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INSTITUTIONAL CONDITIONS OF INTERACTION OF FINANCIAL-CREDIT AND INNOVATIVE ECONOMIC SECTORS

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Abstract. In this article, the authors consider one of the most important issues in the development of the Kazakhstani economy - strengthening the innovation component, capable of ensuring economic growth regardless of export revenues of the oil and gas sector of the country. According to the authors, the solution of this strategic task directly depends on the vector of state regulation, which should be characterized by integration and proportionality in ensuring more active and productive interaction of subjects of financial and credit and real (including innovation) sectors of the economy. In this regard, the authors, based on the use of a systems approach and the theory of institutionalism, carried out economic and mathematical modeling on data from a number of countries, allowing to determine the degree of influence of regulatory institutional measures on the quality of interaction between the subjects of these sectors. The obtained results allowed formulating a number of conclusions that can be a starting point in terms of improving the current regulatory system in the Republic of Kazakhstan.

Keywords: Financial - credit sector, real and innovative sector, system of state regulation, interaction, economic development

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1. Introduction

The evolution of world economic systems over the past decades indicates the emergence of trends associated with increased external shocks, market volatility, a slowdown in economic growth, a weakening of ties between material production and the financial and credit sector, and the excessive reliance of the authorities on the impact of regulatory measures on financial stability and economic development in whole. In turn, these phenomena have led to a concentration of risks in both the financial and real sectors amid tightening of regulatory requirements for

financial and credit organizations, an intensive consolidation process in the banking sector and predominant government support for systemically important market players, which further delays these sectors from active and effective interaction. This thesis is confirmed by a comparative assessment of the degree of participation of financial and credit sector entities in the development of innovations in Kazakhstan with similar indicators in foreign countries: 1) the share of innovation-active enterprises of the total number of business entities following the results of 2018: in Kazakhstan it is no more than 10%, while in Germany - 79%, in Sweden - 60%, in France - 54%, in the UK - 45%; 2) the share of real sector enterprises engaged in technological innovation of their total number at the end of 2018: in Kazakhstan also does not exceed 10%, while in Germany - 64.2%, in Belgium - 60%, in Sweden - 48.5%, in the Netherlands - 47.1%, in Finland - 46.4%, in Austria 43.9%, in the UK - 32.7% (2019).

The development of the economy of the Republic of Kazakhstan according to the model of industrial-innovative development takes place in the context of one of the main priorities of the state regulation policy, which is aimed at ensuring the sustainability of the national economy in the context of global turbulence and competition. It is about building up the innovative potential of the country, active generation and practical application of innovative achievements and technologies, the results of which can be used to ensure sustained economic growth. In particular, the President's Address to the People of Kazakhstan "Third Modernization of Kazakhstan: Global Competitiveness" states the need to create a new model of economic development that can increase the country's competitiveness in world markets, including through industrial modernization and the use of digital technologies (2019).

The relevance of the implementation of the model of industrial-innovative development is due to the participation of external shocks, volatility in the commodity and financial world markets, a significant reduction in economic growth, asymmetric position of the financial and credit and real sectors of the economy, low efficiency of regulatory measures in terms of enhancing the interaction of these sectors and many others. Unfortunately, all these factors not only do not contribute to the active interaction of the financial and real sectors of the economy, but further alienate them from each other. Attempts to stimulate business activity in the economy are still insufficient, which affects the persistence of problems and contradictions in the process of interaction between sector actors, as evidenced by macroeconomic indicators. So, if in 2001 the growth rate of GDP in Kazakhstan reached its historical maximum of 13.5%, then by the end of 2018, the value of this indicator decreased to 4.1% (2019). At the same time, the level of annual inflation did not change significantly over the same period, amounting to 8.4% and 6.1% for the same periods, respectively (2019).

The existing conditions of vital activity of the subjects of the interacting sectors - persisting inflation, high cost of financial and credit resources provided on a long-term basis to enterprises with a long duration of production and innovation cycles, weak technical and technological component of most small and medium enterprises (except for the giants of the national industry, whose products are focused on exports and those that are managed by foreign investors are actually and representing transnational companies), high risks in both sectors, strict regulation of financial market entities require the improvement of the regulatory system of financial and credit entities in order to increase their financial support for the real and innovative sectors of the economy against the background of the institutional vacuum.

As the situation shows, the further effective development of small and medium-sized enterprises (SMEs) is constrained by significant financial deficiencies, which include insufficient amounts of financial support. The market economy is characterized by a multiplicity of sources of financial support for production costs, forms and methods, principles and conditions of financing. Optimization of the relationship between forms of financial security is carried out by the state through its financial policy (Bekaert, Lundblad 2015; Uakhitzhanova et al. 2017).

2. Methodological approach

The methodological basis of this study is the work of scientists in the field of the development of theories: systems, finance, credit, interaction, information asymmetry, institutionalism and state regulation of the economy. Using a systematic reproduction approach in the study allows you to show the process of interaction between the financial and credit and real (including innovative) sectors of the economy as a set of functioning elements of the economic system that influence each other as a relationship between the whole and its individual parts and confirm the thesis that quality the latter's interaction largely determines the sustainable development of the modern economic system (the impact of macroeconomic trends on the economic development).

Simultaneously, the study is also based on the development of the founders and followers of the theory of institutionalism, whose attention is focused on the analysis of the conditions that determine the viability of the mechanisms for coordinating the interests of fully functioning and developing economic entities, as well as the state and society.

It should be noted that the connection between the two methodological paradigms is due to the fact that it is the institutions that determine not only the flow, but also the nature and boundaries of the ongoing economic processes, ensure the integration of the public whole, smooth out the conflicting interests of many system elements (in this case, the subjects of financial and credit real (innovative) sectors and the state), which, ultimately, determine the stability of the functioning of both the elements themselves and the uniform of megaeconom system.

3. Materials and methods

The study used the method of economic-mathematical modeling to determine the degree of influence of institutional factors on the activity of financial institutions in the innovation sector of the economy. At the same time, the analysis of the scientific literature indicates the ambiguity of the impact of financial intermediaries on economic growth. So, F. Rioja, N. Valev (Rioja, Valev 2014) emphasize the nonlinear nature of the interaction of the financial system and economic growth. According to the authors, there are three groups of countries depending on the level of development of the financial system, in which the impact of financial intermediaries on economic growth is different: 1) in countries with a low level of financial intermediation, improvements in the financial sector do not affect economic growth; 2) in countries with an average level of financial development, even small improvements in the financial sector have a significant positive effect on economic growth; 3) for countries with a high level of financial intermediation - the effect is positive, but insignificant.

Authors such as L. Deidda, B. Fatia (Deidda, Fatia 2015) note a nonlinear and non-monotonic relationship between the level of concentration in the banking sector and the rate of economic growth. At the same time, on the one hand, increased specialization and division of labor in the financial sector have a positive impact on economic growth, on the other hand, they lead to an increase in investment, which slows down the process of economic growth.

Basic Diamond models (Diamond 1984), L. Kaas, G. Weinrich (Kaas, Weinrich 2015) determine the dependence of economic growth on the endogenous behavior of the financial sector in the economy. In the work of Fu-Sheng (2017) using the non-linear model of endogenous growth with financing investments through the credit market, the ambiguity of the impact of changes in this situation is shown.

In general, after analyzing a number of econometric models presented in the scientific literature, we can divide them into two types: Type 1 - models for assessing the impact of the financial system on economic growth through increased investment; Type 2 - models that study the impact of financial intermediaries on technical progress, the innovative activity of firms and the quality of investments.

At the same time, in the economic literature there are examples of models using both temporal and panel data series for different samples of countries, which confirm the presence of a statistically significant positive correlation between the level of development of the financial sector and its individual segments and economic growth rates, as well as a causal relationship between them (Schumpeter, 1982).

Most authors in studies conduct empirical verification of statistical data (on time or panel series) using the standard regression equation (1), when potentially significant variables are included in the set of regressors that reflect political, geographical, economic, social and other factors:

$$y_i = a_0 + \sum_e a_e x_{ei} + \sum_p b_p z_{pi} + \sum_r c_r D_{ri} + \varepsilon_i$$

where:

y_i – GDP growth rate in the i-th country;

a_0 – constant;

a_e – economic variable coefficient;

x_{ei} – economic variables (investment, capital, human capital, etc.);

b_p – coefficients for additional variables;

z_{pi} – additional variables (political, social, geographical, etc.);

c_r – coefficient at dummy variable;

D_{ri} – dummy (dummy) variable reflecting the group effect (for example, regional, etc.);

ε_i – random component.

4. Qualitative and Quantitative Research

Unlike previous researchers, we set the task of combining the two types of models into one, because the interaction of financial-credit and real (including innovation) sectors is considered by us as a systemic dynamic process occurring within a larger mega-economic dynamic system, which requires Simultaneous use in the model of such significant factors of economic development as growth of investments, innovations and development of the institutional environment that affect the character, quality and The direction of the interaction process subjects said sectors (Kleiner, 1997).

The Paneldata source of data was the statistical database of the World Bank's macroeconomic indicators (The World Bank - www.data.worldbank.org) (2019), on the basis of which macroeconomic indicators were collected for 15 countries over the past 40 years. Countries were grouped into 3 groups:

- 1 group - developed countries (United Kingdom, Denmark, Germany, Netherlands, Norway, Singapore, USA, Finland, Switzerland, Sweden). The choice of countries united in the first group was due to the high position of each of them in the ranking of the Global Innovation Index (<https://www.globalinnovationindex.org/Home>), published annually by the international business school INSEAD (2019).

- 2 group - developing countries of BRICS. Taking into account that the positions of the countries of the first group on a number of macroeconomic indicators are quite high compared to Russia and Kazakhstan, data on Brazil, India and China, with the exception of the Republic of South Africa, were entered into the model due to the lack of certain statistical indicators in the World Bank database.
- 3 group - Russia and Kazakhstan. The Russian Federation is assigned to the 3rd group of countries along with the Republic of Kazakhstan due to the similarity of trends.

Work with panel data was carried out in the statistical package Stata 12.

The proposed model was based on a wide range of indicators of a temporary and spatial nature, given that the process of interaction between sectors is influenced by a set of interrelated micro, meso and macroeconomic factors, and the subjects are distinguished from each other by the specifics of their activities and institutional environment (Ahmed, Ansari 2018).

One of four main methods was chosen as a measure of institutional characteristics - based on macroeconomic indicators - characterizing the degree of maturity of the relationship between the studied sectors (the amount of bank loans extended to the private sector (in% of GDP), the GDP deflator (index), the amount of investment (in% to GDP), the level of refinancing rate (in%), tax rates (in%), reserve requirements (in% of total assets), etc (Chatelain, Amable 2001).

The logic of structuring the groups of dependencies of macroeconomic parameters in the proposed model is based on the key factors of economic development that are directly related to the process of interaction between the financial and credit and real (including innovation) sectors.

The following variables were chosen as dependent (explained) and independent (explaining) variables:

1) $GDP_{growth_{it}}$ (vector of GDP growth rate values,% (GDPgrowth (annual%)) is a macroeconomic indicator reflecting the dynamics of the value of all goods and services produced, characterizing the rate of economic growth in group i at time t and considered as the following function (2) :

$$GDP_{growth_{it}} = f(GDP_{deflator_{it}}; inv_{it}; tech_{exp_{it}}) \quad (2)$$

2) $Credit_{it}$ (vector of values of domestic bank credit to the private sector, in% of GDP (Domestic credit to private sector by banks (% of GDP)) - a macroeconomic indicator of the role of banks in the development of the economy in the group i at time t , determined in accordance with the formula (3):

$$credit_{it} = f(inf_{it}; dep_{int_{it}}; lend_{int_{it}}; refin_{it}; npls_{it}; risk_{prem_{it}}; bank_{res_{it}}; bank_{cap_{it}}; tax_{rate_{it}}) \quad (3)$$

At the stage of preliminary data analysis, checking the series for stationarity and cointegration showed that the data are strictly non-stationary and cointegrated, which required the use of the panel cointegration method.

But on the macrodata, this method often gave an error, which led to the choice of two classical models of panel data at once, in order to check the stability of the obtained results:

- the combined regression model or the generalized least squares method (“PooledS” model) - does not take into account the panel data structure and the differences between the temporal and individual

effects of the objects under consideration. It assumes that all errors ε_{it} uncorrelated with all explanatory variables x_{it} .

Ordinary OLS – assessments β are well-off and efficient:

$$y_{it} = x'_{it} \beta + \varepsilon_{it} \quad (4)$$

• model with a fixed effect (FE – fixed effect model) - allows to take into account the immeasurable individual differences of objects (effects) (7):

$$y_{it} = \alpha_i + x'_{it} b + e_{it}, \quad (5)$$

where α_i expresses the individual effect of object i (in this case, groups of countries), independent of time t (in this case from 1985 to 2014), with regressors x_{it} do not contain a constant.

5. Results

The results of the assessment of the dependence of GDP growth rates and the growth of innovations and investments, presented in Table 1, showed that in the first group of developed countries, the most significant positive factor of economic growth (at a significance level of 99.9%) are innovations (0.105 by PooledOLS and 0.131 by FE). The model results showed that investments, despite the rather high level of significance of the coefficient obtained (99%), in the group of developed countries occupy only the second place in the structure of factors of economic growth (0.135 Pooled OLS).

In the second group of developing countries, BRICS showed the greatest positive impact on economic growth with a level of confidence of the obtained coefficients at the level of 99%; (0.147 by FE). At the same time, the share of R-squared dispersion explained by the PooledOLS model was 63%. As can be seen from formulas (10) and (11), just as in the first group of developed countries, the crisis of 2008 exerted a decline in economic growth in Brazil, India and China. (-4.048 by Pooled OLS and FE).

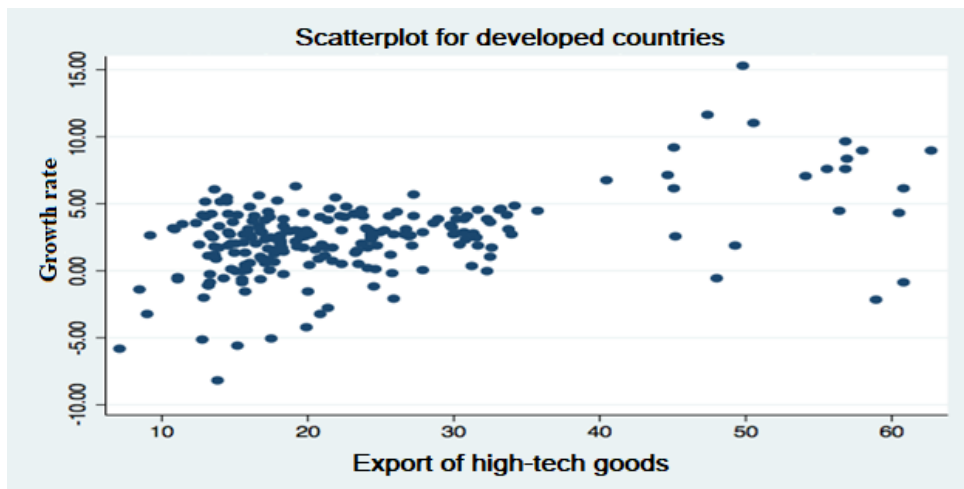
We believe that the obtained result confirms the thesis that economic development in Russia and Kazakhstan is due to the historically established raw structure of the economy, and economic growth in modern conditions is still achieved due to income from the export of raw materials and investment growth in traditionally developed extractive industries. At the same time, the share of the R-squared dispersion explained by the FE model is rather high and amounts to 56%.

The dynamics of the dependence of GDP growth and exports of high-tech goods by groups of countries is presented in Figure 1.

Table 1. Results of testing the dependence of the GDP growth rate on the GDP deflator, investments and innovations

Variables	1 st group of countries (developed countries)		2 nd group of countries (BRICS countries)		3 ^d group of countries (Russia and Kazakhstan)	
	Pooled OLS	FE	Pooled OLS	FE	Pooled OLS	FE
	GDP growth		GDP growth		GDP growth	
GDP deflator	-0,044***	-0,044**	0,001	0,018***	-0,001	-0,002
Investments	0,135**	0,117	0,345***	0,361***	0,451***	0,469**
Innovations (techexp)	0,105***	0,131***	-0,072	0,147**	-0,001	-0,049
Constant	0,530	0,339	-3,015***	-4,091*	-5,789	-7,257**
Observations	220	220	69	69	37	37
R-squared	-	-	0,627	0,305	0,208	0,563
Number of id	-	-	-	3	-	2
* p < 0.05, ** p < 0.01, *** p < 0.001 (1 st group of countries) Standard errors in parentheses * p < 0.01, ** p < 0.05, *** p < 0.1 (2 nd and 3 ^d groups of countries)						

Source: compiled and calculated by authors



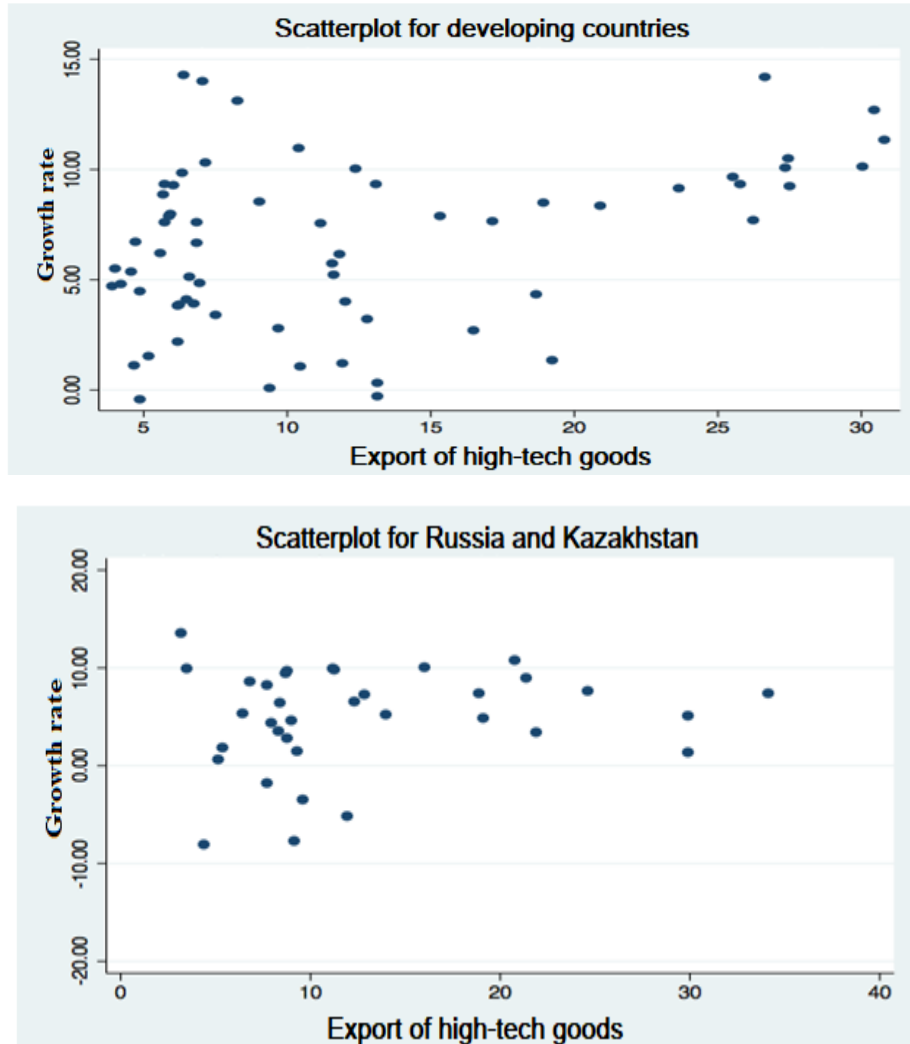


Figure 1. The scatter diagram of data showing the dependence of GDP growth and exports of high-tech goods
Source: compiled by authors

Within the framework of the second level of dependence, the task was set to determine the impact of variables reflecting the existing institutional environment on the domestic bank credit as one of the most common instruments of influence of financial and credit institutions on innovation activity in the real sector. In other words, within the framework of one model, along with an assessment of the impact of innovations and investments on economic growth (realization of external effects), the task was to determine the impact of regulatory institutions, the distribution of risks and resources on the interaction of financial and credit and real (including innovation) sectors of the economy (realization of internal effects) (Levine, 2015, 2016).

The results presented in Table 2 showed the difference in the influence of central bank regulatory instruments (in particular, monetary policy) on the growth of bank lending as the predominant form of interaction between the financial and credit and real (including innovation) sectors. So, while in the group of developed countries (0.355 for PooledOLS and 0.632 for FE) and BRICS countries (3.041 for PooledOLS), a significant dependence of domestic bank credit on the refinancing rate was noted, in Russia and Kazakhstan this trend was not revealed.

It is also necessary to point out the negative impact on credit growth in Russia and Kazakhstan of the risk premium (-0.214 by POLS), which is higher than in foreign countries, as well as tax rates in the group of developed countries (-5.276 by FE) and in Russia and Kazakhstan (-0.573 by pols). For example, this is illustrated by the example of the countries of the first group of developed countries in Figure 2 and 3. In these countries, in the aftermath of the global financial crisis, tax rates were significantly increased compared to countries such as Russia and Kazakhstan, which remained lower tax rates.

The lack of correlation between the refinancing rate and the dynamics of bank lending suggests that this instrument of state regulation of the financial market does not work and is not a valid indicator of changes in market interest rates set by commercial banks. Not the effectiveness of such an important instrument of regulation by the financial regulator generates a chain interrelated problems and related consequences that limit the interaction of financial and credit Nogo, and real (including innovation) sectors. These include: increased cost and inaccessibility of credit resources adequate in terms of time and cost, sectoral and regional imbalances, poor state and low competitiveness of industries and enterprises of the non-commodity sector, low transparency of sector entities against the backdrop of a complicated reporting system and stricter government regulation, the corruption component in both sectors and many others.

In other words, against the background of the institutional conditionality of the process of interaction between the financial and credit and real (including innovative) sectors of the economy, the effect of the “regulation - risks - resources” problem hub is aggravated. The presence of some problematic ligament due to a causal relationship of the three node components or the system "3 R":

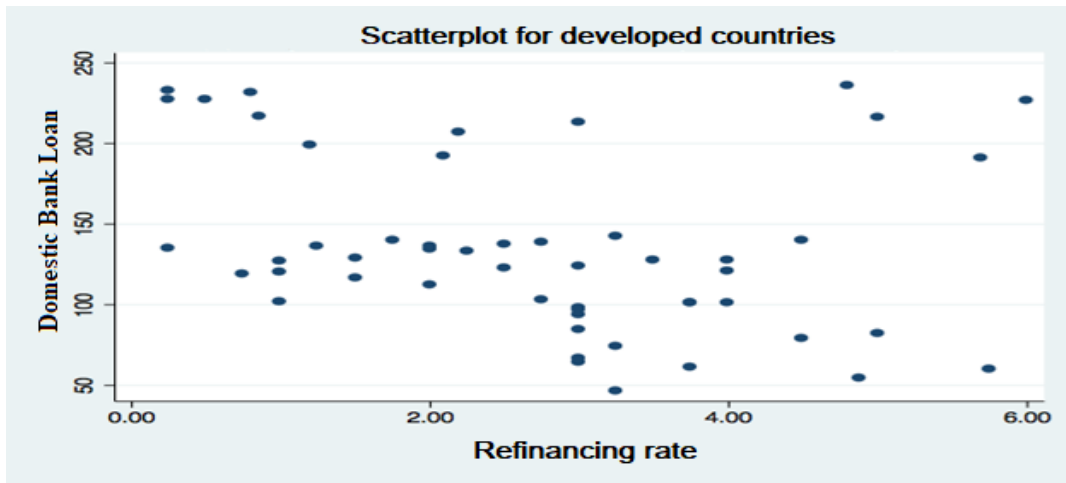
- the regulatory component (regulation) incorporates such problems as: sectoral and regional imbalances, the state and competitiveness of industries and enterprises of the non-commodity sector, low transparency of the subjects of the financial and real sectors against the background of a complicated reporting system and stricter financial regulation, a corruption component in both sectors other (North, 2017).
- the risk component (risks) combines such problems as the opposition of interests of subjects of financial and real sectors, information asymmetry, growth of speculative transactions, deterioration in the quality of financial assets, tightening of regulatory and banking policies, unavailability of services, state and potential of sectors, changes in market conditions and others (Coase, 2013).
- the resource component (resources) finds its manifestation in an insufficient level of public confidence in the financial and credit system, the growth of fund-raising funds, a shortage of long-term liquidity at the micro, meso and macro levels of interaction between sectoral actors, capital outflows outside the country, and the absence of effective mechanisms for investing funds from funds long-term accumulation, underdevelopment of refinancing tools, weak stock market, financial literacy of subjects and many others (Akerlof 1970).

Table 2. Results of testing the dependence of domestic bank loans on various institutional conditions

Variables	1 st group of countries (developed countries)		2 nd group of countries (BRICS countries)		3 ^d group of countries (Russia and Kazakhstan)	
	Pooled OLS	FE	Pooled OLS	FE	Pooled OLS	FE
	Domestic Bank Credit to the Private Sector (credit)		Domestic Bank Credit to the Private Sector (credit)		Domestic Bank Credit to the Private Sector (credit)	
% loan rate (lendint)	-6,938	-	0,496	-	0,631	-

total tax rate (tax rate)	0,903	-5,276***	1,544	-	-0,573***	-
% deposit rate (depint)	-	4,047**	-	-	-	-
credit risk premium (risk prem)	-	-	3,614	-	-0,214*	-
% refinancing rate (refinan)	0,355**	0,632**	3,041	-	0,631	-
bank reserves to assets (bankres)	0,019*	0,226**	2,816	-	-0,421***	-
Constant	145,2***	131,0***	-3,061	-	-	-
Observations	51	141	12	-	9	-
R-squared	-	-	1,000	-	0,435	-
Number of id	-	-	-	-	-	-
<p><i>t</i>statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (1 группа стран)</p> <p>Standard errors in parentheses * $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$ (2 и 3 группы стран)</p>						

Source: compiled and calculated by authors



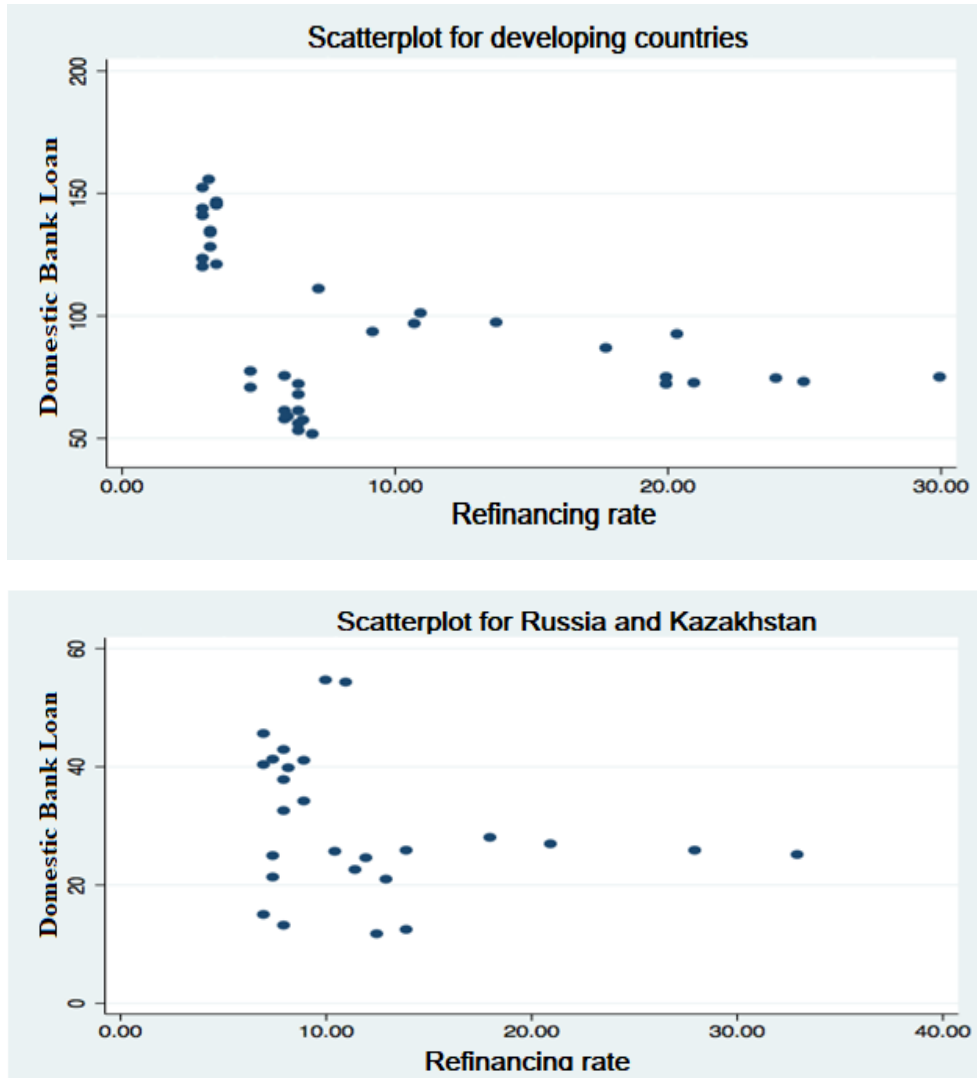
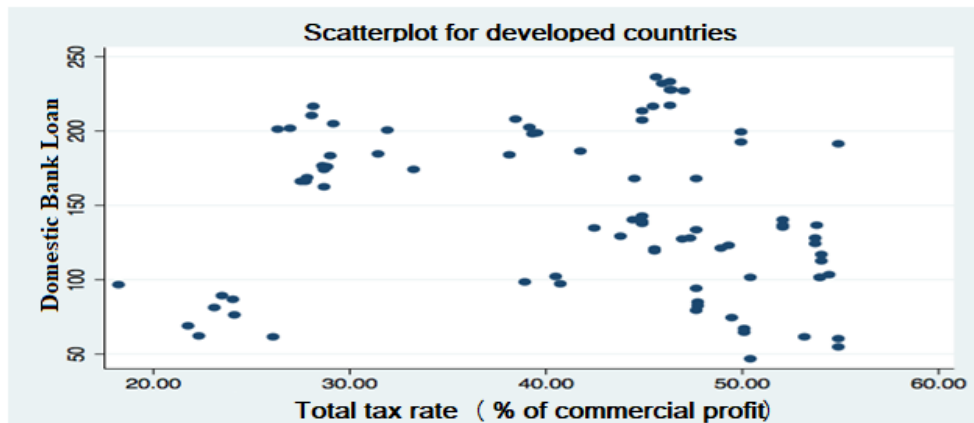


Figure 2. The scatter diagram of data showing the dependence of bank lending on the refinancing rate of the Central Bank
Source: compiled by authors



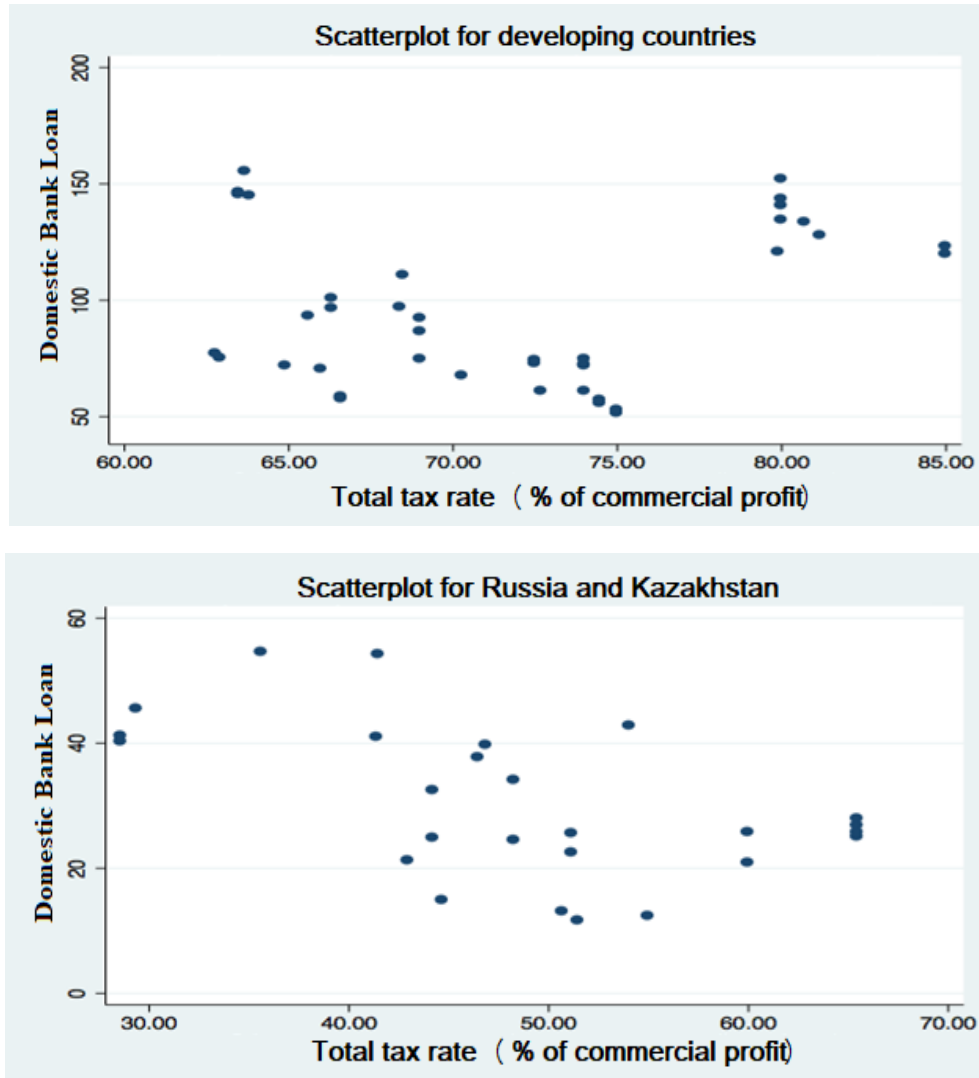


Figure 3. The scatter diagram of data showing the dependence of bank lending on the level of taxation
 Source: compiled by authors

5. Discussions

The obtained results allowed to draw a number of conclusions:

- Innovation has a strong influence on the dynamics of GDP growth in developed countries and, to a lesser extent, in countries with rapidly emerging markets, compared with Russia and Kazakhstan, where investments from the oil and gas sector continue to be the main driver of economic growth (Kalkabayeva et al. 2017);
- for Kazakhstan, the strong impact of bank loans on innovations in the real sector was revealed, which predetermines their prospects in the short and medium term against the background of a shortage of domestic and limited budget sources for financing investments;
- found that in Kazakhstan, compared to developed countries and BRICS countries, there is no strong dependence of investments on inflation, which should be the basis for eliminating distortions in the conduct of restriction policies of the central bank, aggravating and preserving problem nodes in the area of interaction between the banking and real sectors of the economy (Blauberg 1969);

- based on the assessment of the impact of the innovation activity indicator (negative impact of R & D costs) and use in modeling time lags, it was determined that in the short and medium term for Kazakhstan, the impact of short and medium-term bank loans is most significant for the purchase of ready-made innovations in the context of catch-up development (Veblen, 2014);
- groups of dependencies in the model provided a result confirming the asymmetry of state regulation measures, when with a significant impact of public resources on investment compared to bank loans, this effect on innovation does not occur, despite the fact that the policy of industrial-innovative development is being implemented (Rozmainsky, 2018);
- it proved that there is no relationship between the level of the refinancing rate and the domestic bank loan in Kazakhstan, therefore, the manipulation of the discount rate by the central bank cannot affect the availability and expansion of bank lending, as the most topical form of interaction between the banking and real sectors of the economy, including due to the endogeneity of banks' behavioral strategies;
- revealed the negative impact of specific pricing on bank resources, including through the current practice of taxation and a relatively high risk premium on the expansion of bank lending, as a simultaneous manifestation of the actions of the problem nodes we identified: “risks”, “resources”, “regulation”.

Conclusions

Pronounced globalization processes and trends in financial and economic turbulence today have exacerbated issues related to ensuring the sustainable development of national economic systems, including through the harmonious intersectoral interaction of various economic actors. In this study, an attempt was made to simulate country panel data to prove the significant impact of the regulatory system on the intensity and quality of interaction between the two strategic sectors for any economy - financial and credit and real (including innovation) sectors of the economy against the background of a strong correlation between economic growth rates and innovation component.

At the same time, the ability of the process of interaction of financial-credit and real (including innovative) sectors of the economy to simultaneously generate effects (as expected results at different levels) as the resulting system element led to an inter-country comparative analysis of indicators of the role of interaction between economic sectors in order to determine their current and perspective positioning. The results of the analysis showed that Kazakhstan's lag behind a number of developed countries is caused by various institutional conditions affecting the potential and capabilities of the interacting sectors.

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