

Monetary and Credit Policy: Regulatory Instruments the Security of the Banking Sector

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Abstract: The article considers the monetary and credit policy, its regulators and tools to strengthen the security of the banking sector of Ukraine. The priority of the study is to implement a comprehensive methodological approach to assessing monetary and credit policy instruments in the system of strengthening the security of the banking sector of the economy, which determines the financial independence of the state, its exchange rate policy, credit market regulatory instruments and financial obligations. To model the state of the objects of strengthening the security of the banking sector of the state economy, optimization methods are used, which are based on the structure of algorithms for finding the maxima (minima) of the function and the points at which they are achieved, with and without restrictions. An algorithm for consistent assessment of the efficiency of development and functioning of the monetary sphere and its impact on the security parameters of the banking sector of the state has been developed. The indicators of structural components of security of the banking sector were assessed as debt policy, currency policy, banking security, stock market security, monetary and credit security, financial security. The size of the loan portfolio of Ukrainian banks has been determined. The normalized values of indicators and the index of monetary and credit security of Ukraine are presented. The regression analysis of the component indicators and their structural influence on the change of the integrated level of security of the banking sector of Ukraine is carried out.

Keywords: Interest Rate, Debt, Currency Policy, Banking Security, Economy.

JEL Codes: G12; G21; G31.

1. INTRODUCTION

Ensuring the sustainable development of the country's economy, the stability of the banking system largely depends on effective monetary policy. At the same time, in Ukraine due to the critical growth of debt, the devaluation of the national currency and limited reserves of the Central Bank, the high level of shadowing of financial and economic relations and intensification of capital outflows, reduced lending by banks to the real sector, lead to significant weakening credit policy in the country. These challenges are also exacerbated by the impact of modern global factors of destabilization of financial systems at various levels and financial and economic relations, which highlights the problem of using monetary and credit policy instruments in

the context of strengthening the security of the banking sector (Doszhan et al., 2020). At the same time, the priority of tight monetary and credit policy, which does not depend on the state of affairs, should be aimed at limiting inflation and controlling the circulation of money through banking institutions, ensuring compliance with their proposals in the long run. It is believed that such an orientation in the banking sector is the best trend for the optimal pace of economic development and banking security system (Kryvenko, 2010; Chochia et al., 2018).

However, the direction of monetary and credit policy instruments to strengthen the security of the banking sector faces new requirements, which include shifting the emphasis from the external orientation of the economy to the activation of regulators of uninterrupted servicing of cash and non-cash payments, storage of legal entities and individuals and their credit resources. Existing problems in the banking system in modern conditions are exacerbated by the rapid development of the information economy, which radically changes the payment landscape of entire countries

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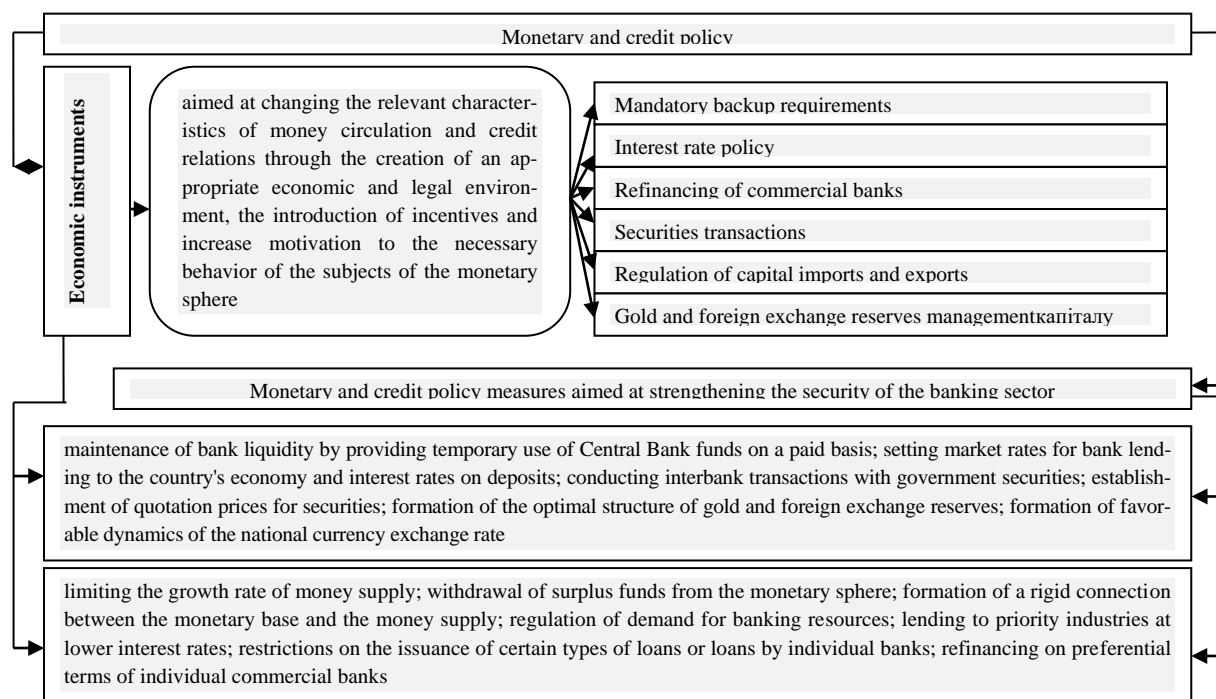


Fig. (1). Methodological tools of monetary and credit policy with a projection on strengthening the security of the banking sector of the economy.

Source: developed by the authors.

and threatens the existence of the banking system as such in the usual sense. The objectively difficult situation for banks is exacerbated by the fact that the transition of the economy to digital rails in the world is extremely fast, leaving virtually no choice for banks. Existing problems in the banking system in modern conditions are exacerbated by the rapid development of the information economy, which radically changes the payment landscape of entire countries and threatens the existence of the banking system as such in the usual sense (Leonow et al., 2019; Ismayilov et al., 2021; Komilova et al., 2021).

The objectively difficult situation for banks is exacerbated by the fact that the transition of the economy to digital rails in the world is extremely fast, leaving virtually no choice for banks. Those institutions that want to stay in the market must quickly adapt to a fundamentally new reality. Thus, banks are forced to integrate into the digital ecosystem, which includes the gradual abandonment of cash transactions, the development of new types of payments and transfers, the introduction of mobile applications, contactless payments, online lending, e-money and more (Makhazhanova et al., 2022; Getman et al., 2019). Under the influence of these processes, the world is gradually merging “classic” banks and Fintech companies, because only such a merger in the long run can meet the growing demands and needs of customers, which are rapidly changing and transforming. In general, these circumstances highlight the practical problem of the need to introduce new instruments of monetary and credit policy in Ukraine in order to strengthen the security of the banking sector (Petrov and Serdyuk, 2008).

The functioning and development of the monetary sphere, the implementation of state monetary and credit policy are being studied S.M. Diachek and O.O. Panasiuk (2012);

Th.M. Havrilesky and J.T. Boorman (1980); A.M. Moroza and M.F. Pukhovkinoi (2005); N.M. Poberezhna and A.S. Kolisnichenko (2014); V. Stelmakh and O. Petryk (2000); I.Ye. Trush, (2015a); in addition, its monetary regime is thoroughly disclosed I.Ye. Trush (2015b); M.I. Tuhan-Baranovskyi (2004). However, their theoretical and applied justifications are focused on countries with a developed market economy and do not fully meet the conditions of economic development of the state, which requires further in-depth study of this area. From the standpoint of the implementation of monetary and credit policy mechanisms to regulate external factors that provide foreign exchange earnings to the economy through the global interbank market and strengthen the security of the banking sector, research A. Berg, et al. (2004); K.A. Crystal and P.D. Mizen (2001); F.H. Knight (1921); R. Lucas (1983); A.H. Willett (1951); O.M. Shtaiier (2011), are fragmentary. The priority of the study is to implement a comprehensive methodological approach to assessing monetary and credit policy instruments in the system of strengthening the security of the banking sector of the economy, which determines the financial independence of the state, its exchange rate policy, credit market regulatory instruments and financial obligations.

2. MATERIALS AND METHODS

The main criterion of effective monetary policy is the independence, stability, stability and ability of the country's financial system to further development. The functioning of the monetary and credit sphere by structural components is closely interrelated with the security parameters of the banking sector of the economy, which depend on the set of tools and means of their provision (Fig. 1).

Effective monetary and credit policy to strengthen the security of the banking sector through economic measures sets clear limits, the so-called framework conditions, which should not go beyond the subjects of the monetary and credit sector, because otherwise their interests may conflict with the national strategic task. These are limiting the growth rate of the money supply, withdrawing surplus funds from the monetary and credit sphere, forming a tight link between the monetary base and money supply, regulating the demand for banking resources, lending to priority industries at lower interest rates, limiting the issuance of certain loans by banks, refinancing conditions of individual banks.

Note that only a comprehensive combination and implementation of the proposed instruments of monetary policy will form a holistic system of strengthening the security of the banking sector. However, the non-standard situation related to the strengthening of imbalances in the development of money circulation and credit relations objectively requires their identification and justification of the methodological approach to assessing the monetary and credit sector in the context of identifying regulatory instruments to strengthen the security of the banking sector as an objectively complex system with heterogeneous characteristics of the state and dynamics of the credit market. It should be noted that the development of scenarios for strengthening the security of the banking sector of the economy is associated with changes in the external conditions of the resulting variables, which through mathematical modeling allow refining and specifying initial forecasts, creating new options within the proposed models.

To model the state of strengthening the security of the banking sector of the state economy, optimization methods are used, which are based on the construction of algorithms for finding the maxima (minima) of the function and the points at which they are achieved, with and without restrictions. This approach is used in the multidimensional statistical analysis of the studied processes in order to synthesize the selected criteria, parameters and indicators of security of the banking sector, as well as to identify patterns of past trends with an assessment of their design for the future (Lucas, 1983). Note that before a multidimensional analysis of the security of the banking sector, first of all, it is necessary to determine the set of general indicators that are used to assess the state of the monetary sphere of the state. Thus, to a large extent when studying the credit component of the monetary policy of the state, in addition to the general indicators (levels of monetization of the economy, velocity of money aggregates, the size of the money supply) it is necessary to use the following criteria is refinancing rate, the movement of money supply and its structure, the amount of receivables in general and as a percentage of gross domestic product (GDP), the amount of accounts payable (Baranovskyi, 2004; Antonenko et al., 2019; Kerimkhulle et al., 2022).

A broader list of indicators is provided by the Decision of the Board of the National Bank of Ukraine No. 803-rsh "On approval of the Methodology for calculating economic standards for regulating the activities of banks in Ukraine" (2017), which focuses on the effectiveness of monetary development through the use of the following indicators: the

share of cash outside banks in the total money supply; the difference between interest rates on loans granted by deposit-taking corporations and interest rates on deposits attracted by deposit-taking institutions (excluding the Central Bank); the level of the weighted average interest rate on loans granted by deposit-taking corporations (excluding the Central Bank) in the national currency, relative to the consumer price index; the share of consumer loans to households in the overall structure of loans to residents; the share of long-term loans in the total amount of loans granted (adjusted for exchange rate differences); the total amount of export of financial resources outside the country. The availability and sufficient amounts of gold and foreign exchange reserves of the state are a signal of the financial condition and liquidity of the country's banking institutions.

Thus, among the main indicators of the effectiveness of public policy in the analyzed area are the discount rate, interest rate, loan terms, loan amount, special refinancing conditions, reserve requirements, control over the intended use, loan currency, moratorium and prohibitions, state guarantees, preferential credit regimes, requirements for creditworthiness assessment and for the formation of reserves at work (Moskvichova, 2013; Karshalova et al., 2017). At the same time, emphasis should be placed on the estimated quality of refinancing by the Central Bank of financial institutions, using the following indicators: volumes and weighted average interest rates on overnight loans granted through a permanent refinancing line, loans granted through tenders, lending through direct repo transactions, swaps, general refinancing. This aspect, although without exaggeration, seems appropriate to take into account when assessing the effectiveness of the current monetary policy of the state. At the same time, an important addition to the characteristics of gold and foreign exchange reserves is the level of dollarization of money circulation, as the growth of this indicator leads to increased dependence of the economy on fluctuations in foreign exchange rates.

Summarizing the above, authors believe that the general list of the main characteristics of the monetary sphere to strengthen the security of the banking sector should consist of the following indicators: the volume of money in circulation, the monetary and credit base and the speed of their circulation; volumes and level of gold and foreign exchange reserves, deposits and loans, reserve ratios; refinancing rates and interest rates on loans and borrowings, their dynamics compared to rising prices, quality parameters of lending conditions; inflation index; volumes of domestic credit and shares of lending to households, long-term loans; the size of the budget deficit; volumes of the securities purchase and sale market and their structure; balance of payments, settlements for import and export transactions; levels of shadowing, dollarization (currencyization) of money circulation; the exchange rate of the national currency, the share of sales of foreign currency in the interbank foreign exchange market; the level of capital flight abroad. Establishing the threshold values of these indicators, as well as the application of the most acceptable approaches, methods and techniques allows the development of the classic scientific provisions for assessing the functioning of the banking sector, in particular the Central Bank. Thus, the determination of the operational capacity of the Central Bank

and its impact on the foreign exchange market through the indicator of the intensity of exchange rate regulation is determined by the equation (1), (Goldstein et al., 2000):

$$I_{er} = T_{or} \times \frac{\sigma_{er}}{\sigma_{or}} - T_{er}, \quad (1)$$

where: I_{er} – indicator of the intensity of exchange rate regulation; T_{or}, T_{er} – growth rates of official reserves and the exchange rate; σ_{er}, σ_{or} – standard deviations of official reserves and exchange rate.

At the same time, a completely new theory of exchange rate regulation, called “active approaches” due to the key role of methods and models of placement of assets by economic entities of all levels focuses on the concept of capital assets, with a stable dependence of exchange rates on interest rates in different countries (Kharazishvili and Dron, 2014). This theory has two directions to covered and uncovered interest rate parity. The first direction is characterized by compensation by appropriate changes in the exchange rate of interest rate differentiation in open financial markets (equation (2)). Currency equilibrium under this approach is ensured by an equal investment in domestic and foreign assets. From the logarithmic equation (2) it can be got a model of the expected change in the future exchange rate (equation (3)), which is the difference between the return on assets (Kharazishvili and Dron, 2014):

$$\frac{XR_{t+1}}{XR_t} = \frac{1 + i_t}{1 + i'_t}, \quad (2)$$

where: XR_{t+1} – future exchange rate; XR_t – exchange rate of the previous period; i_t – return on domestic assets; i'_t – return on foreign assets.

$$\Delta XR_t = \ln XR_{t+1} - \ln XR_t = i_t - i'_t \quad (3)$$

According to this theory, the direction of interest parity covers the risk of possible exchange rate changes when concluding a forward agreement, because the forward rate (which corresponds to the expected value of the spot rate in the future) depends on the level of interest rates. The difference from uncovered interest parity is the absence of risk in this approach because the forward rate is discussed in advance. The covered interest rate parity model (equation (4)) after logarithm demonstrates the main equilibrium condition (equation (5)) is the term rate tends to increase the spot rate by as many percentage points as interest rates in a given currency lower than rates in another country (Kharazishvili and Dron, 2014):

$$\frac{FXR_{t+1}}{XR_t} = \frac{1 + i_t}{1 + i'_t}, \quad (4)$$

where: FXR_{t+1} – forward exchange rate of the future period.

$$\Delta XR_t = \ln FXR_{t+1} - \ln XR_t = i_t - i'_t \quad (5)$$

The value of this technique lies in the actualization of the factor of interest rates on the dynamics of exchange rates. Numerous models that make up the portfolio approach, in contrast to the theories already considered are based on the expectation of a certain amount of compensation for the greater risk of owning foreign assets. Based on the assumption that economic agents before buying a foreign asset assess its future return as the sum of the interest rate on foreign currency deposits and expected changes in exchange rates, the return on domestic assets is determined only by the domestic interest rate. In other words, when determining the return on investment, only three indicators are taken into account – the domestic rate, foreign rate and exchange rate dynamics. The impact of aggregate supply and demand on the exchange rate is justified by the balance of payments model (Kozlov and Fridmen, 2002). That is, the exchange rate is primarily determined by the decisions of economic entities on the distribution of domestic and foreign assets, and it is important not only and not so much the level of profitability as the level of risk. Equation (6) of the exchange rate for this approach shows the composite effect (in a given weight ratio) of net exports and the balance of the capital account of the balance of payments (Kozlov and Fridmen, 2002):

$$\Delta XR_t = \alpha(X_t - I_t) + \sigma(V_t - W_t), \quad (6)$$

where: V_t – capital inflows from abroad; W_t – outflow of capital abroad; α i σ – parametric coefficients of the model.

The influence of the Central Bank on the situation of interest rates on foreign currency credit resources, due to the discount rate, which is the basis for the formation of interest on bank loans and deposits – a change in its level provokes a corresponding reduction or increase in market rates. This, in turn, causes a change in the market interest rate within the country, which directly affects the outflow or inflow of investment from abroad, as the disposal of foreign exchange assets, their exchange for national currency directly affects the domestic foreign exchange market, and hence on the balance of payments. Possibility to use the indicator of the impact of information asymmetry on the results of banks' lending activities, in particular on the basis of data on the cost of borrowing, the dynamics of the customer base and its structure for price, quantity and structural areas, macroeconomic variables (GDP, inflation, public debt), as well as indices of financial stability of the banking sector (capital adequacy, asset quality, profitability, liquidity), allows assessing the attractiveness of bank lending due to the level of risk of such financial transactions.

Largely, the attractiveness of bank lending is determined by the perfection and rationality of public policy in this area. However, given the information asymmetry in the market, the Central Bank (which has full information about the state and development of the economy) is able to manipulate the devaluation and inflation expectations of all actors in the national economy by its regulatory measures or even by declaring their intentions. At the same time, the credit channel of currency regulation is realized due to both transactions with securities on the open market and the establishment of reserve requirements. Such actions, first of all, affect the credit capabilities of banks. The change of the

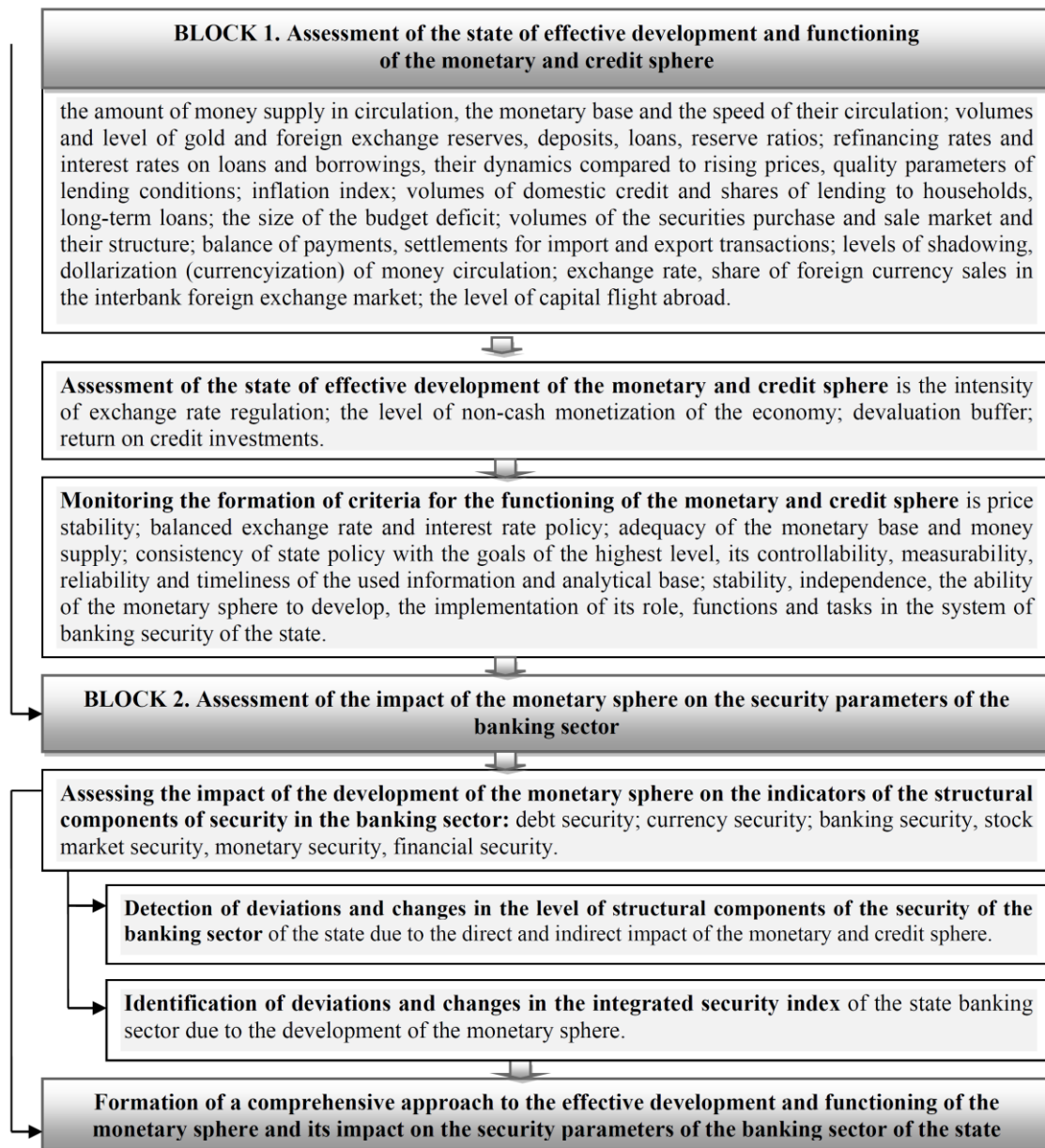


Fig. (2). A comprehensive methodological approach to assessing the monetary and credit sphere and its impact on the security parameters of the banking sector.

Source: developed by the authors.

latter directly affects the volume of foreign exchange transactions and foreign exchange turnover. However, in the event of a narrowing of credit potential drawn from within the country, banks may resort to foreign borrowing, increasing external debt. This affects the balance of payments and the exchange rate. The proposed comprehensive methodological approach allows to quickly and accurately apply the tools of monetary and credit policy in the relationship between provisions, exchange rates and non-cash monetization of the economy. Accordingly, the quantitative indicator for assessing the level of non-cash monetization of the economy, which is based on the structure of the money supply and its adjustment to the dynamics of inflation, has the form (equation (7)) (Stelmakh, 2009):

$$RM = \frac{(M_1 - M_0) + (M_2 - M_1) + (M_3 - M_2)}{M_3} \times \frac{1}{ICP} \times 100, (7)$$

where: RM – the level of non-cash monetization of the economy; M_0, M_1, M_2, M_3 – correlation coefficients for known monetary aggregates; ICP – consumer price index.

The level of non-cash monetization characterizes the degree of security of the economy with the money needed to make payments and settlements, and reflects the security of production and consumption of the relevant money supply. The indicator simultaneously reflects public confidence in the national currency, monetary policy, as well as the level

of lending activity. The main factor in the dynamics of this indicator is the demand for real money, which, in turn, depends on the degree of confidence of economic entities in the national currency: the higher the level of monetization, the greater, other things being equal, the demand for real money. Ultimately, the level of monetization of the economy is determined by the level of economic development. This ratio also characterizes the state's gold and foreign exchange reserves. The level of gold and foreign exchange reserves is used as an indicator of the effective development of the monetary sphere (equation (8)) (Zaharii, 2014):

$$GCL_{\min} = 30\%S_{tED} + 20\%FPI + 10\%M_2 + 5\%Exp + \text{"devaluation buffer"} \tag{8}$$

where: S_{tED} – short-term external debt; FPI – foreign portfolio investment; M_2 – money supply M_2 ; Exp – export of goods and services.

Adherence to the minimum value of this indicator indicates a gradual devaluation of the national currency and the achievement of monetary stability in the near future. It is proposed to calculate the indicator as the sum of 30% of short-term external debt, 20% of foreign portfolio investment, 10% of the money supply, 5% of exports of goods and services. In order to streamline loans in the credit market and reduce risks, it is proposed to apply the level of interest rate on the riskiness of credit investments (equation (9)), (Andrieieva, 2014):

$$r_t = 0.1011 - 3.934risk^2 + 0.9327risk + \varepsilon_t \tag{9}$$

where: r_t – return on credit investments (average placement rate); $risk$ – riskiness of credit investments.

Of course, the list of numerical regulatory indicators of the monetary sphere to strengthen the security of the banking sector may expand, but the most important indicators are the intensity of exchange rate regulation, the level of non-cash monetization of the economy, devaluation buffer and return on investment. Fig. (2) presents a comprehensive sequence of assessing the effectiveness of the development and functioning of the monetary and credit sphere and its impact on the security parameters of the banking sector of the state.

The algorithm consists of two logical blocks, where at the first stage of the analytical part of the integrated approach generalized criteria of indicators of functioning of the monetary sector and quantitative indicators of efficiency of its development under the influence of numerous factors are formed. If price stability, prudence of exchange rate and interest rate policy, adequacy of the monetary base and money supply are achieved, it indicates an effective monetary policy. In the second stage, the impact of the monetary sphere on the security of the banking sector is assessed. If the level of ensuring the structural components of the security of the banking sector, without affecting the state of development of the monetary and credit sector, is within certain limits, then only the deviation of these components from the marginal level of strengthening the security of the banking sector. At the final stage, measures are developed to effectively influence the monetary and credit sphere on the security parameters of the banking sector, taking into account the European experience of using monetary and credit instruments to improve and increase the efficiency of the banking system to improve solvency and stabilize the banking potential (Table 1).

Table 1. The Results of the Impact of the Monetary and Credit Sphere on the Level of Strengthening the Security of the Banking Sector of the Economy of European Countries.

| Policy Directions | Implemented Tools and Measures | Policy Results |
|---|---|--|
| Rational use of monetary instruments | lower interest rates, increase the rate of money supply (expansionary monetary policy); raising interest rates, limiting the money supply (restriction policy) | stimulating aggregate demand and economic growth, reducing unemployment; positive impact on the financial system through the development of the internal market and the real sector; curbing inflation and ensuring financial stabilization |
| | active implementation of the principles of flexibility, transparency and accountability of the National Bank | inflation targeting |
| | expanding the functions of the Central Bank and shifting their priorities from price stability to promoting economic growth and financial stabilization | increase employment, ensure economic growth, stability of the banking and financial system, efficient operation of payment systems |
| | changes in interest rates | revival or restraint of economic growth and financial capabilities of the state |
| | providing budgetary financial and credit support to the subjects of the internal market and the real sector of the economy | improving the financial support of economic agents, increasing the monetization of the economy |
| Effective functioning of the banking system | creation of investment funds to finance the reserves of commercial banks | freeing up financial resources for lending purposes, improving the financial capabilities of businesses and households |

| | | |
|---|--|---|
| | formation of trust funds and development of the infrastructure of cooperation between the government, the banking sector and business entities | reduction of financial risks and increase of efficiency of distribution of financial opportunities of bank crediting |
| | implementation of banking programs for lending to small business development | formation of the middle class, development of the internal market, strengthening the financial security of households and communities |
| | entry of bank capital into the capital of business entities | improving the financial condition and strengthening the creditworthiness of the real sector |
| | state financing of banks' capital, provision of guarantees and sureties, implementation of investment policy in the banking system, organizational and economic, institutional and financial and resource support of banks | implementation of functions and tasks of the banking sector in the financial system of the state, increasing the efficiency of money supply regulation, mobilization and distribution of financial resources, ensuring the sustainability of banking and money market |
| Stability of monetary and credit policy | influence on economic motivation and behavior of subjects of currency relations; legal registration of monetary policy; organizational measures of state institutions for the implementation of monetary policy | ensuring favorable foreign economic conditions for reproduction processes, forming an effective mechanism for the functioning and development of the domestic foreign exchange market, avoiding financial crises, ensuring macroeconomic and financial stability |

Source: systematized by the authors according to V. Mishchenko et al. (2009); O.S. Moskvichova (2013); D.M. Hladkykh (2019).

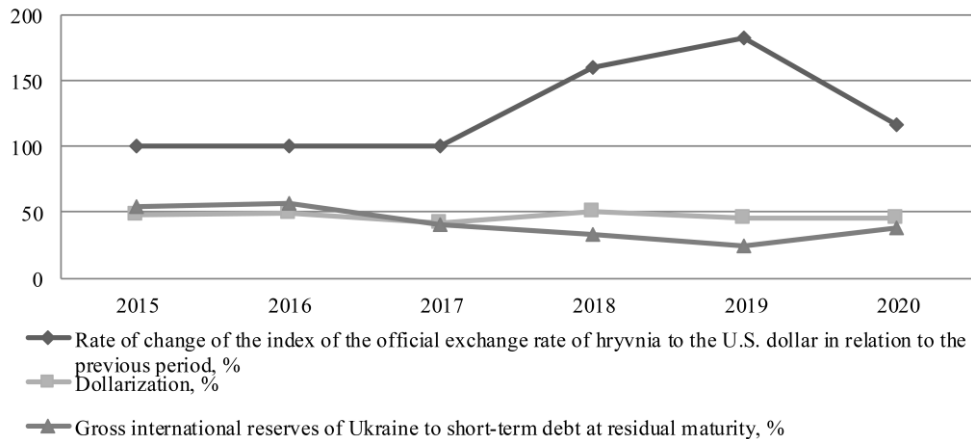


Fig. (3). Indicators of currency security of Ukraine 2015-2020, %.

Source: calculated by the authors according to *Currency market indicators (2020)*.

Most of the identified instruments of the monetary sphere have all the necessary prerequisites for the implementation of stages of economic development of the state in order to ensure the effective functioning of the banking system, providing favorable foreign economic conditions for effective mechanism of functioning and development of the domestic foreign exchange market, avoiding financial crises.

3. RESULTS AND DISCUSSION

Monetary and credit policy with a substantive component of strengthening the security of the banking sector through currency regulation optimizes exchange rate formation in the country to stimulate exports, unimpeded inflow of foreign investment, and integration into the world economic system and ensure maximum protection against crises in international foreign exchange markets. A number of destructive external and internal challenges that have exacerbated currency security issues have shaped the current state of Ukraine's monetary system. The ineffective exchange rate policy of the domestic government, including

liberal floating exchange rate policy, increased volatility of international reserves and unfavorable external conditions on major export positions, has led to a threatening increase in the amplitude of exchange rate fluctuations of the national currency and inflationary devaluation (Patashkova et al., 2021). Thus, in 2015-2020, the indicators of currency security had different trends: they were both within satisfactory values and exceeded the limit values of the indicators, moving into the danger zone (Fig. 3).

In particular, the values of the index of the official exchange rate of hryvnia to the United States dollar (USD) have long been in a safe zone, which testified to the effectiveness of foreign exchange regulation tools of the National Bank of Ukraine (NBU). However, in 2016, the volume of international reserves reached a critical level, which is due to the desire of the NBU to artificially maintain a fixed exchange rate of hryvnia. As a result, the limited capacity of the NBU due to the growing balance of payments deficit and the reduction of international reserves increased the devaluation pressure on the national economy. The recessive

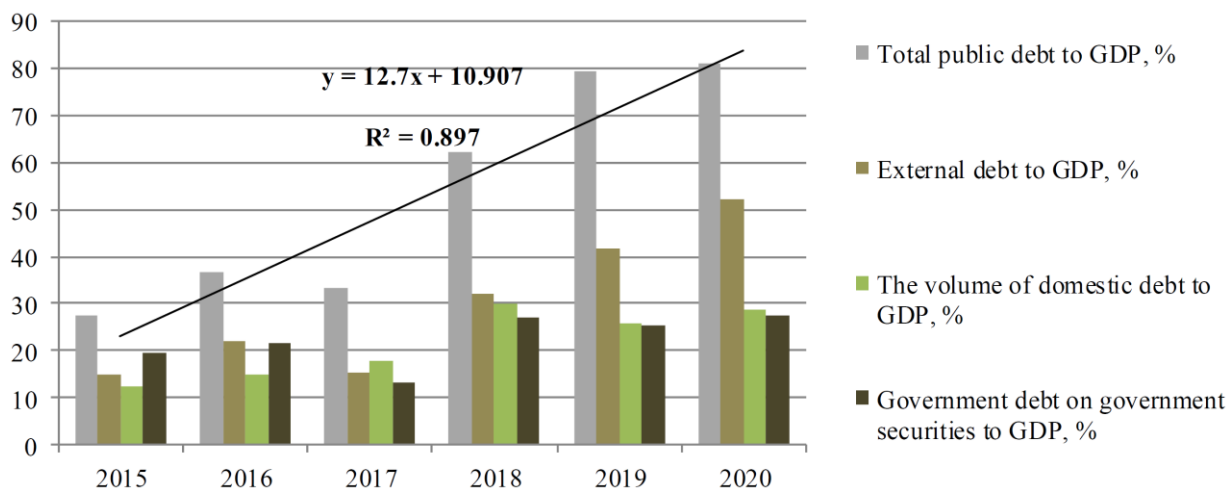


Fig. (4). Indicators of debt security of Ukraine 2015-2020, %.

Source: calculated by the authors according to National Bank of Ukraine (2020).

trends of 2016-2017 deteriorated sharply due to an unprecedented combination of socio-political, financial-economic and banking crises. At the same time, given the limited international reserves, the NBU refused to maintain the exchange rate and introduced a “floating exchange rate” policy in the country. This led to increased exchange rate fluctuations. In particular, from the level of 100% in 2018, the index of the official exchange rate of hryvnia to the USD rose sharply to 183% in 2019 and exceeded the limit value of this indicator (130%), by 53 percentage points. In 2020, the index of the official exchange rate of hryvnia to the USD stabilized, but remained in the critical zone.

The negative trend is the growth of the level of dollarization to the money supply in 2015-2016. After reducing its level in 2017, there was a resumption of negative trends in 2018, due to the aggravation of the crisis in the Ukrainian foreign exchange market and growing distrust of economic agent’s national currency. In 2020, the share of foreign currency deposits in the total volume of deposits exceeded the limit value of this indicator by 20.8%. The level of Ukraine's gross international reserves for short-term debt is in the danger zone. During 2017-2018, this figure reached 38% with a limit of 300%. In particular, the pressure on the NBU’s international reserves necessitates servicing the public debt and maintaining a fixed exchange rate of the national currency. Security in the field of public and corporate debt management involves maintaining the level of internal and external debt (given the cost of servicing, efficient use of internal and external borrowing and their optimal ratio), which is sufficient to address urgent economic needs and at the same time does not threaten default or loss of financial sovereignty and the destruction of the banking system (Yudina et al., 2022; Tatsiy and Serohina, 2018). During 2015-2020, there was a threatening trend in the debt sector of Ukraine, which resulted in the continuation of the economic recession, the accumulation of problems with the functioning of the banking sector in lower credit ratings and rising social tensions in society (Fig. 4).

The upward trend in Ukraine's public debt has been observed over the past few years, due to the unstable situation of debt refinancing in previous years, the pressure of debt payments on public finances, as well as high currency risks of external debt. In 2018-2020, the indicator of total public debt to GDP exceeded the maximum acceptable value by 7.1, 24.4 and 25.9 percentage points, respectively. It is dangerous for Ukraine to increase its external debt to GDP. The significant devaluation of the national currency during 2018-2020 led to an increase in the part of the debt denominated in foreign currency and the corresponding payments on it. Thus, the index of external debt to GDP increased from 15.3% in 2017 to 52.1% in 2020 with a maximum level of 25%, which increases the risks of the Ukrainian economy's dependence on international creditors. Despite the general trend of increasing the level of debt security of Ukraine due to the restructuring and partial write-off of public debt, the critical situation in 2019 stabilized. In particular, in 2020, the domestic debt-to-GDP index decreased by 1.3 percentage points compared to 2018, which is a positive fact and indicates a partial stabilization of the debt policy situation.

The level of government debt on government securities to GDP tends to deteriorate and approach the threatening level (in 2019 to 27.3% against 30%). The increase in debt has led to a narrowing of investment opportunities for economic growth and is holding back the Ukrainian economy’s entry into a sustainable medium-term development trajectory. The degree of security of the stock market, which is a key factor in mobilizing financial resources and a tool to enhance investment and innovation activities of banks is determined by the optimal amount of capitalization needed to stabilize the financial condition of issuers, depositories, custodians and the state as a whole. Despite the long-term functioning of the Ukrainian stock market, it remains opaque, inefficient and illiquid. At the same time, it does not ensure the implementation of its main functions – attracting financial resources to invest in innovative and other long-term economic projects (Fig. 5).

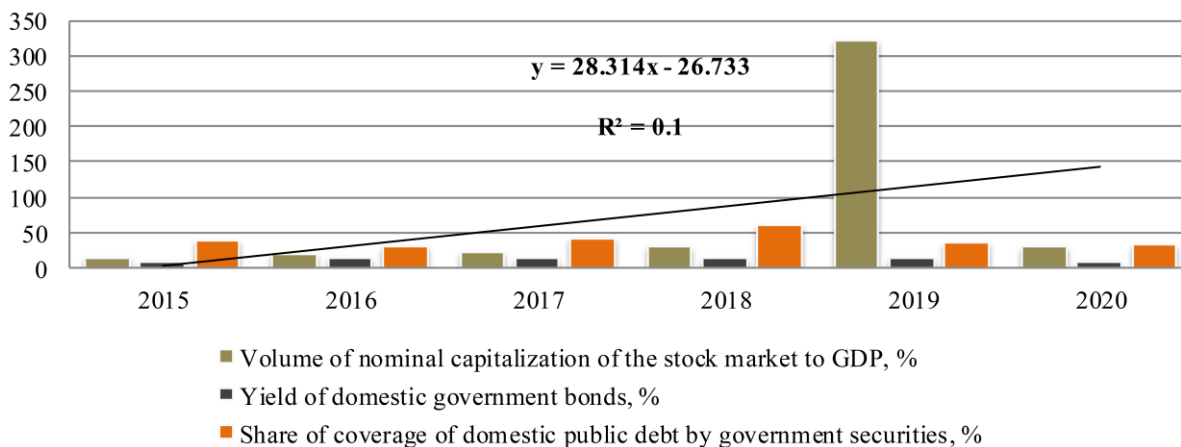


Fig. (5). Security indicators of the stock market of Ukraine for 2015-2020, %.

Source: calculated by the authors according to National Commission on Securities and Stock Market (2020).

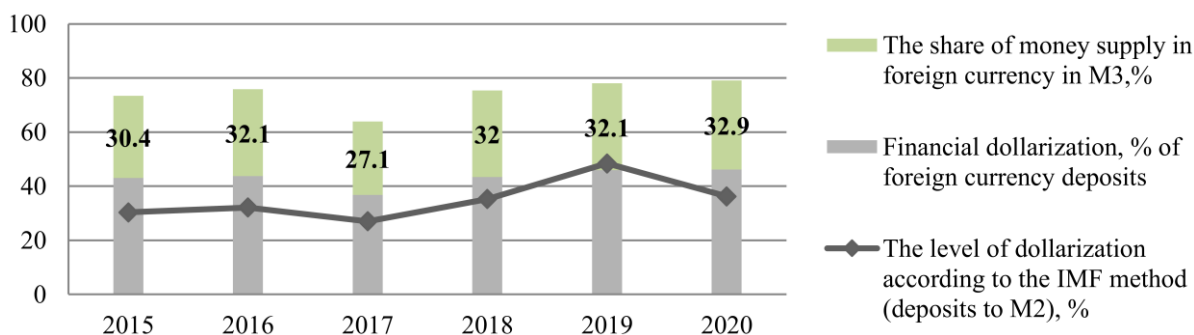


Fig. (6). Indicator of the level of dollarization of the economy of Ukraine for 2015-2020, %.

Source: calculated by the authors according to D. Sologub, (2019).

In particular, the actual values of the indicator “the ratio of nominal capital market capitalization to GDP” in 2015-2020 were in the range of 13.7-30.1%, while the generally accepted value of the indicator should be 60-90%, which leads to significant volatility of the stock market, as well as indicates the lack of opportunity to form a proper financial and investment support of the banking system of the state. In 2020, the yield on domestic government bonds (IGLBs) also deviated from the norm (by 4.2%) and amounted to 9.2%. This is a negative trend in the stock market, but high yields increase the attractiveness of government securities for domestic and foreign investors, but also significantly increase the cost of servicing public debt. The index of coverage of domestic public debt by government securities in 2020 amounted to 32.7% (at the limit of 30%), which confirms the weak diversification of financial resources to cover it and the high cost of government borrowing in the domestic market.

The study of the mechanism of monetary and credit policy is considered a priority area of monetary development, due to inflation, which is associated with the real interest rate (Melnyk, 2018). Developing these provisions for the effective development of monetary and credit relations through monetary and credit indicators of the formation and placement of money supply, there is a need for such indicators as the monetary base, monetary and credit aggregate M3, domestic lending, requirements for the

banking sector of the economy, including loan claims, net external assets (Stelmakh, 2009; Kataeva et al., 2019). Thus, imbalances in money circulation in Ukraine are associated with an unbalanced structure of money supply, when the growth of money supply is due to the issuance of NBU funds through stock and currency channels, the channel of refinancing and redemption of IGLBs for government securities (Begzhan et al., 2021). The main channel for issuing money is the currency channel, due to the state of the balance of payments – with the inflow of speculative capital or significant amounts of export earnings money supply increased, which led to an increase in the dollarization of the domestic economy (Fig. 6). This is due to the high level of distrust in the national currency and the Ukrainian banking system, which encourages the population to accumulate cash currency.

In the crisis period of 2018-2020, the dollarization of assets and the volume of foreign cash in circulation in 2020 increased to 36.2%, i.e., by 7.1 percentage points. In 2019, cash foreign exchange reserves outside banks amounted to about USA (United States of America) 84 billion, which is comparable to the annual GDP of Ukraine in 2019. However, in 2020 due to the strengthening of the national currency recorded a reduction in cash outside banks by USA 82 million. Note that the growth of dollarization and cash in circulation outside the banking system leads to a decrease in the efficiency of the transmission mechanism of monetary

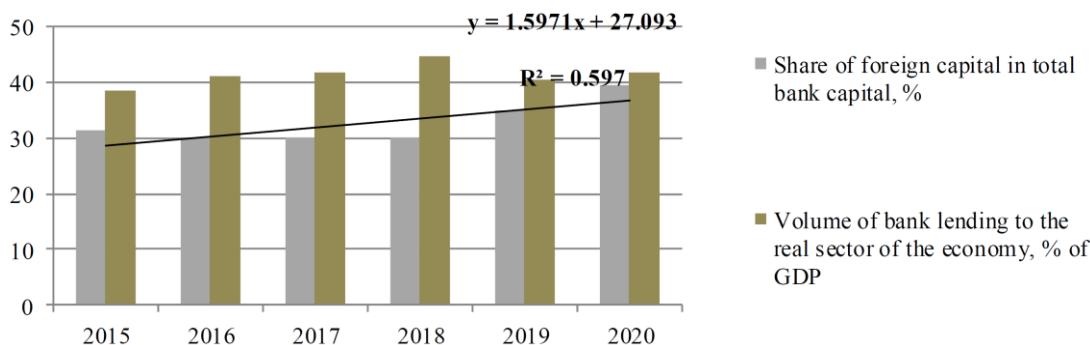


Fig. (7). Banking security indicators of Ukraine for 2015-2020, %.

Source: calculated by the authors according to D. Sologub (2019); National Bank of Ukraine (2020).

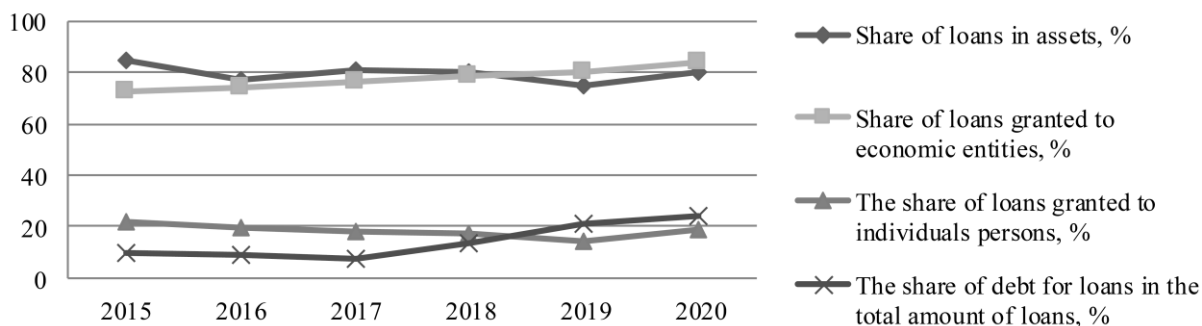


Fig. (8). Loan portfolio of Ukrainian banks for 2015-2020, %.

Source: calculated by the authors according to D. Sologub (2019); National Bank of Ukraine (2020).

and credit policy due to an insufficient link between the NBU's monetary and credit measures, the dynamics of the financial market and the real sector. In addition, the high level of dollarization of the economy is the result of the inefficient performance of its functions by the national currency, which leads to the replacement of the national currency by a foreign one and the imbalance of the monetary market in general (Krasnov et al., 2020; Komilova et al., 2019).

The credit component in the monetary sphere, as a provisioning tool, characterizes the state influence on the discount rate, overnight loan rates, bank refinancing lines through tenders, official reserve assets (foreign currencies, position of international financial organizations, monetary metals), official exchange rate, purchase and sale of currency on the interbank foreign exchange market, foreign exchange market restrictions, purchase and sale by the Central Bank of treasury bonds, other securities (except for securities confirming corporate rights), terms of placement and redemption of certificates of deposit (interest, maximum or minimum amount) applications from the bank, the amount of the deposit, term, additional restrictions on potential owners, etc.), registration of credit agreements between residents and non-residents, setting requirements for settlements for export and import transactions (Sologub, 2019; Ivanov et al., 2021). It should be noted that the development of crisis phenomena in the economy of Ukraine during 2015-2020 affected the stability of the banking system due to insufficient capitalization, instability of the resource base, deteriorating financial results, increasing debt burden,

reducing lending to the real sector, deteriorating bank loan portfolio (Fig. 7).

Thus, the share of foreign banking capital in the total amount of banking capital in Ukraine increased by 8.3 percentage points (in 2015 the indicator was 31.3%, in 2020 is 39.6%), exceeding the threshold value (30%), which increases the risk of loss of control over the banking system by the state in the person of the NBU, leads to the dependence of the Ukrainian banking sector on external capital, and also leads to the displacement of banks with capital of Ukrainian origin from the market or from its profitable segments. In 2020, the volume of bank lending to the real sector of the economy decreased by 2.7 percentage points compared to 2018, which deprives the banking system of sources of future income and financial opportunities for development. At the same time, banks prefer to lend mainly to short-term projects with a lower level of risk and a shorter payback period related to trade and processing. The total volume of bank loans increased by 25.5% during 2015-2020 (from USD 29.1 billion in 2015 to USD 37.0 billion) (Fig. 8).

On the other hand, the share of loans in the assets of Ukrainian banks in 2015-2018 decreased slightly from 85.1% in 2015 to 79.9% in 2018, but remained at a high level. At the same time, a significant increase in the share of the loan portfolio in the total assets of the bank led to an increase in imbalances of the banking system of Ukraine in 2018-2020, through the choice of income maximization strategy, which led to a critical increase in lending in high risk. The result of this situation was the deterioration of the financial stability of both individual banks and the banking

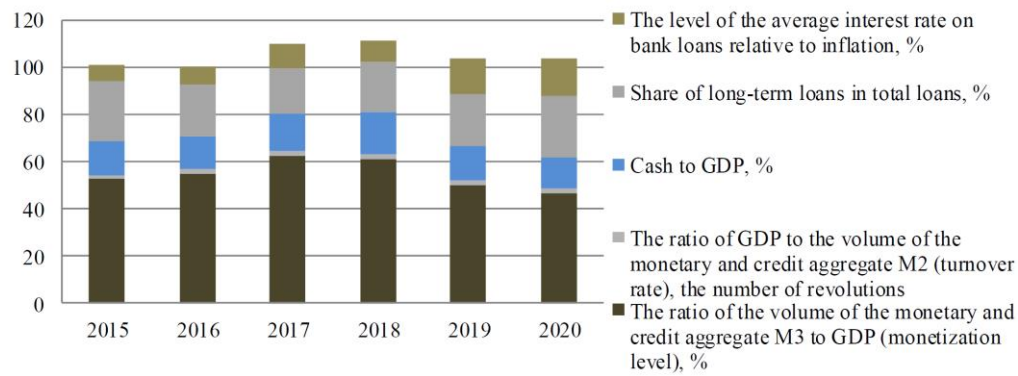


Fig. (9). Indicators of monetary security of Ukraine for 2015-2020, %.

Source: calculated by the authors according to D. Sologub (2019); National Bank of Ukraine (2020).

system as a whole. During 2015-2020, the overall structure of loans recorded a predominance of the share of loans to economic entities, which ranged from 72.4% to 84.2%. Lending to economic entities takes place in the national currency, which grew by 45.8% during the study period. Due to the reduction of the corporate loan portfolio in 2017-2018 at the same time in the national and foreign currency, the loan portfolio of economic entities in the national currency in 2020 increased by USA 2.86 billion. In the structure of the corporate loan portfolio of the banking system of Ukraine in terms of economic activities in 2020, traditional industries continue to dominate, in particular, wholesale and retail trade is 33.5%, and manufacturing is 24.8% real estate is 9.9%. At the same time, industries that are traditionally considered stabilizers of economic growth are experiencing an acute shortage of bank lending. This is agriculture is 6.7%, construction is 5.4%, mining is 2.2%. Thus, the structure of lending during the study period by type of economic activity does not meet the objectives of investment renewal of the real sector of the economy.

The unbalanced structure of money supply, critically high level of monetization of the national economy, a significant share of cash in the money supply, increasing dollarization of money circulation, inefficient monetary policy transmission mechanism and volatility of stock market instruments, significantly destabilize the security of the banking economy, due to the reduction of the loan portfolio and the deterioration of its quality, the implementation of lending to short-term low-risk projects, increasing the share of foreign capital in the banking system. These trends only exacerbate and threaten Ukraine's economy. Therefore, the further development of the monetary sphere requires the search for new and improvement of existing tools in the context of strengthening the security of the banking sector of the state. Minimizing monetary and credit imbalances that pose a threat to Ukraine's economy leads to the actualization of effective methods of assessing the level of monetary and credit security from the separation of indicators to assess its level, focusing on indicators whose values exceed the threshold and have a destructive effect on the banking system. Note that determining the dynamics of the integrated index of monetary security requires an appropriate methodology that can provide a diagnosis of its condition with the possibility of comparison with the integrated

threshold (optimal) values (Melnyk, 2018; Shebanina et al., 2022). The actual values of monetary security indicators in Ukraine are shown in Fig. (9).

It is noteworthy that most monetary and credit security indicators are in critical, dangerous and unsatisfactory areas. The results of the calculations illustrate the quantitative measurement of threats to monetary and credit security, indicating the actual loss of positive functions of influence in the field of money circulation and credit relations of the state. To strengthen the security of the banking sector of the economy, it is necessary to determine its integral level through the following components: the level of monetary and credit security; level of currency security; level of debt security; level of banking security; the level of stock market security; level of financial security. Note that monetary and credit security, as the main component of strengthening the security of the banking sector of the economy in monetary policy has divergent indicators. Therefore, the use of the procedure of normalization of indicators according to the equation (10), allows to bring the stimulating (disincentive) factors in the compared dimensionless values in the range (0.1), (Lucas, 1983).

$$z_i = \begin{cases} y_i / y_{\max}, & \text{if } y_i \in S \\ y_{\min} / y_i, & \text{if } y_i \in D \end{cases} \quad (10)$$

It is expedient to substantiate the weights by using the principal components method, which allows describing the indicators of monetary and credit security through the endogenous parameters of the macro model. The use of this approach, taking into account non-linear economic processes, allows determining the dynamics of the index of monetary security of Ukraine by the equation (11) (Lucas, 1983):

$$I_t = \prod_{i=1}^n z_{it}^{a_i}, \quad \sum_{i=1}^n a_i = 1, \quad a_i \geq 0, \quad (11)$$

where: z_i – normalized values of indicators; a_i – weights; n – number of indicators.

Normalized values of indicators, weights and index of monetary and credit security of Ukraine in 2015-2020 are shown in Fig. (10). It is determined that the most influential

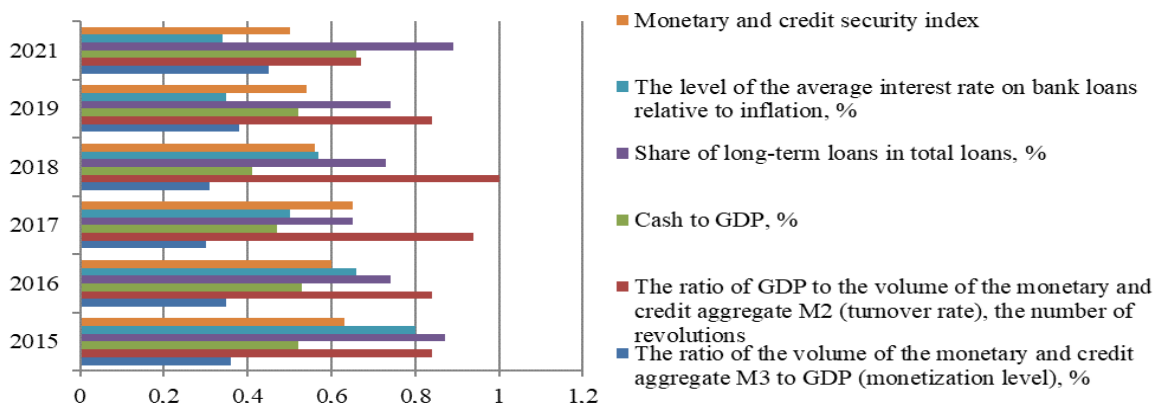


Fig. (10). Normalized values of indicators and the index of monetary and credit security of Ukraine for 2015-2020, %.

Source: calculated by the authors according to D. Sologub (2019); National Bank of Ukraine (2020).

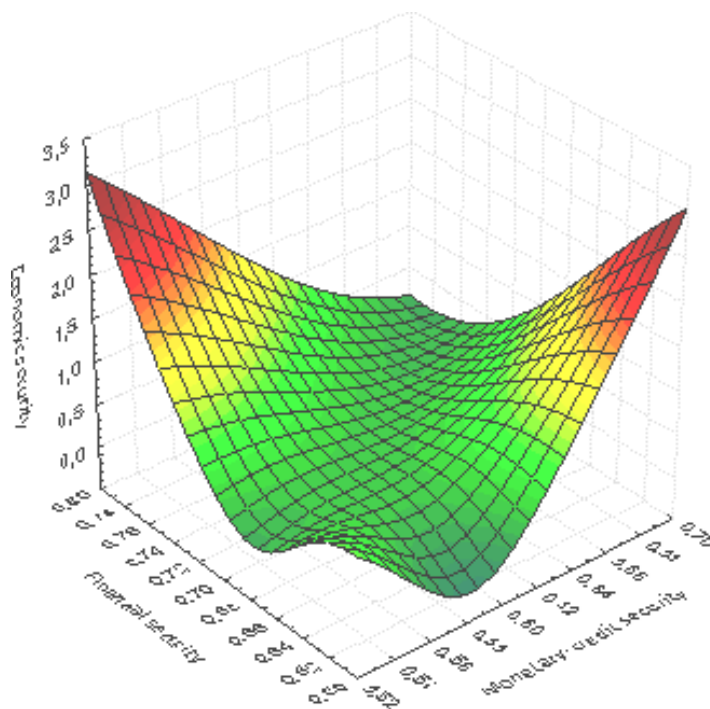


Fig. (11). Indicators of monetary and credit, financial and economic security of Ukraine in 2015-2016.

Source: calculated by the authors.

on the index of monetary and credit security of Ukraine in 2015-2020 were the following indicators: the ratio of the monetary and credit aggregate M3 to GDP (monetization level) (0.225), the ratio of GDP to the volume of the monetary and credit aggregate M2 (0.231), the amount of cash to GDP (0.230).

The downward trends of the monetary and credit security index coincide with the dynamics of indicators of financial and economic security of the state (Fig. 11), which indicates the relationship between the values of indicators of the monetary and credit sector of the banking sector, the level of financial stability and economic development. At the same time, the decrease in monetary and credit security leads to an imbalance of deposit and foreign exchange markets, reducing the profitability of banking.

Regression analysis allowed determining the relationship between the values of the components of indicators of

strengthening the security of the banking sector of Ukraine. The results of estimating the influence of selected factors are presented in the system of corresponding regression equations (12):

$$\begin{cases}
 y_1 = 2.1754 - 1.7443\beta_1 - 1.58127\beta_2 - 0.4821\beta_3 - 0.2188\beta_4 \\
 \quad + 0.2432\beta_5 - 0.4701\beta_6 \\
 y_2 = 2.4973 - 0.3589\beta_{14} - 0.0523\beta_{15} + 0.6186\beta_{16} \\
 y_3 = 1.0864 + 2.7767\beta_{17} - 0.6732\beta_{19} - 0.6135\beta_{20} \\
 \quad + 1.8932\beta_{21} - 1.9234\beta_{22} - 0.3831\beta_{23} \\
 y_4 = 0.4571 - 3.3785\beta_{26} + 3.1223\beta_{27} \\
 y_5 = 0.9422 + 0.2731\beta_{33} + 0.8083\beta_{34} - 1.1445\beta_{35} \\
 y_6 = 3.2711 - 0.0287\beta_{36} - 0.3877\beta_{37} - 0.6952\beta_{38}
 \end{cases}
 , (12)$$

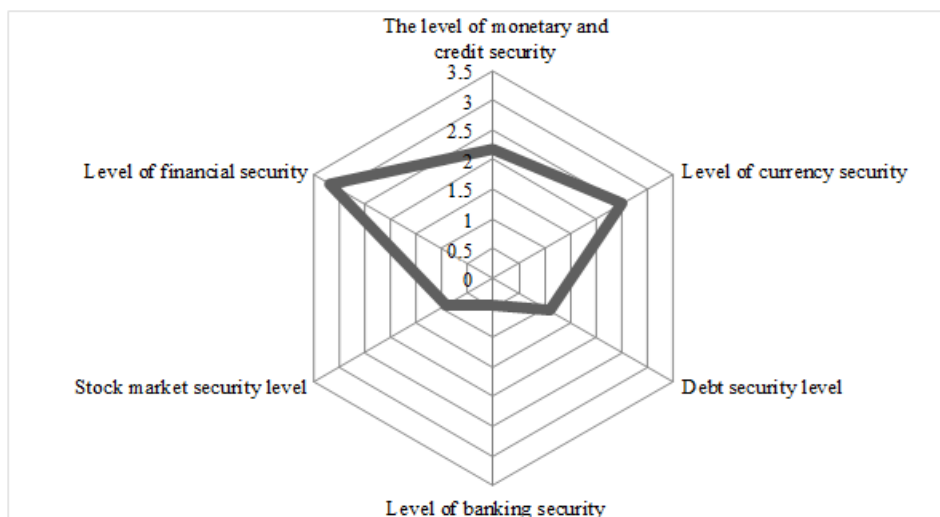


Fig. (12). The structure of the impact of individual components on the change of the integrated level of security of the banking sector of Ukraine in 2015-2020.

Source: calculated by the authors.

where: y_1 – level of monetary and credit security; y_2 – level of currency security; y_3 – level of debt security; y_4 – level of banking security; y_5 – stock market security level;

y_6 – level of financial security; $\beta_i, i = 1.41$ – coefficients of strengthening of the banking sector.

Aggregate factors influencing the studied factors indicate the closest connection with them. Thus, the analysis revealed general tendencies to increase almost all dependent variables: the level of monetary and credit security (free member is 2.1754), the level of currency security (free member is 2.4973), the level of debt security (free member is 1.0864), the level of banking security (free member is 0.4571), the level of security of the stock market (free member is 0.9234), the level of financial security (free member is 3.1715). These results should be considered positive and indicate that the processes of stabilization of the banking system and reduction of inflation and devaluation pressures have begun, which is the basis for strengthening the security of the banking sector of Ukraine's economy. The results of the integrated assessment of the level of strengthening the security of the banking sector of Ukraine in 2015-2020 show that the greatest impact on its change is monetary and credit security (Fig. 12), which shapes the conditions of economic development and affects the financial and foreign exchange markets.

In particular, with a decrease in the values of monetary and credit aggregation by 1% (the level of monetization of the national economy and the amount of cash to GDP) the level of security of the banking sector increases by 1.7443 and 0.4821 respectively. The relationship between the velocity of money and the level of security of the banking sector is similar. In particular, when the ratio of GDP to the volume of the monetary and credit aggregate M2 decreases by one revolution the dependent variable increases by 1.5812. These dependencies are quite natural, as the reduction of money supply, primarily cash in circulation, leads to lower inflation

and demand in the foreign exchange market and, consequently, stabilizes the national currency, which is a prerequisite for strengthening the security of the banking sector of Ukraine.

The share of long-term loans in the total volume of loans and the level of security of the banking sector show a direct proportional dependence. That is, an increase in the independent variable by 1% causes an increase in the level of security of the banking sector by 0.2432 by ensuring positive dynamics of lending to industries with high potential for economic development, the implementation of which can accelerate structural and technological modernization of the national economy. It is quite logical that the relationship between the level of the average interest rate of commercial banks' loans against inflation and the security of the banking sector of the economy – when the independent variable decreases by 1%, the dependent variable increases by 0.4701. This leads to an increase in the credit activity of banks, increasing the financial and resource security of economic agents, accelerating business activity of banks within the state to increase resources in investment and innovation activities of the real sector of the economy and the financial potential of the country as a whole.

4. CONCLUSIONS

Thus, strengthening the instruments of monetary and credit policy of the state to strengthen the security of the banking sector allows for ensuring the balance of the money supply and positively affecting the money supply and its value. One of the tools that can be used in the banking sector as a factor in the formation of a moderate structural deficit of bank liquidity and interest rate control is a monetary regulator with mandatory reserve requirements. To do this, it is necessary to improve the order of its formation and storage through:

- expansion of criteria for differentiation of reserve requirements by absolute amounts of funds

deposited in bank deposits, by target of loans provided by banks, by type of credit institutions, their size, and depending on the choice of priorities during active-passive operations;

- reduction of required reserves by the amount of long-term investment loans provided at the expense of independently formed resources, the amount of purchased IGLBs and NBU certificates of deposit;
- introduction of accrual and payment of interest on the amount of required reserves of banks in order to increase the efficiency of payments and transfers through the NBU EPS (Electrum Payment System).

At the same time, this instrument in the monetary and credit regulation of the banking sector should not be considered operational, but is used only in the context of systemic and structural imbalances in monetary and credit policy in the country due to monetary factors. It is expedient to transform this instrument of monetary influence from the list of instruments of operative intervention of the NBU EPS, to the category of instruments that provide long-term and structural impact on the change of money supply and are used in case of increased risks of macro financial destabilization in the banking system.

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