Financial Stability Report

Spring 2022

Czech National Bank —— Financial Stability Report —— Spring 2022

CNB CZECH NATIONAL BANK

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The Financial Stability Report – Spring 2022 was discussed by the CNB Bank Board at its regular meeting on financial stability issues on 16 June 2022 and published on 4 July 2022. With a few exceptions, it contains information available as of 31 March 2022. It is available in electronic form on the CNB website, where the underlying data for the tables and charts used in this publication are also published. A list of abbreviations can also be found there.

The mandate of the CNB

Maintaining financial stability is defined as one of the CNB's main objectives in Act No. 6/1993 Coll., on the Czech National Bank, as amended:

Article 2

(2) The Czech National Bank shall perform the following tasks:

...

e) set macroprudential policy by identifying, monitoring and assessing risks jeopardising the stability of the financial system and, in order to prevent or mitigate these risks, contribute by means of its powers to the resilience of the financial system and the maintenance of financial stability; where necessary, it shall cooperate with the relevant state authorities in setting macroprudential policy,

...

The CNB defines financial stability as a situation where the financial system operates with no serious failures or undesirable impacts on the present and future development of the economy as a whole, while showing a high degree of resilience to shocks. The CNB's definition is based on the fact that financial stability may be disturbed both by processes inside the financial sector that lead to the emergence of weak spots, and by strong shocks, which may arise from the external environment, domestic macroeconomic developments, large debtors and creditors, economic policies or changes in the institutional environment. Any interaction between weak spots and shocks can result in the collapse of systemically important financial institutions and in disruption of the financial intermediation and payment functions of the financial system.

The CNB's aim with regard to financial stability is to ensure a degree of resilience of the system that minimises the risk of financial instability. To fulfil this aim, the CNB as the central bank and supervisory authority uses the instruments made available to it by the Act on the CNB, the Act on Banks and other applicable laws. Cooperation with other national and international institutions is also very important in this area. In order to maintain financial stability, the CNB focuses on prevention and broad communication with the public regarding the potential risks and factors posing a threat to financial stability. This Financial Stability Report is an integral part of such communication.

The global financial crisis led to a strengthening of the importance of the objective of financial stability in central banks. Macroprudential policy, which is intended to contribute to the maintenance of financial stability, was formally introduced in the Czech Republic in 2013 through an amendment of the Act on the CNB No. 227/2013 Coll. In line with the CNB's Strategy, the main aim of macroprudential policy is to mitigate systemic risk, i.e. the risk of instability of the financial system as a whole. A debate about the tools of macroprudential regulation, i.e. the set of pre-emptive measures intended to prevent financial instability, is going on at international level. The European Systemic Risk Board (ESRB) has been operating at the European level since the start of 2011. Together with three pan-European sectoral supervisory authorities (EBA, ESMA and EIOPA) it makes up the European System of Financial Supervision (ESFS). If it identifies increased risks of a systemic nature, the ESRB issues warnings and recommendations to mitigate those risks. CNB representatives are involved directly in the ESRB's work; the CNB Governor and another board member are members of the General Board of the ESRB, and CNB experts participate in its working groups. Since 2011, the CNB has also been represented in the Regional Consultative Group of the Financial Stability Board established by the G20.

The CNB regularly monitors and closely analyses developments in all areas relevant to financial stability. The members of the CNB Bank Board meet with experts from key sections at regular meetings on financial stability issues. A wide range of information on developments of risks in the domestic financial system and abroad is presented at these meetings. The position of the Czech economy in the financial cycle is assessed and – if any risks to financial stability are identified – discussions are held regarding the use of regulatory, supervisory and other economic policy tools to suppress such risks or their potential effects.

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Foreword

Dear Readers,

Our main publication in the area of financial stability and macroprudential policy is the *Financial Stability Report*, which we have published usually in June since 2005. It is the key document for the regular spring Bank Board meeting on financial stability issues. The 18th Report – the **Spring 2022** edition – is now at your disposal. I am sure you will welcome this opportunity to again get hold of information about this currently very important area of supervision and regulation.

This is the first year in which we will issue two Financial Stability Reports. The second one will be the **Autumn 2022** issue. However, it will not be completely new. This document, which is an update to the spring Financial Stability Report, has been published on the CNB website since 2018 as **Risks to financial stability and their indicators**. The fact that it, too, will now be called the Financial Stability Report reflects its evolution towards a fully fledged publication. This step will also bring the names of the reports for the Bank Board's financial stability meetings into line with those for the monetary policy meetings. In addition, the votes cast by the individual Bank Board members regarding the application of macroprudential policy instruments will from now on be published in attributed form in the minutes of the Bank Board meetings on financial stability issues, as is the practice for the minutes of monetary policy meetings.

In 2020, the preparation of the spring *Report* was significantly affected by the coronavirus pandemic. Given the need to partially capture the impacts of the pandemic on the financial sector, the *Report* was published about four weeks later than in previous years. **In view of the war in Ukraine, we decided to proceed similarly this year.** This was primarily because of a need to estimate macrofinancial variables using the CNB's spring macroeconomic forecast, which already captured the first potential impacts of the war. We devote significant space to macroprudential capital buffers and instruments aimed at maintaining financial institutions' resilience to adverse shocks. We apply an increasingly large set of stress tests, in which we used two scenarios based on the forecast published in Monetary Policy Report – Spring 2022. The *Baseline Scenario* is based on the CNB's May macroeconomic forecast. As in the previous two years, the *Adverse Scenario*, which assumes a longer-lasting economic downturn as a result of the war in Ukraine and persisting pandemic effects, represents an extreme stress.

According to the Act on the CNB, maintaining financial stability is one of our key tasks. In accordance with the Act, the CNB identifies, monitors and assesses risks jeopardising the stability of the financial system and, in order to prevent or mitigate these risks, contributes by means of its powers to the resilience of the financial system and the maintenance of financial stability. To do so, it primarily employs macroprudential policy tools, which it implements on the basis of its published Strategy.

The CNB defines financial stability as a situation where the financial system operates with no serious failures or undesirable impacts on the present and future development of the economy as a whole, while showing a high degree of resilience to shocks. The CNB's definition is based on the fact that financial stability may be disturbed both by processes inside the financial sector that lead to the emergence of weak spots, and by strong shocks, which may arise from the external environment, domestic macroeconomic developments, large debtors and creditors, economic policies or changes in the institutional environment. Any interaction between weak spots and shocks can result in the collapse of systemically important financial institutions and in disruption of the financial intermediation and payment functions of the financial system.

The CNB's aim with regard to financial stability is to ensure a degree of resilience of the system that minimises the risk of financial instability. To fulfil this aim, the CNB as an integrated authority for financial market supervision and monetary policy uses the instruments made available to it by the Act on the CNB, the Act on Banks and other applicable laws. Cooperation with other national and international authorities is also very important in this area. In order to maintain financial stability, the CNB focuses on prevention and broad communication with the public regarding the potential risks and factors posing a threat to financial stability.

The CNB regularly monitors and closely analyses developments in all areas relevant to financial stability. The members of the CNB Bank Board meet with experts from key sections at regular meetings on financial stability issues. A wide range of information on developments of risks in the domestic financial system and abroad is presented at these meetings and the position of the Czech economy in the financial cycle is assessed. If any risks to financial stability are identified, discussions are held regarding the possible use of regulatory, supervisory and other economic policy tools to mitigate such risks or their potential effects.

The CNB is a member of the joint EU institution for the identification of systemic risks and macroprudential policy – the European Systemic Risk Board (ESRB). Together with three pan-European sectoral supervisory authorities (EBA, ESMA and EIOPA), the ESRB makes up the European System of Financial Supervision (ESFS). CNB representatives are involved directly in the ESRB's work; the CNB Governor and another board member are members of the General Board of the ESRB, and CNB experts participate in its working groups. In line with an ESRB recommendation, macroprudential policy focuses on the fulfilment of several intermediate objectives. These objectives include (a) to mitigate and prevent excessive credit growth and leverage; (b) to mitigate and prevent excessive maturity mismatch and market illiquidity; (c) to limit direct and indirect exposure concentrations; (d) to limit the systemic impact of misaligned incentives with a view to reducing moral hazard; and (e) to strengthen the resilience of financial infrastructures. According to an ESRB assessment, the CNB is one of the most active authorities in the EU countries as regards the use of macroprudential policy at the national level.

The macroprudential policy instruments used by CNB include above all a set of prescribed capital buffers for credit institutions. The CNB sets a countercyclical capital buffer and a systemic risk buffer for systemically important banks (called capital buffer for other systemically important institutions since 2021) at regular intervals. For many years, the CNB has dealt intensively with risks associated with property market developments and mortgage lending. To mitigate these risks, the CNB used a set of recommendations regarding the provision of mortgage loans. Following an amendment to the Act on the CNB, a narrower set of recommendations has been used since 2021, accompanied by legally binding upper limits on the LTV, DTI and DSTI credit ratios set in a provision of a general nature.

The publication is divided into five sections. The introduction is followed by the *Real economy and financial markets* section, which deals with the macroeconomic environment, property markets, general government, non-financial corporations and households, and analyses overall developments in the financial markets. The section called *The financial sector* discusses developments in the banking and non-banking financial sector. The *Stress tests* section assesses the resilience of sectors on the basis of stress tests and sensitivity analyses. The section *Macroprudential policy* contains an overall risk assessment, information on macroprudential instruments for mitigating risks identified, and an analysis of risks associated with developments in the regulatory environment.

The CNB will publish additional detailed analyses of risks to financial stability and information about the macroprudential policy settings in December 2022. It will do so in its regular document *Financial Stability Report – Autumn 2022*, which will be the underlying document for the autumn Bank Board meeting on financial stability issues.

On behalf of the Czech National Bank

Jiří Rusnok

Governor

I. DECISIONS AND ASSESSMENT OF RISKS TO FINANCIAL STABILITY

The CNB Bank Board decided at its meeting on financial stability issues on 16 June 2022 to leave the countercyclical capital buffer rate unchanged at 2.5%. Banks will be required to maintain the buffer at this level from 1 April 2023. Based on an assessment of risks associated with mortgage lending and the housing market, the Bank Board also decided to leave the upper limits on the LTV, DTI and DSTI ratios at the levels applicable since 1 April 2022. The basic LTV limit is set at 80%, the upper limit on the DTI ratio at 8.5 times net annual income and that on the DSTI ratio at 45% of net monthly income. Higher limits – an LTV of 90%, a DTI of 9.5 and a DSTI of 50% – apply to applicants under 36 years of age.

The global and domestic economy is facing increased risks to economic activity and price and financial stability in an environment of extraordinarily high uncertainty. The reintroduction of anti-pandemic measures in Asia and the outbreak of the war in Ukraine has led to a significant downward revision of economic growth for 2022 and has strengthened the global inflation pressures, which are associated mainly with growth in prices of energy and agricultural commodities. Medium-term outlooks are subject to exceptionally high levels of uncertainty. In an environment of rapidly rising inflation, central banks in advanced economies have revised their view of the duration of elevated inflation pressures and many of them have started to tighten monetary policy. As a result, government bond yields on global financial markets have risen and prices of many financial assets have corrected, due also to rising global risk aversion. Another sizeable decrease in, and heightened volatility of, financial asset prices remains a major risk. Market stress and the consequences of potential increased asset sell-offs may swiftly spill across markets and regions. Despite the start of the monetary policy tightening process, real yields on most assets remain negative. This could continue to motivate investors to seek opportunities in riskier investments or investments on the property market.

The rising commodity prices and tightening financial conditions are starting to affect the private non-financial sector. Tightening financial conditions and related growth in debt servicing costs, together with growth in input prices, are gradually putting significant pressure on non-financial corporations in the EU, many of which are still recovering from previous anti-pandemic measures and are highly indebted. Households may also be exposed to risks associated with growth in debt service, as in many countries they substantially increased their indebtedness through debt financing of residential property in the previous environment of low interest rates. This could also be the case for some Czech households, as growth in housing loans in the Czech Republic has been among the strongest in recent years and growth in koruna interest rates has been one of the highest in Europe since autumn 2021, as has growth in living costs. As in the EU, domestic companies remain highly heterogeneous across sectors. Overall, however, the combination of rising input prices and debt servicing costs is putting increased pressure on the financial soundness of firms.

The Czech financial sector showed favourable trends in 2021. All the main segments of the financial sector saw growth in assets and profitability. The capital position of its key segment – the banking sector – remains robust, thanks in part to capital buffers and capital surpluses in excess of the regulatory requirements, and its profitability is also developing favourably. The banking sector's resilience to a crisis is being enhanced by gradual compliance with a minimum requirement for own funds and eligible liabilities (MREL). The post-pandemic stabilisation of economic conditions and the positive economic outlook were reflected in a drop in credit risk perceived by banks in late 2021. The ratio of non-performing loans to total loans went down, and coverage of loans by provisions decreased as a result of the release of provisions. Government loan guarantee schemes and banks' relief policies for at-risk borrowers continued to have a favourable effect. However, the war in Ukraine and persisting problems in global supply chains have increased the potential credit risks again. This is reflected in banks' expectations of higher credit losses from the second half of 2022 onwards.

The domestic non-bank financial sector is growing and remains stable. All its segments remain sufficiently capitalised and are maintaining a good liquidity position. Growth in asset prices on global financial markets in 2021 led to an increase in the value of the assets managed by domestic investment funds, which fostered an inflow of new funds into them. This has made them the second most important financial segment for allocation of savings in the economy after banks. Some transformed funds incurred greater losses as a result of brisk growth in domestic yields and a drop in Czech government bond prices, and pension management companies had to top up their capital. However, the amounts involved and the extent of any further losses do not represent an immediate source of risk to this segment's financial stability amid the continuing tightening of domestic financial conditions. An increase in uncertainty on global financial markets, accompanied by an abrupt repricing of risk premia and a relatively significant decline in prices of investment assets, remains the primary risk to the solvency and liquidity positions of non-bank financial institutions.

Macro stress tests of the domestic financial sector confirmed its resilience to shocks. The banking sector has sufficient capital to absorb shocks in the event of prolonged economic stress and as a whole would comply with the regulatory limits on the capital and leverage ratios in both scenarios. The *Adverse Scenario*, which assumes an extreme stress by historical comparison, would, however, significantly reduce banks' capitalisation. In such a situation, the CNB would respond by releasing the countercyclical capital buffer to support lending to the real economy. Banks would also partly use the capital conservation buffer. In the *Adverse Scenario*, the banking sector as a whole would have to top up its capital by CZK 16 billion in order to comply with the capital requirements and the leverage ratio. In addition, some banks would have to issue eligible liabilities in excess of their existing issuance plans to meet the MREL. This situation requires banks to act very prudently in the management of balance sheets, risks and capital, and in their dividend policies. The bank liquidity stress test also showed that banks are highly resilient to liquidity shocks. This resilience is based on a long-running high share of liquid assets on balance sheets, a stable base of client deposits and a high level of capital. Results of stress tests of the segments of the non-bank financial sector demonstrated that the current capitalisation, stable liquidity position and continued profitability of those segments continue to ensure their resilience to shocks and thus do not contribute materially to systemic risks to financial stability.

The domestic private non-financial sector should also be able to withstand stress without major shocks at the three-year horizon. Results of stress tests of non-financial corporations and households indicated that they were highly resilient to adverse conditions. Although the rising prices of energy and other inputs combined with the increase in interest rates are being reflected quickly in non-financial corporations' financial results, and the persisting supply-side difficulties together with the expected decline in household consumption will affect corporate performance, the default rate increases only slightly in the *Baseline Scenario*. The default rate also rises temporarily for households, but credit risk materialisation remains limited. An escalation of geopolitical tensions and a larger-than-expected economic slowdown amid further growth in prices of energy commodities and other items pose a risk to the financial soundness of the domestic private non-financial sector. This could lead to a considerable deterioration in consumer sentiment, an increase in risk aversion and a pronounced rise in the unemployment rate. If this *Adverse Scenario* were to materialise, the financial situation of non-financial corporations and households would worsen markedly and the default rate would surge. However, even developments associated with significantly increased credit losses of banks should not pose a threat to financial stability.

General government debt will rise further, but the risks associated with public finances remain relatively low. Due to the pandemic and the expansionary fiscal stance, general government finances ended 2021 in a deficit of 5.9% of GDP. Over the horizon of the *Baseline Scenario*, general government reduces this deficit only gradually to 3.3% of GDP and the government debt rises to 46% of GDP in 2024. If the *Adverse Scenario* were to materialise, though, the deficit would increase to 7.5% of GDP due to an assumed drop in revenues, and the debt would come close to 60% of GDP at the scenario horizon. The CNB uses the *Adverse Scenario* to assess the risk of concentration of systemically important exposures to the Czech government in domestic banks' balance sheets. Despite the substantial deterioration in government finances assumed in the *Adverse Scenario*, the stress test results do not indicate a need to require banks to meet an additional capital requirement to cover the risk of concentration of these exposures. This is due mainly to still relatively low general government debt and a favourable government debt maturity profile, supported by high demand for government bond issues.

At its meeting in June 2022, the CNB Bank Board decided to leave the CCyB rate unchanged at 2.5%. Banks are required to maintain the buffer at this level from 1 April 2023. Until then, the CCyB rate will rise gradually from the current level of 1%. The decision to leave the CCyB rate at 2.5% is a reaction to the high volume of previously accepted cyclical risks in the banking sector's balance sheet. Additional risks are also entering banks' balance sheets via relatively **rapid credit growth**, which was well above the historical averages in the main credit segments in 2022 Q1. The Bank Board also took into account the current geopolitical and macroeconomic uncertainties, which create room for sudden and strong materialisation of previously accepted risks. Given the absence of credit losses, provisioning remains low, which may make the banking sector vulnerable. Against this backdrop, it is desirable for banks to have relatively high buffers. Should the economic situation worsen and significant unexpected credit losses form in the domestic banking sector, the CNB is ready to lower the buffer rate or release the buffer fully in order to support banks' ability to lend to the real economy without interruption.

The affordability of housing has deteriorated further due to rapid growth in residential property prices, and the estimated overvaluation of apartment prices has also increased. A renewed vicious loop between credit financing of residential property purchases and rapidly rising residential property prices is a significant source of systemic risk in the Czech economy. Year-on-year growth in residential property prices in the Czech Republic increased markedly in 2021 and exceeded 25% in Q4. Average year-on-year property price growth has exceeded 12% over the last five years, significantly exceeding growth in households' average income in the same period (around 7%). This has led to growth in the average size of new mortgage loans, which has increased by 63% over the last five years. The rapid price growth is also reflected

in the estimated degree of apartment price overvaluation. In this quarter, apartment prices for the median household were around 40% higher than the level consistent with their incomes and with the interest rates required on the market. The share of households whose income allows them to safely debt-finance an average apartment at the given level of interest rates dropped below 10%. The rapid growth in residential property prices amid increasing macroeconomic uncertainties and a rising degree of overvaluation is creating potential for a major price correction in the future. The CNB estimates that the probability of these prices falling by more than 10% over the next two years relative to the present price level is about 12%.

The volume of genuinely new mortgage loans was exceptionally high in 2021. Activity on the mortgage and property markets strengthened in the course of the first half of 2021, and the strongest lending activity was observed around the middle of the year. Lending then slowed slightly, but the overall volumes remained relatively high. The strong growth was driven by brisk growth in residential property prices, which was reflected in an increasing average mortgage loan size and a growing number of new loan contracts.

Credit standards in mortgage lending remained generally relaxed. Until April 2022, the CNB recommended that lenders comply with an LTV limit of 90%, to be exceeded only by loans representing a maximum of 5% of the reference volume. All lenders complied with this volume exemption in 2021 and the first two months of 2022. A moderate decrease was recorded in the shares of loans with LTVs of over 80% and loans with LTVs of 80%–90%. The CNB applied no upper limits on the DTI and DSTI ratios between the second half of 2020 and April 2022. However, based on the conclusions of its analyses and stress tests, the CNB still regards mortgage loans with a DSTI of over 40% of net monthly income and a DTI of over 8 times net annual income as very risky under most circumstances. The share of loans with high DSTIs increased in 2021 and the first few months of 2022. In January and February 2022, banks provided 50% of the new volume of loans with a DSTI of over 40%, 26% of loans with a DSTI of over 45%, and 12% of loans with a DSTI of over 50%. The volume exemptions for the previous recommended limits would thus have been markedly exceeded. This trend strengthened gradually, partly due to increasing interest rates on new loans. This was particularly true of second and subsequent mortgage loans, whose share in genuinely new loans was stable at around one-third in previous years but reached 38% in February 2022. By contrast, the share of loans with high DTIs started to decline in 2021 Q4. Loans with DTIs of over 8.5 accounted for 15% of loans provided in January and February of this year, while loans with DTIs of over 9.5 accounted for only 6% of loans. The different trends in the shares of risky loans by DSTIs and DTIs are mainly due to the substantial rise in client interest rates, which only affect the DSTI ratio.

At the end of 2021, the CNB responded to the growth in systemic risks associated with mortgage lending and housing market developments by means of newly acquired legal powers. In 2021, the Czech Parliament approved an amendment to the Act on the CNB giving the CNB the power to set binding upper limits on the LTV, DTI and DSTI ratios for all mortgage lenders where systemic risks related to mortgage lending have been identified. The aim of capping the ratios is to prevent excessive growth in the share of loans with highly risky characteristics in lenders' balance sheets, which could lead to failures in the domestic financial system in the event of highly adverse economic developments. The CNB sets the specific upper limits on credit ratios in a provision of a general nature. If the CNB sets an upper limit on one or more credit ratios through the provision, lenders may not provide loans exceeding that limit. However, an exemption not exceeding 5% of the total volume of loans provided in the previous quarter may be applied by specific lenders to specific cases in the current calendar quarter. Two levels of the relevant limit apply for each ratio. The first can be regarded as the basic one and the second – designed for applicants under 36 years for purchases of owner-occupied housing – as less strict (LTV 10 pp higher, DSTI 5 pp higher and DTI one multiple of net annual income higher than the basic limit).

The CNB left the basic LTV limit at 80% (90% for applicants under 36 years) and the cap on the DTI ratio at 8.5 times net annual income and the cap on the DSTI ratio at 45% of net monthly income (9.5 times and 50% respectively for applicants under 36 years). The Bank Board decided at its meeting on 25 November 2021 to introduce limits on the LTV, DTI and DSTI ratios for the first time in accordance with the new legally binding rules. Given the four-month time interval between the setting of the caps and their date of effect, lenders have only been following the new rules since April 2022. By capping the LTV, DTI and DSTI ratios, the CNB responded to the growth in systemic risk associated with the rising numbers of vulnerable borrowers in lenders' balance sheets. As the DSTI ratio is above the risky level of 40% for a large proportion of new loans, the CNB still considers the systemic risks to be significantly elevated. It is quite likely that in a period of interest rate growth the share of risky loans would continue to rise if credit ratio limits were not set, due to competition between lenders. Therefore, at its meeting on financial stability issues in June 2022, the Bank Board decided that the limits on credit ratios will remain unchanged. It will only be possible to get a picture of the evolution of risks following the introduction of the legally binding limits based on the data on the characteristics of the loans provided in the months since April, when the previous limits took effect. The CNB will publish the relevant analysis in December in *Financial Stability Report – Autumn 2022*.

Some mortgage-lending conditions continue to be set using the Recommendation. According to the valid version of the Recommendation of 10 December 2021, the LTV ratio should not exceed 100% for any loan. The term of a mortgage loan should not exceed the horizon of economic activity of the client or the lifetime of the property (as a rule, a maximum of 30 years) and the term of an unsecured consumer loan should not exceed eight years. The CNB also recommends that the LTV, DTI and DSTI ratios for new mortgage loans for the purchase of buy-to-let residential property or the purchase of additional residential property by the same borrower should never exceed the upper limits set in the provision of a general nature effective when these loans are provided (i.e. that lenders should not apply the equivalent of volume exemptions in these cases). Moreover, when refinancing consumer credit secured by residential property whose credit ratio levels they are not required to assess by law, lenders should not extend the final maturity of the loan beyond that agreed with the original provider. The qualitative parameters specified in the Recommendation include a recommendation that lenders should stress test the applicant's ability to repay a loan in the event of an increase in interest rates and under worse economic conditions, and conversely should not provide loans with a non-standard repayment schedule shifting the applicant's commitments to a later period.

The CNB will publish additional detailed analyses of risks to financial stability and information about the macroprudential policy settings in December 2022 in its publication *Financial Stability Report – Autumn 2022*, which will be the underlying document for the autumn Bank Board meeting on financial stability issues.

II. THE REAL ECONOMY AND FINANCIAL MARKETS

II.1 THE MACROECONOMIC AND FINANCIAL ENVIRONMENT

II.1.1 The external and domestic environment

The global economy is facing growing inflation pressures and worsening growth outlooks…

The global economy returned to growth in the second half of 2021 (see Chart II.1 CB). However, the favourable prospects were interrupted in early 2022 by new anti-epidemic measures in Asia and particularly by the war in Ukraine. While the January IMF forecast had expected the global economy to grow by 4.4% in 2022, the April forecast revised the figure down to 3.6% (see Chart II.1).[1] The downward revision largely reflected the war's direct impacts on Russia and Ukraine.[2] The economic effects of the war have started to spread globally, mainly via high inflation and volatile energy and agricultural commodity prices (see Chart II.2 CB).[3] This has led to a revision of the inflation forecast for 2022 to 5.7% for advanced economies and 8.7% in emerging markets and developing economies. Persisting problems in global supply chains will also continue to weigh on economic growth and inflation in many economies. In addition, Chinese GDP growth will be adversely affected by continued low activity in the construction sector,[4] while the US economy is facing additional inflation pressures from a tight labour market as a result of stabilisation policies implemented in previous years.

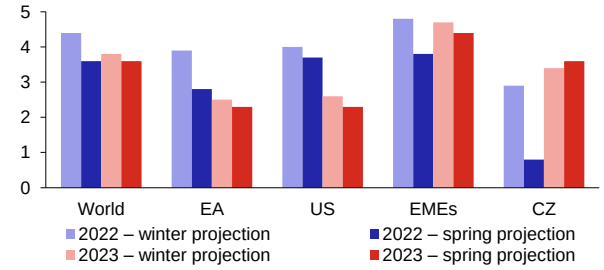
…EU economies have been hit very hard by the war in Ukraine…

The economic ties between the EU, Russia and Ukraine mean that the war is having a major impact on economic activity and inflation in EU countries. In its April forecast, the IMF cut the euro area growth outlook for 2022 by 1.1 pp relative to the January forecast to 2.8%. Besides persisting supply-side constraints and growing inflation pressures due to rising energy and food prices (see Chart II.2 and Chart II.3 CB), activity will be affected by the EU's sanctions on Russia and the potential escalation thereof, and by the halt in operations of Russian and Ukrainian firms that were supplying specialised inputs to European producers. PMI leading indicators[5] are now signalling a downward trend in business sentiment in industry. Growth was driven up in 2022 Q1 by renewed demand for services, but a drop in that demand (albeit limited by a favourable labour market situation) can be expected in the rest of the year due to falling real household income (see Chart II.4 CB). Given the EU's dependence on energy sources from Russia (see Chart II.3[6]), the scenario of Russia cutting off oil and gas supplies to EU countries in retaliation for the EU's sanctions (see Chart II.4) would be extremely detrimental to EU economic growth.[7]

Chart II.1

Economic growth projections for selected regions

(annual real GDP growth in %)



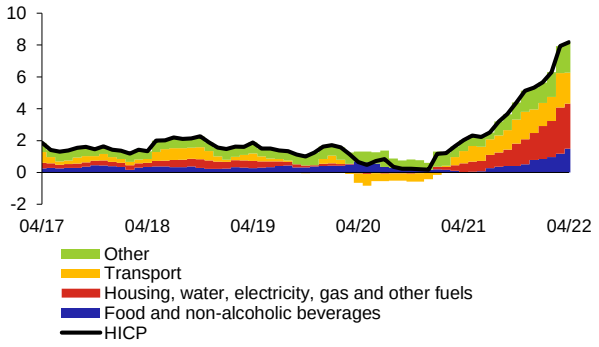
Source: IMF, CNB

Note: The forecast for the Czech Republic is based on the CNB's winter and spring forecasts (MPR – Winter 2022 and MPR – Spring 2022). The forecasts for the other economies are based on the IMF's January and April forecasts published in World Economic Outlook, January 2022, and World Economic Outlook, April 2022.

Chart II.2

Harmonised Index of Consumer Prices for the EU

(year-on-year growth in %)



Source: Eurostat

Note: The Other category contains all categories not included in the ECOICOP classification. The HICP does not include imputed rent.

1 More information on global economic developments can be found in World Economic Outlook, January 2022, and World Economic Outlook, April 2022.

2 Ukrainian GDP is expected to fall by 35% in 2022 due to the war. Russian GDP is projected to decline by 8.5% due to sanctions and European countries' decisions to scale back energy imports.

3 The sharp increase in volatility and uncertainty regarding future developments has affected the commodity derivative markets. Margin requirements have surged for energy commodity derivatives, leading to temporary liquidity shortages in some energy companies and limiting access to hedging of energy commodity prices using derivatives.

4 The IMF describes the risks to financial stability in developing economies and China in more detail in Global Financial Stability Report, October 2022.

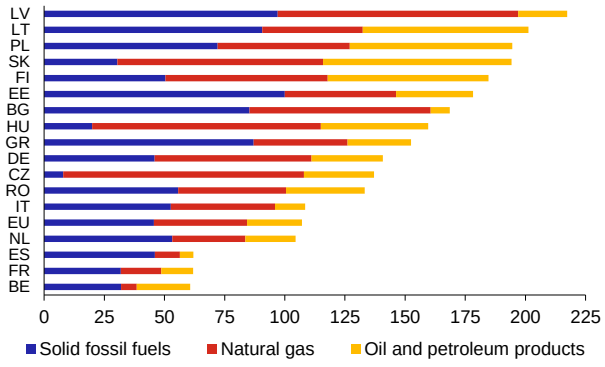
5 S&P Global Eurozone Manufacturing PMI.

6 Monetary Policy Report – Spring 2022, Box 1 Europe's dependence on imports of energy commodities from Russia in the context of Russia's invasion of Ukraine.

7 In its spring forecast published in May 2022, the Commission also revised real GDP growth in the euro area and the EU down from 4.0% to 2.7%. In an alternative scenario, in which the negative factors include a sudden stop of gas supply from Russia, real GDP growth in the euro area is 0.2% in 2022.

Chart II.3
Russia's share in fossil fuel imports in selected EU countries

(%)

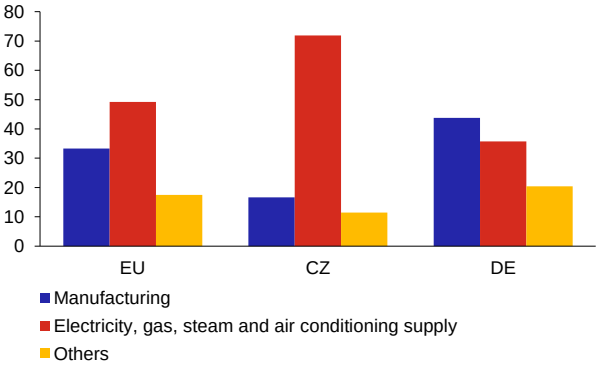


Source: Eurostat

Note: Data for 2020. Data for the countries of origin of the energy products. The data on the shares of the individual commodities are combined into one axis, so the total share would be 300% at 100% dependence.

Chart II.4
Natural gas use by sector

(%)



Source: Eurostat

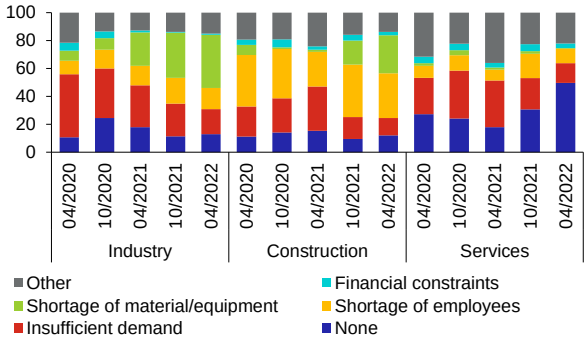
Note: Data as of 2019. Sectors classified by NACE Rev. 2.

…the Czech macroeconomic environment is also affected by inflationary pressures driven by demand factors

In addition to supply-side bottlenecks, specific inflation pressures from the overheated labour market (see Chart II.5 and section II.2.2) and property market (see Chart II.15) are weighing on the Czech economy. External and internal inflation factors are being reflected in a sharp drop in consumers' economic sentiment (see Chart II.5 CB). The CNB has also had to revise its domestic growth outlook due to the war in Ukraine. According to its spring forecast,[8] the domestic economy will grow by 0.8% in real terms and annual inflation will reach 13.1% this year. However, the uncertainties and risks of the forecast are significant. The estimate of the real GDP growth distribution in the spring forecast indicates increased uncertainty and a shift of the left tail of the distribution to a lower level than in the winter forecast (the 5% quantile decreases from -2.1% to -3.9%; see Chart II.6). The main risks of the forecast include, on the one hand, stronger-than-forecasted negative demand effects of the war. On the other hand, further sharp growth in energy and commodity prices and a related unanchoring of inflation expectations could have an inflationary effect. Continued wage growth supported by fiscal policy, and potentially also an excessively weak koruna responding to tightening financial conditions abroad, would exert similar upward pressure on inflation.

Chart II.5
Barriers to growth in production by sector in the Czech Republic

(%)

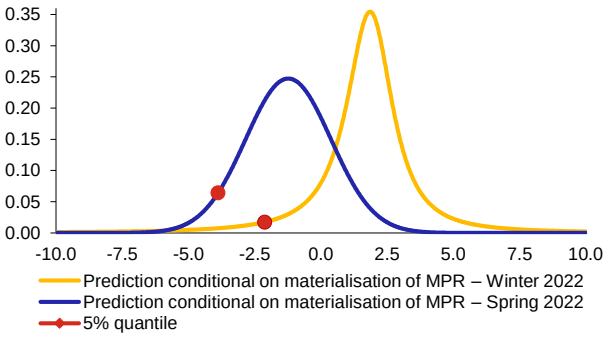


Source: CZSO

Note: Results of a survey in the corporate sector.

Chart II.6
GDP growth outlook for the Czech Republic and the associated uncertainty

(probability density; x-axis: annual real GDP growth in %)



Note: Conditional estimate of the real GDP growth distribution for 2022 according to the projections published in the given MPR.

The war in Ukraine has increased the potential of climate and cyber risks to EU countries' financial stability

Owing to EU countries' heavy dependence on Russian fossil[9] (see Chart II.3) and nuclear sources (see Chart II.6 CB), the need for greater diversification of the countries of origin of these sources and related energy infrastructure investment is being discussed in the EU. However, the sharp increase in government debt (see Chart II.7 CB) during the pandemic has

8 Monetary Policy Report – Spring 2022.

9 In its explanatory memorandum on the EU taxonomy, the Commission considers natural gas, together with nuclear energy, as a transitional source which should make a contribution to mitigating climate change.

reduced EU countries' fiscal space for the necessary investment, and a preference for energy security may lead them to invest less than is necessary in transitioning to low-emission economies.[10] This is being bolstered by concerns that embarking on this transition could foster inflation and further reduce supply on the fossil fuel market in the current situation.[11] As a result of these potential changes in preferences, the scenario of a later transition to low-emission economies is becoming increasingly likely. Climate risks to the macroeconomic environment and financial stability are meanwhile also rising in the medium term.[12] As noted in a 2022 IPCC report,[13] greenhouse gas emissions would have to peak before 2025 to keep global warming below 1.5°C (compared with the pre-industrial level) by 2100.[14] In addition to climate risks, cyber risks are on the rise due to the war. The number of cyber attacks has increased significantly since the war, with EU banks being a frequent target. Disruptions to financial infrastructure might undermine confidence in the financial system and jeopardise financial stability (see Box 3 in section III.2).[15]

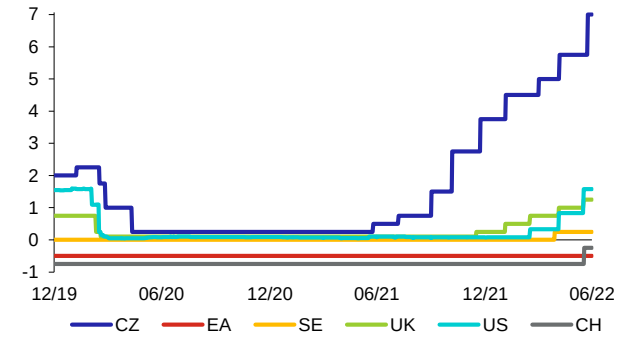
Monetary policy tightening and growth in risk aversion caused a price correction on financial markets…

The global inflation led to monetary policy tightening in most advanced economies in the second half of 2021 and particularly from the start of 2022 onwards (see Chart II.7).[16] At the same time, financial market participants' expectations regarding the duration of the period of elevated inflation and tighter/less accommodative monetary policies shifted from the short to the medium term. This fostered a global rise in government bond yields, often to several-year highs (see Chart II.8). Tighter financial conditions and expectations of further tightening were the main trigger of a correction on global financial markets starting in January 2022 (see Chart II.9). This correction intensified after the outbreak of the war in Ukraine, which caused global risk aversion to surge. The growth in risk aversion was accompanied by growth in uncertainty indices (see Chart II.8 CB), a global flight to safe assets (especially dollar-denominated ones; see Chart II.9 CB) and a widening of the credit spread on corporate bonds (see Chart II.10 CB).

Chart II.7

Main monetary policy rates of selected central banks

(%)



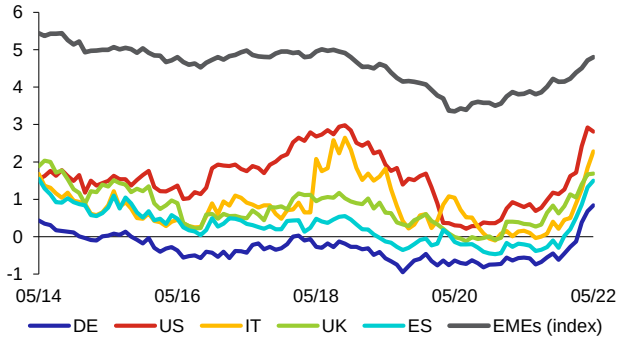
Source: Refinitiv Datastream

Note: In the case of EA, the chart shows the deposit rate. In the case of the US, it shows the centre of the band.

Chart II.8

Five-year government bond yields for selected countries

(%)



Source: Refinitiv

Note: In the case of EMEs, the chart shows the index of yields across maturities.

…there is still room for a further global drop in prices of financial assets

A relevant risk for financial markets is a longer period of significantly elevated risk premia and increased volatility of financial asset prices, with prices of riskier assets potentially not returning to growth. Despite corrections on global financial markets, corporate bond yields were not as significantly elevated in early 2022 as they had been in 2008, 2016 or 2020 (see Chart II.10 CB). Stock markets have so far corrected by erasing their 2021 gains (see Chart II.9). Real yields remain negative, confronting investors with the dilemma of whether to continue to search for yield and buy property (see Chart II.10) or invest in risky financial assets subject to price corrections amid rising global uncertainty. However, there is

10 The Commission estimates that in order to reduce greenhouse gas emissions by 55% (relative to 1990), the EU Member States will have to increase their investment in transitioning to low-emission economies by around EUR 350 billion a year compared with 2011–2020.

11 In its plan to rapidly reduce dependence on Russian fossil fuels (REPowerEU Plan), the Commission states that some of the existing coal capacities might be used longer than initially expected.

12 See the CNB blog: Modelování dopadu klimatické změny na světovou ekonomiku: Stagflační šok na obzoru (*Modelling the impacts of climate change on the global economy: Stagflationary shock looming*, available in Czech only) or Finanční stabilita vs. finanční rizika ze změny klimatu (*Financial stability versus financial risks from climate change*, available in Czech only). The CNB is developing climate scenarios for stress testing financial institutions. Pilot testing of these scenarios will take place in the second half of 2022. The results will be published in financial stability publications.

13 Climate change: Mitigation of Climate Change.

14 According to the IPCC, pre-industrial refers to the period 1850–1900, i.e. the temperature before the industrial revolution.

15 More information on cyber incidents as a systemic risk can be found in ESRB, 2020: Systemic cyber risk.

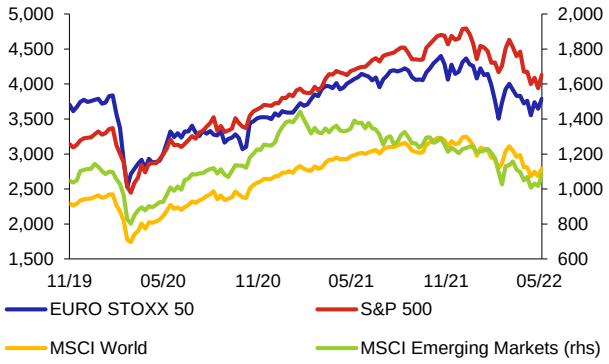
16 The Fed raised the target range for its key monetary policy rate to 1.50%–1.75% and is expected to increase it further at the coming meetings. It also started the process of reducing its balance sheet by USD 47.5 billion a month and is planning to double this pace. The ECB ended asset purchases under both the PEPP and the APP and will probably start raising monetary policy rates from July 2022. Central banks in other countries, such as the UK, Canada, Australia, Switzerland and Sweden, have also started to increase their rates.

still room for a further, relatively large price correction and a surge in asset market volatility. A substantial increase in market rates could generally lead to stress in a number of market segments, as several years of very low yields on safe assets have given rise to a material increase in the proportion of risky financial assets in many financial institutions' balance sheets. Repricing of unrealistically high-priced assets, which could be quite substantial due to the similar investment structures of a wide range of institutions, could become a source of stress. If some institutions decided to sell part of their assets at the same time, the prices of those assets could be exposed to significant downward pressure. Losses arising from the subsequent repricing of assets held in other institutions' balance sheets could in turn force them to sell a large part of those assets, creating conditions for a downward price spiral. Sell-offs of risky assets could be reflected in increased demand for cash, which could exhaust the supply capacity of the financial system. This could cause the initial shock to multiply and spill over into other market segments. Maturity mismatch in non-banking institutions such as money market funds and open-ended funds, and potentially also the liquidity needs associated with some risk management strategies, could become a source of liquidity problems.[17] A drop in prices of collateral against short-maturity debt could also be a source of stress. Moreover, as in previous crises, markets not directly exposed to intensive monetary policy tightening could also see price corrections (see Box 1).

Chart II.9

Key global stock indices

(points)

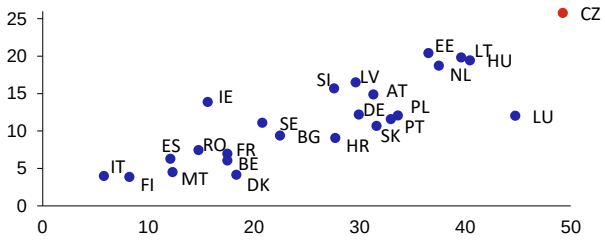


Source: Refinitiv

Chart II.10

Residential property price growth in selected EU countries

(%; x-axis: three-year growth; y-axis: one-year growth)



Source: Eurostat

Note: Data as of 31 December 2021. Due to different methodologies, the data for SK differ considerably from those published by the NBS, according to which property prices recorded one-year growth of 22.11% and three-year growth of 50.64%.

BOX 1 Past bond market shocks and potential parallels with the current situation

An environment of exceptionally low interest rates prevailed in advanced countries and some emerging economies for more than a decade. This was true not only for central bank policy rates, but also for medium- and long-term yields on government and corporate bonds. Concerns about the unintended side effects of this environment have been growing in recent years.[18] The ESRB, for example, has repeatedly said that investors may engage in excessive risk-taking and assess risks incorrectly due to the search for yield.[19] It has also warned of a sudden repricing of risk premia, which could lead to widespread market disruption as a result of a disorderly downward spiral of deleveraging, falling asset prices and increasing defaults. An unexpected surge in government bonds yields in key economies could trigger such a situation.

Economists often hark back to the global shock caused by the US Fed's surprise announcement in May 2013 that it would tighten its monetary policy at a faster pace while tapering its Treasury security purchases. This led to quite a rapid rise in US Treasury yields of around 1 pp. This seemingly mild shock caused currencies to weaken sharply and bond and stock prices to fall in many emerging economies, in some cases with negative impacts on the real economy.[20] A much more serious episode of this type, whose start shares some similarities with the current situation, occurred in 1994.

In early 1994, economic growth expectations were still optimistic, against a backdrop of low inflation. Market participants were expecting US Treasury yields to rise slightly and European government bond yields to fall gradually. However, an increase in the Fed's policy rate in February, followed by further hikes (the key rate rose from 3.0% to 5.5% during the year), was reflected in a surge in yields virtually worldwide (see Chart 1). Yields in advanced countries went up by 2–3 pp. Bond investors suffered extensive market losses and stock markets were hit hard as well. The financial turbulence also

17 The CNB tests the systemic risk of contagion connected with maturity mismatch in non-banking institutions once a year (see section IV.2).

18 Malovaná, S., Bajzík, J., Ehrenbergerová, D., Janků, J. (2020): A Prolonged Period of Low Interest Rates: Unintended Consequences. CNB Research and Policy Note 2/2020.

19 ESRB (2021): Lower for longer – macroprudential policy issues arising from the low interest rate environment.

20 BIS (2014): The transmission of unconventional monetary policy to the emerging markets. BIS Papers, No 78.

affected many emerging economies, with Mexico experiencing a particularly severe crisis. In most countries, however, the adverse impacts on economic activity were small and lasted for just a few quarters.

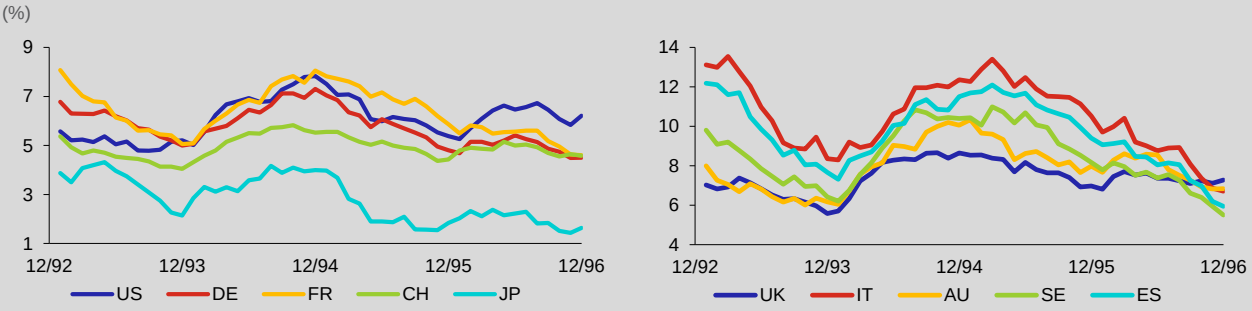
The sharp rise in yields was very surprising, and to this day there is no full consensus on its causes.[21] One possible reason was unsustainably low yield levels related to the previous recession. The rise in yields thus represented a partial correction reflecting the economic recovery, particularly in Europe. The response of foreign markets to the Fed's tightening was amplified by an unwinding of positions created by previous speculative purchases mainly by US investors, who searched for higher yields by purchasing riskier assets in Europe and Latin America. As bond yields grew, their losses started to multiply due to high leverage, forcing them to liquidate positions.

Similar surges in bond yields had been recorded in the late 1970s and mid-1980s. However, the shock in 1994 was unusual in other respects. First, yields soared in an environment of low or falling inflation. By contrast, the crises in the 1970s and 1980s had occurred when inflation was high. Second, the start of the drop in bond prices was more synchronised across countries than in the past, although the cyclical positions of the economies concerned were more similar during the previous crises. Third, this was the first time that prices fell simultaneously in so many different countries in response to the Fed's monetary policy tightening. The intensity of the growth in long-term rates in these countries was uncharacteristically strong, and even stronger than the growth in rates in the USA themselves.

However, the parallels between the start of the 1994 bond shock and the current situation are only partial. On the one hand, the interest rates of advanced countries and emerging economies have become even more synchronised in recent years. The decline in the long rates of large economies has been reflected in a drop in rates in smaller and emerging economies. Markets have become more interconnected, increasing the potential for cross-border spillovers of shocks, including monetary policy surprises. On the other hand, however, major central banks have learned some lessons from past episodes and try to communicate their future policies well in advance. This in turn allows markets to respond in good time and avoid sudden market shocks. Moreover, central banks are more willing than they were in the past to intervene at the longer end of the yield curve. Nonetheless, the fact that the key central banks have been surprised by the strong growth in inflation pressures over the last year cannot be overlooked. Some of them have realised that they are "behind the curve" and have changed their policy outlooks considerably. If the necessary response turns out to be much stronger than expected until recently, its global impact may be quite significant.

Chart 1 (BOX 1)

Five-year government bond yields for selected advanced economies



Source: Refinitiv

The tighter financial conditions contribute to greater vulnerability of some sectors of the EU real economy

The tightening financial conditions and related growth in debt service costs is becoming risky for entities that are overleveraged or creditworthy only if interest rates are low.[22] The profitability of large EU companies has returned to the pre-pandemic level, but there are still differences between countries and sectors, as the productivity of sectors hit hard by anti-pandemic measures (accommodation and administrative services) has yet to reach the pre-pandemic level. The number of firms with low interest coverage ratios,[23] indicating that they are dependent on low interest rates, has meanwhile risen. In many European countries, the tighter financial conditions are also becoming an increased risk for households, which, in the previous environment of very loose credit standards and low mortgage rates (see Chart II.11), increased their debt levels (see Chart II.7 CB and Chart II.12) by investing in residential property (see Chart II.10).[24] Against a backdrop

21 BIS (1995): Turbulence in Bond Markets (Chapter V). 65th Annual Report. Bank for International Settlements.

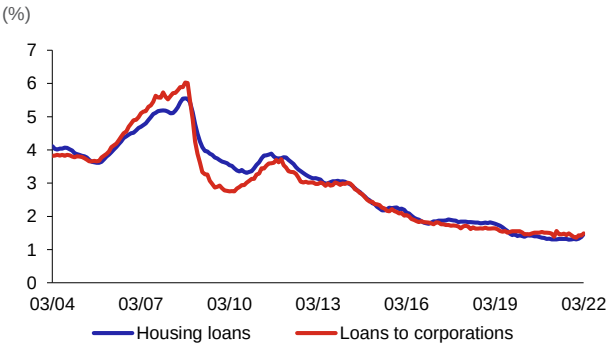
22 More information on the risks arising from the high leverage of the non-financial private sector can be found in Chapter 2 of World Economic Outlook, April 2022: Private Sector Debt and the Global Recovery.

23 The interest coverage ratio shows how many times a company's profitability is higher than its interest costs, i.e. how much those costs are covered by the company's profit.

24 The ESRB has issued new warnings and recommendations for eight EEA countries in response to growth in vulnerabilities in financial stability arising from the residential property segment.

of sustained inflation and a related potential sharp tightening of financial conditions, debt service may rise markedly, particularly for firms and households with loans rates fixed for short periods. The growth in credit risk will adversely affect lenders.[25] Banks and other financial institutions may face an increased number of defaults accompanied by market losses arising from asset repricing. The ECB has also drawn attention to the potential importance of credit risk arising from tighter financing conditions.[26]

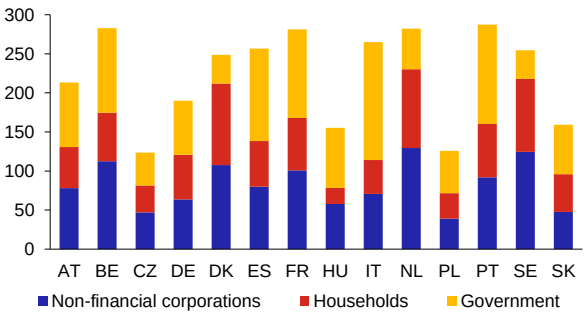
Chart II.11
Interest rates on new loans in the euro area



Source: ECB

Note: Interest rates are calculated as the average of the rates on short-term and long-term loans weighted by the amount of new loans. New loans also include refinanced loans.

Chart II.12
Debt ratios of economic agents in selected EU countries



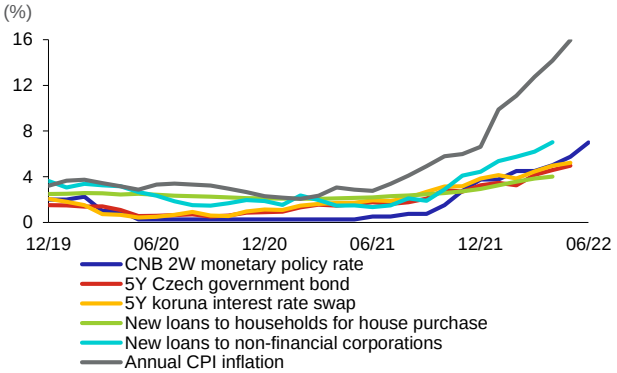
Source: ECB

Note: Data as of 31 December 2021.

The growth in domestic monetary policy rates has led to an exit from the environment of very low nominal yields

In response to the rising inflation, the CNB raised its key monetary policy rate a total of nine times to 7% between June 2021 and June 2022 (see Chart II.7). All koruna yields and interest rates rose as the rates went up (see Chart II.13). Yields on Czech government bonds grew across all maturities, with the yield curve staying inverted across the entire maturity structure (see Chart II.14). This growth was due mainly to an increase in risk-free yields, while risk premia did not rise (see Chart II.12 CB). In the *Baseline Scenario*, koruna interest rates and yields remain elevated in the months ahead (see Chart II.21D and Chart II.21E). The domestic economy has exited from the environment of very low nominal yields, which, however, remain strongly negative in real terms. For this and other reasons, some investors in the domestic environment may continue to be motivated to invest in risky assets or in property (see Chart II.10) and thereby hedge at least partly against a decline in the real value of their savings. The domestic financial sector therefore remains exposed to risks associated with a potential surge in risk premia (see section III.3). For Czech government bonds, this risk could materialise to some extent if foreign demand for Czech government bonds were to drop due to growth in geopolitical tensions in the region, a narrowing of the differential between domestic and foreign interest rates, or a deterioration in the domestic government's sovereign risk (see section II.2.1).

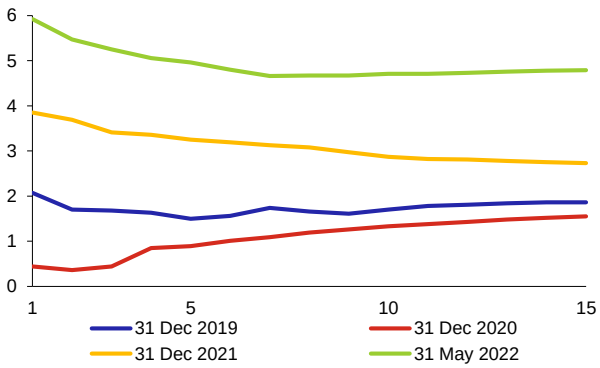
Chart II.13
Interest rates, yields and inflation in the Czech Republic



Source: Refinitiv, CNB

Note: Month-end values are used, except for interest rates on new loans, where monthly averages are used instead. These loans only include koruna loans.

Chart II.14
Czech government bond yield curve



Source: Refinitiv, CNB

25 Although the ratio of exposures to Russian entities in the total assets of European banks is low (see Chart II.11 CB), the banking sector may be indirectly jeopardised by the impacts of the war through higher insolvency of households and non-financial corporations. The risk associated with mortgage loans is being mitigated to some extent by a sharp increase in the value of the property pledged as collateral (see Chart II.10).

26 ECB (2021): Financial Stability Review.

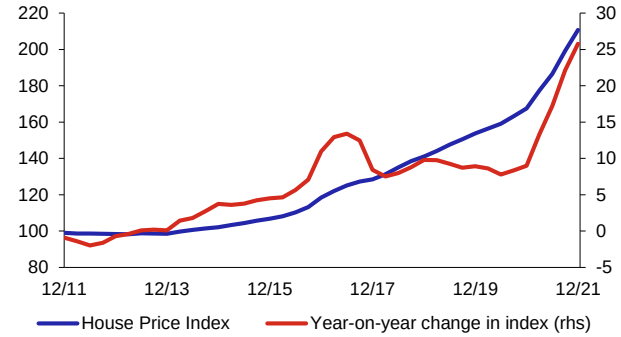
Growth in residential property prices in the Czech Republic increased markedly in 2021, exceeding 25%

Growth in residential property transaction prices surged in 2021. The year-on-year growth rate reached 25.8% in Q4 (see Chart II.15), which means that prices have doubled over the past six years. The price growth reflected a broad rise in prices of all types of property, and especially rapid growth in prices of land, new apartments in Prague and older apartments outside the capital (see Chart II.13 CB and Chart II.14 CB). Market data from estate agencies indicates that the brisk growth in apartment prices began to slow in the first few months of 2022, although not across all localities and regions. Transaction data from the Czech Office for Surveying, Mapping and Cadastre (COSMC) for 2022 Q1 provide a similar picture (see Chart II.13 CB). The trend in asking prices was broadly the same as that in transaction prices, but at lower growth rates (see Chart II.15 CB). This, too, may signal gradually diminishing pressure in the property market and a future slowdown in the sharp price growth.

Chart II.15

Transaction prices of residential property in the Czech Republic

(2010 = 100; right-hand scale: %)

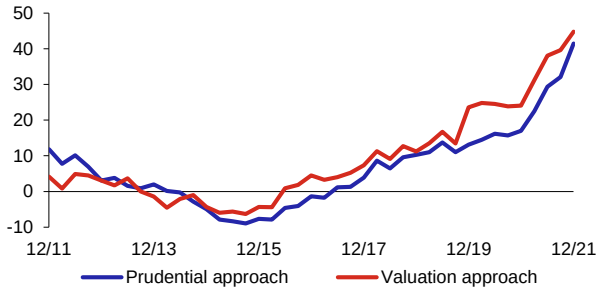


Source: CZSO

Chart II.16

Estimated overvaluation of apartment prices in the Czech Republic

(%)



Note: The methodology of the indicators is described in Plašil, M., Andrle, M. (2019): *Assessing House Price Sustainability*, Thematic Article on Financial Stability 1/2019, CNB.

The sharp rise in property prices has made owner-occupied housing much less affordable…

According to all indicators monitored, the rising growth in property prices has further reduced the affordability of owner-occupied housing (see Chart II.16 CB). The percentage of households for which average apartment prices are attainable has fallen sharply over the past two years and was below 10% in 2021 Q4 (see Chart II.17 CB). In this quarter, apartment prices for the median household were around 40% higher than the level consistent with their incomes and with the mortgage interest rates required on the market (see Chart II.16).[27] The degree of overvaluation of investment apartments was also above 40% on average at the end of 2021, the highest level since it started to be monitored. This suggests that households were willing to accept very low rental yields or were very optimistic about future growth in residential property prices.

…and has increased the probability of a fall in property prices

The *Baseline Scenario* of the CNB's spring macroeconomic forecast expects growth in residential property prices to slow sharply in the second half of 2022 and stay subdued in 2023 (see Chart II.17). This will be due to an expected increase in interest rates on housing loans, a drop in new mortgage loans, worsening consumer sentiment (see Chart II.5 CB) and falling real wages (see Chart II.28). Although year-on-year property price growth remains positive over the entire horizon of the *Baseline Scenario*, the risk of a marked price decline has increased. By the CNB's estimation, the probability of a decline in average apartment prices of more than 10% over the next two years is now about 12% (see Chart II.18 CB). A bigger increase in mortgage rates than assumed in the scenario, lower wage growth, a rise in pessimism regarding future price growth and a decreasing willingness to buy at prices well above fundamentals could contribute to the decline.

Even a cooling of demand for housing would not necessarily cause a broad decline in property market tightness

Uncertainty regarding future developments remains high. Factors supporting further growth in property prices include the limited supply of property and the increased motivation of some households to hedge against inflation by investing in housing. Rising demand from institutional investors may also play a role. The persisting strong excess demand for residential property reflects a relatively stable number of transactions and a sharp drop in available property in recent years (see Chart II.19 CB). The fall in supply is due, on the one hand, to owners' decreasing willingness to sell their investments amid sharply rising property prices and, on the other, to insufficient construction of new apartments in the long term. Although the number of apartment starts rose markedly in 2021 and is close to the increases observed before the financial crisis, the number of apartment completions fell (see Chart II.18). Even a cooling of demand would thus not necessarily restore market equilibrium in the near term, and the upward pressure on property prices will probably persist in some

27 The estimated degree of overvaluation is based on developments consistent with the CNB's forecast published in Monetary Policy Report – Spring 2022.

localities. Tightness can be expected mainly in regions with good transport links to cities, where absolute house price levels are more affordable (Central Bohemia, Ústí nad Labem and Liberec, for example). By contrast, the situation in cities with high shares of investment apartments may calm somewhat. Even here, however, the relative drop in investment demand is being offset to some extent by a widening range of potential investors. In addition to a rising number of institutional investors, the range of potential buyers depends on growth in the cohort of persons older than 35 years, which contains households that invest in property most often (see Chart II.18).

Chart II.17
Property price projections
(year-on-year growth in %)

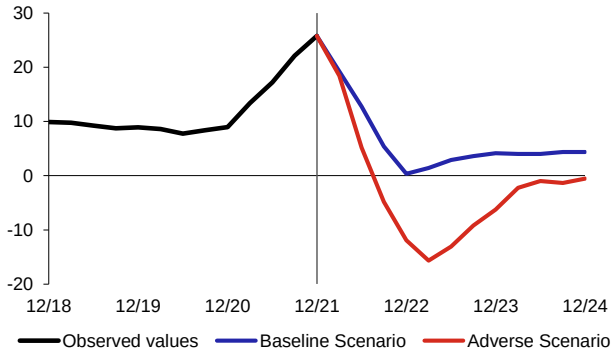
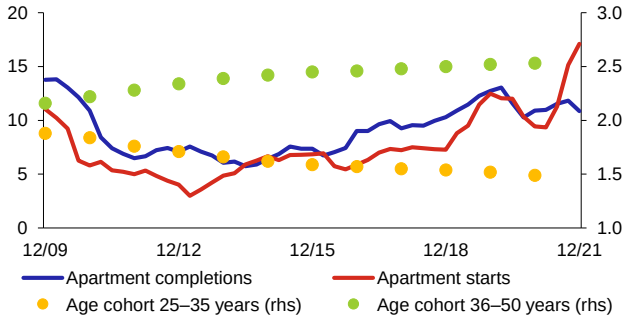


Chart II.18
Sizes of housing construction and age cohorts
(annual moving totals in thousands of apartments; right-hand scale: millions of persons)

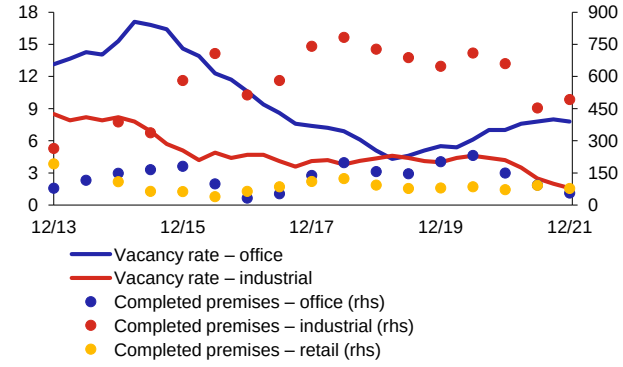


Source: CZSO
Note: Number of apartments in apartment blocks.

The commercial property market remained robust in 2021, the rate of recovery differing across market segments

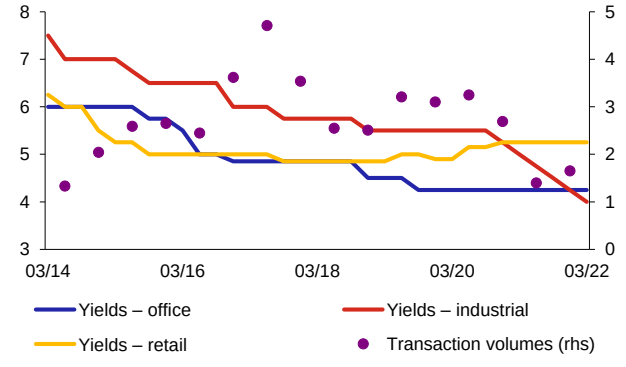
The commercial property market made it through the pandemic without experiencing major shocks. The pandemic-related stress and uncertainty started to fade gradually in the second half of 2021. However, the trends differed across market segments depending on the impact of the anti-epidemic measures. The industrial property segment recorded a recovery in the form of a significant drop in vacancy rates and a rise in rents (see Chart II.19). By contrast, office and retail property have seen only a limited improvement in these two indicators so far, due to the only partial return of staff to offices and sluggish growth in sales at shopping centres. Investment in commercial property started to recover in 2021 but remained low compared with the pre-pandemic period (see Chart II.20). However, growth in investment activity was hindered not by a lack of interest among investors, but by a lack of suitable investment opportunities and relatively low construction of new space. A decrease in new construction was observed particularly for office premises, due to growth in construction work prices and existing uncertainties (see Chart II.19). Limited supply, coupled with investors' increasing willingness to invest their free funds in commercial property, was reflected in the evolution of prime yields. Yields on industrial property fell sharply in 2021, while those on office and retail space remain stable despite lower occupancy and lower income (see Chart II.20). Given the levels of risk-free interest rates and returns on alternative investments, the CNB assesses the observed yields on domestic commercial property as very low (see Chart II.20 CB).

Chart II.19
Vacancy rates and completed premises for commercial property
(vacancy rates in %; right-hand scale: space in thousands of m²)



Source: Jones Lang LaSalle
Note: Stocks of completed premises are reported at annual frequency until 2013 and as annual moving totals at semi-annual frequency from 2014 onwards.

Chart II.20
Yields on commercial property and transaction volumes
(%; right-hand scale: EUR billions)



Source: Jones Lang LaSalle
Note: Prime yields. Transaction volumes are reported at annual frequency until 2013 and as annual moving totals at semi-annual frequency from 2014 onwards.

II.1.2 Alternative economic scenarios

Two scenarios were used to stress test the sectors of the financial market and selected segments of the economy. The *Baseline Scenario* is based on the CNB's macroeconomic forecast presented in Monetary Policy Report – Spring 2022.[28] The *Adverse Scenario* assumes a sizeable drop in domestic and foreign economic activity associated with a rise in global risk aversion. Charts II.21A–F illustrate the paths of the key indicators in the scenarios. The evolution of other indicators is described in charts in sections II–V.

The domestic economy slows in the *Baseline Scenario*…

The *Baseline Scenario* assumes a marked slowdown of the economy in 2022. Average annual GDP growth drops below 1% and economic activity even declines year on year at the close of the year (see Chart II.21A and Chart II.21 CB). This is due mainly to a drop in household consumption, as household income decreases due to surging prices. In addition, corporations rein in investment as a result of subdued demand and a worse financial situation against a backdrop of rising costs of energy and other commodities and materials. In the first year of the scenario, exports also remain subdued on account of persisting disruptions to global value chains. The labour market cools slightly in this year of the scenario, while wage growth slows (see Chart II.28) and the unemployment rate edges up (see Chart II.21B). Inflation is in double figures throughout the first year of the scenario (see Chart II.21C). Assuming that the exchange rate remains moderately above CZK 24 to the euro, this is consistent with a temporary increase in market rates to over 8% (see Chart II.21D) and long-term government bond yields to over 5% (see Chart II.21E). Consistent with the assumed developments abroad is a correction of prices on global stock and corporate bond markets in the first two quarters of the scenario, followed by their stabilisation (see Chart II.21F). As the war gradually de-escalates and the problems in global value chains ease, annual GDP growth accelerates to more than 3.5% in the second and third years of the scenario. The unemployment rate falls again and real wages return to growth. Consistent with the macrofinancial developments in this scenario is a more pronounced slowdown in residential property price growth, which gradually stabilises at around 5% after stagnating in late 2022 (see Chart II.17). Credit activity in the non-financial corporations sector remains well above the long-term average of 4% over the entire scenario horizon (see Chart II.31), while lending in the household sector slows, mainly as a result of a marked rise in client rates. This notwithstanding, year-on-year growth in loans for house purchase and consumer credit remain above 7% and 3% respectively (see Chart II.32). The default rates on loans for house purchase and consumer credit stay low following a very slight increase in the first year of the scenario, with 3.2% of loans for house purchase and 12.7% of consumer credit becoming non-performing in cumulative terms over the entire horizon (see Chart II.35). In the non-financial corporations sector, 7.3% of loans default over the entire horizon scenario (see Chart II.34).

…the *Adverse Scenario* assumes a double-dip economic crisis

The *Adverse Scenario* assumes repeated declines in domestic and foreign economic activity associated with a rise in global risk aversion. This would be fostered by deepening geopolitical tensions, markedly elevated energy and food prices and a related sizeable decrease in consumer sentiment. Foreign central banks would not respond to the cost pressures by raising monetary policy rates, which would thus remain low. A substantial decrease in external demand, a downturn in household consumption and a drop in corporate investment activity would be reflected a decline in domestic real GDP, which would fall by 4.3% on average in the first year and 2.6% in the second year (see Chart II.21A and Chart II.21 CB). Domestic inflation would be in double figures throughout the first year of the scenario (see Chart II.21C) and fall in subsequent years, mainly on account of the decline in domestic economic activity. General government would pursue a passive fiscal policy but continue to record deficits, due not only to the decline in economic activity, but also to rising debt servicing costs (see Chart II.23 and Chart II.22 CB). Firms' economic exhaustion would be reflected in a sharp rise in the unemployment rate (see Chart II.21B) and subdued wage growth. Default rates on loans to households (see Chart II.35) and loans to non-financial corporations (see Chart II.34) would increase sharply. Credit growth would decline, especially for households (see Chart II.31 and Chart II.32). The significant deterioration in the financial situation of households, accompanied by negative consumer sentiment, would lead to a sharp correction of residential property prices and a decrease in their year-on-year dynamics into negative territory over the entire scenario horizon (see Chart II.17). Domestic monetary policy would react to the onset of the crisis by lowering interest rates to zero in the first half of the scenario and keeping them at that level until the end of the scenario. Yields on Czech government bonds with short residual maturities would fall in line with short-term market rates (see Chart II.21D). The decrease in yields for longer maturities would be less pronounced, in the context of a rise in risk premia owing to stronger global risk aversion and a partial outflow of foreign capital from the Czech government bond market (see Chart II.21E). In connection with the outflow of foreign capital and a sharp deterioration of the trade balance, the exchange rate would weaken significantly to more than CZK 31 to the euro. As a result of rising risk premium of banks, interest rates on new loans to non-financial corporations and households would decline only very slowly and even increase in the case of consumer credit.

28 In the first two years, the *Baseline Scenario* is based on the CNB's spring forecast. The *Baseline Scenario* for the third year and the *Adverse Scenario* were created solely for stress testing purposes. Therefore, neither the *Baseline Scenario* beyond the forecast horizon, nor the *Adverse Scenario* is an official forecast of the CNB.

Chart II.21A
Alternative scenarios: real GDP
(CZK billions; quarterly data)

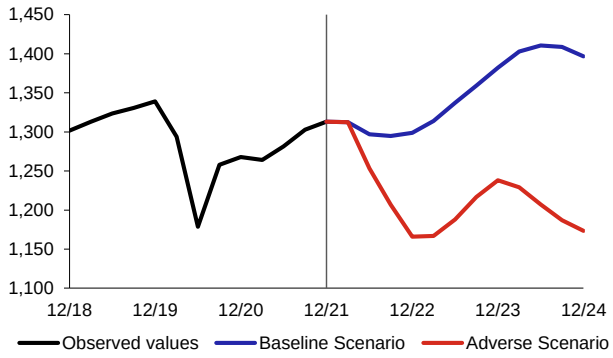


Chart II.21B
Alternative scenarios: unemployment rate
(%)

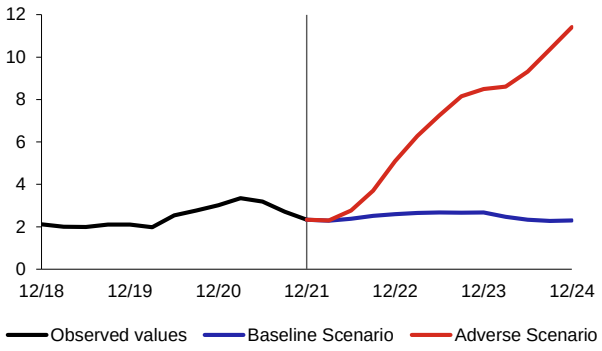


Chart II.21C
Alternative scenarios: inflation
(year on year in %)

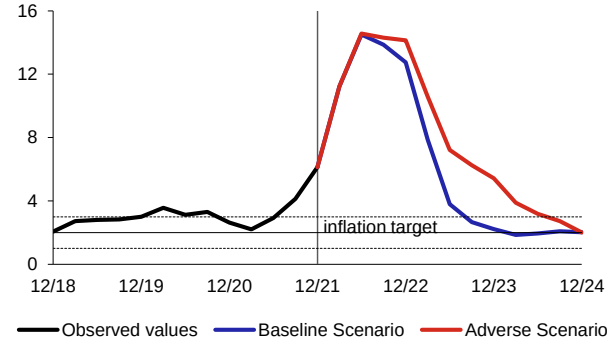


Chart II.21D
Alternative scenarios: 3M PRIBOR
(%)

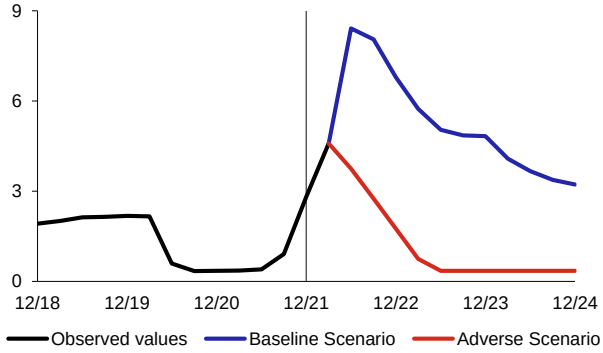
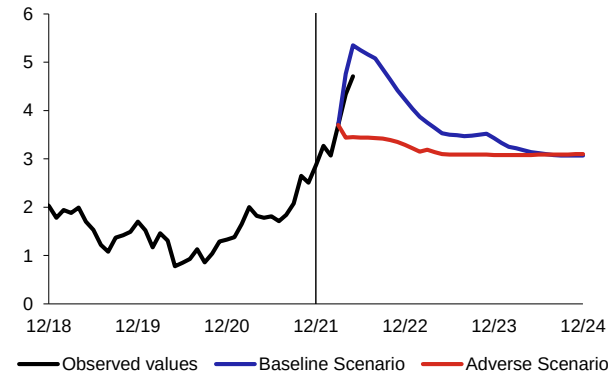
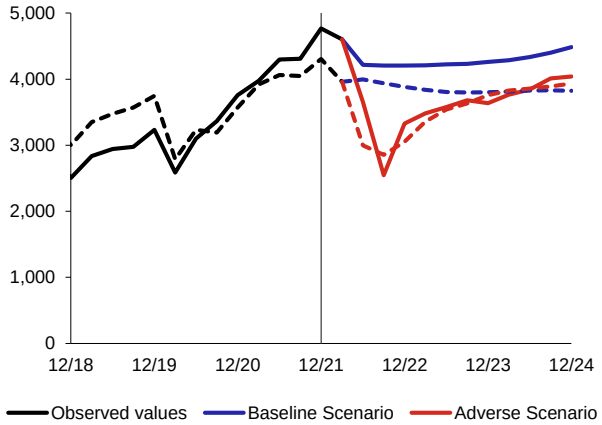


Chart II.21E
Alternative scenarios: ten-year Czech government bond yield
(%)



Source: CNB, Refinitiv

Chart II.21F
Alternative scenarios: stock indices
(points)



Source: CNB, Refinitiv
Note: The solid line denotes the S&P 500 index and the dashed line the EURO STOXX 50 index.

II.2 THE NON-FINANCIAL SECTOR

II.2.1 General government

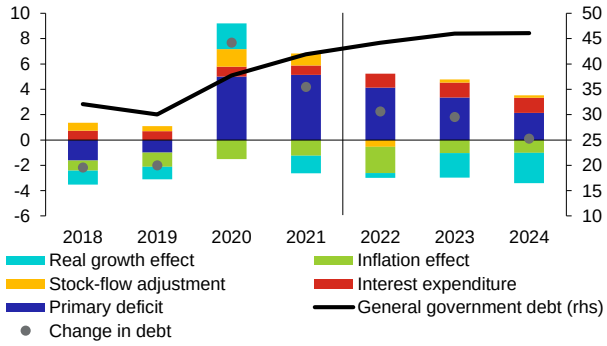
General government stabilisation measures significantly affected the general government budget balance

The general government deficit of 5.9% of GDP (CZK 356 billion)[29] in 2021 was due largely to the ongoing pandemic and expansionary fiscal policy. Government support measures significantly affected revenues from current taxes on income and wealth (-14%), where an important role was played by a decrease in personal income tax collection, caused by the abolition of the super-gross wage used to calculate the tax, and by an increase in the tax deductible bonus. General government current expenditure also rose significantly (by 6.7%), while investment in fixed capital went up by just 3.1%. General government debt rose by 4.2 pp in 2021, reaching 41.9% of GDP (CZK 2,567 billion; see Chart II.22).

Chart II.22

Decomposition of changes in the general government debt-to-GDP ratio in the *Baseline Scenario*

(pp; right-hand scale: % of GDP)



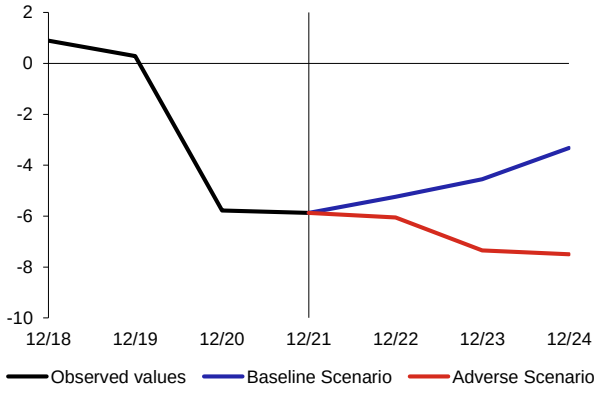
Source: CZSO, CNB

Note: The vertical line divides the observed values and the values based on the *Baseline Scenario*.

Chart II.23

General government balance

(% of nominal GDP)



Continuing budget deficits and further growth in government debt are expected in the years ahead

The general government deficit gradually falls over the horizon of the *Baseline Scenario*, from 5.2% of GDP in 2022 to 3.3% of GDP in 2024. Total revenues rise due to favourable tax revenues, which are positively affected by the effect of inflation on the relevant tax bases. The high-inflation environment also affects total expenditure. In the *Baseline Scenario*, general government will record a gradual increase in interest expenditure, from 0.7% of GDP in 2021 to 1.2% in 2024. The higher inflation means that pension spending will also rise more strongly as a result of statutory indexation. The growth in total expenditure is also due to higher spending on health care and education for Ukrainian refugees and an expected rise in government investment. An additional need to adopt discretionary measures in response to the rising energy and fuel prices cannot be ruled out either. In the *Baseline Scenario*, the general government debt-to-GDP ratio rises to 46% in 2024, despite inflation contributing negatively (see Chart II.22). In the *Adverse Scenario*, which assumes a sharp fall in economic activity and growth in the risk premium (see Chart II.21A, section II.1.2), general government revenues would drop, further increasing the deficit (see Chart II.23). The debt would then rise significantly faster, reaching 60% of GDP (see Chart II.22 CB). In this scenario, the debt brake would be exceeded and the use of fiscal policy for macroeconomic stabilisation outside downturns would be limited as early as 2024.[30]

The government's good position on the government bond market persists, with increasing risks in sight

Demand for Czech government bonds was sufficiently high in 2021, despite relatively high issuing activity by the Czech government (see Chart II.24). The demand came mainly from residents, while non-residents' share in government debt decreased (see Chart II.25). However, the planned state budget deficit of CZK 280 billion in 2022, together with expected debt payments of CZK 272 billion, implies another increase in the amount of funding needed (see Chart II.26; for an international comparison see Chart II.23 CB). Markets assess the sovereign risk of the Czech government as low (see Table II.1). This is due mostly to the relatively low level, safe average maturity[31] and currency structure of the government

29 As regards sub-sectors, only local government recorded a surplus, thanks to transfers from the state budget. As usual, the overall deficit was due mainly to central government (CZK -385 billion).

30 For details see Act No. 23/2017 Coll., on Budget Responsibility.

31 According to the end-March 2022 data, the average maturity is 6.3 years, i.e. inside the target range of 6–6.5 years given in the Czech Finance Ministry's issuance strategy for 2022. For comparison, the average maturity is 4.3 years in PL and 8 years in the euro area (IT 7 years, GR 9 years, ES 8 years, BE more than 10 years).

debt, and also to a global liquidity surplus on interbank markets driven by investors' attempts to avoid the persisting negative interest rates on euro-denominated balances.[32] Gradual drawdown of the Czech Republic's grants from the Next Generation EU instrument and the possibility to obtain loans under this support package are major factors reducing the risk of debt financing.[33] A reassessment of market sentiment towards the Czech Republic, amplified by an expected tightening by the ECB and the Fed and by the Czech Republic's heavy reliance on imports of energy from Russia, is a major factor increasing sovereign risk (see Chart II.3, section II.1.1). The market perception of these risks is also indicated by Fitch's downgrade of the Czech Republic's rating in May 2022.[34]

Chart II.24

Koruna-denominated Czech government security issue volumes

(CZK billions)

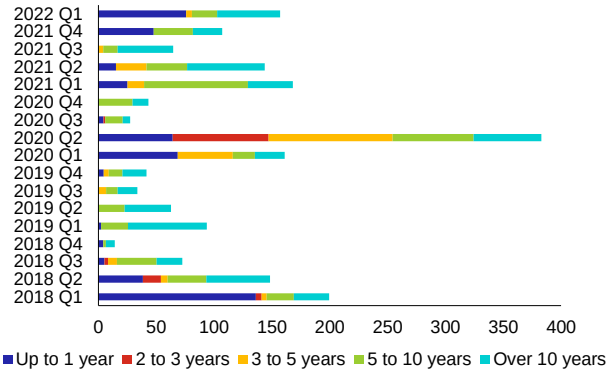
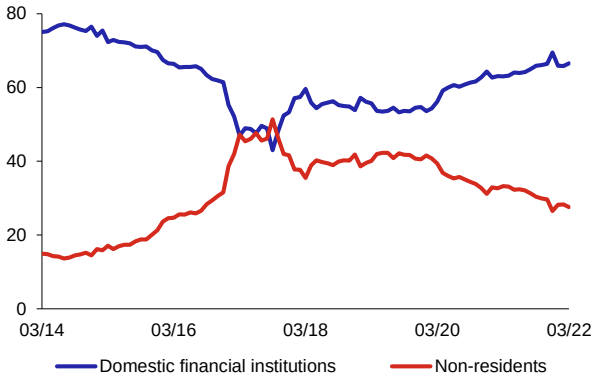


Chart II.25

Holders of Czech government debt

(% of stock of Czech koruna government bonds)

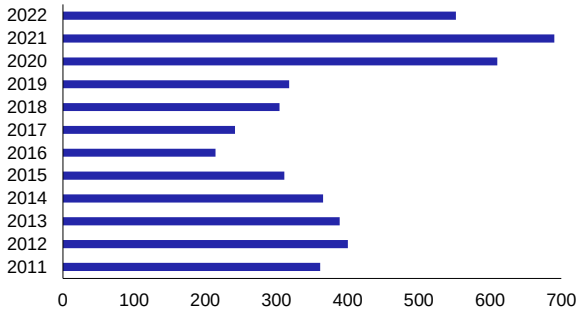


Source: Ministry of Finance of the Czech Republic

Chart II.26

Czech government debt funding needs

(CZK billions)



Source: Ministry of Finance of the Czech Republic

Note: The figure for 2022 is taken from the strategy of the Czech Ministry of Finance.

Table II.1

The Czech Republic's ratings

Rating agency	Rating	Outlook
Moody's	Aa3	Stable
S&P Global Ratings	AA	Stable
Fitch Ratings	AA-	Negative
JCR	AA	Stable
R&I	AA-	Stable
Scope Ratings	AA	Stable
Dagong Global Credit Rating	A+	Stable
ACRA Europe	AA	Stable
ACRA	AA	Stable

Source: Ministry of Finance of the Czech Republic

Note: Ratings of long-term debt in domestic currency. Data as of 11 May 2021.

A return to more ambitious fiscal rules and structural reforms are crucial for public finance sustainability

Domestic general government finance showed signs of strong procyclicality even before the pandemic. Moreover, 2020 saw the approval of two amendments to the Budget Responsibility Act which significantly relaxed the fiscal rules in the Czech Republic. The current form of the fiscal rule for deriving expenditure permits greater discretion and benevolence[35] in setting the consolidation effort than is appropriate given the need to create prudential buffers for future adverse economic shocks. Numerous research papers[36] and international experience show that effective fiscal rules can limit the procyclicality of general government finance and are conducive to the creation of necessary buffers in good times. Creating buffers,

32 The recent inclusion of Czech euro-denominated government bonds issued under Czech law among the assets eligible for use in Eurosystem credit operations may also have a positive effect on non-residents' demand for euro-denominated issues. The strong interest in these issues was confirmed by the May auction, where the bid volume of EUR 1.157 billion far exceeded the originally offered EUR 200 million.

33 The Czech Republic will receive a total of EUR 7.1 billion in grants.

34 Fitch's main arguments for revising the outlook are worsening real GDP growth prospects, heavy reliance on imports of Russian energy, and risks associated with rising inflation.

35 The summer 2021 structural balance estimate of -6.1% of GDP, which, under the Budget Responsibility Act, represents the starting point for the downward trajectory of the structural deficit of 0.5 pp a year in subsequent years, has improved to -4.1% of GDP thanks to a Czech Ministry of Finance revision. The revised figure could be used to derive a more ambitious consolidation effort and achieve the medium-term budgetary objective – currently a structural deficit of 0.75% of GDP – sooner.

36 Larch M., Orseau E., Wielen W. (2021): Do EU fiscal rules support or hinder counter-cyclical fiscal policy?

along with implementing necessary pension and health system reforms, is crucial for coping with future population ageing costs in the Czech Republic. This year's public finance sustainability assessment by the European Commission, which added the Czech Republic to the list of countries at highest risk, confirms the acute need for reforms.[37] As the high concentration of Czech government debt in domestic financial institutions' balance sheets (see section III) represents a clear source of systemic risk, it is vital for the CNB to monitor the potential impacts of the adverse trend in public finance on financial stability even in the short term. To this end, the CNB conducts a public finance stress test and assesses whether sovereign risk is present in banks' balance sheets (see section IV.5).

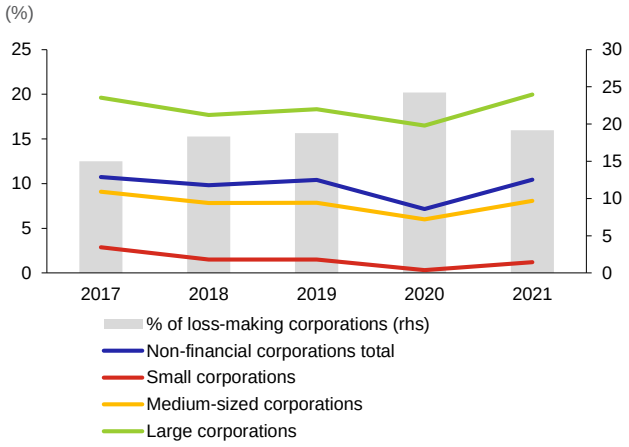
II.2.2 The private non-financial sector

The post-Covid recovery was reflected in an increase in the profitability of non-financial corporations and a decline in the unemployment rate in 2021…

The global and domestic economic recovery in 2021 (see section II.1.1, Chart II.1 CB) had a positive effect on the Czech non-financial sector. The profitability of non-financial corporations as measured by return on equity returned to pre-pandemic levels (see Chart II.27) despite persisting problems in global supply chains and rising energy prices (see Chart II.2 CB) and interest rates (see Chart II.13) in the second half of the year. The increase in the sector's overall profitability was due mainly to higher profits in manufacturing and transport (see Chart II.24 CB). The recovery caused the percentage of loss-making non-financial corporations to decline (see Chart II.27). Despite a pronounced increase in investment volumes, however, the investment rate declined further, as growth in gross value outpaced investment growth (see Chart II.25 CB). The unemployment rate, which fell back below 3% in the second half of 2021, mirrored the solid trend in the corporate sector. However, nominal wage growth slowed and real wages declined at the end of 2021 (see Chart II.28) due to high inflation (see Chart II.21 C).

Chart II.27

After-tax return on equity and percentage of loss-making non-financial corporations



Source: CZSO

Note: The results are based on a sample of around 1,800 corporations together accounting for more than 40% of the sector's gross value added.

Chart II.28

Labour market indicators in the *Baseline Scenario*

Source: CNB, CZSO

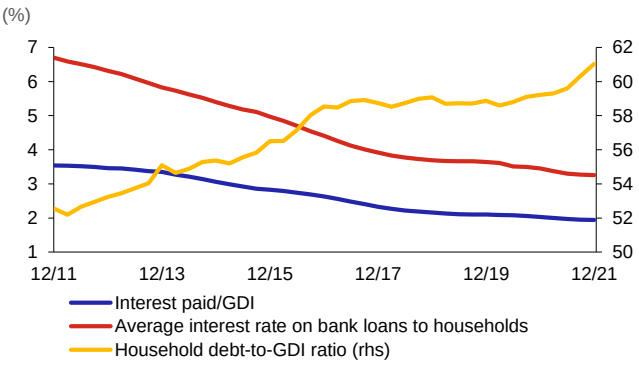
Note: The vertical line divides the observed values and the values based on the *Baseline Scenario*.

…improved consumer sentiment was reflected in strong growth in loans and debt in the household sector

Strong growth in new loans to households was reflected in the debt ratio, which started to surge in mid-2021 after a long period of stagnation (see Chart II.29 and Chart II.27 CB). Interest paid on bank loans to households remained low (see Chart II.29), as the rise in client interest rates on new loans (see Chart II.13) is feeding through to it only gradually. However, the rise in rates was reflected quickly in new and refinanced loans and, coupled with growth in the median mortgage size, led to a gradual increase in the median instalment (see Table II.1 CB). It recorded a year-on-year increase of CZK 2,400 a month (from CZK 9,900 to CZK 12,300), with the data for January and February 2022 pointing to a further rise to CZK 14,200. By contrast, the debt ratio in the non-financial corporations sector declined, as growth in corporate profits (measured using the sector's gross operating surplus) outpaced growth in loans (see Chart II.30). Given the substantial koruna-euro interest rate differential (see Chart II.11 and Chart II.13), the share of foreign currency bank loans to non-financial corporations can be expected to increase further. It stood at 36.7% in March 2022, up by 2 pp year on year.

37 European Commission (2022): Fiscal Sustainability Report 2021, April 2022. *"Over the long-term, nine Member States (Belgium, Czechia, Spain, Italy, Luxembourg, Hungary, Malta, Slovenia and Slovakia) appear at high risk, driven by the notable projected increase of ageing costs by 2070 according to the Ageing Report 2021."*

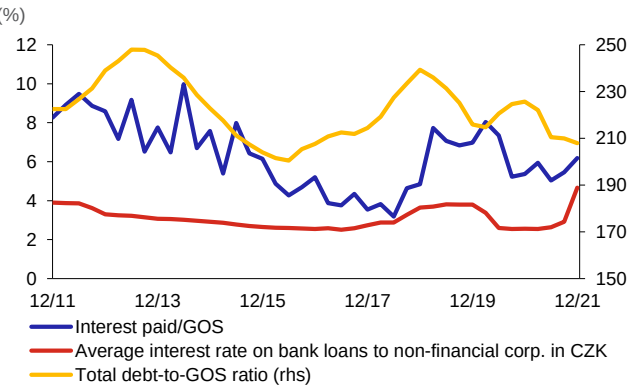
Chart II.29
Debt ratio and interest paid by households



Source: CNB, CZSO

Note: The household sector also includes data for NPISHs. The interest rate is calculated as the average interest rate on the stock of bank loans to households.

Chart II.30
Debt ratio and interest paid by non-financial corporations



Source: CNB, CZSO

Note: The interest rate is calculated as the average interest rate on the stock of bank loans to non-financial corporations.

The *Baseline Scenario* assumes an upswing in credit activity in the non-financial corporations sector and a decrease in the household sector

In the first year of the *Baseline Scenario*, credit growth in the non-financial corporations sector goes up in line with growth in nominal corporate investment (see Chart II.31). The growth rate of loans to non-financial corporations moves above 10% in early 2023 and is above the long-term average over the entire scenario horizon. However, given the assumed pronounced growth in nominal earnings, the sector's debt ratio is broadly flat. Owing to a decline in consumer optimism in further rapid growth in property prices and to a sharp increase in interest rates, credit activity in the household sector slows relative to the record-high 2021 and the volume of new loans for house purchase drops by 30% year on year. This notwithstanding, year-on-year growth in the stock of house purchase loans and consumer credit stays above 7% and 3% respectively over the entire horizon (see Chart II.32). The debt ratio of households is flat thanks to the strong growth in nominal disposable income assumed in the second half of the scenario horizon.

Chart II.31
Projections of growth in bank loans in the non-financial corporations sector

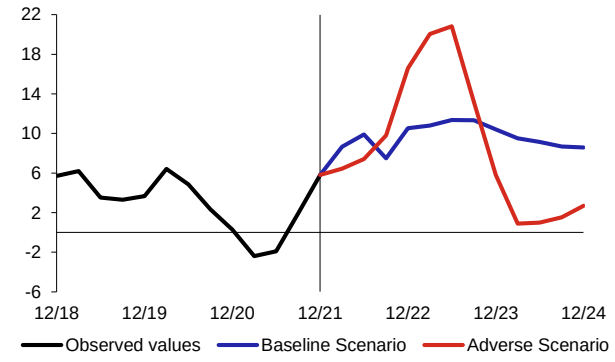
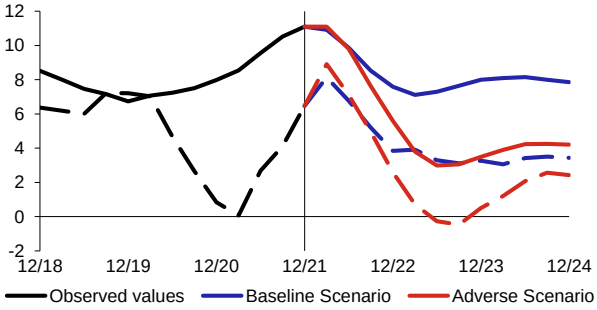


Chart II.32
Projections of growth in bank loans in the household sector



Note: The dashed line denotes consumer credit and the solid line house purchase loans.

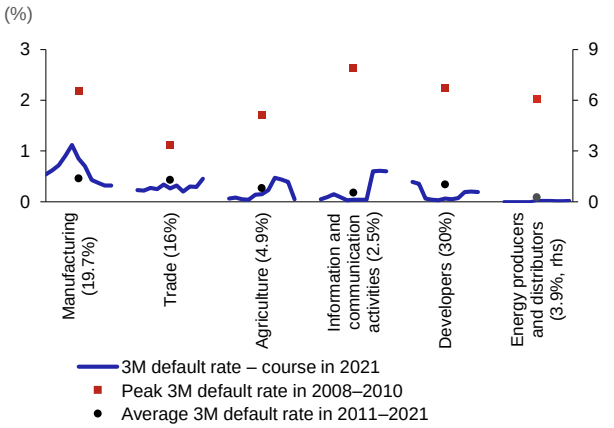
The default rate in the non-financial corporations sector increases in the *Baseline Scenario*

Thanks to the economic recovery, a low default rate was observed for loans to non-financial corporations. Manufacturing and agriculture recorded slightly above-average levels during 2021 (see Chart II.33). The *Baseline Scenario* implies a rise in the 12-month default rate above its long-term average for 2022 and 2023 (to 2.7% and 2.6% respectively; see Chart II.34), due mainly to higher interest expenses,[38] which will affect sectors with higher debt ratios more strongly (see section IV.3). The default rate on loans to households was also very low in 2021 and is not expected to rise significantly over the horizon of the *Baseline Scenario* despite strong growth in consumer prices and interest rates (see Chart II.35, section IV.4). However, the inflow of non-performing loans will increase in 2022 and early 2023 and the debt ratio relating to financing of housing will become unsustainable for a small proportion of households (see Chart II.28 CB). This will reverse in mid-2023 on the back of a renewed fall in the unemployment rate and growth in real wages, and the 12-month default rates on house purchase loans and consumer credit will drop from peaks of 1.3% and 4.5% to 0.8% and 4.2%

38 Most loans to non-financial corporations have a variable interest rate, so rates on such loans respond very quickly to changes in monetary policy rates.

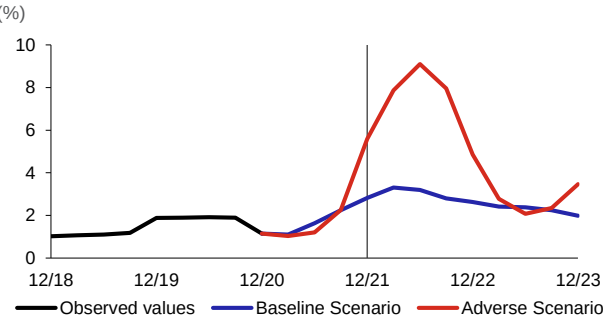
respectively at the end of the scenario horizon. There will be increased uncertainty for loans for self-build construction, whose share in the volume of new loans has risen by almost 6 pp over the last year (see Chart II.36; from CZK 10.8 billion in 2020 Q4 to CZK 21.3 billion in 2021 Q4). Owing to the sharp growth in prices of building materials, it can also be expected that self-construction work will be suspended or the extra costs will be covered by households using either own funds or external financing. Under these conditions, the households concerned may see an increase in debt and debt service or a decline in their financial reserves and a rise in their sensitivity to shocks.

Chart II.33
3M default rate in selected NFC sub-sectors in 2021



Note: The number shown in brackets after the name of the sub-sector is the ratio of loans in the sector to performing loans.

Chart II.34
12M default rate on loans to non-financial corporations in the *Baseline Scenario* and the *Adverse Scenario*

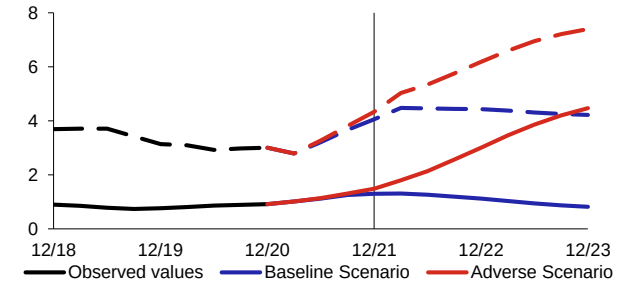


Note: The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period.

The *Adverse Scenario* would lead to an increase in the default rate across the entire private non-financial sector

The *Baseline Scenario* is subject to large risks and uncertainties, especially concerning the strength of the negative demand impacts of the war, but also regarding further sharp growth in energy and commodity prices (see section II.1.2). The materialisation of the risks in question, accompanied by the severe double-dip recession assumed in the *Adverse Scenario*, would imply a sizeable drop in demand for property and household consumption and be reflected in markedly slower credit growth in the household sector (see Chart II.32). Credit growth in the non-financial corporations sector would come to a virtual halt, with investments postponed and cut amid high uncertainty regarding future economic developments, but the total stock of loans expressed in koruna would rise sharply in the first five quarters of the scenario due to foreign currency loans being revalued using a much weaker koruna exchange rate (see Chart II.31). The *Adverse Scenario* would also imply a big increase in the default rate in all main credit segments. Owing to a rapid rise in the unemployment rate, a drop in real income and partly also an increase in debt service on refinanced loans, the 12-month default rate in the household sector would peak at 4.5% for house purchase loans and 7.4% for consumer loans, with 9% and 17.9% respectively defaulting cumulatively over the entire scenario horizon (see Chart II.35). High levels would also be recorded by the non-financial corporations sector, where the 12-month default rate would peak at 8.5% in mid-2023 and almost 14% of loans would become non-performing in cumulative terms over the entire horizon of the *Adverse Scenario* (see Chart II.34).

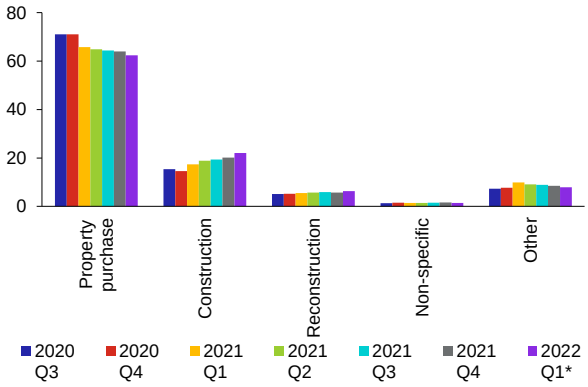
Chart II.35
12M default rate on bank loans to households in the *Baseline Scenario* and the *Adverse Scenario*



Source: BRCI, CNB

Note: The dashed line denotes consumer credit and the solid line house purchase loans. The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period.

Chart II.36
Genuinely new mortgage loans by purpose
(share in total volume in %)



Note: The share of loans in 2022 is calculated using the available data for January and February (marked *).

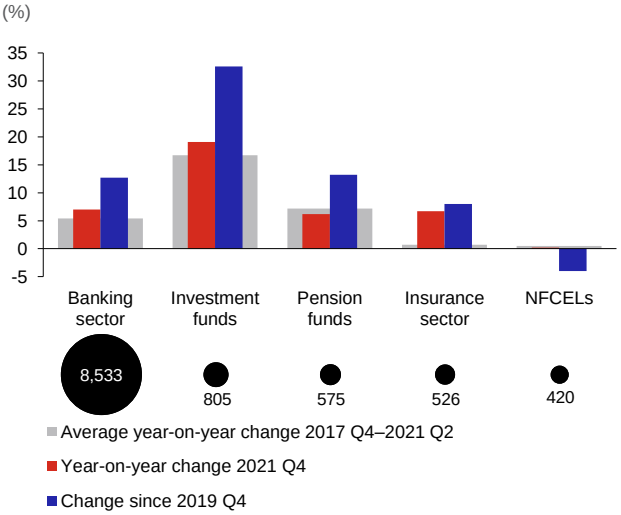
III. THE FINANCIAL SECTOR

III.1 DEVELOPMENTS IN THE FINANCIAL SECTOR

The total assets of all segments of the financial sector increased year on year

The total assets of all segments of the financial sector increased year on year (see Chart III.1). The total assets of the financial sector grew by 7.5% to CZK 11 trillion (178% of GDP). The banking sector, which accounts for almost 80% of the domestic financial sector's assets, recorded the largest growth in absolute terms (CZK 556 billion, or 7.0%). The investment fund sector recorded the largest increase in relative terms (CZK 129.4 billion, or 19.1%). The pension fund sector continued to show dynamic growth (CZK 32.4 billion, or 6.2%) and the insurance sector also recorded sizeable growth for the first time in several years (CZK 33.2 billion, or 6.7%). A low growth rate continues to be seen for non-bank financial corporations engaged in lending (year-on-year growth of CZK 0.9 billion, or 0.2%). Prices on global stock and bond markets declined in 2022 Q1 on the back of growing expectations of monetary policy tightening (see section II.1). However, investment and pension funds recorded no outflows at the aggregate level.

Chart III.1
Rates of growth of segments of the financial sector



Note: NFCELs = non-bank financial corporations engaged in lending. The circles show the value of the segments' assets in CZK billions as of 2021 Q4. The banking sector also includes credit unions.

The concentration of the domestic banking sector increased

A property transaction relating to the sale of Equa bank was completed at the start of 2022 and the total assets of Raiffeisenbank thus rose by 9% to CZK 558 billion. This will be reflected in the assessment of systemically important institutions in the domestic banking sector (see section V.2), whose share in the sector's total assets stood at almost 80% at the end of 2021 and will increase further as a result of the said transaction. The growth in concentration was also due to the closure of Sberbank CZ, when the CNB for the first time used bank resolution procedures based on the liquidation of a bank in normal insolvency proceedings under the Recovery and Resolution Act (for details see Box 2).

BOX 2 The resolution of Sberbank CZ proved the effectiveness of the regulatory framework for resolution and the high level of preparedness and cooperation of resolution authorities

The start of the war in Ukraine at the end of February 2022 had a direct impact on the domestic banking sector. A historically unprecedented outflow of liquidity – a typical bank run – resulted in a crisis at, and the failure of, Sberbank CZ. This bank was a member of the Austria-based Sberbank Europe AG group established in the EU by the Russian, state-controlled Sberbank and was supervised by the European Central Bank and the national supervisory authorities of Bosnia and Herzegovina, the Czech Republic, Croatia, Hungary, Austria and Slovenia. There was also a group resolution plan prepared by a college led by the Single Resolution Board (SRB).

The liquidity crisis caused by customers' response to the war in Ukraine very quickly engulfed the entire Sberbank Europe AG group. After supervisors declared the individual banks in the group to be failing, the SRB and the national resolution authorities agreed on a joint resolution procedure during the "resolution weekend" of Friday 25 February to Sunday 27 February. This procedure was based on the application of a group resolution scheme containing pre-prepared actions differing according to whether the national resolution authorities had identified a public interest in continuing the bank's operation in the planning or implementation stages of their work.

The EU's bank resolution framework generally works with two main assumptions:

(i) liquidation of a failed bank under normal insolvency proceedings should always be considered before resolution tools are applied; resolution actions should be used only if liquidation or the procedures set out in the Insolvency Act would risk destabilising the financial system or have a major adverse impact on the economy of the country concerned or another EU Member State or on the bank's critical functions (the public interest), and

(ii) taxpayers should not be involved in the resolution.

This notwithstanding, insured deposits up to EUR 100,000 are not at risk whatever resolution method is chosen (liquidation or resolution actions). The above assumptions were taken into account in the Czech Republic in both the preparation and the subsequent implementation of the resolution plan for Sberbank CZ. The plan itself had assumed that the bank would be liquidated if it failed. When it did fail, the CNB reassessed the credibility and feasibility of liquidating it and confirmed the procedure in line with the plan. Sberbank CZ was not providing any critical functions, i.e. services essential to the economy, the sudden disruption of which would have a significant adverse external impact or lead to a threat to financial stability, with particular regard to the substitutability of those services. Therefore, no public interest was found in applying specific resolution actions.

In accordance with the chosen resolution method, the CNB commenced the necessary steps to revoke the bank's licence and the Financial Market Guarantee System started to pay out compensation for insured deposits within the statutory time limit of seven days. Claims related to uninsured deposits of other depositors, other creditors and shareholders will be settled in liquidation or insolvency proceedings.

The resolution of Sberbank Europe AG showed that the EU's resolution framework is well designed and used effectively by competent authorities. These authorities, together with banks themselves, have long been preparing regularly for crisis situations in a process of increasing resolvability. For such situations to be handled successfully, it is very important to have well-prepared group and individual resolution plans and related processes, including the necessary legal documentation, draft communication schemes, and national and cross-border coordination of activities. The feasibility and effectiveness of the solutions are enhanced by simulation exercises carried out regularly by competent authorities.

An important parameter characterising the resolvability of banks whose resolution plans assume that resolution actions will be applied in the public interest if they fail is their loss-absorbing and recapitalisation capacity. To this end, the CNB has set a minimum requirement for own funds and eligible liabilities (MREL) for banks, in line with the resolution plan. The aim is to ensure that banks gradually set aside sufficient funds which, in the event of them failing, can be used to absorb losses and subsequently create enough new capital to obviate the need to use public money to resolve crises. All domestic banks are continuously compliant with the MREL (for details see section III.2). Under the CNB's General Approach, the final level should be reached by 31 December 2023.

III.2 BANKING INSTITUTIONS[39]

III.2.1 Capital

The capitalisation of the domestic banking sector remains robust

The domestic banking sector strengthened its capital adequacy further in 2021. The capital of the domestic banking sector rose by CZK 13 billion year on year to CZK 632 billion. Most of the capital (around 97%) consisted of the highest-quality Tier 1 capital.

Banks meet the capital ratio requirement by a sufficient margin…

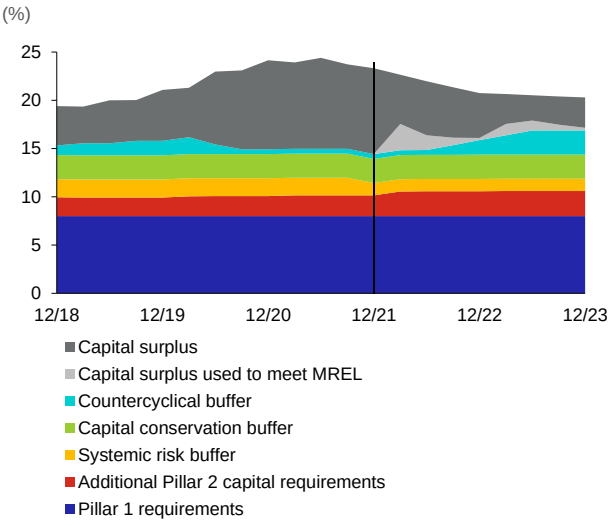
The risk-weighted capital requirement, expressed as the ratio of capital to risk-weighted exposures, consists of the minimum level of regulatory capital in Pillar 1 (8%), requirements based on the supervisory review and evaluation process in Pillar 2 (an average of 2.1% for the sector) and capital buffers (an average of 4.3% for the sector). Its aim is to ensure that the banking sector is sufficiently resilient to shocks. Banks currently meet the requirement by a significant margin (an average of 8.9% for the sector). The overall capital ratio decreased by 0.8 pp year on year to 23.3% last year (see Chart III.2).[40] With capital recording a relatively small year-on-year increase, the decrease in the ratio was due mainly to growth in client loans and other assets (-2.1 pp of the capital ratio), while a drop in the aggregate risk weight of exposures and an increase in capital from profit had the opposite effect (+0.8 pp and +0.5 pp respectively).

…and have also been compliant with the leverage ratio requirement since June 2021…

A leverage ratio requirement, expressed as the ratio of Tier 1 capital to total exposures, has been binding in the EU since June 2021. Its aim is to mitigate the risk of excessive leverage, particularly in institutions with relatively low aggregate risk weights.[41] The leverage ratio of the banking sector fell by 0.5 pp year on year to 7.3% at the end of 2021 (see Chart III.3) but was still well above the 3% minimum. In the domestic banking sector, the leverage ratio is significantly affected by banks' high risk-free exposures to the CNB (3.8 pp; see Chart III.3). The leverage ratio adjusted for exposures to the central bank rose by 0.1 pp year on year to 11.1%. Banks may also use their capital buffers to meet the leverage ratio requirement. This may limit the usability of the buffers in times of stress (for more details see section V.1).

Chart III.2

Structure of capital and capital requirements in the domestic banking sector

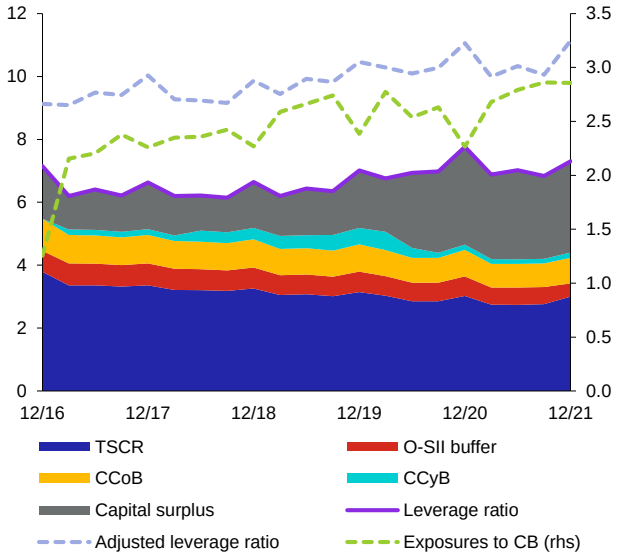


Note: The capital prediction assumes constant risk weights. Risky exposures are calculated on the basis of banks' assumptions about future loans, which banks report in the statement "Bank financing plans" (FPSIFE10). It also takes into account the issuance of eligible liabilities of banks with a non-zero MREL recapitalisation amount.

Chart III.3

Structure of the leverage ratio by capital source

(%; right-hand scale: CZK trillions)



Note: TSCR = sum of Pillar 1 and Pillar 2 requirements. Adjusted leverage ratio = Tier 1/total exposures excluding CB.

39 The Czech Export Bank and the Czech-Moravian Guarantee and Development Bank are excluded from the analysis of the capital of the banking sector as a whole in the entire section III.2. This is because these banks are wholly owned by the Czech state (providing implicit state guarantees for their liabilities) and have different business models and volatile credit portfolios.

40 The capital surplus on top of the capital ratio requirement amounted to CZK 241 billion at the end of 2021, of which that of systemically important banks was CZK 213 billion and that of other banks was CZK 28 billion.

41 See Pfeifer, L., Hodula, M., Holub, L., Pikhart, Z. (2018): *The Leverage Ratio and Its Impact on Capital Regulation*. CNB WP 15/2018.

…and with the intermediate objective of the MREL since the start of 2022

The CNB has been setting a minimum requirement for own funds and eligible liabilities (MREL) for banks since 2020. An intermediate objective has been in effect since 1 January 2022 and must be fully met by 1 January 2024. The MREL is designed to ensure that banks have sufficient capacity for the absorption of losses and subsequent recapitalisation in the event of resolution. The banking sector's MREL stood at CZK 384 billion at the start of 2022, with the loss absorption amount CZK 269 billion and the recapitalisation amount CZK 115 billion. Other things being equal, the recapitalisation amount should increase to CZK 251 billion by January 2024. The loss absorption amount equals the capital requirements and usually consists of Pillar 1 and Pillar 2 capital. The recapitalisation amount, if set, can be met using capital, eligible liabilities or a combination thereof. It is set if the resolution plan assumes that a bank or part of its business will be preserved due to its economic significance or its significance for the financial system and its stability. In the event of default, the bank (or a part thereof) would thus be able to continue to operate, as recapitalisation would allow it to meet the legal conditions for the provision of banking services as regards capital and to maintain sufficient market confidence.

The capital surplus on top of the capital ratio requirement is at a historical high…

The surplus increased slightly year on year, by CZK 4 billion, to a historical high of CZK 241 billion (8.9% of risk-weighted exposures), due in part to the CNB's previous recommendation calling on banks to temporarily restrict dividend payments during the pandemic (see Chart III.2). In September 2021, the CNB notified banks that dividend policy would no longer be restricted across the board and that their proposals would be assessed individually in the standard supervisory process. Banks can thus be expected to resume their pre-pandemic dividend policies, which, together with the announced increase in the countercyclical capital buffer rate, will very likely lead to decreases in their capital surpluses.

…but the possibility of its use is also being affected by banks' approach to meeting the MREL

The MREL compliance structure as of 1 January 2022 (see Chart III.4) shows that banks have so far used capital to meet 48% of the recapitalisation amount. After taking the MREL into account, the banking sector's capital surplus amounted to CZK 186 billion (77% of the total surplus) and stood at 6.9% of risk-weighted exposures. This level implies that capital is potentially available for paying dividends or absorbing losses, and that the capital surplus has a credit potential of around CZK 2.8 trillion at the end of 2021. Large banks have started to issue debt instruments in response to the interim MREL objective in force. In their plans, they currently foresee meeting the MREL recapitalisation amount mainly by means of eligible liabilities (see Chart III.2). Other things being equal, this should release the capital surplus for potential distribution, for loss absorption or for strengthening the banking sector's credit potential. The CNB will analyse banks' approaches to compliance with the MREL on an ongoing basis and assess the possible risks of the effect of the compliance structure on the banking sector's resilience. In doing so, it will take into account not just the significant uncertainty about future economic developments at home and abroad (see section II), but also future changes in capital regulation, especially the phase-in of the output floor starting 1 January 2023.[42]

Chart III.4
MREL amount and compliance structure
(CZK billions as of the end of 2021)

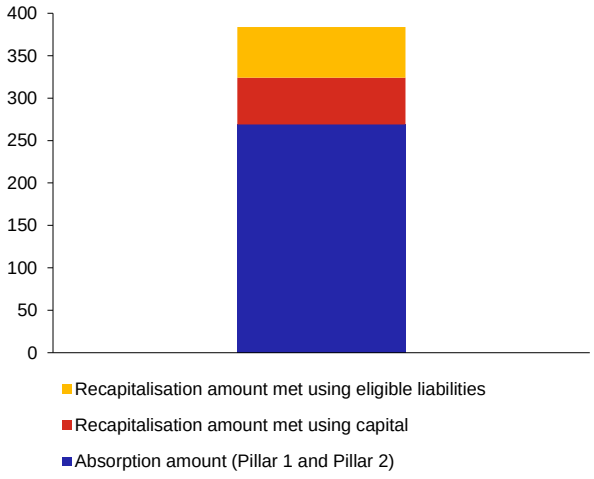
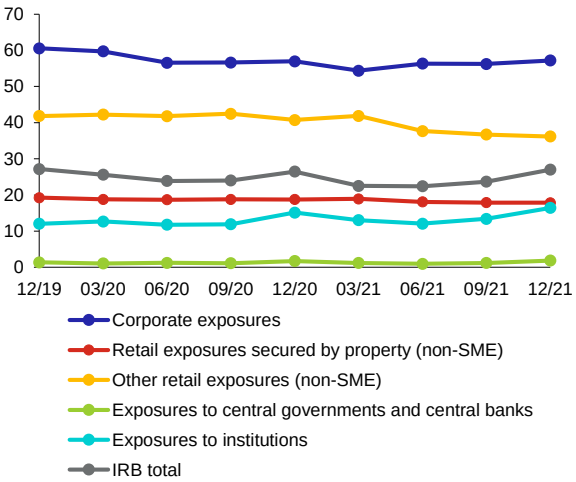


Chart III.5
Average risk weights of the main categories of exposures under the IRB approach
(%)



42 For details see the December 2017 document *Basel III: Finalising post-crisis reforms* at https://www.bis.org/bcbs/publ/d424.htm and the March 2020 communication on the deferral of the finalisation of the Basel III reforms at https://www.bis.org/press/p200327.htm.

Risk weights for retail exposures remain on a downward trend…

The general downward trend in risk weights for exposures of banks that use internal models to set those weights (the IRB approach) halted at the end of 2021 (see Chart III.5).[43] Average risk weights were higher at the end of 2021 than a year earlier for corporate exposures (by 0.2 pp to 57.2%) and for exposures to institutions (by 1.3 pp to 16.4%). On the other hand, average risk weights continued to decrease year on year for exposures secured by residential property (by 0.9 pp to 17.9%) and other retail exposures (by 4.6 pp to 36.2%).[44]

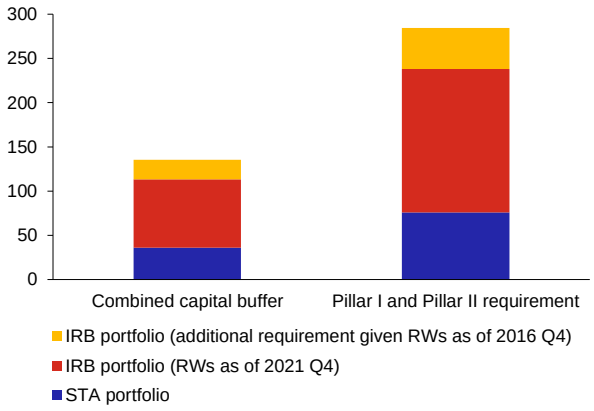
…and are reducing the portfolio's resilience to unexpected losses…

Chart III.6 depicts the capital requirements for the current IRB portfolio given by the relevant risk weights (27% on aggregate) and their levels given the risk weights as they were five years ago (34.7% on aggregate).[45] It shows that with the current IRB portfolio structure and the end-2016 risk weights, the capital buffers would be CZK 22.1 billion higher and the Pillar 1 and Pillar 2 requirement a full CZK 46.4 billion higher (i.e. 2.9% of risk-weighted exposures) than they are now. If the MREL were taken into account, the increase would be even greater. An increase in risk weights due to a negative economic shock may thus gradually adversely affect the capital position of banks using the IRB approach and thus limit their capacity to lend. The CNB takes this risk into account when setting the CCyB rate (see section V.3). It also assesses it in the regular macro stress tests of households (see section IV.4) and banks (see section IV.1), which indicate that this risk is currently limited in the Czech Republic, thanks in part to prudent and preventive use of microprudential (Pillar 2) and macroprudential instruments (capital buffers and credit ratio caps).

Chart III.6

Capital requirements given the IRB portfolio risk weights as of 2016 Q4 and 2021 Q4

(CZK billions)



…the evolution of risk weights will probably depend on the economic impacts of the war in Ukraine

The evolution of risk weights will be affected most of all by the scale and duration of the economic impacts of the war in Ukraine. The potential increase in risk weights should not be strong at first, as even a highly adverse trend in the real economy is reflected in banks' IRB credit risk models with a lag, because these models take into account developments over the last several (around eight) years. Other things being equal, though, growth in risk weights generally results in an increase in the capital requirement (including the MREL) in absolute terms and a drop in the capital ratio (see Chart III.6). This may magnify the effect on banks' capital positions, especially if combined with major credit losses (see section IV.1.1). In such a situation, banks may use the capital buffers they created earlier. As part of its supervision, the CNB requires credit institutions to make sufficiently robust probability of default estimates in a manner that considers the default rates observed over the entire economic cycle and does not take disproportionate account of those observed in economically favourable times. It also requires banks applying the advanced IRB approach to set the LGD parameter in the upward phase of the cycle in such a way as to take account of conditions in the adverse phase of the cycle.

43 Exposures whose risk weights are set using the IRB approach amounted to CZK 5.6 trillion at the end of 2021. This corresponded to 66% of the exposures of the domestic banking sector.

44 For details on the risk of procyclicality of risk weights under the IRB approach, see also Malovaná, S. (2021): *The Pro-cyclicality of Risk Weights for Credit Exposures*: *Driven by the Retail Segment*, Economic Systems, Elsevier, vol. 45(1), and Brož, V. and Pfeifer, L. (2021): *Are the Risk Weights of Banks in the Czech Republic Procyclical? Evidence from Wavelet Analysis*, Journal of Central Banking Theory and Practice, vol. 10(1).

45 The risk weights as they were five years ago correspond to the current structure of the banking sector's portfolio but do not take into account its improving quality over time.

III.2.2 Credit risk

The fading of the pandemic was accompanied by the release of provisions…

The economic stabilisation after the recession caused by the coronavirus pandemic in 2020 and the positive economic outlook in the second half of 2021 were reflected in a decline in credit risk perceived by banks. Thanks to strong government support and the resilience of the real economy, the recession was not accompanied by systemic materialisation of credit risk, and banks released 27% of the provisions they had created in 2020. In 2021, they released provisions totalling CZK 5.8 billion across all credit stages and segments of the real economy, and their total provisions thus decreased by 7.5% year on year to CZK 70.7 billion (see Table III.1). The release of provisions was concentrated mainly in the non-financial corporations segment (CZK -3.9 billion, or -8.8%) and to a lesser extent in the household segment (CZK -1.9 billion, or -6%; see Table III.1 CB). The trend of releasing provisions continued into 2022 Q1 – a further CZK 0.6 billion of provisions were released in the first three months of 2022, mainly in the non-financial corporations segment.

Table III.1
Exposures, provisions and coverage ratios by risk stage and portfolio

Client		Exposures		Provisions		Coverage ratio	
Stage	Date	Volume (CZK billions)	Change (%)	Volume (CZK billions)	Change (%)	Ratio (%)	Change (pp)
Total	12/2020	3,465	7.9	76.41	-7.5	2.21	-0.31
	12/2021	3,738		70.66		1.89	
	03/2022	3,906		70.12		1.80	
S1	12/2020	3,024	7.6	9.23	-7.4	0.31	-0.04
	12/2021	3,254		8.54		0.26	
	03/2022	3,370		8.78		0.26	
S2	12/2020	349	14.4	19.28	3.9	5.53	-1.42
	12/2021	399		16.38		4.10	
	03/2022	451		17.02		3.78	
S3	12/2020	92	-8.0	47.90	-3.1	51.83	1.96
	12/2021	85		45.74		53.79	
	03/2022	85		44.31		52.13	

Note: S1 and S2 comprise performing loans; S3 can be considered identical to non-performing loans.

…a decline in the coverage of loans by provisions…

The release of provisions, coupled with growth in exposures, was reflected in a drop in the total coverage of loans by provisions. The coverage ratio is on a downward trend, briefly interrupted in 2020 by the response to the pandemic (see Chart III.7). The decline across all segments was renewed in 2021, when the coverage ratio reached 1.9%. At the end of 2021, the decrease in the coverage of performing loans with no increase in credit risk (Stage 1) of 0.04 pp to 0.26% and of loans with increased risk (Stage 2) of 1.42 pp to 4.1% outweighed the increase in the coverage of non-performing loans of 1.96 pp to 53.8%. The decline across all segments continued into 2022 Q1, when the total coverage ratio reached 1.8% (see Table III.1). This testified to positive expectations regarding credit losses on performing loans after the end of the pandemic and persisting relatively high coverage of non-performing loans by international comparison (see Chart III.8).

Chart III.7
Loan coverage by portfolio

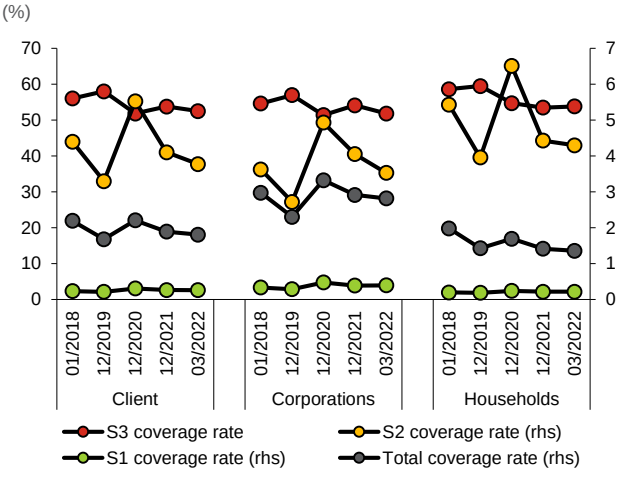
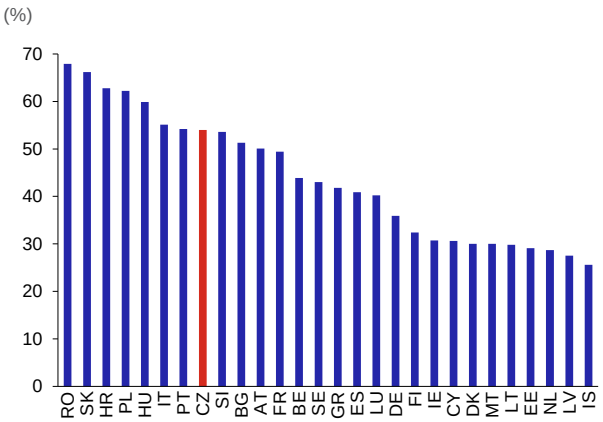


Chart III.8
Comparison of NPL coverage ratios as of 31 December 2021



Source: EBA

…and a decrease in the ratio of non-performing loans to total loans

The ratio of non-performing loans decreased to 2.3% at the end of 2021 and further to 2.2% in the first three months of 2022. It is thus at virtually the same level as before the outbreak of the pandemic. As regards the individual credit stages, which capture credit portfolio quality, the total shares of loans in these stages were essentially unchanged from a year earlier at the end of 2021 (see Chart III.9). The share of Stage 2 loans increased by 2 pp to 16.3% in the non-financial corporations segment and by 0.4 pp to 9.2% in the household segment in 2022 Q1, probably due to the war in Ukraine. The share of performing loans with increased credit risk is thus the highest since the start of 2018, when the IFRS 9 financial reporting standard dividing provisions into three credit stages entered into force.

State loan guarantee schemes continue to play a stabilising role…

State guarantee schemes introduced during the pandemic[46] continue to reduce the credit risk of the more vulnerable segment of small and medium-sized corporations (SMEs) and enhance banks' resilience. Loans drawn under Covid guarantee schemes,[47] provided mainly to non-financial corporations in the SME segment, totalled CZK 78.7 billion, or 15.9% of total loans provided to SMEs, at the end of 2021.

…as does relief policy for at-risk borrowers

In justified cases, banks provided relief to specific borrowers to enable them to overcome the negative effects of the pandemic. As of the end of 2021, relief had been granted on CZK 35.6 billion (or 2.6%) of loans to non-financial corporations, CZK 7.6 billion (or 0.5%) of loans to households for house purchase and CZK 5.4 billion (or 1.3%) of loans for consumption. As loans with relief still account for only a small part of the relevant portfolios, they do not represent potential for the systemic materialisation of credit losses.

The war in Ukraine and its consequences are giving rise to new risks…

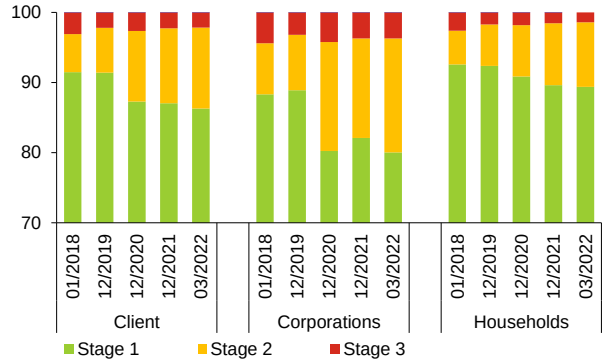
The direct exposures of the domestic banking sector to Russia, Ukraine and Belarus are immaterial. They amounted to CZK 12.3 billion, or just 0.13% of the sector's total credit exposures, at the end of 2021 and had fallen to CZK 11.8 billion by the end of March 2022. However, the indirect effects of the limited economic activity and disrupted international economic cooperation in an environment of increased inflation imply increased credit risk for both non-financial corporations and households (see section II.1).

…which are beginning to be reflected in expectations about future credit losses…

In March 2022, more than one-third of the domestic banking market was expecting credit losses to grow across all credit market segments[48] in the period ahead. Credit losses were expected to increase for around 35% of the market for loans to non-financial corporations and loans to households for house purchase and 15% of the market for loans to households for consumption.[49] Perceptions of the risk of credit losses were less intense compared with the outbreak of the pandemic, when credit losses had been expected to increase across all segments in 90% of the market (see Chart III.10).

Chart III.9
Loan structure by portfolio

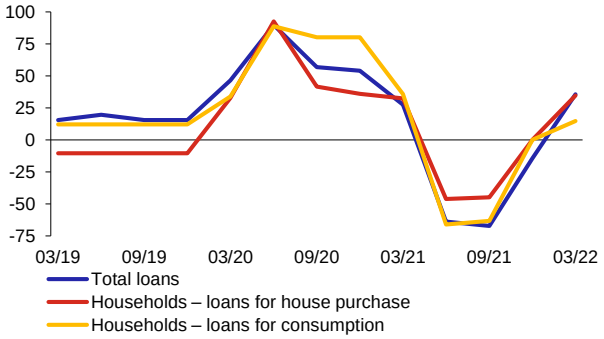
(%)



Note: Under the new IFRS 9 accounting standard (in effect since 1 January 2018), non-performing loans (NPLs) correspond to loans classified in Stage 3 – impaired loans.

Chart III.10
Expectations of lifetime credit losses

(market share in %)



Source: Bank Lending Survey, CNB

Note: The cut-off date of the Survey was 15 March 2022. The data refer to expectations in 2022 Q2. Positive figures refer to a growth in expected credit losses, while negative figures refer to a decline.

46 For details see https://www.cnb.cz/cs/dohled-financni-trh/souhrnne-informace-fin-trhy/statistika-odkladu-splatek-a-uveru-v-programech-covid/ (available in Czech only).

47 COVID II, COVID III, COVID Praha, COVID EGAP and other similar support programmes, including foreign ones.

48 For details see https://www.cnb.cz/en/statistics/bank-lending-survey/Bank-lending-survey-2022/.

49 The expectations should be interpreted in light of the fact that the cut-off date of the survey was 15 March 2022 and the assessment of the impacts of the current developments was based on the information available at the time.

…the level of which could be higher for non-financial corporations under certain assumptions…

Using information obtained from the largest six domestic banks,[50] the CNB analysed the potential effects of the war in Ukraine on the credit portfolio of the non-financial corporations segment in 2022 Q1. According to the banks, direct and indirect exposures to risks associated with the war amount to CZK 98 billion and the estimated losses on these exposures could run to CZK 25.6 billion (26%). Even the potential materialisation of losses on this scale should not currently jeopardise the banking sector's profitability and lead to financial losses (see section IV.1). In view of the high level of uncertainty regarding the future course of the war, however, higher losses and much lower profitability cannot be ruled out.

…and increases the risk of a cliff effect

The CNB has long drawn attention to the risk of a cliff effect consisting in banks being forced to create large amounts of provisions in a short period of time in the event of a sudden and sharp deterioration in economic conditions, amounts that might represent a shock to their finances having the potential to spilling over to their capital positions (see Box 3 in Risks to financial stability and their indicators 2020). In addition to the above potential effects on the non-financial corporations credit portfolio, the loans to households portfolio may be adversely affected in an environment of higher interest rates and inflation. The results of the *Baseline Scenario* of the solvency macro stress tests of banks (see section IV.1) signal persisting robust profitability of the banking sector. However, from the macroprudential policy perspective, the potential credit losses and related growth in risk weights in the *Adverse Scenario* continue to require a need for a balanced approach to the capital surplus and capital buffers, including communication of their purpose in the event of economic stress.

III.2.3 Profitability and liquidity

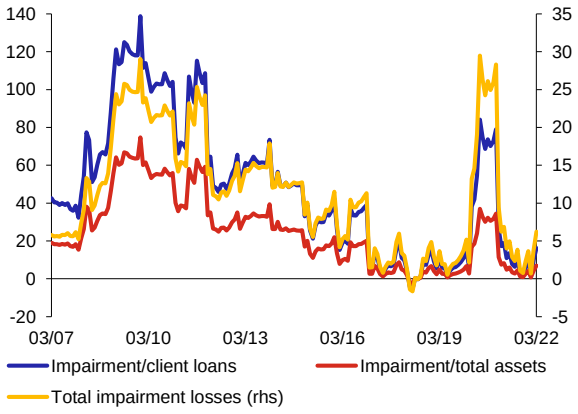
The profit of the banking sector increased significantly

The substantial year-on-year increase in the banking sector's profit of CZK 22.7 billion to CZK 69.7 billion in 2021 reflects the relatively low, pandemic-induced base of 2020 and a significant decrease in impairment losses. The latter dropped by CZK 24 billion year on year to CZK 3.8 billion at the end of 2021, which corresponds to pre-pandemic levels (see Chart III.11). Year-on-year growth in profit from fees and commissions of 12.9% to CZK 39.4 billion also had a positive effect. Although administrative expenses rose by 3.3% year on year to CZK 74.4 billion, the cost-to-income ratio still signals high efficiency of the sector in international terms (51.4% in the Czech Republic, as against 63.3% in the EU). Efficiency may potentially be adversely affected by the need to respond preventively to increased cyber risk and strengthen resilience to its possible systemic effects (see Box 3). Higher growth in profit than in total assets was reflected in higher return on assets, which increased by 0.2 pp year on year to 0.8% (see Chart III.1 CB).[51] The positive profitability trend was supported in 2022 Q1 by growth in interest margins and profit on excess liquidity (see Chart III.12), which was related to the process of raising monetary policy rates. Q1 profit rose by CZK 12.8 billion year on year to CZK 23.5 billion, equal to one-third of the profit for 2021 as a whole. However, uncertainty regarding future profit growth remains high due to the war in Ukraine and rising inflation. Credit losses will probably increase. However, they may be offset under certain conditions by rising interest profit, including profit on excess liquidity, (see section IV.1).

Chart III.11

Asset impairment losses

(bp; right-hand scale: CZK billions)

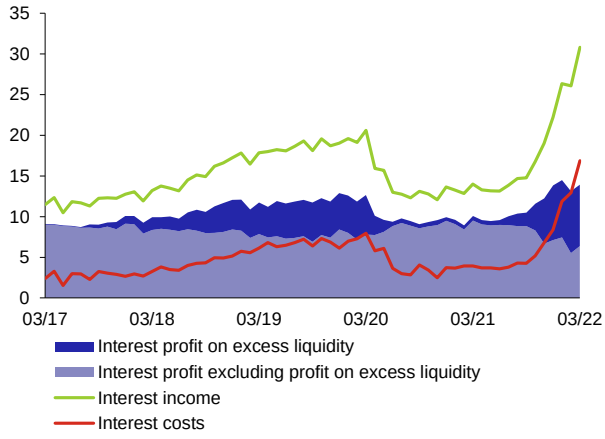


Note: Impairment losses are annualised. Client loans comprise loans to the private sector.

Chart III.12

Decomposition of interest profit

(monthly contributions in CZK billions)



50 Česká spořitelna, ČSOB, Komerční banka, Raiffeisenbank, UniCredit Bank and MONETA Money bank, with a combined market share in the NFC credit portfolio of 76%.

51 Return on assets in the EU stood at 0.5% at the end of 2021.

BOX 3 Current developments in the area of systemic cyber risk

The level of digitalisation of financial services and communication interconnectedness of financial institutions has risen significantly over the past ten years. This has increased the vulnerability of the financial system to cyber risk.[52] The ESRB[53] currently considers cyber risk to be a major source of systemic risk, as it may have the potential for serious negative consequences for the real economy should individual cyber incidents develop into a systemic event. The importance of cyber resilience and cyber security has increased further in the current difficult international situation.

Cyber incidents in the Czech financial system may develop into a systemic event as a result of:

a) the targeting of an element which, by its nature, gives rise to a risk of concentration for the financial sector. Such elements can include (i) significant financial institutions, (ii) third-party suppliers of IT services to financial institutions and (iii) core IT infrastructure.
   A relevant scenario here is **a cyber attack on a key supplier of IT services** to the financial sector, which may lead to the provision of services being interrupted for an extended period.

b) the gradual propagation of the effects of a single large incident (domino effect) to multiple institutions due to interconnectedness through services and business links.
   A relevant scenario here is **the widespread exploitation of a vulnerability in a common piece of software or an information infrastructure element** used by most financial institutions, which could affect critical IT services in information systems.

c) a loss of customer confidence in the event, for example, of long and repeated disruptions or theft of sensitive client data, which in its extreme form may lead to a run and potentially affect institutions' liquidity.
   A relevant scenario here is **a targeted attack on electronic channels**, in particular electronic banking, aimed at disrupting the provision of services to customers and acquiring sensitive banking data on a large scale.

The Czech National Bank focuses intensively on cyber risk in its microprudential and macroprudential supervision of credit institutions, insurance companies, pension funds and other financial institutions. It pays closest attention to banks, the most important part of the financial sector. External factors affecting the banking sector are taken into account in determining the level of systemic cyber risk. In 2021, these factors included an increase in phishing attacks and the existence of serious vulnerabilities in commonly used IT. Attention was drawn to these factors in warnings and measures issued by the National Cyber and Information Security Agency (NÚKIB)[54] and reports issued by the European Union Agency for Cybersecurity (ENISA).[55] These factors have slightly increased the estimated probability of materialisation of cyber incident scenarios with potentially systemic impacts. However, supervisory findings signal[56] that the Czech banking sector has a relatively good level of resilience to cyber risk.

The risk[57] of a successful cyber attack is low in the majority of systemically important banks (see section 5.2). The probability of a synchronised cyber attack with a strong negative impact on the entire sector is therefore low. This probability is further reduced by the fact that the likelihood of harmful activity being detected using automatic security tools increases in proportion to the time spent by the attacker in a bank's internal IT environment. On the other hand, smaller financial institutions display medium cyber risk. However, the materialisation of this risk would not have a systemic impact given these institutions' small share of the banking market, the measures in place and the attentiveness of the CNB's supervisors.

Based on information obtained in 2021,[58] the CNB estimates that the financial impacts of a serious systemic cyber event caused by a combination of cyber incidents would amount to no more than CZK 20 billion in the Czech banking sector. The probability of such an event is estimated to be less than 0.7%. Such an event could render the critical banking services of several banks inaccessible for up to 48 hours and disrupt less critical bank information systems for up to seven days. The capital requirement for the banking sector's operational risk (which includes cyber risk) was CZK 30 billion at the end of 2021 and is thus in principle able to absorb the above potential systemic cyber incident. Therefore, the financial stability of the banking sector should not be disrupted. Moreover, capital resilience is currently enhanced by a significant capital surplus (see section III.2).

52 The destruction, encryption and alteration of data expressing financial value and the disruption of communication interconnectedness (incidents) are considered to be the main risks of this type from the macroprudential perspective. A concatenation of individual incidents can develop into a systemic event, impairing the provision of key economic functions, generating significant financial losses and undermining confidence in the financial system.

53 https://www.esrb.europa.eu//pub/pdf/reports/esrb.report200219_systemiccyberrisk~101a09685e.en.pdf

54 https://www.nukib.cz/cs/uredni-deska/

55 https://www.enisa.europa.eu/publications/enisa-threat-landscape-2021

56 None of the banks under review was subject to a cyber attack causing a security incident with a material impact in 2021. The incidents that did occur did not signal an upward trend in seriousness and did not have the potential to develop into a systemic impact; they were isolated events with limited effects.

57 As measured by grades on a four-tier assessment scale: low, medium, high and very high risk.

58 Information obtained from examinations, IT SREP, reported IT incidents, outsourced activities, external information on threats and cyber incident scenarios considered.

Appropriate preventive measures play a significant role in preventing and managing a cyber incident and stopping it spreading to other financial institutions. They include:

i) regular testing of the cyber resilience of key financial sector elements and improving their cyber protection.

ii) preparedness for a cyber incident with a large impact, and a synergistic effort to minimise the impact. Key conditions include effective and timely sharing of important information on incidents to prevent them from propagating to other financial institutions.

iii) crisis communication by financial institutions and the relevant competent authorities to manage and mitigate crises caused by cyber attacks. The importance of this measure was confirmed by the conclusions of the ESRB report *Mitigating systemic cyber risk*[59] and the related recommendation to create a pan-European framework for a systemic response to cyber incidents.[60]

The above preventive measures to mitigate systemic cyber risks have not yet reached full maturity. Their further development and improvement will make it possible to reduce the probability of systemic cyber incidents and mitigate their impacts. The financial sector, and particularly banks, should therefore continue to work intensively on enhancing cyber security.

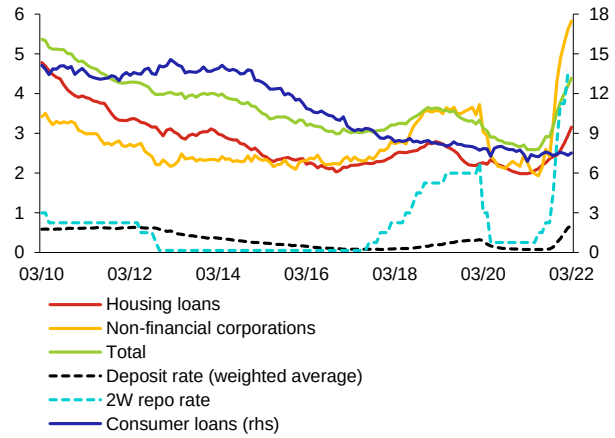
Future developments will be greatly affected by monetary policy and the impacts of the war in Ukraine

The increase in monetary policy interest rates was associated with a change in trend in interest margins in mid-2021, and those margins continued to grow in 2022 Q1 (see Chart III.13). In 2022 Q1, margins on corporate loans recorded the highest year-on-year growth (of 3.57 pp to 5.83%), while margins on housing loans rose more moderately (by 1.17 pp to 3.15%) and margins on consumer credit showed the lowest growth (of 0.62 pp to 7.52%). The total interest rate margin thus rose by 1.81 pp year on year to 4.39%. Further growth in margins may be fostered by a rise in the risk premium for loans. Gradual growth in interest rates on client deposits will probably have the opposite effect. Chart III.14 shows how the growth in monetary policy rates is being reflected in rates on client deposits on term accounts (2.12% in 2022 Q1) and with less intensity also in rates on the current accounts of households and non-financial corporations (0.54% in 2022 Q1). In addition to loan margins, interest profit on client loans will be affected by credit activity, which may be reduced due to rising interest rates on client loans and the negative impacts of the war in Ukraine on the financial situation of households and non-financial corporations (see section II).

Chart III.13

Interest margins on new loans

(rates in %; margins in pp)

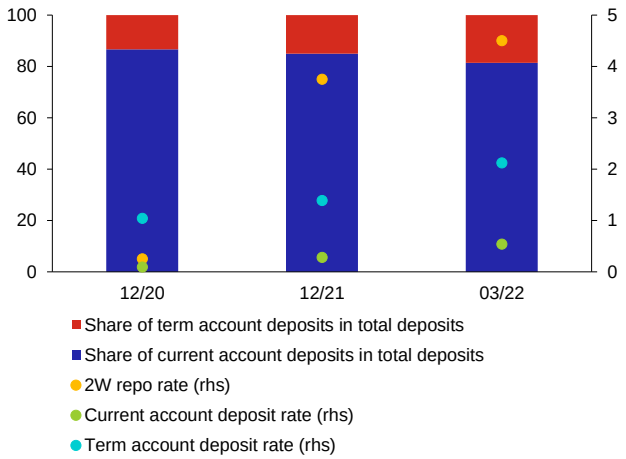


Note: Margins are calculated as loan rates for the given sector minus the average deposit rate. The non-financial corporations item excludes revolving loans and credit cards.

Chart III.14

Interest rates on current and term accounts

(%)



The banking sector's liquidity and LCR are at high levels…

The banking sector's aggregate liquidity coverage ratio (LCR) was 183% at the end of 2021. The LCR was consistently above the limit during 2021, averaging 190%. All banks were compliant with the regulatory limit of 100% throughout 2021.[61]

59 https://www.esrb.europa.eu//pub/pdf/reports/esrb.SystemiCyberRisk.220127~b6655fa027.en.pdf

60 European systemic cyber incident coordination framework for relevant authorities (EU-SCIRF)

61 An LCR of 100% is required under normal circumstances. However, the LCR is designed for safe coverage of liquidity outflows in a situation of a (systemic or idiosyncratic) liquidity shock, even if this were to mean a drop in the ratio below 100% (see Article 412(1) CRR in conjunction with Article 4(3) of Commission Delegated Regulation (EU) 2015/61).

Smaller banks and building societies have higher LCRs on average (see Chart III.15). The LCR exceeded the limit due to a number of factors.[62] The main factor is a significant rise in highly liquid assets (of 15% to CZK 2,739 billion compared with the end of 2020), consisting almost solely of government bonds and claims on the CNB (37% and 60% of liquid assets respectively). A slight decrease in the market value of government bonds due to the gradual growth in market interest rates[63] was fully offset by an increase in government bond holdings – the market value of Czech government bond holdings went up by 23% year on year (for the implications for risks to financial stability, see section IV.5). The increase in liquid assets was offset by a gradual rise in net outflows (of 24% year on year).

…and the evolution of the non-binding foreign currency LCR was also favourable

The foreign currency LCR was below 100% at the end of 2022, even though liquid claims on foreign central governments rose. However, the foreign currency outflows are not entirely marginal. Net outflows in EUR and USD made up 16% of the total net liquidity outflows in the banking sector. Foreign currency liquidity mismatch[64] could create sources of risk in the form of excessive dependence on foreign currency liquidity from parent companies or via the FX swap market, which could be illiquid and relatively costly in the event of market stress.

The NSFR confirms that institutions have sufficient stable funding

After taking liquidity subgroups into account,[65] the NSFR for individual banks was 200% on average at the end of 2021 (see Chart III.15). The high ratio was due to a growing base of client deposits, which are considered a stable source of funding (see Chart III.2 CB).

Resilience to liquidity shocks is also being enhanced by the balance-sheet structure of the domestic banking system

The main reasons for domestic banks' high resilience to liquidity shocks remain the same. They include a high share of liquid assets and an excess of client deposits over client loans (see Chart III.16 and section IV.1.2). The banking sector's claims on the CNB account for almost 28% of its balance-sheet total (see Chart III.16). The share of less stable funding sources from non-resident credit institutions in total liabilities stopped falling and has been fluctuating around 9% since the end of 2021, well below the 20% peak observed at the end of 2017.

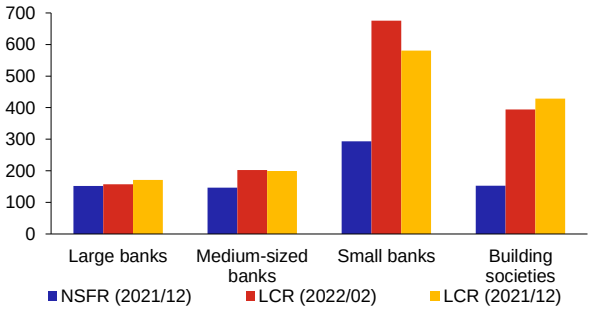
According to banks' plans, coverage of loans by primary funds will remain high in the future

In their end-2021 funding plans, domestic banks were expecting loans to the private sector to increase on average by 4.3% year on year, from CZK 4.4 trillion to around CZK 5 trillion three years ahead (see Chart III.3 CB). Banks' were planning to increase private sector deposits and issuance of debt securities with maturities of at least three years from CZK 5.6 trillion to CZK 6.5 trillion.[66] The planned funds of banks would sufficiently exceed their planned loans. According to banks' expectations, the sector's liquidity position should thus remain favourable.

Chart III.15

Comparison of selected indicators of banks' balance-sheet liquidity

(%)

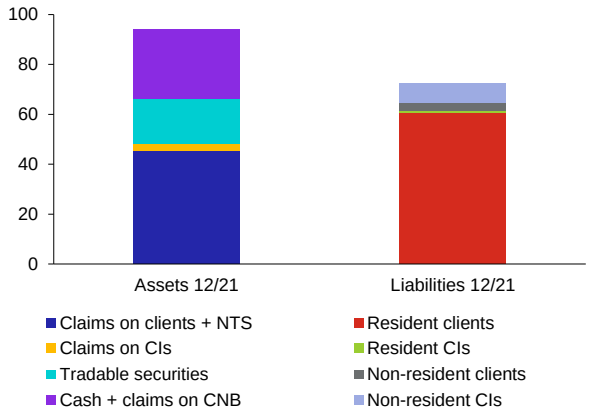


Note: The LCR is the ratio of the liquidity buffer to the net liquidity outflow of banks over a 30-day stress horizon as defined by EC Regulation 2015/61. The NSFR is the ratio of available stable funding to required stable funding as defined by Basel III. The results take liquidity subgroups into account and exclude state-owned banks.

Chart III.16

Selected balance-sheet items of the domestic banking sector

(% of balance sheet)



Note: CIs = credit institutions. NTS = nontradable securities.

62 The above-average aggregate year-end value is due to the annual optimisation of bank balance sheets related to contributions to the Resolution Fund.

63 The average duration of Czech government bonds in domestic banks' portfolios is 6.1 years.

64 Liquidity mismatch in the sense of liquidity outflows which are not covered by liquidity inflows or liquid assets.

65 See Article 8(1) CRR.

66 Bond issuance represents a negligible source of planned funding compared with deposits.

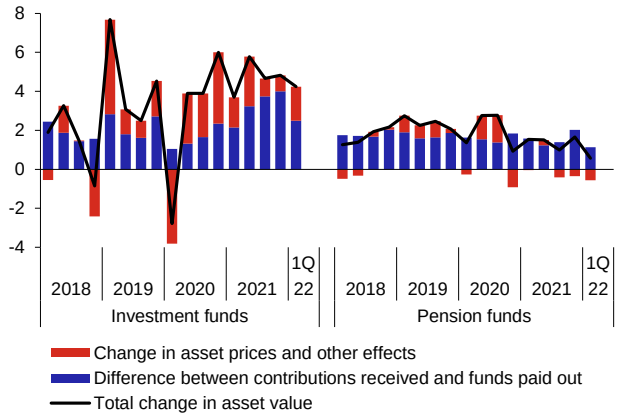
III.3 NON-BANK FINANCIAL CORPORATIONS

Domestic investment and pension funds recorded a strong inflow of new funds…

The total assets of the domestic non-bank segments of the financial sector increased in 2021 (see Chart III.1). Investment funds recorded the fastest growth (of 19% year on year to CZK 805 billion as of 31 December 2021), the main source of which was inflows of new funds (see Chart III.17). The growth in assets was also driven by favourable price trends on financial markets (see Chart III.4 CB), with equities still the dominant component of investment funds' aggregate portfolio (see Chart III.18). The total assets of pension funds also increased (by 6% to CZK 575 billion) due to an inflow of new funds. The volume of their assets and liabilities was also affected by changes in the use of synthetic hedging[67] and movements in Czech government bond prices. The insurance sector also recorded an increase in assets in 2021 (of 7% to CZK 526 billion), mainly reflecting cross-border mergers and acquisitions in the sector. The inflow of funds into pension and investment funds continued in 2022 Q1 (see Chart III.17) despite elevated uncertainty on global financial markets (see section II.1). These sectors' assets rose further and their investment structure remained broadly unchanged (see Chart III.18).

Chart III.17
Decomposition of the change in the value of investment and pension funds' assets

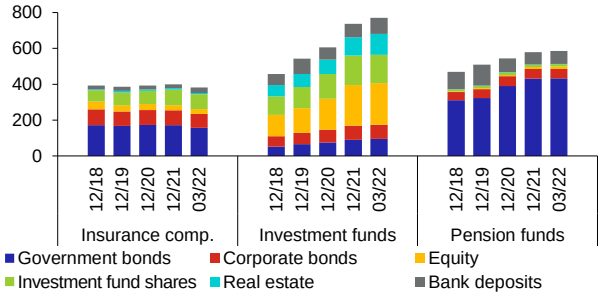
(% of assets as of end of previous quarter)



Note: For pension funds, the change in asset value does not include assets associated with the use of synthetic hedging.[67]

Chart III.18
Main components of domestic institutional investors' investment assets

(CZK billions)



Note: The difference between the sectors' investment assets and total assets (see Chart III.1) is material for insurance companies and investment funds. For insurance companies, non-investment assets include, for example, insurance claims and reinsurance recoverables; for investment funds, they include loans and receivables. Moreover, in the case of insurance companies, this chart excludes branches of foreign insurance companies, the Export Guarantee and Insurance Corporation and the Czech Insurers' Bureau.

Investment funds maintained a stable share of liquid assets at the aggregate level[68]…

The risks to financial stability associated with the investment fund sector stem mainly from the potential mismatch between funds' liquid assets and liabilities. These risks mostly arise at times of falling prices of financial assets and growing market uncertainty, when the risk of a rise in the number of investors leaving the funds increases. Investment funds are forced to use their liquidity buffers to pay out redeeming investors and sell off less liquid assets if the buffers prove insufficient.[69] This intensifies the drop in prices amid worsening market liquidity and amplifies the initial shock. Adverse developments in the form of the continuing coronavirus pandemic and the war in Ukraine did not lead to a weakening of the aggregate liquidity position of domestic investment funds. The share of liquid assets on collective investment funds' balance sheets has remained largely stable over the last three years (see Chart III.19).[70]

…their contribution to systemic risk is currently immaterial

The CNB assesses the aforementioned risks using a macro-stress test of collective investment funds (see section IV.2.3), whose 2022 results confirmed the immaterial contribution of these funds to domestic systemic risk through fire sales three years ahead. If the buoyant growth of the investment fund sector continues, increasing potential for the formation or multiplication of adverse shocks and thus for a rise in their contribution to systemic risk can be expected. The CNB is also newly conducting its regular quarterly assessment of alternative investment funds, which comprise special collective investment funds and funds for qualified investors. The CNB monitors in particular the contribution of alternative funds with increased leverage to risks associated with fire sales, lending by funds and the interconnectedness of funds and other

67 Synthetic hedging is used by entities which hold foreign currency assets and wish to hedge against appreciation of the koruna and which consider hedging through currency derivatives to be too expensive. The hedging entity accepts a foreign currency loan, which it converts into koruna and, for example, deposits it on a koruna-denominated account. This increases both the entity's assets and liabilities. The loan is subsequently repaid by gradually converting the koruna deposit back into the foreign currency. If the koruna appreciates, the foreign exchange losses arising from the foreign currency assets are then offset by a decrease in the koruna value of the foreign currency liability.

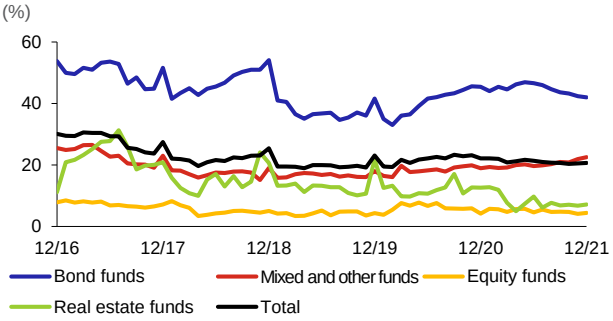
68 In this case, liquid assets comprise cash, debt securities issued by general government, and bank deposits and other claims payable on demand.

69 For details see Szabo, M. (2022): *Meeting Investor Outflows in Czech Bond and Equity Funds: Horizontal or Vertical?* CNB WP 6/2022.

70 The collective investment funds sector excludes funds for qualified investors. The share of liquid assets is not shown for the latter because this segment is highly heterogeneous and changes in the aggregate indicator are therefore difficult to interpret.

domestic financial corporations. The results of this assessment do not currently indicate any immediate excessive risks to domestic financial stability stemming from the domestic alternative investment fund segment.[71]

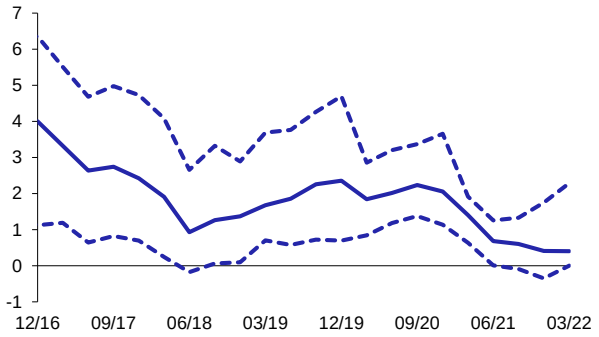
Chart III.19
Share of liquid assets on the balance sheets of collective investment funds



Note: Liquid assets comprise cash, debt securities issued by general government, and bank deposits and other claims payable on demand. The collective investment funds sector excludes funds for qualified investors.

Chart III.20
Surplus of assets over liabilities of transformed funds

(% of total assets of TFs)



Note: Dashed lines denote the minimum and maximum values across TFs.

Transformed funds made losses on part of their Czech government bond portfolios as a result of rising yields…

The implemented and further expected tightening of domestic monetary policy in 2021 and 2022 Q1 was accompanied by growth in Czech government bond yields (see section II.1, Chart II.14) and hence a fall in their prices.[72] This mainly affected pension management companies (PMCs), as Czech government bonds are dominant in the portfolios of their pension (primarily transformed) funds (see Chart III.18). Transformed funds do not mark a large proportion of their bond holdings to market at the aggregate level (see Chart III.5 CB). Nonetheless, the total amount of bonds marked to market ranged between CZK 167 billion and CZK 191 billion in the second half of 2021 and in 2022 Q1.[73] The marking to market was reflected in a gradual decrease in the value of transformed funds' aggregate surplus of assets over liabilities in 2021 (see Chart III.20). Liabilities exceeded assets for some transformed funds in the second half of 2021 and in 2022 Q1, and five PMCs had to top up the assets in these funds by a total of CZK 2.2 billion. At the aggregate level, the capital adequacy of PMCs remained sufficient even after they had topped up their transformed funds (see Chart III.21). According to the results of the PMC sector stress test, the further growth in yields assumed in the *Baseline Scenario* and the increase in risk premia under the *Adverse Scenario* would lead to a need to top up the assets of transformed funds and consequently also the capital of some PMCs. However, the necessary capital injections would be relatively insignificant and the sector would remain relatively stable at the aggregate level (see section IV.2.2).

…sovereign credit risk remains a long-term risk for the PMC sector

After the initial highly negative effect of the decline in the market prices of government bonds on the ability of transformed funds to cover their liabilities with assets subsides, the exit from the low-yield environment assumed in the *Baseline Scenario* is favourable for transformed funds in the longer run, as higher yields make it easier to fulfil the guarantee of non-negative returns. However, any further drop in the prices of Czech government bonds associated with an increase in their riskiness (see section II) might temporarily jeopardise the ability of PMCs to fulfil their statutory requirements. This risk would be especially relevant in conjunction with a material deterioration in the rating of the sovereign credit risk of the Czech government (i.e. an increase in the risk premium), which would give rise to a need to create provisions for bonds that are not marked to market. According to the results of the public finance stress test (see section IV.5), the likelihood of this occurring in the coming years is low. However, the risks connected with domestic public finance sustainability may increase in the longer term (see section II.2.1).

The systemic risks associated with a possible outflow of funds from PMCs are not high at present

Pension funds can also contribute to systemic risk in the opposite direction through indirect interconnectedness via the Czech government bond market. If pension funds faced a material outflow of invested funds, they could obtain additional liquidity by selling Czech government bonds and, in so doing, foster a fall in their prices with consequences for other holders

71 The CNB is required by law to conduct this assessment under Article 25 of Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on alternative investment fund managers. The CNB has been conducting regular quarterly assessments since the second half of 2021, when the related guidelines of the European Securities and Markets Authority entered into force. The assessment under these guidelines using data as of the end of 2021 involved 56 alternative investment funds which had increased leverage and/or managed large amounts of assets. For these funds, the potential to contribute to the formation or multiplication of systemic risk was assessed both individually and jointly for all funds. The potential to contribute to systemic risk was identified in eight of the funds assessed, but this contribution was not material in scale for any of them.

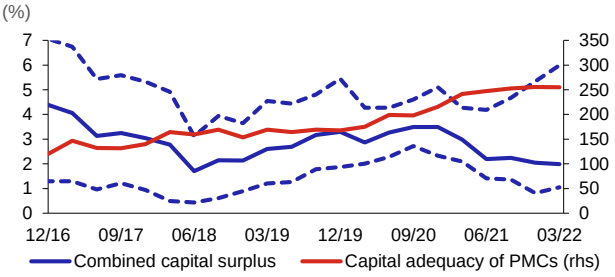
72 For example, the price of the Czech government bond issued in 2018 with a 2.75% coupon and a maturity date in July 2029 was down by 2.2% as of 30 September 2021, 8.9% as of 31 December 2021 and 12.5% as of 30 March 2022 relative to its value at the end of June 2021.

73 The gradual increase in the share of government bonds held at amortised cost since the start of 2021 is related to PMCs' switch to IFRS 9 in 2021 and the related abandonment of the 35% limit on the share of these bonds in total assets applicable in the previous accounting framework.

(see section III.4). The elevated inflation and the related drop in real wages are currently contributing to the risk of a possible stronger outflow of funds, as participants over 60 years of age could react by withdrawing their savings and younger participants saving in transformed funds for over 15 years by withdrawing up to half of their savings without losing their government contributions.[74] Pension management companies manage the risks associated with the outflow of funds, among other things, by holding an appropriate amount of liquid assets priced at fair value. A number of factors counteract the risk of sudden changes in participants' behaviour and subsequent outflows of a significantly increased volume of funds from the sector. Owing to revalorisation increases in pensions, some participants of retirement age may not be hard hit by inflation and may thus not have to resort to suddenly withdrawing their funds. In the case of younger participants, whose ability to repay their loans may be jeopardised, the household stress test did not indicate any risk of material withdrawals to obtain money for loan repayments (see section IV.4). Moreover, even in an environment of elevated inflation and financial market volatility associated with geopolitical uncertainty, saving in pension funds may continue to be seen as a prudent way to save for retirement compared to other alternatives thanks to government contributions and, in the case of transformed funds, to the guarantee of non-negative returns. Relatively conservative behaviour by participants and stable inflows into pension funds have been apparent in recent years, even in periods of heightened uncertainty (see Chart III.17).

Chart III.21

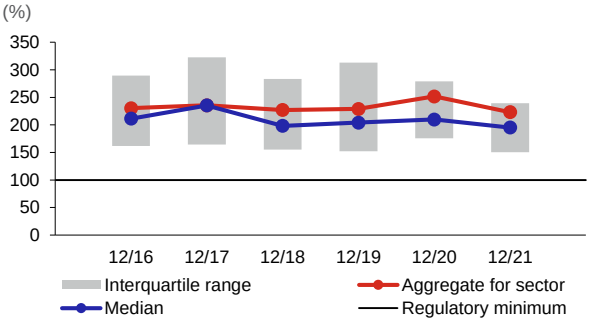
Combined capital surplus and capital adequacy of the pension fund sector



Note: Dashed lines denote the minimum and maximum values of the combined capital surplus across TFs. The combined capital surplus is the ratio of the sum of (1) the capital surplus of pension management companies and (2) the difference between the assets and liabilities of TFs to the assets of TFs.

Chart III.22

Ratio of insurance companies' eligible own funds to the solvency capital requirement



Note: The values exclude the Export Guarantee and Insurance Corporation and the Czech Insurers' Bureau.

The insurance sector maintained profitability and sufficient capitalisation…

In 2021, the domestic insurance sector maintained a stable investment portfolio size and structure (see Chart III.18) and stable premiums written in life insurance, while non-life insurance continued to grow (see Chart III.6 CB). Aggregate profitability (see Chart III.7 CB) increased year on year, due among other things to the accounting revaluation of equity holdings linked with changes in the structure of the financial groups to which some domestic insurance companies belong. Profitability was solid and comparable with previous years, even when adjusted for one-off effects. The ratio of eligible capital to the solvency capital requirement fell year on year at the aggregate level, largely because of mergers and acquisitions. However, it remained sufficiently high above the regulatory minimum (see Chart III.22). The rise in domestic and foreign yields did not have a material adverse effect on the insurance sector, owing mainly to the degree of matching of cash flows from assets and liabilities. The war in Ukraine also did not directly affect the domestic insurance sector, due to its limited scale of exposures and insurance liabilities to those countries affected by the war.

…increased inflation is amplifying premium sufficiency risk

In life insurance, a major correction of financial asset prices (see section II.1) and a return to a very low-yield environment in the medium term remain the main risk to the stability of the Czech insurance sector. In non-life insurance, premium sufficiency risk has intensified owing to increased inflation amid uncertainty about future economic developments, the continuing pandemic, the war in Ukraine and climate change (see section II.1). Claim settlement costs may grow appreciably in an inflationary environment. Growth in costs may also be driven by growth in reinsurance prices due to a continuation of the pandemic and to climate change. If insurance companies failed to increase their premiums in line with their costs due to a competitive environment and a decline in demand for insurance products, these products would become less profitable and potentially even temporarily loss-making. This could reduce the resilience of insurance companies and lead to changes in the range of the products offered. The CNB uses, among other things, macro-stress tests of the insurance sector to assess these risks. The results of this year's test confirmed that the domestic insurance sector remained resilient to potential adverse shocks at the aggregate level at the end of 2021 (see section IV.2.1).

74 This risk is especially relevant for transformed funds. The funds of participants over 60 years of age (CZK 147 billion as of 31 December 2021) make up a material part of the funds they manage. A large proportion of these participants can be expected to be able to withdraw all their funds without losing their government contributions. For most young participants (funds of CZK 314 billion), a large number of them can be expected to have already been saving for over 15 years and may thus withdraw half of their savings without losing their government contributions. In both cases, transformed funds have a three-month time limit for paying out the value of shares to departing participants.

III.4 INTERCONNECTEDNESS OF THE FINANCIAL SYSTEM

The level of interconnectedness of the sectors of the financial system mostly fell at the aggregate level

The interconnectedness of the segments of the domestic financial market has not strengthened in recent years.[75] Domestic banks continued to play a key role in the network of direct links between domestic financial institutions. They are an important counterparty for other financial institutions, which need to keep part of their assets in liquid form in bank accounts. However, the amount of these funds has declined in recent years (see Chart III.8 CB). Banks also continued to be a relevant source of funding for some firms in their domestic financial groups. This is particularly evident for NFCELs. In 2021, the importance of investment funds continued to grow slightly. They are used by some domestic financial institutions as vehicles to invest in the financial markets and property. In the area of indirect interconnectedness, common exposures in the form of Czech government bonds continued to dominate. A sell-off of these bonds by any of their major holders (see Chart III.18) could lead to a rise in stress on the Czech government bond market and thereby propagate to other balance sheets. The likelihood of this happening is currently relatively low and any stress would probably be short-lived, as the experience with rising stress in March 2020 showed. The sensitivity of Czech government bond prices and the level of contagion through them could nonetheless increase if perceived sovereign risk were to deteriorate (see section II.2.1).

Banks remain in a net creditor position in their ownership groups

The net creditor position of the banks under review has essentially remained largely unchanged over the last five years, ranging between 30% and 40% of total regulatory capital. It was up by 5.5 pp year on year to 36.7% at the end of 2021 (see Chart III.23). The net claim on controlled entities rose by CZK 18 billion year on year to CZK 184 billion. At the same time, absolute liabilities to controlled entities fell by CZK 8.9 billion year on year to CZK 32.2 billion. On the asset side of banks' balance sheets, own NFCELs remain the largest debtor within bank groups. However, the high concentration of claims on NFCELs has long been stable and, given the nature of the controlled companies' transactions (leasing and factoring), does not give rise to increased risk. As in previous years, liquidity from building societies was the largest item on the liability side of banks' balance sheets.

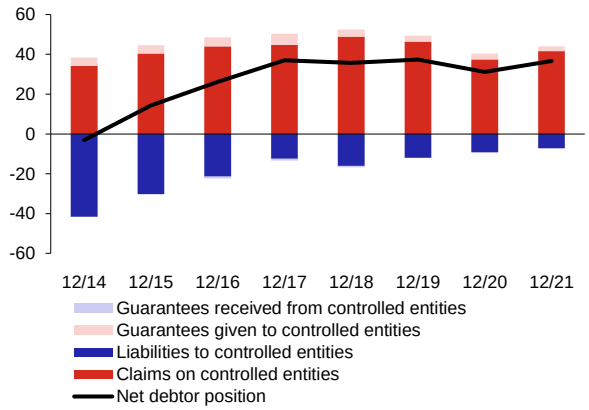
The net debtor position of banks vis-à-vis non-residents remains relatively stable in the long term

The net debtor position of the five largest domestic banks vis-à-vis their foreign parent financial institutions decreased slightly year on year from -175.3% to -163.9% of their regulatory capital at the end of 2021 (see Chart III.24). The debtor position has gradually decreased since 2018, due to a gradual increase in domestic banks' capital (see section III.2.1), and a fall in their liabilities to their parent institutions. The domestic banking sector's total net external debtor position has remained relatively stable since 2017. It increased by CZK 200 billion (13%) year on year to CZK -1,637 billion after a moderate improvement in previous years. However, given the high level of the banking sector's excess liquidity at the CNB (see Chart III.24, bold yellow line), this position does not pose a risk to financial stability.

Chart III.23

Interconnectedness in domestic bank groups

(% of regulatory capital of domestic parent banks)



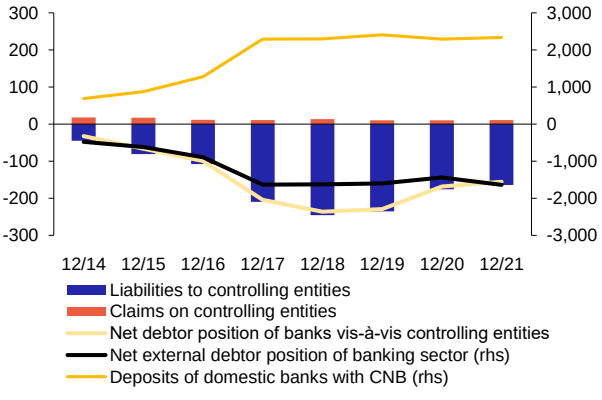
Source: Obligatory information to be disclosed pursuant to Decree No. 123/2007 and Decree No. 163/2014

Note: The chart depicts the aggregate credit interconnectedness of the largest domestic banks, i.e. Česká spořitelna, ČSOB, Komerční banka, Raiffeisenbank and UniCredit Bank.

Chart III.24

Interconnectedness vis-à-vis non-residents

(% of regulatory capital of domestic banks; right-hand scale: CZK billions)



Source: Obligatory information to be disclosed pursuant to Decree No. 123/2007 and Decree No. 163/2014, banks' annual reports, CNB

Note: The chart depicts the aggregate credit interconnectedness of the five largest domestic banks vis-à-vis their parent companies. The net debt position of the banking sector represents the overall net position of all banks vis-à-vis all non-residents excluding shares and other equity.

75 A detailed description of interconnectedness in the Czech financial system based on data as of 30 June 2020 is presented in Kučera, A. and Szabo, M. (2020): Interconnectedness and contagion in the Czech financial system, Thematic Article on Financial Stability 5/2020.

IV. STRESS TESTS

IV.1 STRESS TESTS OF BANKING INSTITUTIONS

IV.1.1 Solvency macro stress test of banks

The solvency macro stress test (SMST) is a tool for assessing the resilience of the domestic banking sector to hypothetical adverse economic developments. The test has a three-year horizon and assesses two economic scenarios, which are described in more detail in section II.1.2. The *Baseline Scenario*,[76] constituting the expected developments, is based on the macroeconomic forecast published in Monetary Policy Report – Spring 2022 and the *Adverse Scenario* on hypothetical developments in which the economy would remain in recession for an extended period. Both scenarios assume that general government sector deficits are financed through issues of bonds, which may increase the risk of concentration of exposures to the government in banks' assets (see section IV.5). Neither scenario assumes the application of profit distribution restrictions similar to those during the pandemic. However, gradual compliance with the MREL has some effect on dividend payouts, as the part of the capital surplus in excess of the regulatory requirements may be held for the purposes of MREL compliance (see section III.2.1, Chart III.2).

The methodology has been developed to respond to changes in the regulatory environment and refine the results in the area of interest costs and risk weights

The methodology responds to the application of the MREL by modelling eligible liabilities[77] and profit distribution[78]. Changes in the interest rate environment gave rise to a need to incorporate a more granular view of deposits and issued securities into the interest costs forecasting model. The accuracy of the risk weight predictions is enhanced by the use of data from credit risk regulatory statements.

Table IV.1

Key variables in the alternative scenarios and their impact on the banking sector

	Actual value	*Baseline Scenario*			*Adverse Scenario*		
	2021	2022	2023	2024	2022	2023	2024
Macroeconomic variables (averages for given periods in %)							
Real GDP growth (y-o-y)	3.4	0.8	3.7	3.9	-4.2	-2.3	-0.2
Inflation rate (y-o-y)	3.8	13.1	4.1	2.0	13.6	7.4	3.0
Unemployment rate*	2.9	2.4	2.7	2.3	3.5	7.5	9.9
Nominal wage growth (y-o-y)	6.6	4.8	5.6	6.6	4.0	2.8	4.0
Real GDP growth in EMU (y-o-y)	5.0	2.2	2.9	2.3	0.2	-2.8	-0.9
Growth in loans (y-o-y, averages for given periods in %)							
Non-financial corporations	0.9	9.1	11.0	9.0	10.4	14.7	1.5
Loans for house purchase	9.9	9.2	7.5	8.0	8.5	3.3	4.1
Consumer credit	3.3	6.0	3.4	3.4	5.9	0.1	2.1
Default rate (PD)*							
Non-financial corporations	2.2	2.7	2.2	1.0	7.4	2.3	4.2
Loans for house purchase	1.1	1.1	0.9	0.6	2.9	4.1	3.1
Consumer credit	4.1	4.4	4.2	3.2	6.2	7.4	5.6
Loss given default (LGD) (averages for given periods in %)							
Non-financial corporations	32	35	35	35	36	49	52
Loans for house purchase	15	17	18	18	19	26	28
Consumer credit	42	43	45	44	49	60	63
Asset markets (averages for given periods in %)							
3M PRIBOR	1.1	7.0	5.1	3.6	3.2	0.5	0.4
5Y IRS CZK	2.5	5.5	3.9	3.0	3.1	1.2	1.2
5Y Czech GB yield	2.2	5.3	3.8	3.0	3.3	2.2	2.2
3M EURIBOR	-0.5	-0.1	1.1	1.6	-0.5	-0.4	-0.4
5Y IRS EUR	-0.2	1.4	2.1	2.0	0.7	0.2	0.1
Residential property (y-o-y)	19.6	9.4	3.0	4.2	1.7	-11.1	-1.3
Equities (y-o-y)	28.4	-6.7	-2.8	0.7	-24.3	14.1	9.0

	Actual value	*Baseline Scenario*			*Adverse Scenario*		
	2021	2022	2023	2024	2022	2023	2024
Items in P/L statement and OCI (CZK billions)							
Profit to cover losses*	78.6	135.8	123.6	116.9	84.9	70.1	80.1
Credit losses*	-1.5	-25.2	-24.6	-20.6	-80.5	-70.5	-58.5
in stages 1 and 2	-2.6	-4.5	1.6	3.9	-56.9	7.9	1.7
in stage 3	4.3	-20.7	-26.2	-24.5	-23.6	-78.4	-60.1
Profit from market risks (P/L)	8.9	-2.1	0.6	0.4	-3.2	1.9	0.5
Pre-tax profit	85.3	108.5	99.6	96.7	1.2	1.4	22.1
Profit from market risks (OCI)	-14.9	-4.0	1.8	1.4	-5.5	2.4	0.7
Interbank contagion	0.0	0.0	0.0	0.0	-1.5	-0.4	-0.3
Balance-sheet items (CZK trillions; end of period)							
Assets	7.63	8.73	9.22	9.72	8.76	9.11	9.46
Client loans (net)	3.21	3.47	3.76	4.05	3.46	3.56	3.66
Debt securities holdings	1.46	1.61	1.78	1.95	1.64	1.87	2.11
Regulatory capital	0.62	0.54	0.59	0.63	0.47	0.47	0.49
TREA	2.62	2.83	2.97	3.13	3.05	3.28	3.59
TEM	8.21	9.32	9.83	10.32	9.41	9.81	10.18
Regulatory indicators (% as of end of period)							
Overall CAR (% of TREA)	23.5	19.2	19.8	20.1	15.4	14.4	13.5
CET 1 CAR (% of TREA)	22.1	17.9	18.5	18.9	14.2	13.2	12.5
Leverage ratio (% of TEM)	7.3	5.6	5.8	5.9	4.8	4.6	4.6
MREL indicator* (% of TREA)	25.6	25.1	28.4	28.3	20.9	22.2	20.7
MREL indicator* (% of TEM)	8.2	7.6	8.6	8.6	6.8	7.4	7.3
Others							
Dividends for given year*	194.2	19.6	37.0	39.4	0.9	0.8	2.7
Loss rate* (%)	0.05	0.71	0.64	0.5	2.24	1.85	1.49
RoA* (in %)	0.86	1.06	0.90	0.83	-0.01	-0.01	0.18

Source: CNB, BRCI

Note: * The unemployment rate is calculated using the ILO methodology. The PD values represent the expected default rate in the following year. Profit to cover losses represents pre-tax profit adjusted for credit losses and losses from market risk. Credit losses (with a minus sign) represent impairment losses due to credit risk. If loss allowances are released, the figure is shown with a plus sign. The MREL indicator is the sum of own funds and eligible liabilities. Dividends for 2021 represent the dividends paid on the basis of the model assumptions from the 2021 profit and retained earnings, not the actually reported dividends paid that year. Dividends are paid in the first quarter of the following year. The loss rate is calculated as credit losses divided by gross average client loans. RoA is calculated as after-tax profit divided by average assets at the end of the period.

76 The time series of the variables for the third year of the *Baseline Scenario* and all three years of the *Adverse Scenario* were created solely for stress testing purposes. For this reason, neither the *Baseline Scenario* beyond the forecast horizon, nor the *Adverse Scenario* is the CNB's official forecast.

77 The issuance of eligible liabilities is modelled in response to the issuance planning of banks (see section III.2.1).

78 In the modelling framework, where the bank's own funds and eligible liabilities are insufficient to meet the MREL, banks withhold profits until they reach the level necessary to comply with the MREL.

The *Adverse Scenario* reacts to the uncertainty associated with the war in Ukraine and disruptions to the global economy

The *Adverse Scenario* is designed to test the banking sector's resilience to severe but plausible developments. In the current situation, the need to assess how the impacts of a potential escalation of the war in Ukraine and worsening disruptions to global value chains may manifest themselves has moved to the forefront. In this scenario, these factors cause GDP to decline and stay at significantly lower levels than in 2021 (see Table IV.1). This scenario involves exceptionally high stress by historical comparison.

In the *Baseline Scenario*, the banking sector is highly profitable…

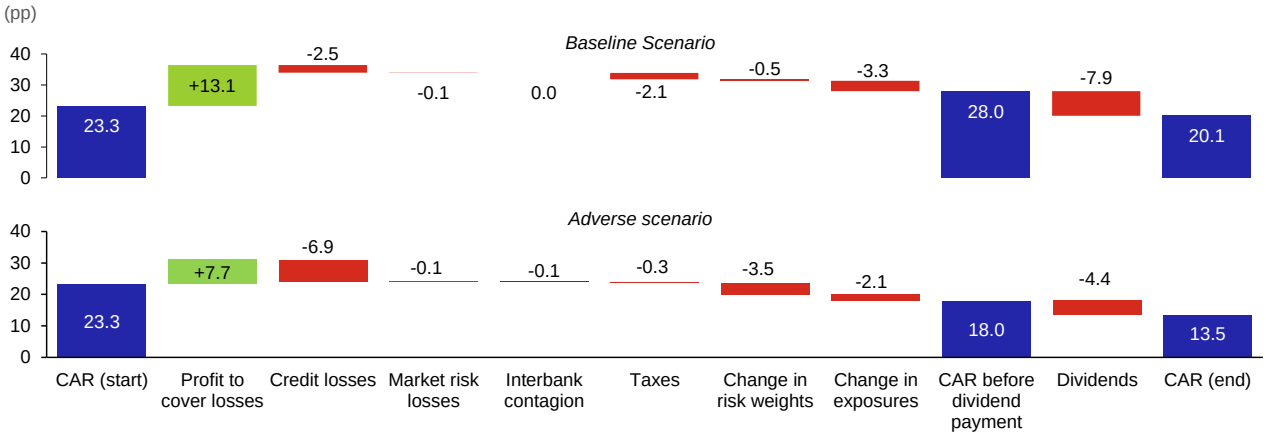
Pre-tax profit increases significantly to CZK 108.5 billion in the first year of the test (see Table IV.1) and then stays close to CZK 100 billion a year. RoA rises to 1.1% and then corrects slightly lower. Profitability is bolstered by income on excess liquidity, growth in loan portfolios and relatively low losses from credit and market risks (see Table IV.1). Income on excess liquidity gradually decreases owing to a decline in monetary policy rates. This is partially offset by growth in interest income on loans supported by relatively strong credit activity. Profit to cover losses (13.1 pp of the capital ratio; see Chart IV.1) markedly exceeds credit losses (-2.5 pp) and covers taxes paid (-2.1 pp), growth in the capital requirement due to growth in risk weights (-0.5 pp) and risk exposures (-3.3 pp) and the immaterial losses from market risks (-0.1 pp). There is no interbank contagion, or losses associated with it, in the *Baseline Scenario*. The capital ratio excluding dividend payments rises from its initial level of 23.3% to 28.0%. The model framework for dividend policy,[79] which takes the MREL into account, allows the payout of a significant part of retained earnings of CZK 194 billion in the first year of the test and subsequently part of the profits of CZK 96 billion in cumulative terms (a total of 7.9 pp).

…and the resulting capital ratio remains well above the regulatory threshold

After taking dividends into account, the sector's overall capital ratio amounts to 20.1% and remains well above the minimum overall capital requirement (OCR).[80] None of the banks tested would breach the minimum total SREP capital requirement (TSCR)[81] or the sum of the TSCR and the O-SII buffer (see Chart IV.2). The banking sector is even above the binding 3% leverage ratio limit by a sufficient margin and, taken on an individual basis, only one bank would fail to meet it (with a capital injection need of CZK 0.4 billion).

Chart IV.1

Decomposition of the change in the banking sector's overall capital ratio in the alternative scenarios



Note: CAR = overall capital ratio. Items increasing the capital ratio are shown in green and items reducing it in red.

Even in the *Adverse Scenario*, the banking sector would not record a systemic loss…

The hypothetical extremely adverse economic developments would lead to high credit losses and a drop in net interest profit. Despite this, the aggregate profit of the banking sector would remain slightly positive. Profit to cover losses (7.7 pp of the capital ratio; see Chart IV.1) would absorb the higher credit losses (-6.9 pp) but would no longer be sufficient to cover the growth in the capital requirement due to increased risk weights (-3.5 pp) and risk exposures (-2.1 pp). Immaterial losses from market risks (-0.1 pp), interbank contagion (-0.1 pp) and taxes paid (-0.3 pp) would reduce the capital ratio slightly further to 18.0% at the test horizon. The high 2021 capital surplus would allow dividend payouts of CZK 194 billion at the

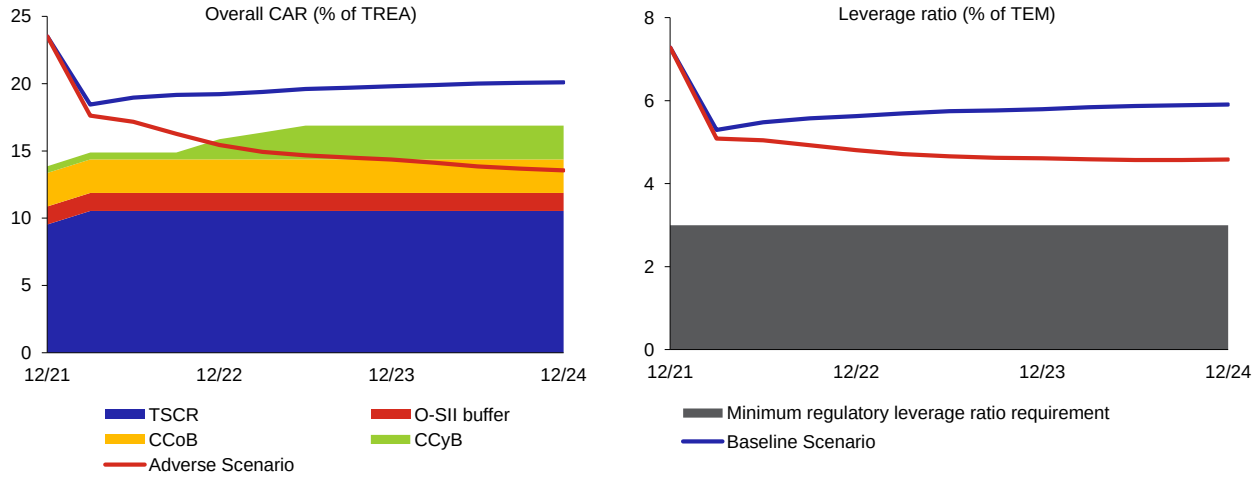
79 For details see Solvency macro stress test of the domestic banking sector.

80 The sum of the Pillar 1 and Pillar 2 requirements and the combined capital buffer. The OCR reaches 16.9% at the sector level during the test.

81 The sum of the Pillar 1 and Pillar 2 requirements. The TSCR reaches 10.5% at the sector level during the test.

start of the test. However, low profitability would limit further payouts to a total of CZK 4.4 billion (overall, dividends would lower the capital ratio by 4.4 pp).

Chart IV.2
Compliance with selected regulatory requirements by the banking sector in the alternative scenarios

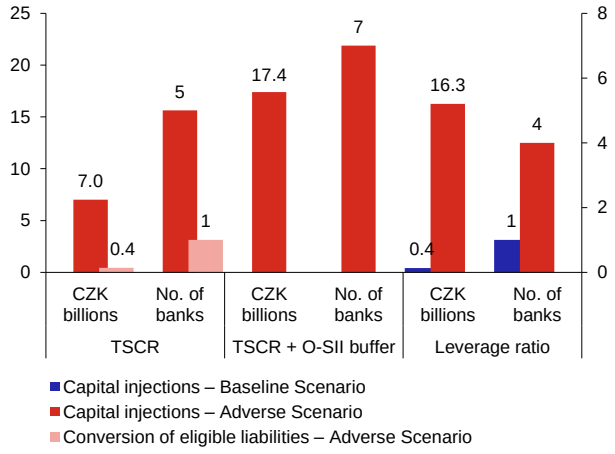


…and the resulting capital ratio would signal a need for the release and use of capital buffers

After taking dividend payouts into account, the overall capital ratio would be 13.5%. The result indicates that the banking sector as a whole would not meet the OCR. In this scenario, the CNB would respond by fully releasing the CCyB, allowing it to be used to absorb the banking sector's losses and lend to the real economy, and banks would make partial use of the capital conservation buffer. The TSCR would be breached by six banks (see Chart IV.3). In one case, this could lead to the conversion of CZK 0.4 billion of eligible liabilities. The other five banks would require capital injections totalling CZK 7.0 billion. Although the banking sector as a whole would meet the leverage ratio requirement, four banks would not meet it on an individual basis, and the indicative capital injection need would be CZK 16.3 billion. The resulting capital ratio in the *Adverse Scenario* shows that the pending CCyB rate is essential to ensure that the banking sector is sufficiently resilient and able to lend to the real economy.

Chart IV.3
Need and method for replenishing own funds at different capital requirement levels

(CZK billions; right-hand scale: number of banks)



Note: The model assumption for the conversion of eligible liabilities is a breach of the TSCR. In the event of breaches of the other capital requirements, replenishment of capital solely by capital injections is considered.

The CNB has set an MREL and now assesses compliance with it in its stress tests

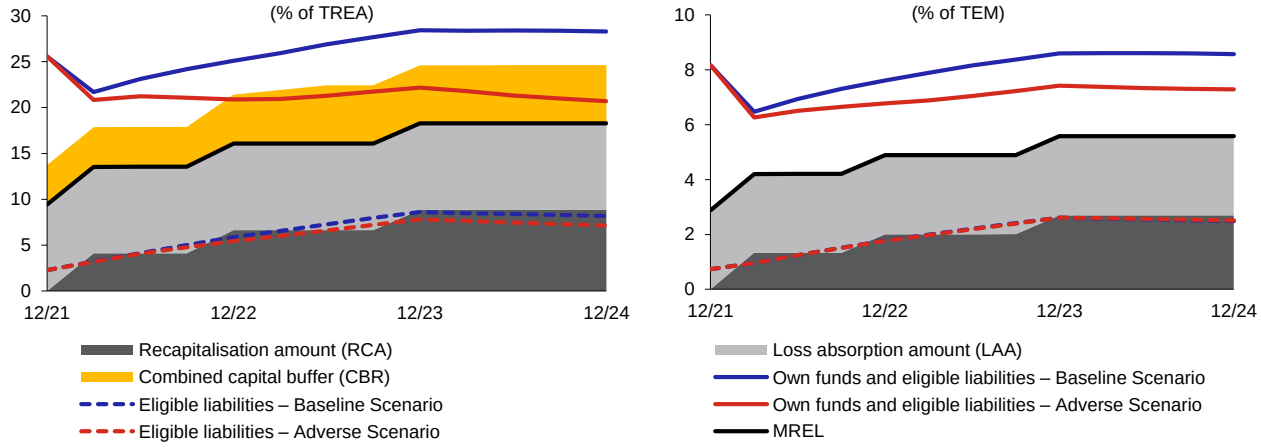
The MREL[82] is included in the stress test framework in order to assess whether banks would have sufficient funds to absorb losses (the loss absorption amount, LAA) and to recapitalise (the recapitalisation amount, RCA) in each scenario.

The banking sector is compliant with the required MREL in the *Baseline Scenario*

The banking sector as a whole has sufficient capital to meet the LAA and the combined capital buffer requirement (CBR) in the *Baseline Scenario*. However, owing to a substantial increase in total assets (see Table IV.1) and a moderate rise in risk exposures (see Chart IV.1), eligible liabilities are not sufficient to fully cover the RCA in the case of both the risk-weighted $MREL_{TREA}$ and the non-risk-weighted $MREL_{TEM}$ and part of the RCA thus consists of capital (CZK 22.3 billion) at the horizon of the *Baseline Scenario*. If banks were to issue sufficient eligible liabilities of the above amount in excess of the current issuance plans, part of the retained earnings tied up in the MREL would be released.

Chart IV.4

Compliance with the MREL by the banking sector in the alternative scenarios



In the *Adverse Scenario*, the banking sector would not meet the MREL

The banking sector as a whole would not have sufficient capital to simultaneously meet the LAA for the $MREL_{TREA}$ and the CBR. By contrast, the requirement based on the LAA for the $MREL_{TEM}$ would be met by a sufficient margin because of lower growth in non-risk-weighted exposures (TEM) than in the TREA (see Table IV.1). Owing to substantial growth in the TREA, eligible liabilities are insufficient to meet the RCA in the case of both the $MREL_{TREA}$ and the $MREL_{TEM}$. To meet the regulatory requirements of the MREL, eligible liabilities of CZK 61.2 billion would need to be issued on top of the existing issuance plans.[83]

82 An intermediate target for the MREL was set on 1 January 2022 and the MREL must be met fully by 1 January 2024 (see section III.2.1).

83 If the CCyB is fully released, part of the own funds tied to meeting the CBR can be used to fully cover the LAA and partially cover the RCA as well. However, additional eligible liabilities issues of CZK 51.3 billion are needed to fully cover the RCA.

IV.1.2 Bank liquidity stress test

The CNB stress tested the banking sector's resilience to liquidity risk

The stress test of the banking sector's liquidity is idiosyncratic[84] and static. It aims to monitor the extent to which each bank balances its expected liquidity outflows using its expected liquidity inflows and its initial counterbalancing capacity over a period of six months (the liquidity gap). The test yields information about whether and which banks would experience a liquidity shortfall (a negative liquidity gap), i.e. fully exhaust their counterbalancing capacity in the form of liquid assets, in the stress scenario over a six-month period. It is assumed that banks do not respond to any liquidity shortfall over the entire test period. The tests focus exclusively on liquidity shocks, the source of which is a freezing of interbank markets and financial collateral markets combined with a large outflow from unstable deposits. The main purpose of the test is to check whether the bank is too reliant on unstable sources of funding accompanied by insufficient holdings of liquid assets. The scenario parameters are based on the methodology in force (see Table IV.1 CB). Except for state-owned banks, all 19 domestic banks were tested for negative liquidity gap risk using the balance-sheet data as of February 2022. This involved a total of 16 entities after taking liquidity subgroups into account.[85]

The stress test confirmed domestic banks' robust liquidity position

The domestic banking sector has long been highly liquid (see section III.2.3). This year's test results confirmed domestic banks' considerable resilience to the liquidity shock tested. If a stress were applied to liquidity flows and liquid assets, all the banks tested would show a positive liquidity gap over the entire stress horizon (see Chart IV.5). As in the previous year, the level of liquid assets[86] (CZK 2.7 trillion) of the banks tested would be sufficient to cover the net outflows in the given period, due partly to a persistently high volume of stable retail deposits (CZK 3.7 trillion). The robust liquidity position was aided most of all by the composition of liquid assets (60% claims on the CNB and 37% government securities, which are not subject to stress).

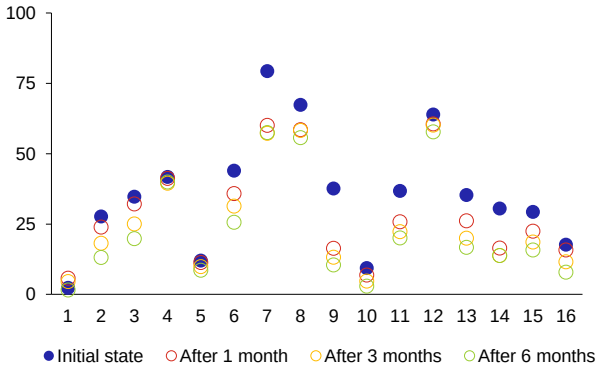
Indicators of systemic liquidity also show robust values

Certain ratios were selected to assess the banking sector's systemic liquidity (see Table IV.2). They track the main sources of systemic liquidity risk in the form of domestic banks' reliance on short-term or less stable sources of funding and excessive interconnectedness or similarity in sources of funding. Domestic banks are characterised by a very low ratio of encumbered assets to total assets (including collateral received) and low rehypothecation (the ratio of encumbered collateral received to total assets; see Table IV.2). Repo operations with the central bank are usually the source of such encumbrance. This, along with a low share of short-term wholesale or less stable funding and a robust loan-to-deposit ratio, signals a limited risk of interconnectedness and reliance on unstable sources of funding.

Chart IV.5

Results of the idiosyncratic test of the liquidity of individual liquidity subgroups

(liquidity gap in % of total assets; x-axis: liquidity subgroup)



Note: The initial state represents the share of highly liquid assets in total assets as of 28 February 2022.

Table IV.2

Selected indicators of systemic liquidity

(%; as of 31 December 2021)

	Large banks	Medium -sized banks	Small banks	Building societies
Ratio of encumbered assets to total assets, including collateral received	14	14	4	0
Ratio of transactions with CNB to sources of encumbered assets	96	100	100	100
Ratio of encumbered collateral received to total assets, including collateral received	6	13	9	0
Ratio of liquid assets eligible for acceptance by CNB to total assets	31	26	61	6
Ratio of LCR outflows to liquid assets eligible for acceptance by CNB	72	48	21	56
Ratio of wholesale funding sources to total assets	15	11	1	13
Loan-to-deposit ratio	72	58	46	93

Note: Averages weighted by the bank's balance sheet size.

84 The test focuses on the liquidity flows of individual banks and assumes that an outflow of liquidity from one bank means an inflow of liquidity into another. The test thus does not assume a simultaneous outflow of liquidity from all the banks tested or a liquidity outflow from the banking sector. The test results therefore cannot be simply aggregated and used to assess systemic liquidity risk.

85 See Article 8 of the Capital Requirements Regulation (CRR).

86 Level 1 assets under Commission Delegated Regulation (EU) 61/2015.

IV.2 MACRO STRESS TESTS OF NON-BANK FINANCIAL INSTITUTIONS

IV.2.1 Stress test of the insurance sector

The macro stress test of the insurance sector was based on similar assumptions as in the previous year…
The macro stress test of the domestic insurance sector covered 20 domestic insurance companies, which together accounted for 84% of the Czech life insurance market and 95% of the Czech non-life insurance market as measured by their share in net premiums written.[87] The test assessed the sector's aggregate resilience on the basis of Solvency II data as of 31 December 2021 (the balance sheet) and for 2021 (selected flow indicators). It monitored how the selected variables would affect the balance sheet, profit, and liquidity and capital positions of the tested insurance companies at quarterly frequency over a period of three years. Resilience was assessed using the solvency capital ratio, i.e. the ratio of eligible capital to the solvency capital requirement, which insurance companies are required to maintain above 100%. The test also monitored net cash flows related to the investment assets held by insurance companies and the insurance products provided by them, and evaluated the extent to which they would sell investment assets if they exhausted their liquidity buffers. As in previous years, the test used a number of methodological assumptions.[88]

…and considered developments under the *Baseline Scenario* and the *Adverse Scenario*
The stress test monitored the relevant variables in the scenarios considered (see section II.1.2). The key indicator for insurance companies is the movement of risk-free rates, which reflects the movement of domestic interest rates (see Chart II.21D). In the *Baseline Scenario*, risk-free rates initially rise sharply and then fall, while in the *Adverse Scenario* they would gradually decline to a very low level. The movement of risk-free interest rates affects the value of insurance companies' liabilities through changes in discount rates. Insurance companies' resilience is also affected by changes in prices of financial assets – shares, bonds, property, investment fund units and financial derivatives. In the *Baseline Scenario*, prices of Czech government bonds fall, i.e. their yields rise (see Chart II.21E). In the *Adverse Scenario*, share prices on global stock markets would drop sharply in the first year (US shares by 47%, European shares by 34%–38% and shares of other countries by 56%; see Chart II.21F) and risk premia on corporate bonds would rise (those on speculative grade bonds by more than 500 bp). This adverse trend would reverse only partly in the following years. In the *Adverse Scenario*, yields on Czech government bonds with short residual maturities would fall in line with the decline in monetary policy rates. In the case of bonds with long residual maturities, this decline would be offset by a rise in risk premia, so their yields would remain elevated (see section II.1.2). Besides the above variables, change in premiums and claim settlement costs in non-life insurance is relevant to the stress test of insurance companies. The *Baseline Scenario* assumes that the amount of premiums and claim settlement costs reflects inflation (see Chart II.21C). As an additional stress, the *Adverse Scenario* assumes that in order to maintain their market share, insurers would not pass on the increased inflation to their clients and instead cover part of their inflation costs with their profits. Inflation would thus be fully reflected in claim settlement costs but not in premiums. The growth in premiums in the *Adverse Scenario* is therefore adjusted for inflation by the decline in real GDP (see Chart II.21A) to take into account the impact of the decrease in demand for insurance products resulting from the economic downturn.[89] The financial stress experienced by some households in the *Adverse Scenario* would also result in growth in the lapse rate of life insurance policies proportionate to the decline in real GDP. The average additional annual lapse rate in life insurance in excess of the lapses expected by insurance companies would be 7.3%.

In the *Baseline Scenario*, the insurance sector remains resilient at the aggregate level…
In the *Baseline Scenario*, the aggregate solvency capital ratio rises from its initial level of 224% to 241% at the scenario horizon (see Chart IV.6) and the insurance sector as a whole thus remains sufficiently resilient. The main reason for the growth in the capital ratio is continued aggregate profitability in non-life insurance, which, however, is counteracted by the

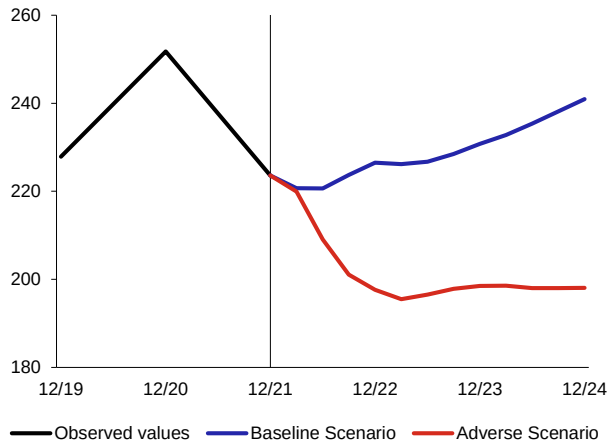
87 Branches of foreign insurance companies were not included in the test.

88 The test assumptions are described in detail in the methodology of the macro stress test of insurance companies. The most important are as follows:
(i) The test does not consider any change in the solvency capital requirement relative to the level at the start of the test and uses the solvency capital requirement for insurance companies that have to comply with a minimum capital requirement.
(ii) The test calculates insurance technical provisions in a simplified way by discounting the originally expected future cash flows. This calculation method ignores the absorption capacity of technical provisions to respond to changes in yield curves, for example by reducing the originally expected payments of shares in investment income to clients.
(iii) The test takes into account the fact that, in the case of unit-linked life insurance products, the impact of market risks on the value of investment assets is adequately reflected in the change in liabilities arising from these products.
(iv) The test takes into account insurance companies' option to apply volatility adjustment.
(v) The impact of additional life insurance policy lapses was evaluated solely from the perspective of insurance companies' liquidity position; the effect of this shock on their capital position was not considered.

89 The coefficients of correlation between change in insurance variables and change in GDP and inflation are set at 0.7–1.5 depending on the individual non-life insurance segments and are taken from Hodula, M., Janků, J., Časta, M., Kučera, A. (2021): On the Macrofinancial Determinants of Life and Non-life Insurance Premiums. *Geneva Papers on Risk and Insurance - Issues and Practice*, November 2021. In addition, the return of activity in the travel health insurance segment to the pre-pandemic level is considered in both scenarios. This is achieved by including the additional increase in premiums and claim settlement costs as of 2022 Q1 relative to the figures for 2021.

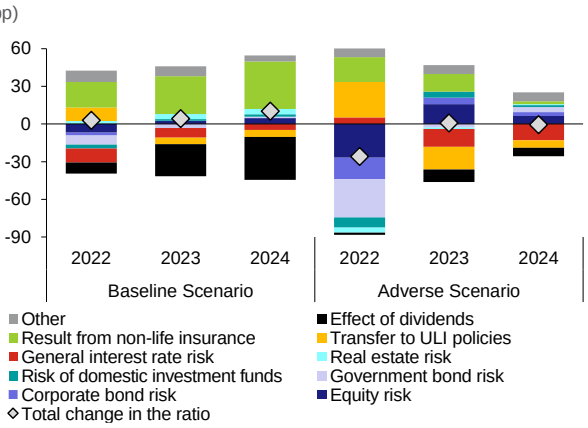
payment of dividends (see Chart IV.7). The test results indicate that most of the insurance companies tested will be well above the regulatory minimum of 100%. However, the impact of the scenario on individual insurance companies differs depending on their business models, the composition of their investment portfolios and the sensitivity of their assets and liabilities to change in interest rates. The solvency capital ratio drops significantly below the regulatory minimum at the end of the second year of the scenario in one insurance company and just below that minimum during the last year in another. According to the test results, the capital shortfall will amount to CZK 170 million, i.e. 0.16% of aggregate eligible capital as of 31 December 2021, at the end of the scenario.

Chart IV.6
Solvency capital ratio



Note: Insurance companies are required to maintain the solvency capital ratio above 100%.

Chart IV.7
Decomposition of year-on-year changes in the solvency capital ratio



Note: Other comprises taxes, yields and dividends on investment, and fixed costs. ULI = index-linked and unit-linked life insurance. In addition to the effect of change in risk-free interest rates, general interest rate risk reflects the possible application of volatility adjustment.

…the test results for the *Adverse Scenario* also indicate no material risks to financial stability

In the *Adverse Scenario*, the solvency capital ratio would fall to 198% in the first year and stay close to that level over the rest of the scenario. The aggregate capital ratio would therefore remain high enough above the regulatory minimum even in this scenario. The domestic insurance sector should not thus be a significant source of risks to the stability of the domestic financial sector. Market risks would contribute materially to the fall in the solvency capital ratio in the first year of the test (see Chart IV.7). Persistently high government bond yields, which would lead to a 30 pp drop in the solvency ratio if unadjusted for the transfer of part of losses to clients, would have the biggest effect. The ratio would also be adversely affected by a fall in the value of equity holdings (an unadjusted contribution of 27 pp) and a rise in credit spreads on corporate bonds (an unadjusted contribution of 17 pp). However, the drop would be partially offset by a decline in the value of insurance liabilities arising from index-linked or unit-linked life insurance where the investment risk is borne by the policy holder (see Chart IV.7, line: *Transfer to ULI policies*). Profitability in non-life insurance would also have a favourable effect. At the individual insurance company level, the test results indicate that the companies failing to meet the capital ratio in the *Adverse Scenario* would be the same as those in the *Baseline Scenario*. In this case, however, the capital ratio would drop below the regulatory minimum in the second half of the first year of the scenario and would be larger. The capital shortfall would amount to CZK 2.6 billion at the end of 2024 (2.39% of the initial aggregate eligible capital).[90]

Insurance companies would not face a material shortage of liquidity in any of the scenarios considered

The test results showed that insurance companies would cover the large majority of their cash outflows (claim settlements, dividend payments and tax payments) from their cash inflows (income and principal repayments on assets and premiums received) in both the *Baseline Scenario* and the *Adverse Scenario*. The total cash inflow shortfall would be CZK 1.5 billion in the *Baseline Scenario* and CZK 2 billion in the *Adverse Scenario* (see Chart IV.1 CB). Even if insurance companies obtained additional liquidity only through sales of Czech government bonds, these sales would not unbalance the government bond market. The test results thus show that insurance companies' contribution to the risk of contagion through the indirect interconnectedness of the domestic financial sector in the form of fire sales of Czech government bonds (see section III.4) is immaterial.

90 The capital shortfalls of both insurance companies in the test are due mainly to their increased sensitivity to significant changes in interest rates in both scenarios (see Chart II.21D). Losses on bond portfolios and a drop in profitability (growth in losses on non-life insurance) also had an additional downward impact on eligible capital. Given the assumptions of the test, the results represent the upper limit on the potential losses. In particular, it can be expected that the growth in the value of liabilities would be smaller, as the absorption capacity of technical provisions was not considered in the test. Moreover, the insurance companies concerned would hedge the key risks additionally or adjust their portfolios in the event of shocks.

IV.2.2 Stress test of pension management companies

The test assesses the resilience of the pension management companies sector at the one-year horizon

The stress test of pension management companies (PMCs) focuses on assessing the risks to transformed funds (TFs) managed by PMCs. The test was performed on TFs' portfolios using the end-2022 rate and risk parameter projections as the parameters of the *Baseline Scenario* and the *Adverse Scenario* (see section II.1.2 and Table IV.1). The *Baseline Scenario* is characterised by continued tightening of monetary policy, while the *Adverse Scenario* presents a recession linked with a rise in global risk aversion, which is corrected by supportive central bank monetary policy.

The test evaluates the credit risk of assets measured at amortised cost

A process of increasing the share of assets valued at amortised cost (mostly Czech government bonds) has been going on in TFs since the start of 2021.[91] This share stood at 58% at the end of 2021 (see Chart III.5 CB). As a result, an assessment[92] of the impact of the credit risk of portfolios measured at amortised cost and fair value through other comprehensive income has been added to the stress test.[93] Coverage of assets by loss allowances stood at 0.015%[94] at the end of 2021. This reflects the low riskiness of the main asset component, Czech government bonds (see section IV.5).

Transformed funds are still sensitive to general interest rate risk…

In both scenarios, the impact of shifts in risk-free rates affecting general interest rate risk is mitigated by derivative hedging and an increased share of exposures valued at amortised cost, which are not marked to market. In the *Baseline Scenario*, the koruna and euro yield curves both increase due to monetary policy tightening – by 2.4 pp and 1.1 pp respectively at the short end. The overall impact leads to a drop in TFs' asset value of 1.0% (see Table IV.3). In the *Adverse Scenario*, by contrast, accommodative monetary policy would reduce the koruna and euro risk-free rates (see Chart II.23C). This would lead to a 1.1% rise in asset value (see Table IV.3).

…but growth in the credit spread would outweigh the positive effect of the drop in risk-free rates in the *Adverse Scenario*

Government bonds account for 80% of the value of debt securities held, of which most (63%) were recognised at amortised cost at the end of 2021.[95] The remainder respond to shifts not only in risk-free rates, but also in the credit spread (risk premia). The credit spread in the *Baseline Scenario* grows slightly due to the dominant portfolio and liquidity effects of Czech government bonds,[96] and TFs' assets thus decrease in value by 0.3%. In the *Adverse Scenario*, growth in risk premia on government bonds would lead to a drop in TFs' assets of 1.7% (see Table IV.3). The credit spread risk for corporate bonds reduces assets by 0.1% in the *Baseline Scenario* and by 0.8% in the *Adverse Scenario* (see Table IV.6). The impacts of shifts in interest rates are partly offset by derivative hedging in both scenarios (+0.2% of assets in the *Baseline Scenario* and -0.2% of assets in the *Adverse Scenario*). However, TFs make little use of derivative hedging against interest rate risk.

The sensitivity of TFs to the other risks monitored is minimal

Although assets valued at amortised cost make up a large part of the portfolio, the expected credit risk losses are low. In the *Baseline Scenario*, loss allowances grow by CZK 49 million, leading to a drop in TFs' assets of 0.01%, while in the *Adverse Scenario*, they increase by CZK 294 million (see Chart IV.8), which equates to a decrease of 0.1%. This is due to a still low probability of default on both government and corporate bonds. Foreign currency assets account for 7.2% of TFs' balance sheets. Due to long-term high-quality derivative hedging, however, exchange rate risk (see Chart IV.8) has no material impact. Slight over-hedging leads to a rise in assets of 0.01% in the *Baseline Scenario* and a drop in assets of 0.2% in the *Adverse Scenario*. Equity securities account for only 0.3% of TFs' assets,[97] so the impact of equity risk would be limited despite the fall in share prices (of 29.1%) considered in the *Adverse Scenario*. The decline in property prices (of 11.9%) in the *Adverse Scenario* would result in a similarly immaterial impact of real estate risk, as property investments account for only 0.4% of TFs' assets.

Both scenarios indicate a need to top up TFs' funds…

PMCs guarantee non-negative returns for TF participants by law. If a TF's assets declined below its liabilities, the relevant PMC would be obliged to top up the TF's assets with funds equal to the difference between its assets and liabilities. In the *Baseline Scenario*, this situation arises in seven TFs, where the top-up need is estimated at CZK 5.7 billion (see

91 The regulatory limit on the amount of government bonds held to maturity (a maximum of 35% of TFs' assets) which can be valued on a basis other than fair value was abolished on the adoption of IFRS 9 in 2021.

92 The methodology for estimating the impact of credit risk on TFs' portfolios is described in the stress test methodology published on the CNB website.

93 However, the credit risk of assets measured at fair value through other comprehensive income has no impact on the result of the stress test, as loss allowances are not allowed to reduce the carrying amount of an asset (5.5.2 IFRS 9).

94 The coverage ratio was 0.008% for portfolios measured at amortised cost and 0.025% for portfolios measured at fair value through other comprehensive income.

95 For this reason, the impact of the scenario is smaller than in previous years.

96 The increase in the credit spread on foreign government bonds has no major effect on the results, due to only moderate growth in credit risk; it reduces assets by just 0.02%.

97 Their share decreased by 0.6 pp compared with the start of 2021.

Table IV.3). The *Adverse Scenario* would lead to a need to replenish the funds of all eight TFs by a total of CZK 5.9 billion (see Table IV.3). If the current *Adverse Scenario* were applied to the data as of the start of 2021, seven TFs would have to top up their funds by a total of CZK 3.1 billion.

…but this top-up does not represent a significant stress for PMCs in terms of financial stability

In the *Baseline Scenario*, the replenishment of TFs' funds by PMCs leads to a drop in the capital adequacy of three PMCs below the required statutory level (see Table IV.3). The shareholders of these PMCs therefore have to inject capital totalling CZK 0.9 billion into these PMCs. In the *Adverse Scenario*, a capital injection of CZK 1.1 billion is required for two PMCs (see Table IV.3).[98] If the *Adverse Scenario* were applied to the sector's situation at the start of 2021, no capital injections would be required. The greater impacts of the risks on the sector at the end of 2021 relative to the start of 2021 are due to the increase in interest rates during 2021 and the payment of dividends. However, the predicted capital injections do not represent a significant stress in terms of financial stability and the sector is relatively stable despite the strong rate increases in the *Baseline Scenario* and the growth in risk premia in the *Adverse Scenario*.[99]

Table IV.3

Results of the stress test of PMCs

Start of test:	CZK billions	
Excess of assets over liabilities in TFs	2.1	
PMC equity	12.7	
PMC capital requirement:	5.0	

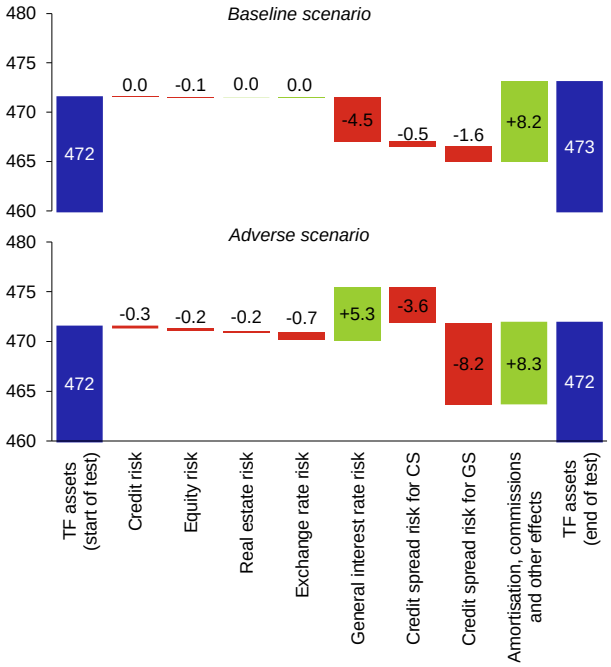
	Baseline Scenario		***Adverse Scenario***	
	CZK bn	% of TF assets	CZK bn	% of TF assets
TF assets at start of test	**471.6**		**471.6**	
Total impact of risks on TF assets	-6.6	-1.4	-7.9	-1.7
General interest rate risk	-4.5	-1.0	5.3	1.1
Credit spread risk for CS	-0.5	-0.1	-3.6	-0.8
Credit spread risk for GS	-1.6	-0.3	-8.2	-1.7
Credit risk	0.0	0.0	-0.3	-0.1
Exchange rate risk	0.0	0.0	-0.7	-0.2
Equity risk	-0.1	0.0	-0.2	0.0
Real estate risk	0.0	0.0	-0.2	0.0
Change in assets due to amortisation, commissions and other effects*	8.2	1.7	8.3	1.8
TF assets at end of test	**473.2**	**100.3**	**472.0**	**100.1**
TF liabilities at start of test	**469.5**		**469.5**	
Change in liabilities due to profit distribution	9.3		8.3	
TF liabilities at end of test	**478.8**		**477.9**	
End of test:	CZK bn		CZK bn	
Excess of assets over liabilities in TFs	-5.7		-5.9	
TF asset top-up need	**5.7**		**5.9**	
Number of TFs needing top-ups	**7**		**8**	
PMC equity (after commissions from TFs and TF top-ups)	7.7		7.5	
PMC capital requirement	4.9		5.0	
Capital injection into PMCs	0.9		1.1	
Number of PMCs needing capital injections	**3**		**2**	

Note: TF = transformed fund, PMC = pension management company, CS = corporate securities, GS = government securities. * Other effects are bond coupons received, dividend income and income from deposits.

Chart IV.8

Change in the value of assets of transformed funds due to the risks tested in the *Baseline* and *Adverse Scenarios*

(CZK billions)



Note: CS = corporate securities, GS = government securities. Other effects are bond coupons received, dividend income and income from deposits. Change in the value of foreign currency liabilities (cross-currency repos) is accounted for when considering exchange rate risk.

IV.2.3 Stress test of collective investment funds and PMC participation funds

The CNB tests the contribution of fund investment to systemic risks through its contribution to stress on the Czech government bond market

The CNB uses a stress test of collective investment funds and PMC participation funds (hereinafter "funds")[100] to assess their contribution to systemic risk in the domestic financial sector. The source of this contribution is the mismatch between the liquidity of funds' assets and liabilities.[101] The test is based on the assumption that in the event of asset repricing on the financial markets, sell-offs of fund units will increase and savings in individual funds will be cancelled, leading to a

98 For prudential reasons, the presented results do not include PMCs' TF management fees, which would increase PMCs' equity by an additional CZK 2.9 billion in the *Baseline Scenario* and CZK 2.5 billion in the *Adverse Scenario*. If PMCs were credited with the fees, they would meet the capital requirements without any capital injections.

99 The dividend payments of CZK 1 billion planned for 2022 have no major effect on the sector's stability..

100 For this year, the test has been extended to include PMC participation funds, whose business model and regulatory treatment is similar to that of collective investment funds. The term "fund" here refers to both collective investment funds and participation funds, while the term "investor" refers to both investors in investment funds and participants in pension funds.

101 Liquid assets comprise the deposits of individual funds on bank accounts with maturities of up to one year, deposits in money market funds and credit lines. Funds' liabilities consist mainly of the deposits of individual investors/participants.

sharp increase in funds' liquidity need. By redeeming units and paying out shares, funds will gradually exhaust their liquidity buffers and start to sell off assets if their buffers are insufficient. Increased sell-offs and a subsequent drop in the prices of those assets, which other domestic financial institutions also hold in their portfolios, may create an additional source of contagion in the domestic financial system.[102] The test considers sell-offs of Czech government bonds and a subsequent drop in their prices, as these bonds are held by all domestic financial institutions.

The test is performed dynamically on a significant part of the collective investment funds sector and on all PMC participation funds

The test involves repricing of individual funds' assets under the *Baseline* and *Adverse Scenarios* (see section II.2), followed by additional rounds of stress multiplication caused by exits of investors and participants. The test is based on funds' balance and off-balance sheets as of 31 December 2021. It covers 149 open-ended collective investment funds, which were managing assets totalling CZK 467 billion, i.e. 95% of the assets of the collective investment funds sector, at the end of 2021. It also covered 30 PMC participation funds, with assets totalling CZK 101.4 billion, i.e. 96% of the participation funds segment and 18% of the entire pension funds sector.[103]

The *Baseline Scenario* indicates a significant fall in assets held by individual collective investment funds…

In the *Baseline Scenario*, the aggregate test result is affected most strongly by growth in monetary policy rates and a related shift in yield curves (see Chart II.21D and Chart II.21E). This shift manifests itself mainly in the first year of the test and leads to a decline in prices of bonds held by funds. The fall in bond prices has a particularly strong impact on collective investment bond funds, which subsequently face an outflow of funds. Their assets fall to CZK 73.3 billion (-24%; see Table IV.4) at the end of the first year of the test. The total liquidity need of these funds caused by margin requirements and investor outflows is CZK 14.9 billion in the first year of the test. The increase in monetary policy rates also affects share prices.[104] As a result, equity and mixed funds record a fall in the value of their assets to CZK 88.3 billion (-20%) and CZK 148.8 billion (-23%) respectively due to price decreases and investor outflows as of the end of the first year of the test and a related liquidity need of CZK 7 billion and CZK 22.9 billion respectively. The assets of real estate funds are almost unchanged (-0.2%), in line with the property price scenario (see Chart II.17), and amount to CZK 68.4 billion at the end of the first year of the test. In the subsequent years, the *Baseline Scenario* predicts growth in assets of most segments and a much lower liquidity need. At the level of the collective investment funds sector as a whole, assets fall by CZK 82 billion over all three years, or 17% compared to the start of the test, to CZK 384.8 billion at the end of 2024 (see Table IV.4) and the total liquidity need is CZK 47.4 billion.

…the liquidity need of participation funds is much lower in the *Baseline Scenario*

The assets of participation funds decrease by CZK 10.7 billion in the first year of the test and CZK 8.6 billion over the test horizon to CZK 92.7 billion. This decrease is mainly a result of the temporary drop in prices of Czech government bonds, which account for a large part of participation funds' assets, considered in the first year of the scenario. The effect of redeeming participants will be apparent only in the first year of the test, and the related liquidity need of participation funds is insignificant (CZK 0.9 billion).

The impact of the *Adverse Scenario* on collective investment funds is affected most of all by a sharp increase in risk premia on financial markets…

The *Adverse Scenario* would have the greatest impact on collective investment equity funds, due to a strong correction on stock markets (see Chart II.21F). The value of equity funds' assets would fall by CZK 34.3 billion to CZK 75.7 billion in the first year of the test. As a result, these funds would experience significant investor outflows, fostering a total liquidity need of CZK 14.8 billion in the first year of the test (see Table IV.4). Mixed funds would also be hit hard; their asset value would be CZK 129.9 billion at the end of the first year (a drop of CZK 62.1 billion). Bond funds would be affected by a rise in the credit risk premium. However, the premium would be almost fully offset by a decrease in domestic interest rates, especially in the case of government bonds (see Chart II.21D and Chart II.21E). The decrease in assets managed by collective investment bond funds to CZK 71.8 billion at the end of the first year would thus be roughly equal to the results of the *Baseline Scenario*. Property prices would continue to correct in the *Adverse Scenario* (see Chart II.17) and real estate funds' assets would be down 13% in value at the end of 2024 (see Table IV.4). At the level of the collective investment

102 The test assumptions and calculation method are presented in a methodology. Assets are repriced in each quarter based on the scenario, and the repricing is used to derive the liquidity stress caused by the exit of investors and participants. A 10% decline in the value of a fund's assets will lead to the exit of investors holding 4% of assets in the case of equity funds, 8% in the case of mixed and other funds, and 12% in the case of bond funds. In the case of real estate funds, the fact that these funds have one year to redeem investors' units is considered. Similarly, in the case of participation funds, the loss of state contributions and the back-payment of tax in the event of early withdrawal are taken into consideration. The test takes into account yields on bond holdings and related cash flows, and currency hedging, including the impacts of any changes in margin requirements for derivatives on funds' liquidity position. On the other hand, the test abstracts from yields and cash flows on assets other than bonds, arrivals of new investors and purchases of new assets by funds (the static balance sheet assumption).

103 The remainder of the PMC sector comprises transformed funds, which the CNB tests separately due to differences in their business model and the nature of the associated risks (see section IV.2.2).

104 The discount factor will rise due to an increase in (risk-free) rates. This will result in a fall in the present value of future dividends and hence a drop in share prices. For details see Časta, M. (2022): *Deriving Equity Risk Premium using Dividend Futures.* North American Journal of Economics and Finance 60.

funds sector as a whole, the unit value would on average drop to 72% of its initial value at the end of the first year of the test. The losses would decrease during the second and third years, mainly due to the assumed correction of the initial drop in prices of individual assets, and the average unit value would thus be 81% of the initial value at the end of 2024 (see Chart IV.9). The assets of the collective investment funds sector as a whole would fall on aggregate by CZK 94.7 billion, or 20%, compared with the start of the test to CZK 372 billion (see Table IV.4). The overall aggregate liquidity need would be CZK 74.7 billion in the first year of the test and CZK 78.5 billion over the entire scenario period.

…in the case of participation funds, a decline in risk-free yields counteracts a significant fall in asset prices

In the case of participation funds, the *Adverse Scenario* would imply a fall in asset prices of CZK 11 billion in the first year. Over the scenario horizon, participation funds' assets would drop by CZK 8.7 billion to CZK 98.3 billion. This drop would be caused mainly by growth in risk-free premia on bond and stock markets. The smaller impact relative to collective investment funds is due mainly to the higher share of (Czech) government bonds in participation funds' portfolios, where the growth in risk-free premia would be significantly offset by a decrease in monetary policy rates. As in the *Baseline Scenario*, the effect of redeeming participants and the related liquidity need is immaterial and will be apparent only in the first year of the test (CZK 1.2 billion).

The test results indicate that funds do not contribute materially to systemic risk in the form of multiplication of adverse market developments

The stress test results indicate that the funds tested would not contribute materially to systemic risk in the form of multiplication of adverse market developments. Collective investment funds held Czech government bonds totalling CZK 66.7 billion (i.e. 2.9% of the total government debt and 4% of the total Czech government bond portfolio held by domestic financial institutions) in their balance sheets at the end of 2021. PMC participation funds held Czech government bonds amounting to CZK 44.3 billion (2% of the total government debt and 2.6% of the Czech government bonds held by domestic financial institutions) in their portfolios. In the *Baseline Scenario*, the total value of Czech government bonds sold by funds is relatively low, at around CZK 8.5 billion. According to the test estimate, this would lead to a drop in their prices of no more than 1.7%. Even under the *Adverse Scenario*, funds would not be forced to sell off material amounts of Czech government bonds, owing to their high liquid asset holdings relative to their Czech government bond holdings. The test estimates that the sell-offs would total CZK 14.9 billion, which would lead to a drop in bond prices of 3.1% amid lower market liquidity (see Table IV.4).

Table IV.4

Results of the stress test of collective investment funds and PMC participation funds

(CZK billions)

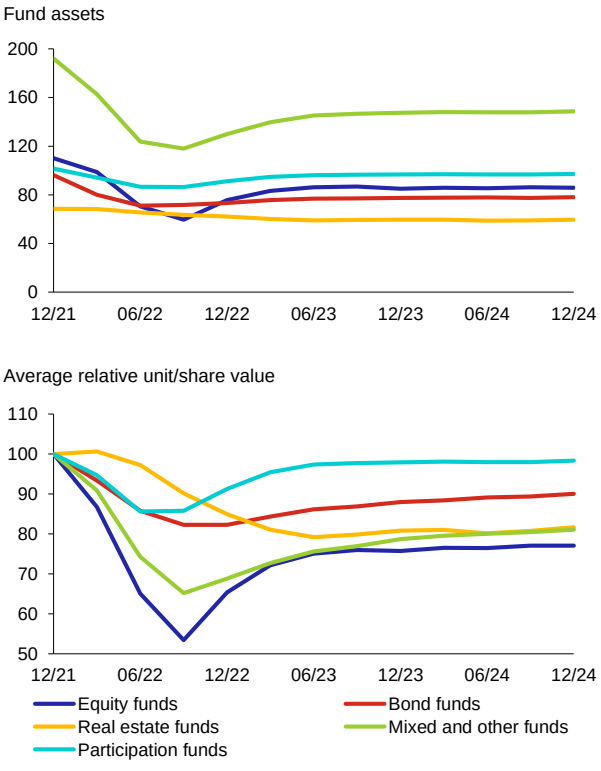
	Actual value	*Baseline Scenario*			*Adverse Scenario*		
	2021	2022	2023	2024	2022	2023	2024
Assets of funds covered by test							
Collective investment funds	466.7	378.8	380.5	384.8	340.9	369.6	372.0
Equity funds	110.0	88.3	86.1	85.4	75.7	85.1	85.8
Bond funds	96.1	73.3	75.0	77.5	73.3	77.4	78.0
Real estate funds	68.5	68.4	70.0	71.8	62.1	59.6	59.6
Mixed and other funds	192.0	148.8	149.3	150.1	129.9	147.4	148.6
PMC participation funds	101.4	90.6	91.7	92.7	91.1	97.9	98.3
Unit value (% of initial value)							
Collective investment funds	100	82.3	82.7	84.9	71.8	79.5	81.1
Equity funds	100	80.1	79.0	80.6	65.3	75.7	77.1
Bond funds	100	87.0	89.3	92.8	82.3	88.0	90.1
Real estate funds	100	101.5	103.9	106.9	84.9	80.8	81.7
Mixed and other funds	100	86.1	85.8	88.6	68.8	78.7	81.1
PMC participation funds	100	90.2	91.7	92.7	91.3	97.9	98.3
Liquidity need							
Collective investment funds		45.0	1.8	0.6	74.7	3.0	0.8
Equity funds		7.0	0.5	0.2	14.8	0.7	0.2
Bond funds		14.9	0.2	0.0	18.2	0.4	0.3
Real estate funds		0.0	0.0	0.0	2.0	0.7	0.1
Mixed and other funds		22.9	1.1	0.4	39.8	1.2	0.3
PMC participation funds		0.9	0.0	0.0	1.2	0.0	0.0
Impact on Czech government bond (GB) market							
Czech GBs sold		8.3	0.2	0.0	14.7	0.2	0.0
Decrease in bond price (%)		1.7	0.0	0.0	3.1	0.0	0.0

Note: The liquidity need consists of the value of redeeming investors' units and margin requirements on derivative transactions. The waterfall method is used for portfolio sales.

Chart IV.9

Aggregate paths of investment funds' assets and units/shares in the *Adverse Scenario*

(upper panel: CZK billions; lower panel: % relative to start)



IV.3 STRESS TEST OF NON-FINANCIAL CORPORATIONS

The CNB conducts a macro stress test of non-financial corporations to identify which industries would be hit hardest in the *Baseline* or *Adverse Scenario* (see section II.1.2).[105] Of key importance from the financial stability perspective is an analysis of the adverse impacts on the industries with the highest shares of loans. In the Czech economy, these have long been manufacturing, wholesale and retail trade, and real estate activities (also referred to here as property developers). Banks' exposures to these industries account for about two-thirds of total performing loans in the non-financial corporations sector (around CZK 750 billion). One output of this stress test is an estimate of the default rate on loans to individual industries, which is a key input to the bank stress tests (see section IV.1, Table IV.1).

The non-financial corporations sector entered the stress test in good shape

The economic recovery in 2021 had a very favourable effect on non-financial corporations (see section II.2). Despite some problems on the supply side of the economy (see section II.1), return on equity in non-financial corporations went back to pre-pandemic levels (around 10% on average; see Chart II.27). The favourable situation in the sector is also evidenced by the aggregate default rate on corporate loans, which was very low during 2021 (1.2%; see Chart II.33).

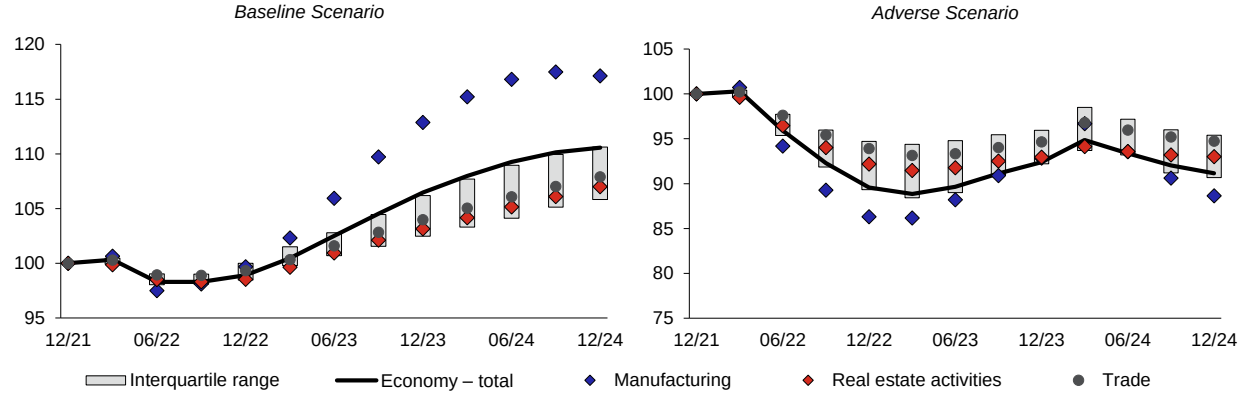
In the *Baseline Scenario*, the default rate on loans to trade, construction and property developers rises slightly

Growing costs of energy, other commodities and materials (see Chart II.21C), an increase in market interest rates (see Chart II.21D), a drop in household consumption due to falling real income (see Chart II.28) and persisting supply-side disruptions affect the financial situation of corporations in the first year of the *Baseline Scenario*. Highly subdued growth in economic activity in the first year of the scenario and its acceleration from the second year onwards (see Chart II.21A) are reflected in gross output (see Chart IV.10). The favourable trade balance assumed from the second year of the scenario onwards fosters above-average growth in real output in manufacturing. The output trend is mirrored by growth in the profit rate, which picks up significantly in manufacturing in the second year of the scenario. It decreases in the third year as a result of accelerating wage growth (see Chart IV.11). The default rate on corporate loans increases in the *Baseline Scenario*, mainly because of higher debt servicing costs. In aggregate terms, roughly 2.7% and 2.6% of loans become non-performing in 2022 and 2023 respectively (see Chart IV.12). The default rate falls to 1.9% in 2024 as interest rates decline. Turning to individual sectors, the default rate increases to above-average levels mainly for loans to wholesale and retail trade, construction and property developers. By contrast, the default rate on loans to manufacturing is very low in the first two years.[106]

Chart IV.10

Economic output in industries in the *Baseline Scenario* and the *Adverse Scenario*

(index of real variables, 12/21 = 100)

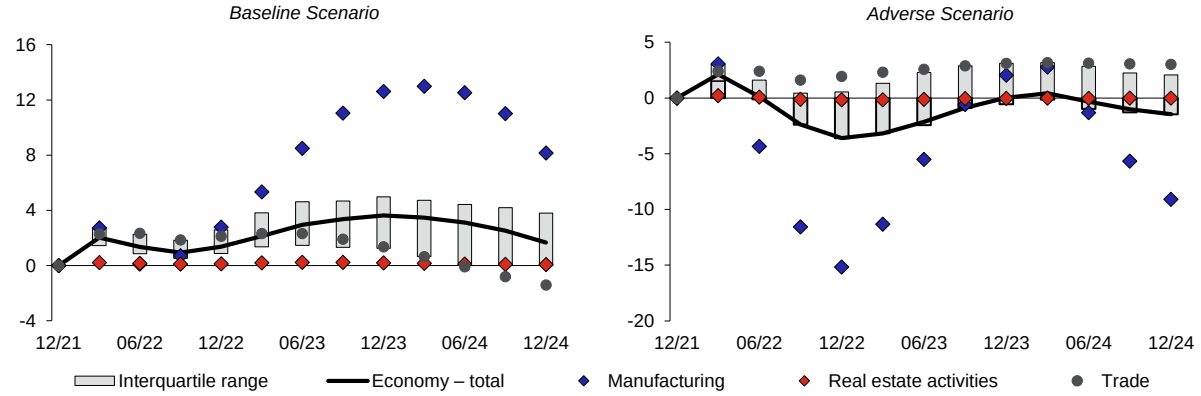


Note: Owing to a delay in the availability of macroeconomic data, the figures for 12/21 are estimated.

105 More information on stress testing of non-financial corporations can be found in a methodological document on the CNB website and in Siuda, V. (2020): *A Top-down Stress-testing Framework for the Nonfinancial Corporate Sector*. CNB Working Paper 12/2020. The current stress test was based on the structure of demand in the individual industries and the relations between them observed in 2020. This structure was estimated for 2021 based on the observed evolution of the economy and the banking sector's credit exposures.

106 The stress test methodology does not work with non-financial corporations' current balance sheets (data for the Czech Republic become available with a substantial lag). Firms' results for 2022 Q1 reported in Western Europe and the USA suggest that corporate balance sheets are very strong and sound and the sector is able to generate very solid profits even in the current situation of rising costs. Assuming that the situation is similar in the Czech Republic, the estimated default rates may be overestimated.

Chart IV.11
Growth in the profit rate in industries in the *Baseline Scenario* and the *Adverse Scenario*
(change in pp)

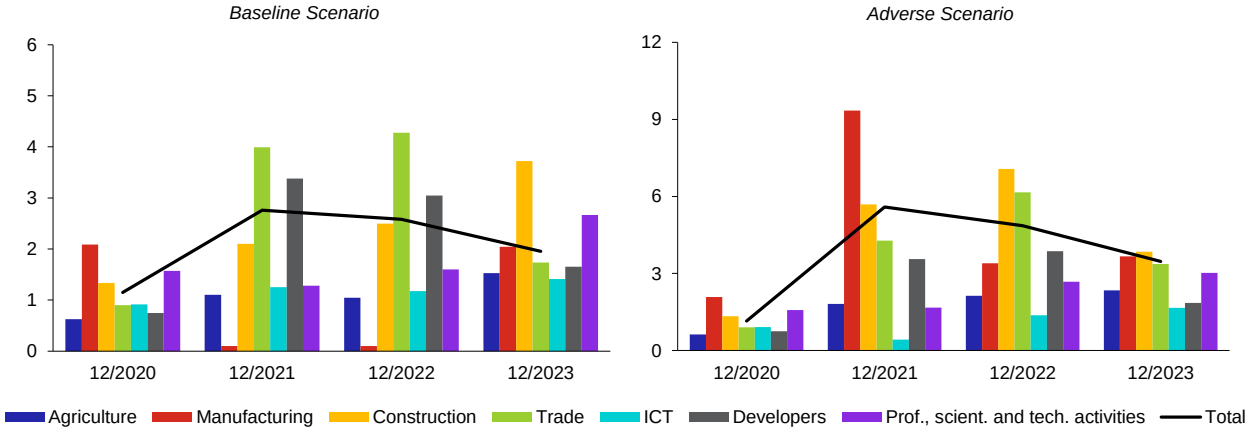


Note: The profit rate is the ratio of gross operating surplus to gross value added. Owing to a delay in the availability of macroeconomic data, the figures for 12/21 are estimated.

In the *Adverse Scenario*, the default rate on loans to manufacturing would increase markedly

Materialisation of the *Adverse Scenario*, which assumes a drop in economic activity of up to 11% at the peak of the crisis at the end of the first and the start of the second year of the scenario (see Chart II.21A), would mean that real output would fall below 90% of the initial level observed at the end of 2021 (see Chart IV.10). The decrease in the trade balance into negative territory would mainly affect manufacturing, whereas the decline in investment activity of up to 24% would severely hit production above all in the construction industry. Despite the sharp economic contraction, the total profit rate would fall only slightly (see Chart IV.11), owing to negative real wage growth (-11% at the peak of the crisis) in the first two years of the scenario. Again, bigger decreases in the profit rate would be seen in manufacturing and construction. The aggregate 12-month default rate would rise to more than 5% in the first year of the scenario (see Chart IV.12) and would still exceed 3% in the last year. Overall, around 13.9% of loans to non-financial corporations would become non-performing over the three years of the scenario. The default rate in manufacturing, which would be hit the hardest in the *Adverse Scenario*, would exceed 9% in the first year. Construction and trade would also record high default rates (peaking at over 7% and 6% respectively), mainly in reaction to the repercussions of elevated interest rates coupled with a drop in household consumption.

Chart IV.12
12M default rate in selected industries in the *Baseline Scenario* and the *Adverse Scenario*
(%)



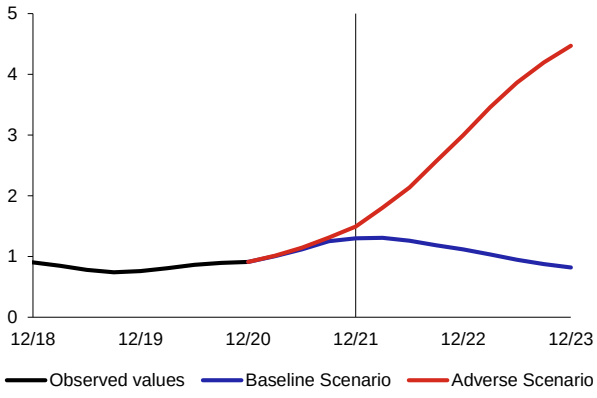
IV.4 HOUSEHOLD STRESS TEST[107]

The household stress test focuses on the credit risk of households with a mortgage loan, which the CNB measures using the 12-month mortgage default rate. The default rate is monitored over a three-year horizon using the *Baseline* and *Adverse Scenarios* (see section II.1.2) and the resulting estimate is used – among other things – as one of the main inputs to the bank stress test (see section IV.1). Stress testing has gained importance over the last year because of the rise in inflation and debt servicing costs (see section II.1), which is gradually feeding through to Czech households' budgets.

According to the household stress test, credit default risk remains low in the *Baseline Scenario*…
The default rate on mortgage loans to households increases only modestly in the *Baseline Scenario*, rising from record lows to 1.3% and amounting to 3.2% in cumulative terms over the entire scenario horizon (see Chart IV.13). This is due mainly to a stronger inflow of non-performing loans during 2022 and partly also 2023 caused by rising unemployment and falling real income (see Chart II.28). In the last year of the test, however, the situation stabilises and the default rate starts to go down gradually.

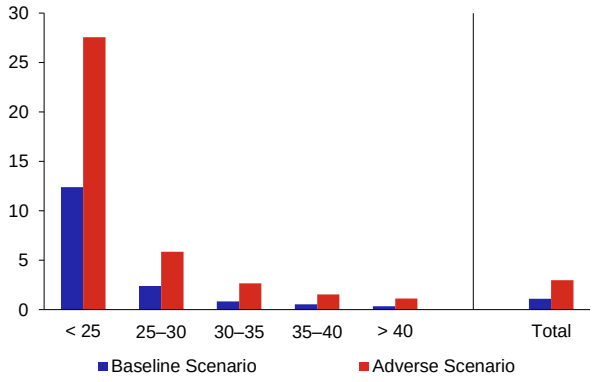
…mostly low-income households and households with high debt service are exposed to the risk of default
According to the stress test results, low-income households are most at risk of defaulting on their mortgage loans, as they are the most sensitive to a rise in costs and a drop in, or temporary loss of, income. The average default rate among households whose principal mortgage loan applicant has a net monthly income of less than CZK 25,000 is 12.4% in the *Baseline Scenario* (see Chart IV.14). However, banks' credit exposures to this group of households have long been low (less than 10% of total exposures), so their potential default has no major effect on the overall quality of banks' portfolios (see section IV.1). The default rate among medium- and high-income households, which account for over 90% of banks' mortgage exposures, is crucial to the financial stability of the banking sector. Although households whose principal applicant has a net monthly income of CZK 25,000–CZK 30,000 record a slightly above-average default rate (2.4%), the overall default rate of medium- and high-income households remains low. In addition, the stress test results confirm that credit default risk is elevated for mortgages with a DSTI of over 40% and a DTI of over 8, the default rate being above average in both cases (see Chart IV.2 CB). Loans with a DSTI of up to 30% and a DTI of up to 6 appear very safe according to the household stress test (see Chart IV.2 CB). These household stress test results are confirmed by a complementary analysis (see Box 4).

Chart IV.13
12M default rate on mortgage loans to households
(%)



Note: The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period.

Chart IV.14
Average 12M default rate by income group
(% of loans in given income group; x-axis: borrower's net income in CZK thousands)



Note: The chart shows the average default rate calculated across the years of the scenario. The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period. Net income is the net monthly income of the principal mortgage loan applicant. Interval closed from the right.

107 The stress testing methodology is described on the CNB website (see Stress testing: Household sector).

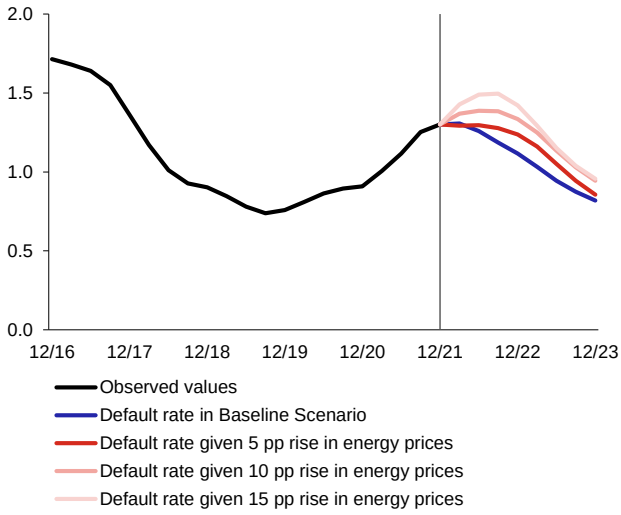
Growth in energy prices has no major impact on the financial stability of households with a mortgage loan…

The expected growth in housing costs, reflecting energy price developments, gradually passes through strongly to households' overall budgets (see section II.2) but has only a limited impact on the mortgage default rate. A sizeable proportion of households with a mortgage loan either cover their elevated housing costs from savings accumulated in previous years or reduce unnecessary consumption.[108] In connection with the energy price developments, a sensitivity analysis was used to test the situation where energy prices rise sharply not only in 2022 as in the *Baseline Scenario*, but also in 2023 and 2024, such that the rapid drop in the price growth in these two years is replaced by declines that are 5 pp, 10 pp and 15 pp slower. The analysis shows that the mortgage default rate does not change much, increasing by just 0.3 pp even in the case of the strongest shock to energy prices (see Chart IV.15). However, if the strict ceteris paribus assumption is abandoned and the higher energy prices are allowed to pass through to goods and services prices, the default rate rises by roughly a further 0.15 pp.[109]

Chart IV.15

12M default rate on mortgage loans to households given continued strong growth in energy prices

(%)

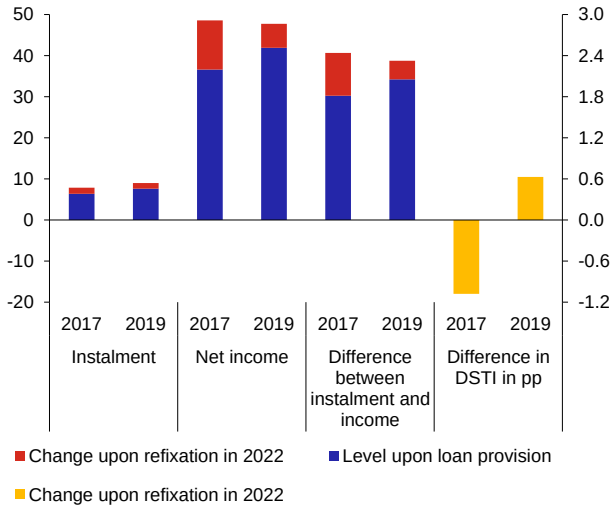


Note: The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period.

Chart IV.16

Change in the median instalment and income upon refixation in 2022

(CZK thousands; right-hand scale: pp)



Note: The x-axis shows the year when the mortgage loan was granted. The change in nominal income considered corresponds to the average change in income as of 2022 Q2 by comparison with Q2 of the year when the mortgage loan was granted.

…excessive growth in the unemployment rate would have adverse effects, while growth in interest rates would not

A sensitivity analysis going beyond the *Baseline Scenario* was used to test households for growth in the unemployment rate and interest rates. Other things being equal, the default rate on mortgage loans to households would rise significantly in the case of an increase in unemployment. In the extreme case, it could climb as high as 3% (see Chart IV.17). By contrast, the impact of a change in interest rates on the default rate turns out to be rather limited (see Chart IV.17). This is mainly because the increase in interest rates, and hence also in instalments on refixed loans, is largely offset by past growth in nominal income (see Chart IV.16).[110] Moreover, a trend of longer fixed-rate periods has prevailed in recent years, with more than 90% of new mortgage loans being provided with the rate fixed for three years or more and almost 50% with the rate fixed for five years or more. The increase in interest rates thus affects only a limited share of banks' mortgage portfolios and has a marginal impact on the overall default rate. The results of the sensitivity analyses clearly confirm that the solvency of indebted households is largely determined by the unemployment rate.

108 Monetary Policy Report – Spring 2022.

109 A weight of 7.85% is employed in the analysis of the transmission of the energy price shock to general inflation in the economy, in line with the consumer basket used to calculate the consumer price index as of January 2022 (CZSO).

110 For illustration, consider two mortgage loans, one provided in 2017 with a five-year fixed rate and the other in 2019 with a three-year fixed rate. Assuming the median loan sizes (CZK 1.55 million and CZK 1.8 million), median interest rates (1.99% and 2.79%) and median loan terms (314 and 342 months) for the two periods, the instalments are about CZK 6,300 for the loan provided in 2017 and about CZK 7,600 for that provided in 2019. Refixation of the rates in 2022 at an average of 4.3% would increase the instalments by CZK 1,500 and CZK 1,400 respectively. However, the average past growth in nominal income should fully cover this increase, with DSTI even decreasing for the loan provided in 2017 by comparison with the level when the loan was granted (see Chart IV.16).

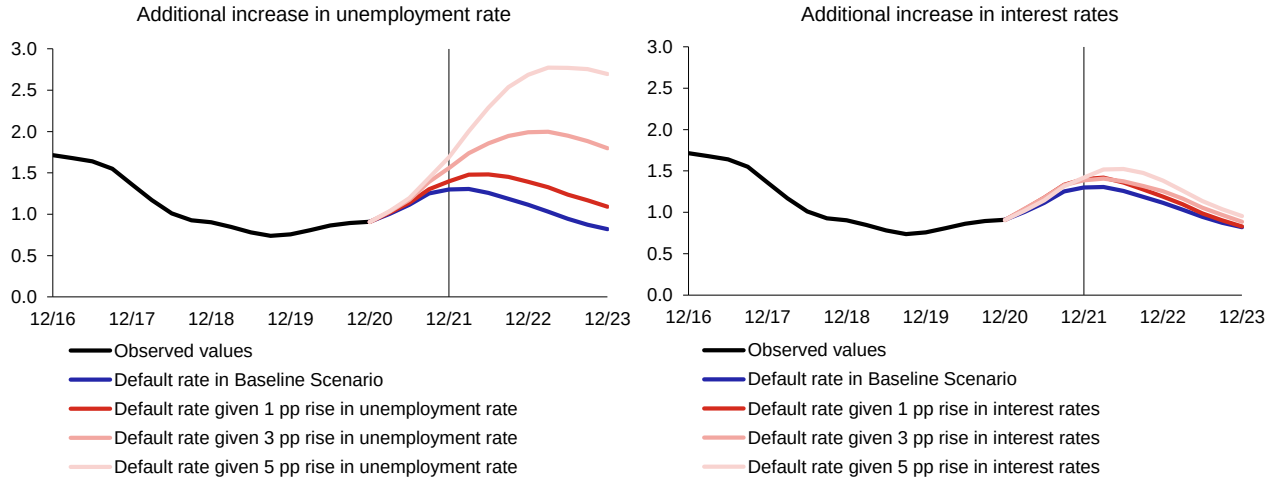
The *Adverse Scenario* would lead to substantial materialisation of credit risk in the household sector

The results of testing under the *Adverse Scenario*, which assumes an unemployment rate of 11% (see Chart II.21B), also show that the unemployment rate has a significant effect on the default rate of households with a mortgage. If the *Adverse Scenario* were to materialise, the mortgage default rate would rise rapidly, peaking at almost 4.5% at the end of the test horizon and reaching 9% in cumulative terms over the entire scenario horizon (see Chart IV.13). In this situation, medium-income households as well as low-income ones would record a higher default rate (see Chart IV.14). The highly adverse developments would also affect mortgage loans with a DSTI of over 40%, which the CNB considers to be risky (see Chart IV.2 CB).

Chart IV.17

12M default rate on mortgage loans to households given an additional rise in the unemployment rate and interest rates going beyond the *Baseline Scenario*

(%)



Note: The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period.

BOX 4 The effect of DSTI and other factors on defaults on mortgage loans provided to households in the Czech Republic

This box presents the results of an analysis[111] of the effect of the DSTI ratio and other factors[112] on the probability of mortgage default. The analysis helps determine how high a DSTI ratio poses an increased risk to financial stability, and makes it possible to verify the results of the household stress test and facilitate realistic calibration of its parameters. The empirical model is based on panel logistic regression with fixed effects taking into account different default rates for individual banks, differences in reporting methodology for loans past due, different macroeconomic conditions when the loan was provided, and different horizons at which loans became non-performing.[113]

The model estimated on mortgage loans provided in 2018–2021 has a relatively high ability to explain observed defaults.[114] The results show that, among the borrower-based measures, DSTI has the greatest effect on mortgage defaults (see Chart 1). The estimated default rate rises rapidly at a DSTI of around 40% (see Chart 2), consistent with the results of the household stress test.[115] This conclusion holds both for the age group where the relevant (co-)borrower[116] is under 36 years

111 The analysis uses data from the Survey of Consumer Credit Secured by Residential Property conducted by the CNB twice a year, which contains information on individual new loans provided by banks.

112 Other factors include DTI, LTV, the region in which the pledged property is located, the number of borrowers, additional debt, the age of the principal borrower, new unsecured consumer credit provided during the last six months, the source of income and the size of the loan.

113 Using the same default horizon for all loans would mean that the model would be estimated using a very low number of non-performing loans. Given the available data, the relationship between actual defaults and other factors such as the DSTI ratio was examined primarily at the start of the mortgage loan's existence. However, it is reasonable to assume that the estimated relationships also apply at other stages of loan repayment.

114 McFadden's R-squared = 13.3%, Gini coefficient = 74.1%, cross-validated Gini coefficient = 72.8%. Variables that were not statistically significant at least at the 5% level were omitted from the model.

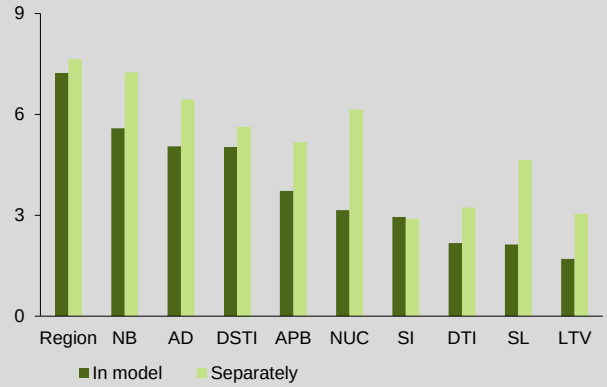
115 Household stress test.

116 Relevant (co-)borrower means the (co-)borrower whose age is decisive for the potential application of less strict upper limits on credit ratios under the Act on the CNB.

and for other borrowers.[117] The results also show that the default rate for DSTIs of 25%–40% remains relatively stable. This has been empirically observed in other countries as well.[118] DTI has a markedly smaller effect on mortgage defaults, and LTV an even smaller one.[119] As for other factors, the region in which the pledged property is located, the number of applicants, and their additional debt on top of the mortgage loan have a high predictive power for mortgage defaults.

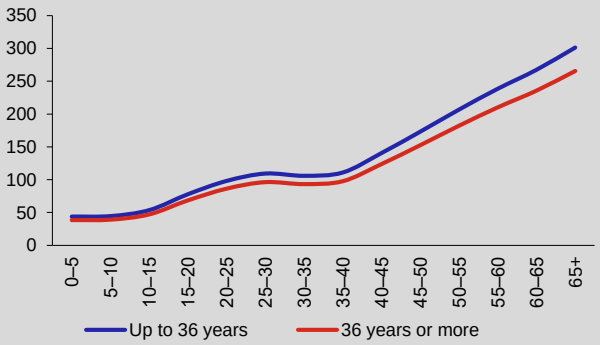
Overall, the empirical results confirm that the household stress test parameters are realistic and that the model assumptions on which the test is based are reasonable. The analysis also lends additional support to the current upper DSTI limit.[120] Although the limit cannot be set in a purely mechanistic way and some shortcomings in the analysis must be taken into account (the possible reactions of applicants, such as lowering the requested loan amount if DSTI is tightened, the absence of information on rejected applications, and dubious DSTI values for some tax-optimising self-employed persons), the application of an upper limit of 40%–50% can be considered justified in the context of the results obtained.

Chart 1 (BOX 4)
Predictive power of the explanatory variables
(size of standardised regression coefficient)



Note: The explanatory variables were discretised before the model was estimated. Region = region in which pledged property is located, NB = number of borrowers, AD = additional debt, APB = age of principal borrower, NUC = new unsecured consumer credit, SI = source of income and SL = size of loan. The size of fixed effects is not shown.

Chart 2 (BOX 4)
DSTI and estimated mortgage default rate in the Czech Republic
(estimated default rate, average for entire sample = 100; x-axis: DSTI in %)



Note: Model-estimated values smoothed using the LOWESS method. Age means the age of the borrower relevant for the application of the DSTI limit under the Act on the CNB. Intervals closed from the left and open from the right.

117 Pursuant to the Act on the CNB, these groups of applicants are subject to different upper limits on credit ratios, so the estimated default ratios for these groups are given separately.

118 IMF (2018): *Calibration of a Debt-Service-to-Income Limit in Romania: Evidence from Microdata*, or de Haan, L., Mastrogiacomo, M. (2019): *Loan to Value Caps and Government-Backed Mortgage Insurance: Loan-level Evidence from Dutch Residential Mortgages*. DNB Working Paper No. 655.

119 According to economic theory, the LTV ratio should be more closely related to loss given default (LGD) than to PD.

120 Provision of a general nature of 25 November 2021 on setting upper limits on credit ratios No. I/2021.

IV.5 PUBLIC FINANCE STRESS TEST

The CNB reviews and evaluates the risks of concentration of sovereign exposures

Since 2015, based on its internal methodology,[121] the CNB has been annually reviewing and evaluating the risks of concentration of exposures to sovereign issuers in the balance sheets of credit institutions based in the Czech Republic (hereinafter "banks"). In its *Financial Stability Reports* it informs the market about which sovereign exposures it has identified as systemically important and whether it will require relevant banks to meet an additional capital requirement to cover the risk of concentration of these exposures at a three-year horizon. The methodology defines an important sovereign exposure as an exposure to a sovereign issuer with a minimum ratio of 100% to the bank's eligible capital. It becomes systemic if the assets of banks with important sovereign exposures exceed 5% of the total assets of all the banks operating in the Czech Republic, including branches of foreign banks. It is indicated that an additional capital requirement must be met if the three-year outlook for the sovereign risk indicator (ISR) in the *Adverse Scenario* exceeds one of its thresholds.[122] The CNB requires additional capital where the bank holds exposures in excess of the limit and this above-limit exposure is not already sufficiently covered by capital.[123]

The CNB continues to refine its modelling system

The general government primary balance (in per cent of GDP) has been replaced by the structural balance (in per cent of GDP) in order to improve the interpretability of the criteria that enter the public finance stress test. Based on the methodology, the critical limit on the general government structural balance was estimated at -3.11% of GDP. The structural balance better captures the fiscal stance, as it is adjusted for the business cycle and one-off measures. In the *Adverse Scenario*, the originally assumed primary balance was affected by the fall in economic activity itself, so it was difficult to evaluate whether it had exceeded its critical limit. Along with the above change, the weights on the other monitored variables were also recalibrated. The public finance stress test presented below is based on the revised methodology.

Exposures to Czech general government debt were assessed as systemically important…

The CNB assessed the investments of banks based in the Czech Republic in Czech government bonds as a systemically important sovereign exposure. The value of these exposures rose by CZK 204 billion year on year to CZK 994 billion at the end of 2021, accounting for 12.7% of these banks' total assets. The assets of banks with above-limit exposures accounted for 73% of the banking sector's total assets, as against 66% a year earlier. Exposures to other governments, the EU and the EIB were not found to be systemically important.

…but their riskiness did not exceed the thresholds, despite the current outlook

The sovereign risk indicator (ISR) was estimated for systemically important exposures. Over the three-year horizon of the *Adverse Scenario*, it peaks at 0.94% in 2022 and falls to 0.58% in 2023, where it remains in 2024 (see Chart IV.18). The ISR is constantly well below the supervisory thresholds of 5% and 8% over the test period. The CNB will therefore not require banks based in the Czech Republic to meet an additional capital requirement to cover the risk of concentration of exposures to the Czech government in the next three years.

In the *Adverse Scenario* a number of the variables determining the ISR would exceed their critical limits…

The *Adverse Scenario* (see sections II.1.2 and II.2.1) expects a significant year-on-year decline in real GDP growth in the first year of the scenario. The first difference in year-on-year GDP growth entering the ISR would thus exceed the critical limit in the first year of the scenario and contribute to the ISR (see Chart IV.18). The general government structural balance in per cent of GDP would exceed its critical limit over the entire stress horizon (see Table IV.5), as it was already at high levels in 2021 (-5.9% of HDP). Due to the passive fiscal policy considered in the *Adverse Scenario*, the structural balance would stay at similar negative levels over the entire stress horizon. The current account balance, which is negative under the scenario, would also contribute markedly to the ISR in all three years. As usual, the share of non-residents in debt holdings contributes to the ISR (see Table IV.5). It has nonetheless been declining in relative terms in recent years (see section II.2.1, Chart II.25) and is now at 26.5%, which is very slightly above the critical limit of 25.9%.

…but several key variables still remain below their critical limits

Countercyclical fiscal policy is not considered in the *Adverse Scenario*, so general government debt in per cent of GDP would not exceed the critical limit (see Chart IV.19), although it would come very close. The year-on-year change in ten-year yields in the *Adverse Scenario* would not exceed its critical limit either (see Chart II.21E), as these yields follow the accommodative monetary policy in the scenario and growth in yields is thus expected to be relatively modest compared

121 Internal CNB methodology for the review and evaluation of sovereign exposure concentration risk.

122 The CNB primarily monitors two ISR thresholds: a soft threshold of 5% indicating the creation of an additional capital requirement where an additional expert analysis proves this to be necessary, and a hard threshold of 8% indicating unconditional creation of an additional capital requirement.

123 The above-limit part of a sovereign exposure is determined using the ISR where the latter exceeds its thresholds. The ISR provides a simplified assessment of the risk of default on a sovereign exposure. The threshold separating the limit and above-limit parts of a sovereign exposure gradually falls as this indicator increases. As a result, the above-limit part rises. The highest effective limit is 222% and the lowest is 0%.

with the end of 2021. In the *Adverse Scenario*, the difference between real interest rates and real GDP growth would stop recording favourable negative values only very gradually in 2023 and would therefore also not exceed the critical limit by far. The shares of short-term debt and foreign currency debt – important criteria reflecting the potential liquidity risk – would also stay well below the critical limits.

An increase in the ISR above the 8% threshold could cause a sharp deterioration in market sentiment

The variables monitoring the amount of debt maturing within one year in per cent of GDP and in per cent of total general government debt are of key importance for the resulting ISR figure. In the CNB methodology, the maturity structure of new issues is based on the Czech Finance Ministry's issuance history in recent years and the announced issuance strategy for the years ahead. In reality, it is largely dependent on the level of uncertainty and on financial market tensions. In bad times, the relationship between the fiscal needs of a country (a country with less liquid markets, or one seen as too indebted, or one with a downgraded rating – see Table II.1) and the supply of funding from financial markets is unstable. The methodology's original assumption about the maturity structure of new issues would not necessarily materialise, and the borrowing requirement at the given horizon could only be met with a whole new issue of short-maturity debt. A sensitivity analysis in which these variables theoretically exceed their critical limits of 15.1% and 33.2% respectively (see Table IV.5) indicates a jump in the ISR to 3.3% (see Chart IV.20). If ten-year yield rates were simultaneously to rise sharply, with their year-on-year growth also exceeding the critical limit of 0.5 pp (see Table IV.5), the ISR would additionally increase to 8% (see Chart IV.20). The CNB would then require additional capital under its methodology. However, the developments in this sensitivity analysis, where, in the *Adverse Scenario*, the government would be forced to refinance its debt at short maturities only, and at much higher rates, seem highly unfavourable and, due to their critical nature, significantly exceed general government's ability to refinance its debt.

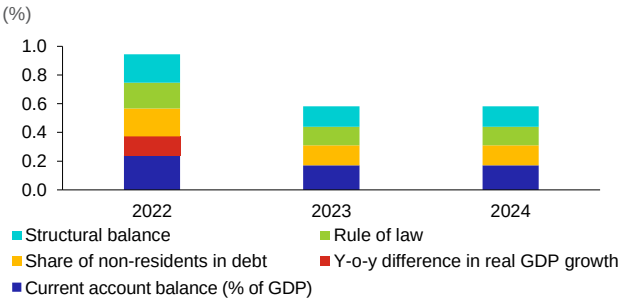
Table IV.5
Czech public finance stress test

	Actual value	*Adverse Scenario*			Critical limit	
	2021	2022	2023	2024		
Macroeconomic variables						
Year-on-year difference in real GDP growth (pp)	9.1	-7.6	1.7	2.3	<	-1.0
Current account balance (% of GDP)	-0.8	-4.6	-3.0	-3.2	<	-1.4
Gross national savings (% of GDP)*	28.4	28.4	28.4	28.4	<	19.3
External debt (% of GDP)*	73.1	73.1	73.1	73.1	>	113.5
Difference between real 10Y GB yield and real GDP growth (pp)	-6.5	-6.5	0.3	1.4	>	6.4
Fiscal variables						
General government debt (% of GDP)	41.9	45.7	53.7	60.3	>	61.4
General government structural balance (% of GDP)	-5.9	-4.4	-5.6	-6.0	<	-3.1
Year-on-year difference in 10Y government bond yield (pp)	1.5	0.4	-0.2	0.0	>	0.5
Government debt maturing within one year (% of GDP)	4.4	4.2	3.0	5.3	>	15.1
Share of government debt maturing within one year (%)	10.4	9.1	5.6	8.7	>	33.2
Share of foreign currency debt (%)	7.3	4.0	3.2	2.8	>	29.0
Share of non-residents in debt holdings (%)*	26.5	26.5	26.5	26.5	>	25.9
Institutional variables						
Government effectiveness (WGI score)*	1.0	1.0	1.0	1.0	<	0.1
Political stability (WGI score)*	0.9	0.9	0.9	0.9	<	0.8
Rule of law (WGI score)*	1.1	1.1	1.1	1.1	<	1.2
Banking crisis	0	0	0	0	=	0.0
Past sovereign defaults	0	0	0	0	=	0.0
Sovereign risk indicator (ISR, %)	-	0.94	0.58	0.58		

Source: CNB, CZSO, ECB, World Bank

Note: The symbol > (< or =) denotes that a higher (lower or equal) value means a breach of the critical limit and indication of increased risk. The figures are rounded. Indications of a breach of the critical limit are based on unrounded figures. Where the limit is breached, the relevant variables are further indicated in red. * Variable not modelled; last known value assumed in projection.

Chart IV.18
Decomposition of the ISR in the *Adverse Scenario*



Source: CNB, World Bank

Chart IV.19
Comparison of the paths of general government debt in the public finance stress tests

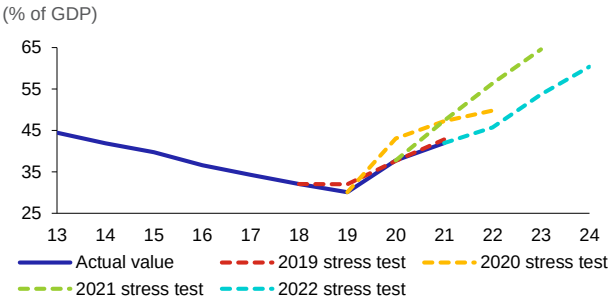
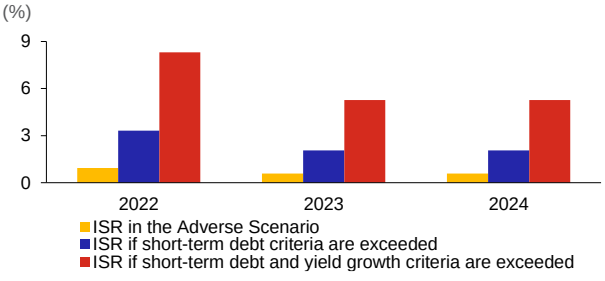


Chart IV.20
ISR sensitivity analysis



V. MACROPRUDENTIAL POLICY

Pursuant to Article 2 of the Act on the CNB, the CNB maintains financial stability and sees to the sound operation of the financial system in the Czech Republic. To achieve these objectives, it conducts macroprudential policy. To this end, it uses a set of macroprudential instruments focused mainly on the banking sector, which is the largest sector in the domestic financial system. Section V evaluates the current position of the Czech economy in the financial cycle, the resilience of the domestic financial sector to the risks identified, and the tasks and recommendations arising from analyses for the settings of the CNB's macroprudential policy instruments.

V.1 THE CNB'S MACROPRUDENTIAL POLICY OBJECTIVES AND INSTRUMENTS

Macroprudential policy responds to changes in systemic risk on an ongoing basis…

The CNB sets macroprudential policy instruments on the basis of an assessment of the intensity of systemic risks.[124] In conformity with an ESRB recommendation, it focuses on the fulfilment of intermediate objectives (see Table V.1) reflecting the existence of several sources of systemic risk and their own transmission mechanisms. Among the most important macroprudential instruments in the current regulatory framework are capital buffers, which are applied on top of the 8% minimum capital requirement (Pillar 1) and the Pillar 2 requirements (see section III.2.1). The CNB currently applies three capital buffers to strengthen the resilience of the banking sector (see Table V.2) and its ability to lend. The buffer rates reflect the current and expected cyclical and structural characteristics of the Czech banking sector.[125] Given the systemic risks identified in the area of housing loans, the CNB has been exercising its statutory power to set upper limits on credit ratios since 1 April (see section V.4).

Table V.1

Summary of intermediate objectives and macroprudential instruments and evolution of specific risks

Intermediate objectives	Specific risk	Existence of specific risk in CZ	Key instruments	Applied in CZ	Detailed information
Mitigate excessive credit growth and leverage	Stronger credit recovery accompanied by easing of lending standards	Yes	Countercyclical capital buffer	Yes, 0.5% from 1 July 2020; increased to 1.0% from 1 July 2022, 1.5% from 1 October 2022, 2.0% from 1 January 2023 and 2.5% from 1 April 2023	V.3
	Rising leverage, rising off-balance sheet risk	Potential	Macroprudential leverage ratio	No	-
	Low risk weights of significant credit portfolios	Potential	Macroprudential tool to mitigate systemic risk at Member State level (Article 458 CRR)	No	-
	Elevated growth in loans and risks in specific sector	Potential	Sectoral capital requirements (sectoral and broad-based systemic risk buffer)	Not as yet, CNB reacts to property exposure risks with other instruments	-
	Risk of spiral between property prices and property financing loans	Yes	LTV caps	Yes, tightened on 1 April 2022	V.4
	Risk of excessive household indebtedness and debt service	Yes	LTI, DTI, LSTI, DSTI caps	Yes, DTI and DSTI reintroduced on 1 April 2022	V.4
Mitigate excessive maturity mismatch and illiquidity	Long-term liquidity risk	Potential	Macroprudential NSFR	No	III.2
	Short-term liquidity risk	No	Macroprudential LCR	No	III.2
Limit exposure concentrations	Property exposure concentration	Potential	Systemic risk buffer	Not as yet, CNB reacts to property exposure risks with other instruments	-
	Sovereign exposure concentration	Yes	Public finance stress test	Yes, option of additional capital requirements in event of elevated sovereign risk, since 2015	-
Limit misaligned incentives	Potential impacts of problems in SIFIs on financial market stability and real economy	Yes	SIFI capital surcharges (G-SII and O-SII buffer)	Yes, O-SII buffer rate of 0.5%–2.5%	V.2
			Systemic risk buffer	No	V.2
Strengthen resilience of financial infrastructures	Counterparty default risk, interconnectedness of financial infrastructures	No	Margin and haircut requirements on CCP clearing	No	-
			Increased disclosure	No	-
			Systemic risk buffer	No	-

Note: The main goal of these instruments is to strengthen the resilience of the banking sector, not to mitigate systemic risk. The classification of intermediate objectives and instruments is based on Recommendation of the ESRB of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1).

124 For details see https://www.cnb.cz/export/sites/cnb/en/financial-stability/.galleries/macroprudential_policy/cnb_macroprudential_policy_strategy.pdf.

125 The exception is the capital conservation buffer, whose rate is unchanged over time.

The macroprudential space created has enhanced banks' capacity to lend to the real economy in times of stress…
The CNB's Macroprudential Policy Strategy puts an emphasis on timely and preventive use of the available instruments. The macroprudential space has been significantly enhanced by capital buffers (the combined capital buffer), whose rates for individual banks ranged between 3% and 5.5% at the end of 2021 depending on the banks' systemic importance. Owing to the announced increase in the countercyclical capital buffer rate, this space should grow by 2 pp by April 2023 (see Table V.2 and section V.3). Other things being equal, the credit potential of capital buffers (when released and used) amounted to CZK 2.3 trillion at the end of 2021.[126] This potential depends not only on capital buffer rates, but also on risk weight levels. If risk weights increase, the credit potential of the buffers decreases (see section III.2 for details on the risks of a change in trend in risk weights).

…and the CNB considers it natural for banks to use it if necessary
The CNB has long emphasised that it considers it natural for banks to use their combined capital buffer to cover credit losses and provide loans in the event of adverse economic developments. This approach is fully in line with the current regulatory framework. If banks use their combined buffer, they become subject to restrictions on the distribution of profits.[127] The maximum distributable amount (MDA, or dividend) depends on the level of non-compliance with the combined buffer requirement. The potential dividend is limited to 0%, 20%, 40% or 60% of profits. Retained earnings enable banks to gradually restore buffers used to absorb losses or lend to the economy.

Table V.2
Summary of macroprudential capital buffers in the Czech Republic
(%)

Capital buffer	Rate	Date of effect
Capital conservation buffer (CCoB)	2.50	2014
Countercyclical capital buffer (CCyB)	0.50	1 July 2020–30 June 2022
	1.00	1 July 2022
	1.50	1 October 2022
	2.00	1 January 2023
	2.50	1 April 2023
Systemic risk buffer (SRB)	-	-
Buffer for other systemically important institutions (O-SIIs)	0.50–2.50	1 October 2021

The overlap between the parallel capital requirements may limit the usability of capital buffers…
The current regulation allows capital buffers to be used to meet the leverage ratio requirement or the MREL (the "parallel capital requirements"). This may give rise to an overlap between the capital requirements which limits the usability of the buffers.[128] Banks may only use the part of buffers which is not subject to the parallel capital requirements to absorb losses and lend to the economy (otherwise they would fail to comply with these requirements). As regards the leverage ratio requirement, the degree of overlap depends mainly on banks' aggregate risk weight, with the probability of overlap increasing as the risk weight decreases.[129] As for the MREL, the degree of overlap depends – in addition to banks' aggregate risk weight – on the ratio of own funds to eligible liabilities required to meet the MREL recapitalisation amount. The degree of overlap increases as the share of own funds rises.

…but this risk is not currently systemic in the domestic banking sector
Some domestic banks use capital intended for buffers to meet the parallel capital requirements. This capital amounted to CZK 27 billion (i.e. 24% of the combined capital buffer; see Chart V.1) at the end of 2021 and was held by six banks, one of which is a systemically important institution. Other things being equal, the overlap causes the credit potential of the capital buffers to decrease by CZK 630 billion to CZK 1.6 trillion. The overlap between the parallel capital requirements has not yet reached the level where it systemically limits the effectiveness of macroprudential policy capital instruments. A systemic overlap would give rise a risk of the supply of lending services by the banking sector becoming limited at times of stress. The CNB will therefore monitor the degree of overlap on an ongoing basis and, where necessary, respond with

126 For details on the calculation of the credit potential from capital buffers see Holub, L., Konečný, T., Pfeifer, L., Brož, V. (2020): *The CNB's Approach to Releasing the Countercyclical Capital Buffer*. Thematic Article on Financial Stability 3/2020, Czech National Bank.

127 Article 141 CRR, *Restrictions on distributions*.

128 For details on the overlap between capital buffers and the parallel capital requirements see ESRB (2021): *Report of the Analytical Task Force on the overlap between capital buffers and minimum requirements, December 2021*, or Pfeifer, L. (2020): *Usability of Capital Buffers under a Binding Leverage Ratio Requirement*. Thematic Article on Financial Stability 6/2020, Czech National Bank.

129 For details see Pfeifer, L., Hodula, M., Holub, L., Pikhart, Z. (2018): *The Leverage Ratio and Its Impact on Capital Regulation*. CNB WP 15/2018.

microprudential and macroprudential supervisory actions and resolution measures to maintain the effectiveness of the capital buffers at a sufficient level.

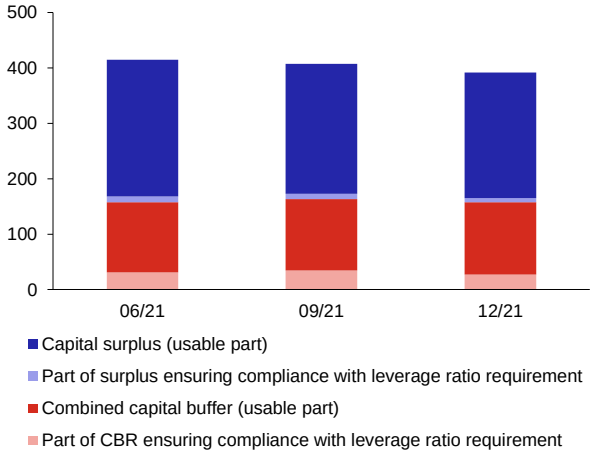
The risk of a deterioration in the risk profiles of mortgage portfolios as regards household debt sustainability has been mitigated by the reintroduction of limits on income credit ratios

The CNB's long-standing active macroprudential policy in the area of housing loans gradually led to an improvement in the risk profiles of the largest domestic banks' mortgage portfolios in terms of credit ratios (see Chart V.2). The CNB eased or abolished its credit ratio caps during the pandemic.[130] As a result, the share of new mortgage loans provided with risky income credit ratios in 2021 returned to or exceeded the levels observed before the DTI and DSTI limits were set in 2018 (see section V.4). This trend was reflected in the largest domestic banks' portfolios as a halt in the tendency of improving risk profiles as measured by the LSTI ratio, with the share of LSTIs of over 40% rising by 1 pp year on year to 32%.[131] The risk profile should be positively affected by the reintroduction of income credit caps with effect from 1 April 2022. Despite an easing of the LTV limit in 2020 and 2021, no shift towards riskier loan profiles from the perspective of collateral has been observed, as banks are probably being relatively cautious given the increasing overvaluation of property prices (see sections II.1 and V.4).

Chart V.1

Capital buffers and their overlap with the leverage ratio requirement

(CZK billions)

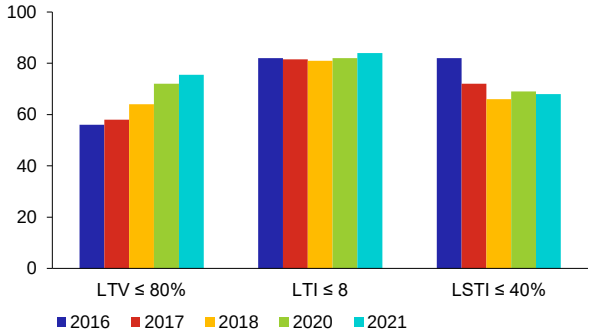


Note: The light red part of the chart illustrates the amount of buffers that would have been used to meet the leverage ratio requirement had it been binding before 28 June 2021. The chart does not show the overlap with the minimum requirement for own funds and eligible liabilities (MREL), whose intermediate objective took effect on 1 January 2022.

Chart V.2

Share of the mortgage portfolio with prudent credit ratio levels (levels at the time of loan provision)

(%)



Note: Data on the six largest domestic banks, which together account for 83% of the domestic banking sector's total assets at the consolidated level.

130 In response to the pandemic, the LTV cap was lowered to 90% and the DTI cap abolished on 1 April 2020. Subsequently, on 1 July 2020, the DSTI limit was also cancelled.

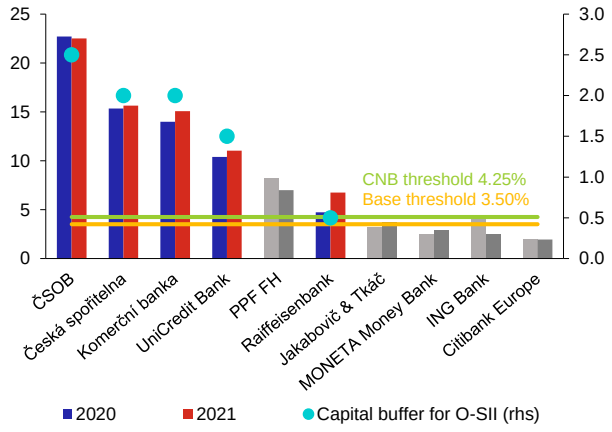
131 The LTI/LSTI ratios only include clients' new mortgage debt, while the DTI/DSTI ratios indicate their total debt.

V.2 STRUCTURAL CAPITAL BUFFERS

Risks associated with institutions' systemic importance are mitigated by the O-SII buffer

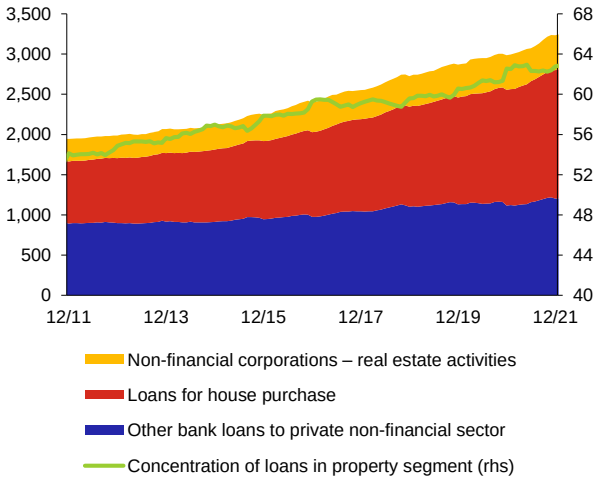
In 2022 the Czech financial sector has five other systemically important institutions (O-SIIs), which are banking groups.[132] The total assets of these institutions accounted for almost 80% of the domestic banking sector at the end of 2021. Their resilience is thus crucial for financial stability. The CNB has set an O-SII buffer rate ranging between 0.5% and 2.5% for these institutions depending on their degree of systemic importance (see Chart V.3).[133] The list of O-SIIs and the buffer rates for 2023 will be updated in autumn 2022. The updates will be published in *Financial Stability Report – Autumn 2022*.

Chart V.3
Systemic importance scores and O-SII buffers
(score in %; right-hand scale: rate in %)



Note: Grey denotes institutions not included in the list of other systemically important institutions for 2022.

Chart V.4
Concentration of bank loans in the property segment
(CZK billions; right-hand scale: %)



The risk of concentration of the housing loan portfolio is the most significant structural risk for the domestic banking sector…

The concentration of property financing loans has long been growing in the domestic banking sector. Their share in loans to the private non-financial sector stood at 62.8% at the end of 2021 and has risen by 3.5 pp over the past five years (see Chart V.4). The share of housing loans in loans to the private non-financial sector was 49%, having increased by 5.0 pp in the same period. The implicit risk weights on housing loan portfolios derived from banks' internal models are now at record-low levels (having dropped by 7.4 pp to 17.9% over the past five years) and may not fully reflect the macroprudential systemic risks associated with the relevant portfolio (see section III.2). The significant share of housing loans in banks' balance sheets, coupled with the long-running fall in the loans' risk weights, implies increased risks in the event of stress.

…but the results of the *Adverse Scenario* of the stress test of banks do not indicate unexpected losses on the housing loan portfolio

According to the results of the *Adverse Scenario* of the solvency macro stress test (see section IV.1), average quarterly provisioning at the sector level would total around CZK 3.9 billion. Conversely, the net interest margin on housing loans would be around CZK 8.7 billion. Therefore, during the test, the total new provisions do not exceed the income on this portfolio, nor do they result in a loss which, coupled with a steady rise in risk weights, could weaken the sector's capital position. However, the favourable result is positively affected by the recent trend in property prices and their relatively limited correction in the *Adverse Scenario*.

132 For details see the CNB website: https://www.cnb.cz/en/financial-stability/macroprudential-policy/list-of-other-systemically-important-institutions/.

133 To calibrate the O-SII buffer, the CNB applies the bucketing approach. See Pfeifer, L. (2021). *The CNB's Approach to Setting the Capital Buffer for Other Systemically Important Institutions: Past and Present*. Thematic Article on Financial Stability 2/2021, Czech National Bank.

Macroprudential and monetary policy tightening is limiting the accumulation of risks…

The tightening of the LTV cap and the reintroduction of the DTI and DSTI caps (see section V.4) should limit the accumulation of risks and lead (as they have done in the past; see section V.1) to a positive shift in the risk profile of domestic banks' housing loan portfolio. The risks associated with the cyclical decline in risk weights for housing loans are, among other things, taken into account in the CCyB rate, which will be gradually increased to 2.5% (effective 1 April 2023). The monetary policy tightening, which is affecting the pace of credit growth due to a gradual rise in the interest rate on housing loans, may also slow the risk accumulation trend.[134] Macroprudential and monetary policy are thus acting in the same direction in the current situation.[135]

…or the resilience of the housing loan portfolio can be increased using other macroprudential tools, as in some other EU countries

European countries that have identified increased systemic risks arising from housing loans have responded – in addition to tightening credit limits (see section V.4 for the Czech Republic) – by setting minimum risk weights through procedurally complex application of Article 458 CRR or by applying the sectoral systemic risk buffer.[136] Article 458 CRR was applied by Norway, Sweden and Estonia in 2021. Following the transposition of CRD V,[137] a sectoral systemic risk buffer (sSRB) can also be used to increase the resilience of the housing loan portfolio. This buffer was applied by the macroprudential authorities in Lithuania, Belgium, Germany and Slovenia in 2021. The ESRB recommended reciprocal application of some of the above measures adopted in EU countries. However, the CNB concluded that the domestic banking sector has no material activity in relation to these countries and has therefore not yet reciprocated any of the measures.[138]

The substantive and operational effectiveness of these instruments could be increased by changes proposed by the CNB in the EC targeted consultation on the review of the EU's macroprudential framework

The advantage of the sSRB is that it can be used to mitigate specific risks and target balance sheet items of specific banks. However, under EU legislation, its application is hindered by a cap on the sum of the structural buffers, which can only be exceeded with the approval of the EC. Therefore, the CNB – like many other national macroprudential authorities in Europe – recommends removing or at least significantly reducing this hindrance in the ongoing review of the EU's macroprudential rules. At the same time, it proposes significantly simplifying the activation process for Article 458 CRR for setting minimum risk weights for the housing loan portfolio (for details see Box 5).

BOX 5 Review of the EU's macroprudential policy framework for the banking sector in 2022

Macroprudential policy, which aims to mitigate systemic risks and increase the financial system's resilience to shocks, was incorporated into EU law in response to the global financial crisis.[139] The European Commission (EC) regularly reviews the macroprudential policy framework to ensure that its instruments are effective in reducing potential and existing systemic risks. The first of these reviews, which are to be conducted every five years, should be completed by 30 June 2022.

The EC therefore on 30 November 2021 published a targeted consultation on the preparation of a review of the EU's macroprudential framework for the banking sector to gather evidence from stakeholders' experience with the current functioning of the framework and to obtain suggestions for developing it further. The results of the targeted consultation are to be used to prepare legislative proposals for changes to increase the effectiveness, and potentially simplify, the current macroprudential policy framework. The targeted consultation was divided into four sections. The first focused on the effectiveness of capital buffers in terms of their ability to cover individual types of systemic risk. The second section dealt mainly with the issue of introducing borrower-based measures (LTV, DTI and DSTI) into EU law, the approach to distribution restrictions, and the simplification and streamlining of the existing instruments. The third section contained questions about the effect of macroprudential policy instruments on the functioning of the internal market. The last section covered the issue of newly accentuated global risks, most notably financial innovation, cyber-threats and climate risks.

134 The average mortgage loan rate was up 1.8 pp year on year to 3.8% as of 2022 Q1. It does not yet reflect the recent increases in the monetary policy rate totalling 2.5 pp to 7% (the most recent increase occurred on 22 June 2022).

135 For more details on the interaction between monetary and macroprudential policies see Malovaná, S., Frait, J. (2017): *Monetary Policy and Macroprudential Policy: Rivals or Teammates?* Journal of Financial Stability 32 (2017): 1–16.

136 For details see https://www.esrb.europa.eu/national_policy/html/index.en.html.

137 Since October 2021 in the Czech Republic.

138 For details see https://www.cnb.cz/en/financial-stability/macroprudential-policy/mutual-recognition-of-macroprudential-measures-reciprocity/.

139 For details see CRD V, CRR II or *The ESRB handbook on operationalising macroprudential policy in the banking sector* at https://www.esrb.europa.eu/pub/pdf/other/esrb.handbook_mp180115.en.pdf.

The CNB focused mainly on the first two sections of the document in its response to the consultation.[140] It raised objections to the cap on the O-SII buffer rates for subsidiaries being derived from the O-SII/G-SII buffer rates of their parent companies, as this cap may harm the level playing field for domestic O-SSIs and make the O-SSI buffer rate less predictable.[141] In line with its current approach, the CNB also supported changes enhancing the option of proactive use of the CCyB.[142] At the same time, the CNB recommended introducing the option of temporarily restricting dividend payments in times of stress to the same extent as that to which the buffer is released, so as to prevent its unintended use for dividend payouts, for example. It also proposed changing the cap on the sum of the structural buffers so as to increase the usability of the sectoral systemic risk buffer in particular.[143] Moreover, the CNB supported the exclusion of exposures to central banks from the denominator of the leverage ratio, as such exposures arise primarily as a result of monetary policy decisions and are risk-free by design but increase the minimum leverage ratio capital requirement under the current regulation. In this area, it also supported mirroring capital buffers in the leverage ratio in order to reduce capital buffer overlaps, which may reduce the buffers' effectiveness (for details on overlaps see section V.1).

The CNB also recommended simplifying the procedure for applying Article 458 CRR to set minimum risk weights and extending it to exposures other than those secured by property. It supported the introduction of a minimum harmonised set of measures for mortgage borrowers. At the same time, however, it expressed the opinion that national macroprudential authorities should retain full discretion to decide on the configuration of those measures. The CNB adopted a cautious stance on how the macroprudential framework might affect the functioning of the internal market and particularly on the issue of the actual ability of macroprudential policy to mitigate climate and cyber risks. The CNB will continue to be active in promoting legislative changes enhancing the effectiveness of the EU macroprudential policy framework.

The stances adopted on each measure by the ESRB and the ECB may provide a signal about the probability of the CNB's proposals being incorporated into the legislation. The differences in opinion in some areas (see Table 1) are due mainly to these institutions' initial "capital-neutral" approach to changing the framework, i.e. that the changes should not increase the current capital requirements. The likelihood of the CNB's proposals becoming law is thus low in some areas.

Table 1 (BOX 5)

Comparison of the responses of the CNB, the ESRB and the ECB to the EC's targeted consultation on the review of the EU's macroprudential framework for the banking sector

(x means that the given institution supports the change)

	CNB	ESRB	ECB
Cancellation of O-SII buffer cap for subsidiaries	x		
Changes supporting more proactive use of CCyB	x	x	x
Option of temporary and conditional restrictions on dividend payouts	x	x	
Change to threshold for sum of structural buffers	x	x	x
Exclusion of exposures to central banks from leverage ratio denominator	x		
Mirroring of capital buffers in leverage ratio	x		
Simplifying process of application of Article 458 CRR	x	x	x
Minimum harmonised set of measures for mortgage borrowers in EU	x	x	

140 See CNB's response to the *Targeted Consultation on Improving the EU's Macroprudential Framework for the Banking Sector*.

141 For details see Pfeifer, L. (2021): *The CNB's Approach to Setting the Capital Buffer for Other Systemically Important Institutions: Past and Present*. Thematic Article on Financial Stability 2/2021, Czech National Bank.

142 See *The CNB's approach to setting the countercyclical capital buffer*.

143 In calculating the threshold at which the EC's opinion on a decision to set the buffer is required, the current regulation treats the SyRB rates applied to all exposures in the same way as sectoral SyRB rates, which only apply to specific subsets of exposures. The need for EC permission for sectoral SyRB rates exceeding 5% may impede the use of the sectoral SyRB, especially for portfolios with low risk weights.

V.3 THE COUNTERCYCLICAL CAPITAL BUFFER

The CNB has been setting the countercyclical capital buffer (CCyB) since 2014 with the aim of limiting the negative impacts of the financial cycle on the banking sector and thus preventing the transmission of adverse financial shocks to the real economy. Given the wide range of manifestations of the financial cycle in the real economy and the financial sector, the CNB sets the CCyB rate on the basis of a comprehensive assessment of a set of macrofinancial and banking sector-specific indicators. The CNB regards as appropriate a CCyB rate that is sufficient to cover the potential losses stemming from the materialisation of cyclical risks while maintaining banks' capital capacity for lending at a sufficient level.[144]

The CNB leaves the CCyB rate unchanged at 2.5%

The CNB Bank Board decided at its meeting on 16 June 2022 to leave the CCyB rate unchanged at 2.5% (see Chart V.5). In adopting this decision, it took into account indicators and analyses assessing the position of the Czech economy in the financial cycle and the degree of vulnerability of the banking sector. Given the very low materialisation of previously accepted cyclical risks recorded so far, the Bank Board agreed that the aggregate cyclical risks in the banking sector's balance sheet remained significant. When last discussing the setting of the CCyB rate in March 2022, it had also taken into consideration the appreciable growth in geopolitical uncertainty and the increased potential for sudden and extensive materialisation of credit risks. These conditions persist, requiring a more prudent approach to setting the CCyB rate. Should the economic situation worsen and significant unexpected credit losses form in the domestic banking sector, the CNB is ready to lower the buffer rate or release the buffer fully in order to support banks' ability to provide credit to the real economy without interruption.

Chart V.5
Applicable and pending CCyB rate in the Czech Republic
(% of total risk exposure)

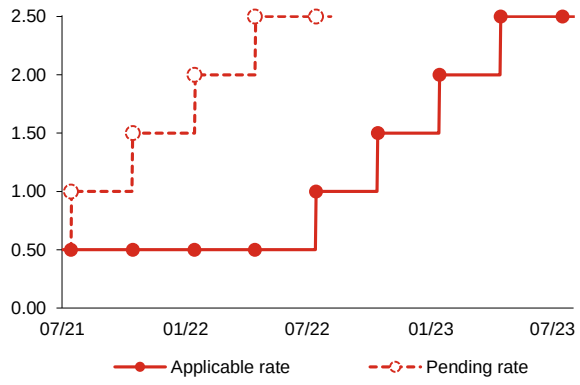
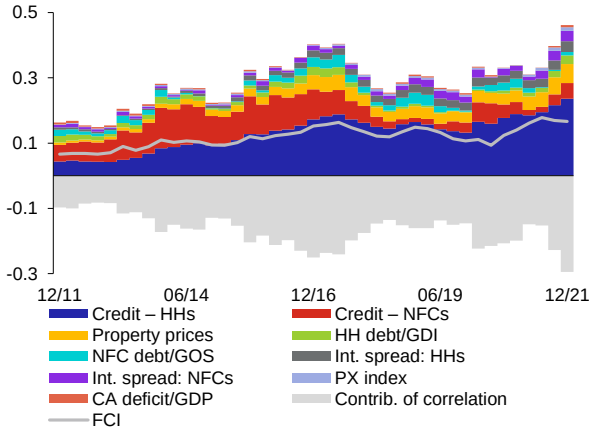


Chart V.6
Financial cycle indicator
(0 minimum, 1 maximum)



Source: CNB, CZSO

Note: The interest rate spread is the difference between the client rate on new loans and the 3M PRIBOR. The negative contribution of the cross-correlation structure to the FCI value (the loss due to imperfect correlation of the subindicators) is the difference between the current FCI value and the upper bound, which assumes perfect correlation between all indicators. Weak correlation between the subindicators is reflected in growth in the negative contribution to the overall FCI value.

The economy was close to the peak of the financial cycle at the end of last year

The financial cycle indicator (FCI) serves as a starting point for assessing the position of the economy in the financial cycle (see Chart V.6). The FCI increased year on year in 2021 Q4, mainly as a result of increasing debt financing of residential property and related high growth in property prices, and was close to the local maximum recorded in 2021 Q2. The contributions of the interest rate spreads on loans to households and non-financial corporations and the domestic stock market trend to the FCI value were also significantly above the historical average. The theoretical FCI value abstracting from the strength of the correlation between the individual manifestations of the financial cycle was the highest since 2009. The indicative mapping between the FCI value (0.17) and the CCyB implies a rate of 1.25%.

Growth in bank loans rose markedly in all credit segments

The rate of growth of bank loans to the private non-financial sector started to rise significantly in 2021 Q2, due mainly to lending to the household sector (see Chart V.7). Loans in the non-financial corporations sector also started to increase in

144 For more details on the setting of the CCyB rate see the methodological document *The CNB's approach to setting the countercyclical capital buffer*.

the second half of the year, although some of the recovery was due to technical factors such as base effects and the fade-out of exchange rate revaluation of foreign currency loans.[145] Credit growth in the main credit segments was well above the historical averages in 2022 Q1 (see Chart V.8).

Chart V.7
Year-on-year growth in bank loans to the private non-financial sector

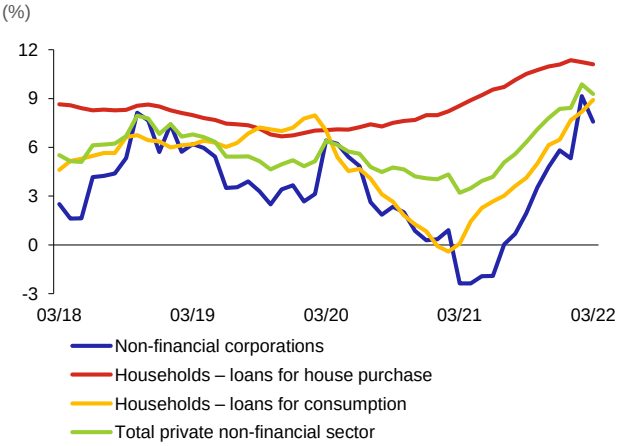
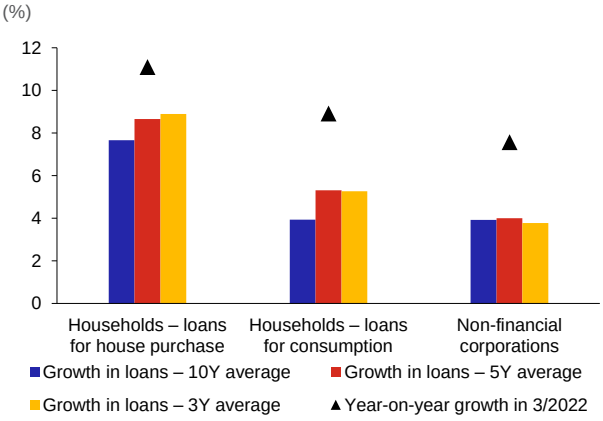


Chart V.8
Average and current growth in bank loans to the private non-financial sector



Genuinely new bank loans increased significantly in the household sector

Aggregate genuinely new loans to households increased by 51% in 2021 compared with 2020 (from CZK 354 billion to CZK 536 billion; see Chart V.9). The largest growth was recorded by genuinely new loans for house purchase, which rose by 63% year on year in 2021. In 2022 Q1, however, genuinely new loans to households saw a year-on-year drop (of 8%), which will probably increase further due to rising interest rates (see section V.4.1). Genuinely new loans to non-financial corporations were volatile in 2021, as a decline in these loans in the first half of the year was followed by a sharp rise in the second half. The growth remained volatile in 2022 Q1. Aggregate new corporate loans were broadly flat in 2021 (up by 2.3% compared with 2020).

The cyclical risks in the banking sector's balance sheet grew further…

Despite an increase in monetary policy rates from 2021 Q3 onwards (see Chart II.13), credit growth continued to strengthen in the household sector in particular. Risks and potential cyclical losses thus increased further. The current forecasts of the most likely developments suggest that credit growth in both sectors will peak in 2022 and gradually return to their average levels in the next two years (see Chart II.31 and Chart II.32). The prudential estimate of unexpected credit losses based on the conditional credit loss distribution indicates a need for capital of CZK 22.4 billion to cover these losses. This corresponds to a CCyB rate of 1%.

…the current environment creates room for sudden and strong materialisation of previously accepted risks

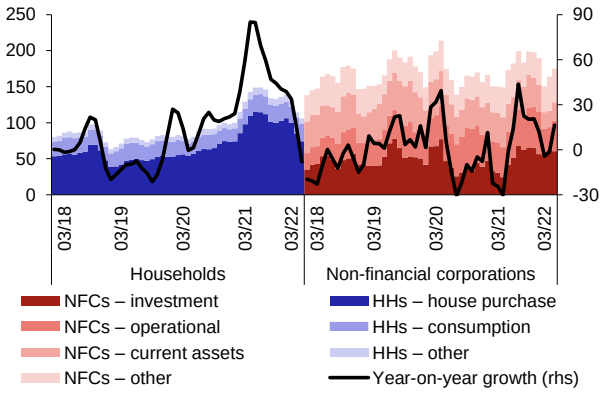
Increasing problems in global supply chains, coupled with a sharp increase in prices of energy, commodities and materials and strong domestic demand, have led to a surge in inflation (see section II.1.1), which has made the financial situation of households and firms more difficult. That situation may also be negatively affected by a gradual increase in debt service as a result of rising interest rates (see Chart II.21D and Chart II.21E). Greater financial stress may weigh in particular on households that spend a relatively large proportion of their income on servicing their debt (see section V.4.1) and also on firms under pressure from input shortages and firms operating with low margins and high leverage. The uncertainty regarding future macroeconomic developments is further increased by the war in Ukraine, which, in addition to causing strong growth in geopolitical tensions, is exacerbating the problems relating to the above supply-side factors.

Provisioning remains exceptionally low

Given the absence of credit losses, provisioning remains low (impairment losses; see Chart III.11). This may make the banking sector vulnerable if risk materialisation increases. In line with the low provisioning, the ratio of provisions created for loans to gross loans continues to decline. Increasing vulnerability is also implied by a renewed increase in the BPI indicator, which expresses the ratio of the margin on the stock of loans to provisions per unit of credit (see Chart V.10).

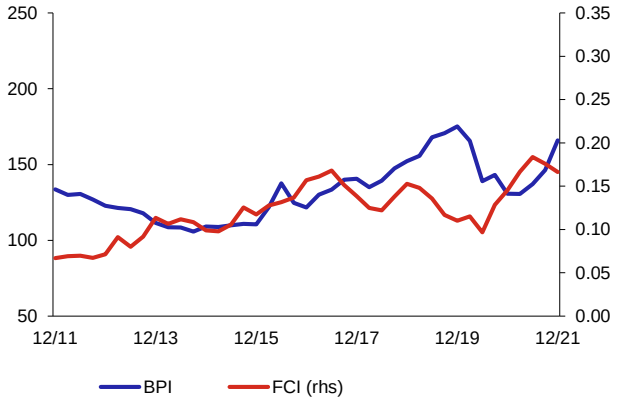
145 Foreign currency loans account for more than one-third of bank loans to non-financial corporations. When the koruna depreciated sharply after the outbreak of the coronavirus pandemic, the stock of total foreign currency loans expressed in koruna increased and the rate of growth was inflated. After the koruna appreciated again, the rate of growth was conversely depressed. This effect faded out in mid-2021.

Chart V.9
Genuinely new bank loans to the private non-financial sector
(three-month totals in CZK billions; right-hand scale: %)



Note: Genuinely new loans comprise increases in existing loans and are adjusted for refinanced and refixed loans. The growth rate is calculated using three-month totals.

Chart V.10
BPI and FCI
(%; right-hand scale: 0 minimum, 1 maximum)



Note: The BPI expresses the ratio of the margin on the stock of loans to provisions per unit of credit. The margin on the stock of loans is the difference between the client lending rate and the client deposit rate.

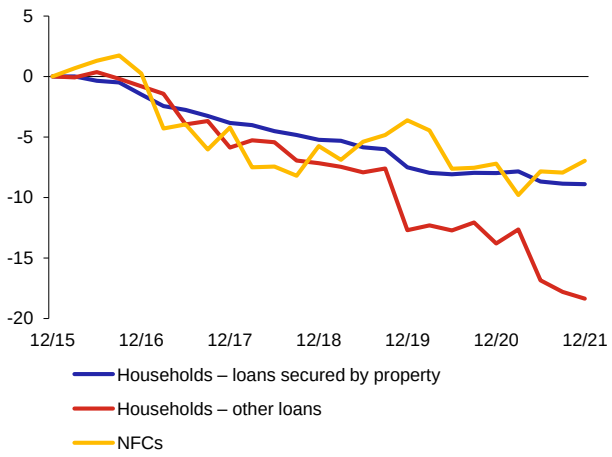
Risk weights on the main credit portfolios remain low, especially in the household sector…

Risk weights on credit portfolios under the IRB approach ("risk weights") are an important indicator of the banking sector's vulnerability over the financial cycle. A drop in risk weights leads to a decrease in risk-weighted assets and indirectly to a fall in the capital requirement in absolute terms. Since the end of 2015, when, according to CNB analyses, the Czech economy entered a strongly expansionary phase of the financial cycle, risk weights have been decreasing steadily, in particular in the household sector (see Chart V.11): at the end of 2021, they were 8.9 pp lower for loans to households secured by property, 18.4 pp lower for other loans to households and 7 pp lower for loans to non-financial corporations than in 2015.

…a cyclical deterioration in risk parameters would lead to an increase in the capital requirement

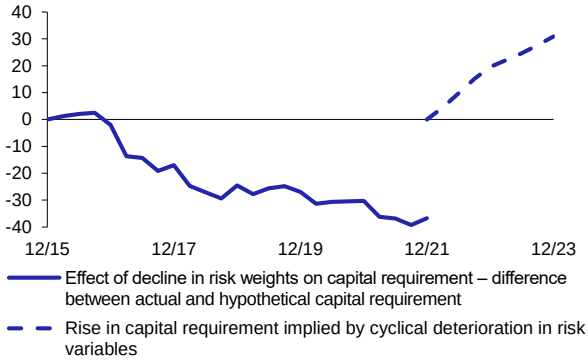
Part of the observed drop in risk weights is due to cyclically favourable values of risk parameters – the probability of default (PD) and loss given default (LGD) – entering the models used to derive risk weights. The countercyclical capital buffer (CCyB) should cover the potential growth in risk weights due to a cyclical deterioration in risk parameters. This growth is estimated using stress values of risk parameters obtained when calculating the conditional credit loss distribution. This estimate shows that the growth in risk weights would lead to an increase in the capital requirement in absolute terms of CZK 30.9 billion, which implies a need to create a CCyB of 1.25% for this purpose (see Chart V.12).

Chart V.11
Change in risk weights compared with the start of the strongly expansionary phase of the financial cycle
(pp)



Note: According to the CNB's analyses, the strongly expansionary phase of the financial cycle started in 2015 Q4.

Chart V.12
Effect of a change in risk weights on the capital requirement
(CZK billions)



Note: The chart shows the capital requirement for the following IRB portfolios reported in the given period: retail exposures – non-SME exposures secured by property, and retail exposures – other non-SME and corporate exposures. The actual capital requirement is based on the actually observed risk weights and exposures. The hypothetical capital requirement is calculated on the basis of the risk weights as of the beginning of the expansionary phase of the financial cycle (12/2015) and the actually observed exposures.

Given the evolution of cyclical risks in the banking sector and the increased risk of sudden and strong materialisation of those risks, the Bank Board decided to leave the CCyB rate unchanged at 2.5%

The prudential estimate of unexpected losses[146] (see Chart V.13, column: *Conditional credit loss distribution*) of around CZK 22.4 billion, together with the estimated capital need in the event of an increase in risk weights of CZK 30.9 billion (see Chart V.13, column: *Growth in risk weights due to cyclical deterioration of risk parameters*), form the quantitative basis for setting the CCyB rate. The additional capital needed to cover both the potential unexpected losses and the potential increase in the capital requirement in the event of an increase in risk weights due to a deterioration in risk variables thus amounts to CZK 53.3 billion[147] and implies a CCyB rate of 2% (see Chart IV.13, column: *Combination of observed risks*). In setting the CCyB rate, the Bank Board took into account the current macroeconomic and geopolitical uncertainties (see section II.1.1), which may lead to higher risk materialisation, and kept the rate at the current level of 2.5%. This decision will not have a negative effect on lending to the real economy, as the credit potential of the capital surplus amounted to around CZK 3.8 trillion at the end of 2021, which would mean roughly a doubling of the current portfolio of loans to the private non-financial sector.

Chart V.13

CCyB rate covering financial cycle effects monitored

(% of total risk exposure)

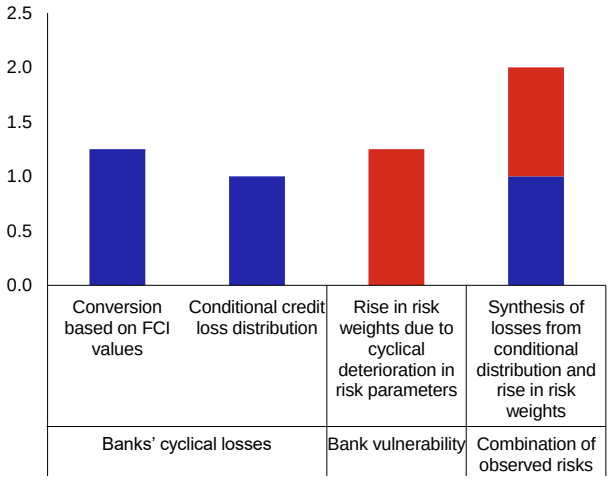
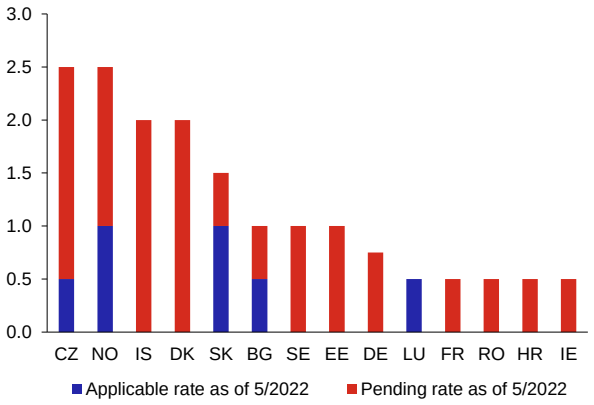


Chart V.14

CCyB rates in selected European countries

(% of total risk exposure)



Source: ESRB, Haut Conseil de stabilité financière, Central Bank of Ireland

Note: Data as of 31 May 2022.

Other European countries have also increased their CCyB rates further

Other European countries have also responded to the growth in cyclical risks via the CCyB rate (see Chart V.14). The same rate as in the Czech Republic was announced by Norway. The other Nordic economies have also increased their CCyB rates, responding as usual more quickly to the upswing in the financial cycle. However, even traditionally more reluctant countries such as Ireland, Germany and France have now set a non-zero CCyB rate.

Deviations of the credit-to-GDP ratio from its trend do not provide a suitable guide to increasing or releasing the CCyB for the Czech Republic

In accordance with an ESRB recommendation,[148] the CNB should take into account the credit-to-GDP ratio and its deviation from the long-term trend when determining the position in the financial cycle and deciding on the CCyB rate. In 2021 Q4, the ratio was 86.2% and the relevant gap -6.1 pp. The CNB has long maintained that this approach is not a suitable tool for assessing cyclical risks in the Czech economy and is subject to a range of shortcomings which reduce its reliability.[149] The additional gap (the expansionary credit gap), which uses an alternative approach to determining the long-term trend and partially eliminates the problems associated with the recommended methodology, was 4.4 pp in 2021 Q4 and implies a rate of 0.75% (see Chart V.1 CB). However, this indicator must also be viewed as only a simplified way of assessing the position in the financial cycle, with very limited direct usefulness as regards deciding on the CCyB rate.

146 The CNB estimates potential unexpected losses using the conditional probability distribution of credit losses. This is one of the quantitative approaches used by the CNB as a guide to setting the CCyB rate. More detailed information about the construction can be found in Appendix 3 of *The CNB's approach to setting the countercyclical capital buffer*.

147 The simple sum of the potential losses implied by the conditional distribution and the additional capital created as a result of the increase in risk weights is adjusted for newly defaulted exposures, which are already included in the losses and whose risk weights will not return to their original levels.

148 European Systemic Risk Board (ESRB, 2014): *Recommendation (ESRB/2014/1) on guidance for setting countercyclical buffer rates*.

149 *The CNB's Approach to Setting the Countercyclical Capital Buffer* (Appendix 1).

V.4 RISKS ASSOCIATED WITH PROPERTY MARKETS

V.4.1 Risks associated with residential property markets

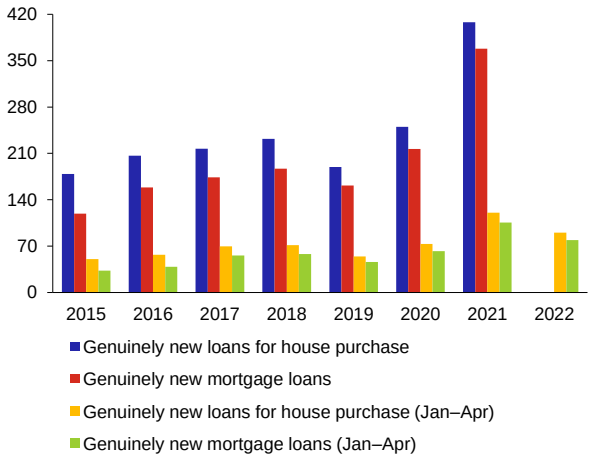
The CNB thoroughly evaluates risks associated with the residential property market

The CNB has long been monitoring and regularly assessing the risks arising in the mortgage and property markets. The main source of information for aggregate analyses in this field is the semi-annual *Survey of consumer loans secured by residential property* (the "Survey"). This report contains data on the results of the Survey up to the end of February 2022. The data that will capture the results of the Survey starting from April 2022, when the new mortgage lending limits took effect, will be included in the autumn Financial Stability Report. The evaluation of risks associated with new housing loans[150] is based, among other things, on regular stress testing of households (see section IV.4). The test results, along with other detailed analyses, are reflected in the caps on credit ratios.

New loans for house purchase rose sharply in 2021 and remained elevated in the first few months of 2022, despite a slowdown in their growth

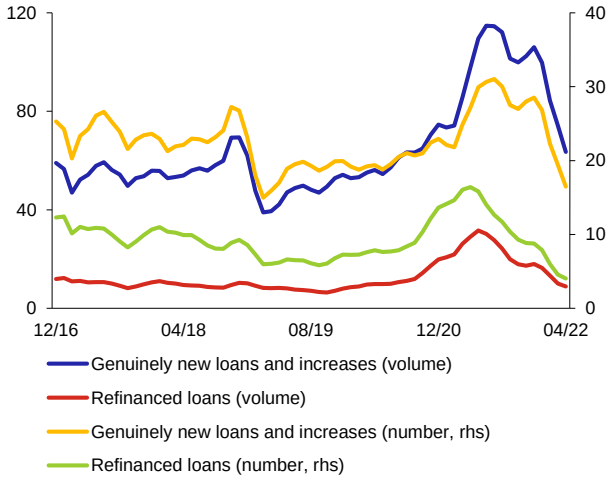
The mortgage market showed significant signs of overheating in 2021. The volume of genuinely new loans provided in 2021 markedly exceeded the full-year volumes of previous years (see Chart V.15), with the highest lending activity observed around the middle of the year. Lending slowed slightly from mid-2021 onwards, but the overall volumes remained very high (see Chart V.16). The strong growth was driven by brisk growth in residential property prices (see section II.1.1), which was reflected in an increasing average mortgage loan size but also by a growing number of new loan contracts (see Chart V.16). The latter was driven by the efforts of some households to maintain the value of their savings amid increasing uncertainty and inflation (see section II.1.1). In addition to the growth in genuinely new loans, there was increased interest in refinancing existing loans during the pandemic (see Chart V.16). Demand for refinancing loans has been declining since the second half of 2021, due mainly to a rise in interest rates. In the first few months of 2022, the volumes of genuinely new loans remained fairly high from the historical perspective but fell sharply compared with last year.

Chart V.15
Bank loans for house purchase and mortgage loans
(CZK billions)



Note: All series include increases in existing loans.

Chart V.16
Three-month totals of components of new loans for house purchase
(CZK billions; right-hand scale: thousands; moving three-month totals)



Note: The numbers of genuinely new and refinanced loans for March and April 2022 are estimated.

Households responded to the tight situation on the residential property market by borrowing larger amounts

Growth in the median mortgage loan size (16% year on year at the end of 2021) significantly outpaced income growth, as did year-on-year property transaction price growth (almost 26%). Some households adjusted to the market situation mainly through growth in total debt after the cancellation of the recommended DSTI and DTI limits during the pandemic. The median total debt per loan applicant reached around CZK 3.2 million in the second half of 2021 (see Chart V.3 CB and Chart V.4 CB).[151] Clients with the median debt included households with both high and relatively low incomes (see

150 Although the terms "loans for house purchase", "mortgage loans" and "(consumer) credit secured by residential property" are not entirely identical, in this section these terms mean the same group of loans contained in the above Survey.

151 The average total debt per client was CZK 4.1 million and the most frequent debt amount (mode) rounded to the nearest thousand was CZK 3 million. In addition to the mortgage loan itself, total debt includes consumer credit, mortgage loans taken out earlier and any other revolving loans and credit lines.

Chart V.4 CB). Around half of the applicants declared a net monthly income of below CZK 50,000. At the same time, an adjustment in the form of more frequent loan applications by multiple (co-)applicants re-emerged (see Chart V.17).

The scope for a drop in monthly repayments through growth in housing loan maturity has evidently been exhausted

Unlike in previous years, households no longer adjusted very much to the increasing loan size by extending the repayment term, which had previously made it possible to pay lower monthly instalments (see Chart V.18). This behaviour has evidently hit its limit, as the median repayment term of genuinely new loans has been almost 30 years for more than two years now, while 60% of genuinely new loans have a maturity of between 25 and 30 years (see Chart V.19). The largest maturity category until a few years ago – 20–25 years – is rare nowadays. Some genuinely new loans are provided with maturity exceeding 30 years (see Chart V.19). For such mortgages, however, the maturity does not exceed 32 years, while the actual foreseen maturity is 30 years and applicants have a two-year period to draw on the approved funds. Banks provide such mortgages to relatively young applicants (see Chart V.20).

Chart V.17

Average mortgage loan size and number of clients per loan application

(CZK millions; right-hand scale: number of persons)

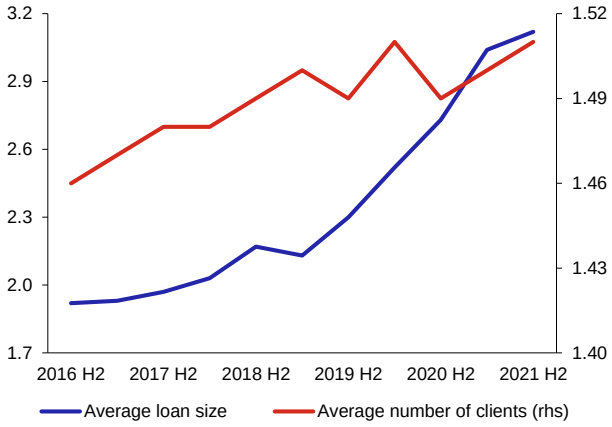
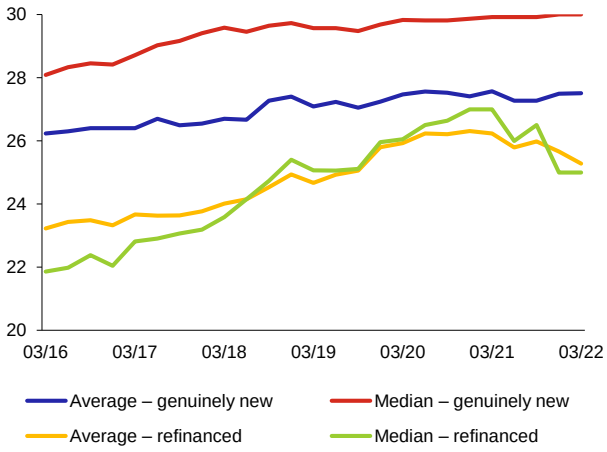


Chart V.18

Maturity of loans secured by residential property

(years; averages weighted by loan amount)

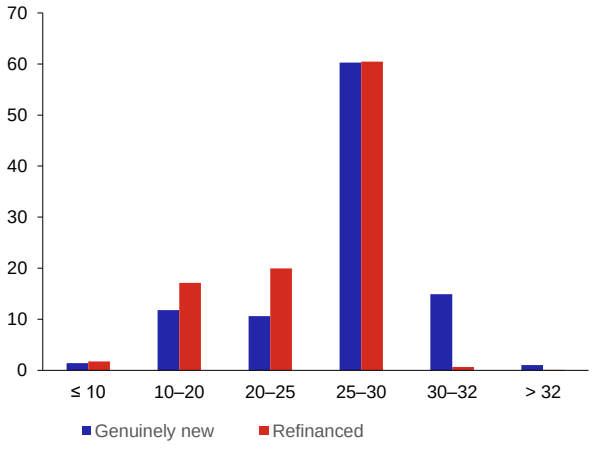


Note: The figure for 2022 Q1 is based only on the data for January and February.

Chart V.19

Maturity distribution of new loans

(share of loans in volume provided in %; x-axis: maturity in years)

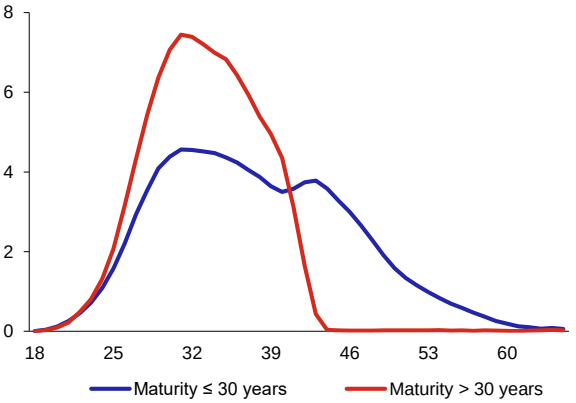


Note: Interval closed from the right. Data for March 2021–February 2022.

Chart V.20

Distribution of new loans by age of the principal borrower for various loan maturities

(share of loans in volume provided in %; x-axis: age of principal borrower in years)



Note: Data for March 2021–February 2022. The curves are smoothed.

Banks met the recommended LTV limit

Under the CNB's Recommendation, in 2021 mortgage lenders were supposed to comply with an LTV limit of 90%, to be exceeded only by loans representing a maximum of 5% of the reference volume (the average for the previous two quarters).[152] All the financial institutions concerned complied with this volume exemption, and loans with LTVs of over 90% made up less than 2% of the volume provided overall (see Chart V.21). There was also a modest decrease in the share of loans with LTVs of over 80% and loans with LTVs of 80%–90%, which are subject to the limits that took effect in April 2022. The LTV distribution (see Chart V.5 CB) saw an increase in the share of loans with low LTVs. This may reflect increased interest in buying residential property as an investment among high-income households with accumulated savings. The stability of the LTV distribution is contributing to the resilience of the Czech banking system mainly through limited losses given default (low LGD), because the correlation between the LTV ratio and probability of default (PD) is proving to be fairly weak in the Survey (see Box 4 in section IV.4).

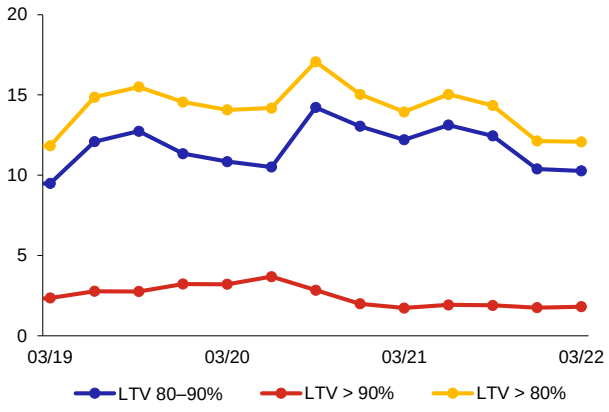
Circumvention of LTV limits by taking out additional unsecured loans for property financing remains limited

In the context of compliance with the LTV limits, the CNB is continuing to monitor any efforts to circumvent the limits through the additional provision of unsecured consumer credit. Taking out an unsecured loan in the six months before or after obtaining a mortgage may be a signal of such behaviour. Although the concurrent provision of secured and unsecured loans almost tripled in 2021 compared with 2020 (see Chart V.22), these amounts remain relatively low overall and this phenomenon is insignificant in terms of its impacts on financial stability. Lenders are well aware of the potential risks associated with a drop in collateral value in the current conditions. This is also evidenced by incomplete take-up of the permissible volume exemptions for the LTV ratio.

Chart V.21

Loans with LTVs in selected bands

(share of loans in volume provided in %)

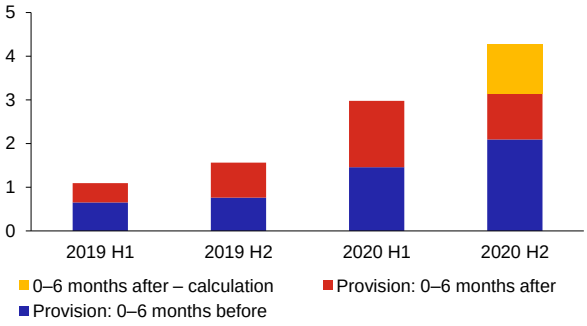


Note: The figure for 2022 Q1 is based only on the data for January and February.

Chart V.22

Concurrent provision of unsecured and mortgage loans

(unsecured loans in CZK billions; x-axis: half-year in which mortgage loan was provided)



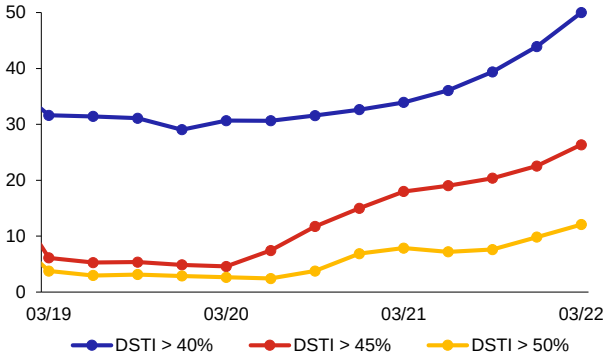
Note: "Before" and "after" relate to the time of provision of the mortgage loan. For the first and last monitored period, the data are calculated to add up to the whole, as the known data do not cover the entire six months. Data for the period of one year before the provision of the mortgage loan and one year after it provide a similar picture.

Lenders are continuing to take on increased risks in terms of DSTI and DTI ratios

The CNB did not apply any DSTI or DTI limits from mid-2020 until April 2022. In response to the onset of the pandemic, this relaxation started to be gradually reflected in increasingly less tight credit standards and an increase in the share of loans which, based on the conclusions of its analyses and stress tests, the CNB usually regards as very risky (see again Box 4 in section IV.4). These are mortgage loans with a DSTI of over 40% of net income and a DTI of over 8 times net annual income. The share of loans with high DSTIs increased in 2021 and the first few months of 2022. In January and February 2022, banks provided 50% of the new volume of loans with a DSTI of over 40%, 26% of loans with a DSTI of over 45%, and 12% of loans with a DSTI of over 50% (see Chart V.23). The volume exemptions for the previous recommended limits would thus have been markedly exceeded. This trend strengthened gradually (see Chart V.6 CB), partly due to increasing interest rates on new loans. This was particularly true of second and subsequent mortgage loans, whose share in genuinely new loans was stable at around one-third in previous years but reached 38% in February of this year (see Chart V.8 CB). By contrast, the DTI ratio (see Chart V.24 and Chart V.7 CB) experienced a turnaround in 2021 Q4. While loans with DTIs of over 8 accounted for almost 30% of loans provided in 2021 Q2 and Q3, they made up only 22% of loans provided in January and February 2022. Loans with DTIs of over 8.5 accounted for 15% of loans provided in January and February of this year, while loans with DTIs of over 9.5 accounted for only 6%. The different trends in the shares of risky loans by DSTI and DTI are mainly due to the substantial rise in client interest rates, which only affect the DSTI ratio.

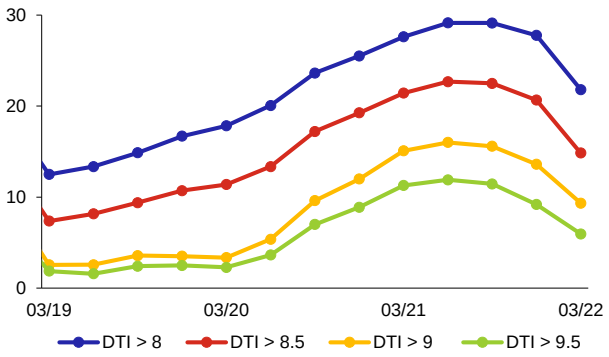
152 The LTV limit of 90% formally applied only until 10 December 2021. The new Recommendation effective from this date recommends that lenders do not exceed an LTV limit of 100% for any loan. Binding LTV limits set in a provision of a general nature did not come into effect until 1 April 2022.

Chart V.23
Loans with DSTIs in selected bands
(share of loans in volume provided in %)



Note: The figure for 2022 Q1 is based only on the data for January and February.

Chart V.24
Loans with DTIs in selected bands
(share of loans in volume provided in %)

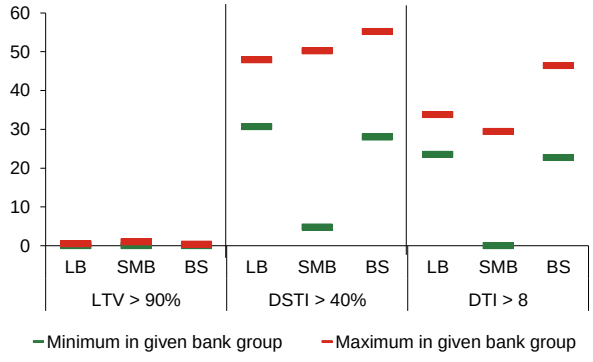


Note: The figure for 2022 Q1 is based only on the data for January and February.

Lenders took appropriate account of the level of risk undertaken when setting interest rates

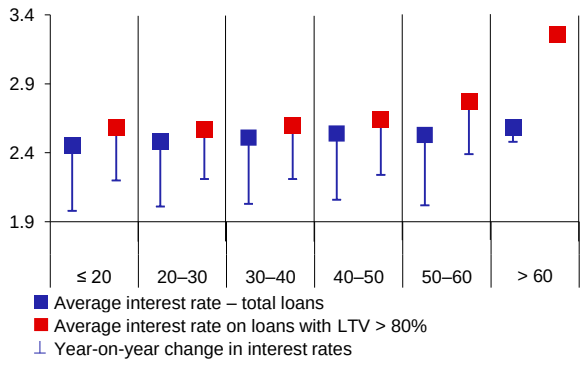
All types of banks contributed to the increase in the share of loans with high DSTIs (see Chart V.25). There was an effort by banks to differentiate loan rates based on credit ratios. The level of risk was reflected above all in rates on loans with LTVs of over 80% (see Chart V.26 and Chart V.9 CB). In addition to elevated loan riskiness, the higher interest rates in this category may reflect clients' high demand for this type of loan and limited supply thereof by lenders. Whether the loan also had a DTI of over 8 or a DSTI of over 40% had no significant effect on the additional interest rate risk premium in the category of loans with LTVs of 80%–90%. By contrast, banks took into account riskier DSTIs or DTIs for loans with LTVs of over 90% in their interest rate risk premiums all the more substantially (no loans with an LTV of over 100% were provided in this period). This again indicates efforts to reflect higher credit risk in the level of interest rates.

Chart V.25
Shares of loans exceeding risky LTV, DSTI and DTI levels by bank group
(% of portfolio of loans for house purchase of given institution; 2021 H2)



Note: SMB = small and medium-sized banks, LB = large banks, BS = building societies.

Chart V.26
Average interest rates by loan characteristics
(average interest rate in %; x-axis: DSTI in %)

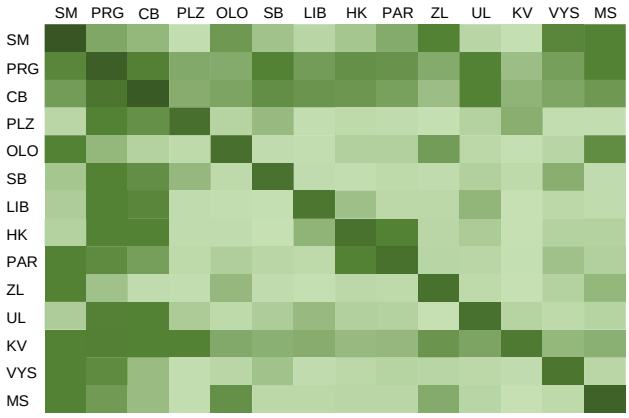


Note: Data for 2021 H2. Weighted average interest rates with the sizes of individual loans as weights. Interval closed from the right.

Some mortgage applicants are buying property in regions other than their region of permanent residence

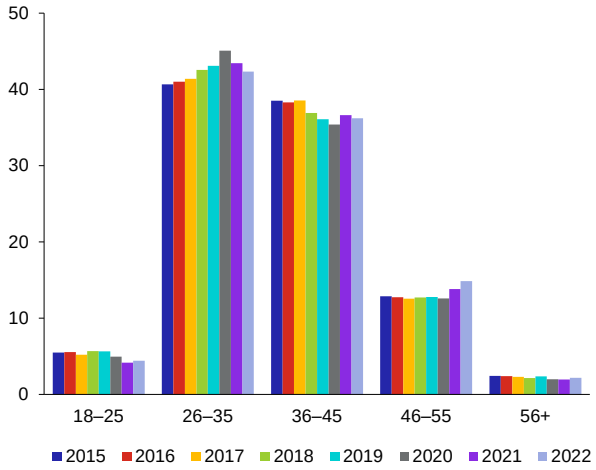
Data from the Survey show that recently about 18% of new loans have been secured by property in a region other than the one in which the applicant has permanent residence. This applies to an increased extent to applicants with permanent residence in Prague, Central Bohemia and South Moravia (see Chart V.27). These are often higher-income individuals in the 45+ age group who are financing recreational property or a second property for living in occasionally. By contrast, there are also many cases of people with permanent residence outside these regions moving there using debt financing to purchase a property. These are often university-educated childless applicants aged 25–36 taking out a loan to purchase an existing property (and hence not for the purposes of construction, reconstruction, etc.). These characteristics are evidently consistent with people relocating for better job opportunities – most often to Prague. However, the data do not indicate that, as a whole, people borrowing to acquire property outside their region of permanent residence could be a source of a higher risk of default.

Chart V.27
Principal applicant's region of permanent residence versus region in which the pledged property is located
(number of genuinely new loans secured by residential property)



Note: Darker shades show cells with a higher number of loans. The rows indicate the region in which the property is located and the columns indicate the principal applicant's region of permanent residence. Data for September 2021–February 2022. Refinanced loans are not included. The share of loans outside the main diagonal of the matrix is around 18%. SM = South Moravian Region, PRG = Prague, CB = Central Bohemian Region, PLZ = Plzeň Region, OLO = Olomouc Region, SB = South Bohemian Region, LIB = Liberec Region, HK = Hradec Králové Region, PAR = Pardubice Region, ZL = Zlín Region, UL = Ústí nad Labem Region, KV = Karlovy Vary Region, VYS = Vysočina Region, MS = Moravian-Silesian Region.

Chart V.28
Distribution of new loans by age of the principal borrower
(share of loans in volume provided in %; x-axis: age of principal borrower in years)



Note: The figure for 2022 is based only on the data for January and February.

The mortgage-lending rules changed last year following an amendment of the Act on the CNB

Since 2015, the CNB has been mitigating the systemic risks associated with mortgage lending and residential property market developments on the basis of the aforementioned macroprudential analyses and information obtained in the course of supervising the financial market. To this end, the CNB has gradually introduced and modified the LTV, LTI, DTI and DSTI caps (or limits). Up to December last year, it specified these requirements in its *Recommendation on the management of risks associated with the provision of consumer loans secured by residential property*[153] (the "Recommendation"), which also included a set of additional rules of prudent conduct in providing the relevant type of loan. At the end of 2021, the CNB also started to set the conditions for providing such loans using binding measures based on an amendment to Act No. 6/1993 Coll., on the Czech National Bank, as amended by Act No. 219/2021 Coll. (the "Act on the CNB"). It contains Article 45b, which allows the CNB to set binding upper limits on the LTV, DTI and DSTI ratios for all mortgage lenders where systemic risks related to such lending have been identified. Two levels of the relevant limit will apply for each ratio. The first can be regarded as the basic or standard one and the second – designed for applicants under 36 years of age for purchases of owner-occupied housing – as less strict. Lenders therefore have the option of applying the LTV cap 10 pp higher, the DSTI cap 5 pp higher and the DTI cap a one-year multiple of net income higher for applicants under 36 years. The principal applicant has been aged under 36 years for around half of all loans provided in recent years (see Chart V.28).[154]

Limits on credit ratios are now set in a provision of a general nature…

The CNB sets the specific upper limits on credit ratios in a provision of a general nature (the "Provision"), which is issued without a procedure on a proposal for the Provision. The limits take effect no earlier than four months after the Bank Board decides on them and the Provision is published.[155] The CNB reviews the reasons for the issuance of the Provision at least once every six months with respect to the existence and expected further evolution of the factors giving rise to systemic risks. If the CNB sets an upper limit on one or more credit ratios through the Provision, lenders may not provide loans exceeding that limit. The Act on the CNB respects the fact that a small proportion of loan cases have specific characteristics and that strict insistence on the application of the caps could lead to excessive regulatory hardship. Therefore, an

153 This used to be called the *Recommendation on the management of risks associated with the provision of retail loans secured by residential property*.

154 However, the Act on the CNB also allows the application of more moderate upper limits on credit ratios where the principal applicant is over 36 years but the co-applicant – spouse or registered partner – is under 36 years. The CNB estimates that after taking these cases into account the more moderate limits will be applied to about 60% of new loans.

155 If the CNB increases or cancels the upper limit on a credit ratio in the Provision, this change takes effect the day after the date of publication unless the Provision provides for a later date of effect.

exemption not exceeding 5% of the total amount of loans provided in the previous quarter may be applied by specific lenders to specific cases in the current calendar quarter.

…whose first edition – effective from April 2022 – was published by the CNB in November 2021
In view of the relaxation of credit standards for mortgage loans last year, the Bank Board decided at its meeting on 25 November 2021 to introduce the first limits on the LTV, DTI and DSTI ratios in accordance with the new legally binding rules. In the relevant Provision, the basic LTV limit was set at 80% (90% for applicants under 36 years). The cap on the DTI ratio is set at 8.5 times net annual income and that on the DSTI ratio at 45% of the applicant's net monthly income (9.5 times and 50% respectively for applicants under 36 years). At the same time, applications for loans with DTIs of 8 and DSTIs of 40% should still be assessed with an increased degree of prudence. Given the four-month time interval between the setting of the caps and their date of effect, lenders have only been following the new rules since April 2022.

The aim of the upper limits on credit ratios is to prevent the vulnerability of the banking sector from rising…
Credit ratios are macroeconomic instruments aimed at ensuring that lenders are sufficiently resilient to adverse shocks. Capping them will prevent excessive growth in the share of loans with highly risky characteristics in lenders' balance sheets, which could lead to failures in the domestic financial system in the event of highly adverse economic developments. Together with the CNB's monetary policy normalisation, the upper limits will reduce the risk of a continued spiral between rising housing prices and growth in loans for financing housing purchases.

…and help reduce the taking on of excessive credit risk by households
Another positive effect of introducing the caps is that they reduce the vulnerability of recipients of new mortgage loans to adverse shocks. The DTI ratio is designed primarily to mitigate risks associated with excessive household debt, while the DSTI ratio is targeted at risks connected with excessive debt service. According to CNB analyses conducted using DTI and DSTI data, many of the clients granted a loan in the past two years spend a relatively large proportion of their income on servicing their debt. An adverse shock to their income situation and living costs may cause them to cut back significantly on non-essential expenses, which may have a sizeable effect on domestic aggregate demand. In the extreme case, their ability to repay the loan may be jeopardised. A marked increase in interest rates upon refixation may have similar effects, although under the CNB's Recommendation, lenders have been testing applicants' resilience to this type of shock for a number of years. Given that these shocks have occurred in recent months and may intensify further, the CNB is currently paying increased attention to the resilience of mortgage holders (see section IV.4).

The caps in themselves will represent a constraint on only a small proportion of mortgage loans, but combined with other factors they will cause a significant year-on-year decline in new loans in 2022
When setting the upper limits on credit ratios in November 2021, the CNB stated that this would not limit the volume of new loans by more than one-tenth of the amount of loans that would hypothetically have been provided if the measures did not exist. This estimate was based on the structure of new loans in terms of LTV (see Chart V.5 CB), DSTI (see Chart V.6 CB) and DTI (see Chart V.7 CB), the less strict limits for applicants under 36 years, the 5% volume exemption calculated using both genuinely new and refinanced loans, and experience with the application of the previously recommended caps. However, the year-on-year decline in the amount of new loans will certainly be significantly larger in 2022 due to the interaction of other factors. It will be driven by weaker demand for loans due to the rising interest rates and worse economic situation, especially the surge in energy prices and other living costs. The frontloading of mortgage loans by some households last year as a result of the expected increase in interest rates will also have a temporary effect. This is evidenced, among other things, by a substantial increase in off-balance sheet loan commitments (i.e. primarily negotiated but undrawn or only partially drawn loans) to banks last year for loans to households (see Chart V.10 CB).

The persisting risks in the area of borrowers' vulnerability do not allow the caps to be eased at present
The constant lead of growth in housing prices over growth in households' disposable income in the Czech Republic in recent years has been reflected in an increase in the loan size needed to buy a house and, in turn, in the indebtedness of households with loans. The numbers of vulnerable borrowers in lenders' balance sheets have therefore risen. Combined with adverse shocks from the real economy, this has caused macrofinancial risks to increase. In view of this situation, the CNB Bank Board decided in November 2021 to set limits on credit ratios. The situation still persists, as evidenced by the finding that the DSTI ratio is above the risky level of 40% for a significant proportion of new loans. In this situation, it seems very likely that in a period of interest rate growth the share of highly risky loans would continue to rise if credit ratio limits were not set, due to competition between lenders. Therefore, at its meeting on financial stability issues in June, the Bank Board decided that the limits on credit ratios set by the relevant Provision will remain unchanged. It will only be possible to get a more accurate picture of the risks based on the data on the characteristics of the loans provided in the months since April, when the previous limits took effect. The CNB will publish the relevant analysis in December in *Financial Stability Report – Autumn 2022*.

The financing of residential property and the rapid rise in house prices is creating systemic risk in many European countries

At the end of 2021, the ESRB re-examined the vulnerability of the banking sector associated with trends in the residential property market. Further to this, in February this year it published a report titled *Vulnerabilities in the residential real estate sectors of the EEA countries*. Five countries (Bulgaria, Croatia, Hungary, Liechtenstein and Slovakia) were issued with warnings for not having responded sufficiently to the relevant risks. Austria and Germany, which, according to the ESRB, had not responded adequately to the risks identified in the 2019 report, were given a recommendation to revise their macroprudential policy appropriately. The ESRB also prepared a recommendation for the Czech Republic but abandoned the step following the adoption of binding limits on credit ratios at the end of November. In addition, the ESRB pointed out that – despite the measures taken – the risks remain significantly elevated in certain countries (Denmark, Finland, Luxembourg, the Netherlands and Sweden).

Some mortgage-lending conditions continue to be set using the Recommendation

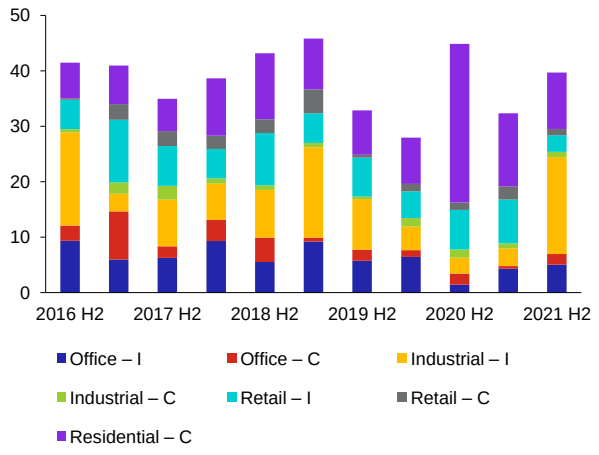
The CNB continues to use the Recommendation to set certain conditions related to mortgage lending which are not governed by the Act on the CNB and specified in the Provision. According to the valid version of the Recommendation of 10 December 2021, the LTV ratio should not exceed 100% for any loan. The term of a mortgage loan should not exceed the horizon of economic activity of the client or the lifetime of the property (as a rule, a maximum of 30 years) and the term of an unsecured consumer loan should not exceed eight years. The CNB also recommends that the LTV, DTI and DSTI ratios for new mortgage loans for the purchase of buy-to-let residential property or the purchase of additional residential property by the same borrower should never exceed the upper limits set in the Provision effective when these loans are provided (i.e. that lenders should not apply the equivalent of volume exemptions in these cases). Moreover, when refinancing consumer credit secured by residential property whose credit ratio levels they are not required to assess by law, lenders should not extend the final maturity of the loan beyond that agreed with the original provider. The qualitative parameters specified in the Recommendation include a recommendation that lenders should stress test the applicant's ability to repay the loan in the event of an increase in interest rates and under worse economic conditions, and conversely should not provide loans with a non-standard repayment schedule shifting the applicant's commitments to a later period.

V.4.2 Risks associated with commercial property markets

New bank loans secured by commercial property were at their usual levels in the second half of 2021…

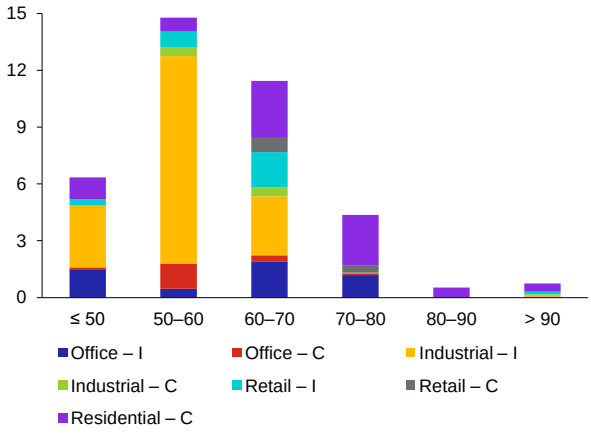
New loans secured by commercial property amounted to CZK 40 billion in the second half of 2021. This is roughly equal to the average value over the last five years (see Chart V.29).[156] Compared with the first half of last year, the volume of loans for residential construction fell markedly and the volume of loans for industrial property conversely increased.

Chart V.29
Amount of new loans secured by commercial property
(CZK billions)



Note: I: investment in existing commercial property, C: construction of commercial property.

Chart V.30
LTV distribution of new loans in 2021 H2
(CZK billions; x-axis: LTV in %)



Note: I: investment in existing commercial property, C: construction of commercial property. Interval closed from the right.

156 The results are based on a semi-annual survey of loans secured by commercial property among eight banks covering around 70% of the market.

…and the risks associated with commercial property markets continue to be largely exported

The total exposures secured by commercial property in Czech banks' balance sheets have long been marginal, and the rapid growth in house purchase loans has caused their relative importance to decrease further. Foreign investors play a key role in financing the construction and purchase of commercial property. The current observed tightness in the market (see section II.1) should thus not pose a systemic risk to the stability of the domestic banking sector even if the situation were to worsen significantly further. However, the commercial property market could be an aggravating factor in the event of a further economic decline and subsequent significant materialisation of accumulated risks. Even under such a scenario, though, a majority of the risks would be transferred to foreign investors.

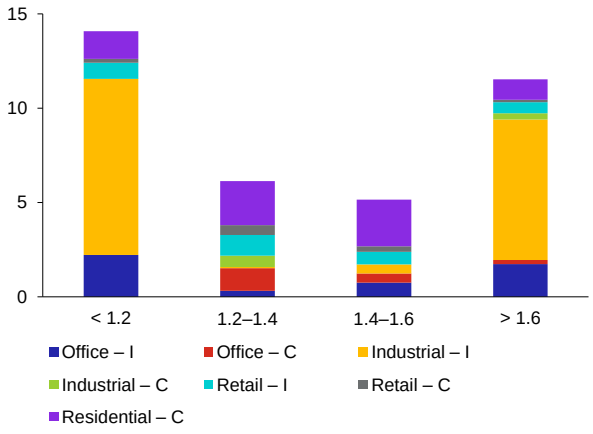
Banks are more cautious about financing commercial property

Lenders are well aware of the increased uncertainty associated with the developments on the commercial property market and significantly increased their collateral requirements during the pandemic. While previously most new loans had LTVs of 60%–70%, loans provided with LTVs of 50%–60% have been most strongly represented since the second half of 2020 (see Chart V.30 and Chart V.11 CB). The decline in uncertainty regarding future property income was reflected in a slight decrease in new loans with lower DSCRs (see Chart V.31) or an increase in the share of loans with more favourable DSCR values (above 1.6). Higher collateral requirements are applied to loans in riskier categories, and the total amount of risky loans with low DSCRs and high LTVs is therefore still fairly low (see Chart V.32).

Chart V.31

DSCR distribution of new loans in 2021 H2

(CZK billions; x-axis: DSCR in %)

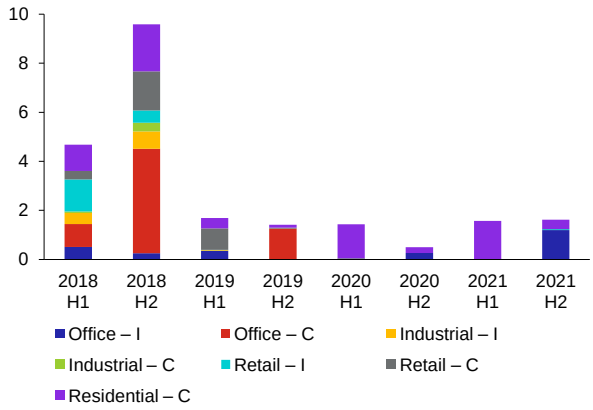


Note: I: investment in existing commercial property, C: construction of commercial property.

Chart V.32

Amount of new loans with an LTV of more than 70% and a DSCR of less than 1.2

(CZK billions)

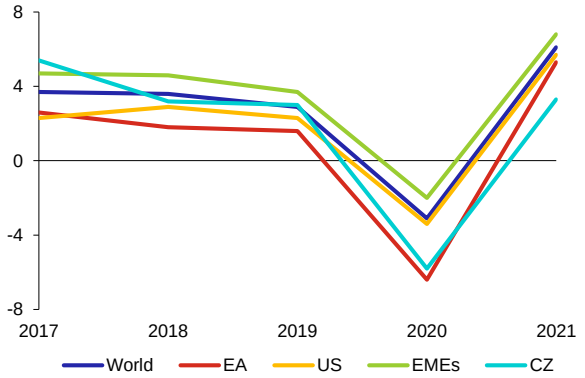


Note: I: investment in existing commercial property, C: construction of commercial property.

VI. CHARTBOOK

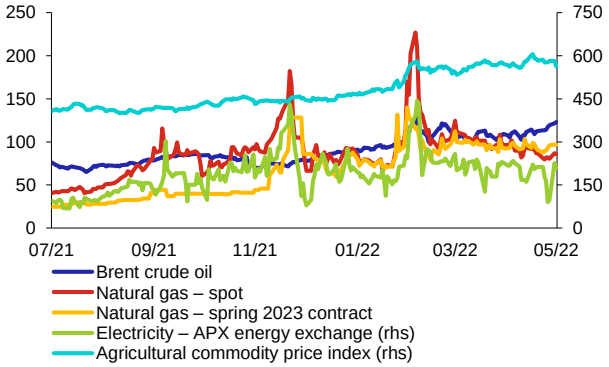
SECTION II

Chart II.1 CB
Economic growth in selected areas
(annual real GDP growth in %)



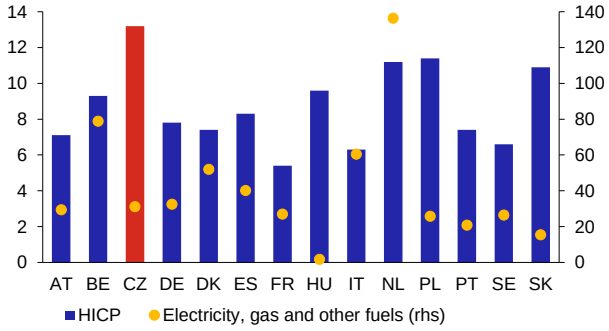
Source: IMF, CNB

Chart II.2 CB
Selected commodity prices
(oil in USD/barrel; commodity index in USD/index point; natural gas and electricity in EUR/MWh)



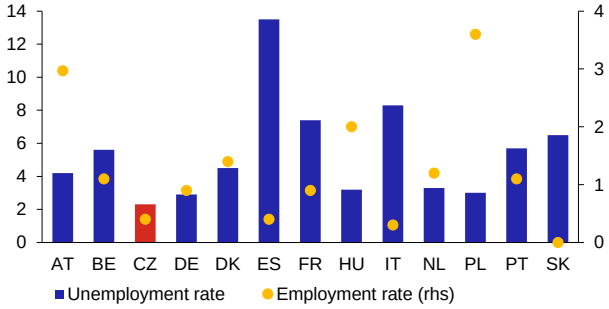
Source: Refinitiv, Standard and Poor's, Amsterdam Power Exchange

Chart II.3 CB
Growth in the HICP and its energy component in selected EU countries
(year-on-year growth in %)



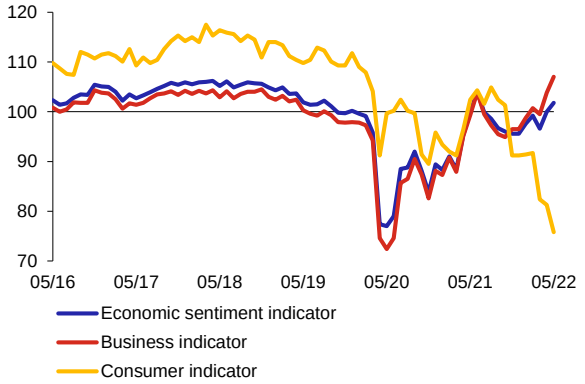
Source: Eurostat
Note: Data as of 30 April 2022.

Chart II.4 CB
Unemployment rate and change in employment rate in selected EU countries
(%; right-hand scale: pp)



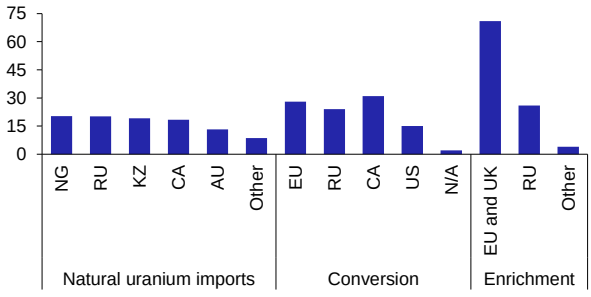
Source: Eurostat
Note: Unemployment rate as of 31 March 2022. Change in employment rate as the difference between 31 December 2021 and 31 December 2019.

Chart II.5 CB
Economic sentiment indicator for the Czech Republic
(base index relative to long-term average)



Source: CZSO

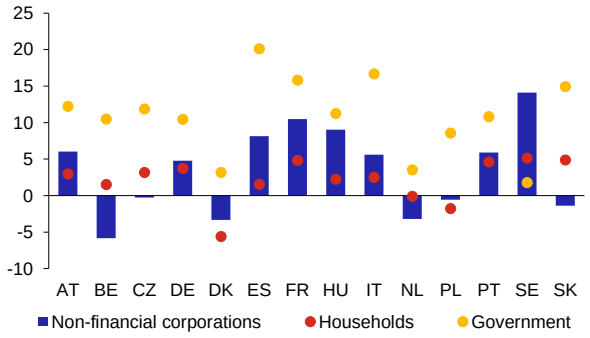
Chart II.6 CB
Russia's contribution to EU nuclear energy processes
(%)



Source: EURATOM
Note: Uranium undergoes conversion and enrichment processes during the production of nuclear fuel. During conversion, uranium oxide is converted into hexafluoride, subsequently enriched with the U-235 isotope. The enriched uranium is used to produce nuclear fuel that is specific to the individual reactor type, which is why the former Eastern Bloc countries are highly dependent on Russian nuclear fuel. 2020 data. N/A denotes unspecified countries. Figures may not add up to 100% due to rounding.

Chart II.7 CB
Change in the debt ratio of economic agents in selected EU countries

(pp)

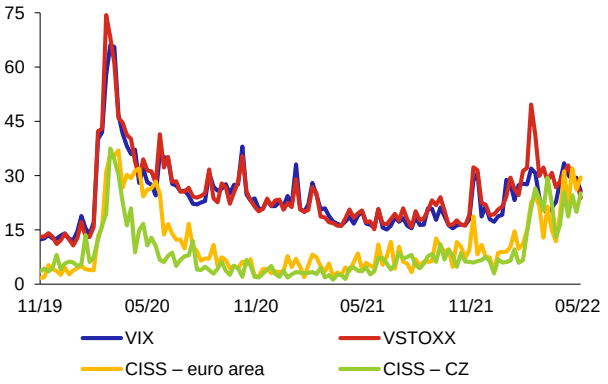


Source: ECB

Note: Data as of 31 December 2021. Change from 31 December 2019. Debt is expressed relative to GDP.

Chart II.8 CB
VIX, VSTOXX and CISS indices

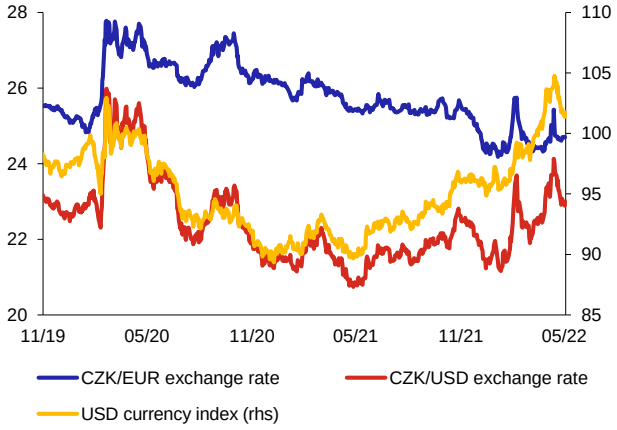
(points)



Source: Refinitiv, CNB

Chart II.9 CB
Selected exchange rates

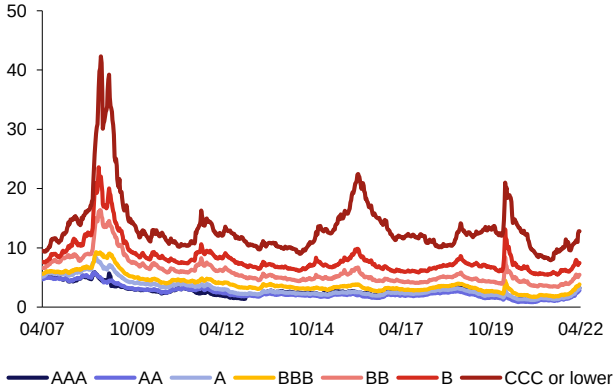
(CZK; right-hand scale: index in points)



Source: Refinitiv

Chart II.10 CB
Global corporate bond yield indices by rating grade

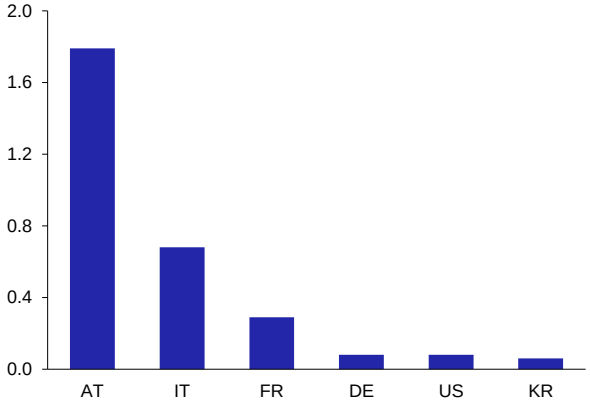
(%)



Source: Bank of America Merrill Lynch

Chart II.11 CB
Share of banks' exposures to Russia in total assets

(%)

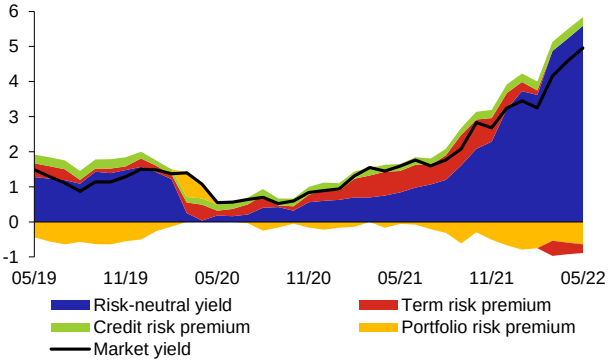


Source: BIS

Note: Data as of 31 December 2021.

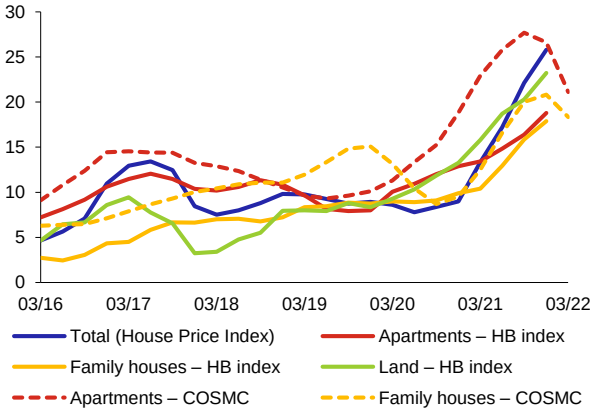
Chart II.12 CB
Decomposition of the five-year Czech government bond yield

(yield in %; components in pp)



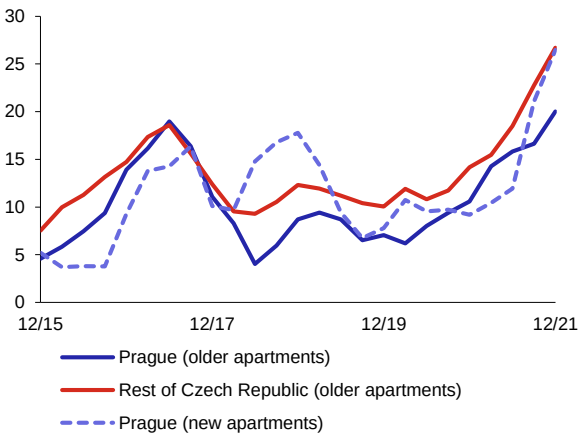
Source: Refinitiv, CNB

Chart II.13 CB
Transaction prices by type of property
(year-on-year growth in %)



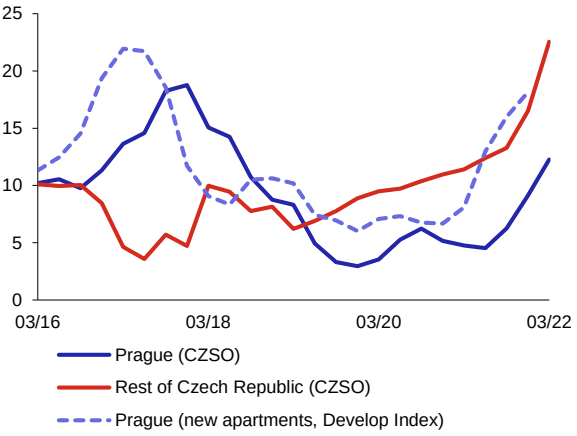
Source: CZSO, HB Index, COSMC
Note: Growth rates calculated from COSMC data are currently experimental.

Chart II.14 CB
Apartment transaction prices by region
(year-on-year growth in %)



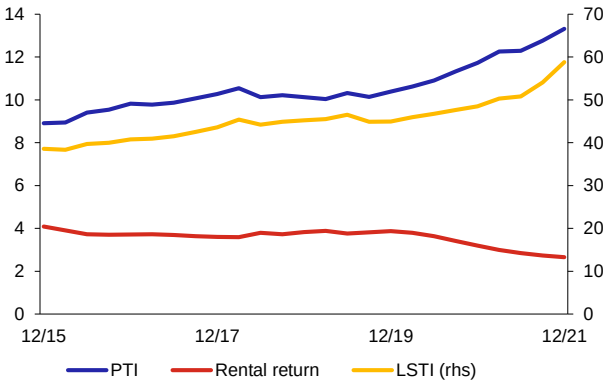
Source: CZSO

Chart II.15 CB
Apartment asking prices by region
(year-on-year growth in %)



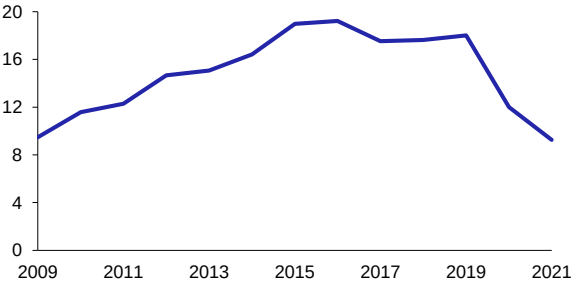
Source: CZSO, Společnost pro cenové mapy ČR s.r.o.
Note: As the Develop Index is published every two months, the figures for March and September were obtained as the average of the year-on-year growth rates in February and April and in August and October respectively.

Chart II.16 CB
Selected apartment affordability indicators
(PTI in years; yields in %; right-hand scale: %)



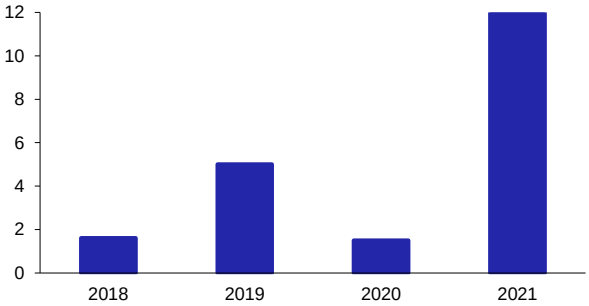
Source: CNB, CZSO, IRI, Společnost pro cenové mapy ČR, s.r.o.
Note: PTI is the price-to-income ratio and LSTI the loan service-to-income ratio. The apartment price is defined as the average price of a 68 m^2 apartment. Income is defined as the annual moving total of the average gross wage. A loan with an LTV of 80% and a repayment period of 25 years was considered for the LSTI calculation.

Chart II.17 CB
Households for which debt financing of an average apartment is attainable
(%)



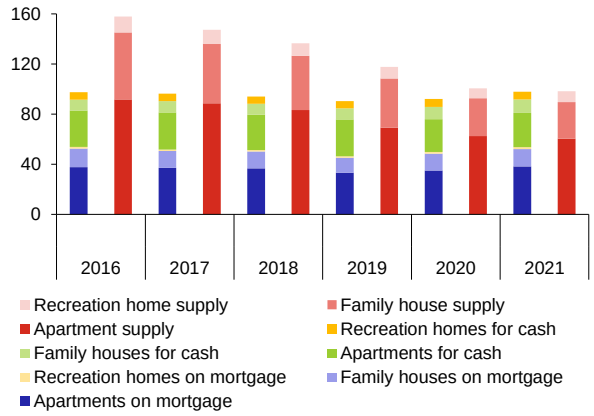
Note: Percentage of households whose income allows them to safely repay a loan for the purchase of housing at the average price and with a floor area of 68 m^2. Regional differences in income and housing prices are not taken into account. A mortgage loan with a repayment period of 25 years and an LTV of 80% is considered.

Chart II.18 CB
Probability of average apartment prices falling by more than 10%
(%; Q4 of given year)



Note: The probability of average apartment prices falling by more than 10% over the next two years. Regional differences are not taken into account.

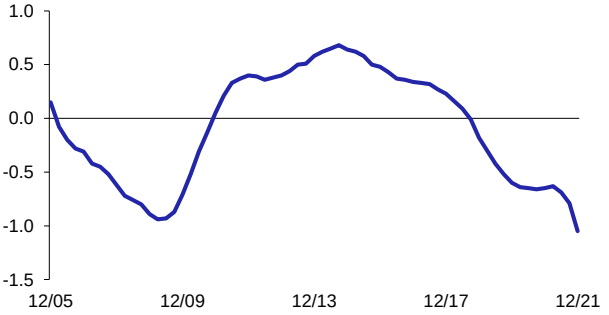
Chart II.19 CB
Property transfers and advertised property supply
(thousands)



Source: CNB, COSMC, sreality.cz

Note: Property transfers at market prices. Mortgage transactions correspond only to mortgage loans with the "property purchase" purpose and therefore do not include the entire volume of mortgages. 2021 data do not include transactions in the second half of December. Supply denotes new advertisements in the given period. However, they may not be unique advertisements.

Chart II.20 CB
Risk premium for yields on commercial property
(pp)



Note: The risk premium is calculated as the difference between observed prime yields on commercial property (Jones Lang LaSalle) and the value implied by a model covering the individual market segments, commercial property yields in nearby countries and the domestic and foreign risk-free return (10Y IRS).

Chart II.21 CB
Alternative scenarios: change in real GDP
(year on year in %)

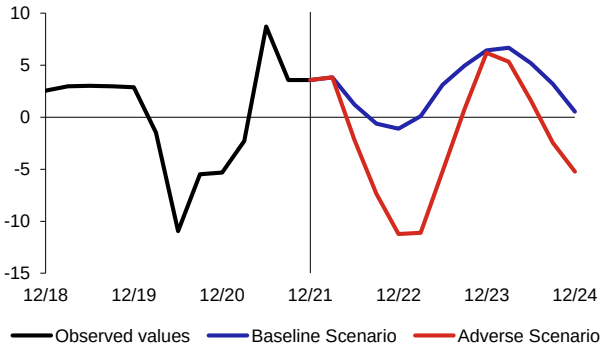


Chart II.22 CB
General government debt
(% of nominal GDP)

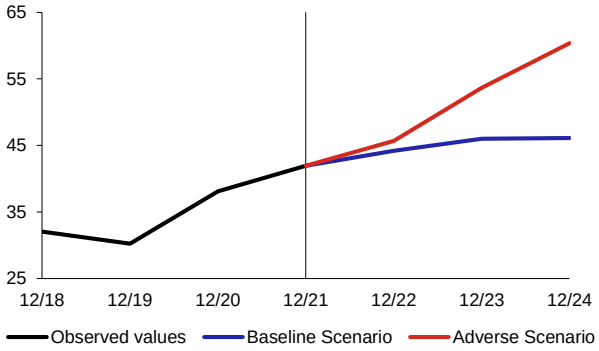
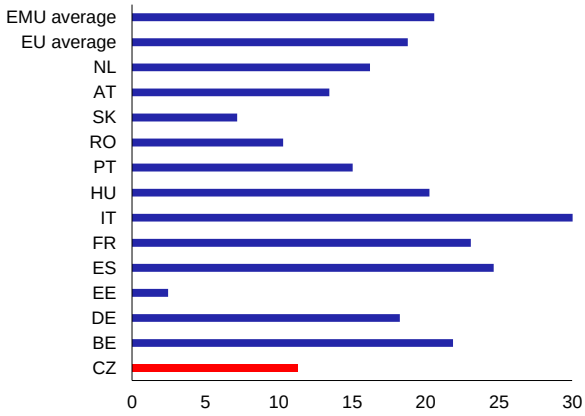
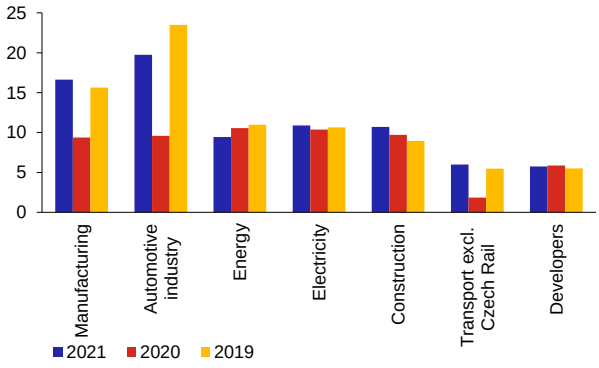


Chart II.23 CB
General government gross funding needs in 2021
(% of GDP)



Source: European Commission

Chart II.24 CB
After-tax return on equity in selected sub-sectors
(%)



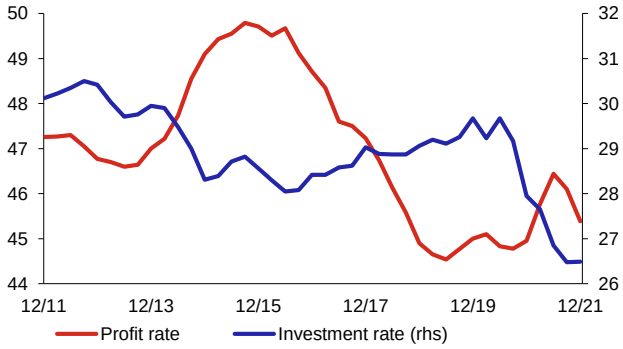
Source: CZSO

Note: Energy comprises electricity, gas, heat and air-conditioned air. The automotive industry is included in manufacturing. Property development projects are included in the results for construction. The results are based on a sample of non-financial corporations.

Chart II.25 CB

Profit rate and investment rate in the non-financial corporations sector

(% of gross value added)



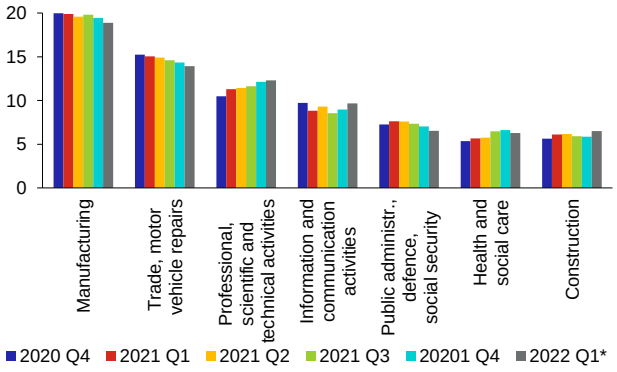
Source: CZSO

Note: Profit is expressed by the annual moving total of gross operating surplus and investment by the annual moving total of gross fixed capital formation.

Chart II.26 CB

Share of mortgage loans provided by sector of the principal applicant

(share in total volume in %)

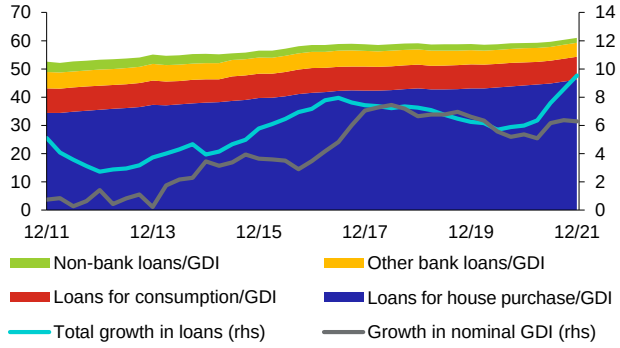


Note: The chart only shows sectors in which the share of loans provided exceeds 5% of the total volume. Data for 2022 Q1 only include January and February (marked *).

Chart II.27 CB

Household indebtedness and disposable income indicators

(ratios in %; right-hand scale: year on year in %)



Source: CNB, CZSO

Note: Non-bank loans are loans provided by other financial institutions. GDI stands for gross disposable income. The household sector also includes data for NPISHs.

Table II.1 CB

Medians of variables describing the characteristics of households when taking out a mortgage loan

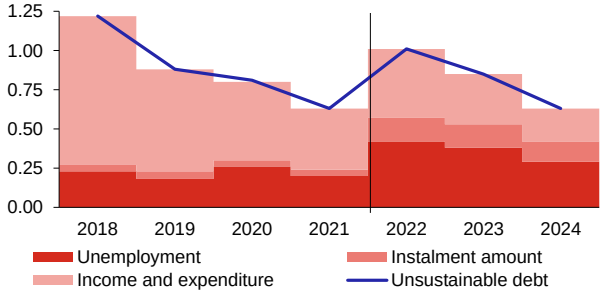
(CZK thousands; y-o-y change in %)	2020 H1	2020 H2	2021 H1	2021 H2	2022 H1
Net monthly income	45.9	46.8	50.2	54.0	57.5
Year-on-year change	8.0	6.0	9.2	15.4	17.3
Property purchase price	2,900	3,200	3,570	3,700	3,750
Year-on-year change	16.0	23.1	23.1	15.6	12.0
Loan size	2,200	2,400	2,700	2,800	2,800
Year-on-year change	13.6	20.0	22.7	16.7	10.8
Mortgage loan instalment	9.5	9.9	11.3	12.3	14.2
Year-on-year change	15.0	21.4	18.6	24.3	35.5
Client's other debt	50.0	30.0	31.0	50.0	60.0
Year-on-year change	-12.3	-50.0	-38.0	66.7	100

Note: The figures are from the database of genuinely new mortgages and relate to the date on which the loan agreement was concluded. Net monthly income is the net income declared in the loan application and comprises the income of all persons listed in the loan agreement. The last half-year, indicated by *, contains data for January and February 2022 only. The year-on-year changes for the last half-year thus compare the median values for January and February only.

Chart II.28 CB

Share of unsustainable mortgage debt in the *Baseline Scenario*

(% of total mortgage debt)

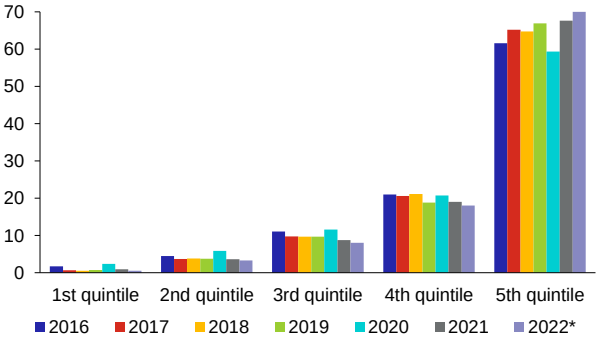


Note: The share of unsustainable debt refers to the portion of loans in the portfolio for which repayment problems can potentially be expected. A breakdown into individual factors shows what the predominant factor was in loans becoming unsustainable. Instalment amount and unemployment reflect the business cycle, and their effect is thus largely natural. By contrast, the income and expenditure factor reflects an unrealistic assessment of the income and expenditure sides of the household's budget when taking out a mortgage. The influence of this factor should be minimal for growth in debt to be sustainable over the long term.

Chart II.29 CB

Share of mortgage loans provided by income quintile of the principal applicant

(% of total volume of mortgage loans)



Source: CNB, CZSO

Note: Income quintiles are calculated using data from the Survey of Income and Living Conditions (SILC). The figure for 2022 is an estimate, as data on the income of the principal applicant are not available for this year. The share of loans in 2022 is calculated using the available data for January and February (marked *).

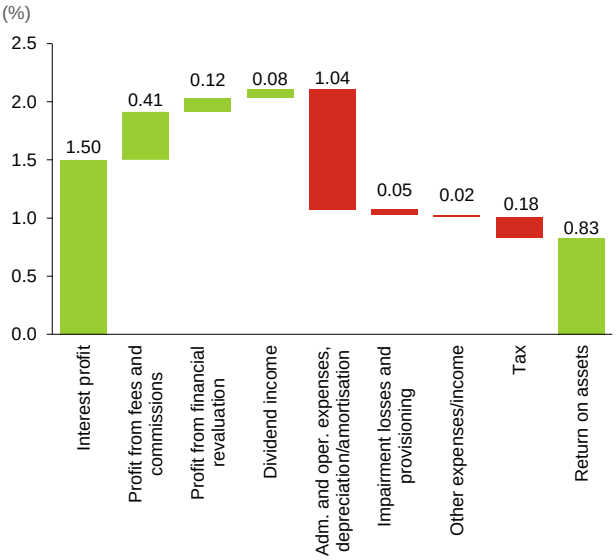
SECTION III

Table III.1 CB
Exposures, provisions and coverage ratios by risk stage and portfolio

Households		Exposures		Provisions		Coverage ratio	
Stage	Date	Volume (CZK billions)	Change (%)	Volume (CZK billions)	Change (%)	Ratio (%)	Change (pp)
Total	12/2020	1889	12.5	31.9	-6.0	1.69	-0.28
	12/2021	2124		30.0		1.41	
	03/2022	2205		29.9		1.36	
S1	12/2020	1716	10.9	4.1	0.1	0.24	-0.02
	12/2021	1904		4.1		0.21	
	03/2022	1971		4.2		0.21	
S2	12/2020	138	35.4	9.0	-7.9	6.51	-2.08
	12/2021	187		8.3		4.43	
	03/2022	203		8.7		4.30	
S3	12/2020	34	-4.3	18.9	-6.5	54.73	-1.25
	12/2021	33		17.6		53.48	
	03/2022	32		17.0		53.81	
NFCs		**Exposures**		**Provisions**		**Coverage ratio**	
Stage	Date	Volume (CZK billions)	Change (%)	Volume (CZK billions)	Change (%)	Ratio (%)	Change (pp)
Total	12/2020	1333	4.0	44.3	-8.8	3.32	-0.41
	12/2021	1386		40.4		2.91	
	03/2022	1412		39.5		2.80	
S1	12/2020	1070	6.4	5.1	-13.4	0.47	-0.09
	12/2021	1138		4.4		0.39	
	03/2022	1130		4.5		0.40	
S2	12/2020	207	-5.1	10.2	-22.1	4.93	-0.88
	12/2021	196		8.0		4.05	
	03/2022	230		8.1		3.53	
S3	12/2020	56	-8.1	29.0	-3.3	51.41	2.72
	12/2021	52		28.1		54.12	
	03/2022	53		26.9		51.23	

Note: S1 and S2 comprise performing loans; S3 can be considered identical to non-performing loans.

Chart III.1 CB
Decomposition of return on assets



Note: The given value is the ratio of the given type of income/expense to the level of assets.

Chart III.2 CB
Structure and amount of items ensuring stable funding

(% of balance sheet as of 31 December 2021)

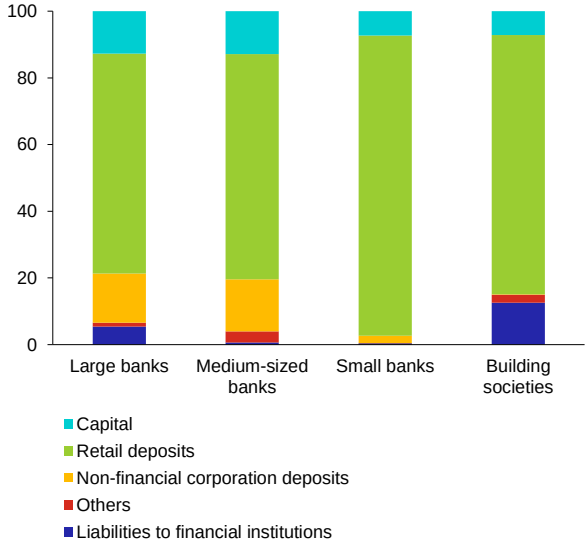
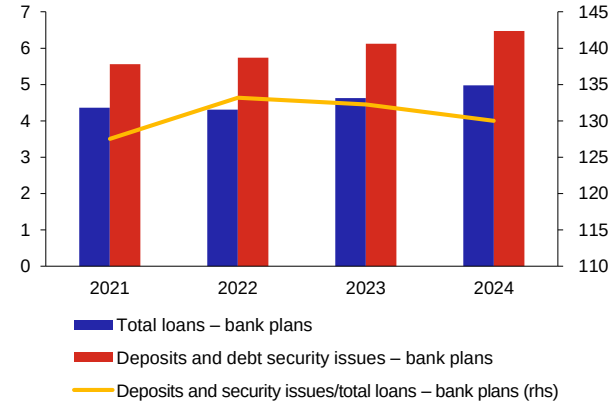


Chart III.3 CB
Funding plans of domestic institutions

(CZK trillions; right-hand scale: %)



Note: Includes loans and deposits to the private sector defined as households, non-financial corporations and financial institutions. Also includes debt securities with maturities equal to or more than three years. Data on a consolidated basis and for selected entities for which plans are available as of 17 May 2022.

Chart III.4 CB
Decomposition of the change in the value of investment funds' assets by investment policy in 2021

(CZK billions; x-axis: individual months of 2021)

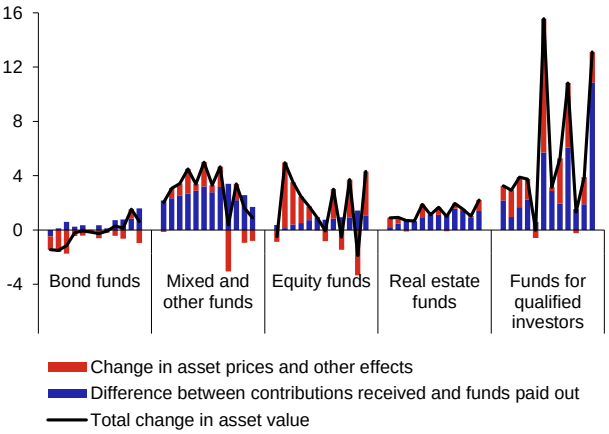
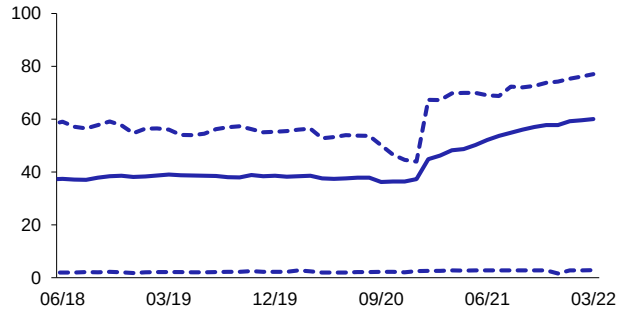


Chart III.5 CB
Share of bonds not marked to market held by transformed funds

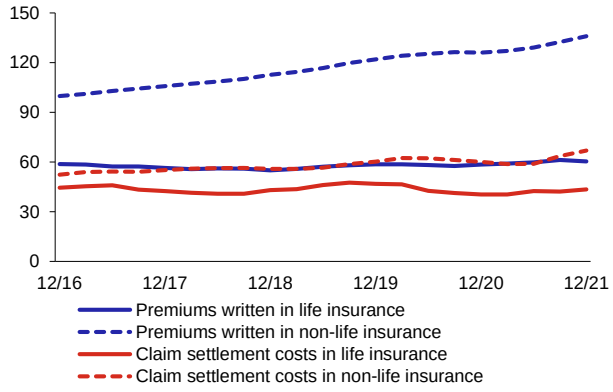
(% of total value of bonds held by transformed funds)



Note: Bonds not marked to market mean bonds at amortised cost and, before 2021, bonds classified as held to maturity. Dashed lines denote the minimum and maximum values across TFs.

Chart III.6 CB
Developments in the insurance sector

(CZK billions)



Note: The chart shows the moving sum of the values for four quarters in gross terms, i.e. unadjusted for reinsurers' share.

Chart III.7 CB
Insurance sector profitability

(%)

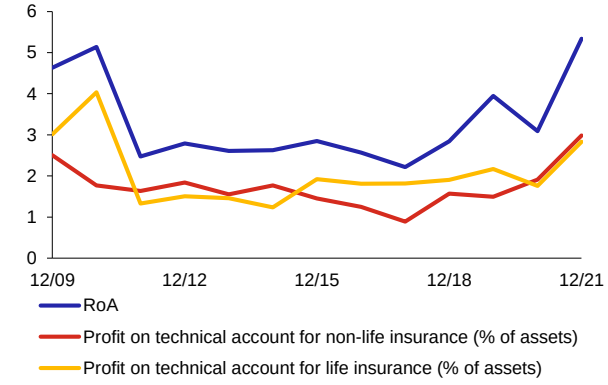
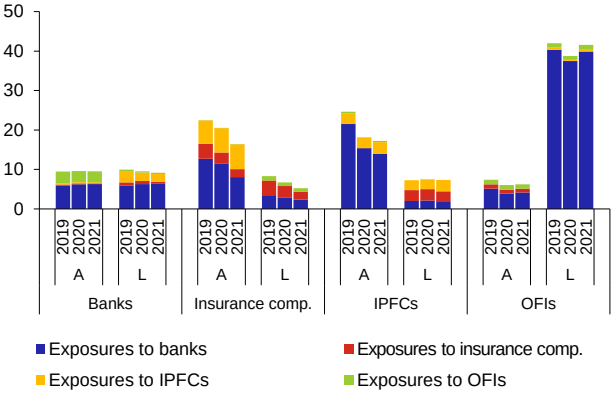


Chart III.8 CB
Share of exposures to domestic financial counterparties

(% of financial assets and liabilities of segments)



Note: A = assets, L = liabilities. IPFCs = investment and pension funds and companies. Other financial intermediaries (OFIs) primarily comprise NFCELs and non-bank investment firms. Year-end values.

SECTION IV

Table IV.1 CB
Liquidity stress test scenario

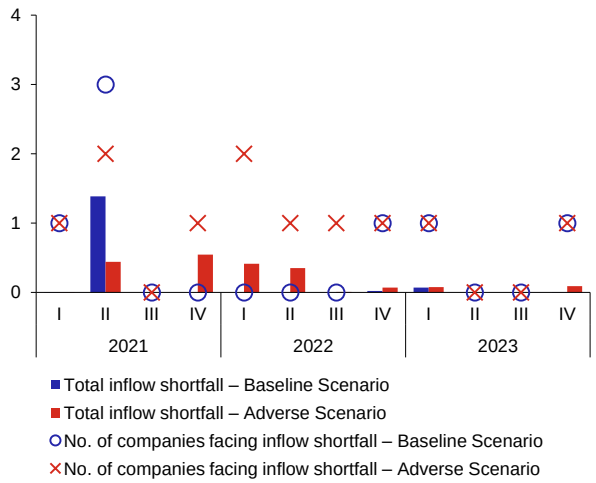
Outflow items, rate of outflow in %:	1M	2M and 3M	over 3M
Stable retail deposits	2%	1%	1%
Other retail deposits	3%	2%	1%
Operating deposits	10%	7%	5%
Non-operating deposits of credit institutions	100%	100%	100%
Non-operating deposits of other financial customers	25%	25%	25%
Non-operating deposits of central banks	0%	0%	0%
Non-operating deposits of non-financial corporations	10%	7%	5%
Non-operating deposits of other counterparties	15%	10%	5%
Liabilities from secured loans		100%	
Liabilities from securities issued		100%	
Maturity of derivatives		100%	
Other outflows		100%	
Increase in NFC loans	10% per 6M (1.6% per M)		
Retail credit lines	5%	5%	5%
NFC credit lines	15%	15%	15%

Inflow items, inflow haircut in %:	for each month
Retail loans (due to moratorium)	50%
Corporate loans (due to moratorium)	50%
Loans to other non-financial counterparties other than NFCs and retail	50%
Loans to and receivables from credit institutions and financial customers	0%
Other inflows	100%
Inflows from secured operations	0%

Liquid assets, haircut on liquid assets in %:	for each month
Corporate bonds	10–100% depending on quality
Covered bonds	10–100% depending on quality
Shares	40–100% depending on quality
Central government	10–20% depending on quality
Cash, T-bills, government bonds	0%

Chart IV.1 CB
Matching of insurance companies' cash inflows and outflows

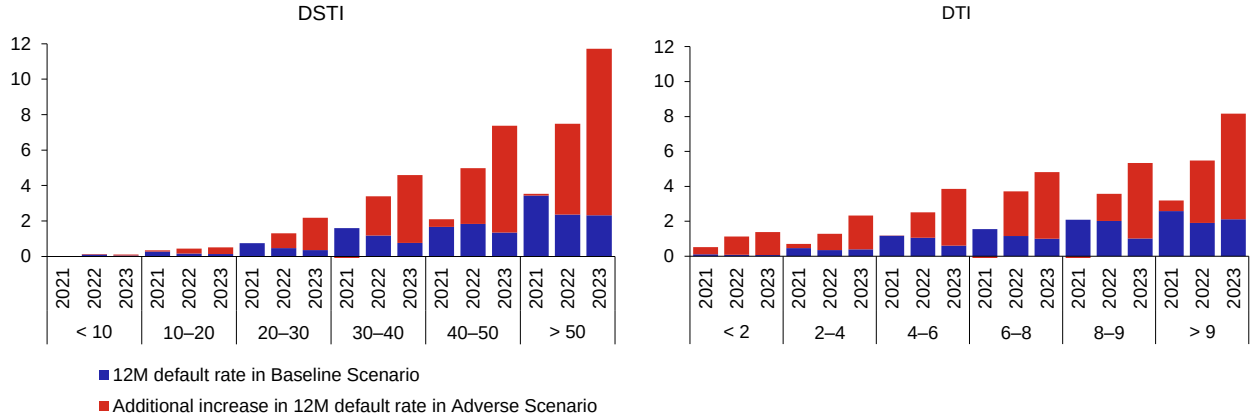
(CZK billions and number of companies)



Note: The inflow shortfall is the total difference between cash inflows and cash outflows for insurance companies whose outflows exceeded inflows in the given quarter.

Chart IV.2 CB
12M default rate on mortgage loans to households by DSTI and DTI ratios

(% of loans in given DSTI/DTI category; x-axis: DSTI ratio in %, DTI ratio in number of net annual incomes)



Note: The 12-month default rate is a forward-looking indicator defined as the flow of non-performing loans in the next 12 months divided by the total stock of performing loans in the starting period. DSTI and DTI intervals are closed from the right. DSTI/DTI categories are based on the level of the ratio as of the day on which the mortgage loan was concluded.

SECTION V

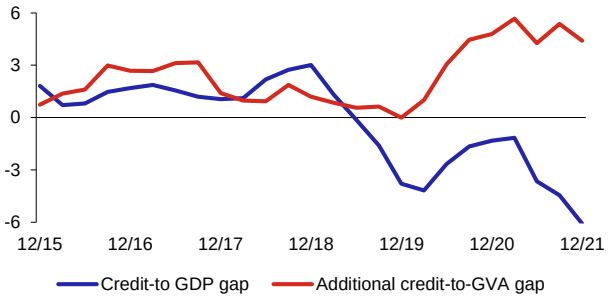
Table V.1 CB
Conversion of FCI values into the countercyclical capital buffer rate

Range of FCI values		CCyB rate
from	to	
0.00	0.09	0.00%
0.09	0.10	0.25%
0.10	0.12	0.50%
0.12	0.14	0.75%
0.14	0.16	1.00%
0.16	0.19	1.25%
0.19	0.21	1.50%
0.21	0.24	1.75%
0.24	0.27	2.00%
0.27	0.31	2.25%
0.31	1.00	2.50%

Note: The interval containing the current FCI value is indicated in red.

Chart V.1 CB
Standardised credit-to-GDP gap and additional gap

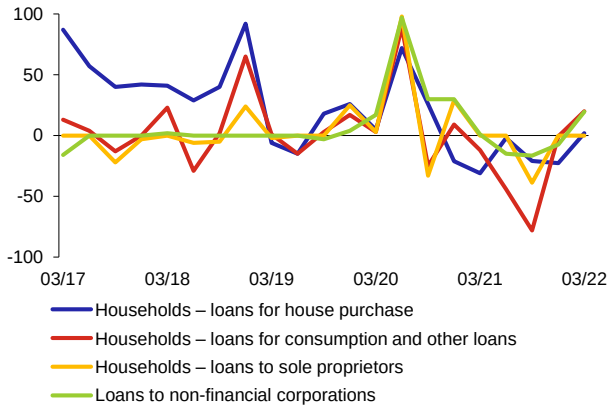
(pp)



Note: The trend in the standardised gap is estimated using the HP filter (lambda = 400,000) over the entire time series. The additional gap – the expansionary credit gap – is calculated as the difference between the ratio of bank loans to the gross value added (GVA) of the private sector and the minimum level of this ratio over the past eight quarters.

Chart V.2 CB
Credit standards in the Czech Republic

(net percentages)

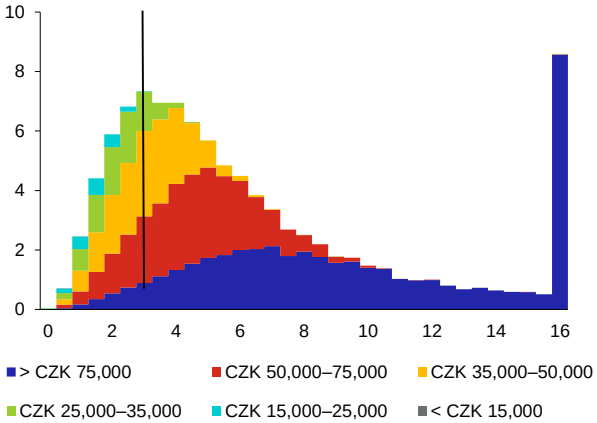


Source: Bank Lending Survey, CNB

Note: The data represent the difference between the market share of banks that reported a tightening of lending standards and banks that reported an easing of lending standards in the past three months. More information on the indicator methodology can be found on the CNB website.

Chart V.3 CB
Total debt distribution by declared income

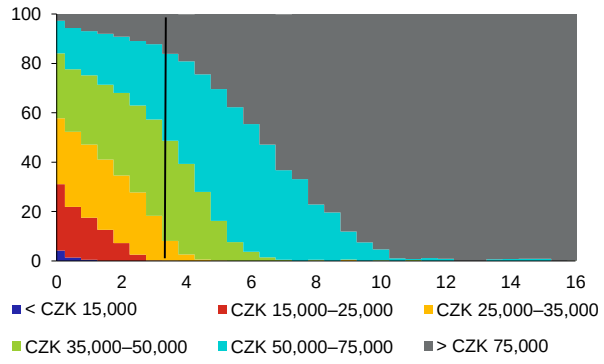
(% of total debt; x-axis: CZK millions)



Note: The vertical line represents the median debt. Data for 1 July 2021–28 February 2022. The sharp jump for the highest debt category is due to the fact that the highest categories of income and debt are limited only from the left.

Chart V.4 CB
Total debt distribution by declared income

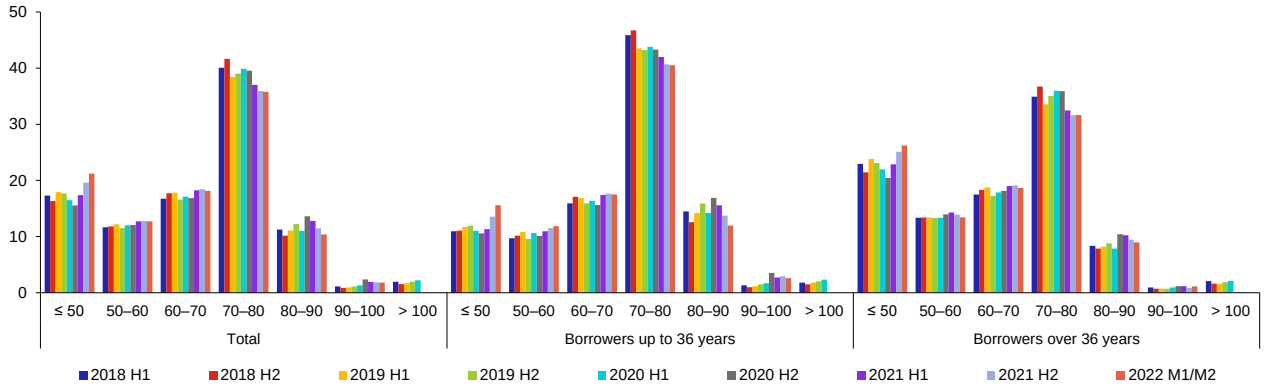
(% of given category; x-axis: CZK millions)



Note: The vertical line represents the median debt. Data for 1 July 2021–28 February 2022.

Chart V.5 CB
LTV distribution of new loans

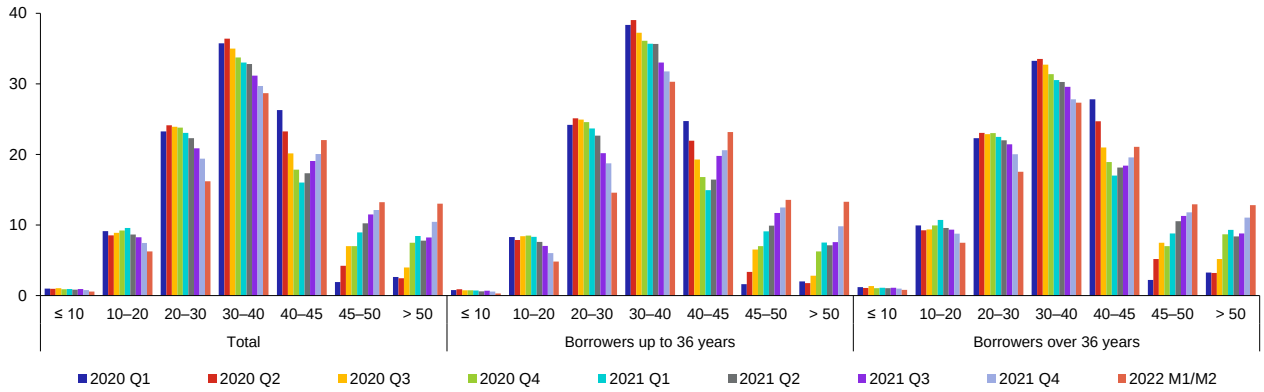
(share of loans in volume provided in %; x-axis: LTV in %)



Note: Interval closed from the right.

Chart V.6 CB
DSTI distribution of new loans

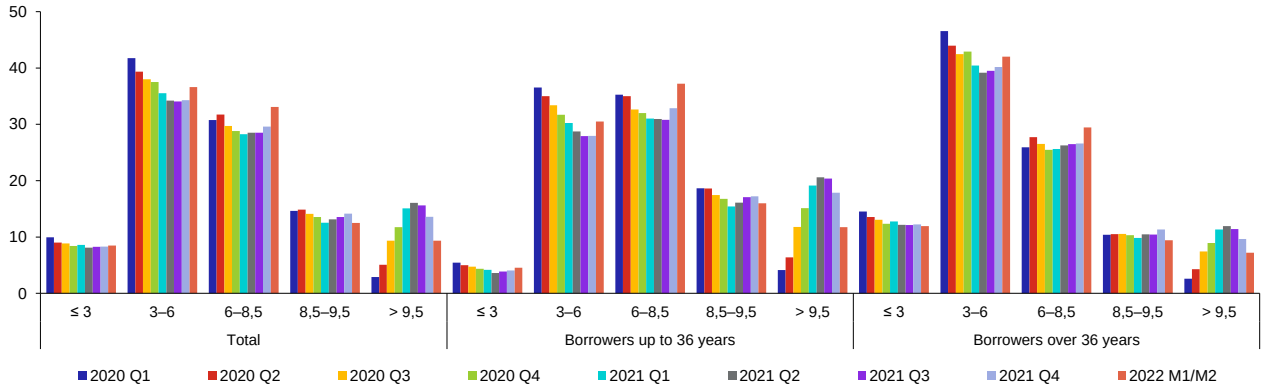
(share of loans in volume provided in %; x-axis: DSTI in %)



Note: Interval closed from the right.

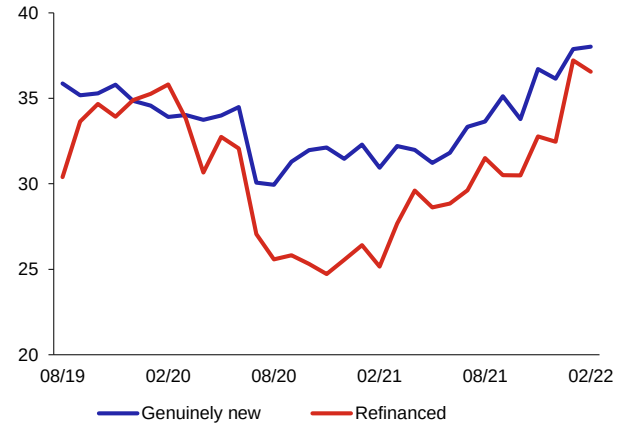
Chart V.7 CB
DTI distribution of new loans

(share of loans in volume provided in %; x-axis: DTI in years)



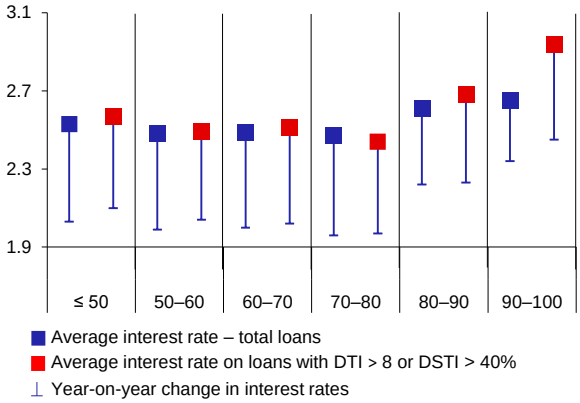
Note: Interval closed from the right.

Chart V.8 CB
Share of second and subsequent mortgage loans
(% of monthly volume)



Note: Estimate based on the value of the total additional debt.

Chart V.9 CB
Average interest rates by loan characteristics
(average interest rate in %; x-axis: LTV in %)



Note: Data for 2021 H2. Weighted average interest rates with the sizes of individual loans as weights. Interval closed from the right. No loans with LTVs of over 100% were provided in 2021 H2.

Chart V.10 CB
Credit commitments to households
(CZK billions; right-hand scale: y-o-y changes in %)

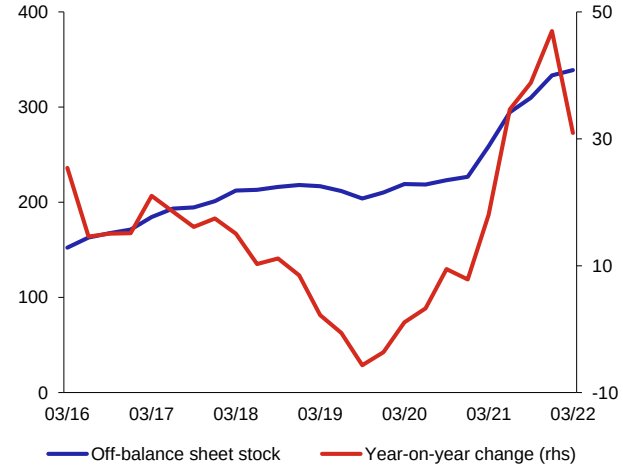
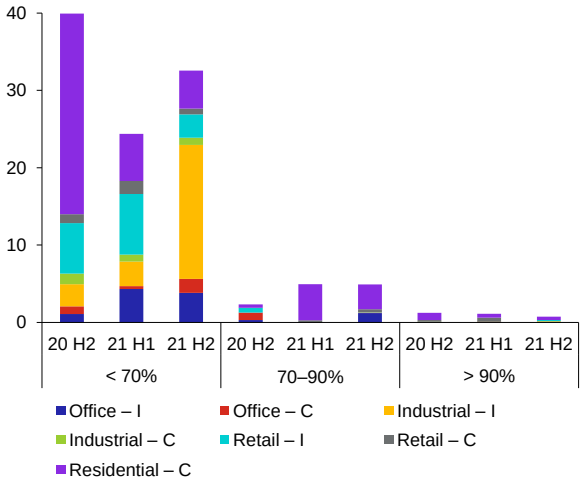


Chart V.11 CB
LTV distribution of new loans over time
(CZK billions; x-axis: LTV in %)



Note: I: investment in commercial property, C: construction.

Glossary

Bank Lending Survey (BLS): A survey of bank lending conditions for non-financial corporations and households in the Czech Republic, the pilot round of which took place in 2012 Q1. The survey aims to obtain qualitative information on current perceptions of the situation on both the supply and demand side of the credit market.

Basel III: A regulatory framework issued by the Basel Committee on Banking Supervision in 2010 which sets standards for capital adequacy of banks and now also for their liquidity. Overall, Basel III introduces stricter rules than the previous framework and came into existence mainly as a reaction to the financial crisis.

Breakdown of banks by total assets: In some charts and tables in the FSR, banks are assigned to groups based on the amount of their total assets. The breakdown of banks into groups is revised at the end of each calendar year. In 2007 and 2008, banks having total assets of over CZK 150 billion were regarded as large banks, banks having total assets of over CZK 50 billion and up to CZK 150 billion were regarded as medium-sized banks and banks having total assets of less than CZK 50 billion were regarded as small banks. In 2009 the total amount of assets necessary for inclusion in the group of large banks was increased to CZK 200 billion and the range for medium-sized banks was changed to CZK 50 billion–CZK 200 billion. The range for small banks was unchanged. As from 2012, the breakdown of banks by total assets is as follows: large banks have total assets of over CZK 250 billion, medium-sized banks have total assets of over CZK 50 billion and up to CZK 250 billion and small banks have total assets of less than CZK 50 billion.

Capital ratio: The ratio of regulatory capital to total risk-weighted assets. The Tier 1 capital ratio is the ratio of Tier 1 capital to total risk-weighted assets (see also Tier 1).

Capital requirement: The capital requirement is the amount of capital a bank has to hold so as to cover all the risks it undertakes.

Collective investment funds (CIFs): Mutual and investment funds whose sole business activity is collective investment, i.e. collecting funds from investors and investing them. CIFs are broken down by investor type into funds intended for the public (dominated by open-ended mutual funds) and funds for qualified investors, and by asset risk into money market, bond, equity, mixed and real estate funds and funds of funds. Sometimes the category of funds of funds is not listed separately, but is included in the other categories according to the type of funds in which they invest.

Consumer credit: Credit used to finance household consumption. It also includes bank overdrafts and debit balances and credit card credit.

Countercyclical capital buffer: A macroprudential tool designed to increase the banking sector's resilience to cyclical risks associated with fluctuations in lending.

Credit potential of the capital buffers: Provides information on the additional volume of loans banks can lend – other things being equal – from their capital buffers when the buffers are released or used.

Credit potential of the capital surplus: Provides information on the additional volume of loans banks can lend – other things being equal – from their capital beyond Pillar 1, Pillar 2 and the capital buffers.

Debt service-to-income (DSTI): The ratio of total debt service to the net income of the loan applicant.

Debt-to-income: The ratio of debt to the net income of the loan applicant.

Default: Default is defined as a breach of the debtor's payment discipline. In regulatory terminology (Regulation (EU) No 575/2013), The debtor is in default at the moment when it is probable that he will not be able to repay his obligations in a proper and timely manner, without recourse by the creditor to settlement of the claim from the security, or when at least one repayment (the amount of which deemed by the creditor to be significant) is more than 90 days past due.

IFRS 9: The financial reporting standard IFRS 9 *Financial instruments*, the final version of which was introduced in July 2014 by the International Accounting Standards Board (IASB), took effect on 1 January 2018 pursuant to Commission Regulation (EU) 2016/2067, replacing the previously valid IAS 39 standard. IFRS 9 lays down requirements for the recognition, valuation, impairment and derecognition of financial assets and financial liabilities and general hedge accounting. It aims to provide financial statement users with relevant information for assessing the size, timing and uncertainty of an entity's future cash flows.

Institutional investor: Either (a) a bank executing trades in investment instruments on its own account on the capital market, a management company, an investment fund, a pension fund or an insurance company, or (b) a foreign entity authorised to carry on business in the same fields in the Czech Republic as the entities listed under (a).

Interest margin: The difference between a bank's loan rate and its deposit rate.

Interest rate spread: Also interest rate differential; the spread between the interest rate on a contract (deposit, security) and a reference interest rate.

Leverage: See Leverage ratio.

Leverage ratio: The CRD IV/CRR rules define the leverage ratio as capital to risk-weighted assets. The term leverage is also often used in financial economics. There, however, capital is the denominator in the ratio (e.g. assets/capital or debt/capital). When we say that a bank has high leverage, we generally refer to the definition consistent with the assets/capital ratio. However, such a bank has a low leverage ratio.

Liquidity coverage ratio: A requirement to cover net liquidity outflows over a 30-day time horizon with liquid assets. It is calculated as the ratio of the liquidity buffer to the net liquidity outflow.

Loan for house purchase: Consumer credit (a) secured with real property or a lien on real property; (b) the purpose of which is (1) to acquire, settle or maintain rights to real property or part of real property; (2) to build real property or part of real property; (3) to pay for a transfer of a share in a housing cooperative or to acquire a share in another legal entity in order to acquire the right to use a flat or a house, (4) to change a building in accordance with the Building Act or to connect it to public networks; (5) to cover costs related to obtaining a cash loan, credit or other similar financial service with the purpose referred to in (1)–(4), or (6) to repay credit, a cash loan or other similar financial service provided for purposes referred to in (1)–(6); or (c) provided by a building society in accordance with the act regulating building savings schemes.

Loan service-to-income: The ratio of loan-related debt service to the net income of the loan applicant.

Loan-to-income (LTI): The ratio of the amount of a loan to the net income of the loan applicant.

Loan-to-value (LTV): The ratio of the amount of a loan to the value of collateral.

Loss given default (LGD): The ratio of the loss on an exposure in the event of counterparty default to the amount owed at the time of default.

Macroprudential policy: A key component of financial stability policy. It focuses on the stability of the financial system as a whole. Its main objective is to help prevent systemic risk.

Market liquidity: The ability of market participants to carry out financial transactions in assets of a given volume without causing a pronounced change in their prices.

Minimum Requirement for Own Funds and Eligible Liabilities (MREL): A sufficient volume of eligible liabilities is necessary for a failed bank to be recapitalised using internal funds (bail-in). In the event of a crisis, the CNB writes off or converts these liabilities. A sufficient MREL together with the application of a suitable combination of resolution tools thus enables a failed institution to be resolved without the use of public money.

Mortgage loan: A loan which is at least partly secured with a lien on property.

Mortgage loan refinancing: The process whereby a mortgage debtor accepts a new loan from a different lender than the one from which he received the original loan and uses it to repay the original loan. He thus becomes a debtor of the other lender, but usually under more favourable conditions. This is usually possible only at the end of the original loan's fixation period.

Mortgage loan refixation: The process whereby at the end of the fixation period of a mortgage loan the debtor selects the length of the new fixation period and negotiates new conditions for this period with the creditor. In this case, the identity of the creditor does not change.

Net stable funding ratio (NSFR): A structural liquidity requirement monitored over a one-year time horizon. It is defined as the ratio of available stable funding to required stable funding.

Non-bank financial corporations engaged in lending: Financial leasing companies, other lending companies, including consumer credit, credit card and hire-purchase providers, and factoring and forfaiting companies.

Non-performing loans: A loan is non-performing if at least one of the following two situations occurs: a) the debtor is unlikely to pay its credit obligations in full without recourse to actions such as realising security, b) the debtor is past due more than 90 days on a credit obligation. For details, see Article 178 of Regulation (EU) No 575/2013 of the European Parliament and of the Council.

Output floor: A lower limit on the total risk-weighted exposures of IRB banks set at 72.5% of the total risk-weighted exposures calculated using the STA approach. The output floor is currently scheduled to be phased in between January 2023 and January 2028, increasing each year from an initial level of 50% to the target of 72.5%.

Pension funds: In the Czech environment, pension funds are transformed and participation funds which are managed by pension management companies. Participation funds are further classed into obligatory conservative funds and other funds. Obligatory conservative funds are only allowed to invest in a significantly restricted group of assets.

Pillar 1: The first part of the CRD directive, focused on the determination of minimum capital requirements for all credit institutions to cover credit, market and operational risks.

Pillar 2: The second part of the CRD directive, requiring credit institutions to assess whether the Pillar 1 capital requirement is sufficient to cover all the risks to which they are exposed. This assessment process is reviewed by the supervisory authority under the supervisory review and evaluation process (SREP). The supervisory authority then can apply a wide range of instruments, including setting an additional capital requirement, for example to cover concentration risk.

Prague InterBank Offered Rate (PRIBOR): The reference interest rate on the interbank deposit market for deposit sales. Reference banks quoting the PRIBOR must be important participants in the interbank market.

Price-to-income (PTI): A housing affordability indicator calculated as the ratio of the property price to the annual income of the household or loan applicant.

Price-to-rent (PR): The ratio of the price of an apartment to the annual rent. The price-to-rent ratio is the inverse of the rental return.

Property asking prices: Property sale asking prices in estate agencies. Asking prices should be higher than transaction prices. Property asking prices in the Czech Republic are published, for example, by the CZSO and the Institute for Regional Information (which also publishes data on market rent supply prices).

Property developers/developments: Companies/projects whose aim is to build a complex of residential and commercial property. Property developers' work includes choosing an appropriate site, setting up a project, obtaining the necessary permits, building the necessary infrastructure, constructing the buildings and selling the property. Developers also often organise purchase financing for clients and frequently lease or manage the property once it is built (especially in the case of commercial property). Given the combination of construction activity and speculative property purchases, developers' results are strongly dependent on movements in property prices.

Property transaction prices: Prices of actual transactions on the property market, which should be the closest to actual market prices. The CZSO has been publishing two types of data on property transaction prices since 2011. Prices based on Ministry of Finance statistics from property transfer tax returns and published by the CZSO are the older source. These data contain time series from 1998 and are available in a relatively detailed breakdown (by region, degree of wear and tear and type of property). On the other hand, they do not include transactions which are not subject to property transfer tax (i.e. primarily transactions in new property) and the index is published with a lag of at least half a year. The second, new source of data on property transaction prices is data from CZSO surveys in estate agencies. They cover new property, but are not available in such a long time series and such a detailed breakdown.

Rehypothecation: Re-use of an asset accepted as collateral in a secured loan.

Return on assets (RoA): The ratio of pre-tax profit and interest to total assets of a firm.

Return on equity (RoE): The ratio of net profit to equity of a firm.

Risk premium: The risk premium an investor demands on investments in riskier financial instruments.

Search for yield: A situation where economic agents attempt to make up for generally low asset yields by seeking riskier-than-usual investments that yield a premium in return for the increased risk. Such behaviour may increase the future risks to the financial system.

Solvency (insurance companies): Solvency in the insurance sector is the ability of an insurer to meet its insurance obligations, i.e. to settle eligible insurance claims arising from insured losses.

Solvency II: A European regulatory framework (directive) for European insurance companies and reinsurers laying down quantitative and qualitative requirements and prudential rules, including requirements to comply with market discipline and disclosure duties. It entered into force in 2016, when it replaced the Solvency I regulatory framework.

Sovereign risk: The risk that a government will default on its obligations, leading to national bankruptcy or restructuring of government debt.

Systemic risk: The risk of the entire financial system or market collapsing.

Tier 1: The highest quality and, for banks in the Czech Republic, also the most significant part of regulatory capital. The dominant components of Tier 1 are equity capital, retained earnings and mandatory reserve funds.

VIX: An index of expected 30-day volatility of US stocks (S&P 500 index), derived from market prices of options traded at the Chicago Board Options Exchange. A higher value indicates higher expected volatility of the stock index, and therefore higher market uncertainty.

Abbreviations

AEs	advanced economies
BCBS	Basel Committee on Banking Supervision
BEA	Bureau of economic analysis (U.S. Department of commerce)
BIS	Bank for International Settlements
bp	basis point
BRCI	Bank Register of Client Information operated by Czech Credit Banking Bureau
C	construction
CB	central bank
CBCB	Czech Banking Credit Bureau
CCoB	capital conservation buffer
CCyB	countercyclical capital buffer
CDS	credit default swap
CEB	Czech Export Bank
CEE	Central and Eastern Europe
CET1	common equity Tier 1
CF	Consensus Forecast
CISS	Composite Indicator of Systemic Risk
CI	credit institution
CLO	collateralised loan obligation
ČMZRB	Českomoravská záruční a rozvojová banka
CNB	Czech National Bank
CNCB	Czech Non-Banking Credit Bureau
COREP	The Common Reporting Framework
Coll.	collection
CPI	Consumer Price Index
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CSDB	Centralised Securities Database
CZK	Czech koruna
CZSO	Czech Statistical Office
DSCR	debt service coverage ratio
DSTI	debt service-to-income
DTI	debt-to-income
EA	euro area
EAD	exposure at default
EBA	European Banking Authority
EC	European Commission
ECB	European Central Bank
ECL	expected credit loss
EGAP	Export Guarantee and Insurance Company
EIB	European Investment Bank
EIOPA	European Insurance and Occupational Pensions Authority
EL	expected loss
EMs	emerging market economies
EMIR	Regulation on OTC derivatives, central counterparties and trade repositories
EMU	European Monetary Union
ESA	Joint Committee of European Supervisory Authorities
ESFS	European System of Financial Supervision
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
EU	European Union
EUR	euro
EURIBOR	Euro InterBank Offered Rate (reference interest rate on the interbank market)
FCI	financial cycle indicator
Fed	Federal Reserve System
FI	financial institution
FINREP	Financial Reporting
FSR	Financial Stability Report
G20	Group of Twenty
GB	government bond
GDI	gross disposable income
GDP	gross domestic product
GFSR	Global Financial Stability Report
GNI	gross national income
G-SII	Global systemically important institution
H	half-year
HBS	Household Budget Statistics
I	investment
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
ILO	International Labour Organization
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPFCs	investment and pension funds and companies
IR	Inflation Report
IRB	Internal Rating Based Approach, an approach within the Basel II framework for capital adequacy of banks
IRI	Institute for Regional Information
IRS	interest rate swap

ISR	sovereign risk indicator
IT	information technology
LAA	loss absorption amount
LCR	liquidity coverage ratio
LGD	loss given default
LLP	loan loss provision
LSTI	loan service-to-income
LTI	loan-to-income
LTV	loan-to-value
M	month
MBs	mortgage bonds
MF CR	Ministry of Finance of the Czech Republic
MIT	Ministry of Industry and Trade
MM	money market
MPR	Monetary Policy Report
MREL	minimum requirement for own funds and eligible liabilities
$MREL_{TEM}$	Minimum requirement for own funds and eligible liabilities – total exposure measure
$MREL_{TREA}$	Minimum requirement for own funds and eligible liabilities – total risk exposure amount
MSCI	Morgan Stanley Capital International
NACE	General Industrial Classification of Economic Activities
NBER	The National Bureau of Economic Research
NFC	non-financial corporation
NFCEL	non-bank financial corporations engaged in lending
NP	natural person
NPISH	non-profit institutions serving households
NPL	non-performing loan
NRCI	Non-bank Register of Client Information
NSFR	net stable funding ratio
OCI	other comprehensive income
OCR	overall capital requirement
OECD	Organisation for Economic Cooperation and Development
OFIs	other financial intermediaries
O-SII	Other systemically important institutions
PD	probability of default
P/L	profit/loss
PMC	pension management company
PMI	Purchasing Managers' Index
pp	percentage point
PRIBOR	Prague InterBank Offered Rate (reference interest rate on the interbank market)
PTI	price-to-income
Q	quarter
QA	quick assets
RCA	recapitalisation amount
RoA	return on assets
RoE	return on equity
RPN	Research and Policy Notes
S&P	Standard & Poor´s
SCR	Solvency Capital Requirement
SHI	social and health insurance
SMEs	small and medium-sized enterprises
SMST	solvency macro stress test
SOLUS	Sdružení na ochranu leasingu a úvěrů spotřebitelům (Association for the Protection of Leasing and Loans to Consumers)
SRB	systemic risk buffer
STA	standardised approach to credit risk
SFA	stock flow adjustments
TEM	see $MREL_{TEM}$
TF	transformed fund
TLTRO	Targeted Longer-Term Refinancing Operations
TP	technical provision
TREA	see $MREL_{TREA}$
TSCR	total supervisory review and evaluation process capital requirement
TTC	through the cycle
ULI	Unit Linked Insurance
VIX	Volatility index
WGI	Worldwide Governance Indicators
WP	Working Paper
Y	year

Country abbreviations

AT	Austria	IT	Italy
AU	Australia	JP	Japan
BE	Belgium	KR	South Korea
BG	Bulgaria	KZ	Kazakhstan
BR	Brazil	LT	Lithuania
CA	Canada	LU	Luxembourg
CL	Chile	LV	Latvia
CN	China	MT	Malta
CY	Cyprus	MX	Mexico
CZ	Czech Republic	MY	Malaysia
DE	Germany	NG	Nigeria
DK	Denmark	NL	Netherlands
EA	euro area	NO	Norway
EE	Estonia	NZ	New Zealand
ES	Spain	PL	Poland
FI	Finland	PT	Portugal
FR	France	RO	Romania
GR	Greece	RU	Russia
HK	Hongkong	SE	Sweden
HR	Croatia	SI	Slovenia
HU	Hungary	SK	Slovakia
CH	Switzerland	TH	Thailand
ID	Indonesia	TR	Turkey
IE	Ireland	UK	United Kingdom
IL	Israel	US	United States
IN	India	ZA	Republic of South Africa
IS	Iceland		

Selected indicators

FINANCIAL STABILITY INDICATORS – PART 1

		2016	2017	2018	2019	2020	2021	2022 Jan.	2022 Feb.	2022 Mar.
Macroeconomic environment										
ME.1	Real GDP growth (year on year, %)	2.4	5.4	3.2	3.0	-5.8	3.3			
ME.2	Consumer price inflation (average annual index growth, %)	0.7	2.5	2.1	2.8	3.2	3.8	4.5	5.2	6.1
ME.3	General government balance / GDP (%)	0.7	1.5	0.9	0.3	-5.8	-5.9			
ME.4	General government debt / GDP (%)	36.6	34.2	32.1	30.1	37.7	41.9			
ME.5	Trade balance / GDP (%)	5.4	5.1	3.7	4.1	4.9	1.2			
ME.6	External debt in % of banking sector external assets	120.3	114.0	113.8	108.7	103.2	102.3			
ME.7	Balance of payments current account / GDP (%)	1.8	1.5	0.4	0.3	2.0	-0.8			
ME.8	Monetary policy 2W repo rate (end of period, %)	0.05	0.50	1.75	2.00	0.25	3.75	3.75	4.50	4.50
Non-financial corporations										
NC.1	Return on equity (%)	11.3	10.7	9.8	10.4	7.2	10.5			
NC.2	Debt (% of total liabilities)	50.2	49.7	49.3	48.4	46.2	41.5			
NC.3	Credit indebtedness (% of GDP)	50.0	50.3	53.1	48.2	49.9	47.3			
NC.4	– loans from Czech banks (% of GDP)	20.3	20.0	20.0	19.3	19.7	19.4			
NC.5	– loans from Czech non-bank financial corporations (% of GDP)	4.4	4.5	4.5	4.3	4.4	4.2			
NC.6	– other (including financing from abroad. % of GDP)	25.3	25.8	28.6	24.5	25.7	23.7			
NC.7	Interest coverage (pre-tax profit + interest paid / interest paid, %)	22.1	26.8	25.2	15.0	16.6	18.7			
NC.8	12M default rate (%)	1.1	1.2	1.0	1.9	1.1	2.8			
Households (including sole traders)										
H.1	Total debt / gross disposable income (%)	58.6	58.8	59.1	58.8	59.1	61.1			
H.2	Total debt / financial assets (%)	25.9	26.3	24.6	24.2	23.0	24.0			
H.3	Net financial assets (total financial assets − total liabilities, % of GDP)	83.9	80.8	90.5	92.2	105.5	101.4			
H.4	Debt / GDP (%)	30.9	31.2	31.6	31.3	33.7	34.5			
H.5	– loans from Czech banks to households (% of GDP)	27.7	28.1	28.7	28.5	31.0	31.8			
H.6	– loans from Czech non-bank fin. corporations to households (% of GDP)	1.3	1.2	1.2	1.2	1.1	1.0			
H.7	– loans from Czech banks to sole traders (% of GDP)	0.8	0.8	0.8	0.8	0.8	0.8			
H.8	– loans from Czech non-bank fin. corporations to sole traders (% of GDP)	0.2	0.1	0.2	0.2	0.2	0.2			
H.9	– other (including financing from abroad. % of GDP)	1.1	1.0	0.9	0.8	0.8	0.8			
H.10	Net interest expenses / gross disposable income (%)	2.6	2.3	2.2	2.1	2.0	1.9			
H.11	12M default rate (%, excluding sole traders)	2.2	1.8	1.5	1.3	1.0				
Financial markets										
FM.1	3M PRIBOR (average for period, %)	0.3	0.4	1.3	2.1	0.9	1.1	4.2	4.7	4.9
FM.2	1Y PRIBOR (average for period, %)	0.5	0.6	1.5	2.2	0.9	1.4	4.6	4.9	5.1
FM.3	10Y government bond yield (average for period, %)	0.4	1.0	2.0	1.5	1.1	1.9	3.1	3.0	3.5
FM.4	CZK / EUR exchange rate (average for period, %)	27.0	26.3	25.6	25.7	26.5	25.6	24.5	24.4	25.0
FM.5	Change in PX stock index (% year on year, end of period)	-3.6	17.0	-8.5	9.8	-5.2	38.8	39.2	28.0	25.4
Property market										
PM.1	Total change in residential property prices (transaction prices, % year on year)	11.0	8.4	9.8	8.9	9.0	25.8			
PM.2	Change in apartment prices (asking prices according to CZSO, % year on year)	15.1	11.6	6.5	10.8	16.4	18.8			
PM.3	Apartment price / average annual wage	9.8	10.3	10.1	10.4	11.7	13.1			
PM.4	Apartment price / annual rent (according to IRI)	26.9	27.8	26.1	25.9	31.3	37.3			
Financial sector										
FS.1	Financial sector assets / GDP (%)	160.3	175.4	173.0	181.5	178.6	177.3			
FS.2	Shares of individual segments in financial sector assets (%)									
FS.3	banks	77.4	78.7	78.7	78.4	78.6	78.2			
FS.4	credit unions	0.3	0.3	0.3	0.3	0.3	0.3			
FS.5	insurance companies	6.4	5.7	5.6	5.1	4.9	4.8			
FS.6	pension management companies and funds	5.2	5.0	5.1	5.3	5.4	5.3			
FS.7	investment funds*	5.3	5.4	5.5	6.3	6.7	7.4			
FS.8	non-bank financial corporations engaged in lending	5.0	4.6	4.6	4.6	4.1	3.9			
FS.9	investment firms	0.4	0.3	0.2	0.1	0.1	0.1			
Non-bank financial corporations										
NI.1	Share in financial sector assets (%)	22.0	20.9	20.9	21.3	21.1	21.4			
	Insurance companies									
NI.2	Premiums written / GDP (%)	3.1	3.0	2.9	2.9	3.0	2.9			
NI.3	Ratio of eligible own funds to the solvency capital requirement (in %)	238.1	230.0	243.6	202.4	251.3	230.5			
NI.4	Change in financial investment of insurance companies (%, year on year)	0.9	4.2	1.4	-6.7	0.6	4.0			
NI.5	Return on equity of insurance companies (%)	15.7	14.7	15.8	24.1	18.4	36.5			
NI.6	Claim settlement costs / net technical provisions (life, %)	15.1	14.4	15.3	16.6	14.2	14.4			
NI.7	Claim settlement costs / net technical provisions (non-life, %)	58.1	59.4	57.8	62.7	58.4	55.1			
	Pension management companies (PMCs) and PMC funds									
NI.8	Change in assets of funds managed by PMCs (%)	7.8	10.8	5.6	8.0	6.8	6.0			
NI.9	Nominal change in value of assets of PMC funds	0.3	3.6	-1.7	0.9	0.3	-0.4			
	Investment funds									
NI.10	Growth in net assets (= equity; year on year, %)	17.7	20.9	6.4	21.5	10.6	19.4			
	Non-bank financial corporations engaged in lending									
NI.11	Growth in loans from non-bank financial corporations engaged in lending (%):									
NI.12	total	8.9	8.2	4.7	4.3	-2.3	0.9			
NI.13	households	7.0	0.7	-1.6	-1.2	-9.1	-2.0			
NI.14	non-financial corporations	10.1	10.0	6.3	2.6	0.0	1.4			

FINANCIAL STABILITY INDICATORS – PART 2

		2016	2017	2018	2019	2020	2021	2022 Jan.	2022 Feb.	2022 Mar.
Banking sector										
BS.1	Bank assets / GDP (%)	123.0	135.7	133.5	129.6	139.0	139.3			149.1
BS.2	Assets structure (%, end of period)									
BS.3	loans to central bank	21.5	32.8	31.8	32.0	29.0	27.6			30.8
BS.4	interbank loans	3.7	3.6	3.4	2.9	2.8	2.3			3.4
BS.5	client loans	50.6	45.2	46.5	46.8	46.1	46.5			42.7
BS.6	bond holdings	18.4	13.7	13.7	13.0	16.1	17.6			17.0
BS.7	– government bonds	11.5	7.9	8.2	7.6	11.0	12.3			11.6
BS.8	– Czech government bonds	10.0	7.0	7.4	6.9	10.3	11.8			11.2
BS.9	other	5.8	4.8	4.7	5.4	5.9	6.0			6.0
BS.10	Liabilities structure (%, end of period)									
BS.11	liabilities to central bank	0.2	0.3	0.2	0.1	0.5	0.5			0.4
BS.12	interbank deposits	10.1	16.0	15.0	12.7	8.0	7.7			9.5
BS.13	client deposits	65.4	61.5	63.0	64.5	66.7	66.4			66.9
BS.14	bonds issued	11.4	11.0	10.7	11.2	12.5	12.7			10.9
BS.15	other	12.9	11.2	11.0	11.6	12.4	12.7			12.3
BS.16	Client loans / client deposits (%)	77.3	73.5	73.8	72.5	69.2	70.1			63.9
BS.17	Sectoral breakdown of total loans (%)									
BS.18	non-financial corporations	33.1	33.1	32.7	32.5	30.2	30.9	30.9	31.7	31.1
BS.19	households	45.1	46.6	46.9	47.8	47.7	50.6	51.0	50.5	50.6
BS.20	sole traders	1.2	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
BS.21	others (including non-residents)	20.6	19.0	19.1	18.4	20.9	17.2	16.8	16.6	17.0
BS.22	Growth in loans (%, end of period, year on year):									
BS.23	total	6.0	4.6	7.2	4.4	4.2	7.0	6.1	7.2	4.4
BS.24	non-financial corporations	5.9	4.8	5.7	3.7	0.3	5.8	5.3	9.1	7.6
BS.25	– real estate activity (NACE L)	12.1	-1.7	5.2	7.5	4.8	0.9	1.2	0.0	0.1
BS.26	households	7.7	8.0	7.9	6.4	6.9	10.5	10.8	10.9	10.9
BS.27	– loans for house purchase	8.4	9.0	8.5	6.7	8.0	11.1	11.4	11.2	11.1
BS.28	– loans for consumption	4.5	4.1	6.4	7.2	0.8	6.5	7.7	8.2	8.9
BS.29	sole traders	4.4	10.1	5.6	8.1	2.2	1.3	5.0	1.5	1.3
BS.30	Non-performing loans / total loans (%):									
BS.31	total	4.8	4.0	3.3	2.5	2.7	2.4	2.4	2.3	2.0
BS.32	non-financial corporations	5.2	4.2	3.6	3.2	4.2	3.8	3.8	3.7	3.2
BS.33	households	3.2	2.5	2.1	1.6	1.7	1.4	1.4	1.4	1.3
BS.34	– loans for house purchase	2.0	1.8	1.5	1.2	1.1	0.9	0.9	0.8	0.8
BS.35	– loans for consumption	8.9	6.0	5.1	4.0	5.1	4.7	4.7	4.5	4.0
BS.36	sole traders	8.6	6.7	5.0	4.3	6.1	6.4	6.3	6.1	5.4
BS.37	Coverage of non-performing loans by provisions (%)	57.2	54.8	58.2	57.8	52.0	53.8	53.6	52.7	52.5
BS.38	Capital ratio (%)	18.5	19.3	19.7	21.3	24.4	23.5			22.4
BS.39	Tier 1 capital ratio (%)	17.9	18.7	19.1	20.8	23.7	22.8			21.7
BS.40	Leverage (assets as a multiple of Tier 1)	13.9	15.2	15.1	14.3	13.0	13.7			15.6
BS.41	Leverage ratio (Tier 1 capital / total exposures)	7.1	6.6	6.6	7.0	7.7	7.3			6.3
BS.42	Return on assets (%)	1.3	1.1	1.1	1.2	0.6	0.8			0.9
BS.43	Return on Tier 1 (%)	17.8	17.0	17.5	18.1	8.2	11.3			15.3
BS.44	Quick assets / total assets (%)	34.4	42.0	41.2	40.7	41.2	40.9	44.4	44.3	44.0
BS.45	Quick assets / client deposits (%)	52.1	68.0	65.1	62.8	61.5	61.7	66.0	66.3	65.8
BS.46	Net external position of banking sector (% of GDP)	-7.8	-21.4	-20.2	-18.2	-15.8	-16.8			
BS.47	Banking sector external debt / banking sector total assets (%)	19.1	26.1	25.0	23.3	20.6	20.9			

ADDITIONAL INFORMATION ON THE INDICATORS

Owing to data revisions, some historical values of the indicators may not be comparable to those published in previous publications. Also, owing to a different date of update, the values of the indicators may not be the same as those referred in the text of this FSR. Missing values were unavailable at the time of preparation of the table.

ME.6	Total external debt in % of external assets held by MFIs and the CNB.
PM.1	Property prices based on the House Price Index, source: CZSO
PM.2	Apartment prices based on data from Společnost pro cenové mapy, s.r.o., apartment size 68 m^2.
FS.7	Act No. 240/2013 Coll., on Management Companies and Pension funds, was adopted in 2013, introducing the term "investment funds". Investment funds comprise collective investment funds and funds for qualified investors.
BS.25	Real estate activities (NACE L) comprise above all the activities of lessors, agents or brokers in the area of selling or purchasing property, renting property and the provision of other services related to property.
BS.37	Loans provided by the Czech Export Bank and the Czech-Moravian Guarantee and Development Bank were excluded from the calculation.
BS.44, BS.45	Assets readily available to cover liabilities. They comprise cash and claims on central banks, claims on credit institutions and other clients payable on demand and bonds issued by central banks and general government.
NI.2 to NI.7	These indicators comprise domestic insurance companies (excluding the EGAP) and branches of foreign insurance companies.
NI.2	Premiums written include total gross premiums written for 12 months by domestic insurance companies including branches of foreign insurance companies (excluding EGAP).
NI.9	Change in the assets of pension funds adjusted for contributions and benefits.

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ISSN 2788-1237 (Print)
ISSN 2788-1245 (Online)