ВПЛИВ КРЕДИТОУТВОРЮЮЧИХ ЧИННИКІВ НА СТАН РОЗВИТКУ РЕАЛЬНОГО СЕКТОРА ЕКОНОМІКИ В УМОВАХ ЕКОНОМІЧНОЇ НЕСТАБІЛЬНОСТІ

Анотація. Проведено аналіз стану банківського кредитування реального сектору. Оцінено масштаби обсягів кредитів для фінансування суб’єктів реальної економіки. З метою визначення впливу банківського кредитування на стан реальної економіки встановлено залежність між обсягом кредитів, наданими банками в економіку країни, активами банківської галузі та основним макроекономічним показником – ВВП. Проведено факторний аналіз впливу кредитоутворюючих чинників на стан розвитку реального сектора економіки в умовах економічної нестабільності. Визначено, що система кредитування реального сектору економіки в Україні потребує суттєвого переосмислення в напрямі орієнтації банківських установ на першочергове кредитування пріоритетних у національній економіці видів діяльності.

Ключові слова: банківське кредитування, реальний сектор, валовий внутрішній продукт, активи банків, валютний курс, облікова ставка, ставка за кредитами, економічна нестабільність.

Формул: 2; рис.: 1; табл.: 4; бібл.: 12.

THE INFLUENCE OF CREDIT FACTORS ON THE DEVELOPMENT OF THE REAL ECONOMIC SECTOR IN THE CONDITIONS OF ECONOMIC INSTABILITY

Abstract. The analysis of the status of bank lending in the real economic sector is carried out. The scope of credits for financing of subjects of the real economy are estimated. In order to determine the
impact of bank lending on the state of the real economy, the relation ship between the volume of loans provided by banks to the country's economy, assets of the banking industry and the main macroeconomic indicator – GDP have been established.

The application of economic-mathematical modeling in the study of the banking sector's activity enabled the collection and streamlining of statistical information on the main parameters of the banking system development; using the leastsquares method, to construct a six-factor linear regression model of the influence of the factors of the banking system on GDP on a matrix basis; the correlation between the indicators of the National Bank discount rate, the exchange rate, inflation, return on assets and capital of the banking system, the interest rate on loans were investigated.

It is determined that the lending of the real economy sector in Ukraine needs a substantial rethink in the direction of prioritizing the activities in the national economy.

The practical application of the calculation enables to increase the level of the National Bank's management in order to ensure the efficient functioning of both individual banking institutions and the banking systems as wholes in the further growth of Ukraine depending on the stable development of the banking system, the possibility of entering the international financial market and active participation in the globalization processes. A reliable and developed banking sector play an extremely important role in stabilizing the country's economy.

Keywords: bank lending, real sector, gross domestic product, bank assets, exchange rate, discount rate, interest rate on loans, economic instability.

JEL Classification: E51, E59, G20, G21

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ВЛИЯНИЕ КРЕДИТООБРАЗУЮЩИХ ФАКТОРОВ НА СОСТОЯНИЕ РАЗВИТИЯ РЕАЛЬНОГО СЕКТОРА ЭКОНОМИКИ В УСЛОВИЯХ ЭКОНОМИЧЕСКОЙ НЕСТАБИЛЬНОСТИ

Аннотация. Проведен анализ банковского кредитования реального сектора. Оценены масштабы объемов кредитов для финансирования субъектов реальной экономики. С целью определения влияния банковского кредитования на состояние реальной экономики установлена зависимость между объемом кредитов, предоставленных банками в экономику страны, активами банковской отрасли и основным макроэкономическим показателем – ВВП. Проведен факторный анализ влияния банковского кредитования на состояние реального сектора экономики в условиях экономической нестабильности. Определено, что система кредитования реального сектора экономики в Украине требует существенного переосмысления в направлении и ориентации банковских учреждений на первоочередное кредитование приоритетных в национальной экономике видов деятельности.
Introduction. Emergence of a market economy in Ukraine enhances the attention of economic science to all the components of market relations. Today, the most urgent aspect is the development of new conceptual foundations of credit tools for the development of the real economy. Credit as an economic category has not only the internal essence, which manifests itself in its structure, laws of motion, forms and species, but also actively interacts with the external environment and stimulates the process of expanded reproduction.

The movement of loan capital between economic entities at the national and international levels takes place in various forms using a variety of lending tools – forms of providing economic entities with borrowed financial resources to finance the real sector of the economy, which are implemented through the mechanism of the credit market. The real sector of the economy must have such lending tools that would ensure the overall economic reproduction and continuity of the business cycle. The main banking credit tools for the development of the real sector of the economy are consumer loans, loans to economic entities, mortgage loans, leasing, factoring and franchising. The main purpose of such tools is to prevent interruptions in the field of social production and generally economic reproduction.

Credit activity of modern commercial banks is quite diverse and includes various forms and types of loans, provided to legal entities or individuals in order to receive income, as well as banking services of a credit nature. However, the financial instability, under which the Ukrainian economy is in need, requires a thorough analysis of the situation in order to work out mechanisms for ensuring the restoration of economic growth and normal functioning of the financial sector.

Analysis of research and target setting. A lot of attention in scientific works of domestic scholars is paid to separate aspects of credit tolls development and their influence on the real sector of economy: O. Vovchak [1], U. Vladychyn [2-3], V. Vovk [4], I. Gutsal, O. Dzuybiuk [5], N. Zhukov, V. Kovalenko, V. Lagutin, N. P. Ploiak [6], S. Reverchuk, M. Savluk, O. V. Skaletska, N. Sleludko and others. In foreign literature, these issues were considered by A. Gan, W. Lexis, J. Law, R. Miller, A. Smith, N. Samsonov, D. Ricardo, J. Shumpeter [7] and others.

Despite significant achievements of domestic and foreign scientists, there are a number of issues related to the search for mechanisms in order to improve the efficiency of bank lending to the real economy, with the purpose of revitalizing economic processes and stabilizing the situation in Ukraine in the current conditions. The system assessment of the efficiency of using credit tool sand way softisimp rovement in order to provide the development of the real economy in conditions of the latest challenges and threats requires further scientific-methodological elaborations. In view of this, there is a need for further research in the direction of combining theoretical developments with mathematical tools concerning analysis of the credit activity of the domestic banking system, use of methods of economic and mathematical modeling for quantitative assessment of credit factors, which influence the development of the real sector and determine the direction for ensuring its dynamics.

Purpose of the work is to study the state of bank lending to the real sector of the economy of Ukraine and to identify problems that affect the efficiency level of credit provision of the economy.

Methods of research used in the analysis of the impact of bank lending on the development of the real sector of the economy under conditions of economic instability – analysis and synthesis, method of comparison, economic-statistical, mathematical, grouping and modeling, table and graphic.

Results of the research. The banking system is the largest lender of the real economy in Ukraine, and bank lending plays an important role in meeting the needs of the real sector of the economy (along with investments and state support) and consumer demand of population for additional financing. However, the imbalance between demand and supply in the market for bank
lending leads to crises throughout the economic system and becomes a factor in slowing down its recovery process. After all, for a long time in the domestic banking practice, short-term lending prevails, while the share of medium- and especially long-term loans is low, the loan is mainly used to cover the working capital deficit and has little effect on structural changes, increasing the scientific and technological level of production, competitiveness of products in the domestic and foreign markets [8, p. 56].

Thus, for moving temporarily free funds through the mechanism of the credit market, its subjects use the appropriate tools, which because of their credit nature received the name of the credit ones. Based on the fact that a "credit tool" is an integral part of a financial instrument, it will largely reflect the forms of the movement of loan capital between the subjects of the real economy. At the same time, its hould benoted that in credit policy, namely, at the stage of development of credit products, it is expedient to use the term types of loans, and at the stage of their sale they become the appropriate tools, through which the redistribution of resources from creditors to those who have them in need takes place.

To analyze the state of bank lending to the real sector, let’s consider the state of the banking market: according to official NBU data, as of January 1, 2017, there were 96 banking institutions in Ukraine, that is 21 units less than a year earlier. Of these, 37 are banks with foreign capital. This is due to the liquidation of financially unstable banks and the outflow of foreign capital from the banking system of Ukraine. During this period, the activity of banks with foreign capital in the retail markets is reduced and their reorientation into the corporate segment takes place; in addition, some banks have left the Ukrainian banking market due to the ineffective business atmosphere [9].

The domestic market of bank loans was significantly influenced by the political and economic situation. In this regard, individual bank have virtually ceased lending, having doubts about the long-term solvency of potential borrowers. However, a significant number of Ukrainian banks are actively engaged in lending to individuals for consumer needs (Table 1).

<table>
<thead>
<tr>
<th>Loans granted by the Ukrainian banks in 2012-2016 UAH million</th>
<th>As of 01.01.</th>
<th>Growth rate in 2016 until 2012, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granted loans</td>
<td>815 327</td>
<td>911 402</td>
</tr>
<tr>
<td>including loans granted to economic entities</td>
<td>609 202</td>
<td>698 777</td>
</tr>
<tr>
<td>short-term</td>
<td>255 865</td>
<td>293 486</td>
</tr>
<tr>
<td>long-term</td>
<td>353 337</td>
<td>405 291</td>
</tr>
<tr>
<td>share of loans granted to economic entities</td>
<td>75</td>
<td>77</td>
</tr>
<tr>
<td>including loans granted to individuals</td>
<td>161 775</td>
<td>167 773</td>
</tr>
<tr>
<td>short-term</td>
<td>134 273</td>
<td>142 607</td>
</tr>
<tr>
<td>long-term</td>
<td>27 502</td>
<td>25 166</td>
</tr>
<tr>
<td>share of loans to individuals</td>
<td>25</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: compiled by the authors based on the data of the National Bank of Ukraine [9].

Consequently, the volume of loans issued at the beginning of 2017 compared to the beginning of 2013 increased by more than 23%, amounting to UAH 1,005,920 million. In addition, as of January 1, 2017, the loans to economic entities increased in comparison with the previous 2016 year the same, as in 2013 increased by 39.05%. While loans to individuals increased in comparison with 2016, while in comparison with 2013 they decreased by about 3%.

Among the loans granted to the economy, the largest share belongs to loans to legal entities. During the investigated period loans to legal entities amounted to an average of 80% of their total volume. The conducted analysis according to the NBU revealed, that a sharp increase in the use of loans by enterprises occurred in 2014 and 2016, with their share as of 01.01.2014 amounted to
76.7% of the total volume of loans granted by the banks of Ukraine. The smallest increase in the volume of such loans occurred in 2013 – UAH 28,295.0 million, or 4.7% compared to 2012.

Thus, short-term loans for enterprises are more profitable, and banks, in turn, do not have enough free financial resources to provide long-term investment loans to the real economy.

In terms of scale of loans to finance real economy subjects, we will analyze them in comparison with the growth rates of total assets of domestic banks for 2012–2016, presented in Fig. 1.

According to the data presented in Fig. 1, we can state that bank loans were the largest in 2014–2015, there was an increase before this period, whereas after 2015 there is a trend of lending contraction.

This situation characterizes the growth of the physical volume of lending, while the relative value relative to GDP generally does not have a clear tendency. After all, by 2014, there is an increase and then a reduction. In 2016, the share of loans in GDP decreased in comparison with 2014 by 22.02%, and since 2012 – by 15.66%.

These gaps are due to the growth of GDP and lower lending rates by banks. GDP in 2016 increased by UAH 403723.56 million, while the volume of issued loans decreased by UAH 3845.24 million. However, the decline in lending activity of banking institutions last year is primarily determined by focusing banks only on a limited number of reliable clients, which would faithfully fulfill their obligations during the crisis, in order to protect themselves from the emergence of troubled loans.

As for the assets of the banking system of Ukraine, they reached the largest size in 2014 in terms of money in the period under review. In the future, the clear dynamics of assets is not available in monetary terms, whereas in percentage terms, assets relative to GDP began to increase from 2012 to 2013 by 7.84%, and afterwards their significance began to decrease dynamically.

The assets in percent age reached the lowest meaning in 2016, namely during the analyzed period, they decreased by 27.29%, at the same time compared to 2013 – by 35.13%. Devaluation of hryvnia, high rate of inflation, and increase in overdue loans by both corporate borrowers and the population can be considered the reasons of the decrease in the volume of banks assets.

In order to determine the impact of bank lending on the state of the real economy, we will conduct a factor analysis based on data from the National Bank of Ukraine and the State Statistics Service, grouped in Table. 2 during the last seven years, relating the impact of the average interest
rate on loans in national currency, the NBU discount rate, the weighted average hryvna to dollar exchange rate on the interbank foreign exchange market of Ukraine, index of inflation, indicators of profitability of assets and return on capital of the banking system of Ukraine to the dependent variable – gross domestic product (GDP) [9; 10].

Table 2

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP, UAH million</th>
<th>Average interest rate on loans in national currency</th>
<th>Average NBU discount rate</th>
<th>Average weighted rate on the interbank foreign exchange market of Ukraine (at the time of establishing the official hryvnia rate), UAH</th>
<th>Inflation index, annual value</th>
<th>Return on assets</th>
<th>Profitability of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.01.2011</td>
<td>1083</td>
<td>0,15</td>
<td>0,09</td>
<td>796,36</td>
<td>1,091</td>
<td>-0,0145</td>
<td>-0,1019</td>
</tr>
<tr>
<td>01.01.2012</td>
<td>1317</td>
<td>0,15</td>
<td>0,08</td>
<td>803,51</td>
<td>1,046</td>
<td>-0,0076</td>
<td>-0,0527</td>
</tr>
<tr>
<td>01.01.2013</td>
<td>1409</td>
<td>0,18</td>
<td>0,08</td>
<td>802,4</td>
<td>0,998</td>
<td>0,0303</td>
<td>0,0045</td>
</tr>
<tr>
<td>01.01.2014</td>
<td>1455</td>
<td>0,16</td>
<td>0,07</td>
<td>814,95</td>
<td>1,005</td>
<td>0,0012</td>
<td>0,0081</td>
</tr>
<tr>
<td>01.01.2015</td>
<td>1567</td>
<td>0,19</td>
<td>0,11</td>
<td>1577,96</td>
<td>1,249</td>
<td>-0,0407</td>
<td>-0,3046</td>
</tr>
<tr>
<td>01.01.2016</td>
<td>1979</td>
<td>0,21</td>
<td>0,22</td>
<td>2378,37</td>
<td>1,433</td>
<td>-0,05</td>
<td>-0,5191</td>
</tr>
<tr>
<td>01.01.2017</td>
<td>2383</td>
<td>0,18</td>
<td>0,17</td>
<td>2669,24</td>
<td>1,124</td>
<td>-0,13</td>
<td>-1,17</td>
</tr>
</tbody>
</table>

Source: compiled by the authors by the data of State Statistic Service and the National Bank of Ukraine [9; 10].

Calculations of the pair correlation coefficients allowed determining the degree of connection between the investigated factors.

As a result of the calculations of partial correlation coefficients, the least significant factors were rejected, and the following were selected as influential factor variables:

- average interest rate on loans in national currency (x₁);
- average NBU discount rate (x₂);
- weighted average rate on the interbank foreign exchange market of Ukraine (at the time of establishing the official exchange rate of hryvnia), UAH (x₃);
- inflation index, annual value (x₄);
- profitability of assets of the banking system of Ukraine (x₅);
- profitability of capital of the banking system of Ukraine (x₆).

Repeated calculations of the pair correlation coefficients allowed determining the degree and direction of connection between the volume of GDP and selected factors.

Table 3

<table>
<thead>
<tr>
<th>Y</th>
<th>X₁</th>
<th>X₂</th>
<th>X₃</th>
<th>X₄</th>
<th>X₅</th>
<th>X₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₁</td>
<td>0,6626</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₂</td>
<td>0,79517</td>
<td>0,78068</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₃</td>
<td>0,94308</td>
<td>0,74032</td>
<td>0,91475</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₄</td>
<td>0,46755</td>
<td>0,78877</td>
<td>0,84172</td>
<td>0,69556</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>X₅</td>
<td>-0,8591</td>
<td>-0,4106</td>
<td>-0,7291</td>
<td>-0,9071</td>
<td>-0,4738</td>
<td>1</td>
</tr>
<tr>
<td>X₆</td>
<td>-0,9221</td>
<td>-0,4916</td>
<td>-0,7508</td>
<td>-0,9301</td>
<td>-0,4213</td>
<td>0,97136</td>
</tr>
</tbody>
</table>

Source: own calculations of the authors.

Data analysis was performed using MS Excel, as a result of calculating the quality of approximation, which is determined by the coefficient of determination = R² and in our case, is close to 1. This means that the impact of the studied indicators X₁, X₂, X₃, X₄, X₅, X₆ on (GDP) is quite high.

The value of the coefficient of multiple correlation R indicates the adequacy of the constructed model.

After calculating the values of independent variables, the regression equation will have the form:
\[ Y = 3158.88 - 10818.13X_1 - 3817.76X_2 + 2.05X_3 - 1394.77X_4 + 8772.15X_5 + 789.28X_6 \]  

(1)

Statistical significance of the independent variables of the model is determined by the t-criterion. Theoretical value of the t-criterion is 2.179, so the variables \( X_3, X_5 \) and \( X_6 \) have a significant impact, and \( X_1, X_2, \) and \( X_4 \) are not statistically significant coefficients, i.e., their influence in the observed period is non-systematic.

Let’s consider the coefficients of partial elasticity, which clearly demonstrate the dependence of the change in the effective indicator of GDP on changes in one of the factor indicators, provided that other factors remain unchanged.

We calculate the partial elasticity coefficients of the constructed model, which characterize the effect of changing the specific weight \( X_i \) on \( Y \) in the assumption that the influence of other factors is absent.

The partial elasticity coefficient shows how many % will change \( Y \) if \( X_i \) changes to 1% and is determined by the formula:

\[ k_{el(i)} = a_i \times X_i \]  

(2)

where, \( K_{el(i)} \) – partial elasticity coefficient;  
\( a_i \) – model parameters to be evaluated;  
\( X_i \) – average values of independent variables of the model;  
\( Y \) – value of the dependent variable of the model\[11\].

Calculations of partial elasticity coefficients were performed in MS EXCEL (Table 4).

<table>
<thead>
<tr>
<th>Elasticity coefficients</th>
<th>Calculation results of partial elasticity coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>( K_{el(1)} )</td>
<td>-1.29</td>
</tr>
<tr>
<td>( K_{el(2)} )</td>
<td>-0.23</td>
</tr>
<tr>
<td>( K_{el(3)} )</td>
<td>1.82</td>
</tr>
<tr>
<td>( K_{el(4)} )</td>
<td>-1.09</td>
</tr>
<tr>
<td>( K_{el(5)} )</td>
<td>-0.18</td>
</tr>
<tr>
<td>( K_{el(6)} )</td>
<td>-0.15</td>
</tr>
</tbody>
</table>

Source: own calculations of the authors based on [11].

The calculate delasticity coefficients for the constructed model indicatet hat the most sign ificantimpact on GD Pisthe exchangerate, while other factor sareless influential. There sults of the factor modeles tima tionarea s: growth of the rate on loans in national currency, as well as growth of the discount rate, negatively influence GDP, theoretically lead to its decrease; however, growth of the exchange rate of foreign currency leads to GDP growth; in turn, inflation leads to a decrease in real GDP in Ukraine; he indicator of return on capital describes the level of efficiency of the use of bank capital, according to calculations it has a positive impact on GDP; the indicator of the profitability of assets of the banking system of Ukraine shows the level of efficiency of the use of bank resources, based on data analysis of the growth of this indicator will lead to GDP growth.

Conclusions. Application of economic-mathematical modeling in the study of the banking sector's activity enabled the collection and streamlining of statistical information based on the analysis of the main parameters of the banking system; using the least squares method, to construct a six-factor linear regression model of the influence of the factors of the banking system on GDP on a matrix basis; to investigate the correlation between the indicators of the NBU discount rate, the exchange rate, inflation, return on assets and capital of the banking system, and the interest rate on loans.

Based on the analysis of bank lending to the real sector of the economy, it is worthwhile to note measures that will increase its level in Ukraine:

- increasing the role of non-bank financial and credit institutions in lending not only to the population but also the real sector of the state's economy;
- promotion of in creasing the credit facilities of commercial banks [12, p. 244];
- reduction of their terestrate through the mechanism of state compensation of the loans cost forenterprises of strategically important sectos of the economy;
- in crease of legal protection of credit or sand creation of institution almotive for attracting banks to lending to enterprises of the realsector of the economy for their innovative development;
- in order to reduce administrative and operation alcosts of commercial banks, it is necessary to introduce a preferential taxation regime for banks thatl end to enter prises of strategically important industrie sand spheres of the economy.

Practical application of the calculations enables to raise the level of bank management of the National Bank in order to ensure the efficient functioning of both individual banking institutions and the banking system as a whole, since the further economic growth of Ukraine, an opportunity to enter the international financial markets and active participation in the globalization processes depend on the stable development of the banking system. A reliable and developed banking sector plays an extremely important role in stabilizing the country's economy.

Development of Ukraine directly depends on the development level of the real sector of the economy, which is possible for the effective implementation of measures of credit policy of banks and non-bank lending institutions, formation of national competitive advantages and creation of a reliable foundation for modernization and integration of Ukraine into the European and world economic space. Therefore, in order to ensure further development of the domestic economy, stability of its operating conditions, profitability of enterprises and the welfare of the population, it is necessary to combine the efforts of all subjects of economic relations.

Prospects for further scientific developments are related to the urgent need for scientific analysis and generalization of best international experience in the field of bank lending to the real economy sector. However, the approaches to bank lending to the economy, which are actively pursued by foreign countries, should be critically rethought taking into consideration the Ukraine's economic reality.
References


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