

# Clarivate

# FINANCIAL SECTOR ASSETS, REAL INNOVATION AND ECONOMIC GROWTH: ASSESSMENT OF INTERCONNECTION AND INFLUENCE OF REGULATORY INSTRUMENTS\*

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**Abstract.** The authors raise the actual problem of weak intersectoral interaction of subjects of the financial-credit and innovation sectors of Kazakhstan. Currently, asymmetric processes are observed not only in the interaction of two strategically important sectors for the economy, but also in the asymmetric nature of the impact of regulatory instruments on the process of their interaction. This is a consequence of a largely non-integrated and disproportionate government policy, which in recent years has been characterized by one-sidedness and narrow focus in stimulating and supporting certain sectors and industries. In this regard, the authors carried out a three-level assessment of dependencies to determine the degree of influence of innovation activity on the rate of economic growth, the degree of influence of financial-credit organizations on the results of innovation activity and the degree of influence of the current regulatory instruments on the investment activity of the financial sector. As a result of the construction and use of an econometric model, results were obtained that confirm the hypothesis formulated by the authors about the creative role of systemic regulation, but also reveal the existing potential and points of convergence of financial-credit organizations with the innovative sector of the economy.

Keywords: financial and credit organizations; innovation sector; intersectoral interaction; regulatory institutions

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# 1. Introduction

In modern conditions of global geopolitical changes, volatility in the commodity and financial markets, frequent cyclical fluctuations and the rapid growth of integration processes, the issues of ensuring sustainable development of the national economy by deepening the diversification of its structure and increasing competitiveness in the field of innovations in the real sector of the economy come to the fore. These issues are especially relevant for Kazakhstan with a slowdown in economic growth and continued dependence of the economy on the income of the oil and gas sector. The existing practice in the country of relations between the financial and innovation sectors of the economy shows that even with the presence of potentially successful ideas, the desire to financially support these projects is reduced to almost zero due to the low risk appetite of financial and credit institutions and the tightening requirements of the financial regulator. The emerging trends, the presence of unsolved problems and at the same time the accumulated potential of private financial and credit organizations in Kazakhstan emphasize the ambiguity and relevance of this study, the need for a critical rethinking of the process of regulation the activities of financial and credit organizations for more effective interaction with innovative enterprises in the new conditions of the development of the world economy.

# 2. Theoretical background

Currently, the role of state regulation as a direction in resolving these problems is growing. Many scientists and experts are of the opinion that the solution of the complex task of reorienting investments in the sphere of expanded reproduction and modernization of fixed assets in the real sector is impossible without embedding incentives in the process of macro regulation. Moreover, the experience of a number of countries in America, Asia and Europe (period 1997-2010) testifies to the productivity of this regulatory paradigm (Pradhan, Arvin, Nair, Bennett, 2020). Overcoming the increased appetites of monopolies and financial and credit structures, reorienting them to meet the financial needs of the real sector, will possible only with government support and stimulation of structural and technological restructuring of the economy by stimulating innovation (Rakhmetova, 2015)

The analysis of problems about the relation between the financial and innovative sectors of the economy' study indicates that there is a link between indicators of the development of the financial sector, real innovation and economic growth (Majeed, Iftikhar, Atiq, 2019). Some studies are devoted to the interaction of various factors (Niyazbekova, Grekov, Blokhina, 2016). For example, a study of 6,422 enterprises in 22 emerging economies found that lack of an access to credit resources hinders innovation. This statement is particularly true for firms that are limited in alternative sources of financing (Qi, Ongena, 2020). Studies of Spatareanu M., Manole V., Kabiri A. emphasize the importance of bank financing for the innovative activities of British firms. The authors found out the problems of stability of banks during the crisis of 2008 and 2011 affected the innovative development of companies negatively (Spatareanu, Manole, Kabiri, 2019). In the study of Khan MK., Kaleem A., Zulfigar S., Akram U. the relation between the various sources of financing used by Chinese firms and the intensity of their research and development were analyzed. The choice of funding source for research and development depends on financial constraints (Khan, Kaleem, Zulfigar, Akram, 2019).

Wang HZ., Yin DS., Zhang XTTN., Zhen XT. applied regression analysis to investigate universal banks as an important source of external financing and their impact on the results of innovative activity of borrowing firms. The authors also explore other sources of funding for innovation in firms (Wang, Yin, Zhang, Zhen, 2019). A study of the use of bank credit lines to finance research and development investments based on the data of 939 firms from 17 European countries was conducted by a group of researchers Guney Y., Karpuz A., Ozkan N. The results of the study showed that provided credit lines had a positive and significant impact on investment in

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research and development (Guney, Karpuz, Ozkan, 2017). Kim S., Lee H., Kim J. investigate the various effects of external financing (bank loans, equity and bond issues) on the technological innovation activities of Korean listed companies. They found that indirect external financing through bank loans affected the technological innovation activities of Korean firms negatively, while direct external financing through the issuance of securities had a positive impact (Kim, Lee, Kim, 2016).

A significant part of the research was conducted on the basis of panel and time series data using standard regression equations, including the introduction of various significant variables (factors that are significant for the result). Researchers Diamond D, Weinrich G., Kaas L. in their work used a model of dependence between the indicator of economic growth and the endogeneity of behavioral strategies of banking system subjects (Kaas, 2018). As a basis, scientists had taken such types of assets as money supply and securities (corporate shares and government bonds). Evidence of growth of the money supply that leads to a decrease in the yield on government securities, and to an increase in the yield on corporate shares had been uncovered. In turn, the direction of bank investments in corporate stocks encourages economic growth.

The endogenous growth model reveals a non linear relationship between the rate of economic growth and the performance of the banking sector by Dieda L., Fatya B. In particular, scientists have identified a contradictory impact of the activities of banking sector entities on the economy: positive – increasing trends in the division of labor and specialization, and negative - competition between banking sector entities and increased speculation in the stock market (Deidda, 2002). Authors Hung F. and Kosren R. we applied a non-linear model of endogenous growth and identified the impact of bank credit operations on economic growth through innovation financing. As in previous models, the ambiguous impact of the credit mechanism on economic growth is shown here (Hung, 2012).

We believe that the fundamental basis for the prevention of emerging contradictions in the context of intersectoral interaction between the financial-credit and innovation sectors of the economy is the adjustment of the vector of the current system of state regulation. In this regard, the central hypothesis of this study is to identify the role of state systemic regulation on the nature and quality of interaction between the financial-credit and innovation sectors, and, as a consequence, on economic growth. Our hypothesis, in context of a systems approach, allows us to formulate the following questions: 1) What is the impact of innovation in the real sector on the rate of economic growth? 2) What is the impact of various sources of investment financing on the growth of innovation? 3) What is the role of the assets of financial-credit organizations in financing real innovations? 4) What is the degree of influence of government regulation instruments on the activities of financial-credit organizations, on the intensity and trajectory of intersectoral interaction? – which we check using correlation-regression analysis.

# 3. Research objective and methodology

To confirm our hypothesis about the role of regulatory measures on the interaction of financial-credit and innovation sectors, within the framework of this scientific study an economic and mathematical model was developed. The novelty of the research is the application of an integrated approach to the construction of an economic and mathematical model based on the identification of a causal relationship at three levels: the first level – the impact of the results of innovative activities on economic growth; the second level is the influence of financial assets on the growth of the innovation sector and the third level – the influence of regulatory instruments on the investment activity of financial and credit institutions (Figure 1).

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Figure 1. Logic and structure of the conducted econometric research

#### Source: compiled by the authors

For empirical data analysis, we applied econometric modeling methods, in particular correllation-regression analysis with the construction of paired and multiple linear regression models. The choice of correllation-regression model is due to the fact that it is this model that allows us to confirm our hypothesis and answer the formulated questions as much as possible. The PPP Stata 13 was used as a modeling tool and graphical illustration of dependencies was performed in Excel. The statistics were taken from World Bank's international database (www.worldbank.data.org) and databases of the National Bank of the Republic of Kazakhstan for the last 25 years from 1993 to 2017 (www.nationalbank.kz). It should be noted that the research limitations in the modeling being carried out were certain indicators, the values of which were not available due to their absence in the statistical databases we used (such as reserve rates in the context of financial-credit organizations, the share of medium-term loans issued to enterprises of the innovation sector, etc.)

### 4. Results and discussion

1. To assess the first group of relationships (the impact of innovation results on economic growth), we used an indicator reflecting economic growth – GDP growth rates (gross domestic product) in % per year and an indicator of innovation performance – exports of high-tech goods, as a % of industrial exports. The dependent variable was the GDP growth rate (% per year) for the study period. The indicator of exports of high-tech goods (in % of industrial exports) was used as an independent variable. The correlation analysis showed a weak causal relationship between these variables, since the correlation coefficient between GDP growth rates and exports of high-tech goods was equal to r = 0.18 (Figure 2).

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Figure 2. Diagram of dependence between GDP growth rates and the results of innovation activity in the Republic of Kazakhstan

Source: compiled by the authors

The regression equation has the following form:

GDP=2,1782+0,0925Inn (2,27) (0,11) ' where: GDP - GDP growth rate (% per year), Inn - exports of high-tech goods (% from industrial export).

Obtained results show that exports of high-tech goods in Kazakhstan do not affect the GDP growth rate in this period significantly, which confirms the thesis that economic development in Kazakhstan is still determined by the historically established structure of the economy, the development of which is mainly due to income from raw materials exports and investment growth in traditional sectors of the extractive sector. At the same time, recent trends in the development of the global economy, which are mainly characterized by frequent cyclical fluctuations and geopolitical changes in the world, require deeper diversification and effective structural adjustment in Kazakhstan strongly. However, in countries with more diversified economies and less dependence on mineral exports, on the contrary, there is a correlation in the first group of indicators (table 1). In particular, the countries with the largest innovation component that affects GDP growth rates include the United States (0.089,/0.15), Sweden (0.198/0.11), (United Kingdom (0.173/0.26).

Table 1. Models of dependence of GDP growth rates on exports of high-tech goods in cross-country context

Country	Constant	Regression coefficient	$R^2$
United States	0.279 (1.153)	0.089* (0.044)	0.15
Sweden	- 0.237 (1.848)	0.198 (0.117)	0.11
United Kingdom	- 2.119 (1.515)	0.173*** (0.059)	0.26

Note: Standard errors are shown in parentheses: \* denotes significance at the 10 percent level;

\*\* denotes visibility at the 5 percent level; \*\*\* denotes significance at the 1 percent level.

Source: compiled by the authors

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2. Within the framework of modeling indicators for the second group of dependencies (the impact of financial assets on the growth of the innovation sector), we have made an attempt to determine the degree of the greatest impact of various sources of innovation financing on the growth of the innovation sector. In this regard, we have grouped all existing relevant factors that can influence the growth of innovation in domestic conditions into appropriate groups, in order to assess the degree of correlation with the performance indicator of the innovation sector for each group (table 2).

Investment	Bank loans	Assets	Stock market
1 group	2 group	3 group	4 group
R & d expenditures ( <i>I</i> <sub>1</sub> , % of GDP)	Domestic credit to the private sector by banks $(C_l, \% \text{ of GDP})$	Banking assets (A1, % of GDP)	Market capitalization of listed domestic companies ( <i>F</i> <sub>1</sub> , % of GDP)
Fixed capital investment ( <i>I</i> <sub>2</sub> , % compared to the previous year)	Long-term bank loans to legal entities ( $C_2$ , % of GDP)	Pension assets $(A_{A2}, \% \text{ of GDP})$	Shares outstanding, total value $(F_2, \% \text{ of GDP})$
Foreign direct investment ( <i>I</i> <sub>3</sub> , % compared to the previous year)	Short-term loans of second- tier banks ( <i>C</i> <sub>3</sub> , % of GDP)	Assets of insurance companies (A3, % of GDP)	

Table 2.	Grouning	of sources	of innov	ation	financin	g indicators
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Source: compiled by the authors

The sources of statistical data for this group of dependencies were statistical indicators from the World Bank database (www.worldbank.data.org), National Bank of the Republic of Kazakhstan (www.nationalbank.kz) and the Committee on statistics of the Ministry of National economy of the Republic of Kazakhstan (economy.gov.kz) for the period from 1995 to 2018. The obtained data was previously systematized and grouped. The choice of the indicator "export of high-tech goods in the total volume of industrial exports" is justified by the fact that the practice of determining key indicators in the development of the innovation sector of Kazakhstan and economically developed foreign countries differs significantly. Thus, the main indicators in the field of innovation development, which are calculated by domestic statistical agencies, are mainly quantitative data (number of patents, the number and share of innovative-active enterprises, the number of enterprises, the share of research and development expenditures implementing high-tech innovations, etc.) in Kazakhstan, but the methodology of World Bank uses as a key indicator in the field of innovation development an indicator, that reflects, in our opinion, the final result of innovative entities – "the share of high-tech products in the total volume of industrial exports", which we took as a dependent variable. For each group of factors, a correlation analysis of the relationship with the indicator of exports of high-tech goods in the Republic of Kazakhstan (*Inn*, % of industrial exports) was conducted and a corresponding regression model was developed.

The regression equation in this case has the following type:

 $\begin{array}{c} Inn = & 78,88 + & 78,33 \cdot I_1 - & 0,22 \cdot I_2 - & 0,14 \cdot I_8 \\ (10,9) & (29,6) & (0,05) & (0,07)' \end{array}$ 

In particular, the results of analysis of the first group of factors ("investment») also have shown that there is a feedback link between exports of high-tech goods in Kazakhstan and expenditures on research and development (R & d) ( $r_{Inn,I_1} = -0.52$ ). The obtained result confirms the thesis that the quantitative growth of innovation

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activity indicators, including the growth of research and development expenditures, do not provide a guaranteed impact on the quality of work of subjects of the innovation sector in the Republic of Kazakhstan and, above all, on the results of their activities. In this case, we should note the weakness of the institutional infrastructure represented in Kazakhstan by a network of specially created development institutions (JSC "National Agency for technological development" (LLC «Natr»), JSC "Development Bank of Kazakhstan", JCS "QazTech Ventures", Kazakh Export, Kazakhstan project preparation Fund, etc.) which are aimed at stimulating the growth of the national economy at the expense of public funds. However, the activities of these organizations on the background of realization of strategy of industrial-innovative development, in our view, without full competition from private financial-credit institutions, as it can be seen from the obtained results, work only for the execution of mainly quantitative indicators (The concept of development of financial sector of Kazakhstan until 2030, State program of industrial and innovative development of the Republic of Kazakhstan for the period 2015 -2019). Moreover, both investments in fixed assets and direct foreign investments do not show a positive effect on the resulting indicator ( $r_{Inn,I_s} = -0.53$ ;  $r_{Inn,I_s} = -0.48$ ) (Figure 3).



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Figure 3. Diagram of the dependence of innovation performance on a number of indicators: research and development expenditures, foreign investment and investment in fixed assets in the Republic of Kazakhstan

#### Source: compiled by the authors

This result is not accidental, it confirms the choice of Kazakhstan's industrial sector enterprises, of the so-called, "catch-up development" model according to which the owners of enterprises (both domestic and foreign investors) do not invest resources in innovative development, but purchase ready – made high-tech equipment in partner countries in order to level the time factor. The use of ready-made foreign equipment and technologies is evidenced by the activities of such industrial companies as: JSC "Arcelor Mittal Temirtau", LLP "Corporation Kazakhmys», «Tengizchevroil", "Karachaganak Petroleum", and others that work in the extractive sector [18].

Assessment of the impact of factors of the second group ("Bank loans») showed the strongest correlation with the export of high-tech goods indicators of domestic lending to the private sector and long-term bank lending to legal entities, since the pair correlation coefficients have values  $r_{Inn,C_1} = 0.62$ ;  $r_{Inn,C_2} = 0.65$ . At the same time, short-term loans from second-tier banks do not have a positive impact on the development of innovations, since поскольку  $r_{Inn,C_n} = -0,06$ . This can be explained by the fact that the terms of short-term lending and the conditions for its provision do not coincide with the duration of the full innovation cycle.

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Taking into account the fact that the indicators of domestic lending to the private sector and long-term lending to legal entities are very closely interrelated, it is advisable to evaluate separate models:

 $Inn = 5.43 + 0.49 \cdot C_1$ (4.61) (0.14) '
and  $Inn = 16.0 + 1.8 \cdot C_2 - 3,03 \cdot C_3$ (3.86) (0.25) (0.65) '

All regression coefficients are statistically significant. At the same time, with an increase in the share of domestic loans to the private sector in GDP by 1%, the share of exports of high-tech goods in industrial exports will grow by 0.49%. Similarly, an increase in the share of long-term bank loans to legal entities in GDP by 1% will contribute to an increase in the share of exports by 1.8%. While an increase in the share of short-term bank loans in GDP by 1% leads to a decrease in the share of exports by 3.03% (Figure 4).



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Figure 4. Diagram of the dependence of the results of innovation activity and indicators of bank lending, including the context of credit terms in the Republic of Kazakhstan

#### Source: compiled by the authors

The evaluation of the influence factors of the third group ("assets") for the performance indicator of innovative activity (high-technology exports in total industrial exports) in the Republic of Kazakhstan to the greatest extent on the resulting sign is influenced by the assets of insurance companies ( $r_{InnA_{\pi}} = 0.79$ ) and to least extent – pension assets ( $r_{InnA_{\pi}} = 0.56$ ). Total bank assets have a weak impact on the result ( $r_{Inn\& a_{\pi}} = 0.11$ ). The regression model has the following type:

 $Inn = 20.85 + 0.33 \times A_1 + 1.89 \times A_2 + 29.4 \times A_3$ (8.89) (0.12) (0.97) (6.02) '

Thus, with an increase in the share of banking assets in GDP by 1%, we can expect an increase in the share of exports of high-tech goods in industrial exports by 0.33%. In turn, if the share of pension assets increases by 1%, the share of exports of high-tech goods will increase by 1.89%. An increase in the share of assets of insurance companies will contribute to the growth of exports of high-tech goods by 29.4% of industrial exports (Figure 5).

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Figure 4. Diagram of the dependence of the results of innovation activities and various types of financial assets in the Republic of Kazakhstan

Source: compiled by the authors

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Thus, despite the still insufficient role of insurance sector entities in the development of the domestic economy (no more than 1 trillion tenge or 1.8% of GDP), insurance sector entities, due to the concentration of long-term resources, have a great potential to interact with the subjects of the innovation sector (Kalkabayeva, Kurmanalina, Gusmanova, 2017). The term of placement of long-term insurance resources coincides with the duration of the innovation process (on average 7-10 years). This confirms the prospects of using insurance savings in the interests of economic development, as it happens in economically developed countries. Thus, the share of insurance resources in the structure of venture business financing in the European Union has reached 15% (www.ec.europa.eu/eurostat). At the same time, pension assets play an even greater role in the development of innovations here, their share in the structure of venture business financing has reached 25%, exceeding the share of investment by the banking sector in the development of innovations. Of course, the similar nature of the formation of insurance and pension resources, as well as successful international practice, indicate the prospects for their use. The inconsistency of the result obtained for pension assets indicates the imperfection of regulatory institutions of financial organizations in terms of their interaction with subjects of the innovation sector, and the current practice of strict regulation, as well as in relation to subjects of the banking sector, which reduces their role in the development of the domestic innovation sector (Rakhmetova, Kalkabayeva, Iskakova, Kurmanalina, Turmakhanbetova, 2019).

Studing the degree of influence of factors of the fourth group ("stock market»), which characterize trends in the development of the stock market in Kazakhstan, it is necessary to highlight the indicators "market capitalization of listed domestic companies" and " value of shares in circulation». However, the obtained results showed that these indicators do not affect the indicator "export of high-tech goods» significantly. The coefficients of paired correlation coefficients between these indicators are  $r_{InnF_1} = 0.005$  and  $r_{InnF_2} = -0.19$  respectively. The same result is given by a regression analysis of the dependence of innovations on the stock market indicators:

 $Inn = 24,5+0,13 \cdot F_1 - 1,44 \cdot F_2$  (4,78) (0,25) (1,59)

3. To assess the third group of relationships (the impact of regulatory instruments on the investment activity of financial and credit sector entities), we set the task of assessing the degree of influence of regulatory instruments on key indicators of the main sectors of the financial market. In particular, the results of regression analysis presented in table 3 show that the regression equation in terms of the impact of regulatory instruments on the dynamics of bank lending is statistically significant. The 75% variation in loans to the private sector is explained by changes in the factors included in the model. All coefficients of the equation, except the coefficient before the "total tax rate" indicator, are statistically significant.

Interpretation of regression coefficients, all other things being equal, gives the following results: - with an increase in the refinancing rate by 1%, we can expect a decrease in bank loans to the private sector in GDP by 0.41%; - with an increase in the CIT rate by 1%, the share of bank loans to the private sector in GDP will decrease by 2.4%; - if the inflation rate rises by 1%, the share of bank loans to the private sector in GDP will increase by 0.85%.

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Table 3. Model of dependence between bank loans to the private sector and regulatory instruments in the Republic of Kazakhstan

Dependent variable: Domestic credit to the private sector by banks (% of	GDP)			
MNC				
Total tax rate (% of commercial profit)	-0.015 (0.508)			
Refinancing rate/ now base rate of National Bank of the Republic of Kazakhstan, %	-0.406* (0.202)			
CIT rate, %	-2.365*** (0.701)			
Annual inflation, %	0.847* (0.469)			
Constant	81.689*** (10.754)			
The sample size, n	24			
$R^2$	of 0.75			

Note: Standard errors are shown in parentheses: \* denotes significance at the 10 percent level; \* \* denotes significance at the 5 percent level; \* \* \* denotes significance at the 1 percent level.

#### Source: compiled by the authors

Model building of assets of the insurance sector dependence and regulatory instruments (table 4) allowed us to obtain the following results:

Table 4. Model of insurance sector assets dependence on regulatory instruments in the Republic of Kazakhstan

Dependent variable: insurance sector Assets (% of GDP)			
MNC			
share of securities in the investment portfolio of the insurance sector, %	-0.009 (0.009)		
Standard of diversification of assets of the insurance sector invested in non-government securities of the Issuer of the Republic of Kazakhstan, billion tenge	3.957** (1.629)		
share of bank deposits in the insurance sector's investment portfolio, %	0.023 (0.014)		
Standard of diversification of assets of the insurance sector invested in deposits of one bank, billion tenge	2.574** (0.921)		
Total tax rate (% of commercial profit)	-0.055*** (0.0104)		
Annual inflation, %	0.052*** (0.014)		
Constant	1.189 (0.866)		
The sample size, n	16		
$R^2$	of 0.95		

Note: Standard errors are shown in parentheses: \* denotes significance at the 10 percent level; \*\* denotes significance at the 5 percent level; \*\*\* denotes significance at the 1 percent level.

Source: compiled by the authors

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- in general, the regression equation is statistically significant. The 95% variation in the resulting indicator, namely, insurance sector assets, is explained by the regressors included in the model;

- insignificant coefficients are the coefficients of the equation for the variables "share of securities" and "specific weight of bank deposits in the investment portfolio of the insurance sector». The remaining coefficients are statistically significant with a probability of 95%;

- with an increase in the insurance sector's asset diversification ratios invested in non-government securities and in deposits of one Bank by 1%, the insurance sector's assets in GDP will increase by 3.96 and 2.57 %, respectively;

- if the total tax rate increases by 1%, the assets of the insurance sector will decrease by 0.06%. At the same time, gross inflation, on the contrary, will contribute to an increase in assets of the insurance sector by 0.05%.

Dependent variable: pension sector assets (% of GDP)				
MNC				
Share of non-governmental securities of Kazakhstan issuers in the investment portfolio of the pension sector, %	-0.021 (0.048)			
Limits of investment of pension assets in non-government securities of organizations of the Republic of Kazakhstan, except for second-tier banks of the Republic of Kazakhstan, %	-33,743*** (9,415)			
Share of bank deposits in the pension sector's investment portfolio, %	-0.045 (0.082)			
Limits on investment of pension assets in deposits and financial instruments of second-tier banks in Kazakhstan, %	-29,236** (12,771)			
Total tax rate (% of commercial profit)	-0,142** (0,064)			
Annual inflation, %	0,032 (is 0.102)			
Constant	37.918*** (7,625)			
The sample size, n	16			
$R^2$	of 0.91			

Table 5. Model of pension sector assets dependencies and regulatory instruments in the Republic of Kazakhstan

Note: Standard errors are shown in parentheses: \* denotes significance at the 10 percent level; \* \* denotes significance at the 5 percent level; \* \* \* denotes significance at the 1 percent level.

#### Source: compiled by the authors

Modeling the dependence of pension sector assets on regulatory instruments (table 5) led to the following conclusions:

- the 91% change in pension sector assets is explained by changes in regulatory instruments. The regression equation is statistically significant;

- insignificant for our data were "the share of non-state securities issued by issuers" and "the share of second-tier banks deposits in the pension sector's investment portfolio», as well as the "annual inflation rate ".

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- statistically significant instruments based on the sample data under study are: the "investment limits of pension assets in non-government securities of organizations and in deposits and financial instruments of second-tier banks" and "total tax rate";

- if the investment limits of pension assets in non-government securities, as well as in second-tier banks deposits and financial instruments increase by 1%, the share of pension sector assets will decrease by 33.7 and 29.2, respectively;

- with an increase in the tax rate by 1%, pension assets are expected to decrease by 0.14%.

# 5. Discussion

The obtained results by applying an economic and mathematical model allowed us to formulate the main conclusions in the context of this scientific study:

The absence of dependence between the results of innovation activity in Kazakhstan and the dynamics of GDP growth was revealed against the background of such dependence in economically developed countries, which occupy leading positions in the global innovation index, which confirmed the thesis about using "catch - up development" model, and the main factor of economic development is still the income of the extractive sector. There is an inverse relationship between research and development expenditures and innovation results, which indicates the ineffectiveness of specially created quasi-public sector development institutions that work primarily on the implementation quantitative indicators.

It was confirmed that investments in fixed assets and foreign investment also do not significantly affect the results of innovation activities, which indicates the direction of investment flows mainly in branch, technology and equipment of the extractive sector.

Significant potential impact of bank loans on the results of innovation activity has been confirmed, first of all, long-term bank loans, the timing of which corresponds to the duration of the competitive innovation cycle, which determines the prospects for their use in contrast to short-term loans, for which such a dependence is not observed.

There is a strong correlation between the assets of insurance companies and the results of innovation activity, which indicates the existing potential of the insurance sector, including pension assets; the effective use of long-term assets of the insurance sector in favor of subjects of the innovation sector is successfully confirmed by world practice.

As expected, the instruments of the securities market did not show an impact on the results of innovation activity due to the least developed structure of the financial market and the lack of practice of using securities by real entities (including the innovation sector).

It is shown that there is no strong dependence of the activity of financial market entities on the inflation indicator, which should become the basis for eliminating distortions in the implementation of the monetary policy of the regulator, which aggravates and preserves problematic nodes in the interaction of the financial and credit and innovation sectors of the economy.

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The results confirming the influence of state regulatory instruments on the activity of banking sector entities, in which refinancing rate and corporate interest rate had the greatest correlation, are presented. It is the state, as the regulatory bodies is actively involved in the implementation of integrated economic policy, that, as world practice shows, is subject to adjust and stimulate the activities of commercial banks so that they are more actively involved in the innovation sector.

The results confirming the influence of instruments of state regulation of activity of subjects of insurance sector, the structure of which has the greatest correlation show the set standards for diversification of assets of the insurance sector and tax burden, which speaks about the potential impact of regulatory options on business entities of the insurance sector (including pension fund) with the aim of enhancing their interaction with actors of the innovation sector. The injection of resources of insurance and pension funds, which has a long-term investment character corresponding to the duration of the full innovation process, is blocked by the rather strict regulatory practice of the financial regulator. We believe that the current practice of placing these funds in highly liquid securities of foreign banks and companies should be focused on investing resources primarily in domestic economy (the experience of Norway and other European countries) taking into account the establishment of an appropriate anti-corruption mechanism and the development of a mechanism for repayment and efficient utilization of these resources in the manufacturing and innovation sectors of Kazakhstan.

The authors point out the asymmetry in the work of the public system of regulation of intersectoral interaction, which is confirmed by the weak institutional infrastructure, centralized innovation policy in the country's industries and regions against the background of the long-term implementation of the state program of industrial and innovative development.

# 6. Conclusion

Thus, the pronounced processes of globalization and trends in financial and economic turbulence today have exacerbated issues related to ensuring the sustainable development of national economic systems, including on the basis of harmonious intersectoral interaction of various economic entities. This study attempts to model country panel data in order to prove the significant impact of the regulatory system on the intensity and quality of interaction between two strategic sectors for any economy – financial-credit and real (including innovative) sectors of the economy against the background of a strong correlation between the rates of economic growth and the innovation component.

Among other things the ability of the process of interaction between financial and real (including innovative) sectors of the economy simultaneously generate the effects (expected results at different levels) as a result of system element determines the conduct of cross-national comparative analysis of the role of interaction of economic sectors to determine their current and future positioning. The results of the analysis showed that Kazakhstan's lag behind a number of developed countries was caused by various institutional conditions affecting the potential and capabilities of interacting sectors.

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