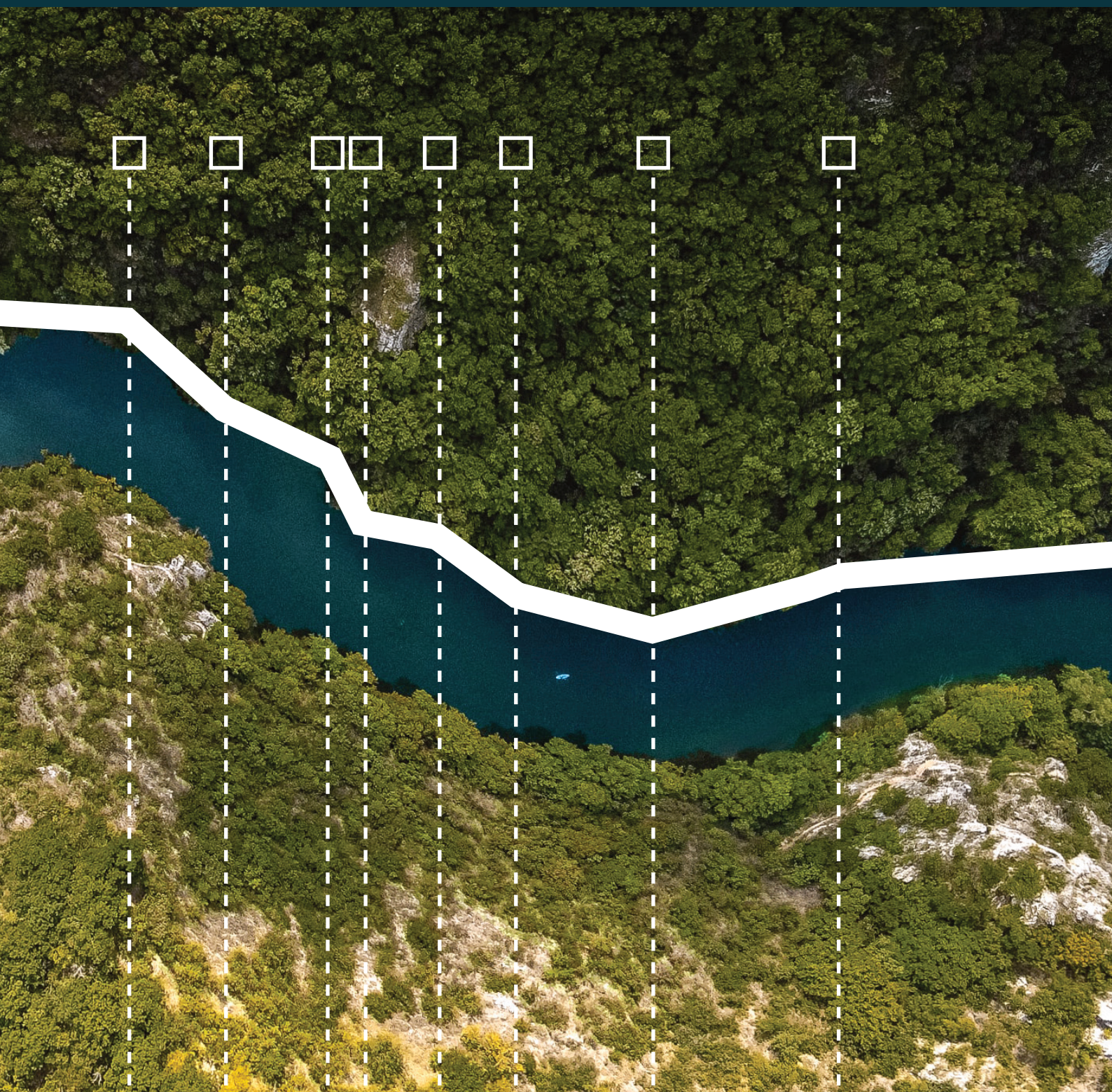




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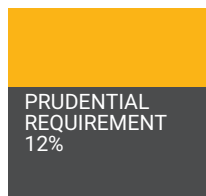


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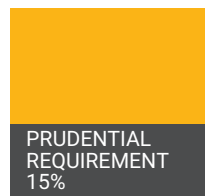


The banking system is capable of absorbing risks and maintaining the continuity of lending.

20.3%
Capital Adequacy



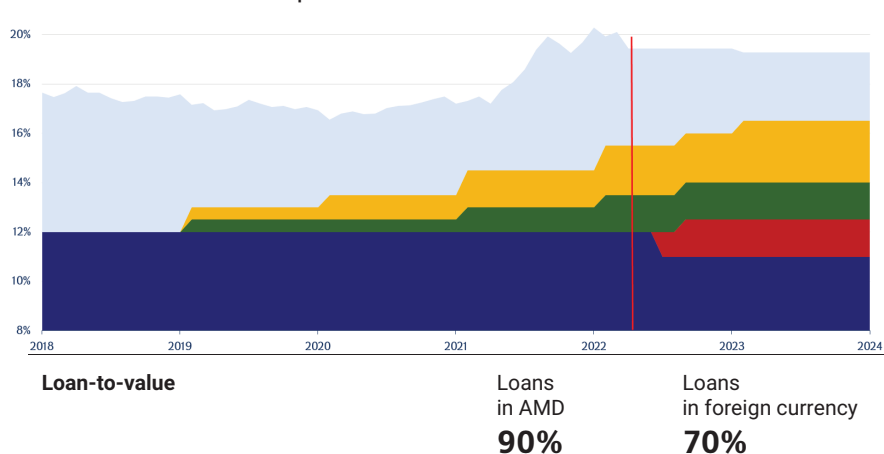
37.6%
Total Liquidity



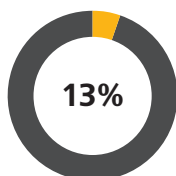
286.5%
Liquidity Coverage Ratio (LCR)



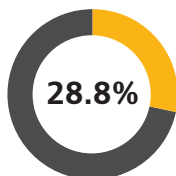
Actual rates of macroprudential tools



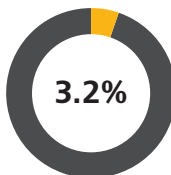
Growth of loans



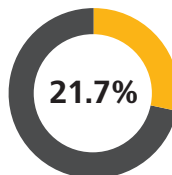
Growth of deposits



Profitability of banking system has improved



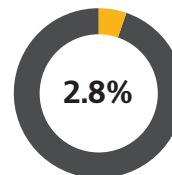
RoA



RoE

NPL ratio has remained at a low level during high economic activity and revenue growth

NPL ratio



Threats to financial system (major risks)



High levels of uncertainty



Overheating in the mortgage market



Central Bank
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Financial Stability Report 2022

More detailed information on Armenia's macroeconomic environment is available in the Inflation Report, Monetary Policy Program, Status Report on Implementation of the Monetary Policy Program periodical publications.

Previous publications of the Financial Stability Report and Inflation Reports are available on the official website of the Central Bank of Armenia (www.cba.am).

The data published in this report are those available as of 30.04.2023.

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Yerevan 2023



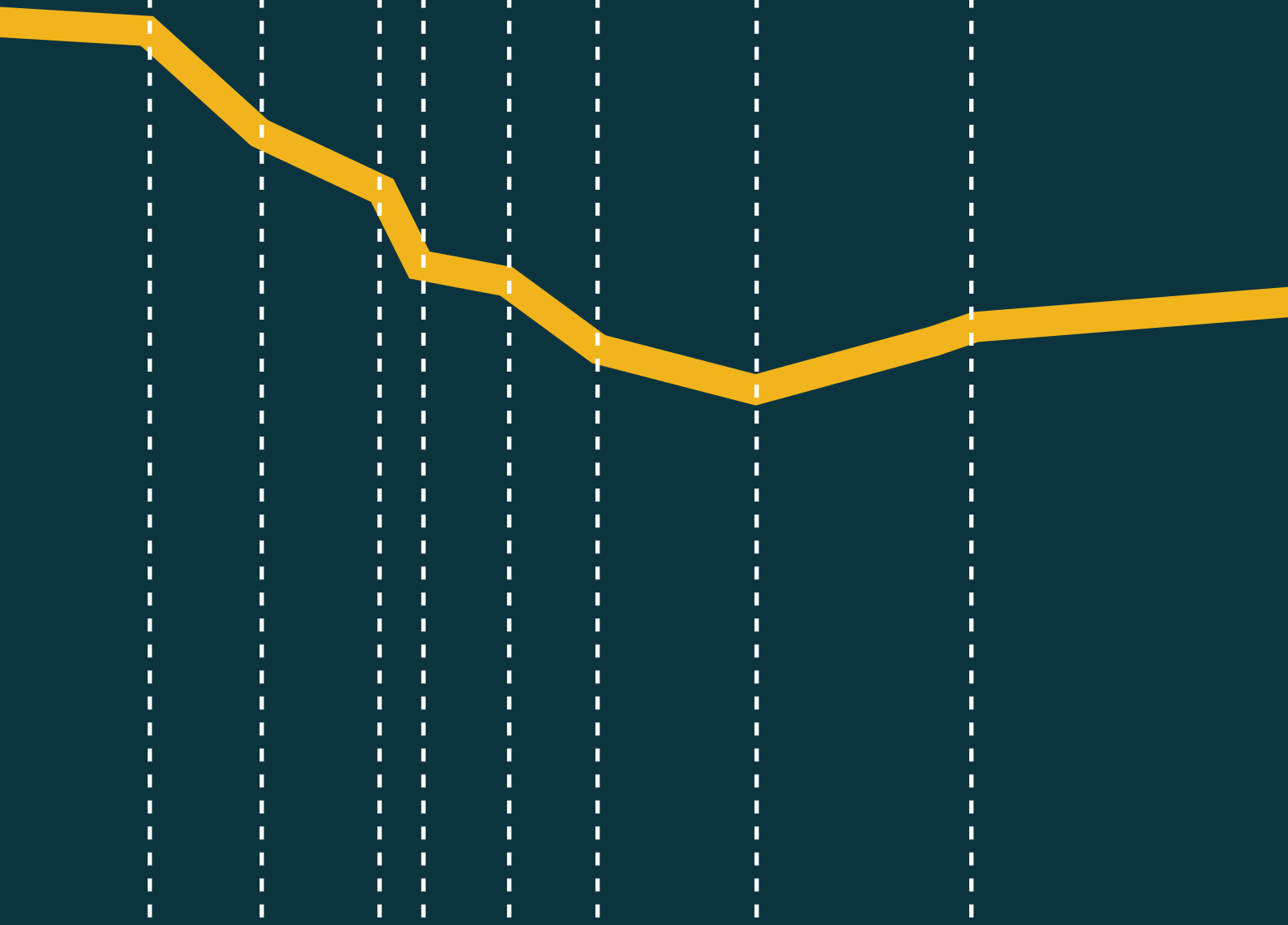
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□ Financial stability is one of the primary objectives of the Central Bank of Armenia, along with price stability. Financial stability is a crucial element of overall macroeconomic stability and an essential precondition for stable long-term economic growth. Financial stability can be described as the concurrence of financial and macroeconomic conditions at a time when the financial system (i.e., financial institutions, markets, and infrastructure) is capable of withstanding probable shocks and instability, minimizing the probability of interruption of intermediation function. In defining financial stability, the potential risks endangering the stability of the financial system and the sources of those risks arising from the financial sector, as well as the internal and external macroeconomic developments, are monitored and assessed. As a result of the comprehensive analysis of these risks and assessment of their potential impact on financial stability, an appropriate policy is developed and implemented.

INTRODUCTION





The **Financial Stability Report** of the Central Bank of the Republic of Armenia is published annually and incorporates the assessment of risks that might potentially threaten the stability of the financial system or hamper the capacity of the financial system to withstand such risks. Through the publication of information on financial stability developments, the Central Bank aims to solicit the attention of stakeholders toward those risks and eventualities that might jeopardize the financial stability of the Republic of Armenia, as well as to present the policy needed to manage and reduce those risks.

Financial stability and price stability are components of overall macroeconomic stability and effectively complement each other. The volatility of the financial system can hamper the implementation of effective monetary policy and impede long-term and sustainable economic growth. Concurrently, macroeconomic stability, including price stability, helps to reduce the risks to financial stability. The financial system plays an important role in the overall economic system, and it is essential that the financial system maintain the continuity and stability of its processes, thus contributing to the natural growth of the economy.

In order to timely identify risks endangering financial stability, the Central Bank of the Republic of Armenia conducts continuous monitoring and analysis of both the financial system and general macroeconomic developments. This report presents the risks in the macro-environment and the financial system, their impact on the development of various

sectors of the economy and financial system, as well as the implemented macroprudential policy.

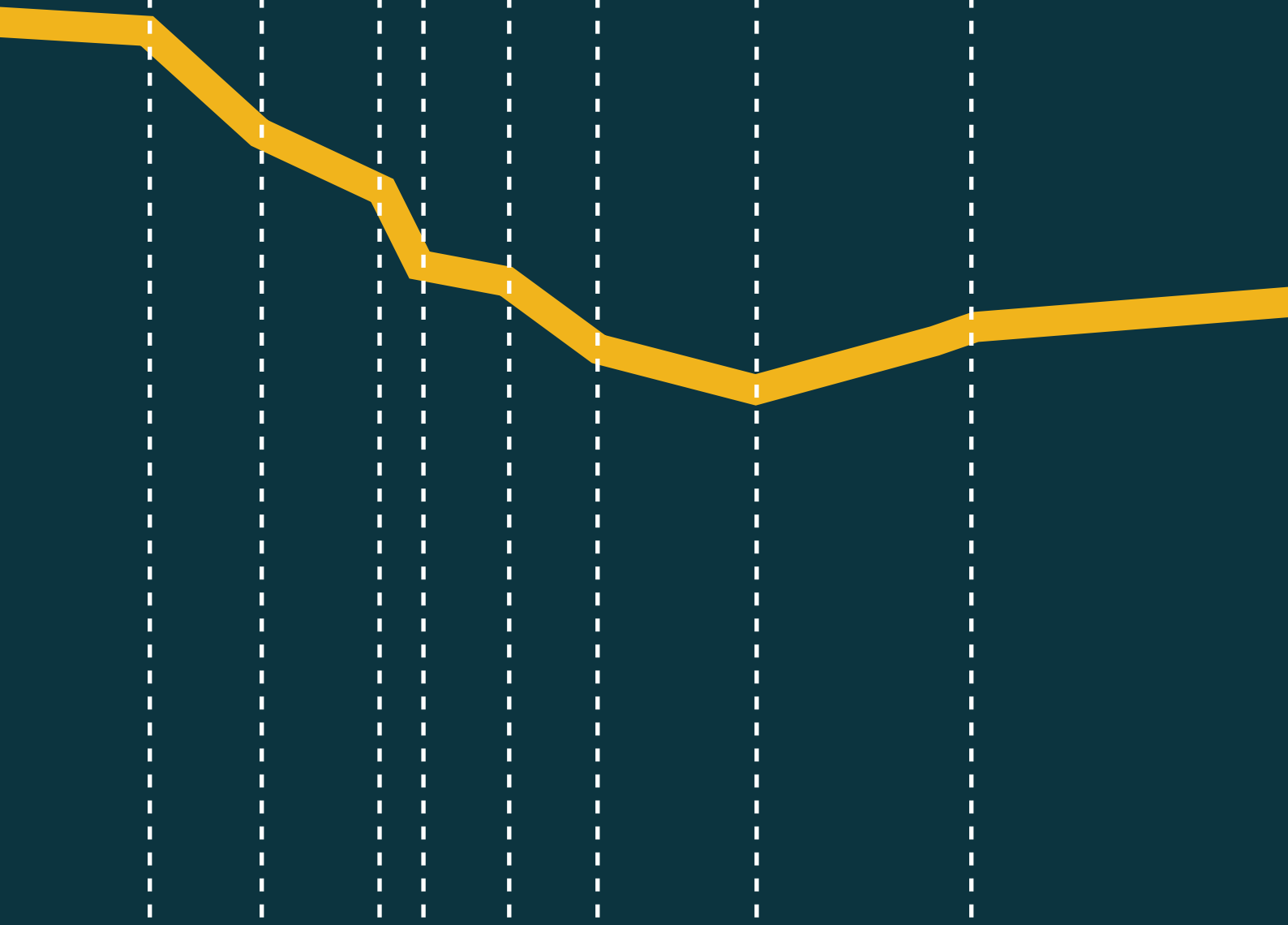
Economic and non-economic risks affecting the financial stability of the Republic of Armenia may arise in the domestic macro-environment, in the external economy, and in the financial system itself.

Based on the above, the potential risks threatening the financial stability of the Republic of Armenia are presented in the report in the following main directions:

- risks derived from developments in the global economy,
- risks derived from developments in the macroeconomic environment of Armenia,
- risks derived from developments in the financial market of Armenia,
- risks derived from the financial institutions of Armenia, and
- risks derived from the financial infrastructure of Armenia.

The report presents the accumulation of risks in these areas and their possible impact on the development of all sectors of the economy and financial system, as well as the Central Bank's macroprudential policy, regulations, and infrastructure surveillance aimed at addressing the above-mentioned risks. Furthermore, the Financial Stability Report mainly emphasizes the risks and development directions of the banking system, as the substantial part of the assets of the financial system are the assets of commercial banks and it is therefore the state of the banking system that primarily determines the level of general financial stability and development directions.

EXECUTIVE SUMMARY



In an environment of increased uncertainties caused by the geopolitical tensions, in 2022, the financial system of the Republic of Armenia ensured the normal path of the financial intermediation.

During the year, the credit growth rate of the banking system was generally in line with the growth of real incomes of the economy. The credit market witnessed a surge in activity, evident across all lending domains. Thanks to the robust economic growth, the banking system adhered to normal stance of lending, effectively curbing any further escalation of debt burden and credit risk. Nevertheless, mortgage lending emerged as a distinct outlier, with sustained high growth rates, potentially leading to overheating risks in the mortgage market.

During 2022, the key prudential indicators of the banking system improved significantly.

The banking system's profitability witnessed a substantial upturn, following the low profitability rates observed in previous years. The main driver behind the increase in profitability was the growth in non-interest income, which was fueled by the expanding customer base and a substantial surge in payment and foreign exchange transactions. Additionally, capital adequacy and system liquidity indicators increased, significantly enhancing the loss absorption capacity of the banking system.

In the environment of high inflation and increased inflationary expectations, there has been a significant rise in the policy rate. Meanwhile, the increase of interest rates for existing and new loans was relatively small. Consequently, the impact of these rate changes on the further escalation of debt servicing costs remained moderate.

A relatively small upward correction of loan interest rates was mainly conditioned by high profitability, capitalization, and liquidity of the banks, which allowed the banking system to refrain from significant increases in loan interest rates. The relatively minor increase in loan interest rates can be attributed primarily to the robust financial health of the banks, characterized by high profitability, capitalization, and liquidity. This enabled the banking system to avoid significant rate hikes. Additionally, factors like fierce competition among banks, reduced demand loan types, a limited share of loans with floating

interest rates in the overall loan portfolio, and substantial inflows of funds into the banking system during the year played key roles in contributing to the modest growth of loan interest rates.

Given the heightened geopolitical tensions, the current environment is marked by increased uncertainties, posing risks of future economic activity contraction and the prolonged maintenance of elevated interest rates. Consequently, the potential for a future increase in the debt burden also remains high.

In recent years, the combination of rising income levels and an increase in the proportion of lower interest rate and longer maturity loans in credit portfolios has helped maintain the economy's debt burden at a relatively low level. Nonetheless, the current context of escalating geopolitical uncertainty and both domestic and external inflationary pressures presents substantial risks. These include the possibility of a decline in future economic activity and the continuation of elevated policy rates. As a consequence, there are also high risks of a potential increase in the economy's debt burden and the materialization of credit losses."

There are risks of overheating in the mortgage and real estate market.

The recent years' surge in mortgage loans and real estate prices have been mutually reinforcing in their nature, signifying potential risks of overheating in the real estate market. As of the end of 2022, the Central Bank estimates the possible overvaluation of real estate prices, representing a deviation of about 16-22% from their fundamental levels.

The stress tests indicate that the banking system can successfully withstand the assumed stress events. Nevertheless, given the growing uncertainties, there is a heightened likelihood of systemic cyclical risks materializing. In this context, it becomes crucial for commercial banks to adopt prudent and balanced approaches in managing risks and distributing dividends.

The Board of the Central Bank of Armenia decided to increase the countercyclical capital buffer.

During the year, the cyclical risks stemming from developments in the overall credit market were generally well balanced (neither elevated nor subdued), while the banking system recorded a high level of profitability and capital adequacy. In light of these circum-





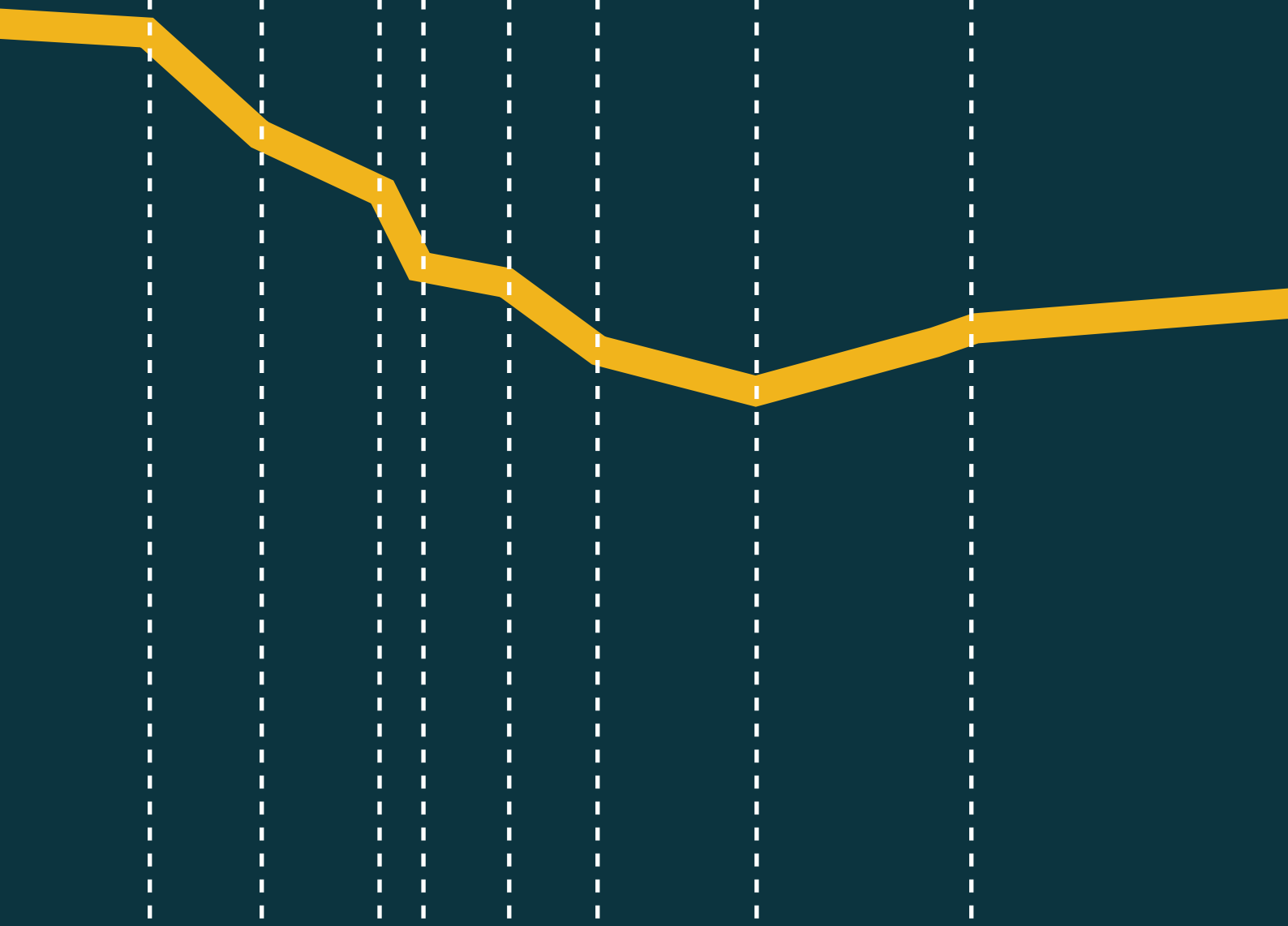
stances, and considering the low costs of equity and adequate capitalization levels to support lending to the economy, the Central Bank Board made the decision to raise the CCyB rate. The buffer rate was increased twice, first to 1%, and then further to 1.5% (applicable from May and August 2023, respectively).

The requirements for the loan-to-value (LTV) ratio are in effect as of April 2022.

As a measure to address the risks of overheating in the mortgage and real estate markets, the loan-to-value (LTV) ratio requirements were introduced and became effective in April 2022. The maximum LTV limits were established at 90% for AMD loans and 70% for foreign exchange loans. These limits are subject to adjustment in response to changing risk outlook in the mortgage market.

7

MACROPRUDENTIAL DASHBOARD



The macroprudential risk map consists of two main sections: sources of risks threatening financial stability and the system's risk resilience or ability to absorb these risks.

The part characterizing the accumulation of risks presents the accumulations of systemic risks according to certain origins, the materialization of which can endanger the stability of the banking system.

The part characterizing the endurance of the banking system and its capability to absorb risks presents the system's potential to endure the risks, i.e., the availability of liquidity and capital buffers.

In 2022, compared to the previous year-end, a reduction of accumulation of risks was observed in almost all risk groups. This is largely conditioned by the high economic growth that Armenia has recorded, as well as the banking system's prudent approaches to risk management and crediting. As a result of the reduction of accumulation of risks and increase of capital, the capability of banks to absorb risks has improved.

The compact indicator of the **macro-risks group** has significantly improved; the high economic growth that was recorded during the year, the growth of private remittances and the positive changes in the current account helped improve the overall macro-environment and reduce the risks deriving thereof. Acceleration of the pace of inflation had a certain negative impact on the

composite indicator (see the "Macroeconomic Developments" section for details).

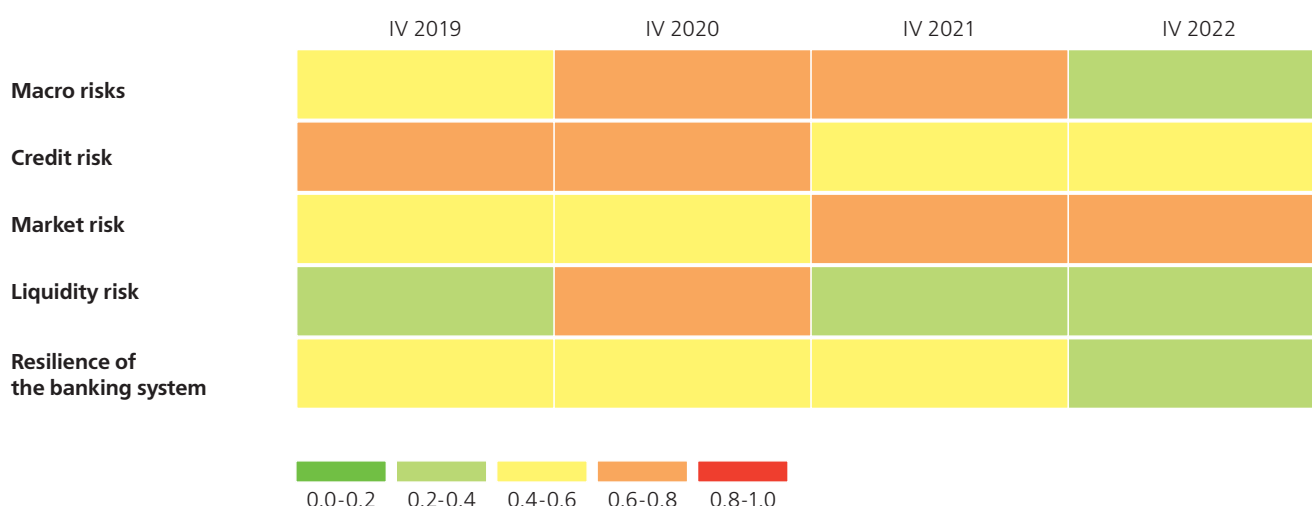
The composite indicator of **credit risk** remained at the same level. The banking system ensured the normal pace of lending to the economy, which was also accompanied by a reduction of the debt burden of economic entities and the credit risk deriving from that. Compared with the previous year, the pace of growth of mortgage lending dropped to a certain extent (base effect), but still remained at a high level compared with the historical average. The indicators for the loans to households/GNDI⁰¹ and interest payments/GNDI contain impulses for accumulation of credit risk due to the high pace of growth of mortgage lending over the past years. In case of high growth of incomes, the specified indicators have also improved to a certain extent, but they still remain in the yellow zone (see the "Household debt and risks" section for details).

Increase of accumulation of risks in the **market risks** sub-group was recorded due to the increase of prices of real estate and government bonds' yields. At the same time, the impact of sub-indicators characterizing the interest rate and currency risks on the overall score was neutral (see "Real estate market developments and risks" and "Developments in the domestic financial market" sections for details).

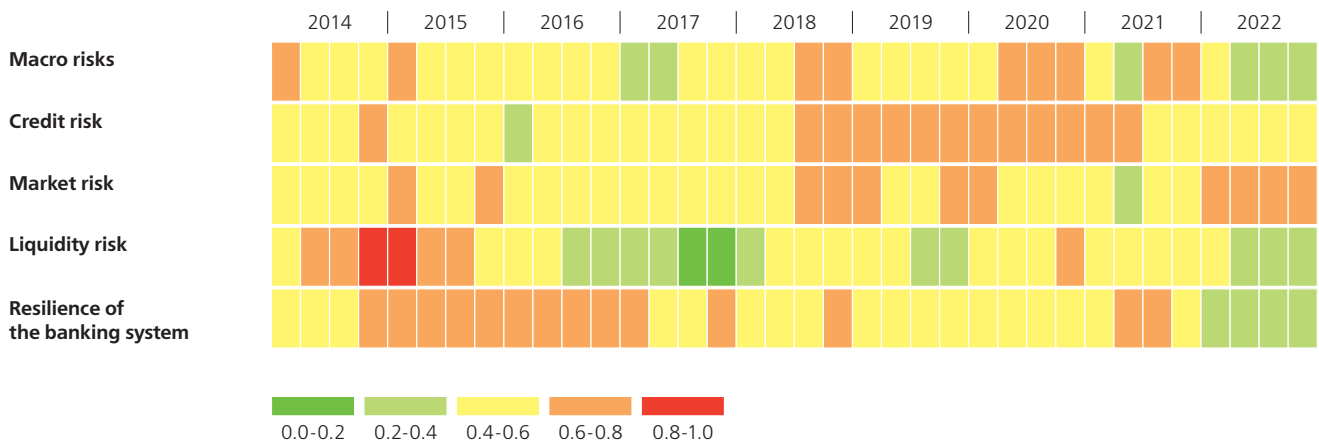
The compact indicator of **liquidity risk** improved due to the banking system's build-

01 GNDI – Gross National Disposal Income.

Macroprudential Dashboard



During the year a decline in the accumulation of some risks was observed



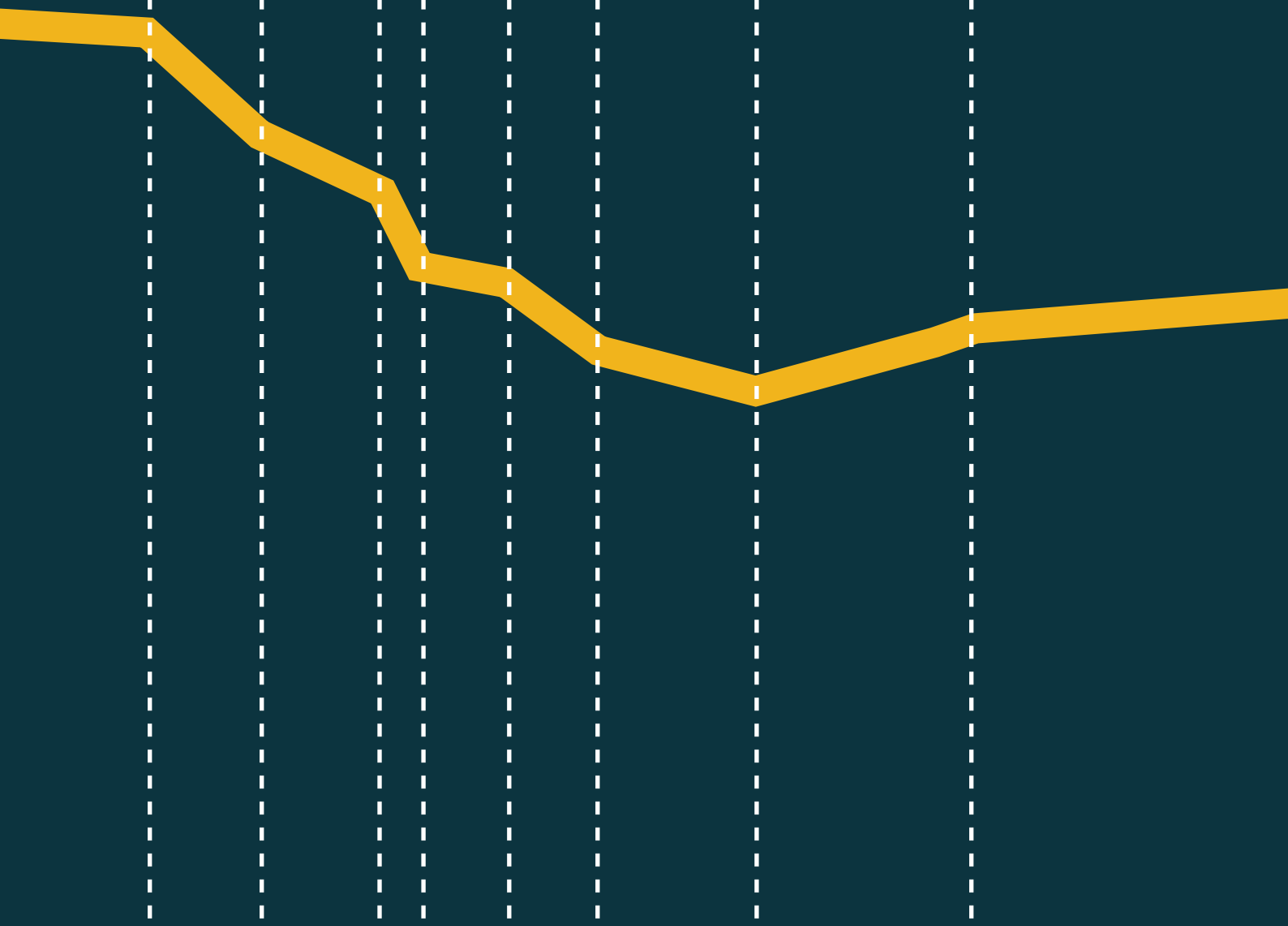
up of liquidity buffers. Increases were recorded in the banking system’s liquidity indicators, and this was a characterizing trend throughout the year (see “Risks in the Financial System: Liquidity Risk” section for details).

The composite indicator of the risk-absorption capacity of the financial system strengthened and passed to the green color zone. The positive dynamic of the indicator was due to the high profitability and high capitalization of the banking system. The

increase of profitability was ensured by the growth of non-interest incomes caused by the large influx of new customers and the expansion of the amount of banking services that are provided (see “Risks in the Financial System: Capital Adequacy and Profitability” section for details).

The macroprudential dashboard comprehensively shows the main observations and conclusions set forth in the next sections of the Report.

2 MACROECONOMIC DEVELOPMENTS



2.1.

DEVELOPMENTS IN THE EXTERNAL ENVIRONMENT

The 2022 forecasted level of global economic growth was revised downwards, conditioned by growing uncertainties in the global economy due to continued disruptions in value chains, accelerating inflation, new outbreaks of the COVID-19 pandemic in China, the Russia-Ukraine conflict, and the sanctions imposed against Russia.

According to projections, the tightening of monetary conditions aimed at regulating the inflationary environment and anchoring inflation and uncertainties related to geopolitical developments will continue to have a further negative impact on global economic growth.

The economic consequences of the pandemic continued to be observed at the beginning of 2022. The deterioration of economic conditions deepened as a result of the escalation of the Russia-Ukraine conflict and the sanctions imposed on Russia. The worsening of the economic situation was also expressed through disruptions in the provision of several raw materials and food products,

with a reduction in supply. The slowdown in economic activity in China due to the outbreak of a new wave of the pandemic in the country has negatively affected overall global demand. The IMF's World Uncertainty Index continues to remain at a high level due to successive shocks, reflecting the fact of continued uncertainties and the slowdown of economic growth (see Chart 2.1⁰¹).

In the partner countries of Armenia, 2022 economic growth expectations have been regularly revised downwards, except in the case of Russia. This is primarily due to the sharp increase in uncertainties regarding geopolitical and economic prospects, tightening monetary conditions in developed countries, as well as the negative impacts of the sanctions imposed on the Russian Federation.

Considering the developments in the US economy at the end of the year, slightly higher growth than the previous estimate is expected. According to the forecast of the Bureau of

01 https://www.imf.org/en/Blogs/Articles/2023/01/26/global-economic-uncertainty-remains-elevated-weighing-on-growth?utm_medium=email&utm_source=govdelivery, data are calculated on a quarterly basis.

Chart 2.1
WORLD UNCERTAINTY INDEX

Source: IMF

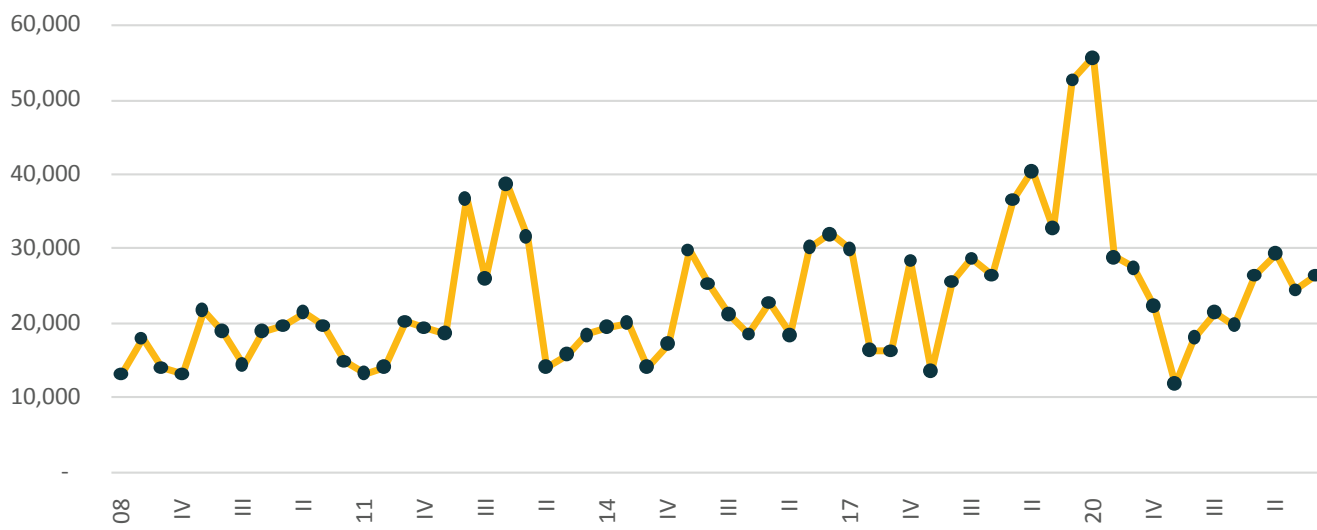
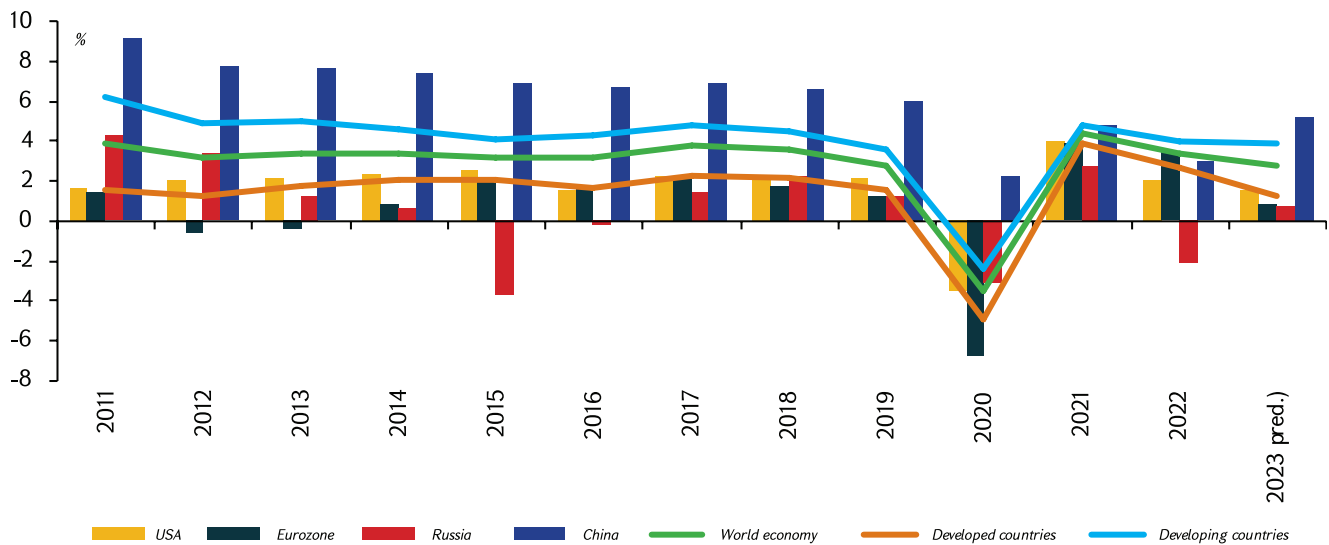


Chart 2.2.
ECONOMIC GROWTH INDICATORS BY REGION

Source: IMF



Economic Analysis of the U.S. Department of Commerce, the US economy grew by 2.1% YoY in 2022 (see Chart 2.2). However, it is estimated that, due to the continuous tightening of monetary policy, economic growth in the US will weaken and will be about 1.6% in 2023.

Rising energy prices have significantly contributed to a more-than-expected slowdown in economic activity in European countries. Economic activity in the Eurozone has significantly decreased despite fiscal support

aimed at overcoming the energy crisis. The Eurozone's economic growth is estimated to be 3.5% in 2022. However, due to the tightening of monetary policy by the European Central Bank and the deterioration of trade conditions due to the increase in energy prices, it is expected that Eurozone economic growth will drop to 0.8% in 2023.

New outbreaks of the pandemic in China and the government's anti-pandemic policy aimed at managing the situation have

Chart 2.3.
POLICY INTEREST RATES OF THE FED, THE ECB, THE BANK OF ENGLAND AND THE CENTRAL BANK OF THE RUSSIAN FEDERATION

Source: Websites of countries' central banks.

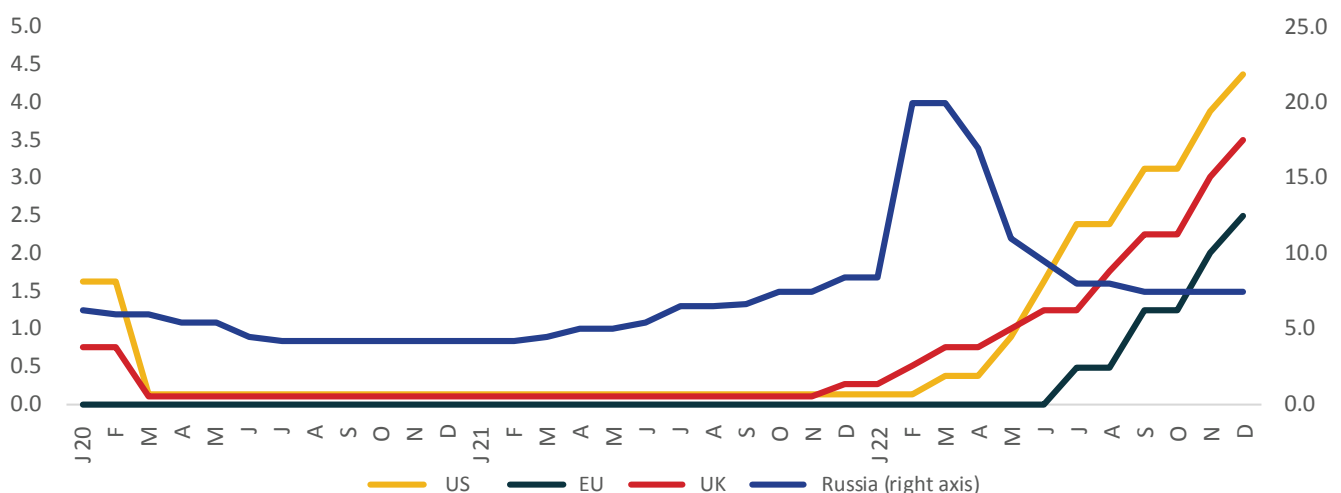
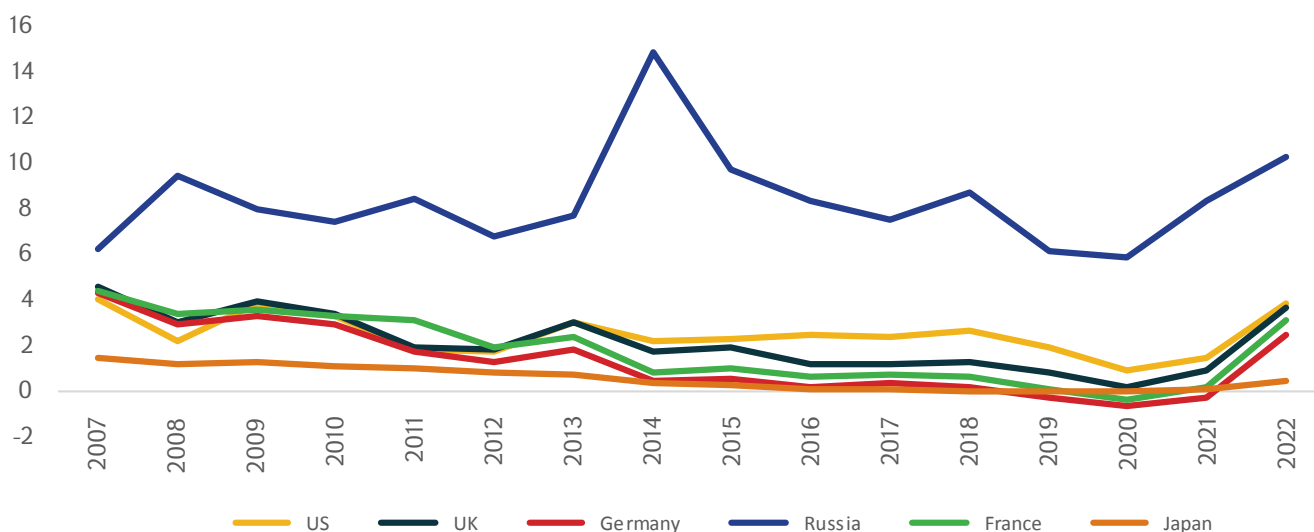


Chart 2.4.

YIELDS OF 10-YEAR GOVERNMENT BONDS IN THE US, UK, GERMANY, FRANCE, JAPAN AND RUSSIA

Source: Bloomberg



weakened the economy, resulting in economic growth of 3.0% in 2022. Along with the mitigation of anti-pandemic restrictions, economic growth is estimated to recover and reach 5.2% in 2023.

According to the estimates of the Federal Service for State Statistics of Russia, there was a 2.1% economic decline in Russia in 2022, which is slightly more optimistic than the previous estimate. The indicators of the economic growth of

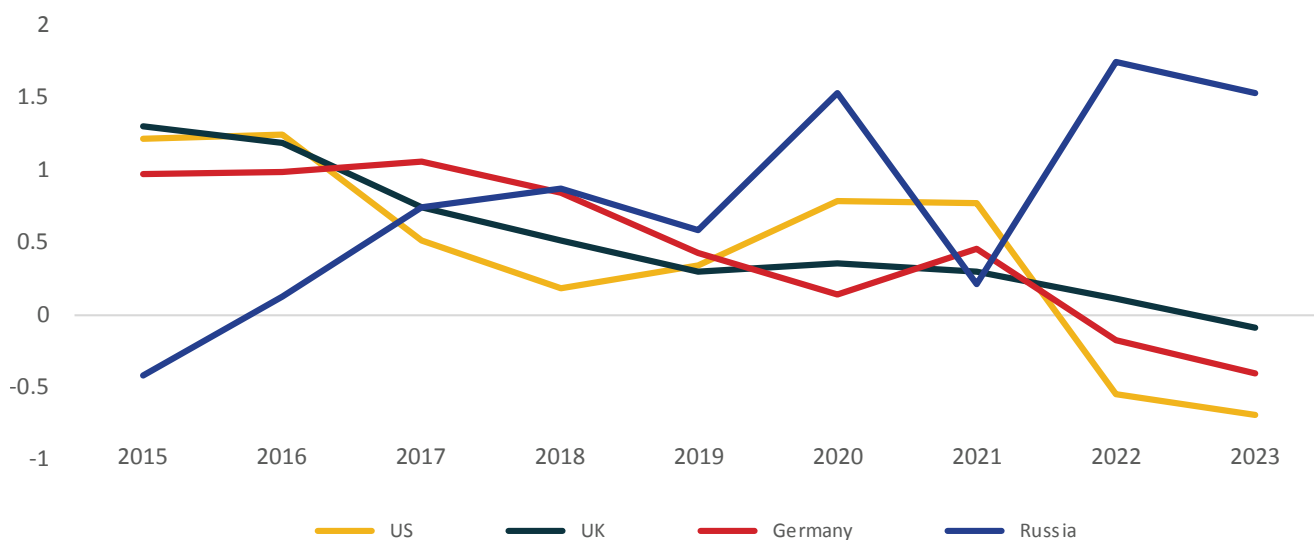
Russia were revised in the direction of growth in 2023, being raised to 0.7% from - 0.3%.

Prices in almost all commodity markets increased, especially in the first months of the year. This was due to deepening issues related to supply in the context of continuous recovery of demand. Along with the tightening of global financial conditions, prices adjusted downwards in the second half of the year.

Chart 2.5.

DIFFERENCE (SPREAD) OF YIELDS OF 2-YEAR AND 10-YEAR TREASURY BONDS IN THE US, UK, GERMANY AND RUSSIA

Source: Bloomberg



Uncertainties in the international copper and oil markets contributed to relatively high price volatility. Uncertainty has been fueled by successive tightening of sanctions against Russia (the ban on Russian oil imports to the EU and the price ceiling policy), changes in China's pandemic management policy, and the pace of economic recovery. The effectiveness of the implementation of the OPEC+ agreement on the reduction of supply in various member countries was also decisive for the determination of oil prices. Starting from the third quarter of 2022, prices in the copper and oil markets decreased due to the combined effect of the above-mentioned events.

It is expected that, along with the gradual weakening of supply chain disruptions and the slowdown of global demand due to the tightening of financial conditions, the downward adjustment in prices will be maintained in commodity markets.

The response of central banks worldwide to the escalating inflationary pressures present since the beginning of the year has generally led to a significant and rapid tightening of financial conditions.

Central banks in both developed and several developing countries tightened monetary conditions throughout the year to control rising inflation. Since the year's start, the US Federal Reserve has increased interest rates by approximately 4 percentage points, with rates reaching 4.5% in December. The European Central Bank began tightening monetary policy in July, raising its key rate from zero by a total of 2.5 percentage points. In response to the escalating Russia-Ukraine conflict and the risks of surging inflationary expectations, the Central Bank of the Russian Federation immediately raised the interest rate by 10.5 percentage points to 20%.

Subsequently, as inflation slowed down during the year and inflation expectations weakened, the Central Bank of Russia grad-

ually eased monetary conditions, setting the policy rate at 7.5% (see Chart 2.3).

In 2022, debt, stock, and currency markets across the globe experienced high volatility. Government bond yields increased in almost all developed and developing countries. Since the beginning of the year, 10-year Treasury yields have risen by about 235 basis points in the US, 273 in the UK, 238 in Germany, 290 in France, 34 in Japan, and 192 in the Russian Federation (see Chart 2.4).

The trends in the yield difference (spread) of short-term and long-term treasury bonds also reflect the financial market's development and the expectations of market participants. In 2022, the sharp tightening of monetary conditions, aimed at containing inflationary pressures in the US and the Eurozone, initially led to a reduction in the spread, causing yield curves to "straighten." However, in the second quarter, the spread narrowed, leading to yield curves flipping (see Chart 2.5). Some estimates suggest that such yield curves could trigger a possible short-term recession.

Amidst high interest rates, the yield of RA Eurobonds corrected upward along with the increase in the yield of government bonds of various countries. The yield of RA Eurobonds with a 10-year maturity grew at a faster pace than that of 10-year US, Eurozone, and UK Treasury bonds.

The spread between the latter, known as the country risk premium, has been on a downward trend, mainly due to the relatively fast rise in US, Eurozone, and UK 10-year Treasury yields since the third quarter (for more details, see the section titled "Development in the domestic financial market"). With increasing interest rates in international markets and financial inflow into the Republic of Armenia, there was a rise in investments by commercial banks of the Republic of Armenia in both RA Eurobonds and treasury bonds of other countries.

2.2.

DOMESTIC DEVELOPMENTS

During 2022, the macroeconomic environment of Armenia was mainly characterized by positive development trends. The high level of economic activity was sustained through external demand, which was boosted by a rise in international visitors, financial resources, workforce, and exports.

Armenia's economy experienced a growth of 12.6% in 2022, primarily driven by the service sector, which was largely attributed to the strong external demand.

This economic growth indicator was observed in the context of growing uncertainties during the year due to many external factors, in particular, the sharp weakening of economic growth in partner countries (especially in the Russian Federation) due to the escalation of the Russia-Ukraine conflict and disruptions in commercial transactions, business relationships, and supply contracts between Armenia and the Russian Federation against the backdrop of the devaluation of the ruble. These events had a negative impact on the Armenian economy in the short term, which manifested in some weakening of economic activity. At the same time, several external factors had a positive impact on

economic growth, in particular, the increase in aggregate demand due to the large-scale inflow of international visitors to Armenia (from the Russian Federation, Belarus, and Ukraine) (see Charts 2.6 and 2.7). The acceleration of the growth rate of trade, construction, and partly also the manufacturing sector contributed to the acceleration of the economic growth rate.

The high growth recorded mainly in the financial and insurance services, as well as in the information and communication sectors, greatly contributed to the 18.3% growth of the services sector.

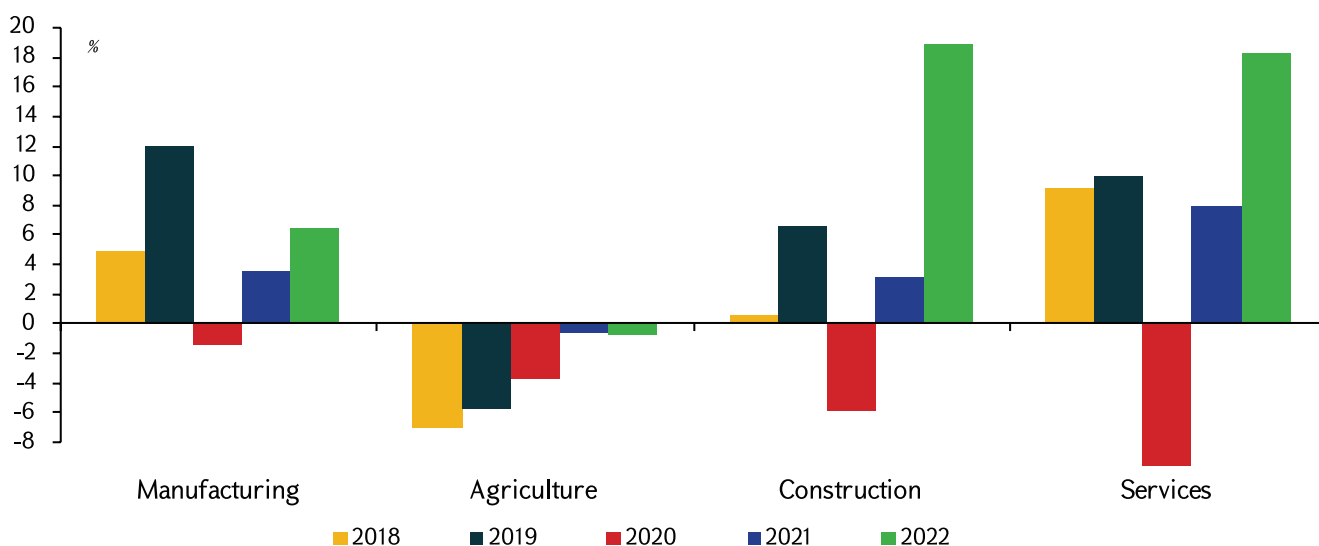
A 6.4% growth was registered in the manufacturing sector, to which the processing industry subsector significantly contributed. Taking advantage of the opportunities provided in foreign markets, it was possible to ensure high growth in the sector. This was achieved by increasing output and export potential due to investment activity in the food production subsector.

The growth in the construction sector was 18.8%. A slight decrease was recorded in the agricultural sector, - 0.7%.

Chart 2.6.

GROWTH DYNAMICS OF ECONOMIC SECTORS

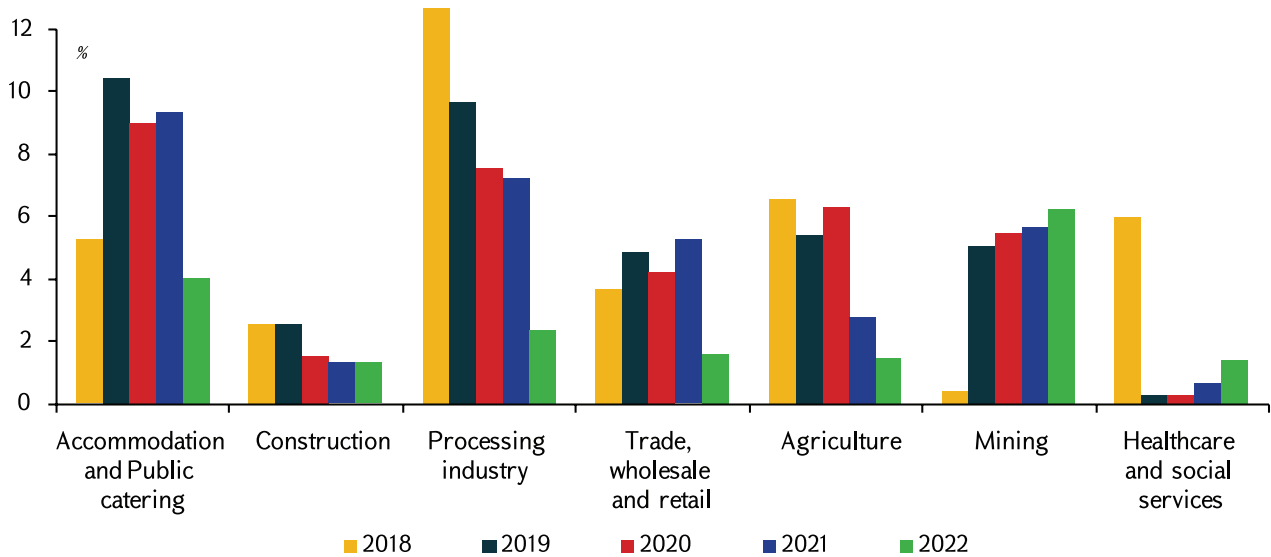
Source: SCRA



Գծապետեր 2.7.

PERCENTAGE OF NON-PERFORMING LOANS BY ECONOMIC SECTOR

Source: CBA



In the context of growing demand, a high inflationary environment was maintained during the year. The 12-month inflation rate was 8.3%,⁰¹ which had negative consequences on the real income of the economy.

In 2022, the growth rate of business deposits exceeded the growth rate

of credit obligations, which indicates a significant accumulation of financial resources in businesses and savings in the economy, as well as an increase in the financial flexibility of companies.

The surveys on credit conditions⁰² indicate that the decrease in loan applications

01 For details, please see "Inflation Report," https://www.cba.am/Storage/EN/publications/DVQ/Monetary%20overview_II.2022.pdf.

02 The survey on credit conditions is carried out quarterly with the participation of commercial banks and credit institutions. The survey of the fourth quarter of 2022 was conducted in February.

Chart 2.8.

PUBLIC DEBT/GDP RATIO

Source: Ministry of Finance, CBA

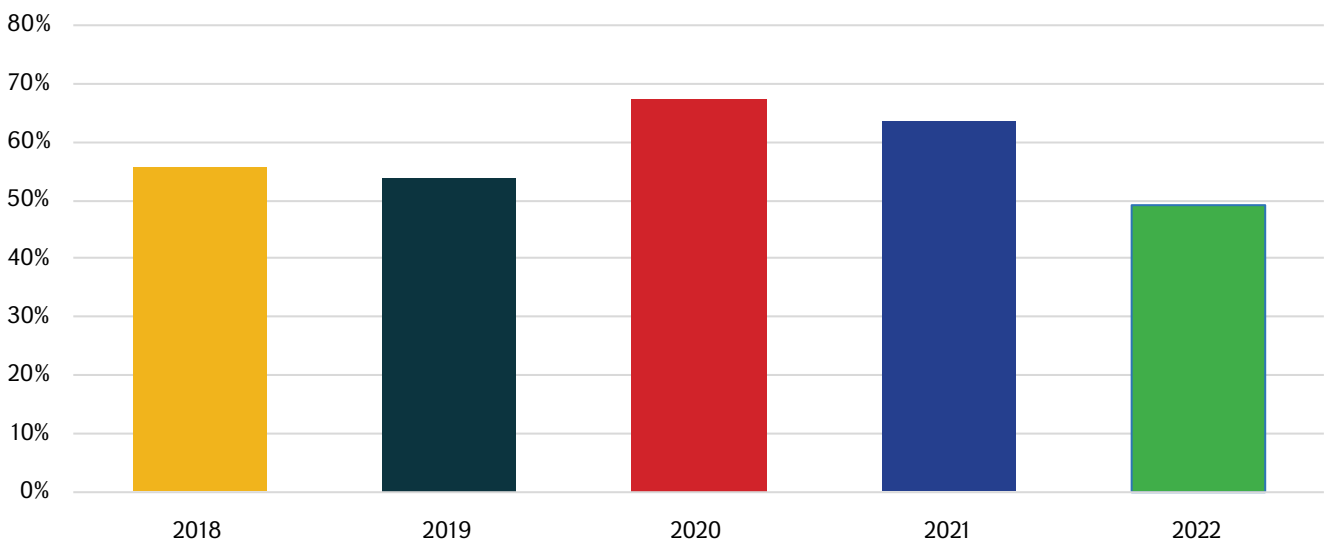
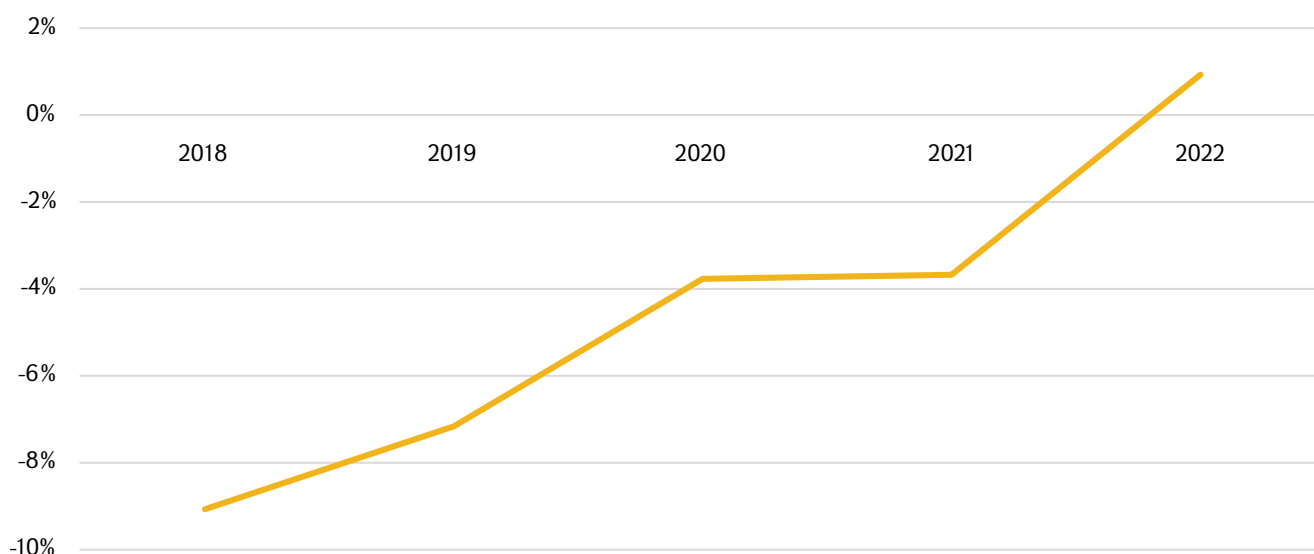


Chart 2.9.
CURRENT ACCOUNT DEFICIT/GDP RATIO

Source: CBA



and credit demand can be attributed to various factors such as the rise in customer incomes, the increase in external and internal uncertainties, and a tightening of credit supply conditions. This finding is supported by the actual data, which shows an increase in deposits for both individuals and legal entities.

During the year, the ratio of non-performing loans in the credit portfolios of loans to the processing, service, as well as accommodation and public catering, sectors decreased, along with the growth of revenues in these sectors, which contributed the most to economic growth. This again demonstrates improvement in the financial condition of businesses.

A decrease in the public debt-to-GDP ratio was observed in 2022.

During the year, the public debt⁰³ decreased by 5.5 percentage points, partly due to the appreciation of the national currency (see

Chart 2.8). The debt-to-GDP ratio amounted to 49.3%. The volume of domestic public debt increased by 33.2%, while external public debt decreased by 20.5%, in line with the government's announced strategy of public debt management. In the future, the change in the public debt service burden may be influenced by the decrease in the average maturity of the debt.

Exports and imports grew significantly in 2022. Due to geopolitical developments, Armenia's opportunities to export have expanded, in parallel with an increase of export potential. A high increase was also recorded in import volume due to the increased demand in the economy.

The current account deficit continued to improve during the year, driven by both unprecedented positive export trends and strong growth in inflows of net remittances (see Chart 2.9).

03 https://minfin.am/en/page/summary_data_on_public_debt/

2.3.

HOUSEHOLD DEBT AND RISKS

The high economic growth in Armenia in 2022 has significantly alleviated the debt burden on households and mitigated their financial vulnerability. Nevertheless, in the context of increasing geopolitical uncertainties and both internal and external inflationary pressures, the risks associated with sustained economic activity and a potential increase in household debt burden have been assessed to be at a high level. Additionally, the growth of mortgage lending to households is outpacing income growth, indicating potential risk accumulations in the mortgage lending.

The rapid recovery following the economic downturn caused by the pandemic has positively impacted the labor market and household incomes. The growth of nominal wages recorded during the year was accompanied by high infla-

tion, resulting in lower real income growth. In nominal terms, wages increased by 15.5% over the year (see Chart 2.10), while average real wage growth improved to 6.3% and the employment rate decreased by about 3.0 percentage points to 13.1%. These developments have significantly mitigated the vulnerability of households to potential risks.

In 2022, the total financial assets of households continued to grow and were mostly invested in low-risk segments. Total financial assets⁰¹ grew by around 6.0%, and the financial assets-to-GDP ratio amounted to 10.0%, exceeding the pre-pandemic level.

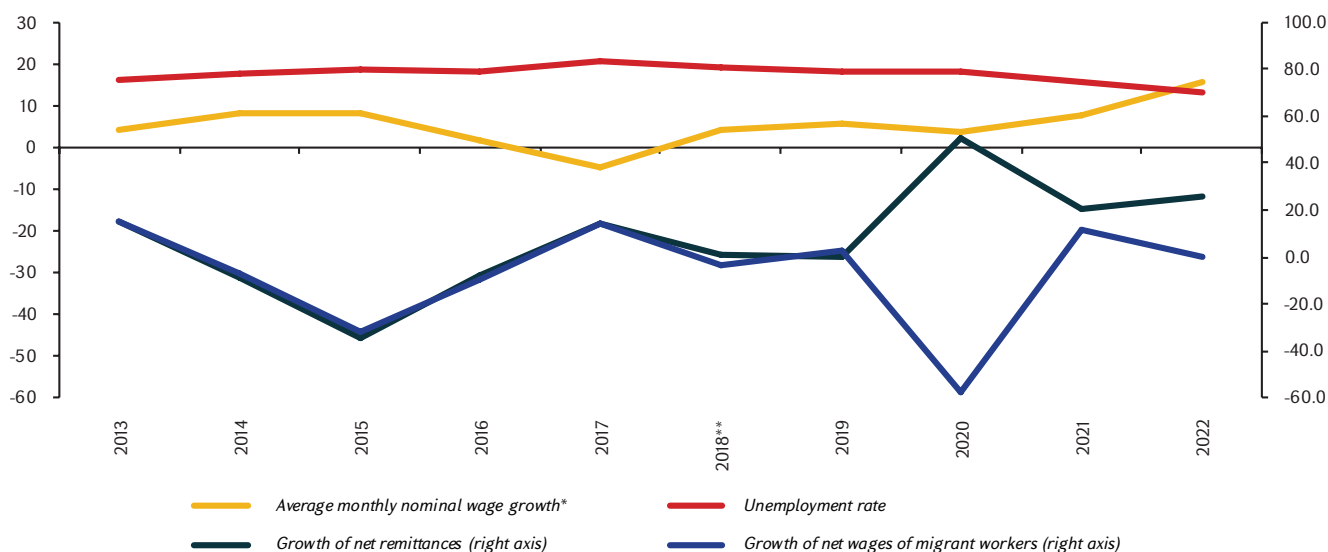
Deposits are the biggest chunk of households' financial assets and saw the largest increase. Deposits continue to show a stable growth trend, averaging about 13% annually, and the deposits-to-GDP ratio varied

⁰¹ Financial assets include bank deposits, stocks, bonds, household contributions to pension funds during the year, and insurance benefits.

Chart 2.10.

CHANGES IN REMITTANCES, MIGRANT WORKERS' REMUNERATION, WAGES AND UNEMPLOYMENT

Source: CBA, SCRA

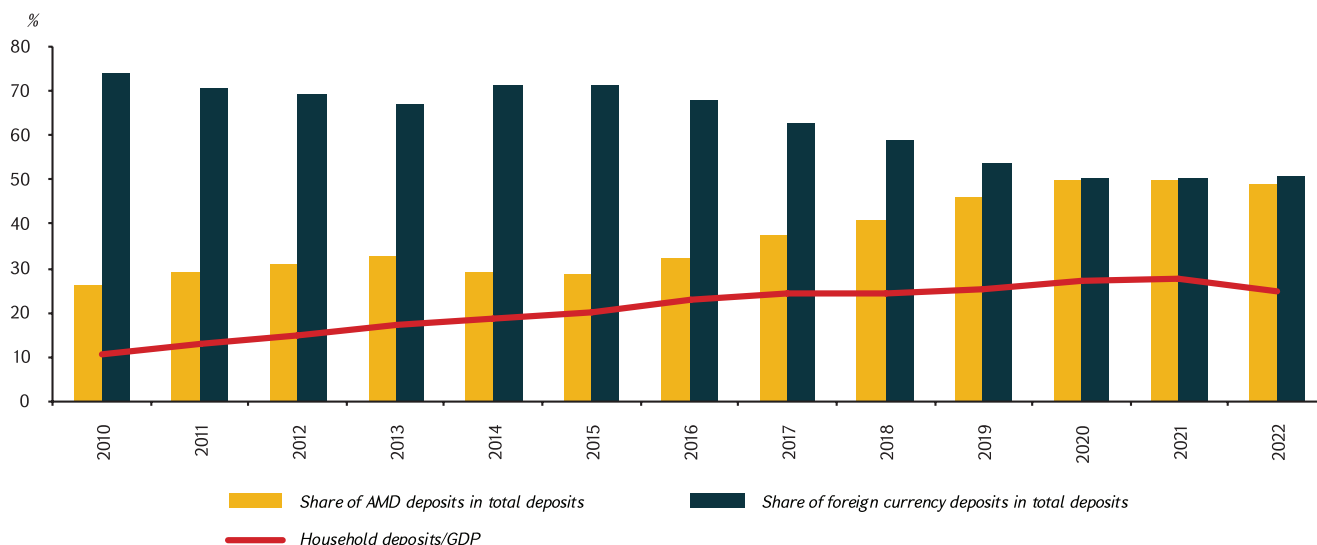


* The average annual wage index is presented.

** In January 2018, the Statistical Committee of Armenia revised the methodology of labor market statistics, within the scope of which the sizes of a number of indicators were changed. Accordingly, the average nominal wage now applies to organizations with one or more employees.

Chart 2.11.
HOUSEHOLD DEPOSITS

Source: CBA



between 24% and 27% (see Charts 2.11 and 2.12). The rise in deposits can be attributed to multiple factors, such as an increase in income, the expectation of economic uncertainties and geopolitical developments leading to the reduction or cancellation of certain expenses, as well as the surge in bank accounts and savings of citizens arriving from abroad (international visitors) since the beginning of the year.

Given the significant increase of households' financial assets since 2021, along with the reduction of the debt bur-

den of households, we can conclude that the net financial situation of households has improved.

Compared with historical trends, the pace of growth of the debt burden of households has declined over the past years. As economic growth recovered and lending increased in 2022, the credit/GDP ratio declined to approximately 27% (28% in 2021, 30.2% in 2020) (see Charts 2.13, 2.14). Compared to the median for countries in the region, this indicator is still high and behind only Georgia's 38%

Chart 2.12.
GROSS DOMESTIC SAVINGS (% OF GDP)

Source: World Bank

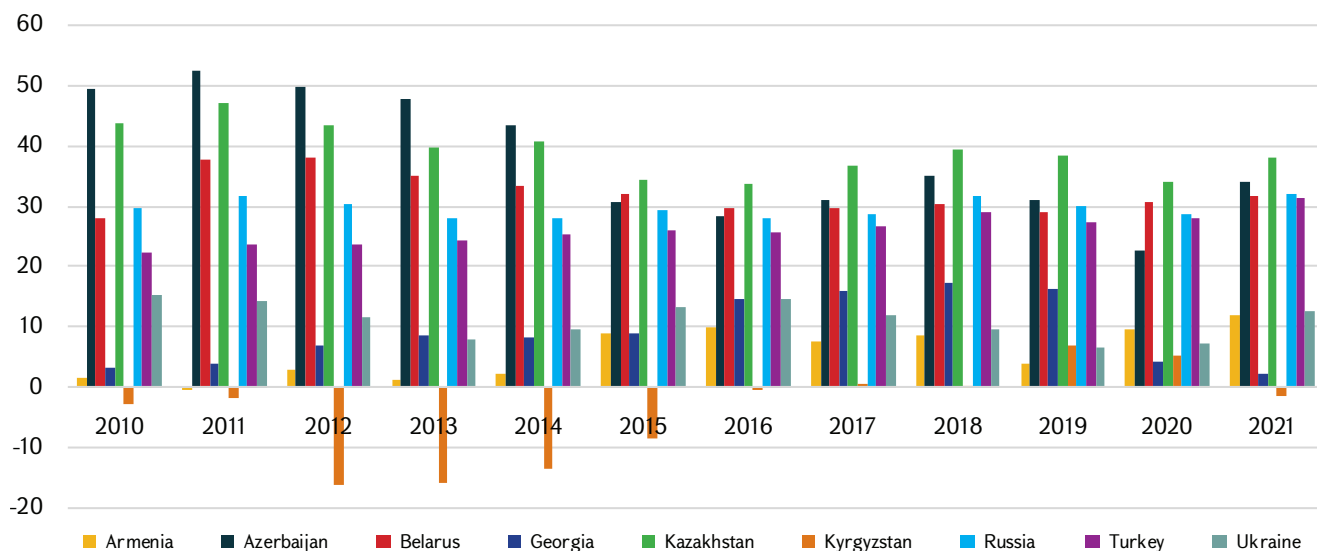
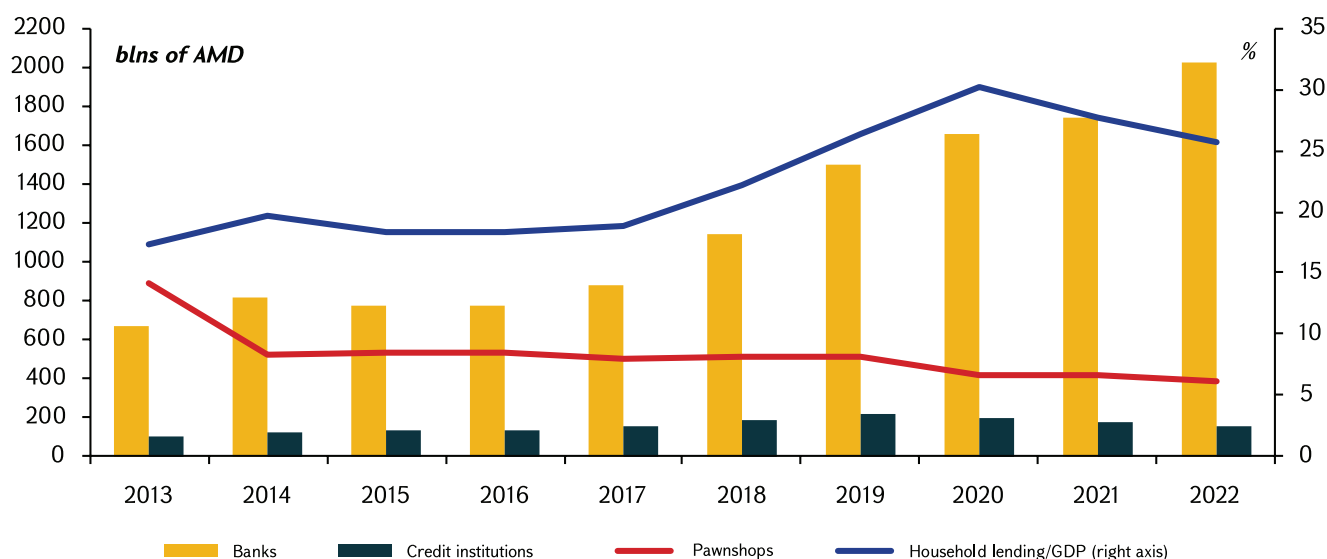


Chart 2.13.
STRUCTURE OF HOUSEHOLD LIABILITIES

Source: CBA



level (see Chart 2.15; the data for September are presented for comparison).

The growth of household loans was higher compared to the previous year and amounted to 17.9%, mainly due to the high growth of mortgage loans. Consumer loans have gradually recovered with an upward trend, after last year's recorded decline.

In recent years, the high growth rate of mortgage loans is mainly due to a state program involving the return of mortgage loan

interest payments in the amount of income tax paid and the phased termination of the program by 2025. Real estate prices and rents increased because of the large inflow of foreign citizens during 2022, which provided an additional momentum to the growth of mortgages. Mortgage loans grew by 27.6% during the year and amounted to about 11.0% of GDP (see Chart 2.16). Demand for consumer loans recovered, albeit at a weaker pace, with annual growth of 4.7% (see Chart 2.16). Growth trends of consumer loans became evident in

Chart 2.14.
STRUCTURE OF LENDING TO HOUSEHOLDS BY BANKS AND CREDIT INSTITUTIONS

Source: CBA

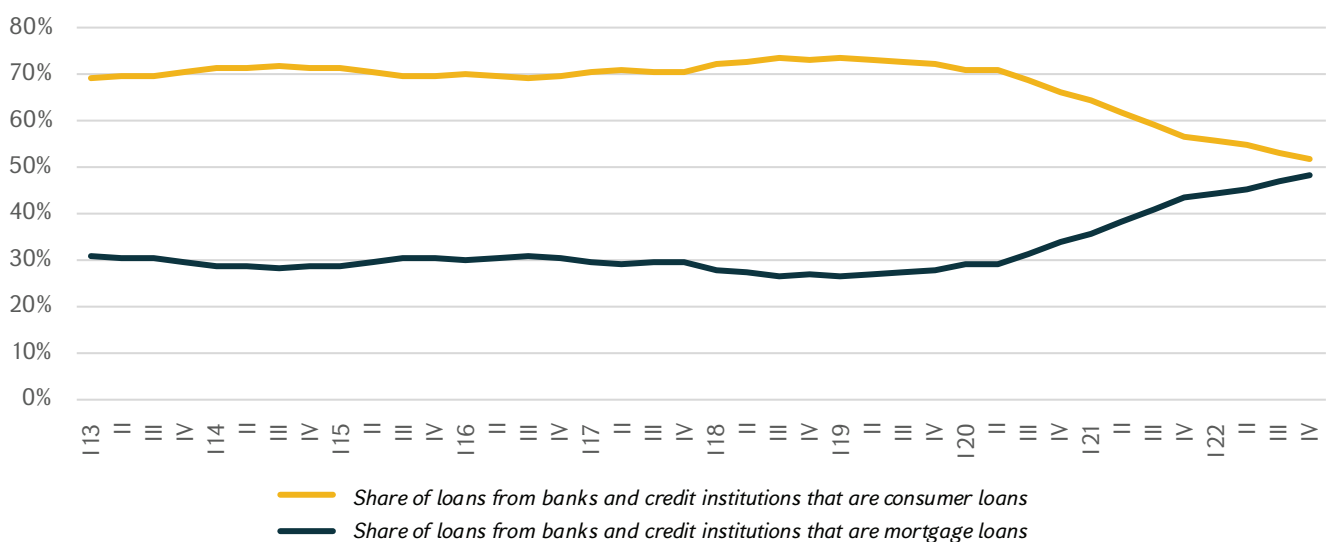
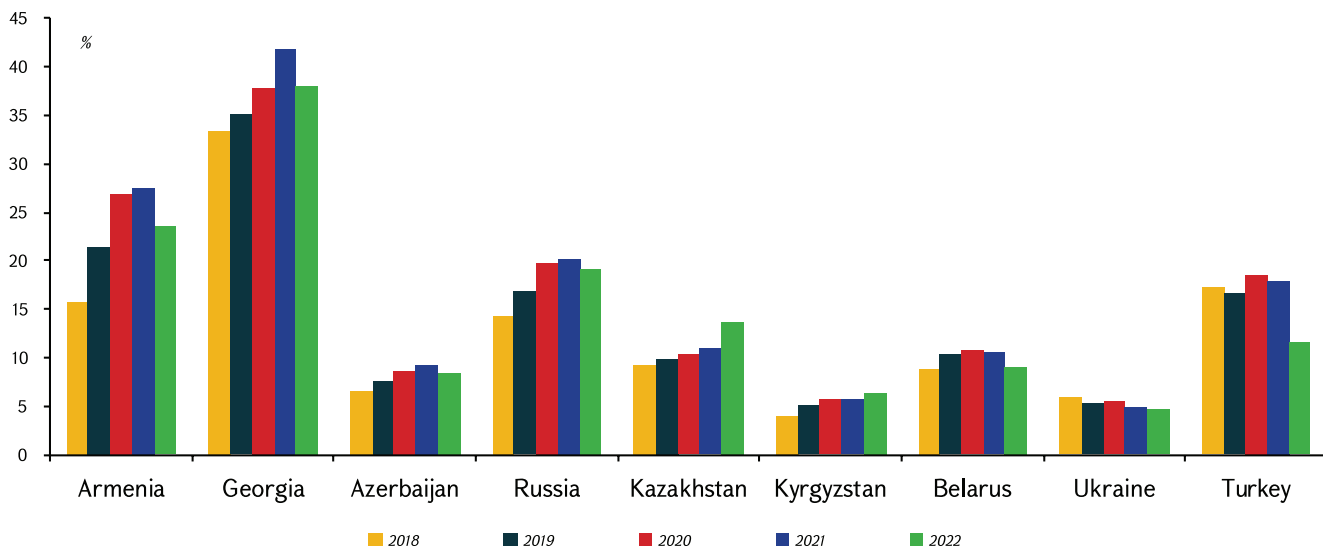


Chart 2.15.
RATIO OF HOUSEHOLD LOANS TO GDP

Source: World Bank



* The value of the Household debt / GDP ratio in the chart may differ from the value of the same indicator presented in the report. To ensure comparability, the most recent figures available for the period are used instead of year-end indicators.

the second quarter of 2022 when economic activity improved significantly. In the following quarters, the increase in the income of Armenia's population, along with the large inflow of foreign visitors, had a certain restraining effect on the demand for credit funds. Amidst the ongoing high growth of mortgages, the share of consumer loans in household loans continues to decrease (see Chart 2.16).

According to the results of the survey, the growth rate of consumer loans is recovering slowly, mainly due to the tightening of lending terms by banks, especially for riskier customers, and the growth of the interest rate margin is due to the increase in the cost of the funds. However, at the end of the year, credit supply condition indices across all lending directions experienced net easing, mainly attributable to

Chart 2.16.
LOAN PORTFOLIO OF MORTGAGE AND CONSUMER LOANS BY BANKS AND CREDIT INSTITUTIONS

Source: CBA

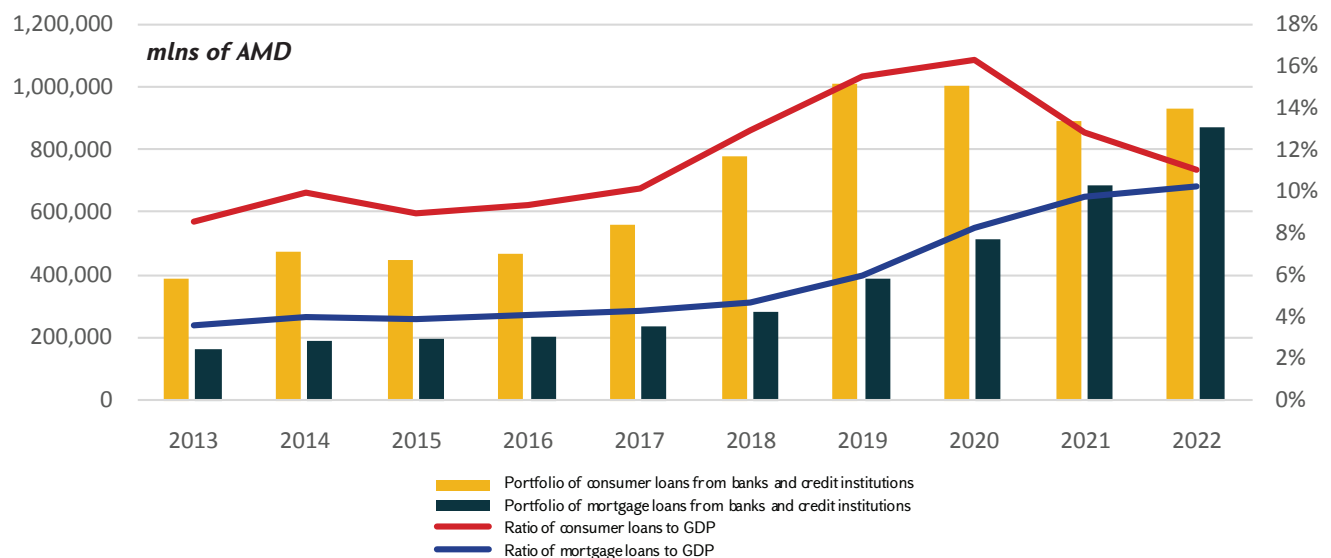
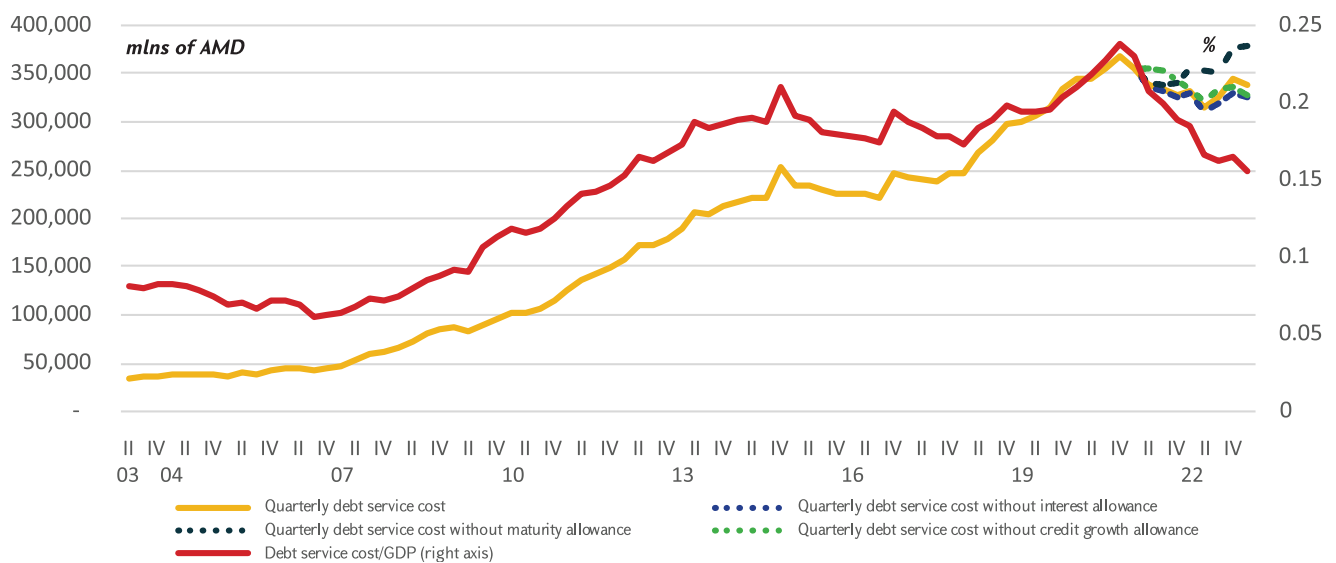


Chart 2.17.
DEBT SERVICE DYNAMICS

Source: CBA



recovery of economic activity and strengthening of economic growth expectations.

Inflated household spending due to an increase in consumer prices, the expansion of the availability of certain credit instruments (credit lines and overdrafts, which were on average used up to 60-70% of the limit), as well as an increase in demand for durable goods raised the demand for consumer loans. The increased demand for durable goods relates to the acquisition of new apartments, as well as the temporary inflow of foreign citi-

zens and the increase in the nominal income of the population.

High economic growth in 2022 has had a positive impact on reducing the debt service burden of households. Nevertheless, there is a high risk associated with the potential growth of household debt burden, given growing geopolitical uncertainties and uncertainties regarding maintaining future economic activity in high external and internal inflationary environments.

Chart 2.18.
HOUSEHOLD LOAN TRENDS

Source: CBA

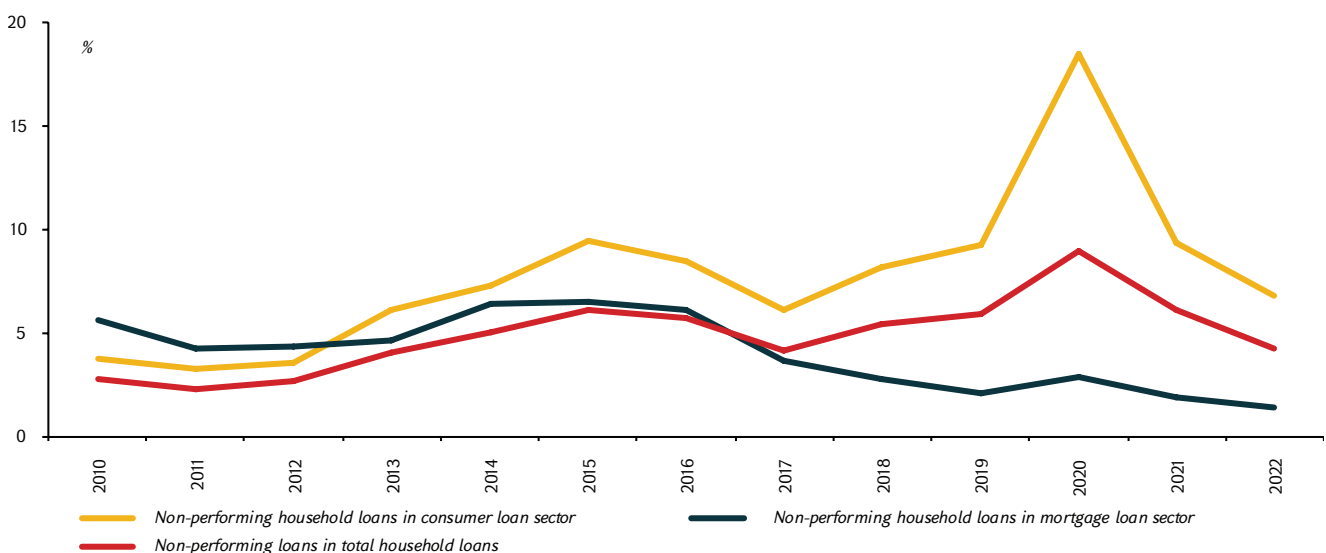
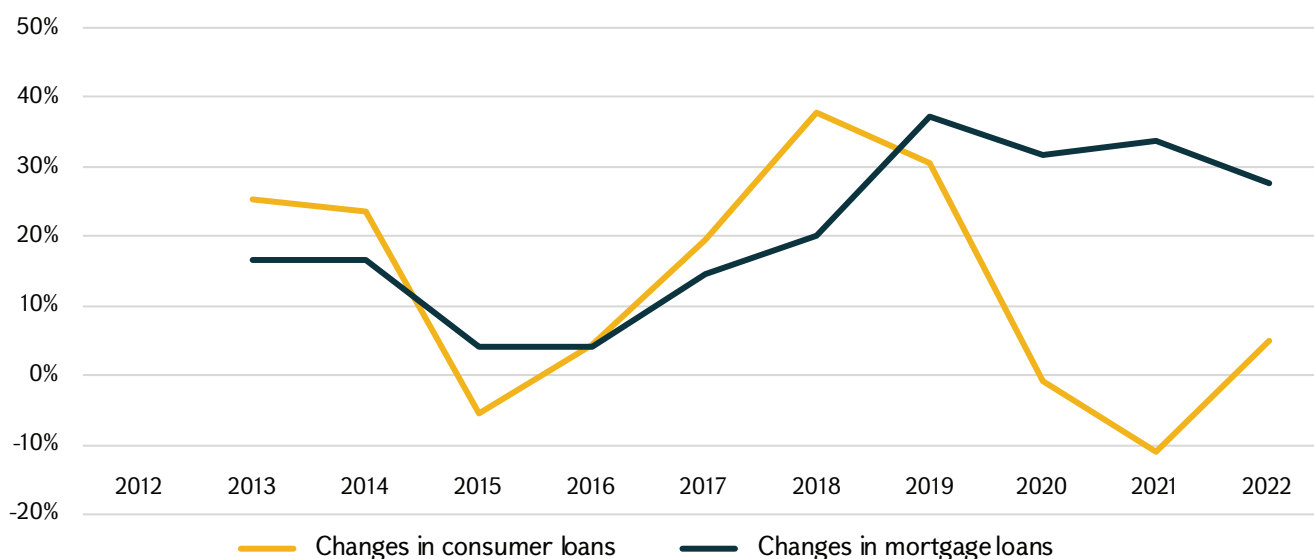


Chart 2.19.

DYNAMICS/GROWTH RATE OF CONSUMER AND MORTGAGE LOANS

Source: CBA



In recent years, the increase in disposable income, combined with relatively low interest rates and an increase in the maturity of credits, has enabled households to maintain a relatively low level of debt service (see Chart 2.17). The change in the structure of household liabilities resulting from the high growth of mortgages has also eased the loan servicing burden at the expense of longer repayment periods and lower interest rates than consumer loans.

Over the past couple of years, the rise in interest rates on both new and existing

household loans has been relatively minor, despite a significant increase in the policy rate, which was driven by high inflation levels. High levels of profitability, capitalization, and liquidity for banks have enabled them to refrain from raising loan interest rates to a greater extent. In addition, high competition among banks, the reduction in demand for certain types of loans, the relatively small share of loans with floating interest rates in the loan portfolio, and the inflow of large-scale funds into the banking system during

Chart 2.20.

CURRENCY STRUCTURE OF HOUSEHOLD LOANS

Source: CBA

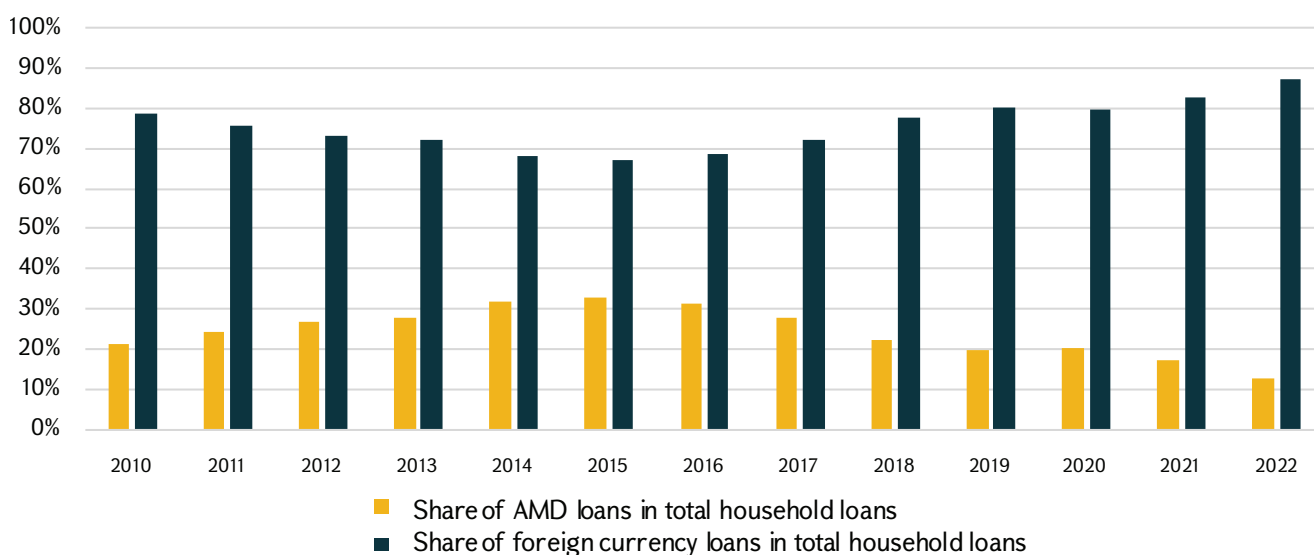


Chart 2.21.
CURRENCY STRUCTURE OF MORTGAGE LOANS

Source: CBA



the year additionally contributed to a mitigation of the growth of credit interest rates. In the event high levels of inflation and interest rates in the financial markets persist, there is a likelihood of loan servicing costs increasing further. (For more information, please refer to the section on “Development in domestic financial markets.”)

Household loan quality has continuously improved over recent years due to favorable economic developments and prudent lending policies of financial institutions.

The share of non-performing loans in total household loans decreased by 2.0 percentage points to 4.1%, which is below the historical average (see Chart 2.18), while the total credit portfolio of households increased by 18.0%. The share of non-performing consumer loans decreased by 2.6 percentage points to 6.8%, while consumer loan growth was at approximately 5.0% at the end of the year. The share of non-performing mortgages decreased by 0.5 percentage points and remained at 1.4%, low compared to other loan types (see Chart 2.19).

The significant increase in the annual growth of both the mortgage portfolio and real estate prices complemented each other, pointing to the potential risks of overheating of the real estate market.

New requirements regarding loan-to-value (LTV) ratio entered into force beginning on April 1, 2022 in order to effectively address the accumulation of systemic risks arising from the growth of mortgages and imbalances in the real estate market. (For more information, please refer to the section on “Macroprudential policy.”)

Dramization trends in terms of both household savings and borrowings have continued. The trend of increasing household deposits contributed to the reduction of household debt leverage (see Charts 2.11 and 2.21).

The share of AMD-denominated mortgage and consumer loans reached 87.4%, increasing by 5.4 percentage points compared to the previous year. The share of AMD-denominated deposits remained at the same level and was about 50.0% (see Charts 2.20 and 2.21).

2.4.

REAL ESTATE MARKET DEVELOPMENTS AND RISKS

Vulnerability of financial stability to fluctuations in real estate prices mainly derives from lending to construction and mortgage loans and materialization of risks related to change in collateral value. Sharp fluctuations in real estate supply/demand, and severe price variations thereof, can harm banks' loan security and loan quality, generating risks to financial stability.

An acceleration of the price index growth rate was recorded in the real estate market of Armenia in 2022, due to high economic activity, as well as the operation of an income tax refund mechanism and its planned phase-out (see Chart 2.22). The significant increase in real estate rents caused by the substantial growth in demand from foreign visitors additionally contributed to the growth of real estate prices.

The real estate market activity continued to grow in the first half of 2022 but slowed down somewhat in the second half of the year. During 2020, because of temporary difficulties for completion of certain transactions in the light of pandemic restrictions and military operations, some of the real estate transactions

were carried out later in 2021. Hence, against the background of the significant increase in the volume and number of transactions carried out in the real estate market in 2021, the growth of total transactions in the considered year may seem low. Nevertheless, in 2022, real estate market activity was high if we neutralize the above-mentioned factor of the base year. In the year under review, a 1.7% increase in total transactions was recorded (see Chart 2.23) and the volume of new mortgage loans provided by banks to individuals increased by 17.0% compared to the previous year.

In 2022, prices for apartments in multi-apartment residential buildings in Yerevan continued to increase, with the maximum increase recorded in May at 17.2%, and at the end of the year at 11.1%.

The significant acceleration of economic activity has been sustained, along with the high growth rate of mortgage loans and the shift in the income tax refund mechanism since Q2 2022.

The current mechanism of income tax repayment for mortgage loan inter-

Chart 2.22.

CHANGE IN THE AVERAGE HOUSE PRICE INDEX (HPI) IN YEREVAN AND REGIONAL CITIES

Source: CBA, SCRA

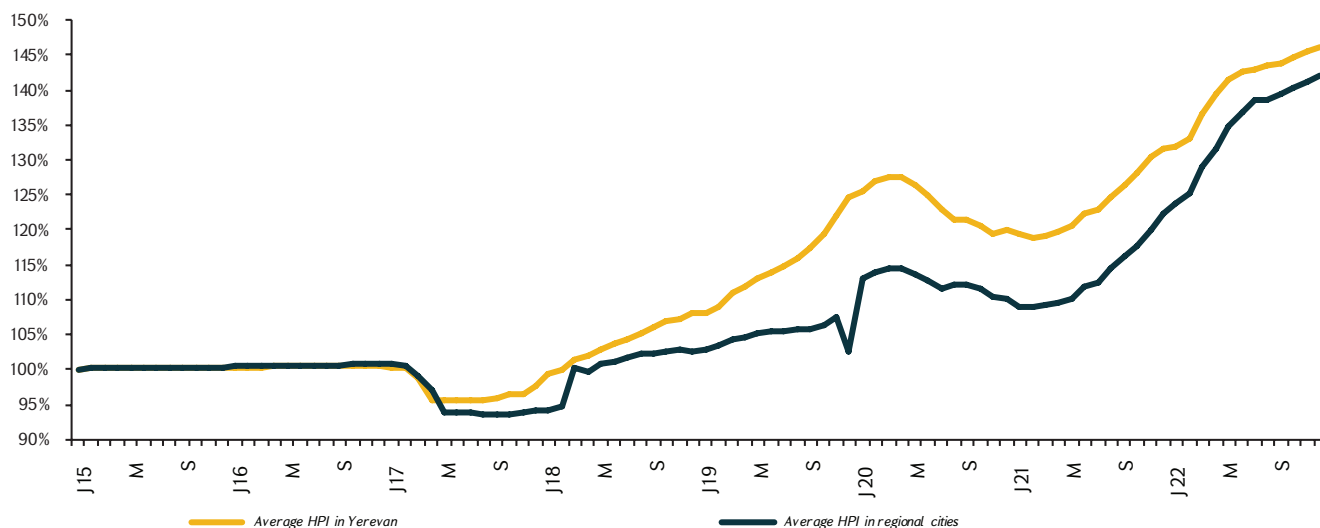
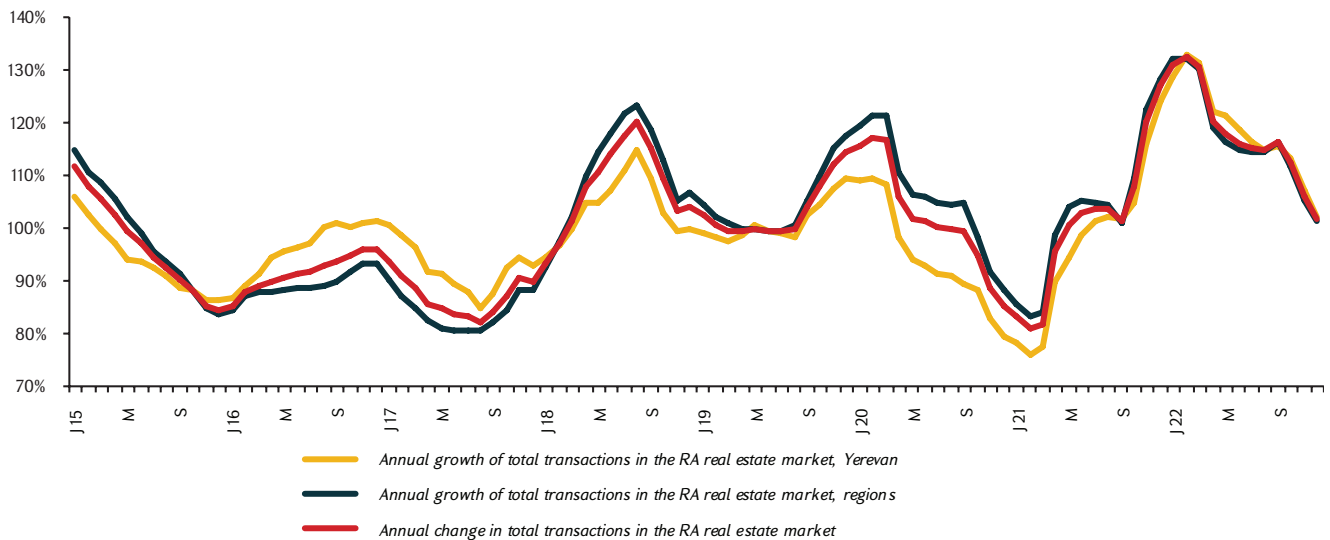


Chart 2.23.

AVERAGE ANNUAL CHANGE OF GENERAL TRANSACTIONS IN THE RA REAL ESTATE MARKET

Source: CBA, SCRA



est payments and other state refinancing programs⁰¹ expand the availability and affordability of mortgage lending, not only easing lending terms but also significantly reducing the current debt service burden (especially during the first years of the loan repayment). The effect of phasing out the income tax refund mechanism on mortgage growth was dual. On the one hand,

people rushed to buy real estate while the mechanism is still in place, which contributed to the growth of mortgages. On the other hand, with the phase-out of the mechanism in the first zone of the Yerevan administrative district, the growth of mortgage loans slowed down compared to last year, negatively affecting total mortgage growth in RA.

⁰¹ The amendments to the RA Law on Income Tax came into force in January 2015, and the state housing support programs for 2020-2023 for families with children have been in operation since 2020.

Chart 2.24.

LOANS PROVIDED BY BANKS AND CREDIT INSTITUTIONS TO THE CONSTRUCTION SECTOR

Source: CBA

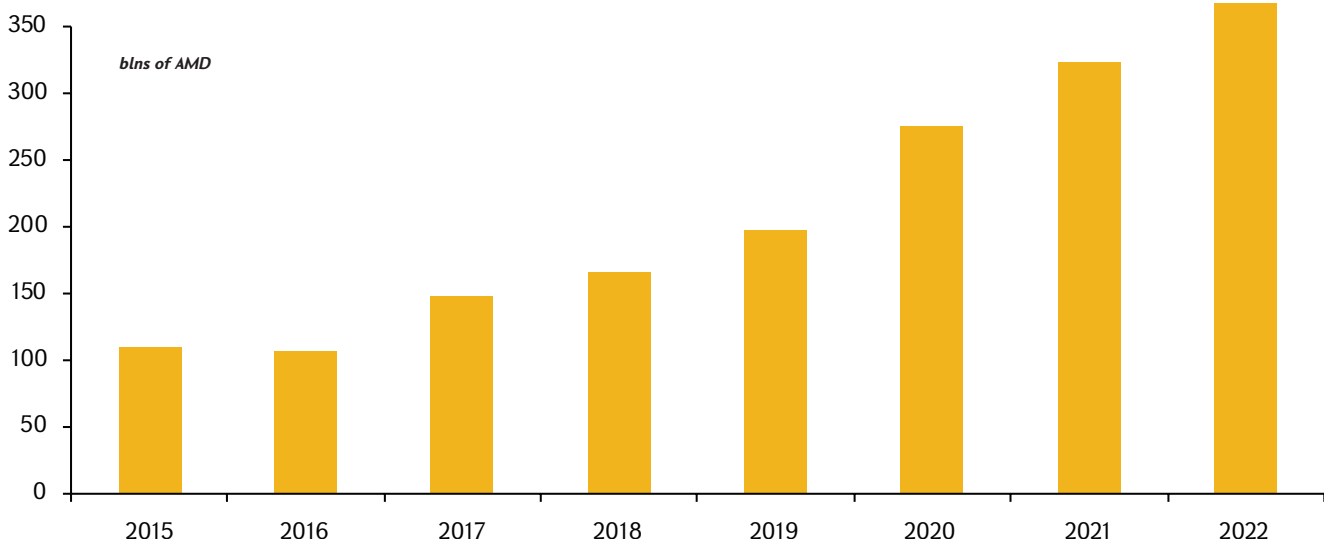
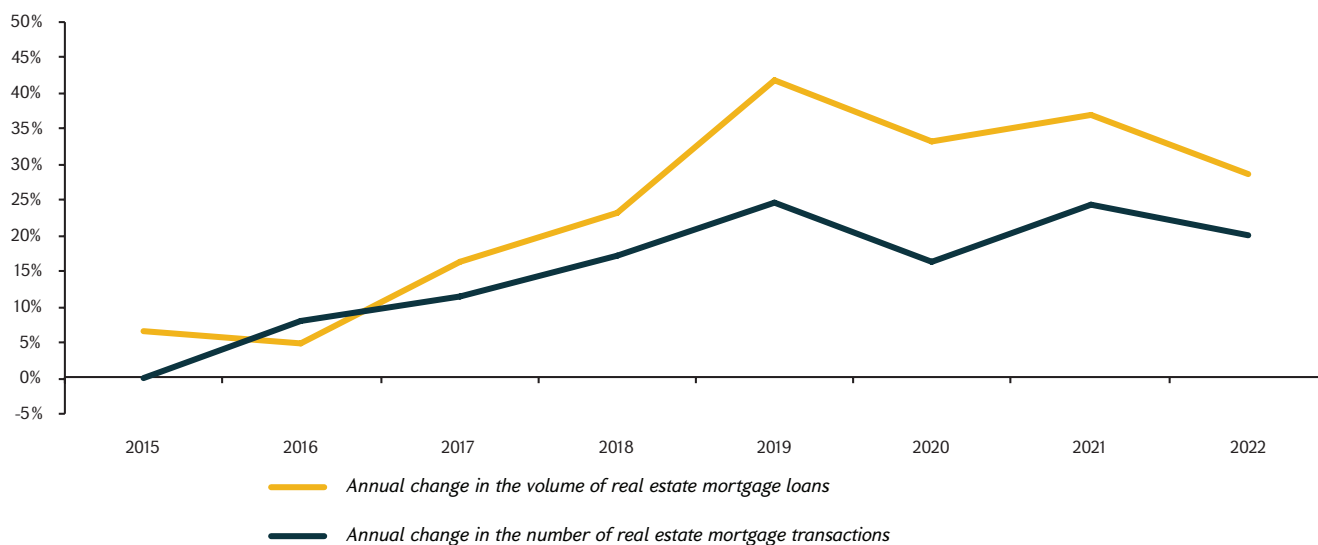


Chart 2.25.

CHANGE IN REAL ESTATE MORTGAGE LOANS

Source: CBA



The volume of mortgage loans provided by banks and credit institutions^{o2} for the purchase of real estate increased by 28.0%, while the number of such loans grew by 20.0%. The volume of the dram equivalent of loans for the construction of residential buildings increased by 14.0% (see Charts 2.24 and 2.25).

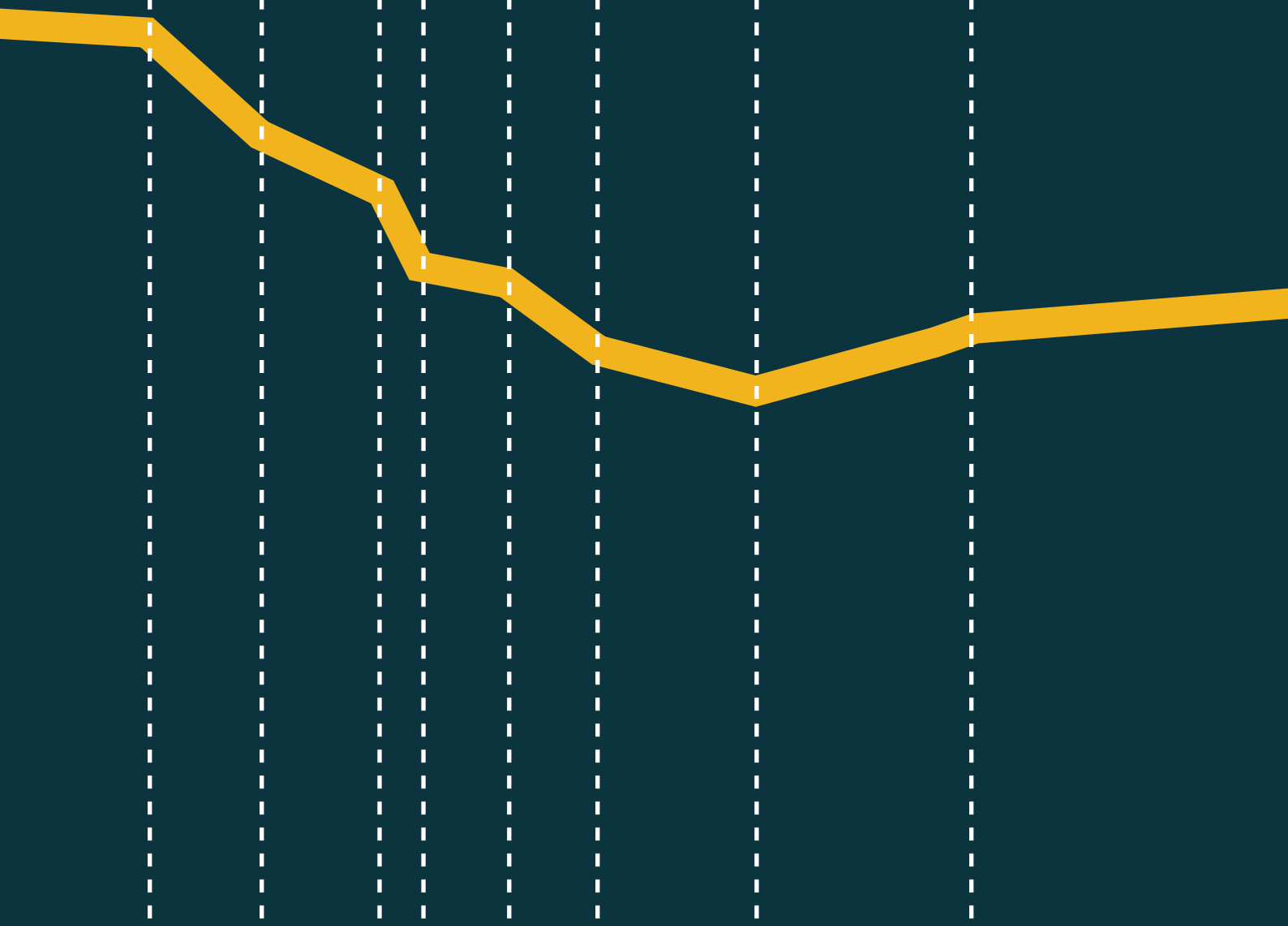
As of the end of the year, the share of mortgage loans with a floating interest rate in the total portfolio of mortgage loans

amounted to about 33%, and, as a result of tightening financial conditions, an increase in rates for those loans is possible. It is considered possible that for loans issued under the income tax refund mechanism, financial market participants may underestimate the risks of a possible increase in interest rates. In the medium term, this may lead to an increase in the mortgage loan service burden (in cases where interest payments exceed the amount of income tax).

^{o2} Mortgage loans include loans for real estate acquisition, real estate renovation, and real estate construction.

3

DEVELOPMENTS IN THE RA FINANCIAL SYSTEM



3.1.

DEVELOPMENTS IN THE DOMESTIC FINANCIAL MARKET

Throughout the year, in light of an actual rise in the policy rate of the Central Bank and in anticipation of further tightening of monetary conditions, there was a notable upturn in interest rates and a corresponding downturn in prices for nearly all financial market instruments, including government bonds. These developments have mainly resulted from the growing geopolitical and economic uncertainties, along with the rapid increase in external inflation. Since the beginning of the year, under the influence of foreign visitors' high demand for domestic services and a significant influx of financial transfers from abroad, there has been pressure towards the appreciation of the dram.

The tightening of monetary conditions continued in 2022, as the refinancing rate was increased by a cumulative 3 percentage points to 10.75%.

During this period, short-term market interest rates primarily revolved around the discount rate, following an upward trend of the latter (see Chart 3.1).

Following the adjustment in the monetary policy interest rate and the unprecedented influx of foreign currency funds into

the banking system, the interest rates on AMD and USD deposits offered by commercial banks to resident individuals were also revised. The upward movement of rates on AMD deposits, as a whole, mirrored the direction of the base interest rate, whereas the decrease in USD deposit rates can be attributed to the augmented dollar liquidity in the banking system (resulting from the attraction of new foreign customers and a significant inflow of foreign currency funds) (see Chart 3.2).

Compared to the change in short-term money market interest rates, there was a marginal uptick observed in the interest rates on loans.

The enhanced profitability and liquidity of banks enabled them to limit upward adjustments of lending rates. Consequently, this mitigated the rise in loan servicing burden, thus minimizing the potential increase of loan portfolio credit risk. In 2022, compared to the previous year, interest rates increased by an average of 1.0 percentage points on consumer lending, 0.8 percentage points on mortgage lending, and 0.6 percentage points on business lending (see Chart 3.3).

Chart 3.1.

DYNAMICS OF SHORT-TERM MARKET INTEREST RATES IN 2022

Source: CBA

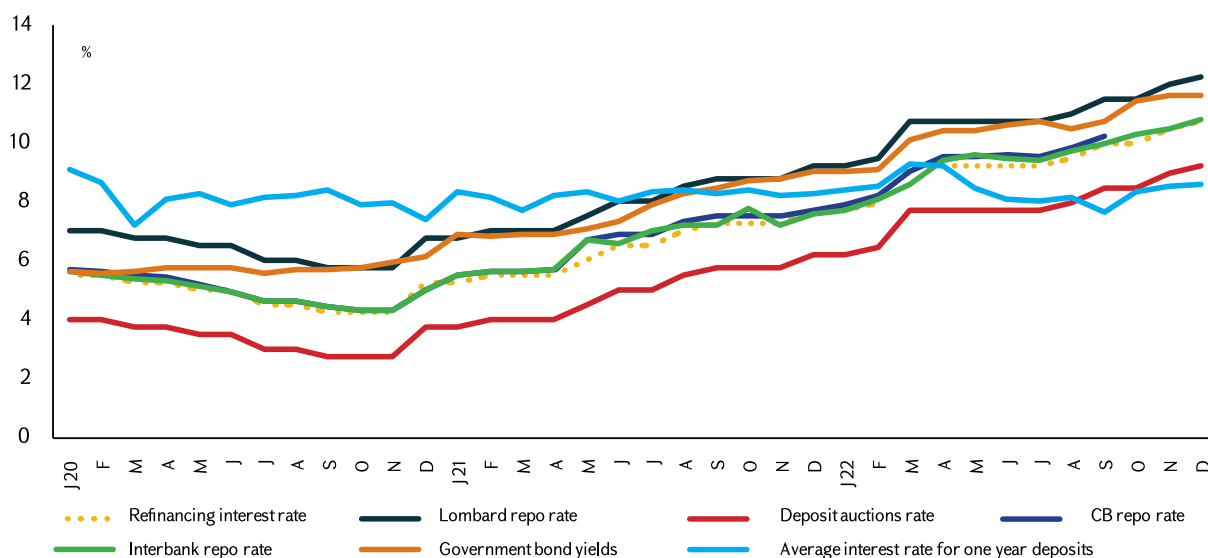
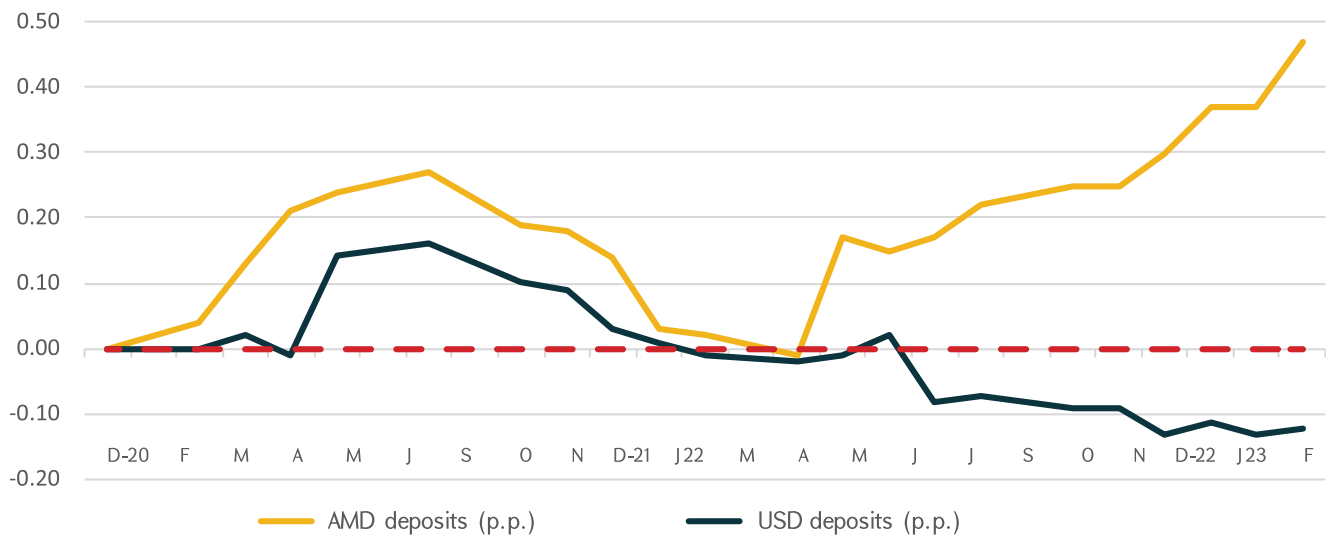


Chart 3.2.

CHANGES IN INTEREST RATES OF SHORT-TERM DEPOSIT OFFERS (PERCENTAGE POINTS)

Source: CBA



Throughout the year, the money markets were characterized by high liquidity.

As part of its monetary policy measures, the Central Bank of Armenia ensured the necessary supply of AMD liquidity through the use of main refinancing instruments and fine-tuning repo instruments. Additionally, banks used the standing facility Lombard repo to meet their liquidity needs. In the third and fourth quarters, there was a decrease in the volume of gross repo transactions with

the Central Bank, while concurrently, there was an increase in the volume of interbank repo transactions in AMD. Both interbank and Central Bank repo interest rates were predominantly aligned, with interbank AMD repo rates being, on average, 0.13 percentage points lower (see Chart 3.4).

Government bond yields also went up in line with the tightening of monetary conditions (see Chart 3.5).

The increased liquidity in the financial system somewhat tempered the growth of

Chart 3.3.

AMD LENDING INTEREST RATE DYNAMICS

Source: CBA

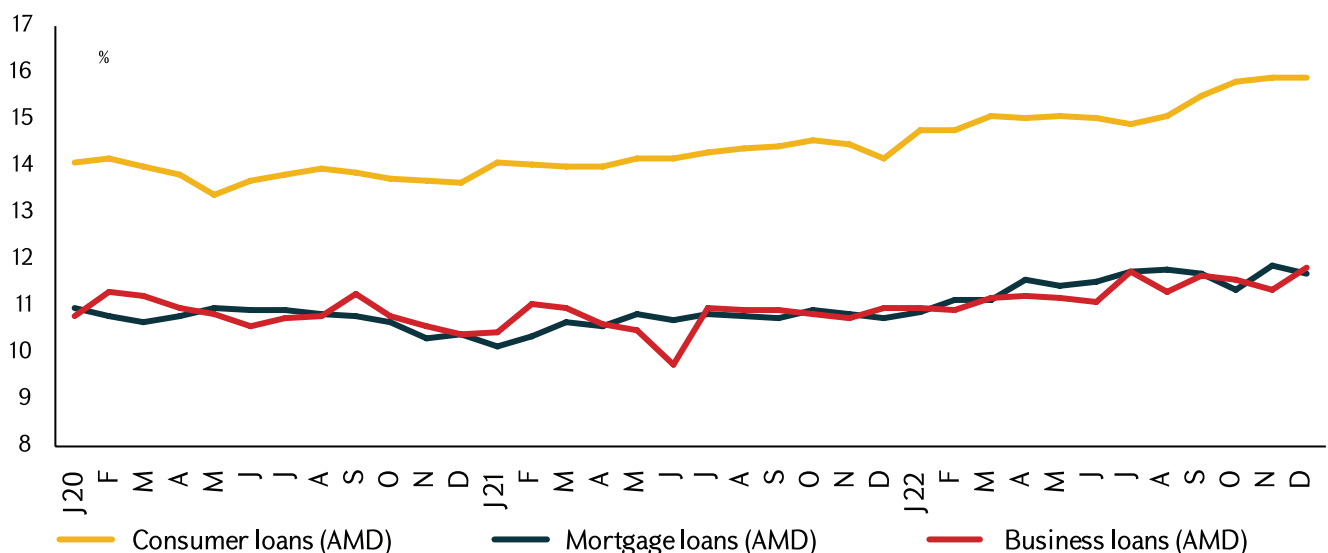
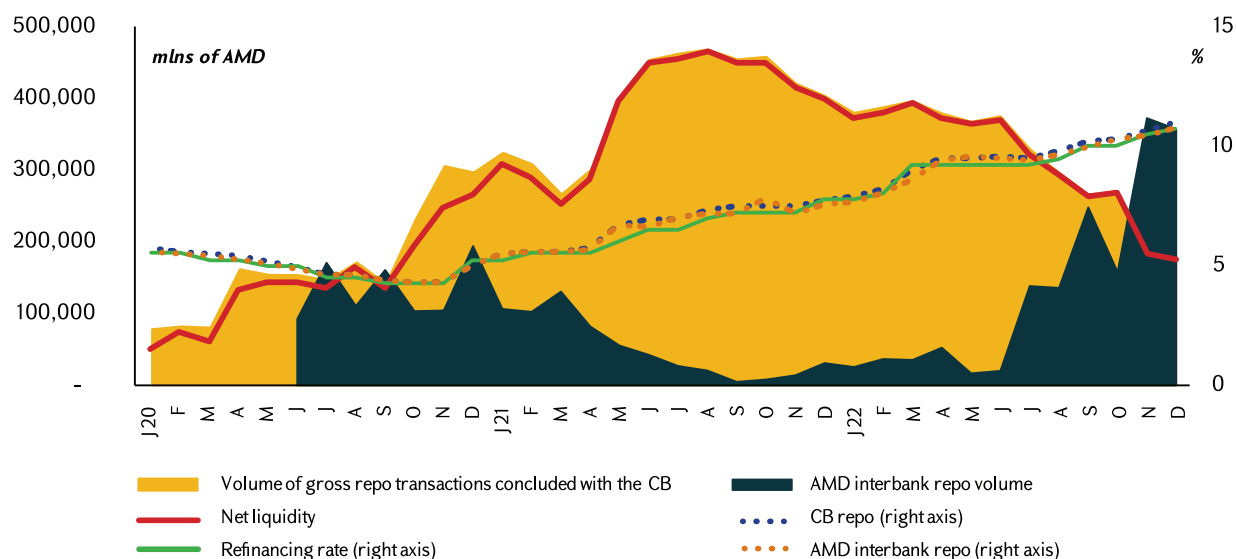


Chart 3.4.

VOLUMES, INTEREST RATES AND NET LIQUIDITY OF GROSS REPO TRANSACTIONS AND AMD INTERBANK MONETARY TRANSACTIONS OF THE CENTRAL BANK OF ARMENIA (AVERAGE MONTHLY AMOUNT, IN MILLIONS OF AMD)

Source: CBA



government bond yields. However, it is important to note that, by the end of the year, the yield curve experienced an upward shift in comparison to the same period of the previous year, as shown in Chart 3.6. Since the start of the year, government bond yields have increased. The growth in the yield of short-term bonds has been significant, reaching about 2.6 percentage points. For long-term bonds, the growth rate has been slightly lower at

1.9 percentage points along the yield curve. In the first quarter, banks' cautious lending practices resulted in an increased demand for government bonds as a profitable investment alternative option. However, there were no significant changes in the position of the yield curve during that period. Subsequently, the increase in interest rates on government bonds attributed to both the ongoing upward adjustment of the Central Bank's discount rate

Chart 3.5.

YIELD BEHAVIOR OF GOVERNMENT BONDS

Source: CBA, RA Ministry of Finance

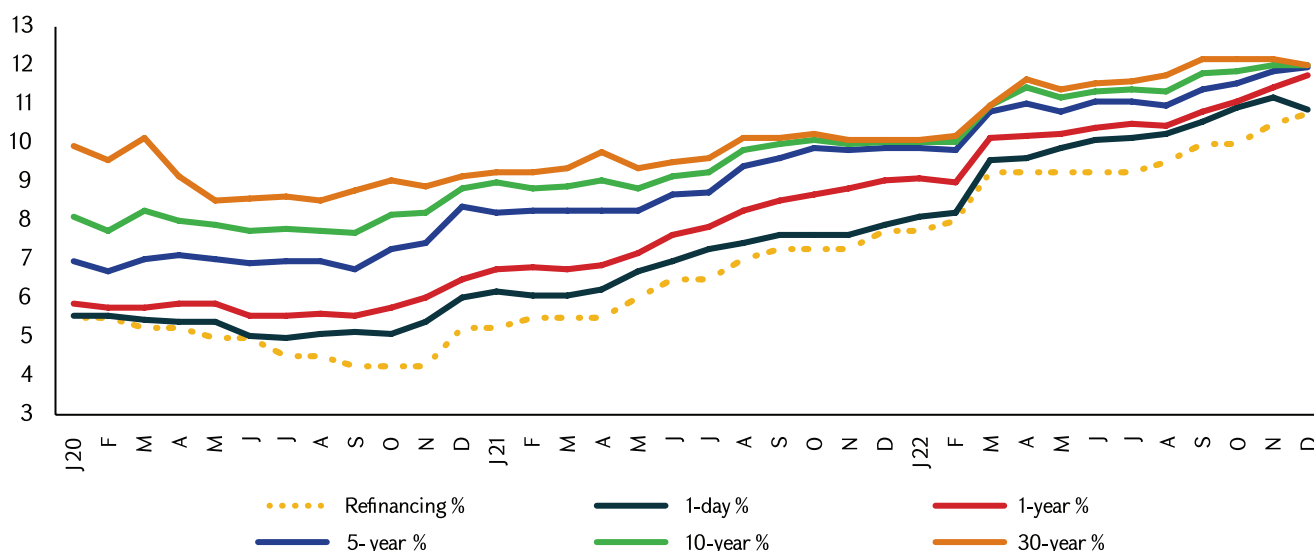
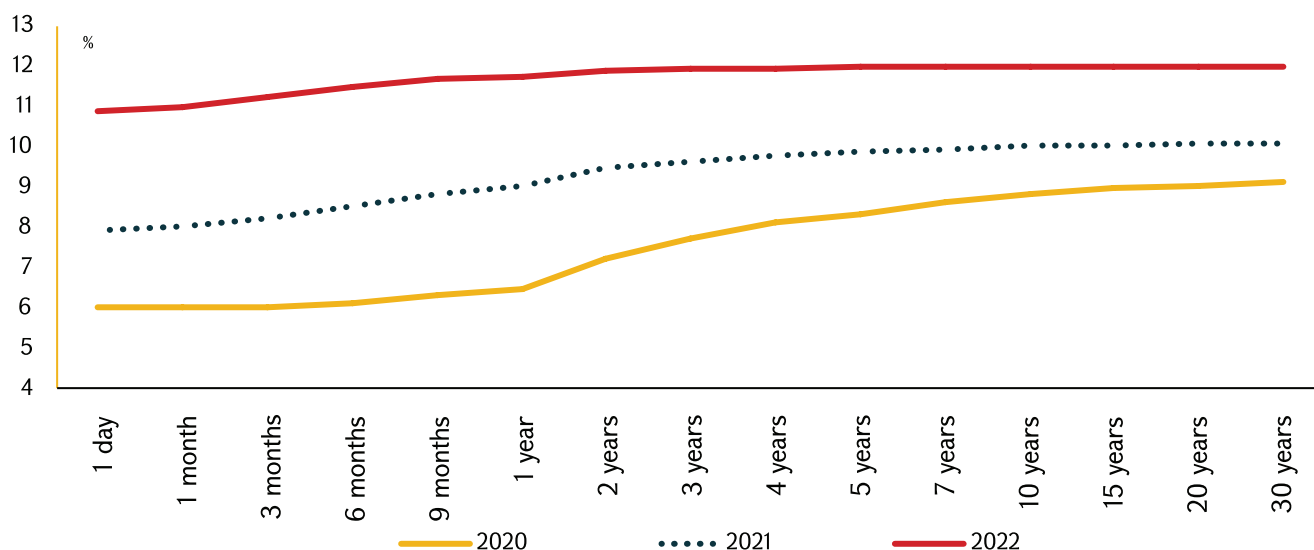


Chart 3.6.
CHANGE IN THE YIELD CURVE OF GOVERNMENT BONDS

Source: CBA, RA Ministry of Finance



and the expansion of the issuance in primary market. The supply increase is a primary result of the government's aim to largely rely on domestic borrowing sources to finance the state budget deficit, as outlined in the government's medium-term strategy. Consequently, towards the end of the year, the notable surge in short-term bond yields contributed to a partial "inversion" of the yield curve (see Chart 3.7).

The above trends are also noticeable in the changes observed in the yield spreads of government bonds (which refer to the dif-

ferences in yield to maturity). The spreads between the yields of short-term bonds and medium-term/long-term bonds have surged. Specifically, the spread between 1-year and 10-year bonds decreased by an average of approximately 0.8 percentage points (see Chart 3.8). The narrowing of spreads is mainly due to the yield of short-term government bonds growing steadily compared to long-term government bonds. This trend is also influenced by the market's expectation of a low likelihood of a further increase in the discount rate.

Chart 3.7.
CHANGE IN THE YIELD CURVE OF GOVERNMENT BONDS IN 2022

Source: CBA, RA Ministry of Finance

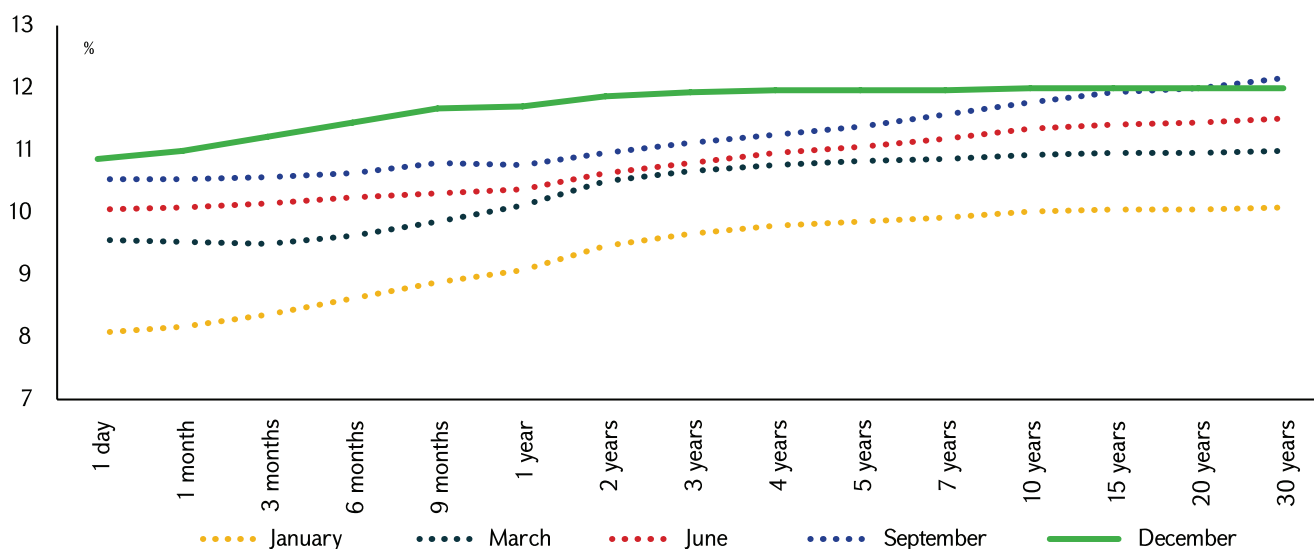
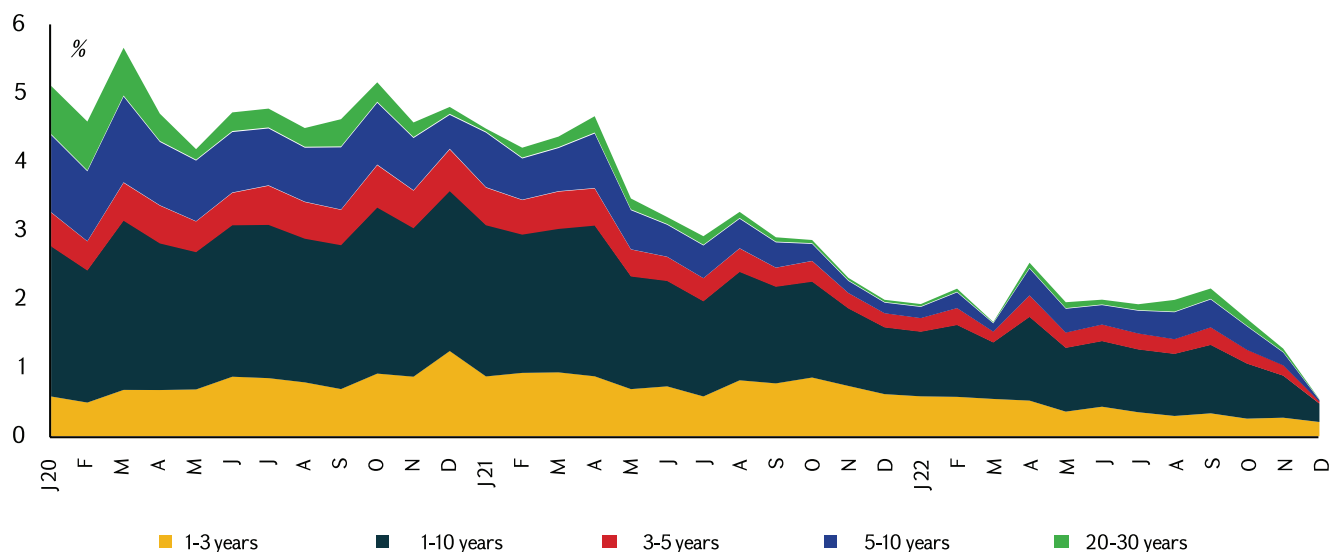


Chart 3.8.

DYNAMICS OF GOVERNMENT BOND YIELD SPREADS TO MATURITY, 2020-2022

Source: CBA, RA Ministry of Finance



Due to the geopolitical events of the year, the country risk premium decreased, allowing Armenia to have access to international financial markets on favorable terms if needed.

Due to diminishing risk in emerging economies, robust economic growth in the RA, significant capital inflows, a strength-

ening dram and a notable reduction in the public debt burden, the risk premium was anticipated to be lower. However, with the upward movement of monetary policy rates in the United States and the Eurozone, the tightening of financial markets resulted in more challenging conditions for attracting liquidity from international financial markets

Chart 3.9.

COUNTRY RISK PREMIUM (DIFFERENCE IN YIELDS OF 2025 AND 2029 EUROBONDS ISSUED BY RA) YIELDS MATURING IN 2025 AND IN 2029 AND US TREASURY YIELDS (WITH CORRESPONDING MATURITY)

Source: Bloomberg

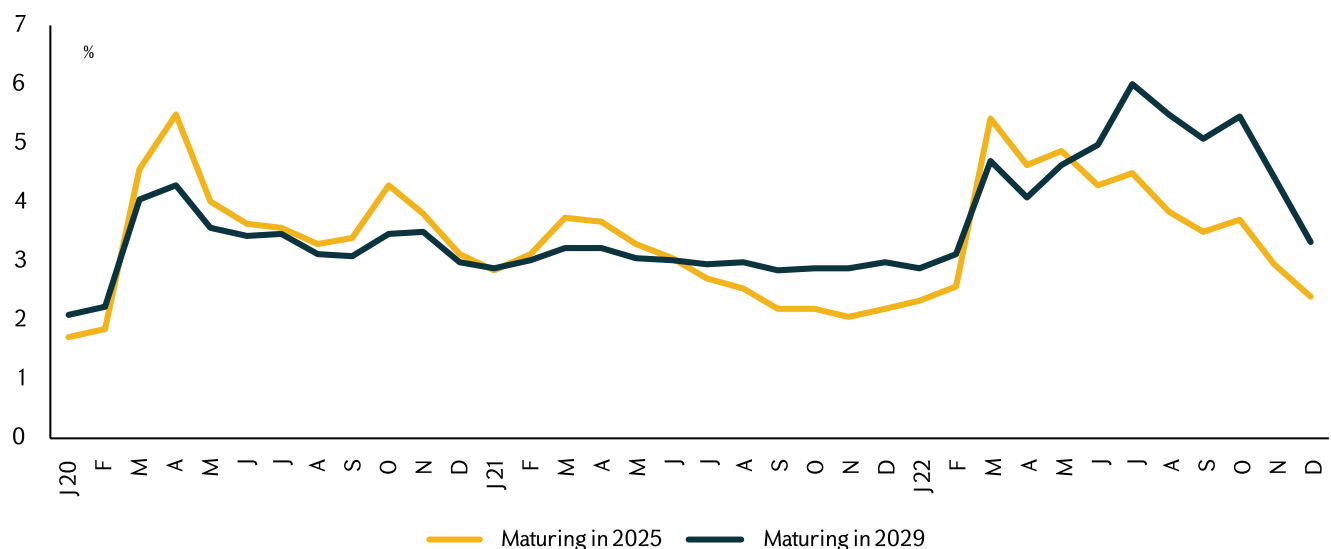
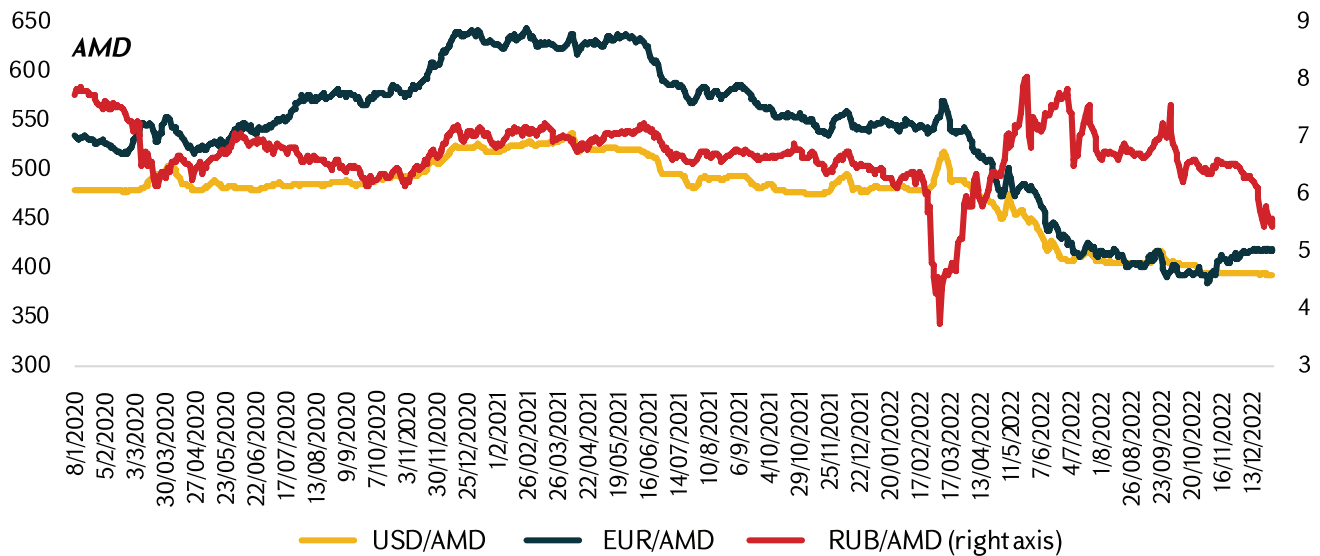


Chart 3.10.

BEHAVIOR OF AVERAGE DAILY EXCHANGE RATES OF FOREIGN CURRENCIES AGAINST THE ARMENIAN DRAM

Source: CBA



for developing countries, including Armenia (see Chart 3.9)⁰¹.

The fluctuations observed in the foreign exchange market primarily reflected the influence of geopolitical events and tighter monetary conditions.

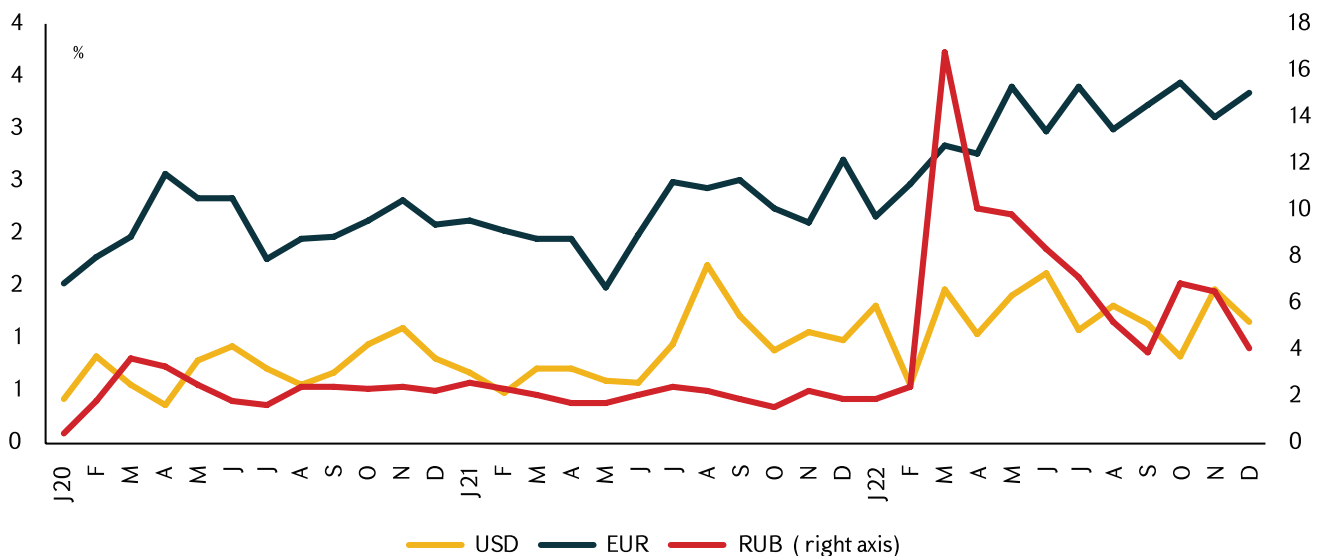
Since the beginning of the year, the value of the dram has been affected by the high demand for domestic services from foreign visitors and a large influx of financial resources. During the year, the foreign exchange market in the RA experienced a substantial increase in trading activity due to

⁰¹ Source: CBA, Ministry of Finance of the RA, <https://www.bloomberg.com/markets/rates-bonds/government-bonds/us>:

Chart 3.11.

BID-ASK SPREADS OF AVERAGE DAILY EXCHANGE RATES OF FOREIGN CURRENCIES AGAINST THE AMD (% IN THE EXCHANGE RATES)

Source: CBA





the inflow of financial resources and fluctuations in exchange rates. In December 2022, the Armenian dram significantly appreciated against major currencies, with an approximately 22% increase against the US dollar, an approximately 29% increase against the euro, and a 15% increase against the Russian ruble compared to the previous year. The strengthening of the dram against the US dollar and the euro was noticeable during the second quarter and continued until the end of the year. In the first quarter, the Armenian dram significantly gained value, increasing by about 14.7% against the Russian ruble. This was mainly because of the sharp decline in value of the Russian ruble against the US dollar. However, in the second quarter, the depreciation of the Russian ruble against the Armenian dram slowed down because of Russian ruble appreciation against the US dollar in the foreign exchange market of Russia (see Chart 3.10).

To ensure the stability and smooth operation of financial markets, the Central Bank intervened in the foreign exchange market in response to the significant inflow of funds in

comparison with the depth of the foreign exchange market. During this period, the Central Bank made net purchases of approximately 534 million US dollars, reflecting its efforts to uphold a stable foreign exchange market.

Since the beginning of the year, various factors, such as economic and geopolitical uncertainty, a significant rise in foreign currency transactions from new customers, and the strengthening of the Armenian dram, have had notable influence on the behavior of exchange rates margins (buying and selling price margin). During the first quarter, there was a notable increase in the exchange rate margins for the US dollar, euro, and Russian ruble. The registered increase slowed down towards the end of the year, ending, on average, three, two, and four times higher respectively, compared to the beginning of the year (see Chart 3.11). The higher increase in the average margin of the Russian ruble exchange rate, in comparison to that of the US dollar and the euro, is mainly because of the relatively lower liquidity of the ruble and the shallower depth of the foreign exchange market.

3.2.

RISKS IN THE FINANCIAL SYSTEM

3.2.1.

DEVELOPMENTS IN THE FINANCIAL SYSTEM

In 2022, the financial system ensured the smooth functioning of financial services. In terms of volume, the system grew at a regular pace. Nevertheless, in the conditions of progressive growth of the GDP, the level of financial mediation decreased.

As of the end of the year, the assets/GDP and loans/GDP indicators of the financial system were 115.8% and 48.2%, dropping by 5.1 and 8.5 percentage points during the year, respectively. Banks and pension funds achieved the highest growth out of all financial institutions, both in absolute and relative terms (see Chart 3.12). Banks continue to dominate the system with 85% asset share (see Chart 3.13). The issuance of a license for banking activities to the Fast Credit Capital

universal credit organization also contributed to the increased weight of banks by 0.6 percentage points.

Compared with previous years, the low growth of pension funds is due to the temporary decline in the yield of funds. A high inflationary environment and growing geopolitical uncertainties caused a decline in the prices of both stocks and fixed income instruments. In 2022, the loan/GDP indicator dropped, though lending continued at a regular pace. The growth of loans of banks and credit institutions to the real sector (at a fixed exchange rate) was 13.0%. As a result of Armenian Dram appreciation, the dram equivalent of loans (at the actual exchange rate) only increased by 3.4%, which is about 18 percentage points less than nominal GDP growth.

The banking system's assets/GDP and loans/GDP indicators dropped by 2.8 percentage points and 7.1 percentage points, totaling 98.7% and 45.9%, respectively. With a high increase in deposits, the deposits/GDP ratio grew by 3.0 percentage points, reaching 54.8% (see Chart 3.14).

Chart 3.12.
GROWTH OF ASSETS OF FINANCIAL SYSTEM PARTICIPANTS

Source: CBA

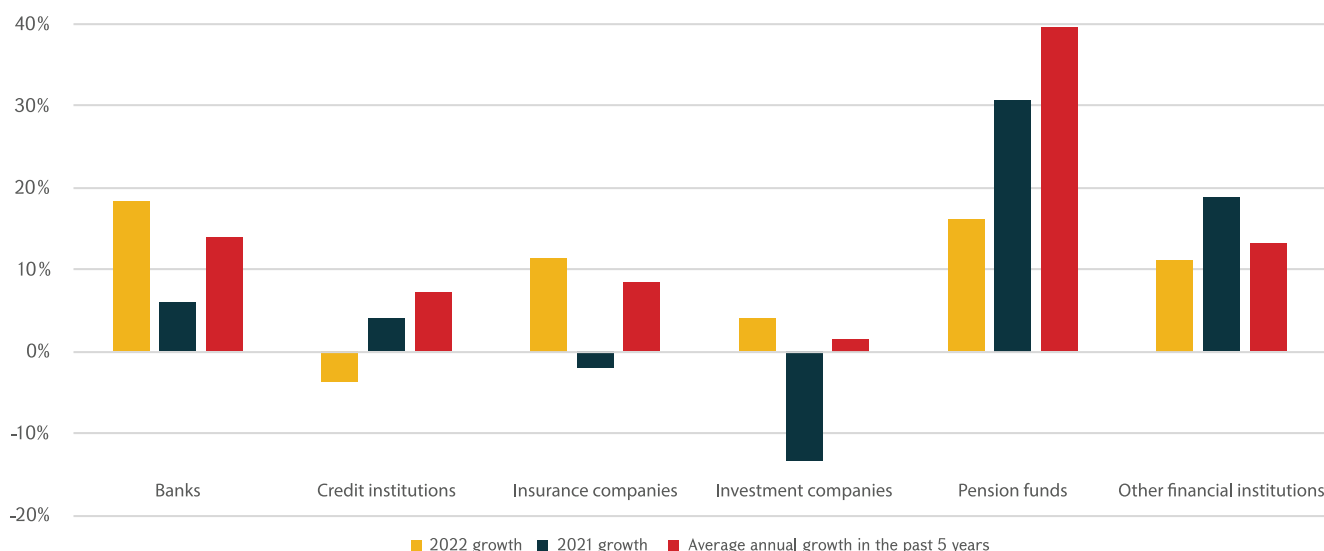
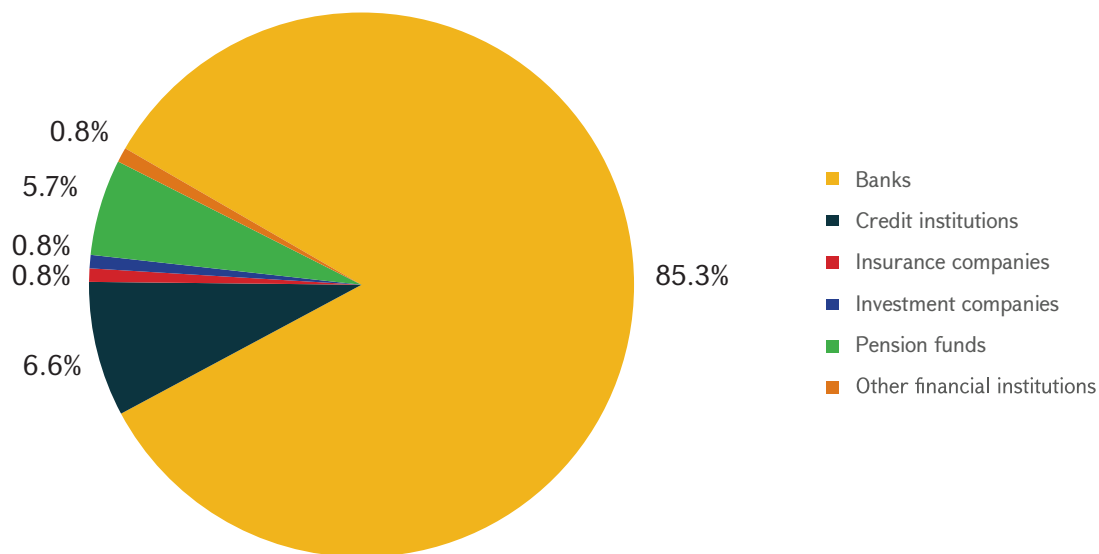


Chart 3.13.

STRUCTURE OF FINANCIAL SYSTEM ASSETS BY FINANCIAL INSTITUTION, 31 DECEMBER 2022

Source: CBA



3.2.2.

COMMERCIAL BANKS

Macro-financial developments in 2022 were favorable for the banking system in terms of absorbing the risks from the previous years and further strengthening capital and liquidity positions.

The year 2022 was favorable with regard to the increase in profitability that was at a low level for a long time. As a result, on one hand, the business prospective of financial intermediation in Armenia has become more substantive, and on the other hand, banks have a good opportunity to undertake the implementation of long-term development and investment projects to further increase efficiency.

Chart 3.14.

INTERMEDIATION INDICATORS OF THE BANKING SYSTEM

Source: CBA

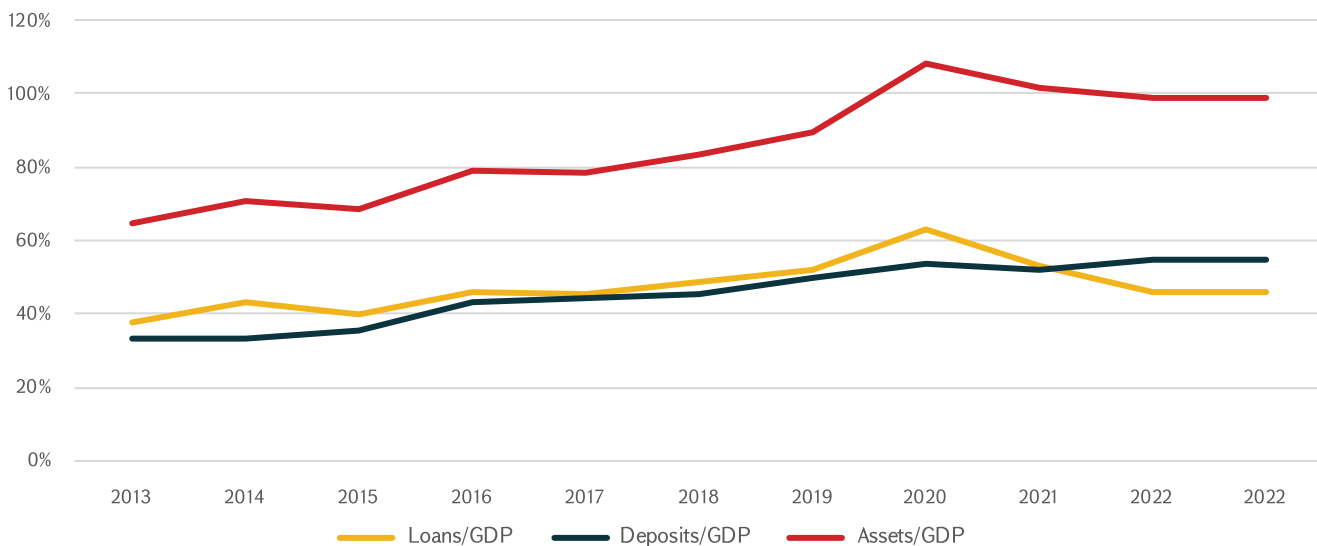
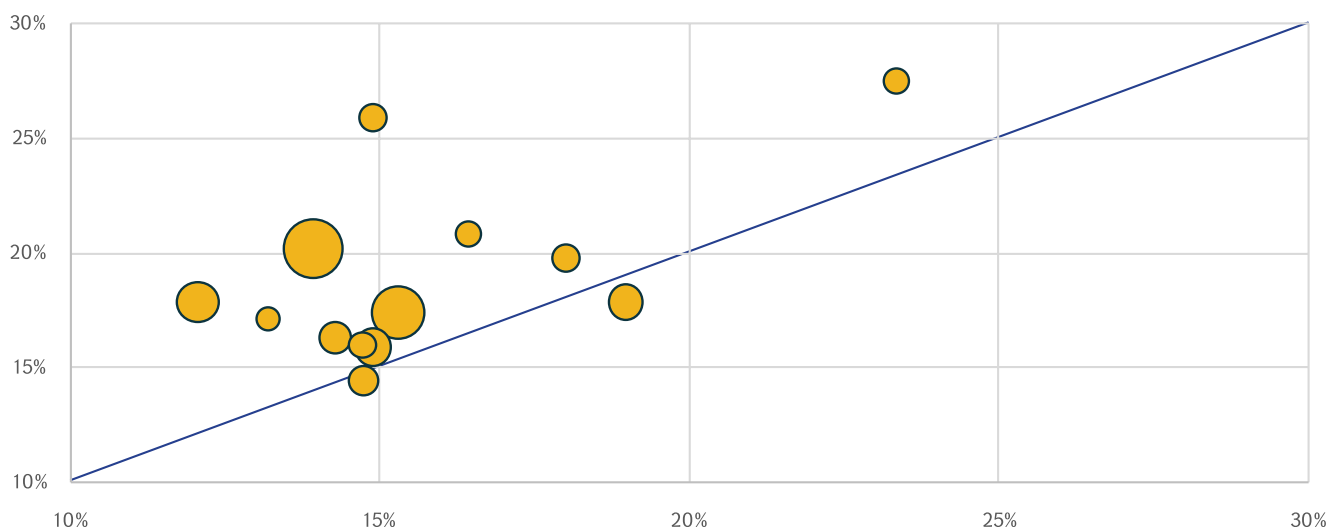


Chart 3.15.
BANKS' CAPITAL ADEQUACY CHANGES

Source: CBA



CAPITAL ADEQUACY AND PROFITABILITY

The banking system entered the year 2022 at a high level of capital adequacy, which was further strengthened during the year. The results of stress tests show that the banking system is capable of absorbing

the losses deriving from possible macroeconomic shocks. Assessing the situation as favorable, the Central Bank made a decision on accumulation of the countercyclical capital buffer for the first time.

In December 2022, the total capital adequacy was 20.3%, higher by 3.1 percentage points compared with December of the

Chart 3.16.
STRUCTURE OF RISK-WEIGHTED ASSETS (31 DECEMBER 2022)

Source: CBA

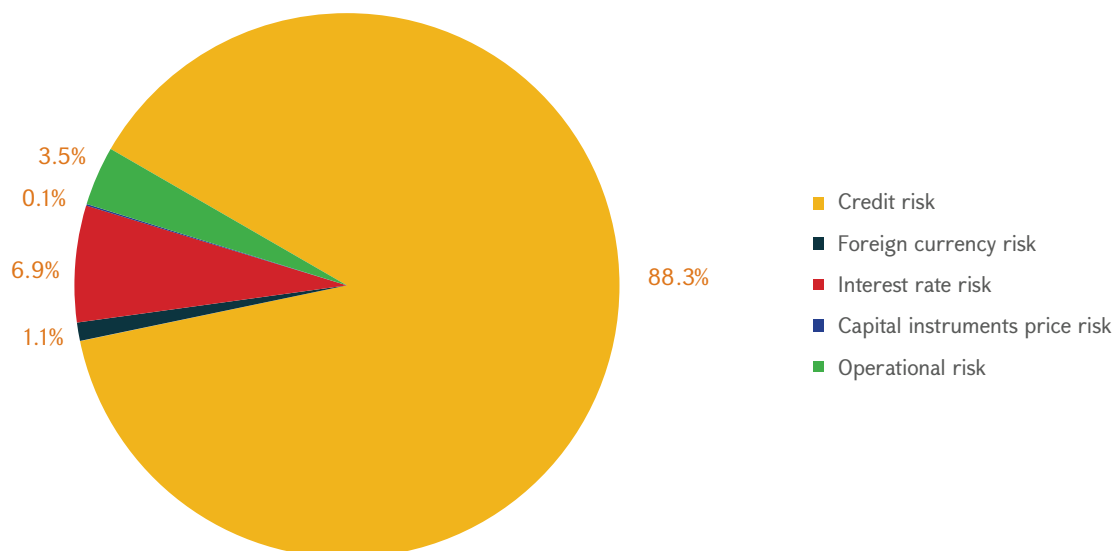
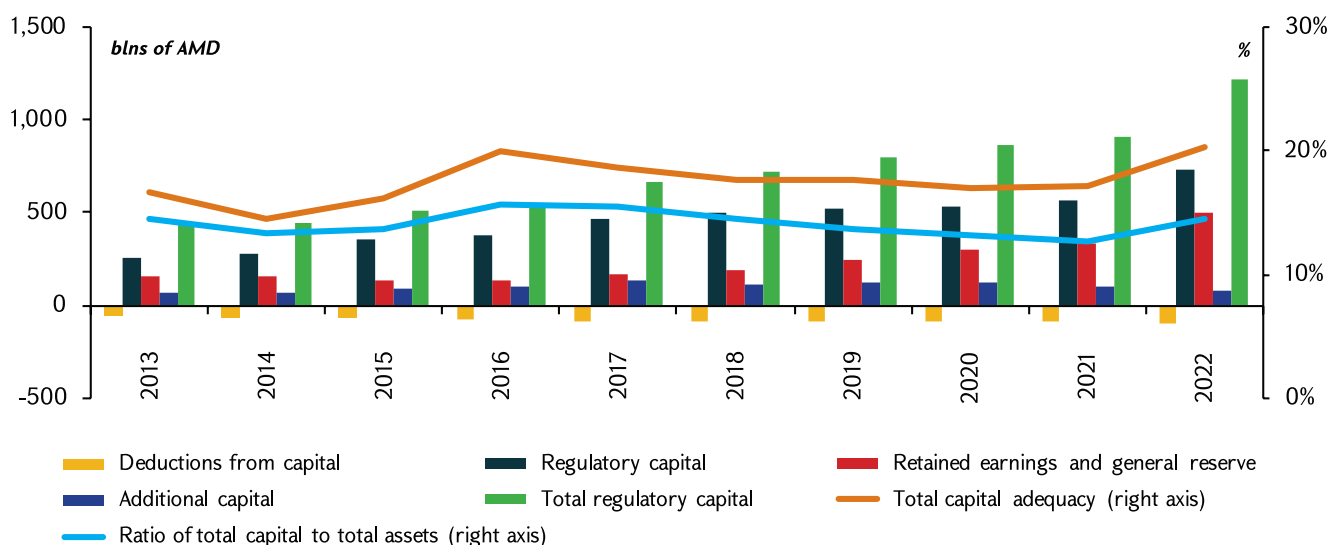


Chart 3.17.
STRUCTURE OF TOTAL REGULATORY CAPITAL

Source: CBA



previous year (see Chart 3.15⁰¹). The growth of capital, the decreases in the dram equivalent of risk-weighted assets (loans) as a result of the appreciation of the Armenian dram (see Chart 3.16), as well as the reduction in the share of foreign currency loans, had a positive impact on the change in capital adequacy.

Regulatory capital grew by 36%, mainly due to retained profits and increase in the statutory capital (see Chart 3.17). The regulatory capital/assets ratio grew by nearly 2 percentage points, resulting in 14.6% at the end of the year.

The ratio of risk-weighted assets to total assets has shown a continuous downward trend

- 01 The chart does not include banks that more than twice exceed the capital adequacy ratio (four banks, the share of assets of which comprise 5.3% of the banking system). The abscissa (horizontal) axis in the chart is the capital adequacy of 2021, the ordinate (vertical) axis is that of 2022, and the point size is the share of assets in the banking system as of the end of 2022.

Chart 3.18.
BANKING SYSTEM LEVERAGE RATIOS

Source: CBA

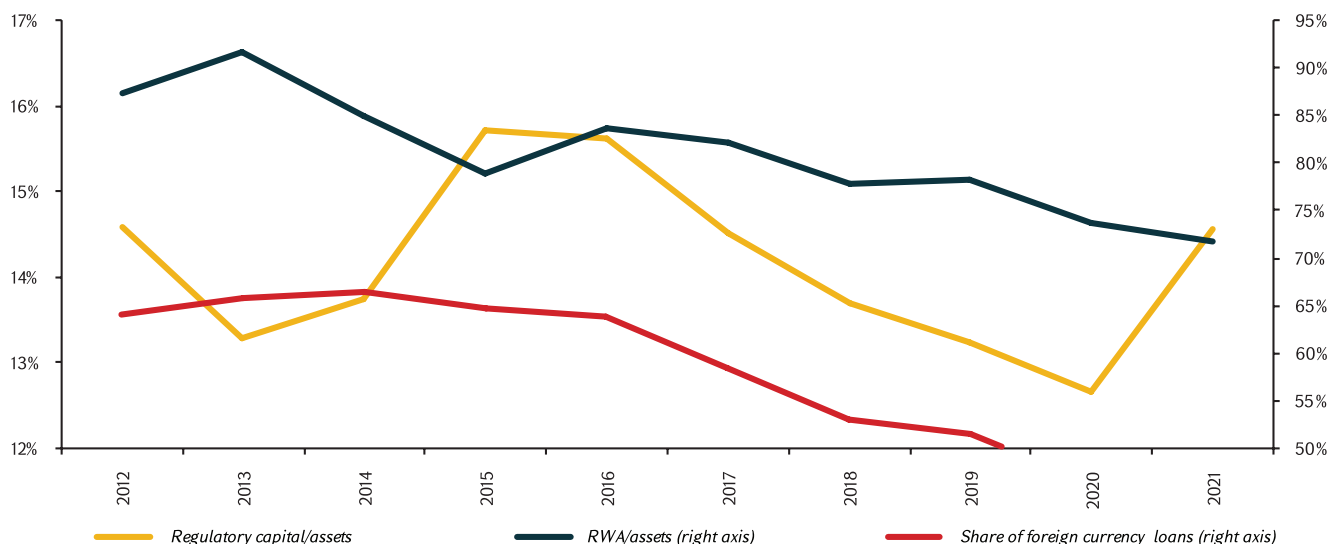
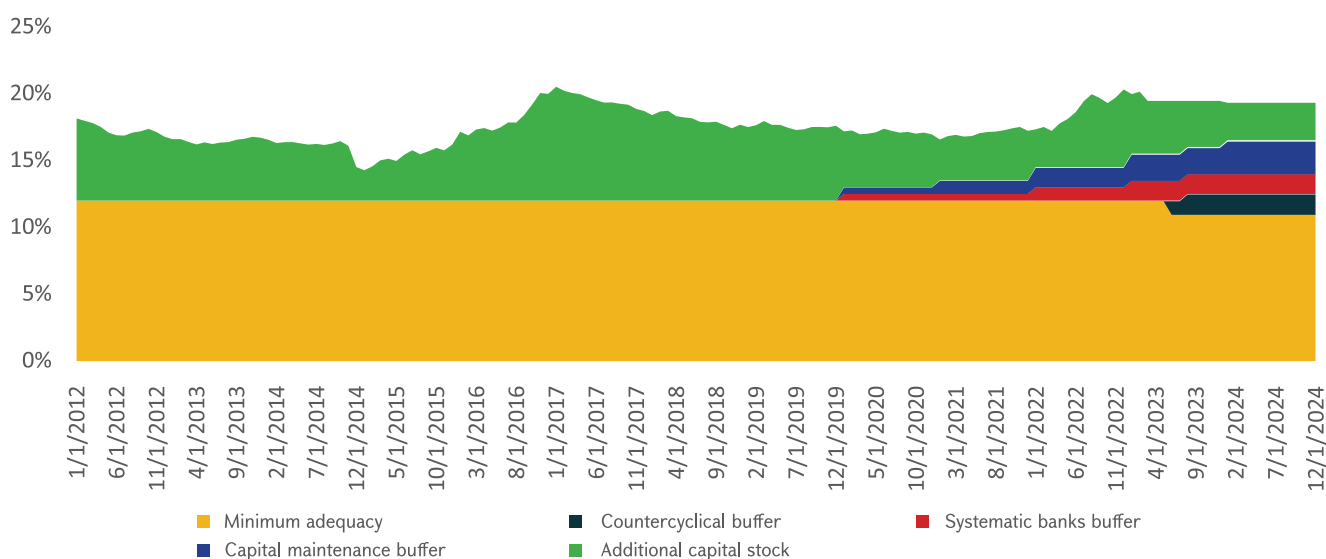


Chart 3.19
CHANGES IN ADEQUACY COMPONENTS

Source: CBA



in the past years, due to the decrease in the share of foreign currency loans (see Chart 3.18).

In 2022, capital adequacy regulation requirements were revised; starting from June 2023, the requirement for capital adequacy will be set at three levels of capital, including:

1. Common equity tier 1 capital (CET 1),
2. Tier 1 capital,
3. Total capital.

At the same time, the total capital adequacy ratio of 12% was dropped by 1 percentage point.

Starting from January 2023, the capital conservation buffer and capital buffer for systematically important banks were increased according to the timetable for introduction of buffers. The buffers were raised, each by 0.5 percentage points, and set at 2.0% and 1.5%, respectively (see Chart 3.19).

The banking system entered the year 2022 with a level of profitability typical of non-crisis years, which has significantly improved starting from the second quarter.

Chart 3.20.
PROFITABILITY OF THE BANKING SECTOR BY ASSETS AND CAPITAL

Source: CBA

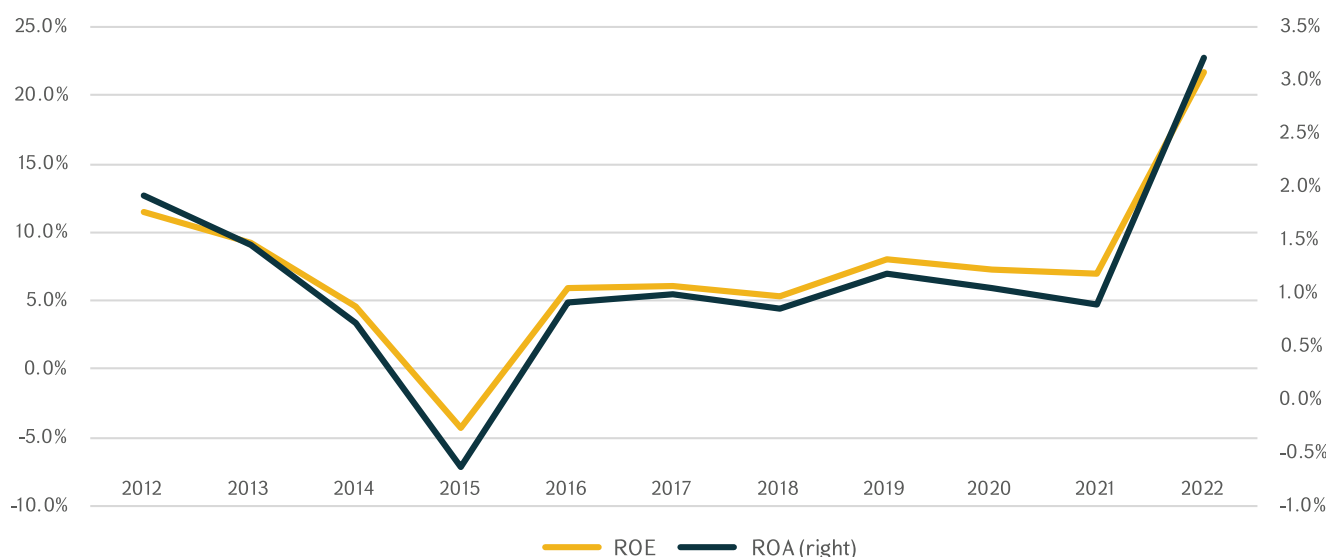
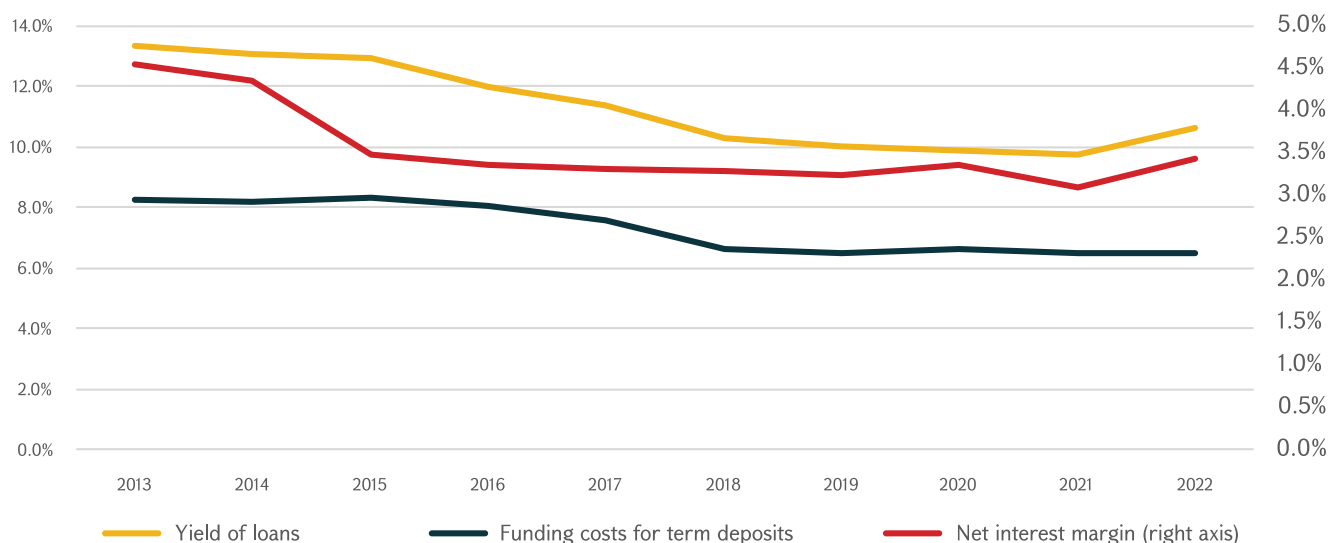


Chart 3.21.
INTEREST MARGIN

Source: CBA



According to the reports submitted to the Central Bank, in 2022, return on assets (RoA) and return on equity (RoE) tripled compared with the previous year and reached 3.2% and 21.7%, respectively (see Chart 3.20).

The increase in profitability is mainly due to the multifold increase in the volume of payment-and-settlement and foreign currency transactions as a result of the large inflow of new customers. In particular, compared with the indicators of 2021, the net

non-interest income of banks increased by 220 billion AMD. Meanwhile, the aggregate amount of net interest income and credit losses increased by only 7 billion AMD.

The net interest margin (the ratio of net interest income to total assets) grew by 0.3 percentage points compared with the previous year (see Chart 3.21). The three main factors positively contributing to the net interest margin were the growth of loan yields, deleveraging as a result of high capital growth and the cut of funding costs due

Chart 3.22.
STRUCTURE OF LOANS PROVIDED TO RESIDENTS BY MAIN LOAN TYPE

Source: CBA

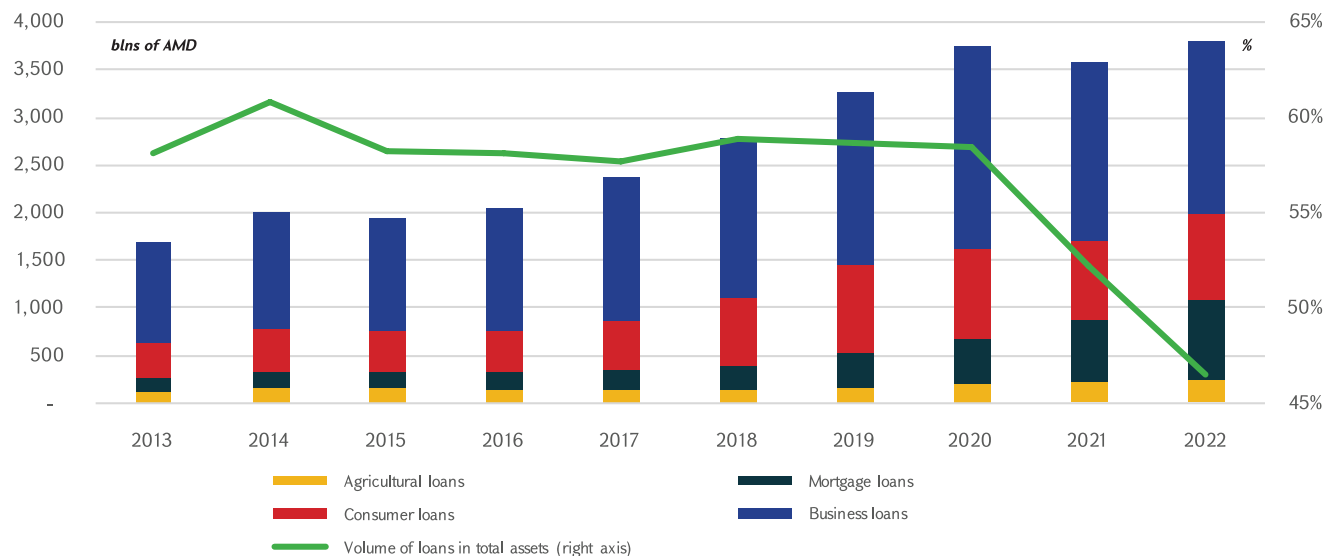
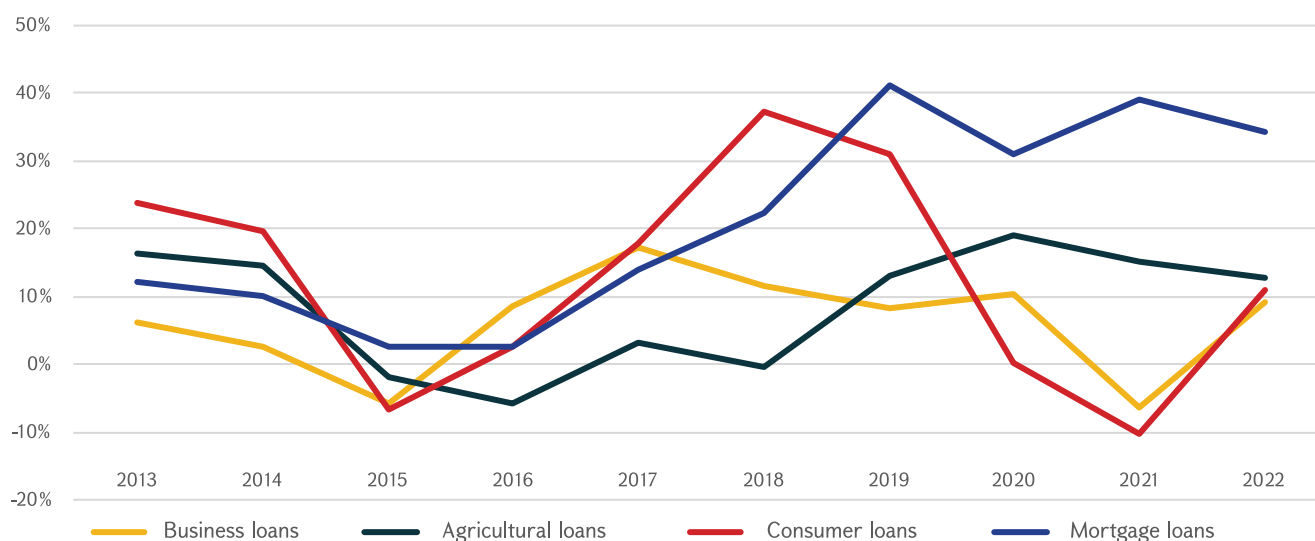


Chart 3.23.
GROWTH RATE OF LOAN TYPES (FIXED-RATE)

Source: CBA



to an increase in the share of demand deposits in the structure of residents' deposits. The average yield of loans has grown by 0.9 percentage points due to the increase in the share of AMD loans, as well as the change of market interest rates. Under the same market conditions, the rate of AMD deposits has also increased, but this was offset by the decrease in USD deposit rates, as well as structural changes. As a result, the total cost of funding remained unchanged.

CREDIT RISK

Amid high economic activity, loans have also increased at a double-digit rate; mortgage loans continue to be the main contributor to this growth.

The growth of loans issued by banks (under the fixed exchange rate assumption) was 15.5%. The dram equivalent of loans has increased by 5.5% as a result of the devaluation of the Armenian dram.

Chart 3.24.
DOLLARIZATION OF RESIDENTS' LOANS AND DEPOSITS

Source: CBA

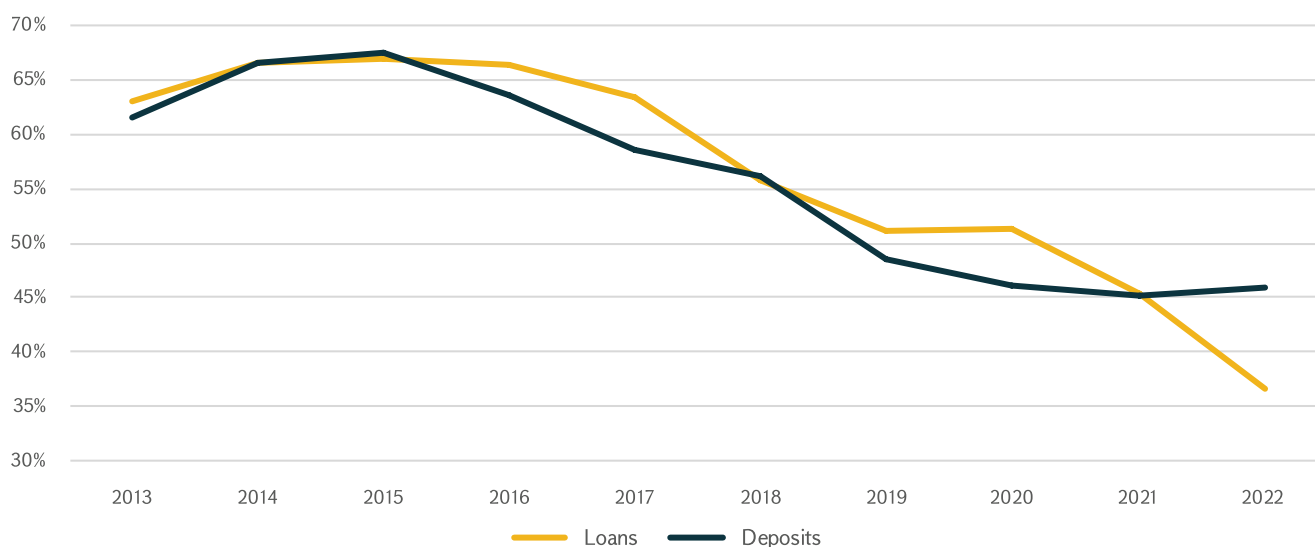
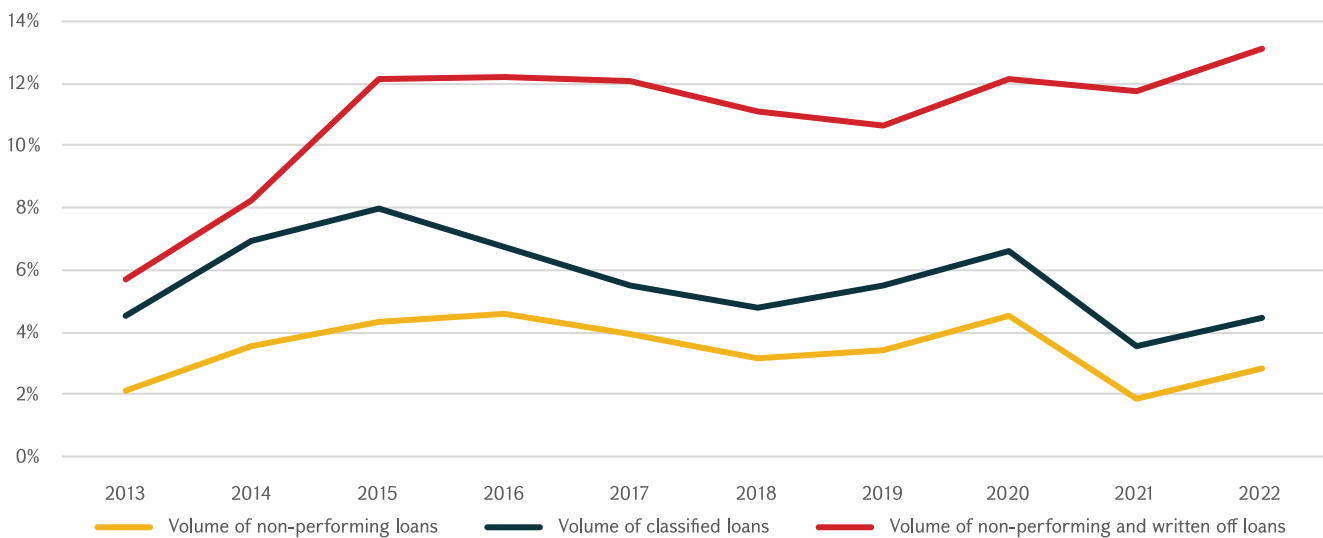


Chart 3.25.
DYNAMICS OF VOLUME OF NON-PERFORMING LOANS

Source: CBA



Mortgage and construction loans have increased at a higher rate (see Charts 3.22, 3.23). In 2022, the growth of mortgage loans (under the fixed exchange rate assumption) was 34.2%. Consumer loans had the lowest growth rate; the growth of consumer loans in banks would have been 5.5% without “Fast Credit Capital” UCO.

In 2022 the dollarization of loans continued to decline (see Chart 3.24); moreover, the indicator is decreasing even if the effect of the devaluation of the Armenian dram is neutralized.

In conditions of high economic activity and income growth, the NPL ratio, with some fluctuations, has remained lower than the long-term average and pre-pandemic levels.

The share of non-performing loans was 2.8% at the end of the year. Among the types of loans issued to residents, the NPL ratio has only increased for business loans (see Charts 3.25, 3.26). Compared to the previous year, credit losses (net provisioning to average loans) have increased, which is mainly at-

Chart 3.26.
CLASSIFIED (NON-PERFORMING + WATCHED) LOANS TO RESIDENTS BY MAIN TYPES OF LOANS

Source: CBA

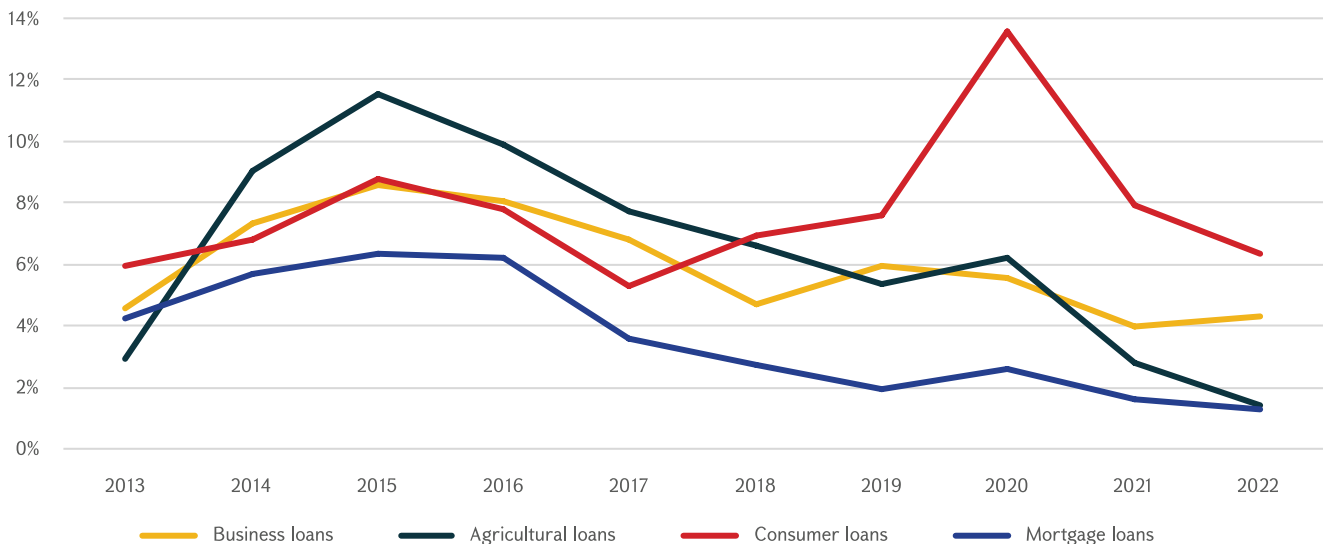
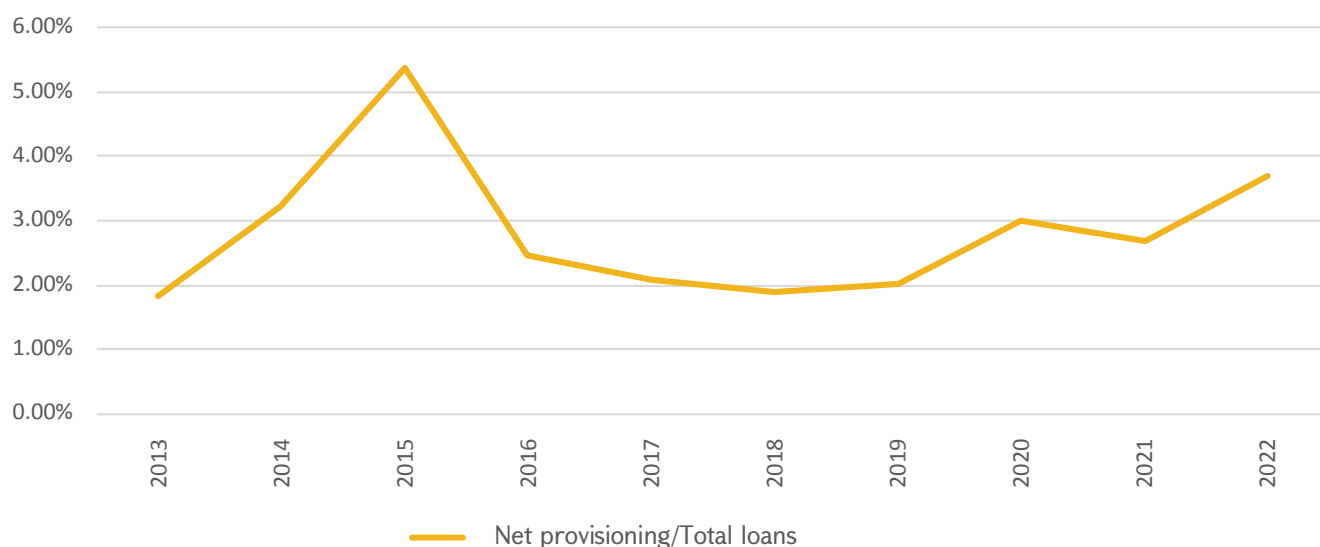


Chart 3.27.
LOSSES FROM LOANS

Source: CBA



tributed to the banks' conservative behavior of loan loss provisioning, rather than an increase in the share of non-performing loans (see Chart 3.27).

The loan portfolio concentration has decreased. In particular, the share of loans to large borrowers⁰² has dropped by 4.1 percentage points (see Chart 3.28).

LIQUIDITY RISK

Banks' foreign currency liquidity has continued to rise due to the Central Bank's long-term policy on liquidity risk regulation and developments in 2022.

As a result of the inflow of non-resident deposits, foreign currency liquidity is at

⁰² A borrower for which the bank's risk (including that of the affiliates) exceeds 5% of its average monthly total regulatory capital is considered large.

Chart 3.28.
CREDIT INVESTMENTS TO LARGE BORROWERS IN THE BANKING SYSTEM

Source: CBA

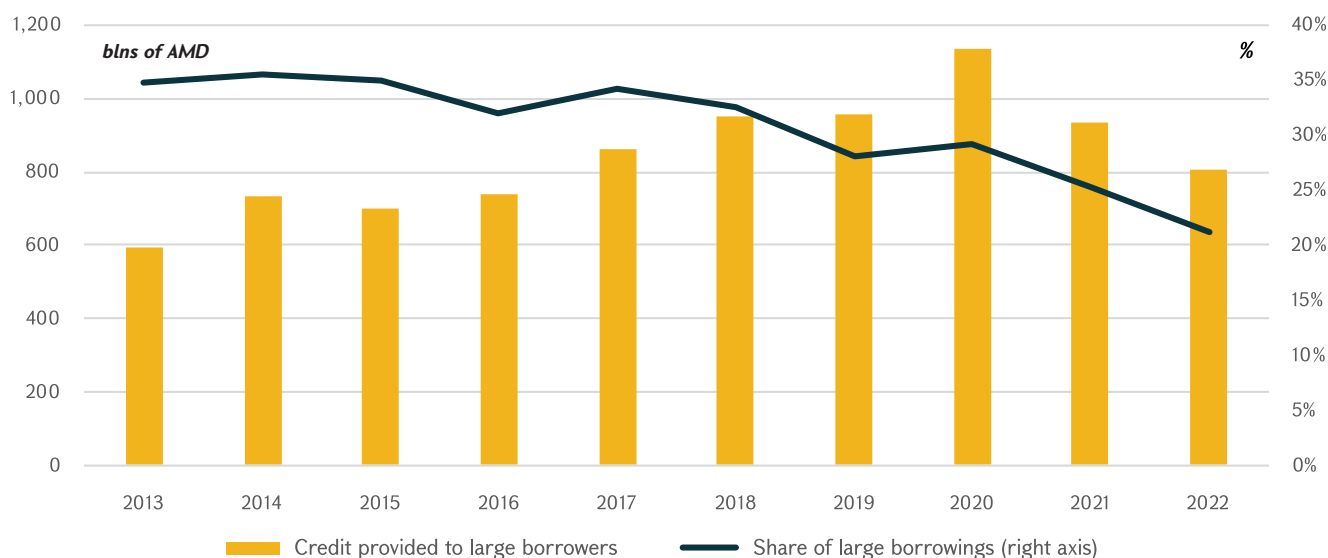
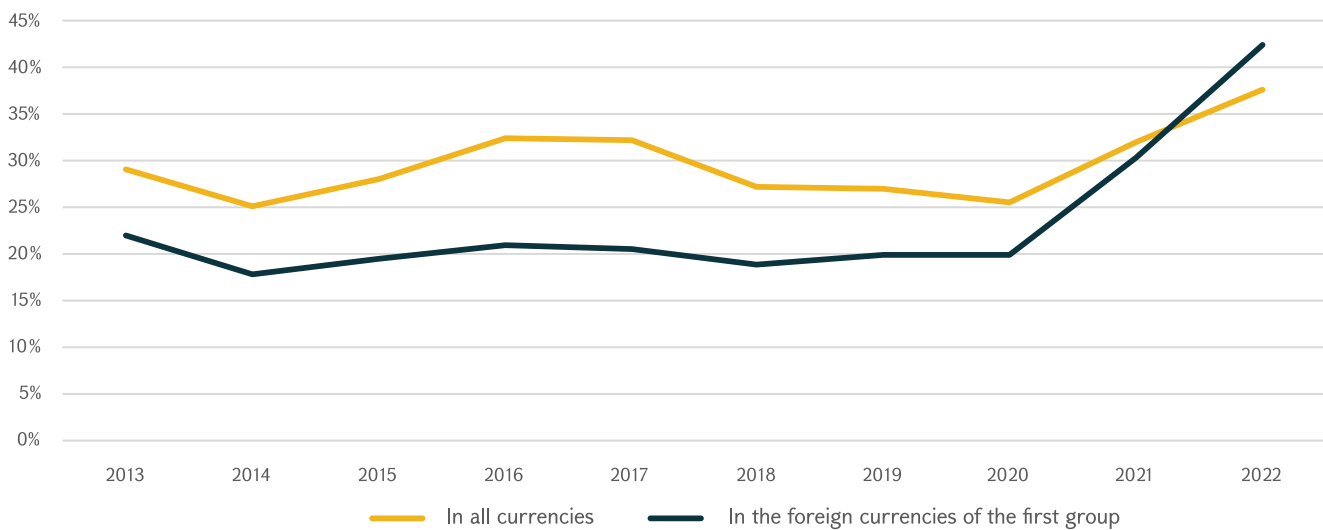


Chart 3.29.
DYNAMICS OF TOTAL LIQUIDITY

Source: CBA



its historical maximum. Meanwhile, liquidity indicators are increasing even when the effect of non-resident deposits is neutralized. Compared with the beginning of the year, the total liquidity in all currencies increased by 5.6 percentage points, while foreign currency liquidity increased by 12.1 percentage points (see Chart 3.29). In December 2022, the average Liquidity Coverage Ratio (LCR) in all currencies was about 290%, while in the first group of currencies, it was about 470% (see Chart 3.30). The banks met the require-

ments of the net stable funding ratio (see Chart 3.30).

During the year, the Central Bank continued to gradually change the denomination of reserve requirement on foreign currency deposits from AMD to FX; the portion of reserves held in foreign currency was increased by 2 percentage points.

The deposits of legal entities and individuals (at a fixed exchange rate) increased by about 43% (the AMD equivalent growth was 28.8%); moreover, resident and non-resident

Chart 3.30.
DYNAMICS OF LIQUIDITY COVERAGE AND NSFR

Source: CBA

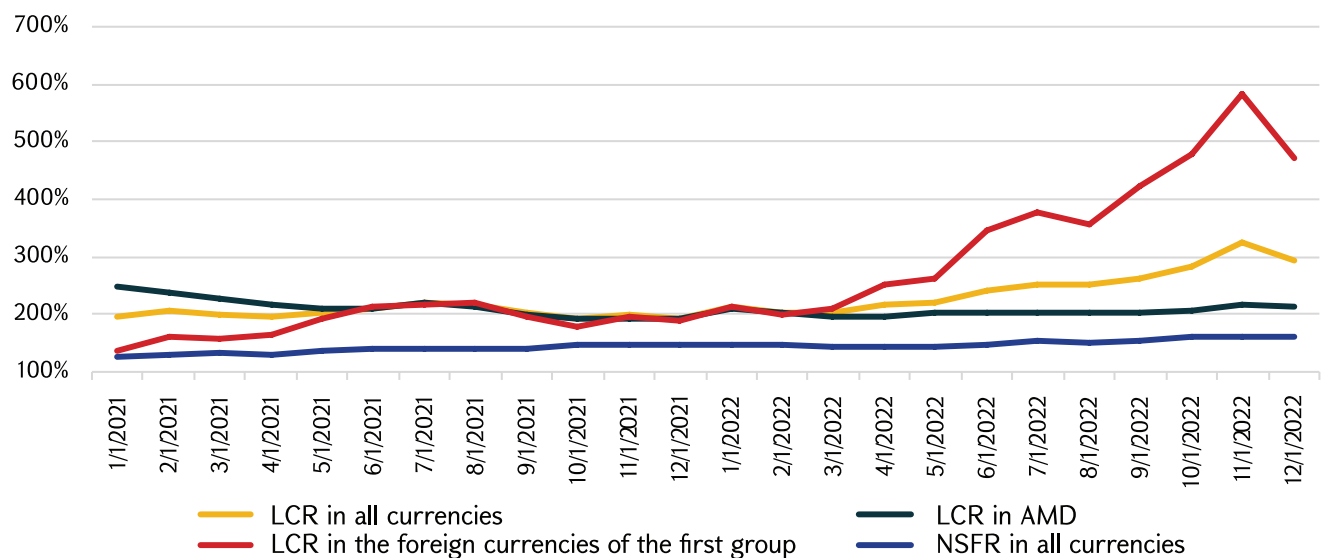
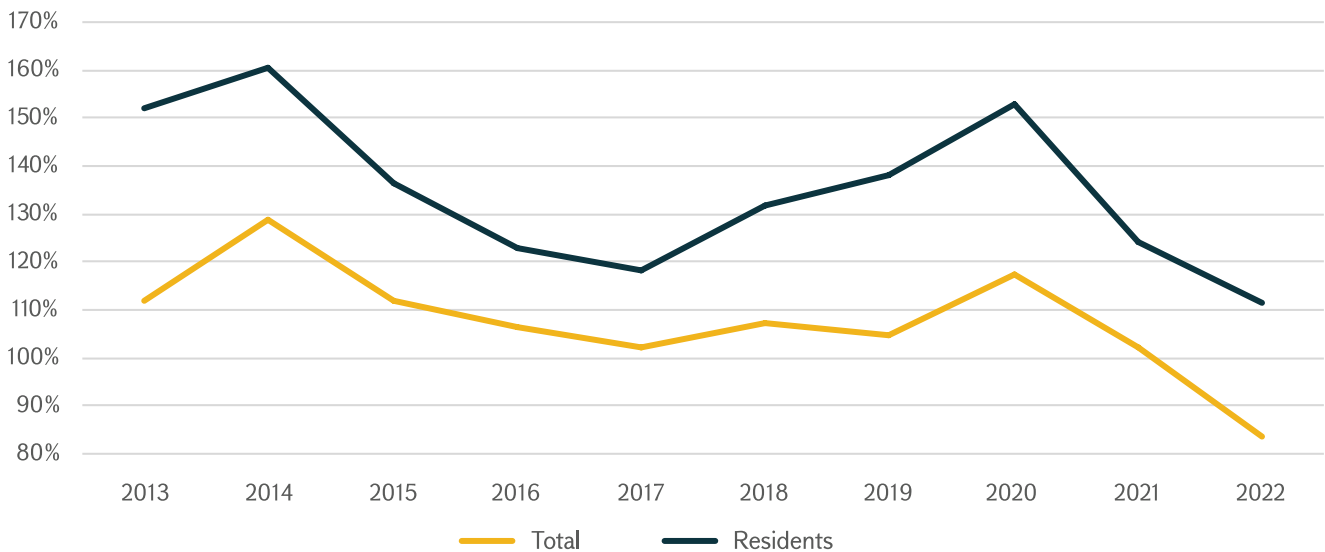


Chart 3.31.
RATIO OF LOANS TO DEPOSITS

Source: CBA



deposits increased by 29.4% and 96.3%, respectively.

The trend of the loan-to-deposit ratio also provides evidence of the strengthening of the foreign currency liquidity position of banks; moreover, the ratio has decreased both in the total portfolio and resident portfolio (see Charts 3.31, 3.32). The progressive growth of deposits over lending was due to several factors. First, as a result of the low demand for foreign currency loans, the portfolio growth (at a fixed exchange rate) was

4.8%, and the banks have allocated the funds attracted from non-residents in highly liquid assets based on their risk management approaches. On the other hand, banks were more inclined to replace sources of external funds with domestic deposits as the interest rates in the international market have increased.

In conditions of relatively high growth of AMD loans, the AMD loan-to-deposit ratio increased by about 6 percentage points; however, AMD liquidity did not decrease be-

Chart 3.32.
RESIDENTS' LOAN-TO-DEPOSIT RATIOS BY CURRENCY TYPE

Source: CBA

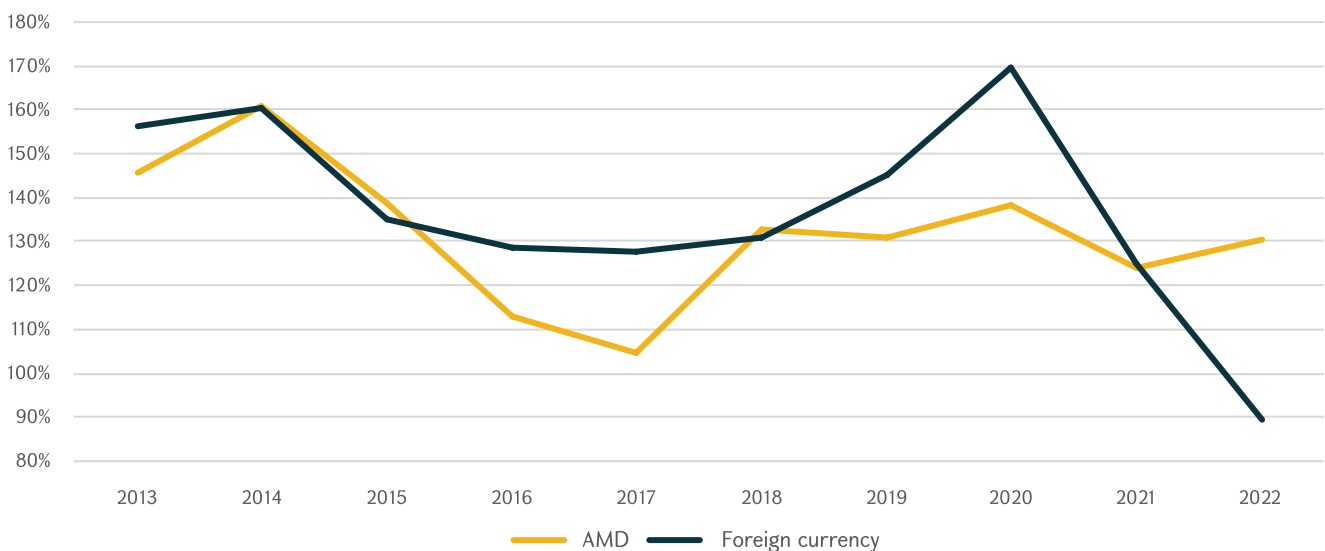
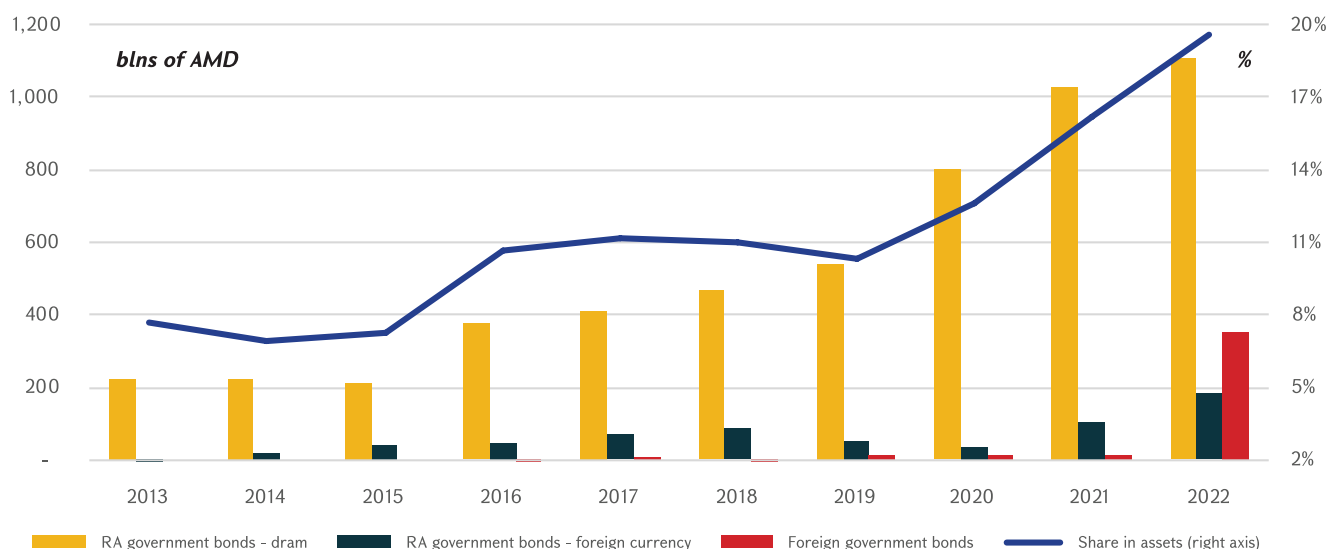


Chart 3.33.
INVESTMENT IN GOVERNMENT BONDS

Source: CBA



cause of the high level of banks' profitability (see Charts 3.30, 3.32).

MARKET RISK

Alongside the rise of the yield curve of government bonds, banks have negatively re-valued bond portfolios. However, given the high level of liquidity, it is unlikely for banks to liquidate their portfolios, and unrealized losses can potentially be recovered gradually over time.

In 2022, the revaluation reserve decreased by 29.8 billion drams and amounted to -34.4 billion drams, and the realized loss was 1.0 billion drams. The total negative result is 2.9% of the equity.

Banks' investments in government bonds have increased significantly during the year (see Chart 3.33). In the case of the Armenian dram, it was due to the change in the interest rate. The change in the yield curve of government bonds was greater than the change in interest rates on dram loans. In

Chart 3.34.
IMPACT OF CHANGES IN INTEREST RATES ON CAPITAL

Source: CBA

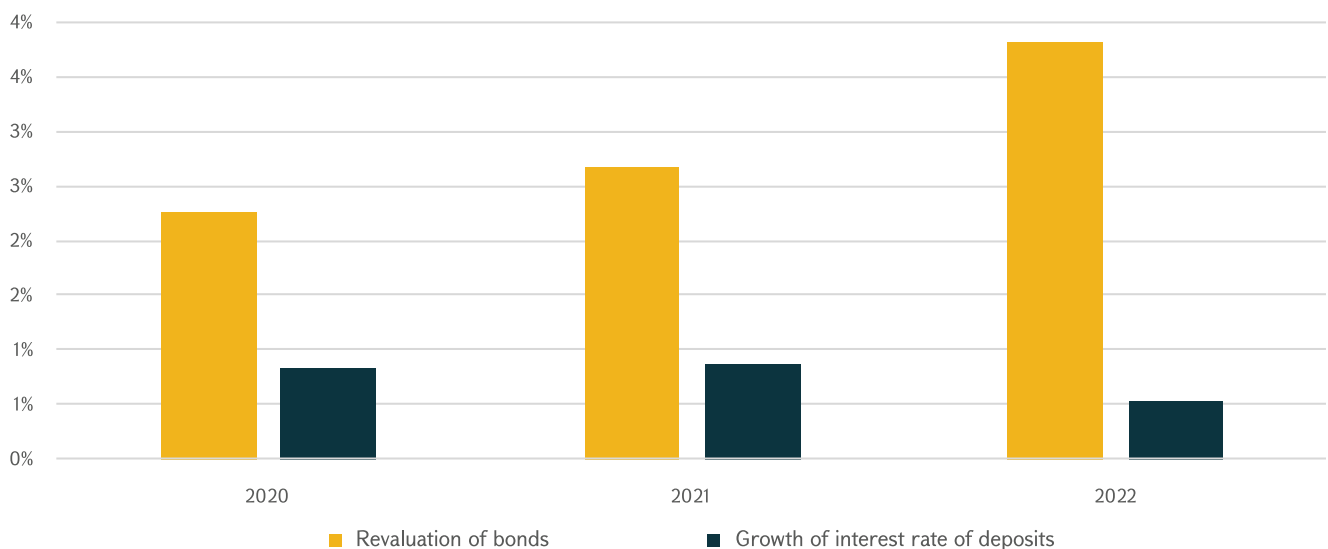
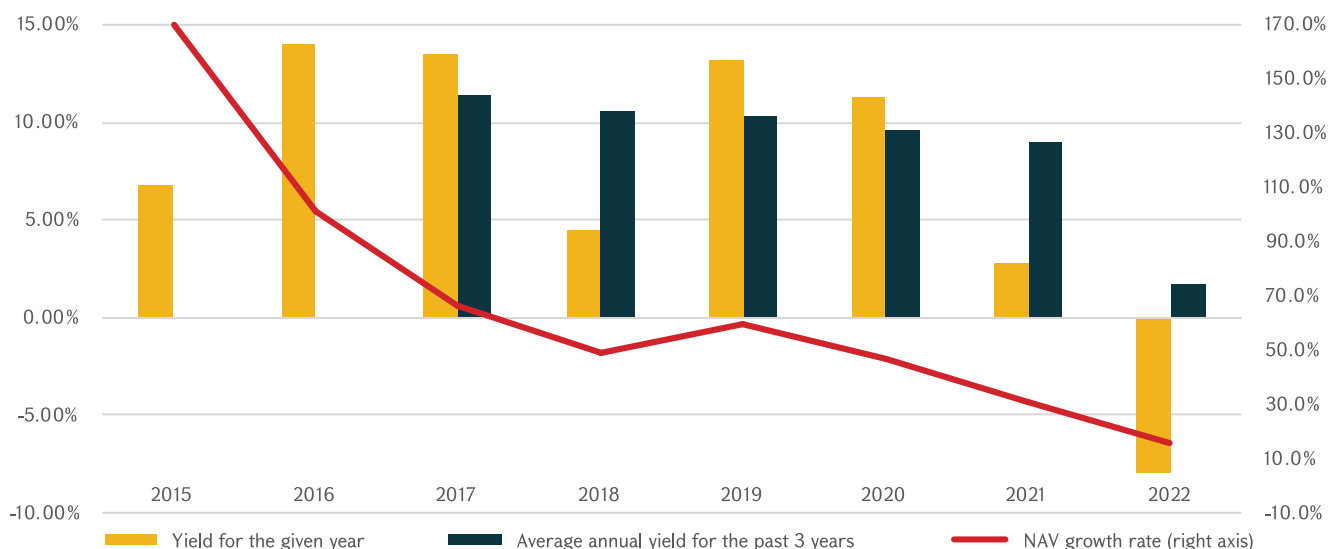


Chart 3.35.
YIELD OF PENSION FUNDS AND GROWTH RATE OF NAV

Source: CBA



the case of foreign currency, investments in bonds have increased due to a sharp increase in deposits; of course, the interest rate has also contributed.

Banks' sensitivity to financial asset prices has increased (see Chart 3.34). However, given the current structure of banks' balance sheets, the potential impact of market risk is not significant, including the FX risk of open currency positions. Meanwhile, the currency induced credit risk of unhedged borrowers remains material.

3.2.3.

NONBANK FINANCIAL INSTITUTIONS

The share of non-bank financial institutions in the financial system is still relatively small and only the share of pension funds is gradually increasing. As of now, the potential impact of pension funds and other non-bank

Chart 3.36.
NUMBER OF FUND PARTICIPANTS AND NAV/GDP RATIO

Source: CBA

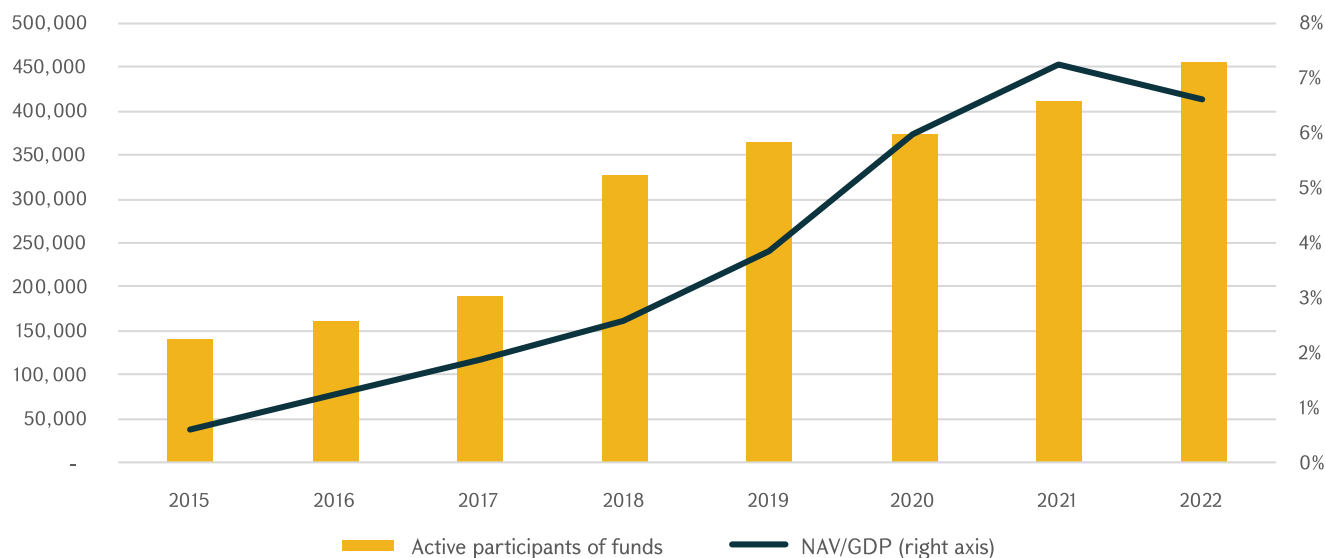
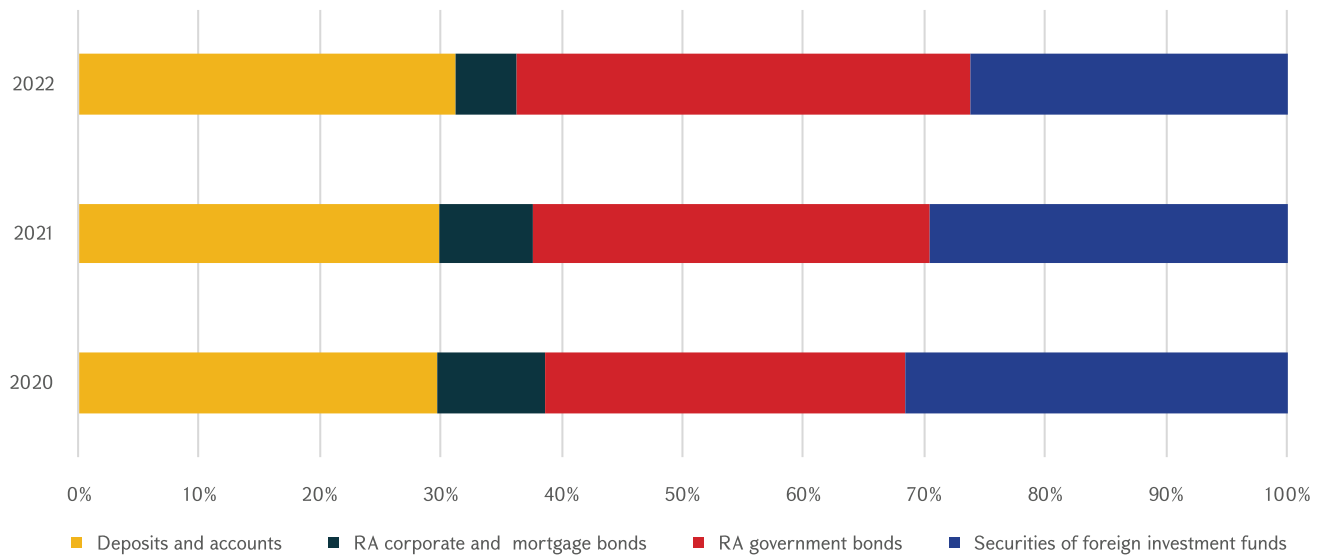


Chart 3.37.

FUNDS' INVESTMENT DIRECTIONS

Source: CBA



financial institutions on financial stability is considered to be insignificant.

DEVELOPMENTS IN PENSION FUNDS

In 2022, the performance of pension funds was -7.9%; as a result, their net asset value (NAV) increased by only 16% (see Chart 3.35). Since inception, the funds have made 76.9% in profits, which is equivalent to an annual return of 6.7%. In 2022, the decline in the

profitability of pension funds was a result of decreasing asset prices, particularly in foreign asset shares, foreign bonds, and the bonds of the Republic of Armenia, as well as the appreciation of the Armenian dram. This also reduced the value of foreign currency investments when expressed in Armenian dram. Such circumstances were due to the disruption of the global supply chains caused by the COVID-19 pandemic, which was further intensified by the Russia-Ukraine conflict. This resulted in high inflation and more uncertain-

Chart 3.38.

REGIONAL AND CURRENCY STRUCTURE OF FUNDS (IN BILLIONS OF AMD)

Source: CBA

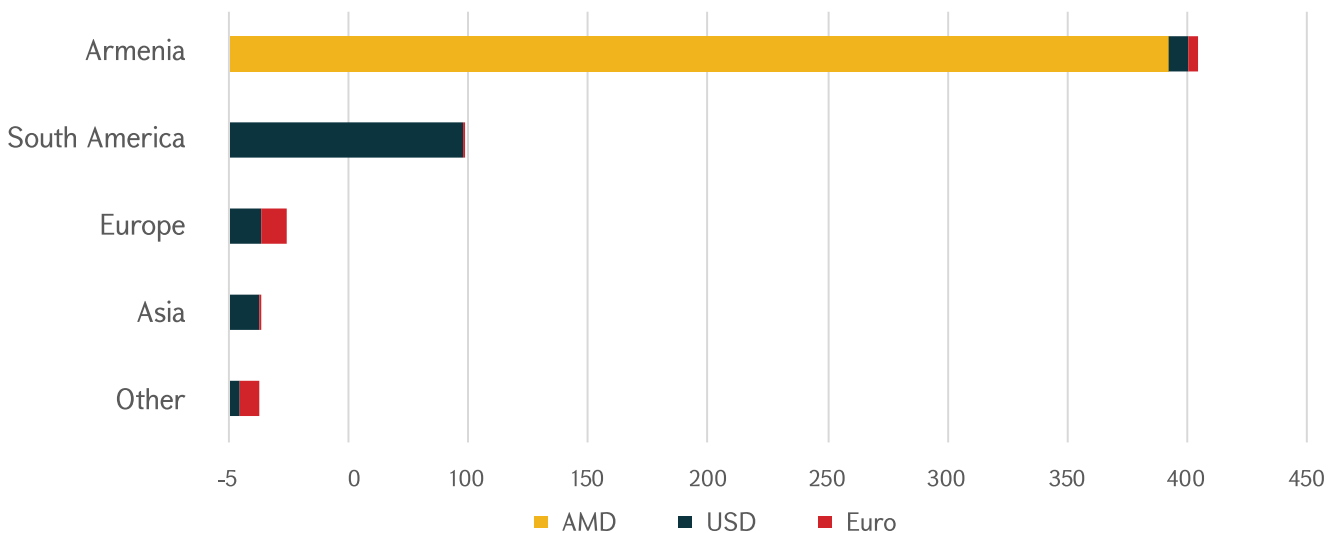


Table 1.
PENSION FUND STRESS TESTS

/// Source: CBA

Type of fund		NAV and structure of funds			Change of yield after stress		
		Stable income	Conservative	Balanced	Stable income	Conservative	Balanced
NAV of fund (blns of AMD)		4.2	538.5	6.2			
Structure	RA government bonds	46%	44%	47%	-6.9%	-7.7%	-6.6%
	Investments abroad	18%	26%	28%	-17.6%	-19.4%	-19.7%
	Other assets	36%	29%	25%			
Total		100%	100%	100%	-6.4%	-8.6%	-8.7%

ty regarding prospects for economic development. Central banks reacted to the high inflation by raising refinancing rates.

Out of the listed factors, the appreciation of the Armenian dram had the most adverse impact on the return of pension funds; the complete reversal of the exchange rate has a nearly 7 percentage point positive impact on the return of funds (see Table 2 for information about the yield sensitivity of the funds).

The developments in 2022 were specific in that all key factors impacting the return of the funds changed unfavorably all at once; of course, such developments do not in any way reduce the effectiveness of the diversification of the funds. It is also essential to mention the presence of an equity component in the structure of funds' investments. Equity investments generally have higher volatility. On the other hand, they are considered instruments "protected from inflation," which is especially important in the current high inflationary environment. Taking into consideration the fact that the negative returns of

funds are not realized losses, it would be fully realistic to expect that, alongside the recovery of the financial and economic conditions, the returns of pension funds will also readjust, at a pace that will help compensate for the current reduction.

As a result of the progressive growth of the nominal GDP, the NAV/GDP ratio decreased by 0.6 percentage points to 6.6% (see Chart 3.36).

The weight of foreign investment fund securities in pension funds' investment structure decreased by 4 percentage points due to the negative effect that the appreciation of the Armenian dram has on the value of the funds. From the set of other investment avenues, the ones with the highest growth were the investments in the state bonds of the Republic of Armenia (see Chart 3.37).

At the end of the year, foreign currency assets in pension funds made up 27.9% (at the end of 2021 — 31.6%) of total assets. The majority of foreign currency assets are foreign investment funds (see the currency structure of pension funds in Chart 3.38).

Table 2.
PENSION FUND SENSITIVITY TESTS

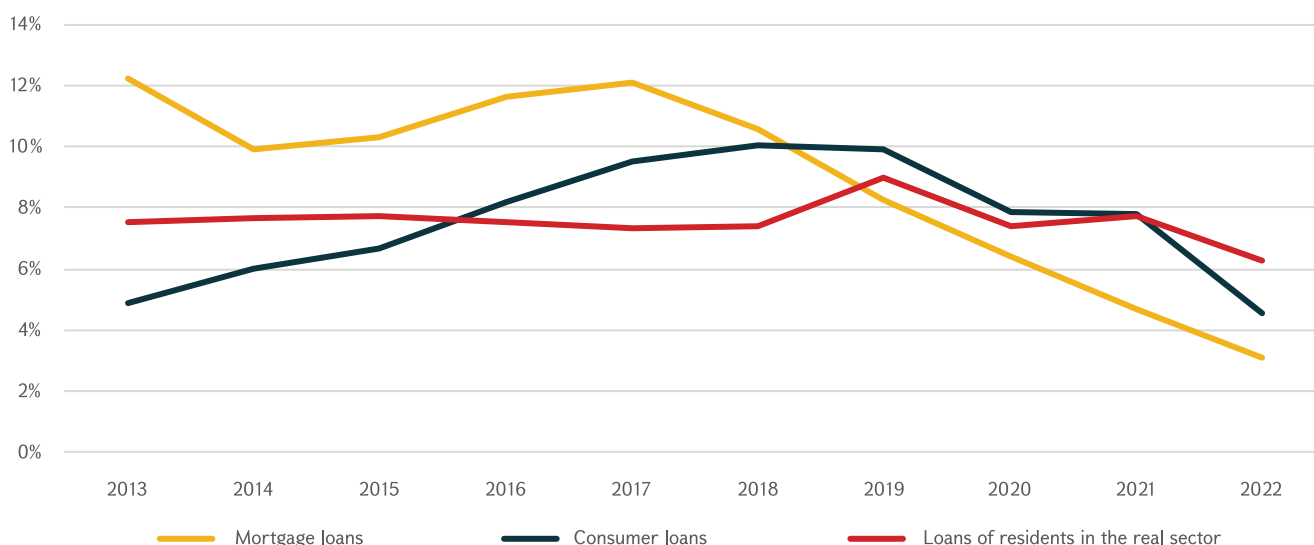
/// Source: CBA

Scenario	Change of yield		
	Stable income	Conservative	Balanced
Growth of interest rate in RA by 1 percentage point	-1.59%	-1.71%	-1.54%
Appreciation of Armenian dram by 1%	-0.21%	-0.28%	-0.33%
External shock (1% quartile)	-3.24%	-5.14%	-5.58%

Chart 3.39.

SHARE OF CREDIT INSTITUTIONS IN TOTAL LOANS IN FINANCIAL SYSTEM

Source: CBA



ASSESSMENT OF SENSITIVITY OF PENSION FUNDS AND STRESS TESTS

The aim of the stress tests presented in Tables 1 and 2 is to assess the impact of the assumed shock scenarios on pension funds; in particular, the stress tests were used to assess the possible changes in the net assets value and profitability of pension funds that would be realized in a stress scenario.

In the results of the stress test, the overall loss to the funds is calculated as the sum of losses originating from separate investments, particularly:

1. The stress test with respect to the bonds of the Republic of Armenia (state and corporate) was calculated based on the duration of the bonds and by applying the interest rate scenario used in the macro stress test of solvency.
2. The risk of securities of foreign investment funds was assessed using the VaR (Value at Risk) method. The stress loss estimation takes the 1% quantile of the maximum 260-day VaR (≈ 1 calendar year). It fixes the portfolio structure as of the end of 2022 and considers the price changes

Chart 3.40.

CLASSIFIED LOANS AND LOSSES FROM LOANS

Source: CBA

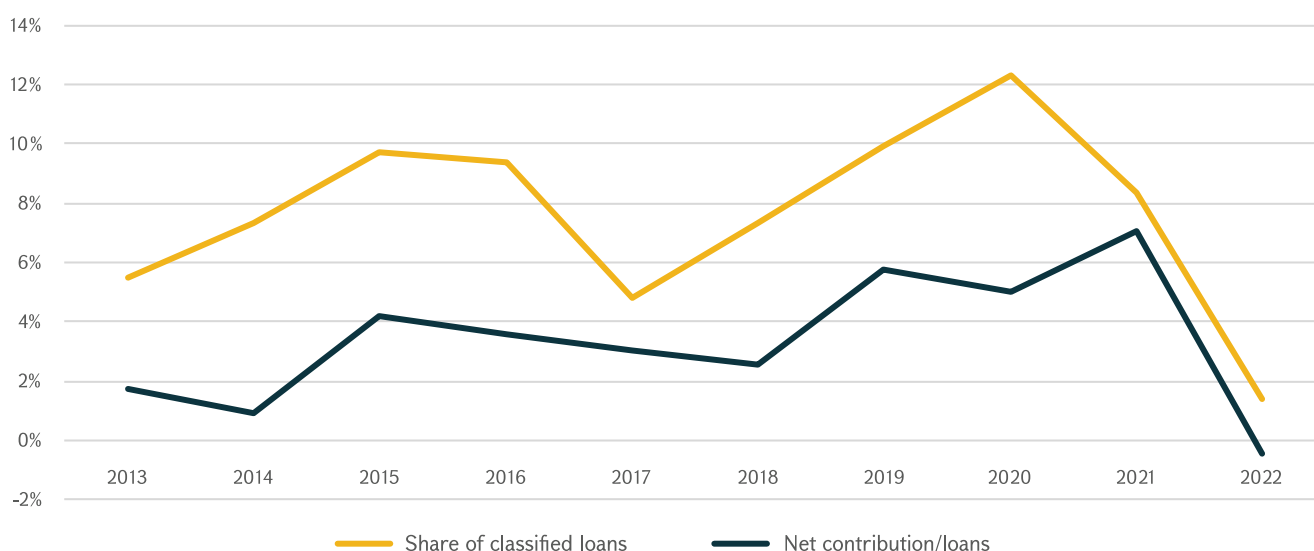
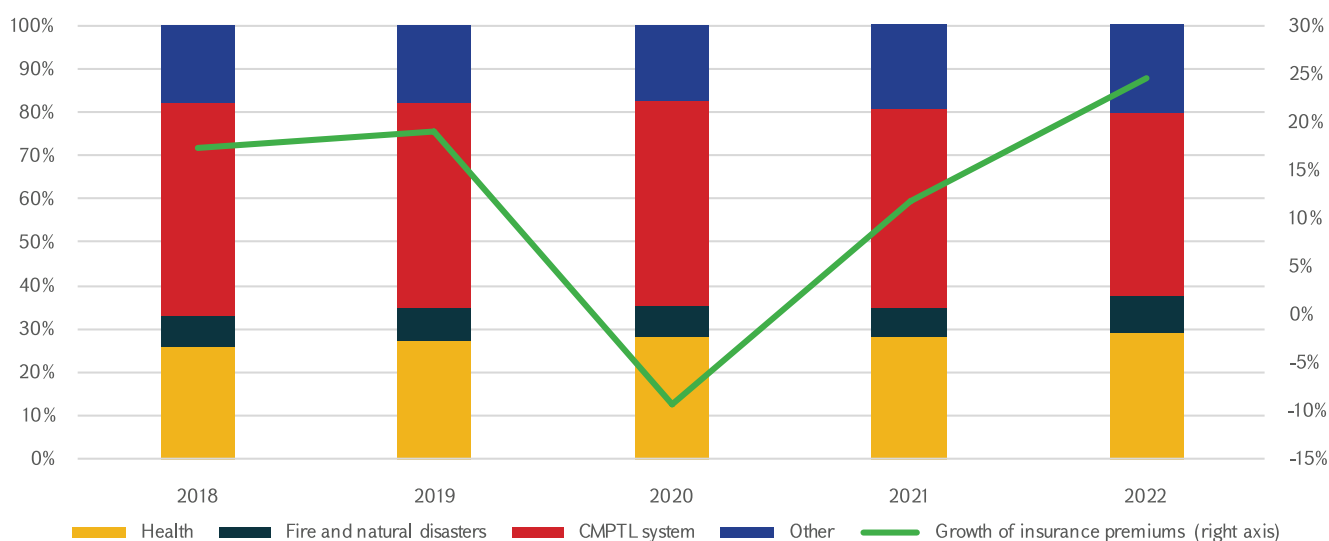


Chart 3.41.

STRUCTURE AND GROWTH RATE OF GROSS INSURANCE PREMIUMS

Source: CBA



- of individual securities in the period between 2016 and 2022.
3. In the model of macro stress testing of solvency, the exchange rate devaluation scenario is observed as a risky development, which, in the case of pension funds, has a positive impact on profitability. The impact of the exchange rate was omitted from this scenario to make the effects of the other two variables more explicit. In Table 2, we present the sensitivity of pension funds to changes in the exchange rate.

4. Stress losses (market risk based) for the other large investments by the pension funds, namely deposits, were not assessed, since these investments are held until maturity.

CREDIT INSTITUTIONS

The highly competitive environment in the credit market limits the growth opportunities of credit institutions. On the other hand, interest rate developments in international and

Chart 3.42.

LOSSES OF INSURANCE SECTOR PER PRODUCTS

Source: CBA

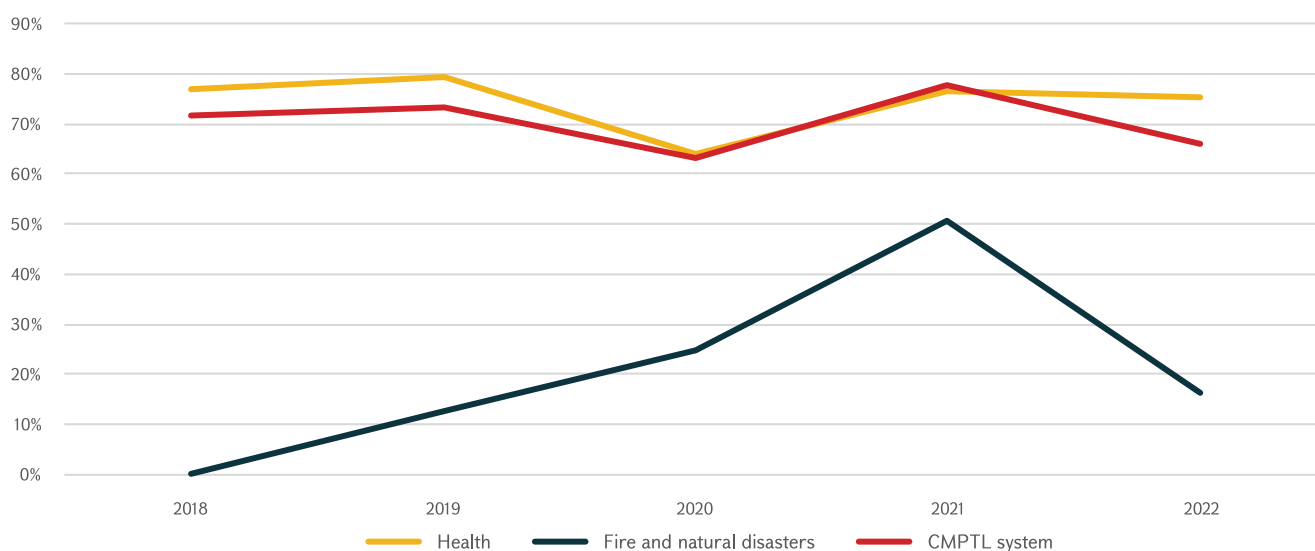
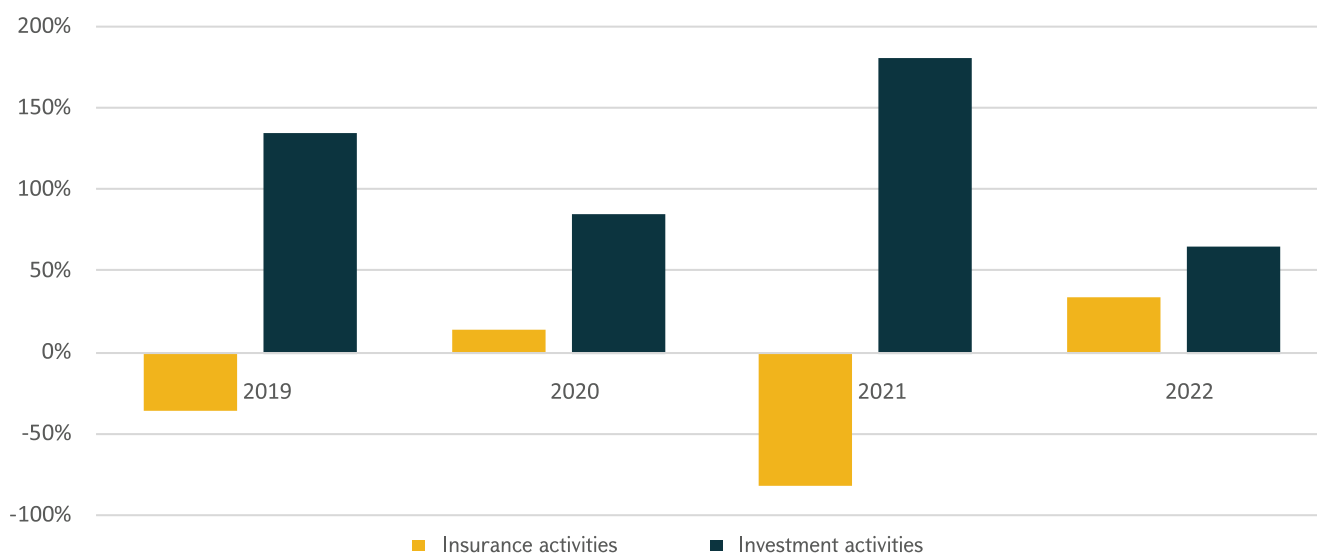


Chart 3.43.

SHARE OF INSURANCE AND NON-INSURANCE ACTIVITIES IN PROFITABILITY

Source: CBA



local financial markets pose additional challenges for credit institutions. All this attests to the need for qualitative transformation of the current business models of credit institutions.

Compared with the previous year, the assets of credit institutions have dropped by 3.6%. Without "Fast Credit Capital" UCO, the growth of assets of credit institutions will be 3.5%, which, however, is entirely due to the growth of the assets of refinancing credit institutions. In a highly competitive environment, the share of loans issued by credit institutions in the total loans is continuously decreasing (see Chart 3.39).

In 2022, credit institutions operated with a net profit of 16.0 billion AMD. The decrease in the weight of nonperforming loans and net provisioning had a positive impact on the financial result (see Chart 3.40).

INSURANCE COMPANIES

The share of insurance companies in the financial system remains low. The sector's growth trends remain moderate.

Chart 3.44.

STRUCTURE OF ASSETS

Source: CBA

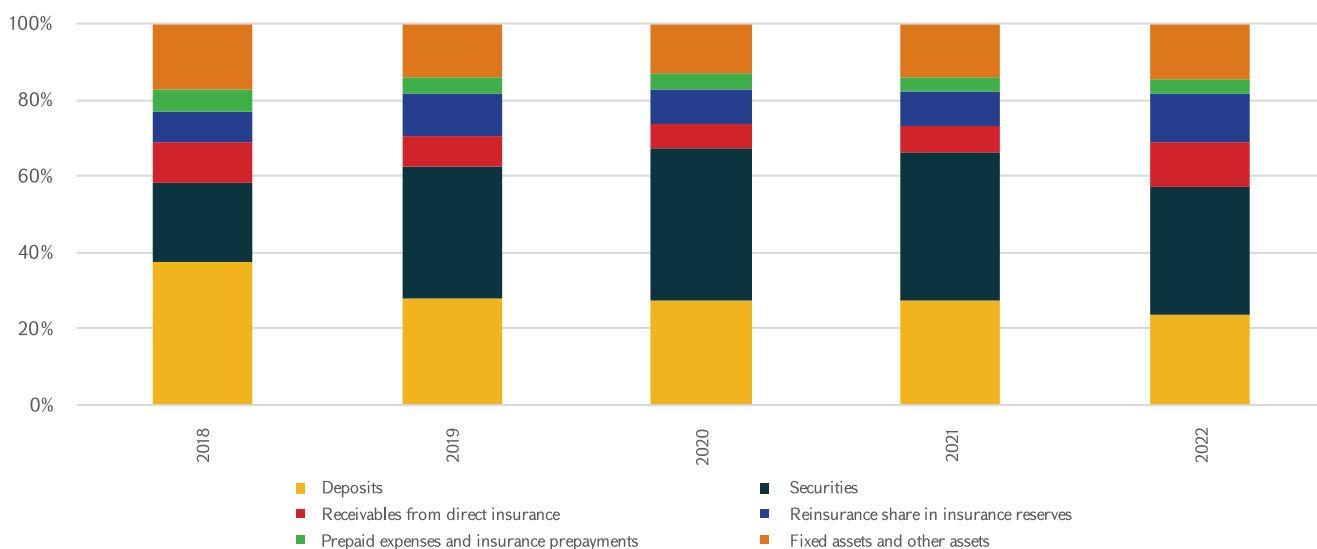


Table 3.

SENSITIVITY TESTS FOR ASSESSING THE SOLVENCY AND LIQUIDITY OF THE INSURANCE SYSTEM

Source: CBA

	Growth by 10% in the frequency of refunds			Shock growth by 25% of reported but not settled (RBNS) reserves		
	31.12.2020	31.12.2021	31.12.2022	31.12.2020	31.12.2021	31.12.2022
Loss or income decrease per scenario (bln AMD)	0.7	0.7	0.8	0.7	0.7	0.9
Loss or decrease in return on capital (%)	3.1	3.5	3.5	3.2	3.7	3.6
Change in liquidity level (percentage point)	-	-	-	-51.4	-21.6	-21.2
Change in total capital adequacy (percentage point)	-5.6	-4.7	-4.6	-5.8	-4.8	-4.8

The main indicators of the insurance system, insurance penetration and density, showed an upward trend in 2022, reaching 0.76% and 20,960 AMD, respectively, compared to 0.71% and 16,885 AMD in the previous year. Gross written premiums increased by 24.6%, and the average annual growth in the previous five years comprised 12%. The growth of insurance premiums was mainly driven by the health insurance, compulsory third-party liability insurance (CMTPL) and fire insurance classes. The largest classes of the insurance sector remain CMTPL and health insurance (see Chart 3.41).

The growth of insurance claims was relatively lower, comprising 2.5%. The loss and expense ratios⁰³ of the insurance system decreased by 8 and 2 percentage points, respectively, reaching 62.0% and 22.9% (see Chart 3.42).

The growth of insurance claims slowed down compared to previous years, which con-

tributed to positive profitability of the system from insurance activities. Overall, non-traditional insurance activities are the main drivers of the insurance sector's profitability (see Chart 3.43).

In 2022, as a result of the withdrawal of ratings of some companies by international rating companies, around 64.4% of reinsurance was transferred to European reinsurance companies.

The total assets of the insurance system grew by 11.3%, reaching 74.5 billion AMD. Bank deposits and securities made up a large share of assets (see Chart 3.44). The total capital of the system increased by 14.5% and reached 23 billion AMD due to the growth of profitability.

The sensitivity of the insurance system to potential shock has not changed in general. Regulatory violations are not recorded based on the results of the scenarios observed below (see Table 3).

⁰³ The expense ratio was calculated using the following formula: non-interest expenses / (net accrued insurance premiums - net refunds on terminated contracts - unearned insurance premium reserve change). The loss ratio was calculated using the following formula: (net accrued compensation + change in net claims reserves + settlement costs) / (net accrued insurance premiums - net amounts refunded on terminated contracts - unearned insurance premium reserve change).

BOX 1

THE IMPORTANCE OF CLIMATE RISKS FROM THE PERSPECTIVE OF FINANCIAL STABILITY/TRANSMISSION OF CLIMATE RISKS TO THE FINANCIAL SYSTEM

Interest in environmental, social and governance issues⁰¹ has considerably grown over the past years, and the outbreak of the COVID-19 pandemic has further highlighted these issues, accelerating the integration of ESG (environmental, social and governance) standards into the analyses conducted on the financial sector and capital markets.

In the first stage, it is important to assess the impact of climate risks on the financial system. Climate risks are categorized into physical risks and transition risks. Physical risks arise from physical impacts associated with climate change and other environmental issues. Transition risk is the potential cost for society when transitioning to a low carbon economy in order to mitigate climate change. It impacts socio-economic development, economic activity, companies, as well as natural and physical capital. Climate risks impact the economy at two levels — micro (impact on economic entities and households) and macro (total impact on macroeconomics).

From the perspective of the impact on the whole economy, climate risk may entail depreciation of capital and the need for additional investments, changes in pricing, fall of productivity, labor market drifts and socio-economic problems, as well as negative impact on international trade and shifts in fiscal revenues, interest rates and the exchange rate

TRANSMISSION OF CLIMATE RISKS TO THE FINANCIAL SYSTEM

In essence, climate change can impact all financial risks. In particular, the bankruptcy of corporations and households, as well as the depreciation of collateral value, may entail credit risk de-

rived from climate risk. The revaluation of capital instruments and of instruments and commodities ensuring fixed income may entail growth of market risk. The increasing insurance reimbursements generate additional costs for insurance companies and cause underwriting risk. Issues in the supply chain and the closure of organizations, in turn, cause various operational risks. The liquidity risk associated with climate change derives from the additional liquidity demand and refinancing risk.

The financial system can have an essential impact on the mitigation of climate risks, becoming a major link for transformation into an ecologically sustainable economy and mediating investments that will contribute to protection of the environment in the long run.

THE CURRENT STATE OF CLIMATE RISKS IN ARMENIA AND FORECASTS

Armenia is a small, landlocked country, and the main climate risks are drought, significant degradation and desertification of lands. Armenia is also vulnerable to the following natural disasters: landslides, mudslides, floods, earthquakes, etc. Between 1998 and 2010, damages caused by weather phenomena comprised 2.8 billion USD, an average of 450 million USD per year (USAID, 2017).⁰²

Chart 3.45 presents the average change in temperature in Armenia and globally between 2010 and 2021, indicating that the average temperature rise in Armenia largely exceeds the global one.

Climate change impacts by sector in Armenia are presented in Chart 3.46.⁰³

The following are the climate change forecasts in Armenia by 2050 according to the Asian Development Bank (2021) and USAID (2017):

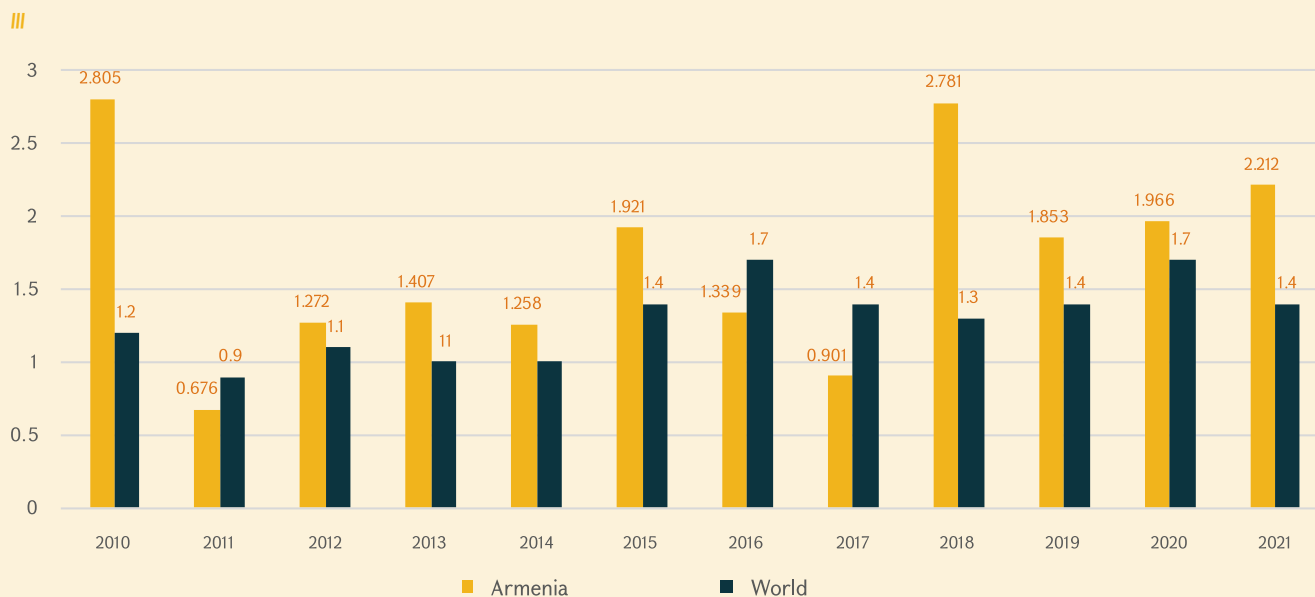
- 1.6-2.2 degree rise in temperature.
- Potential reduction in average monthly precipitation in June-September by 7-10%.

01 <https://www.greenfinanceplatform.org/themes/environmental-social-and-governance-esg>

02 "Climate Risk Profile Armenia" USAID, https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile_Armenia.pdf

03 Source: USAID, 2017.

Chart 3.45.
CHANGE IN AVERAGE TEMPERATURE (IN DEGREES CELSIUS)



- Increase of extremely precipitative days by 22-32%.
- Increase in number of consecutive dry days by 7-11%.
- Increase in the number of hot days and nights and decrease in the number of cold days and nights.
- Warming levels in Armenia higher than the global average according to RCP8.5 scenario, potential rise of 4.7° C by the year 2090.

DEVELOPMENTS IN GREEN FINANCE IN ARMENIA

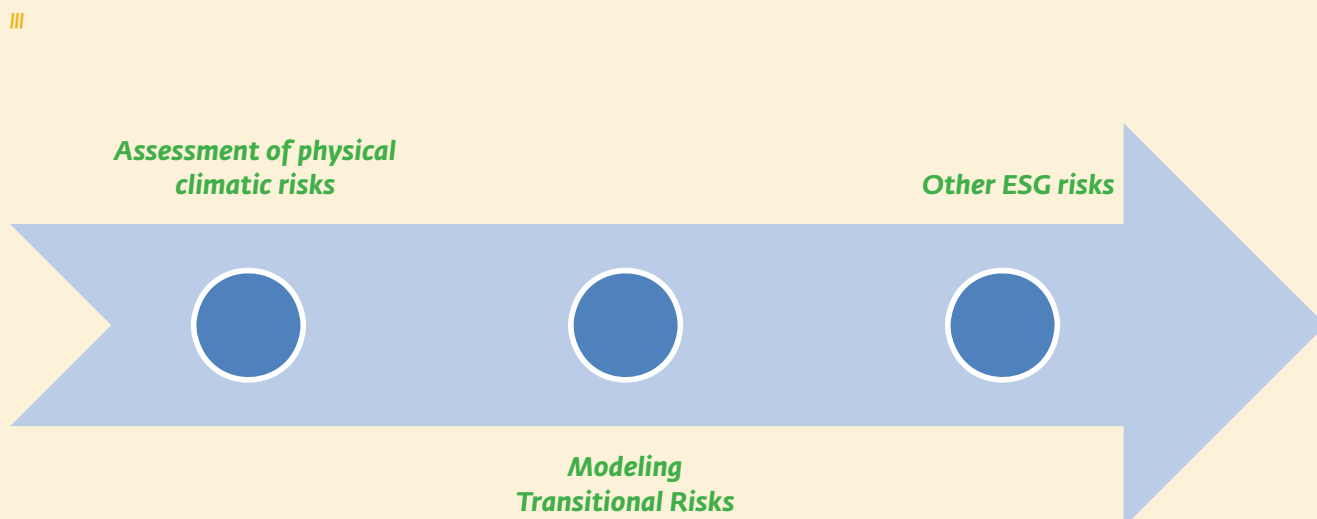
The Central Bank of Armenia has issued a press release on **“The role of the Central Bank of Armenia in promoting sustainable finance”**⁰⁴ which highlights the importance of climate change and the need to introduce the principles of sustainable finance. In particular, it stresses the importance of the need to take

04 https://www.cba.am/EN/pmessagesannouncements/PRESS%20RELEASE_03.10.22.pdf

Chart 3.46.
MAIN CLIMATIC IMPACTS



Chart 1.
RISK ASSESSMENT STAGES BY SECTORS



actions aimed at introducing ESG criteria⁰⁵ to the financial system. Taking into consideration that ensuring financial stability is one of the key objectives of the Central Bank of Armenia, the latter has assumed the obligation to introduce principles of financing in the financial system in Armenia.

It is also worth mentioning that the private sector is also taking actions towards the development of this sector; in particular, more financial institutions are engaging in funding energy-efficient and renewable energy sectors.

MEMBERSHIP IN INTERNATIONAL REPUTABLE PLATFORMS - NETWORK FOR GREENING THE FINANCIAL SYSTEM (NGFS) AND SUSTAINABLE BANKING AND FINANCE NETWORK (SBFN)

Currently, the Central Bank of Armenia is a member of the Network for Greening the Financial System⁰⁶ and the Sustainable Banking and Finance Network,⁰⁷ which implies that the CBA

has already undertaken a certain commitment to promote the establishment of green financing in the Republic of Armenia.

The Central Bank of Armenia joined the **NGFS** on April 15, 2020 and is a member of the following working groups: "Supervision," "Net Zero for Central Banks," "Monetary Policy," "Capacity Building and Training," as well as the "Data" and "Research" groups set up in 2023.

The Central Bank of Armenia joined the **SBFN** on November 24, 2021 and became involved in the activities of the "Sustainable Finance Tools" and "Data and Disclosure" working groups.

It is noteworthy to mention that international funds and organizations play a major role in financing the green economy in Armenia. This includes the Green Climate Fund⁰⁸ (GCF), the Green for Growth Fund (GGF), the Global Environment Facility⁰⁹ (GEF) and the European Bank for Reconstruction and Development (EBRD). The GCF has funded five projects costing nearly 117.2 million USD, while the GEF has allocated about 43 million USD within the scope of 16 programs in Armenia.

⁰⁵ ESG (Environmental, Social and Governance) criteria are among the criteria for companies' activities which socially aware investors use in assessing potential investments and which companies use to identify and manage non-financial risks.

⁰⁶ <https://www.ngfs.net/en>

⁰⁷ <https://www.sbfnetwork.org/>

⁰⁸ <https://www.greencilmate.fund/countries/armenia>

⁰⁹ <https://www.thegef.org/projects-operations/country-profiles/armenia>

Table 4.

HIGHEST RISK AND HIGH-RISK ECONOMIC SECTORS IN ARMENIA

Source: CBA

Highest risk (7 points)	High risk (6 points)
A. Agriculture, forestry, fishing	A 1.2. Cultivation of perennial crops
A 1.1. Cultivation of non-perennial crops	A 3. Fishing and fish farming
A 2. Forestry and logging	C 10. Manufacture of food products
D. E Electricity, gas, steam and air conditioning supply	C 12. Manufacture of tobacco products
E. Water supply, sewerage, waste management remediation activities	C 19. Production of coke and distilled petroleum products
H. Transportation and warehousing	C 20. Chemical production
	F. Construction

ARMENIA'S ROADMAP

The primary step taken by the Central Bank of Armenia for transition to sustainable finance is the development of a national roadmap, which the Central Bank started developing in 2022. The roadmap provides actions in four areas, including:

- **Mobilize finance:** To facilitate capital inflows into industries and other activities that are in line with Armenia's carbon reduction aspirations in a risk-based, market-driven and sustainable manner.
- **Expand the markets:** to support the transmission of knowledge, reduce information asymmetries, ensure market confidence and strengthen an enabling environment for sustainable financing.
- **Introduce the principles of sustainable development:** to guide financial sector participants to incorporate ESG into their business decisions.
- **Raise level of awareness:** to raise the level of awareness about sustainability risks and opportunities in Armenia, build capacities within the Central Bank and among participants of the financial market.

RISK RADAR AND HEATMAP

Being one of the major global issues, climate change has an impact on the economies of countries and their financial systems. This impact is mainly expressed in the form of climate risks. In its turn, in practice, the impact of climate risks emerges in the form of credit risk for most banks.

Accordingly, an experiment was conducted to quantify the size of that impact.

In 2022, the Central Bank of Armenia, in cooperation with the German Sparkassenstiftung for International Cooperation (DSIK), developed climate risk assessment tools for the financial sector such as the Risk Radar and Heatmap.

The Risk Radar is a tool that uses available information to assess the size of a potential climate risk posing a threat to the economic sectors. The assessment procedure for every single sector of economic activity consists of the following steps (See Chart 1).

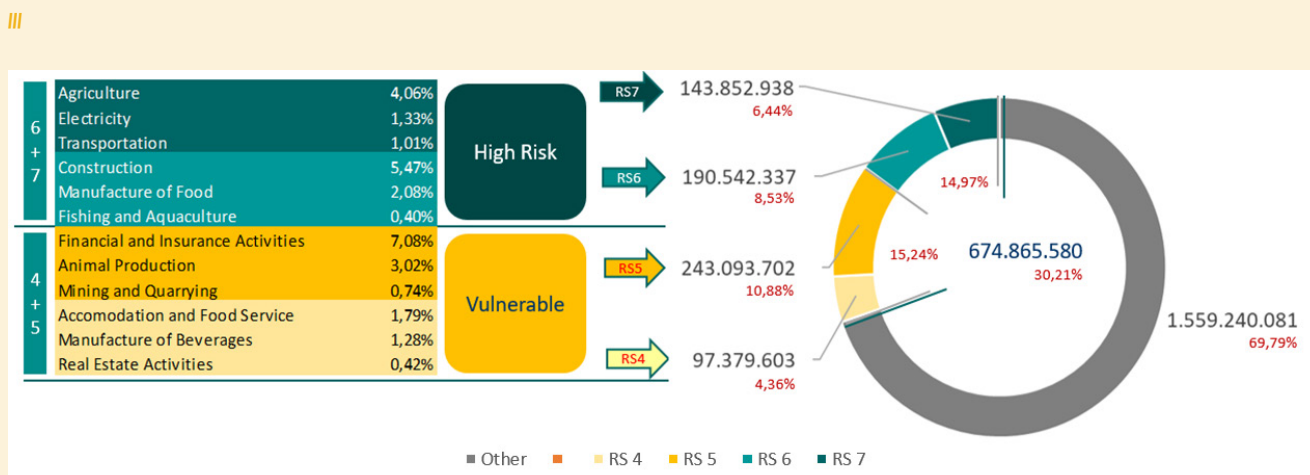
Each of the physical and transition risks (including their separate sub-types) are assessed on a 5-level scale (0-4) where 0 is the indicator of low risk, and 4 is the indicator of high risk. Other ESG risks are assessed under the yes/no principle where an additional 0.5 points (maximum 2 points) is added for every category. The scores are based on expert opinions taken from various sector-specific and publicly accessible sources.

The total maximum risk level for every separate economic sector is 10 points. Thus, the total risk assessment scale is divided into the following categories: 0-3 (neglected), 4-5 (vulnerable), 6-7 (high), 8-10 (critical risks).

RESULTS OF THE IMPACT OF CLIMATE RISK ON THE ECONOMIC SECTORS IN ARMENIA

Risk Radar has been applied for the main sectors of Armenia's economy, according to the NACE classification. The sub-branches have also

Chart 2
RISK-SECTOR SCORE (RS)



been assessed for agriculture and industry. Based on the results of the analysis, the vulnerable and high-risk sectors in Armenia are presented in Table 4.

Currently, the highest score is 7; therefore, there are still no critical sectors in Armenia. Nevertheless, the sectors specified in the Table are the most vulnerable in terms of physical and/or transition climate risks. On the other hand, those sectors also have a big negative impact on climate change.

As evidence of this, the specified sectors appear in national documents on the functions of mitigation of and adaptability to climate change and in European taxonomy which, in turn, proves the effectiveness of the tool.

APPLICATION OF THE RISK RADAR FOR ARMENIA'S FINANCIAL SYSTEM

The Heat Map is the tool that provides the opportunity to use the results of the Risk Radar (detected sector-specific climate risks) to assess the risks posing a threat to the financial system, particularly at the level of credit risk. The Heatmap was prepared on the basis of

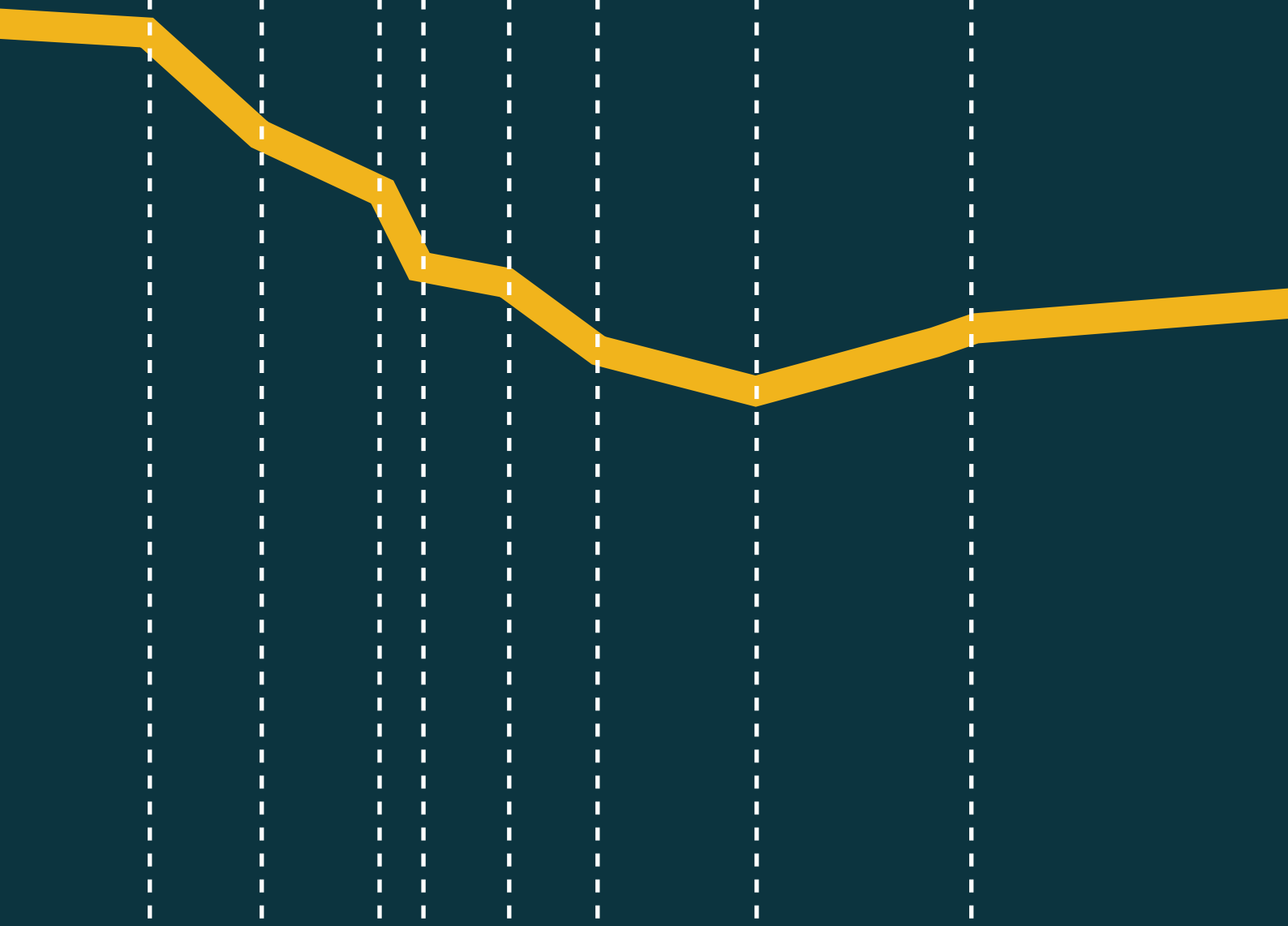
loans issued to residents in Armenia, based on data from June 2022.

The results show that about 14.97% of the loans of the banking system are high-risk (See Chart 2); (economic sectors with high-risk score of 6 or 7 were financed). The sectors that include not only high-risk sectors (6 points and 7 points), but also vulnerable sectors (5 points and 4 points) have 30.21% share of loans.

Heatmaps can be used by financial institutions with both small and large portfolios. This tool provides an initial image of the extent to which financial institutions are exposed to the impact of climate risks.

For a more thorough assessment of risks at the level of clients, individual assessment modifiers can be established for every sector, with the use of a short questionnaire. This will provide the opportunity to analyze and see to what extent the particular company is exposed to the same risk to which its sphere of activity is exposed and whether mitigation of this risk score is adequate. Consequently, restrictions, as well as price effects and the requirements for collateral value may be formulated for borrowers, ensuring comprehensiveness of the management of ESG risks.

4 BANK STRESS TEST RESULTS



4.1.

STRESS TESTS FOR SOLVENCY OF BANKING SYSTEM

This section presents the results of macro stress tests to assess the stability of the banking system in Armenia. Stress testing of the banking system is one of the key components of financial stability, which aims to assess the ability of the banking system to withstand various hypothetical shock situations (scenarios). Stress testing provides the opportunity to understand and analyze the possible vulnerabilities of the banking system more thoroughly and to take steps in that direction.

The results of the stress tests show that the banking system has sufficient capital and liquidity to withstand the shocks in the scenarios and ensure further normal operation.

SOLVENCY MACRO STRESS TESTS

Solvency stress tests assess the banking system's ability to absorb risks threatening the stability of the financial system in various shock situations. Credit risk has a prominent role in the macro stress testing framework as it is one of the most important risks inherited in the activities of banks. Solvency stress tests have been conducted over a three-year horizon and assume two scenarios: monetary policy and stress.

MONETARY POLICY SCENARIO

The monetary policy scenario considers the main developments described in the inflation report of the Central Bank of Armenia for the fourth quarter of 2022. According to them, the relatively high economic growth recorded in 2022 will be adjusted, approaching its long-term level of about 4.2% in the period from 2023 to 2025.

In the monetary policy scenario the high capitalization level of the system is maintained.

STRESS SCENARIO

The stress scenario presented below is an extremely adverse version of the hypothetical development of events, which should not be assumed as the Central Bank's projection.

The stress scenario considers the development of a shock situation in the Armenian economy and financial system as a result of the development of external and internal events.

In particular, in 2023-2024, many geopolitical uncertainties are assumed, which will expand the uncertainties of economic activity in key trade partner countries of Armenia,

Table 5.
VALUES OF KEY VARIABLES IN DIFFERENT SCENARIOS
///

	Actual	Baseline scenario			Adverse scenario		
	2022	2023	2024	2025	2023	2024	2025
households							
GDP	12.6%	4.60%	4.40%	4.20%	-8.91%	0.73%	4.23%
Inflation	8.3%	3.90%	4.00%	4.00%	5.53%	3.40%	3.08%
Credit growth	5.5%	10.00%	10.00%	10.00%	4.00%	6.00%	7.50%
Probability of default (PD)							
of Consumer loans	6.3%	4.2%	5.9%	6.5%	5.5%	9.3%	7.5%
of Mortgage loans	1.8%	1.4%	2.2%	2.6%	1.9%	3.5%	3.0%
of Business loans	4.0%	2.9%	4.3%	4.8%	3.7%	6.7%	5.6%
Loss given defaults (LGD)							

Table 6.

THE MAIN RESULTS OF STRESS TESTING*

///

	Actual	Baseline scenario			Adverse scenario		
	2022	2023	2024	2025	2023	2024	2025
Withdrawals from credit portfolio (in blns of AMD)	-140.8	-70.1	-107.7	-120.1	-117.4	-174.4	-134.5
weight in assets (%)	1.69	0.77	1.10	1.13	1.39	2.03	1.49
Market risk** (in blns of AMD)		-49.9	8.4	19.8	-102.1	36.6	19.8
Total losses (in blns of AMD)	140.8	120.0	99.3	100.3	219.4	137.8	114.7
weight in assets (%)		1.32	1.01	0.94	2.60	1.61	1.27
Net interest income (in blns of AMD)	256.0	258.3	273.1	288.4	193.3	196.6	206.1
Net profit (in blns of AMD)	239.3	110.7	139.0	150.5	-26.1	47.1	73.1
weight in assets (%)		1.22	1.42	1.42	-0.31	0.55	0.81
Capital adequacy (% as of the end of period)	20.28	19.48	19.40	19.72	17.97	18.06	18.12
Necessary capital injection (in blns of AMD)			0			0	
weight in GDP (%)			0			0	
Number of banks with less than 12% capital adequacy			0			0	

* Losses are expressed with (-) sign

** Losses from market risk include losses due to interest rate changes and direct exchange rate effects. In particular, for the baseline scenario, it was assumed that the market interest rate grows by 1 percentage point in the first year and decreases by 0.5 percentage point in each subsequent year. In the case of a stress scenario, market interest rates are expected to grow by 2 percentage points in the first year and decrease by 1 and 0.5 percentage points in the following years, respectively.

putting the processes of economic recovery at risk. On the one hand, this will lead to the formation of an unfavorable environment in the global economy and currency and financial markets, while, on the other hand, it will be reflected in the sharp increase in the international prices of energy carriers in the global market, mainly due to supply factors. As a result, due to a sharp slowdown in economic activity in key partner countries, Armenia will record a decline in export volumes, as well as a certain increase in the risk premium. In the high and possibly rising inflation environment, both the external and Armenian monetary authorities will continue to raise interest rates. Under these conditions, a continuous decrease in asset prices and a possible reduction in the rate of lending to the economy may be observed in the financial markets. Along with the above-mentioned developments, it was assumed that, in 2023, most most of the foreign citizens residing in Armenia will leave the country in the context of possible uncertainties related to geopolitical developments in the region. This may be followed by an outflow of capital, as well as a

decrease both in real estate prices and in the volume of construction loans and mortgages.

It was assumed that the shocks will have their main impact during 2023-2024 which will be followed by a gradual softening of the impact and a recovery of economic activity.

The events described above will lead to a decrease in economic growth of about -9% in the first year of the considered horizon, which will gradually improve over the following years, reaching 4.2% at the end of the stress scenario. A more detailed description of the scenario is provided in Table 5.

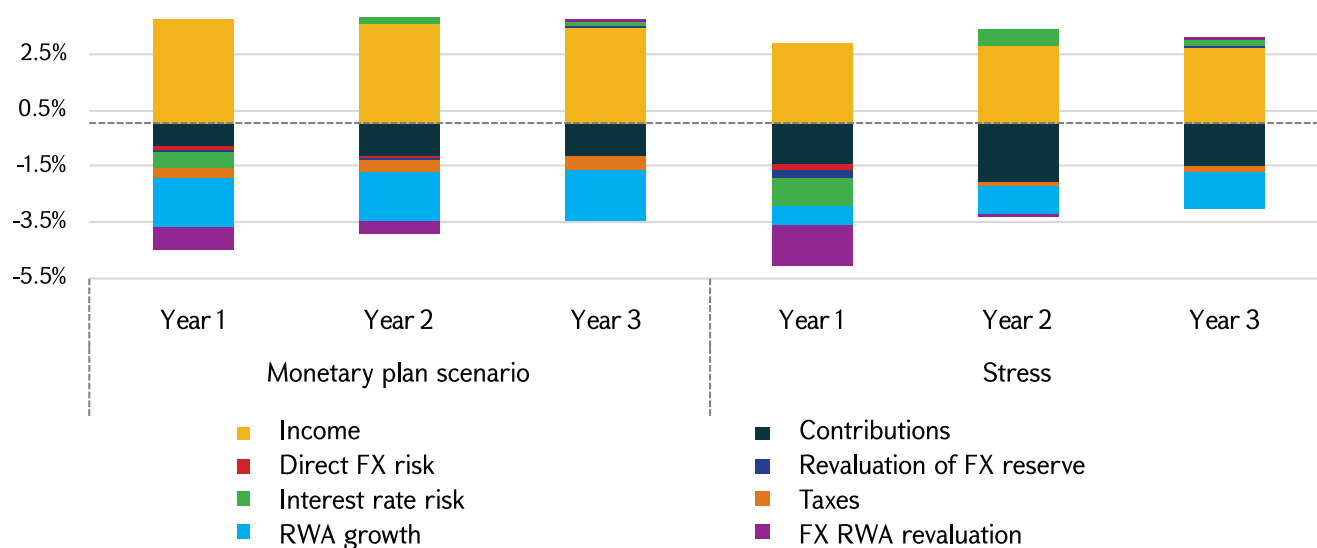
SOLVENCY STRESS TEST RESULTS

Under the monetary policy scenario, the banking system remains highly capitalized. According to the monetary policy scenario, the total losses of the banking system will decrease over the horizon, which is due to the relatively favorable developments of the probability of default (PDs) and the loss given default (LGD) under the given macroeconomic developments. Along with the reduction of

Chart 4.1.

CONTRIBUTIONS OF VARIOUS COMPONENT ELEMENTS TO CHANGE OF CAPITAL ADEQUACY RATIO

Source: CBA



losses, some increase will be recorded in the profitability of the banking system, as a result of which the capital adequacy ratio of both the banking system as a whole and of individual banks will continue to exceed the required minimum level.

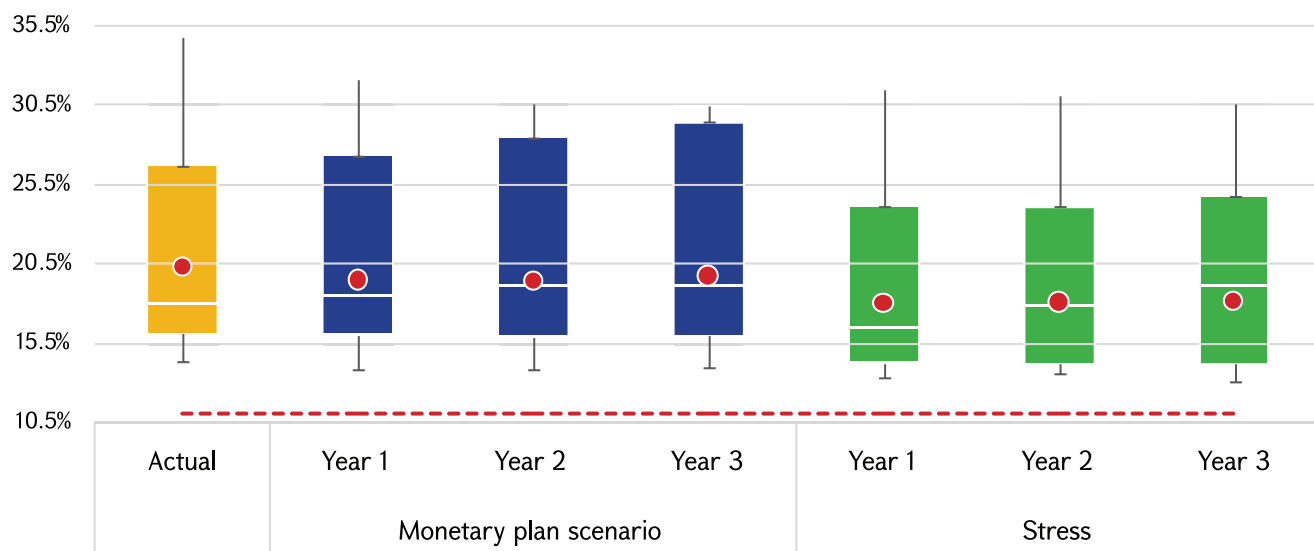
Under the assumptions of the stress scenario, credit losses in the banking system increase. In particular, in the conditions of reduction of income in the economy, high

inflation and exchange rate shock, the financial system of Armenia will record an increase in the components of credit risk (probability of default (PD) and loss given default (LGD)), which will lead to an increase in credit losses. In addition to the credit risk, additional losses will be recorded due to the revaluation of the portfolios in the event of an assumed increase in interest rates. As a result, in the first year of the period under consideration, the profitabil-

Chart 4.2.

DISTRIBUTION OF THE CAPITAL ADEQUACY RATIO UNDER VARIOUS SCENARIOS (BY INTERQUARTILE INTERVALS)

Source: CBA





ity of the banking system will decrease sharply and a net loss will be recorded. Moreover, the process of the materialization of credit losses will continue and will reach its maximum peak in the second year of the stress horizon.

In the current situation, banks will show relatively conservative and risk-averse behavior, because of which a relatively small increase in the loan portfolio will be recorded in the first year of the observed period. This will lead to a reduction in banks' net interest income, which will not be enough to cover credit and market losses. Despite maintaining a high level of credit risk losses, positive profitability will be registered in the second year. In the last year of the stress horizon, the system's profitability will start to recover, as a result of the reduction in credit risk losses (see Table 6).

Under the adverse scenario, the capital adequacy of the banking system decreases but does not breach the re-

quired minimum level of 11%. In particular, the capital adequacy of the banking system remains at a high level, decreasing to a maximum of 17.9% during the observed stress period (see Chart 4.2).

Due to pre-stress high capital adequacy ratios, no bank registers a case of violation of the minimum requirement of capital adequacy. In the next years, capital adequacy ratios increase along with the gradual improvement of the situation and the restoration of the profitability of the banking system.

Overall, the stress testing shows that the Armenian banking system remains sufficiently capitalized to withstand the situation assumed under the adverse scenario. Moreover, even after the materialization of the risks of the hypothetical scenario, most of the banks still have sufficient capital reserves to absorb further possible losses.

4.2.

BANKING SYSTEM LIQUIDITY STRESS TESTS

Commercial banks' ability to withstand liquidity risk is assessed through the sufficient stock of liquidity buffers in the banking system under the conditions of the hypothetical stress scenario(s). The main parameters and the result of the liquidity stress test based on the actual indicators as of December 31, 2022, are described below.

STRESS TEST SCENARIO AND METHODOLOGY

The liquidity stress test is based on the following assumptions:

- systemic liquidity risk (outflow of deposits from all banks at the same time) over a period of 6 months is considered; moreover, the expected shock is stronger in the first two months and relatively mild in subsequent months;
- the possibility of banks attracting new funds, as well as converting from AMD to

foreign currency or vice versa are neglected (static balance sheet assumption);

- the expected inflow from the loan portfolio is included by 50% (corresponding to the assumption under the Liquidity Coverage Ratio (LCR) requirement), the potential inflow from classified loans is ignored, and haircuts are applied to highly liquid securities⁰¹;
- the revision of contracts in terms of both claims and obligations regarding financial institutions is assumed;
- the potential outflow of funds from other items (for example, undrawn credit card balance) is ignored, given their insignificant balance and historical behavior under different shock situations.

The hypothetical scenario of deposit outflow is designed based on the developments in 2020⁰² with more conservative assumptions. In the scenario, the deposit outflow rates vary by bank, reflecting the dif-

01 10% haircuts were applied for AMD bonds and 5% haircuts for foreign currency bonds.

02 The year 2020 was chosen as a historically adverse scenario, considering the intensity of actual shock.

Chart 4.3.

CUMULATIVE OUTFLOW OF DEPOSITS IN THE FIRST TWO MONTHS

Source: CBA

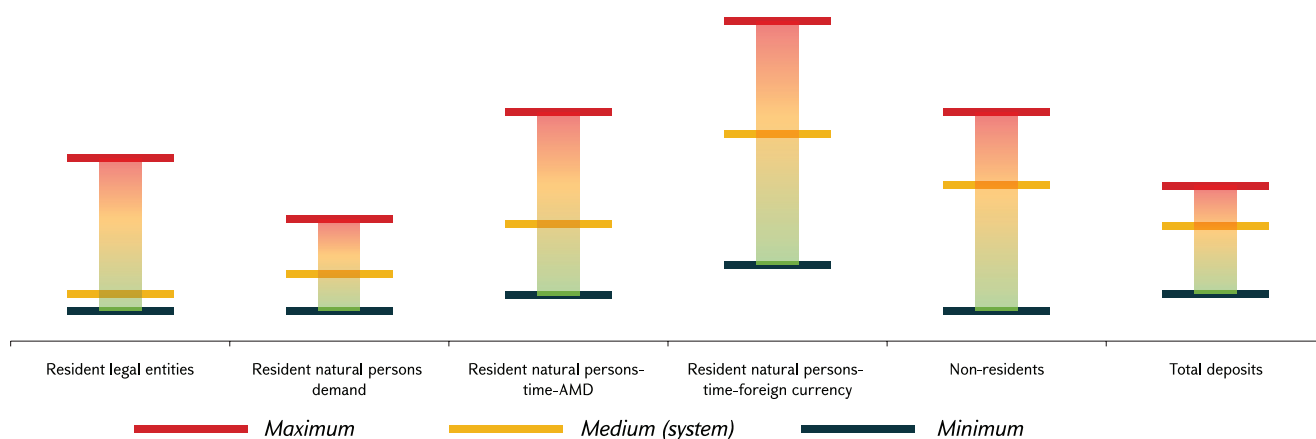
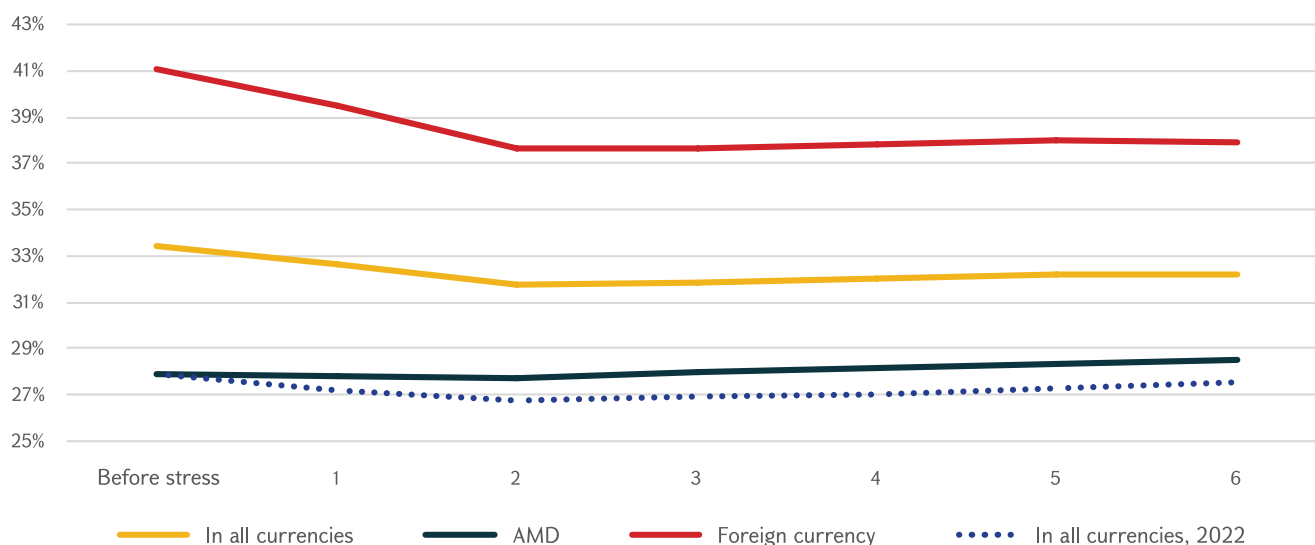


Chart 4.4.
CHANGE IN LIQUIDITY POSITION

Source: CBA



ferences in the sensitivity of customers of the given bank to possible shocks, as well as the effect of concentration.

Outflow rates are assigned based on the following breakdown of deposits:

- deposits of resident legal entities;
- demand deposits of resident natural persons;
- AMD term deposits of resident natural persons;
- foreign currency term deposits of resident natural persons;
- deposits of non-residents.

Chart 4.4 presents the minimum, maximum and average (banking system) outflow rates applied by banks over the first two months of the stress period⁰³.

LIQUIDITY STRESS TEST RESULTS

The stress test assesses the change in the bank's liquidity position over the stress period, i.e., the ratio of the post-stress li-

quidity buffer to total assets was estimated as of the last day of each month (see Chart 4.3). The stress test results show that available liquidity buffers of both the banking system, as well as individual banks, are sufficient to cover the stress outflow of the funds involved.

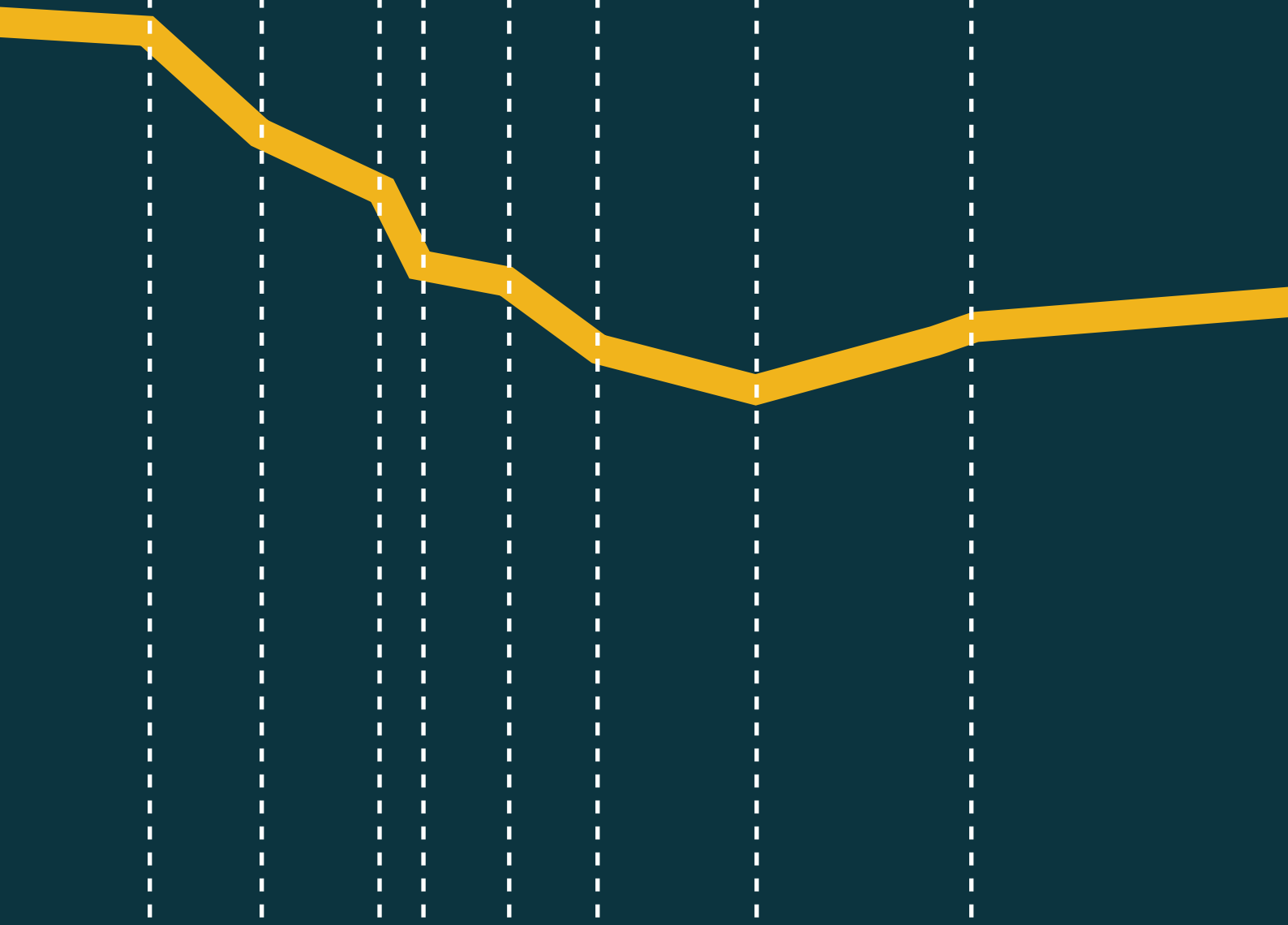
As a result of the sharp increase in foreign currency liquidity of banks, liquidity remains at a very high level even after a stress scenario. In the stress scenario, the risk (sensitivity) of the outflow of funds of new non-resident customers was considered to the same extent as it was in 2020. However, even if the 2022 growth of non-residents' deposits is fully paid off, the foreign currency liquidity of the banking system will remain at a higher level than the rate at the end of 2021.

As in previous years, the stress test does not show a significant decline in the level of AMD liquidity. At the system level, even 50% of the expected inflow from loans is sufficient to cover the stress outflow of the funds involved.

⁰³ The accumulative outflow scenario for total deposits for the next four months is 5.0% - average, 7.3% - maximum, and 4.1% - minimum.

5

MACROPRUDENTIAL POLICY



During 2022, the macroprudential policy of the Central Bank of Armenia was aimed at maintaining the revitalization trends of the credit market and normal lending process to the economy which started in 2021. This was mainly done by increasing the ability of the banking system to resist potential shocks through accumulation of capital buffers. During the year, the macroprudential policy priority of the Central Bank of Armenia was to strengthen the ability of the banking system to absorb losses, which, in the case of materialization of the cyclical systemic risks, may contribute to the ability of the banking system to provide necessary credit to the economy without any risk of interruption.

A comprehensive analysis of the early warning indicators of the credit market shows that the credit market is in the moderate growth stage and that the cyclical systemic risks are generally balanced, with the exception of overheating risks in the mortgage lending sector. The Financial Cycle Index, which presents the trends of the credit market, shows that the Armenian economy is in the expansion stage of the credit cycle (See Charts 5.1 and 5.2). Further developments, including the response of the Central Bank in the context of the macroprudential policy, depend on the

trends of macro-financial conditions, level of geopolitical uncertainties, as well as the pace of accumulation and/or materialization of systemic risks.

In 2022, the Central Bank raised the countercyclical capital buffer (CCyB) twice, setting it at 1% in the third quarter of 2022 (effective from May 2023) and at 1.5% in the fourth quarter of 2022 (effective from August 2023).

The CCyB is a macroprudential instrument that can be calibrated over time (it may be tightened or loosened), which regulatory bodies apply to address the risky developments of the financial or credit cycles. Every quarter, the Central Bank of Armenia recalibrates the CCyB rate, and the decision is posted on the website of the Central Bank.⁰¹

Due to favorable economic conditions, in 2022, growth of activity was registered in the credit market, which was noticeable in all lending areas. At the same time, the cyclical systemic risks in the financial system were generally balanced (neither elevated nor subdued), and the banking system was characterized by high levels of profitability and capital adequacy. Taking into consideration the fact that under these conditions the costs for capital accumulation are low and the level of banks' capitalization is suf-

01 The decisions of the Central Bank and the justifications underlying those decisions are available on the following website: https://www.cba.am/am/SitePages/smacropolicy_int_report_2021.aspx

Chart 5.1.
FCI IN ARMENIAN ECONOMY

Source: CBA

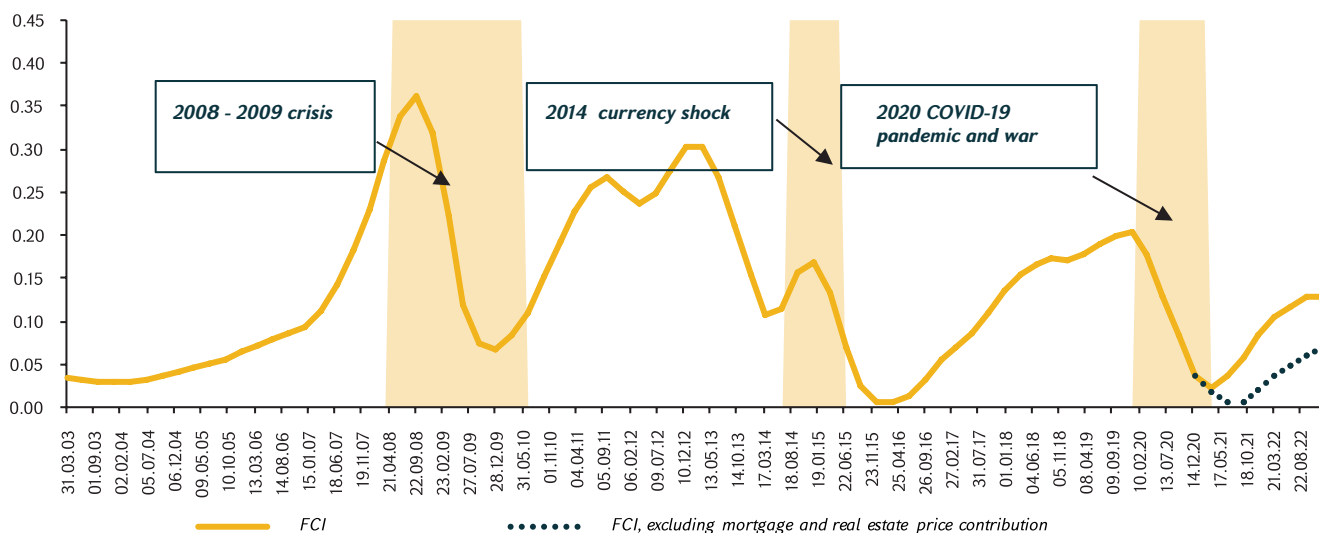
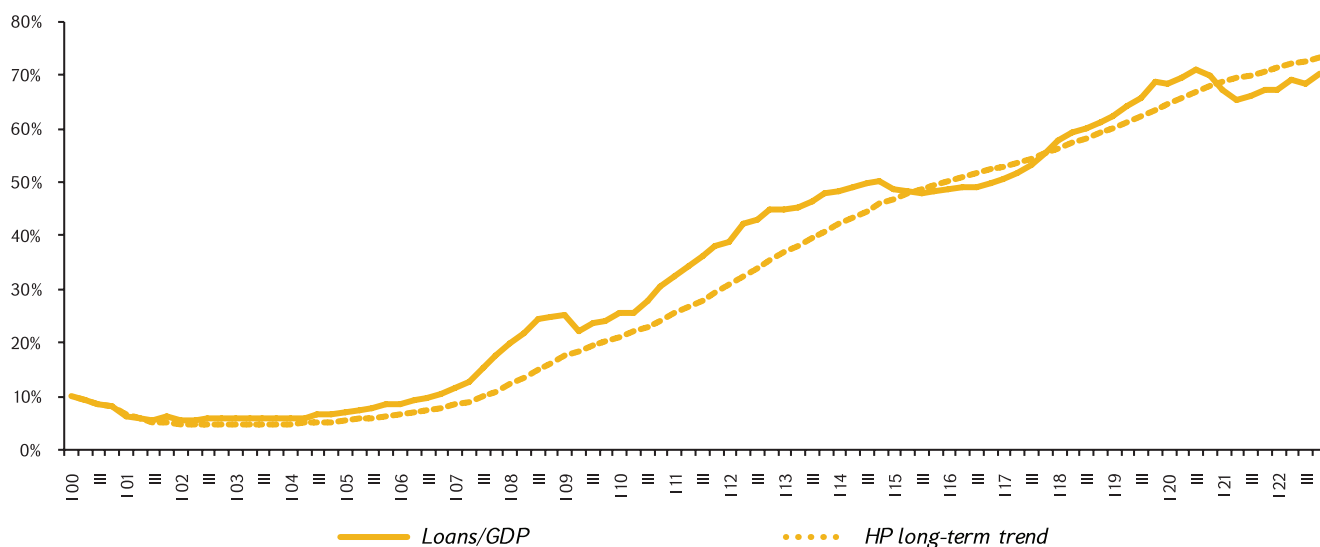


Chart 5.2.

LOANS-TO-ADJUSTED GDP INDICATOR AND ITS LONG-TERM TREND

Ratio was calculated by accepting as a basis the smoothed GDP series. Source: CBA



efficient for maintaining the regular pace of lending to the economy, the Central Bank considered it appropriate to increase the CCyB rate, first setting it at 1% (third quarter of 2022) and then at 1.5% (fourth quarter of 2022) (see Chart 5.3).

In 2022, the Central Bank of Armenia revised the methodology for setting the CCyB

rate, aiming to more efficiently and flexibly use this tool in response to the developments observed in the credit market and in the banking system. Among the major changes, the new methodology uses a normal or neutral rate⁰² of the CCyB which is aimed at making the Central Bank's macroprudential policy more forward-looking. According to

⁰² CCyB rate, which the regulatory body strives to accumulate in the period of a "normal" risk environment. The "normal" risk environment or "normal" stage of the financial cycle is described as a situation where the risks in the credit market are neither elevated nor subdued.

Chart 5.3.

CCyB RATE

Source: CBA

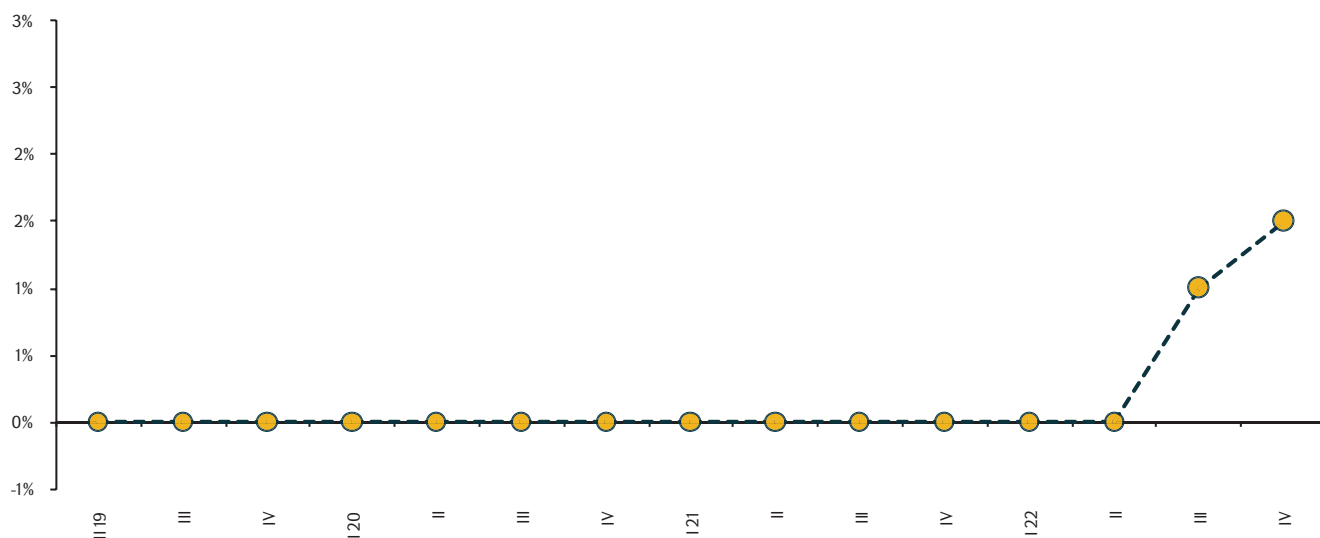
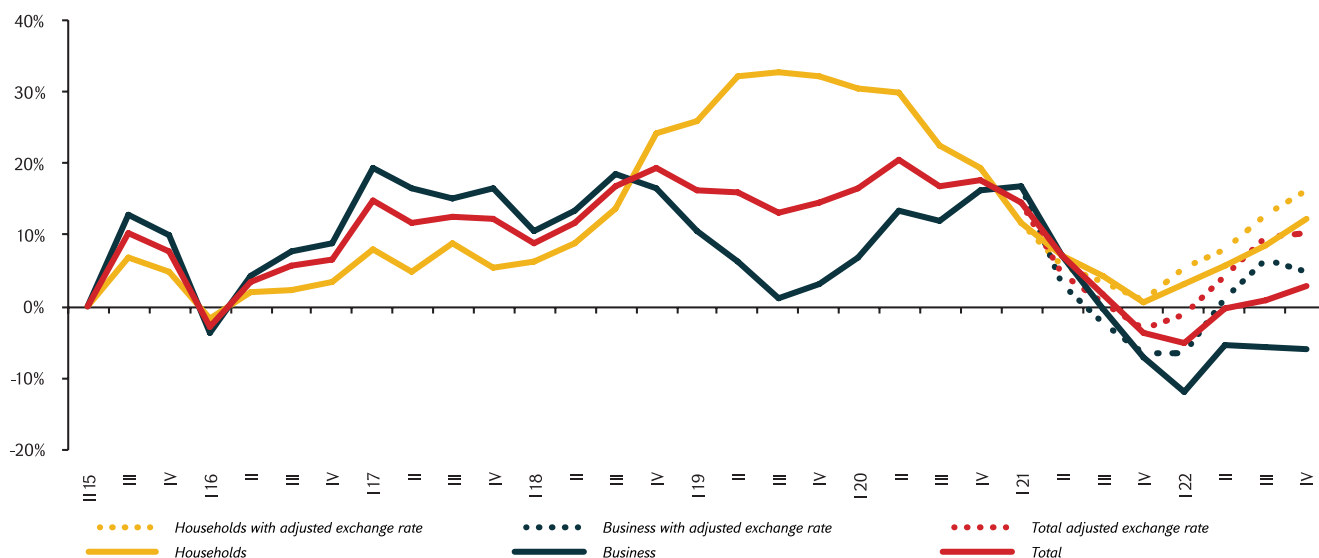


Chart 5.4.
YOY GROWTH OF STOCK RATIO OF VARIOUS LENDING SECTORS

Source: CBA



this approach, before the overheating stage of the financial cycle, it is appropriate for the banking system to have the minimum and sufficient stock of capital to effectively resist unpredictable shocks in the future. The application of the neutral or normal rate is based on the consideration that measuring the systemic cyclical risks, especially in the early recovery stage of the financial cycle, is a complex process and that there is a risk that the tightening of the CCyB may be late and ineffective, if it is used only after clear signals for

credit risk accumulation are present. Moreover, by using the neutral CCyB approach in a "normal" risk environment, the Central Bank tends to reduce the costs for CCyB accumulation by distributing the costs of future allocation of buffers over a longer period, thereby smoothing/reducing those costs and the risks of banks' undesired resistance to them (i.e. cut of supply of loans, etc.). In the "normal" stage of the financial cycle, the Central Bank strives to accumulate up to 1.5% CCyB (see Box 2 for more details).

Chart 5.5.
ANNUAL GROWTH RATES OF LENDING FLOW RATE

Source: CBA

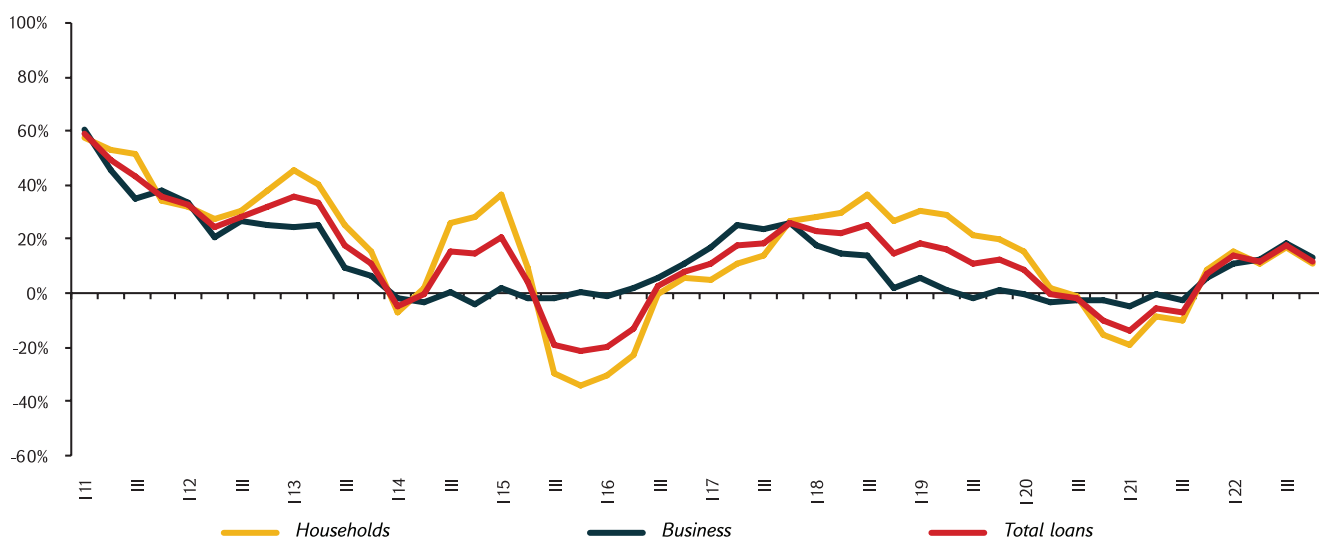
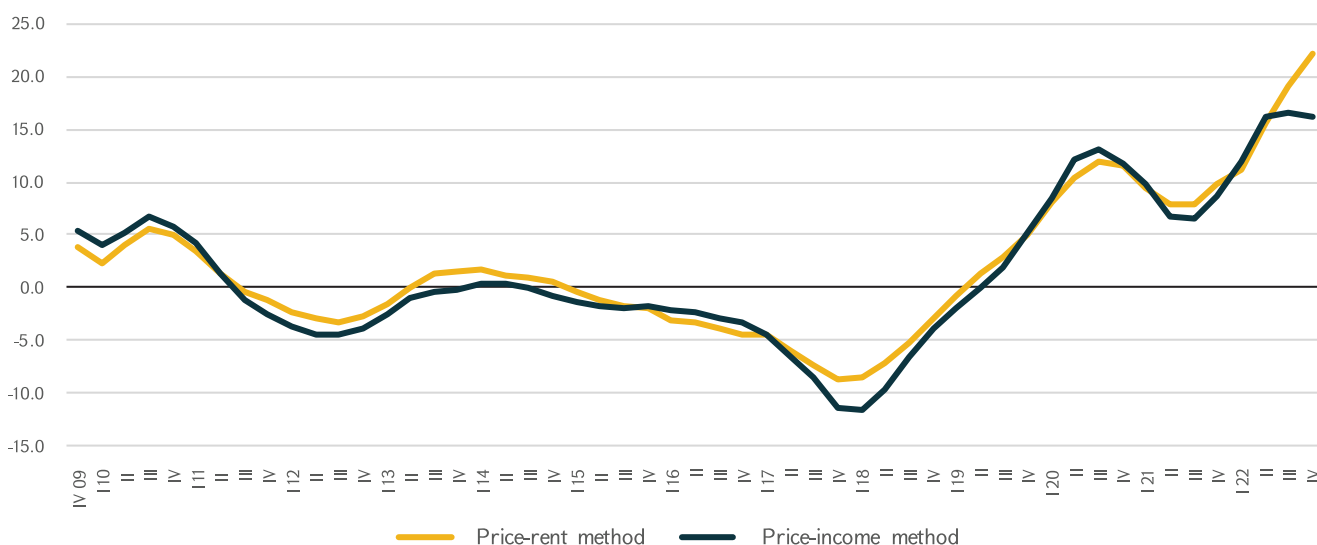


Chart 5.6.

DEVIATION OF THE AVERAGE PRICE OF REAL ESTATE FROM THE BASE LEVEL

Source: CBA



In 2022, the credit market recorded an increase of activity, which was noticeable in all lending directions. Throughout the year, growth of credit stock and flow indicators were observed (see Charts 5.4 and 5.5).

The high economic growth recorded during the year, as well as the inflationary environment, created additional demand

for credit. In these conditions, however, the growth trends observed in the credit market were moderate. At the same time, the liquidity and capital buffers in the banking system were more than enough to ensure the regular flow of credit to the economy.

The high growth rates of mortgage lending were maintained. According to the assessments of the Central Bank of

Chart 5.7.

YOY GROWTH OF STOCK RATIO OF LOANS

Source: CBA

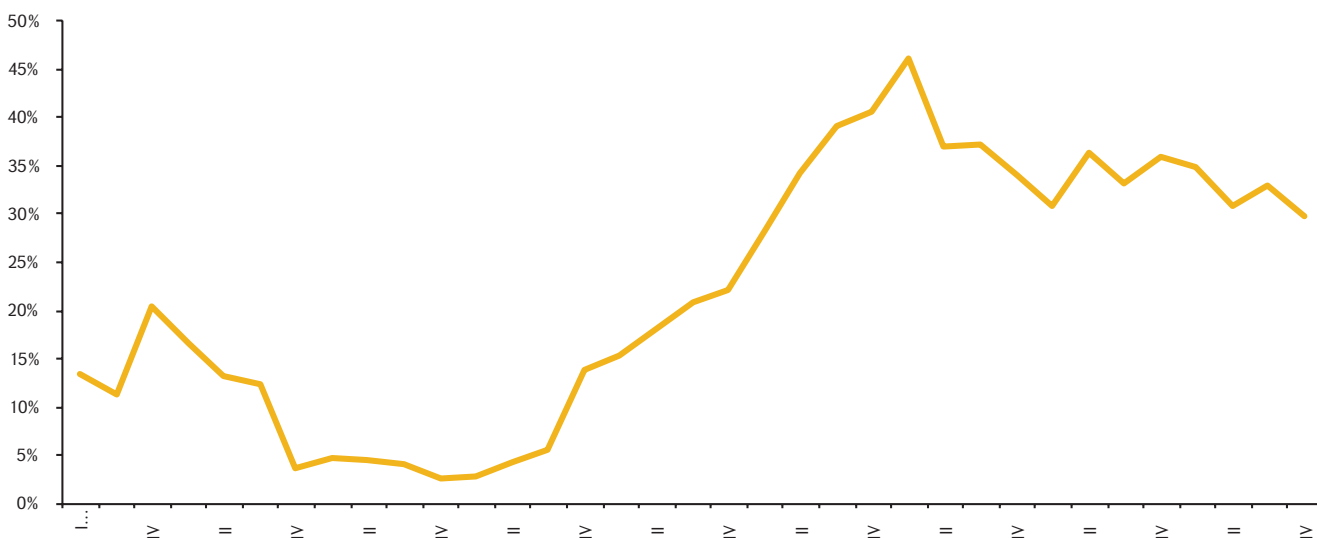
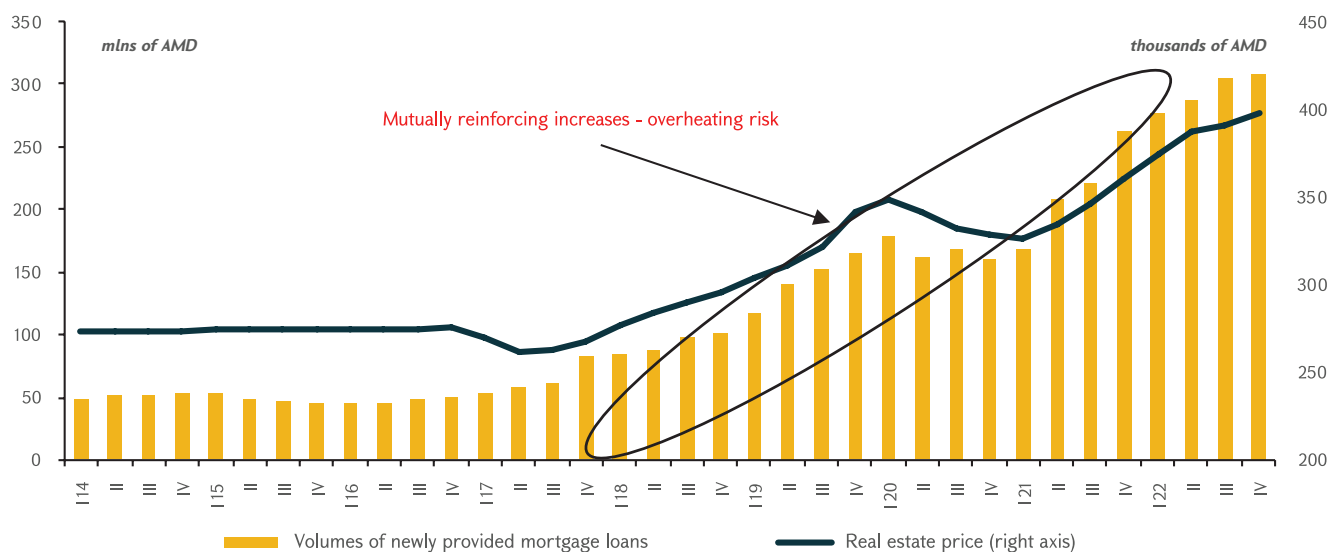


Chart 5.8.
MORTGAGE LENDING AND REAL ESTATE PRICES

Source: CBA



Armenia, real estate prices were over-valued by 16-22%.⁰³ At the end of the year, the growth rate of mortgage stock was about 29.7% (see Charts 5.6 and 5.7).

The annual flow of mortgage loans has also increased significantly; it made up nearly 304 billion AMD for 2022, versus 263 billion AMD in 2021, registering a nearly 17% growth. It should also be noted that such developments in the mortgage market were accompanied by significant growth in real estate market prices. The average representative real estate price in 2022 exceeded the level of the same indicator in 2021 by nearly 10%. As of the fourth quarter of 2022, the Central Bank assessed the amount of overestimation, that is, deviation of actual prices from the estimated fundamental price, to be in the range of 16-22%.

The mutually reinforcing increases in mortgage lending and real estate prices may indicate a possible accumulation of systemic risk in this sector. To address these risks effectively, the caps on LTVs (loan-to-value ratio) for the loans secured by real estate has been applied since April 2022. For AMD loans, the maximum threshold was set at 90%, and for FX loans — 70%. There is an allowance for loans with LTVs above the maximum; in particular, the provision of loans out of the standard requirements is allowed in the amount of 10% and 5% for AMD and FX loans respectively, in relation to the average of previous two quarterly flows. The rates of this instrument may change in response to changes of risks in the mortgage market.

⁰³ See "Financial Stability Report, 2021," p. 45, Box 3: Estimation of fundamental prices in real estate market of the Republic of Armenia. https://www.cba.am/EN/ppperiodicals/Stability%20report_2021.pdf

BOX 2

ASSESSMENT OF CCyB NEUTRAL RATE

This Box briefly presents the analysis that the Central Bank of Armenia conducted to assess the size of the neutral rate of the CCyB in the normal stage of the financial cycle. Two approaches were applied for assessment, particularly historical simulation and macro stress testing approaches.

The first approach is based on the assumption that the CCyB is not raised so long as the overheating risks become visible in the credit market. As an indicator for detecting the overheating risks in the financial system, we use the case when the Financial Cycle Index exceeds its median value. In other words, when the current value of the FCI does not exceed the median, the economy is considered to be in the recovery stage (there is no accumulation of systemic cyclical risks); therefore, an increase in the level of the CCyB is not required. In this part of the document, we will use backward historical simulation and will try to estimate the level of CCyB that the Armenian banking system needed to have between 2005 and 2022 to absorb the losses caused by the crises in that period. The chart below presents the Financial Cycle Index in the period between 2005 and 2009 and

the assumptions for application of the hypothetical CCyB. Under the mainstream international rules, the decision on the CCyB and its practical implementation are separated with a time lag of at least one year. (In the case of Armenia, it is set to at least six months, but, as a more prudent approach, we will consider the international approach.)

The chart shows that, according to the rules described above, the accumulation of the CCyB would start from the third quarter of 2007 and would continue up to the third quarter of 2008 when the CCyB is set to 1.25%. However, at that moment, right before the crisis, the effective rate for CCyB would be 0.25%, which would be the decision made a year ago coming into force. Right before the 2008 crisis, the banking system would have managed to accumulate only 0.25% of CCyB, when the additional losses actually recorded in the banking system during the following several quarters would make up 2.15% of the RWAs. It turns out that the banking system would need an additional 1.9% of CCyB, given that during the pre-crisis period it managed to accumulate only 0.25% of CCyB.

The same simulation was also made for the succeeding periods, the results of which are presented in Charts 5.10 and 5.11.

Chart 5.9.
2005-2009

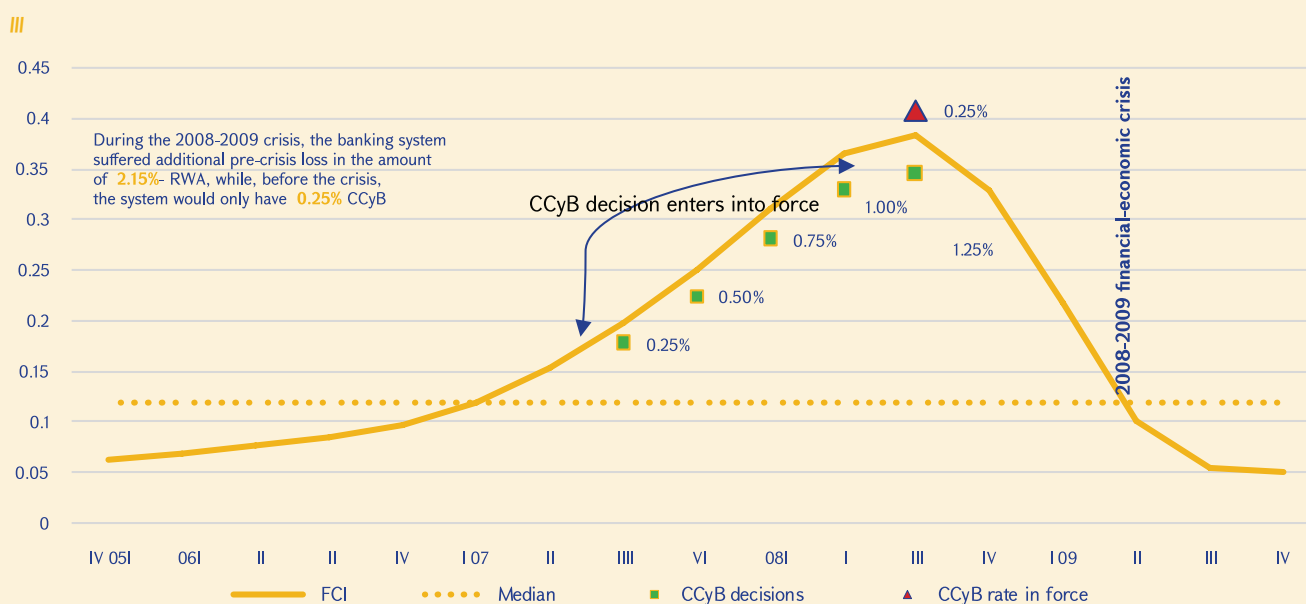
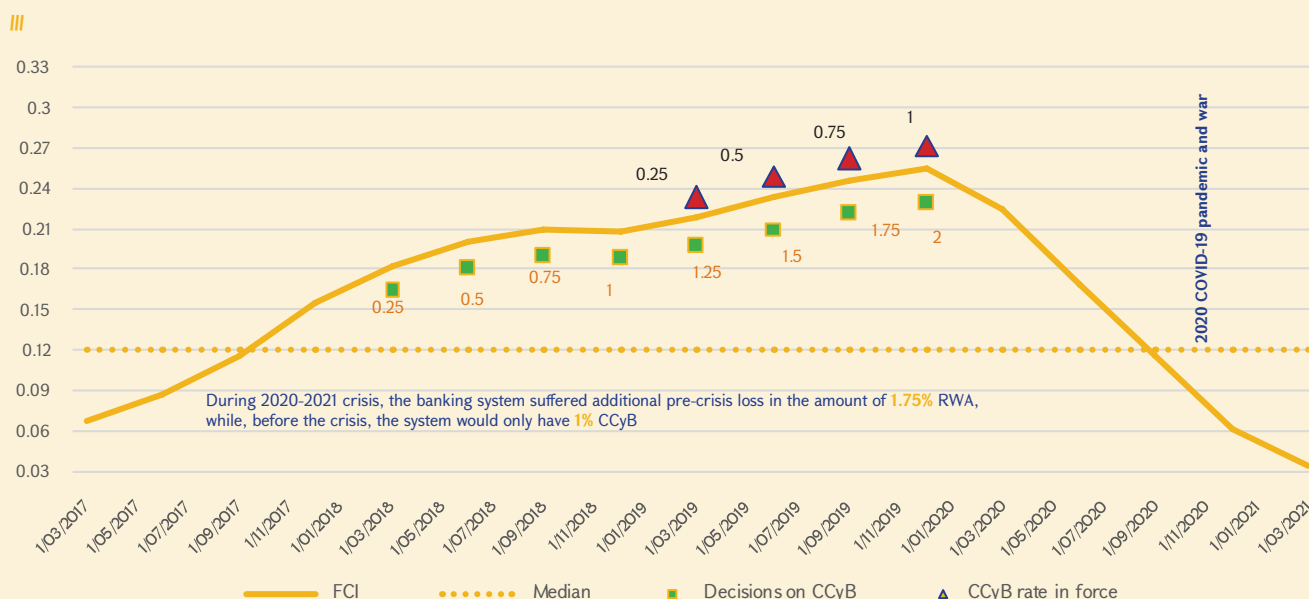


Chart 5.10.
2017-2021



By looking at the charts, one can conclude that, in all three cases, if the CCyB existed as a macroprudential policy instrument, and the Central Bank acted according to the rule of FCI exceeding its median, the prescribed CCyB would not be sufficient to absorb the losses completely.

The table below is a summary of the net capital needs for all the cases (2008 crisis, 2014 currency shock and 2020 COVID-19 pandemic and war), which has been used as a basis to approximate the neutral CCyB rate.

From the table presented above, it becomes clear that in the three observed cases, on top of existing capital stock, the banking system would also need additional capital buffers, which, based on the calculations above, comprise nearly 1.57% on average. Put differently, if the accumulation of the CCyB would start earlier (as in the case of neutral CCyB approach), the banking system would manage to have an additional 1.57% CCyB right before crises.

The second approach tries to estimate the additional demand for capital based on the macro stress tests at the current (normal) stage of finan-

Chart 5.11.
2010-2014

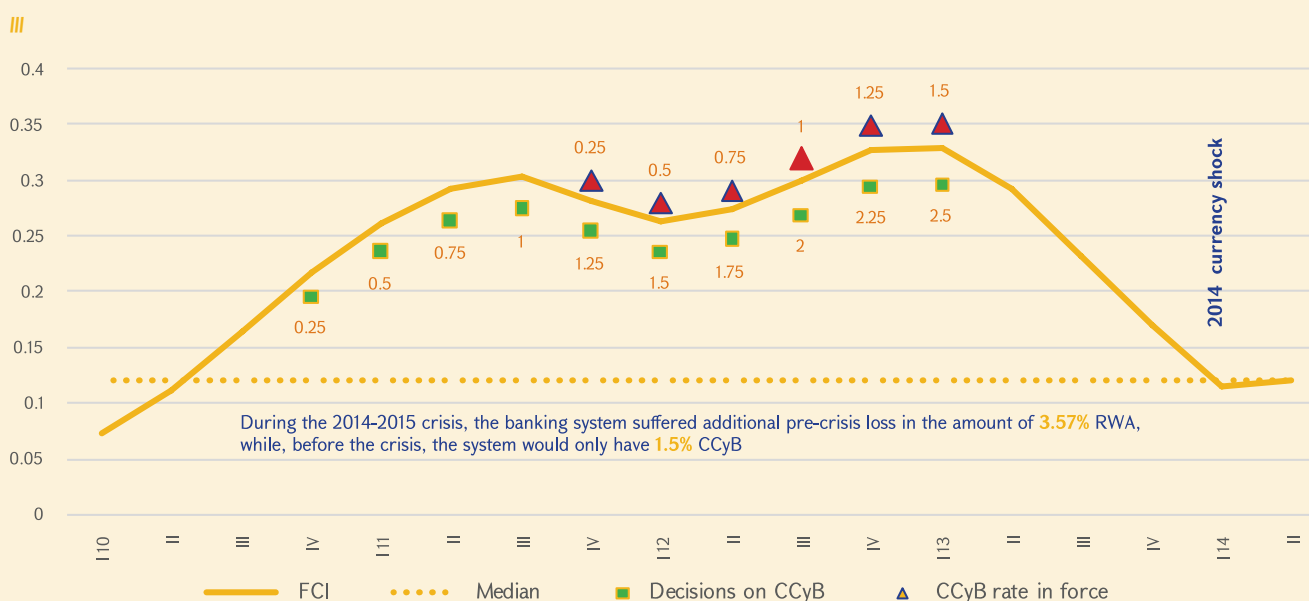


Table 7.

NET CAPITAL REQUIREMENT FOR THREE CRISIS CASES UNDER CONSIDERATION

Source: CBA

Case being observed	Period	CCyB level that banking system could have reached according to presented approach	Actual losses/risk-weighted assets ratio in the given period	Amount of "decreasing" buffer
Case 1	2005-2009	0.25%	2.152%	1.90%
Case 2	2010-2014	1.50%	3.57%	2.07%
Case 3	2017-2021	1.00%	1.72%	0.72%

cial cycle. This method puts emphasis on the distinction between expected and unexpected losses. Expected losses do not require additional capital and can be addressed through interest rate or loan loss provisions. In case of unexpected losses, additional capital is needed to cover them.

To distinguish between expected and unexpected losses, a probability density function (pdf) has been created for average credit losses in the upcoming period. To get the probability density function, a set of hypothetical but reasonable scenarios was generated, where the probability of default (PD) and losses were estimated for each scenario.

We applied Multivariate Gaussian Copula to generate 500 scenarios for exchange rate and economic growth. To ensure accuracy and plausibility of the scenarios, the historical averages, standard deviations and statistical relationships of that variables were taken into account. In addition to the above, the joint distribution of exchange rate

and economic growth was considered to be close to normal, which is in line with the empirical distribution of the actual data. Chart 5.12 presents the synthesis of actual and synthetic data. As can be observed, in general, the patterns in the generated scenarios do not conflict with the historical data.

Afterwards, the point scenarios were converted to 3-year scenarios, assuming U-shape limitations for each scenario (shock and recovery pattern in each scenario). The results are presented in Chart 5.13. The estimation probabilities of default (PDs) for the scenarios have been done using Bayesian model averaging (BMA) approach. The latter uses the first four lags of logit transformed PD, log of exchange rate and log of economic growth as independent variables. Moreover, the model was based on multivariate panel data which made heavy use of cross-sectional disaggregation of PDs (PDs were disaggregated by sectors (consumer, mortgage, business), currencies (AMD, foreign currency) and banks (for 17 individual banks)).

Chart 5.12.

ACTUAL DATA AND GENERATED SCENARIOS

Source: CBA

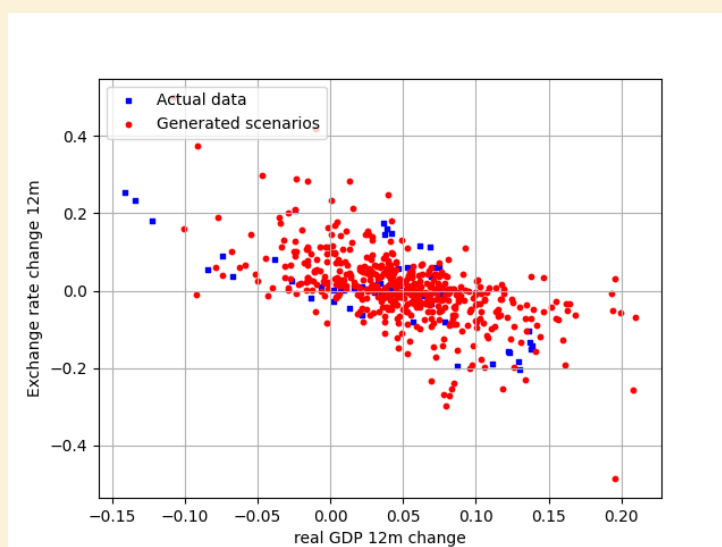
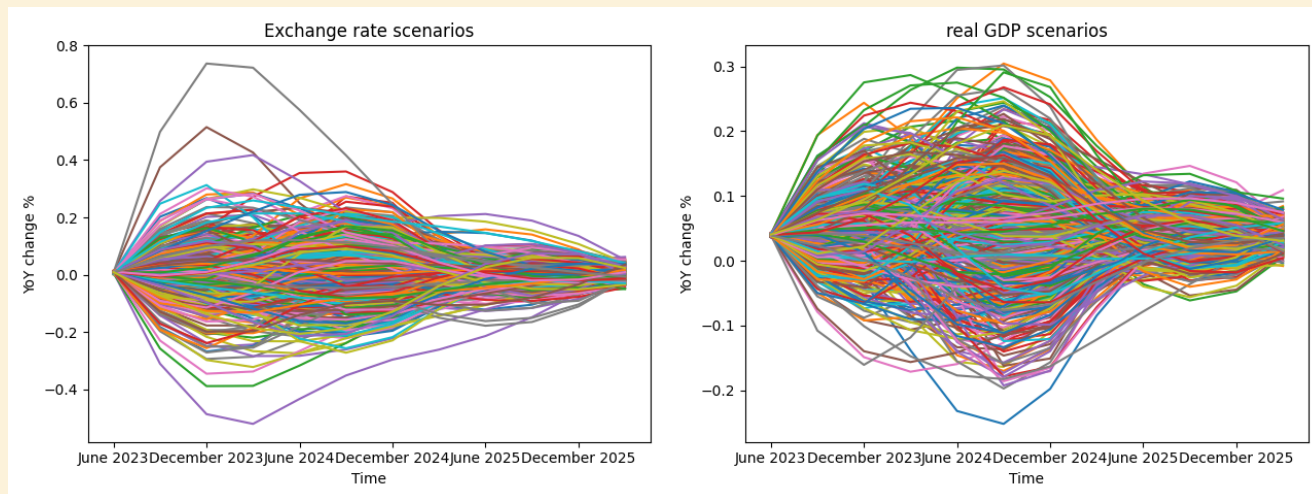


Chart 5.13.

CONVERSION OF POINT SCENARIOS TO INTERVAL SCENARIOS

III



By applying the predicted probabilities of default to the banks' balance sheet, as well as taking into account interest rate and exchange rate risks, a series of average losses of the banking system was obtained. Let us note that each of these 500 losses corresponds to one of the 500 scenarios of economic developments for the upcoming period. Distribution of the losses, that is, the empirical assessment of the density function for losses, is presented in Chart 5.14.

Therefore, based on the assessments of macro stress testing, the amount of ad-

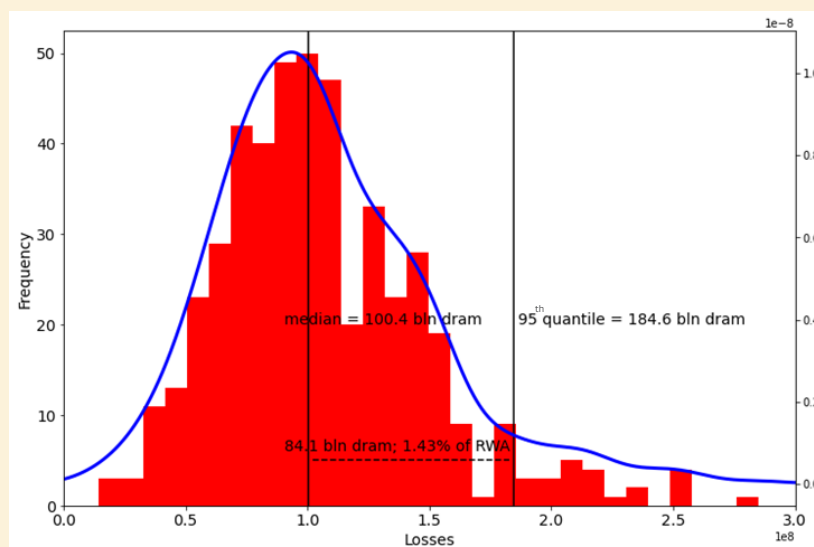
ditional capital required to cover unexpected losses as a result of a hypothetical shock at the current stage of the financial cycle is determined as the difference between the 95th quintile of the loss distribution and the median, which is around 84 billion AMD or 1.43% of risk-weighted assets.

Based on the results of the two described methods, the Central Bank has approximated the CCyB neutral rate in the amount of 1.5% of risk-weighted assets.

Chart 5.14.

DISTRIBUTION OF BANKING SYSTEM LOSSES

III



6

STABILITY OF FINANCIAL INFRASTRUCTURE

Given the importance and the impact of the payment and settlement systems on the monetary policy and the financial stability of Armenia, the Central Bank pays distinct attention to the systematically important payment and securities settlement systems and the telecommunication networks supporting their activity.



INTERBANK PAYMENTS VIA ELECTRONIC PAYMENT SYSTEM OF THE CENTRAL BANK

During the reported period, 5.4 million payments (payment messages) comprising 25,804.4 billion AMD were made via the Electronic Payments System (EPS) of the Central Bank of Armenia, increasing by 19.9%, and 10.3% respectively over 2021. The growth of the value of interbank payments totaled 14.8% as compared to the same period of the previous year (while in 2021, growth of 11.9% was recorded as compared to 2020). The growth of pure budget payments was only 18.6% (compared to 14.8% growth in the previous period).

In the system, risks are observed in the below-mentioned directions.

CREDIT RISK

There is no credit risk for the settlement bank (the Central Bank of Armenia) in the system, because the Central Bank provides intraday liquidity to participants using a repo instrument which is backed by highly liquid assets with a haircut of the asset's market value. The receiving participant has no credit risk either as it receives the notice of the payment only after the payment is final and irrevocable.

LIQUIDITY RISK

The average daily rate⁰¹ of own liquidity indicator used for liquidity risk assessment was 2.5 in the reporting period (3.2 in the same period of 2021, 3.1 in the same period of 2020). It reached its maximum of 3.2 in May (in 2021 the maximum was 3.8 in August).⁰² Starting from 2022, the average daily opening balances declined to a certain extent

compared to the same period in the previous year, while the average daily payments registered some growth, as a result of which the monthly values of the aforementioned indicator declined.

In spite of this, the average opening balance is two or more times the average daily payments, which is a very high indicator. It should also be considered that calculation of the indicator does not include incoming payments (account credits) and/or funds from other sources, which further neutralizes the liquidity risk. In addition, the share of rejections due to insufficient liquidity in EPS is also insignificant both in terms of value (0.002%) and number (0.001%).

The same indicator was also monitored by individual banks, based on which the probability of liquidity risk is assessed to be minimal.

INTRADAY DISTRIBUTION OF PAYMENTS

The peak hour for the number of payments in the reporting period was the 10:00-11:00 interval of the day, during which an average of 18.1% (19.4% in 2021) of transactions were settled. The second peak hour in terms of payment flow is the 11:00-12:00 interval (during which an average of 16.8% of the number of payments were made). Distribution between the other hours of the day is almost proportionate. 83.9% of the quantitative flow of payments is made before 15:00 and not left until the end of the day.

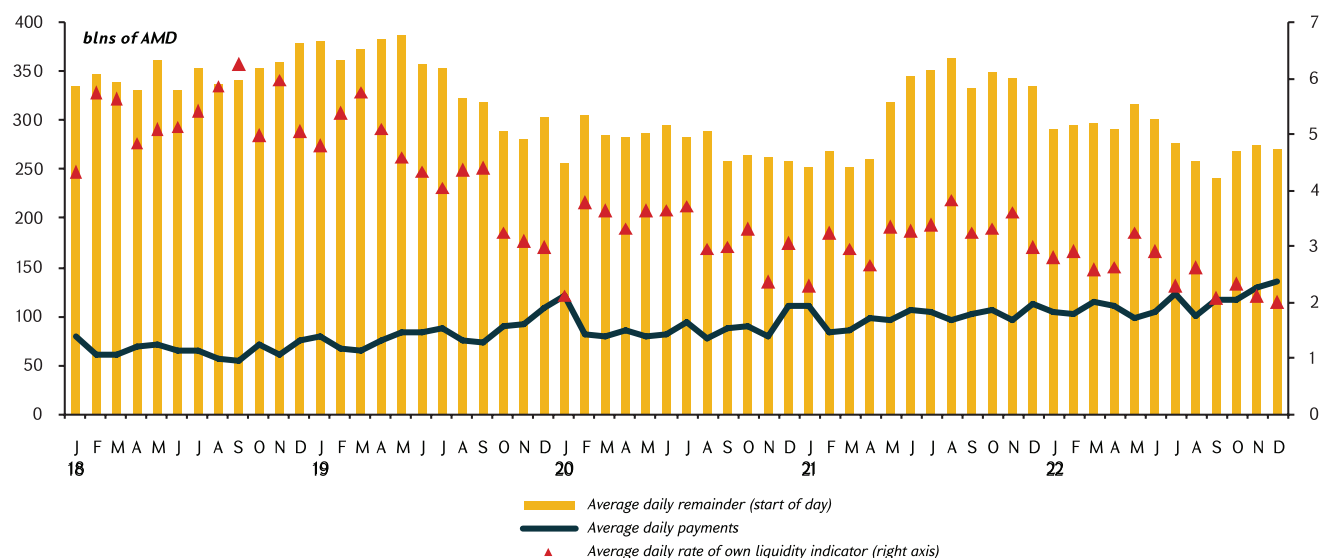
The peak hour for the value of payments was also recorded for the 10:00-11:00 time range, when 19.6% of the total value of payments was made (19.2% in 2021). The peak hour was in the first half of the day, which

- 01 The daily own liquidity indicator is calculated based on the ratio of opening liquidity on AMD correspondent accounts of commercial banks to debits (payments) through the account. Incoming payments are not included in the indicator so that a stress-scenario can assess the likelihood of bank projections if additional liquidity is not available within a day, namely to what extent banks are able to generate their payments using only opening balances of their funds. The calculation does not include cash enhancements through the accounts of commercial banks. The indicator is calculated at system level (aggregate for all banks).
- 02 Since June 2019, banks have been able to maintain reserves in foreign currency, as a result of which the balances on AMD accounts have decreased, and consequently, the above-mentioned indicators have decreased respectively, maintaining a general high level.

Chart 6.1.

COMPARATIVE ANALYSIS OF AVERAGE DAILY PAYMENTS, AVERAGE DAILY LIQUIDITY OPENING BALANCE AND AVERAGE DAILY RATE OF OWN LIQUIDITY INDICATOR (SYSTEM BASED)

Source: CBA



reduces concentration risks, as in the event of problems, participants have enough time to take the necessary measures to settle payments on the given day. In spite of this, 18.3% of the amount of daily payments are made in the last hour of the operational day.

Considering the sufficient level of system capacity, the positive outcomes of liquidity and operational availability indicators, and a negligible share of rejections in total payments, the concentration of payments during certain hours of the day did not lead to prob-

lems. Therefore, the likelihood of the emergence of risks to the system is generally low.

SYSTEM CAPACITY

The dynamics of the maximum hourly number of payments (the maximum number of payments per hour for each month) significantly increased compared to 2022. This was due to changes in one of the software modules of the system at the end of 2021, due to

Chart 6.2.

INTRADAY DISTRIBUTION OF THE NUMBER OF PAYMENTS ON AN AVERAGE SEMIANNUAL BASIS

Source: CBA

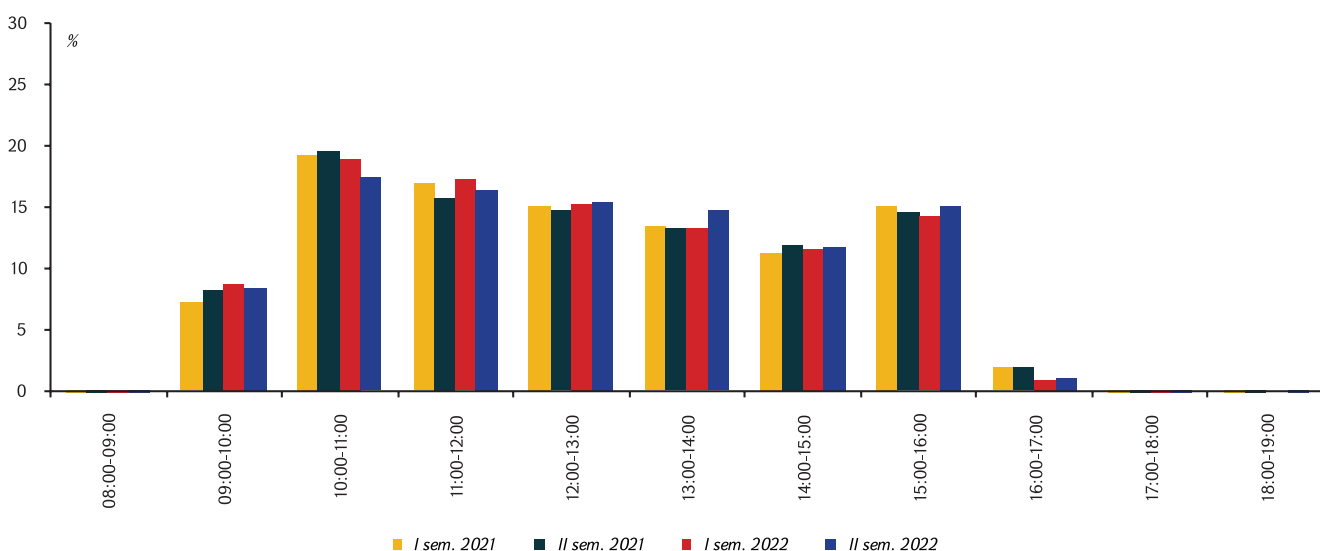
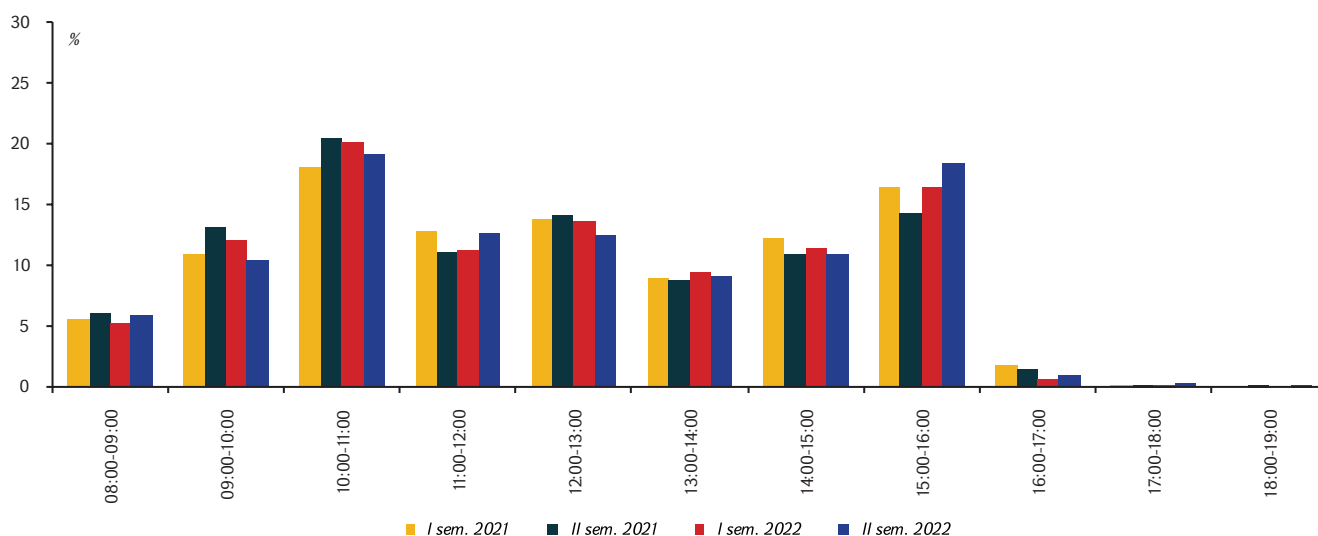


Chart 6.3.

INTRADAY DISTRIBUTION OF THE VALUE OF PAYMENTS ON AN AVERAGE SEMIANNUAL BASIS

Source: CBA



which the speed of payment processing has increased, growing the system's overall bandwidth.

The maximum hourly indicator in 2022 was 9,694 payments per hour (7,283 in 2021). The peak hour was the time range of 10:00-11:00 in October, totaling 33.4% of the number and 14.3% of the value of payments for that day. This maximum indicator was due to a large flow of payments in the given time range of that day, not the increase in daily flow of payments (28,999 payments per day)

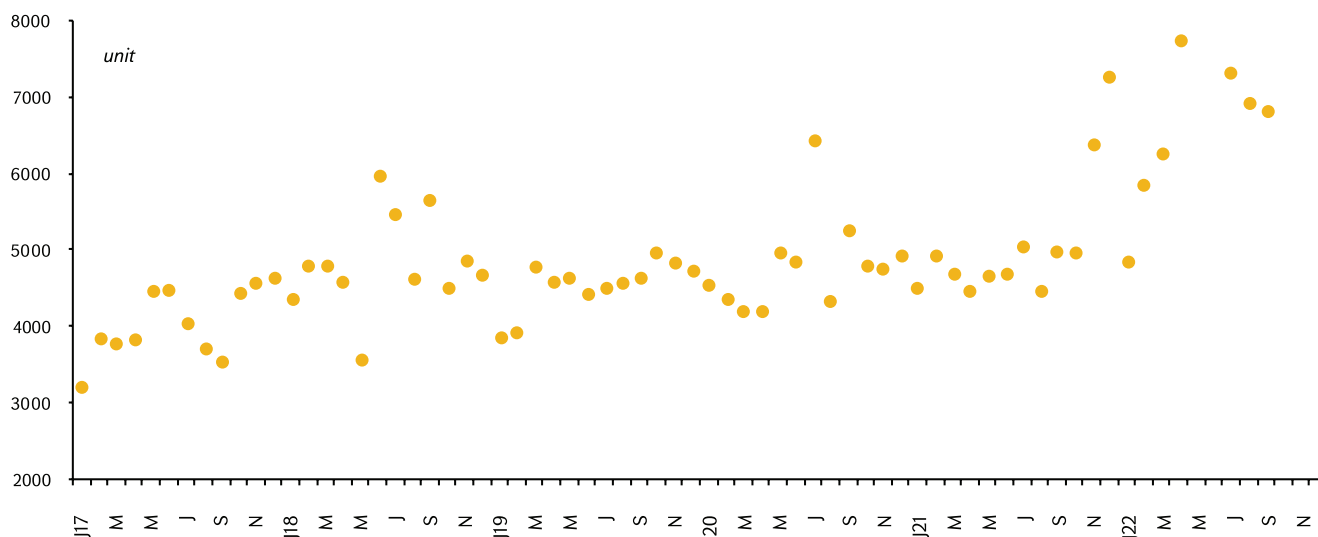
or system unavailability during other hours of the day. The major part of the payments in the given hour range were made by two banks (83%), 26% of the payments were sent to the budget, 44% — to four main, active banks. Due to changes in the system software module, payments were quickly settled by the system, and the operational day was closed on time, with no problems for participants.

During the reporting period, certain marginal indicators (showing the significance of the flow of payments per hour) also sharply

Chart 6.4.

MAXIMUM NUMBER OF PAYMENTS PER HOUR BY MONTH

Source: CBA



increased, especially in the second semester. This again was due to the above-mentioned software changes and the overall increase in the number of payments. At the same time, the share of mentioned indicators remains insignificant. The indicator of 4300 and more payments per hour is 10.5% (4.8% in 2021), of which payments exceeding 5,400 were 3.7% (which was observed only in the last two months of 2021 after the software changes). The share of 3500-4300 payments is 11.3% (8.3% in 2021), and 2500-3500 payments comprise 22.9% (22.0% in 2021) of total operational hours.

The maximum daily indicator (the number of payments per day) grew by 27.0% over 2021 to 41,135 payments (in 2021, the maximum was 32,400, in 220 — 28,487). The given day was December 5th, 27% of the flow of payments was sent to the budget (the latter is the largest receiver for the given day), 61% of payments were made by three banks and were mainly sent to the budget (the share of these banks in overall payments to the budget is 75%) and towards each other, the major part of which was made before 15:00 (71-88% of their payments). Despite the large flow of payments, the system completely absorbed

that flow, and the operational day was closed at the set time.

Given that the share of the abovementioned marginal indicators is still small in total payments flow and that the system capacity was increased significantly^{o3} after the software changes, the probability of the emergence of capacity-related risks is generally deemed to be low.

OPERATIONAL AVAILABILITY OF THE SYSTEM

During the reporting period, only one significant incident (lasting one hour or more) affecting the availability of the EPS was recorded. There was a communication problem between the components of the EPS, as a result of which the Central Bank adopted recommendations, but the final settlements were made after the incident/failure was solved. It was during operational hours, and there was no need to extend the operational day. There were other cases of unavailability for shorter times (they were rare and up to one hour, mainly up to half an hour). As a result, operational availability of EPS for the year was 99.6%.^{o4}

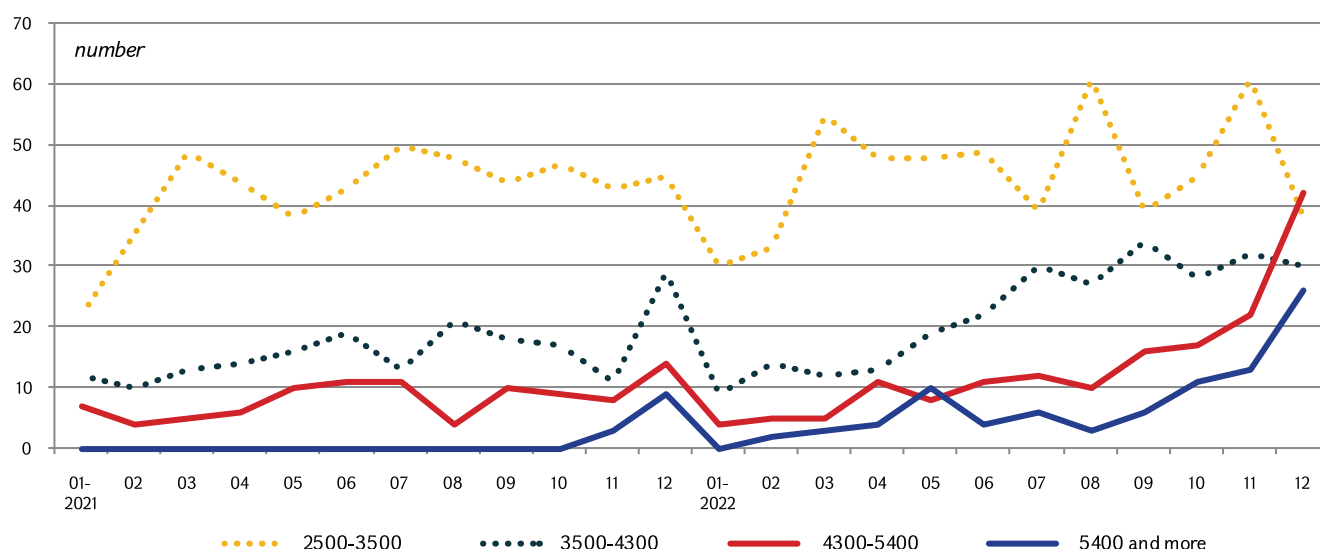
^{o3} For example, the share of 3,500 or more payments per hour comprises 13.1% per year.

^{o4} Under the EPS participation agreement, the level of operational availability of the system is set for at least 98.0% per year.

Chart 6.5.

DYNAMICS OF PAYMENTS EXCEEDING 2500, 3500, 4300 AND 5400 LIMITS PER HOUR BY MONTH

Source: CBA



6.2.

SECURITIES SETTLEMENT SYSTEMS

In Armenia, the settlement of securities is implemented through two systems, the Unified Securities Accounting and Settlement System of the Central Depository of Armenia (hereinafter, CDA's SSS) and the Government Securities Accounting and Settlement System of the Central Bank of Armenia (hereinafter, GSASS).

In 2022, secondary market transactions totaling 20,166.7 billion AMD were carried out through GSASS (17,486.2 billion AMD in 2021). The transactions grew by 15.3% compared to the previous year. Such growth was mainly conditioned by the more than 82% growth of DVP (Delivery versus Payment) transactions and more than 33% growth of stock exchange transactions. In 2022, secondary market transactions totaling 6,676.2 billion AMD were carried out through CDA's SSS (1,292.8 billion AMD in 2021), growing more than five-fold over the previous year. Such growth is explained by the fact that over-the-counter transfers grew more than five-fold (conditioned by the significant growth of over-the-counter transfers with foreign securities and

Eurobonds), as well as the more than 40% growth of stock exchange operations of the Central Depository of Armenia.

In 2022, transactions made through the GSASS comprised 75.1% of the operations carried out in the secondary market through the securities settlement systems of the Republic of Armenia (instead of the previous year's 93.1%). From the perspective of financial stability, both systems are of major significance and are among the systems with systemic importance.

In both the GSASS and the CDA's SSS, the settlement of OTC transactions is subject to the principle of DVP (Delivery versus Payment), while stock exchange transactions are executed through a procedure of pre-depositing of securities and cash, thereby excluding counterparty risk. No credit risk may emerge due to the usage of gross settlement and irrevocability principles in the system.

In 2022, there were no significant (with duration of more than one hour) incidents which could impact the uninterrupted functioning of the GSASS.

Table 8.

TRANSFER OF SECURITIES THROUGH THE GOVERNMENT SECURITIES ACCOUNTING AND SETTLEMENT SYSTEM OF THE CENTRAL BANK PERTAINING TO TRANSACTIONS WITH SECURITIES IN THE SECONDARY MARKET*

Transfers	2020թ.	2021թ.	2022թ.
Value of OTC transactions (trades, repo, reverse repo) (billion AMD nominal value)	13,616	17,416	20,074.1
Number of OTC transactions (trades, repo, reverse repo)	33,847	33,893	28,745
Value of stock exchange transactions (billion AMD nominal value)	62.7	69.7	92.6
Number of stock exchange transactions	993	616	589
Total value of transfers of securities (billion AMD nominal value)	13,679.6	17,486.2	20,166.7
Total number of transfers of securities	34,840	34,509	29,334

* The statistical information provided includes the GSASS-executed settlements and excludes transfers via CDA nominee account and internal transfers made by subcustodians for their clients.

Table 9.

TRANSFER OF SECURITIES THROUGH THE UNIFIED SECURITIES ACCOUNTING AND SETTLEMENT SYSTEM OF THE CENTRAL DEPOSITORY OF ARMENIA PERTAINING TO TRANSACTIONS WITH SECURITIES IN THE SECONDARY MARKET*

///

Transfers	2020	2021	2022
Value of OTC transactions (trades, repo, reverse repo) (billion AMD nominal value)	832.3	1,139.8	6,461.0
Number of OTC transactions (trades, repo, reverse repo)	2,557	4,020	9,341
Value of stock exchange transactions (billion AMD nominal value)	86.7	153.0	215.1
Number of stock exchange transactions	4,058	4,382	6,547
Total transfers of securities (billion AMD nominal value)	918.9	1,292.8	6,676.2
Total number of transfers of securities	6,615	8,402	15,888

* OTC transactions for 2019 and 2020 were adjusted based on the adjustments made by the CDA.

BOX 3

PECULIARITIES OF PAYMENT CARD TRANSACTIONS

Payment card is the most popular payment instrument used in the retail sector in Armenia. Therefore, the indicators of transactions made via payment cards can clearly reflect the changes in the volume and number of non-cash transactions. Since 2020, the number of contactless payment cards in Armenia is growing rapidly, conditioned also by the COVID-19 pandemic. As of the end of 2022, there were 2.1 million contactless payment cards, which is 67% of the total payment cards issued by Armenian banks. The total number of payment cards issued by Armenian banks grew by 17.8%, making up 3.2 million cards.

The RA Law on “Non-Cash Transactions,” which entered into force on July 1, 2022, is aimed at increasing non-cash transactions.

Due to the increased demand for non-cash transactions, the number of physical and virtual POS terminals has increased, respectively, by 275% and 16%. This is the main infrastructure for servicing non-cash transactions.

TRANSACTIONS WITH DOMESTIC CARDS IN ARMENIA

In 2022, the value of transactions with domestic cards in Armenia grew by 29.2% compared to the previous year, to 3,957 billion AMD. The growth of non-cash payments (57.9% compared to 2021) significantly exceeds the growth of cash transactions (18.2% compared to 2021). As a result, the share of non-cash transactions has increased by 6.2 percentage points compared to the previous year, making up 33.8% (see Charts 6.6 and 6.7).

The number of transactions in Armenia with domestic cards has increased by 43.4% compared to the previous year, due to a 60.0% increase in the number of non-cash transactions. Starting from 2020, the number of non-cash transactions exceeds the number of cash transactions. In 2022, 73.7% of the total payments were non-cash transactions, making up 122.3 million transactions.

By comparing the above-mentioned facts with growth rate of non-cash payments, we can conclude that the culture of non-cash

Chart 6.6.

VOLUME OF TRANSACTIONS WITH DOMESTIC CARDS IN RA

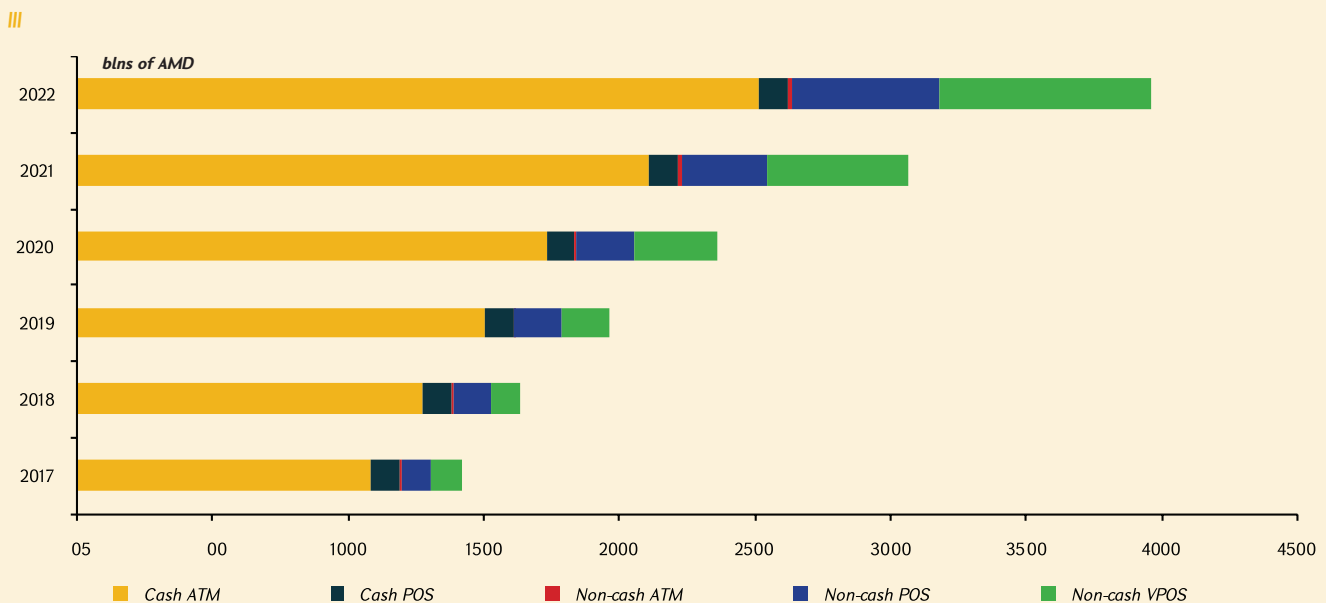
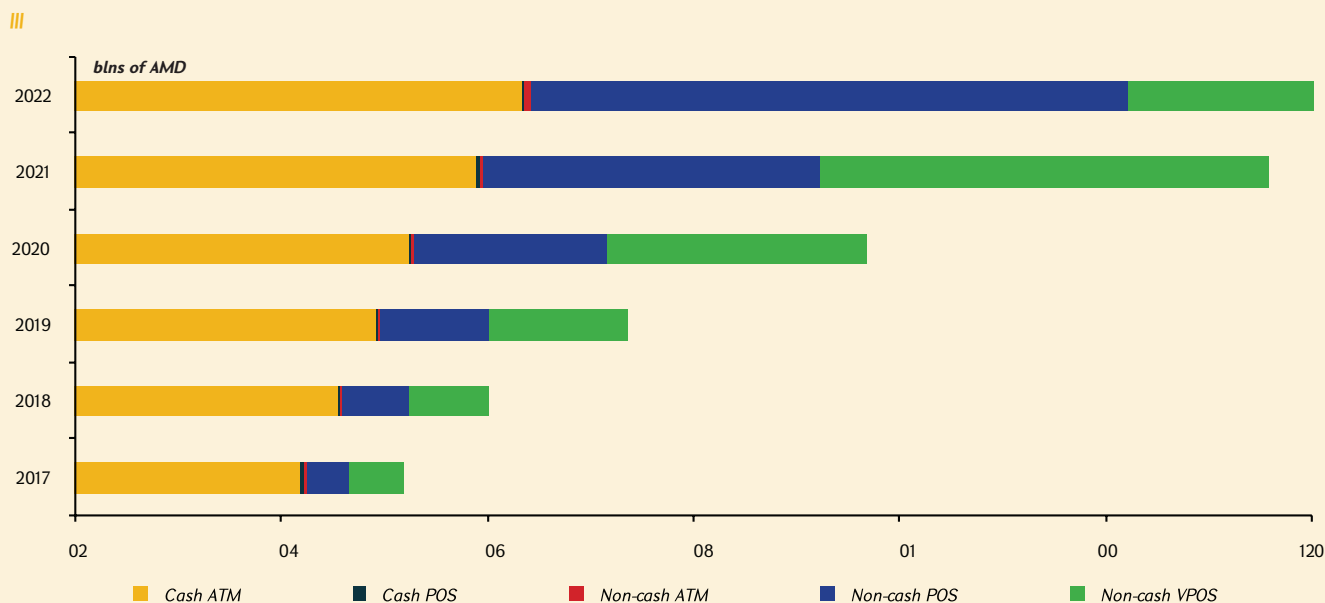


Chart 6.7.

NUMBER OF TRANSACTIONS WITH DOMESTIC CARDS IN RA (IN MILLIONS)



transactions in Armenia has strengthened (see Chart 6.8).

The volume and number of online transactions is also growing year by year.

INTERNATIONAL TRANSACTIONS

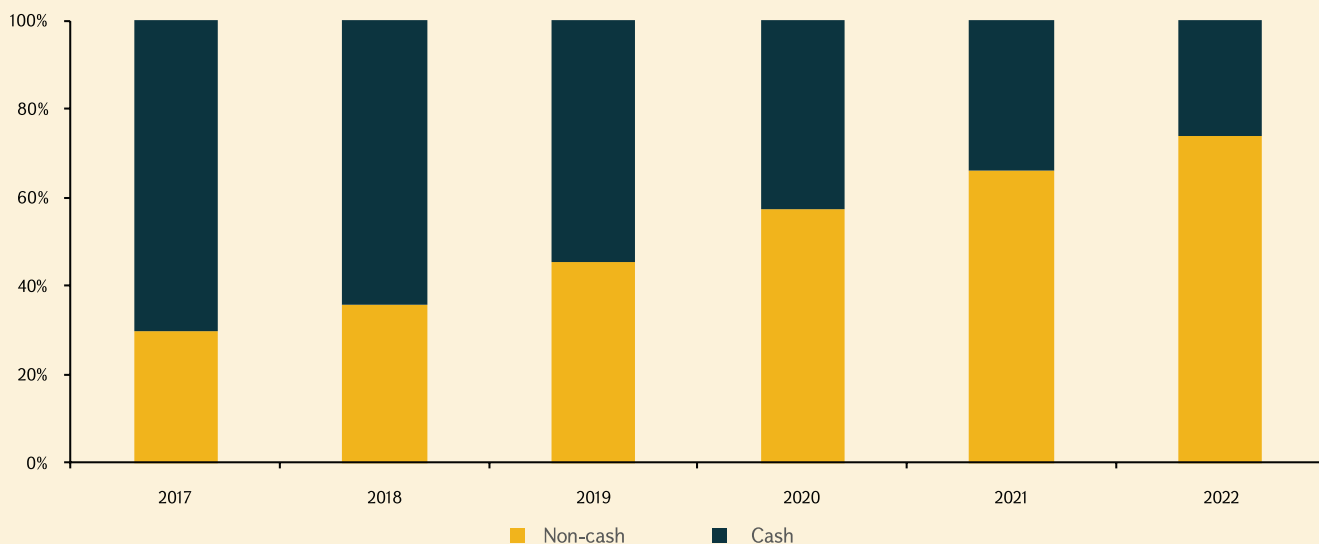
As expected, both volumetric and quantitative indicators of transactions with Armenian cards abroad and with foreign cards in

Armenia increased compared to the previous year. The increases make up 111.6% in terms of value and 68.2% in terms of number of transactions with Armenian cards abroad, and 33.4% in terms of value and 64.6% in terms of number with foreign cards in Armenia, including in the online environment; 14.97 million transactions worth 456.5 billion AMD were made with RA cards abroad, and 17.9 million transactions worth 339.1 billion AMD were made with foreign cards in Armenia.

Chart 6.8.

SHARES OF THE NUMBER OF CASH AND NON-CASH TRANSACTIONS WITH DOMESTIC CARDS IN RA

Source: CBA





ArCa CARD SYSTEM

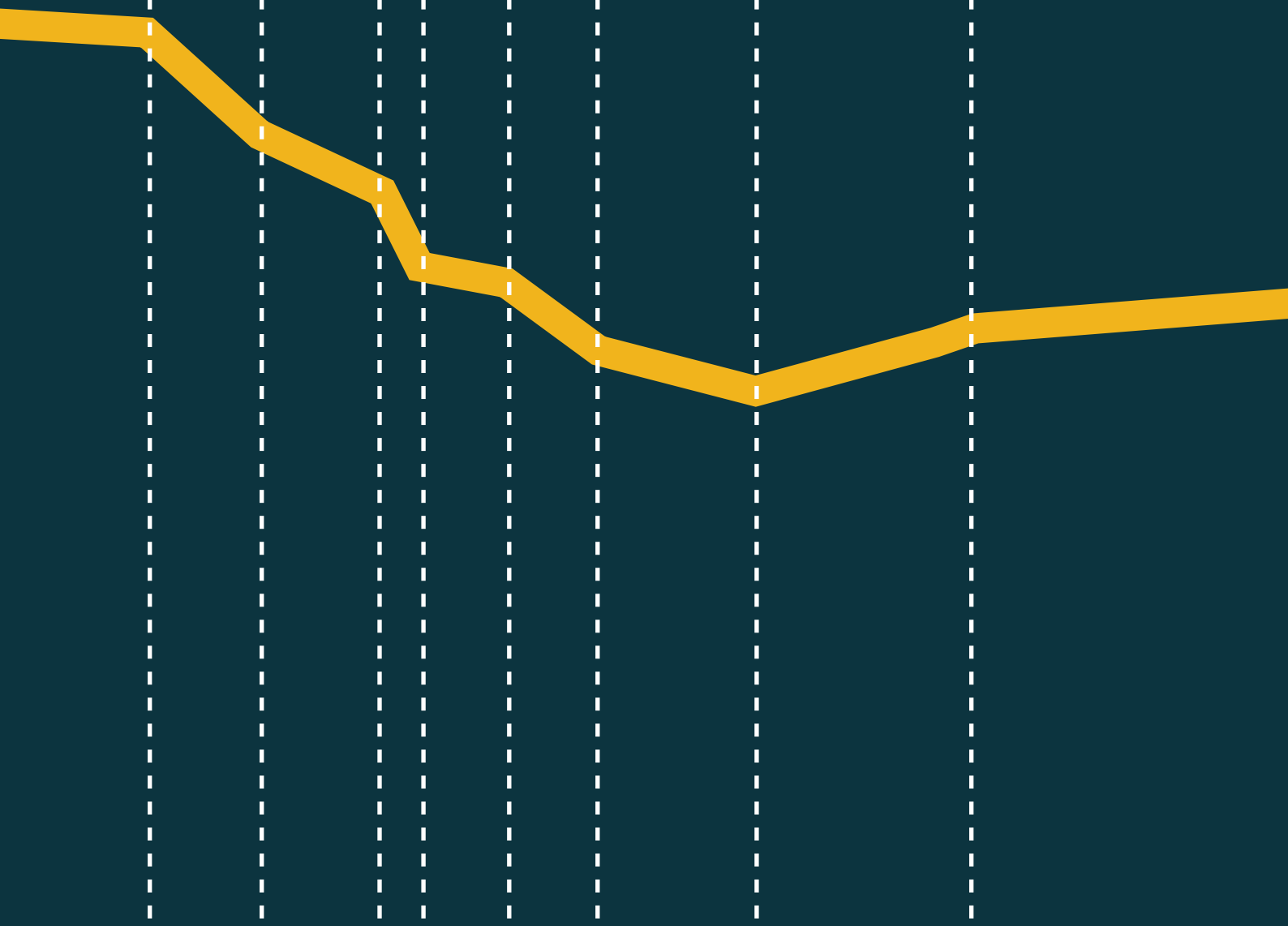
The key infrastructure for card payments in the Republic of Armenia is the “ArCa” card system, which processes the majority of card transactions carried out in the Republic of Armenia.

According to its indicators, “ArCa” is a retail payments system of public (prominent) importance, so its operational reliability and security are subject to monitoring by the Central Bank of Armenia, and the significant incidents in the system (with a duration of one hour or more),

their causes and the measures for their elimination are in the center of attention of the Central Bank of Armenia.

Taking into consideration the importance of the uninterrupted operation of the ArCa card system, the Central Bank of Armenia pays special attention to the significant incidents recorded, the adequacy of the steps of “Armenian Card” CJSC aimed at detecting the causes of the incidents and avoiding them in the future, and, upon necessity, undertakes actions for additional interference.

ANNEX 1



INDICATORS ENTERING THE MACROPRUDENTIAL DASHBOARD

Group	Indicator
Macro risks	Real GDP annual growth
	12-month inflation
	Growth of remittances (year on year)
	Current account balance/GDP
	Foreign debt/GDP
Credit risk	Loans to non-financial corporations / GNDI
	Growth of loans to enterprises (year on year)
	Growth of mortgage loans (year on year)
	Growth of consumer loans (year on year)
	Interest payments by Households / GNDI
Market risk	Bank leverage ratio
	Increase in apartment prices (year on year)
	Apartment price / average annual salary
	Interest rate margin
	Gross foreign exchange position
Liquidity risk	Growth of foreign currency loans (year on year)
	Government bond yields
	Quick assets / Total assets
Resilience of banking sector	Interbank financing / Total liabilities of the banking system
	Capital in excess of total capital requirement
	NPL coverage of banks
	Return on assets
	Return on equity



