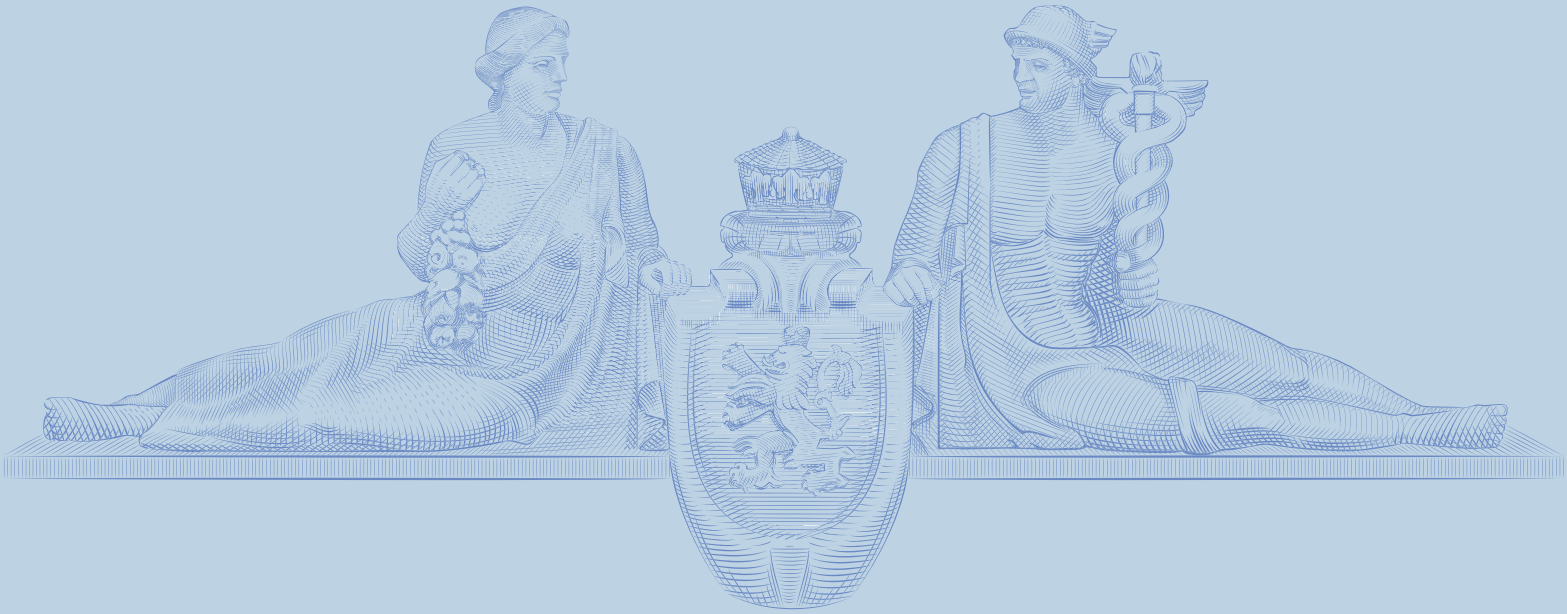

Topical Research and Highlights

Transmission of the ECB Monetary Policy to Interest Rates in Bulgaria. Assessment of Potential Effects of the Increase in Minimum Required Reserve Rate on Key Macroeconomic Indicators

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BULGARIAN NATIONAL BANK

Transmission of the ECB Monetary Policy to Interest Rates in Bulgaria. Assessment of Potential Effects of the Increase in Minimum Required Reserve Rate on Key Macroeconomic Indicators

Current macroeconomic developments in Bulgaria are characterised by high rates of consumer price growth and persistently high core inflation, strong growth of private sector wages and private consumption, and continued robust growth of loans to households. The continuation of these trends poses potential risks to the resilience of the banking system and to the fulfilment of the Bulgarian National Bank (BNB) primary objective of maintaining price stability. Therefore, on 26 April 2023 the BNB Governing Council decided to raise the percentage of minimum required reserves (MRR) on funds attracted by banks from non-residents from 5 per cent to 10 per cent as of 1 June 2023, and the percentage of minimum required reserves on funds attracted by banks from residents and non-residents from 10 per cent to 12 per cent as of 1 July 2023. The purpose of this topical research is to present the factors behind the BNB Governing Council's decision to raise the percentage of the MRR and to provide an assessment of the potential effects of the increase in minimum required reserve rate on key macroeconomic indicators in Bulgaria.

Current Macroeconomic Developments in Bulgaria

In the past two years global consumer prices recorded accelerated growth rates. Factors behind the high inflation were related to the prolonged period of very accommodative monetary policy by leading central banks, the series of monetary and fiscal measures implemented by a number of countries to address the implications of the COVID-19 pandemic, the supply chain disruptions, as well as the rising energy and food prices owing to the military conflict in Ukraine. As a result of the high degree of openness of the Bulgarian economy and the existing currency board in Bulgaria, the inflation in the country is largely influenced by global processes, international prices of raw materials and commodities, as well as by the European Central Bank (ECB) monetary policy. At the same time, however, there are internal factors, which further amplified external inflationary pressures.

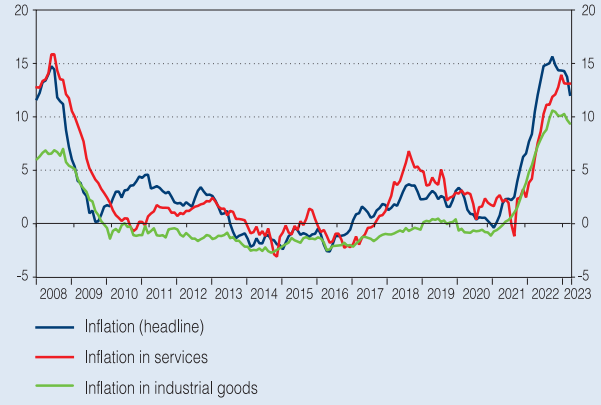
In 2022, the significant rise in energy and agricultural commodity prices in international markets, which exerted upward pressure on firms' production costs due to the high energy intensity of the Bulgarian economy and the high relative share of foreign goods used in the domestic production was a major pro-inflationary factor in Bulgaria stemming from the external environment. Concurrently, price rises became broad-based across consumer basket components, with an accelerated rate of price increases in services and non-energy industrial goods items, in addition to energy and food (Chart 1). The main factors related to the internal macroeconomic environment that contributed to the formation of high inflation throughout 2022 were the strong increase in unit labour costs and the growth of household final consumption expenditure. Reflecting higher inflation expectations and growing labour shortages, nominal compensation *per* employee recorded a significant increase of 18.4 per cent year on year in 2022, driven by the private sector, while unit labour cost growth for the total economy amounted to 16.0 per cent (Chart 2). The average annual HICP inflation remained lower in 2022, standing at 13 per cent. High wage and consumer price growth, coupled with untargeted fiscal measures to support households amid political instability and fiscal policy easing, created prerequisites for a sustained increase in inflation and strengthening the link between inflation and wage growth in the country. The strong lending growth, including for the financing of consumer expenditure was another pro-inflationary factor.

Consumer price inflation has started to moderate slightly since the fourth quarter of 2022, standing at 14.3 per cent in December from 15.6 per cent in September, and reaching 12.1 per cent in March 2023. Inflation developments mainly reflected the downward trend in international prices of major energy sources, which led to a significant decline in the contribution of energy products

to headline inflation. At the same time, annual HICP core inflation, and in particular inflation in services remained at persistently high levels at the end of 2022 and in the first three months of 2023 (Chart 1).

Chart 1. Annual Inflation and Core Inflation (Services and Non-Energy Industrial Goods)

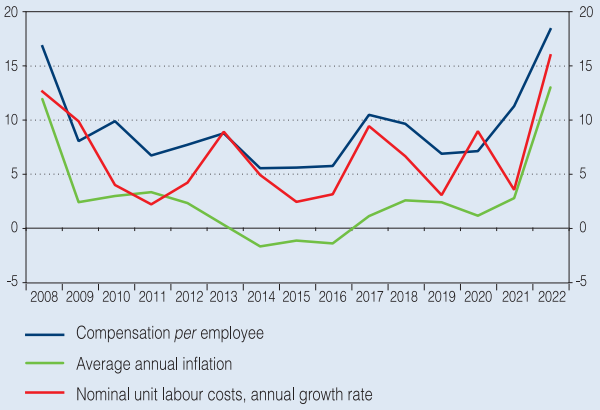
(per cent)



Sources: NSI, BNB calculations.

Chart 2. Average Annual Inflation, Compensation *per* Employee and Unit Labour Cost (Annual Data)

(per cent)

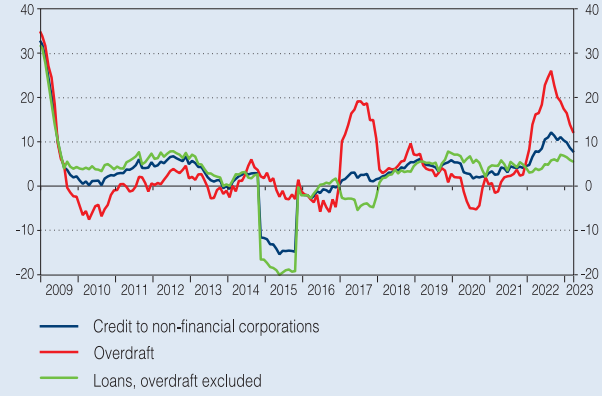


Source: NSI.

Credit growth to the non-government sector remained high in 2022 amid strongly negative real interest rates, significant volume of attracted funds and ample liquidity of the banking system. Demand for corporate loans was mainly aimed at providing financial resources for working capital and build-up of inventories due to significant price rises in commodities and raw materials, bottlenecks in supply chains and an increased uncertainty in the economic environment. The reported fall in inventories after the high levels reached in the first half of the year contributed to some decline in corporate credit growth in the last months of the year (Chart 3). Higher wage growth than inflation and negative real interest rates underpinned demand for consumer and housing loans, with the growth in housing loans remaining at high levels throughout 2022, while consumer loan growth slowed slightly at the end of the year (Chart 4). High growth in housing loans (17.9 per cent as of December 2022 against 16.5 per cent at the end of 2021) reflected, in addi-

Chart 3. Annual Growth of Credit to Non-financial Corporations

(per cent)

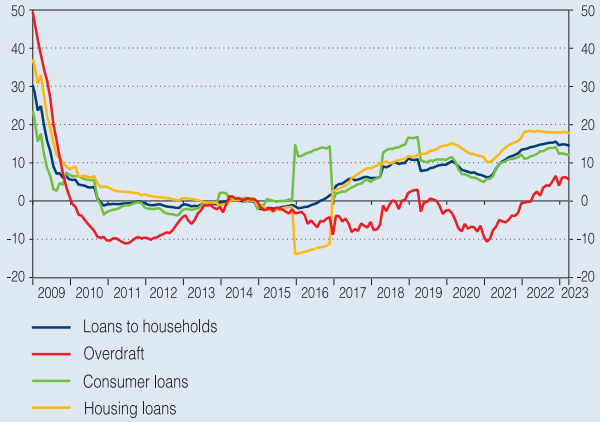


Note: The annual growth rate of loans to non-financial corporations in November 2015 reflects the wearing off of the base effect of KTB removal as a reporting unit from the monetary statistics in November 2014.

Source: BNB.

Chart 4. Annual Growth of Credit to Households

(per cent)



Notes: Based on additional information received from reporting units, a revision of household loans was carried out according to their purpose of use in December 2015–August 2019.

The chart does not show other loans to households, which accounted for 1.2 per cent of total loans to households in March 2023.

Source: BNB.

tion to interest rates, households' maintained preferences for real estate purchases as an alternative form of savings or investment and the strong increase in nominal labour income.

The growth in loans to non-financial corporations (NFCs) continued to decelerate gradually at the beginning of 2023, but remained relatively high, standing at 7.9 per cent year on year at the end of March (10.4 per cent in December 2022). Household credit growth did not slow down, amounting to 12.1 per cent year on year for consumer loans (12.3 per cent in December 2022) and 17.8 per cent year on year for housing loans.

Amid continued strong lending activity and rapid growth in loan volumes, especially in the housing loan segment, the BNB Governing Council undertook a series of increases in the countercyclical capital buffer rate: from 0.5 per cent to 1.0 per cent as of 1 October 2022[1], to 1.5 per cent, with effect from 1 January 2023[2] and to 2.0 per cent with effect from 1 October 2023[3]. Although the main objective of the decisions taken by the BNB to increase the countercyclical capital buffer rate is to strengthen the resilience of the banking system, a potential indirect effect of higher buffer rates could be expected to be limiting the lending activity and lowering credit growth. The sustained high rates of credit growth, particularly in the household sector, show that the increase in the countercyclical capital buffer rate does not have a significant impact on the weakening of lending activity. This can be explained by the high levels of capital indicators of the banking system, which significantly exceed regulatory minimum requirements, as well as excess liquidity in the banking system and banks' high credit risk appetite.

Transmission of the ECB monetary policy to interest rates in Bulgaria

Under Bulgaria's currency board, the BNB does not conduct open market operations and does not set a policy interest rate[4]. Accordingly, in a currency board the BNB has no direct influence on interest rates in Bulgaria, while monetary conditions in the euro area are transmitted to monetary conditions in Bulgaria depending on the level of liquidity in the banking system, the assessment of borrowers' and the Bulgaria's risk premium, and banks' risk appetite. The ECB monetary policy, through changes in euro area interest rates, affects interbank money market interest rates and deposit and lending rates in Bulgaria, which in turn affects consumer demand, household savings and economic activity, and thus domestic inflation.

The ECB's increase in key interest rates in the euro area since the second half of 2022 was passed very rapidly to interbank money market interest rates in Bulgaria. The negative spread between the interest rate on banks' excess reserves with the BNB (0 per cent) and the ECB deposit facility rate since mid-September 2022 created an incentive for banks that are subsidiaries of euro area banks to reduce part of their excess reserves, which was a prerequisite for more active trade in the interbank money market. Since the third quarter of 2022, there has been a significant increase in interbank money market trading volumes, which intensified further in the first quarter of 2023. In March 2023 LEONIA Plus index was 2.47 per cent, up by 311 basis points compared with June 2022, while its spread with €STR amounted to -0.10 percentage points (Chart 5).

[1] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/PR_20210916_CCB_EN

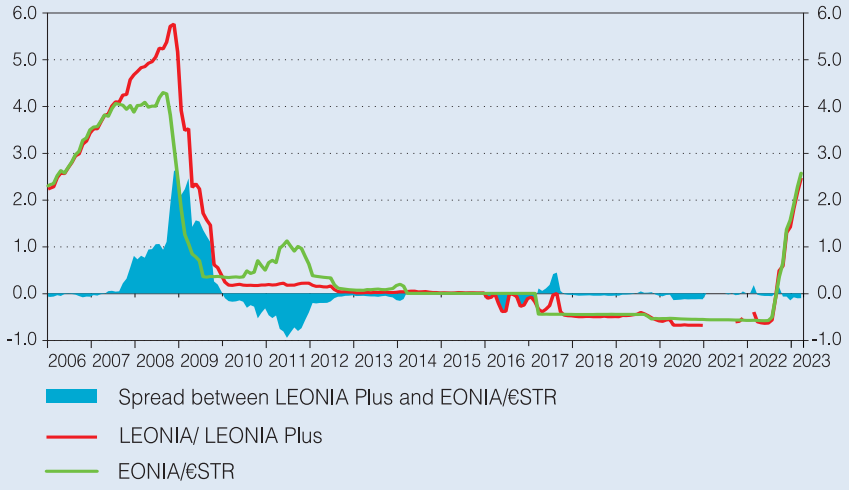
[2] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/PR_20211216_CCB_EN

[3] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/PR_20220929_CCB_EN

[4] The BNB calculates and announces a base interest rate (BIR), which is not a monetary policy instrument but is determined based on market principles. The amount of BIR in force on the first day of each calendar month is equal to the arithmetic average of the LEONIA Plus *index (LEONIA: LEv OverNight Interest Average Plus)* for the working days of the previous calendar month. Where this arithmetic average is less than zero, the BIR is set at zero.

Chart 5. Interbank Money Market Rates on Overnight Deposits

(per cent, percentage points)



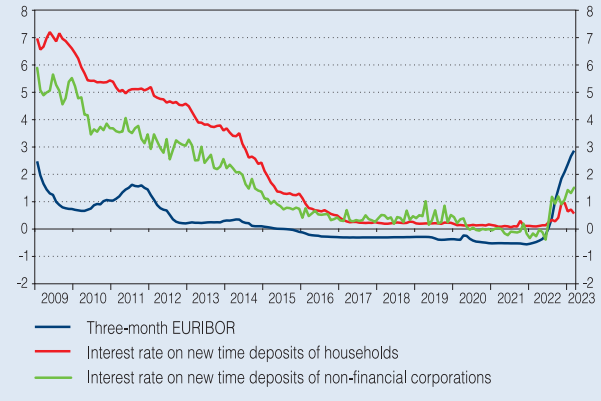
Notes: The EONIA/€STR time series is composed of: EONIA between 2008 and 14 March 2017; pre-€STR between 15 March 2017 and 30 September 2019; €STR in the period after 30 September 2019.
LEONIA Plus replaced LEONIA as of 1 July 2017. LEONIA Plus monthly values are calculated as an arithmetic average for days when overnight unsecured lending transactions are concluded in the interbank market in levs.

Sources: ECB, BNB.

In the context of continued substantial inflows of attracted funds, significant liquidity and strong competition in the banking sector, the extent and speed of the pass-through of key ECB interest rates increases to deposit and lending rates in Bulgaria remained very subdued around the beginning of 2023, particularly as regards the household sector. As the three-month EURIBOR rate rose by 311 basis points in March 2023 compared to June 2022, the interest rate on new time deposits of households increased by only 43 basis points, while the interest rate on new time deposits of non-financial corporations by 190 basis points (Chart 6). Over the same period the interest rate on new loans for house purchase went up by 16 basis points, the interest rate on new consumer loans rose by 66 basis points, while the interest rate on new loans to non-financial corporations indicated an increase of 168 basis points (Chart 7).

Chart 6. Interest Rates on New Time Deposits and Three-Month EURIBOR

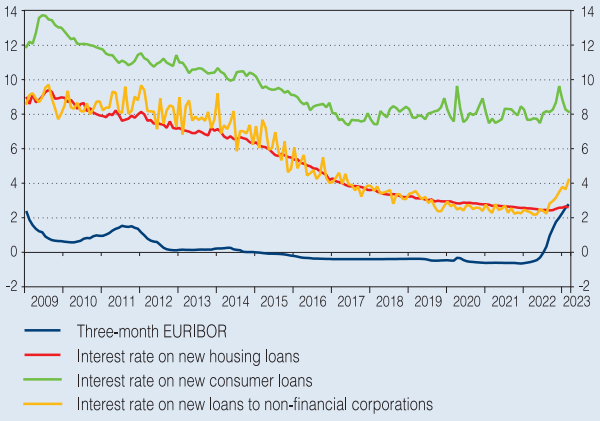
(per cent)



Source: BNB.

Chart 7. Interest Rates on New Loans and Three-Month EURIBOR

(per cent)

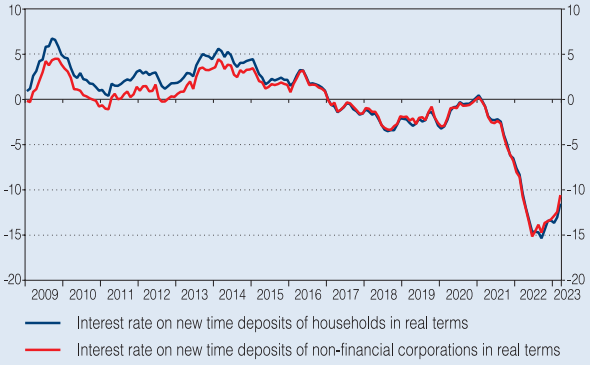


Source: BNB.

Taking into account annual consumer price inflation, deposit and lending rates in real terms remained strongly negative (Charts 8 and 9) and continued to support household demand and private consumption growth. At the same time, strong consumer demand remains one of the main drivers behind persistently high domestic inflation.

Chart 8. Interest Rates on New Time Deposits in Real Terms

(per cent)

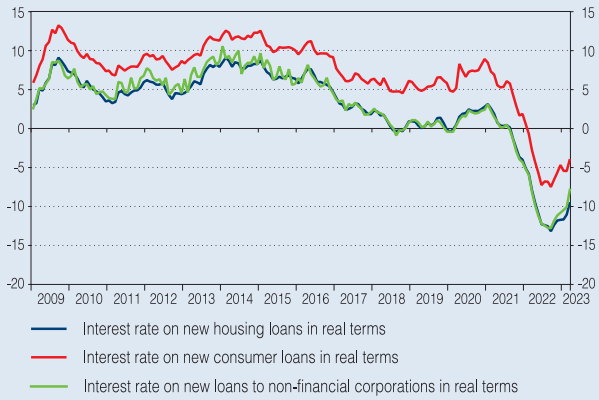


Note: Real interest rates are calculated by deflating the relevant nominal interest rate for a given month by the annual HICP inflation for the same month.

Source: BNB, BNB calculations.

Chart 9. Interest Rates on New Loans in Real Terms

(per cent)



Note: Real interest rates are calculated by deflating the relevant nominal interest rate for a given month by the annual HICP inflation for the same month.

Source: BNB, BNB calculations.

A comparison of the interest rates on deposits and loans in Bulgaria with those of other EU countries shows that the interest rates in Bulgaria were at some of the lowest levels in the EU at the end of the first quarter of 2023 (Charts 10 to 14). In the case of interest rates on deposits to both the household sector and non-financial corporations in particular, the weighted average rate on deposits with agreed maturity in euro and national currency in Bulgaria is the lowest among non-euro area countries and the second lowest in the EU after that of Cyprus. As regards lending rates, Malta and France were the only countries in the EU with a lower weighted average interest rate on housing loans. Regarding interest rates on loans to non-financial corporations, Bulgaria ranks third lowest among non-euro area countries and eighth lowest in the EU. Interest rates in Bulgaria only on consumer loans are close to the average of the EU Member States.

Chart 10. Interest Rates on New Deposits to Households with Agreed Maturity in EU Countries

(per cent)

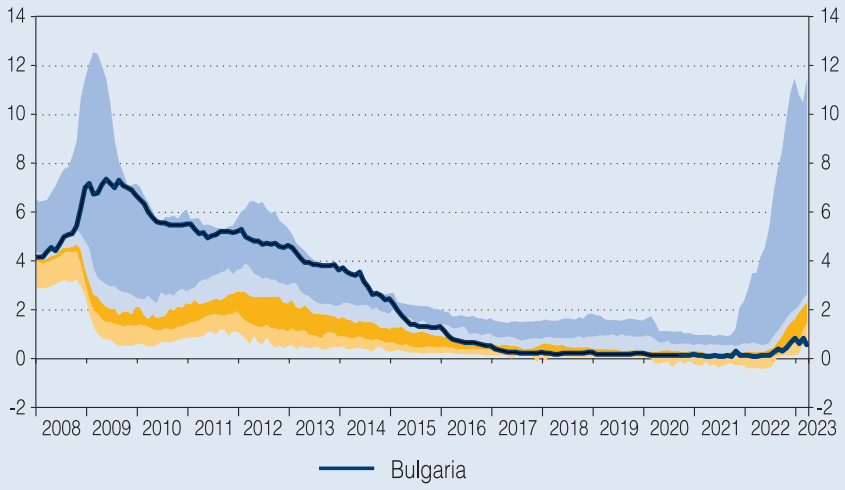


Chart 11. Interest Rates on New Deposits to Non-financial Corporations with Agreed Maturity in EU Countries

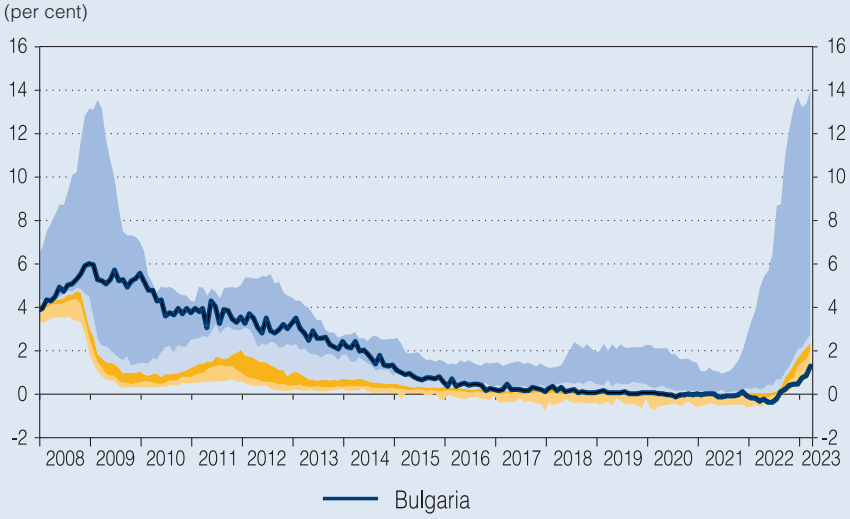


Chart 12. Interest Rates on New Housing Loans in EU Countries

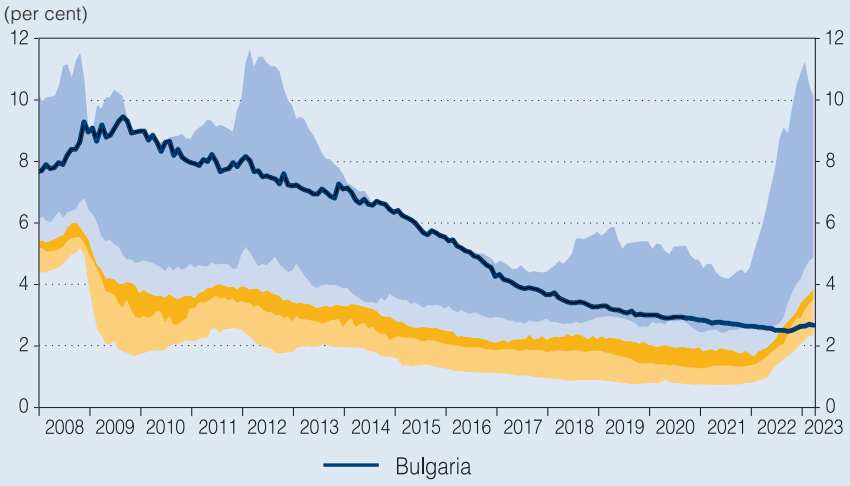


Chart 13. Interest Rates on New Consumer Loans in EU Countries

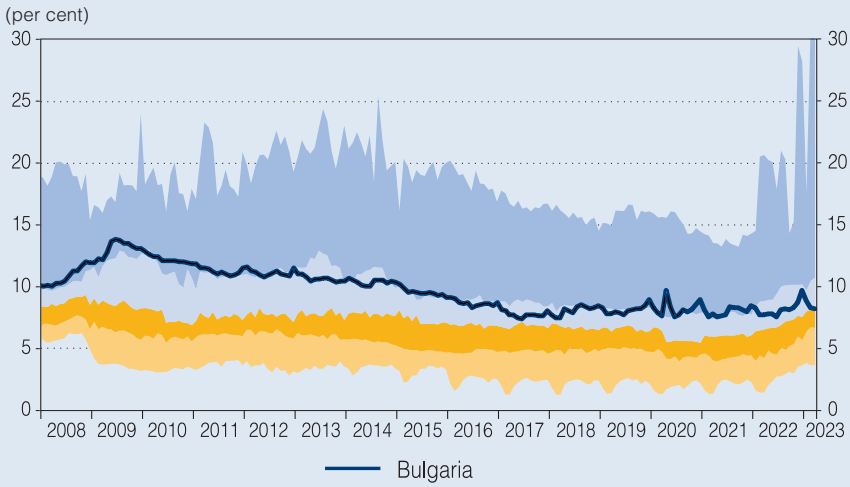
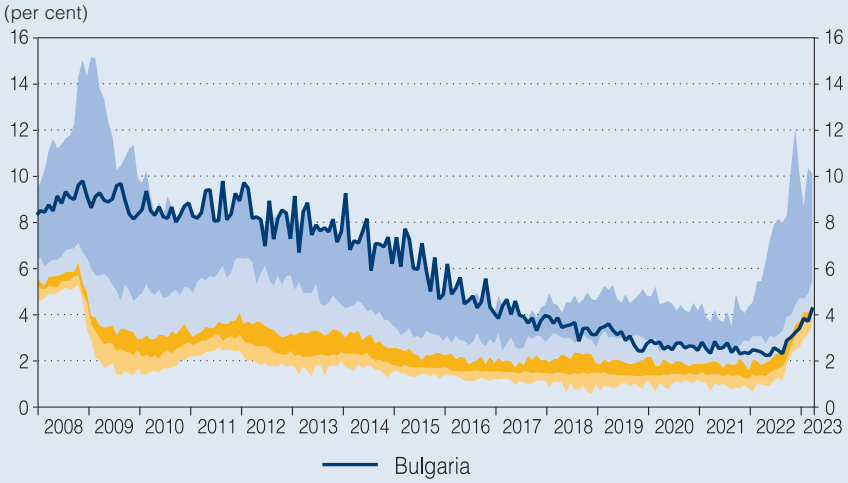


Chart 14. Interest Rates on New Loans to Non-financial Corporations in EU Countries



Notes: The charts show a quartile distribution of the selected indicators for EU Member States. Each segment contains 25 per cent of the Member States: the one at the lowest end presents the first 25 per cent with the lowest values of the relevant indicator, the second segment presents the next 25 per cent of the countries with higher values of the indicator, and the top 25 segment covers the countries with the highest values of the indicator. The values for Bulgaria are presented with a line.

Source: ECB.

The key factors driving the weak and slow transmission of the ECB's monetary policy tightening to deposit and lending rates in Bulgaria are ample liquidity in the banking system and strong competition in the banking sector for market share in the consumer and housing loan segment. The continued strong growth of non-government sector's deposits in recent years contributed to the significant liquidity in the banking system.

In 2022, the annual growth of non-government sector's deposits accelerated, driven by deposits of non-financial corporations. As of March 2023, deposits of the non-government sector increased by BGN 13.8 billion on an annual basis, reaching BGN 118.9 billion (71.9 per cent of GDP). Concurrently, claims on the non-government sector were BGN 84.5 billion (51.1 per cent of GDP), those on the government sector amounted to BGN 12.8 billion and banks' reserves with the BNB were BGN 27.6 billion, of which BGN 1.9 billion in the form of cash balances and BGN 25.7 billion of deposits (minimum required reserves, excess reserves and account balances in TARGET2). Data on banks' foreign assets, which accounted for BGN 28.1 billion at the end of March 2023 and comprised mainly liquid assets[5] (around 57 per cent of total foreign assets or BGN 15.9 billion), point to the high amount of liquid funds in the banking system invested outside the country (Chart 15).[6] Total liquidity in the banking system can be seen as a sum of banks' liquid foreign assets, the part of banks' reserves in excess of the minimum reserve requirements (BGN 2.6 billion on an average daily basis in March 2023[7]) and banks' cash balances. Current data show excess liquidity in the banking system, which is one of the main factors hampering the transmission of the ECB monetary policy to the monetary conditions in Bulgaria.

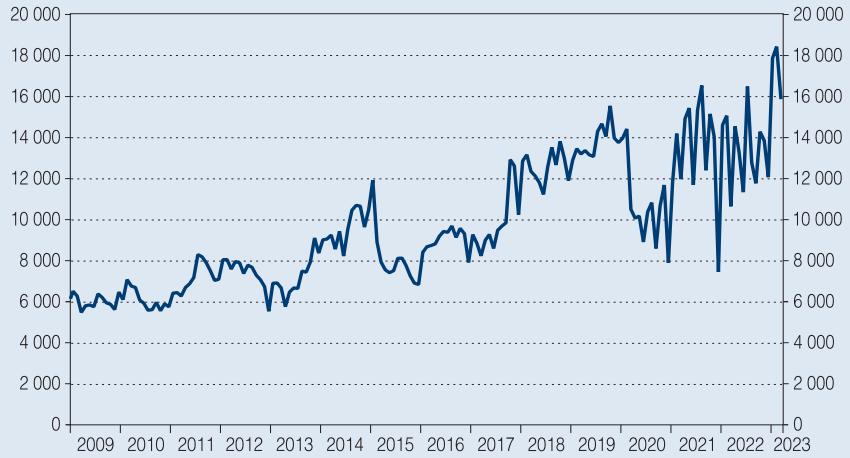
[5] Liquid funds as part of banks' foreign assets are calculated on the basis of data on the amount of funds in the following categories: cash in foreign currency, deposits and repurchase agreements (repos).

[6] The amount of net foreign assets of banks as of March 2023 was BGN 15.1 billion.

[7] This refers to the average daily amount of bank excess reserves owing to their usual strong growth at the end of each quarterly period.

Chart 15. Liquid Foreign Assets of Banks

(BGN million)



Source: BNB.

Instruments Used by the BNB to Influence Monetary Conditions in Bulgaria. Use of the Instrument of Minimum Required Reserves in Bulgaria

In the framework of the currency board currency board, the main instrument used by the BNB to influence monetary conditions in Bulgaria is the regulation of MRR maintained by banks with the central bank. This instrument enables the BNB to provide liquidity to or withdraw liquidity from the banking system, thereby affecting developments in the interbank money market, banks' incentives to extend credit and overall lending activity in Bulgaria. In addition, since minimum reserves are not remunerated, their rate implicitly affects banks' total funding costs and thus influences their policy in setting lending interest rates. The second instrument the BNB can use to influence monetary conditions is the interest rate on excess reserves of banks maintained with the central bank. All other things being equal, a positive spread between the excess reserve rate and the prevailing market rate on alternative liquid assets creates an incentive for banks to maintain excess liquidity at the BNB. By contrast, the negative interest spread between these rates generates incentives for seeking alternative opportunities for banks to invest their excess liquidity. Other tools by which the BNB can indirectly affect monetary conditions in Bulgaria include the implementation of supervisory, macroprudential and administrative measures. Nevertheless, supervisory policy instruments aim at building buffers and improving the quality of banking assets to ensure the financial stability, rather than affecting directly monetary conditions in Bulgaria.

The BNB uses MRR primarily as a tool to maintain precautionary liquidity buffers in the banking system due to its limited role as lender of last resort under the currency board. At the same time, the BNB has historically used the MRR instrument for conducting monetary policy as well.

Following the introduction of the currency board in Bulgaria, in 1998–2006 the MRR rate was set at 8 per cent of the deposit base.

In 2004 and 2005, the BNB adopted a package of measures to stabilise the rapid growth rates of credit to the private sector to moderate levels that could be sustained in the medium term without threatening financial stability in Bulgaria. More specifically, in May 2004 the BNB Governing Council decided to broaden the deposit base for calculating minimum reserves and reduce the amount of cash holdings recognised as minimum reserves from 100 to 50 per cent,[8] and in November 2004

[8] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20040520_EN

bank cash holdings were completely excluded from the amount of minimum reserves to be maintained by banks with the BNB.[9] In April 2005, the BNB imposed administrative credit restrictions (credit ceilings) effective until January 2007. These restrictions obliged banks to hold additional minimum reserves with the BNB if the quarterly credit growth would exceed certain values specified by the central bank.[10] Since the introduction of credit ceilings, there has been significant improvements in banks' balance sheets and credit risk mitigation in the banking system, as well as a slowdown in the growth of credit to the private sector.[11] After the expiry date of credit ceilings at the beginning of 2007, credit growth started to accelerate again. Continuing its counter-cyclical policy, in July 2007 the BNB Governing Council decided to raise the minimum reserve requirement rate from 8 to 12 per cent.[12]

Since the end of 2008, lending to the private sector has slowed down significantly, reflecting the increased negative effects of the global financial and economic crisis. During the downturn in economic activity, the BNB continued its counter-cyclical policy, initiating in late 2008 and early 2009 a number of measures to offer banks greater flexibility in managing their liquidity resources by using the capital buffers accumulated during the period of economic growth. Part of these measures concerned easing of the minimum reserve requirements, including the recognition of 50 per cent of bank cash in vaults as reserve assets[13] and a reduction of the MRR rate from 12 to 10 per cent.[14] These measures were followed by a further reduction of minimum reserve requirements, and the MRR rate was cut to 5 per cent for funds attracted from non-residents and to 0 per cent for those from state and local government budgets. The differentiation of the rate for non-residents was intended to preserve the existing foreign funding for banks in the context of a declining global liquidity, while the zero rate for attracted funds from state and local government budgets was justified by government securities used as collateral. The overall effect of BNB measures was reflected in a release of liquidity in the economy of about BGN 3 billion, which in combination with the ECB's cuts in policy rates and measures to provide liquidity in response to the crisis led also to a significant decrease in interbank money market rates in Bulgaria (see Chart 5). From 2009 to the beginning of 2023, the BNB did not undertake any changes to the MRR rate.

Historically, the BNB has used the instrument of bank excess reserve rate for conducting monetary policy only during the period of negative interest rates globally and in the euro area, in particular. More specifically, after the introduction of a negative deposit facility rate by the ECB in June 2014 with a view to decreasing interest rates and providing incentives for lending in the euro area in an environment of very low inflation, banks in Bulgaria started to accumulate significant amounts of excess reserves on their accounts with the BNB, which were remunerated at 0 per cent. As a result, the transmission of the ECB monetary policy to interbank money market rates in Bulgaria weakened. In order to affect the level of excess reserves and to strengthen the transmission mechanism of the ECB policy to the Bulgarian economy, in late 2015 the BNB Governing Council adopted a new Ordinance No 21 on the Minimum Required Reserves Maintained with the Bulgarian National Bank by Banks. The main new provisions were the introduction of the definition of bank excess reserves with the BNB and the application of the ECB deposit facility rate on excess reserves, when this rate is negative.[15] The BNB continued to apply a zero interest rate on excess reserves when the ECB deposit facility rate is positive or nil. The BNB also retained its zero MRR rate policy. The amendments to Ordinance No 21 contributed to the strengthening of the transmis-

[9] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20041118_BG

[10] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20050422_1_BG
https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20051110_BG

[11] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20061026_EN

[12] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20070719_EN

[13] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20081021_EN

[14] https://www.bnb.bg/AboutUs/PressOffice/POPressReleases/POPRDate/RELEASE_20081127_1_EN

[15] From 9 December 2015 the ECB deposit facility rate was cut to -0.30 per cent.

sion of the ECB monetary policy to interbank money market rates in Bulgaria, but the amount of banks' excess reserves remained substantial. October 2017 saw the entry into force of the amended methodology for calculating interest rates on accounts with the BNB: bank excess reserves were remunerated at 0 per cent or the ECB deposit facility rate, reduced by 20 basis points, whichever is lower.[16] The more negative interest rate on bank excess reserves had an impact on their significant reduction and the fall of overnight deposit rates in the Bulgarian interbank money market into negative territory, with their rate coming closer to the negative interest rate on excess reserves. On the other hand, the negative rate on excess reserves contributed to the increase in banks' funding costs. As a result of the increase in the ECB policy rates at the end of July 2022, the deposit facility rate was raised to 0 per cent (previously -0.50 per cent), bringing the bank excess reserve rate to 0 per cent.

Taking into account the slow and weak pass-through of changes in the ECB monetary policy and the limited effects of increases in the countercyclical capital buffer by the BNB on lending activity, on 26 April 2023, the BNB Governing Council decided to raise the MRR rate on funds attracted by banks from non-residents from 5 per cent to 10 per cent as of 1 June 2023, and to further raise the rate on funds attracted from both residents and non-residents from 10 per cent to 12 per cent as of 1 July 2023.

Simulations with the BNB's main econometric model to assess the potential effects of raising the MRR rate on key macroeconomic indicators

The strengthening of the relationship between inflation and wage growth over the past few years and the very limited transmission of the ECB monetary policy tightening amid ample liquidity in the banking system and limited effects of the increased countercyclical capital buffer rate on household credit suggest that further policy measures are needed to lower inflation. In pursuit of its price stability mandate and within its monetary policy instruments, the BNB can influence the dampening of inflation by raising the banks' minimum required reserve rate. Through this measure part of the existing excess liquidity in the banking system will be absorbed, which will lower the banking system's lending capacity by reducing banks' free resources and thereby, curbing banks' incentives to lend. At the same time, as the minimum required reserves are not remunerated, the increased rate can be expected to implicitly affect banks' overall funding costs and help push lending rates up. Higher lending rates will dampen households' demand for consumer credit and loans for house purchase, while weakening consumer demand would, in turn, contribute to the easing of inflationary pressures in the economy. On the other hand, since excess liquidity in the banking system is not evenly distributed across banks, withdrawing part of it will create incentives to increase deposit rates, which will also result in deferring consumption and will put additional upward pressure on lending rates.

To quantify the potential macroeconomic effects of an increase in the MRR rate, a simulation exercise was carried out using the main BNB macroeconometric forecasting model – BNB's main tool for forecasting and simulation analysis of the impact of economic shocks. The system of equations in the model is based on the assumption of long- and short-term behavioural relationships in the economy in the form of the so-called error correction mechanism.[17]

For simulation purposes, a channel of influence on macroeconomic variables is included in the BNB econometric model through the effective implicit MRR rate and through a variable reflecting

[16] From 16 March 2016 the ECB deposit facility rate was lowered to -0.40 per cent and from 18 September 2019 to -0.50 per cent respectively.

[17] For more information on the main forecasting model, see the box entitled *Bulgarian National Bank Forecast of Key Macroeconomic Indicators for 2015–2017* in the Economic Review quarterly, issue 4 of 2015. Empirical analysis of the channels through which the ECB monetary policy is transmitted to economic activity and inflation in Bulgaria is provided in Nenova, M. et al. (2019): „Transmission of ECB's Monetary Policy in Bulgaria: Insights from a Large Macro-Econometric Model", BNB Discussion Papers DP/115/2019.

the lending capacity of the banking system in the economy. More specifically, the influence channel of macroeconomic variables has two dimensions: (1) a price dimension, reflecting the impact of a change in the MRR rate on interest rates on deposits and loans to non-financial corporations and households, where the estimated econometric relationship between the MRR rate and the interest rates is positive; and (2) a quantitative dimension, reflecting the impact of a change in the amount of minimum required reserves on the banking system's lending capacity and, hence, on the volume of lending to corporations and households. The lending capacity of the banking system in the economy is included in the model through a variable that represents the sum of residents' deposits and banks' foreign liabilities less the amount of minimum reserve requirements, and the estimated econometric relationship between this variable and lending to corporations and households is positive. Accordingly, in case of an increase in the effective implicit MRR rate, the econometric relationship indicates a reduction in the amount of available resources in the banking system, which is reflected in a reduction in credit supply.

The simulation starts in the second quarter of 2023 and is carried out in three consecutive steps. The first step simulates an alignment of the rate of minimum required reserves on funds attracted from non-residents (currently 5 per cent) with that of funds attracted from residents (10 per cent), while keeping the rate of MRR on funds attracted from the state and local budgets unchanged at 0 per cent. This leads to an increase in the effective MRR rate to 9.7 per cent in the second quarter of the year with a current effective rate of 9.3 per cent. The second step simulates an increase in the overall rate to 12 per cent as of the third quarter of 2023, corresponding to an effective rate of 11.7 per cent. The last step includes a further increase in the effective rate to 14.6 per cent in the fourth quarter of 2023, which simulates an increase in the overall rate to 15 per cent. Following the simulated three consecutive increases, the MRR rate is maintained at 15 per cent by the end of the simulation horizon (2025).

The simulation assesses the impact of the increase in the MRR rate on a set of macroeconomic variables (interest rates, credit to the private sector, economic activity, and inflation) against the baseline scenario for the development of the Bulgarian economy outlined in the January 2023 BNB macroeconomic forecast.[18] The estimated effects represent deviations from the baseline scenario in percentages or in BGN million.

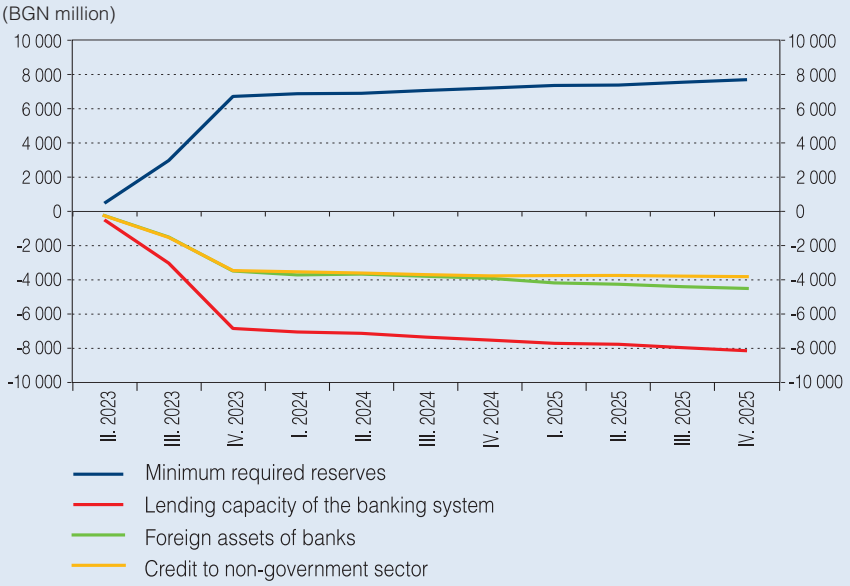
The simulation results show that, on the basis of estimated historical relationships between macroeconomic variables, the effects of the increase in the MRR rate on deposit and lending rates are positive, but marginal. A key factor behind the muted response of lending rates is the slight increase in deposit interest rates, which, in turn, can be explained by the strong credit contraction in the simulation and the lack of necessity for banks to attract additional deposit resources.

The contraction in the amount of credit relative to the baseline scenario is mainly driven by the decrease in the available resources that banks can lend (the lending capacity of the banking system), resulting from the withdrawal of liquidity following the increase in the minimum required reserves to be maintained with the BNB. Estimates show that in the simulation the amount of the minimum required reserves increases by BGN 485 million in the second quarter of 2023 compared to the level in the baseline scenario level. In the third quarter of 2023, it increased by BGN 3 billion, and in the fourth quarter by BGN 6.8 billion, respectively[19] (Chart 16).

[18] https://www.bnb.bg/bnbweb/groups/public/documents/bnb_publication/pub_mac_for%D0%B5cast_2023_01_en.pdf

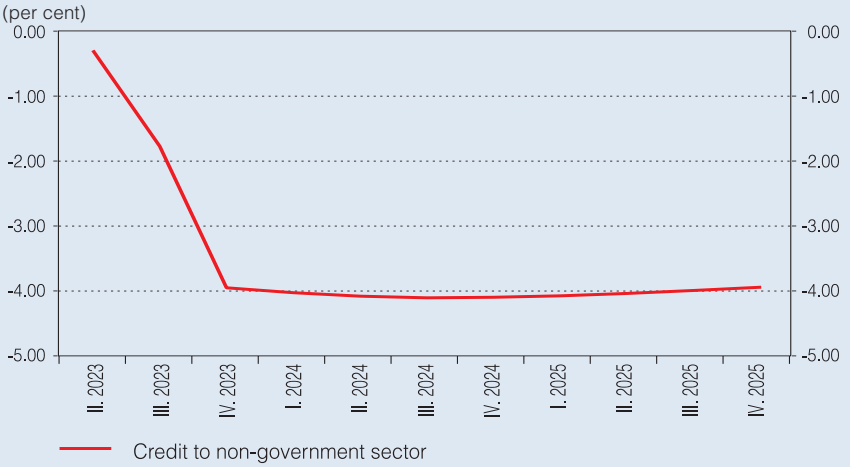
[19] The stronger effect of the second and third steps in the increase of minimum required reserves was due to the fact that funds attracted from residents accounted for 89.3 per cent of total attracted funds in the banking system. In March 2023 the share of attracted funds from non-residents stood at 8.2 per cent, while that of funds attracted from state and local budgets was 2.5 per cent.

Chart 16. Deviation from the Baseline Scenario



Source: BNB calculations.

Chart 17. Percentage Deviation of Credit to the Non-government Sector from the Baseline Level



Source: BNB calculations.

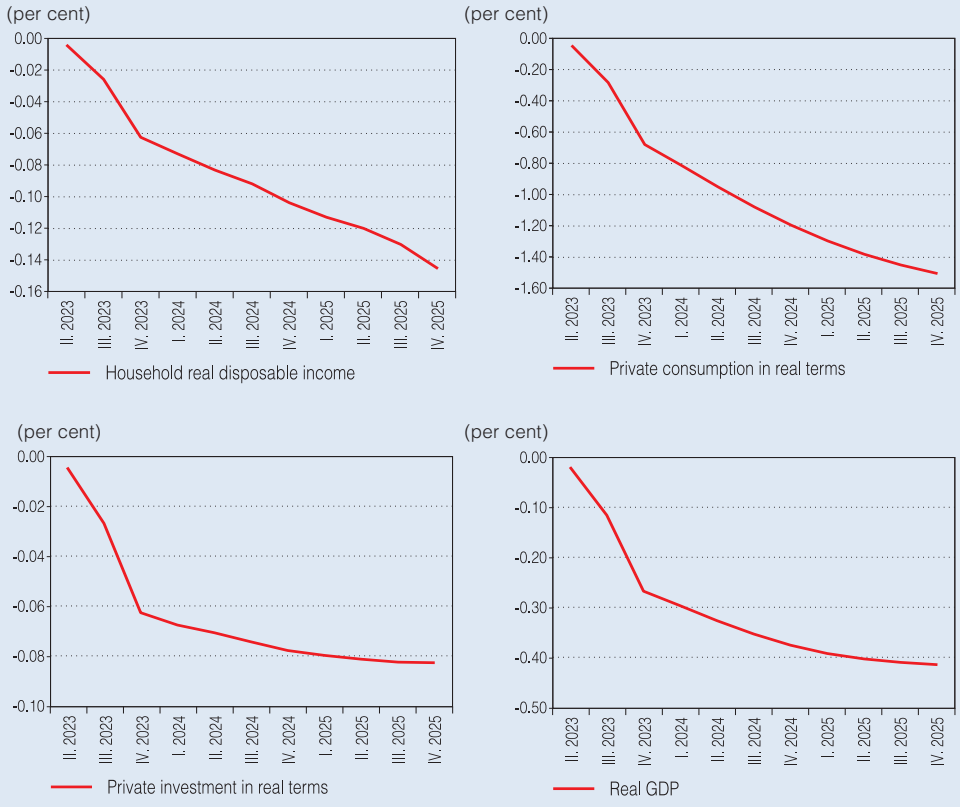
As the amount of deposits from residents and funds attracted from non-residents does not change significantly compared with the baseline scenario, the banking system's credit capacity is reduced by an amount similar to that of the increase in minimum required reserves. The lower lending capacity of the banking system helps reduce the amount of credit to the non-government sector by 4.0 per cent at the end of 2023 as compared to the baseline scenario level (year-on-year growth of credit to the private sector is 1.4 per cent at the end of 2023 against an increase of 5.6 per cent in the baseline scenario[20]) (Chart 17). The decline in credit compared to the baseline scenario may be explained mainly by lower banks' liquidity, which is reflected in lower credit supply. On the demand side, the main factor behind the decline in credit is weakening economic activity driven by the fall in household real consumption. The impact of interest rates on loan demand, as measured by the

[20] The amount of credit to households and that to non-financial corporations decreases by 4.6 per cent and 4.1 per cent, respectively, at the end of 2023 compared to the level in the baseline scenario.

spread between the lending rate and the deposit rate, is negligible due to the historically weak estimated relationship with loan dynamics and the estimated insignificant increase of this spread in the simulation. The slight change in deposits and total bank liabilities compared to the baseline scenario, combined with an increase in minimum required reserves by an amount higher than the decrease in credit, are reflected in a fall in banks' foreign assets. Given the strong decline in banks' excess reserves since the second quarter of 2022 and their strong historical volatility, the simulation assumes that excess reserves are not used to meet the increased minimum reserve requirements[21]) (Chart 16).

The decrease in credit, weakening economic activity and lower household real disposable income lead to a 0.7 per cent decline in real private consumption in the fourth quarter of 2023 compared with the baseline scenario level (average for 2023 private consumption growth in the simulation amounts to 3.1 per cent against 3.3 per cent in the baseline scenario). The contraction of private consumption is the main factor behind a negative deviation of real GDP from the level in the baseline scenario (by -0.3 per cent at the end of 2023 and by -0.4 per cent at the end of 2024). Unlike household consumption, where credit is modelled as one of the sources of financing of consumer spending in addition to disposable income, the equation of fixed investment in the private sector does not include credit to firms but gross operating surplus in the economy. As a result, private investment is less responsive in the simulation than private consumption, with their drop following mainly the drop in economic activity and the associated fall in firms' operating surplus (Chart 18). It should be noted that the estimated historical econometric relationship between real deposit rates and private consumption dynamics and between real lending rates and private investment dynamics is weak.

Chart 18. Percentage Deviation of a Set of Macroeconomic Variables from the Baseline Level

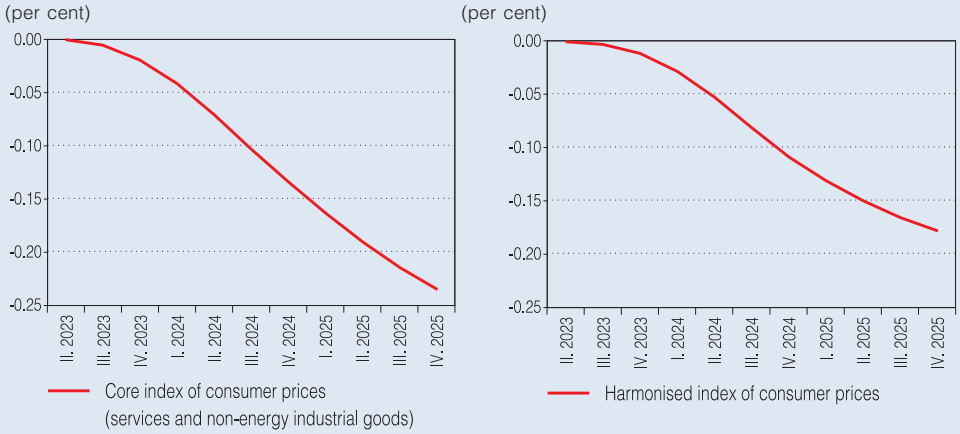


Source: BNB calculations.

[21] In March 2023 banks' funds maintained with the BNB in excess of the minimum required reserve assets under Ordinance No 21 amounted to BGN 1.8 billion on an average daily basis for the maintenance period, or 15.8 per cent of MRR.

The effect of lower private consumption on inflation in the simulation is partly compensated by a rise in unit labour costs compared to the baseline scenario. These factors, combined with the relatively high inflation persistence of the main components of the consumer price index (services and non-energy industrial goods), are responsible for limited effects on core and headline inflation at the end of 2023. The simulation suggests that the decline is more substantial at the end of 2024, reinforcing further in 2025 (Chart 19).

Chart 19. Percentage Deviation of the HICP and Core Consumer Price Index Compared to the Level in the Baseline Scenario



Source: BNB calculations.

The simulation does not take into account some factors that may be relevant for the actual macroeconomic effects that would materialise if the MRR rate is increased by the specified amount and time profile: (1) the simulation is based on estimated historical relationships between macroeconomic variables over a long historical period (over 20 years) and these relationships may be different from the behaviour of economic agents in the current macroeconomic environment; and (2) the results of the simulation cover the banking system as a whole and do not take into consideration specific features of individual banks (the amount of attracted funds from residents/non-residents by individual bank and liquidity resources by which each bank could meet the increased minimum reserve requirements).

Conclusion

The strengthened relationship between inflation and wage growth, and the weak pass-through of changes in the ECB monetary policy amid ample liquidity in the banking system and limited effects of the increased countercyclical capital buffer rate on lending activity in Bulgaria, suggest that additional measures are required to curb credit growth and subdue inflation.

The simulation with the BNB's main econometric model shows that an increase in the effective MRR rate to 9.7 per cent in the second quarter and further to 11.7 per cent and 14.6 per cent in the third and fourth quarters of 2023 will lead to: (1) a withdrawal of liquidity from the banking system, with banks' MRR increasing by BGN 485 million in the second quarter of 2023, by BGN 3 billion in the third quarter and by BGN 6.8 billion in the fourth quarter compared with the level in the baseline scenario of the BNB January 2023 macroeconomic forecast (which does not include any change in the MRR rate); (2) a decrease in available resources that banks can lend, which is a major factor behind the decline in the amount of credit to households and this leads to lower private consumption and weaker economic activity as a whole. The simulation shows a slight increase in deposit and lending rates based on estimated historical macroeconomic relationships; (3) a decrease in core and overall consumer price index compared with the baseline scenario level, with effects being relatively limited in 2023 and increasing in 2024 and 2025.

The uncertainty about actual macroeconomic effects that would materialise and the fact that the simulation is based on estimated historical relationships and does not reflect the specific starting conditions in individual banks imply a gradual approach toward raising the MRR rate.

The sculptural composition by Kiril Shivarov depicting Hermes and Demeter on the southern façade of the Bulgarian National Bank building is used in cover design.