

Article

Factors Affecting Commercial Bank Loans for Small Businesses: Long-Term and Short-Term Econometric Analysis

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Abstract: In this article, the factors influencing the volume of loans allocated by commercial banks to small businesses are analyzed based on a long-term and short-term econometric approach. The study empirically assesses how internal indicators of the banking sector (capital volume, share of liquid assets, level of non-performing loans, volume of deposits) and macroeconomic factors (interest rate, inflation expectations) affect the dynamics of credit supply. The ARDL (Autoregressive Distributed Lag) and error correction mechanism (ECM) are used as a model, and the presence of a cointegration relationship between variables is checked. Although some factors have a significant impact on the loan amount in the short term, the degree of long-term dependence is not the same for all factors. In particular, bank liquidity and expansion of the deposit base act as a factor stimulating the supply of loans, but the long-term impact of interest rates and the level of non-performing loans is statistically unstable. The stability of the model is checked using the CUSUM test, and the possibility of short-term forecasting is substantiated. This research is of practical importance in terms of increasing the efficiency of financing small businesses, improving bank lending policy, and ensuring macroeconomic stability.

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1. Introduction

In the context of the modern economy, the banking and financial system is one of the main institutional supports for the development of the real sector. In particular, commercial bank loans play a decisive role in the financial support of small businesses and private entrepreneurship. Small business, forming a significant part of the gross domestic product in many countries, plays an important role in ensuring the level of employment and saturating the domestic market with goods and services. In recent years, small businesses in Uzbekistan have also become a factor of sustainable economic growth, occupying a significant share in the structure of GDP. Therefore, the issue of meeting their needs for financial resources, in particular, bank loans, is of urgent scientific and practical importance[1].

The volume of loans issued by commercial banks is directly related not only to the internal financial capabilities of banks, but also to the macroeconomic environment. The adequacy of bank capital, the level of liquid assets, the breadth of the deposit base, and the share of non-performing loans are the main microeconomic factors of the credit supply. At the same time, macroeconomic indicators such as the inflation rate, the base interest rate, inflationary expectations, and overall economic activity also have a significant impact on the lending process. For example, an increase in interest rates can increase the cost of credit resources and limit the ability of small businesses to borrow. On the contrary, under conditions of stabilizing inflation expectations, banks will more actively carry out long-term lending[2].

Theoretically, the formation and development of the credit market is explained by the balance between the supply of credit and the demand for credit. In economic theory, the credit supply model is determined by banks' risk predisposition, resource base, and interest rate policy. Small businesses, on the other hand, usually face certain restrictions on financing due to a lack of collateral, low transparency of financial reporting, and high credit risk. From this point of view, an important scientific task is the econometric assessment of the long-term and short-term impact of banking factors and macroeconomic conditions on the volume of loans.

In recent years, as a result of reforms in the banking sector, the volume of lending has significantly expanded, however, the issue of the quality and stability of the loan portfolio remains relevant. Changes in the share of non-performing loans (NPLs) directly affect banks' ability to issue new loans. If the NPL level increases, banks will tighten their credit policies to mitigate risks. This can limit access to financial resources, especially for small businesses. Therefore, a comprehensive analysis of the factors influencing the volume of loans, both in the long and short term, is relevant[3].

Econometric research allows for a deeper understanding of the lending process. Based on time series data, it is possible to determine the cointegration relationship between variables, check the presence of long-term equilibrium, and assess short-term dynamic adaptation processes. The ARDL (Autoregressive Distributed Lag) model and the error correction mechanism (ECM) are effective tools for determining the influence of factors related to loan volume. This approach shows that the credit supply depends not only on current changes, but also on indicators of the previous period.

The relevance of this research lies in the fact that the formation of a sustainable mechanism for financing small businesses serves to ensure the continuity of economic growth. Sufficient lending increases investment activity, creates new jobs, and stimulates domestic demand. At the same time, the emergence of imbalances in the credit market can negatively affect macroeconomic stability. Consequently, the scientific identification of factors influencing the volume of bank loans and the assessment of their long-term and short-term impact are of great importance for improving economic policy[4].

The main goal of the research is to determine the intra-bank and macroeconomic factors influencing the volume of loans allocated by commercial banks to small businesses based on an econometric model and to assess their long-term and short-term impact. Within the framework of this goal, the relationship between the loan amount and the interest rate on deposits, bank capital, liquid assets, the level of non-performing loans, and inflation expectations is analyzed. The stability of the model and forecasting capabilities are also checked.

In general, an in-depth analysis of the credit activities of commercial banks and an assessment of its impact on the development of small businesses serve to increase the effectiveness of economic policy. By forming a rational credit policy in the banking sector, improving the risk management system, and ensuring macroeconomic stability, it is possible to further strengthen the mechanism of financial support for small businesses. In

this regard, this research has theoretical and practical significance and is devoted to a comprehensive econometric analysis of the lending process[5].

Literature Review

The issue of the influence of commercial bank loans on the development of small business is one of the most actively researched areas in Uzbekistan in recent years. In particular, the connection of the lending process with economic factors, internal indicators of the banking sector, and the influence of the macroeconomic environment are at the center of scientific research. Below is an analysis of some studies conducted in this area.

In his research, A.I. Asrorov analyzed the process of lending to small businesses in commercial banks of Uzbekistan based on econometric methods. Using ARDL and regression models, the author attempted to identify the main factors influencing the volume of lending. The research results show that the resource base of banks, interest rate policy, and macroeconomic stability indicators have a significant impact on lending dynamics. In particular, the priority of short-term factors and the dynamic nature of the lending process are substantiated. This work is significant from a methodological point of view as it made it possible to analyze the loan amount based on a time series[6].

V.K. Olimova studied the practice of lending to small business entities by commercial banks from an institutional and practical point of view. The study analyzes the relationship between the mechanism of credit allocation, the structure of the loan portfolio, and the financial stability of small businesses. The author emphasizes that collateral, interest rates, and bank risk policy play an important role in the lending process. It is also shown that the sufficiency of credit resources and the level of bank liquidity are one of the main factors in financing small businesses. This research has a practical direction and provides recommendations for improving credit policy[7].

B. Zhunussov systematically studied the system of financing small and medium-sized businesses, analyzed existing problems and ways to eliminate them. In the author's opinion, the process of financing small businesses in Uzbekistan is mainly carried out through bank loans, and in this process, credit risks, the share of problem loans, and interest rate policy are of great importance. The study substantiates the need to diversify the financing system, develop alternative financial instruments, and strengthen banking control. Zhunussov's approach is systemic and institutional in nature, linking lending with macroeconomic stability[8].

Summarizing the above research, it can be said that the issue of lending to small businesses in Uzbekistan is largely formed in connection with short-term factors and internal financial indicators of the banking sector. Asrorov revealed the dynamic relationship through an econometric approach, Olimova focused on the institutional aspects of lending practice, and Zhunussov highlighted systemic problems and strategic development directions. Among these studies, the issue of a comprehensive analysis of long-term and short-term relationships based on the ARDL and ECM models is insufficiently covered. This aspect determines the scientific novelty of this research.

2. Material and Methods

This study is aimed at identifying the factors influencing the volume of loans allocated by commercial banks to small businesses and assessing their long-term and short-term impact. The object of the research is the volume of loans allocated by commercial banks of Uzbekistan to small business entities, and the subject is the economic relationship between the bank's internal indicators and macroeconomic factors affecting the volume of this lending. In the analysis, time series data were used, and the data were obtained from the Central Bank of the Republic of Uzbekistan and official statistical sources.

The Autoregressive Distributed Lag (ARDL) model was used in the econometric assessment. This model is effective in working with small samples and allows application

regardless of whether the degree of integration of variables is $I(0)$ or $I(1)$. Initially, the stability of the variables was checked, and then the presence of cointegration was determined using the Bounds test, proposed by Pesaran, Shin, and Smith. If the long-term dependence is confirmed, the short-term dynamic adaptation process was assessed using the error correction mechanism (ECM) model. The negative and statistically significantness of the ECM coefficient represents the recovery rate of the system in cases of long-term deviation from equilibrium.

The reliability of the model was checked by means of diagnostic tests. In particular, autocorrelation, heteroskedasticity, and normal distribution tests were conducted. CUSUM and CUSUMSQ tests were used to determine parameter stability. The variables were entered in logarithmic form, and the results were interpreted as elasticity coefficients. Statistical significance was assessed at the levels of 1%, 5%, and 10%. Thus, the research methodology made it possible to deeply analyze the dynamic features of the lending process and identify short-term and long-term impacts.

3. Results and Discussion

The results showed that there is a short-term relationship between the variables through the cointegration relationship identified in the model, and some factors have a statistically significant influence on the volume of lending. In particular, it was established that the interest rate on deposits of commercial banks and the indicator of problem loans have a positive and significant impact on the growth of loan volumes in the short term. This situation shows that the value of the bank's resource base and the quality of the loan portfolio directly affect the lending dynamicsp[9].

At the same time, the results of the long-term correlation test showed that there is no statistically significant long-term influence of the selected factors on the volume of lending. This means that short-term macroeconomic and microeconomic factors are of paramount importance in the lending process.

The fact that the error correction mechanism (ECM) coefficient is negative and statistically significant confirms the stability of the model and means that deviations from the long-term equilibrium return to equilibrium in the short term. The results of the CUSUM test also show the stability of the model parameters and justify the possibility of using the model for short-term forecasts[10].

Table 1. Cointegration form and short-term dependence test

Variables	Coefficient t	Standard error	t-statistics	Probability
C	0.776507	1.612508	0.481552	0.6335
lnloans(-1)*	-0.266068	0.166923	-1.593957	0.1211
lndeposit_interest_rate**	0.730321	0.353464	2.066180	0.0473
lnprofit(-1)	-0.045504	0.088709	-0.512959	0.6116
dlncapital**	-0.570674	4.563119	-0.125062	0.9013
dlndeposit (-1)	2.060875	3.761403	0.547901	0.5877
dlninflation_expectation(-1)	-2.809001	1.698064	-1.654237	0.1082
dlninterest_rate(-1)	4.901237	3.273745	1.497134	0.1445
dlnliquid_asset(-1)	-3.225751	1.398354	-2.306820	0.0279
dlnnpl**	0.838444	0.462327	1.813530	0.0094
$\Delta(\lnloans(-1))$	-0.541513	0.182851	-2.961504	0.0058
$\Delta(\lnloans(-2))$	-0.541615	0.161115	-3.361669	0.0021
$\Delta(\lnprofit)$	-0.022161	0.076230	-0.290708	0.7732
$\Delta(\lnprofit(-1))$	0.108585	0.066072	1.643416	0.1104

$\Delta(\text{dlndeposit})$	-2.778726	2.773083	-1.002035	0.3241
$\Delta(\text{dlninflation_expectation})$	-0.897396	0.583638	-1.537592	0.1343
$\Delta(\text{dlninflation_expectation}(-1))$	1.717651	0.907544	1.892636	0.0678
$\Delta(\text{dlninflation_expectation}(-2))$	1.009430	0.523139	1.929564	0.0629
$\Delta(\text{dlninterest_rate})$	-0.814477	1.245350	-0.654015	0.5179
$\Delta(\text{dlninterest_rate}(-1))$	-5.874942	2.254097	-2.606340	0.0139
$\Delta(\text{dlninterest_rate}(-2))$	-3.453453	1.794196	-1.924791	0.0635
$\Delta(\text{dlninterest_rate}(-3))$	-2.708201	1.341460	-2.018846	0.0522
$\Delta(\text{dlnliquid_asset})$	-0.000610	0.957940	-0.000636	0.9995
$\Delta(\text{dlnliquid_asset}(-1))$	1.362469	0.518258	2.628938	0.0132
ec = lnloans - (2.7449*lndeposit_interest_rate -0.1710*lnprofit -2.1448*dlncapital + 7.7457*dlndeposit -10.5575*dlninflation_expectation + 18.4210*dlninterest_rate- 12.1238*dlnliquid_asset+ 3.1512*dlnnpl - 2.9185)				

Source: Prepared by the author based on data from the Central Bank of the Republic of Uzbekistan using the Eviews-12.0 program

Indicates statistical significance in 1%, statistical significance in **5%, statistical significance in *10%.

Based on the data of Table 1, when implementing the cointegration form and short-term dependence test, it was found that after correcting the errors, the growth of commercial bank loans to business entities is positively influenced by the increase in the interest rate on commercial bank deposits and problem loans of commercial banks as free variables[11].

According to the hypothesis test, the probability value of the interest rate coefficient of commercial bank deposits is 0.0473, which indicates that it is statistically significant at a 95% confidence level. In addition, it was found that the probability value of the problem loans ratio of commercial banks is 0.0094, which is statistically significant at a 99% confidence level.

The error correction coefficient (ECM) CointEq (-1) is considered significant at a probability value of 0.0000 and a 99% confidence level. This coefficient means that short-term deviations from long-term equilibrium are significantly adjusted quarterly. The CointEq (-1) coefficient of -2.9185 supports a 2.91% correction of short-term detachment from long-term detention[12].

The short-term correlation test shows that the volume of loans allocated to small business entities has a short-term correlation with the deposit interest rate and problem loans.

Table 2. Long-term dependency test

Variables	Coefficient	Standard error	t-statistics	Probability
LNDEPOSIT	2.744867	2.959234	0.927560	0.3608
_INTEREST_RATE	-0.171025	0.521736	-0.327799	0.7453
LNPROFIT	-2.144845	14.54280	-0.147485	0.8837
DLNCAPITAL	7.745672	25.01016	0.309701	0.7589
DLNDEPOSIT	-10.55746	11.78231	-0.896043	0.3771
DLNINFLATION_EXPECTATION	18.42100	15.14592	1.216235	0.2331
DLNINTEREST_RATE				

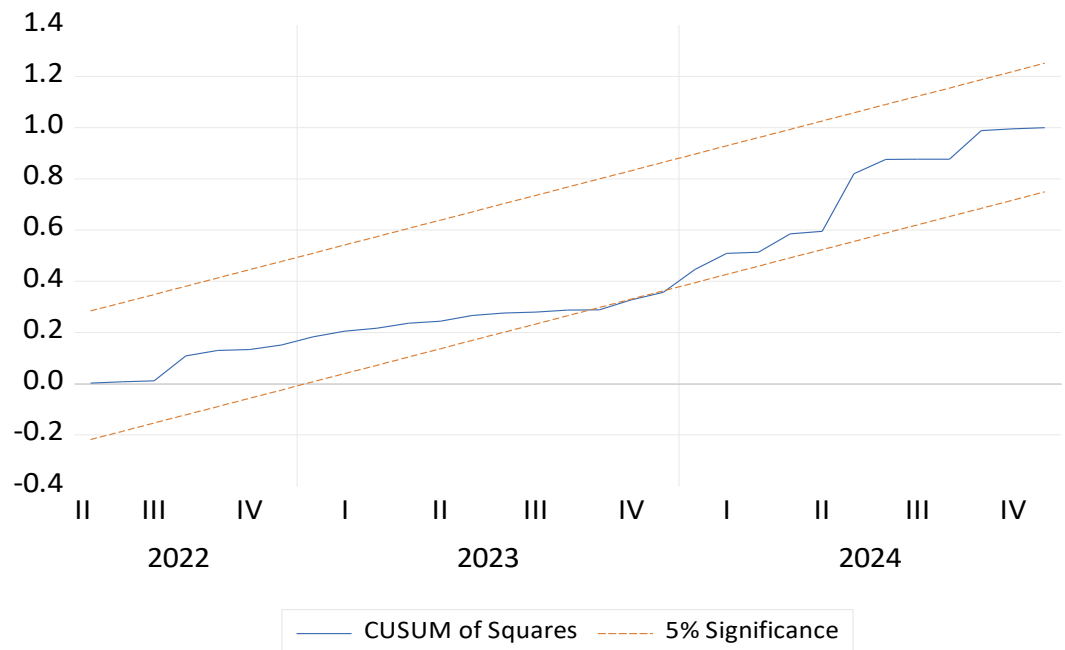
DLNLIQUID_ASSET	-12.12378	16.27969	-0.744718	0.4621
DLNNPL	3.151241	3.048171	1.033814	0.3092
C	2.918453	4.576047	0.637767	0.5283

*** Indicates statistical significance in 1%, ** Indicates statistical significance in 5%, * Indicates statistical significance in 10%.

Source: Prepared by the author based on data from the Central Bank of the Republic of Uzbekistan using the Eviews-12.0 program

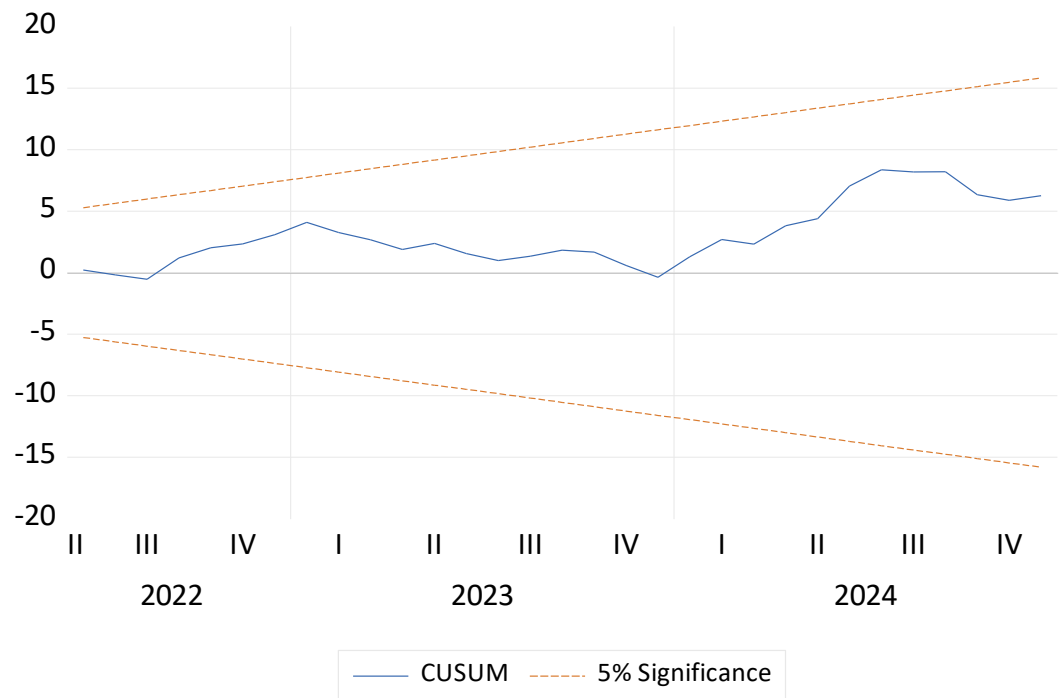
The data in Table 2 show that the long-term correlation test showed a slight change in the influence of factors. In particular, the growth of the volume of commercial bank loans to small business entities is mainly not affected by the increase in interest rates on deposits of commercial banks and problem loans of commercial banks, which is not statistically significant. The coefficient of these indicators is statistically insignificant, and we can see that the degree of reliability of the influence of these coefficients is absent even at 99 percent[13].

As can be seen from the econometric model, the selected variables are only short-term dependencies, therefore allowing for short-term forecasting. To test the strength of our econometric model, we conduct the CUSUM residue test. As can be seen from the CUSUM test, the total sum of the residuals of the variables is considered stable. In addition, the sum of the squares of the remainders of the variables is also stable. Because the interval of residuals does not exceed the five-percent interval of the level of statistical significance. The econometric model, formed based on the results of the CUSUM test, can only make short-term forecasts [Fig. 1][14].



Source: Created by the author using the Eviews-12.0 program based on data from the Central Bank of the Republic of Uzbekistan

Figure 1. CUSUM test for the total sum of residues



As a result of a deep econometric analysis conducted in the autoregressive distributed lag (ARDL) model, the influence of the dependent variable - the interest rate on deposits of commercial banks and problem loans of commercial banks, selected as independent variables, on the growth of the volume of loans of commercial banks to small business entities, was studied[15].

According to the results, with other factors remaining unchanged (*ceteris paribus*), a 1% increase in the interest rate on commercial bank deposits leads to a 0.73% increase in the volume of loans allocated to small businesses. It was also determined that a 1% increase in problem loans of commercial banks will lead to a 0.83% increase in the volume of loans[16].

The research results show that in the short term, the dynamics of problem loans, interest rates on deposits, and changes in bank liquid assets have a significant impact on the volume of lending. Therefore, when implementing monetary policy and developing a bank liquidity management strategy, it is necessary to ensure a close connection with credit policy. In particular, taking into account short-term factors, it can be concluded that improving the mechanisms of risk management and efficient resource allocation in the banking system can have a positive impact on the volume of financing of small business entities[17].

4. Conclusion

In this study, the factors influencing the volume of loans allocated by commercial banks to small businesses were comprehensively analyzed based on a long-term and short-term econometric approach. Using the ARDL model and the error correction mechanism (ECM), the dynamic relationship between variables was assessed, and short-term and long-term effects were compared. The obtained results showed that the lending process is formed mainly under the influence of short-term factors.

According to the results of the empirical analysis, the deposit interest rate and the problem loans indicator have a statistically significant impact on the loan volume in the short term. In particular, it was found that an increase in the deposit interest rate contributes to the expansion of the volume of credit resources, and a change in the share of non-performing loans also has a significant impact on lending dynamics. This means

that credit policy and risk management mechanisms play an important role in the banking sector.

However, the results of long-term correlation tests showed that the selected factors did not form a stable cointegration relationship with the loan amount. Consequently, the lending process is formed more in relation to short-term financial and macroeconomic conditions than to long-term fundamental equilibrium. This confirms the importance of taking into account the operational economic environment and current indicators when making decisions in the banking sector.

The statistical significance of the error correction coefficient showed that the model is economically logically correct and that the system has a certain degree of rapid adaptation in the event of a deviation from long-term equilibrium. The results of the CUSUM test confirmed the stability of the model parameters and substantiated the possibility of short-term forecasting.

In general, the research results show that the internal financial condition of the banking sector, interest rate policy, and the quality of the loan portfolio are important in increasing the efficiency of small business financing. When forming monetary policy, taking into account the liquidity of the bank, the stability of the deposit base, and the level of non-performing loans can serve to maintain the volume of lending at the optimal level.

Thus, econometric analysis showed the priority of short-term factors in the process of financing small businesses and created a scientific basis for the development of practical recommendations for further improvement of credit policy.

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