COMPARATIVE ANALYSIS OF STATE POLICY EFFECTIVENESS ON THE LABOR MARKETS OF RESEARCH EMPLOYEES IN THE EURASIAN ECONOMIC UNION'S COUNTRIES

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The relevance of the survey is determined by integration process related to the creation of the Eurasian Economic Union, necessity for structural reforms, and the increasing importance of science in ensuring national competitiveness, which requires proper state policy in relation to the labor markets of research employees within EAEU.

The approaches to assess the state regulation effectiveness on the labor markets are presented in O. Williamson, N. D. Klikunov, D. S. Tereshchenko, O. S. Sukharev, I. V. Ryabov, O. Smirnova, E. V. Agapova, E. S. Silova, A. N. Oleynik, N. V. Makovskaya, etc. studies. It is should be pointed out that among all the diversity of approaches to analyze the labor markets and its state regulation effectiveness by researchers, there is a lack of theoretical surveys and practical studies of assessing the particularities of state regulation effectiveness on the labor markets of research employees. There are no academic developments regarding approaches to assessing the state policy effectiveness on labor markets of research employees within the framework of international integration processes.

The object of the study is the state regulation of the labor market of research employees; the subject is the effectiveness of state regulation on the labor markets of research employees in the EAEU's countries. The choice of the object and the subject of the study is explained by the integration processes, the increasing importance of science in ensuring the competitiveness of the economy, insufficient development of effectiveness assessment methods of state policy in the sectoral labor markets, and the lack of adequate adaptation of such methods to the labor market of research employees.

According to A. N. Oleynik, one must take into account the fact that, similar to the market "failures", there are also the state "failures". Lack of clear criteria of the government agencies' effectiveness is one of such "failures". A. N. Oleynik adheres to the point of view that the choice between the market and the state is a choice between two different types of imperfection. Keeping this fact in mind, O. Williamson proposes to evaluate the effectiveness of one or another option, not comparing it with perfect one, but with achievable alternatives [10, p. 350–351].

The labor market of research employees requires a special approach to analyze its state regulation's effectiveness.

The effectiveness of managing labor market of research employees can be examined in three aspects:

– the effectiveness of achieving a specific goal (the optimal number of post-graduate students and doctoral students, the number of candidates and doctors of science, etc.) [11, p. 65];

– quantitative assessment of the ratio of the effect to costs in specific conditions (economic efficiency);

– qualitative assessment of public administration activity (social effectiveness): it expresses the conformity of authorities' purpose to public goals and the needs of the population [1, p. 389].

– efficiency from the standpoint of economy of the activity (the index of areas used, laboratory equipment, the optimal proportion of managers among the whole number of research employees) [11, p. 65].

To assess the regulation effectiveness on the labor market of research employees, the "science and technology" component of the "Good Country Index" (Table 1) can be used as a result of the regulatory impact [14].

Table 1. Decomposition of the "science and technology" component of the "Good Country Index"

Components	Quantitative characteristic
1. International students	the number of foreign students studying in the country (according to UNESCO) in relation to the size of the economy *
2. Export of Magazines	export of scientific magazines and newspapers (according to ITC) in relation to the size of the economy
3. International editions	the number of articles published in international magazines (according to the World Bank) in relation to the size of the economy
4. Nobel prizes	the accumulated Nobel Prizes assigned to the countries depending on the laureates' country of birth, as well as the laureates' country (countries) of institutional belonging at the time of award, in relation to the size of the economy
5. Patents	the number of applications to the International Patent Cooperation Treaty (according to the data of the World Intellectual Property Organization) in relation to the size of the economy

Note: * The correspondence of indexes with the size of the economy means the adjustment of indexes according to the GDP of countries

Source – prepared according to [14]

As for the "Good country Index" the ranking is conducted also including the ranking for each component of the index separately, so that this indicator can be also used to determine the state regulation effectiveness on the labor market of research employees through cross-country comparisons.

Thus, to determine the state regulation *effectiveness on the labor market of research employees*, the following methodological approaches and indexes are proposed (Table 2):

Table 2. The approaches to assess the state regulation effectiveness on the labor market of research employees

Approach	Indexes of the state regulation effectiveness on the labor market of research employees
An analysis of achievement the target indexes of the labor market development of research employees, the correspondence of the actual values to the planned indexes	- increase in salary of research employees; - the implementation of mechanisms to stimulate the quality of work of research employees; - improvement of the evaluation process of research employees' work results; - attracting young people to science; - "brain drain" restraining; - development of international scientific cooperation, etc.
Correlation of results to expenses relatively to the functioning of labor market of research employees	- the ratio of internal R & D costs to the number of issued patents for inventions; - the ratio of internal costs of research employees' salaries to the number of patents issued for inventions; - the ratio of internal R & D costs to the number of publications for the reporting period (including the calculation for publications indexed by Russian Science Citation Index, Web of Science, Scopus); - the ratio of internal costs of research employees' salaries to the number of publications for the reporting period (including the calculation for publications indexed by Russian Science Citation Index, Web of Science, Scopus); - internal costs per one engaged in scientific research and developments
Cross-country comparisons that characterize competitiveness of the national labor markets of research employees	- comparison of internal costs per one engaged in research and developments in US dollars; - calculation of the balance of research employees mobility (in country and out of it); - comparison of the value of the "science and technology" component of the "Good Country Index"

Note: Source – made by author

The integrated application of the above mentioned methodological approaches allows making more objective assessment.

To determine the state regulation effectiveness on the labor markets of research employees in the EAEU's countries the above mentioned methodological approaches and indexes will be used.

1. The ratio of internal R & D costs to the number of issued patents for inventions.

If we take into consideration the dynamics of this index for 2009—2015 years in the US dollars for a 1 patent in Belarus, Russia and Kazakhstan, the highest value is in Russia, the lowest one is in Kazakhstan (Figure 1). Too high value of this index indicates poor state regulation efficiency. However, it should be noticed that although this index is falling the number of issued patents is increasing simultaneously in Russia (Figure 2), that gives us evidence about effective state policy in the medium-term retrospective. The decrease of this index could be noticed in 2015 year for all

countries compared to 2013 year. In 2015 year in Russia the index was 429795 US dollars for 1 issued patent, in Belarus – 306630 US dollars, in Kazakhstan – 246316 US dollars. There is a positive dynamics of this index in Kazakhstan for the 2009—2014 years, except for its relatively small decline in 2015 year, what calls for a question the Kazakhstan state policy's effectiveness [3; 4; 6; 8; 12; 13; 15].
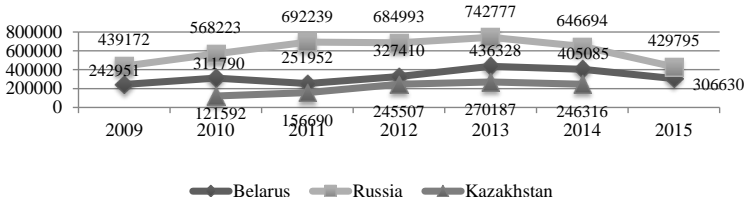

Figure 1. – The ratio of internal R & D costs to the number of issued patents for inventions

Note: Source – made by author according to [3; 4; 6; 8; 12; 13; 15]

State regulation effectiveness on the labor market of research employees in Belarus is not also very high by this criterion, because along with the negative dynamics of the analyzed index it is noticed a significant decrease in the number of issued patents (Figure 2) [3; 4; 8; 15].
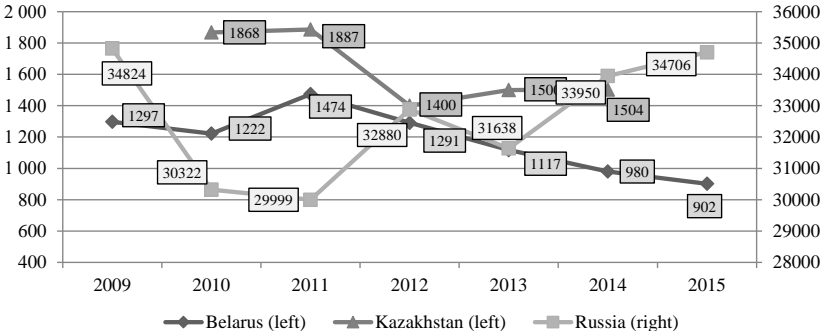

Figure 2. – The number of issued patents for inventions in the EAEU's countries

Note: Source – made up according to [3; 4; 8; 15]

2. The ratio of internal costs of research employees' salaries to the number of patents issued for inventions.

The index trend for 2009—2015 years in US dollars in Russia, Belarus and Kazakhstan is very similar to the dynamics of the previous index (Figure 3).
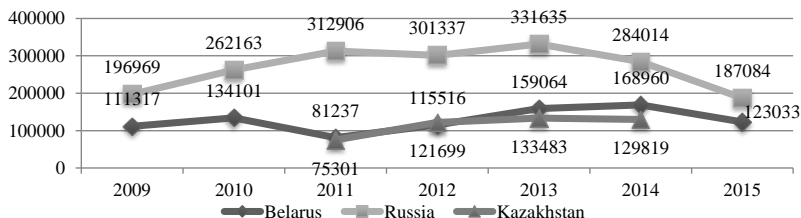
Figure 3. – The ratio of internal costs of research employees' salaries to the number of patents issued for inventions

Note: Source – made by author according to [3; 4; 6; 8; 12; 13; 15]

The differences are that in Belarus this indicator is slightly higher than in Kazakhstan. In Russia its value is relatively high. But the negative dynamics refers to the positive impact of state policy on the labor market of research employees on the labor productivity [3; 4; 6; 8; 12; 13; 15].

3. The ratio of internal R & D costs to the number of publications for the reporting period, indexed by the Web of Science.

Analyzing the values of this index in US dollars for 1 publication in Belarus, Russia, Kazakhstan, Armenia and Kyrgyzstan for 2011—2015 years, it is possible to note a decrease in costs in all countries except Armenia (Figure 4). In 2015 year, the value of the index in Belarus was 202623 US dollars for 1 publication indexed by the Web of Science, for Russia – 348158 US dollars, for Kazakhstan – 241346 US dollars, for Armenia – 26644 US dollars. In general, for the analyzed period, Armenia was expected to have the lowest costs, when Russia the highest.
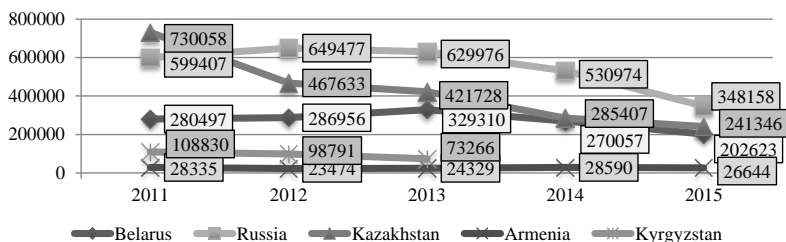

Figure 4. – The ratio of internal R & D costs to the number of publications for the reporting period, indexed by the Web of Science

Note: Source – made by author according to [2; 3; 4; 5; 6; 7; 8; 9; 12; 13; 15]

Especially significant decrease occurred in Russia and Kazakhstan that, taking into consideration the growing number of publications in these countries, shows the state policy effectiveness on the labor market of research employees. In Belarus state

regulation is less effective, as taking into consideration a slight decrease in costs, there is a decrease in the number of analyzed types of publications (Figure 5) [2; 3; 4; 5; 6; 7; 8; 9; 12; 13; 15].
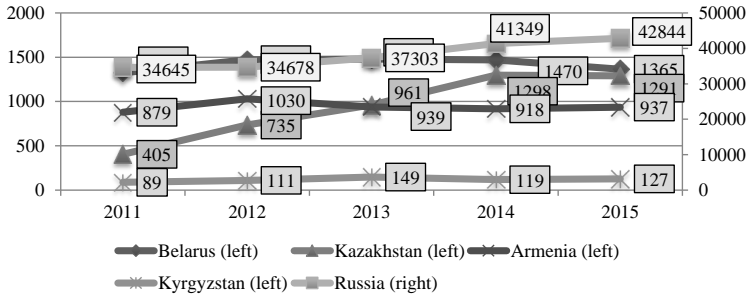

Figure 5. – The number of annual research publications in the EAEU's countries

Note: Source – made up according to [15]

4. The ratio of internal costs of research employees' salaries to the number of publications for the reporting period, indexed by Web of Science.

This index has a similar dynamics to the previous one for 2011—2015 years in Belarus, Russia and Kazakhstan, for which data is available (Figure 6). It allows us to draw conclusions that are similar to the previous index conclusions: the effectiveness of state regulation in Russia and Kazakhstan is the highest, in Belarus - much lower [3; 4; 6; 8; 12; 13; 15].
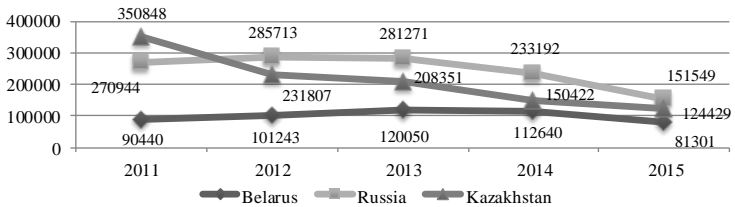

Figure 6. – The ratio of internal costs of research employees' salaries to the number of publications for the reporting period, indexed by Web of Science

Note: Source – made by author according to [3; 4; 6; 8; 12; 13; 15]

5. Comparison of internal costs per one engaged in R & D in US dollars

Internal costs per one engaged in scientific researches and developments in US dollars are of the greatest importance in Russia for 2009—2015 years (in 2015 year – 20189 US dollars), followed by Kazakhstan (12,597 US

dollars in 2015 year), Belarus (1,058 US dollars), Armenia and Kyrgyzstan (Figure 7). High values of this index show the priority attitude of state toward science and the desire to provide the researcher's workplace with everything necessary for R & D [2; 3; 4; 5; 6; 7; 8; 9; 12; 13].
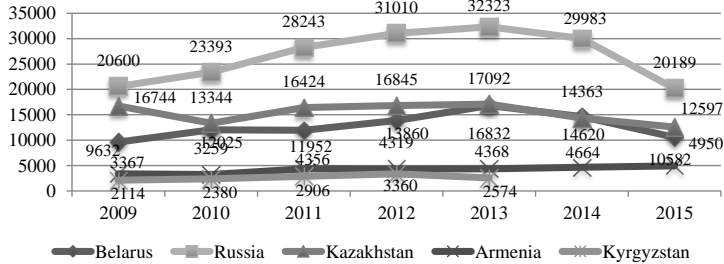

Figure 7. – Internal costs per one engaged in R & D

Note: Source – made by author according to [2; 3; 4; 5; 6; 7; 8; 9; 12; 13]

6. Comparison of the value of the "science and technology" component of the "Good Country Index".

According to the analyzed component of the index of the *"Good Country Index"*, the best position among the EAEU's countries Belarus has (37th out of 165), followed by Russia (47), Armenia (48), Kyrgyzstan (94) and Kazakhstan (148) (Table 3). Consequently, taking into account the place of countries in the ranking, the level of costs per one engaged in R & D is most optimal in Russia and Belarus [14].

Table 3. Dynamics of the values of the "science and technology" component of the "Good Country Index"

EAEU's country / the period of analysis	Version 1.0 (according to the data in 2010–2014)		Version 1.1 (according to the data in 2011–2016)	
	The place in the league table on the "science and technology" component (out of 125 countries)	The place in the common league table (out of 125 countries)	The place in the league table on the "science and technology" component (out of 163 countries)	The place in the common league table (out of 163 countries)
Belarus	36	82	37	69
Russia	41	95	47	78
Kazakhstan	109	80	148	120
Armenia	50	72	48	90
Kyrgyzstan	72	74	94	115

Note: Source – made up according to [14]

The complex application of the proposed methodological approaches allowed carrying out more objective assessment of the state regulation

effectiveness on labor markets of research employees in the EAEU's countries. Taking into account the integration processes related to the creation of the EAEU, it is necessary to develop directions for improving the institutional mechanism for the state regulation on the labor markets of research employees in the EAEU's member states, as well as for the common labor market of research employees in the EAEU aimed at improving the human resources capacity of separate states and integration group. It is necessary to take a number of measures to improve the institutional structure that regulates the processes of labor movement within the labor markets of research employees in the EAEU's countries.

Prevention of brain drain and ensuring the reproduction of researchers are possible through the implementation by the EAEU's countries the state policy based on employees salaries' reformations in the state sphere, granting to research organizations and higher education institutions greater freedom in choosing the systems and forms of employees' salaries, providing some level of international mobility of scientists for joint research that will promote the "brain circulation" that benefits both the countries of immigration and the countries of emigration.

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