



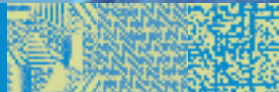
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Introduction

Increased geopolitical tensions and the attack by Russia on Ukraine worsened the outlook for the global economy, particularly for European countries due to their geographical proximity and economic links. In addition, inflationary pressures grew stronger amid disruptions on the global markets of energy, certain raw materials and intermediary goods, global supply chain bottlenecks and increased freight costs. Risks arising from the tightening of global financing conditions are increasing as well, which is particularly reflected in growing yields on long-term government bonds following the outbreak of war in Ukraine. This provided an additional stimulus to the upward trend in long-term yields which began in late 2021 in parallel with growing inflation and increased chances of a faster and sharper-than-expected normalisation of the monetary policies of central banks in major economic areas.

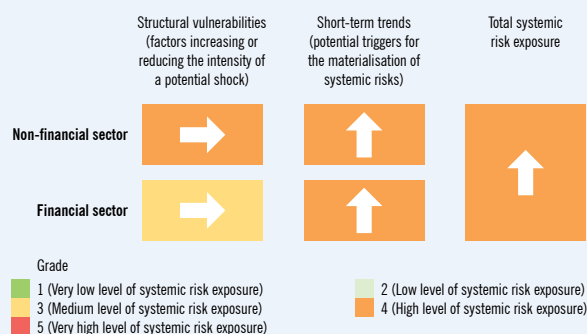
As regards the domestic economy, total exposure of the financial system to systemic risks has increased as a result of the war in Ukraine (Figure 1). As there are not many direct links between the Croatian economy and financial sector and Russia, the consequences of the conflict in Ukraine and the sanctions

against Russia mostly spill over to the Croatian economy via the developments on the global and regional markets of energy and raw materials. In the early days of the attack on Ukraine, direct damage to the Croatian financial system caused by reputational issues of a domestic bank in Russian ownership was prevented. The bank's reputational difficulties triggered rapid deposit withdrawal by clients, and when it became likely that the bank would fail within a matter of days, a fast decision on its resolution by sale to a domestic bank preserved its operations and thus maintained financial stability (see [Box 1 Effects of war in Ukraine on the financial stability in Croatia](#)). Despite increased uncertainty, the exchange rate remained stable, supported by, among other things, the anticipated introduction of the euro in the near future, after Croatia joined the European Exchange Rate Mechanism (ERM II) in mid-2020.

The deteriorating outlook for the global and particularly the European economy is reflected in domestic developments, after economic activity in 2021 exceeded that recorded in the pre-pandemic year of 2019. Increased vaccination rates and lower mortality rates of COVID-19 patients enabled the relaxation of epidemiological measures and the return to normal operations with the gradual withdrawal of fiscal support for non-financial corporations. Fiscal indicators improved, important macroeconomic imbalances (public debt and net international indebtedness of the private sector returned to pre-pandemic levels. The recovery of corporations in 2021 was uneven and dominated by corporations less affected by the pandemic, while the revenues of corporations struck more severely began to grow in early 2022. Housing lending accounted for the largest portion of household lending and, as in the previous years, continued to contribute to the accumulation of risks related to the real estate market, which reached a moderate level. Consumer lending also recovered.

The real estate sector proved resilient to the crisis caused by the coronavirus pandemic. The recovery in the number of transactions and the continued increase in the prices of

Figure 1 Risk map, April 2022



Note: The arrows show changes in relation to the Risk map published in Macroprudential Diagnostics No. 16. Source: CNB.

residential real estate in 2021 were supported by the strong demand of non-residents in the coastal regions as well as by the still favourable financing conditions on the market, the continued implementation of the government housing loan subsidy programme and favourable developments on the labour market. The gradual adjustment of residential real estate supply to growing demand was accompanied by increasing costs of construction and problems with labour force shortages. Although the intensity of price growth slowed down slightly from 2021 (from 7.7% in 2020 to 7.3%), prices increased more sharply than income, reducing the already low housing affordability. Prices continue to diverge from their key macroeconomic fundamentals, but the continued decline in interest rates still keeps the debt service-to-income ratio relatively stable, so that the magnitude of divergence is, for now, estimated as moderate.

Increased household borrowing and growing real estate prices are the main generator of growth of cyclical risks, which is why in early 2022, the CNB announced that it would be increasing the countercyclical capital buffer rate. Applicable as of March 2023, the raised rate is expected to additionally strengthen the resilience of credit institutions to possible losses linked to exposures to cyclical systemic risks in the downward phase of the financial cycle or in the event of a sudden crisis. In addition, the CNB continues to closely monitor the lending standards at individual debtor level, striving to continuously improve available data to be able to identify potential sources of systemic risk on time.

Uncertainties related to the pandemic and recent geopolitical tensions still have not jeopardised the stability of the financial sector in Croatia. High banking system liquidity and capitalisation, including the important element of the capital buffers built up over the past years, played an important role in achieving this. During the period of recovery from the recession caused by the pandemic, asset quality improved, as did the earnings of credit institutions. Despite the continued strong inflow of domestic deposits and the still favourable financing conditions, the growth in placements to the public sector was almost entirely attributable to household lending, while corporate lending was slow. Investments in liquid instruments with low interest rates increased, which, coupled with the continued decline in interest rates, limited interest margins, so that the profitability of credit institutions recovered mainly thanks to the decrease in impairment expenses. To enable sustainable long-term operations of credit institutions, reliance on new technologies needs to intensify, as this can cut operating costs and strengthen the distribution network and the competitive position of credit institutions relative to fast-growing FinTech companies (see [Box 4 The operation of FinTech companies in Croatia and the impact of the technology race on financial stability](#)). Overall, the systemic risks faced by credit institutions include the relatively high exposure to the government sector and the increase in their exposure to the overheated real estate market, while the exposure to currency-induced credit risk will mostly disappear once the euro is introduced.

Banking system resilience was confirmed by stress testing, in a scenario of elevated risks stemming from growing inflation. Testing was based on a stress scenario assuming a long-term inflationary shock accompanied by a gradual increase in interest rates and relatively unfavourable economic developments in the period from 2022 to 2024. The results show that the banking system as a whole is resilient in such a hypothetical scenario. In the same way as in the previous years, the response of credit institutions to stress was heterogeneous, and only a few institutions that are not systemically important failed the test. The key role in securing the stability of the system and cushioning the effects of unfavourable developments is played by the high level of accumulated capital surpluses that credit institutions maintain above minimum legal requirements.

Challenges and risks for the financial system in Croatia stem from several areas: geopolitical instabilities and related inflationary pressures, the expected normalisation of monetary policy and the fast increase in the prices of residential real estate. The duration of war in Ukraine and the intensity of its consequences will determine the intensity of its effects on macroeconomic, fiscal and financial developments. Disruptions in the supply chains of raw materials and intermediary and finished goods and their growing and exceptionally volatile prices, particularly of energy, are a significant burden for corporations. Operating at the very frontier of technical efficiency leads to increased operational risk for corporations, which can, within a very short term, spill over to other sectors. As consumer price inflation accelerates, real incomes of households weaken, reducing their capability to repay loans, although systemic effects are, to a certain extent, limited by the relatively low total household debt.

Against the backdrop of growing inflation, monetary policy is expected to tighten and key benchmark rates of the central banks of major economic areas are likely to rise, increasing the price of new borrowing and the debt repayment burden for debtors with variable interest rates. However, the increase in the price of new government borrowing for Croatia, still perceived as risky due to the high level of public debt and borrowing in foreign currency (euro), could be mitigated by the expected introduction of the euro. Furthermore, the gradual increase in benchmark rates would increase the financial obligations of debtors, primarily those with loans granted at variable interest rates, or with periods of initial interest rate fixing over a period significantly shorter than maturity (see [Box 2 How much would repayment costs grow for users of housing and consumer loans in the event of an interest rate increase?](#)). Consumers with longer remaining maturities (over 20 years) and short periods of interest rate fixing display the highest level of exposure to interest rate risk. Potential systemic effects of interest rate risk materialisation should, nevertheless, be relatively mild owing to the relatively small volume of the portfolio of loans whose repayments could increase significantly. On the other hand, an interest rate increase could alleviate risks that grew during the prolonged period of low interest rates: heavy borrowing by the private sector, low bank profitability and the search for risky alternative forms of investment offering higher rates of return.

Finally, the anticipated accession to the euro area will greatly eliminate currency risk and is expected to mitigate the possible effects of interest rate increase relative to the scenario in which Croatia remains outside the euro area.

Due to the sharp price increases and the volume of housing lending, the residential real estate sector is a significant source of risk to financial stability. Although the demand and the pressure on prices show no signs of weakening, sudden market shocks which could lead to a decrease in prices and transactions are possible due to growing inflationary pressures, expected interest rate increases and continued geopolitical ten-

sions. By increasing the prescribed capital buffers the CNB additionally strengthened the resilience of banks to potential shocks related to the real estate market, but to effectively mitigate the vulnerabilities linked to the real estate market, a combined approach using various economic policies is needed (see [Box 6 The policies and ways to influence the residential real estate market](#)). Although areas of activity, goals and priorities of various policies do not necessarily have to be synchronised, creating a framework for an efficient and balanced real estate market, without boom-bust cycles, facilitates resolving housing issues, contributes to economic growth and social welfare and the preservation of financial stability in the long run.

1 Macroeconomic environment

Increasing geopolitical tensions and the war in Ukraine have led to a drop in economic optimism and the deterioration of short-term expectations, which will have a negative impact on the global economy. Growing inflationary risks and risks related to disruptions in the global market of food, energy and other important raw materials are particularly pronounced. Negative risks to financial stability are elevated as well, most notably risks arising from the tightening of global financing conditions amid growing uncertainty and the increased likelihood of a faster and stronger normalisation of monetary policy than expected earlier. Short-term expectations also deteriorated noticeably in the domestic environment, with indirect unfavourable effects of the war in Ukraine and the sanctions against Russia on the domestic economy, such as the movements of raw material prices and reduced foreign demand of major trading partners, looming large.

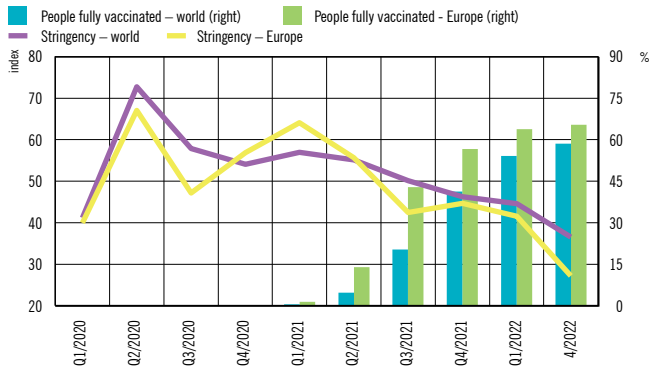
1.1 International environment

In late 2021 and the early months of 2022, global GDP continued to recover from the strong contraction caused by the outbreak of the COVID-19 pandemic, but currently the global outlook is deteriorating. The widespread recovery of the global economy was favourably influenced by increasing vaccination rates and less restrictive epidemiological measures in most countries (Figure 1.1 and 1.2). However, the global economy was expected to slow down even before war broke out

in Ukraine and sanctions were imposed on Russia, primarily due to the base effect, while the economic outlook deteriorated considerably under the effect of growing pressures arising from global supply chain disruptions and imbalances in the goods market, which hampered the recovery of manufacturing industry and contributed to stronger inflationary pressures. Against such a backdrop, economic sentiment began to deteriorate in the second half of 2021 and weakened further under the influence of the military conflict in Ukraine and a rise in geopolitical tensions (Figures 1.3 and 1.4). Increasing geopolitical tensions had an unfavourable effect on the economic outlook, primarily in relation to the energy market and the markets of important raw materials, while expectations regarding global economic growth from the end of 2021 were revised downwards. Unfavourable economic effects of the war in Ukraine could be particularly pronounced in European countries due to their proximity and closer links to the markets of Russia and Ukraine, most notably with regard to energy supply. Furthermore, the expected policy aimed at reducing the significant level of dependency of European countries on Russian energy and the redirection towards other sources of energy could put additional pressure on medium-term economic growth.

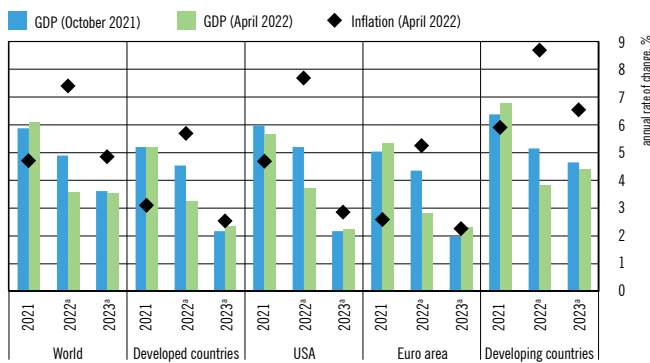
The steady increase in consumer price inflation began in 2021 due to supply chain disruptions, shortages of individual raw materials and intermediary goods and increases in the prices of goods transport (Figure 1.5). Following the outbreak of war in Ukraine, uncertainties related to the intensity and duration of inflationary pressures grew further, primarily in the segment of the prices of energy, agricultural products and individual raw materials. Amid increasing inflation, the Fed initiated a cycle of monetary policy tightening by raising its benchmark rate by 25 basis points in March and by 50 basis points in May, with increased chances of a normalisation that would be faster than what was expected in the early months of 2022 (Figure 1.6). The ECB's benchmark rate remained unchanged, but in late March, the Governing Council of the ECB ended the pandemic emergency purchase programme (PEPP) and announced that it would reduce the purchase volume of and,

Figure 1.1 Increased vaccination rates and more relaxed epidemiological measures



Note: The figure shows quarterly averages and the average for April 2022.
Source: <https://ourworldindata.org/coronavirus>

Figure 1.2 Expected economic growth for 2022 has been revised downwards

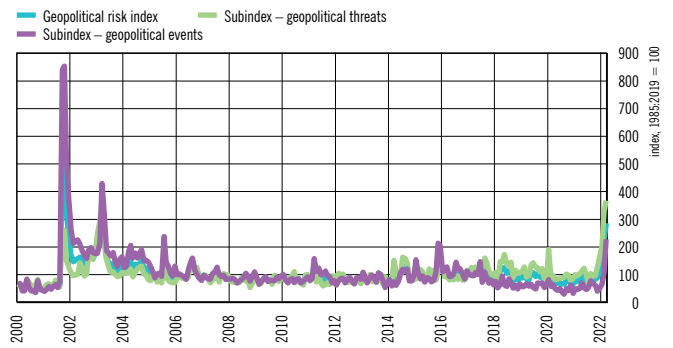


^a Forecast.
Source: IMF (WEO, April 2022/October 2021).

ultimately, end the regular asset purchase programme (APP) sooner than previously anticipated. Considering the growing inflationary pressures in the euro area, the markets expect the ECB to gradually raise the benchmark rate in late 2022, soon after the completion of the asset purchase programme.

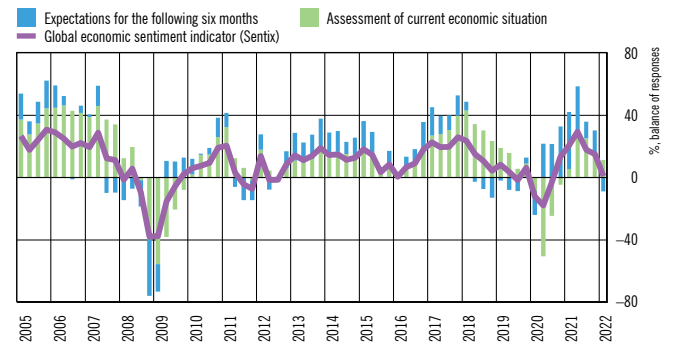
The upward trends in major global equity indices recorded in 2021 reversed in early 2022 with a slight rise in volatility and increased caution on the global capital market (Figure 1.7). Expectations of a faster-than-expected tightening of the monetary policies of central banks of major economic areas and the increasingly stringent financing conditions contributed to such developments. After having increased sharply in 2021, price-to-earnings ratios dropped as well, signaling increased caution and reduced investor confidence caused by, among other things, the uncertainties arising from the war in Ukraine (Figure 1.8). Yields on the long-term government bonds of developed countries, although relatively low in historical terms, saw a noticeable increase from the beginning of the current

Figure 1.3 Geopolitical risks went up



Note: The geopolitical risk index reflects the results of an automated text-search of the electronic archives of ten newspapers.
Source: <https://www.matteoiacoviello.com/gpr.htm>.

Figure 1.4 Global economic sentiment deteriorated

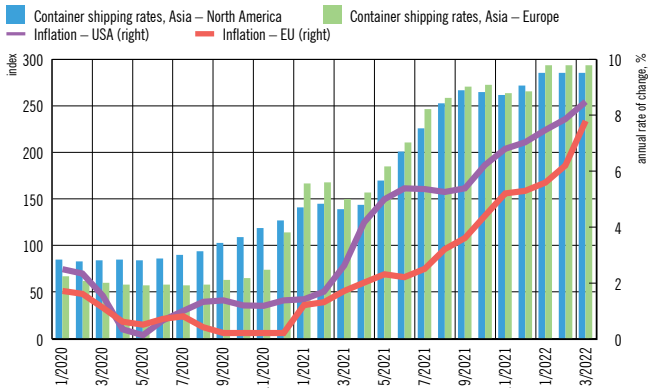


Note: The sentiment indicator (Sentix) monitors the overall state of the global economy. It is based on a survey regarding the current economic situation and short-term expectations. The indicator value may range between -100 and 100. Positive values point to a positive assessment of the economic situation and vice versa.
Source: Bloomberg.

year, primarily under the influence of growing inflationary expectations and the anticipated monetary policy tightening (Figure 1.9). The spread between 10-year and 2-year US government bonds declined significantly, reflecting the deterioration in confidence regarding the dynamics of future economic activity (Figure 1.10). On the other hand, the upward trend in residential real estate prices in leading global economies continued, which additionally increases concern over the mismatch of prices and economic fundamentals and the risk of future repricing (Figure 1.11).

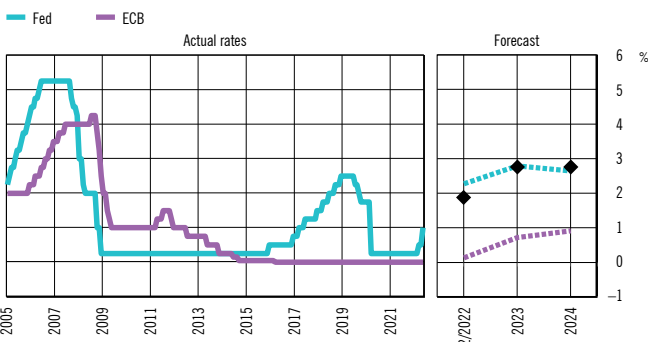
The US dollar exchange rate ended last year considerably stronger than the majority of other important global currencies, and its appreciation continued into 2022 (Figure 1.12). The trend was largely driven by the increased likelihood of a faster-than-expected tightening of the Fed's monetary policy through the abolition of monetary incentives and the increase in benchmark rates. The start of the war in Ukraine in February and increased geopolitical tensions further increased the de-

Figure 1.5 Strong increase of inflationary pressures



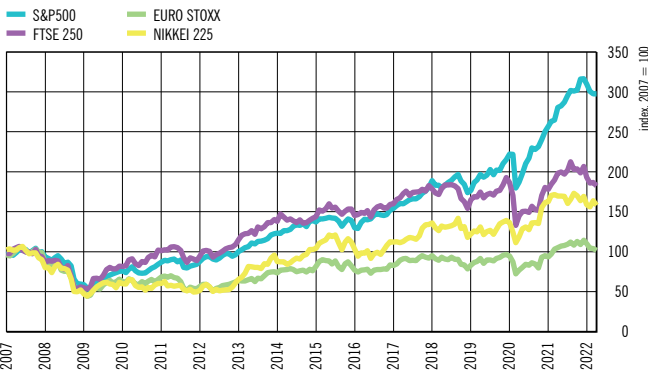
Source: Bloomberg.

Figure 1.6 Monetary policy is tightening



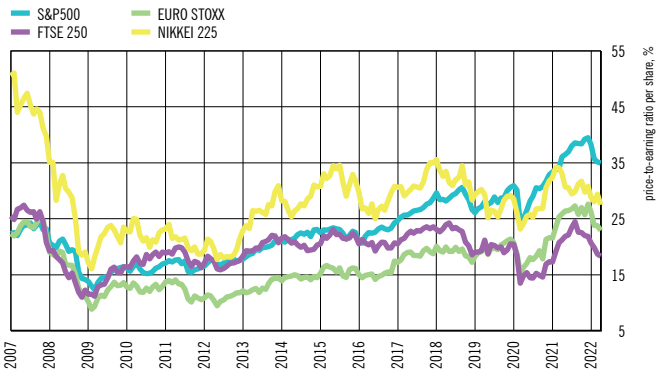
Notes: The figure shows Fed and ECB benchmark interest rates. The dashed lines in the forecast represent market expectations from May 2022, while dots represent FOMC expectations from the meeting held on 17 March 2022. Sources: Fed and ECB (actual rates) and Bloomberg (forecast).

Figure 1.7 The upward trend in main global equity indices reversed in early 2022



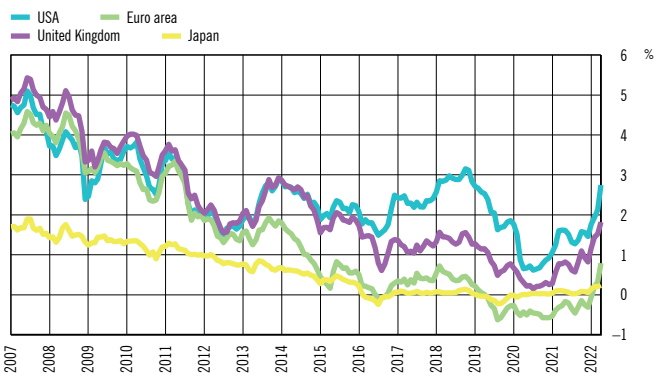
Source: Bloomberg.

Figure 1.8 Price-to-earnings ratios decreased at the beginning of 2022 after having grown sharply in 2021



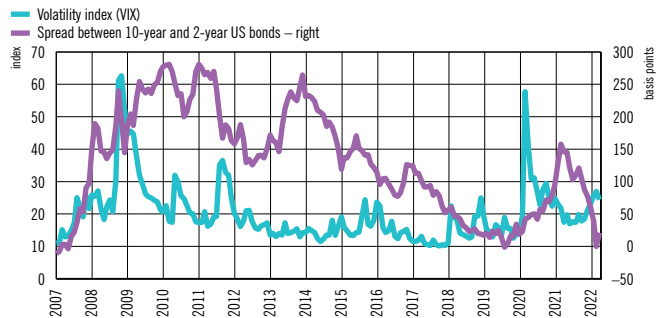
Source: Bloomberg.

Figure 1.9 Yields on long-term government bonds continue to grow



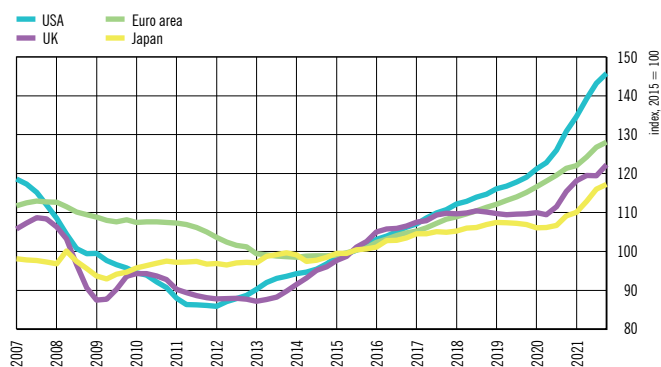
Source: Bloomberg.

Figure 1.10 Increase in volatility on the capital market and expectation deterioration



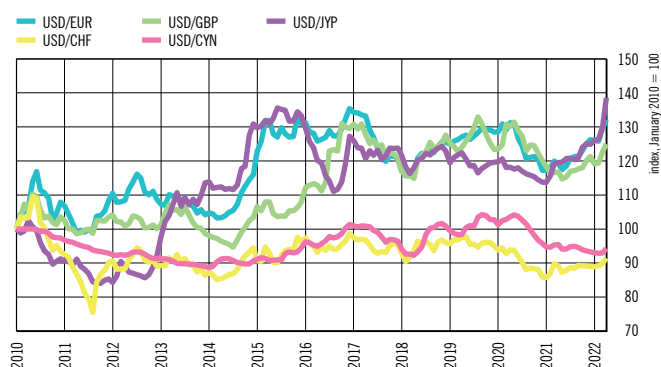
Notes: VIX is a measure of expected implicit fluctuations in the S&P500 options, calculated and published by the Chicago Board Options Exchange (CBOE). The spread between 10-year and 2-year bonds points to investors' perception of risk (long-term yields lower than short-term yields point to potential recession). Source: Bloomberg.

Figure 1.11 Real estate prices continue to rise



Note: The figure shows real residential real estate prices.
Source: OECD.

Figure 1.12 US dollar appreciated noticeably versus most other currencies

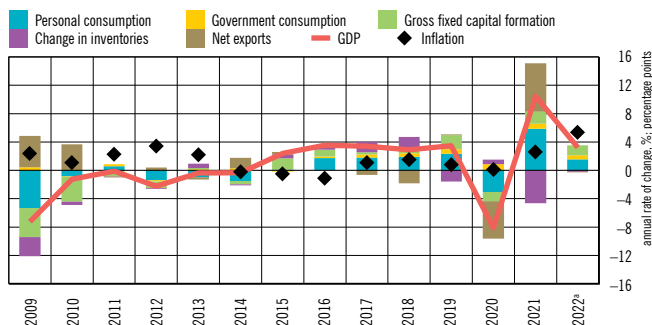


Note: The rise in the index shows currency depreciation against the dollar.
Source: Bloomberg.

1.2 Domestic environment

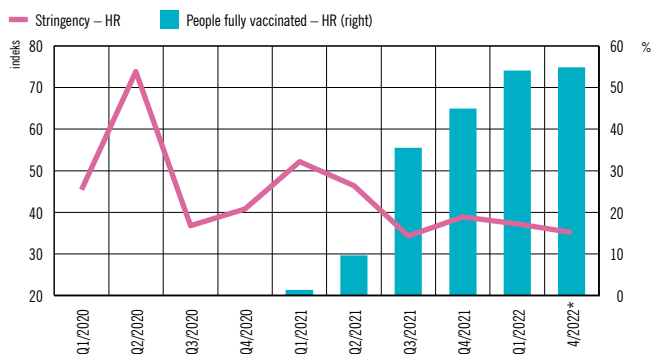
The recovery of the Croatian economy marked 2021 and continued in the early months of the current year, but risks re-

Figure 1.13 Croatian economy rebounded strongly in 2021



^a Forecast
Note: The figure shows contributions to GDP growth, the annual rates of change in real GDP and the average annual rate of change in the consumer price index (CPI).
Sources: CBS and CNB.

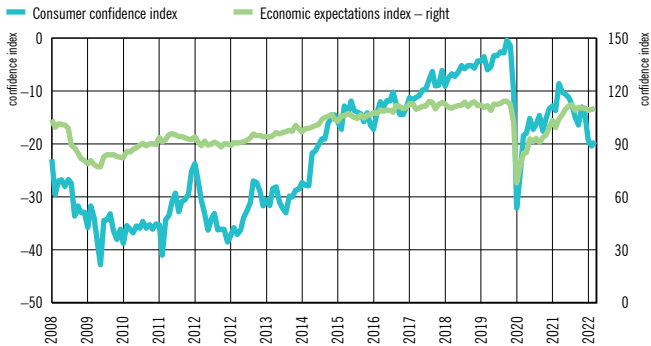
Figure 1.14 Thanks to increased vaccination rates, epidemiological measures were relaxed



Note: The figure shows quarterly averages and the average for April 2022.
Source: <https://ourworldindata.org/coronavirus>

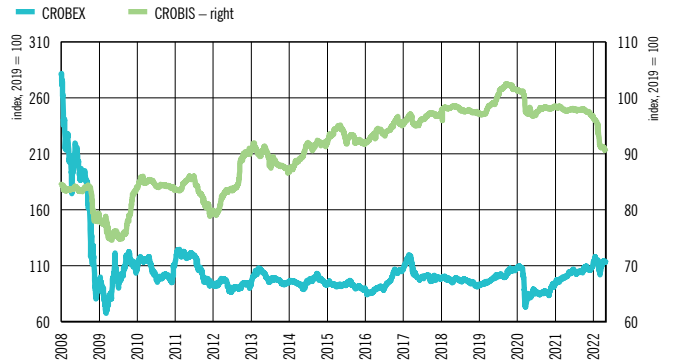
garding future economic activity in the country are elevated. Owing to the strong increase in real GDP in 2021, economic activity exceeded the level recorded in the pre-pandemic year of 2019, with the recovery of all components of domestic and foreign demand contributing to the trend, most notably personal consumption and net exports (Figure 1.13). The gradual waning of the pandemic spurred by higher vaccination rates enabled more relaxed epidemiological measures and additionally supported recovery (Figure 1.14). Developments in the labour market were exceptionally favourable and employment grew across all sectors of the economy, accompanied by accelerated growth in nominal wages. However, real wage growth slowed down in the second half of the year as consumer price inflation picked up, which was reflected in consumer confidence that has been decreasing steadily since the summer of 2021 (Figure 1.15). The increase in domestic economic activity could slow down considerably in 2022, particularly under the influence of the considerable slowdown in the growth of foreign demand of major trading partners. As regards domestic demand, personal

Figure 1.15 Consumer confidence has been decreasing since mid-2021



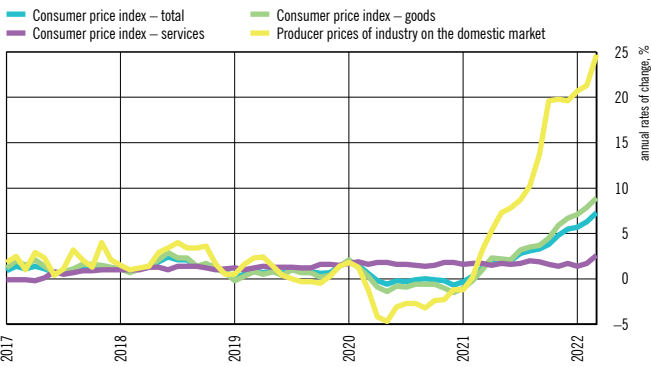
Note: The figure shows data up to 29 April 2022.
Source: European Commission.

Figure 1.18 CROBIS index went down, while the CROBEX slightly exceeded pre-pandemic levels



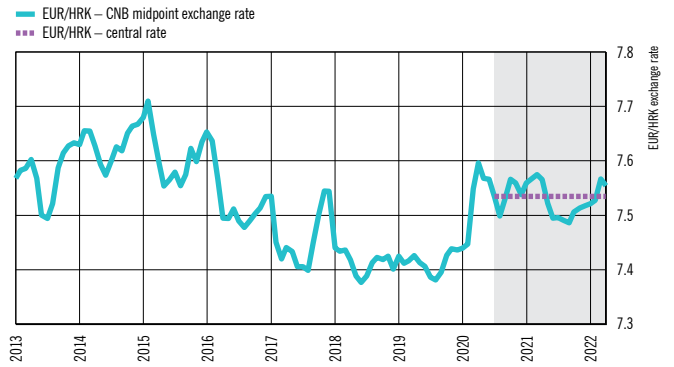
Source: Zagreb Stock Exchange.

Figure 1.16 Consumer price and producer price inflation is increasing strongly



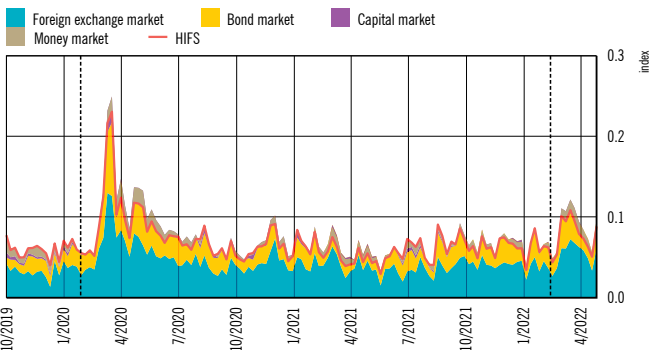
Note: The figure shows data up to 31 March 2022.
Source: CNB.

Figure 1.19 The exchange rate of the kuna against the euro is stable



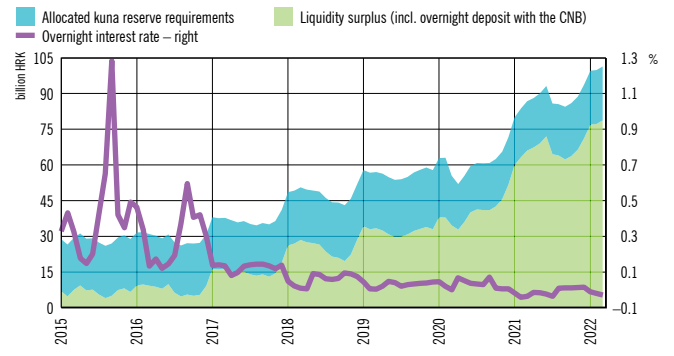
Note: The shaded area indicates the period when kuna joined the European Exchange Rate Mechanism (ERM II).
Source: CNB.

Figure 1.17 Croatia's financial stress index moved up only slightly and is hovering at relatively low levels



Note: Dotted lines indicate the first recorded case of coronavirus disease in Croatia (15 February 2020) and the beginning of the war in Ukraine (24 February 2022).
Source: CNB.

Figure 1.20 Liquidity surplus reached record highs



Note: The overnight interest rate refers to the overnight interbank interest rate by the end of 2015, while as of the beginning of 2016, it refers to the overnight interest rate on interbank demand deposit trading.
Source: CNB.

consumption is expected to slow down primarily due to rising costs of living.

After having picked up considerably in 2021, inflationary pressures will be high in 2022 as well. Consumer price inflation increased mainly due to the rise in the prices of energy and food products, reflecting the higher prices of crude oil and agricultural raw materials on the global market, while the increase in the prices of services is still expected to be relatively contained. Domestic industrial producer prices went up significantly as well, and the spillover of growing producer prices to consumer prices is expected to continue, which will greatly contribute to the acceleration of the average annual rate of inflation in the current year (Figure 1.16). In addition to having an unfavourable impact on household propensity to consume, globally stronger inflationary pressures will push interest rates up and tighten financing conditions, which will have unfavourable consequences on the performance of some enterprises (see chapter 3 Household sector and chapter 5 Non-financial corporate sector).

Pressures on the foreign exchange market increased slightly in February and March 2022 under the influence of war in Ukraine, sanctions against Russia and increasing geopolitical uncertainties. However, such developments did not have a significant effect on the estimated level of financial stress in Croatia (Figure 1.17). Three foreign exchange interventions of the CNB in March, although relatively small in volume, contributed to the preservation of foreign exchange stability, while the stability of the exchange rate of the kuna against the euro is also greatly supported by the participation of the kuna in the European Exchange Rate Mechanism (ERM II) since mid-2020 and the expected introduction of the euro as the official currency in Croatia in early 2023 (Figure 1.19). Market expectations were also calmed by the fast resolution of Sberbank d.d., which faced significant liquidity issues as a result of the reputational impact of sanctions against Russia (see Box 1 Effects of war in Ukraine on the financial stability in Croatia). The kuna liquidity of the domestic banking system continued to reach historical highs, while overnight interest rates on interbank demand deposit trading dropped (Figure 1.20). As regards the developments on the domestic bond market, yields on government bonds increased slightly, with the CROBIS index having gone down since the last quarter of 2021 as a result of accelerated consumer price inflation and the anticipated increase in key interest rates. On the other hand, the CROBEX rebounded noticeably, slightly exceeding pre-pandemic levels (Figure 1.18).

1.3 Current risks in the international and domestic environment

Great uncertainty arising from increasing geopolitical tensions poses the most significant risk for global financial stability. Prolonged war in Ukraine and the introduction of more severe sanctions against Russia could have an additional unfavourable impact on global trade, particularly the trade in ener-

gy, agricultural raw materials and other important raw materials. Possible disruptions in energy supply would put additional pressure on energy prices, which would burden the global economy, particularly the economies of European countries due to their proximity and economic links with Russia and Ukraine. Such developments could aggravate the existing imbalances in the goods market and supply chain bottlenecks, which would have an unfavourable impact on investment plans and overall corporate performance and lead to a further decline in economic confidence and an economic slowdown.

Growing inflationary pressures have increased the likelihood of a faster and stronger tightening of monetary policy than expected several months ago and led to a further deterioration in global financing conditions. Growing market interest rates could hit highly-indebted countries with accumulated structural imbalances and significant financing needs particularly hard, increasing the risk of debt refinancing and the cost of new borrowing as well as the risk of capital outflow. Further deterioration of financing conditions could increase the debt repayment burden and risks arising from the globally high debt level of non-financial corporations, which increased during the pandemic. Moreover, the confidence of investors on the financial markets and their risk appetite could decrease considerably, leading to significantly lower market turnover and liquidity coupled with the sharp repricing of certain types of assets.

The future course of the pandemic still poses a significant risk. Although risks arising from the COVID-19 pandemic are gradually declining, new coronavirus strains could still appear and re-escalate the disease. The possible tightening of epidemiological measures would have an unfavourable effect on economic confidence and increase pressure on public finance, exacerbating negative risks to economic activity.

Direct unfavourable effects of the war in Ukraine and sanctions against Russia on the domestic economy are minor. However, prolonged war would increase indirect effects through trends in raw material prices, reduced confidence and a decline in demand from major trading partners, which would unfavourably affect the dynamics of exports of goods and tourism revenues. Problems in energy supply could appear. Furthermore, stronger inflationary pressures may further affect consumer confidence, increase pressure on household consumption and have an unfavourable effect on investment plans and private sector capital investments, which would additionally weaken domestic economic activity.

As regards risks arising from the domestic environment, structural long-term risks pose the greatest challenge. Even though the government has already met most of its financing needs for this year, the high level of public and external debt is still a cause of significant structural vulnerability, making the economy sensitive to any deterioration of financing conditions. Among other risks, stagnant and unfavourable demographic trends and the low labour activity of the population are particularly noteworthy.

Box 1 Effects of war in Ukraine on the financial stability in Croatia – failure of a Russian-owned bank prevented

Increased geopolitical risks that culminated at the end of February of 2022 with Russia's attack on Ukraine enhanced the weaknesses caused by the pandemic: supply chain disruptions and increases in the prices of energy, raw materials and food. The developments on the global markets of raw materials and on financial markets are the main channel of spillover of the negative consequences of the conflict in Ukraine and the sanctions against Russia to the Croatian economy, as Croatia's direct exposures to these countries are low. Russia accounts for only slightly over 1% of Croatia's total trade in goods, and tourist arrivals from Russia accounted for approximately the same share in total foreign tourist arrivals and overnight stays in Croatia. Modest Russian equity investments in Croatia were primarily linked to real estate and the management rights in one large enterprise (following a debt-to-equity swap), while one medium-sized bank, Sberbank d.d., was indirectly Russian-owned. At the same time, the direct exposure of Croatian financial institutions to Russia was exceptionally low, although some of them are members of European banking groups operating on the Russian and Ukrainian market, and as such are indirectly, although not materially, exposed to the consequences of war.

However, only a few days before the war broke out, subsidiaries owned by the Russian Sberbank faced serious consequences of reputational damage across Europe, leading to significant liquidity outflows. Sberbank d.d. operating in Croatia and owned by Sberbank AG with its head office in Austria, and thus indirectly owned by the parent undertaking Sberbank Russia, majority-owned by the Russian Federation, experienced the same. The bank was eighth in size on the Croatian market and accounted for slightly over 2% of the assets of the Croatian credit institutions sector at the end of 2021. According to the data from the last released annual financial report for 2020, it mainly relied on deposits as the main source of financing, household deposits accounting for more than one half, while the exposure to affiliated persons was relatively small.

Due to the unfavourable impact of geopolitical tensions on the bank's reputation, business entities began withdrawing their funds from the bank and transferring them to other banks in Croatia, while citizens formed long lines in front of the bank's branch offices waiting to withdraw their savings or regular inflows from their bank accounts. Due to the strong outflow of deposits in the period from 24 to 27 February 2022, the bank's liquidity was heavily damaged, and the European Central Bank (ECB), which directly supervises the bank, declared in the early hours of Monday, 28 February 2022, that Sberbank d.d. was failing or was likely to fail. The same assessment was made for the parent undertaking Sberbank AG and the Slovenian subsidiary, and the Single Supervisory Board, the central resolution authority in the banking union, was notified of the situation. The ECB adopted the 'failing or likely to fail' decision upon determining that the aforementioned banks would not be capable of settling their debts or other liabilities upon maturity.

Following the ECB's assessment, the SRB adopted a decision on a two-day moratorium, and pursuant to that decision, the CNB adopted the Decision on the two-day suspension of payments. Because, for the sake of the public interest and to prevent the negative impact of the bank's

failure on financial stability in Croatia, the resolution of Sberbank d.d. had been deemed necessary even before payments were suspended on account of significant liquidity issues caused by the damaged reputation of the parent bank, the sale of the bank was estimated to be the only efficient strategy. When the moratorium ended, on Tuesday, 1 March 2022, the SRB adopted the decision on the resolution of Sberbank Group members with head offices in Croatia and Slovenia by applying the instrument of sale; no resolution action was deemed necessary for the parent undertaking in Austria and it was decided that it would be wound up. During the moratorium, the CNB organised the process of collecting binding bids for the purchase of the bank's shares. Hrvatska poštanska banka (HPB) d.d. offered the highest bid and therefore the SRB ordered the Croatian National Bank to transfer the ownership over 100% of the bank's shares from the then owner to HPB. The resolution proceedings against Sberbank d.d. ended on 13 April 2022 after transferring shares to the new shareholder and implementing resolution measures.

In addition to Croatia and Slovenia, Sberbank Europe AG had subsidiaries in the Federation of Bosnia and Herzegovina, Republika Srpska, Serbia, the Czech Republic and Hungary and a branch in Germany. In Bosnia and Herzegovina, entity banking authorities took over the control of local subsidiaries at the end of February, and by the end of March, both banks received a new owner from the domestic market. In Serbia, the subsidiary was acquired by AIK banka, operating within a group that had announced the acquisition of Sberbank AG subsidiaries in Croatia, Bosnia and Herzegovina, Slovenia, Serbia and Hungary in late 2021, but the process was not completed as it was pending approval by the regulators and the national authorities in charge of market competition. In contrast, national resolution authorities in the Czech Republic and Hungary decided to wind up Sberbank subsidiaries due to their relatively low importance.

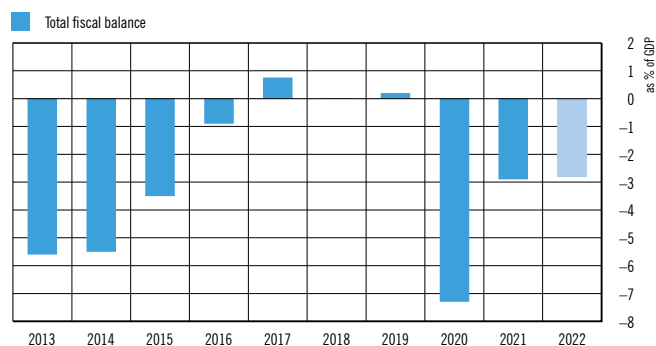
On Wednesday, 3 March, the first day following the opening of resolution proceedings, it was announced in Croatia that the bank would continue to operate under the name *Nova hrvatska banka*, and the pressure on cash withdrawal rapidly subsided. HPB announced that the process of the new bank's integration would last for about a year, and that its completion was planned for the period after the official introduction of the euro (anticipated in early January 2023), as both banks were in the midst of complex preparations for that significant event for Croatia and its financial system.

Spillover of the contagion to other banks was avoided and confidence in the Croatian banking system was restored, although other banks also recorded deposit withdrawals during the early days of war in Ukraine, triggered by preparations for living in increased uncertainty. However, it is necessary to note that Sberbank d.d. was a liquid and solvent bank which did not, at any moment, face difficulties due to mismanagement or mispricing of risk; it was the materialisation of reputational risk that led to serious issues in the maintenance of liquidity which threatened to jeopardise the bank's capital. The resolution of Sberbank d.d. through the sale of the bank to a new owner prevented the negative impact of the bank's failure on the financial stability in Croatia. In addition, costs which would have otherwise been incurred by the deposit insurance fund were avoided, which indirectly prevented costs for other banks as well, because the payment of insured deposits up to the amount of EUR 100,000.00 would have depleted the fund, creating the need to replenish it with new payments of other banks.

2 Government sector

Strong economic recovery had a favourable impact on fiscal indicators. Thanks to ample fiscal revenues and fiscal savings arising from the abolition of support measures aimed at fighting the consequences of the pandemic the general government deficit dropped to 2.9% of GDP in 2021. The public-debt-to-GDP ratio decreased strongly as a result of fast recovery, standing at 79.8% of GDP at end-2021. However, a slow-down in economic growth, accelerated inflation coupled with increased costs of government borrowing and heightened geopolitical tensions in 2022 are expected to increase exposure to systemic risks stemming from the government sector.

Figure 2.1 Favourable economic developments have led to the improvement of the ratio of fiscal deficit to GDP..

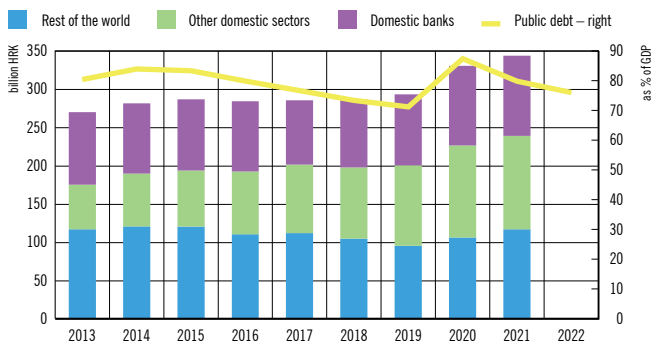


Note: Projection for 2022 based on the Excessive Deficit Procedure Report, Republic of Croatia, April 2022.
Source: Eurostat.

2.1 Fiscal developments

The strong recovery of the Croatian economy in 2021 had a favourable effect on public finance. After the strong deterioration of fiscal indicators in 2020, general government revenues increased substantially in 2021, while expenditures grew moderately. Revenues from indirect taxes brought about by the strong growth in personal consumption and exports of services saw a particularly strong increase on the revenue side, particularly in the second half of the year (for details, see 1 Macroeconomic developments). Other revenue categories also went up from the year before, except for revenues from direct taxes which declined due to income and profit tax changes implemented as part of the fifth round of tax reforms aimed at alleviating the tax burden. The expenditure side of the budget increased only slightly from 2020, as expenditures for interest payments and subsidies aimed at alleviating the economic effects of the pandemic dropped and government capital in-

Figure 2.2 ... and to a noticeable decline in the public debt-to-GDP ratio in 2022



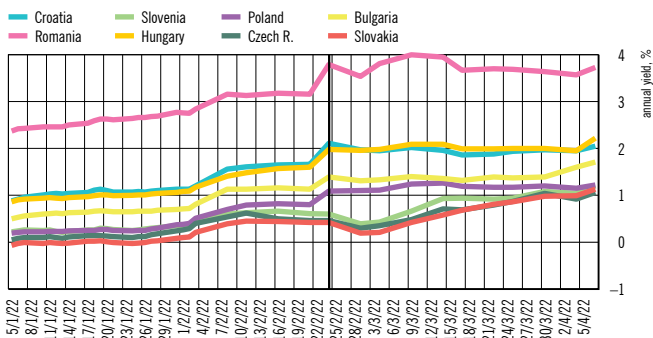
Note: Projection for 2022 based on the Excessive Deficit Procedure Report, Republic of Croatia, April 2022. Sources: Eurostat and CNB.

investments went down. The consolidated general government budget deficit decreased in 2021 to 2.9% of GDP, and a similar level is expected for 2022 (Figure 2.1). Deficit stagnation is greatly linked to additional fiscal expenditures aimed at mitigating the unfavourable effects of exceptionally high prices of energy on the one hand and expected continued economic growth on the other. Economic recovery reduced the public debt-to-GDP ratio substantially, so that at end-2021, it stood at 79.8% of GDP (Figure 2.2). It is expected to decline further in 2022 amid continued economic growth.¹

2.2 Government sector financing

The shift in the course of monetary policies of central banks in major economic areas in early 2022 pushed the yield on Croatia’s government bonds slightly upwards; similar trends

Figure 2.3 Monetary policy tightening and the war in Ukraine led to increases in the yields of generic bonds of CEE countries



Note: The vertical line indicates 24 February 2022, when the conflict in Ukraine began. Source: BoA Merrill Lynch, data for 2022, available until 8 April.

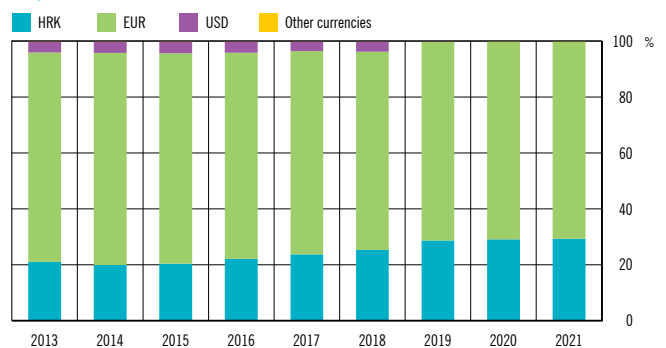
1 Budget deficit and public debt forecasts (as a share of GDP) for 2022 have been taken from the April Fiscal Notification in the context of the Excessive Deficit Procedure Report.

Table 2.1 In 2022, general government financing needs stand at some 16% of GDP

Payments due in 2022, as % of GDP	16.4
of which:	
bonds	5.1
loans	3.2
T-bills	5.3
planned fiscal deficit	2.8

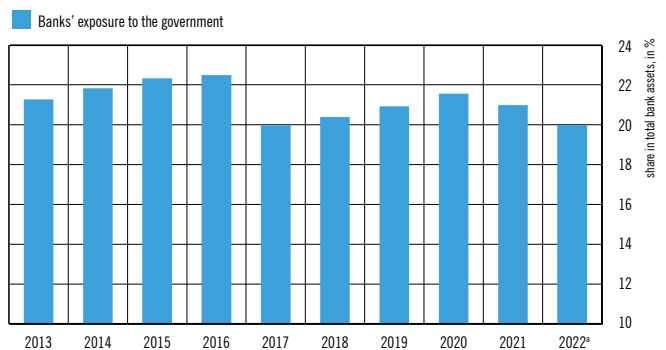
Sources: CNB and MoF.

Figure 2.4 Introduction of the euro as the official currency in Croatia will eliminate the sensitivity of public debt to currency depreciation



Source: CNB.

Figure 2.5 The sovereign-bank-nexus continues to be strong



* Refers to the first quarter of 2022. Source: CNB.

were recorded in most developed countries as well. The Fed lifted its benchmark rate by 25 basis points as early as in March 2022 and announced further increases at a faster rate, while the ECB announced that it would accelerate the completion of its regular asset purchase programme (APP). The monetary policy shifts announced led to an increase in the yields of government bonds for most developed countries at the beginning of Febru-

ary, following the first announcements of the shift in the course of US monetary policy. After war broke out in Ukraine and geopolitical tensions increased, risk perception increased further and demand for safe assets grew, while European countries, particularly those geographically relatively close to the Ukraine, were perceived as risky. Current yields on Croatia's government bonds hover at levels recorded in early 2018 (Figure 2.3) after having increased slightly.

The anticipated increase in the yield on government bonds is expected to increase the costs of financing in 2022, but the cost of new financing will still be lower than the average cost of maturing liabilities, so that government interest expenditures will continue to decline. In 2022, Croatia is expected to refinance bonds, loans and T-bills which, along with the planned deficit, account for some 16% of GDP (Table 2.1); however, in addition to financing in the market, there is a possibility of increased borrowing from public sources if necessary (e. g. from the NextGenerationEU fund).

2.3 Current risks to financial stability in the government sector

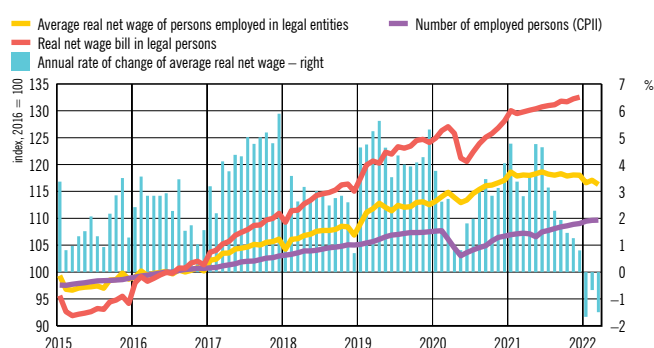
Current risks to financial stability stemming from fiscal developments are estimated to be elevated, depending primarily on the intensity and duration of the war in Ukraine and the potential introduction of additional sanctions and further tightening of relations with Russia. Prolonged war in Ukraine and further sanctions against Russia, primarily aimed at exports of energy, could lead to additional sharp increases in energy prices, unfavourably impacting economic growth and fiscal indicators. War in Ukraine could have an unfavourable effect

on the planned dynamics of general government revenues and expenditures due to possible higher government subsidies and interventions in the event of further increases in energy prices, additional costs arising from incentives to strengthen existing programmes aimed at substituting energy sources, costs of the refugee crisis and potential higher investments in Croatia's defence capabilities. Any further inflation growth could spur faster and stronger tightening of monetary policy and interest rate increases sharper than currently expected, which could increase uncertainty further and push costs of government borrowing up. The COVID-19 pandemic continues to pose an unfavourable risk that could have adverse consequences to economic activity should new virus strains appear, as general government expenditures would move up again if more stringent epidemiological measures are introduced.

The introduction of the euro as the official currency in Croatia, planned for the beginning of 2023, should eliminate currency risk from public debt and thus increase the resilience of public finance to various disruptions. Because of the high share of public debt (71% at the end of 2021) denominated in the euro (Figure 2.4), even a small depreciation of domestic currency significantly increases the debt repayment burden. The elimination of currency risk from public debt will have a favourable impact on the domestic banking sector (see chapter 6 *Credit institutions*) considering the continuously high exposure to the government. This is evident from the structure of bank assets, as in March 2022, 20% of total bank assets were accounted for by placements to the government (Figure 2.5), which is one of the highest shares among EU countries. Around one half (48%) of total placements of domestic credit institutions to the government are denominated in the euro or indexed to the euro.

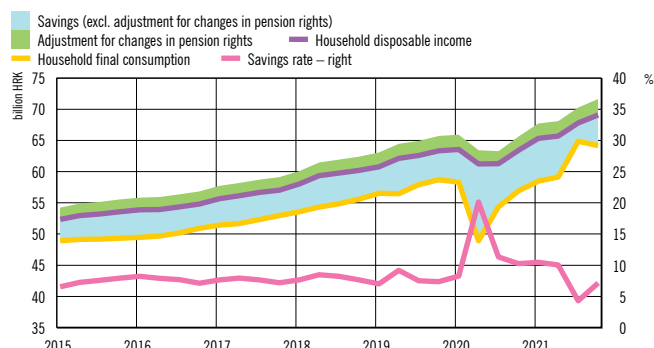
3 Household sector

Figure 3.1 Inflation growth led to a decline in real wages



Notes: The shown data have been seasonally and calendar adjusted. The data series showing the real net wage bill of persons employed in legal entities shows data up to 2021, as the data on employed persons for 2022 are preliminary, which could affect the reliability of the wage bill data.
Sources: CBS, CNB and CPII.

Figure 3.2 The increase in household savings amid the coronavirus pandemic was short-lived



Note: Quarterly disposable income values have been estimated using the Chow-Lin method and series of compensation of employees and gross operating surplus and mixed income as indicators.
Sources: Eurostat and CNB calculations.

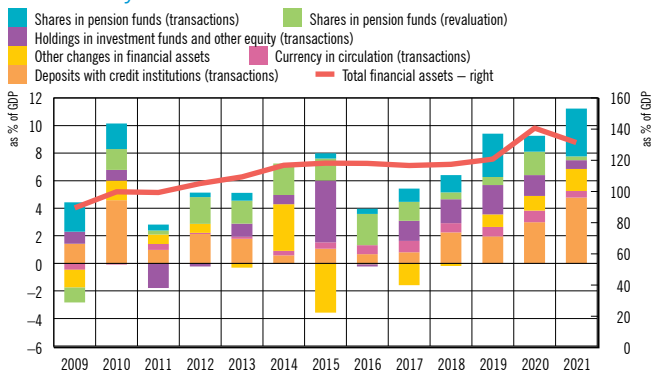
Economic recovery is mitigating the systemic vulnerabilities of the household sector. Lending to households is still predominantly influenced by housing loans, while non-housing loans are gradually rebounding. Still, inflation growth seen in late 2021 and early 2022 led to a drop in real income, and the spillover of the effects of war in Ukraine to the domestic economy could further intensify unfavourable trends. Even though the favourable trends seen in 2021 mitigated the vulnerabilities of the household sector, systemic risks could increase slightly in the upcoming period.

3.1 Income and assets

The rapid recovery of the economy from the recession caused by the pandemic had a favourable effect on the labour market and household income. However, the average real salary decreased slightly at the beginning of 2022 under the influence of growing inflation. Employment grew by 2.2% in 2021 (CPII data on the number of insured persons), and the upward trend continued in early 2022, although at a slightly slower rate (Figure 3.1). At the same time, wages grew in nominal terms, but inflation exceeded that growth in late 2021, and the average real salary began to decline. The fast growth of household consumption was financed by the reduction of household savings, which returned to pre-pandemic levels (Figure 3.2).

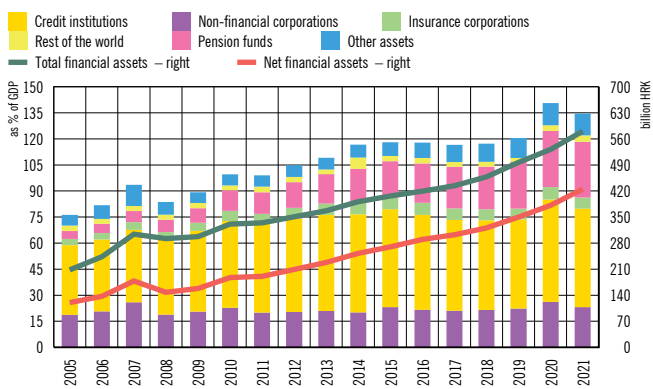
Financial assets of households continue to grow considerably and are being directed towards the least risky forms of investment. Total financial assets of households grew by 9.1% in nominal terms and, despite a slight decline due to economic recovery, the ratio of financial assets to GDP has exceeded pre-pandemic levels. The most significant portion of asset

Figure 3.3 Deposits in credit institutions increased considerably



Note: The figure shows the most significant types of changes in financial assets of households, with the category "Other changes in financial assets" including all changes not shown separately.
Source: CNB.

Figure 3.4 The upward trend in the total value of household financial assets continued



Source: CNB.

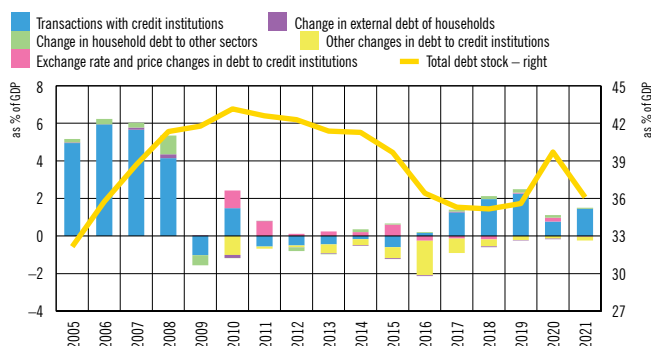
growth is attributable to deposits in credit institutions, which increased even more in 2021 than in 2020 (Figure 3.3) and are still the most common type of household financial assets (Figure 3.4). The value of shares in pension funds is growing steadily in line with the mandatory nature of the majority of such contributions, while other types of financial assets mostly grow at a slower rate than in the preceding years. Considering that the increase in household debt was slow in 2021 compared with the growth in financial assets, the growth in net financial assets of households exceeded that of total financial assets (11.3%), reaching 98% of GDP at the end of the year.

3.2 Debt and loans

Total household debt increased moderately in 2021, but its ratio to GDP decreased as a result of fast economic recovery, returning to pre-pandemic levels (Figure 3.5). Household debt increased by some HRK 5bn (4.6%) in 2021, ending the year

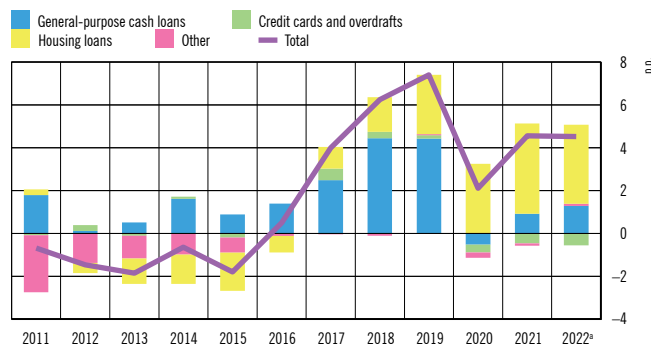
at slightly below HRK 156bn (36.1% of GDP). The increase of debt was moderate in historical terms, but was concentrated in housing loans, which have been growing strongly for several years now, with oscillations linked to the implementation of the government housing loans subsidy programme. Hence, housing loans peaked in late October (11.3% on an annual basis), after which their growth slowed down, standing at 8.0% at the end of March 2022 (Figure 3.6). Demand for consumer loans began to recover as well (Figure 3.7), particularly in the first three quarters of 2021, when consumer confidence also increased sharply. The increase in cash loans continued to pick up, standing at 3.4% at the end of the first quarter of 2022. On the other hand, in 2021 the number of renewed agreements with consumers dropped, suggesting that the volume of moratoria declined from their elevated level in 2020 (Figure 3.8). Housing and general-purpose cash loans dominate the stock of household loans, with their share continuously growing over the past several years (Figure 3.9). In contrast, the overdraft facility principal amount declined as overdraft facilities dropped by some 15% from the end of 2016, ending March 2022 at

Figure 3.5 Economic recovery returned the debt-to-GDP ratio to pre-pandemic levels



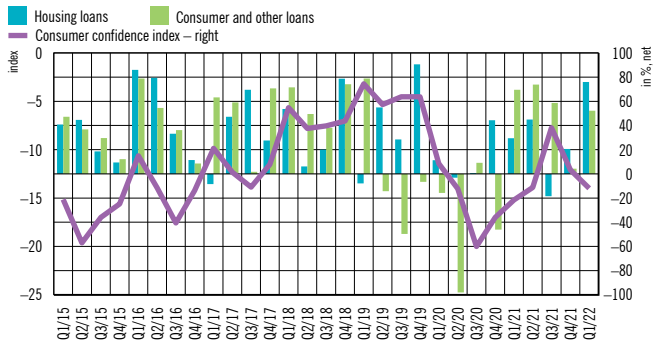
Note: Changes in debt to other sectors and the rest of the world are shown as the difference between the end of the previous year and relativised as a share in GDP.
Source: CNB.

Figure 3.6 Loan growth is still supported by housing loans



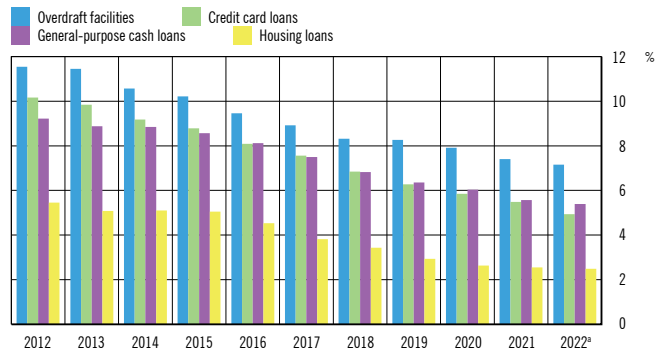
^a Twelve-month period ending 31 March 2022.
Note: The figure shows the transaction-based change in debt, which excludes exchange rate, price and other changes.
Source: CNB.

Figure 3.7 Demand for consumer loans recovered under the influence of growing consumer confidence



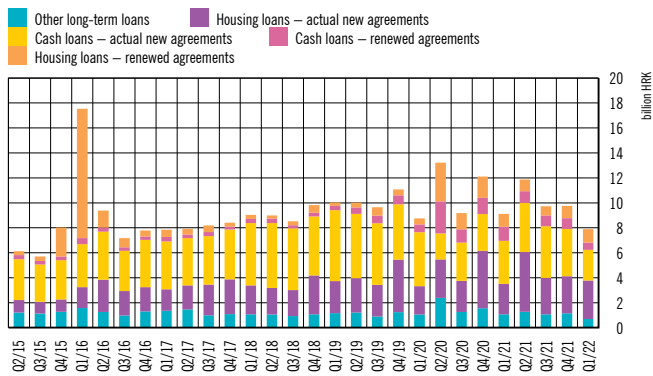
Notes: The figure shows the quarterly change in household demand for loans as reported by banks. A positive value indicates an increase and a negative value indicates a decrease in demand.
Source: CNB (Bank Lending Survey, Consumer Confidence Survey).

Figure 3.10 Interest rates on newly-granted loans are decreasing at an ever-slower rate



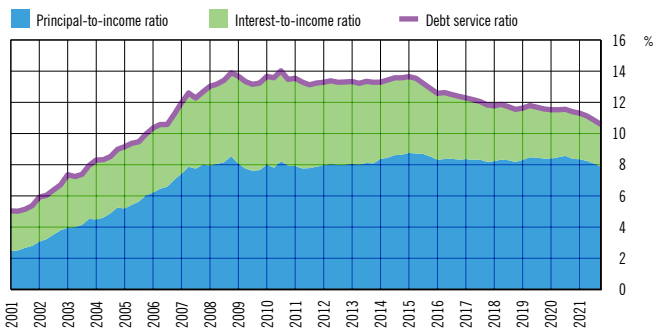
^a The data for 2022 refer to data up to March.
Note: Renewed agreements are excluded for housing loans and cash loans from 2015 onwards.
Source: CNB.

Figure 3.8 The amount of renewed agreements decreased in 2021



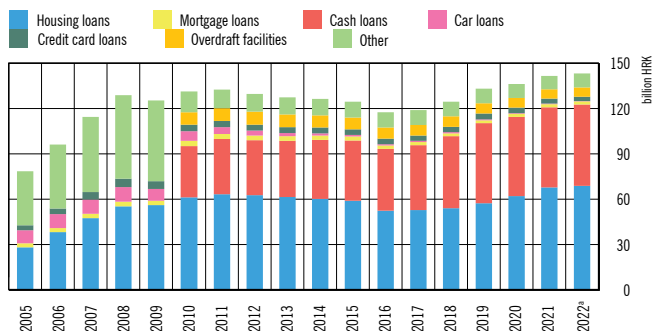
Source: CNB.

Figure 3.11 Household debt service ratio decreased in 2021



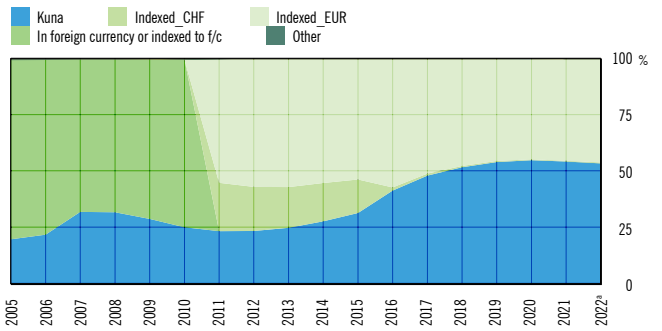
Note: Disposable income of households has been estimated for 2021 using the Chow-Lin method and series of compensation of employees and gross operating surplus and mixed income as indicators.
Sources: Eurostat and CNB.

Figure 3.9 Total loans are dominated by housing and general-purpose cash loans



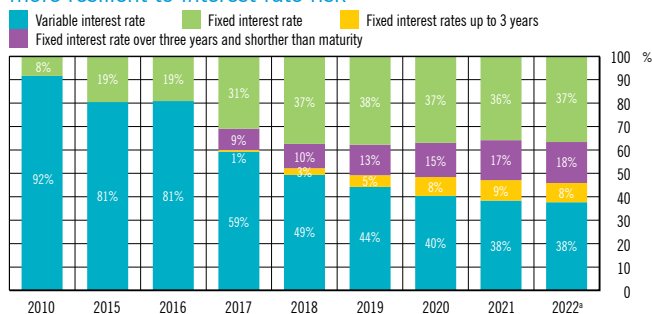
^a Balance as at 31 March 2022.
Note: Cash loans and overdraft facilities have been excluded from the category of other household loans since the end of 2010 because they have become new categories.
Source: CNB.

Figure 3.12 Currency-induced credit risk of households is stable



^a Balance as at 31 March 2021.
Note: Since the end of 2010, the category of foreign currency loans or foreign currency-indexed loans has been divided into two subcategories: euro-indexed and Swiss franc-indexed loans.
Source: CNB.

Figure 3.13 The several-year long downward trend in the share of loans with variable interest rates is making debtors more resilient to interest-rate risk

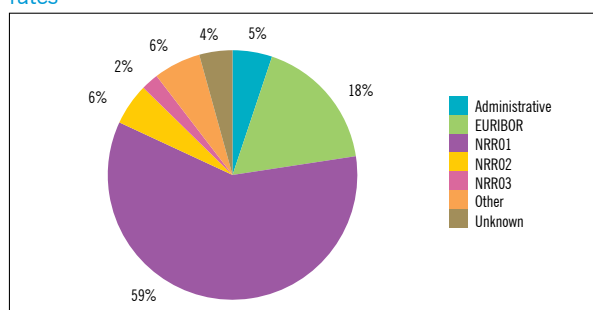


* Balance as at 31 March 2022.

Notes: The figure does not include credit card debt and overdraft facilities. Since 2017, two additional categories have been excluded from the category of loans with variable interest rates, depending on the remaining period of interest rate fixing, i.e. those to 3 years and those over 3 years.

Source: CNB.

Figure 3.14 The predominance of the NRR as the benchmark rate has a stabilising effect on the possible increase in interest rates



Notes: The figure shows the structure of the stock of loans on 31 March 2022 according to the reference parameter to which the change in the variable interest rate is linked, i.e. to which the change in interest rates will be linked after the expiry of the initial period of interest rate fixing. The national reference rate reflects the average cost of sources of funds of the Croatian banking sector.

Source: CNB.

around HRK 6.1bn (4.4% of the total household loan principal).

Lending growth is still supported by historically low interest rates on newly-granted loans to households, which decreased in 2021 for all loan categories. However, following a significant decline in the period from 2015 to 2019, the rate of their decrease slowed down (Figure 3.10). Interest rates on newly-granted general-purpose cash loans were 5.6% in 2021, having gone down by around a half-percentage point from 2020. The decrease seen in interest rates on housing loans was somewhat slower (around 0.09 p. p.), with interest rates at 2.5% on average in 2021. Even though interest rates on newly granted loans to households continued to decrease in early 2022 as well, the expected normalisation of monetary policy is expected to reverse this several-year trend. The increase in interest rates is expected to be gradual, to which the introduction of the euro is anticipated to contribute, reducing regulatory costs for banks and the level of risk arising from lending in foreign currency.

Interest rate decrease reduced the debt repayment burden for households in 2021 (Figure 3.11). Although total debt grew (Figure 3.9), the increase in disposable income coupled with the interest rate decrease reduced the debt servicing burden for households. However, rising inflation is affecting real income unfavourably, which could diminish savings and thus reduce the loan repayment capacity despite the faster nominal growth of income and the smaller debt repayment burden. The reduced capacity of households to cushion various financial disruptions could prove important should strong inflationary pressures persist, prompting interest rate growth.

The exposure of households to the risk of interest rate change continued to decline, while currency-induced credit risk is same (Figure 3.12). The share of fixed-rate household loans is stagnating, while the share of loans with variable interest rates is continuously decreasing, although at a slower rate than in the previous years, and currently accounts for one third of household loans (Figure 3.13). On the other hand, the share of loans with interest rates fixed over a period shorter than loan maturity is growing, providing a certain level of hedging against interest-rate risk. The several-year long downward trend seen in the share of loans with variable interest rates strengthened the overall resilience of households to interest-rate risk. This is particularly important considering the shift in the ECB's monetary policy stance affecting domestic financing conditions. The national reference rate (NRR), the most common benchmark to which interest rates on household loans are linked (Figure 3.14), could react to changes in monetary conditions with a certain lag, as opposed to EURIBOR, which adapts relatively fast to such changes.

3.3 Lending conditions

The data on consumer lending standards² point to elevated risks assumed by consumers and credit institutions in relation to a portion of housing loans granted. Around half of housing loans have been granted with a debt-service-to-income³ (DSTI) ratio above 40%. If the DSTI ratio is adjusted by the amount of subsidies, the aforementioned share is significantly lower in subsidised loans over the period of subsidy duration (Figure 3.15). However, when that period expires, users of subsidised loans will be faced with a 40% rise in debt repayment costs, which amounts to some 12% of consumer income, coupled with a possible additional repayment burden increase arising from possible interest rate increases (see [Box 2 How much would repayment costs grow for users of housing and consumer loans in the event of an interest rate increase?](#)). Furthermore, the ratio of loan principal to the value of pledged

2 The CNB is continuously implementing activities aimed at improving the quality of data on consumer lending standards in order to thoroughly define reporting requirements and remove the deficiencies observed in the reports of credit institutions. For previous analysis results concerning data on consumer lending standards, see [Macprudential Diagnostics No. 15 \(Box 1\)](#), and [Financial Stability No. 22 \(Box 1\)](#).

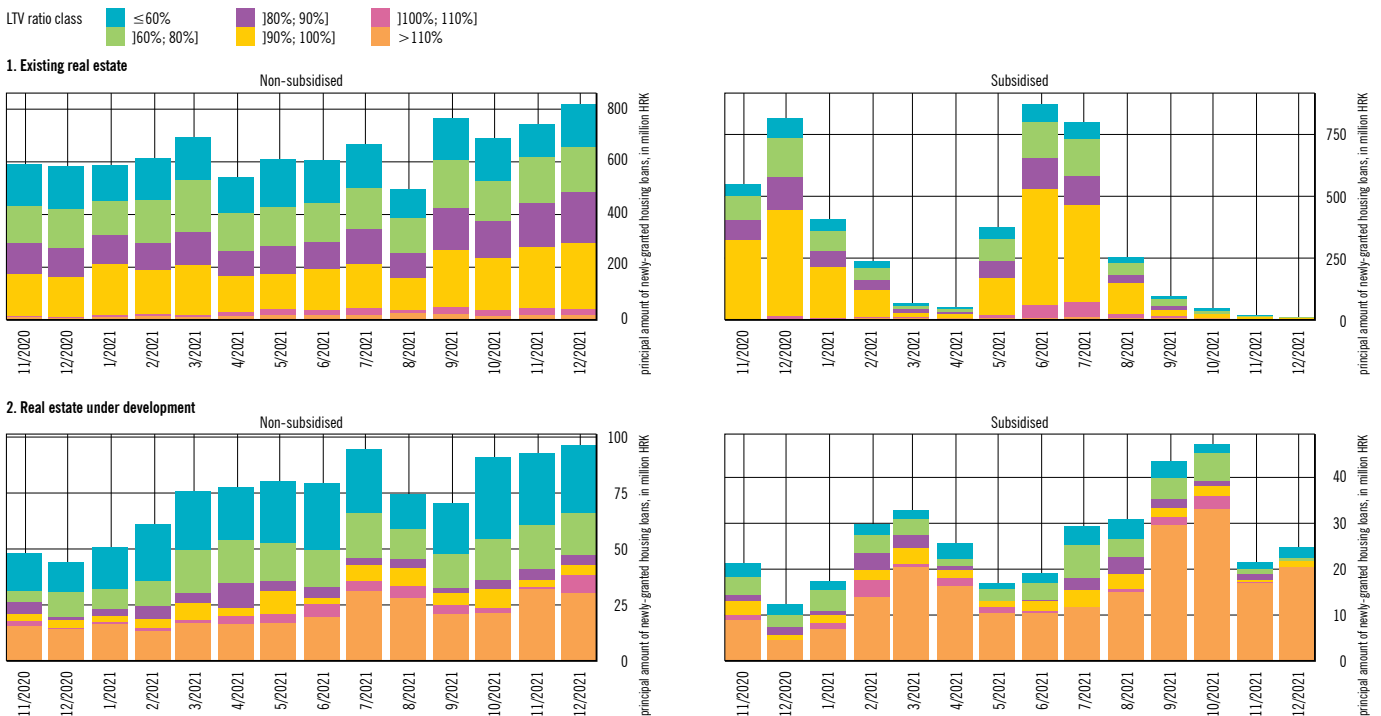
3 The total debt repayment cost of a borrower is calculated as the sum of the monthly principal repayment and the payment of interest on the borrower's total debt.

Figure 3.15 A significant portion of household loans was disbursed with a DSTI ratio above 40%



Notes: Data shown refer to housing loans collateralised by real estate and disbursed in the period from November 2020 to December 2021. In the first column, the cost of repayment has been reduced by the amount of subsidies, while in the second column, the DSTI ratio has been calculated with the full repayment cost and an unchanged consumer income. Loans with very high or missing DSTI ratio values have been excluded from the figure. Verification of these data is still ongoing. Source: CNB.

Figure 3.16 Very high LTV ratios have been observed in loans collateralised by real estate under development



Notes: Data shown refer to housing loans collateralised by real estate and disbursed in the period from November 2020 to December 2021. The figure does not include loans with very high LTV ratio values. Data on the LTV ratio do not include other exposures encumbering the collateral. Loans withdrawn in tranches are included for each month in which a tranche was disbursed, with the cumulative value of the outstanding loan principal reported for individual tranche disbursement. Verification of these data is still ongoing. Source: CNB.

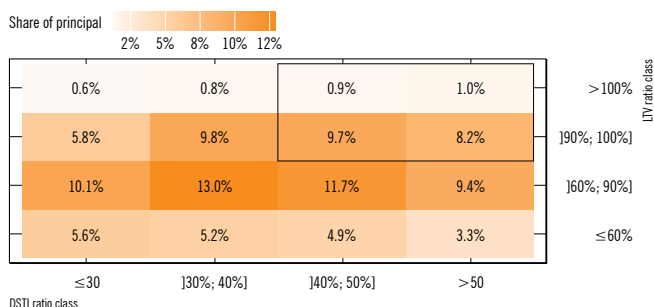
real estate⁴ (loan-to-value ratio, LTV) is higher in subsidised loans, with around 36% of the principal linked to loans with an LTV ratio above 90%, while the LTV structure in non-subsidised loans is somewhat more favourable (Figure 3.16). Over

the observed period, the average LTV ratio of disbursed housing loans collateralised by existing real estate was 80% (77% for non-subsidised and 86% for subsidised loans). Furthermore,

4 In contrast to previous publications, the data on the LTV ratio do not include other exposures encumbering the collateral as inconsistencies have been observed in reporting on such exposures which led to a higher share of principal of newly-granted

housing loans in which LTV exceeds 100% than the one actually recorded in newly-granted loans. Before this adjustment was made, the share hovered around 10%, while after the adjustment, the share stood at some 6% and was mostly accounted for by housing loans collateralised by real estate under development.

Figure 3.17 A portion of housing loans was granted under relatively lenient criteria



Notes: Data shown refer to housing loans collateralised by real estate and disbursed in the period from November 2020 to December 2021. The figure does not include loans with very high or missing LTV and DSTI ratio values and loans collateralised by real estate under development. Data on the LTV ratio do not include other exposures encumbering the collateral and DSTI ratios have not been reduced by the amount of subsidies. Verification of these data is ongoing. Source: CNB.

the highest LTV ratio values (>110%) are observed in loans collateralised by real estate under development, where the value of such real estate could exceed the value of the loan principal upon the completion of construction, with LTV values dropping to moderate levels.

The joint distribution of the principal according to DSTI and LTV ratios shows the relatively lenient criteria applied in the granting of some housing loans (Figure 3.17). Loans in which both the DSTI and the LTV ratio are elevated (DSTI > 40%,

LTV > 90%) account for one fifth of the principal of disbursed housing loans. Such loans could be considered more risky, as potentially unfavourable income developments could cause difficulties in repayment⁵, and possible unfavourable trends in real estate prices could prevent the full coverage of loan principal by collateral. In contrast, in most new housing loans granted in 2021, either both or at least one of the aforementioned ratios is below the specified thresholds (LTV<90%, DSTI < 40%).

3.4 Current risks in the household sector

Stagnation and potential decline in the real income of households could diminish their capacity for orderly debt servicing. Furthermore, the ongoing normalisation of monetary policy will gradually increase interest rates on loans granted with variable interest rates. The risk should, to a certain extent, be mitigated by the decline in Croatia’s risk premium and in the regulatory costs of banks linked to the anticipated entry into the euro area. Furthermore, the widespread use of the NRR as the benchmark for variable interest rates could further mitigate the spillover of more stringent financing conditions to domestic interest rates for existing debtors. All risks specified above are mitigated by the relatively low level of total household debt, although aggregate indicators may cover up vulnerabilities in individual segments of household lending, as indicated by the relatively lenient criteria in the granting of a portion of housing loans.

⁵ Shamloo, M., E. Nier, R. Popa and L. Voinea (2019), *Debt Service and Default: Calibrating Macroprudential Policy Using Micro Data*, IMF Working Papers 2019/182, International Monetary Fund.

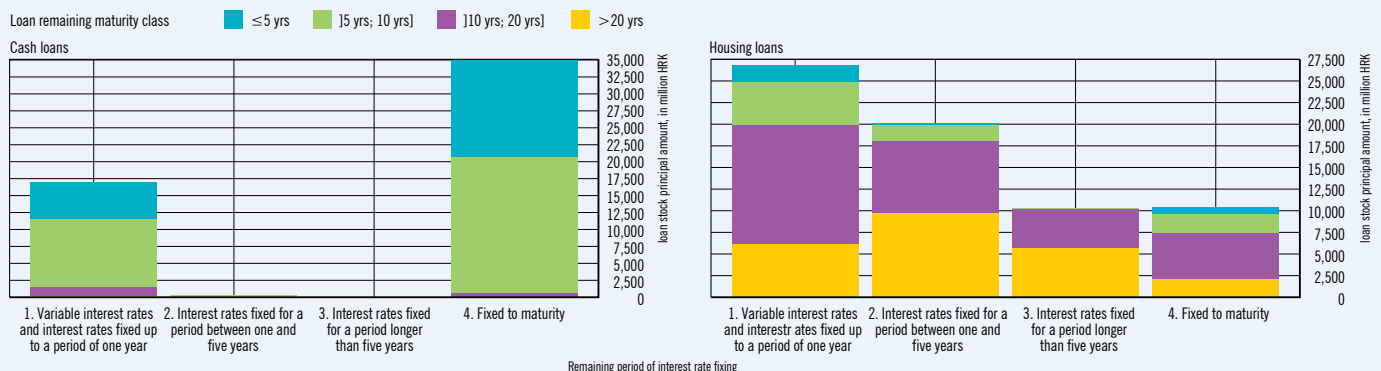
Box 2 How much would repayment costs grow for users of housing and consumer loans in the event of an interest rate increase?

The tightening of global financing conditions amid the increased likelihood of a fairly strong normalisation of monetary policy will put an end to the period of historically low interest rates (see chapter 1 Macroeconomic environment). Growth in interest rates on domestic household loans should be gradual, as high liquidity surpluses on the domestic financial market have a stabilising effect on the NRR, which is the most widely used benchmark in setting interest rates. Although the accession to the euro area should lower regulatory costs for banks and the level of risk arising from lending in a foreign currency, variable interest rates on newly-granted loans will be tied to the EURIBOR in the future, which will result in a more direct passthrough of changes in the conditions on the European interbank market to household loans. Although it is impossible to foresee the exact moment of a benchmark interest rate increase on the domestic market, it is highly likely that it will occur in the medium term, which is why it is necessary to analyse the possible effect of an interest rate increase on household loan repayment costs.

For the sake of analysis, housing and cash loans constituting 85% of the remaining principal of household loans (around HRK 120bn) as at 31 December 2021 have been included in the sample. It is important to note that, in contrast to general-purpose cash loans, housing loans, as a rule, have higher outstanding principal amounts, longer maturities and are mostly linked to variable interest rates or rates fixed over a period shorter than maturity (Figure 1).

Based on the data on the outstanding principal and maturity and the nominal interest rate, the cost of repayment was calculated for each housing and cash loan recorded in the balance sheets of credit institutions as at 31 December 2021. The repayment cost thus obtained was compared with the cost that consumers would face in the event of an interest rate increase of 0.5, one or two percentage points. It is important to note that, in loans with the initial period of interest rate fixation, the effect of interest rate increase is observed through the change in the cost of repayment after the expiry of that period, taking into account the outstanding part of the principal at that moment. Furthermore, there is no effect of interest rate increase in loans with interest rates fixed over the entire period of repayment, while in loans granted at a variable interest rate, the repayment cost increase is immediate. As regards sub-

Figure 1 Housing loans are mainly linked to variable interest rates and general-purpose cash loans to fixed interest rates



Notes: The structure of the stock of loans shown above is based on the information on the remaining period of interest rate fixation for housing loans (left) and general-purpose cash loans (right). Fixed rates are fixed to maturity and variable rates are those which are variable or fixed up to a period of 12 months. The figure shows data as at 31 December 2021.
Source: CNB.

Table 1 Average and median amount of the nominal and relative repayment cost increase in the event of interest rate increase

Instrument	Assumed interest rate increase (p. p.)	Nominal loan repayment cost increase (HRK, annually)		Relative loan repayment cost increase		Average initial loan repayment cost (HRK, annually)	
		Average	Median	Average	Median	Average	Median
Cash loans	0.5	193	130	1.1%	1.0%	16,904	13,976
	1	387	260	2.2%	2.0%	16,904	13,976
	2	781	524	4.5%	4.0%	16,904	13,976
Housing loans	0.5	893	681	2.8%	2.6%	32,555	27,351
	1	1,805	1,374	5.6%	5.3%	32,555	27,351
	2	3,684	2,793	11.5%	10.7%	32,555	27,351

Note: The calculation does not include loans with interest rates fixed to maturity.
Source: CNB.

sidised housing loans, it is assumed that the period of subsidy payment will expire before the period of initial interest rate fixation, so the effect on the repayment cost not reduced by subsidies is observed.

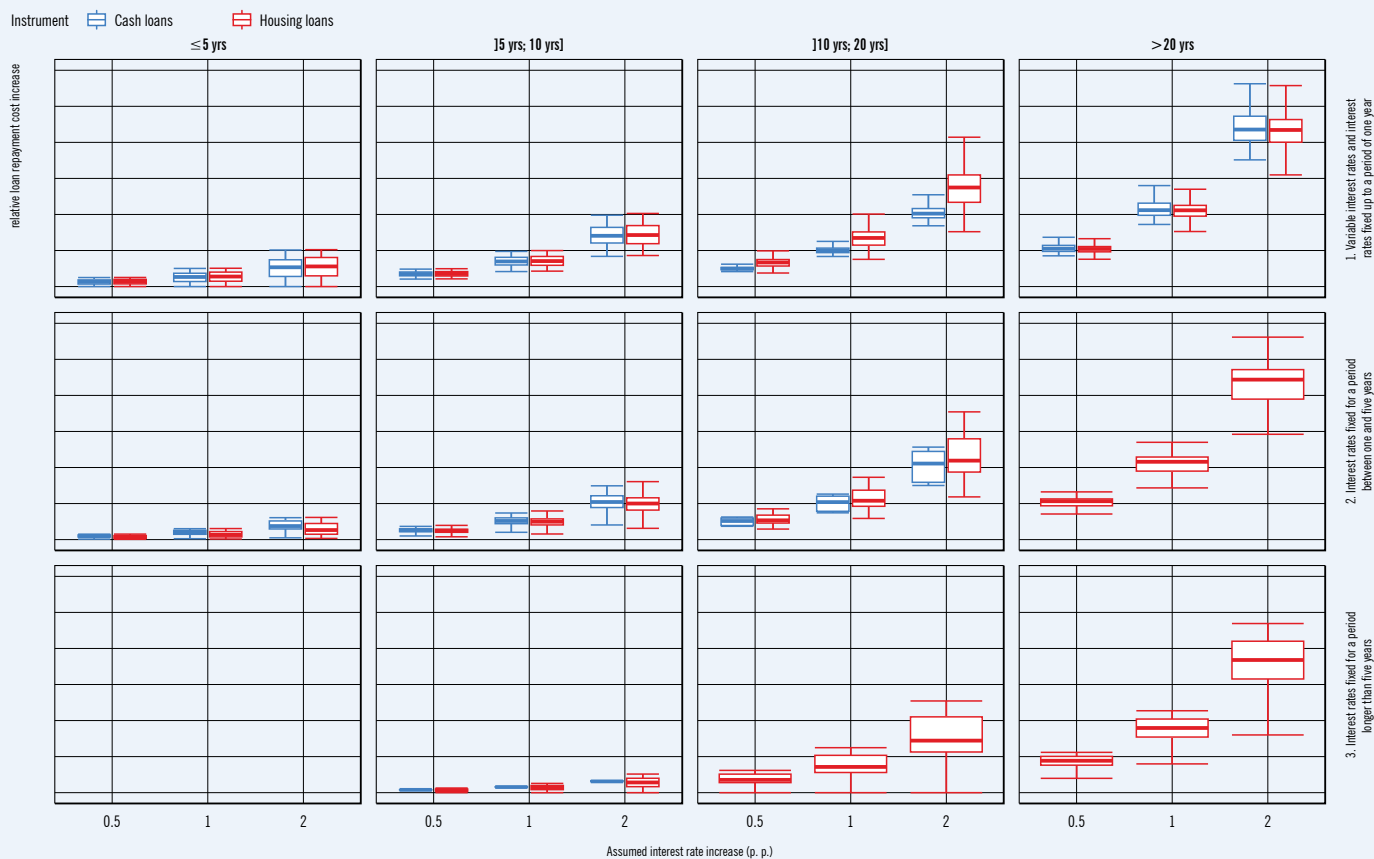
Table 1 shows the summary of the increase in repayment costs that consumers having debts arising from housing and cash loans could face. In the event of a one-percentage point interest rate increase, the average annual nominal increase in housing loan repayment cost would hover around HRK 1,800, or some 5.6%, with one half of users of newly-granted housing loans facing a repayment cost increase of above HRK 1,400 in annual terms. On the other hand, due to the shorter maturity, the cost of repayment of general-purpose cash loans would grow by some HRK 400 annually, or by around 2.2%. In the case of an interest rate increase of two percentage points, the average repayment cost increase would be around HRK 3,700 (11.5%) for housing loans and around HRK 800 (4.5%) for general-purpose cash loans.

The possible increase in the loan repayment cost primarily depends on the remaining period of interest rate fixation and the maturity of the disbursed loan. Figure 2 shows the distribution of the ratio of repayment cost increase to consumer income for housing and cash loans

according to classes of remaining maturity (columns) and the remaining period of initial interest rate fixation (rows). The relationship between maturity and initial interest rate fixation and the relative increase in repayment cost is monotonous, so the sensitivity of repayment cost is higher for loans with longer maturities and shorter periods of initial interest rate fixation. For example, in the case of an interest rate increase of two percentage points, the median values of a relative increase in the repayment burden stand between 2% for loans with the shortest maturity and around 22% for loans with the longest maturity and variable interest rates. There are no significant differences between housing and cash loans in the sensitivity of repayment with regard to a possible interest rate increase that do not result from differences in average maturity or the period of initial interest rate fixation.

Since cash loans have shorter maturities and are granted at higher interest rates, the cost of their repayment is less sensitive to interest rate increase (Figure 3). In the case of an interest rate increase of two percentage points, the cost of cash loan repayment would not grow by more than 10%, except for a very small portion of loans with maturities of over 10 years. In contrast, relatively short periods of interest rate fixation relative to maturity and lower interest rate levels make the

Figure 2 The repayment burden increases the most for consumers with loans having relatively long maturities and relatively short periods of initial interest rate fixation



Notes: The figure shows the first and the third quartile, the median and the smallest and the largest piece of data within the interquartile range, looking from the lower or the upper quartile, respectively. The columns show the class of remaining maturity, while lines show the period of initial interest rate fixation. The figure does not include loans with interest rates fixed to maturity.
Source: CNB.

Figure 3 Cash loan repayments are less sensitive to interest rate increase

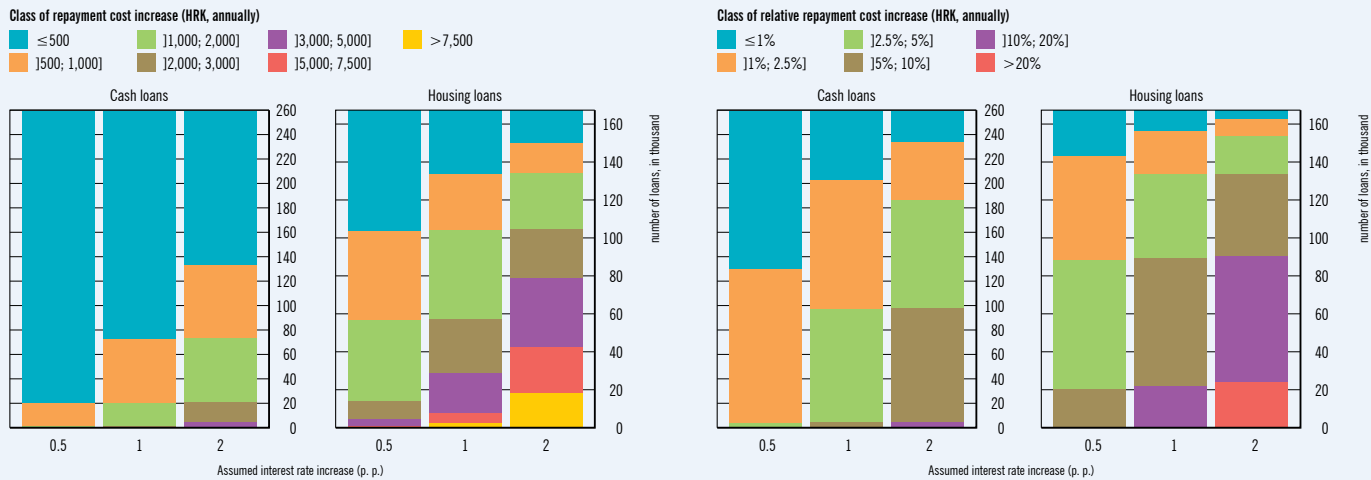
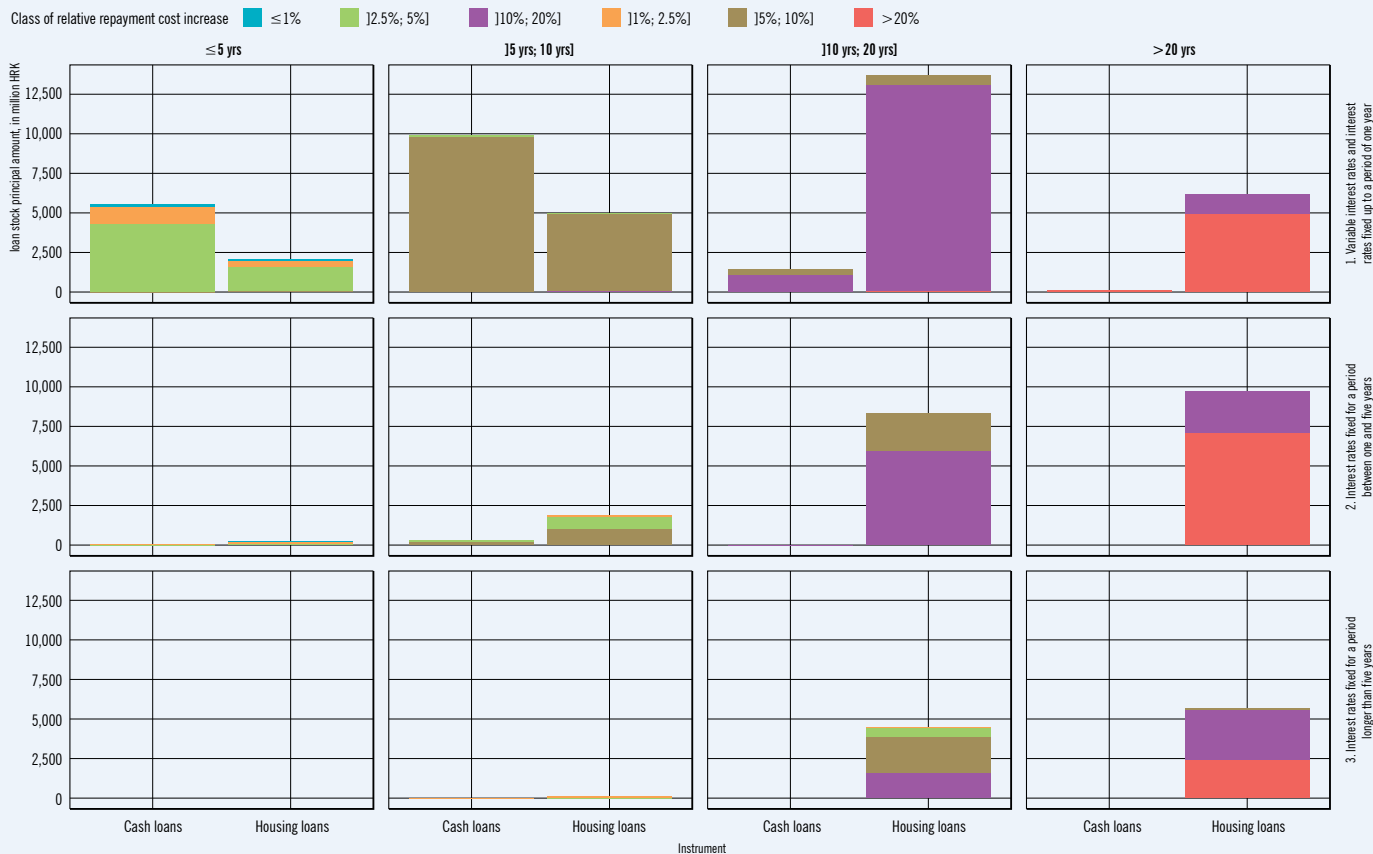


Figure 4 The highest repayment cost increase occurs in loans with maturities longer than 20 years and periods of interest rate fixation shorter than five years



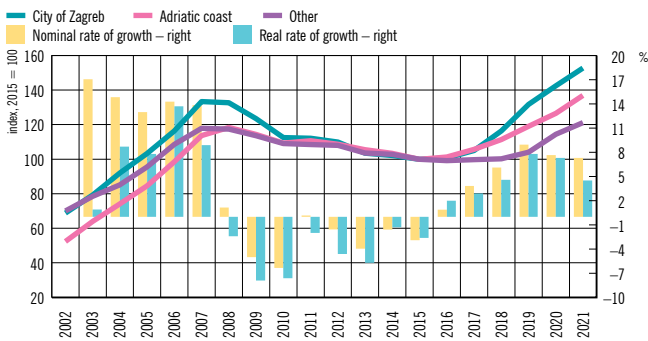
cost of housing loan repayment more sensitive to absolute and relative interest rate changes. Should interest rates of housing loans increase by two percentage points, the repayment cost would go up by 10% or more for over 53% of loans or 62% of the total principal of housing loans to consumers, while a repayment cost increase of over 20% would occur in 11.7% loans (21.5% of the total principal). For around 45% of the principal of housing and cash loans, repayment costs would not increase by more than 5%, while for around 35% of the principal, the costs would rise by 10% or more.

The highest concentration of the principal of housing loans with a relatively high repayment cost increase (>20%) refers to loans with relatively long remaining maturity (>20 years), while loans with remaining maturities between 10 and 20 years would experience a more moderate repayment cost increase, between 10% and 20% (Figure 4). Regardless of the remaining maturity, longer remaining periods of interest rate fixation mitigate the possible repayment cost increase, so that the repayment cost would increase less for a significant portion of loans with remaining periods of initial rate fixation of over five years than for loans with short periods of initial rate fixation or loans with variable interest rates. Furthermore, due to longer maturity and the currently low levels of interest rates on newly-granted loans, new debtors have the highest level of exposure to interest rate risk if their loans have been granted at variable interest rates or interest rates fixed over a relatively short period relative to maturity.

In conclusion, the analysis of the effect of interest rate increase on the repayment cost of loans points to the importance of prudent decision making with regard to the period of initial interest rate fixation, as consumers with loans granted at interest rates fixed over a relatively long period relative to maturity are less vulnerable in the event of interest rate change. However, although the analysis shows the calculations of possible debt repayment cost increases for consumers in the event of an interest rate increase, it is important to note that the developments in the debtors' incomes would also influence the debt repayment burden. Should nominal income continue to grow, the debt repayment burden could increase to a smaller extent or even remain stable in the case of a very strong increase in the debtors' nominal incomes. On the other hand, should nominal incomes drop as a result of, for example, unfavourable developments in the macroeconomic environment, the repayment burden would grow. The significance of consumer interest rate risk, i.e. of the effect of an interest rate increase on the repayment cost, is not negligible and is linked with particular housing lending segments that account for slightly less than one tenth of total bank assets. Inflationary pressures on the continued growth in nominal incomes could limit the scope of the possible materialisation of interest rate induced credit risk and, due to high capitalisation, the systemic effect on the banking sector would be relatively mild.

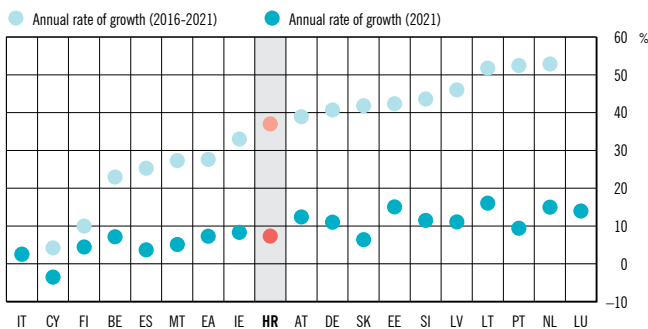
4 Real estate market

Figure 4.1 Despite the slowdown, residential real estate prices in Croatia continued to grow at a high rate



Notes: For details on the construction of the nominal index, see Kunovac, D. and K. Kotarac (2019): Residential Property Prices in Croatia. The real rate of growth was calculated by deflating using the harmonised consumer price index. Sources: CBS, Eurostat and CNB calculations.

Figure 4.2 Price increase in Croatia is comparable to that in other euro area countries



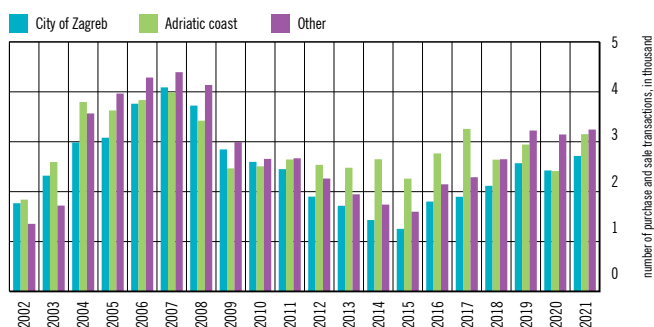
Note: The figure shows nominal annual growth rates in one-year and five-year periods for all euro area countries except Greece. Sources: Eurostat and CNB calculations.

Against the backdrop of the strong economic recovery, residential real estate prices continued to grow in 2021, spurred by strong foreign demand, favourable financing conditions, continued growth in housing lending and increased construction costs in the construction sector. In addition to the growing divergence between the prices and their key macroeconomic fundamentals, risks arising from the residential real estate market are also increasing due to the unfavourable effects of inflationary pressures on real income and demand, and the uncertainty regarding the continued coronavirus pandemic and the military conflict in Ukraine. The potential continuation of the sharp growth in residential real estate prices increases the probability of a sudden reversal should there be any macroeconomic disruption, which would decrease liquidity and increase potential losses for credit institutions. With regard to commercial real estate, downward pressures on yields continue to grow, particularly in the segment of logistics space.

4.1 Residential real estate market

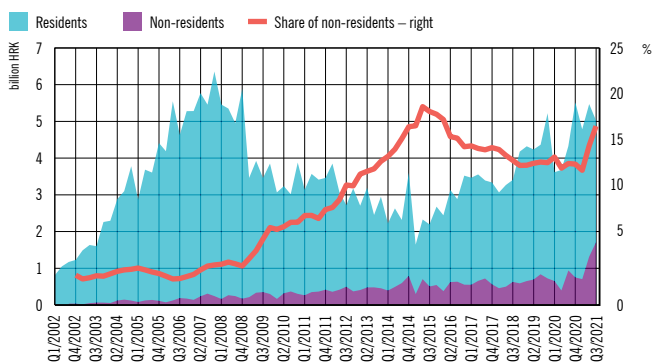
The residential real estate market proved resilient to the coronavirus pandemic, and prices of residential real estate continued to grow amid the fast economic recovery in the second half of 2021. The intensity of price growth accelerated throughout the year, the annual rate of growth reaching 9.1% in the last quarter of 2021. The most substantial increase was recorded on the Adriatic coast (11.7%), while in the City of

Figure 4.3 Volume of residential real estate transactions recovered



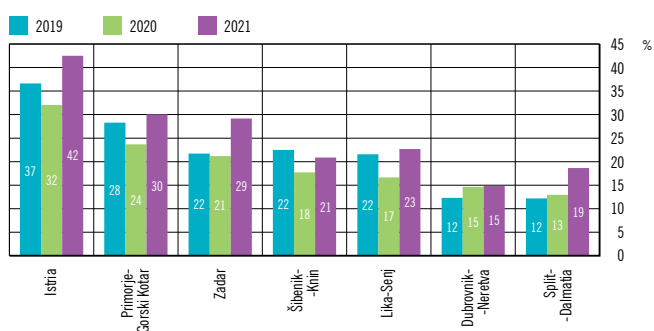
Note: The figure shows quarterly average values of the number of transactions in a year, and the data for 2021 refer to the average recorded in the period between the first and the third quarter.
Source: Tax Administration database.

Figure 4.4 Residential real estate turnover is supported by non-resident demand



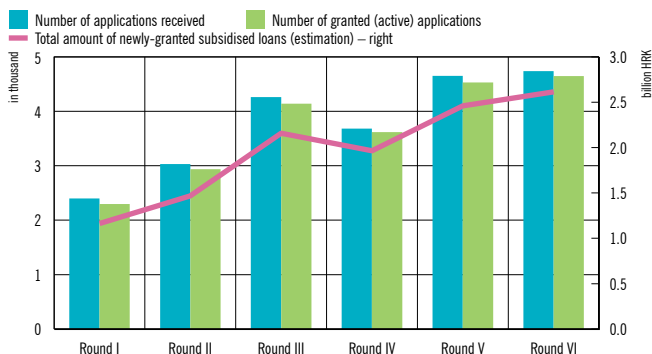
Note: The share of non-residents is shown as a 12-month moving average.
Source: Tax Administration database.

Figure 4.5 Non-resident demand is concentrated in the coastal counties



Notes: The figure shows the share of non-residents in the total number of transactions in a particular county. The data for 2021 are available up to the third quarter.
Source: Tax Administration database.

Figure 4.6 The highest amount of subsidised loans granted in a single round was recorded in 2021



Note: First round from 2017, second round from 2018, third round from 2019, fourth and fifth round from 2020 and sixth round from 2021.
Source: APN and CNB calculations.

Zagreb and the rest of Croatia the growth slowed down from previous years. Observing 2021 as a whole, in Croatia, prices rose by 7.3% from 2020, i.e. by 4.5% in real terms (deflated by consumer prices) (Figure 4.1). The total increase in residential real estate prices over the past five years in Croatia hovered around 40%, in line with the average EU trends (Figure 4.2), while the level of prices exceeded the earlier peak recorded in 2008 by 12%.

Due to increasing demand on the residential real estate market, the volume of purchase and sale transactions exceeded the pre-pandemic level. The number of transactions on the residential real estate market recovered noticeably in 2021, with the total volume having gone up by 9% from 2019⁶, after a significant slowdown amid the pandemic and the earthquakes that struck Zagreb and Sisak-Moslavina County (Figure 4.3). The number of transactions went up in all parts of Croatia, particularly on the Adriatic coast, where one third of transactions in 2021 were recorded. The increase was significantly affected by the demand of non-residents, accounting for a share of 10% in the total number of transactions and a share of 20% in the total value⁷. The anticipated accession to the euro area and the Schengen area could drive non-resident demand further up (Figure 4.4), particularly in the coastal regions (Figure 4.5).

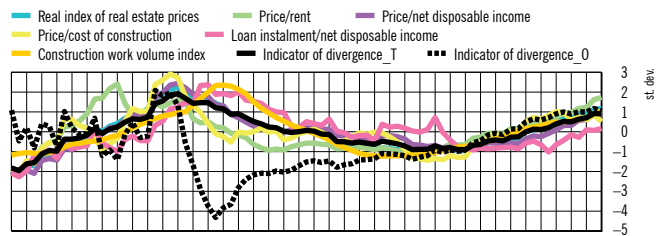
The increase in the demand and in residential real estate prices was supported by favourable financing conditions and the perception of real estate as a safe asset. Changes in the way of living and working, such as remote work, also gave impetus to demand for residential space and prompted a preference for living outside urban centres. The importance of state-of-the-art construction standards grew, increasing demand for

6 This refers to the increase in the number of transactions in the period between the first and the third quarter of 2019 and the first and the third quarter of 2021.

7 This refers to the average recorded in the period between the first and the third quarter of 2021.

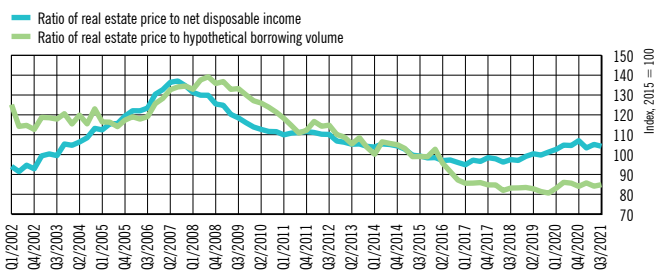
real estate outside the centre of City of Zagreb and in the surrounding areas. Furthermore, the demand for residential real estate is supported by the still favourable financing conditions with low and decreasing interest rates that declined to around 2.5% by the end of 2021 (see chapter 3 Household sector). Favourable developments on the labour market in 2021 coupled with the strong recovery of consumer confidence and the continued government housing loan subsidy programme also contributed to the recovery of transactions and the increase in prices. The number of granted housing loans covered by the government programme in the spring of 2021 was the highest to date, and one fifth of newly-granted housing loans in 2021 were subsidised (versus one third in 2020, when two rounds of the programme were implemented) (Figure 4.6). In 2022, the round of applications that ended on 22 April could boost growth in housing loans and prices still further⁸.

Figure 4.7 Real estate prices are diverging from their key macroeconomic fundamentals



Notes: The data for 2021 are available up to the third quarter. The figure shows standardised cyclical components of various indicators relevant for the developments in real estate prices obtained using a one-sided and a two-sided Hodrick-Prescott filter ($\lambda = 400\,000$) included in the composite divergence indicator. The two-sided Hodrick-Prescott filter (T) observes the entire sample, while the one-sided Hodrick-Prescott filter (O) is applied only up to a particular moment in the sample. Both indicators are calculated as the first main component of standardised cycle indicators. The construction work volume index refers to buildings.
Sources: CNB, CBS, Tax Administration and Eurostat.

Figure 4.8 The capacity of households to finance housing purchase has remained stable over the recent period

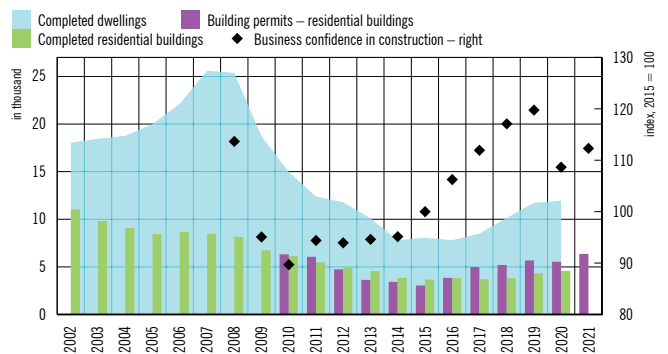


Note: The data for 2021 are available up to the third quarter. The hypothetical borrowing volume is defined as the maximum loan amount that households may be granted taking into consideration disposable income, interest rates on housing loans and the average maturity of housing loans, while the household debt service ratio is constant in the observed period. 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-indicator-for-germany-806946>.
Sources: CNB, CBS and Eurostat.

8 According to the data of the APN 5,870 applications were received in the seventh round.

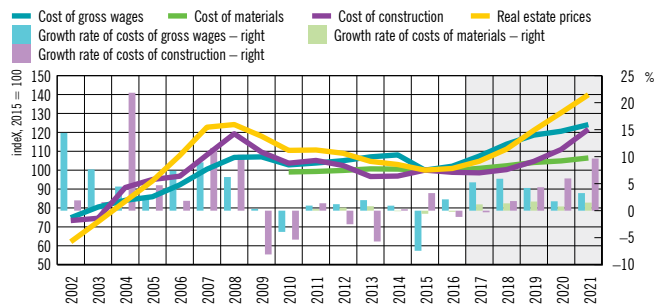
The composite indicator of real estate price divergence continues to point to the increasing disconnect between price developments and the key macroeconomic fundamentals (Figure 4.7). Economic recovery, accompanied by an increase in disposable income, improved the ratio of residential real estate price to income to a certain extent, but the problem of housing affordability on the market is still pronounced. The ratios of prices to income and rental costs are still higher than their long-term trends, particularly relative to levels recorded five years ago. The deterioration in housing affordability and the increase in housing costs is a great economic and social challenge which, in order to be addressed, requires the interaction and coordination of various policies on the market (see Box 6 The policies and ways to influence the residential real estate market). On the other hand, the housing affordability financed by loans (the maximum loan amount that households may be granted under given market conditions) is still relatively favourable as a result

Figure 4.9 The growth in construction activity and business confidence continued



Note: Residential buildings are buildings in which 50% or more of overall useful floor area is used for dwelling purposes.
Sources: CBS and CNB.

Figure 4.10 Construction costs are increasing alongside with real estate prices



Notes: The cost of materials refers to the index of producer prices of construction materials on the domestic market. The index measures changes in the level of producer prices of construction materials manufactured and sold on the domestic market and does not include the prices of equipment, mechanisation, labour, and other elements from the structure of prices of construction volume. In addition to materials, other costs, such as energy and transport, are also included in construction costs.
Sources: CBS, CNB and Eurostat.

of exceptionally favourable financing conditions (Figure 4.8). Furthermore, despite the increase in loan amounts arising from real estate price growth, the period of low yield environment and disposable income growth kept the debt service-to-income ratio relatively stable. All of these indicators point to a moderate divergence between the residential real estate prices and their macroeconomic fundamentals i.e. they suggest that the level of risk arising from the market is moderate, which was also recognised by the ESRB (see [Box 3 ESRB warnings and recommendations on medium-term vulnerabilities on the residential real estate market](#)).

The supply of real estate is gradually adjusting to increasing demand. Although construction activity contracted slightly in the second half of 2021, the construction volume on buildings rose by 10% annually. Business confidence strengthened in the construction sector, and the number of building permits issued for residential buildings increased, exceeding pre-pandemic levels (Figure 4.9). The number of non-financial corporations and persons employed in construction and real estate activities grew and new placements of credit institutions to the non-financial corporate sector were primarily directed to that sector (see chapter 5 [Non-financial corporate sector](#)), although the sector's share of value added in GVA did remain stable. However, construction activity and the number of completed residential buildings are still significantly lower than in the period prior to the global financial crisis (Figure 4.9). In 2021, slightly fewer than 12 thousand new residential buildings were completed, of which 3,000 were built in the City of Zagreb, while in 2008, the number of new buildings was two to three times higher: somewhat more than 25 thousand buildings were built in Croatia, 9,000 of which were in the City of Zagreb.

The increase in real estate supply was accompanied by an increase in costs of construction, affecting the prices of new dwellings. Prices of construction materials (iron, wood, aluminium) rose significantly on the global market in the first half of 2021 and decreased only slightly at the end of last year, and prices of energy increased sharply as well. Costs of labour, however, increased only moderately, mitigating, to a certain extent, the effect of growing prices of imported materials and energy, so that total costs of construction increased by no more than 10% in annual terms (Figure 4.14). Prices of new dwellings increased less in Zagreb (4.5%) and more in the rest of Croatia (12%). In addition to stronger demand for new dwellings, stronger activity in the reconstruction of earthquake-hit areas⁹ (particularly on residential buildings in Zagreb) and further activity in the construction of infrastructural projects supported by EU funds could strengthen construction activity in the future, but also exert additional pressure on construction costs.

9 According to the data of the [Fund for the Reconstruction of the City of Zagreb, Krapina-Zagorje County and Zagreb County](#), an amount of HRK 71m has been disbursed thus far to compensate for the damage caused by the earthquake.

10 Based on the indicators and reports of market participants (real estate agencies) for the City of Zagreb and the surrounding area and the relevant information of the CBS and CNB.

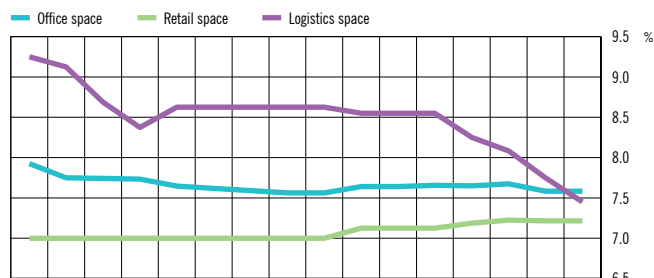
4.2 Commercial real estate market¹⁰

The pandemic has had a very heterogeneous effect on various commercial real estate market segments. The rate of available office and retail space capacities increased slightly, while the availability of logistics space remained the same. As a result of the continued need to work from home and to reduce social contact and the segmentation of demand for office space after the earthquake in Zagreb, the availability of office space at prime locations stabilised at a level of around 4% of total office capacities for rent, while the availability of retail space exceeded the pre-crisis level, reaching 4.2% in 2021. On the other hand, the segment of logistics space is still characterised by very low availability of around 2.3%, primarily due to the limited demand of existing real estate, so most investments are made through the construction of new facilities.

Despite the changes in demand for commercial space, rents remained relatively stable. Despite the fact that in 2021, 120,000 m² of new available space entered the market, the rent in the segment of logistics space did not change significantly, remaining at around EUR 5/m². Rents of prime retail locations (EUR 19/m²) are also stagnating, while a slight drop has been recorded in all other locations (to EUR 14/m²). In contrast, in late 2021, a slight increase was observed in rents in the segment of office space, in the space at both prime (EUR 14/m²) and other locations (EUR 11/m²).

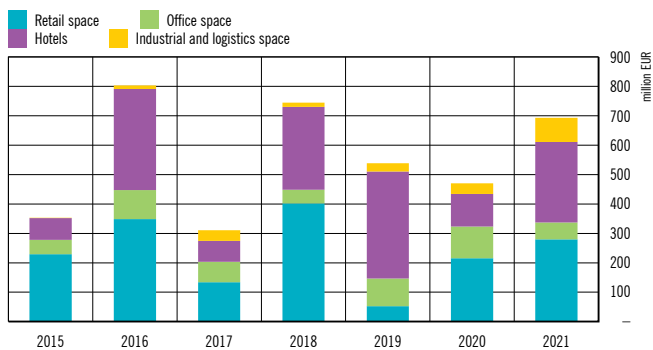
At the same time, yields on investment remained relatively stable in the aforementioned segments, while the most significant decrease was recorded in the segment of logistics space. The average yield in the segment of logistics space was 8% in 2021 as a result of growing capital values arising from strong investor demand (Figure 4.11). Yields in all market segments were affected by increased competition, growing inflationary pressures, low and negative interest rates on deposits and a combination of preferences related to investments on the real estate market and overvaluation of financial assets.

Figure 4.11 Yield pressures in the segment of logistics space are present



Notes: Data refer to Zagreb and its surroundings. Yield is defined as the ratio of annual income from rent and the price paid for the real estate.
Sources: CBRE, Colliers, CW CBS International and Spiller Farmer.

Figure 4.12 Assessment of annual purchase and sale transactions points to a recovery in the hotel segment



Notes: The assessment does not cover total transactions but only investment deals recorded in the market. It also does not include investments in construction.

Source: Colliers.

The resilience of tourism and its fast recovery in 2021 was reflected in the increased demand for hotels. According to the data of a private agency, the activity measured by the amount of purchase and sale transactions prior to the onset of the pandemic was highest (in both absolute and relative terms) precisely in the hotel segment, while values of transactions including office and retail spaces fluctuated. In 2021, the total turnover of commercial real estate on the market grew by 40% from the year before, reaching some EUR 700m. Demand for hotels and retail spaces continued, accounting for two thirds of the total volume of transactions (Figure 4.12). The most vigorous activity on the market was observed on the Adriatic coast, where almost 40% of transaction volume took place, while Zagreb participated with some 25% of the total transaction volume. In the same period, purchase and sale transactions in the segment of office space decreased considerably, reflecting the shortage in office space supply, while the segment of industrial and logistics space recorded the highest increase relative to the pre-pandemic period, which is attributable to the fact that, due to issues in global supply chains, logistics space is being moved closer to European markets.

4.3 Current risks in the real estate market

Price developments will be marked by a certain level of uncertainty in the upcoming period. The results of the [Survey on consumer confidence and expectations](#) and current market trends suggest that, due to increased demand, pressure on prices could continue. However, the tendency to invest in real estate will primarily depend on the economic developments amid geopolitical tensions, growing inflationary pressures and the possible decline in real income, all of which has not pro-

duced negative effects as yet. Price growth could be driven by shortages in qualified domestic labour, the dependency of the construction sector on fluctuations in the prices of raw materials, i.e. on the increases in the prices of basic construction materials, and by bottlenecks in the supply/procurement of such materials, which could push construction costs further up and slow down project implementation.

The spillover effects of the expected gradual increase in euro area interest rates to the domestic market could increase the existing debt repayment burden and raise the costs of new borrowing. As a result, the debt servicing capacity of some borrowers could weaken (see [Box 2 How much would repayment costs grow for users of housing and consumer loans in the event of an interest rate increase?](#)). Furthermore, higher living costs are unfavourably affecting real incomes and may additionally reduce debt servicing capacities. In addition, the period of subsidy payment expired in the early months of 2022 for some users, increasing repayment and vulnerability in the case of macroeconomic disturbances. The growth in interest rates on new loans could also reduce the creditworthiness of consumers taking out new loans. All of the above could have an unfavourable impact on the volume of transactions on the market and slow down the increase in residential real estate prices. However, the expected accession to the euro area should have a stabilising effect on the domestic loan market.

Should price trends continue to diverge from their key macroeconomic fundamentals and exposures of credit institutions to the residential real estate market continue to grow, risks to financial stability will increase. The intensity of a potential disruption, once it occurs, will be proportional to the increase in the magnitude of imbalances. In unfavourable macroeconomic conditions residential real estate liquidity and collateral value may decline, which would activate a spiral of growing credit risk and decreasing market prices.

In addition to structural factors due to change of preferences, developments on the commercial real estate market will be influenced by geopolitical tensions. Increased online shopping will result in the further redirection of demand from retail spaces to industrial and logistics centres, which will additionally be supported by adjustments in ways of doing business in terms of redirection towards regional markets and the build-up of larger stocks. Moreover, remote work and higher demand for safer buildings may redirect the demand towards high-quality office space outside city centres. On the other hand, fuelled by the increases in the prices of raw and construction materials, growing costs of construction and shortages of qualified workers could delay project development on the supply side and exert additional upward pressure on rent and, consequently, the operating costs of corporations. Should the military conflict spread outside the borders of Ukraine, investment activity could slow down and trigger capital outflows to the West.

Box 3 ESRB warnings and recommendations on medium-term vulnerabilities on the residential real estate market

The European Systemic Risk Board regularly analyses the vulnerabilities linked to the residential real estate market and evaluates macroprudential policy measures implemented by national designated authorities to respond to identified risks¹. Based on the analysis performed, the European Systemic Risk Board (hereinafter 'the ESRB') assesses the level of vulnerability in European Economic Area (EEA) member states² and the appropriateness and sufficiency of relevant national macroprudential policies, based on which it releases a Report. If the ESRB identifies elevated risks in a member state and deems the macroprudential measures implemented not fully appropriate and/or sufficient, it may issue a warning to stress the identified risks to the financial stability. Where necessary, the ESRB may take an additional step and issue a recommendation which, in addition to identifying vulnerabilities, also proposes the macroprudential policy measures necessary to address them.

The analysis of the sources and intensity of vulnerabilities related to the residential real estate market is performed in three steps and begins with the assessment of the position in the real estate cycle, which, according to ESRB methodology, is divided into four phases (expansion, downturn, recession, recovery). The cyclical position is important for an understanding of the context within which real estate market indicators are interpreted, because the time and the likelihood of potential risk materialisation greatly depend on the phase of the cycle. In the second step, an analysis of quantitative risk indicators is performed by grouping the indicators into three categories: the collateral stretch covers the value of loan collateral, the funding stretch covers mortgage lending and credit standards and the household stretch covers the financial situation of households. Stretches are rated from 0 to 3 according to threshold values set in advance (where 0 indicates absence of risk, 1 indicates a low level of risk, 2 indicates a moderate level of risk and 3 indicates a high level of risk). The final composite indicator summarises the average scores of all three categories and is regularly displayed in the form of a scoreboard (Table 1). Considering the significant heterogeneity of the real estate market in member states, in the third step, quantitative scores are adjusted with regard to other relevant information and expert opinion based on cyclical, structural and institutional characteristics of national real estate markets.

Based on the analysis performed, in February 2022, the ESRB issued five warnings (to Croatia, Bulgaria, Hungary, Slovakia and Liechtenstein) and two recommendations (to Austria and Germany) regarding medium-term vulnerabilities connected with the real estate market that could jeopardise the stability of the financial system and proposed possible macroprudential policy measures aimed at their mitigation. Furthermore, the ESRB put a special emphasis on countries that were issued a recommendation in 2019, but in which the vulnerabilities remained high or increased further despite the measures introduced (Denmark, Finland,

¹ ESRB (2019): Methodologies for the assessment of real estate vulnerabilities and macroprudential policies: residential real estate.

² In addition to EU member states, the analysis covers Iceland, Norway and Liechtenstein.

Table 1 Average scores of countries based on three categories of quantitative indicators (stretches)

	Countries	Collateral stretch	Funding stretch	Household stretch
Special emphasis	DK	2	2	3
	FI	1	2	3
	SE	3	2	3
	NL	2	2	3
	LU	3	2	3
Recommendations	DE	3	2	1
	AT	3	2	1
Warnings	HR	2	2	1
	BG	2	2	1
	HU	3	2	1
	SK	3	2	2
	LI	2	1	2
Other	BE	2	2	2
	CY	1	2	3
	CZ	3	2	1
	EE	3	2	2
	ES	1	1	1
	FR	2	2	2
	GR	1	1	1
	IE	2	2	2
	IS	2	2	2
	IT	1	1	1
	LT	2	2	1
	LV	1	1	1
	MT	2	2	2
	NO	2	2	3
	PL	1	1	1
	PT	3	2	2
	RO	1	2	1
SI	3	1	1	

Notes: All EEA countries from the ESRB analysis of medium-term vulnerabilities in the residential real estate sector are shown. White indicates a low level (1), yellow indicates a moderate level (2), and red indicates a high level of risk (3).

Source: ESRB (2022): Vulnerabilities in the residential real estate sectors of the EEA countries.

Sweden, the Netherlands and Luxembourg). Most of these countries have certain vulnerabilities in common, such as the increase in house prices, house price overvaluation and growth in mortgage lending (Table 2). The level of vulnerability in Croatia was estimated as moderate, with particular emphasis on house price overvaluation and the accelerated growth in mortgage loans granted under relatively loose credit standards (see chapter 8 Macroprudential policy implementation).

Despite the crisis caused by the coronavirus pandemic, prices of real estate continued to grow in the countries analysed by the ESRB (Table 2). Even before the outbreak of the pandemic, the increase in real estate prices was particularly pronounced in Germany, Croatia, Luxem-

Table 2 Identified vulnerabilities on which the ESRB laid special emphasis or with regard to which the ESRB issued a recommendation/warning in 2021

	Key vulnerabilities					
	Countries	House price growth	House price overvaluation	Mortgage lending growth	High household indebtedness	Loose credit standards
Special emphasis	DK	●	●	●	●	
	FI			●	●	●
	SE	●	●	●	●	
	NL	●	●		●	●
	LU	●	●	●	●	●
Recommendation	DE	●	●			●
	AT	●	●	●		●
	HR	●	●	●		●
Warning	BG	●	●	●		
	HU	●	●	●	●	
	SK	●	●	●	●	
	LI				●	

Notes: The risk exposure of all countries in the table was assessed as moderate, except Denmark, Sweden and Luxembourg, whose exposure to risk was assessed as high. In Finland and Sweden, vulnerabilities related to their interconnectedness with the Nordic banking system were identified.

Source: ESRB (2022): Vulnerabilities in the residential real estate sectors of the EEA countries.

bourg, Hungary, the Netherlands and Slovakia. Regardless of uncertainties arising from the consequences of the pandemic and the drop in economic activity, no country recorded negative real rates of growth in real estate prices. As a result of the increase in prices and the upward trend in the already high level of household debt, house price overvaluation based on the data on the deviation of price-to-income ratio and the econometric model of overvaluation³ in the Netherlands, Luxembourg, Austria and Sweden points to the deterioration of housing affordability and elevated risks of possible house price bubbles (Table 2). House price overvaluation and the consequential worsening of housing affordability was observed in Croatia as well (see chapter 4 Real estate market).

Household debt remained relatively stable over the analysed period.

The decline in economic activity amid the pandemic had a stronger effect on the deterioration of the debt-to-GDP ratio in Denmark, the Netherlands and Sweden than the increase in household debt. Against the backdrop of decreasing and low interest rates, the debt service ratio remained relatively stable in most countries. However, the high levels of debt in some countries make households more vulnerable to unfavourable shocks (disposable income decrease and interest rate increase), which is particularly pronounced in the event of a previous deterioration of asset value in the balance sheets of households⁴. In Croatia, household debt is relatively low in comparison with other countries, standing at 35% of GDP (Figure 2). In addition, increased vulnerability on the market was recognised to be a result of, among other things, relaxed credit standards (Table 2) and the absence of explicit borrower-based

measures (e.g. in Croatia and Germany), relatively recently implemented measures (e.g. in Luxembourg) or overly loose measures (e.g. the Netherlands).

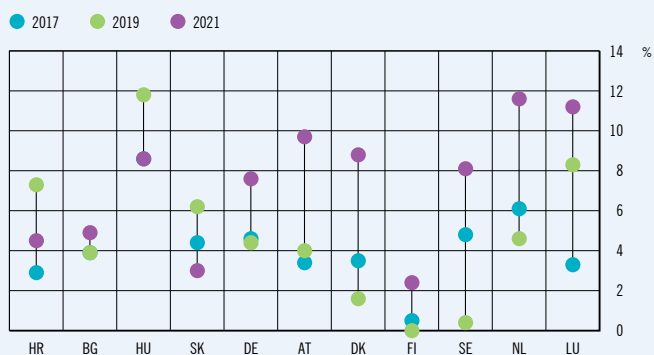
Continued mortgage lending was mainly a result of favourable financing conditions and support measures. Because the cost of borrowing has already been at historically low levels owing to unconventional monetary policy measures since the last global financial crisis, the onset of the pandemic prolonged the period of accommodative monetary policy and affected further interest rate decrease. Decreased interest rates supported the rise in mortgage lending, which has been identified as one of the key vulnerabilities in all countries except Liechtenstein, Germany and the Netherlands. In many countries, the increase in lending was coupled with a rapid increase in house prices, resulting in the further accumulation of vulnerabilities. The average annual rate of growth in housing loans in the two-year period between 2019 and 2021 was the highest in Sweden (5.9%), Croatia (7.4%) and Bulgaria (14.6%) (Figure 3), while in other countries, it slowed down. Furthermore, lending margins fell; at the end of 2021, the lowest values of lending margins were recorded in Finland (0.9%), and the highest in Croatia, Bulgaria and Hungary (2.6%) (Figure 4). Limited lending margins further increased the risks associated with the profitability of credit institutions.

Upon analysing the sources and the intensity of vulnerabilities and the related risks on the residential real estate market, the ESRB estimates the appropriateness and sufficiency of national macroprudential policy measures. If the level of risk exposure of a country is evaluated as moderate or high, this indicates that the identified vulnerabilities referred to in Table 2 should be addressed by macroprudential policy measures. In that context, the ESRB estimates whether the policies of national designated authorities are appropriate considering the choice of instruments and the duration of their application and whether they are sufficient considering their calibration and the efficiency in attaining desired objectives. The appropriateness of national macroprudential policy

3 For more information, see ESRB (2022): Box 2 House price overvaluation measures for the European Union.

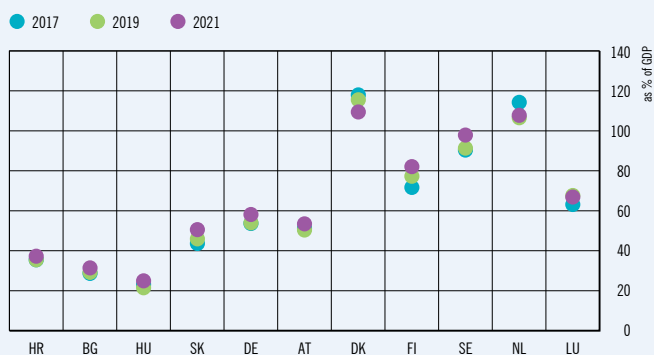
4 Empirical research has shown that the dynamics of household debt and real estate prices has a strong predictive capability in signalling recessions and that recessions are much deeper in the case of high household debt (for more information, see Mian, A. and A. Sufi (2017): Household Debt and Business Cycles Worldwide).

Figure 1 Real growth rate in real estate prices



Source: Eurostat.

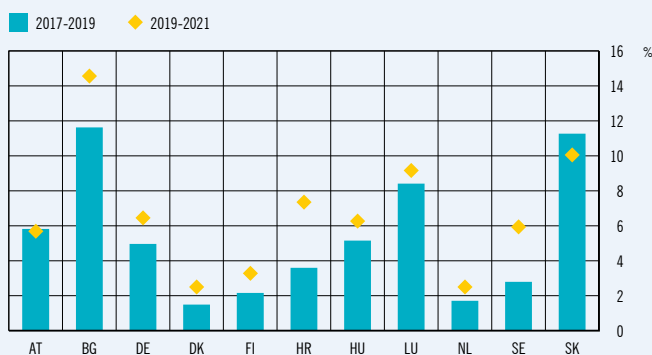
Figure 2 Household indebtedness



Note: The data refer to the third quarter.
Source: Eurostat.

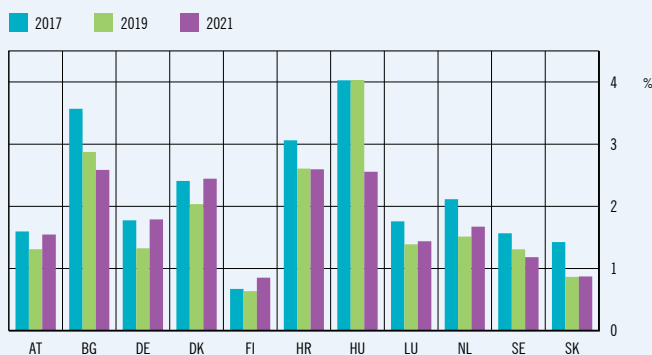
measures is estimated bearing in mind the type and level of identified vulnerabilities and the phase of the real estate cycle. For instance, if the market is in a mature phase of expansion characterised by an elevated level of previously accumulated vulnerabilities (stock vulnerabilities), it is advisable to use capital-based instruments to mitigate risk. On the other hand, borrower-based measures are appropriate when the accumulation of vulnerabilities is at an early stage, as such measures are aimed at mitigating risks arising from new exposures (flow vulnerabilities). However, in reality, vulnerabilities are often intertwined in a complex way, which is why they should be addressed using a combination of different instruments to enhance their efficiency. In that respect, policies may be assessed as fully appropriate, partially appropriate or not appropriate. After assessing appropriateness, the ESRB assesses the sufficiency of national macroprudential policy measures, that is, their effectiveness at preventing the risk they address by taking into consideration, among other things, the cost-benefit aspect of the measures. Measures can be assessed as partially sufficient or not sufficient if, despite the measures, vulnerabilities continue to grow, which may mean that the measures were not suitably calibrated or that their implementation was incomplete⁵. In addition to assessing the risk level, the assessment of

Figure 3 Mortgage lending



Note: The figure shows average annual rates of growth in the stock of loans to household for house purchase.
Sources: ECB and CNB calculations.

Figure 4 Lending margins



Note: The data refer to the 4th quarter.
Sources: ECB and CNB calculations.

the appropriateness and sufficiency of national macroprudential policy constitutes the basis for the potential issue of warnings and recommendations by the ESRB to member states.

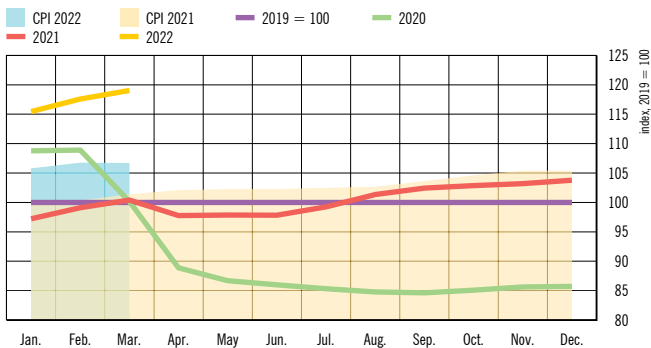
Identified lack of policy often refers to the absence or insufficient stringency of borrower-based measures, with some countries lacking the legal framework for their application and implementation. To be more specific, in contrast to capital-based measures, borrower-based measures are not included in harmonised EU regulations and therefore fall under the exclusive competence of national authorities. In some cases, measures can be assessed as partially sufficient even though they are applied in an ideal way in terms of calibration and feasibility. However, the effectiveness of macroprudential policy on residential real estate market developments is limited, and such an assessment may reflect the need for the implementation of other policies (see [Box 6 The policies and ways to influence the residential real estate market](#)).

⁵ For an overview of macroprudential policy measures applied in analysed countries, see [Macprudential Diagnostics No. 16, Table 1 Overview of macroprudential measures applied by EU member states, Iceland and Norway](#).

5 Non-financial corporate sector

Although the operations of non-financial corporations normalised in 2021, recovery has not been heterogeneous. The business activity of companies in the most affected activities (accommodation and food service activities, transport) remained below the pre-pandemic level. At the beginning of 2022, the risks in the non-financial corporate sector started rising again, predominantly due to continued intensification of disturbances and disruptions in the supply chains of finished products and production materials, and to inflation of supplier prices, especially energy prices, as a consequence of the war breaking out in Ukraine and the still-present pandemic. In the forthcoming period, the sector might be faced with a shortage of certain inputs and loss of markets in the regions affected by war, as well as with the increase in the costs of funding due to the increase in the risk premium.

Figure 5.1 Recovery in revenues started in 2021 continues in Q1 of 2022



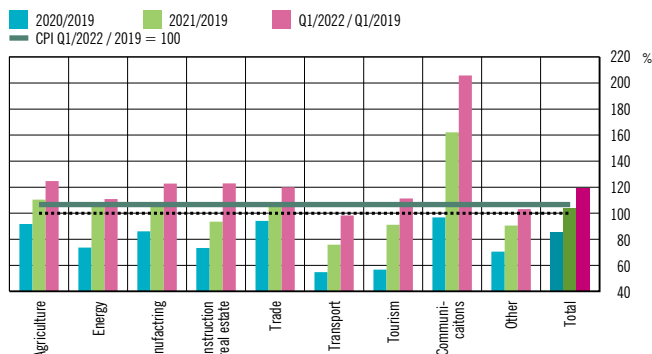
Notes: The lines show a change in the total amount of fiscalised receipts relative to the same month of 2019. The CPI shows the consumer price index (2019 = 100).
Source: Tax Administration and CNB.

5.1 Operations of non-financial corporations

The operations of non-financial corporations normalised gradually in 2021. Recovery in revenues oscillated, mirroring the waves of the pandemic, to accelerate considerably during the summer, thanks, among other things, to a good¹¹ tourist season. Consequently, as indicated by the data obtained from fiscalised receipts, the annual rise in corporate revenues was

¹¹ By the number of tourist nights at the level of some 75% of the total number of tourist nights stayed in 2019.

Figure 5.2 Even activities most affected by COVID-19 recovered in Q1 of 2022



Note: The term Tourism represents accommodation and food services activities.
Source: Tax Administration.

some 3% in 2021 from 2019. Revenues continued to rise at an accelerated pace in the second quarter of 2022, when they were some 20% higher than in 2019. However, this was largely a result in the increase in retail prices spurred primarily by the rise in energy prices and disturbances in supply changes present for some time (Figure 5.1).

The recovery in the operations of enterprises was not heterogeneous, but until the beginning of 2022 even the most affected activities showed signs of recovery. The revenues of enterprises whose business does not depend on social contact had increased considerably in 2021, while the operations of enterprises in activities in which social contact is unavoidable, such as accommodation and food service activities, transport of passengers, organisation of cultural and sports events, and other service activities continue to be subdued (Figure 5.2). The revenues of these most affected enterprises reached the levels from 2019 in the first quarter of 2022, in nominal terms. However, their real revenues are mostly below or only slightly above the level held in the same period in 2019. Since the war in Ukraine will affect industrial activities more, performance differences among different activities might reduce.

In the second half of 2021, the need for measures to help the economy decreased. However, the majority of fiscal measures remained available to enterprises throughout 2022 (Figure 5.3). Approved moratoriums almost fully expired at the end of the third quarter of 2021 (Figure 5.4). In contrast, loans to preserve liquidity and restructured and refinanced loans continued to comprise 5% of total loans of credit institutions, with their balance to be gradually reduced with maturity.

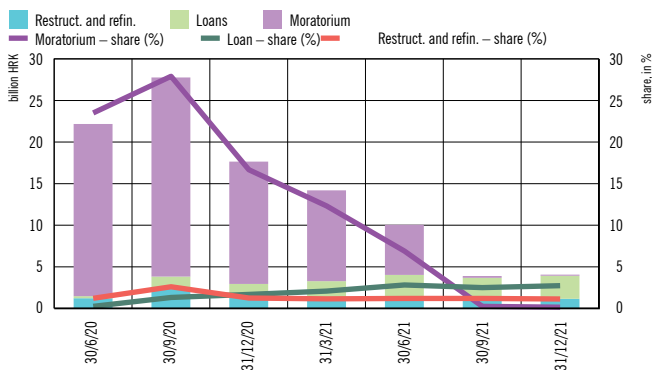
Thanks to measures to help the economy as well as to the speedy economic recovery, the non-financial corporate sector survived the pandemic without suffering any very considerable long-term consequences: employment and business continuity capacity remained intact (Figure 5.5). The substantial fiscal aid package enabled enterprises to retain their employees and capital goods, laying the foundations for speedy recovery.

Figure 5.3 Fiscal supports slackened at the end of 2021



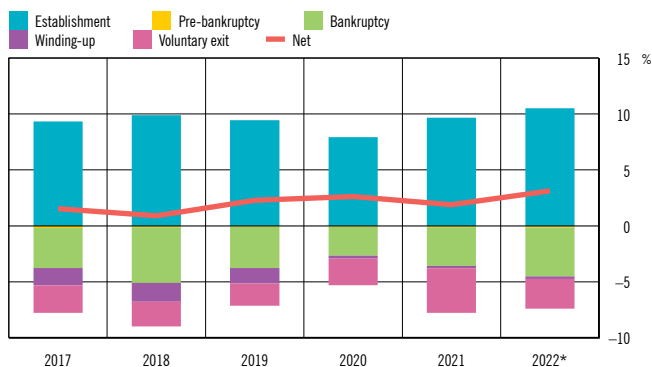
Note: Net changes in measures at the end of the quarter.
Sources: CNB and FINA.

Figure 5.4 Majority of moratoriums expired in Q3 of 2021 while new liquidity and restructured loans are negligibly few



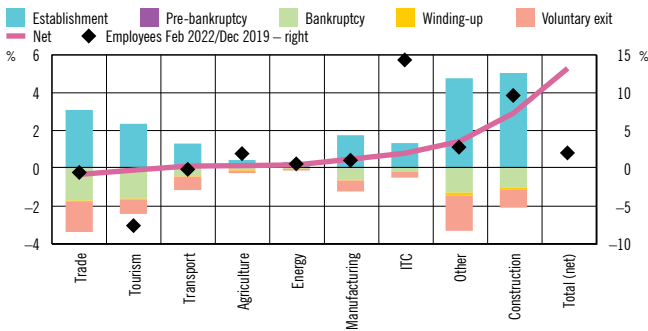
Source: CNB.

Figure 5.5 Change in the number of enterprises in Croatia by type of procedure



* The 2022 data are annualised pursuant to performance in the first quarter 2022.
Sources: CNB and Commercial Court Registry

Figure 5.6 Enterprises survived the COVID-19 pandemic without noticeable scars



Notes: Market entries and exits and net entries in the period from 2020 to Q1 2022. The term Tourism denotes enterprises from accommodation and food services activities. Change in the number of employed persons February 2022 / December 2019
Sources: CNB, CBS and Commercial Court Registry.

Employment thus reduced more noticeably only in activities connected to tourism (some 8%). In the least affected activities, both the number of enterprises and the number of persons employed increased, with construction and real estate business, which quickly recovered in 2021, leading the way, partially also due to jobs on post-earthquake reconstruction in Zagreb and the Banija region. The overall number of enterprises increased from the beginning of the pandemic until February by 5%, and the number of persons employed by 2% (Figure 5.6).

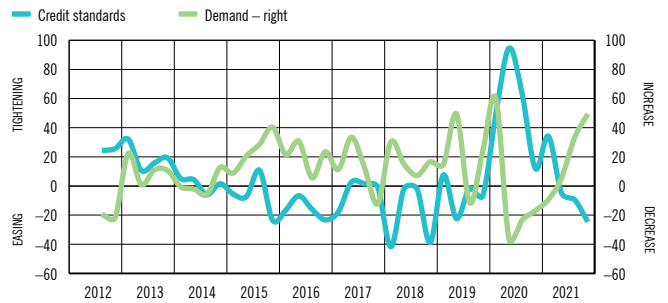
Recovery in operations also led to the normalisation in corporate demographics The rate of enterprises that discontinued their regular operations (bankruptcy, winding-up and termination of business entities) in 2021 returned to levels average in the period from 2017 to 2019. The dynamics from 2021 continued in the first quarter of 2022, with exits by enterprises slightly decreasing and the establishment of new enterprises slightly accelerating (Figure 5.5).

Enterprises largely adjusted their operations to pandemic conditions, although some risks, such as those arising from disturbances in supply chains, are impossible to overcome in the short term. Higher vaccination rates, milder symptoms in those infected and the return to business as usual also decreased the risks for the operation of non-financial corporations. At the same time, credit institutions eased credit standards and demand for loans increased, especially in the second half of 2021 (Figure 5.7). Nevertheless, the consequences of the pandemic can still be felt as problems in supply chains from overseas, resulting in the extension of delivery times and the growth in the price of raw materials, energy and transport (Figure 1.5).

5.2 Indebtedness of non-financial corporations

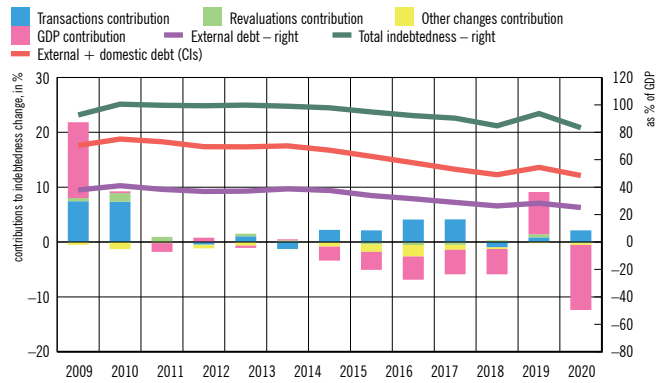
The indebtedness of the corporate sector returned to pre-crisis level in parallel with the recovery of economic activity and

Figure 5.7 Increase in credit demand in 2021 accompanied by the easing of credit standards for corporate loans



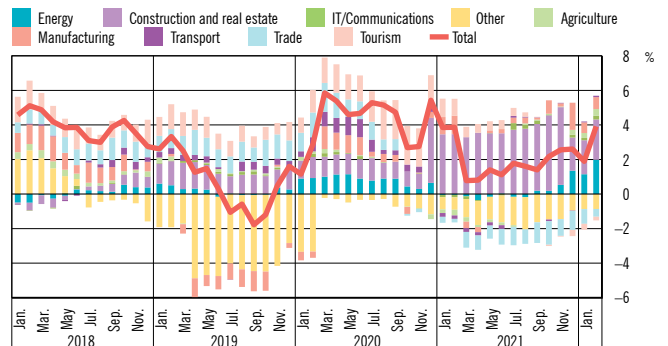
Notes: Positive values show an increase in demand and the tightening of credit standards, whereas negative values show a decrease in demand and the easing of standards. Data show the net percentage of banks weighted by the share in total corporate loans.
Source: CNB.

Figure 5.8 Indebtedness of the corporate sector decreased in 2021



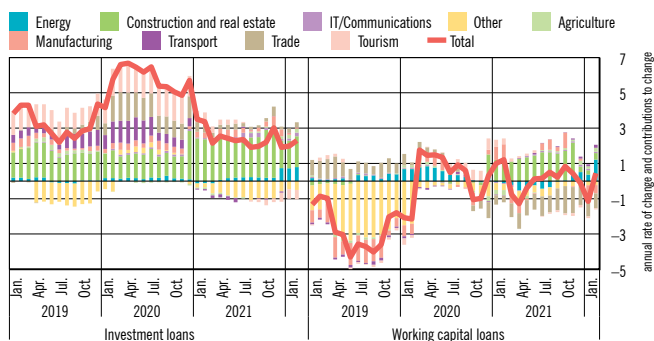
Source: CNB.

Figure 5.9 Construction, real estate activities and energy contributed the most to the growth of total placements



Notes: The term Tourism denotes enterprises from accommodation and food services activities. Data as at 28 February 2022.
Source: CNB.

Figure 5.10 Investment loans account for the bulk of the growth in placements to enterprises in which construction and real estate activities dominate



Notes: The term Tourism denotes enterprises from accommodation and food services activities. Data as at 28 February 2022.

Source: CNB.

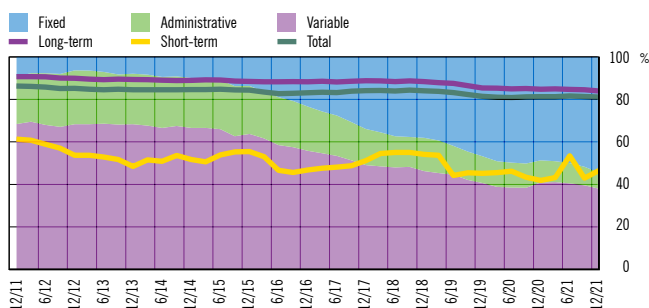
the normalisation of operations. The total unconsolidated indebtedness of the non-financial corporate sector totalled 83.4% of GDP at the end of 2021, the same as before the pandemic (Figure 5.8). Its decrease of almost 12 p.p. in GDP from the end of 2020 was predominantly a result of a considerable rise in GDP. Indebtedness thus decreased despite the rise in nominal debt by some 2.1 p.p. based on transactions, pointing to an economic revitalisation in 2021.

Investment loans to construction companies and real estate companies contributed the most to the rise in placements of domestic credit institutions to non-financial corporations, with a single large placement to a private construction company dominating in 2021. Placements to energy companies have also increased considerably since 2021, being dominated by working capital loans (Figure 5.9 and Figure 5.10). Companies from the accommodation and food service activities (covered by the common term Tourism) have been deleveraging slightly, while other activities slowed down borrowing for investment activities (ITC, transport and trade). Total working capital loans are still stagnating, with those to trade companies decreasing the most and those to construction companies and real estate companies increasing the most.

5.3 Market risks in the non-financial corporate sector

Foreign currency debt continues to dominate the currency structure of the debt of non-financial corporations. In 2021, the foreign currency credit debt of non-financial corporations remained at a high 80% of the total debt of non-financial corporations (Figure 5.11). The share of debt in euro stands at some 98%, while other currencies account for only around 2% of the foreign currency debt. The share of loans in or indexed to foreign currency in the portfolio of short-term loans increased slightly in 2021, their share rising to some 4 p.p. by the end of the year.

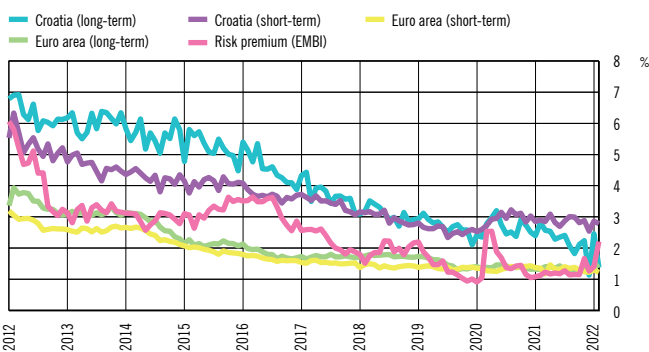
Figure 5.11 Large share of total corporate debt in foreign currency and interest rate risk edged down



Notes: 1 The figure shows the share of foreign currency loans (lines) in total corporate debt (by maturity). It is assumed that total external debt is denominated in foreign currencies. Debt indexed to foreign currencies (a foreign currency clause) is also included. Interest rate risk is presented by the areas and it relates to a breakdown of bank loans to non-financial corporations by interest rate variability.

Source: CNB.

Figure 5.12 Geopolitical instability reflected in increased risk premium

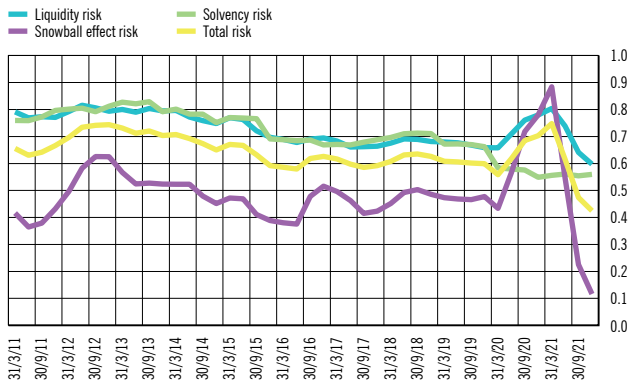


Notes: The figure shows interest rates on the new business volume of loans (long-term and short-term) and risk premium on bonds

Sources: ECB, Bloomberg and CNB.

The interest rate risk of the non-financial corporate sector held steady in 2021. Interest rates of domestic banks on corporate loans at the beginning of 2022 have thus far reacted only slightly to the current geopolitical instability and inflationary pressures, enabling enterprises to continue to find funding on favourable conditions. Although the share of loans with variable interest rates in total loans has been decreasing (Figure 5.11), the cost of short-term corporate financing in Croatia increased in 2021/2022, nearing some 3%, in contrast to the cost of long-term financing which remained at a slightly lower level, of some 2%, on average. The EMBI risk premium increased considerably in the first quarter of 2022 in reaction to the current geopolitical instability in the EU and globally as caused by Russia's war against Ukraine and further polarisation of political and economic relations. Thus far, interest rates have not reacted (Figure 5.12).

Figure 5.13 Improved performance and lower costs of interest payments reduce debt repayment burden



Notes: The vulnerability of the non-financial corporate sector was estimated by three indicators. The liquidity risk indicator was calculated as the ratio of the sum of the total debt amount and interest payments of the sector to gross operating surplus (GOS), i.e.

$$LR_t = 0.5 \cdot \frac{\text{Debt}_t}{\text{GOS}_t} + 0.5 \cdot \frac{\text{Interest payments}_t}{\text{GOS}_t}$$

The solvency indicator was calculated as the debt-to-equity ratio:

$$SR_t = \frac{\text{Debt}_t}{\text{Equity}_t}$$

The snowball effect indicator is based on the ratio of debt servicing burden $b_{t-1} = \text{debt}_{t-1} / \text{GOS}_{t-1}$, adjusted by implicit interest rates i_t and growth rates of gross operating surplus g_t :

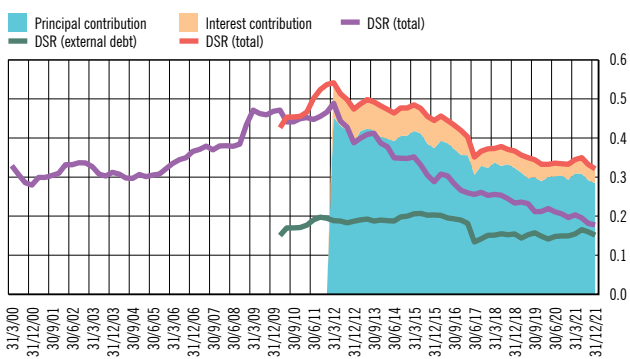
$$SNR_t = \frac{i_t - g_t}{1 + g_t} b_{t-1}$$

These indicators were normalised to the value range 0 – 1 and the total risk was calculated as the average of the three mentioned normalised indicators:

$$TR_t = \frac{LR'_t + SR'_t + SNR'_t}{3}$$

Sources: FINA and CNB.

Figure 5.14 Debt repayment burden decreases amid recovery in revenues of enterprises



Note: DSR is the ratio between debt servicing and available income of non-financial corporations (gross operating surplus).

Source: CNB.

5.4 Vulnerability indicators

The speedy economic recovery in 2021 considerably reduced the vulnerability of non-financial corporations, thanks to a good tourist season and the relaxing of pandemic containment

measures as a result of vaccination and lighter symptoms of those infected. Corporate solvency risk did not increase much during the pandemic, due primarily to capital stability and accumulated corporate profit from the previous years. Solid business results in 2020 and expectations of improvements in 2021¹² paired with stable debt levels additionally reduced solvency risk. The capital of non-financial corporations rose by 4% in 2020, despite the initial pessimistic expectations, while the unconsolidated debt of non-financial corporations grew only slightly in the fourth quarter of 2021, by some 1%, which offset the deterioration of the solvency risk (Figure 5.13). The increase in gross operating surplus in 2021 pushed down the liquidity risk, which, together with the stable implicit interest rate, considerably decreased the debt repayment burden and the snowball-effect risk (Figure 5.14). Nevertheless, due to the already mentioned economic consequences of the war in Ukraine, disruptions in supply chains, and growth in energy prices as well as in other operating costs, it may be expected that pressures on gross operating costs will increase.

5.5 Key risks linked to the non-financial corporate sector

Disruptions in global supply chains caused by the pandemic are intensifying, making corporate operations more difficult and more expensive. Market disturbances linked to the pandemic have been exacerbated by the war in Ukraine and the trade sanctions imposed on Russia. Disruptions in the availability of individual raw materials and intermediary goods and the rise in prices of energy make the operations of enterprises from the manufacturing industry additionally more difficult and strengthen risks for enterprises from the accommodation and travel industries. A potential prolongation of the war in Ukraine could have a considerable impact on inflation and economic activity and strengthen reasons for a rise in interest rates, increasing the burden of debt repayment and making new borrowing more difficult.

The health and geopolitical crises have laid bare the need to redefine corporate business models, i.e. business continuity criteria. The developments during the pandemic and the war in Ukraine have shown the importance of shortening supply chains and building relationships with geographically closer business partners, as well as of increasing energy independence. In addition, viewed at corporate level, operating at the very threshold of technical efficiency (minimising inventories and using most lucrative input and output routes in the short-term) increases enterprises' operational risks. These risks can spill over from corporate balance-sheets to credit institutions within a short horizon.

¹² Annual financial statements for 2021 are not available yet. However, the main economic indicators point towards a recovery in economic activity and good operating results by non-financial corporations.

Box 4 The operation of FinTech companies in Croatia and the impact of the technology race on financial stability

The development of FinTech companies that started after the global financial crisis and picked up momentum during the coronavirus pandemic caused significant changes in financial markets. Numerous new possibilities opening up to users, including lower costs, as well as actual access to finances being enabled for some users, who up to that moment had been excluded from the financial sector, revolutionised the financial market. However, in contrast to the period after the global financial crisis, this time banks faced competition in several areas: custody, payment operations and lending. Existing banks are threatened by the development of FinTech companies since rising competition can lead to them losing a share of the market or to assuming increased risk. However, technological development enables know-how spillover through cooperation or direct acquisition of FinTech companies, aiding banks in the technology race.¹

At the end of 2021 there were approximately 57 companies operating in Croatia that can be considered FinTech companies in the wider sense.² In comparison to banks³, these companies registered a strong rise in assets, staff numbers and operating income after 2015 (Figure 1). As for their specialisation, 50% of the industry lists software design and development as its core activities, while among the most represented activities are retail development and crypto assets / DLT.⁴ Nevertheless, as in the previous few years, the bulk of revenues of FinTech companies comes from design and software development.

At the end of 2020, FinTech companies in Croatia employed some 3100 employees and had assets of HRK 1.2bn, their operating income reaching some HRK 235 million. Although considerably smaller than banks, FinTech companies in Croatia have doubled their assets since 2015, while bank assets rose by a total of 16.2% during the same period. The difference in realised revenues is even greater since the revenues of FinTech companies doubled during the period, while that of banks decreased by roughly a third. Nevertheless, even if, for comparability purposes, only bank's income from fees and commissions is observed, it remained stable during the period (Table 1).

The comparison of financial indicators for FinTech companies and banks is difficult due to their different business models and regulation

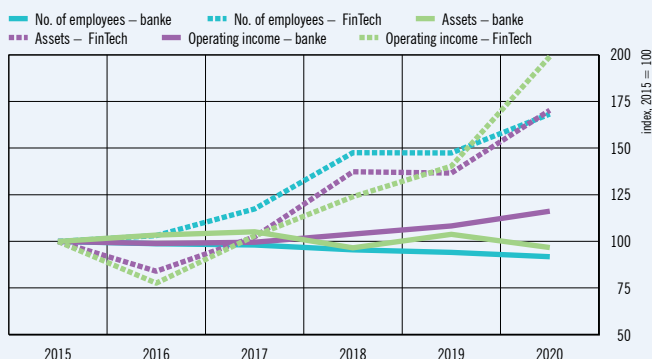
1 FinTech companies in this text include a wide spectrum of companies which, either directly or indirectly, participate in the preparation, creation, design or provision of financial products or services that can be considered FinTech products or services – technology-based financial products or services.

2 In contrast to credit institutions, for FinTech companies there is no strict classification nor (special authorisation). FinTech companies presented by business model, according to their own explanation. However, while some of the companies really do provide payment services, some provide services to banks, Telecom companies, etc.

3 Due to the particulars of their business models, housing savings banks are excluded from the comparison.

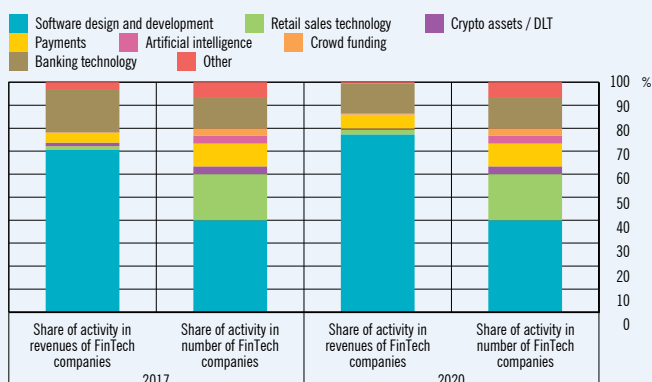
4 Distributed-ledger technology (DLT) refers to the type of decentralised technology that enables more efficient and faster execution of payment system transaction by excluding the intermediary as their validator.

Figure 1 FinTech growth considerably outstripping that of banks



Source: FINA (FinTech), CNB (banks).

Figure 2 FinTech market is heterogeneous but revenues are concentrated in design and software development



Source: CNB.

levels. The differences in the structure of funding by these two groups of companies are considerable, thus apart from FinTech companies being financed almost equally from equity and liabilities, their liabilities are only to a small extent related to financial institutions. Considering that they belong to the group of high-tech companies, they are not the natural clients of banks when it comes to financing.⁵ However, the higher share of equity in these companies leads to a greater average cost of capital, which creates pressure to turn only to more profitable projects (Table 1).

The profitability of FinTech companies considerably exceeds that of banks as they registered a return on equity of some 35% in the period from 2015 to 2020, considerably higher than banks, whose return is below 10% (excluding the years marked by the CHF conversion and the pandemic). In parallel with higher profitability, there are also greater

5 More information on the particulars of financing high-tech companies in: Financing of high-technology manufacturing firms in EU countries, *Macroprudential Diagnostics* No. 8.

Table 1 Comparison of selected indicators of FinTech companies and banks

Year	Banks								
	Assets (in million HRK)	Revenues (in million HRK)	Number of employees	Equity to assets (%)	Return on equity, ROE (%)	Standard deviation ROE	Income by employee (000)	Income by unit of asset	Labour costs (000)
2015	393,385.2	23,928.0	20,352	12.7	-9.3	44	1,175.7	5.8	184.8
2016	388,718.3	21,317.3	20,038	14.1	8.9	19	1,063.9	5.4	188.6
2017	391,336.4	20,001.9	19,917	14.9	5.8	18	1,004.3	5.0	192.9
2018	408,667.3	16,914.2	19,378	14.0	8.6	8	872.9	4.0	189.3
2019	425,806.8	18,661.9	19,091	14.0	9.7	8	966.0	4.0	201.3
2020	457,252.9	15,796.3	18,643	13.4	4.3	6	847.3	3.4	196.2

Year	FinTech								
	Assets (in million HRK)	Revenues (in million HRK)	Number of employees	Equity to assets (%)	Return on equity, ROE (%)	Standard deviation ROE	Income by employee (000)	Income by unit of asset	Labour costs (000)
2015	694.6	949.1	1,830	46.5	32.5	94	518.6	136.5	179.8
2016	583.5	895.4	1,887	40.7	35.2	64	474.3	153.5	174.9
2017	710.9	1,082.0	2,149	36.0	45.3	140	502.6	151.2	175.4
2018	953.6	1,506.3	2,700	39.2	37.4	40	559.3	158.3	198.1
2019	949.2	1,804.1	2,698	51.0	33.3	50	667.2	189.7	215.3
2020	1,182.9	1,990.2	3,080	47.5	35.5	1134	646.1	168.6	228.2

Notes: Bank income consists of interest income and income from fees and commissions. Cost of labour is the annual cost of employees divided by the number of employees.

Sources: FINA (FinTech) and CNB (banks).

differences in the performance of these companies. FinTech companies have higher labour costs due to the hiring of IT experts but the profitability of these companies does not come from higher labour productivity, rather by the ability to generate more revenue per balance sheet item (Table 1).

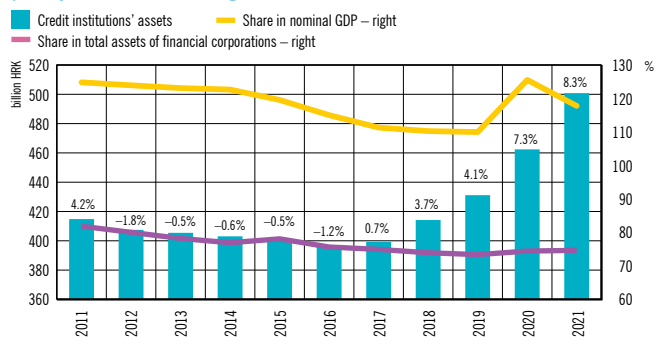
The development of the FinTech industry affects banks' operations and financial stability. While globally important banks regularly acquire FinTech companies, incorporating them into their groups, in Croatia partnerships are more frequent, or else the bank will establish a separate company. The benefits for banks are primarily mirrored in technological advancement that, for the time being, results in better user experience but not better cost efficiency. Nevertheless, business models relying on new technologies and external partners carry certain risks. FinTech companies are volatile, they assume more risk in search for more reward and do not go through a strict licensing process. This opens up the

channel for possible reputational contagion between FinTech companies and the associated bank. At the same time, poor insight into the operation of associated companies provides for agency costs due to different motives behind the operation of FinTech companies and banks. This brings into the foreground the need for a clear regulation of the legal position of FinTech companies, especially those partnering with banks.

Banks have thus far addressed technological challenges by improving user experience with existing products and by increasing their reliance on technology. As a consequence, traditional banking is slowly disappearing and virtual services are gaining strength (some also including products connected to crypto assets). The development of new products within banks is also desirable from the point of view of consumer protection since a large number of banks' new challengers still operate outside a clear regulatory framework, making consumer protection difficult.

6 Credit institutions

Figure 6.1 Annual growth in the assets of credit institutions accelerated under the influence of expansionary monetary policy and economic growth



Notes: The figure shows the annual rate of change in total net assets. Data on the total assets of financial corporations are available up to 31 December 2021.

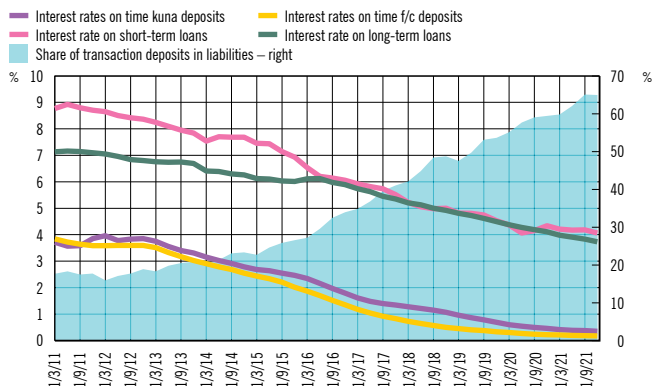
Source: CNB.

The systemic risk for credit institutions in 2021 decreased due to the strong economic recovery, which enabled the asset quality and earnings of credit institutions to improve. As a result of initially high liquidity and capital adequacy and a new inflow of domestic deposits, credit institutions' credit potential additionally increased. However, in the period of still heightened insecurities it continues to be directed at housing loans and liquid assets, leading to the growth in the share of placements with lower interest rates and additionally limiting profitability. Despite the decrease, systemic risks continue to be heightened due to cyclical risks, i.e. an increasingly larger exposure to an overheated real estate market. In addition, the consequences of the war in Ukraine on the global as well as on the Croatian economy might lead to a rise in credit risk, primarily in the corporate sector, the operations of which are under pressure because of interrupted supply chains. In addition to potentially decreasing costs, the participation of credit institutions in the technology race might open the doors to new markets.

6.1 Short-term trends

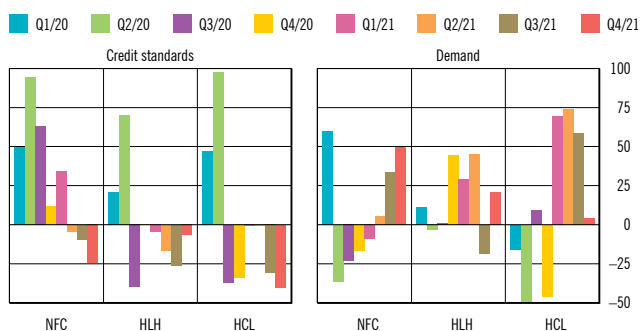
Under the influence of the economic recovery and an expansionary monetary policy, the growth in the assets of credit institutions accelerated in 2021, while interest rates, although at a slower pace, continued to decline. High liquidity contributes to a continued decline in interest rates, spurring a spillover

Figure 6.2 Share of transaction deposits continued to rise due to low interest rates



Source: CNB.

Figure 6.3 Demand for loans recovered in the second half of 2021 and credit standards eased



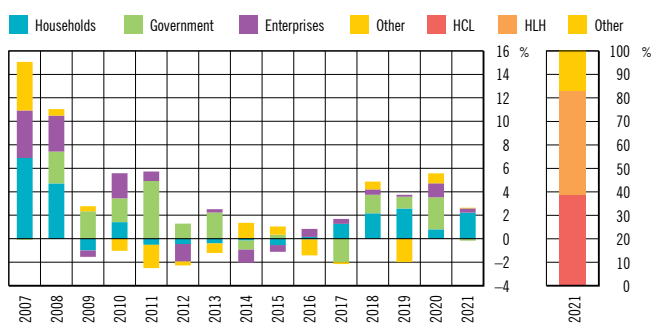
Notes: Data show the net percentage of banks weighted by the share in total loans. The growth in the indicator denotes the tightening of credit standards and the rise in demand and vice versa. NFC refers to non-financial corporations, HLH housing loans to households and HCL to household cash loans.

Source: CNB, Bank lending survey.

from savings and time to transaction deposits (Figures 6.1 and 6.2). The mild increase in the risk premium for Croatia and expected normalisation of monetary policy (see chapter 1 [Macroeconomic environment](#)) has not yet been mirrored in interest rate developments. However, in order to preserve favourable financing conditions in the current environment, it is necessary to continue to improve the perception of Croatia's riskiness, i.e. to strengthen macroeconomic fundamentals, which will be aided by the introduction of the euro (for more details, see [Macroeconomic Developments and Outlook No. 11](#)).

The growth in placements to the private sector in 2021 held at the 2020 level (3.9%), with the rise in households far outstripping that in non-financial corporations (4.5% compared to 2.3%). According to the survey on credit activity, access to financing did not considerably curtail the operation of enterprises, as indicated by the eased financing conditions reported by banks. However, various administrative hurdles listed by enterprises (such as complex rules and their frequent amend-

Figure 6.4 Debt increased in 2021 as a result of the growth in household loans



Notes: Data refer to the monthly amount of debt transactions by sector taken from the national accounts (left) and the structure of transactions for the household sector from the CNB Monetary statistics (right). HCL refers to household cash loans and HLH refers to housing loans to households.

Source: CNB.

ments) affect investment activity and, consequently, lending. In contrast, lending to households continued, primarily as a result of housing loans spurred by the government programme of subsidised housing loans, and to a lesser extent, of general-purpose cash loans (Figures 6.3 and 6.4).

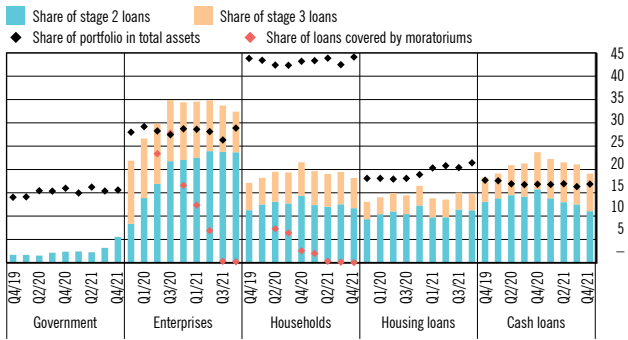
6.2 Systemic risks

The systemic risk for credit institutions in 2021 decreased under the influence of lower credit risk, which led to a recovery in profitability. The continued fall in the share of loans indexed to foreign currency and those with variable interest rates favourably affected structural risks, which will be additionally lowered by the transfer to the euro. However, at the same time, interest income continued to decrease and cyclical risks linked to real estate purchases continued to increase. In the period to come, systemic risk will be significantly impacted by geopolitical developments.

In 2021, asset quality increased under the influence of strong economic recovery, with the market for non-performing placements gaining momentum. After rising from 14.1% to 20.0% in 2020, the share of loans with increased credit risk (stage 2 and stage 3) decreased again to 18.0% in 2021. The decrease in the share of placements in stage 3 after 2015 was predominantly affected by the sale of these placements, which slowed down considerably in 2020. Although the amounts sold continued to be significantly lower than between 2016–2019, the market for non-performing loans in 2021 started coming to life again with double the number of sales in comparison to the previous year (Figures 6.5 and 6.6).

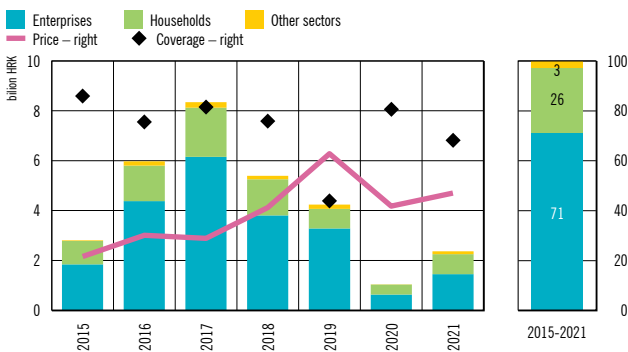
The majority of enterprises whose moratoriums expired continued to regularly repay their credit obligations but uneven recovery of different activities continues to pose a risk. Croatia was one of the countries with a relatively high share of moratorium in loans (in mid-2020 as much as 27% of corporate loans and some 7% of household loans), which increased

Figure 6.5 Credit quality started recovering in 2021 as moratoria expired



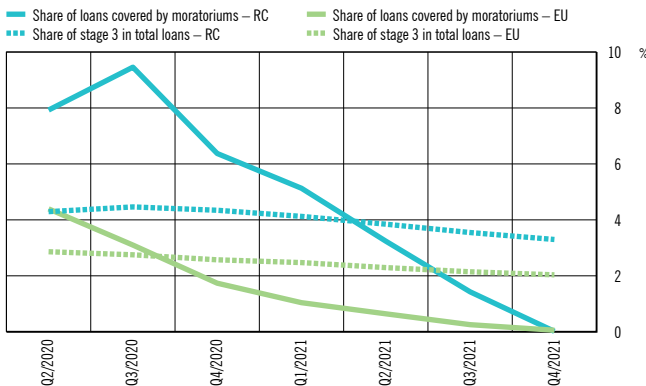
Note: Loans in stage 2 relate to performing loans witnessing a considerable increase in credit risk and loans in stage 3 relate to non-performing loans witnessing a loss.
Source: CNB.

Figure 6.6 Sale of claims intensified in 2021



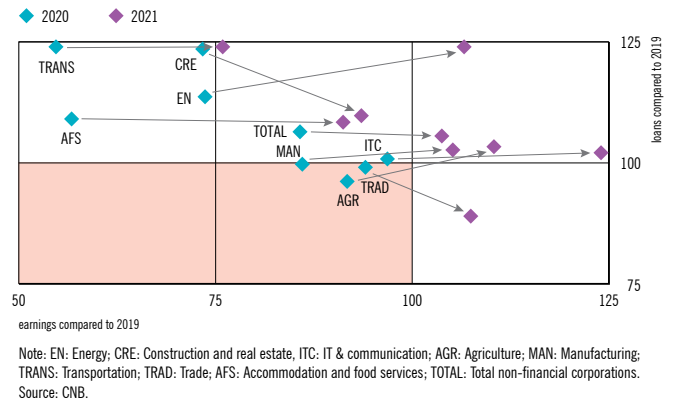
Note: The figure is based on data on sold claims submitted to the CNB by credit institutions.
Source: CNB.

Figure 6.7 Moratoriums did not spill over to non-performing loans



Source: EBA.

Figure 6.8 The connection between riskiness and rise in lending weakened



Note: EN: Energy; CRE: Construction and real estate; ITC: IT & communication; AGR: Agriculture; MAN: Manufacturing; TRANS: Transportation; TRAD: Trade; AFS: Accommodation and food services; TOTAL: Total non-financial corporations.
Source: CNB.

insecurity. Therefore, ordinary completion of the moratorium status and continuation of ordinary repayment is important for asset quality. As in the EU in general, the end of moratoriums in Croatia did not increase the share of loans in Stage 3, which was primarily a result of speedy recovery and comprehensive support provided during the pandemic (Figure 6.7).

The rise in corporate revenues in 2021 decreased credit risk. The rise in lending to riskier corporate clients, registered in 2020, was halted in 2021, when the connection between the performance of an activity and the rise in loans weakened in general (Figure 6.8). The adequate duration of the measures prevented the so-called cliff effect, contributing to the quality of the corporate portfolio. Nevertheless, the possible tightening of financing standards amid increased geopolitical risks, might again increase credit risk.

6.3 Profitability

The profits of credit institutions strongly recovered in 2021, returning to levels comparable with 2019 (Figure 6.9). A generous package of measures to support the economy protected loan beneficiaries from liquidity pressures and consequently credit institutions themselves from the rise in credit risk, which in turn accelerated economic recovery. The return on average assets (ROAA) almost doubled in 2021, totalling 1.4% at the end of the year (Figure 6.10).

Except for exceptionally low interest rates, the possibility for growth of credit institutions' interest income is curtailed by changes in the portfolio structure. The rise in the share of housing loans that have lower interest rates and liquid assets that do not generate income paired with exceptionally low interest rates in general limited profitability. In addition, more than a half of interest income was related to loans to households, with more volatile and riskier general-purpose cash loans continuing to be the amplest source of earnings for credit institutions (Figure 6.11).

Figure 6.9 Profit of credit institutions strongly recovered in 2021

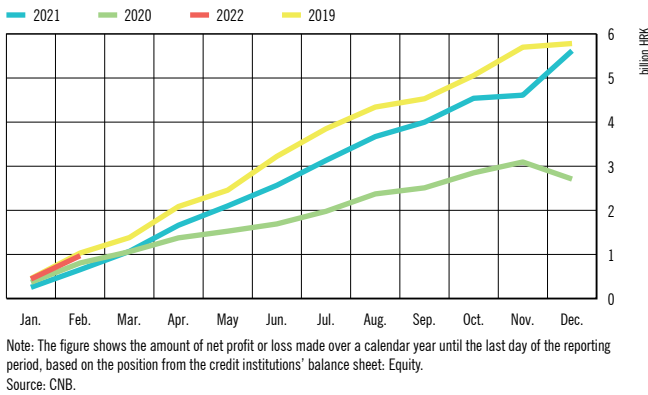


Figure 6.12 Fall in marginal cost slowed down

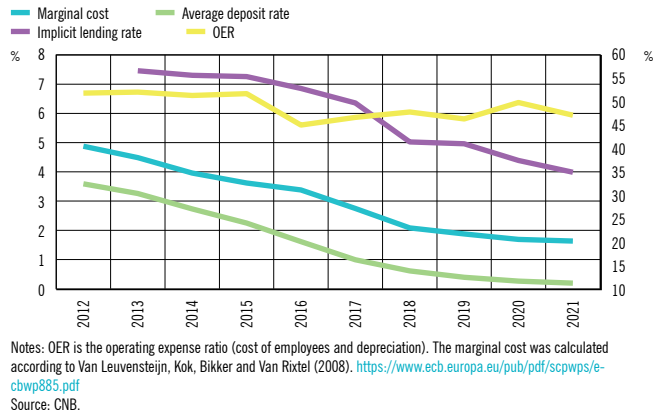
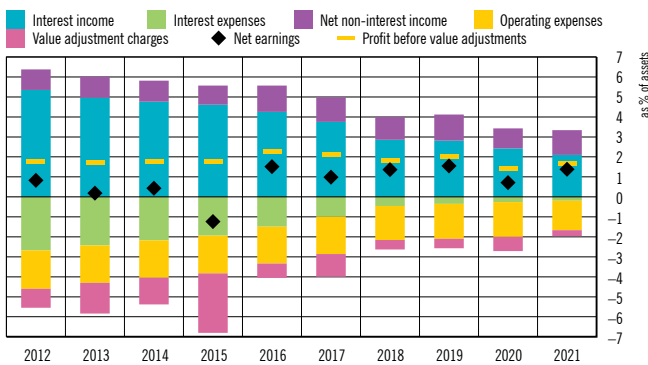


Figure 6.10 Profitability recovery structure



The slowdown in the fall of credit institutions' marginal cost indicated poor technological progress. Over the last ten years, the reduction in marginal cost was based almost entirely on the decline in financing costs, which creates an impression of a rise in credit institutions' cost efficiency. However, the halt of the fall in deposit rates also halted the fall in marginal cost, uncovering poor improvement in cost efficiency (Figure 6.12).

6.4 Shock stabilisers

The upward trend in credit institutions' liquidity continued in 2021. The liquidity coverage ratio increased from 182% to 202.5% in 2021, while the share of stable funding instruments increased by 18.5 percentage points, reaching its historical low of 173.44% (Figure 6.13). Nevertheless, despite high liquidity, developments in the first quarter of 2022 indicate banks' sen-

Figure 6.11 Fall in interest rates and portfolio structure limit credit institutions' profitability

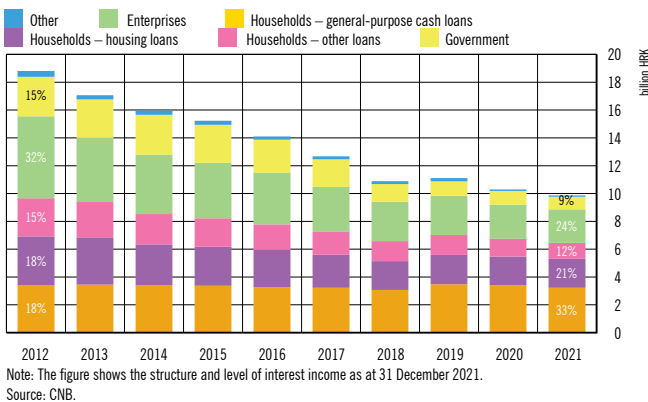


Figure 6.13 System's liquidity continued to rise

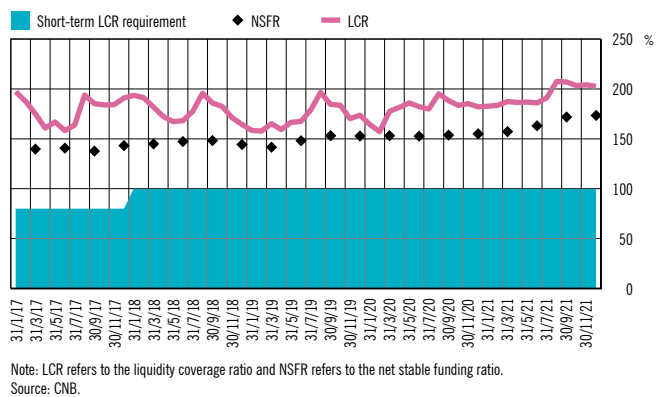
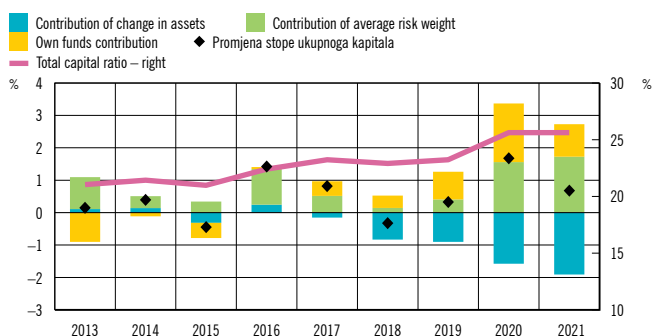


Figure 6.14 Total capital ratio remained high



Note: A decrease in own funds (the numerator of the indicator) results in a fall in the total capital ratio and an increase in own funds in its rise. Earnings show a potential increase in own funds and dividend payments a decrease. In contrast, the exposure to risks component, which is calculated

Source: CNB.

sitive liquidity position in case of reputation shock and a bank run (see [Box 1 Effects of war in Ukraine on the financial stability in Croatia – failure of a Russian owned bank prevented](#)). In the first two months of 2022, the system’s liquidity coverage ratio decreased as well, ending February at 198%.

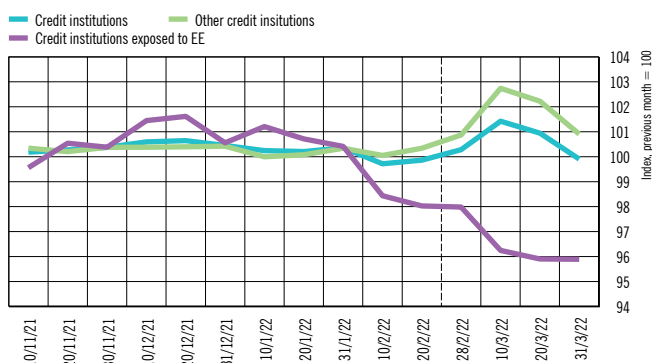
The capitalisation of credit institutions remained high. According to unaudited data for 2020, the total capital ratio remained at 25.6%, primarily as a result of the continuation in the fall of risk weights due to investments in liquid assets, while the unweighted equity-to-assets ratio continued declining. In 2021, the CNB revoked the Decision on restriction of dividend distributions, creating the preconditions for dividend payments in the last quarter of 2021, so increased payments can be expected in 2022. Nevertheless, this should not substantially decrease own funds because banks registered the amounts planned for payments in separate items not part of own funds. (Figure 6.14).

6.5 Risks in the forthcoming period

The escalation of geopolitical tensions in the first quarter of 2022 increased credit institutions’ systemic risks. Although the direct effect of the war in Ukraine on credit institutions in Croatia thus far has been limited, at the end of February a credit institution in indirect Russian ownership was likely to have failed amid liquidity pressures caused by reputation contagion. Although credit institutions maintain high levels of liquidity coverage, developments in numerous European countries in the first quarter of 2022 showed the sensitivity of liquidity under the circumstances of undermined confidence. Thus, banks in Croatia whose parents are exposed to the East European market (Belarus, Russia and Ukraine) lost some 5% of their deposits from the end of January 2022 to the end of March 2022 (Figure 6.15).

The spillover of the effects of the war in Ukraine on Croatia’s economy will affect credit institutions as well. Following the

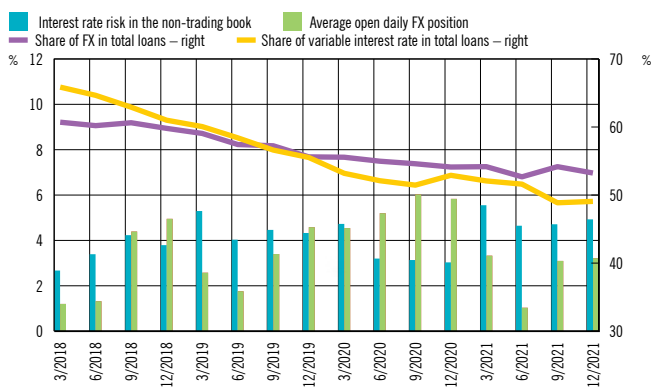
Figure 6.15 Outflow of deposits from credit institutions exposed to the Russian market



Note: The dotted line marks 24 February 2022, the beginning of the Russian invasion on Ukraine

Source: CNB.

Figure 6.16 Introduction of the euro will reduce the systemic importance of market risks



Source: CNB.

resolution of a bank in indirect Russian ownership through sale to a domestic bank, the direct exposure of credit institutions to the war in Ukraine decreased. Nevertheless, the indirect effect of the war on credit risk is still pronounced through exposures to enterprises vulnerable to possible shortages in materials or increase in prices of raw materials and energy, as well as the decrease in citizens’ standard of living due to rising prices of food and energy. The expected increase in interest rates and deterioration in financing standards will also reflect unfavourably on the operation of enterprises.

The introduction of the euro will reduce systemic risks and regulatory costs but will also lead to the loss of a part of credit institutions’ revenues. Indirect credit risks remain elevated since shares of loans with variable interest rates and those in foreign currency (or indexed to foreign currency) continue to be high (Figure 6.16). The introduction of the euro should reduce these risks due to the majority of currency risk being eliminated. However, banks’ earnings will decline due to initial

costs of business adjustment following the introduction of the euro, as well as to loss of income from currency exchange, amid conditions of deteriorating economic outlook.

In order to address the said challenges, credit institutions must intensify their efforts in the field of technology. This will reduce their operating costs, as well as enable them to enlarge their distribution networks. Credit institutions need to address tougher competition, especially in the segment of

payment operations, by investing efforts in developing technological improvements in their operations in order to keep clients. In this sense, the development of own technical solutions and intensifying co-operation with FinTech companies should enable them to keep pace with technological developments in the global financial market (see [Box 4 The operation of FinTech companies in Croatia and the impact of the technology race on financial stability](#)).

7 Stress testing of credit institutions¹³

Stress testing of credit institutions in 2022 started in the period of strong economic growth that followed after the initial macroeconomic shock caused by the COVID-19 pandemic. Despite the repeal of all measures introduced to assist the economy during the pandemic, the share of non-performing loans continued to decline, credit institutions' profitability indicators recovered and capitalisation and liquidity of the system remained at record levels. Stress testing was based on an adverse scenario assuming a long-term inflationary shock, a gradual increase in interest rates and unfavourable economic developments in the period from 2022 to 2024. Results show that the accumulated capital surpluses in the system are sufficient to absorb unfavourable developments, even under an adverse scenario, and, in the same way as in the previous years, the response of credit institutions to stress is heterogeneous. It should be noted that baseline and adverse scenarios used in this year's stress testing were finalised on 20 February 2022 and did not include the latest extraordinary circumstances arising from the outbreak of an armed conflict in Ukraine. Therefore, when interpreting test results, one should take into consideration the high level of uncertainty regarding future macroeconomic developments, in both the baseline and adverse scenarios.

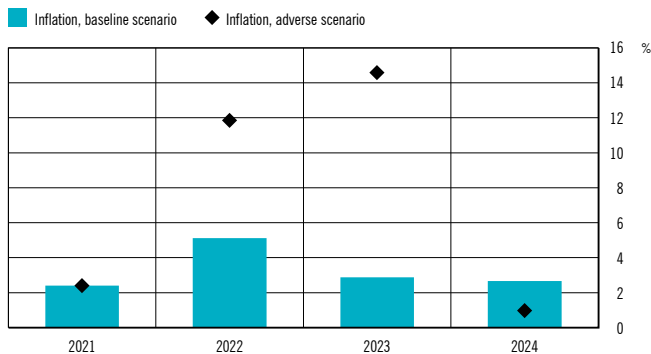
7.1 Macroeconomic scenarios for stress testing

After the sudden economic contraction in 2020 caused by the outbreak of the COVID-19 pandemic, economic growth strongly intensified in 2021, to 10.2%, the amount of real GDP significantly surpassing the pre-pandemic level (for more detail see chapter 1 Macroeconomic environment). Co-ordinated measures to help the economy during the pandemic that included temporary supervisory measures, expansionary monetary policy and fiscal support to companies, proved successful in mitigating the effects of the pandemic and after they expired in 2021 no unfavourable effects on the banking system were observed. Non-performing loans further decreased amid the accelerated and strong economic recovery and bank profitability recovered under the influence of decreased impairment costs and recovery in income from dividends.

Capital adequacy ratio remained at record levels (see chapter 6 Credit institutions). Apart from the recovery in profitability, the maintenance of high capitalisation was also aided by the [Decision on a temporary restriction of distributions](#) in force from January to October 2021. Nevertheless, the pandemic reduced profitability and in the long-term curtailed the repayment capacity in individual activities whose operation was jeopardised by the outbreak of the pandemic and the ensuing social distancing measures, as is still reflected in the exceptionally high share of loans in stage 2 in the accommodation and food service activities, transportation and storage, administrative and support service activities and art, entertainment and recreation.

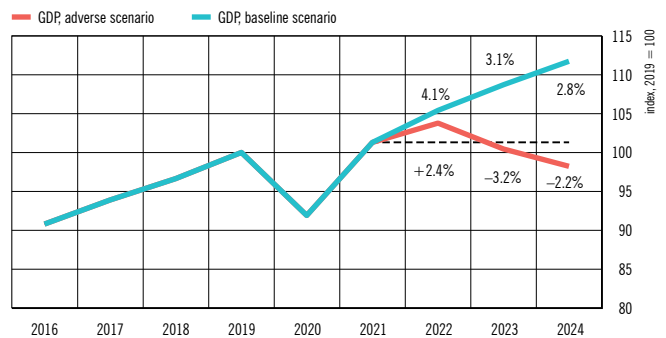
¹³ Stress testing of credit institutions tests credit institutions' resilience under hypothetical, extremely unfavourable macroeconomic and financial conditions that pose highly unlikely but possible materialisation of systemic risks deemed relevant for the operation of the banking sector in Croatia. 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 stability maintenance.

Figure 7.1 Developments in consumer price inflation under baseline and adverse scenario



Sources: CBS and CNB's December 2021 Monetary projection (updated in February 2022) for the baseline scenario and the simulation of the macroeconomic model PACMAN for the adverse scenario.

Figure 7.2 Developments in real GDP under baseline and adverse scenario



Sources: CBS and CNB's December 2021 Monetary projection for the baseline scenario and the simulation of the macroeconomic model PACMAN for the adverse scenario.

Table 1 Main features of the baseline and adverse macroeconomic scenario

	Initial value	Baseline scenario			Adverse scenario		
	2021	2022	2023	2024	2022	2023	2024
International environment							
GDP EU (annual rate of change, %)	5.1	4.2	2.9	1.6	4.1	0.6	0.9
EURIBOR 3M, %	-0.5	-0.5	-0.2	0.0	1.5	3.2	1.0
Macroeconomic developments							
GDP (annual rate of change, %)	10.2	4.1	3.1	2.8	2.4	-3.2	-2.2
Personal consumption (annual rate of change, %)	10.0	3.7	2.3	2.2	1.3	-3.7	-2.0
Investments (annual rate of change, %)	7.6	7.8	3.7	3.5	4.8	-5.3	-5.6
Unemployment rate (%)	6.8	6.2	5.8	5.5	6.3	6.7	6.7
Real estate prices (annual rate of change, %)	7.4	7.9	6.4	6.6	-1.7	-7.8	-13.7
Inflation (%)	2.4	5.1	2.9	2.7	11.9	14.6	1.0
Financing conditions							
Change in average bond yield, p.p.	-0.4	0.2	0.2	0.3	1.9	0.0	-1.2
Change in average long-term interest rates, p.p.	-0.4	0.1	0.1	0.0	3.2	-2.0	-3.0
Change in average short-term interest rates, p.p.	-0.2	0.0	0.1	0.1	0.3	0.5	-0.6
Change in average interest rates on the monetary market, p.p.	0.0	0.1	0.1	0.1	0.8	1.3	-1.8

Sources: CBS and CNB, Eurostat, ECB, CNB's December 2021 Monetary projection for the baseline scenario and the simulation of the macroeconomic model PACMAN for the adverse scenario.

Stress testing of credit institutions in the period from 2022 to 2024 was carried out based on two scenarios, baseline and adverse scenario. After the strong recovery of economic activity in 2021, of 10.2%, the baseline scenario envisages that favourable macroeconomic developments will continue and economic activity will grow, although at slightly weaker intensity than in 2021. Economic activity is expected to rise cumulatively by 10 p.p. by the end of 2024. The baseline scenario envisages consumer price inflation to accelerate (5.1%) in 2022 due to increased demand and continued strengthening of economic recovery, the rise in prices of energy on interna-

tional markets and the effects of global difficulties in supply chains, while in the forthcoming years price growth should return to the long-term average. In such an environment, favourable financing conditions and low interest rates are expected to continue. Macroeconomic developments under the baseline scenario are in line with developments referred to in the CNB's Monetary projection from December 2021.¹⁴

¹⁴ Developments in consumer price inflation, updated in February 2022, are an exception.

The adverse scenario was based on a hypothetical additional escalation of problems in supply chains already present that may result in further strong and relatively persistent growth in the prices of raw materials and energy, as well as growth in the prices of food and other products (in Croatia and abroad). The total inflation rate should be perceptibly higher than in the baseline scenario, possibly amounting to 11.9% in 2022 and 14.6% in 2023, before inflationary pressures subside and it decreases to 1.0% in 2024 (Figure 7.1). High inflation in the adverse scenario is not caused by strong economic growth and rising demand,¹⁵ but exclusively by disturbances in global supply chains and the deficit in some important raw materials and intermediary goods. Therefore, this year's stress test is based on the cost-push shock. The scenario assumes that central banks in their response to the rise in consumer prices will gradually tighten financing conditions, resulting in the rise of long-term and short-term interest rates to the household and non-financial corporate sector, as well as in the rise of the country risk premium. These developments would also lead to lower economic activity growth rates compared to the baseline scenario, and from the fourth quarter of 2023 to a contraction in economic activity. Thus, the adverse scenario envisages a hypothetical development in GDP of +2.4% in 2022, -3.2% in 2023 and -2.2% in 2024 (Figure 7.2), paired with unfavourable developments in the labour market throughout the observed test horizon. In addition to the assumption of difficulties and delays in global supply chains and the strong growth of consumer prices that has a negative spillover effect on the economy as a whole, the adverse scenario also includes a materialisation of additional sources of systemic risks identified as relevant in the risk map (see [Introduction](#)), especially underlining high risks in the real estate market. Thus, the adverse scenario simulates a sharp fall in residential real estate prices. Table 7.1 gives an overview of developments in the main macroeconomic indicators under the baseline and adverse scenario.

7.2 Credit risk under baseline and adverse scenario

In 2021, the ratio of non-performing loans to total loans (NPLR) decreased to its historical low due to the concurrent favourable effect of three different factors: the decline in the amount of non-performing loans, stronger credit growth and sale of non-performing claims. The decrease in non-performing loans led to the fall in value adjustments for exposures in stage 3 of credit risk.¹⁶ On the other hand, the share of loans in stage 2 of credit risk remained elevated (12.4%). This is the stage relating to activities that are still not in default but have registered a noticeable increase in credit risk. After the expiry of moratoriums, the share of stage 2 decreased for households.

¹⁵ The absence of recovery may be caused by the problems in the containment of the pandemic (e.g., emerging of new variants or escalation of the pandemic in developing countries).

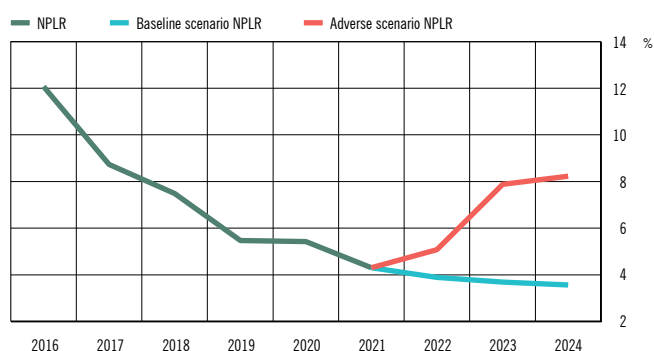
¹⁶ Stage 3 represents instruments in default.

However, for corporates it remained elevated, especially in the accommodation and food service activities (53%), transportation and storage, administrative and support service activities and art, entertainment and recreation (some 36% for all three activities in 2021).

The total NPLR, which includes non-performing exposures to households, non-financial corporations, the government and financial institutions, might continue to decrease under the baseline scenario, declining to its historically low level, never registered in the domestic banking system (3.4% at the end of 2024). Due to favourable economic developments, further decline in the unemployment rate, continued accommodative monetary policy and favourable financing conditions, as well as strong growth in real estate value, the baseline scenario projects a decline in NPLR for households, for both housing and for consumer loans. As for non-financial corporations, NPLR is expected to increase slightly (by 0.5 p.p. by the end of 2024), as a result of a higher consumer price index that generates growth in manufacturing prices for enterprises and adversely affects their profitability.

The hypothetical adverse scenario envisages a reversal in favourable trends and renewed deterioration in loan quality, the total NPLR rising from 4.3% at the end of 2021 to 8.2% at the end of 2024. The increase in NPLR is driven by the strong rise in inflation, contraction in economic activity and the rise in interest rates projected by the scenario. Simulated NPLR growth is weaker for the household sector, and slightly stronger for the non-financial corporate sector. Since the COVID-19 pandemic had a heterogeneous impact on companies belonging to activities whose operation was jeopardised by the outbreak of the pandemic, it is assumed that the inflow of new non-performing loans should be more pronounced for enterprises whose profitability indicators had already deteriorated, such as those from the accommodation and food service activities, transportation and storage, administrative and support service activities and art, entertainment and recreation (for more information see chapter 5 Non-financial corporate sector).

Figure 7.3 Developments in total NPLR under the baseline and adverse scenario



Source: CNB.

The adverse scenario also projects additional impairment costs and provisions for placements that have not yet become non-performing equal to the expected credit loss (stage 2 of credit risk) in accordance with the application of IFRS 9. The increase in value impairments for expected credit loss (stage 2) is most pronounced in the first year of the adverse scenario, when there are the first signs of deterioration in economic developments and growth in interest rates, while the growth in value impairments and provisions for non-performing placements (stage 3) are stronger in the third and the second year.

7.3 Assessment of banking system stability under the baseline and adverse scenario

The banking system maintained a record high capital adequacy ratio of 25.6% at the end of the 2021.¹⁷ High capitalisation was additionally strengthened during the year due to recovery in the profitability of credit institutions which again reached the level from the record 2019, and the [Decision on a temporary restriction of distributions](#) in force from January to October 2021.

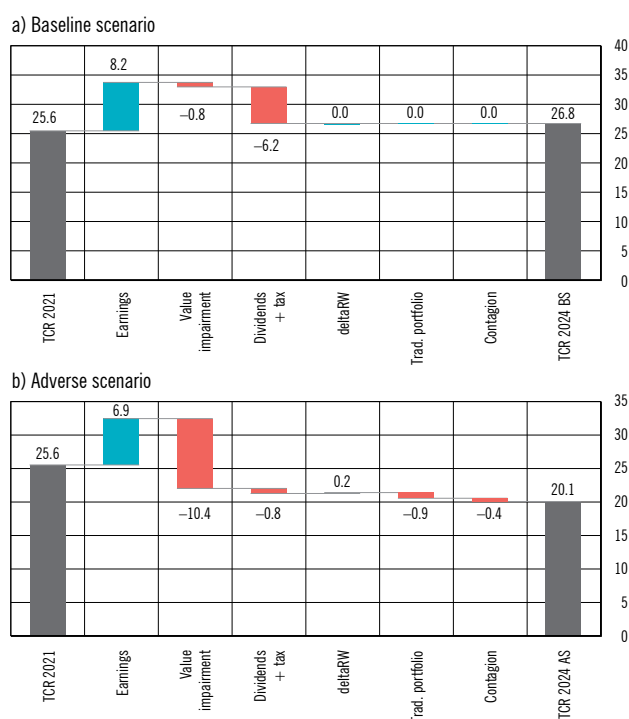
The surplus in own funds that are held by credit institutions above the minimum legally prescribed capital requirements continued to grow to a high 9% at the end of 2021. Against this background, the Croatian National Bank adopted a decision to increase the countercyclical capital buffer rate to 0.5%, to be applied as of the end of the first quarter of 2023 (see [Decision on the countercyclical buffer rate](#) (Official Gazette 39/2022 and chapter 8 Macprudential policy implementation)). In accordance with this decision, in the context of the stress testing of credit institutions, it is assumed that the total minimum requirements rate in 2023 and 2024 will be 0.5 p.p. higher than the current rate. Further, in the simulation of results for the baseline and the adverse scenario it is assumed that credit institutions make distributions totalling 80% of profit registered in each year of the observed test horizon.

Under the baseline scenario the total capital adequacy ratio continues to increase from 25.6% at the end of 2021 to 26.8% at the end of 2024. Income from net operating earnings of banks remains relatively high, strengthened by favourable developments in economic activity. Income from earnings is slightly lower than in the record, pre-pandemic years due to the effect of one-off costs connected with the introduction of the euro as the official currency in Croatia as of 1 January 2023. Those are one-off costs associated with cash supply and transport and adjustments in the operation of credit institutions' internal systems.¹⁸ The effect of the permanent loss of income

from currency exchange business is also taken into consideration, as well as the decrease in fees and net interest income. On the other hand, the introduction of the euro will permanently eliminate the currency-induced credit risk that made the financial system exceptionally vulnerable to the depreciation of the domestic currency. Under the baseline scenario, net operating earnings will rise again in 2024. Costs of impairment and provisioning for credit risk will remain subdued in accordance with expectations of a further reduction in NPLR.¹⁹ In view of favourable developments in the profit of credit institutions under the baseline scenario, credit institutions will pay out dividends based on generated income, reducing the growth in the capital adequacy ratio in the system (Figure 7.4a).

Under the adverse scenario the capital adequacy ratio keeps declining steadily in the first two years of the test horizon, recovering slightly in 2024 to 20.1% at the end of the period. It declined from 25.6% at the end of 2021 to 18.9% at the end of 2023, since operating earnings in 2022 and 2023 were smaller than provisions and value impairments in most institutions in the system, with the banking system operating with a loss. In

Figure 7.4 Decomposition of the change in the capital ratio under baseline and adverse scenario over a three-year period from the end of 2020 to 2024



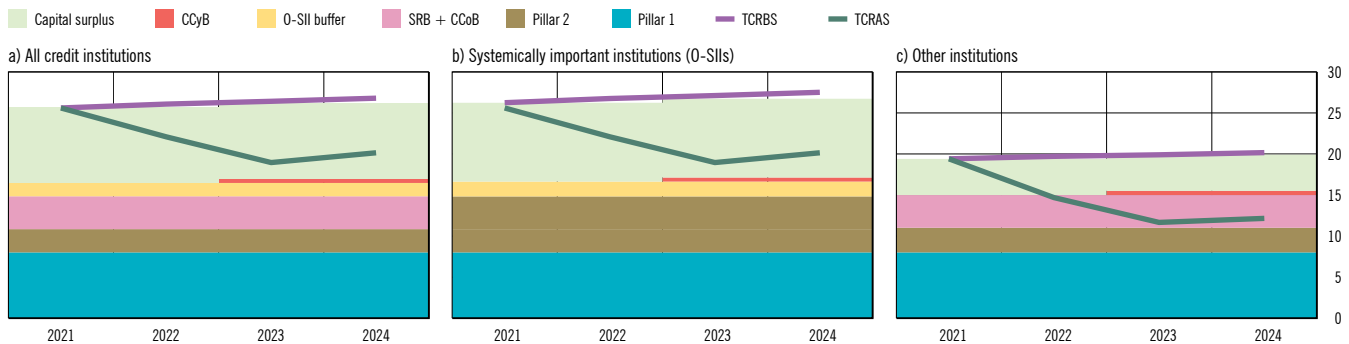
Notes: TCR 2024, BS relates to the baseline scenario and TCR 2024 AS to the adverse scenario. Source: CNB.

¹⁷ According to preliminary unaudited data as at 31 December 2021.

¹⁸ Credit institutions assessed their costs pursuant to the [Instructions for simulation of the effects of adjustment of credit institutions to the introduction of the euro as the official currency in Croatia](#).

¹⁹ In the interpretation of results account should be taken of the fact that the methodology of the stress testing conducted relies on the assumption of a static balance sheet, i.e. there are no changes in the total exposures of banks under the baseline and adverse scenarios; instead they hold steady at end-2021 level.

Figure 7.5 Capital ratio under the baseline and adverse scenario and minimum legally prescribed capital requirements



Notes: Pillar 1 – prescribed minimum capital requirements; Pillar 2 – own funds requirements appropriate to overall system average; SRB – systemic risk buffer; CCoB – capital conservation buffer; O-SII buffer – the 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 balance between the total capital ratio of a credit institution and the sum total of the minimum legally prescribed capital requirements for that credit institution, i.e. as the TCR – (pillar 1 + pillar 2 + CCoB + SRB + O-SII buffer + CCyB). Source: CNB.

2024, the capital adequacy ratio of the system gradually recovers due to the slight recovery of earnings and lower provisions and value impairments compared to previous years. These more favourable developments are in accordance with hypothetical macroeconomic developments under the adverse scenario for 2024, which simulated the subsiding of inflationary pressures and gradual economic recovery. In addition, during the test horizon, capitalisation under adverse conditions was also adversely affected by the trade portfolio revaluation and dividend payments in 2024, as well as the by interbank contagion (Figure 7.4b). The impact of interbank contagion on the system was measured by direct and indirect exposures of all credit institutions to those institutions that failed stress testing.²⁰

The test showed banking system resilience in the face of a hypothetical crisis and increased credit losses, with the high level of accumulated capital surpluses held by credit institution above the minimum legally prescribed requirements playing a key role in the amortisation of the effects of unfavourable economic developments (Figure 7.5a). When an alternative hypothesis was tested under which credit institutions maintained capital ratios equal to the minimum legally prescribed capital requirements, the results indicated that the adverse scenario would witness a breach of the combined capital buffers (all three buffers currently in use: the capital buffer for systemically important institutions, the systemic risk buffer and the capital conservation buffer, as well as the countercyclical capital buffer to be applied as of 31 March 2023). This simulation for a hypothetical banking system without accumulated capital surpluses additionally underlined their key role in maintaining the system’s resilience.

The analysis of the responses of each credit institution to adverse macroeconomic conditions shows a noticeable level of heterogeneity (Figures 7.5b and 7.5c). The total banking system and the aggregate of systemically important institu-

tions achieved relatively good results under the stress scenario and the accumulated capital surpluses efficiently absorbed the unfavourable effect of macroeconomic developments so the capital adequacy ratio held at above the minimum legally prescribed capital requirements. As for other credit institutions, the significantly lower previously accumulated aggregate capital surplus was not sufficient to absorb the effect of several years of unfavourable economic developments, so credit institutions depleted their capital surplus as early as the first year of the adverse scenario and slightly encroached on the combined capital buffer. Continued economic contraction in the forthcoming years led to gradual depletion of combined capital buffers (especially in 2023) in other credit institutions. The analysis of responses of each credit institution to adverse macroeconomic conditions shows 9 credit institutions breaching capital buffers and one more breaching the own funds requirement (pillar 2). Under the adverse scenario, an additional 5 credit institutions breached the prescribed minimum capital requirements (of 8%, pillar 1). Altogether 6 credit institutions, accounting for 2.9% of the banking system failed the system’s stress test, since they breached the total SREP capital ratio (TSCR). Although their results slightly improved on the last year’s, if the number of credit institutions failing the stress test and their share in banking system assets are compared, overall, this year’s testing showed a more prominent decrease in total capital of the system than in the year before.

When interpreting test results, one should take into consideration the high level of uncertainty regarding future economic and financial developments. The stress testing scenario was devised at the beginning of 2022 (in the period from January to 20 February 2022), so it does not take into consideration in any way the impact of the armed conflict that broke out in the Ukraine on 24 February 2022 or of the subsequent sanctions imposed on Russia on economic activity and developments in the financial sector. The baseline and adverse scenarios were based on previously available data and hypothetical assumptions on disturbances in global supply chains, as well as unlikely but possible pandemic developments.

²⁰ Direct interbank contagion spreads through direct placements and obligations among credit institutions, while indirect interbank contagion spreads through the simulation of the sale of government securities by credit institutions that failed stress testing.

Box 5 Improvement of the macroprudential stress testing system – dynamic balance sheet assessment¹

Banking system stress testing is one of the main macroprudential tools enabling the estimation of bank capital sensitivity to macroeconomic disturbances, thus contributing to maintaining financial system stability. The Croatian National Bank continuously improves existing and develops new models to improve the process of stress testing. This Box presents an assessment of models for forecasting banks' dynamic balance sheets, with special emphasis on the role that the capital adequacy ratio of credit institutions has on loan dynamics.² The financial crisis of 2008 and 2009 has shown that the suboptimal allocation of financial resources to the non-financial sector can immensely damage financial stability. Excessive credit growth in the upward phase of the business cycle may lead to systemic risk accumulation in the financial system. On the other hand, in the downward phase, credit institutions may, if facing a capital shortfall, tighten lending standards and reduce their supply, and additionally increase the initial intensity of economic shocks, postponing or weakening economic recovery. Ensuring optimum loan dynamics in normal times as well as at times of unfavourable economic developments is one of the fundamental tasks of macroprudential policy and a precondition for maintaining financial system stability. Therefore, the model for forecasting loan dynamics is a useful component in stress testing of the financial system.

Abandoning the static balance sheet and introducing the dynamic balance sheet in the stress testing system for institutions also constitutes a necessary step in the development of the macroprudential stress testing system. In addition to the dynamic balance sheet the macroprudential stress test must incorporate the feedback loop between developments in the financial sector and macroeconomic developments. In contrast to the traditional banking system solvency tests, the aim of which is to stress-test credit institutions in case of adverse, hypothetical economic shock and evaluate their solvency at the end of a stress period, the macroprudential stress testing system analyses whether the hypothetical crisis can lead to a strong deleveraging of credit institutions and sudden halt in lending to the economy that can additionally worsen macroeconomic developments. In addition, it analyses how active macroprudential policy managing may partially prevent such unwanted developments.

The details of the assessment of the dynamic balance sheet model for the improvement of stress testing system in financial stability are described below. The estimation sample is based on quarterly observations for the period from the first quarter of 2011 to the first quarter of 2020 and contains 20 banks, of which 7 are other systemically important institutions. During the observed period, there was one significant acquisition of a systemically important institution.³

1 A part of this framework was created with an aim to improve the CNB's macroprudential stress testing system, as part of the ECB's working group Working Group on Stress Testing – Micro-Macro Interactions.

2 The link between lending and capital adequacy rate was analysed in detail in the ECB's macroprudential stress testing model BEAST (Budnik, et. al., 2020).

3 To deal with acquisition, we treated acquiring entity as a new bank after merger and acquisition of another bank.

The dependent variable refers to data on levels of loans that are obtained from the Croatian National Bank supervisory database. Since different factors can affect loan dynamics, depending on the sector of their purpose, loan dynamics is analysed by separate models, assessed for three different sectors: non-financial corporations, household mortgage loans and household non-mortgage loans. The data for non-financial corporations are adjusted to account for significant changes in coverage due to the reclassification of several shipyards from the non-financial corporate sector to the general government sector, as a consequence of government support to these entities

Explanatory variables applied in the modelling of loan changes can be divided into three main groups:

1) **macroeconomic variables:** real gross domestic product, real gross fixed capital formation, residential real estate prices, aggregated long-term lending rate for the non-financial corporate sector and the household sector;

2) **sector variables (for credit institutions):** lagged value of the dependent variable of the change in the level of loans, ratio of non-performing loans to total loans, profitability indicators – return on assets, capital surplus/shortfall with respect to minimum legal capital requirements (expressed in own funds), non-linear effect of a 'small' capital surplus, i.e. a situation in which capital surplus only slightly exceeds the minimum requirement (dummy variable, which equals 1 if capital surplus/shortfall is <2.5 p.p. compared to the minimum requirement, multiplied by capital surplus/shortfall), sales and write-offs of non-performing loans;

3) **other variables:** EUR-HRK exchange rate, dummy variable for government housing loans subsidy program dummy variable for conversion of Swiss franc-indexed loans to euro-denominated loans.

Table 1 shows a detailed description of all variables applied in the model assessment.

The econometric model was estimated for each sector individually. The final specification of the model is:

$$\Delta Loans_{i,t}^s = f(\Delta Loans_{i,t-1}^s, Loan\ Supply\ Variables_{i,t-j}^s, Loan\ Demand\ Variables_{t-j}^s, Other\ Variables_{i,t-j}^s) + \varepsilon_{i,t}^s$$

where i indicates the bank, s sector and t time, while j is the number of lags.

Fixed effect estimator is used in econometric estimation. In addition, constant weights corresponding to the bank share in total assets are applied in the model in order to reflect the structure of the banking system that is dominated by a few large banks. Namely, in Croatia the 5 biggest banks account for 81% of the market (7 systemically important banks account for 91% of total assets, while the remaining 13 banks have only 9% of total assets). Therefore, estimates are weighted to capture more properly the system-wide effects. Table 2 shows the results of the estimated model.

Table 1 List of variables

	Label in model	Detailed description	Data source
Dependent variable	$\Delta \log(\text{Loan level})_{i,s,t}$	Loans held by other MFI vis-à-vis resident non-financial corporations and households (outstanding amounts), log difference with respect to 4 lags	MFI balance sheet statistics (CNB)
Independent variable	$\Delta \log(\text{Loan level})_{i,s,t-1}$		MFI balance sheet statistics (HNB)
	$\text{growth rate (GDP)}_{t-i}$	Real Gross Domestic Product, yoy growth rate	Croatian Bureau of Statistics (CBS)
	$\text{growth rate (HIPC)}_{t-i}$	Harmonised index of consumer prices (HICP), yoy growth rate	Croatian Bureau of Statistics (CBS)
	$\text{growth rate (I)}_{t-i}$	Real gross fixed capital formation, yoy growth rate	Croatian Bureau of Statistics (CBS)
	$\text{growth rate (RPP)}_{t-1}$	Residential property price index, yoy growth rate	Croatian Bureau of Statistics (CBS)
	$\text{EURHRK exchange rate}_{t-1}$	Average quarterly exchange rate	CNB
	$\text{Long-term lending rate}_{s,t-1}$	Loans granted by MFIs to domestic nfc and households (interest rates on new business, weighted by outstanding amounts, aggregate for the sector)	MFI in interest rates sheet statistics (CNB)
	$\text{NPLR}_{i,s,t-1}$	Non-performing loans over Loans (gross) ratio	MFI balance sheet statistics (CNB)
	$\frac{\text{Own funds shortfall surplus}}{(\text{OF ratio} - \text{Target OF ratio})_{i,t-1}}$	Own Funds* Bank total capital adequacy ratio – requirements (minimum requirement 8% + CCoB + O-SII + SRB+ CCyB + P2R + P2G) from 2014 onwards, until 2014 requirement was taken as 12% for all institutions	COREP until 2014 and MFI balance sheet statistics before 2014 (CNB)
	$(\frac{\text{Own funds shortfall surplus}}{\text{if OF ratio} - \text{Target OF ratio} < 2.5})_{i,t-1}$ · dummy variable 1,	Dummy variable = 1 of OF surplus/shortfall of own funds < 2.5 p.p. * Amount of the surplus/shortfall	MFI balance sheet statistics until 2014 (CNB) and COREP from 2012 onwards
	$\text{ROA}_{i,t-1}$	Return-on-assets ratio	FINREP and MFI balance sheet statistics (CNB)
	$\text{NPLR write offs and sales} - a_{i,t-j}$	Write-offs and sales in the quarter	MFI balance sheet statistics (CNB)
	Dummy variable – government subsidy housing program _t	Dummy = 1 in the period when government subsidy program for residential real estate purchases was active	CNB and APN
Dummy variable – conversion of CHF to EUR _t	Dummy = 1 in the first quarter 2016	CNB	
$\text{Bank share in total}_{i,t-1}$	Share of assets of credit Institution in total assets of the banking sector	MFI balance sheet statistics (CNB)	

Note: * Capital surplus/shortfall is calculated based on own funds due to data availability issues related to Pillar 2 requirements in common equity tier 1 or tier 1 capital over the sample.

Source: CNB.

The autoregressive term is positive and significant for all three sectors considered. The autoregressive term is 0.7 in the non-financial corporate sector, 0.8 in household mortgage and non-mortgage sector, implying a high persistence of the sector loan stock variables.

The change in household mortgage and non-mortgage loan level in Croatia is linked to economic conditions, while there is no clear relationship between loan dynamics in the non-financial corporate sector and macroeconomic conditions. Higher growth of economic activity, inflation and residential property prices are related to higher loan level growth in the household mortgage and non-mortgage segment, although inflation and real estate prices do not have a statistically significant coefficient. The EUR/HRK exchange rate is a positive and significant determinant of the growth in the value of loans to the household sector, especially household mortgage loans, which is to be expected as 53% of loans, on average, were either in euro or indexed to the euro, over the observed period.

Higher interest rates are related to lower loan growth in the non-financial corporations and household mortgage sector, while the sign of

the relationship is the opposite for the non-mortgage household sector (higher interest rates are related to higher loan growth dynamics), which can probably be explained by the supply side effect associated with the abundance of cash general-purpose consumer loans on the market. As for loans to non-financial corporations and household mortgage loans, the effect of demand is predominant, with interest rate growth decreasing demand for loans to these sectors.

Most of the banking sector variables have a significant influence on loan level dynamics in the examined sectors. A high level of non-performing loans in total loans dampens the loan levels, which is probably related to the high share of non-performing loans after 2009, which increased until 2015. Higher bank profitability (measured by return-on-assets ratio) is also related to higher loan growth, which confirms that more profitable banks are more successful in balance sheet expansion. Write-offs and sales of non-performing loans reduce the size of the balance sheet and have a positive effect on loan growth only after four quarters. Such results imply that the favourable influence of strategies to reduce bad loans on lending in the Croatian banking system are visible with a time lag, although they are relevant to bank operations.

Table 2 Estimation results for non-financial corporation and household sectors (fixed effect estimator)

CROATIA	Non-financial corporations	Household mortgage	Household non mortgage
	Coefficient	Coefficient	Coefficient
AR2: Diff. Log(Loans) t-1	0.7205***	0.7987***	0.8082***
Macroeconomic variables:			
Investment growth t-1	-0.001		
Investment growth t-2	0.0019		
GDP growth t-1		0.0029**	0.0060***
GDP growth t-2		-0.0011	-0.0038***
Inflation t-1	-0.0015	0.0014	0.0014
House price growth t-1		0.0002	0.0008
Long-term lending rate NFC/HH t-1	-0.0028	-0.0163***	0.0036
Macroeconomic variables:			
Own funds shortfall/surplus t-1	0.0036*	0.0019	-0.0025***
Dummy variable for own funds shortfall*own funds shortfall/surplus t-1	0.0003	-0.0022	-0.0011
Non-performing Loan ratio NFC/HH t-1	-0.0016***	-0.0026	-0.0014
ROA t-1	0.0067**	0.0075***	0.0049**
Write offs and sales t-1	-0.0323**	-0.0304	-0.0147
Write offs and sales t-2	-0.0303***	-0.0243	-0.0266*
Write offs and sales t-3	-0.0293**	-0.0367***	-0.0181
Write offs and sales t-4	0.0381***	0.0980***	0.0809***
Other variables:			
EUR/HRK exchange rate	0.1113	0.0996***	0.0470*
Dummy- government subsidy housing program		0.0087**	
Dummy – CHF/EUR conversion		-0.1069***	
Banks	21	20	20
Observations	655	566	568
Adjusted R2 (within)	0.6691	0.8365	0.7770

Note: * p < 0.1, ** p < 0.05, *** p < 0.01

Source: CNB.

When it comes to the impact of the capital adequacy ratio on loan dynamics, results are different for the different sectors analysed. Higher capital adequacy surplus above the required regulatory buffers may be explained by higher growth of loans to non-financial corporations and household mortgage loans, although the variable is not always significant. This is probably related to the high capitalisation of the Croatian banking system, with a capital adequacy ratio above 25% and substantial capital surplus available in the system (some 9 p.p., for more details see chapter 7 Stress testing of credit institutions). The only exception is non-mortgage household loans where results indicate that banks with higher capital surplus are less prone to extend non-mortgage credits. This can be explained by the nature and characteristics of cash general-purpose loans that have become extremely popular in Croatia since 2017, yielding higher earnings but also being much riskier than other analysed forms of credit. The international experience from the previous global crisis showed that in cases when capital surplus decreases significantly and nears the minimum requirement (or a bank breaches capital requirements and registers a capital shortfall vis-à-vis

the regulatory requirements) all further reduction in capital surplus can have a non-linear adverse effect on lending to the economy, so such credit institutions might opt for a drastic decrease in credit allocation. Therefore, the analysis includes an additional indicator of non-linear capital surplus/deficit, which identifies the most vulnerable banks in the system with the capital surplus being lower than 2.5 p.p. (or a capital shortfall), examining how this indicator affects changes in loans. The results of the estimation show that the non-linear indicator of capital surplus/deficit is associated with the lower loan level in the non-financial corporate sector. This is an important result from the macro prudential perspective, since it implies that banks that are close to breaching their minimum capital requirements will reduce credit volumes and deleverage to non-financial corporations, potentially leading to suboptimal credit allocation to the economy. Nevertheless, although pointing towards a potential decrease in lending to the non-financial private sector, this indicator is not statistically relevant. Therefore, it seems that in a highly capitalised banking system, such as Croatia's, other factors are more relevant for determining the loan dynamics.

Two additional dummy variables were included in the estimation of loan growth to the household mortgage sector: the dummy variable for the conversion of Swiss franc-indexed loans to euro-denominated loans and the dummy variable for the period in which the government housing loans subsidy programme was active. The dummy variable for the conversion of Swiss franc-indexed loans to euro-denominated loans takes a value of 1 in the first quarter of 2016. The variable is related to legal conversion⁴ which was performed intensively during January and February 2016. During the conversion, there was a strong shrinkage in loan levels for the household mortgage sector, as the remaining principal of Swiss franc-indexed loans was converted to euro-denominated loans at the exchange rate applicable at the loan origination date. This resulted in a sharp reduction in household mortgage debt. The conversion dummy variable thus had a statistically significant and strongly negative effect on the change in the balance of total household mortgage loans.

The dummy variable for government housing loans subsidy program takes value 1 in the quarters when housing loan subsidies were active. This program was implemented occasionally since 2017 by the Government of the Republic of Croatia and was designed to alleviate the housing problem for citizens under the age of 45 who do not own

real estate, granting them a subsidy for a part of their housing loan repayments. However, the government loan subsidy program disrupted the usual intra-annual dynamics of mortgage loan transactions as they became concentrated in periods when the subsidy program was active. As expected, the dummy variable for the subsidy program had a positive and significant relationship with the change in the balance of household mortgage loans.

The results of this analysis showed that macroeconomic developments are relevant for forecasting loan dynamics, especially in the segment of household mortgage loans and household non-mortgage loans. The importance of the characteristics of the actual credit institutions (such as the share of non-performing loans, profitability and capital surplus in relation to the minimum capital buffers) on the developments in the level of loans to the private non-financial sector was also confirmed. Since the minimum capital buffers are set by macroprudential policy makers, such models may be used for the evaluation of the impact of the potential change in the level of capital buffers on developments in loan levels. In addition, the model for the estimation of loan levels is the first step in building a dynamic balance sheet system in stress testing and may be used for improving the macroprudential stress testing system.

⁴ The conversion was laid down by the Act on Amendments to the Consumer Credit Act of 30 September 2015.

8 Macroprudential policy implementation

Backed by the economic recovery and waning uncertainty regarding the coronavirus pandemic in mid-2021, the stability of the financial system remained resilient in the first quarter of 2022, despite elevated geopolitical risks, which escalated with the war in Ukraine. Favourable macroeconomic and financial developments made way for the early repeal of the Decision on a temporary restriction of distributions in October 2021. Cyclical risks have been on the rise, especially those related to the increase in prices of residential real estate and the pick-up in housing lending. Consequently, in March 2022 the CNB decided to increase the countercyclical capital buffer rate to 0.5%. Cyclical risks associated with the residential real estate market also increased in other EU countries, which led the national competent authorities in several countries to tighten the macroprudential policy measures and the ESRB to issue a number of warnings and recommendations.

8.1 Macroprudential policy instruments and activities

Economic recovery and fading uncertainty about the pandemic have reduced the risks to banks' profitability and capital adequacy, which resulted in the early lifting of restriction of distributions. The [Decision](#) on a temporary restriction of distributions²¹ was first adopted in January 2021 with the aim of enhancing the resilience of credit institutions amid heightened

uncertainty regarding the future course of the pandemic and its impact on the economy and the financial sector, building on the same supervisory measure from March 2020. The review of the circumstances impacting the restriction of distributions in September 2021 showed that credit institutions remained well-capitalised, owing to retained earnings, among other things, while the stability of their operations enabled the smooth financing of all domestic sectors. With the improved epidemiological situation and the easing of containment measures, a good tourist season that had a favourable impact on the enterprises in the hardest hit activities and amid strong economic rebound, the CNB assessed that there was no longer a need to pursue a comprehensive macroprudential measure to restrict distributions. Instead, monitoring of credit institutions' dividend policies and capital adequacy continued within the scope of the regular supervisory assessment of individual credit institutions.

The combined capital buffer that applied in 2021 remained unchanged in the first quarter of 2022. It consisted of the capital conservation buffer of 2.5%, the countercyclical capital buffer that applied at a rate of 0% and the systemic risk buffer of 1.5% for all credit institutions, and of the corresponding O-SII buffer, which applied to other systemically important credit institutions (O-SIIs) on top of the foregoing buffers. The total combined capital buffer ranged from 4% to 6% of the total risk exposure amount, depending on the systemic importance of a credit institution.

While the risks stemming from the economic effects of the pandemic have decreased, cyclical risks have risen, especially those related to the residential real estate market. In March 2022, the CNB decided to increase the countercyclical capital buffer rate for the Republic of Croatia from 0% to 0.5%. The countercyclical capital buffer rate was increased as a response to the continued accumulation of cyclical systemic risks in the conditions of economic recovery, and especially to the rise in

²¹ OG 4/2021.

Table 8.1 Macroprudential policy instruments in Croatia applicable in 2021 and the first quarter of 2022

Measure	Year of introduction	Prescribed rate
Macroprudential measures provided in harmonised European regulations		
Capital conservation buffer	2014	2.50%
Systemic risk buffer	2014	1.5%
O-SII buffer	2015	0.5% or 2%
Countercyclical capital buffer	2015	0% (announced rate of 0.5% to be applied from 31 March 2023)
Risk weights for exposures secured by residential real estate	2014	Stricter definition of residential real estate for the use of the preferential weight of 35%
Risk weights for exposures secured by commercial real estate	2016	100%
Additional criteria for consumer creditworthiness assessment when consumer housing loans are granted	2017	When assessing consumer creditworthiness, credit institutions must take into account minimum costs of living in accordance with the Foreclosure Act.
National macroprudential measures		
Recommendation to mitigate the interest rate and interest rate-induced credit risk	2017	
Recommendation on actions in the granting of non-housing consumer loans	2019	
Temporary restriction of distributions	1-9 2021	

Source: CNB.

residential real estate prices and strong lending activity in the housing loans segment. The [Decision](#)²² will enter into force on 31 March 2023, and the combined capital buffer for all credit institutions will be increased by 0.5 percentage points. The rate has been calibrated according to a new and improved methodology for countercyclical capital buffer identification and calibration, which takes into account a wider set of cyclical systemic risk indicators specific to the Republic of Croatia (for more details on the methodology see Macroprudential Diagnostics No. 16, [Box 2](#)). Compared to the standardised indicator of excessive lending (the so-called Basel credit gap) and previously used specific credit gap indicators for the Republic of Croatia, the new indicators better reflect the total level and dynamics of cyclical risks in the domestic economy, enabling an earlier build-up of countercyclical capital buffer and a timely strengthening of credit institutions' resilience to sudden crises or the materialisation of risks in the downward phase of the financial cycle. Since, at the system level, banks have sizeable capital surpluses that exceed the current regulatory requirements, the capital add-ons should not have a significant impact on the loan supply and credit standards or interest rates.

22 Decision on the countercyclical buffer rate, [OG 39/2022](#).

Table 8.2 Other systemically important credit institutions

O-SII credit institutions	Buffer rate	
	determined for O-SII credit institutions as from 1 January 2022	that O-SII credit institutions are obligated to maintain as from 1 January 2022 ^a
Zagrebačka banka d.d.	2.0%	2.0%
Privredna banka Zagreb d.d.	2.0%	1.75%
Erste&Steiermärkische Bank d.d.	2.0%	2.0%
Raiffeisenbank Austria d.d.	2.0%	2.0%
OTP banka Hrvatska d.d.	2.0%	1.5%
Addiko Bank d.d.	0.5%	0.5%
Hrvatska poštanska banka d.d.	0.5%	0.5%

^a Taking into account the status of the parent O-SII or G-SII in the EU, where applicable.

Source: CNB.

The banking market structure did not undergo any significant changes and market concentration risks remained relatively stable. The CNB carried out the identification of O-SIIs in the second half of 2021. There are still seven O-SIIs in Croatia that are required to maintain an additional capital buffer, while the prescribed rates also remained the same (Table 8.2). The prescribed level of the buffer was determined according to the equal expected impact method, wherein the level of the O-SII buffer is set with a view to equalising the expected impact of an O-SII's distress on the overall system with the potential impact of a non-O-SII's distress. If the local O-SII is a member of a group that is an O-SII or a global systemically important institution in the EU on a consolidated level, such an O-SII is obligated to maintain the O-SII buffer up to the rate applicable to the parent institution increased by 1 percentage point, up to a maximum of 3%. Consequently, two O-SIIs are required to maintain a somewhat lower rate than the prescribed rate in 2022.

Structural systemic risks in the Republic of Croatia remained elevated. Structural vulnerabilities largely emanate from a relatively high government and corporate debt, making the domestic economy vulnerable to potential changes in financing conditions in global financial markets. The most pronounced structural risks faced by the banking sector are associated with high concentration, currency-induced and interest rate-induced credit risk and asymmetric bank portfolios in which claims on the government have a major role (see chapter 6 [Credit institutions](#)). Accordingly, the systemic risk buffer rate of 1.5% of the total risk exposure amount continues to apply for all the credit institutions with a head office in the Republic of Croatia²³. The rate was set in December 2020 and will be reviewed towards the end of 2022, as part of the regular biennial review.

23 Decision on the application of the structural systemic risk buffer, [OG 144/2020](#).

8.2 Relevant activities of the European Systemic Risk Board

In light of recovery from the pandemic crisis, a number of EU countries have started tightening macroprudential policy measures and seek their reciprocation, as a response to the rise in cyclical risks. The measures are mostly aimed at mitigating the risks associated with the residential real estate sector. Since the exposures of domestic credit institutions to the countries requesting reciprocation have been very low and below the materiality threshold, the CNB did not reciprocate macroprudential measures adopted by [Luxembourg](#) and [Norway](#) in 2021. However, the CNB will regularly, on an annual basis, check for potential changes in the materiality of the exposures and will reconsider the reciprocation of measures in the event that the exposures of domestic credit institutions meet the preconditions referred to in the ESRB recommendation. The macroprudential measure adopted by [Lithuania](#) (a 2% systemic risk buffer rate for exposures to natural persons resident in the Republic of Lithuania that are secured by residential property) and the macroprudential measure adopted by the Netherlands (credit institutions using the IRB approach for calculating regulatory capital must apply a minimum average risk weight in relation to their exposures to natural persons secured by residential property located in the Netherlands, depending on the ratio of the loan amount and the pledged real estate) have been recommended for reciprocation in the first quarter of 2022. Both measures will be considered for reciprocation in the Republic of Croatia within three months.

Along with national competent authorities, the ESRB also responded to the rise in systemic risks related to the residential real estate market in many EU countries by issuing warnings and recommendations to a number of countries in February 2022 concerning medium-term vulnerabilities in the residen-

tial real estate sector²⁴. The ESRB issues warnings when significant systemic risks are identified in a certain country which need to be flagged, and monitors whether such systemic risks are appropriately addressed. The recommendations indicate a higher level of systemic risk and, considering their form and effect, represent a stronger exercise of the ESRB's powers with respect to member states, since other than identifying vulnerabilities, the ESRB also recommends the implementation of actual measures for their mitigation, demanding explanation in cases in which such measures have not been implemented ("act or explain mechanism") (see [Box 3 ESRB warnings and recommendations on medium-term vulnerabilities on the residential real estate market](#)). The ESRB issued a warning also to the Republic of Croatia²⁵, whose level of vulnerability has been assessed as medium. The vulnerabilities highlighted by the ESRB include signs of overvaluation of residential real estate prices and a rapid growth in housing loans, partly spurred by the government programme of subsidised housing loans, combined with relatively loose credit standards, in the absence of explicit borrower-based measures. It has also been noted that high capitalisation of the banking sector and measures that have already been put in place by the CNB to mitigate risks associated with residential real estate market (capital buffers, a more restrictive definition of residential real estate for the use of the preferential risk weight and implicit debt service-to-income limit) bolster the resilience of the financial sector to potential unfavourable developments in the residential real estate market. However, the ESRB holds that the introduction of explicit borrower-based measures might diminish the accumulation of risks associated with residential real estate sector and thereby complement the current capital measures. The CNB will continuously monitor and analyse the risks related to the real estate market and, if they are deemed necessary, introduce measures aimed at ensuring prudent credit standards within its area of its competence.

²⁴ Apart from the Republic of Croatia, warnings have also been issued to Bulgaria, Hungary, Lichtenstein and Slovakia, while Austria and Germany have been issued recommendations.

²⁵ ESRB/2021/13.

Box 6 The policies and ways to influence the residential real estate market

Regulators, governments and the general public have been paying particular attention to the trends in the residential real estate market ever since the global financial crisis, whose origins were largely associated with the developments in the real estate market. Real estate prices are susceptible to strong cyclical fluctuations, increasing the vulnerability of households and credit institutions as well as elevating systemic risks to financial stability due to their interconnectedness with the business and financial cycles. Financial crises and recessions have often been preceded by periods of great upswings in the real estate markets, and research has shown that the likelihood of a considerable fall in economic activity is several times higher when a recession is associated with a real estate market crisis¹.

The importance of the real estate market goes beyond its implications for financial system stability. In modern countries housing rights belong to a wider set of social rights and housing for citizens is considered to be a responsibility of the state (Bežovan, 2004²). The problems often occurring in this context include: a) relative affordability of purchasing or renting residential real estate depending on a person's income, b) availability, i.e. the supply of residential real estate in line with demand, c) appropriate housing quality, also given the recent trends concerning environmental sustainability of construction, and d) integrability of housing, having a wider social role by contributing to social cohesion and social stability in general.

The availability and the affordability³ of quality housing have become an increasingly pressing economic and social challenge, recently backed by challenges associated with climate change and the environmental sustainability of housing (OECD, 2021⁴). Growing real estate prices and rents have undermined housing affordability, which might in turn increase the social exclusion of households faced with difficulties related to affording quality housing, which also entails many other aspects such as access to healthcare, employment, education and other facets of cultural and social life. The rise in real estate prices has a relatively strong effect on lower-income households, which spend a larger portion of their income on housing and are more vulnerable to unfavourable economic trends, having limited savings that can be used to alleviate the potential shock. Research conducted by the OECD in 2014⁵ has shown that lower-income households are often deprived of

suitable housing of a proper quality and size, resulting in limited access to fast internet, education and opportunities in the labour market. The problem of inadequate housing became even more prominent amid the COVID-19 pandemic, causing massive switching to remote working and education arrangements. Against this backdrop, there appeared a rise in inequality and long-term negative impact on the income and wealth of households facing the issue of no housing or no suitable housing, a problem further exacerbated by the rise in housing prices.

Developments in real estate prices are impacted by a number of factors on both the demand and the supply side, influenced also by demographic and social trends such as population ageing, migration and household structure. On the demand side, the rise in real estate prices may be due to favourable macroeconomic developments, supply of favourable loans, as well as optimism regarding the expected continuation in the growth of real estate prices. Lately, demand for real estate has been mostly driven by persistently low and falling interest rates, decreasing the costs of mortgage borrowing. On the other hand, real estate has become a desirable alternative to savings deposits for investors, being perceived as a safe investment even in times of crisis. In addition, certain geographical areas with tourism potential, such as big cities and coastal areas, attract both domestic and foreign capital, which further intensifies demand for real estate and the rise in real estate prices. Demand for real estate can also be stimulated by public policies, for instance by favourable tax treatment of property ownership or various government programmes aimed at facilitating the purchase of real estate as a way in which the government addresses the problem of housing affordability.

On the supply side, real estate prices are largely influenced by the fact that real estate supply cannot adjust fast enough to the increase in demand. This is due to several reasons. One of them concerns the complexity of urban planning in the absence of unoccupied land in urban areas, where the demand is often the highest, as well as the time needed for planning and construction of real estate and appertaining infrastructure. Labour shortage and growing construction costs can also pose a problem, especially if efforts are also made to meet environmentally sustainable standards. The rental market can face a limited housing supply due to (over)regulated rental prices or strong tenant protection, averting the landlords from renting their property.

The link between the above factors affecting housing supply and demand and real estate prices is not one-way, since some of these factors are in turn also influenced by real estate prices. For instance, higher real estate prices can create expectations about their further growth, which can boost demand for real estate as a form of investment. Furthermore, inflated real estate prices can also increase the business expectations of construction companies, causing an increase in real estate supply, and vice versa. Elevated rental prices can encourage some landlords to rent a property that would otherwise not be placed on the market, and may also stimulate buy-to-rent investments. Understanding the factors influencing the trends in the real estate market is important in order to appropriately address real estate market imbalances.

In light of the important role of the real estate market for the economy and social welfare in every country, both the government and financial regulators put in efforts to influence it through various policies. While the government primarily strives to improve the availability and

1 Claessens, S., Kose, M. A. and Terrones, M. E. (2009), What Happens during Recessions, Crunches and Busts?, *Economic Policy*, 24(60), 653–700, <http://www.jstor.org/stable/40272534>.

2 Bežovan, G. (2004), Stambena prava u Hrvatskoj i problemi njihova ostvarenja, *Revija za socijalnu politiku*, Vol. 11, No. 1, 2004.

3 Availability means having access to adequate housing in line with a person's or household's needs, while affordability concerns housing costs relative to income.

4 OECD (2021), *Brick by Brick: Building Better Housing Policies*, OECD Publishing, Paris, <https://doi.org/10.1787/b453b043-en>.

5 OECD (2014), *Society at a Glance 2014: OECD Social Indicators*, OECD Publishing, Paris, https://dx.doi.org/10.1787/soc_glance-2014-en.

affordability of housing, financial regulators aim at mitigating the risks and vulnerabilities associated with real estate market cycles and their potential spillover to other parts of the economy. However, since the real estate market cycles, macroeconomic and financial stability and the general social welfare are inextricably linked, an effective reaction to all the financial, economic and social challenges associated with the rise in real estate prices calls for a coordinated and complementary response from different policies, such as housing and spatial planning, fiscal policy, subsidy policy, macroprudential and microprudential policies, etc. (Figure 1).

Figure 1 Policies that may influence the housing market



Source: CNB.

Although the accommodative monetary policy and the low-for-long and declining interest rate environment lead to the increase in systemic risks and spur the rise in the prices of real estate and other assets⁶, Martins et al. (2021)⁷ claim that the relevant literature reveals the prevailing view that the problem of prices in the real estate market cannot be effectively addressed by employing monetary policy instruments. The objective of monetary policy is not to safeguard financial stability, but to maintain price stability, whereas the mitigation of potential negative consequences of monetary policy for the stability of the financial system falls under the remit of macroprudential policy⁸. According to Martins et al. (2021), employing the so-called “leaning against the wind” policy, i.e. monetary tightening on top of what would be justified for price stability objectives, is generally not recommendable because not only are monetary interventions insufficiently targeted to deal with imbalances in the real estate market, but also the raising of interest rates with the aim of alleviating the housing market cycles

6 ESRB (2021), Lower for longer – macroprudential policy issues arising from the low interest rate environment, June

7 Martins, V., Turrini, A., Vašíček, B. and Zamfiri, M. (2021), Euro Area Housing Markets: Trends, Challenges and Policy Responses, European Commission Discussion Paper 147, September.

8 The new monetary policy strategy of the European Central Bank from July 2021 takes account of financial stability to a certain extent, given that the announced medium-term orientation of monetary policy allows for greater flexibility in attaining its primary objective, also taking into account the unintended effects of decisions to real economy and the financial system.

would need to be relatively sharp and the costs of such policy, primarily reflected in declining economic growth, would most likely outweigh the potential benefits for financial stability.

Fiscal policy also has a significant impact on the real estate market.

Although the main role of a tax system is to generate public revenue, its design may intentionally (for the sake of attaining certain social objectives) or unintentionally influence individual segments of the economy. Although, generally speaking, tax systems should provide for neutrality between different forms of investments – in the context of real estate, this means neutrality between homeownership and rental, the OECD (2021) asserts that in practice, taxation policies often favour homeownership in various ways. The most common example would be the deduction of the cost of interest on housing loans from the taxable income base, which increases the affordability of real estate, but may also elevate the risk to financial stability since it encourages loan-financed purchase of real estate, the increase in household indebtedness and the rise in real estate prices above the equilibrium level (which in turn decreases the affordability of real estate).

The type of property taxation, including various deductions and exclusions, inheritance taxes, taxes on construction and other related taxes **may have different effects on the real estate market** (Martins et al., 2021). In addition, the research conducted by the OECD (2021) suggests that property tax, as opposed to transaction tax, can boost the effectiveness of the real estate market and encourage housing mobility and labour, and compared with other tax types, ultimately has a positive effect on economic growth. However, transaction taxes may curb speculative trading in real estate and reduce the risk of price bubbles that such behaviour might reinforce. Progressive taxation of real estate not used as a primary residence can discourage purchasing of real estate as a form of investment, in an environment where this segment largely contributes to the rise in prices and the reduction of housing affordability. Other than the demand side, a tax system can also influence the supply of real estate, for instance in terms of tax treatment of unused building land or favourable tax treatment of construction.

Despite having a significant impact on real estate market outcomes, fiscal policy instruments have not traditionally been used to steer housing cycles (Martins et al., 2021). Firstly, in the context of housing, fiscal policy may have other objectives, smoothing housing price fluctuations not necessarily being a priority. Besides, tax system reforms may not always be politically feasible and are generally subject to implementation delays and thus not suited to address challenges over the short term. Notwithstanding the above limitations, housing taxation policy may take account of the long-term implications for the stability of the economy and the financial system, aiming at reducing the risk of boom-bust cycles in the real estate market.

As opposed to monetary and fiscal policies, macroprudential policy instruments can be targeted at dampening the vulnerabilities associated with the real estate market, but only in case of loan-financed real estate purchases. Other sources of funding for house purchases (e.g. savings) and house purchases made by non-residents are not within the remit of macroprudential authorities and the actual impact of macroprudential policy measures on housing market cycles depends, among other things, on the relevance of loan financing. In such cases macroprudential authorities can avail themselves of two types of in-

struments. First, they can introduce additional direct or indirect capital requirements in order to enhance banks' resilience to potential real estate market-related losses. Second, the credit cycle can be influenced by employing borrower-based macroprudential measures, by imposing minimum, i.e. sound credit standards.

Capital requirements may be increased directly or indirectly. Direct increase in capital requirements means introducing capital buffers, i.e. the obligation to maintain additional capital expressed as percentage of total risk exposure amount⁹. Capital requirements can also be increased indirectly, by increasing the risk weight for exposures secured by real estate to be used for the calculation of RWA, which serves as a basis for the calculation of all (microprudential and macroprudential) capital requirements. Additional capital enables the banks to absorb potential losses in the event of a sudden crisis, safeguarding their lending activity.

In contrast, borrower-based macroprudential measures have a direct impact on the credit cycle, since prudent credit standards limit the amount of loan to be extended by a bank, depending on the borrower's income or assets or the value of collateral. The most common limits are related to the value of pledged real estate and to borrowers' income (see Macroprudential Diagnostics No. 10¹⁰). However, empirical literature shows that even though the above measures have an impact on lending, their impact on housing prices is relatively weak and lagged¹¹, especially where the increase in housing prices is due to structural reasons (limited supply) and/or to the nature of monetary policy.

While the procyclicality of lending is successfully curbed by employing real estate market-related macroprudential measures, which reduces the risks to financial stability¹², their application over the short term might hamper meeting housing needs of certain social groups. This especially concerns young households that often do not have enough accumulated savings to meet housing loan down payment requirements, that LTV caps involve. In addition, lower-income households can be deprived of access to the loan market if their income, upon the application of LSTI/DSTI caps, is not sufficient to cover housing loan instalments. To avoid such outcomes, the measures can be defined and calibrated depending on the purpose of a loan (e.g. stricter standards for purchases of real estate not intended for meeting housing needs but intended for rental or as a form of investment, and more lenient standards for primary residence purchases). Moreover, introducing exemptions or easing credit standards for targeted social groups (e.g. young families,

9 Depending on whether the identified risks in the real estate market are more of a structural or cyclical nature, the harmonised EU legislation provides the application of structural sectoral risk buffers to exposures secured by real estate, i.e. the countercyclical capital buffer that is wider because it always applies to the total risk exposure amount.

10 Borrower-based macroprudential measures, Macroprudential Diagnostics No. 10, February 2020, Box 1.

11 Cerutti, E., Claessens, S. and Laeven, L. (2017), The use and effectiveness of macroprudential policies: New evidence, *Journal of Financial Stability*, 2017, vol. 28, issue C, 203 – 224.

12 See, for example Lim, C. H., Costa, A., Columba, F., Kongsamut, P., Otani, A., Saiyid, M., Wezel, T. and Wu, X. (2011), Macroprudential policy: what instruments and how to use them? Lessons from country experiences, IMF working paper no. 11/238; or Richter, B., Schularick, M. and Shim, I. (2019), The costs of macroprudential policy, *Journal of International Economics*, Elsevier, vol. 118(C), 263 – 282.

households in less-developed regions, etc.) may prevent the negative social effects of the above measures. Nevertheless, it should be borne in mind that the aim of macroprudential policy is ensuring the stability of the financial system and reducing systemic risks, and not dealing with the social and housing policy issues.

Risks associated with the real estate market can also be addressed by employing microprudential policy instruments, at the individual bank level. These instruments are used in banking supervision, which, among other things, deals with risk assessment of banks' business models, including real estate market exposures, and may accordingly set additional capital or other requirements at the individual bank level.

Increasing the availability and affordability of housing is addressed as part of the housing policy at various levels of the state. Housing policy implementation includes comprehensive housing and spatial planning, as well as a wide set of different policies falling under the remit of the government, aimed at meeting housing needs either by facilitating purchases or rentals or by introducing measures to increase housing supply. Measures may also differ depending on whether they are primarily aimed at socially vulnerable borrowers or financially sound (i.e. creditworthy) borrowers.

Housing acquisition may also be facilitated by various incentives such as subsidies for housing loans, transfers or guarantees allocated to individuals or households either directly or indirectly (through housing savings incentives, various special-purpose funds, etc.). Measures facilitating loan-financed real estate acquisitions warrant caution since they can lead to adverse consequences, such as the increase in household indebtedness and a further rise in housing prices, as demonstrated by Kunovac and Žilić (2021)¹³ taking Croatia as a model, which further undermines their affordability and their usefulness for the society in general.

There are policies aimed at developing a long-term real-estate rental market, offering an alternative to housing acquisition. These include regulating the rental market, different tax treatment of long-term rentals compared to short-term rentals (which may prove to be especially relevant in tourist regions where long-term rentals are often crowded out by short-term rentals), an appropriate level of legal protection of landlords and tenants, or introducing rent payment financial relief for vulnerable households.

Housing policy should aim to influence both the demand and the supply side of the housing market, which can include urban planning enabling the expansion of construction zones, construction incentives or tax treatment of building land to boost new construction. The construction of social housing (state, city or municipal), selling at a lower-than-market price, also plays an important role in balancing supply and demand in the real estate market (Bežovan, 2004). Apart from addressing citizens' housing needs, such investments may have a countercyclical effect in the downward phase of the housing market cycle, when such investments spur construction activity and employment in the sector (OECD, 2021). However, future housing needs should be

13 Kunovac, D. and Žilić, I. (2021), Home sweet home: The effects of housing loan subsidies on the housing market in Croatia, Working papers I-63, July.

assessed cautiously, in line with demographic and other trends, in order to avoid excessive construction leading to excess housing units and a housing market collapse. Housing needs should also be aligned with environmental standards and the protection of green zones, in order to prevent overbuilding impeding the quality of housing, as well as to avoid excessive negative impacts on the environment.

The housing policies in Croatia in the past twenty years or more have been mostly market-oriented in dealing with housing needs, while various incentives privileged homeownership over rental¹⁴ (e.g. housing savings incentives, property tax exemption for those purchasing their first real property, subsidized residential construction, housing loan subsidising schemes) (Bežovan, 2004). In addition to their social component, such measures often had an important demographic element, since some of them were especially targeted at young first-time homebuyers. However, the author has also established that Croatia does not have an efficient housing policy in a wider sense, which caters to the housing needs not only of the financially sound middle class, but also of socially vulnerable groups, adducing, for instance, that it lacks both social housing construction programmes and social rental housing. With a traditionally high preference for homeownership and no rental incentives, the long-term rental market is poorly developed, partly due to a more favourable tax treatment of short-term rentals (lump-sum taxation), compared to long-term rentals.

The trends in the Croatian housing market are currently under the strong influence of the low-for-long and falling interest rates, enabling favourable credit standards, but causing growth in indebtedness, while

also boosting both domestic and foreign housing demand as an alternative to regular bank savings (see 4 Real estate market). Consequently, a considerable portion of residential real estate transactions in Croatia are not financed by loans but rather from savings or by foreign financing, which limits the effect of macroprudential policy measures in mitigating the risks associated with the real estate market. Macroprudential policy measures can enhance banks' resilience in order to prevent a potential crisis in the real estate market from undermining financial system stability, which was one of the reasons behind the decision to raise the countercyclical capital buffer rate in the Republic of Croatia to 0.5% (see chapter 8 Macroprudential policy implementation). Other than imposing capital requirements, the Croatian National Bank also has the power to directly limit credit standards in order to ensure prudent borrowing and curb consumer over-indebtedness, if it deems it necessary.

Considering all the aspects of the real estate market, which is susceptible to various economic and social policies and demographic trends, it is evident that real estate market cycles are best managed by the coordinated application of different policy measures, such as those belonging to macroprudential, fiscal and housing policies, including subsidy policy and other reliefs in addressing the issues related to the availability and affordability of housing. Also needing to be taken into account is that in terms of the real estate market, each of these policies has somewhat different priorities, which may sometimes clash. Creating a framework for a balanced and efficient real estate market ultimately facilitates resolving housing issues in the long run and contributes to economic growth and social welfare, which all of the above policies should strive to achieve.

¹⁴ For more information on the share of homeownership see results of the Survey, available at <https://www.hnb.hr/en/-/household-finance-and-consumption-survey-1>.

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Abbreviations and symbols

Abbreviations

bn	– billion
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
EFSS	– 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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