
Regional Development and Banking Activities

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Abstract:

This article is a continuation of studies devoted to the interaction of the region and its banking system. The research object in this article is the banking system of the Rostov region, the Southern Federal District, and its impact on the acceleration of socioeconomic development of both the regions.

The subject of the study is interaction of banks with the real sector of the economy and the population of the region. The authors analyzed the scientific sources exploring the interaction of the banking and real sectors of the economy and methodological approaches to the analysis of banking activities's effects on the region and its socio-economic indicators.

Based on econometric modeling, quantitative and qualitative regularities of the indicators are revealed. As a result, authors concluded that the growth in the total volume of profits received by existing credit institutions contributes to the growth of such important socio-economic indicators like Gross Regional Product, internal costs of research and development, labor productivity, fixed asset investments, per capita income, growth of deposits attracted by credit institutions, as well as the growth in the amount of debt on loans extended by credit institutions to legal entities and individuals.

Keywords: *Socioeconomic development of the region, banking activity, profit, funds raised and allocated, deposits, Gross Regional Product, econometric analysis, fixed assets, debt on loans.*

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1. Introduction

Regions play a crucial role in solving the priority tasks of social and economic development, determining economic growth and raising the welfare level of regions and the Russian Federation in general. The key set for a state regulation at meso-level is ensuring the self-sufficiency of the regional economy and regions' budgets, implemented through the stimulation of regional economic growth.

Granting that in 2017 the share of budget loans in the public debt of the regions of the Russian Federation came to 48%, bank loans to 28%, and also considering the program of restructuring budgetary credits of the regions, started on 01.01.2018, we assume that the financial burden of most regions will significantly increase in the near future. So, the role of an efficiently functioning banking system as one of the priority instruments for ensuring stable economic growth in the region, is substantially strengthened due to contributing to the creation of a resource base for infrastructure and socioeconomic projects, support financial stability in crisis situations, provision of the regional economy with funds used to ensure the continuity of settlements between business entities (Zolotarev *et al.*, 2015).

In this regard, the need to improve the banking system of the region constantly becomes the focus point of regional authorities, banking, business communities, and this trend is increasing in the face of unfavorable macroeconomic conditions and the implementation of import substitution policies. In order to achieve optimally coordinated and effective solutions in this area, it is necessary to ground on a detailed analysis of the regional banking system as well as take into account the parameters of its effect on the social and economic development of the region. The aim of this article is to analyze the impact of the functioning of the regional banking system on the socio-economic development of the region. The authors apply the econometric modeling tool to reach the goal and solve the indicated problem.

2. Theoretical, Empirical, and Methodological Grounds of the Research

The assumption of a significant relationship between the development of the real and banking sectors of the economy arose even in the period when the economy was emerging as a science itself. It was A. Smith who concluded in 1776 that the activities of Scottish banks become a stimulating factor in economic development in Scotland (Smith, 1993). Later Lo and MacLeod, and at the beginning of the XX century, A. Gan and J. Schumpeter argued that bank credit became the decisive force of economic development as well as a source of innovative forms of entrepreneurial activity. Innovations in turn, play an important role in triggering mechanisms and levers in the process of economic growth, is reflected in a number of models of P. Romer (1986; 1988) and R. Lucas (1994), the now-popular concept of endogenous growth or a new theory of growth. To date, a number of theoretical approaches that deal with the interaction of the banking and real sectors of the economy in different ways, has been formed. It is a pure evidence not only of the

diversity of established judgments but also of the controversy of many theses. One thing is clear; the real and banking sectors of the regional economy are closely interrelated and reveal the specifics right in this interaction. Quantitative and qualitative parameters characterizing the development of the banking sector in the region will depend on the scope and quality of economic development, and the dynamics of regional general economic conditions in turn, is determined by the main characteristics of the banking system (Zolotarev *et al.*, 2013; Anureev, 2017; Thalassinos *et al.*, 2013; Japparova and Rupeika-Apoga, 2017).

The most justified methods of studying the effect of the results of banking activities' influence on the social and economic development of the region in our opinion include the following works with some shortcomings.

The thesis of Kryksin (2005) "Formation of regional banks development strategy as a condition of increasing business activity," emphasizes the analysis on identifying trends in the interaction of the banking sector with other sectors of the regional economy, which in our opinion is important, but not enough for a complete analysis.

A certain aspect of the analysis of the regional banking system is highlighted it the research of Milenkov (2005) "The banking sector of the region and its impact on the social and economic development of the territory". The author does not utilize methods of econometric analysis of credit institutions' impact, which in our view, narrows the scope of analysis.

The study of the literature devoted to the analysis of the state of banking systems in the regions revealed the lack of a single generally accepted and generally accessible methodological approach to the study of banking activities' impact on the socio-economic development of the region.

3. Materials and methods

The authors built two groups of models:

- 1) models of region's socioeconomic dependence on the effectiveness of credit institutions' activity (on the example of the Rostov region);
- 2) models of regional banking systems' effect on the GDP and investment in fixed assets in the regions of the Southern Federal District (SFD).

During the study, the socio-economic development indicators of the region were selected via logical and statistical analysis to construct the econometric models presented in Table 1 (Batischeva *et al.*, 2017). The indicators proposed characterize aspects of socioeconomic development of the region: the economic potential of the region and the level of efficiency of its use; innovative development; standards of living; demographic factors; situation in the regional labor market; transport infrastructure; economic risk (Shekhovtsov *et al.*, 2017; Stroeva *et al.*, 2015).

Table 1. Indicators of region's socioeconomic development

Indicator name	Indicator description
1	2
GDP	gross regional product, million rubles.
IF	volume of investments in fixed assets, million rubles,
GDP/P	labor productivity in the economy (the ratio of the gross regional product to the number of employed in the economy of the region), rubles;
INI	internal R&D costs, million rubles.
CIN	monetary income of the population per capita, rubles. (per month)
P	number of economically active population, million people
RG	birth rate - the number of births per 1000 people;
TR	density of roads, km per 1000 sq. km.

As indicators characterizing the efficiency of credit institutions, the following were considered:

PR - total volume of profit received by operating credit institutions, mln. Rub.

VK - deposits (deposits) of individuals and legal entities (in rubles and currencies) raised by credit institutions, million rubles.

ZD - the amount of debt on loans in rubles and foreign currency provided by credit institutions to legal entities and individuals, million rubles.

The initial information on the selected factors was provided by Rosstat, the Bank of Russia for the Rostov region for 2000-2015.

The calculations were carried out using the EVIEWS econometric software. Statistical analysis of the constructed models was carried out using the F-criterion (the significance of the equation as a whole was estimated); Student's test (the significance of regression coefficients was estimated); the determination coefficient R² (the measure of the quality of the regression equation, the Breusch-Godfrey test (the test for autocorrelation in the residues); the White test (heteroscedasticity test) was also evaluated (Eliseeva, 2015).

Elasticity coefficients were calculated to conduct economic analysis. Statistical analysis of the constructed econometric equations (Tables 2, 3 and 4) indicated that they are significant; for each of the constructed regression equations, the calculated values of the F-test are greater than the tabulated values for the 5% significance level. A t-criterion regression coefficients' test showed that factors included in the model have a significant effect on the dependent variable; all regression coefficients are significant at the 5% level.

All the indexes of regression coefficients correspond to the economic essence of the influence of the arguments on the function. The values of multiple correlation ratios show a fairly close relationship of factors included in the model with the dependent variable. The models obtained could be characterized by a sufficiently high degree of determination, the absence of autocorrelation in the residues, and the absence of heteroscedasticity. Models of dependence of socioeconomic development of the region (on the example of the Rostov region) on credit institutions' effectiveness are presented in Table 2.

Table 2. Models of financial-socioeconomic indexes' effect (model group 1).

Model Num.	Regression equation	R ²	E
1	2	3	4
1.1	Model of dependence of internal R&D costs (INI) on profit (PR): $\ln(INI) = 3,853 + 0,703 \cdot \ln(PR) + \varepsilon$	0,802	0,703
1.2	Model of the dependence of gross regional product (GDP) on profit (PR): $\ln(GDP) = 9,661 + 0,495 \cdot \ln(PR) + \varepsilon$	0,842	0,495
1.3	Model of labor productivity in the economy (GDP / P) versus profit (PR): $GDP/P = 108,48 + 0,133 \cdot PR + \varepsilon$	0,819	0,566
1.4	Model of the dependence of investment in fixed assets (IF) on profit (PR): $\ln(IF) = 7,904 + 0,547 \cdot \ln(PR) + \varepsilon$	0,840	0,547
1.5	The model of the dependence of per capita monetary income of the population (CIN) on profit (PR): $\ln(CIN) = 6,232 + 0,442 \cdot \ln(PR) + \varepsilon$	0,969	0,442
1.6	Model of dependence of transport infrastructure development (TR) on profit (PR): $\ln(TR) = 4,305 + 0,113 \cdot \ln(PR) + \varepsilon$	0,756	0,113
1.7	The model of the dependence of the birth rate (RG) on profit (PR): $\ln(RG) = 1,742 + 0,088 \cdot \ln(PR) + \varepsilon$	0,789	0,088
1.8	The model of the dependence of investments in fixed assets (IF) on deposits (VK): $\ln(IF) = 4,379 + 0,627 \cdot \ln(VK) + \varepsilon$	0,961	0,627
1.9	The model of the dependence of investment in fixed assets (IF) on the amount of debt on loans (ZD): $\ln(IF) = 4,317 + 0,598 \cdot \ln(ZD) + \varepsilon$	0,964	0,598
1.10	The model of the dependence of the gross regional product (GDP) on deposits (VK) and the amount of debt on loans (ZD): $\ln(GDP) = 5,658 + 0,496 \cdot \ln(VK) + 0,134 \cdot \ln(ZD) + \varepsilon$	0,996	$E_{VK} = 0,496,$ $E_{ZD} = 0,134$
1.11	The model of the dependence of labor productivity in the economy (GDP / P) on deposits (VK) and the amount of debt on loans (ZD): $\ln(GDP/P) = -1,876 + 0,519 \cdot \ln(VK) + 0,101 \cdot \ln(ZD) + \varepsilon$	0,996	$E_{VK} = 0,519,$ $E_{ZD} = 0,101$
1.12	The model of the dependence of the per capita cash income of the population (CIN) on deposits (VK) and the amount of debt on loans (ZD):	0,990	$E_{VK} = 0,283,$ E_{ZD}

	$CIN = 3042,28 + 0,022 \cdot VK + 0,018 \cdot ZD + \varepsilon$		=0,471
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Econometric analysis of the 1.1-1.12 provides us with the conclusion that the factors of financial activity of the credit organizations of the Rostov region included in these models have a positive impact on the socioeconomic development of the region, i.e., the development of the banking sector has a significant impact on region's economic development (Eliseeva, 2015):

1. An 1% increase in the total volume of profits received by existing credit institutions, contributing to:

- an increase in domestic expenditure on research and development by 0.70% (model 1.1);
- growth of the gross regional product by 0.50% (model 1.2);
- growth of labor productivity in the economy by 0.57% (model 1.3);
- growth of investments in fixed assets by 0.55% (model 1.4);
- an increase in average per capita income of the population by 0.44% (model 1.5);
- development of transport infrastructure by 0.11% (model 1.6).

2. An 1% increase in deposits of individuals and legal entities (in rubles and currencies) attracted by credit institutions contributes to:

- growth of investments in fixed assets by 0.63% (model 1.8);
- growth of the gross regional product by 0.50% (model 1.10);
- growth of labor productivity in the economy by 0.52% (model 1.11);
- an increase in average per capita income of the population by 0.28% (model 1.12).

3. An 1% increase in the volume of debt on loans in rubles and foreign currency provided by credit institutions to legal entities and individuals contributes to:

- growth of investments in fixed assets by 0.60% (model 1.9);
- growth of the gross regional product by 0.13% (model 1.10);
- growth of labor productivity in the economy by 0.10% (model 1.11);
- an increase in average per capita income of the population by 0.47% (model 1.12).

In the construction of the second group of models (models of regional banking systems effect on the gross regional product and investments in fixed assets in the regions of the Southern Federal District), the socio-economic development of the region (see Table 1) and the financial sector indicators listed in Table 3 .

The initial information on the selected indicators (Table 1, Table 3) was provided by Rosstat, Rostovstat, and Bank of Russia for the regions of the Southern Federal District (six regions in total) for 2012-2015. The information is the panel data. Models of regional banking systems' impact on indicators of social and economic development of the region are presented in Table 4.

Table 3. Indicators of credit companies' activity

Indicator name	Indicator description
1	2
X1	Assets of all credit institutions , thousand rubles: - credit organizations registered in the region; - at the head offices of credit institutions and branches located in the region .
X2	Loans, deposits and other placements for all credit institutions located and registered in the region, thousand rubles.
X3	Volume of loans extended to individuals and non-financial organizations by all credit institutions located and registered in the region, thousand rubles.
X4	Overdue debt on loans extended to all credit institutions located and registered in the region, thousand rubles.
X5	Customer funds for all credit institutions located and registered in the region, thousand rubles.
X6	Funds of organizations for all credit institutions located and registered in the region, thousand rubles.
X7	Funds of customers and organizations for all credit institutions located and registered in the region, thousand rubles.
X8	Deposits, customer and organization funds for all credit institutions located and registered in the region, thousand rubles.
X9	Loans, deposits and other placed funds in rubles and currencies on settlement accounts for credit institutions registered in the region , thousand rubles.
X10	Customer's funds in rubles and currencies on settlement accounts for credit institutions registered in the region, thousand rubles.
X11	Funds of organizations in rubles and currencies on settlement accounts for credit institutions registered in the region, thousand rubles.

Table 4. Models of credit organizations' impact on SFD regions' socioeconomic development (model group 2)

	Regression equation	R ²	E
	2	3	4
Gross regional product models			
2.1	The model of dependence gross regional product a (GDP) of assets for all credit institutions located and registered in the region (X1): $GDP = 159069 + 1,536 \cdot X1 + \varepsilon$	0,983	1,074
2.2	The model of the dependence of the gross regional product (GDP) on loans, deposits and other placed funds for all credit institutions located and registered in the region (X2): $\ln(GDP) = 4,883 + 0,737 \cdot \ln(X2) + \varepsilon$	0,969	0,737
2.3	The model of the dependence of the gross regional product (GDP) on loans to individuals and non-financial organizations for all credit institutions located and registered in the region (X3): $\ln(GDP) = 4,784 + 0,754 \cdot \ln(X3) + \varepsilon$	0,966	0,754
2.4	The model of the dependence of the gross regional product (GDP) on customer funds for all credit institutions located and registered in the region (X5): $\ln(GDP) = 3,053 + 0,838 \cdot \ln(X5) + \varepsilon$	0,994	0,838
2.5	The model of the dependence of the gross regional product (GDP) on the organizations' funds for all credit institutions located and registered in the region (X6):	0,990	0,820

	$\ln(GDP) = 4,583 + 0,820 \cdot \ln(X6) + \varepsilon$		
2.6	The model of the dependence of the gross regional product (GDP) on the funds of customers and organizations on all credit institutions located and registered in the region (X7): $GDP = 124521 + 1,938 \cdot (X7) + \varepsilon$	0,992	1,056
2.7	The model of the dependence of the gross regional product (GDP) on deposits, customer accounts and organizations on settlement accounts for all credit institutions located and registered in the X8 region): $\ln(GDP) = 2,872 + 0,830 \cdot \ln(X8) + \varepsilon$	0,992	0,830
2.8	The model of the dependence of the gross regional product (GDP) on loans, deposits and other placed funds (X9), customer funds (X10) and funds of organizations (X11) in rubles and currencies on settlement accounts for credit institutions registered in the region: $GDP = -121763,6 + 2,392 \cdot X9 + 9,577 \cdot X10 + 8,851 \cdot X11 + \varepsilon$	0,986	$E_{X9}=0,130,$ $E_{X10}=0,594,$ $E_{X11}=0,123$
	Investments models		
2.9	The model of dependence of investments in fixed assets (IF) on loans, deposits and other placed funds in rubles and currencies for all credit institutions located and registered in the region (X2): $\ln(IF) = 2,666 + 0,786 \cdot \ln(X2) + \varepsilon$	0,926	0,786
2.10	The model of dependence of investments in fixed assets (IF) on loans extended to individuals and non-financial organizations in rubles for all credit institutions located and registered in the region (X3): $\ln(IF) = 2,543 + 0,805 \cdot \ln(X3) + \varepsilon$	0,935	0,805

4. Results

The analysis of 2.1-2.8 models indicates a close direct dependence of the financial sector indicators' impact on the Gross Regional Product in the constructed models:

- an increase of 1% in all credit institutions located and registered in the region (model 2.1), contributes to the growth of the gross regional product by 1.07%;
- an increase of 1% in loans, deposits and other placements for all credit institutions located and registered in the region (model 2.2), contributes to the growth of the gross regional product by 0.74%;
- an increase of 1% in loans to individuals and non-financial organizations for all credit institutions located and registered in the region contributes to the growth of the gross regional product by 0.75% (model 2.3);
- when comparing the degree of impact of the customer's funds and the funds of organizations on the growth of the gross regional product, the first place goes to clients' funds, the second place - to the funds of the organizations: a 1% increase in customer funds (for all credit institutions located and registered in the region) will cause the growth of the gross regional product by 0.84% (model 2.4), and the growth of 1% of the organizations' funds (for all credit institutions located and

registered in the region) will cause the growth of the gross regional product by 0.82% (model 2.5). A similar relationship between variables is also observed in the multiple regression model (model 2.8).

Analysis of equation (2.8) shows that the factors have a significant impact on the gross regional product. Maximum strength of impact belongs to customer funds: the growth of customer funds on settlement accounts of credit institutions by 1% (with the same value of other factors included in the model) contributes to the growth of the gross regional product by 0.59%. The second place in terms of the strength of influence is the funds of organizations: 1% growth (with the same value of other factors included in the model) contributes to the growth of the gross regional product by 0.13%. The growth of credits by 1% (with the same value of other factors included in the model) contributes to the growth of the gross regional product by 0.12%.

The model (2.8) is a linear model of multiple regression. Each of the regression coefficients in this equation represents the marginal productivity of the corresponding factor. The marginal productivity of a factor is the volume of increase in output obtained from each unit of increment of this production factor. In the model (2.8), the regression coefficient for variable X10 comes out at 9.58. Thus, the increase in customer funds by 1 million rubles will cause an increase in the gross regional product by 9.58 million rubles (with the same value of the remaining factors of the model). Similarly, the increase in organizations' funds (X11) by 1 million rubles will cause an increase in the gross regional product by 8.85 million rubles (with the same value of other factors of the model). Similarly, the increase in the volume of loans, deposits, and other allocated funds (X9) by 1 million rubles will cause an increase in the gross regional product by 2.39 million rubles (with the same value of other factors of the model).

Analysis of 2.9-2.10 models reveals that the development of credit activities of regional banks positively affects the growth of investments in fixed assets. This is indicated by the positive values of the elasticity coefficients of all the factor variables included in these models:

- an increase of 1% in loans, deposits and other placements for all credit institutions located and registered in the region (model 2.9) contributes to the growth of investments in fixed assets by 0.79%;
- an increase of 1% in loans extended to individuals and non-financial organizations by all credit institutions located and registered in the region (model 2.10) contributes to the growth of investments in fixed assets by 0.81%.

5. Conclusions and recommendations

1. The econometric models of socioeconomic development of the region (based on the example of the Rostov region) allowed us to establish not only quantitative, but

also qualitative patterns of impact of the indicators of the banking sector on the indicators of social and economic development of the region:

- growth in the total volume of profit received by operating credit institutions contributes to the growth of crucial socioeconomic indicators like: gross regional product; internal costs of research and development; labor productivity in the economy; investments in fixed assets; per capita incomes of the population;
- the growth in deposits raised by credit institutions, as well as an increase in the amount of debt on loans provided to legal entities and individuals, contributes to the growth of: investment in fixed assets; labor productivity in the economy; gross regional product; per capita income of the population.

2. Econometric analysis of the regional credit organizations' impact on the Gross Regional Product (based on the example of the Southern Federal District) made it possible to evaluate the role of the banking sector in the production; the activation of lending activity for all credit institutions located and registered in the region positively affects the economic development of the region; if we compare the impact degree of customers' funds, organizations' funds, and deposits on the growth of the Gross Regional Product, then customers' funds are leaders in terms of the strength of influence, funds of organizations and deposits are on the second and third place correspondingly.

3. Econometric analysis of banking sector impact on the investment processes (on the example of the regions of the Southern Federal District) made it possible to assess the positive role of the banking sector in the development of investment processes.

The results obtained on the basis of the created models are of practical interest, since the analysis of the constructed models makes it possible to determine which activities should be oriented on the economic policy of the region in order to accelerate its economic development.

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