers' creditworthiness taking into account minimum living costs, which cannot be lower than the legally defined amount of salary exempt from seizure. The interaction of this Decision and the Foreclosure Act results in an indirect (implicit) cap on the DSTI ratio for housing loans, which for consumers with below

average incomes stands at about 25% and for other consumers increases in parallel with the growth of their income[1]. The CNB's recommendation of 2019 continues to apply to non-housing loans, recommending credit institutions to grant non-housing loans with maturities exceeding five years applying the same creditworthiness assessment standards they apply to housing loans.

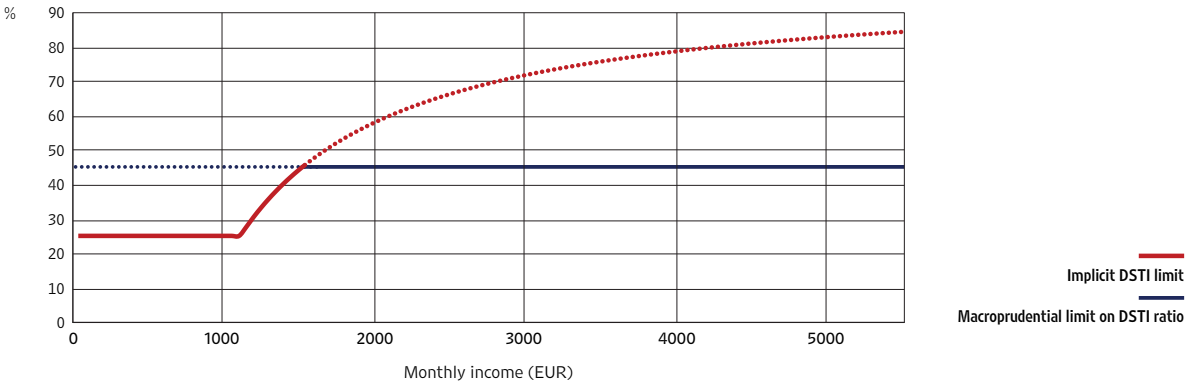
The macroprudential cap on the DSTI ratio and the existing implicit DSTI ratio for housing loans will be applied in parallel as of 1 July 2025. The Decision on consumer lending criteria prescribes a 45% cap on the DSTI ratio irrespective of the income level, while the implicit cap on the DSTI ratio is stricter for consumers with lower incomes. Specifically, for all consumers whose incomes are lower than 120% of the Republic of Croatia average (approximately EUR 1600 in 2025), the monthly loan instalment is limited by the existing implicit DSTI ratio, while the new macroprudential cap on the DSTI ratio will have an impact on consumers with higher incomes (**Figure III.1**).

The measures have been calibrated with the main aim of influencing the riskiest segments of consumer loans that are granted under relatively mild criteria. As regards their impact on overall consumer lending, they should mostly influence general-purpose cash loans, while at the moment they should not have a significant impact on housing lending. In the macroeconomic conditions characterised by a rapid increase in household consumption, these measures also contribute to its slowdown and the reduction of inflationary pressures associated with increased demand.

Lending restrictions are introduced preventively, as a permanent structural element of the CNB's macroprudential policy, which can be adjusted if necessary. Their preventive objective is to mitigate the risk of excessive easing of consumer lending criteria and preserve their financial resilience in possible adverse economic scenarios. The implementation of the measures will be monitored on the basis of consumer lending data, collected monthly at the level of each individual consumer loan. The impact of the restrictions on consumer lending will be monitored in the context of other macroprudential measures and of their contribution to the safeguarding of the stability of the financial system and sustainable economic growth in the long run and will, if necessary, be adapted in line with the development of systemic risks and general macrofinancial circumstances.

1 See Macroprudential Diagnostics No. 8, Box 1.

Figure III.1 Interaction between new DSTI ratio cap and existing implicit DSTI cap



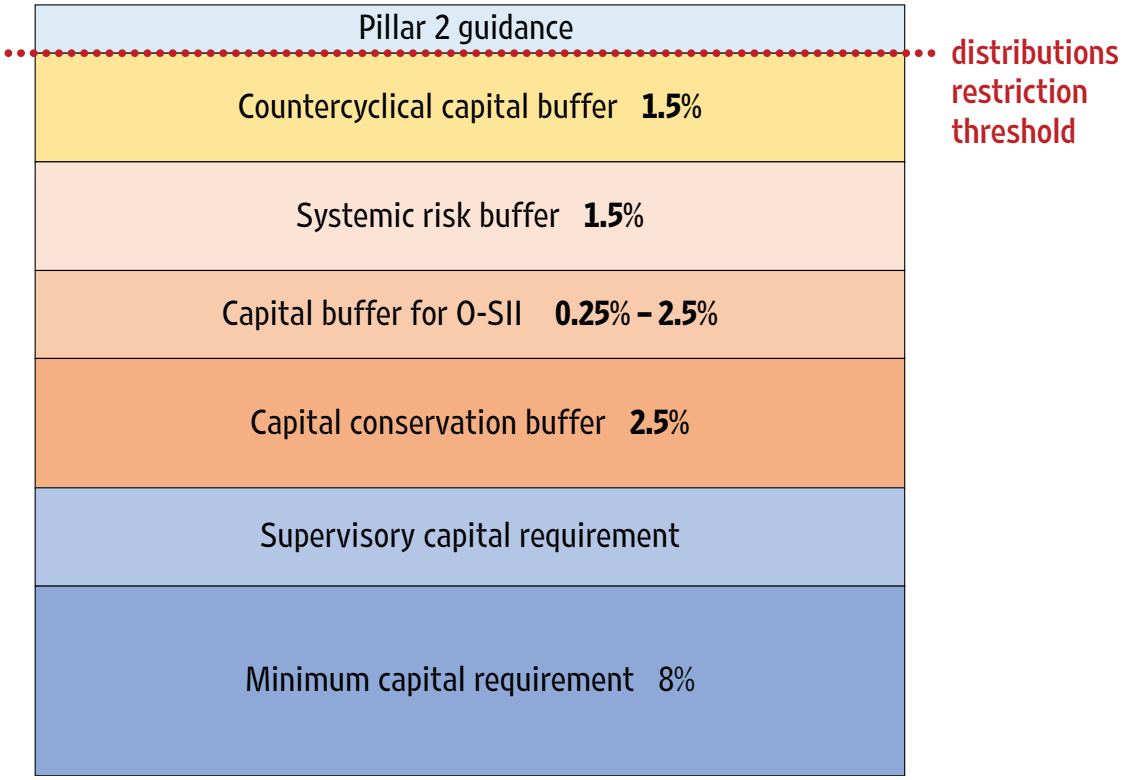
Note: The full line shows the actual cap on the DSTI ratio for all income levels that results from the interaction of the measures. The dashed blue line shows the macroprudential cap on the DSTI ratio that is lower than the existing implicit cap and therefore not restrictive. The dashed red line shows the implicit DSTI ratio for higher income brackets, the highest DSTI ratio of which is limited by the macroprudential DSTI cap.
Source: CNB.

B Capital buffers

The CNB imposes additional macroprudential capital requirements on banks in the form of a combined buffer requirement in order to strengthen their resilience to sudden shocks and adverse financial and macroeconomic scenarios. Capital buffers are used to target structural and cyclical systemic risks, taking into account their interaction with other macroprudential measures and supervisory and resolution requirements. Under the circumstances of heightened systemic risks and highly uncertain future trends, the CNB has retained the existing level of capital requirements. This ensures scope for macroprudential policy action should these risks materialise. Especially important are releasable capital buffer requirements, primarily the countercyclical capital buffer and the systemic risk buffer, calibrated to account for elevated uncertainty and escalating geopolitical risks.

The combined buffer requirement ranged from 5.5% to 8% of the total risk exposure in the previous year, depending on the systemic importance of a credit institution. This buffer has not changed since the increases in the countercyclical buffer and the systemically important institutions buffer in 2024. It consists of the capital conservation buffer, whose rate of 2.5% is prescribed by the European regulation and applies in all EU member states, the countercyclical buffer of 1.5%, the systemic risk buffer of 1.5% and the buffer for other systemically important credit institutions ranging between 0.25% and 2.5% (Figure III.2). The CNB will continue to adjust in good time the countercyclical buffer rate to the evolution of cyclical risks in the context of domestic and global financial and economic developments and in coordination with other macroprudential policy measures, in order to achieve an optimal combination of measures aimed at the preservation of stability of the financial system.

Figure III.2 Capital requirements for banks as at 30 April 2025.



Note: Illustration The amount of buffers shown does not represent their real size. The distributions restrictions threshold refers to the calculation of the maximum distributable amount given the degree of compliance with capital requirements.
Source: CNB.

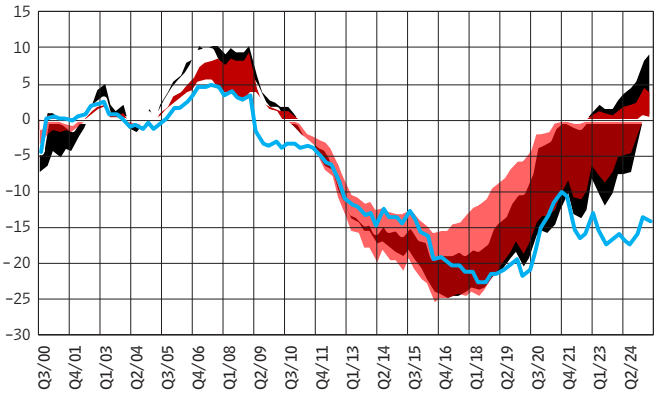
B.1 Countercyclical capital buffer

In the first half of 2025, the domestic financial cycle remained in the phase of expansion, characterised by increased levels of cyclical vulnerabilities. Bank lending activity continued to strengthen, so that the total annual growth of loans to the private non-financial sector based on transactions was 12.4% in March 2025. The largest contribution to the total growth of household loans came from general-purpose cash loans, which accelerate for the third consecutive year, rising at an annual rate of change of 15.6% in March 2025. Housing loans continued to grow at stable elevated rates, recording an annual rate of change of 10% in March 2025, with the growth also driven by cuts in interest rates on these loans in early 2025. Lending to non-financial corporations also accelerated from the previous year, even if the base effect and one-off effects of individual large transactions are excluded. The acceleration was among other things due to a decrease in interest rates on corporate loans. Developments in the residential real estate market continued to boost the growth of cyclical risks. Despite the slowdown, the growth of residential real estate prices remained strong in 2024 (10.4% on average), while market activity stabilised after having declined for two years in a row.

Specific credit-to-GDP gap indicators for the Republic of Croatia and the composite indicator of cyclical systemic risk have remained elevated. All specific credit-to-GDP gap

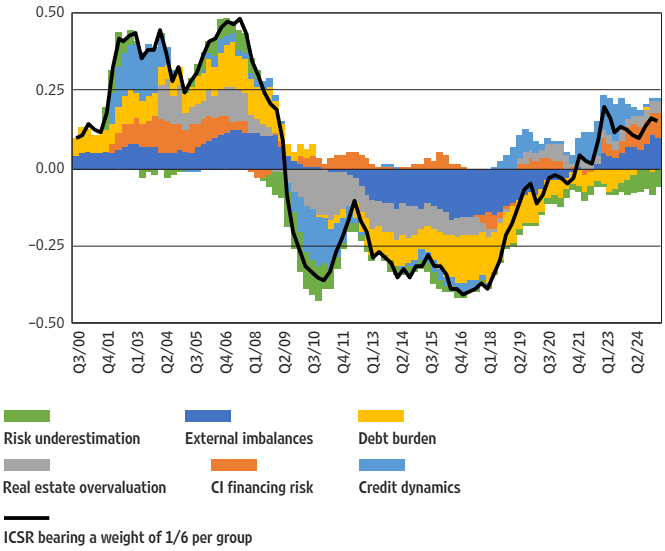
indicators[2] entered into the positive territory in 2024, with the result that the range of benchmark countercyclical buffer rates widened. Strong credit growth in the second half of 2024 halted the decline in the credit-to-GDP ratio that had lasted several years. The trend value of the credit-to GDP-ratio continued to drop in 2024, increasing the positive deviation of credit relative to GDP from the long-term trend (Figure III.3). The composite cyclical risk index[3] remained at an elevated level, which also indicates the continuation of the upward phase of the financial cycle. Bank lending and developments in the residential real estate market continue to predominantly influence the dynamics and level of this index (Figure III.4).

Figure III.3 Credit-to-GDP gap



Note: The panel shows the Basel gap (blue curve) and the range of 12 credit-to-GDP gap indicators which have better signalling properties for the Republic of Croatia than the Basel gap. Red shaded areas indicate the range of absolute gaps, while black shaded areas refer to relative gaps.
Source: CNB.

Figure III.4 Indicator of cyclical systemic risk (ICSR)



Note: ICSR with equal weight of 1/6 by groups of indicators.
Source: CNB.

In view of increased cyclical risks, the countercyclical buffer rate of 1.5% was assessed as adequate for preserving banking system resilience to possible cyclical risk materialisation or sudden shocks. With a timely build-up of the countercyclical capital buffer, as early as in 2024, the CNB increased the share of variable capital requirements in the combined capital buffer, thus additionally expanding room for macroprudential policy action in the event of a sudden shock, which can occur independently of the financial cycle's development (see Box 6 Early resilience building: the countercyclical capital buffer).

2 Specific credit-to-GDP gap indicators for the Republic of Croatia include 12 indicators: 6 absolute and 6 relative gaps, calculated using different definitions of credit and different smoothing parameters. For more information see the CNB's publication Macroprudential Diagnostics No. 16 and Škrinjarić, T., Bukovšak, M. (2022): New Indicators of Credit Gap in Croatia: Improving the Calibration of the Countercyclical Capital Buffer, CNB Working Papers I-69, June.

3 The composite index comprises a wide range of indicators related to excessive credit growth, divided into six risk categories as recommended by the ESRB, which have been assigned equal weights. For more information, see the CNB's publication Macroprudential Diagnostics No. 16 and Škrinjarić, T., Bukovšak, M. (2022): Introduction of the composite indicator of cyclical systemic risk in Croatia: possibilities and limitations, CNB Working Papers I-70, July.

Box 6
Early resilience building: the countercyclical capital buffer

Elevated uncertainty and the rising frequency and intensity of global shocks increase the unpredictability of financial cycles and undermine the reliability of standard early warning indicators of cycle reversals, which makes the preventive strengthening of the banking sector even more important. One way to achieve this is to apply the positive neutral countercyclical buffer rate strategy, that is, to activate the countercyclical buffer rate in the early phase of the financial cycle when cyclical risks are at a standard level, before they start building up. The aim of this approach is the timely build-up of capital buffers, which can be released should sudden shocks occur in any phase of the financial cycle. In this context, an alternative to introducing the positive neutral rate is the application of risk-based indicators that serve to early identify risk and build up the countercyclical capital buffer, an approach employed by the CNB.

The countercyclical capital buffer is a releasable macroprudential requirement designed to mitigate cyclical systemic risks and strengthen the resilience of the banking system. It is introduced in the upward phase of the financial cycle in order to be released during stress periods if necessary, thus facilitating the absorption of potential losses by banks and supporting continued lending to the economy. The requirement was introduced into the European regulatory framework in 2014 as part of the package of measures carried over from Basel III[1], but the sudden crisis triggered by the COVID-19 pandemic has further stimulated discussions on the role of capital buffers in stress periods and the need to activate the countercyclical buffer earlier, irrespective of the signs of cyclical risk growth.

The build-up of the countercyclical buffer was originally linked to the growth of cyclical systemic risks in the national economy. The basic indicator of such trends, recommended by the Basel Committee, is the credit-to-GDP gap, which serves as a basis for deriving the reference rate, the starting point for the calibration of the countercyclical buffer rate. In addition, the European Systemic Risk Board recommends that national macroprudential authorities also take into account specific national indicators of excessive credit growth, as well as a broader set of financial cycle indicators[2].

Ahead of the outbreak of the COVID-19 pandemic, only 11 of 30 European Economic Area (EEA) countries applied a positive countercyclical capital buffer. Although the crisis was triggered by an external shock, unrelated to the financial cycle, member states that had already built up a countercyclical capital buffer reacted by releasing it (in full or in part)[3], in order to support the banking sector and the economy by additional capital relief. However, those countries that

1 Basel III is a set of internationally agreed reforms and measures developed by the Basel Committee on Banking Supervision in response to the financial crisis of the period from 2007 to 2009.

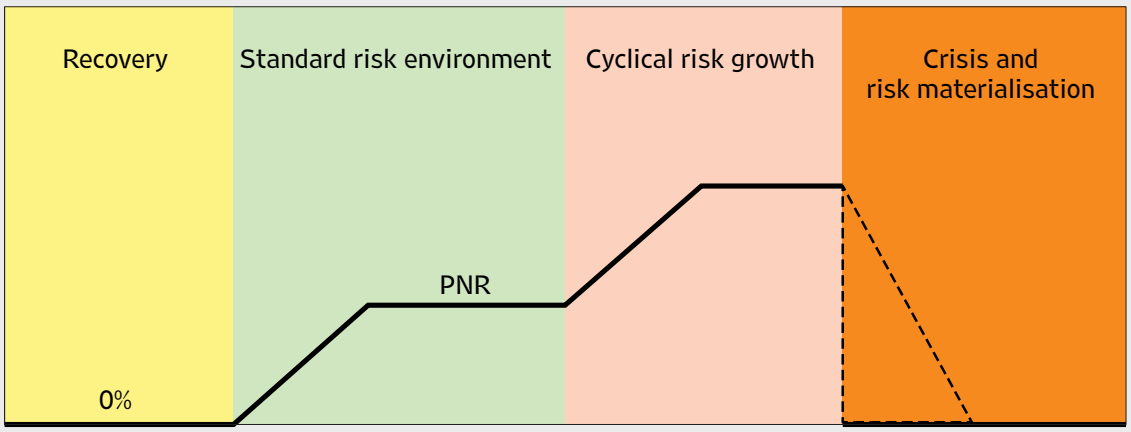
2 Recommendation of the European Systemic Risk Board ESRB/2014/1

3 European Systemic Risk Board Review of the EU Macroprudential Framework for the Banking Sector March 31, 2022.

had not previously introduced a countercyclical buffer had narrowed the scope for macroprudential policy action. Although the European banking system generally proved resilient in the pandemic crisis (also thanks to the broadly based support of monetary and fiscal measures that prevented credit risk from materialising), the lessons learned from this experience have led member states to use countercyclical capital buffers more actively since the crisis.

One way to build a countercyclical capital buffer early is to apply the positive neutral rate strategy. This implies the activation of the countercyclical capital buffer in the early phase of the financial cycle, before cyclical systemic risks start building up. In such an environment characterised by sustained credit growth, moderate asset price growth, stable non-financial sector balance sheets and a profitable banking sector, a positive countercyclical buffer rate increases the resilience of the banking sector to sudden shocks unrelated to the evolution of cyclical risks. When cyclical risks start to accumulate, the level of the countercyclical buffer rate increases further in proportion to risk growth and, since the buffer has already been activated, its increase may be more gradual than in the scenario in which the buffer is built from scratch. In the event of a financial crisis and/or risk materialisation, the countercyclical buffer can be released immediately or gradually and its rebuilding towards the target neutral rate starts in the period in which the financial cycle is assessed to be back in the standard or neutral risk level zone (Figure 1).

Figure 1 Illustration of the use of the countercyclical buffer with a positive neutral rate



Note: The line shows the countercyclical buffer rate in the various phases of the financial cycle. The dashed line shows that the buffer can be released in a crisis in full, immediately or gradually. PNR – positive neutral rate.
Source: ECB.[4]

4 European Central Bank. A Positive Neutral Rate for the Countercyclical Capital Buffer – State of Play in the Banking Union. Macroprudential Bulletin, April 2023.

Many member states started to build a countercyclical capital buffer, applying the positive neutral rate strategy, especially after the pandemic[5,6]. The benefits were recognised by the Basel Committee on Banking Supervision, which in late 2022 issued a notice on the potential benefits of setting the positive neutral countercyclical buffer rate on a voluntary basis.[7] At the end of 2024, according to the joint report of the European Central Bank and the European Systemic Risk Board[8], 17 EEA member countries applied a positive neutral countercyclical buffer rate. They mainly cite as motivation the timely formation of a capital buffer available for release during potential shocks that may occur in any phase of the financial cycle, but also uncertainty about the proper assessment of risk intensity. Another incentive is the possibility of a more gradual (and less costly, if banks do not have capital surpluses, but have to acquire new capital) formation of a buffer, as well as the widening of the scope of macroprudential policy action through increasing releasable capital buffers, that is, those that can be reduced or eliminated in adverse periods.

So far, there is no common definition of a neutral (or standard) level of cyclical risks, nor a harmonised methodology for determining a positive neutral rate at the EU level. The calibration methods applied by member states are different and include analysis of historical losses of the banking system, stress-testing models, estimates of the impact of the release of capital requirements on bank lending activity and/or expert judgement. In addition, also important to member states for setting a neutral rate are the specificities of national economies and the financial cycle, which can relate to the structural characteristics and historical performance indicators of the national banking sector, the volatility of the financial cycle, the relative importance of the residential real estate market and housing lending, etc. Due to various calibration methods and approaches to the quantitative determination of a neutral risk environment, there are considerable differences in the targeted positive neutral rate, which ranges, among the member states that have implemented this strategy, between 0.5% to 2% and is most often set at 1% of the total risk exposure.

The ongoing review of the European regulation for macroprudential policy also includes discussions on the explicit introduction of the possibility of a positive neutral strategy in the European legislation. One of the objectives is to stimulate a more active build-up of releasable capital buffers and thus improve their usability under stress conditions in order to improve their efficiency in all phases of the financial and economic cycles. In this context, a minimum common definition of a positive neutral countercyclical buffer rate is a first step towards the harmonisation of this approach among member states.

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5 Before the pandemic, the positive neutral rate approach was adopted by the United Kingdom (2016), Lithuania (2017) and the Czech Republic (2019). The reasons include uncertainty in measuring cyclical risks, especially during the transition phases of the financial cycle, and intention to build up a buffer gradually and at a lower economic cost.

6 Basel Committee on Banking Supervision. Range of practices in implementing a positive neutral countercyclical capital buffer. BIS Publication No. d585, November 2024.

7 Basel Committee on Banking Supervision. Newsletter on Positive Neutral Countercyclical Capital Buffer Rates. Bank for International Settlements, October 2022.

8 European Central Bank and European Systemic Risk Board. Using the Countercyclical Capital Buffer to Build Up Resilience Early in the Cycle, January 2025.

From the perspective of building a countercyclical buffer in a timely manner, an alternative to a positive neutral rate strategy can also be a methodology that allows for the early identification of the occurrence of cyclical risks. A flexible, risk-based and forward-looking methodological framework can identify cyclical vulnerabilities and signal the need to build a countercyclical buffer early in the financial cycle. A key prerequisite is the identification of indicators that can predict the accumulation of cyclical vulnerabilities in the domestic economy and the banking system very early, serving as a basis for the calibration of the additional capital requirement. This can increase the amount of releasable capital buffers and strengthen the resilience of the banking sector in a way similar to that of the application of a positive neutral countercyclical capital buffer strategy.

Precisely in order to enable early risk identification, in early 2022, the Croatian National Bank revised its methodological framework for countercyclical capital buffer identification[9]. The countercyclical capital buffer was introduced in the Republic of Croatia in 2015 with a rate equal to zero, which remained the same until the beginning of 2022. The new methodology, which relies on a broad set of alternative credit-to-GDP-gap indicators with better early crisis warning properties than the Basel credit-to-GDP-gap indicator and a composite financial cycle index that combines a wider set of indicators[10] has enabled an earlier identification of cyclical risks and the activation of a countercyclical capital buffer. Accordingly, the countercyclical buffer rate has been raised gradually three times since 2022 to the present level of 1.5%[11] in accordance with estimated risk growth. In a way similar to that of the positive neutral rate strategy, this methodology has enabled a more active use of the countercyclical buffer and the timely strengthening of the banking sector's resilience to potential shocks that may not be related to the development of the financial cycle.

9 For more information see Macroprudential Diagnostics No. 16 February 2022, Box 2.

10 Škrinjarić, Tihana, Introduction of the composite indicator of cyclical systemic risk in Croatia: possibilities and limitations, Croatian National Bank, July 2022.

11 See announcements on the countercyclical capital buffer rate, available at the CNB website.

B.2 Coverage of structural systemic risks

An analysis of structural vulnerabilities and systemic risks in the domestic economy showed a moderately elevated exposure of the financial system to structural systemic risks. Accordingly, the CNB decided to continue to apply the systemic risk buffer at an unchanged rate of 1.5% until the next regular review, which is to be conducted in 2026. The major risks to financial stability arise from the international environment, where heightened geopolitical tensions and trade conflicts cause strong fluctuations in financial markets and may result in sudden and severe disruptions in the global economy and financial system. Although economic developments in the Republic of Croatia are favourable at the moment and the banking system is stable and profitable, global disruptions might also negatively impact financial system stability. Preserving the adequate capitalisation of banks is therefore essential to support their ability to withstand potential losses and to continue financing the economy.

At the end 2024, the CNB confirmed the status of seven previously identified other systemically important credit institutions (O-SIIs) and the capital buffer rate to be maintained by these institutions. The prescribed capital buffer rates for O-SIIs for 2025 remained at the same levels as in 2024, after having been raised at the aggregate level in the previous year and adjusted to changes in the systemic importance of O-SIIs (Table III.1).

Tablle III.1 Other systemically important institutions in 2025

O-SII	Systemic importance score as at 31 Dec. 2023 12 2023	CCyB rate 1 1 2025 (%)
Zagrebačka banka d.d., Zagreb.	3004	2.5
Privredna banka Zagreb d.d., Zagreb	2412	2.0
Erste&Steiermärkische Bank d.d., Rijeka	1622	2.0
Raiffeisenbank Austria d.d., Zagreb	1070	1.5
OTP banka Hrvatska d.d., Split	787	1.5
Hrvatska poštanska banka d.d., Zagreb	458	1.0
Addiko Bank d.d., Zagreb	190	0.25

Note: The abbreviation CCyB stands for the capital buffer for O-SIIs.
Source: CNB.

C Coverage of risks associated with the real estate market

In order to mitigate risks associated with the real estate market, the CNB applies measures aimed at increasing banks' and housing loan users' resilience. As regards capital requirements, until the end of 2024 the CNB applied measures[4] related to risk weights for bank exposures[5] secured by residential property and commercial immovable property, indirectly increasing capital requirements for those banks to adequately reflect potential risks. With the beginning of 2025, the amended Capital Requirements Regulation (CRR3) came into force, making a significant change to the treatment of exposures secured by immovable property in the calculation of capital requirements for credit risk, for banks applying the standardised approach, by introducing a more detailed classification of exposures secured by immovable property and appropriate risk weights more sensitive to the type and riskiness of exposures. A quantitative impact analysis of these regulatory amendments signalled a significant reclassification of exposures by domestic credit institutions in the form of an increased volume of exposures recognised as secured by immovable property. As of 1 January, those exposures have been subject to adequate new risk weights, which, according to preliminary results without the application of national discretions at an aggregate level, should not lead to a decrease in capital requirements for those exposures.

In line with the new regulatory approach that is more responsive to the riskiness of exposures, the CNB has adjusted the applied national discretions regarding the calculation of those exposures. As of January 2025, the stricter definition of residential property for the use of a preferential risk weight of 20% for exposures secured by non-income producing (non IPRE) residential property has been retained. It further requires that loan users may not own more than two immovable properties and that the property used as collateral may not be a holiday home. On the other hand, the requirement to apply a higher risk weight to exposures secured by commercial immovable property has been lifted, so that, as of January 2025, these exposures have been subject to risk weights in compliance with CRR3. These weights are higher than the previous ones envisaged under CRR and differ regarding the potential of immovable property to generate income, so that it was decided, based on preliminary analyses, that there was no longer a need to apply higher national risk weights. The appropriateness of the risk weights will be reviewed regularly in the second half of 2025 and they will be adjusted as appropriate in line with the assessed riskiness of exposures, taking into account trends in the real estate market, other financial and economic developments as well as other macroprudential measures.

Cyclical risks related to the real estate market are taken into account in the calibration of the countercyclical capital buffer, which further strengthens banks' resilience. Risks related to the real estate market were taken into account in the calibration of new restrictions on consumer lending criteria.

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4 The measures comprised a more stringent definition of residential property to which a preferential risk weight of 35% can be applied: it concerns only property owned by a natural person who owns a maximum of two residential real properties, occupied or let for residential purposes. Otherwise, a standard weight for exposures to households of 75% is applied. Instead of a risk weight of 50%, the CNB has prescribed a higher risk weight of 100% for exposures completely and fully secured by commercial immovable property.

5 It concerns those that use the standardised approach to capital requirements assessment.

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Abbreviations and symbols

Abbreviations

AS – adverse scenario
bn – billion
BS – baseline scenario
CAR – capital adequacy ratio
CBS – Central Bureau of Statistics
CCE – Croatian Chamber of Economy
CDCC – Central Depository & Clearing Company
CDS – credit default swap
CEE – Central and Eastern European
CES – Croatian Employment Service
CICR – currency-induced credit risk
CIHI – Croatian Institute for Health Insurance
CIs – credit institutions
CM – Croatian Motorways
CNB – Croatian National Bank
CPII – Croatian Pension Insurance Institute
DAB – State Agency for Deposit Insurance and Bank Resolution
EAD – exposure at default
EBA – European Banking Authority
EBITDA – earnings before interest, taxes, depreciation and amortisation
EC – European Commission
ECB – European Central Bank
EFSF – European Financial Stability Facility
EIZG – Institute of Economics, Zagreb
EMBI – Emerging Market Bond Index
EMU – Economic and Monetary Union
EONIA – Euro Overnight Index Average
ERM – Exchange Rate Mechanism
ESM – European Stability Mechanism
EU – European Union
EULIBOR – Euro London Interbank Offered Rate
EUR – euro
EURIBOR – Euro Interbank Offered Rate
f/c – foreign currency
FDI – foreign direct investment
Fed – Federal Reserve System
FINA – Financial Agency
FRA – Fiscal Responsibility Act

FSI – financial soundness indicators
GDP – gross domestic product
GFS – Government Finance Statistics
HANFA – Croatian Financial Services Supervisory Agency
HBS – Household Budget Survey
HH – households
HREPI – hedonic real estate price index
HRK – Croatian kuna
IBIR – interbank interest rates
ILO – International Labour Organization
IMF – International Monetary Fund
IR – interest rate
LTIR – long-term interest rates
m – million
MoF – Ministry of Finance
MRR – marginal reserve requirements
NFC – non-financial corporations
NPLR – ratio of non-performing loans to total loans
OECD – Organisation for Economic Co-operation and Development
OF – own funds
ON USLIBOR – overnight US dollar London Interbank Offered Rate
pp – percentage points
RC – Republic of Croatia
ROAA – return on average assets
ROAE – return on average equity
RR – reserve requirements
RWA – risk-weighted assets
SDR – special drawing rights
SEE – South-Eastern European
yoy – year-on-year
ZIBOR – Zagreb Interbank Offered Rate
ZSE – Zagreb Stock Exchange

Two-letter country codes

BA – Bosnia and Herzegovina
BG – Bulgaria
CZ – Czech Republic
EE – Estonia
HR – Croatia
HU – Hungary
LT – Lithuania
LV – Latvia

MK – The former Yugoslav Republic of Macedonia
PL – Poland
RO – Romania
SI – Slovenia
SK – Slovak Republic

Symbols

– – no entry
.... – data not available
0 – value is less than 0.5 of the unit of measure being used
Ø – average
a, b, c,... – indicates a note beneath the table and figure
***** – corrected data
( ) – incomplete or insufficiently verified data

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