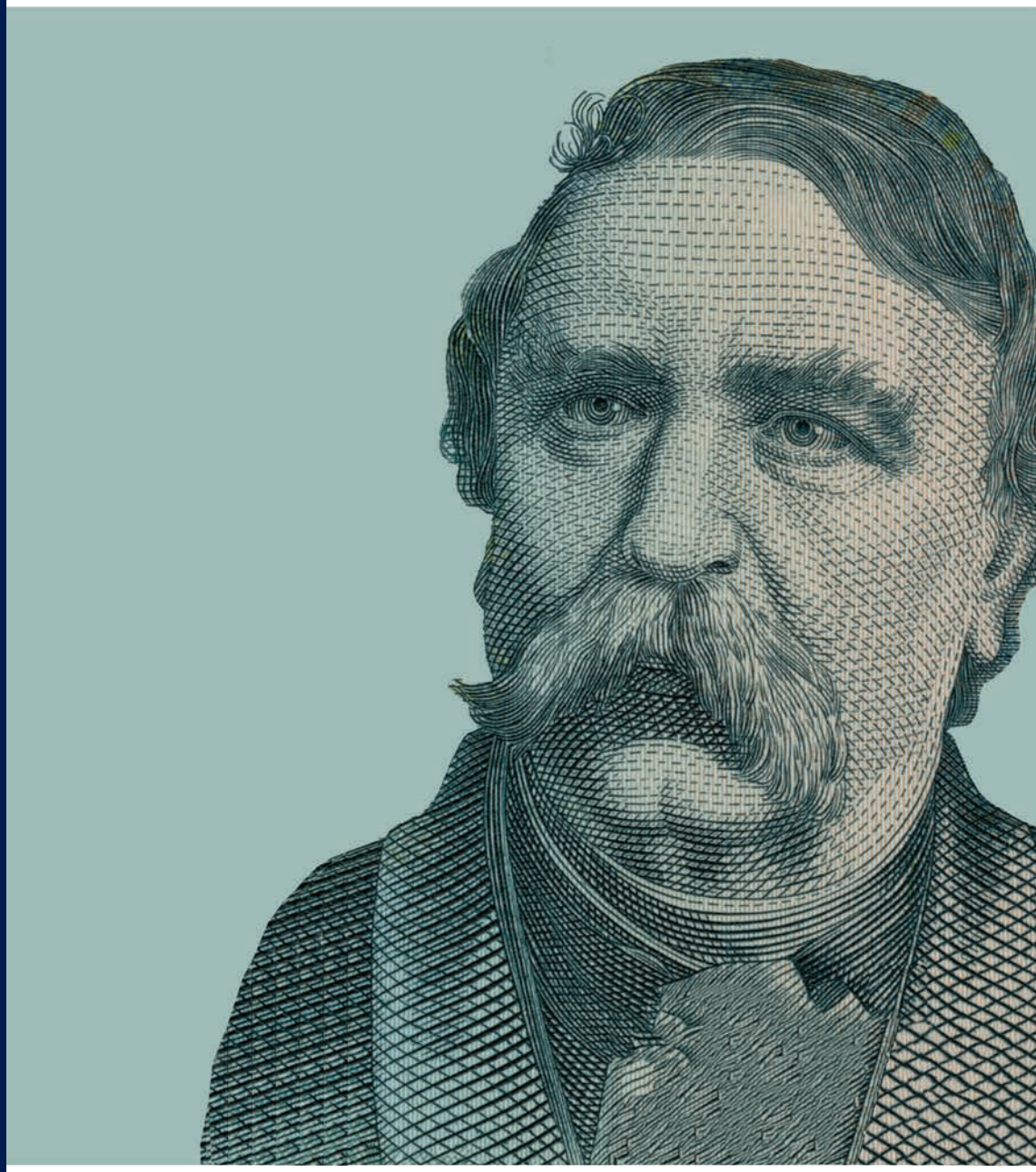
FINANCIAL STABILITY REPORT



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NOVEMBER

'...a nation is strong where property and independence are guarded by free hands.'

Ferenc Deák

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Financial stability is a state in which the financial system, including key financial markets and financial institutions, is capable of withstanding economic shocks and can fulfil its key functions smoothly, i.e. intermediating financial resources, managing financial risks and processing payment transactions.

The Magyar Nemzeti Bank's fundamental interest and joint responsibility with other government institutions is to maintain and promote the stability of the domestic financial system. The role of the Magyar Nemzeti Bank in the maintenance of financial stability is defined by the Central Bank Act.

Without prejudice to its primary objective – to achieve and maintain price stability –, the MNB shall support the maintenance of the stability of the financial intermediary system, the enhancement of its resilience, its sustainable contribution to economic growth; furthermore, the MNB shall support the economic policy of the government using the instruments at its disposal.

The MNB shall establish the macro-prudential policy for the stability of the entire system of financial intermediation, with the objective to enhance the resilience of the system of financial intermediation and to ensure its sustainable contribution to economic growth. To that end and within the limits specified in the Central Bank Act, the MNB shall explore the business and economic risks threatening the system of financial intermediation as a whole, promote the prevention of the development of systemic risks and the reduction or elimination of the evolved systemic risks; furthermore, in the event of disturbances to the credit market it shall contribute to the balanced implementation of the function of the system of intermediation in financing the economy through stimulating lending and by restraining lending it in the event of excessive credit outflow.

The primary objective of the Financial Stability Report is to inform stakeholders about the topical issues related to financial stability, and thereby raise the risk awareness of those concerned as well as maintain and strengthen confidence in the financial system. Accordingly, it is the Magyar Nemzeti Bank's intention to ensure the availability of the information needed for financial decisions, and thereby make a contribution to increasing the stability of the financial system as a whole.

The analyses in this Report were prepared by the Financial System Analysis Directorate, with the contribution of the Prudential and Consumer Protection Supervision of Money Market Institutions Executive Directorate, the Monetary Policy, Financial Market and Macrofinance Analysis Executive Directorate, and the Monetary Policy Instruments and Foreign Reserve Management Executive Directorate, under the general direction of Ádám BANAI, Executive Director for Monetary Policy Instruments and Foreign Reserve Management.

The Report was approved for publication by Barnabás VIRÁG, Deputy Governor.

The Report incorporates the Financial Stability Council's valuable comments and suggestions following its meetings on 4th October and 15th November 2022, and those of the Monetary Council following its meeting on 25th October 2022.

This Report is based on information in the period to 31st October 2022. Since data frequency is divergent through the analyses, the analysis horizons may also alter.

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Executive Summary

The Hungarian banking sector is stable, entered the current complex, challenging period with significant capital position and liquidity reserves. The shock resiliency of the sector is adequate, its liquidity and capital position is robust even in the case of a crisis much more severe than the current forecasts. Credit risks have risen further in the turbulent economic environment, especially in portfolios sensitive to energy prices. Housing market overvaluation advanced to a historically high level on a national average, however, the first signs of a turnaround could be observed in the third quarter. We expect a decline in credit expansion in both the corporate sector and the household sector, due to the rising interest rate environment and uncertainty caused by the war.

International economic developments and prospects are most significantly affected by the rising inflation, the European energy crisis and deepening geopolitical tensions. *The prolonged war between Russia and Ukraine has a major impact on global economic output, and the industrial production and financial stability of the EU economy in particular. The extremely high energy prices reduce households' disposable income and burden companies with serious cost shocks. In view of the inflation risks, many central banks tightened their asset purchase programmes and interest rate conditions, and due to the Fed's interest rate hikes a number of countries faced rising costs of funds and depreciating local currencies, making imports of energy even more expensive. In view of the deteriorating economic outlook and increasing credit risks, European banks must prepare for the simultaneous management of a number of challenges, in relation to which the European Systemic Risk Board (ESRB) issued a warning.*

The deteriorating economic environment negatively affects the Hungarian economy as well, and poses a considerable risk to portfolio quality*. Following the phase-out of the general moratorium in October 2021, the ratio of non-performing loans moved from its historical low to reach 4.2 per cent in the household segment and 3.9 per cent in the corporate segment at the end of 2022 H1. For the time being, the deterioration in the economic environment is reflected in a moderate rise only in longer-term delinquencies, while the portfolio-level loan loss coverage, which relates to the forward-looking recognition of losses in the banking sector, was unchanged in 2022 H1. However, in light of the risks, several banks anticipate higher loan loss provisioning volumes in 2022 H2 and 2023 H1, primarily in the SME portfolio. In the housing market, which is of crucial importance in terms of loan loss provisioning, the nationwide overvaluation rose to a historically high level in the second quarter, however, a clear decline in housing market activity can be observed starting from the third quarter. This impairs the marketability of properties and increases the risk of house price correction. For the time being, no substantial deterioration has been seen in commercial real estate market indicators, vacancy rates grew only slightly, but looking ahead the extreme energy price rises and worsening economic outlook have a negative impact on the value of commercial properties and – through this – on the project loan portfolio.*

The highly vulnerable loan portfolio poses a manageable risk to the banking sector*. The current economic environment – especially the energy crisis – puts pressure on the debt-servicing capacity of corporates and households. According to our estimations, as a result of the shocks observed until the autumn of 2022, the median probability of default for SMEs with loans may have increased from 2.9 per cent to 4.7 per cent. In addition to the cost shocks, the decrease in aggregate demand also suggests higher sectoral bankruptcy rates, particularly in sectors more sensitive to the business cycle. The NPL rate of the mortgage loans of the credit institution sector may rise by 2 percentage points by the end of 2023 as a result of the increase in utility costs, but with adjustments to energy consumption, this increase may be smaller.*

State actions significantly erode the banking sector's profitability this and the next year, which is partly offset by the higher lending rates and interest income on central bank deposits. *In 2022 H1, the credit institution sector achieved an after-tax profit of HUF 200 billion according to individual, i.e. non-consolidated data, reflecting a reduction of HUF 142 billion versus the same prior-year period. The decline in profit is mostly explained by the recognition of loan loss provisioning and the windfall tax, as well as by the impact on profit of the extension of the interest rate cap for 2022 H2. In parallel with the deterioration in nominal income, return on equity fell from 10 per cent to 7 per cent. As a result of the higher interest rate environment and lower return on equity, the sector's premium on the risk-free yield had disappeared by the end of 2022 H1, encumbering institutions' opportunities to attract and accumulate capital.*

Falling profitability and the narrowing of funding opportunities may lead to the deterioration in lending capacities over the medium term.

***The Hungarian banking sector is highly resilient and had significant capital and liquidity buffers when it entered the complex, challenging period caused by the war and inflation**. Although banks' liquidity buffers fell slightly as a result of increasing demand for cash and the revaluation of eligible collateral due to rising yields, ample reserves are still available. The liquidity reserve of the banking system would decline further in a stress situation, but the sector would meet the regulatory requirements even in the case of a severe liquidity shock. The interest rate hikes by the central bank continue to be slowly and partially reflected in the pricing of retail customers' deposits, which is unfavourable for monetary transmission and also poses liquidity risks over the medium term, even if it is currently remunerative. The banking sector's consolidated capital adequacy ratio dropped slightly, to 18.5 per cent by the end of 2022 H1, while the sector's free capital above the overall capital requirement amounted to 4.6 per cent. On the whole, banks' capital adequacy indicates strong resilience, based on our stress testing exercise there is only a temporary and manageable capital shortfall in the banking sector even in the more severe, protracted stress scenario. However, the minimum requirement for own funds and eligible liabilities (MREL) may require considerable funding from institutions facing adjustment pressure.*

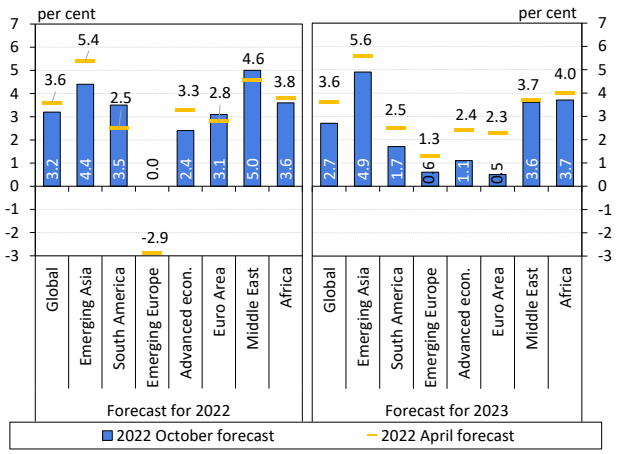
***Lending to the household and corporate sector from financial institutions is expected to decrease, especially in real terms.** Private sector loans outstanding expanded dynamically in 2022 H1, but government and central bank credit schemes, which provided an increasingly large interest advantage in the rising interest rate environment, may have generated significant demand brought-forward in the corporate and household segments as well. In the corporate sector, the increase in market interest rates tracking the development of interbank interest rates has not yet caused in a fall in new credit market volumes, but looking ahead the higher interest rate levels and operating costs as well as the increased uncertainty will result in weaker demand for investment loans. As interest rates on forint and foreign currency loans diverged, the issuance of foreign currency loans grew significantly in the corporate sector, but risks are mitigated by the fact that most of these borrowers also have foreign currency income. Following an outstanding 2022 H1, household loan disbursement already decelerated in the third quarter. In the case of household loan contracts concluded, no excessive risk-taking is identified, but the higher interest rate environment and higher house prices will drive out or force many potential borrowers to adjust, and thus demand for housing loans is expected to wane. According to the results of the Lending Survey conducted in October 2022, the vast majority of banks plan to tighten the terms of both household and corporate loans in the fourth quarter of 2022 and the first quarter of 2023. Accordingly, we expect the annual growth rate of the existing loan portfolio to fall substantially.*

1. External environment: the energy crisis exacerbated the risks in the EU banking system

Risks stemming from the deterioration in the external environment have risen considerably over the past six months. In 2022 H2, accelerating inflation, the European energy crisis, deepening geopolitical tensions as well as economic policy and central bank measures are the main determinants of international economic developments. In view of the higher inflation risks, many central banks have tightened their respective asset purchase programmes and interest rate conditions, but these steps also result in higher debt-financing burdens. As a result of interest rate hikes by the US Federal Reserve, many countries faced rising costs of funds and deteriorating foreign exchange rates, which makes the import of energy even more expensive. Fears of recession strengthened globally due to the deterioration in growth prospects and the rising interest rate environment. In Europe, the extremely high energy prices impose enormous burden on economic agents, and governments are working to mitigate the decline in households' disposable income and the cost shocks to companies with significant fiscal packages.

Owing to the gloomier growth prospects, the increasing interest rate environment and the weakening ability to repay loans, the European banking sector must prepare for the simultaneous management of a number of challenges. In view of the increasing, interrelated risks, the European Systemic Risk Board (ESRB) issued a warning at end-September 2022, calling attention to the mounting systemic risks that threaten the smooth operation of the financial system. At the same time, the findings of the ECB's spring stress test show that most European banks have sufficient capital buffers to address challenges similar in size to the current ones.

Chart 1: IMF forecasts for 2022 and 2023 real GDP growth

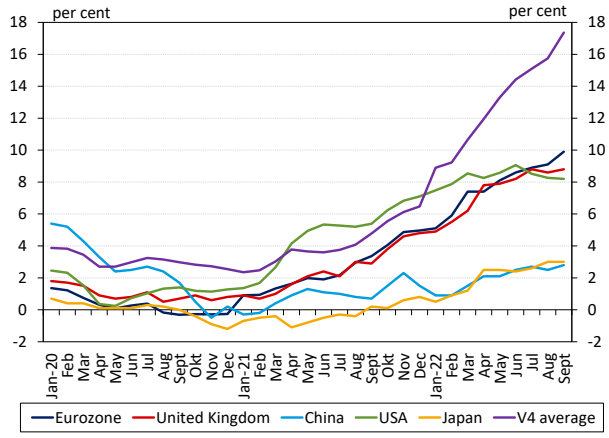


Note: Emerging Europe includes the countries directly affected by the war (Ukraine and Russia), which significantly lowers the average of this region. Source: IMF

1.1. Growth prospects deteriorated further due to the ongoing war and rising inflation

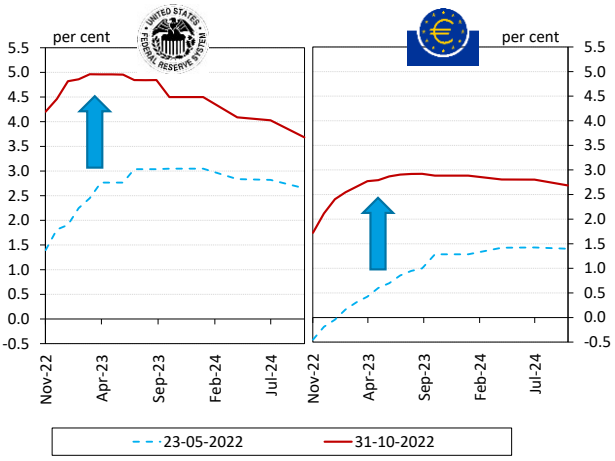
Growth prospects shifted downwards around the world as a result of the uncertainty caused by the protracted war between Russia and Ukraine. In view of the unfavourable phenomena (high inflation, mounting uncertainty, geopolitical tensions, energy supply problems) affecting the global economy, the International Monetary Fund (IMF) lowered its projection for global economic output. According to its October 2022 forecast, real GDP growth in the world economy may only reach 3.2 per cent in 2022 and a mere 2.7 per cent in 2023 (Chart 1). The deterioration in economic growth impacts almost all regions, hitting the euro area in particular, mainly due to the high energy supply risks. Emerging Asian countries were the driving force of the global economy for a long time, but economic growth rates are declining in this region as well, which is strongly attributable to deceleration in the Chinese economy. Nevertheless, in terms of growth prospects, one favourable development in the past months was that downward adjustments were already seen in various raw material prices (steel, copper, aluminium) as well as in the costs of international maritime transport.

Chart 2: Inflation trends by country and region



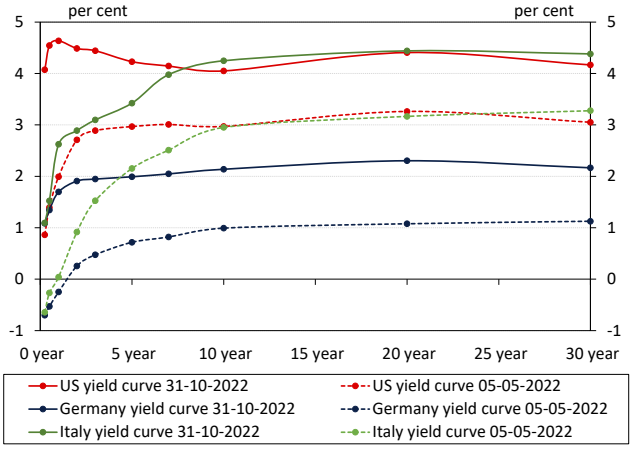
Source: OECD

Chart 3: Expected interest rate paths of the central banks of developed countries based on market pricing



Note: Expected interest rate paths are based on interest rate swaps in the case of the Fed and EONIA forward yields in the case of the ECB.
Source: Bloomberg

Chart 4: Changes in yield curves in developed countries

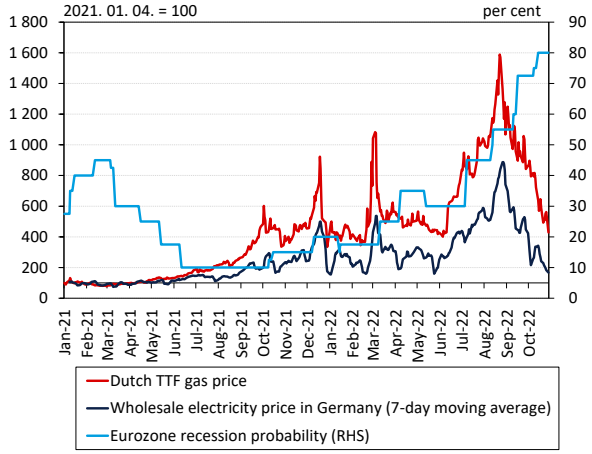


Note: Maturities shown on yield curves: 3M, 6M, 1Y, 2Y, 3Y, 5Y, 7Y, 10Y, 20Y, 30Y. Source: Bloomberg

Inflation rose to highs unseen for decades around the world, although rates vary considerably across regions. Rising inflation is a global phenomenon, with the increased demand stimulus programmes of central banks and governments during the coronavirus pandemic, frictions in global value chains and geopolitical tensions all contributing to the disruption of the supply and demand balance. The effects of the Russia-Ukraine war – first and foremost the European energy crisis – further strengthened inflation and made it more persistent. At the same time, not all countries are equally exposed to the rising energy and produce prices, and supply chain disruptions. Inflation rates in Japan and China have remained low to date, while inflation is ranging at 8–10 per cent in most developed countries; due to higher energy imports inflation is close to or even above 20 percent in the V4 region and the Baltic countries, respectively (Chart 2).

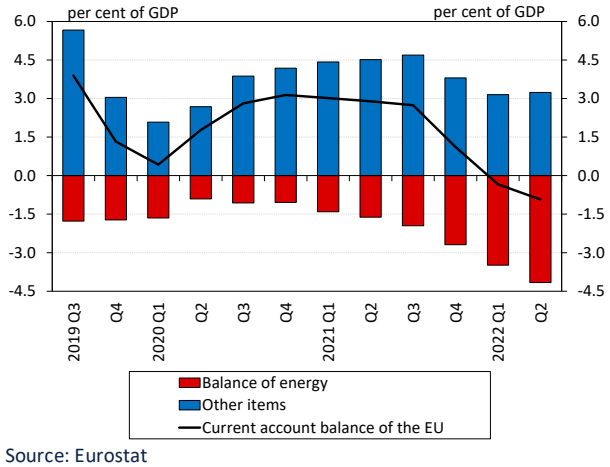
Central banks responded to the rising inflation with aggressive monetary tightening. In 2022 H2, major central banks implemented stronger monetary tightening compared to market expectations, resulting in a remarkable upward shift in the projected interest rate paths (Chart 3). The Bank of England (BoE) raised its Bank Rate seven times in 2022 and already decided to gradually reduce its Asset Purchase Facility in February. The US Fed raised the policy rate by 25 basis points in March 2022, followed by stronger increases (of 50 and 75 basis points), and further interest rate hikes are anticipated in the rest of the year as well. In September, the Fed also doubled the previous pace of balance sheet tightening. The US dollar appreciated significantly as a result of the Fed's aggressive monetary tightening. The ECB waited with interest rate hikes until June, when it launched its interest rate hike cycle with a 50-basis point increase, followed by two 75-basis point moves in September and October. According to market expectations, monetary conditions may continue to tighten in the euro area, and another interest rate hike is expected in remaining part of 2022. The Bank of Japan (BoJ) is committed to an expansive monetary policy until the 2-percent inflation target is exceeded, but this is having an increasingly adverse impact on the exchange rate of the Japanese yen. Most of the currencies of the Visegrád countries, which are small, open economies, have depreciated even though their central banks have implemented large interest rate hikes in recent months. Against the background of rising short-term yields resulting from central bank tightening and in parallel with increasing inflation expectations and deteriorating investor sentiment, the yield curve shifted upwards at longer maturities as well in the government

Chart 5: Trends in wholesale natural gas and electricity prices in Europe and recession expectations in the eurozone



Note: The Dutch TTF gas price shows the 1-month forward prices, while the German wholesale electricity price shows the moving average of the average electricity price the next day. Recession probability is based on Bloomberg's survey of analysts. Source: Bloomberg

Chart 6: Development of the EU's current account and energy balance



Source: Eurostat

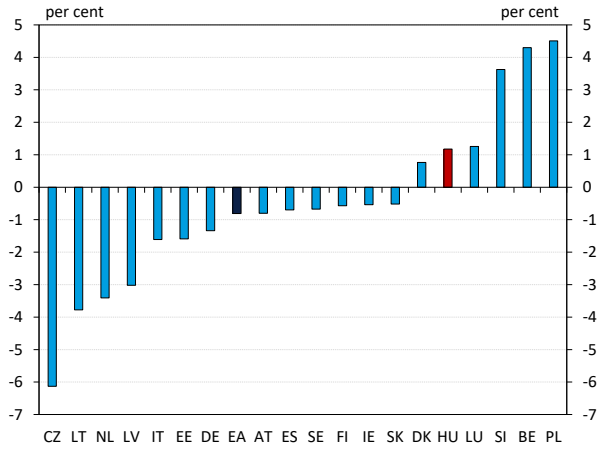
securities markets of developed countries (Chart 4).

1.2. High energy prices impose enormous burdens on economic agents in Europe

Natural gas and electricity prices rose significantly in Europe, because of the EU's gradual reduction of Russian gas imports and uncertainty about supplies. Following the initial shock caused by the war, the price of natural gas on the Dutch exchange surged higher again in the summer of 2022 and, after a correction in the autumn months, at the end of October it was still four to five times higher than in early 2021. After a significant increase and correction, the wholesale price of electricity in Germany, which follows price changes on the gas exchange, was twice as high as in early 2021 at the end of October 2022 (Chart 5). Expectations of the euro area's falling into a recession also increased in parallel with the higher natural gas prices and did not ease despite the drop in energy prices. The increase in energy prices is primarily caused by the risks to the security of energy supply of EU Member States. While Russia accounted for 40 per cent of the EU's natural gas imports in early 2021, only 8 per cent of these imports arrived from Russia in September 2022. The EU is substituting the missing Russian imports by purchasing gas from Norway and with liquefied natural gas (LNG) deliveries; thanks to the faster-than-usual filling of gas storage facilities, and with a 3-per cent reduction in gas consumption or a 6-per cent reduction in the case of a particularly cold winter, the energy security of EU Member States can be guaranteed this coming winter. However, exposure to Russian gas import differs by country: in the case of a complete termination of Russian gas deliveries, consumption would have to be reduced by 8–10 per cent in Germany and Italy, and by an average of 30 per cent in the Czech Republic, Hungary and Slovakia, in order to avoid supply disruptions.

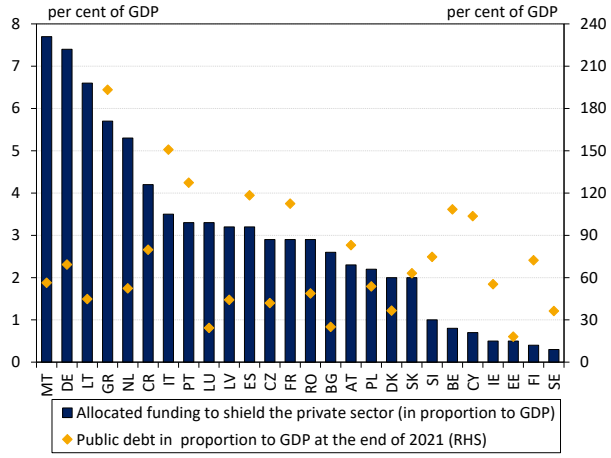
Due to the rising energy costs, the EU's current account balance has turned into a deficit, and the real disposable income of European households is on a decline. In 2022 Q2, the EU's energy balance decreased from -1.6 per cent of GDP in the same period of the previous year to -4.2 per cent, and the current account balance deteriorated from +2.9 per cent of GDP to -0.9 per cent (Chart 6). Higher energy costs affect all sectors of the economy, and due to their pass-through into consumer prices, European households may face declines in their real income. According to the OECD's June forecast, in 2022 the fall in real incomes in the euro area as a whole may amount to 0.8 per cent in

Chart 7: Forecast for real net income of households in selected EU member states for 2022



Note: Including non-profit institutions serving households. The forecast is based on data available until 31 May 2022. Source: OECD

Chart 8: Government funds allocated to mitigate the impact of the energy crisis on the private sector and the public debt-to-GDP ratio



Note: As a percentage of GDP in 2021. Based on measures introduced between September 2021 and October 2022. The utility cost reduction in Hungary has been in effect for longer than that, and its financial burden on government depends on the examined time horizon and the development of energy prices; thus, Hungary is not included. Estimated figures also include measures that have been announced by governments but not put into law yet. Source: Bruegel, Eurostat

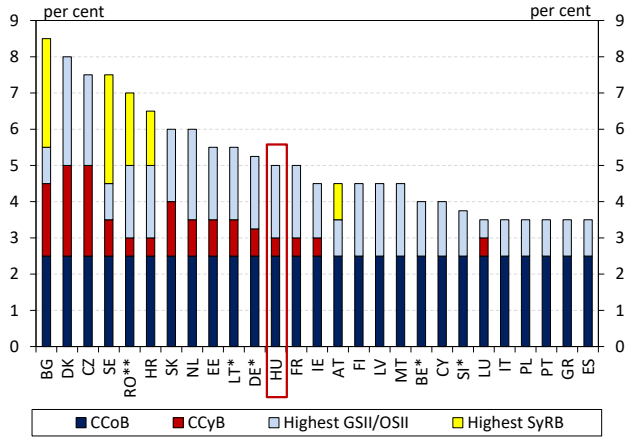
aggregate terms, which corresponds to the decline observed in the pandemic-hit 2020 (Chart 7). The decrease in households' purchasing power has an unfavourable impact on businesses, which also face the cost shock caused by high energy prices. The increase in households' and companies' financial tightness may pass through into the banking sector as well; these effects are discussed in detail in Box 1.

European governments announced large fiscal packages to mitigate the unfavourable effects of the energy crisis. Between September 2021 and October 2022, EU Member States announced fiscal easing and support measures more than EUR 560 billion to help the private sector. The direct fiscal effect of the measures exceeds 3 per cent of GDP in the EU as a whole, but in Germany, which allocated the highest share, it amounts to nearly 7.5 per cent of the GDP (Chart 8). Transfers to vulnerable households (25 Member States), reduction of taxes on energy consumption (25 Member States) and various subsidies for companies (17 Member States) were the most typical fiscal measures. Retail price regulation has been introduced in 12 Member States to date. The above-listed subsidies may increase the debt-to-GDP ratio in the EU, which had already risen significantly due to the costs stemming from the coronavirus pandemic in recent years.

1.3. The European banking sector is responding to the mounting risks by boosting its resilience

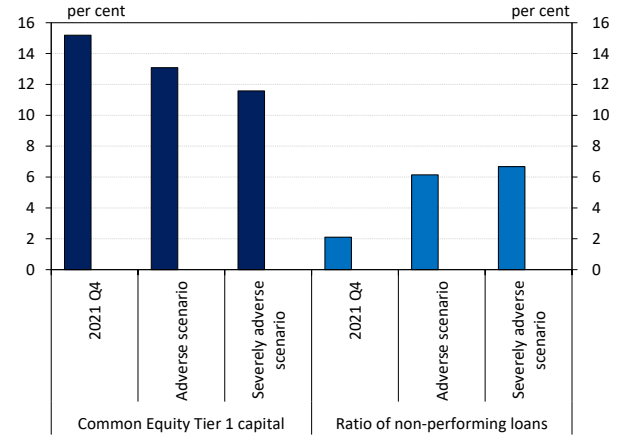
The European Systemic Risk Board (ESRB) has warned of the numerous, interrelated risks affecting the financial system of the EU. In September 2022, the ESRB issued a warning because of the pronounced deterioration in the economic outlook, the increasing interest rate environment, the risk of abrupt repricing of financial assets, the worsening loan portfolio, the eroding profit prospects, the real estate market tensions, the higher probability of the occurrence of increased cyber risks and tail-risk scenarios. It called the attention of the stakeholders and regulators to closer regulatory and supervisory co-operation as well as the need for precautionary measures.

Chart 9: Announced capital buffer requirements in EU Member States (30 September 2022)



Note: Announced buffers. CCoB: Capital Conservation Buffer; CCyB: Countercyclical Capital Buffer; GSII/OSII: Systemically Important Institutions' Capital Buffer; SyRB: Systemic Risk Buffer. *Sectoral SyRB. **In Romania, the highest capital buffer imposed on a bank is currently 5.5%. Source: ESRB, national authorities' websites

Chart 10: Changes in the CET1 and NPL ratios according to the ECB's May stress scenarios



Note: For details of the stress test, see: ECB Financial Stability Review May 2022. Source: ECB

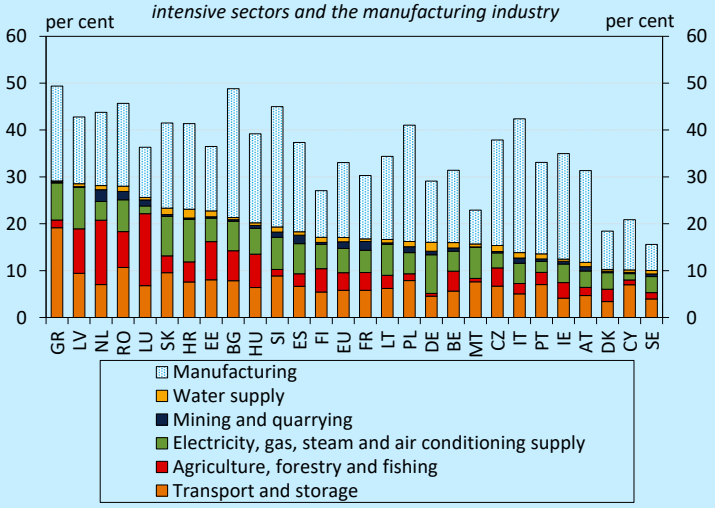
Most EU Member States have already started preparing to mitigate the deepening systemic risks. By end-September 2022, 15 EU Member States had announced the introduction of a positive countercyclical capital buffer (CCyB) rate (Chart 9). At the same time, some countries are addressing overheating in certain segments (such as the real estate market) with the help of a sectoral systemic risk buffer (SyRB). The European banking sectors have strong capital positions and stable fundamentals to face the challenging environment; the sector-level CET1 ratio reached 15 per cent at end-June 2022, and the announced capital buffers provide further adjustment opportunities, in the event that risks do materialise.

The euro area banking sector has stable fundamentals to bear the increasing risks. In its May Financial Stability Review, the ECB examined the resilience of the euro area banking sector based on three stress scenarios. According to the ECB's estimates, if the unfavourable scenario occurred, the banking sector's CET1 ratio would fall from 15.2 per cent at end-2021 to 13.1 per cent, whereas if the most unfavourable scenario materialised, it would fall to 11.6 per cent (*Chart 10*). In both scenarios, the increase in credit risks is the main factor behind the decline in the CET1 ratio. For the next two years, the stress test estimated a nearly 5-per cent probability of default (PD) for the sectors that are the most exposed to the economic effects of the war. As a result, the banking sector's NPL ratio would rise from 2 per cent at end-2021 to nearly 7 per cent.

BOX 1: IMPACT OF THE EUROPEAN ENERGY CRISIS ON THE EUROPEAN BANKING SYSTEM

The persistently high energy prices may feed into banks' credit risks through various channels. Of these risks, a significant deterioration in energy-intensive companies' ability-to-pay may affect the European banking system the most. According to calculations by the European Investment Bank, in 2018 energy costs arising upon production directly or indirectly (upon the production of inputs) accounted for roughly 8 per cent of the value of products and services produced in the EU, with this ratio even exceeding 13 per cent in five Member States. At the end of 2022 H1, 17 per cent of the EU's bank exposure was vis-à-vis sectors with high energy requirements (e.g. infrastructure services, logistics, agriculture, mining), and another 16 per cent vis-à-vis manufacturing, certain sub-sectors of which are also highly energy-intensive (e.g. pharmaceutical and chemical industries, food industry). Over the short run, companies with high energy requirements are unable to pass the drastic energy price rises on to their customers in full, which fundamentally affects their income-generating power. In parallel with the broad-based, significant deterioration in corporate profitability, European banks should expect an increasing default risk if high energy prices persist. Regarding the high volume of outstanding loans to energy-intensive sectors, the abovementioned risks would have a material impact on banks' loan portfolio quality as well as their profitability and capital position via higher loan loss provisioning. In its May stress test, the ECB also examined a scenario including gas and oil price increases that nearly corresponds to the current situation, and according to their estimations, the NPL ratio of euro area banks may rise by as much as 5 percentage points.

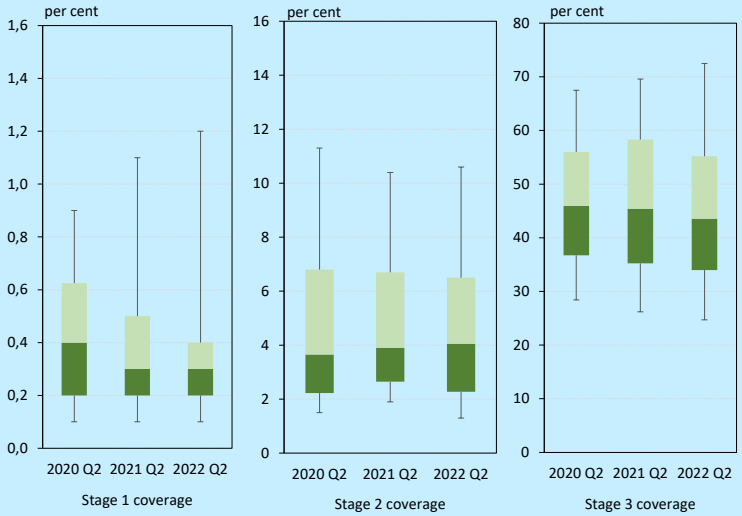
Exposure of EU member states' banking systems to the most energy-intensive sectors and the manufacturing industry



Note: As a proportion of total exposure. Data for the second quarter of 2022. Source: EBA

Households' repayment difficulties and the decline in the collateral value of mortgage loans may also have an adverse impact on banks. As a result of the increase in utility costs and the pass-through of energy costs into consumer prices, households' disposable income may decline considerably. Simultaneously with that, as a result of monetary tightening, debtors with variable-rate loans may face increases in their instalments, and thus their income position is hit by a double shock. Accordingly, the non-performing loan portfolio may rise in the household segment as well. In addition, the high energy prices may result in a major restructuring in the housing market as well, since due to the elevated utility costs the value of real properties with low energy efficiency may decline, and thus banks' loan losses given default may also increase in view of the depreciation of collaterals. Nevertheless, banks' risks may be reduced by the fact that governments are protecting economic agents from the adverse effects of high energy prices with significant fiscal packages across Europe.

Loan loss coverage of the the private sectors' credit stock in the EU banking system



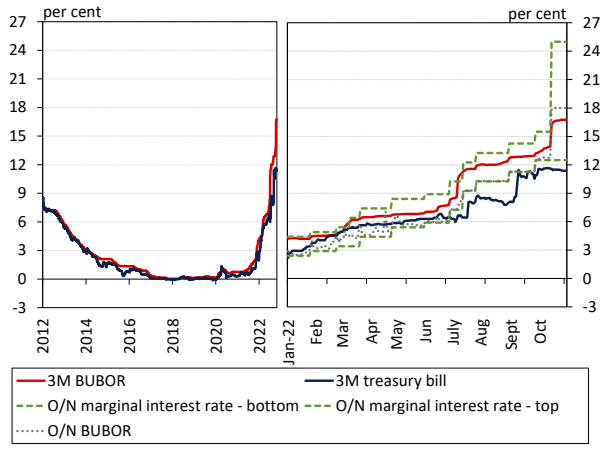
Note: The whiskers show the minimum and maximum values, the boxes show the 25th and the 75th percentiles. Source: EBA

For the time being, the degree of European banks' loan loss provisioning does not reflect increased preparation for the mounting risks. The non-performing loan ratio has been steadily declining in the EU banking sector since 2020 Q1, from 3.0 per cent at that time to 1.8 per cent by the end of 2022 Q2. At the same time, the share of loans outstanding classified into Stage 2 already increased in recent quarters, indicating a deteriorating loan portfolio and banks' forward-looking risk perception. Nevertheless, loan loss coverage of the Stage 3 portfolio declined at both annual and quarterly levels as the average of EU banks, indicating that, for the time being, credit institutions have not raised the buffers accumulated for their riskiest loan portfolios.

2. Market and bank liquidity: ample buffers in the changing interest rate environment

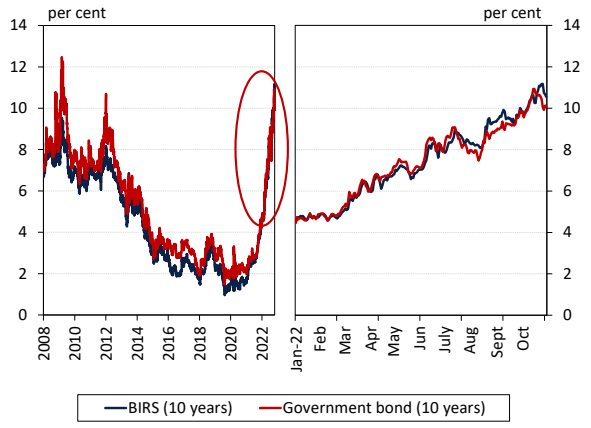
Both short-term and long-term yields increased as a result of central bank interest rate hikes and inflation developments. The banking sector is characterised by a stable, balanced structure of financing, providing an appropriate background for mitigating the financial stability risks in the changing interest rate environment. Financial reserves are sufficient to offset any challenges in obtaining funds, and thus the financing situation currently does not hinder the satisfaction of customers' credit needs. The liquidity reserves of the banking sector declined as a result of the growing demand for cash, the absorption of central bank liquidity over a longer maturity and the revaluation of government securities holdings, which account for most of the collateral, as a result of increasing yields, but continued to constitute an ample buffer against potential liquidity shocks. The repricing of client deposits, which constitute the backbone of the funding for the banking sector, is slow, and its maturity and currency structures show moderate changes. Both the pricing and structure of deposits significantly affect financing and liquidity risks in the banking sector; and banks need to closely monitor the risks in the changing monetary environment.

Chart 11: Developments in short-term yields



Source: Government Debt Management Agency, MNB

Chart 12: Changes in long-term interbank interest rate swaps and government bond reference yields



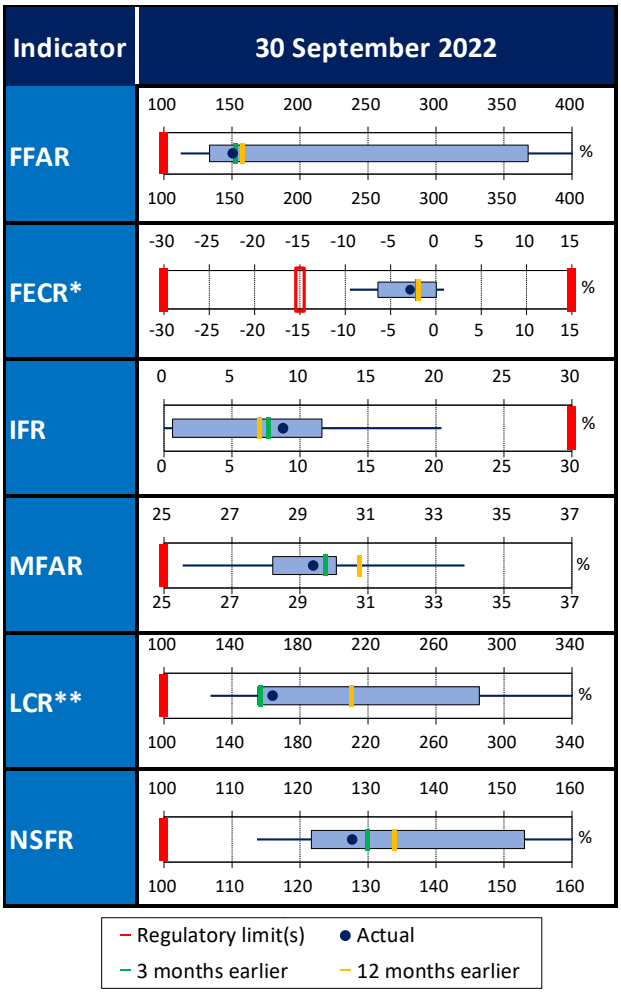
Source: Government Debt Management Agency, MNB

2.1. Increases in both short-term and long-term yields

The level of short-term interest rates reflects the tightening monetary policy. In the interbank unsecured money market, transactions with a maturity of maximum one year closely followed the tightening of monetary conditions, and the 3-month BUBOR rose to 16.76 per cent by the end of October 2022 (*Chart 11*). In its September 2022 announcement, the Monetary Council emphasised that tight monetary conditions will persist, which ensures the anchoring of inflation expectations and the achievement of the inflation target in a sustainable manner. In response to the turbulent financial market environment, the Monetary Council raised the upper limit of the interest rate corridor to 25 per cent in mid-October and introduced a new 1-day deposit instrument and other market stabilisation measures. These steps contributed to the rise in short-term interbank yields in the latter half of October.

Long-term yields have risen in line with global trends. Hungarian long-term government securities market and interbank yields continued to increase in mid-2022 (*Chart 12*). In the government securities market, changes similar to the long-term yields in the countries of the region took place as a result of strengthening inflation developments. In the past six months, 10-year interbank yields have increased by 380 basis points, while government securities yields with the same maturity rose by 320 basis points.

Chart 13: Compliance of the banking sector with liquidity and financing requirements



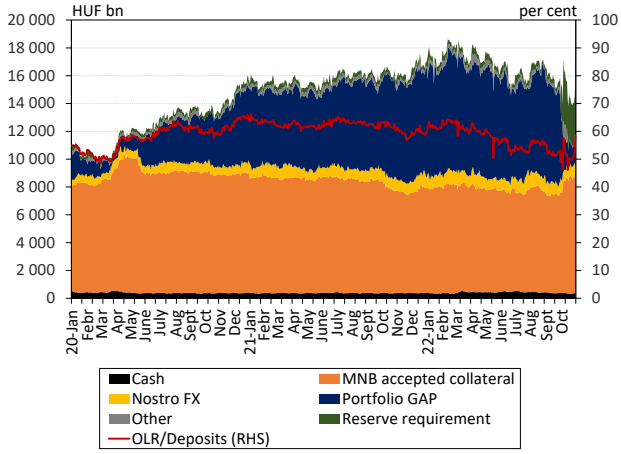
Note: FFAR - Foreign exchange Funding Adequacy Ratio, FECR - Foreign Exchange Coverage Ratio, IFR - Interbank Funding Ratio, MFAR - Mortgage Funding Adequacy Ratio, LCR - Liquidity Coverage Ratio, NSFR – Net Stable Funding Ratio. The edges of the blue rectangle denote the lower and upper quartiles of the distribution, while the ends of the dark blue line show the 10th and 90th percentiles of the distribution. *The FECR has been operating with an asymmetrical limit since 9 December 2021 **Excluding mortgage banks and housing savings banks. Source: MNB

2.2. The banking sector is characterised by ample liquidity and a favourable financing structure

Banks have adequate liquidity and funding reserves, but the size of buffers is declining. The liquidity coverage ratio (LCR), exhibiting the greatest change and affected by monetary policy steps the most, returned to the lower but still safe levels preceding the COVID period, which was characterised by significant liquidity (*Chart 13*). Banks fulfil the 100 per cent expected level of the net stable funding ratio (NSFR), which has been in effect since June 2021 and requires banks' long-term stable funding, with substantial buffers. There was no major change in the banking sector's on-balance-sheet FX liability surplus in 2022 H1, and for the time being no significant restructuring is seen among the main items of the two sides of the balance sheet. Likewise, the banking sector's dependence on riskier financial corporation funds has also not changed and is well below the regulatory limit. Banks comply with the mortgage funding adequacy ratio (MFAR) requirement by maintaining an adequate buffer, which has been supported by the green mortgage bond issues' preferential treatment and may also be strengthened in the future by the FX mortgage bond issues eligible as of July 2022. Continuing monetary tightening and financial market uncertainties suggest increasing risks, but the financial reserves are sufficient to offset the expected challenges in obtaining funds, and thus the financing situation does not hinder the maintenance of lending.

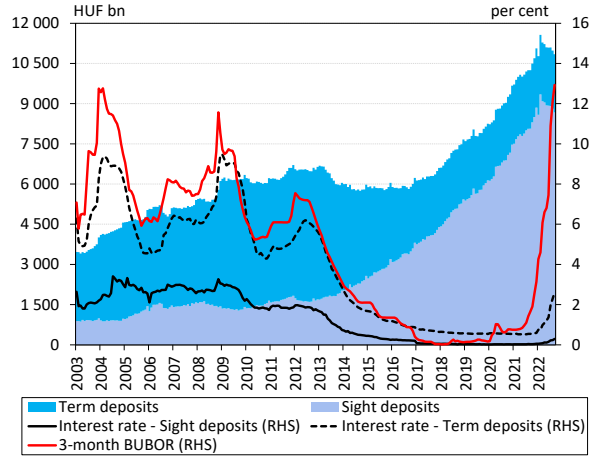
Despite the decline, the banking sector has ample liquidity reserves. Compared to the historical high, i.e. the average level in February 2022, the banking sector's operational liquidity reserves declined by 15 per cent and amounted to HUF 15,200 billion on average in October 2022 (*Chart 14*). In the period under review, the banking sector's operational liquidity reserves fell primarily as a result of an increase in cash holdings, a decrease in the market value of central bank eligible collateral and a rise in the average maturity of deposits with the central bank; however, the ability of long deposits to be considered as collateral by the central bank partially offset the decrease in liquidity in October. Irrespective of the accounting classification, the revaluation due to rising yields of the free government securities holdings, which account for most of the collateral accepted by the MNB, is considered when liquidity reserves are taken into account, as securities are included in the liquidity reserves

Chart 14: Decomposition and development of banks' operative liquidity reserves



Note: The portfolio gap denotes the contractual net flows of treasury operations within 30 days from the date of data reporting with the following content: interbank loans and deposits, MNB deposits, repos, securities other than own issued, deposits over HUF 5 billion and derivatives. Classified into the "other" category: ECB eligible collateral, cash flows from own securities, deviation from and changes in reserve requirements. The central bank takes the reserve requirement into account as liquid asset. Source: MNB

Chart 15: Average annualised interest rate and maturity structure of households' total forint deposits and changes in the monthly average level of the 3-month BUBOR



Source: MNB

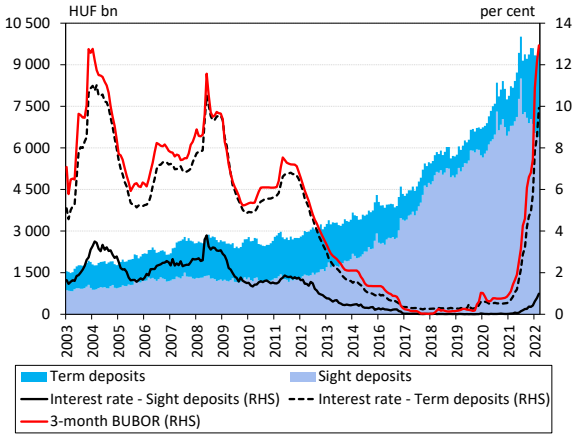
at their market value.[1] The drop in liquidity reserves is also reflected in the decrease in the contractual net flows of treasury operations (portfolio gap), most of which is made up by the inflows of deposits placed with the MNB. Pursuant to the end-September 2022 decision regarding the monetary policy toolkit, credit institutions' reserve requirement is increasing from the previous 1 per cent to a minimum of 5 per cent. As a result of the change in the toolkit, from October 2022 the level of required reserves increased from the previous level of around HUF 400 billion to above a daily of HUF 2,000 billion and a monthly average of HUF 2,700 billion. In addition, as a result of the October long-term deposit tenders until now, central bank deposit inflows of some HUF 2,600 billion became maturing after thirty days, thus temporarily reducing the level of the operational liquidity reserves.

2.3. Changes in client deposits are crucial in terms of bank financing

Interest rate increases by the central bank are still slowly and partially appearing in the pricing of client deposits. The interest rate on sight deposits remains close to zero for both households and companies. According to September 2022 data, households receive interest of 29 basis points (*Chart 15*), while companies receive an average interest rate of 99 basis points on their sight deposits (*Chart 16*). In the case of household deposits, the repricing of term deposits is slower than that of corporate deposits and falls significantly short of the rise in short-term interbank yields. In September 2022, the average interest rate on household time deposits was 2.6 percentage points, whereas the same figure for companies was 9.9 percentage points. The latter has risen significantly since the start of the interest rate hike cycle in June 2021, but still falls short of the change in the 3-month BUBOR measured in the same period. In the current inflation environment, the real value of the household deposits of around HUF 11,000 billion is declining significantly; in the medium term, this may result in a shift in the structure of deposits towards term deposits, or in an extreme case, prompt depositors to turn towards alternative investment possibilities and service providers. The slow adjustment seen in client deposit repricing may be attributable to the sector's ample liquidity and favourable financing position, the insufficient competition in the market of bank deposits, the difficulties of changing banks and the presence

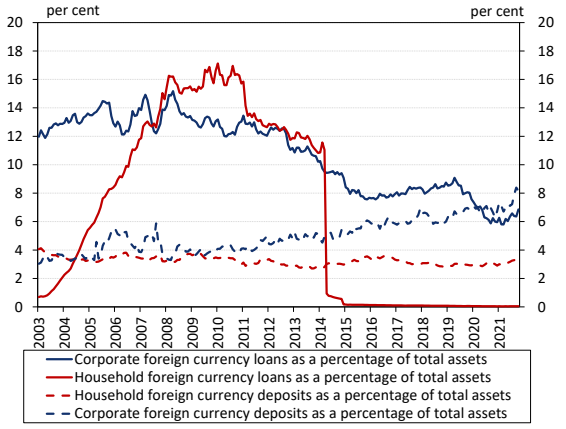
[1] However, on the basis of banks' accounting classification, a mere one fifth of the entire banking sector's government securities holdings is revalued vis-à-vis the capital and profit.

Chart 16: Average annualised interest rate and maturity structure of companies' total forint deposits and changes in the monthly average level of the 3-month BUBOR



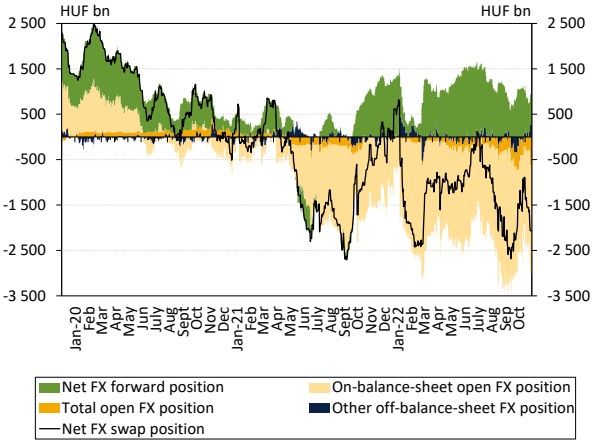
Source: MNB

Chart 17: Development of foreign currency loans and deposits for households and corporates as a percentage of total assets



Source: MNB

Chart 18: Changes in the banking sector's FX swap position and in other components of the total FX position



Note: Data from the banking system, excluding EXIM, MFB and KELER. Net FX swap position = (On-balance-sheet open FX position – Total open FX position) + Net FX forward position + Other off-balance-sheet FX position. Source: MNB

of the government securities market, which offers high yields for households.

The share of foreign currency deposits in the domestic private sector increased slightly this year. In the first nine months of the year, exchange rate-adjusted household foreign currency deposits advanced by HUF 390 billion, in conjunction with a HUF 140 billion decrease in forint deposits, while exchange rate-adjusted corporate foreign currency deposits rose by about HUF 680 billion, along with a nearly HUF 600 billion decrease in forint deposits**.** Between February 2022 and September 2022, corporate and household foreign currency deposits as a percentage of the balance sheet total of the banking sector increased by 1.45 percentage points and 0.58 percentage point, respectively (*Chart 17*). Corporate foreign currency deposits are generally characterised by high volatility, but the longer trend shows growth, which is attributable, inter alia, to the rise of foreign-owned companies and ones producing for international markets as well as to the effects of the ample and cheap euro liquidity; whereas in the past period, the high volatility of the forint exchange rate, the extension of one-off, high-amount loans and the high energy prices requiring the exchange of currencies may have been the main contributors to the increase in foreign currency deposits. Households' foreign currency deposits rose this year, mainly due to growth in summer. However, excluding the exchange rate effect and as a percentage of the balance sheet total, the degree of these deposits cannot be considered unprecedented at present.

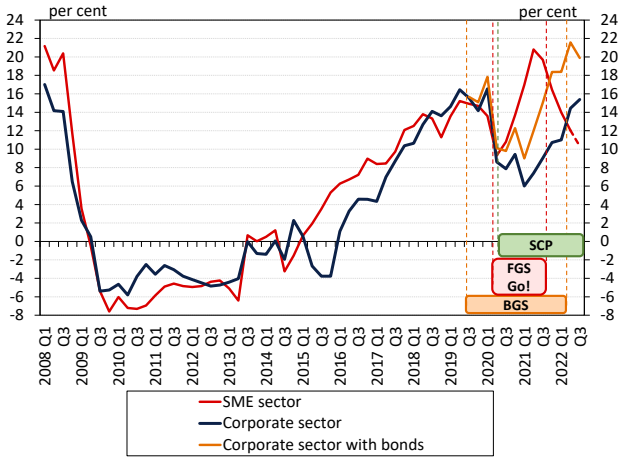
FX lending, falls short of the increase in FX deposits, which raises the banking sector's on-balance-sheet FX liability surplus. As foreign currency asset growth is slower than growth in foreign currency deposits, it continuously opens the banking sector's on-balance-sheet FX position, which has already shown an FX liability surplus since 2020 (*Chart 18*). The banking sector covers the on-balance-sheet position with off-balance-sheet FX sales (forint purchase) on the FX swap market. Nevertheless, the rising swap market exposure increases market, counterparty and liquidity risks related to the derivative transactions, although according to September 2022 data, the banking sector's gross forint-purchasing swaps accounted for only 10 per cent of the banking sector's balance sheet total on average, which cannot be considered excessive. The on-balance-sheet open position is limited by macroprudential rules. The foreign exchange coverage ratio (FECR) regulation reduces the risk of the evolution of an excessive on-balance-sheet open FX position, limiting its ratio to the balance sheet total at a level of 30 per cent in the case of an FX liability surplus.

3. Corporate lending: robust expansion followed by uncertainty and deceleration

By the end of 2022 Q3, the annual rate of expansion in corporate loans outstanding had increased to 15 per cent, while the annual growth rate of SME loans reached 10 per cent according to preliminary data, thanks to the support of subsidised credit schemes. Foreign currency loan issuance increased significantly in the third quarter, but the majority of borrowers were companies with export revenues. According to the Lending Survey, a net 29 per cent of banks tightened lending conditions in 2022 Q3, with 71 per cent planning further tightening. Respondents also foresee a shift in credit demand: 85 per cent expect declining demand for investment loans, while 29 per cent expect rising demand for short-term, working capital loans. By mid-2023, after a steady decline, corporate loan growth may decelerate into single-digit territory, as a result of the recent trends, the higher interest rate environment and elevated economic uncertainty. For the first nine months of 2022, the volume of new contracts exceeded the value for the same prior-year period by 9 per cent and was 33 per cent higher than the pre-pandemic 2019 level. Lending rates on market-based SME working capital and investment loans rose to above 10 per cent, but actual client interest rates are significantly lower than this due to the effect of the subsidised schemes. As a result of the subsidised schemes introduced after the coronavirus pandemic, non-market and guaranteed loans outstanding expanded considerably, in parallel with growth in the share of fixed rate loans.

3.1. The robust corporate loan dynamics are expected to decelerate

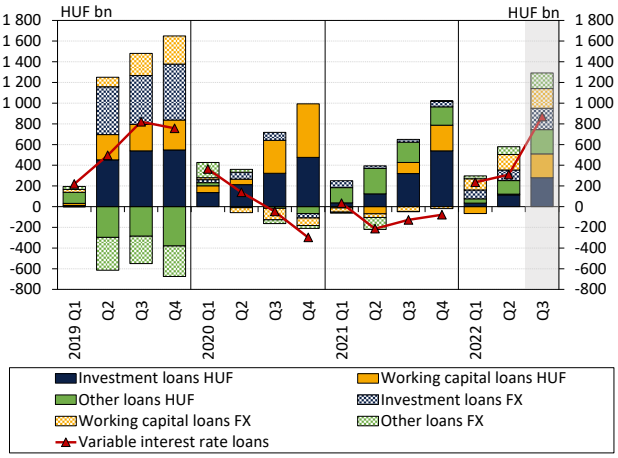
Chart 19: Annual growth rate of loans outstanding of the overall corporate and SME sector, as well as annual growth rate including bonds in the credit institution sector



Note: Transaction based, prior to 2015 Q4, data for SMEs are estimated based on banking system data. Supplemented growth rate with bonds calculated only with bond stocks held by credit institutions. In order to generate the growth rate, we also calculated with payments to Sberbank between March 2022 and August 2022. Growth rate of SMEs in 2022 Q3 is based on preliminary data. Source: MNB

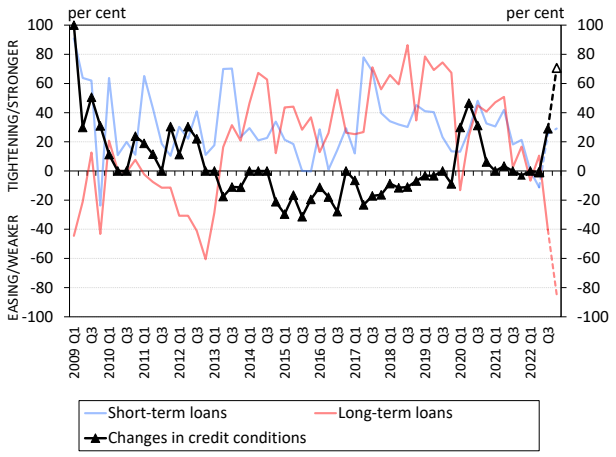
Corporate loans outstanding expanded strongly in 2022 H1. Between July 2021 and June 2022, non-financial corporations' bank loans outstanding rose by 14 per cent on a transaction basis (*Chart 19*). Taking into account transactions in corporate bonds owned by banks as well, the growth rate was even higher, at 22 per cent at the end of the first half of the year. The growth rate of loans outstanding was slightly higher in the case of large corporations in the one-year period under review: the SME portfolio and large companies' loans outstanding expanded by 12 per cent and 16 per cent, respectively, during the period. Despite the significant loan growth, after a slight decline, corporate loans outstanding corresponded to 17 per cent of GDP at end-June, falling 18 percentage points short of the figure for the euro area; thus, this indicator is still considered low in an international comparison. In the third quarter, the SME loan growth reached 10 per cent and the corporate loan growth 15 per cent, according to preliminary data, however, in real terms, this practically means stagnation.

Chart 20: Transactional expansion in corporate loans outstanding by loan purpose, denomination and interest rate



Note: Cumulative transaction data within a year adjusted for exchange rate effects and filtered from other stock changes. The sector reclassification of Sberbank's portfolio is not filtered out from transaction data of 2022 Q3. Source: MNB

Chart 21: Changes in credit conditions and credit demand in the corporate segment

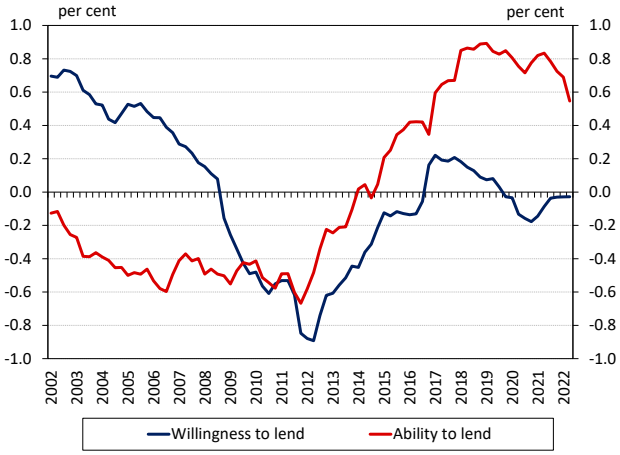


Note: Net percentage balance of respondent banks indicating tightening/easing and weaker/stronger demands, weighted by market share. Source: MNB

In 2022 H1, 50 per cent of the increase in loans occurred in the final month of the SZKP Go! scheme. Corporate loans outstanding rose considerably in 2022 H1, expanding by HUF 577 billion. This increase was concentrated in terms of time, with nearly 50 per cent occurring in June, when the SZKP Go! scheme was closed. On a transaction basis, the loans outstanding of all sectors grew in the period under review, to the greatest degree in the case of trade and vehicle repair activities, real estate activities and manufacturing. On the basis of loan purpose, investment loans were the main contributors to the increase in the first two quarters of 2022 (*Chart 20*). However, in terms of interest rates and composition by denomination, the picture is different than in the past. While an overall decline in variable-rate loans outstanding was observed in 2020 and 2021, these loans accounted for 53 per cent of the portfolio growth in 2022 H1. A shift was observed in terms of currency composition: the share of foreign currency loans increased. The structural change was partly explained by the high, 40-per cent share of one-off, large-amount transactions in excess of HUF 5 billion. In the third quarter, a significant increase in transactions exceeding HUF 600 billion was recorded: large corporate loans with variable interest rates were responsible for about two thirds of this increase. Regarding new contracts, new issuance in the first nine months of 2022 exceeded the value of the same period of the previous year by 9 per cent and the pre-pandemic, 2019 level by 33 per cent.

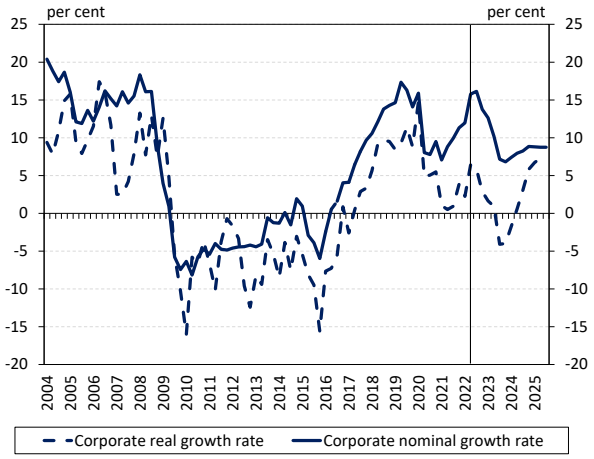
Tightening credit conditions and decreasing credit demand are expected in the corporate credit market. Of the credit institutions responding to the Lending Survey, a net 29 per cent tightened credit conditions in 2022 Q3 (*Chart 21*). Looking ahead to 2022 Q4 and 2023 Q1, 71 per cent of banks plan on further tightening of lending conditions, citing mounting industry-specific problems, worsening economic prospects and changing risk tolerance. As for credit demand, a net 26 per cent of banks experienced a pick-up in demand for short-term loans in 2022 Q3, while four tenths of banks observed a fall in demand for long-term loans. This trend is expected to continue going forward. Nearly 85 per cent of banks anticipate lower demand for investment loans due to the negative impact of the uncertain economic environment on investment activity, while 29 per cent project stronger demand for short-term working capital loans, in parallel with the skyrocketing energy prices and higher operating costs as a partial result of such.

Chart 22: Changes in ability and willingness to lend



Source: MNB

Chart 23: Forecast for annual growth rate of the corporate loan portfolio

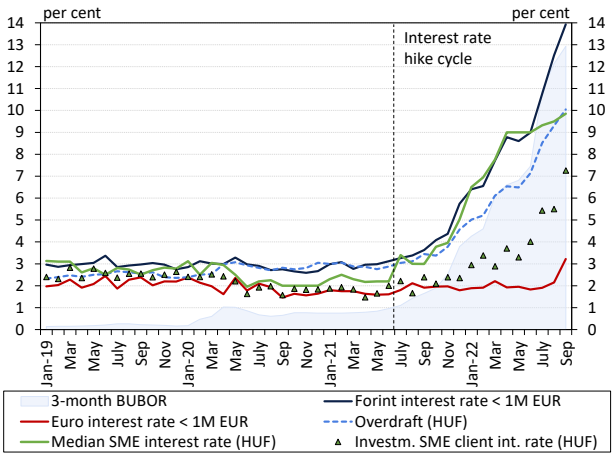


Note: Transaction-based annual growth rate based on data from the financial intermediary system. Real growth rates are deflated by the GDP deflator from the September 2022 Inflation Report model database. Source: MNB

The banking system had a near-neutral impact on real economic expansion through its lending activity. Exhibiting no significant change, willingness to lend factor was close to zero in 2022 Q2 (*Chart 22*). The ability to lend factor dropped significantly, from 0.73 at end-2021 to 0.55 at the end of the second quarter of 2022. However, the value of the factor is still high in a historical comparison, and its decline over the past six months is explained by a reduction in liquidity and capital buffers.

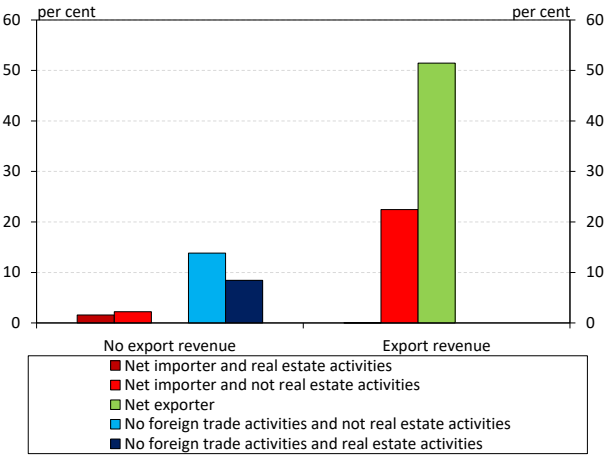
More subdued growth in corporate loans outstanding may be seen in the coming years. In view of the lower economic growth compared to the previous years and the high interest rate environment, the expansion of corporate loans outstanding is expected to decelerate. Nevertheless, companies' demand for working capital loans may grow due to the increased energy and commodity prices, and the SZKP MAX subsidised loan scheme may also contribute to a sustained expansion in SME loans outstanding. Owing to the changed real economy situation, however, demand for investment loans may taper off significantly in the future. On the whole, in this uncertain environment the growth rate of corporate loans outstanding may decelerate into single-digit territory by mid-2023, which means negative real growth rate due to the high inflation environment (*Chart 23*).

Chart 24: Interest rates on new corporate loans and the development of the 3-month BUBOR



Note: Loans with variable interest rate or with up to 1-year initial rate fixation. For the 3-month BUBOR, monthly averages are shown. Volume-weighted interest rate for HUF loans under one million euros excluding money market transactions.[2] In the case of the SME median interest rate, Széchenyi Card Programme transactions have been excluded. Source: MNB

Chart 25: Breakdown of companies that took out foreign currency loans in 2022 by foreign trade activity according to their existing foreign currency loans



Note: The export income is based on the 2021 income statement. Source: NTCA, MNB

3.2. Gradually rising interest rates in the corporate loan market

Interest rates on forint and foreign currency loans have diverged from each other. In parallel with the interest rate hike cycle that started in June 2021, the monthly average of the 3-month BUBOR rose by a total 12 percentage points until September 2022. In line with this, the volume-weighted interest rate on forint loans below one million euros rose by 10.8 percentage points (*Chart 24*). At the same time, interest rates on EUR-denominated loans have only risen moderately so far, with the reference interest rate rising by 155 basis points, thus, the difference between the average interest rate of forint and euro denominated loans increased significantly. In the same period, the median interest rate[3] on SME forint investment loans[4] rose to 9.9 per cent. However, businesses have access to funds at lower actual costs than the latter interest rates: the weighted average interest rate on investments, calculated with the SZKP Go! and SZKP MAX customer interest rates, was only 7.3 per cent at the end of September-2022.

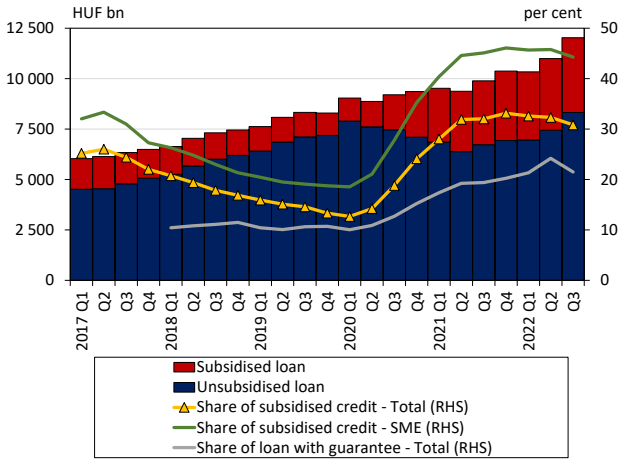
The issuance of foreign currency loans increased significantly, but the borrowers mostly have natural collateral. In 2022 Q3, 60 per cent of new loans were foreign currency loans, which is considerably higher than the average of 31 per cent over the past 5 years. The increasing issuance of foreign currency loans is a risk if it is caused by the difference between forint and foreign currency interest rates, and if these loans are requested by companies with no foreign currency revenue. Based on our data, however, the majority of those taking out foreign currency loans in 2022 have export revenue and thus have natural foreign currency collateral: around 74 per cent of these companies' foreign currency loans are backed by export revenue, and more than half of the total amount belongs to net exporting companies (*Chart 25*). In addition, the share of the real estate activities sector is about 14 per cent; although the companies of this sector do not have export income, their revenues (rental fees) are typically denominated in euros,

[2] Money market transactions are loans granted to non-financial companies whose value exceeds 1 million euros, have a short term – typically within 1 month – and are used to finance some financial operation.

[3] Examining the financing costs of the SME sector, the products of the Szechenyi Card Programme as well as the loan contracts exceeding HUF 3 billion and typical of larger companies were excluded. The reason for this is that the total transaction interest rate, which serves as the basis for the data reported by banks and which contains the state subsidy as well, is much higher than the interest actually payable by the client.

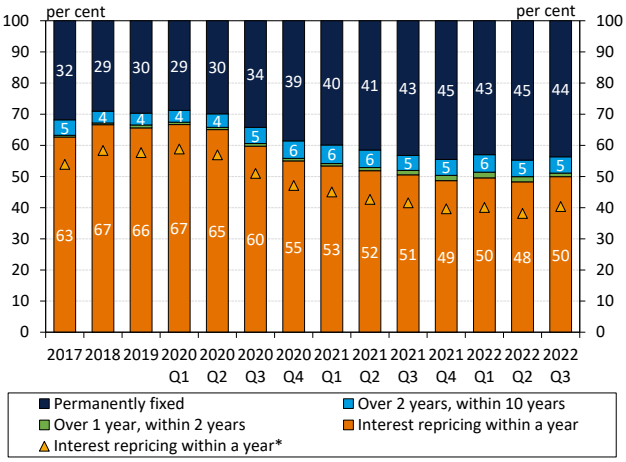
[4] Investment loans: investment loans and credit lines, with the exclusion of leasing transactions. Loans with a purpose that cannot be identified as an investment or working capital loan were not classified into any of the categories.

Chart 26: Share of subsidised credit schemes within the total corporate loan portfolio



Note: Subsidised credit schemes include the individual phases of the FGS, the Széchenyi loan programmes as well as the loan products of the emergency EXIM and MFB programmes introduced during the coronavirus pandemic. Regarding loan portfolios with guarantees, the loans related to the main domestic guarantee institutions are indicated. Source: MNB

Chart 27: Breakdown of SME loans by interest rate period



Note: The loans are classified on the basis of the time until the start of the next interest rate period. In the case of loans maturing within a year, fixed loans during the entire term of the loan were classified in the permanently fixed category, while the rest were classified as variable within one year. Interest repricing within a year*: excluding overdrafts and credit card receivables. Source: MNB

due to the nature of the market.[5] Comparing the above ratios with the foreign currency loan portfolio of companies that did not take out a foreign currency loan this year, but have a foreign currency loan, the natural coverage of this year's foreign currency loan borrowers is higher.

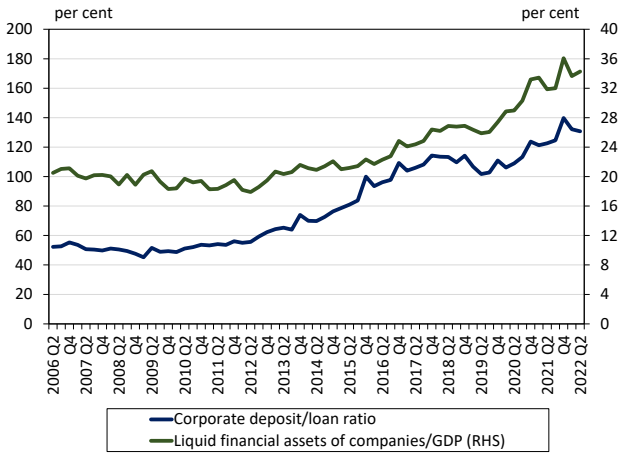
3.3. The structure of SME loans outstanding has changed since the appearance of the coronavirus pandemic

The share of subsidised credit schemes rose considerably following the appearance of the coronavirus. After 2017, in parallel with the end of the third phase of the FGS, purely market-based loan products gradually became more and more dominant, but with the appearance of the coronavirus pandemic and the introduction of the subsidised credit schemes, this trend reversed (*Chart 26*). The rise in subsidised loans was more prevalent in SME sector loans: the share of subsidised loans in 2022 Q2 was close to 50 per cent within the loans outstanding. Due to the narrowing fiscal leeway, subsidised schemes are expected to decline, boosting the negative effect of the rise in interest rates environment on loan volumes. In terms of financial stability, it is crucial that most loans disbursed under the subsidised credit schemes amounting to some HUF 3,700 billion are backed by the guarantee provided by the main domestic guarantee institutions, with a counter-guarantee from the government.

Outstanding loans with predictable interest rates grew considerably in the SME segment. As a result of the subsidised schemes, the share of loans with fixed interest rate until maturity rose significantly in the SME segment. The share, which was 29 per cent upon the appearance of the coronavirus, had advanced to 44 per cent by the end of 2022 Q3 (*Chart 27*). In parallel with that, the share of forint loans within the portfolio also increased in this segment, from 66 per cent in 2020 Q1 to 70 per cent in 2022 Q3. The increase in the share of fixed-rate loans have substantial financial stability advantages due to predictable instalments. The increase in the interest expense of SME loans with variable interest rates is also temporarily limited by the government's decision to fix the reference interest rate for non-current account, HUF, SME and variable rate loans at the level of 28 June 2022 between 15 November 2022 and end-June 2023. The interest rate cap affects HUF 1,200 billion in

[5] However, in some cases this is only an apparent collateral if the tenant does not have foreign currency revenue from which currency-based rent could be paid without exchange rate risk. A summary of the exchange rate risk related to commercial real estate project loans can be found in Box 1 of the November 2018 Financial Stability Report. Available: https://www.mnb.hu/letoltes/financial-stability-report-nov-2018.pdf

Chart 28: Changes in corporate deposit/credit and liquid financial assets/GDP ratios



Note: Liquid financial assets include deposits, cash, debt securities and investment fund shares. Source: MNB

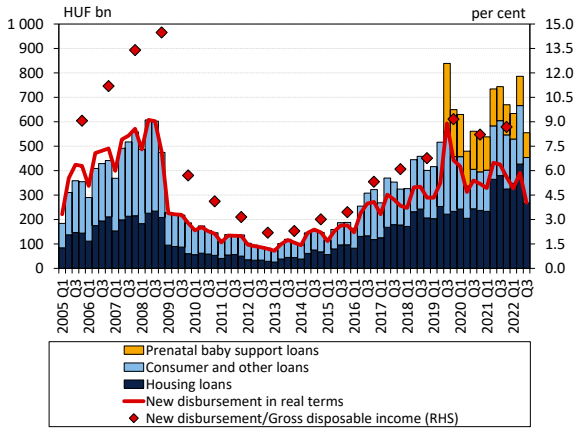
loans, and the affected SMEs receive an interest rate discount of 9-10 percentage points.

The liquidity reserves of companies have grown significantly over the past few years. The proportional value of companies' liquid financial assets to GDP reached 27.4 per cent at the end of 2019, and 34.3 per cent at the end of 2022 Q2 (*Chart 28*). The central bank and state credit programs announced after the outbreak of the coronavirus may have also contributed to the growth. In addition, the corporate loan/deposit ratio is also close to a historical peak, the value of the indicator, which was still 110.9 per cent at the end of 2019, was already 130.7 per cent at the end of 2022 Q2. Overall, the companies have significant reserves at the sector level, which can form a safety net in the slowing economic environment.

4. Household lending: increasing risks and declining loan dynamics

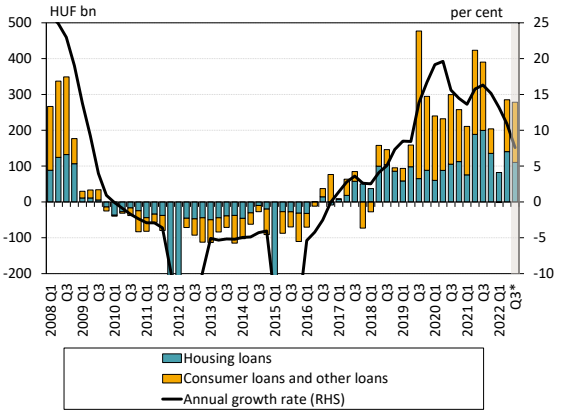
Household loan disbursement set a record in 2022 Q2, partly due to subsidised loans and partly as a result of demand brought forward in relation to interest rate hikes, as well as to the rise in loan amounts in view of price appreciation on the housing market. From July, however, the worsening economic outlook and the steady increase in interest rates already decelerated lending. This may be followed by further slowdown over our forecast horizon, also driven by banks tightening their credit standards in response to the changing environment. Higher loan amounts raised the debt-to-income ratio, which may elevate vulnerability in parallel with the cost shocks affecting households. The stock of variable-rate mortgage loans is continuously declining, supported by early repayments, and thus poses a gradually decreasing systemic risk. For certain debtors, the extension and expansion of the interest rate cap leads to much lower instalments compared to market conditions, but according to our assessment, the long-term harmful effects of the programme already exceed the short-term advantages of the measure.

Chart 29: New household loans of credit institutions



Note: Without FGS loans and early repayment scheme. The disbursement/income figure shows the sum of the annual nominal loan disbursement as a ratio of the household sector's total annual disposable income. To calculate new disbursement in real terms, we used the MNB house price index in case of housing loans, and yearly consumer price index in case of other loans (2008 = 100%). Source: HCSO, MNB

Chart 30: Household loan transactions of credit institutions



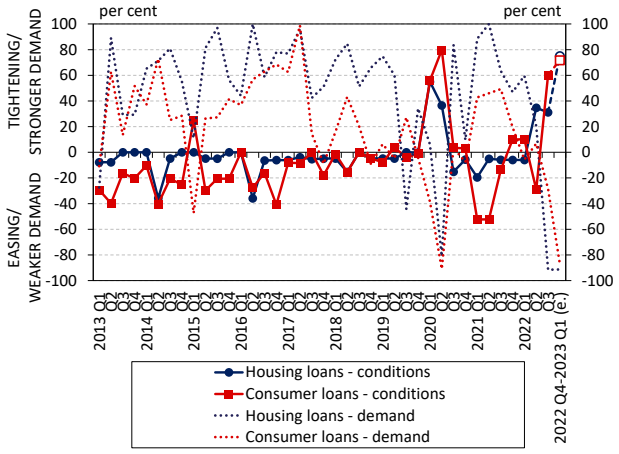
Note: In order to calculate the annual growth rate, we also took the repayments on the Sberbank portfolio into account between March 2022 and August 2022. *Sector reclassification of Sberbank's portfolio is not filtered out from the 2022 Q3 transaction data. Source: MNB

4.1. Dynamic first half of year, followed by a downturn in lending to households

After an outstanding first half of the year, household loan disbursement decelerated in 2022 Q3, especially in real terms. Between July 2021 and June 2022, loan disbursements amounted to more than HUF 2,800 billion, exceeding the previous year's disbursement by 19 percent. This dynamic growth in lending was also supported by strong demand for the FGS Green Home Programme (FGS GHP), resulting in a record-high volume of housing loan disbursement in 2022 Q2. Nevertheless, due to inflation and the dynamic appreciation of house prices, household loan disbursements in real terms are significantly below the levels seen prior to the 2008 crisis (*Chart 29*). Demand brought forward as a result of the interest rate hike cycle may also have appeared in 2022 H1, but since July, in parallel with the downturn in housing market transactions, the further rise in interest rates and the end of the FGS GHP, adjustment has been observed in new lending as well.

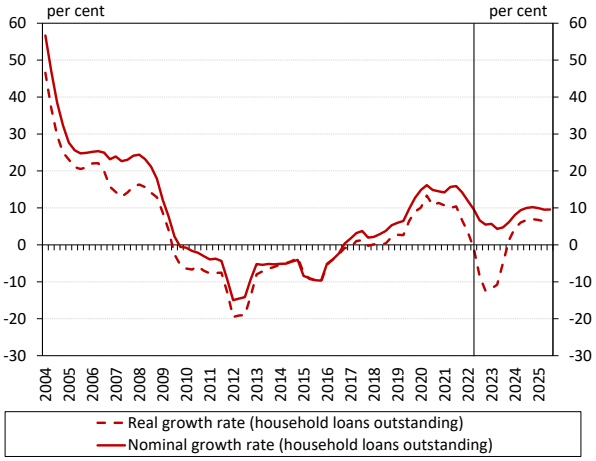
Due to the phase-out of the general moratorium and the surge in prepayments, the growth rate of loans outstanding already declined in H1. Household loans outstanding increased with a lower, 11-percent annual growth rate in 2022 Q2 (*Chart 30*). The gradual slowdown in loan dynamics over the past one year is partly attributable to the fact that only 6 percent of loans outstanding participated in the third, tightened phase of the payment moratorium. The decline in new disbursements in 2022 Q3 also contributed to the lower annual growth rate. The slowing annual growth rate is also attributable to the fact that – in parallel with the interest rate hike cycle – the volume outstanding of securities loans decreased in 2022 Q2, dropping by a significant HUF 123 billion. Besides the early repayment of

Chart 31: Changes in credit conditions and credit demand in the household segment



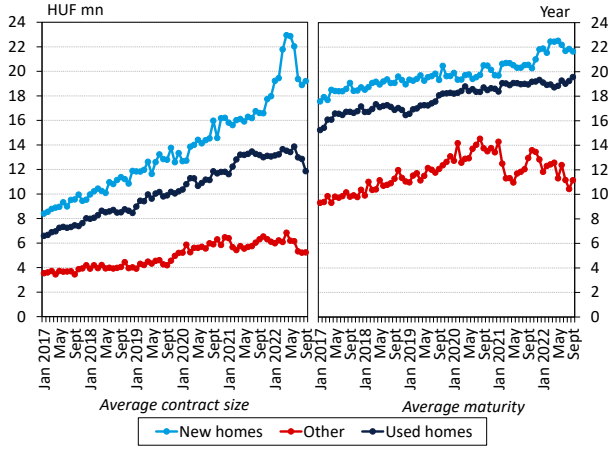
Note: Net ratio of the difference between tightening and easing and banks indicating stronger and weaker demand weighted by market share. Source: MNB, based on banks' responses

Chart 32: Forecast for annual growth rate of the household loan portfolio



Note: Transaction-based annual growth rate. The real growth rate has been calculated based on the CPI. Source: MNB

Chart 33: Average contract size and volume-weighted average maturity of housing loans



Source: MNB

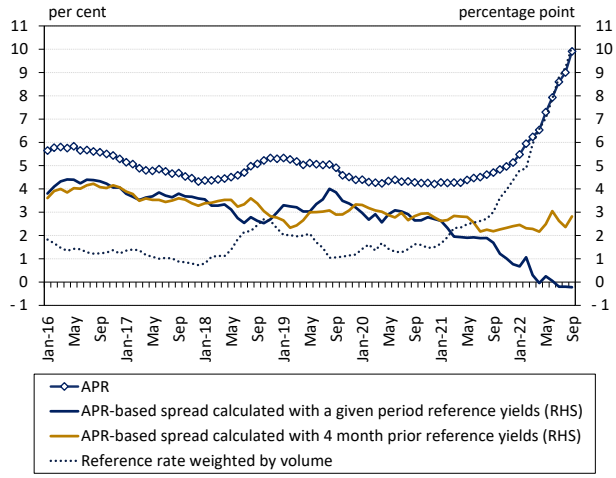
securities loans, the fiscal transfers provided in the first months of 2022 also stimulated early repayment activity in the household loan segment (especially in the case of commodity credit). In 2022 Q3, retail loans outstanding continued to expand, but the annual growth rate had slowed.

Tightening credit conditions and waning credit demand are expected in the retail segment. Due to the deterioration in the economic outlook and clients' creditworthiness, in 2022 Q3, a net 31 percent and 60 percent of banks tightened standards for housing loans and consumer loans, respectively. This tightening primarily consisted of stricter application of bank debt cap rules and the minimum required creditworthiness level. Looking ahead to the next half year, almost all banks indicated further tightening in both segments (*Chart 31*). Lower demand for housing loans was perceived by almost all responding banks, and they expect this trend to continue in 2022 Q4 and 2023 Q1. A net 29 percent of banks perceived a decrease in demand for consumer loans in the third quarter, and looking ahead, a net 87 percent expect a further decrease in demand in this segment, in parallel with the expected drop in consumer confidence and disposable income.

The annual growth rate of household loans outstanding may remain in the single-digit range over the forecast horizon. In 2022 Q2, household loans outstanding in the entire financial intermediary system expanded by 9.6 percent in year-on-year terms. Over the short run, rising interest rates and the unfavourable economic environment will result in a further decline in the growth rate of loans outstanding: on the one hand, these factors can lead to postponed borrowing and, on the other hand, to lower borrowable amounts. At the same time, high inflation and housing price appreciation may contribute to a rise in the average loan amount. In addition, demand for subsidised credit schemes may also facilitate the expansion in loans outstanding. On the whole, household loan dynamics may decelerate, before increasing again from 2024 H1 (*Chart 32*). By the end of this year, household loans outstanding are expected to decline in real terms due to the high inflation.

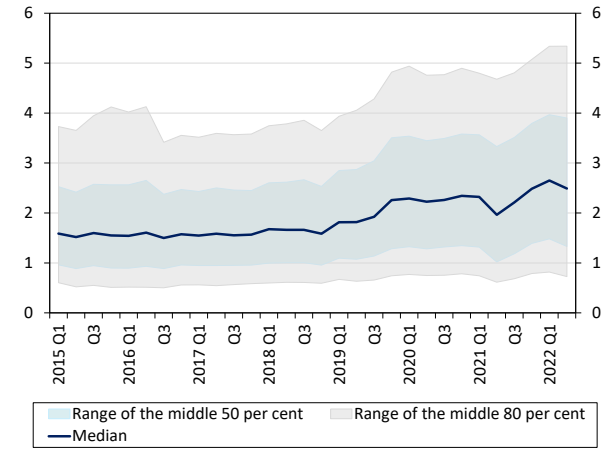
The impact of the interest rate increase may be reflected in the decrease in the average loan amount of loans taken out for used homes. The fact that the number of loan agreements concluded in 2022 Q3 fell for all housing purposes may indicate the effect of the rise in interest rates, which is reducing demand. In addition, while the FGS GHP scheme boosted the average loan amount for the construction and purchase of new homes in the first half of the year, the average loan amount for new homes shrank to

Chart 34: Changes in APR, reference rate and spread on new housing loans



Note: Averages weighed by contractual amount. Calculation excludes FGS GHP. The spreads were calculated on the basis of BIRS data observed in the same period according to interest periods. Source: MNB

Chart 35: Debt-to-income ratios of housing loan debtors



Note: Upon calculating the contract amounts, in the case of housing loan borrowers we took into account the housing loans taken out simultaneously as well as the personal loans and prenatal baby support loans, if any, complementing them (and taken out not earlier than 180 days before the disbursement of the housing loan). Source: MNB

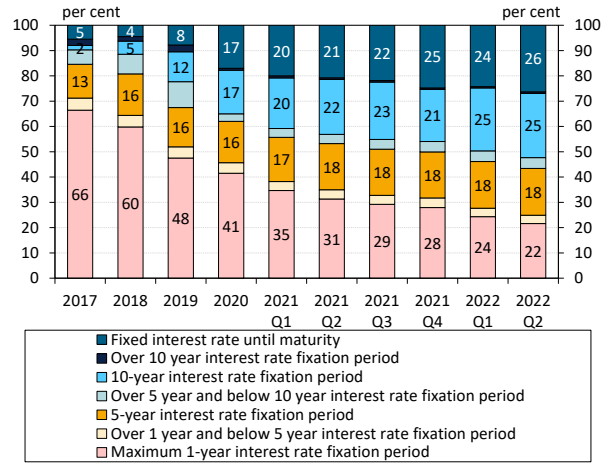
HUF 19 million by the end of September as the FGS GHP scheme ended (*Chart 33*). An average of HUF 12 million was requested for the purchase of used homes, down by HUF 2 million compared to the end of Q2. The average loan amount of loans taken out for other housing purposes (renovation, expansion) dropped by HUF one million in the third quarter.

The low spreads do not represent an easing of price conditions. The weighted average of the main reference rates that affect the pricing of housing loans rose by 5.8 percentage points in the first nine months of 2022. In the same period, the volume-weighted average APR on newly disbursed housing loans rose 4.8 percentage points, and thus the APR-based spread on housing loans declined further (*Chart 34*). All of this indicates that, with the change in the interest rate environment, the rising yield environment has not yet completely passed through into lending rates. This is also attributable to the slower adjustment observed in interest rate conditions on housing loans fixed for a longer term.[6] At the same time, if we calculate the spreads using the average APR of newly contracted housing loans and the average monthly reference costs of funds from 4 months earlier, we cannot detect any major change in the spreads, while according to the Lending Survey, a net 75 percent of banks foresaw a tightening of price conditions in 2022 Q4 and 2023 Q1. Taking into account the assumed time requirement of repricing and assuming unchanged costs of funds, the average APR on housing loans may rise above 12 percent by end-2022.

Certain debtors have a high debt-to-income ratio, which may exacerbate vulnerability in the worsening macroeconomic environment. In 2022 Q2, the average amount of housing loan *contracts* rose to HUF 14.3 million from HUF 11.5 million recorded a year earlier. In the case of housing loan *borrowers*, the average loan amount rose from HUF 15.1 million to HUF 20.3 million during the same timespan, while the financially most stretched decile was indebted by more than five times their annual income in 2022 Q2 (*Chart 35*). In the case of housing loan borrowers who took *out more than one housing loan* at the same time (between 2016 and 2022 Q2 this segment accounted for 16 percent of housing loan debtors), the average loan amount reaches HUF 32 million, while the upper ten percent of the debt-to-income ratio is more than six times higher than the annual income. Although housing loans are typically taken out by

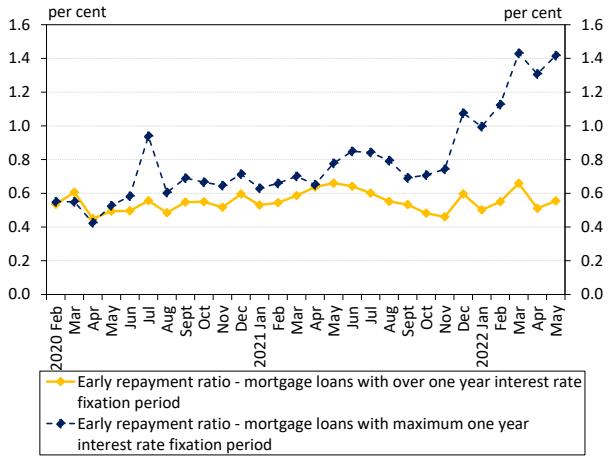
[6]For more details, see: Hajnal, Gábor – Lados, Csaba (2022): Analysis of the Repricing Practice of Newly Disbursed Housing Loans, Financial and Economic Review, Vol. 21 Issue 3, September 2022, pp. 5–43.

Chart 36: Mortgage loans outstanding based on initial interest rate fixation period



Source: MNB

Chart 37: Pre- and early final repayment ratios in case of mortgage loans



Source: MNB

households that belong to the top income deciles, price shocks to households and a possible labour market adjustment may increase their vulnerability.

4.2. The risks of the long-term maintenance of the interest rate cap outweigh the advantages

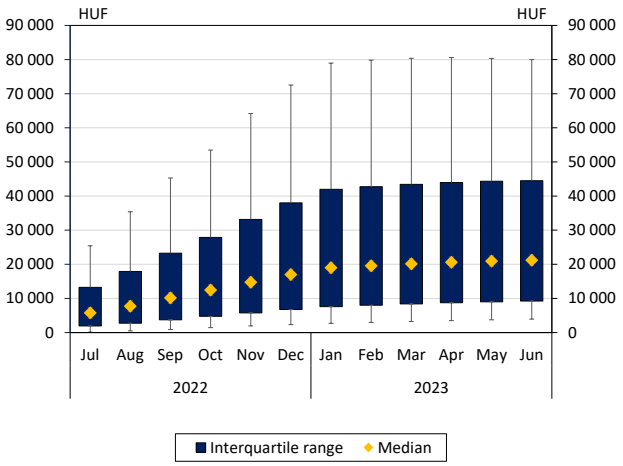
The stock of variable-rate mortgage loans outstanding is continuously shrinking and no longer poses a serious systemic risk. At the end of 2022 Q2, credit institutions' mortgage loans outstanding with a maximum one-year interest rate fixation period amounted to HUF 1,206 billion. Accordingly, their share within mortgage loans outstanding declined to 22 percent (*Chart 36*). These favourable developments in terms of interest rate risk are also attributable to the fact that within new loans the disbursement of loans with a maximum one-year interest rate fixation period practically ceased.[7] At the end of 2022 Q2, the debt outstanding of variable-rate mortgage loans was typically low (median: HUF 2.6 million). Their residual maturity, which is the most important attribute in the case of an interest rate hike, is also moderate (median: 7.1 years).

The decline in variable-rate loans outstanding is also supported by prepayments. Since the start of the MNB's interest rate hike cycle in June 2021, prepayment and early repayment activities have shown a rising trend in the case of variable-rate loans, which contributes to a faster decline in loans outstanding. If the total stock of mortgage loans is examined, a monthly 0.6 percent of the fixed-rate loan volume and a monthly 1.4 percent of the variable-rate loans were repaid partly or in full in the spring months of 2022 (*Chart 37*). In the case of mortgage loans with longer residual maturities of at least five years, nearly 1 percent of the variable-rate loans were partly or completely repaid every month in the spring of 2022, while this ratio in the case of fixed-rate products was around a stable 0.4–0.5 percent a month.

The instalment discount resulting from the interest rate cap is continuously increasing as the interest rate environment rises. With the higher forward interest rate path, the extension of the interest rate cap for 2022 H2 represents significant debt service easing for the debtors of some 300,000 mortgage loan contracts participating in the measure. In 2022 H2, the typical monthly instalment is around HUF 12,000 lower compared to the situation

[7] Borrowers choosing fixed-rate mortgages in recent years have been realizing significant gains, this topic is discussed in more details in Box 2.

Chart 38: Distribution of the annuity difference of interest rate cap loans without interest rate cap and during interest rate cap



Note: Total mortgage loans outstanding with interest rate cap. Annuities without interest rate cap were calculated on the basis of BUBOR expectations of 27 October 2022. Source: MNB

Table 1*: Distribution of mortgage loans according to participation in the interest rate cap*

		Volume of loans outstanding (HUF bn)	Number of contracts (pcs)
Mortgage loans with variable interest rate (originally eligible to the interest rate cap)		**1 216**	**294 148**
Mortgage loans with over 1-year interest rate fixation period	**Loans with subsidized interest rate, repricing within November 2021 and 2023 June (originally eligible to the interest rate cap)**	**54**	**7 865**
	Market rate loans repricing within November 2021 and 2023 June, with maximum 5-year interest rate fixation period, therefore becoming eligible to the interest rate cap	***271***	***68 780***
	Market rate loans repricing within November 2021 and 2023 June, with over 5-year interest rate fixation period, therefore not becoming eligible to the interest rate cap	19	6 816
	Loans not repricing within November 2021 and 2023 June, therefore not eligible to the interest rate cap	4 048	465 138
Altogether		5 608	842 747

Note: Mortgage loans outstanding not only at credit institutions but also at workout companies. Source: MNB

without an interest rate cap under market conditions (*Chart 38*). Some debtors – those with longer residual maturity and higher principal debt – would face a significant increase in instalments if there were no interest rate cap: in the period under review, for 25 percent of the contracts (number of contracts: 75,000) the instalment increase would amount to around HUF 26,000 per month on average. Overall, households' repayment burdens may be HUF 37 billion lower as a result of the measure in 2022 H2. Extending the interest rate cap to 2023 H1 has a similar significant effect: the monthly instalment may typically be HUF 21,000 lower compared to the scenario without the interest rate cap, and thus households pay roughly HUF 60 billion less in total (the profit effects on banks are analysed in detail in Chapter 7 and in Box 5). The instalment discount, however, means that after the phase-out of the interest rate cap, instalments on these loans will rise: the typical debtor will pay a 48-percent higher instalment in July 2023 compared to the instalment paid under the interest rate cap in June 2023.

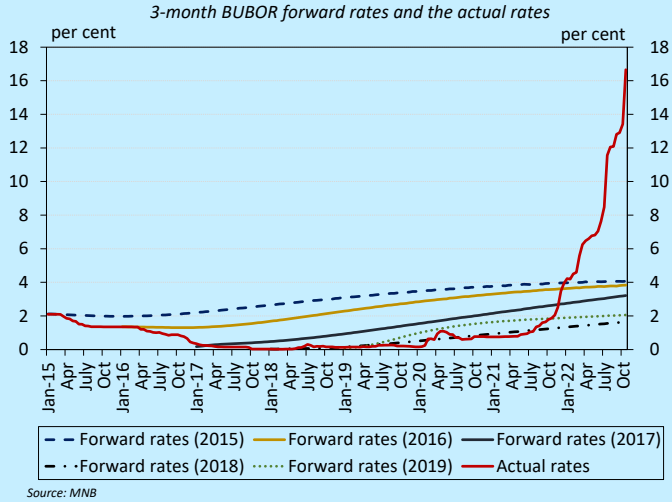
The interest rate cap was extended to cover mortgage loans with interest rate fixation periods up to 5 years, but the disadvantages associated with the measure are not insignificant. The long-term reference yields serving as a basis for the pricing of loans with longer interest rate fixation have increased considerably during the last one and a half years, also resulting in a rise in the instalments of market-based loans with interest rate fixation over one year. At the same time, effective from 1 November 2022, the interest rate cap was extended to market rate mortgage loans with interest rate fixation periods up to 5 years, representing an outstanding principal volume of around HUF 270 billion (Table 1). Accordingly, in their case the effect of interest rate increases is not reflected immediately in the instalments. Households' debt service declines by around HUF 3.5 billion as a result of the measure. In the case of these debtors, in June 2023 the median instalment would amount to HUF 47,000 with the interest rate cap and HUF 55,000 without it. Although the median interest rate would rise to 14 percent by June 2023 without the interest rate cap, compared to 7.5 percent with the interest rate cap, the median principal outstanding of the loans concerned is only HUF 2.3 million, while the median residual maturity is a mere 5.5 years. The interest rate cap measure provides a significant instalment reduction to households, but has a large macroeconomic cost, as discussed in detail in Box 2.

BOX 2: ADVANTAGES OF THE RISE OF FIXED-RATE PRODUCTS AND THE EFFECTS OF THE INTEREST RATE CAP MEASURES

Following the outbreak of the 2008 financial and economic crisis, participants in the Hungarian household loan market gained severe experiences that rapidly increasing debt servicing as a result of changes in external circumstances can pose a systemic financial risk. After the 2008 crisis, the majority of mortgage loans also involved exchange rate and interest rate risks for debtors, as they were denominated in foreign currency and featured unilaterally changeable interest rates.

Following the HUF conversion of the FX loans, the MNB considered it a primary objective in terms of financial stability that mortgage loans outstanding with variable instalments should decline. Over the past five years, the MNB has applied a gradually expanding toolkit to support the spread of mortgage loans with instalments that are predictable for long periods. The first step was the 2017 introduction of the framework of certified consumer-friendly housing loans that can only be disbursed with longer (initially at least 3-year, later at least 5-year) interest rate fixation. In addition, the central bank used various means to support the more favourable cost-management of banks' interest rate risks associated with longer interest rate periods, including, inter alia, the introduction of the mortgage funding adequacy ratio (MFAR), long-term interest rate swaps and the mortgage bond purchase programme. In 2018, with an amendment to the debt brake rules, the limit concerning the payment to income ratio (PTI) was tightened in the case of loans with interest rate fixation periods shorter than 5 years, driving lower-income, riskier debtors towards safer, longer interest rate fixation. In 2019, a recommendation on the interest rate risk of variable-rate mortgage loans and the facilitating of providing information on managing the risk was published. The MNB supported these measures with active communication as well and called attention to the interest rate risk of variable-rate loans. These steps contributed to the fact that the share of variable-rate mortgage loans within new lending declined practically to zero, and their stock also contracted. At the end of 2022 Q2, the ratio of variable-rate mortgage loans to GDP was a mere 2 per cent, representing a major fall compared to the volume of variable-rate, mostly FX-denominated mortgage loans corresponding to 19 per cent of GDP in 2010. The biggest advantage of the spread of longer-term fixed-rate loans is that it provides a predictable instalment to households and ensures the management of the interest rate risk to institutions that have a better access to the necessary tools and money market products.[8]

3-month BUBOR forward rates and the actual rates



Source: MNB

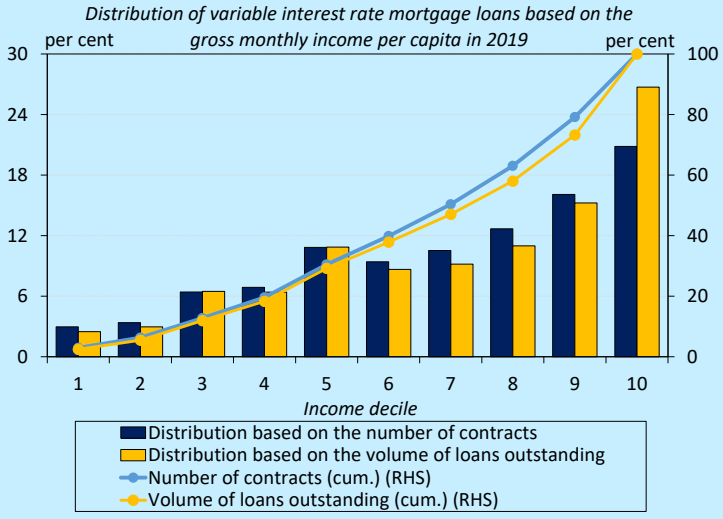
In addition to the predictability of instalments for the client, the ex-post 'gain' or 'loss' of interest rate fixation basically depends on the difference between the forward-looking interest rate path priced at the time of the loan disbursement and the interest rate path that actually materialises going forward. In the case of a rising yield curve, fixing the interest rate for a longer period involves a cost upon concluding the loan agreement: the debtor has to pay a higher interest rate than in the case of taking a variable-rate loan, but the instalment remains stable even if the interest rate environment increases. It can be said of the past years' disbursements that an increase in the interest rate environment like the present one was not priced into the expected interest rate path. This means that debtors who opted for a mortgage loan with longer interest rate fixation not only secured themselves against the interest rate risk, but overall – according to the current state of the yield environment – also gained as a result of this decision.

[8] The MNB's 2022 Macroprudential Report provides more information on the developments and trends in disbursement and regulation of mortgage loans with longer interest rate fixation periods.

We quantified the impact of interest rate fixation on the instalments[9] of the household mortgage loan portfolio with interest rate fixation period of over one year (hereinafter: fixed-rate) outstanding in mid-2022. We examined how a typical debtor's instalment would have changed (under market conditions) if the currently fixed-rate loans had been disbursed with variable interest rates.[10] We compared three quarters for this: (1) one from the period prior to the interest rate hike cycle, (2) one from the period during that and, (3) looking ahead, one on the basis of the current forward interbank rates. In the case of a typical debtor,[11] interest rate fixation resulted in total savings of HUF 1.3 million over the time horizon under review: although prior to the interest rate hike cycle he paid HUF 3 more per month compared to taking out a variable-rate loan, in 2022 Q2 he already paid nearly HUF 20 thousand less a month on average, and is expected to pay HUF 73 thousand less in 2023 Q2. In aggregate terms, this means that while prior to the interest rate hike debtors would have paid HUF 1.6 billion (8 per cent) less a month on average if their product had been disbursed as a variable-rate loan, in the second and third periods they already would have paid HUF 10.6 billion (35 per cent) and HUF 37.7 billion (109 per cent) more, respectively. Under market circumstances, borrowers of fixed-rate loans have to pay a total HUF 609 billion less in debt service over the entire period under review (between mid-2017 and end-2023) compared to taking out variable-rate loans. This difference means that in the case of a larger variable interest-rate mortgage loan share, maintenance of the current interest rate cap measure would entail a much higher cost.

The interest rate cap measure significantly reduces the repayment burden of the debtors concerned, on the other hand it weakens the monetary transmission, has a negative effect on the domestic financial culture and increases the moral hazard. All in all, the current form of the measure provides an unreasonably wide-ranging benefit to higher-risk, variable-rate mortgage borrowers, while also having several negative consequences from a macroeconomic point of view:

- The interest rate cap weakens monetary transmission and results in direct losses for banks, which may be further increased by the additional impairment of the contracts concerned, resulting from the potential sudden surge in instalments upon phase-out of the programme, instead of interest rate increases materialising gradually. The interest rate cap and expansion of the range of loans concerned may also make further development of the mortgage bond market difficult.[12]
- Although the amendment of 14 October 2022 to the relevant decree extended the interest rate cap to market-based mortgage loans with interest rate fixation periods of over 1 year but up to 5 years as well, variable-rate debtors continue to benefit more from the programme as their interest rate fixed during the interest rate cap is lower than that of loans with longer interest rate fixation.



Source: MNB, ONYF

[9] The analysis includes mortgage loans disbursed after 1 June 2017, and we examined two credit paths. In one of them, we kept the repricing period of the loan according to the contract, while in the other one we presumed 3-month repricing, as that was the most frequent period among variable-rate loans.

[10] In our calculation, we did not take into account the effect of the interest rate cap measures concerning mortgage loans.

[11] In 2021, a typical debtor took out a mortgage loan amounting to HUF 8.2 million, maturing in 2041 (20 years), with a 10-year interest rate fixation period, whose interest rate is 4.69 per cent, of which 2.65 percentage points was the interest rate spread.

[12] The loans affected by the interest rate cap narrow the potential scope of collaterals due to the provisions of law laid down in the Mortgage Act XXX of 1997 aiming at creating balance between the interest rate levels of the mortgage loans serving as collateral and the mortgage bond-based funds, and thus they limit the eligible volume of such liabilities.

- Moreover, according to our estimate, there are still some 7 thousand mortgage loan contracts with over 5-year interest rate fixation periods whose interest rate changes between November 2021 and June 2023, i.e. the eligibility period of the interest rate cap, but are not subject to the interest rate cap even after the extension.

Due to the general character of the programme, many debtors that do not need it in respect of income are also provided protection against the interest rate risk. Based on the income distribution[13] of variable-rate mortgage loans presently under the scope of the interest rate cap, the share of the debtors of the 10th income decile (where the monthly gross income per debtor exceeded HUF 554 thousand in 2019) is 21 per cent (or 27 per cent as a percentage of loans outstanding).

[13] As the calculation is based on 2019 data, we could carry out this examination only in the case of loans concluded before 1 January 2020. This does not distort our calculation significantly, as after that date much fewer variable-rate mortgage loans were disbursed. Income information was available for 60 per cent of the contracts.

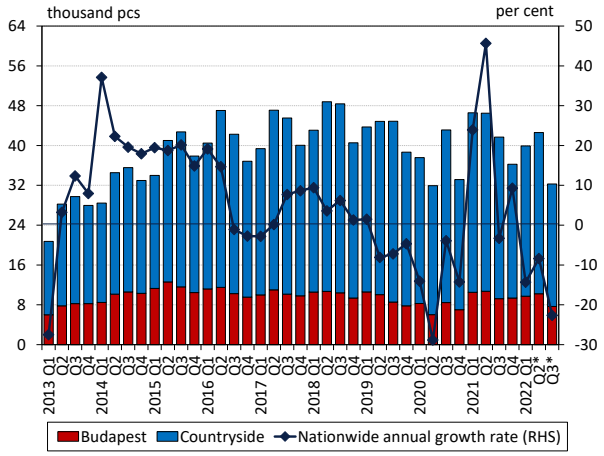
5. Real estate markets: high overvaluation in the housing, increasing risks in the commercial real estate markets

In 2022 Q3, the growth rate of real house prices declined significantly on average across the country. Housing market overvaluation, which is crucial in terms of banks' risk-taking as well, rose to a historically high level nationwide in 2022. There is correlation between the elevated housing market price level and borrowers' income tightness, which justifies close monitoring of the market from a financial stability perspective. In parallel with a downturn in demand, the number of housing market transactions already fell considerably in 2022 Q3. The marketability of real properties declines with the deceleration in activity, and the risk of house price adjustment increases.

In 2022 H1, no material deterioration was yet seen in commercial real estate market indicators, but looking ahead, the energy price surge and worsening economic outlook will have a negative impact on the commercial real estate market. Buoyant development activity is observed in the office, industrial-logistics and hotel segments, resulting in higher vacancy rates. Investment turnover in 2022 H1 declined by 7 percent, and looking ahead, investors' wait-and-see attitude may become general. The domestic banking sector's real estate market exposure compared to regulatory capital is currently much lower than the value observed during the global financial crisis.

5.1. Historically high overvaluation and declining activity in the housing market

Chart 39: Number and growth rate of housing market transactions

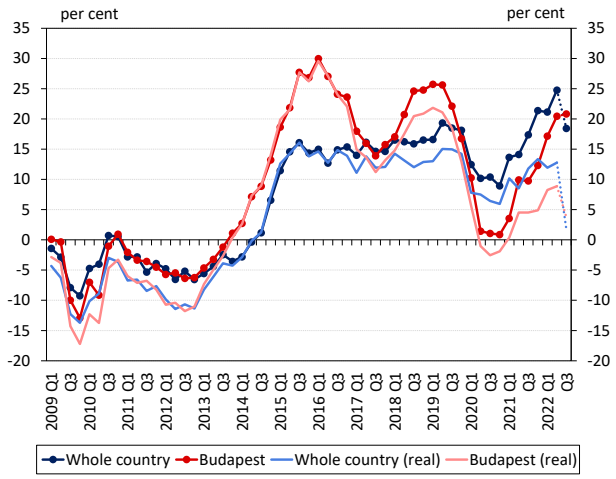


Note: Taking only 50- and 100-percent acquisitions of ownership by private persons into account. From Q4 2020 until Q1 2022, data from the NTCA duty database adjusted based on estimates of level of processing by municipality type. Based on transactions and estimated market share of real estate agents for 2022 Q2 and Q3. Source: NTCA, MNB, housing agent database

The number of housing market transactions already decreased considerably in 2022 Q3. The number of sales and purchases fell by 14 percent and 8 percent in 2022 Q1 and 2022 Q2, respectively, in a year-on-year comparison (*Chart 39*). During the same period, the number of transactions in the countryside declined by 16 percent and 9 percent, respectively, whereas the number of transactions in the capital was 7 percent and 5 percent down, respectively. In 2022 Q3, however, the number of housing market transactions already fell significantly, dropping by 23 percent at the nation level, with the largest decline seen in September. According to data from the ingatlan.com advertising portal, housing market demand was significantly weaker in 2022 Q3, i.e. nearly one third lower than the level observed last year, possibly suggesting a further downturn in the number of sale and purchase transactions. Waning demand can primarily be explained by the higher lending rates and deteriorating economic outlook. The falling number of transactions indicates the start of a turnaround in the housing market. The marketability of real properties declines with the deceleration in the housing market, and the risk of house price adjustment increases.[15]

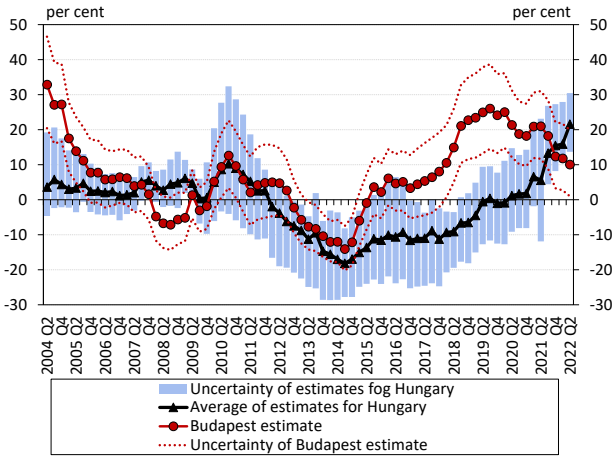
[15] For further details, see the MNB's November 2022 Housing Market Report.

Chart 40: Annual growth rate of the MNB house price index



Source: MNB

Chart 41: Deviation of house prices from the estimated level justified by fundamentals, nationwide and in Budapest

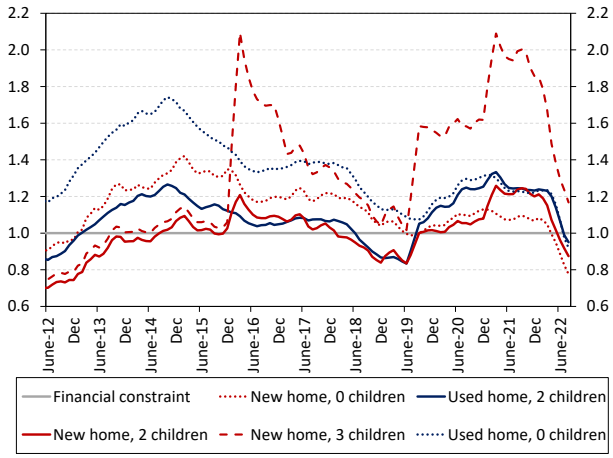


Note: For detailed methodology, see the MNB's Housing Market Report, May 2022. Source: MNB

While the rate of housing market price appreciation was still high in 2022 H1, it may decelerate from 2022 Q3. In 2022 Q2, according to the MNB house price index, on a national average, the annual nominal growth rate of house prices advanced from 21.1 percent to 24.8 percent in the first quarter, and in real terms from 11.9 percent to 12.8 percent (*Chart 40*). The faster rate was mainly attributable to the capital and larger rural settlements. During the same period, in Budapest annual price dynamics rose from 17.2 percent to 20.4 percent in nominal terms, and from 8.2 percent to 8.9 percent in real terms. According to real estate agents' transaction data, in 2022 Q3 the rate of real house price appreciation fell considerably nationwide, to 1.7 percent, while it decelerated to 3.7 percent in Budapest.

As a result of previous years' house price appreciation, housing market overvaluation rose to a historically high level. In 2022 Q2, housing market overvaluation, which is crucial in terms of banks' risk-taking as well, is estimated to have risen to 21.5 percent on a national average (*Chart 41*). The overvaluation of house prices declined in Budapest compared to economic fundamentals, but it is still significant, amounting to 10 percent. The excessive rise in house prices forces borrowers, who are able to finance residential properties that are more expensive compared to their income only under more stretched conditions, to adapt (Box 3). In order to reduce the significant residential property market overvaluation and the related lending risks, starting from 1 July 2023, the MNB set the degree of the countercyclical capital buffer (CCyB) rate to be applied to exposures vis-à-vis residents in Hungary at 0.5 percent. Application of the buffer requirement may increase the banking sector's resilience to shocks against a possible real estate market adjustment and cool the housing and mortgage loan market as well in a preventive manner.

Chart 42: Housing Affordability Index (HAI) in Budapest[14]



Source: MNB, Housing agency database, HCSO

Together with the high level of house prices, the increase in the interest rate environment is expected to cool off housing and credit market demand significantly. The affordability of home purchasing from credit deteriorated considerably in 2022 H1, caused by the continued dynamic increase in house prices, which exceeded that of average wages and by the increase in lending rates (*Chart 42*). As the price appreciation of new homes was stronger than that of used ones, the affordability of the former deteriorated to a larger degree this year, and for those households that cannot apply for home purchase and family support subsidies it dropped to a low level, unseen in the Budapest new home market since 2012. This sharp deterioration in the affordability of home purchasing results in a decline in demand in the credit and housing markets, which may continue in the upcoming months, as interest rate hikes pass through into housing loan interest rates only slowly, typically with a delay of 4 months.

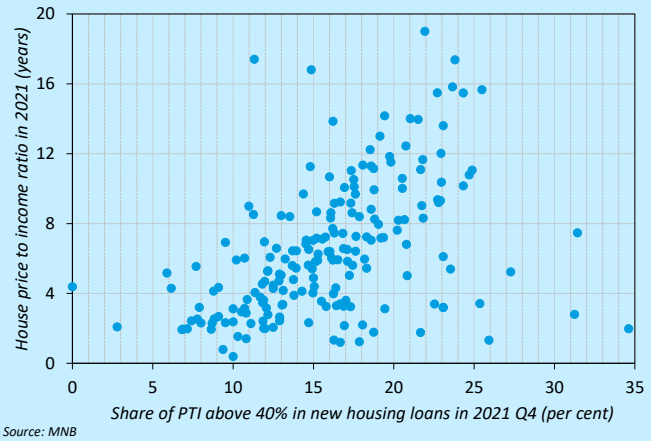
BOX 3: RELATIONSHIP BETWEEN LENDING AND THE HOUSING MARKET BASED ON A TERRITORIAL ANALYSIS

In this box, we examine the correlation between the domestic housing market and credit market at the level of districts and the financial stability implications of the intertwining of these two markets. Our analysis is motivated, on the one hand, by the fact that the price increase in the housing market in recent years and the resulting overvaluation show a heterogeneous picture on a regional basis, as a result of which households may be forced to stretch their credit conditions to a different extent to purchase a home, depending on the region. On the other hand, the subsidies for housing and families, which were expanded in 2019, gave a significant boost to both the housing market and credit market, which may lead to the development of mutually reinforcing interactions between the two markets, and thus the concentrated appearance of risky lending and further significant housing market price increases. For the analysis we use district-level, quarterly-frequency data, which contain credit and housing market indicators. We merged the concluded housing and prenatal baby support loan contracts into so-called credit transactions on the basis of the contract conclusion dates that are close to one another, in a way that one credit transaction means the financing of one residential property. Accordingly, we separated four types of credit transactions in the course of the analysis, depending on whether they are market-based loans or some kind of state-subsidised ones: (1) only market-based mortgage, (2) only prenatal baby support loan, (3) market-based mortgage together with prenatal baby support loan, (4) any combination of loans containing HPS loan as well.

[14] HAI shows how many times the income of a household with two average wages covers the income necessary for the purchase of an average home using a loan. If the value of the indicator is below 1, the purchase poses excessive risk and a material burden. Calculated for a home of 45 square metres without children and 65 square metres for two children. Parameters of the loan product, except for the interest rate, are constant. LTV = 70 percent, DSTI = 30 percent, maturity = 15 years.

The ratio of housing transactions financed from housing loans increased to a greater degree in the districts characterised by higher price appreciation, and in the more expensive districts the share of borrowers who are stretched in terms of income is typically higher. Dividing the domestic districts into two equal parts – between 2015 and 2021 below-median and above-median average square metre price appreciation – it is seen that in 2015 the ratio of housing transactions financed from loans was still the same, varying between 15 per cent and 25 per cent in both groups of districts during the year. However, starting from 2016, the degrees of loan intensity gradually diverged and rose to 50 per cent in the districts characterised by higher housing price increases, while it rose only up to 30–35 per cent in areas where the price increase was lower in the housing market. In addition to the higher loan intensity, a greater degree of income tightness is also observed in the districts where residential properties are more expensive. Within the housing loans disbursed in 2021, the share of borrowers with a PTI of at least 40 per cent was typically higher in the districts that have a less affordable housing market. Accordingly, price appreciation in the housing market and overvaluation compared to incomes may have a substantial impact on the income tightness of borrowers.

House price to income ratio in 2021 and share of housing loans with a PTI above 40 per cent in new disbursements in 2021 Q4 by LAUs

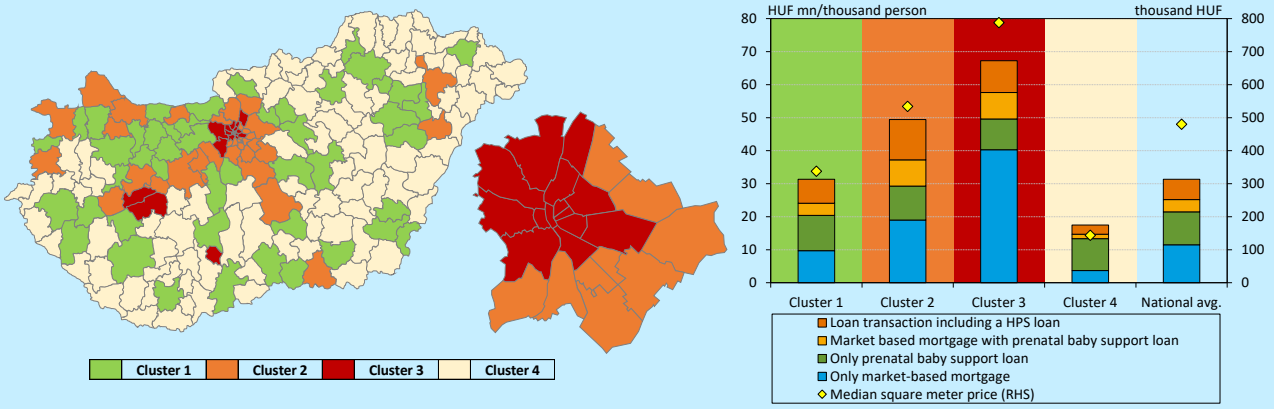


Source: MNB

The relationships between the credit market and the housing market are explored in more detail below, using cluster-based analysis.[16] We grouped Hungary's districts into four clusters based on the 2021 Q1 population-proportional volumes of the four kinds of loan transactions presented above. Our goal was to identify differences in housing market developments based solely on credit market patterns. From 2021 Q1, the government linked favourable conditions to HPS purchases, so the demand for family subsidies and regional differences in such may have increased in this quarter, which is why we chose this period for the clustering. In the average of the districts in the first cluster, the pattern of loan volumes disbursed in the various loan transaction categories practically matches the pattern observed in the average of all the districts. This cluster comprises half of the county seats and the majority of districts in the Central Transdanubia region. The lending pattern of the second cluster is similar to the one above, but with a larger population-proportional loan volume and a higher ratio of HPS loans: it comprises the other half of the county seats as well as the outer districts and a major part of the agglomeration of Budapest. The districts of the third cluster receive the highest amount of credit-type funding, and the share of purely market-based lending is predominant. It is the most expensive cluster in terms of the housing market (inner and intermediate districts of Budapest, Buda-side agglomeration and districts around Lake Balaton belong here). The fourth cluster comprises areas with smaller settlements, where typically few loans are disbursed both in terms of volume and in population-proportional terms as well, and the loan volume disbursed to debtors with only prenatal baby support loans exceeds the total volume of market-based and subsidised housing loans.

[16] For hierarchical clustering we used the Ward's method.

Spatial distribution of clusters (left side) and lending patterns for 2021 Q1 (right side)



Note: Volumes are averages of the districts in the cluster. The median square metre price refers to the 2022 Q2 value of all the transactions by cluster. Source: MNB

The expansion of subsidised lending for housing in 2019 may have contributed to the increase in loan intensity in the 2nd and 3rd clusters. In the 2nd and 3rd clusters, which comprise the most expensive areas of the country, the ratio of housing transactions financed with the help of housing loans has been increasing steadily since 2015, while this indicator has already stagnated in the 1st cluster since 2018, and even declined slightly in the 4th cluster. Accordingly, debtors in the cheaper areas substituted the purely market-based housing loan transactions with subsidised housing loan transactions, and the ratio of those who purchase from housing loans did not increase. By contrast, it is presumed that in the more expensive clusters the subsidised loans were able to increase affordability, involving people in the market who otherwise would have been unable to purchase a home.[17] However, the ensuing higher demand and the abundance of external funds may have contributed to the price increase as well. After 2015 the difference between the clusters' renewal rates also strengthened; the pick-up in the market of new homes was almost entirely concentrated in the 2nd and 3rd clusters. The higher price typical of new homes may also explain why loan intensity increased the most in these areas, whereas the increase in affordability in view of the subsidised lending may have stimulated the building of more homes in these areas.

All mortgage transactions (left side) and subsidised mortgage transactions (right side) in proportion to the number of home purchases

Source: MNB

The number of loan transactions per thousand inhabitants permanently doubled in the 4th cluster as a result of the introduction of the prenatal baby support loan. The popularity of the prenatal baby support loan is balanced across the clusters, but in the cheapest cluster, which has the lowest renewal rate and where lending is the lowest, it increased lending per thousand inhabitants proportionally to a greater degree than in the other areas. If we divide the median square meter price rise of the clusters observed since end-2013 into two periods, we see that in the 4th cluster, which comprises smaller settlements and has lower lending, the price appreciation of homes (mainly pre-owned homes due to the low number of new homes built) in absolute terms was higher in the two years following the introduction of the prenatal baby support loan than in the previous six years, which cannot be observed in the other clusters. A possible explanation for this phenomenon is that households in the 4th cluster may even have purchased homes only from the amount of the prenatal baby support loan (the amount of a prenatal baby support loan is still around 70 times the

median square meter price of this cluster), and the ensuing additional demand may also have been reflected in larger price appreciation in the housing market. A contributor to this may have been that more than half of the population of the 4th cluster live in settlements eligible to receive rural HPS.

Overall, major differences are identified in terms of lending and the housing market as well across the various areas of the country. Our analysis is not suitable for detecting causal relations, as that would require further research. Nevertheless, interrelations between the two markets can be identified. Higher price appreciation in the housing market is coupled with a greater increase in loan intensity, and within borrowers the ratio of those who are more stretched in terms of income is higher in the areas that are more expensive compared to incomes. The expansion of subsidised lending also contributed the most to housing loan intensity in the more expensive areas, where the volume of lending is greater, as these markets thus became accessible even for those households that would have been excluded from there without subsidies. The stronger demand made possible by the external funds may have contributed to price appreciation, but also to the expansion in new supply. The introduction of the prenatal baby support loan increased the population-proportional lending to the greatest degree in the cheapest areas, and this may have played a role in the acceleration of housing price rises in these districts.

5.2. Mounting risks in the commercial real estate market

Table 2: Main features of the Hungarian commercial real estate market in 2022 H1

	Office	Industrial-logistics	Retail (shopping centre)	Hotel
Vacancy rate	9.9%	6.4%	8.0%	46.9%
Change in vacancy rate versus June 2019 (percentage points)	+3.6	+4.3	+4.2	+20.7
Change in demand versus pre-COVID level	-22%	+25%	-	-
New supply under construction as a percentage of existing stock	+11%	+15%	0%	+10%
Change in average offered rent versus June 2019	+12%	+16%	-	-
Change in investment yield versus June 2019	-25 bp	-150 bp	+75 bp	-
Ratio of loans in moratorium as of June 2022	0.0%	0.0%	0.1%	12.1%

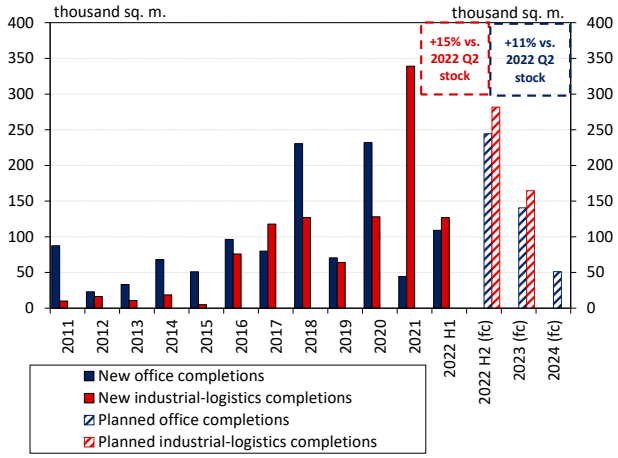
Note: Based on end-June 2022 data. Factors pointing to a decline or increase in the value of properties are shown with red and green background, respectively. In the case of hotels, the vacancy rate (100%–room occupancy) and its change refer to Budapest in the January–June 2022 period. The change in demand compared to the pre-pandemic level is the comparison between the 2022 and the 2019 H1 annual data for total (gross) rental demand. Source: CBRE, Cushman & Wakefield, HCSO, MNB

No major deterioration occurred in commercial real estate market indicators in 2022 H1, but looking ahead, the risks are increasing. Demand for industrial-logistics properties exceeds the pre-pandemic levels, while demand in other segments falls short of such. At the same time, there is uncertainty about how long the strong demand in industrial-logistics will last. Hotel room occupancy in 2022 H1 increased in year-on-year terms, but remains below the pre-pandemic level, and high risks are also indicated by the fact that most of the project loans participating in the moratorium are also related to hotels (*Table 2*). The rising energy prices result in major increases in the costs of operation for tenants and – via building material prices – developers as well.[18] In buildings with low energy efficiency, operating costs to be paid by tenants may reach the amount of rents. The rise in operating costs of corporates forces firms to adjust, which may result in the postponement of investments and thus in a decline in demand for commercial real estate. The increase in building material prices, the dynamics of this increase and the availability of building materials make the planning of development projects and timely implementation much more difficult. The weakening of the forint may have the largest impact in the retail segment, due to the lower ratio of export revenues.

[17] The analysis in Box 6 of the MNB's December 2021 Financial Stability Report also reached a similar conclusion, according to which the home creation programmes significantly helped the situation of first-time home buyers.

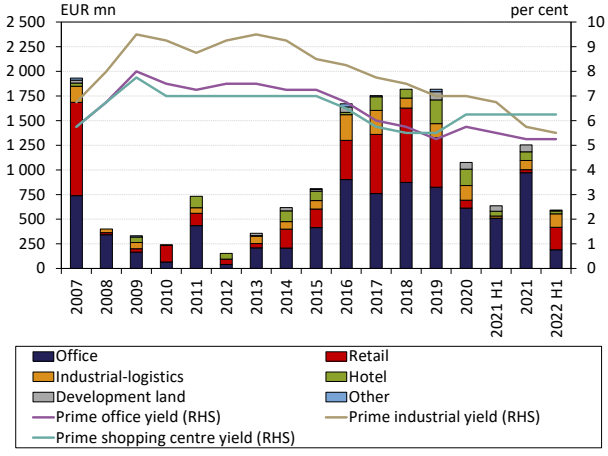
[18] A more detailed explanation of the risks surrounding the commercial real estate market can be found in the MNB's Commercial Real Estate Market Report October 2022. Available at: https://www.mnb.hu/en/publications/reports/commercial-real-estate-market-report/commercial-real-estate-market-report-october-2022

Chart 43: Completions and planned completions in the Budapest office and industrial-logistics market



Note: Based on data for end of 2022 Q2. Source: Budapest Research Forum, Cushman & Wakefield

Chart 44: Investment volume on the Hungarian CRE market, its composition and prime yields

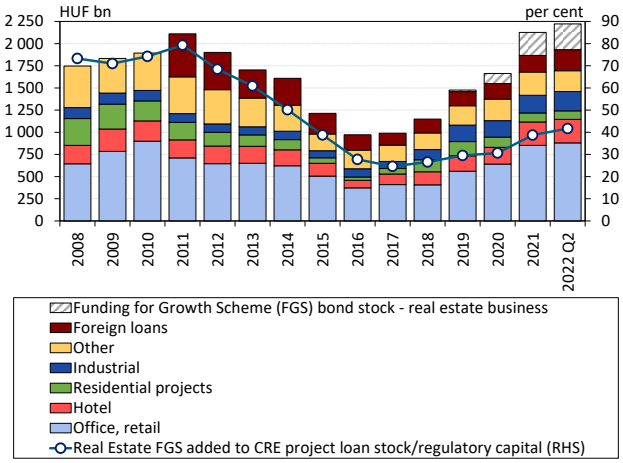


Note: Primary yields mean the (initial) gross yields of the transactions related to the best-location and highest-quality commercial properties, calculated as the ratio of the property's annual net rental revenue and the purchase price. Source: CBRE, Cushman & Wakefield, MNB

Vacancy rates are expected to increase as a result of the high volume of development projects, but a drop-off has already been seen in development activity as well. Over the next 1.5–2 years, significant new supply is expected to be completed in all market segments, apart from the retail segment, where no large volume of new development projects is under way. In the office and industrial-logistics markets in Budapest, the volume of floorspace under construction corresponds to 11 per cent and 15 per cent of the existing stock, respectively (*Chart 43*). As for hotels in Hungary, 5,000 new hotel rooms were being built at end-June 2022, corresponding to 10 per cent of the existing hotel room capacity. In addition to the uncertain economic prospects and rising operating costs of corporates, the significant development volumes may result in an increase in vacancy rates. The rise in this indicator is especially a risk in the case of less modern buildings, as high energy prices drive tenants towards more energy-efficient properties. Nevertheless, the risk of an increase in vacancy in the office market is mitigated by the fact that no new office building construction started in 2022 Q2, and developers are also reviewing the timing of planned projects.

There was no major year-on-year decline in investment turnover, but economic uncertainty and investors' wait-and-see attitude may result in a decrease in the value of properties. Investment turnover on the commercial real estate market amounted to EUR 0.6 billion in 2022 H1, a 7-per cent decline versus the same prior-year period (*Chart 44*). The transaction volume was more concentrated this year and fewer transactions were completed, while the average transaction value was higher, and the share of high-value sales and purchases exceeding EUR 50 million was 47 per cent within the turnover. According to market information, a wait-and-see attitude became typical for investors in 2022 Q2, which may negatively affect turnover in 2023. Looking at the primary yields of individual segments, the yield declined by 25 basis points in the industrial-logistics segment in 2022 H1 but remained unchanged in the other segments. Changes in economic prospects and investors' wait-and-see attitude are also factors that point to a yield increase and carry the risk of depreciation of real properties.

Chart 45: Commercial real estate project loan stock and its ratio to regulatory capital



Note: Credit institutions sector excluding branches, based on non-consolidated data. Until 2010, project loan stock also includes loans to non-resident companies. Source: MNB

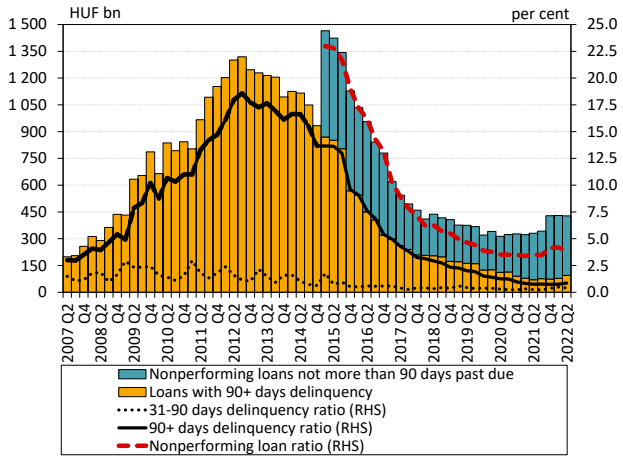
An increase in interest rate risk is identified for project loans, but credit institutions' capital adequacy is appropriate to bear the real estate market risks. Including loans disbursed to finance housing estates, credit institutions' project loans outstanding collateralised with commercial real estate nearly doubled in the past five years. However, considering the shock-absorbing capacity of the institutions, their real estate market exposure is much lower than 10 years ago. The ratio of commercial real estate project loans to regulatory capital amounted to 36 per cent at end-June 2022, compared to 73–79 per cent in the period between 2008 and 2011 (*Chart 45*). Also taking into account institutions' real estate market exposure through corporate bonds issued under the Bond Funding for Growth Scheme (BGS), the ratio corresponds to 42 per cent of the regulatory capital. 81 per cent of project loans outstanding related to commercial real estate are denominated in foreign currency (mostly euro). Accordingly, the interest rate risk of this portfolio is increasing due to the rise in the interest rate environment of the euro area.

6. Portfolio quality: the ratio of non-performing loans is low, but with upside risks

The ratio of non-performing loans moved from its historical low after the phase-out of the general moratorium in October 2021, stagnating at around 4.2 per cent in the household segment and edging slightly lower to 3.9 per cent in the corporate segment at the end-June 2022. Accordingly, the banking sector's NPL ratio for the private sector exceeds the EU average by 1.9 per centage points. During the first half of the year, one favourable impact on NPL ratios was that, following rises in November and December 2021, non-performing stocks did not continue to grow significantly, while loans outstanding increased dynamically. Compared to the more pronounced growth in December 2021, the corporate short-term portfolio, i.e. the portfolio of loans less than 90 days past due, increased to a lesser degree, expanding by HUF 19 billion by end-August 2022. In the household segment, following a major rise in November 2021, non-performing loans expanded by HUF 39 billion between November 2021 and August 2022. In the case of household loans, quality deterioration was registered in particular for personal loans and overdraft portfolios. In August 2022, only 1 per cent of corporate loans and 3 per cent of household loans were in the targeted moratorium, which was extended until the end of 2022. Based on all of the above, it can be established that the phase-out of the general moratorium did not result in a significant increase in non-performing loans. The agricultural moratorium introduced at the beginning of September 2022 and effective until the end of 2023 included 25 per cent of the eligible loan stock.

The complex effects stemming from the economic environment pose upside risks to the non-performing loan portfolio, which is already reflected in the slow rise in longer-term delinquencies as well. Loan loss provisioning on domestic corporate and household loans, which can be considered forward-looking preparation for potential losses by the banking sector, increased in nominal terms in 2022 H1, but stagnated as a proportion of loans outstanding. As opposed to previous quarters, loan loss coverage of loans belonging to the Stage 3 category showed an upward trend, reaching 47 per cent in the corporate segment and 53 per cent in the household sector by end-June 2022.

Chart 46: Ratio of non-performing corporate loans in the credit institution sector

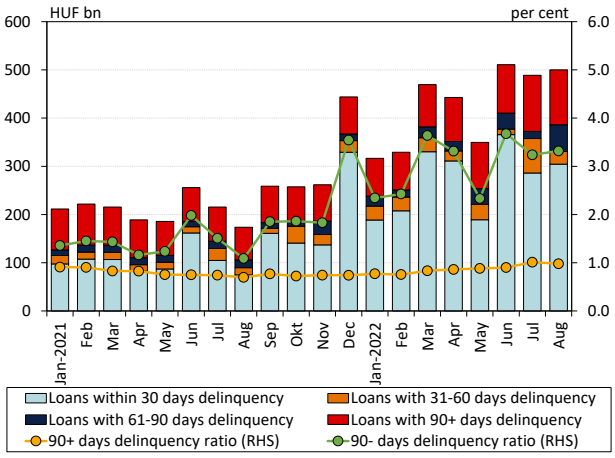


Note: The definition of non-performing loans changed in 2015. From then on, in addition to the loans over 90 days past due, loans less than 90 days past due where non-payment is likely are also classified as non-performing. Calculated by clients until 2010 and by contracts from 2010. Source: MNB

6.1. Ratio of non-performing loans is not increasing, despite growing risks

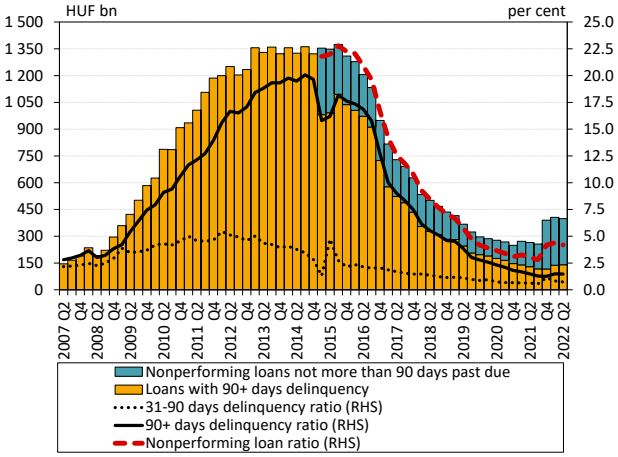
After a modest decline, the ratio of non-performing corporate loans amounted to 3.9 per cent at the end of 2022 H1. Following the phase-out of the general payment moratorium, the stock of corporate loans over 90 days past due remained practically unchanged in the last quarter of 2021 and the first quarter of 2022, before increasing by HUF 17 billion in 2022 Q2 (*Chart 46*). In parallel with that, the loan portfolio not over 90 days past due but classified as non-performing increased considerably, by HUF 89 billion in 2021 Q4, before declining by HUF 22 billion to HUF 333 billion in 2022 H1. These developments notwithstanding, loans not over 90 days past due but recorded as non-performing continue to account for 78 per cent of non-performing loans (NPL). In 2022 H1, the corporate NPL ratio decreased slightly, by 0.2 per centage point to 3.9 per cent by end-June, which was supported by the significant expansion in corporate loans outstanding.

Chart 47: Delinquent corporate loans in the credit institution sector by the duration of the delay



Source: MNB

Chart 48: Ratio of non-performing household loans in the credit institution sector



Note: The definition of non-performing loans changed in 2015. From then on, in addition to the loans over 90 days past due, loans less than 90 days past due where non-payment is likely are also classified as non-performing. Calculated by clients until 2010 and by contracts from 2010. Source: MNB

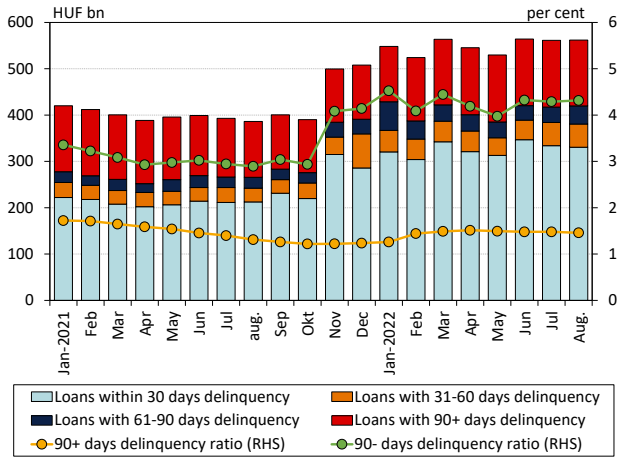
After a major increase following the phase-out of the moratorium, the stock of corporate loans less than 90 days past due has expanded by only HUF 20 billion since December 2021. In 2022 H1, the ratio of loans less than 90 days past due to the total corporate loan portfolio was basically driven by the loans not more than 30 days past due.[19] Following the phase-out of the general moratorium, in December 2021, the ratio of loans not more than one month past due rose to 3.5 per cent, was between 2.3 per cent and 3.7 per cent in 2022 H1, and has stagnated again around 3.5 per cent since June (*Chart 47*). The portfolio less than 90 days past due increased by a total HUF 19 billion between December 2021 and August 2022, which was attributable to the rise in loans at least 2 months past due. However, a major part (84 per cent) of the loan portfolio maximum 90 days past due is still recorded by banks as performing. The stock of non-performing loans has grown by HUF 9 billion since December 2021, with the SME segment according to company size and investment loans according to loan purpose as contributors.

The NPL ratio of the household sector has stagnated since the phase-out of the general moratorium. In 2022 H1, household loans 90 days past due rose by HUF 23 billion (*Chart 48*). In 2021 Q4, which was affected by the phase-out of the general payment moratorium, non-performing loans not more than 90 days past due rose considerably, by HUF 134 billion, and then amounted to HUF 259 billion in 2022 H1, following a decline of HUF 14 billion. From a historical low of 2.8 per cent, the household NPL ratio rose to 4.2 per cent in the final quarter of 2021 following the phase-out of the moratorium at end-October and was around this level in 2022 H1 as well, at 4.4 per cent in the first quarter and 4.2 per cent in the second quarter. In the case of the household sector as well, the latter decline is attributable to the expansion in loans outstanding, and the non-performing portfolio decreased by just HUF 6 billion in this period.

The household loan portfolio with short past-due period has not changed significantly since the increase after the phase-out of the general payment moratorium. Household loans less than 90 days overdue rose by HUF 35 billion between November 2021 and August 2022 (*Chart 49*). This increase was attributable to loans less than 60 days past due but still classified as performing. Accordingly, 84 per cent of the loans less than 90 days past due were classified

[19] The fluctuation during the year of the portfolio less than 30 days past due is attributable to the changing economic environment as well as to corporate liquidity and cost optimisation developments.

Chart 49: Delinquent household loans in the credit institution sector by the duration of delay



Source: MNB

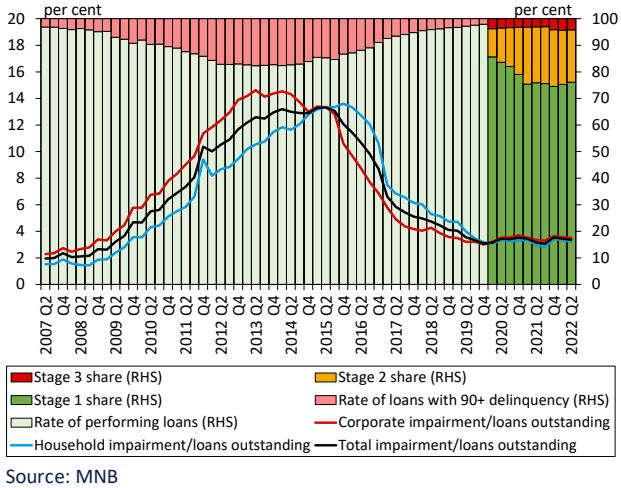
Table 3: Movements of loans out of general moratorium among loan loss categories

Corporate sector					
In proportion to the corporate loan portfolio exiting moratorium		Impairment category 2022 June			
		Stage 1	Stage 2	Stage 3	Total
Impairment category 2021 October	Stage 1	46.8%	5.3%	0.5%	52.6%
	Stage 2	5.2%	36.1%	2.5%	43.8%
	Stage 3	0.0%	0.0%	3.6%	3.6%
	Total	52.1%	41.4%	6.5%	100.0%

Household sector					
In proportion to the household loan portfolio exiting moratorium		Impairment category 2022 June			
		Stage 1	Stage 2	Stage 3	Total
Impairment category 2021 October	Stage 1	36.0%	7.8%	0.8%	44.6%
	Stage 2	17.8%	28.1%	3.2%	49.0%
	Stage 3	0.9%	0.7%	4.8%	6.4%
	Total	54.7%	36.5%	8.7%	100.0%

Note: Credit institutions' data. Ratios on the basis of outstanding portfolios at end-June 2022. Source: MNB

Chart 50: Changes in loan loss coverage



Source: MNB

as performing at end-August. Non-performing loans in the household sector expanded by HUF 39 billion in the period under review. In a breakdown by loan product, all loan types contributed to this development, with the exception of car purchase loans and home equity loans. Since November 2021 the increase in NPL ratio has been the highest in the case of personal loans and overdrafts. For more information about the relationship between NPL-ratio and payment moratorium participation see Box 4.

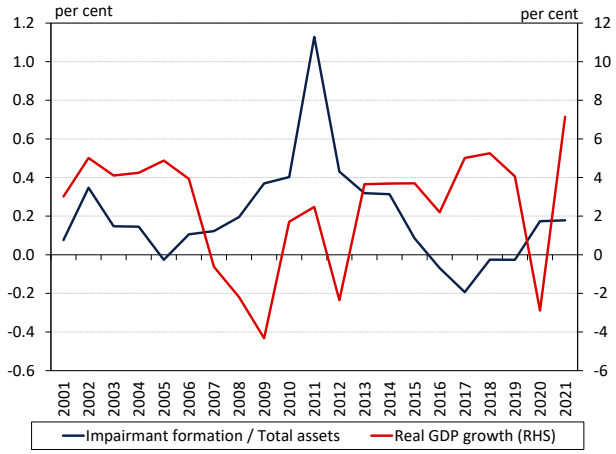
6.2. Loan loss coverage remained unchanged

One fifth of the household loans outstanding that left the moratorium were classified into a more favourable loan loss category. With the October 2021 changes to the payment moratorium introduced in connection with the coronavirus pandemic, major portions of corporate and household loans outstanding were excluded from the moratorium. Looking at the loans that left the moratorium in this period, the credit risk rating worsened in the case of 8 per cent and improved in the case of 5 per cent in the corporate sector, while in the household sector 19 per cent were classified into a more favourable loan loss category and 12 per cent into a less favourable loan loss category (*Table 3*). In terms of the corporate and household loan portfolios participating in the moratorium in July, 64 per cent of both portfolios took the opportunity of extending the payment moratorium until 31 December 2022.[20] Accordingly, in August 2022 only 1 per cent and 3 per cent of the loans, respectively, were participating in the programme. With regard to the agricultural moratorium introduced from September 2022, 25 per cent of the eligible loans outstanding amounting to HUF 1,140 billion, 27 per cent of the eligible corporate loans outstanding and 21 per cent of the eligible self-employed persons' loans outstanding opted to participate.

On the whole, average loan loss coverage in the banking sector did not change in 2022 H1. Although loan loss provisions increased in nominal terms in the past half year, especially regarding the Stage 3 category, i.e. non-performing loans, the average coverage of the total loan portfolio is at a historical low due to the dynamic rise in loans outstanding (*Chart 50*). As a proportion of loans outstanding, average coverage also did not increase during the short economic downturn following the coronavirus pandemic or in connection with the appearance of the inflationary environment at end-2021 or the drastic rise in energy

[20] Government Decree No 216/2022 (VI. 17.)

Chart 51: Impairment and economic cyclicality



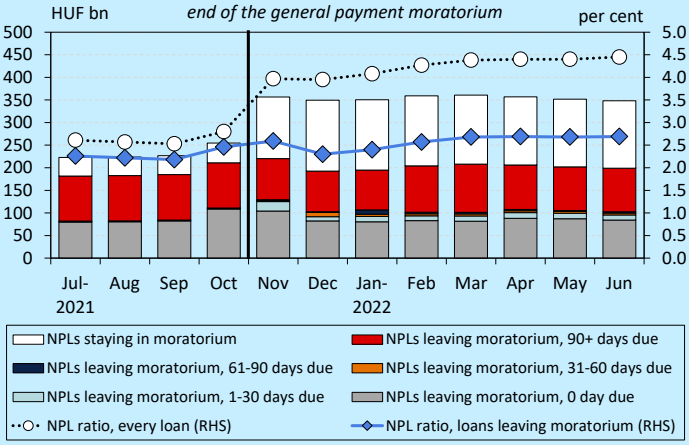
Source: MNB

prices. The loan loss coverage of Stage 3 loans increased to 47 per cent in the corporate segment and to 53 per cent in the household sector. The ratio of loan loss provisions for Stage 2 loans, i.e. loans with elevated credit risk, declined in both segments in the first two quarters of 2022, falling by 1.4 per centage points for the corporate portfolio and by 0.5 per centage point for the household portfolio, to coverage levels of 3.9 per cent and 6.9 per cent, respectively. The coverage level of Stage 1 loans outstanding remained practically unchanged during the half year under review. Accordingly, there was no major shift in the loan loss coverage of the private sector's loan portfolio in 2022 H1, while impairment formation is historically countercyclical: based on the risks to economic growth, an increase in the level of impairments is expected (*Chart 51*).

BOX 4: NON-PERFORMING HOUSEHOLD LOANS AFTER THE PAYMENT MORATORIUM[21]

The ratio of household loans classified by banks as non-performing rose slightly after the end of the general payment moratorium on 31 October 2021.[22] Most of the increase was related to the transactions remaining in the targeted moratorium and not to the ones leaving the general moratorium. Following 9 per cent in October, in November 2021 banks classified 28 per cent of the loans outstanding that remained in the moratorium as non-performing, presumably because the programme remained available only for groups in more vulnerable situations (clients with permanent decline in income, unemployed, those in public employment legal relationship, clients raising children or pensioners). The 2.5-per cent NPL ratio in October 2021 calculated without those remaining in the targeted moratorium increased only to 2.6 per cent by November. The non-performing portfolio of these debtors was stable at around HUF 200 billion after the end of the general moratorium, half of which became over 90 days past due.

Changes in non-performing household loans outstanding around the end of the general payment moratorium



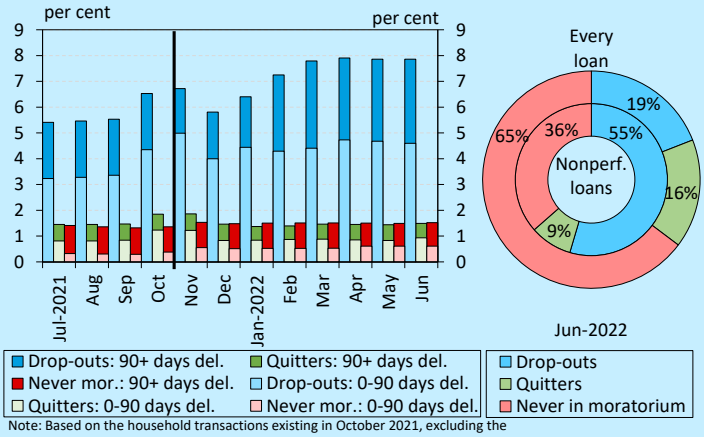
Note: Volumes and shares of the parts classified as non-performing within the debt outstanding at the end of the given month of the transactions existing in October 2021. Source: MNB

[21] The box is based on the following study: Aczél – El-Meouch Nedim – Lakos – Spéder (2022): Vulnerability of the household credit stock outside the general payment moratorium. *Manuscript.*

[22] From November 2021, only a limited group of households remained eligible for the general payment moratorium on household loans disbursed until 18 March 2020. From the beginning, the data of the MNB's credit register (HITREG) show steadily declining participation in the moratorium among the household transactions outstanding in October 2021. In April 2020, 55 percent of loans outstanding were in moratorium, which declined to 24 percent by October 2021 and then fell below 6 percent in November. In parallel with payment obligations becoming due again at the end of the general moratorium, the ratio of non-performing loans jumped to 4.0 percent from the previous 2.8 percent.

There is significant correlation between the non-performing ratios and participation in the general moratorium. Non-performing ratios were at similarly low levels between 1.5–2.0 per cent among the transactions remaining completely outside the moratorium and the ones exiting the general moratorium voluntarily (and permanently) before its end. The values typical of those excluded from the general moratorium (mainly involuntarily) in October 2021 were much higher than that. The increase from 6.6 per cent in October 2021 to 7.8 per cent in June 2022 suggests that mainly they may have faced the difficulties that came up after the programme and were difficult to foresee by credit institutions. In line with this, within non-performing loans the share of those over 90 day past due increased steadily among them.

Changes in non-performing household loans outstanding according to delinquencies and to participation in the general payment moratorium



Note: Based on the household transactions existing in October 2021, excluding the transactions entering the conditional moratorium. Source: MNB

The correlation between participating in the moratorium in the past and the later non-performances can be detected even when various other relevant factors are also taken into account. According to our regression analysis, with unchanged levels of transaction-level credit and debtor characteristics for October 2021, more intensive participation in the general moratorium entails higher non-performances in June 2022. We could not directly use the relevant factors that are known only by banks, but part of them could also be captured through the October non-performing classification of the transactions. The predictive power of the moratorium history is significant even with the involvement of this variable. The correlation identified between the moratorium history and the later credit risk may be explained by various factors. On the one hand, it can be presumed that debtors exposed to greater labour market, private life or health risks used the moratorium for a long time to a greater extent. On the other hand, it is also possible that intensive participation in the moratorium somewhat weakened the incentives to restore solvency. Based on these findings, it is important to take account of clients' moratorium history, both during banks' loan loss provisioning and regulatory risk assessment.

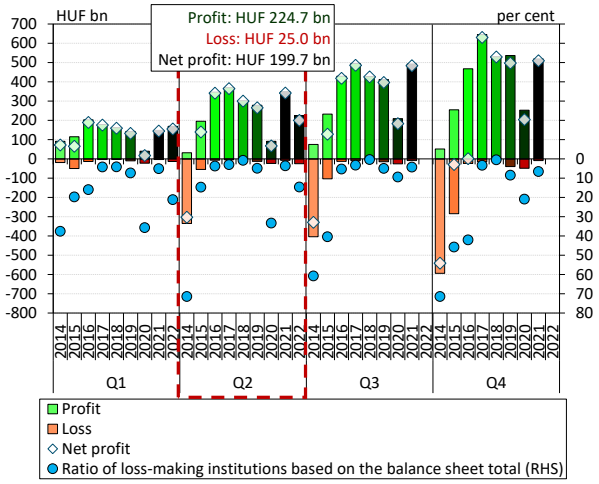
7. Profitability and capital position: declining profits, stable capital position

In 2022 H1, the credit institution sector recorded an after-tax profit of HUF 200 billion according to non-consolidated data, down by HUF 142 billion compared to the same prior-year period. The consolidated profit, which includes the profits of domestic and foreign subsidiaries as well, amounted to HUF 207 billion, HUF 183 billion below the profit figure for 2021 H1. The decline in after-tax profit (at the consolidated level as well) is mostly explained by the recognition of loan loss provisioning and the extra profit tax, as well as the impact on profit of the extension of the interest rate cap for 2022 H2. The profit-reducing effect of these items was only partly offset by the rising interest income and dividend income. In addition to the lower nominal profit, return on equity (RoE) fell from 10 per cent to 7 per cent, and return on assets (RoA) dropped from 0.9 per cent to 0.6 per cent, while the credit institutions sector's premium compared to the risk-free yield disappeared owing to the increase in short-term yields and the decrease in RoE.

The consolidated capital adequacy ratio of the banking sector stood at 18.5 per cent and the CET1 ratio at 16.6 percent at the end of 2022 H1. The sector's free capital above the overall capital requirement amounted to HUF 1,581 billion (4.6 per cent). Together with the total H1 profit, which – for lack of auditing – was not yet eligible for inclusion in own funds and taking into account the 50 per cent usability of the 2.5 per cent capital conservation buffer, it totalled HUF 2,164 billion. Extension of the interest rate cap until June 2023 and the extra profit tax to be recognised in 2023 cause further losses for banks, impairing their capital position as well. In addition, banks must also comply with the 0.5 per cent CCyB rate to be applied to exposures vis-à-vis residents in Hungary from July 2023, and they must also meet the MREL requirements from January 2024, which requires substantial funding from the institutions affected by the adaptation constraint. In spite of the slight decline, the sector safely meets the leverage ratio requirement, and on an exposure basis, banks' leverage ratio exceeded 4 per cent in almost all cases.

7.1. Decline in profits due to impairment charges for foreign exposures and government measures

Chart 52: Year-to-date cumulative after-tax profit of the credit institution sector

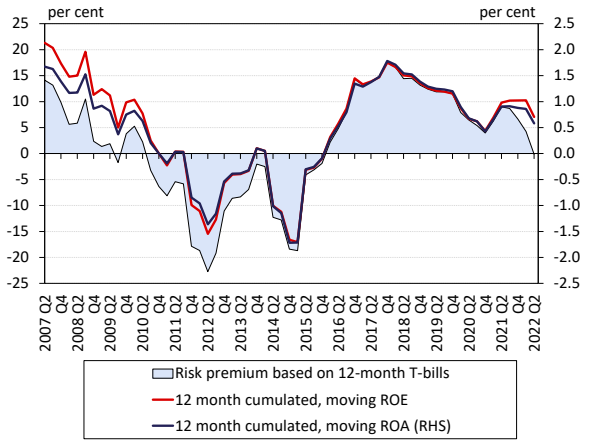


Note: At the end of June 2022, the ratio of loss-making institutions in terms of total assets was 3.7 per cent based on consolidated data.
Source: MNB

Sector-level profit dropped significantly compared to 2021 H1. In 2022 H1, the credit institutions sector recorded an after-tax profit of HUF 200 billion according to non-consolidated data, corresponding to a decline of HUF 142 billion versus the same prior-year period (*Chart 52*). Although the institutions with negative profits recorded a loss amounting to only HUF 25 billion, their share according to the balance sheet total was close to 15 per cent. The consolidated profit, which includes the profits of domestic and foreign subsidiaries as well, amounted to HUF 207 billion, down HUF 183 billion compared to the profit for 2021 H1. In the same period, the profit of financial enterprises declined by HUF 16 billion to HUF 59 billion.

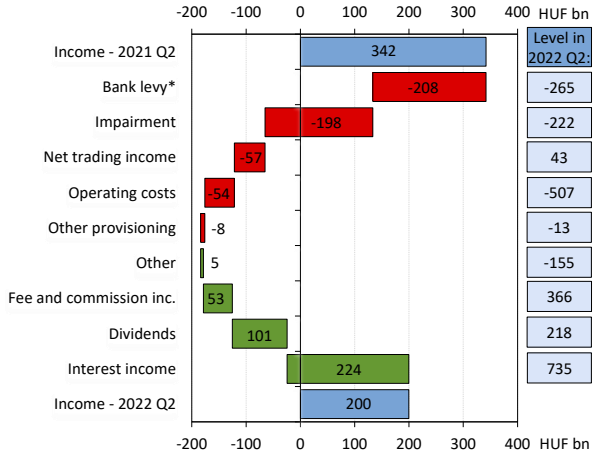
In the rising interest rate environment with declining profitability indicators, the sector's yield premium has disappeared. In addition to the deteriorating nominal profit, the 12-month rolling profitability indicators also declined in 2022 Q2. The sector's return on equity (RoE) fell from 10 per cent in 2022 Q1 to 7 per cent, while the return on assets (RoA) fell from 0.9 per cent to 0.6 per cent (*Chart*

Chart 53: After-tax 12-month rolling ROE and ROA of credit institutions



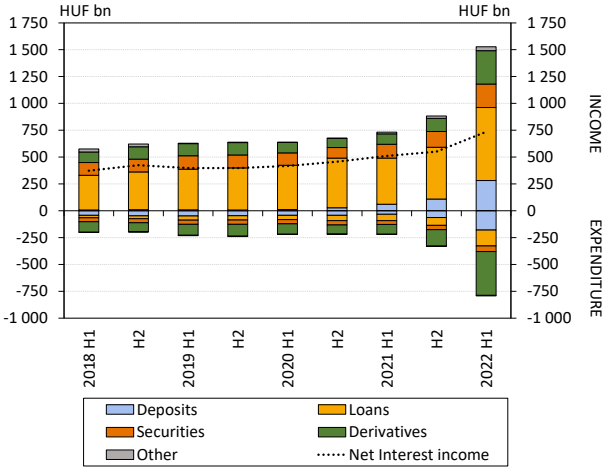
Note: Quarterly time series based on non-consolidated data. Backward-looking yield for the RoE, forward-looking yield for the 12-month discount treasury bill. Source: MNB

Chart 54: Annual changes in after-tax income components of the credit institution sector



Note: Nominal values of income components at the end of June 2022 are shown on the right-hand side. *Bank levy includes the combined change in the 'normal' bank levy and the extra profit tax. Source: MNB

Chart 55: Changes in components of 6-month interest income in the credit institution sector



Source: MNB

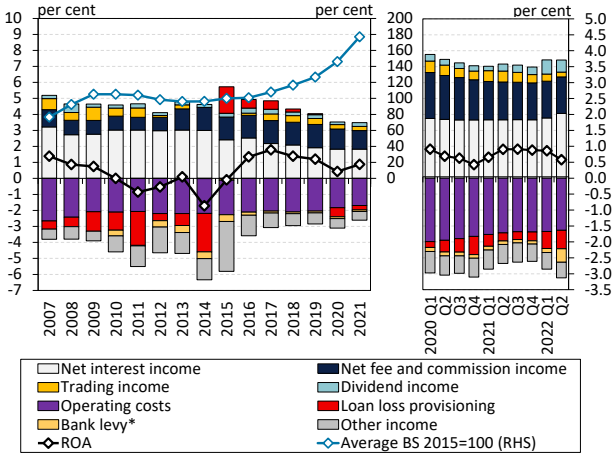
53). The rising interest rate environment already significantly eroded the premium on the risk-free yield of the return on equity in 2021 as well. By end-June 2022, however, the yield premium of the credit institutions sector disappeared completely as a result of the rise in short-term yields and the decline in RoE.

The decline in after-tax profit is primarily attributable to the increase in loan loss provisioning and recognition of the extra profit tax. The decline of HUF 142 billion in after-tax profit is mostly explained by the increased loan loss provisioning, which reduced profits by nearly HUF 200 billion (*Chart 54*). Most of this increase is related to the impairment charges of HUF 146 billion carried out in Q1 mainly for domestic banks' Russian and Ukrainian exposures. It also had a similar profit-reducing effect that the majority of banks recognised the amount of the extra profit tax due in H2 already in June, which reduced the H1 profit by HUF 189 billion (Box 5). Additional extra profit tax of HUF 37 billion is expected to be recognised in 2022 H2. The expansion in the balance sheet total increased the basis of calculation for the bank levy and thus the tax burden as well, corresponding to additional expenditures of HUF 20 billion at the sector level. The profit on financial transactions was HUF 57 billion lower than in 2021 H1, which is related to some larger institutions and basically stems from the revaluation of securities holdings. By contrast, an increase in operating costs was typical of a wide range of institutions, exceeding the figure for the same period of the previous year by HUF 54 billion.

The effect of negative items was only partly offset by rising interest income and dividend income. In 2022 H1, of the profit-increasing items, the most important one was the HUF 224 billion expansion in net interest income, with contributions to the increase from the vast majority of institutions. The expansion in interest income was the result of the balance of the increase in net interest income of loans, deposits and securities as well as of the interest expense of derivative transactions (*Chart 55*). Interest income on loans increased to the largest degree, advancing by some HUF 251 billion, which mostly originates from the repricing of loans to the private sector. At the same time, according to our estimate, extension of the interest rate cap to 2022 H2 results in a loss of nearly HUF 52 billion for banks, part of which was already recognised in 2022 Q2, depending on accounting policy. All of this may restrain the further growth in interest income. Interest income on asset-side deposits exceeded the figure for 2021 H1 by HUF 221 billion, which was primarily attributable to the rising interest rates on central bank deposits. In 2022 H1,

however, interest expenditures on liability-side deposits also increased significantly, by around HUF 147 billion, reducing the effect of the interest income, earned mainly on central bank deposits. Income from dividends increased the after-tax profit by HUF 101 billion year on year, which was almost entirely related to one institution. Expansion in fee and commission income was also typical of the sector as a whole; this item contributed to the half-year profit by an additional HUF 53 billion.

Chart 56: Changes in 12-month rolling income components relative to total assets in the credit institution sector



Note: Based on non-consolidated data. Bank levy* is the sum of the 'normal' bank levy and the extra-profit tax. Source: MNB

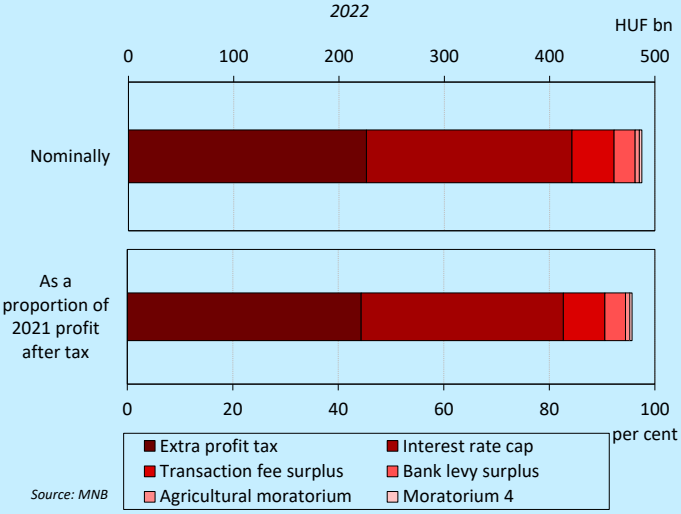
Interest income to total assets increased even in spite of the remarkable balance sheet dynamics in 2022 H1. The 12-month rolling return on assets (RoA) amounted to 0.9 per cent in December 2021, before falling to 0.6 per cent by June (*Chart 56*). As in the case of the nominal items, the decline in the indicator in 2022 H1 was driven by the recognition of the loan loss provisioning and the extra profit tax. The aforementioned items reduced the value of the indicator by 30 basis points and 26 basis points, respectively, which was offset by a 20-basis point increase in interest income and an 11-basis point expansion in dividend income. Of the above-mentioned items, the rise in interest income to total assets is noteworthy in that it follows a decade of a declining trend. Moreover, the value of the indicator increased in parallel with a nearly 20 per cent annual expansion in the sector-level average balance sheet total. The 12-month rolling indicator of operating expenses to total assets declined by 5 basis points to a historical low of below 1.7 per cent.

BOX 5: EFFECTS OF THE 2022 GOVERNMENT MEASURES ON THE BANKING SECTOR'S PROFITABILITY

The extra profit tax, the increasing bank levy and transaction levy, the extension of the interest rate cap, the fourth phase of the moratorium and the effect of the agricultural moratorium on profits may represent an additional burden of nearly HUF 500 billion for the banking sector in 2022. Of the additional burdens, the highest-amount item is the so-called **extra profit tax** announced in May. In 2022, it is 10 per cent (**around HUF 226 billion**) of the sum of the previous year's interest income and the net fee and commission income. The majority of banks recognised the loss impact of the amount of the extra profit tax to be paid in 2022 H2 already in June, which is estimated to have reduced the profit of the sector by **HUF 189 billion**. Additional extra profit tax amounting to **HUF 37 billion** is expected to be recognised in 2022 H2. The expansion in the balance sheet total as a result of crisis management measures in the past periods increased the tax base of the regular bank levy as well, thus entailing an increase in the **tax burden** as well, which means additional annual expenditure of **HUF 20 billion** for the sector compared to the same period of the previous year.

According to our estimate, the extension of the **interest rate cap** regarding variable-rate and state-subsidised mortgage loans to 2022 H2 entails a loss of **HUF 52 billion** for banks. Depending on accounting policy, banks recognised a part of it already in 2022 Q2, and the extension of the interest rate cap until June 2023 may result in an additional immediate loss of **HUF 85 billion** (which is presumed to affect the Q4 profit). Based on our estimates, the interest rate cap on variable-rate (not fixed until maturity) SME loans between November 2022 and June 2023 could lead to further losses of **HUF 54–58 billion** for the entire financial intermediary system.

Additional burden affecting the profitability of the banking system in 2022



Source: MNB

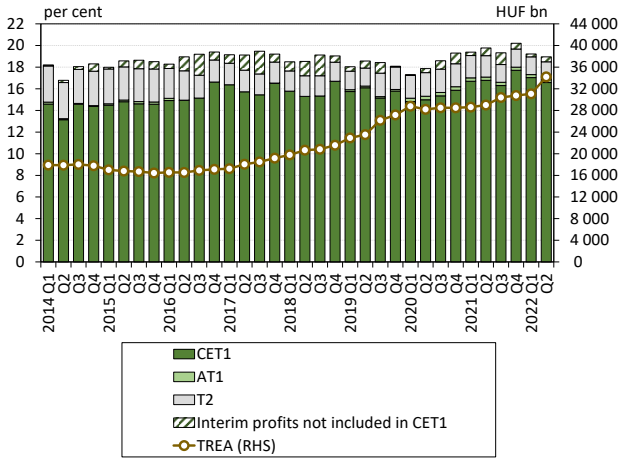
The extension of the **payment moratorium** until December 2022 represents an additional moderate indirect burden for the sector due to low participation ratios. Institutions' loss originates from the effect of the moratorium on the present value of loans; if the interest is not capitalised, lenders suffer a present value loss stemming from losing the potentially collectable additional interest. According to our estimate, the fourth phase of the payment moratorium may have caused a present value loss of some **HUF 2.3 billion** for the sector in 2022.

Corporate and sole proprietors' loans amounting to HUF 1,139 billion (56,000 contracts) are eligible for the **agricultural moratorium**, and 25.2 per cent of this (7,000 contracts) entered the programme. Accordingly, this measure may result in a loss of some **HUF 3-4 billion** for the sector in 2022.

The **transaction fee payment obligation** was extended to securities trading, and the per transaction upper limit of the levy rose from the previous HUF 6,000 to HUF 10,000 in the case of both credit transfers and securities transactions. On the whole, in the budget plan the government raised the planned revenue from the transaction levy by **HUF 50 billion**, of which **HUF 40 billion** is estimated to burden the banking sector.

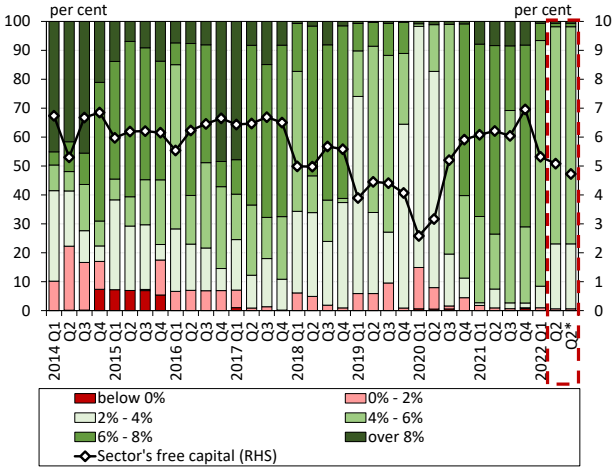
Looking at the banking sector's structural earning power, excluding the effect of the interest rate cap affecting 2022 H1, the extra profit tax and the moratorium, the sector achieved a half-year profit of HUF 413 billion, corresponding to an 11.2 per cent return on equity. **On the whole, however, the special additional burden of nearly HUF 500 billion in 2022 is roughly equal to the 2021 non-consolidated, extraordinary profit of the banking sector.**

Chart 57: Consolidated capital adequacy and total risk exposure amount of the banking sector



Source: MNB

Chart 58: Distribution of banks by level of free capital over the overall capital requirement weighted by the TREA



Note: Free capital includes the total interim or year-end profits as well. Q2* shows values calculated based on Pillar 2 Requirements effective from the beginning of 2022 and the combined buffer requirement to come into effect in June 2022, and it also takes into account capital increases and dividend payouts planned for 2022. The categories indicate the level of own funds above the overall capital requirement as a ratio of the total risk exposure amount. Source: MNB

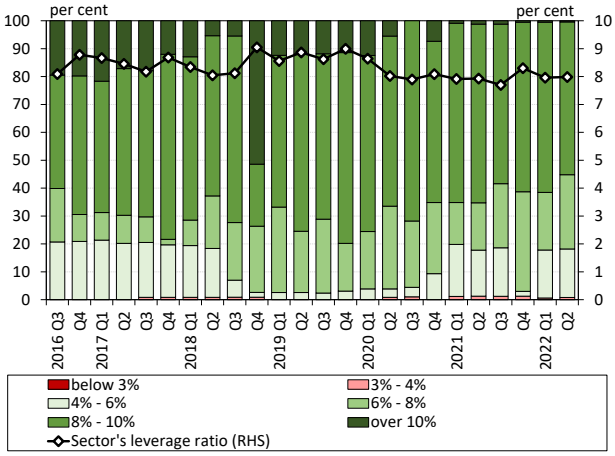
7.2. The capital position of the sector is adequate, even considering the reintroduced requirements

Despite a slight decline in the capital adequacy ratio, the banking sector's capital adequacy implies a strong shock-absorbing capacity. The sector's consolidated capital adequacy ratio (CAR) declined both in 2022 Q1 and Q2, to reach 18.5 per cent by the end of 2022 H1. Within that, the CET1 ratio was 16.6 per cent (*Chart 57*). For lack of auditing, the profit that cannot yet be included in the profit/loss may potentially improve the value of the CAR by some 46 basis points, but in light of banks' dividend disbursement plans, this profit will not completely strengthen the sector's capital position. During the six months under review, own funds increased by 4.4 percent and total risk exposure amount (TREA) by 11.1 percent. 89 per cent of the rise in the TREA observed in 2022 H1 was related to credit risk exposure amounts. Within that, exposure amounts vis-à-vis central governments and central banks as well as companies expanded to the greatest degree. The increase in own funds at the sector level is mostly explained by the rise in the previous years' retained earnings and accumulated other comprehensive income. The increase in both the TREA and own funds was significantly affected by the depreciation of the forint seen in the past half year.

The burdens of government measures and the increase in credit risks may erode banks' capital buffers and lending capacities. The sector's free capital declined from 6.4 per cent at end-2021 to 4.6 per cent of the TREA, while in nominal terms it grew to HUF 1,581 billion (*Chart 58*). The 50 per cent usability of the capital conservation buffer (CCoB) until December 2022 temporarily raises the free capital by 1.25 per cent (by HUF 427 billion), while the not yet audited part of the H1 profit may potentially improve it by not more than HUF 156 billion. Calculating with the total profit and the level of capital requirements valid from early 2023 (50 per cent and 100 per cent reintroduction of the O-SII and CCoB, respectively), on a TREA basis some 77 per cent of the banking sector would have a free buffer exceeding 4 per cent.[23] From 1 July 2023, banks must also comply with the 0.5 per cent CCyB rate to be applied to exposures vis-à-vis residents in Hungary, as well as with the MREL requirements from January 2024, which requires considerable funding from institutions facing adjustment

[23] At end-June 2022, two small banks did not comply with the effective overall capital requirement. Calculating with the total profit, both credit institutions would comply with the capital requirement.

Chart 59: Distribution of total exposure measure based on institutions' leverage ratio



Note: Based on the fully phased-in definition of Tier 1 capital. The categories indicate the level of the leverage ratio, i.e. the ratio of the T1 capital to the total leverage ratio exposure measure. For 2020 Q3, data are only available for 75 per cent and 84 per cent of the sector based on the number of banks and the total exposure measure, respectively. Source: MNB

pressure.[24] Government measures cause losses for banks, and a potential increase in credit risks may be coupled with additional loan loss provisioning, which impairs institutions' capital position and lending capacity.

Despite the slight decline, the sector safely meets the leverage ratio requirement with significant room for manoeuvre. From June 2021, meeting the 3 per cent leverage ratio requirement also became mandatory for banks. In 2022 Q1, the banking sector's leverage ratio (LR) had declined slightly, to 8 per cent, and was stagnant at this level in 2022 Q2 (*Chart 59*). The stagnation seen compared to the decline in the capital adequacy ratio is attributable to the more subdued growth in the denominator of the LR (total exposure amount). Although in a breakdown by institution heterogeneity was identified in spite of the sector-level stagnation (the LR declined in the case of more than half of the institutions), on an exposure basis nearly 82 per cent of the sector had a value above 6 per cent. In the case of two small institutions, the ratio has been fluctuating between 3 and 4 per cent since early 2021.

[24] See sections 9.1. and 9.2. of the *Macroprudential Report 2022* for more detail about the calculation of the MREL requirement and the scale of the necessary adjustment.

8. Banking sector stress tests: increased risks, strong shock resilience

Within the framework of the Financial Stability Report, we conduct a comprehensive stress testing exercise every six months, the aim of which is to quantify the impact of a severe, but still plausible stress scenario on the liquidity and capital position of the Hungarian banking system. Due to the economic effects of the Russian-Ukrainian war, at the time of writing this Report, the economy is clearly in a high-risk environment, the future development of which involves a high degree of uncertainty. This uncertainty can also be captured in the extremely high standard deviation of growth forecasts. In light of this, as an exception, for the solvency stress test in this Report we estimated the effects of two different stress scenarios.

The decline in the banking sector's liquidity surplus remaining after a hypothetical stress situation continued during the past two quarters. Nevertheless, according to the liquidity stress test, the sector would meet the regulatory requirements even in the case of a major shock. Due to the recent decrease in banks' liquidity coverage ratios (LCR), the liquidity stress test results in a lower shocked distribution of banks' ratios compared to the outcome of the stress test presented in the May 2022 Financial Stability Report. Taking banks' adjustment opportunities into account, two institutions would have a problem meeting the requirements. Of the shocks, the relative weight of the potential impact of deposit withdrawals increased further from its previously high level. The liquidity surplus narrowed significantly, but the Liquidity Stress Index still implies a low level of risk.

The results of the solvency stress test, which examines two-year scenarios, are mainly influenced by the unfavourable, uncertain economic environment and the high interest rate environment. In light of the available data, we approached both factors in a conservative spirit in the two stress scenarios. As a result, the risk costs are significantly higher than those estimated in the baseline, and interest income is at a lower level. As a result of the shocks, the proportion of loss-making banks rises sharply in the first year. At the end of the scenario, the decrease in own funds is compensated by positive profitability and a decline in the risk exposure amount, thanks to which a temporary and manageable capital need arises in the sector in the two stress scenarios.

8.1. In a stress scenario the majority of banks would meet the LCR requirement with necessary adjustments

Table 4*: Main parameters of the liquidity stress test*

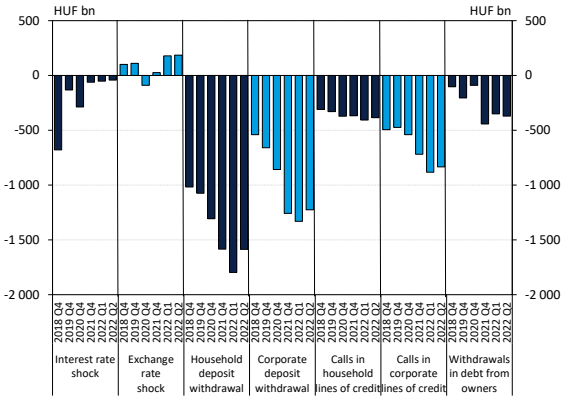
Assets			Liabilities		
Item	Degree	Currencies affected	Item	Degree	Currencies affected
Exchange rate shock on derivatives	15 per cent	FX	Withdrawals in household deposits	10 per cent	HUF/FX
Interest rate shock on interest rate sensitive items	300 basis points	HUF	Withdrawals in corporate deposits	15 per cent	HUF/FX
Calls in household lines of credit	20 per cent	HUF/FX	Withdrawals in debt from owners	30 per cent	HUF/FX
Calls in corporate lines of credit	30 per cent	HUF/FX			

Source: MNB

The relative sensitivity of banks' LCRs to certain stability shocks increased slightly in the recent period.[25] The banking sector's sensitivity to deposit withdrawal shocks continued to increase in early 2022, before adjusting to values observed at the end of last year by 2022 Q2 both in the household and corporate segment. The 2022 Q1 spike in the impact of household deposit withdrawals was caused by the temporary increase in the volume of deposits due to transfer payments at the start of the year. The level of this impact returned to its previous value after the quick

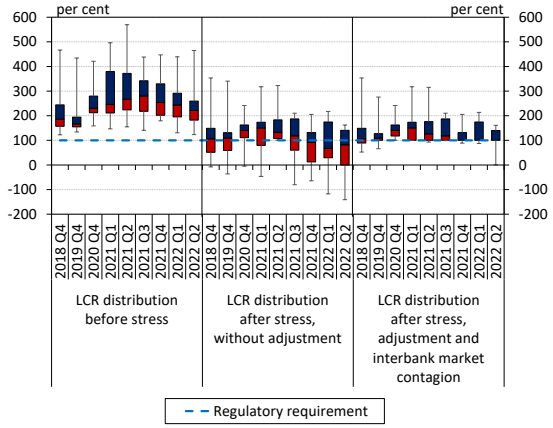
[25] The liquidity stress test examines the impact of a hypothetical, simultaneous occurrence of financial market turmoil, an exchange rate shock, deposit withdrawals, credit line drawdowns and withdrawal of owners' funds with possible interbank contagion effects. For a detailed description of the methodology, see Box 9 of the MNB's May 2016 Financial Stability Report. With regard to the spring 2020 changes to the monetary policy framework, in our calculations, we still take into account the measures that remain effective and relevant during our liquidity stress test, thus including the eligibility of the free stock of large corporation loans and bonds after reduction with an adequate haircut as liquid assets.

Chart 60: Aggregate impact of stress components at the system level



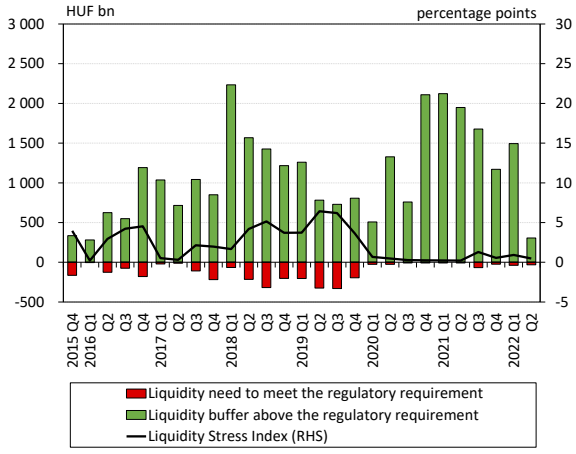
Note: The columns show the HUF billion change in the LCR's liquid assets at the banking sector level as a result of a given shock, adjusted for the change in net outflows. For calculating the impact of each shock we applied the assumption that the given shock occurs individually. Therefore, the sum of the impacts of the shocks does not necessarily reflect the combined impact of the shocks. Source: MNB

Chart 61: Distribution of the LCR before and after stress, based on the number of banks



Note: The boxplot of the distribution between the 10th and 90th percentile. Source: MN

Chart 62: The Liquidity Stress Index



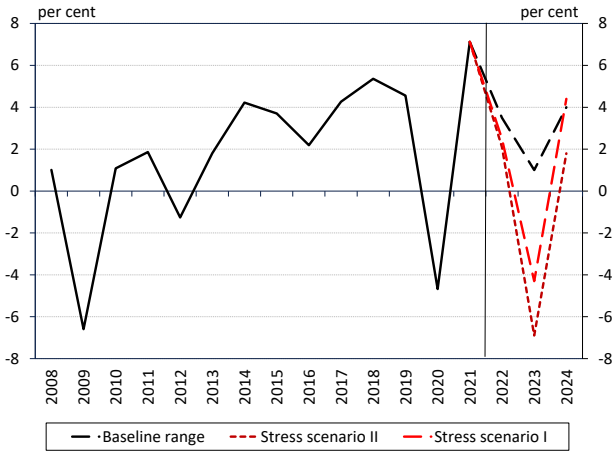
Note: The indicator is the sum of the liquidity shortfalls in percentage points (but not more than 100 percentage points) compared to the 100-per cent regulatory limit of the LCR, weighted by the balance sheet total in the stress scenario. The higher the value of the indicator, the larger the liquidity risk. Data is for the nine largest institutions until 2018 Q1 and for the total credit institution sector thereafter. Source: MNB

depletion of these sums. Of the credit line drawdown shocks, the effect of the corporate stress component increased, whereas that of households remained practically unchanged. The resilience of liquidity to interest rate shocks also improved (*Chart 60*). The exchange rate depreciation under the assumed stress scenario, affecting the derivative portfolio of the banking sector, would have resulted in a slight improvement due to the excess of positions against the forint in 2022 Q2. The role of a shock caused by the withdrawal of owners' funds would still have a relatively moderate impact compared to other items.

In the stress scenario, bank adjustment channels play an important role in meeting liquidity requirements. There is still considerable heterogeneity in LCR compliance between institutions. Banks' median LCR was at 280 per cent in 2021 Q3, and declined to 220 per cent in the following period, until the end of 2022 Q2. The lower and upper ends of the sector-level distribution remained practically unchanged (*Chart 61*). In line with the recent decrease in the LCR, the shocked distribution also shifted downwards in the last couple of quarters. Thus, according to our estimate, without accounting for banks' adjustments, banks' median stressed LCR would have amounted to approximately 80 per cent in June 2022, as opposed to the shocked value of 150 per cent observed in early 2021. Although the regulatory compliance of a large share of institutions would not change significantly, the number of banks with extremely poor liquidity adequacy would grow further. Taking into account the adjustment opportunities and the liquidity-expanding effect of the monetary policy framework revised in spring 2020, average adequacy improves, and the sector's participants, with the exception of two institutions, would meet the regulatory minimum even under serious liquidity stress.

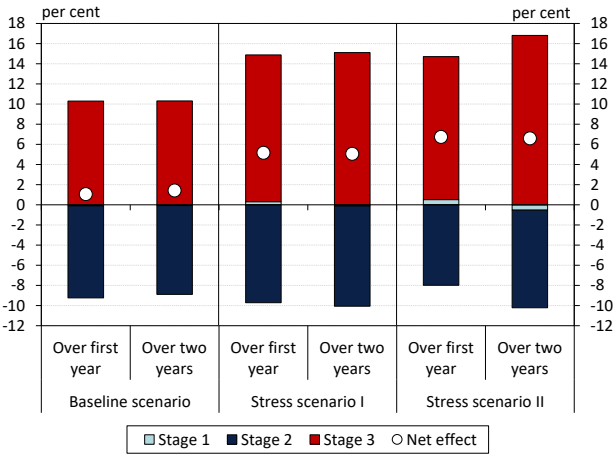
The liquidity surplus declined significantly even if risk management measures are taken into account, but the Liquidity Stress Index continues to imply a low level of risk. The banking sector's liquidity surplus has declined considerably since the beginning of 2021, but the liquidity needs of banks that have a deficit as a result of the stress have not increased.[26] Banks' historically high liquidity surplus under the stress scenario fell from HUF 2,130 billion in early 2021 to HUF 300 billion by mid-2022. The liquidity needs of banks below the requirement in the stress scenario increased slightly to HUF 32 billion (*Chart 62*). In line with the monetary tightening and the framework changes in October 2022, a further relative decline is expected in the banking sector's liquidity surplus in 2022 H2.

Chart 63: Annual GDP growth rate in the scenarios



Source: MNB

Chart 64: Cumulative loan loss provision rate for the corporate loan portfolio



Note: Net generated loan loss provisions from the start of the stress test, grouped by end-of-period stages, in proportion to the gross carrying amount of the corporate loan portfolio. Source: MNB

8.2. The sector's capital adequacy appears to be robust even under major stress

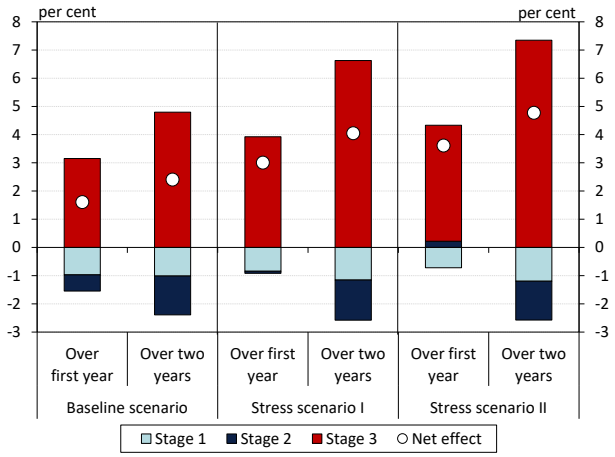
We examined the impact of two stress scenarios with different degrees of severity on the banking sector's capital adequacy. We used the forecast of the September 2022 Inflation Report in the stress test baseline scenario. The results of our calculations reflect the development of the midpoint of the forecast range. As the current economic environment involves an exceptional level of uncertainty, we formulated two separate stress scenarios in our stress test exercise (*Chart 63*). In the stress scenarios, the Russia–Ukraine war, the persistently high energy and commodity prices as well as disruptions in supply chains continue to strain the global economy. These factors negatively affect domestic growth, and thus production capacities are impaired over the longer term as well. According to the assumptions of the stress scenarios, companies postpone their previously planned investments and lay off staff, entailing a further decline in household consumption. Due to mounting risk aversion, capital outflows from emerging economies increase, leading to higher volatility in the money and capital markets. In the more severe stress scenario, all risks unfold in conjunction with a deeper, more protracted macroeconomic downturn, presenting an extreme scenario that is consistent with an increase in geopolitical tensions. As a result, in the first and second stress scenarios, domestic GDP growth in cumulative terms falls short of the baseline forecast by 5–6 per cent and 8–9 per cent, respectively, accompanied by a major exchange rate depreciation and thus different interest rate conditions in both scenarios.

The risks pertaining to the stress scenarios entail high loan loss provisioning, particularly in the corporate segment. In the current environment, the risk characteristics of corporate and household loans are primarily determined by clients' energy price sensitivity[27] and interest rate risk profiles. Higher energy dependency or a major increase in repayment burdens (including those affected by the interest rate cap) were considered as a significant increase in credit risk due to the implicit nature of the risk, and thus the corresponding IFRS 9 classification (Stage 2) is applied to these loans. This elevated vulnerability level

[26] The Liquidity Stress Index, which was prepared to capture the heterogeneity across institutions, aggregates (weighting by the size of bank) the post-stress percentage point liquidity shortfalls compared to the regulatory limit calculated at the level of the individual banks. This allows us to draw conclusions with regard to the extent of a potential stress situation within the banking sector.

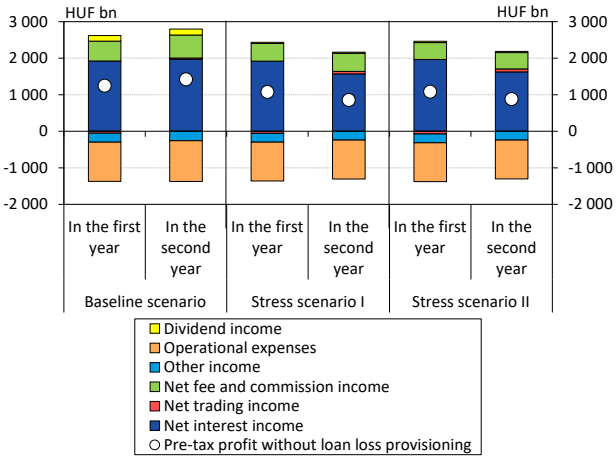
[27] For details, see section 9.1. and 9.2.

Chart 65: Cumulative loan loss provision rate for the household loan portfolio



Note: Net generated loan loss provisions from the start of the stress test, grouped by end-of-period stages, in proportion to the gross carrying amount of the household loan portfolio. Source: MNB

Chart 66: Developments in earnings items before loan losses



Source: MNB

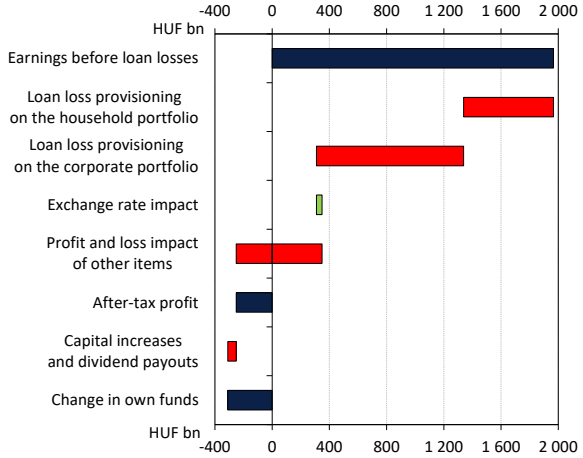
may be offset by the interest rate cap and the effective loan moratorium measures, which delay the level of expected losses and may also reduce it, depending on the timing and mode of phasing out these measures. A large number of loans moves into the delinquent categories in 2022 Q4[28] and 2023 Q3 (following the phase-out of the individual measures). On the whole, total additional loan loss provisioning reaches 5.1–6.6 per cent of the aggregate gross book value in the case of the corporate portfolio (*Chart 64*) and 4–4.8 per cent in the case of the household portfolio (*Chart 65*) in the two stress scenarios.

Banks achieve significantly lower income in both stress scenarios, even before the inclusion of loan loss provisioning. A rising interest rate environment typically results in an increase in banks' net interest income, especially in the short term. In order to conservatively account for the liability-side channels of this process that increase banks' expenditures, both interest rate transmission and the flow into fixed deposits entailing higher expenditures were set at their historical maximum in the two stress scenarios. All of this is combined with more moderate lending dynamics corresponding to the scenarios, and in the less favourable stress scenario, the interest rate cap remains in effect until the end of 2023. As a result, despite the rise in interest rates, the two-year net interest income is substantially lower in both stress scenarios compared to the baseline scenario, although in the second stress scenario the higher interest rate environment results in a smaller difference. Another significant relative difference in income is caused by the net fee and commission income falling due to the slowdown of economic activity under stress. Most of the other items offset the negative differences to a small extent, which is primarily due to the different balance sheet dynamics arising in the calculations. Overall, the profit (before loan loss provisioning) achieved in the two stress scenarios is HUF 736 and HUF 705 billion lower, respectively, in comparison with the two-year horizon of the baseline scenario (*Chart 66*).

In contrast to the positive capital accumulation estimated in the baseline scenario, a decline occurs in the stress scenarios. Loan loss provisioning, as well as other items which include corporate income tax, the regular bank levy and the extra profit tax, will reduce the sector's income before loan loss provisioning by a total of

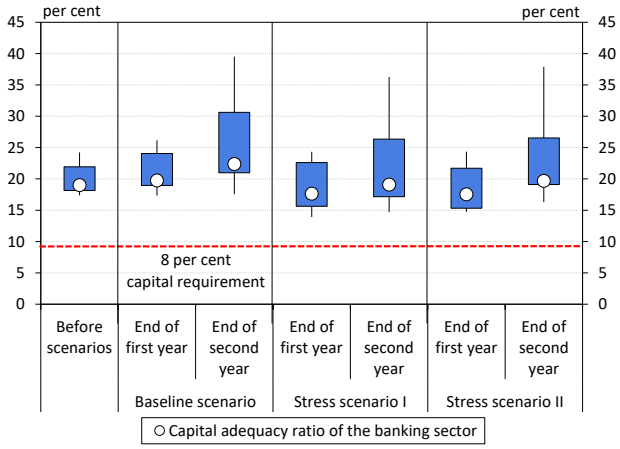
[28] As a result of the macroeconomic shock, according to the rules of IFRS 9, a significant portion of the loan loss provisioning to be recognised in the stress scenario over two years already materialises at the beginning of the scenario.

Chart 67: Changes in certain profit and loss items and own funds of the banking sector in stress scenario II.



Note: Cumulative values over the two-year scenario. The profit and loss impact of other items consists of the following: NDIF, IPF and Resolution Fund fee, bank levy, extra profit tax, capital needs of foreign subsidiaries and bank groups' tax expense. The level of dividend payments is influenced by profits and capital adequacy as well. Source: MNB

Chart 68: Distribution of the capital adequacy ratio based on the number of banks



Note: Vertical line: 10-90 per cent range, rectangle: 25-75 per cent range. Source: MNB

Table 5*: Stress test results at various capital requirements*

	8-per cent capital requirement			Overall capital requirement*		
	Baseline scenario 2024 Q2	Stress scenario I 2024 Q2	Stress scenario II 2024 Q2	Baseline scenario 2024 Q2	Stress scenario I 2024 Q2	Stress scenario II 2024 Q2
Capital need of banks (HUF bn)	0.0	0.0	0.0	0.0	5.2	0.0
Average capital need of banks** (percentage points)	0.0	0.0	0.0	0.0	0.2	0.0
Capital buffer of banks above requirement (HUF bn)	3 574	2 433	2 366	1 701	780	842
Average capital buffer of banks** (percentage points)	14.4	11.1	11.7	6.8	4.1	4.2

Note: *Capital requirements projected for the given quarter. **TREA-weighted averages. Source: MNB

approximately two thousand billion forints over a two-year horizon, according to the two stress scenarios. Since the shocks predominantly materialise at the beginning of the scenarios, on a balance sheet basis, 83–84 per cent of the banks suffer a loss in the first year of the stress scenarios, but in the second year, with the decline of additional impairment, this ratio is significantly reduced in all scenarios. Overall, while significant capital accumulation takes place in the baseline, as a result of the shocks incorporated in the stress scenarios, own funds decrease by HUF 106 billion to HUF 310 billion compared to their initial levels in the period under review (*Chart 67*).

In the case of severe stress, banks are able to preserve their capital adequacy by curbing lending. The sector-level capital adequacy ratio (CAR) of 19 per cent at the end of June 2022, which includes all mid-year profits, drops below 18 per cent by the end of the first year of the two stress scenarios. However, by June 2024, profits turning positive and the decrease in the total risk exposure amount (TREA) increases the ratio slightly above the initial value in the first stress scenario, and to 19.7 per cent in the second scenario (*Chart 68*). The development of profitability and capital adequacy requires adjustments in the dividend payment strategy in certain cases. At the end of the examined period, capital shortfall occurs only in the first stress scenario, in relation to nearly 13 per cent of the sector expressed in terms of total TREA (Table 5). In the two stress scenarios, several banks fall short of the current overall capital requirements, but in the majority of cases, by the end of the period, the deficits turn into a surplus. The results of the second stress scenario, which might seem more favourable at a first glance, develop in this manner primarily due to the lower level of TREA of the banks in question. Ultimately, it can be said that, even with two stress scenarios of different severity, a capital shortfall of a temporary and manageable degree arises in the banking system.

9. Special topic: manageable risks in the vulnerable loan portfolios

Together with the high costs of commodities, increasing wage demands and the rising interest rate environment, the European energy crisis represents a major shock for enterprises. At the same time, the increase in households' cost of living reduces disposable income and demand for the products of the corporate sector, which narrows the final repricing ability of companies, putting pressure on their revenues and debt-servicing capacity. In our special topic, we assess the sensitivity of the corporate and household loan portfolio to these shocks – and especially to the energy price shocks.

The most energy-intensive companies account for 3 per cent of the domestic corporate loan portfolio, while significantly energy-intensive firms account for 18 per cent of the stock. Another 4 per cent of the loan portfolio is related to suppliers closely related to the latter group. According to our estimate, the median probability of default for SMEs with credit may have increased from 2.9 per cent to 4.7 per cent as a result of the combined shocks observed until the autumn of 2022, but this increase does not only affect energy-intensive industries. In addition to cost shocks, aggregate demand may decrease in the near future, as a result of which higher sectoral bankruptcy rates can be expected in sectors that are more sensitive to the business cycle.

In the case of the household sector, we estimate that the rising cost of living will increase the proportion of households with loans considered financially vulnerable by 4–7 percentage points. According to the results of our agent-based housing market model, the NPL rate of the mortgage loans of the credit institution sector may rise by 1.8 percentage points by the end of 2023, as a result of the increase in utility costs, without a change in consumption habits; however, with flexible consumption adjustment it may be substantially smaller.

9.1. The median probability of default of the domestic SME sector may have increased from 2.9 per cent to 4.7 per cent as a result of cost shocks

The changed macroeconomic environment makes the operation of many businesses more difficult or often even impossible. This is also considered to be a primary risk by the European Central Bank in its May 2022 Financial Stability Review.[29] In view of the complexity of challenges, we examined the potential effects of the aforementioned shocks on the domestic corporate sector applying three approaches: (1) we identified energy-intensive activities and their credit exposure; (2) based on a credit risk model, we estimated the probability of default for small and medium-sized enterprises after cost shocks; and (3) with a historical analysis of sectoral bankruptcy rates we identified the sectors sensitive to the business cycle.

In terms of the various cost shocks, the rise in energy prices affects domestic companies' operation the most. Nevertheless, in a sectoral breakdown the shock hits the firms in a highly heterogeneous manner, depending on their energy consumption, i.e. the energy intensity of their activity. As large consumers, companies in many cases purchase energy at market prices by concluding annual contracts. Upon renewal of these contracts, they may have to incorporate purchase prices that are five or seven times higher into their operational planning. This is especially a problem for companies whose energy costs are high compared to sales. According to the HCSO's 2020 data, **24 fields of activity can be identified where the average sub-sector energy costs exceed 10 per cent of the average sales revenue**. In particular, they include the manufacture of rubber, clay building materials and ceramic tiles, manufacture of cement, lime and plaster, manufacture of paper, casting of iron, manufacture of basic iron and steel and of ferro-alloys, operation of sports facilities, manufacture of organic basic chemicals, manufacture of flat and hollow glass, manufacture of starch,

[29] More details: https://www.ecb.europa.eu/pub/financial-stability/fsr/html/ecb.fsr202205~f207f46ea0.en.html

as well as the manufacture of weapons and ammunition. These **24 sub-sectors account for 3 per cent, i.e. nearly HUF 330 billion**, **of all domestic corporate loans outstanding.**

Energy costs also represent a significant operating expense for companies where the ratio of energy costs to sales revenue exceeds 3 per cent. Of the 615 sub-sectors (NACE level 4 classes), this threshold is exceeded by the average values of 111 sub-sectors, which together account for 18 per cent (HUF 1,977 billion) of all domestic corporate loans outstanding. In the case of these firms, **it may happen that their stock of orders declines during their adjustment**, which can also affect the operation of firms that are closely related through supplier links. Accordingly, the impact of a sudden shock to this point of the network constituted by the companies may also suddenly pass through to other companies with which they have business relations. To assess the risks arising from customer-supplier relationships, company-level supplier – VAT – relationship data from the National Tax and Customs Administration were used. The analysis examined the strength of the relationships relative to the sales revenue of the company concerned.[30] If the group is widened to also include firms that obtain at least one quarter of their annual sales revenue from these 111 sub-sectors, i.e. they are closely related, they account for 22 per cent (HUF 2,406 billion) of domestic corporate loans outstanding. Excluding large companies, the ratios are similar for the SME sector as well (19 per cent and 24 per cent). It is important to note, however, that **there are numerous channels of adjustment available for companies, and they have ample liquid reserves, which may attenuate the negative impacts of increasing risks.** Non-financial corporations' liquid assets increased gradually in recent years, and this trend accelerated following the outbreak of the coronavirus pandemic as well as the announcement of the government and central bank credit scheme.

For modelling the credit risk of the Hungarian small and medium-sized enterprises sector, we used the model of Banai et al. (2016)[31] and its revised version (Burger, 2022).[32] **The objective of the estimation is to receive a current broad view of companies' sector-level probability of default, taking the relevant economic developments into account.** Our estimate was based on financial indicators calculated using companies' financial statements submitted to the National Tax and Customs Administration in their 2021 tax returns. Using these values, the model quantifies the median probability of default, whereas the shocked PD (probability of default) was the result of the inclusion of last year's change in the following trends:

- rise in domestic corporate electricity and gas prices, taking account of heterogeneous sectoral energy intensity (at 4-digit Hungarian NACE Rev. 2 (TEÁOR'08) level);
- increase in personnel expenditures according to national wage dynamics;
- rise in other material costs based on producer price indices;
- annual increase in the interest rate environment on the basis of the change in the base rate, taking fixed-rate loans into account; and
- in addition, on the income side we increased corporate sales revenues as a proportion of the consumer price index.

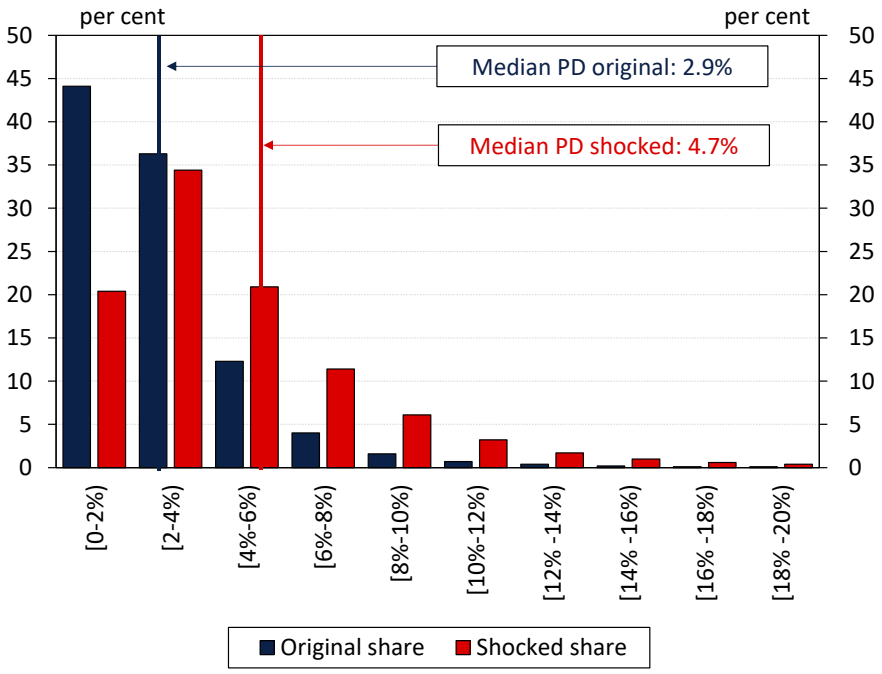
As a result of our assumptions, in the shocked scenario the costs of companies increased to a greater degree than their incomes. On the basis of the estimated results, **the domestic SME sector's median probability of default may have risen from 2.9 per cent to 4.7 per cent** as a combined result of the shocks observed until autumn 2022 (*Chart 69*). As the PD values express probability of default over a one-year time horizon; in an implicit manner the approach is based on the assumption that the shocks persist to a similar degree over this horizon, and the shocked PD value can also be evaluated accordingly.

[30] More details on the methodology can be found in Box 4 of the May 2020 Financial Stability Report. Download link: https://www.mnb.hu/letoltes/financial-stability-report-2020-may.pdf

[31] Banai et al. (2016): Modelling the credit risk of the Hungarian SME sector. Download link: https://www.mnb.hu/letoltes/mnb-op-123-final.pdf

[32] Csaba Burger: Defaulting alone: the geography of SME owner numbers and credit risk in Hungary. Download link: https://www.mnb.hu/letoltes/mnb-op-144-final-1.pdf

Chart 69: PD distributions estimated with the original input data and those according to the shocks observed until autumn 2022 on the basis of the MNB's SME PD model



Note: The shocked PD distribution captures heterogeneous shocks at sector level, as a result of which corporate expenditures increase to a greater degree than their sales. Source: MNB

Although the cost shock affects the various activities to different degrees, the shock spreads through the entire economy depending on the substitutability of the product and service produced and the pricing power of the given company. Aggregate demand may decline in the near future as a result of the decrease in households' disposable income that can be spent on consumption. Demand for various products and services then changes in a heterogeneous manner; there are more crisis resistant companies **and ones that provide products or services that are more sensitive to the business cycle**. In order to identify the companies that depend to a greater degree on economic trends, i.e. the ones that are hardest hit by the drop in aggregate demand, **we went back to the latest crisis that resulted in a decline in aggregate demand and examined the consequences of the 2008–2009 economic crisis**. The impact of the fall in aggregate demand can be identified through three levels: 1) as the most direct effect, in the change of the ratio of companies with declining sales revenue; 2) as a more indirect effect, in the change of the ratio of loss-making companies; and 3) the most indirect effect, which has the most significant impact from a real economy point of view: the increase in the ratio of liquidations. All the three indicators were analysed in a sectoral breakdown, at the two-digit NACE level.

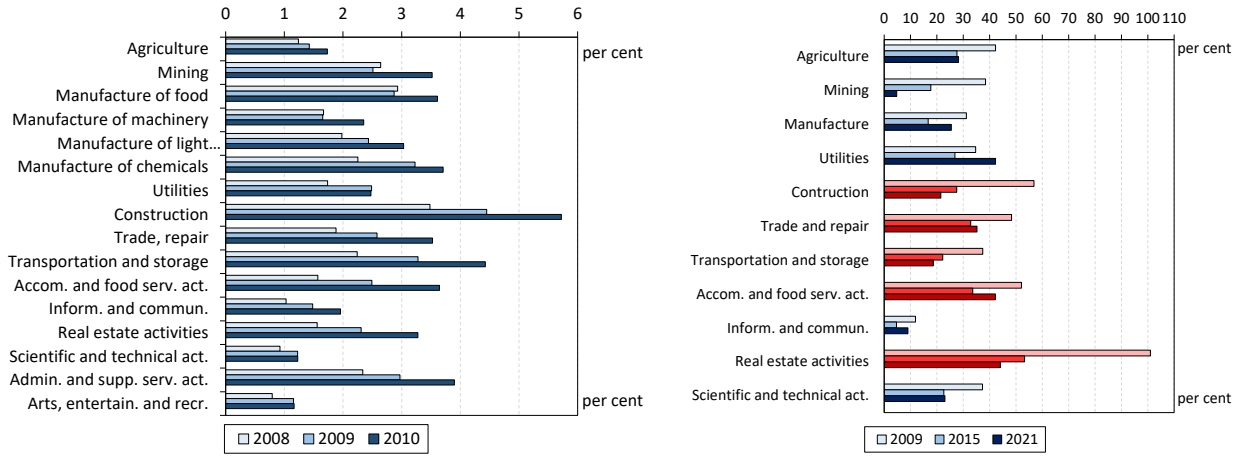
1. The **unfavourable effect of the drop in demand on sales revenue** was mostly experienced in the following national economy sectors: agriculture, forestry, fishing, manufacturing, trade and repair of motor vehicles, transportation and warehousing, accommodation services and food and beverage service activities, and construction.[33]
2. **In terms of the increase in the share of loss-making companies**, the most affected national economy sectors were: trade and vehicle repair as well as arts, entertainment and recreation – examined on both the basis of number or balance sheet total. In addition, on the basis of number, the ratio of loss-making companies increased to the greatest degree in agriculture, forestry, fishing, manufacturing and construction.[34]

[33] At the sub-sector level, on the basis of number, the following can be mentioned: manufacture of food products, manufacture of basic metals and fabricated metal products, manufacture of electrical equipment, manufacture of motor vehicles and water transport.

[34] Of the sub-sectors, on the basis of number, the ratio of loss-making companies increased the most in printing and other reproduction activities, manufacture of basic metals and fabricated metal products, repair and installation of machinery and equipment, other professional, scientific and technical activities, advertising and market research, and gambling and betting activities. On the basis of balance sheet total, manufacture of chemicals

3. In **terms of the ratio of liquidation proceedings**, in the one or two years following the outbreak of the global financial crisis, the highest increase was observed in the chemical industry, construction, trade and repair of motor vehicles, accommodation services and food and beverage service activities, and in real estate activities sectors (*Chart 70*, *left*).[35]

Chart 70: Share of companies affected by liquidation proceedings (left) and outstanding loans as a percentage of sectoral value added (right) in a breakdown by national economy sector



Note: In the figure on the right, cyclically-sensitive sectors are highlighted in red. Source: OPTEN, NTCA, HCSO, MNB

On the whole, based on a joint examination of the three indicators, the sectors construction, trade and repair of motor vehicles, administrative and support service activities, transport and warehousing, and accommodation services and food and beverage service activities are the national economy sectors that are the most sensitive to the fall in aggregate demand. This is presumably related to the differences in the flexibility of the demand for the products and services offered by the individual activities. However, in terms of financial stability it is advantageous that in these cyclically-sensitive sectors the ratio of loans outstanding to the sectoral value added typically declined to a greater degree than in the case of total loans outstanding. While between 2009 and 2021 the corporate loan-to-GDP ratio fell by 12 percentage points, the declines observed amounted to 57 percentage points in real estate activities, 35 percentage points in construction, 19 percentage points in transport and warehousing, 13 percentage points in trade and repair of motor vehicles and 10 percentage points in accommodation services and food and beverage service activities (*Chart 70*, *right*). Accordingly, compared to total corporate loans outstanding, the loans outstanding of these five sectors declined from 58 per cent in 2009 to 51 per cent by end-2021.

In order to map the potential effects of the present risk environment on the banking sector's corporate portfolio and to assess their management by banks, we contacted credit institutions with a questionnaire survey in September 2022. On the basis of the answers, it can be established that **in view of the above risks banks reviewed their respective portfolios, introduced tighter monitoring on the levels of the clients and sectors concerned, and implemented tightening in terms of lending procedures as well.** Based on the assessments, the manufacturing, food industry and hotel industry sectors are affected the most. For 2022, banks **are planning slightly higher loan loss provisioning as well**, which is expected to be higher for 2023. The institutions that expect an increase in risk costs primarily expect possible provisioning for the SME portfolio and attributed this to the feed-through of international effects. Nevertheless, the

and chemical products, manufacture of basic metals, manufacture of other transport equipment, travel agency, tour operator and other reservation service and related activities, and water and air transport were the most affected.

[35] At sub-sector level, the greatest increase in winding-up took place in printing and other reproduction activities, manufacture of other non-metallic mineral products, manufacture of basic metals and fabricated metal products, civil engineering, air transport, warehousing and support activities for transportation, postal and courier activities, employment activities, and security and investigation activities.

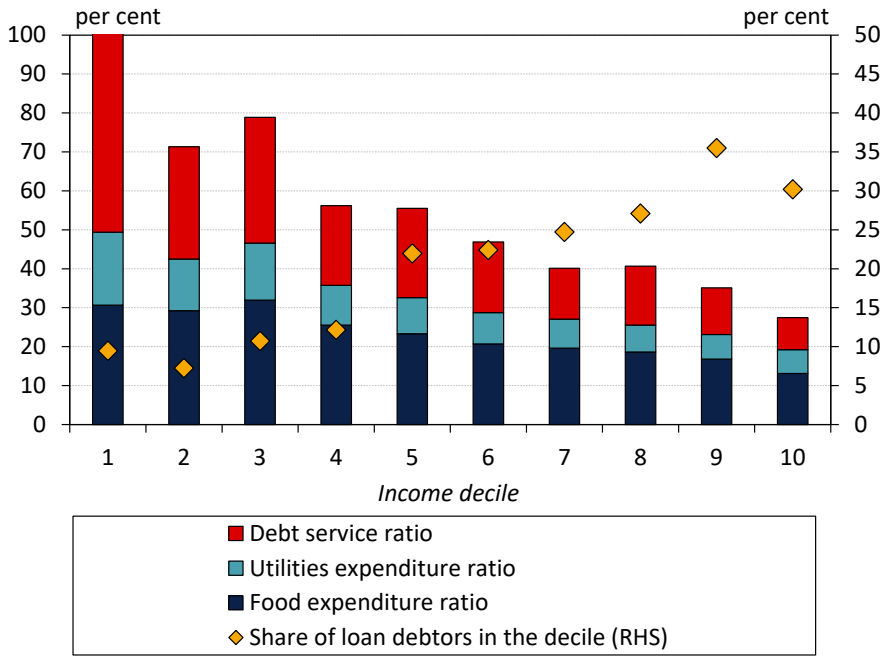
responses suggest that the vulnerability of portfolios is still considered moderate in the short run, i.e. it may become significant if the unfavourable environment persists.

9.2. The NPL ratio of household mortgage loans may rise by around 2 percentage points as a result of rising energy prices

The debt-servicing capacity of the household segment can be affected by changes in the income as well as the expenditure side. In the case of most repricing loans, the increase in instalments is prevented by the interest rate cap in effect until the middle of 2023, but on the expenditure side, the increase in living costs, specifically the increase in housing maintenance and food costs observed in the recent period, reduces the population's financial room for manoeuvre. The impact of the increase in utility costs and food inflation on households with credit was examined in several methodological frameworks: (1) The effect of the increase in utility costs and food expenses on households – seen as the basic unit of financial management – using questionnaire data from 2019; (2) The effect of the increase in utility costs on the loan portfolio using recent micro-level data; (3) The effect of the increase in utility costs on the NPL rate of mortgages in the banking system using an agent-based housing market model.

1. The relative income position of the household plays a decisive role in the effect of the rise in consumer prices on the household segment, as basic costs of living account for a much greater share of the household's total expenditures among those with lower income. In the case of households with an income below the median (HUF 214,000 per month in 2019) and that have loans (whose rate of occurrence is otherwise lower), total expenditures on utilities, food and debt amounted to more than one half[36] of the monthly income in 2019 (*Chart 71*) This ratio is more than 70 per cent in the three lowest income deciles (monthly net household income below HUF 133,000).

Chart 71: Expenditure structure of indebted households by income deciles in 2019



Source: HCSO Household budget survey, 2020

Due to lack of sufficiently detailed and up-to-date household data, the impact of the recent price rise can be quantified only to a limited extent using retrospective factual data. **Nevertheless, based on the Hungarian Central Statistical**

[36] In the analysis, we assume that the households where living and debt costs amount to more than one half of their income find themselves in a financially stretched situation with the increase in these costs.

Office's 2020 survey we examined from two aspects the extent to which the rise in utility costs and food prices[37] increases the ratio of indebted households which can be considered vulnerable from a financial perspective.

(1) *Debt-servicing capacity: the ratio of instalment to disposable income after paying utility and food costs.* In this approach, indebted households are considered vulnerable if the indicator exceeds 50 per cent. Within indebted households, the share of these households was originally 13 per cent. Considering the rise in utility costs in the households whose consumption is above the average and the average annual change in food prices, the share of these households increases by 4 percentage points to 17 per cent.

(2) *Financial strain: the ratio of installment increased by the additional cost of the rise in utility costs and food prices to disposable income.* In this approach too, households are considered vulnerable if the indicator exceeds 50 per cent. The share of these households was originally 8 per cent, rising by 7 percentage points to 15 per cent with the increase in expenditures on utilities and food.

Overall, therefore, the rise in the costs of living may result in debt-servicing difficulties for an additional 4–7 per cent of households with credit – apart from the risks linked to the repricing of loans, which, for the time being, are mitigated by the interest rate cap for many debtors.

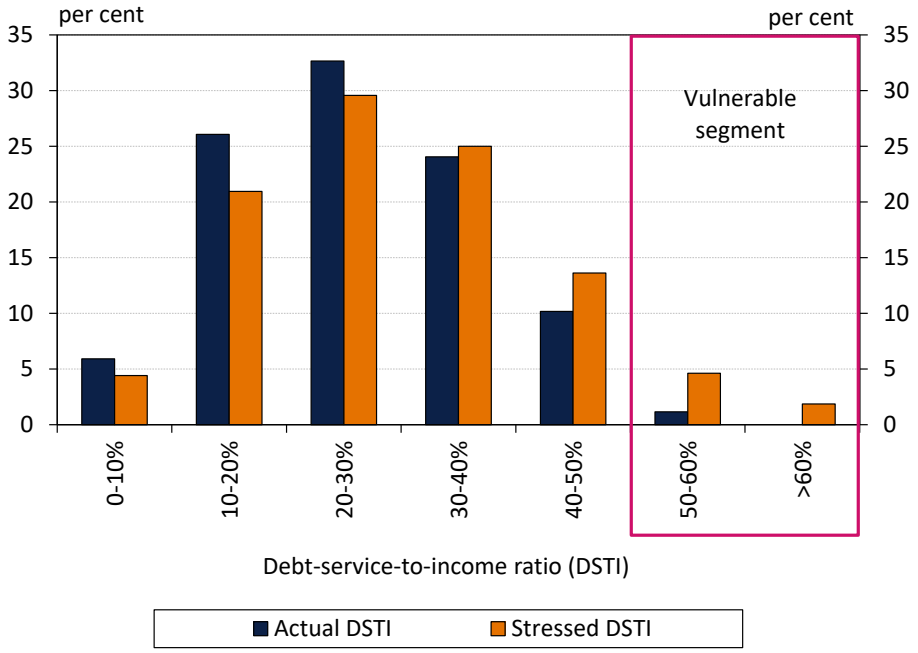
2. In order to assess the potential effects of the energy price increase on the credit market, we also examined the settlement-level gas and electricity consumption data. In villages, the share of households with higher-than-average gas consumption is larger than that of urban areas, which may primarily be explained by the higher weight of detached real properties with poor energy performance in villages. There is heterogeneity by settlement type in terms of electricity consumption as well, but to a lesser extent.

In terms of financial stability, the rise in gas prices may entail a major risk, which is why we examined the potential risks of the gas price rise more deeply. When estimating the effects of the risks, in the central bank credit register we randomly identified the debtors who consume more than the average, based on the probabilities stemming from the average overconsumption ratios at the location of the collateral in the case of mortgages, and at the settlement type of residence in the case of unsecured loans. Debtors' last known income established upon credit scoring during their most recent borrowing was indexed with the rise in nominal GDP. In our estimate, we did not distinguish the debtors on the basis of heating modes, i.e., the shock effect also concerns those who have district heating, and thus we overestimate its effect to some extent.

Adding the rise in the gas costs to the debt installments, according to our estimate the debt-service-to-income (DSTI) ratio of mortgage loans would increase around one and a half times, by 10–15 percentage points on average. The mortgage loans concerned account for some 3 per cent (HUF 300 billion) of all household loans outstanding. In their case, the sum of the installments and the gas costs rise may even exceed half of the monthly net income, which may considerably increase the risk of non-performance. From this, in the case of loans outstanding in an amount of some HUF 70 billion, the DSTI ratio may increase to above 50 per cent by growing more than 20 percentage points. In the case of unsecured loans, 3 per cent (HUF 300 billion) of total household loans outstanding would move to above a 50-per cent DSTI as a result of the gas price increase; of that, in the case of HUF 120 billion the DSTI may rise by more than 20 percentage points. Overall, the risks originating from the energy price rise may remain moderate: the credit risk may grow in the case of 6 per cent of household loans outstanding, and 2 per cent of the loans outstanding might become particularly risky (*Chart 72*).

[37] The rise in food prices was taken into account with the July 2022 annual price change, an increase of 27 per cent.

Chart 72: Estimated effect of the gas costs increase on the DSTI ratio of household mortgages



Note: Debtors' income was indexed by the nominal GDP growth based on the time elapsed since the last known credit scoring. The debtors affected by the gas price increase were determined based on probabilities calculated from the consumption data of gas-consuming households. Source: MNB, MVM

3. Using our agent-based housing market model,[38] we also examined how the expected increase in utility costs affects the probability of default of mortgage loans. To analyse this issue, we determined the expected utility costs of various households based on the territorial distribution of consumption, as well as the quality and size of the dwellings in the model and the household size. We assumed that the worse the quality and the larger the size of the dwelling, and the more people live in it, the higher the utilities consumption of the household is.[39] As for the macroeconomic path, we used the forecast of the Inflation Report September 2022, whereas in the case of government measures the information available until 18 October 2022 was taken as a basis.[40] We quantified the outcomes of four possible scenarios. Of them, in one we presumed unchanged utility costs, and compared it to the three scenarios that expected utility cost increase as well. The difference between the latter three scenarios was the extent to which households were able to reduce their electricity and gas consumption (0/10/20 per cent), in view of the rising expenditures.

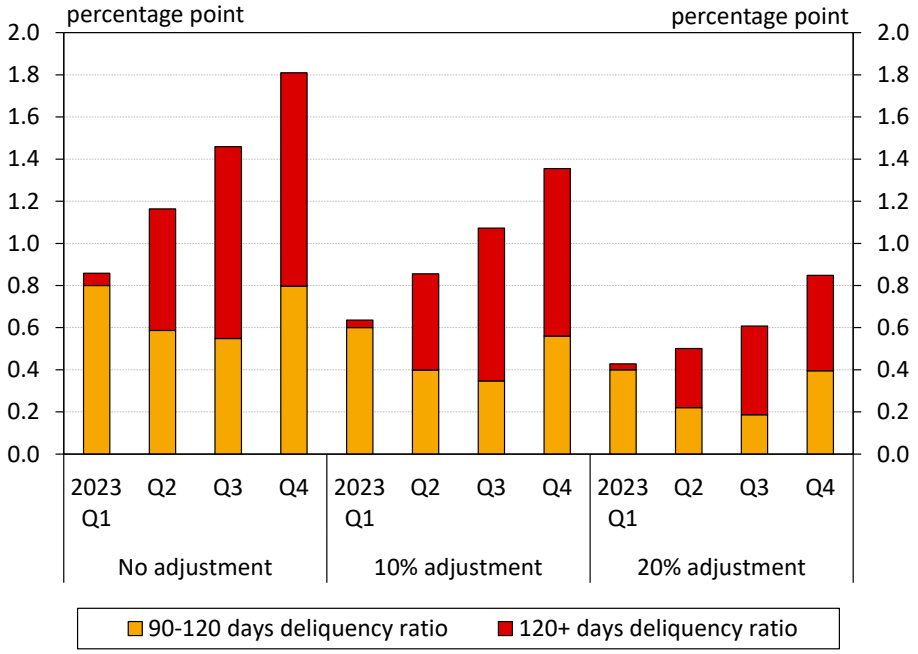
[38] The model is presented in detail in Mérő et al (2022): WP 2022/7 – Mérő – Borsos – Hosszú – Oláh – Vágó: A High Resolution Agent-based Model of the Hungarian Housing Market (mnb.hu).

[39] The seasonality of utility costs was not taken into account; we assumed that the elevated expenditures are uniformly distributed over the year.

[40] For example, the repayment moratorium and the interest rate cap will end in December 2022 and June 2023, respectively.

According to our results, without adjustment in consumption, every quarter 0.5–0.8 percentage point more loans become 90 days past due because of the rise in utility costs. With the restructuring of loans and the restoral of the debtor's solvency,[41] some of these loans may become performing again, while a certain share of them remains non-performing over the longer term as well. The latter permanently increase the NPL ratio of mortgages as well. Accordingly, following steady rise, by end-2023 the NPL ratio (on the basis of the number of contracts) will be 1.8 percentage points higher than in the baseline scenario. At the same time, if households were able to reduce their electricity and gas consumption to some extent, the number of non-performances would be significantly lower. The effect of the rise in utility costs on the default rate would decline by 0.2 percentage point per quarter with a 10-per cent adjustment and by 0.4 percentage point with a 20-per cent adjustment. Likewise, the effect observed in the NPL ratio could decline by one quarter in the case of a 10-per cent consumption reduction and by one half (0.8 percentage point) in the case of a 20-per cent cut in consumption (*Chart 73*).

Chart 73: Changes in mortgage loans' NPL ratio as a result of the rise in utility costs and the decline in utility consumption



Note: By number of contracts. Source: MNB

Overall, according to our estimates, 4–7 per cent of indebted households and 6 per cent of loans outstanding became vulnerable and the latter, 2 per cent can be considered highly risky. As a result of the increase in utility costs, without adjustment to the changed circumstances, the NPL ratio of the credit institutions' sector's mortgage loans would increase by 1.8 percentage points by end-2023. If households can adjust relatively flexibly with their energy consumption (signs of this are already being seen), this ratio may decline by as much as one half.

[41] A debtor's solvency can be restored (1) if he became delinquent due to unemployment but found a job again, or (2) as a result of an increase in wages. As the assumed macroeconomic path shows low unemployment and high wage dynamics, the probability of the 'recovery' of non-performing loans is relatively high.

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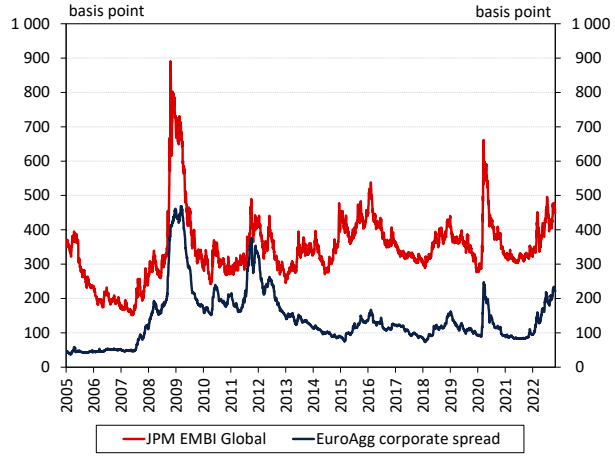
APPENDIX: MACROPRUDENTIAL INDICATORS

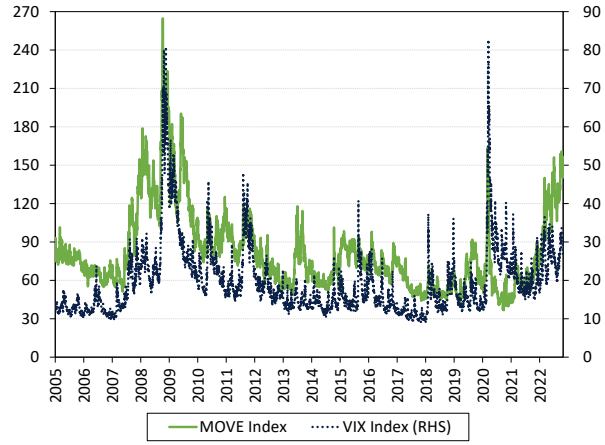
1. Risk appetite

Chart 1: Primary risk indicators



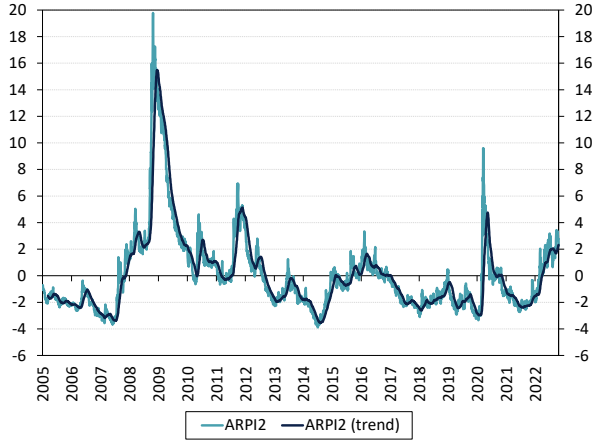
Source: Bloomberg

Chart 2: Implied volatility of the primary markets



Source: Bloomberg

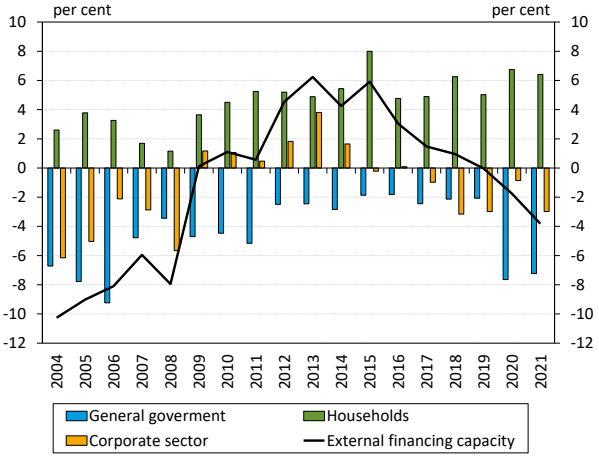
Chart 3: Dresdner Kleinwort indicator



Source: DrKW

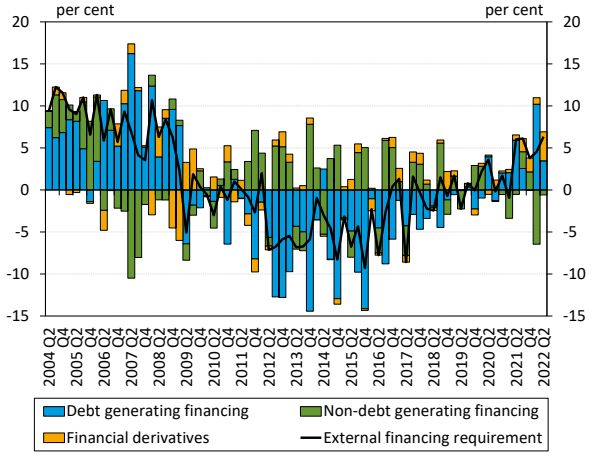
2. External balance and vulnerability

Chart 4: Net financing capacity of the main sectors and external balance as percentage of GDP



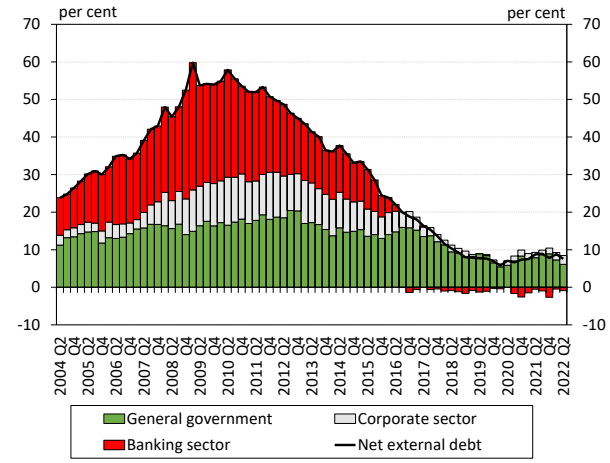
Source: MNB

Chart 5: External financing requirement and its financing as a percentage of GDP



Source: MNB

Chart 6: Net external debt as a percentage of GDP



Source: MNB

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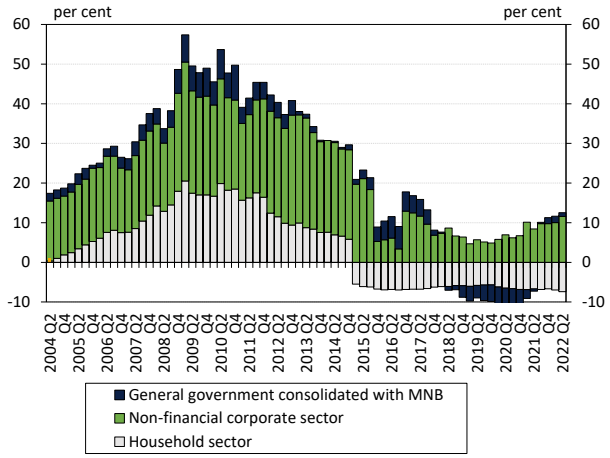
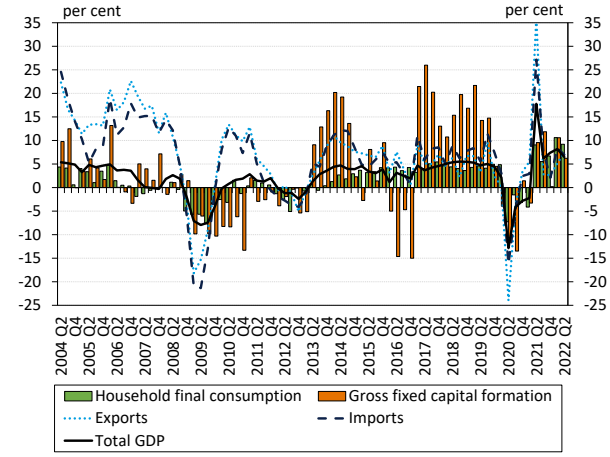


Source: MNB

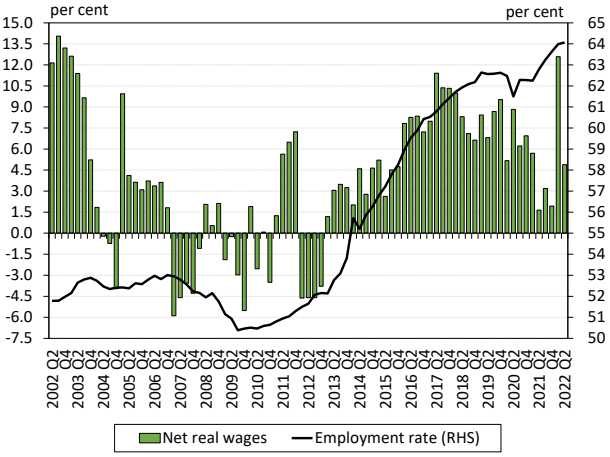
3. Macroeconomic performance

Chart 8: GDP growth and its main components (annual growth rate)



Source: HCSO

Chart 9: Employment rate and net real wage developments (annual growth rate)



Source: HCSO

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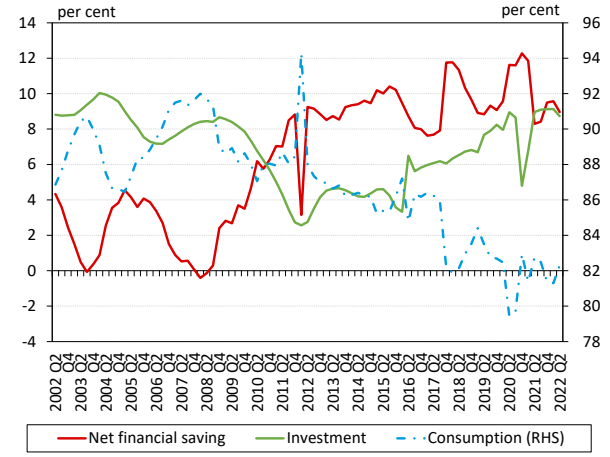
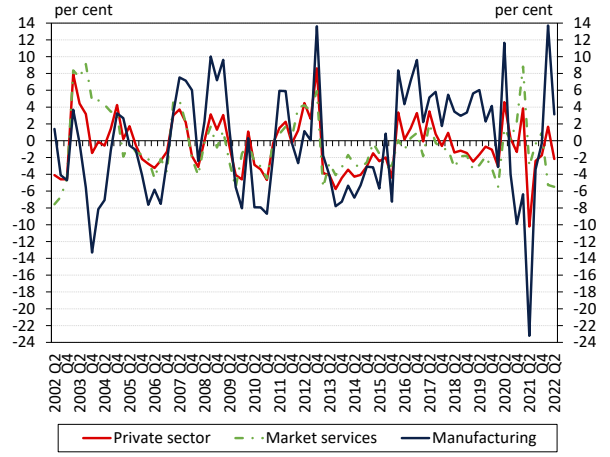


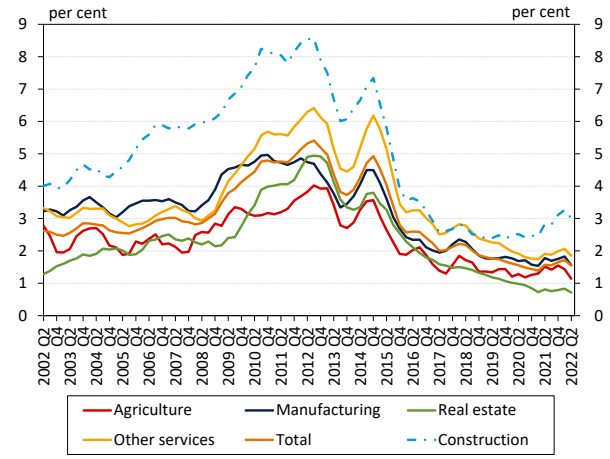
Source: HCSO, MNB

Chart 11: Corporate real unit labour cost in the private sector (annual growth rate)



Source: HCSO, MNB

Chart 12: Sectoral bankruptcy rates



Source: Opten, MNB, HCSO

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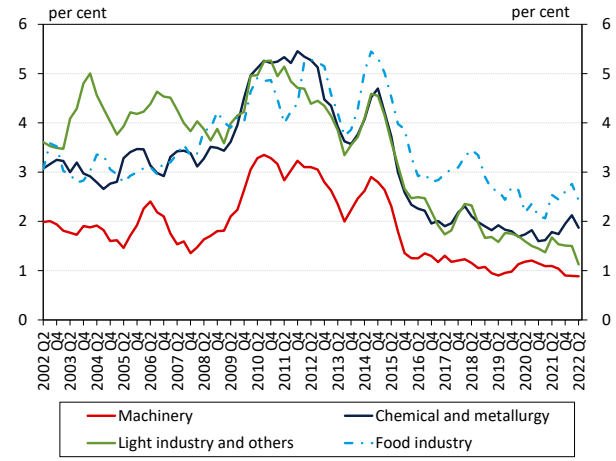
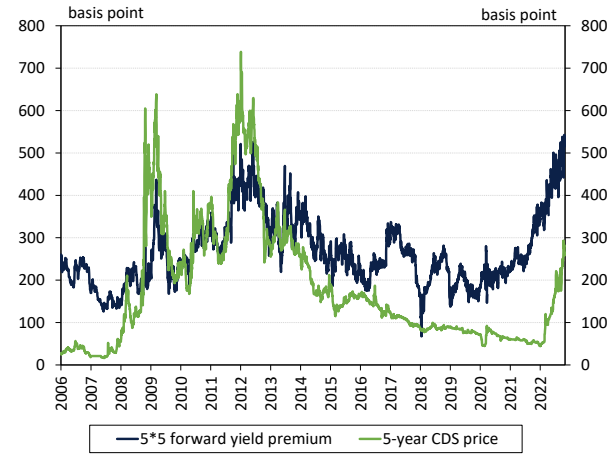


Source: Opten, MNB, HCSO

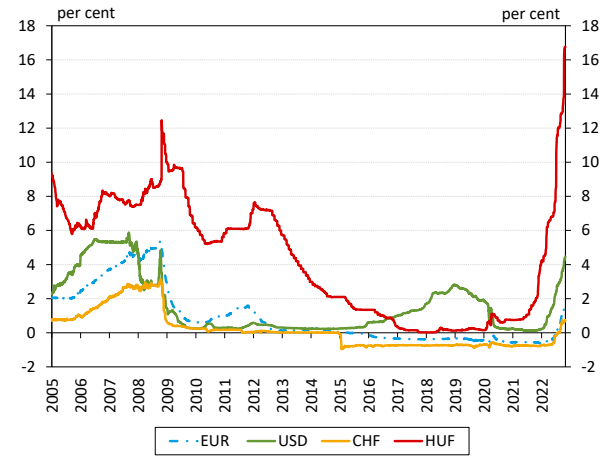
4. Monetary and financial conditions

Chart 14: Long-term sovereign default risk and forward premium of Hungary



Source: Reuters, Bloomberg

Chart 15: Three-month EUR, USD, CHF and HUF money market interest rates (LIBOR and BUBOR fixing)



Source: Bloomberg

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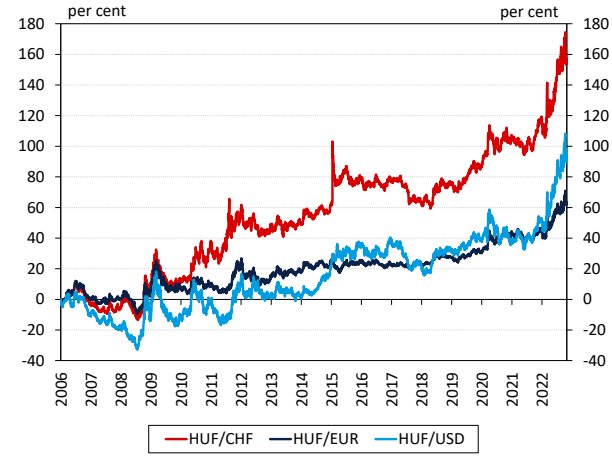

Source: Reuters

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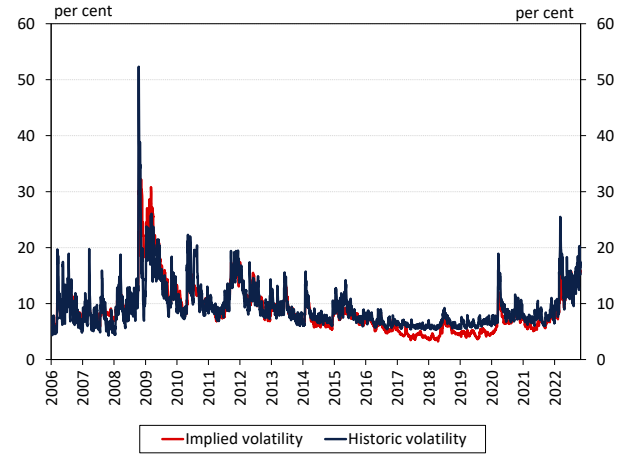

Source: Bloomberg, MNB

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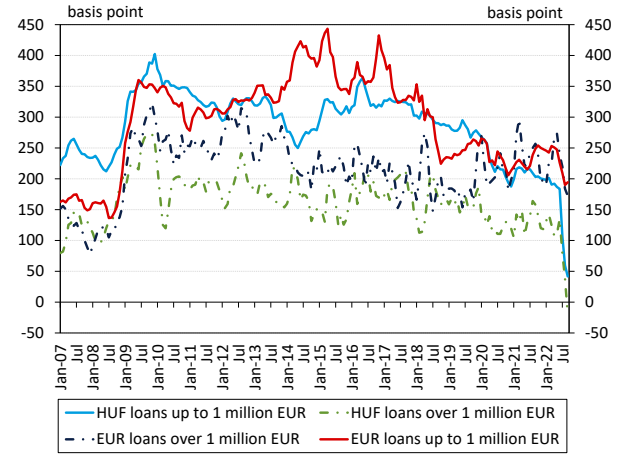
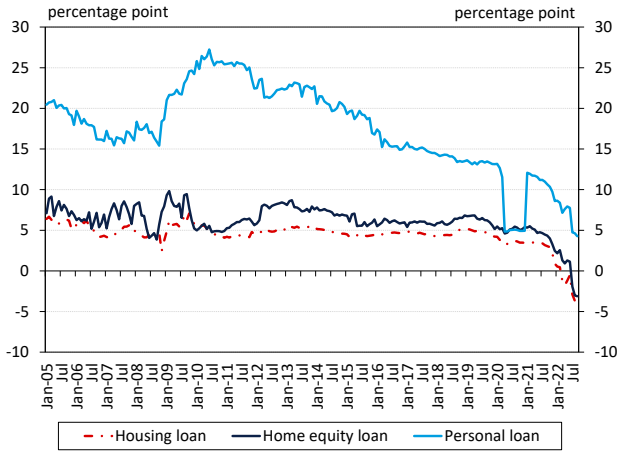


Source: MNB

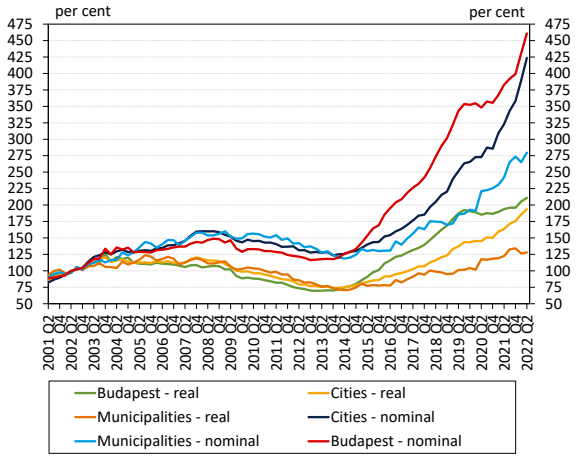
Chart 19: Interest rate premium of new HUF loans to households (over 3-month BUBOR)



Source: MNB

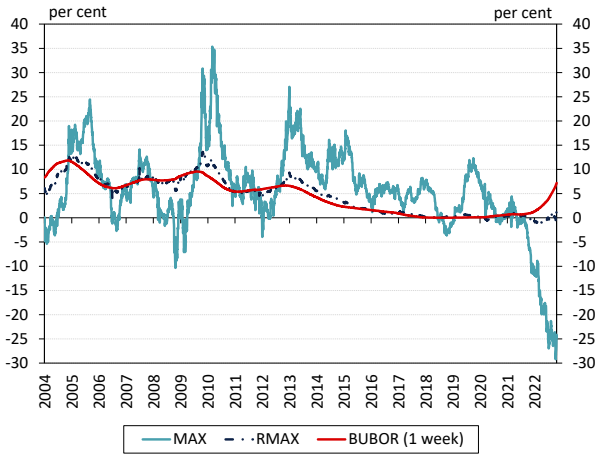
5. Asset prices

Chart 20: MNB house price index breakdown by settlement type



Source: MNB

Chart 21: Annualised yields on government security indices and money markets



Source: Government Debt Management Agency, MNB, portfolio.hu

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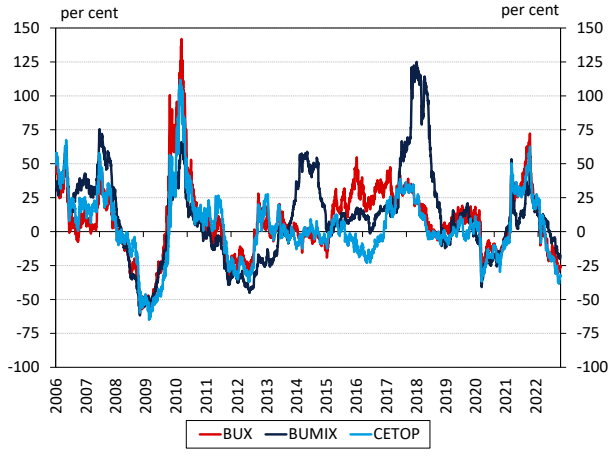
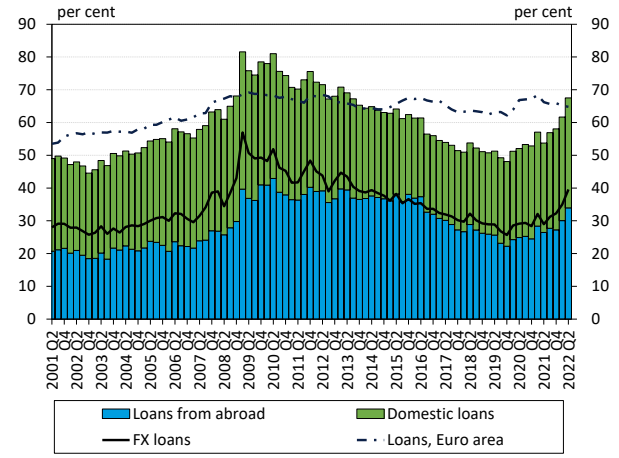


Source: BSE, portfolio.hu

6. Risks of the financial intermediary system

Chart 23: Indebtedness of non-financial corporations as percentage of GDP



Source: MNB, ECB, Eurostat

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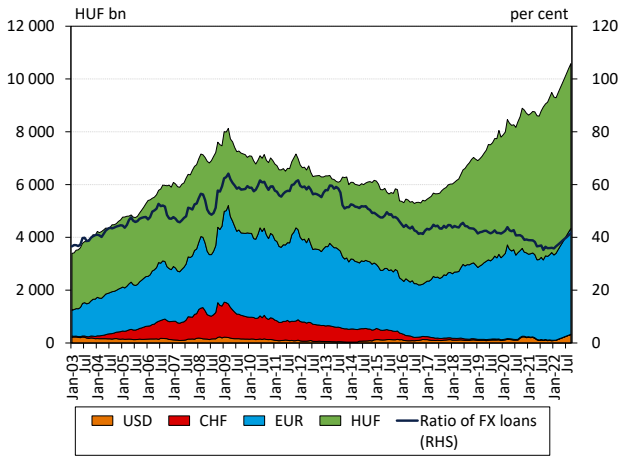

Source: MNB

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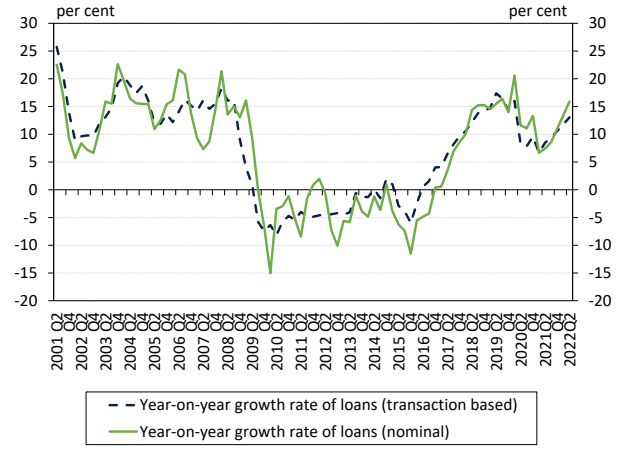

Source: MNB

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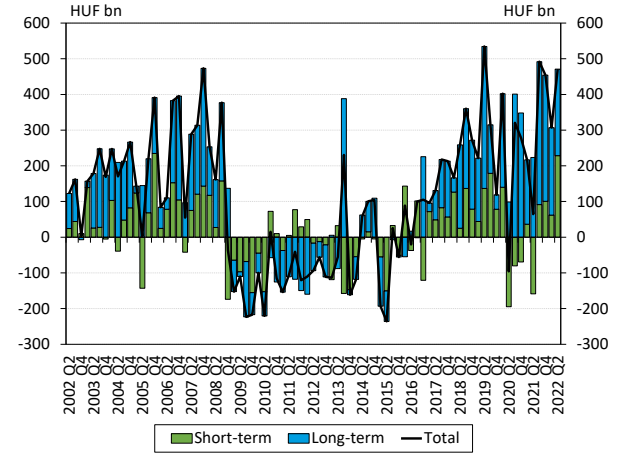

Source: MNB

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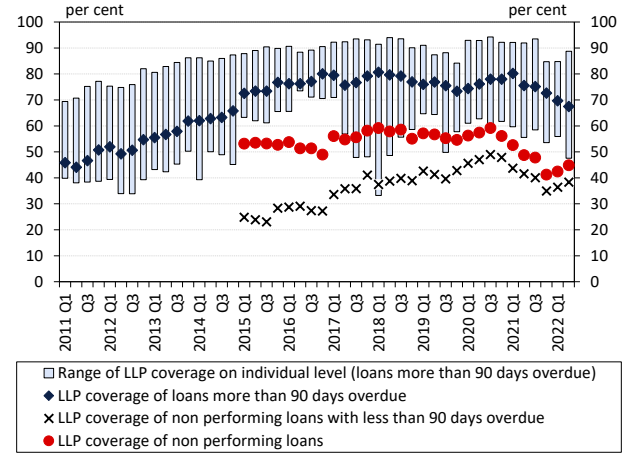

Source: MNB

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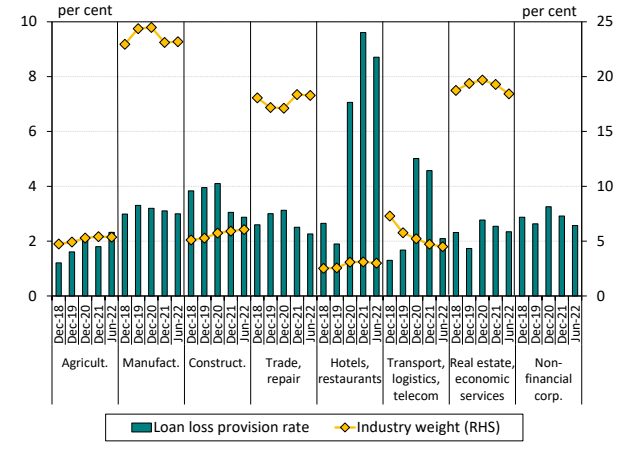

Source: MNB

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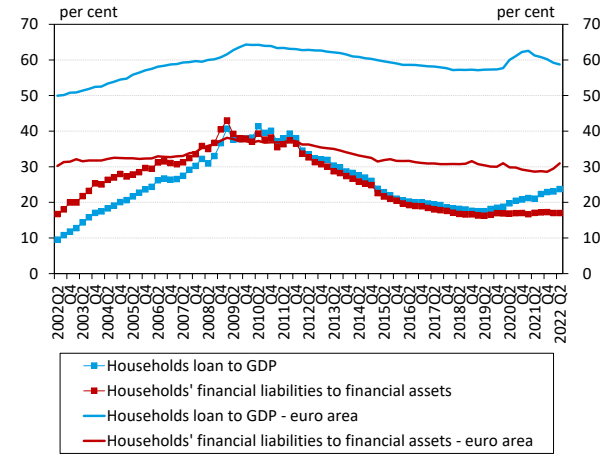

Source: MNB, ECB

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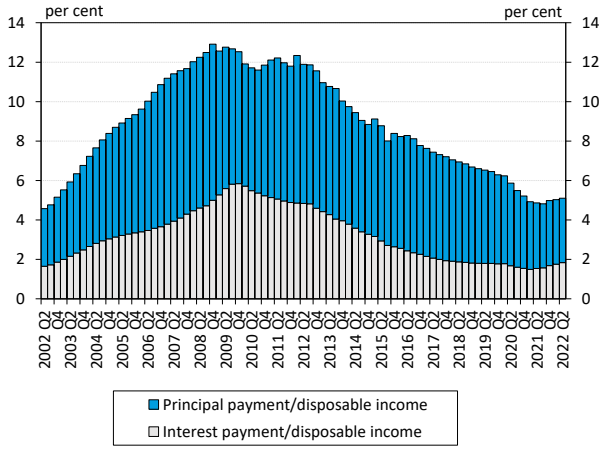

Source: MNB

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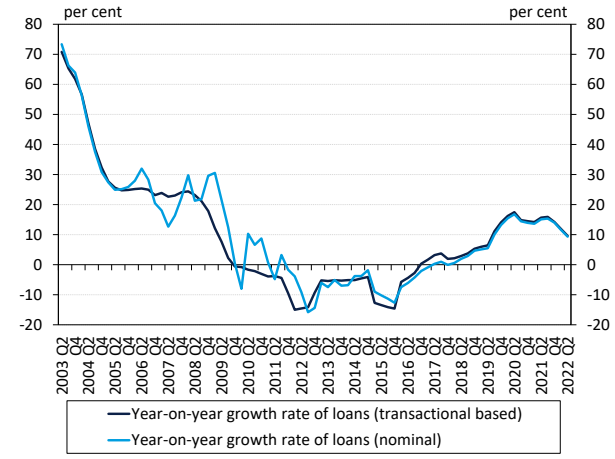

Source: MNB

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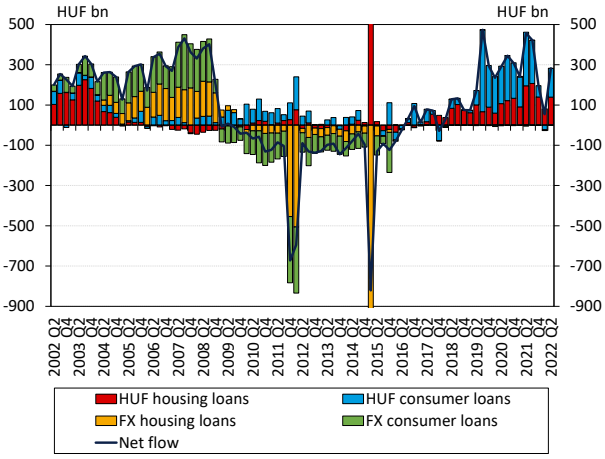

Source: MNB

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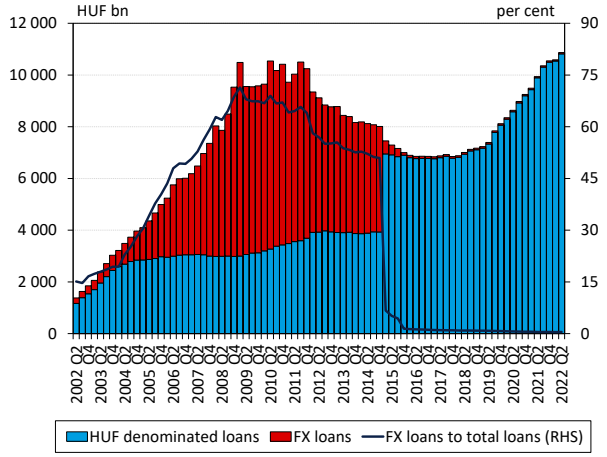

Source: MNB

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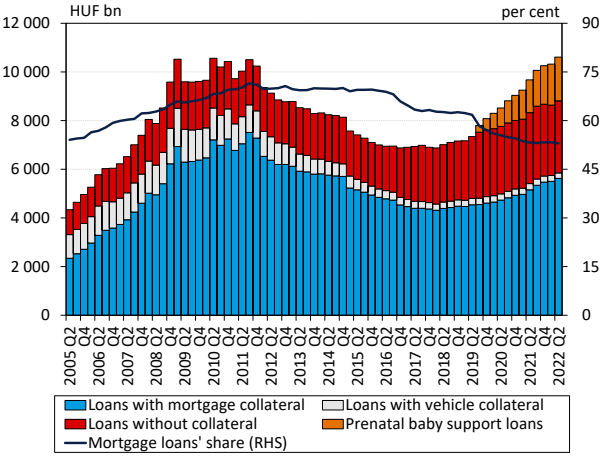

Source: MNB

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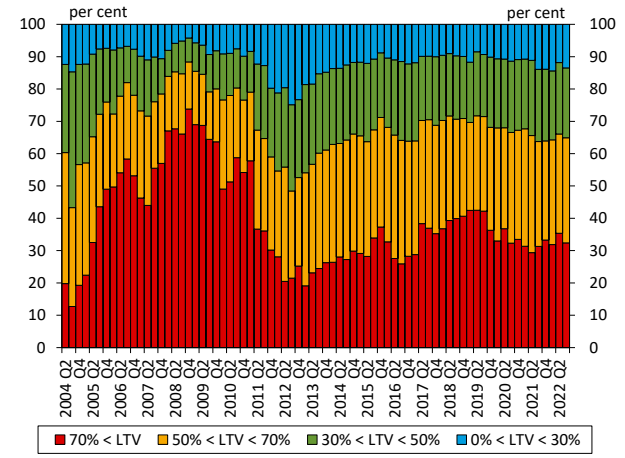

Source: MNB

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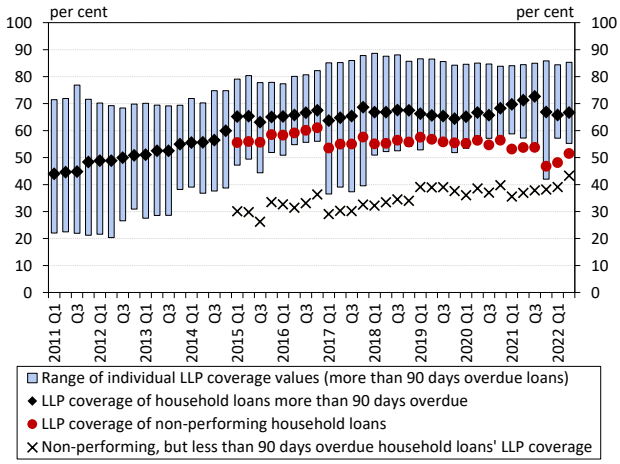

Source: MNB

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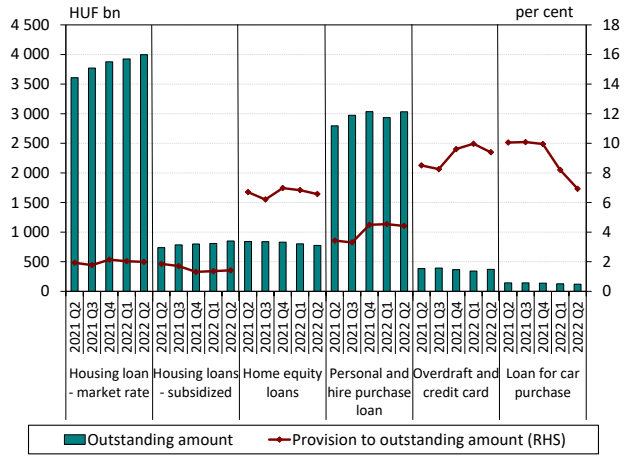

Source: MNB

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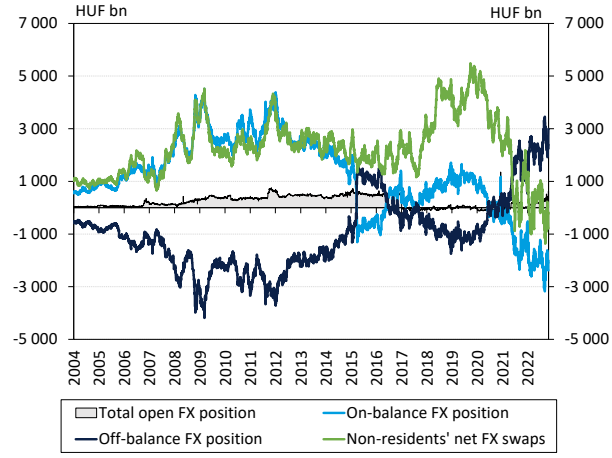

Source: MNB

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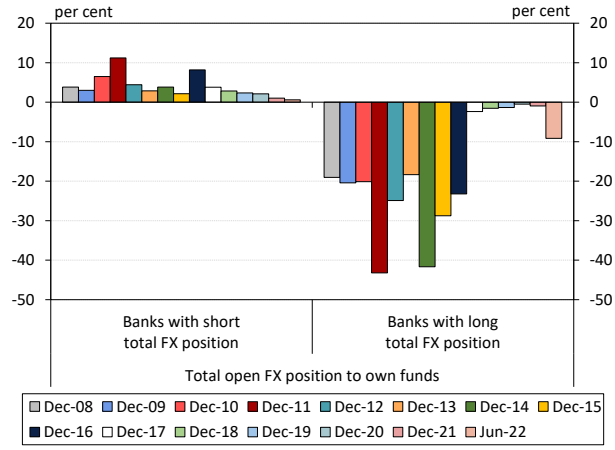

Source: MNB

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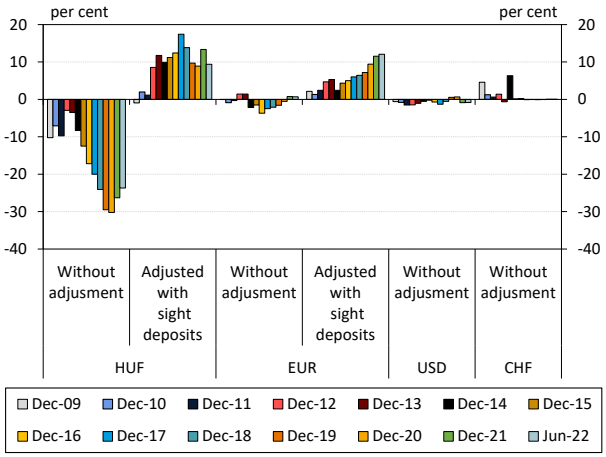
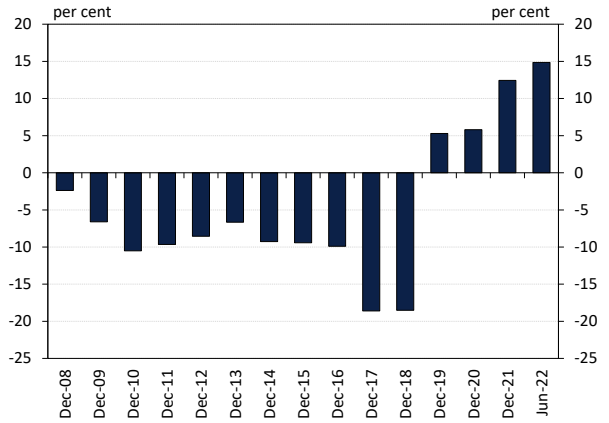


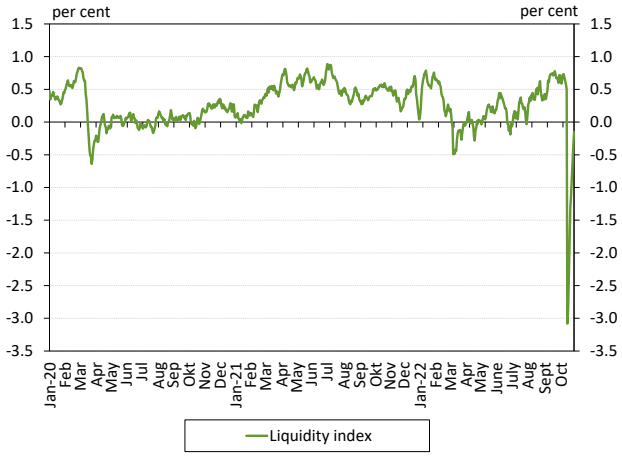
Source: MNB

Chart 41: Estimated maximum loss based on interest rate risk stress tests relative to equity



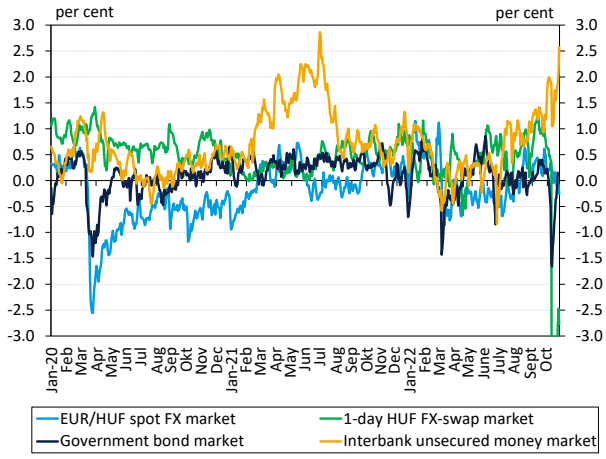
Source: MNB

Chart 42: Liquidity index



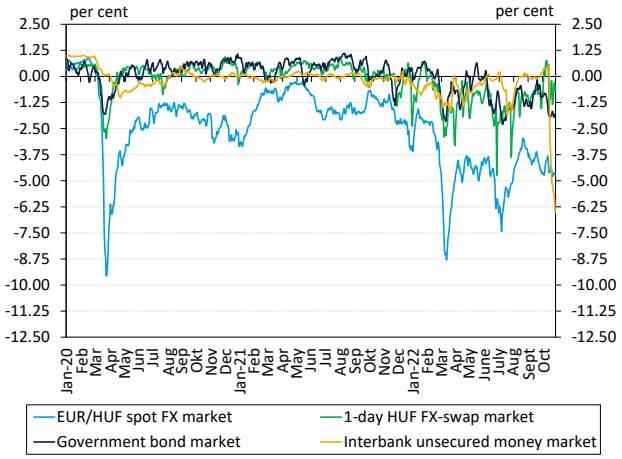
Source: MNB, KELER, Bloomberg

Chart 43: Liquidity indices of sub-markets



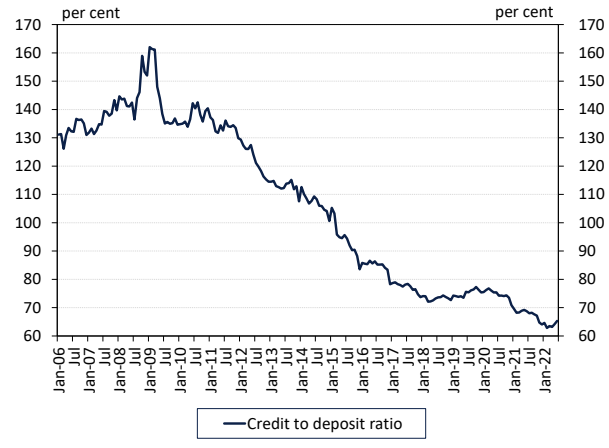
Source: MNB, KELER, Bloomberg

Chart 44: Liquidity sub-indices of bid-ask spreads of the major domestic financial markets)



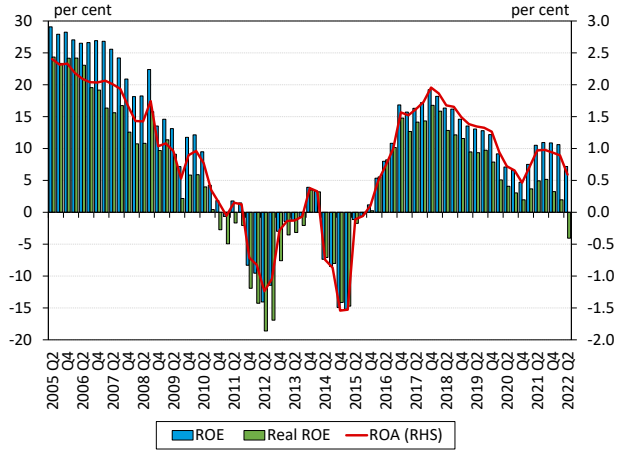
Source: MNB, KELER, Bloomberg

Chart 45: Credit to deposit ratio of the banking sector



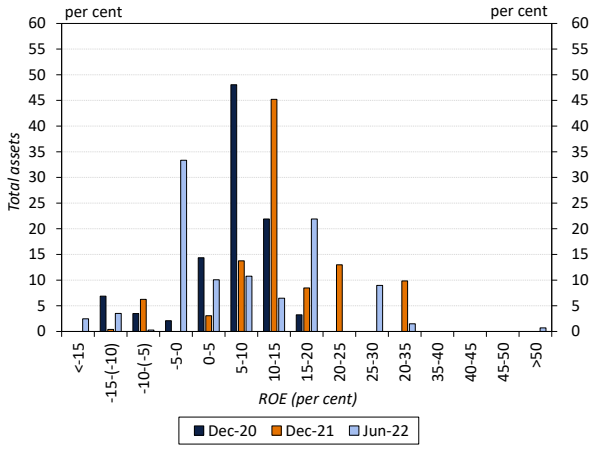
Source: MNB

Chart 46: ROA, ROE and real ROE of the credit institution sector



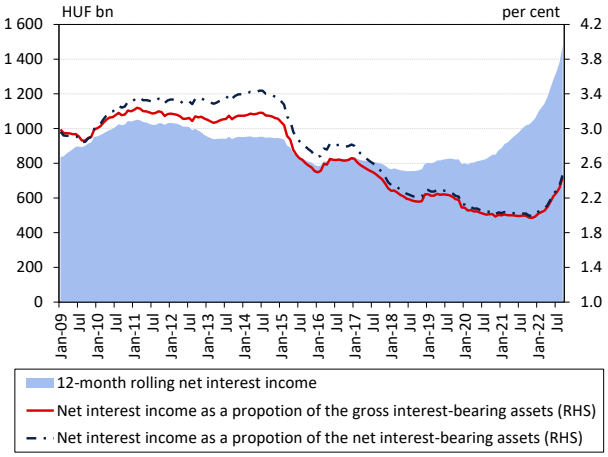
Source: MNB

Chart 47: Dispersion of banks' total assets by ROE



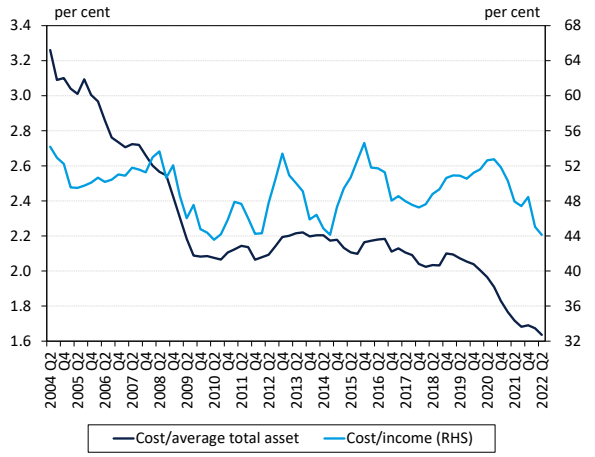
Source: MNB

Chart 48: Net interest income as a proportion of the gross and net interest bearing assets in the credit institution sector



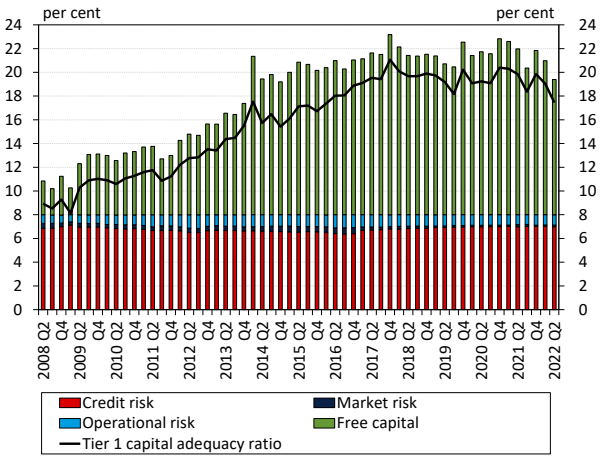
Source: MNB

Chart 49: Operating efficiency indicators of the banking sector



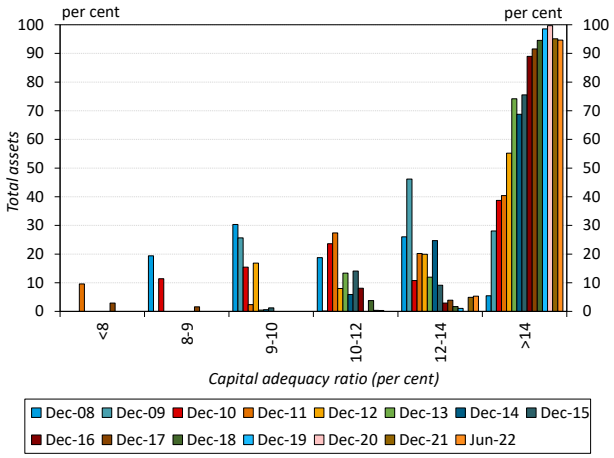
Source: MNB

Chart 50: Banks' capital adequacy ratio (CAR) and Tier 1 capital adequacy ratio



Source: MNB

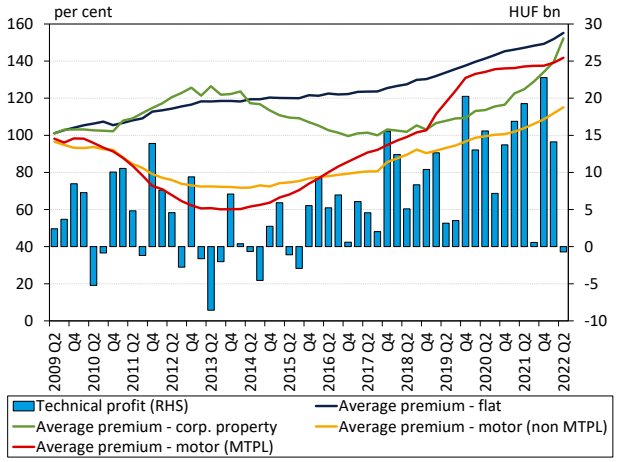
Chart 51: Dispersion of banking sector's total assets by capital adequacy ratio



Source: MNB

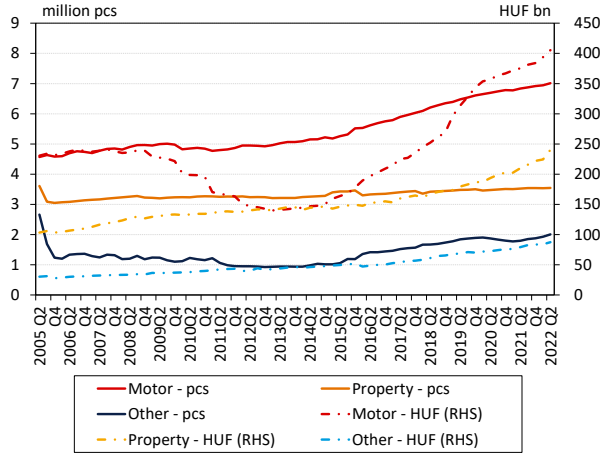
7. Institutional investors

Chart 52: Underline data of insurance tax



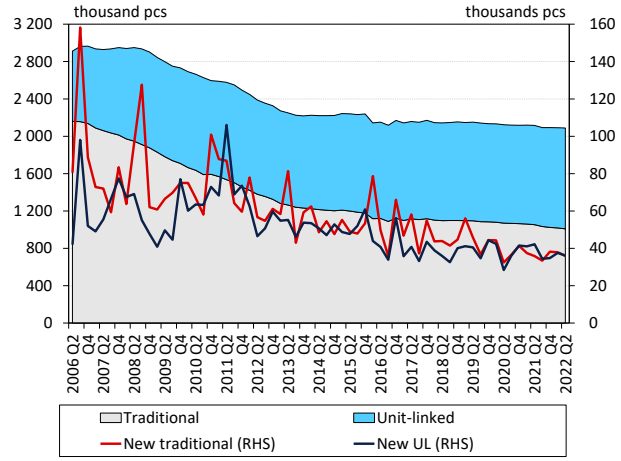
Source: MNB

Chart 53: Development of the outstanding amount of non-life insurance



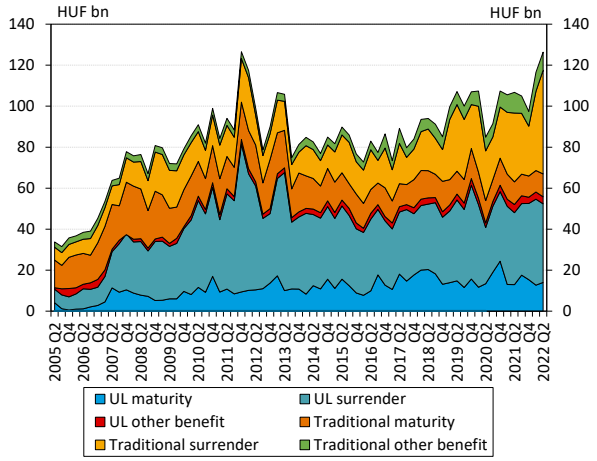
Source: MNB

Chart 54: Development of the outstanding amount of life insurance



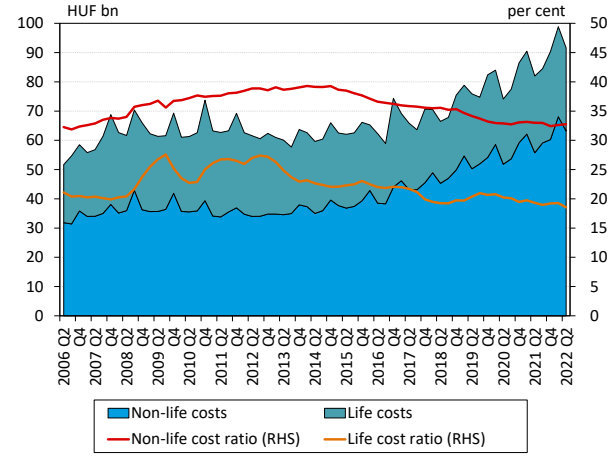
Source: MNB

Chart 55: Development of the outstanding amount of life insurance benefits



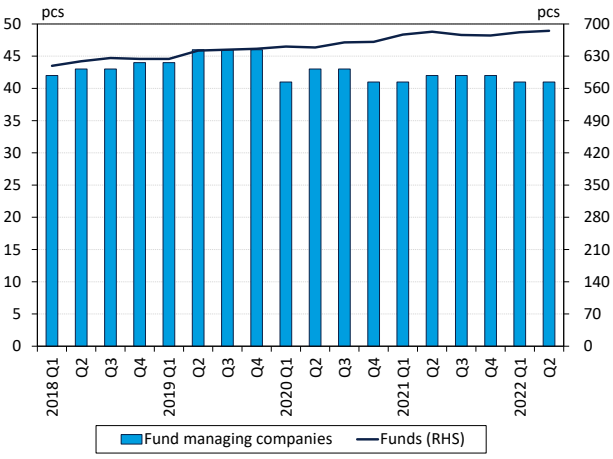
Source: MNB

Chart 56: Costs in the insurance sector



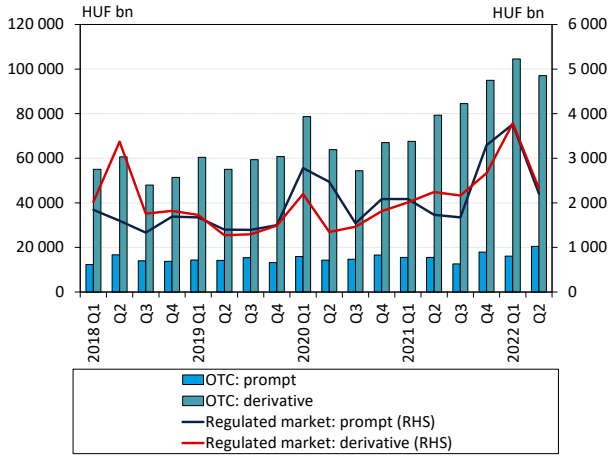
Source: MNB

Chart 57: Number of investment fund managing companies and investment funds



Source: MNB

Chart 58: Capital market turnover of investment firms



Source: MNB

Notes to the appendix

The chart date (e.g. 2020) means the end of the year (the 31st of December) unless indicated otherwise.

Chart 1:

The increased value of the indicator shows declining risk appetite or increasing risk aversion.

Chart 2:

VIX: implied volatility of S&P 500, MOVE: implied volatility of US Treasuries (Merrill Lynch).

Chart 3:

The increased value of the indicator shows declining risk appetite or increasing risk aversion.

Chart 5:

The fundamental development of debt is not influenced by the conversion between unallocated and bullion balances, thus this effect has been excluded.

Chart 6:

Excluding intercompany loans.

Chart 7:

The open FX position of households has turned because of the FX conversion. The compensation of this is shown at banks temporarily, then is was got to the consolidated state with the MNB.

Chart 10:

Disposable income is estimated by the MNB using household consumption, investment and financial savings data.

Chart 12:

Number of bankruptcy proceedings of legal entities, aggregated as of the date of publication and cumulated for 4 quarters, divided by the number of legal entities operating a year before.

Chart 13:

Number of bankruptcy proceedings of legal entities, aggregated as of the date of publication and cumulated for 4 quarters, divided by the number of legal entities operating a year before.

Chart 14:

The 5-year forward forint risk premium as of 5 years from now, compared to the euro forward yield (3-day moving average) and the 5-year Hungarian credit default swap spread.

Chart 17:

Historic volatility: weighted historic volatility of the exchange rate (GARCH method). Implied volatility: implied volatility of quoted 30-day ATM FX options.

Chart 18:

Spread on the 3-month BUBOR and EURIBOR. Loans with floating interest or with up to 1-year initial rate fixation. Adjusted for money market loans > 1M EUR since 2015.

Chart 19:

Spreads based on the APR.

Chart 20:

2002 average = 100 per cent.

Chart 23:

Nominal values, on current rates. Based on consolidated data (previously only unconsolidated data were available for the euro area).

Chart 26:

Exchange rate adjusted values.

Chart 27:

The individual loan loss coverage range covers the banks with at least 2 per cent share in corporate lending.

Chart 28:

In brackets below the names of sectors the weights within corporate credit portfolio are indicated for end-of-observation period.

Chart 35:

The category 0-30 percent contains also the loans disbursed without mortgage before 2008.

Chart 36:

The range of LLP coverage on the individual level refers to the larger banks.

Chart 38:

An increase in the swap stock stands for swaps with a long forint spot leg. Based on the daily FX reports of credit institutions. Calculated from swap transactions between credit institutions and non-resident investors. Revisions due to reporting errors and non-standard transactions can lead to significant subsequent modifications of the data series. The data series does not include swap transactions between branches, specialised credit institutions, cooperative credit institutions and non-resident investors. The swap stock is the sum of termin legs calculated at actual foreign exchange rates.

Chart 40:

From December 2019, the values for the security portfolio, the IRS portfolio, as well as for loans and liabilities were calculated on a cashflow basis instead of a contract basis. In addition, for loans and liabilities, from December 2019 onwards, we could only take into account the remaining maturities, not the time remaining until repricing.

Chart 41:

The interest rate risk stress test indicates the two-year projected result of an extreme interest rate event; in this scenario this event is a parallel upward shift of the yield curve by 300 basis points. For calculating the results, from December 2019 onwards, we applied the interest rate risk model detailed in Box 10 of the December 2019 Financial Stability Report. While for earlier calculations we assumed shocks of each currency's yield curve, for these new calculations we only assumed the shock-like upward shift of the HUF curve.

Chart 42:

A rise in the liquidity index indicates an improvement in the liquidity of the financial markets. The indicator is the unweighted average of the aggregate liquidity ratios of the sub-markets shown in Chart 43.

Chart 43:

Each aggregate liquidity index of a sub-market is the unweighted average of exponential moving averages normalized by the mean and standard deviation of the values of four sub-indices (number of transactions, average transaction size, bid-ask spread, and return to volume indices) between 2013 and 2017. An increase in the aggregate liquidity index indicates an increase in the liquidity of the given sub-market.

Chart 44:

A rise in the indices represents a narrowing bid-ask spread, thus an increase in the tightness and liquidity of the market. The liquidity-index of HUF FX swap market includes the data of USD/HUF and EUR/HUF segments, taking into account tom-next, overnight and spot-next transactions. The earlier version of the liquidity index included only the tom-next USD/HUF transactions.

Chart 45:

Client loans include loans and bonds of non-financial institutions, household loans, loans and bonds of financial and investment enterprises, government loans, municipal loans and municipal bonds. Client deposits include the deposits of non-financial institutions, household deposits, deposits of money market funds, deposits of financial and investment enterprises, government deposits and municipal deposits. The loan-to-deposit ratio is exchange-rate-adjusted with respect to the last period.

Chart 46:

ROE: pre-tax profit/average (equity - balance sheet profit).

ROA: pre-tax profit/average total assets.

Interim data are annualised.

Pre-tax profit: previous 12 months.

Average total assets: mean of previous 12 months.

Average (equity - balance sheet profit/loss): 12 month moving average.

Deflator: previous year same month=100 CPI (per cent).

Chart 47:

Pre-tax profit.

Chart 48:

Based on aggregated individual, non-consolidated data.

Net interest income: 12-month rolling numbers, the difference of interest revenue and interest expenditure.

Gross interest bearing assets: 12-month average numbers, total exposure.

Net interest bearing assets: 12-month average numbers, exposure minus the provision.

Chart 49:

Cost: previous 12 months.

Income: previous 12 months.

Average total asset: mean of previous 12 months.

Chart 50:

Capital adequacy ratio (CAR) = (total own funds for solvency purposes/minimum capital requirement)*8 per cent.

Tier 1 capital adequacy ratio = (tier 1 capital after deductions/minimum capital requirement)*8 per cent.

Chart 53:

Motor insurance premiums contains insurance tax from 2019.

Chart 58:

Sum turnover of investment firms and credit institution.

Ferenc Deák

(17 October 1803 – 28 January 1876)

Politician, lawyer, judge at a regional high court, member of parliament, minister for justice, often mentioned by his contemporaries as the ‘wise man of the homeland’ or the ‘lawyer of the nation’. Eliminating the ever-recurring public law disputes and clarifying the relationship between the ruling dynasty and the hereditary provinces, he not only reinforced the constitution and the existence of the nation but also paved the way for the development as well as the material and intellectual enrichment of Hungary.

Deák was actively involved in preparing the laws for the parliamentary period between 1839 and 1840, and he became an honorary member of the Hungarian Academy of Sciences in 1839. After the death of his elder brother in 1842, Deák the landowner liberated his serfs and voluntarily undertook to pay taxes proving that he was an advocate of economic reforms not only in words but also in deeds. He refused to fill the position of delegate to the 1843/44 parliament because he disagreed with the idea of having to be bound by the instructions received as delegate, and as a moderate political thinker he had his concerns about the radical group led by Kossuth.

He remained level-headed also with regard to the evaluation of the events of 1848, he was afraid of violence and rejected it as a political tool. All the same, he accepted the post of minister for justice in the government of Lajos Batthyány. In December 1849 he was arrested for revolutionary activities, but later on, after being tortured for information, he was released. From then on he acted as the intellectual leader of the national passive resistance movement, and believed from the very beginning that Austrian centralisation was doomed to fail due to its inherent faults. He became the leader of the Address Party in the parliament of 1861, and even though they failed to bring the monarch to accept their ideas, he increasingly managed to take over the initiative over time.

Based on his earlier proposals, in 1865 Deák published his so-called Easter Article – which radically influenced Hungarian politics of the time – and until 1867 he virtually devoted all his time to reaching a compromise with the Hapsburg dynasty. After the compromise between Austria and Hungary ratified in 1867, Hungary was able to return to the path of social and economic development.

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