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EFFECTS OF THE GOVERNMENT EXCELLENCE INITIATIVE ON THE PUBLICATION ACTIVITY OF RUSSIAN UNIVERSITIES

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1. Introduction

The production of new knowledge and technologies, along with social capital, an effective institutional environment and international collaboration, is a key element of economic development (Romer 1993; Kisman & Tasar 2014; Van den Berg 2016). At the same time, the relationship between the development of science and economic development is not equal for different countries and scientific fields (Romer 1993; Pinto & Teixeira 2020; Jacob & Lefgren 2011; Hatemi-J et al. 2016). The observed differences between countries direct the questions about the mechanisms that influence scientific activity and models of science organization.

In the transition to a knowledge economy, organizational structures that contribute to the development and spreading of new knowledge have a special role. Universities and teachers - organizations and actors that are involved in knowledge production, are becoming important elements in the system of modern economic processes (Adams & Griliches 2000; Kisman & Tasar 2014). Universities help countries create globally competitive economies by developing a skilled workforce and creating, applying and spreading new ideas and technologies (Bercovitz & Feldman 2006; Salmi 2016). In addition to the social and cultural role of universities, which increase the ideological, social and cultural values of society (e Silva et al. 2012), there is the economic role of universities. Universities are a source of human capital growth and new knowledge (Kisman & Tasar 2014). In this context, many countries are making efforts to develop national universities and promote them at the international level.

In recent decades, in many countries, Government Excellence Initiative programs were launched. From 2005 to 2014, 37 programs of improving the competitiveness of universities were implemented in different countries and regions, 19 of which were in Europe (Salmi 2015). These programs often have one common aim – improve visibility of national universities in the global academic market. Often, a limited number of universities become participants of excellence programs. In conditions

of having limited resources and the impossibility of all universities to achieve outstanding results, such a model seems reasonable. At the same time, the implementation of such programs is not always successful. Participation in the program may not improve the performance of participating universities or worsen the situation of non-participating organizations (Altbach & Salmi 2011; Salmi 2016).

The results of excellence programs largely depend on the program's design and features of the scientific and educational system in a particular country. Methodology for evaluating the results and the measured indicators also differ. For example, program performance can be measured by the number and quality of publications (Shin 2009; Zhang et al. 2013; Lovakov et al. 2021), the intensity of scientific collaboration (Moller 2016; Yonezawa & Shimmi 2015), and by the impact on the organizational structure of universities (Jungblut & Jungblut 2017). In this context, the study of the results of each specific program is a complementary link to understanding the mechanisms of the impact of government incentives in different institutional systems.

Project 5-100[1] is the Russian example of the Government Excellence Initiative program. The program was launched in May 2013 and finished in 2020. In total 21 universities were participants of the program: 15 universities of the first wave (from May 2013) and 6 universities of the second wave (from October 2015). The total amount of funds for the program was 86.5 billion rubles, which exceeds funding of other Russian government programs in education and science systems (Kliucharev & Neverov 2018). The realization of "Project 5-100" involved work in several directions, namely: development of university research potential, attraction of productive researchers (both from Russia and abroad), as well as support of academic mobility and scientific collaboration. The effectiveness of scientific activity was chosen as one of the key indicators of the program. The short-term control of the main

[1] https://www.5top100.ru/

results is a key feature of the Russian program, which distinguishes it from a similar program in other countries. This design stimulates universities to show positive results annually.

The Russian scientific system has unique features, where two large scientific and educational sectors - research universities and the Academy of Sciences (RAS), are present at the same time. During the Soviet period, there was a clear division between research institutes coordinated by the Academy of Sciences, and universities (Gokhberg et al. 2009). Scientific activity was not a profile for the majority of Russian universities. To become world-class universities, many universities need to do more than just increase the efficiency of their research. In many cases, the mission and structure need to be revised, and the management model needs to be reformed to better fit the research goals. At the same time, the closeness of the Academy of Sciences can accelerate the development of the most successful research practices in the universities. The implementation of "Project 5-100" in Russian institutions is an important case for understanding the results of Government Excellence Initiatives in different research environments.

Objective of the research – estimate the impact of the Russian Excellence program on the scientific productivity and scientific collaboration of participating universities.

Research tasks:

1. To analyze publication activity and scientific collaboration patterns of Russian universities before and after the launch of "Project 5-100";

2. To estimate the effect of the Russian program on the scientific productivity of participating universities in different years of participation;

3. Analyze the impact of "Project 5-100" on different types of university publications and the direction of scientific collaboration;

4. To study the influence of the Russian program on the scientific collaboration structure of the participating universities.

Government Excellence Initiative programs are an example of state policy measures in science and education. The study is **actual,** as part of empirical assessments of the efficiency of government programs. During the choosing of the best stimulated programs the following questions arise: To what extent the chosen program design is successful in a particular institutional environment? Is it possible to achieve the initial goals? How can the achievements be measured? What additional positive and negative effects arise during the implementation of the program? In the sphere of the Russian research system, the assessment of the Government Excellence program becomes especially relevant in view of the current task of turning a number of universities into research centers.

Personal contribution

The personal contribution of the author consists in summarizing and systematizing the works devoted to investigation of Government Excellence Initiates on its impact on the research activities of universities. In the articles (Poldin et al. 2017; Matveeva, Sterligov & Yudkevich 2021), the applicant collected and prepared bibliometric data of the universities; substantiated the choice of applied methods, provide statistical evaluations in the Stata program, described the results and took a direct part in writing the text of the publications. In the work (Matveeva & Ferligoj 2020), the applicant formulated the theoretical framework of the study, prepared the data, provided the calculations and described the results.

Structure of the work

The dissertation research consists of four papers. In the first work (Matveeva 2020), I study how the publication activity and scientific collaboration patterns of 30 Russian universities have changed during the reforms. I analyze the dynamics of the

publication output in various quality segments and scientific fields. Since scientific collaboration is a resource of scientists and organizations that can be used in publication production, I also study how Russian universities collaborate with other organizations at an individual and organization level.

In the second paper (Poldin et al. 2017), the effect of the Russian Excellence program on the publication activity of participating universities in comparison with non-participating universities was estimated. We provide quantitative estimates of the program's impact on the publication output of participating universities, taking into account the number of scientific staff and funding.

The third work (Matveeva, Sterligov & Yudkevich 2021) is devoted to the analysis of "Project 5-100" on various types of publications, and the direction of the scientific collaboration of participating universities. The work continues the previous study on the evaluation of the program's effect. Here not only the quantitative growth of the publication output in the subsequent year of participation was estimated we also analyze the impact of the program on various types of publications: publications in journals Q1 and Q4 and pieces of work with more than 10 authors. The scientific collaboration of participating universities with other Russian and foreign organizations over several years was studied.

In the fourth work (Matveeva & Ferligoj 2020) the patterns of scientific collaboration of participating universities in comparison with universities in the control group were analyzed in detail. Using an analysis of affiliations, the dynamics of collaboration with Russian and foreign organizations in various scientific fields and quality segments was analyzed. In addition, in this work, for the first time, network analysis methods were used to analyze the structure of universities research collaboration.

2. Brief literature review

As noted above, Government Excellence Initiatives in different countries have similar goals - to increase the competitiveness of national universities. Distinctive features are: the institutional environment in which programs are implemented, the design, volume and conditions of findings, and the ways in which results are evaluated. Observable characteristics of an institutional environment are the size of a country's research system and the presence of scientific institutions other than universities. For example, small countries face almost insurmountable problems in their efforts to develop world leading universities due to the lack of human capital in their country and the inability to attract leading researchers from abroad (see Sheil 2010 for more details). At the same time, the presence of academic structures in the country, such as the Academy of Sciences in Russia and the Max Planck Society in Germany, contributes to the growth of scientific collaboration between universities and academic structures (Jungblut & Jungblut 2017; Matveeva, Sterligov & Yudkevich 2021) and, as a result, the mobility of human capital within the country.

The design of excellence programs differs in the set of key indicators and the order in which funding is allocated. The key focus of excellence programs is: direct stimulation of research activities in universities (Zhang, Patton & Kenney 2013; Turko et al. 2016; Fu et al. 2018), creation of new research centers (Shin 2009), attraction of talented students (Zhang , Patton & Kenney 2013; Agasisti et al. 2020), and intensification of collaboration with scientific centers in the country (Moller 2016) and with foreign colleagues (Yonezawa & Shimmi 2015). At the same time, the procedure for allocating funding can be either annual, based on the results of monitoring key indicators (Matveeva, Sterligov & Yudkevich 2021), or one-time in one or two stages (Shin 2009; Zong & Zhang 2019).

Excellence programs have specific goals and expected results, such as increasing publications in certain journals, international rankings, increasing the numbers of international students, and others. Publication activity is a key indicator of many

excellence programs (Shin 2009; Zhang et al. 2013; Turko et al. 2016; Fu et al. 2018), as it provides a quite objective picture of scientific productivity of research units in a short time. In studies analyzing the effect of excellence programs, the results of programs are studied much broader than stated in programs aims, since programs have a complex influence on the research system (Salmi 2016; Matveeva, Sterligov & Yudkevich 2021).

The publication output is the most easily observable outcome of programs. The effect of excellence programs on the number of publications is studied in the analysis of the Chinese program - "Project 985" (Zhang et al. 2013), South Korea - "Project 21" (Shin 2009), Taiwan program (Fu et al. 2018), and Russian - "Project 5-100" programs (Turko et al. 2016, Agasisti et al. 2020). In addition, researchers ask how the quality of publication output has changed at participating universities (for example, the German (Civera et al. 2020) and Taiwanese excellence programs (Fu et al. 2018)). It is worth noting that the quality of publications can also be measured in different ways.

The results of excellence programs can not only be expressed in the formal growth of publication indicators. The experience of the first programs shows that the creation of world-class universities requires not only targeted financial investments to increase publication activity, but also the reorganization of universities internal structure (Jungblut & Jungblut 2017; Agasisti et al. 2020), including the patterns of scientific collaboration. Scientific collaboration helps solve complex research issues, increases the competence of scientists, provides access to new equipment, and thereby increases scientific productivity (Medoff 2003; Abramo et al. 2017). Considering the positive effects of collaboration, some excellence programs are designed to develop intra-country (Möller et al. 2016; Lindvig & Hillersdal 2019) and international collaboration (Yonezawa & Shimmi 2015).

Through scientific collaboration and mobility, excellence programs influence not only participating universities, but also other universities and research organizations in the country. The following studies (Zong & Zhang 2019; Yonezawa & Shimmi 2015; Lovakov et al. 2021) note a growing gap between participating and non-participating universities after the launch of excellence programs.

Evaluation of excellence programs implementation also depends on the methodology used. For example, the works (Zhang et al. 2013) and (Zong & Zhang 2019) use different methods to assess the Chinese excellence program, so the results are also slightly different. Often, to assess the impact of the programs, the following approaches are used: analysis of the dynamics of key indicators (Yonezawa & Shimmi 2015; Turko et al. 2016), its quantitative assessment using regression analysis (Shin 2009; Zhang et al. 2013; Fu et al. 2018), and Propensity score matching (Agasisti et al. 2020), as well as an analysis of a university staff survey (Jungblut & Jungblut 2017).

In the dissertation, the Russian program is studied. The feature of the programs is its implementation in the scientific system, where, along with universities, there are institutes of the Russian Academy of Sciences. In the current system, where the university sector has not been the main center for the production of scientific knowledge for many years, universities need to reform the organizational system so that it better suits research goals. In addition, the design of 'Project 5-100' assumes a short-term control of key indicators.

In recent years, several studies which estimated the influence of the Russian program have appeared. Researchers analyze the impact of the program on the scientific activities of participating universities. Already, in the first years of the program implementation, participating universities demonstrate a growth of publication numbers, including highly cited ones (Turko et al. 2016; Guskov et al. 2018). These studies do not take into account the number of scientific staff. Achievement of key

indicators encourages both universities and individual scientists to change their collaboration strategies in favor of increasing the number of publications. Under these conditions, scientific collaboration is a resource that enhances scientific productivity (Abramo, D'Angelo & Murgia 2017). The work (Guskov et al. 2018) notes that universities participating in the program increase the number of joint publications with institutes of the Russian Academy of Sciences, as well as increase the number of conferences in which university staff participate.

In addition to collaboration strategies, participation in the program encourages universities to change the internal environment in favor of new research tasks. Thus, the program had a positive effect on the productivity and efficiency of universities, calculated by taking into account the number of publications, average examination scores, the number of students, and R&D expenditures (Agasisti et al. 2020). At the same time, the Russian excellence program has had a significant effect on non-participating universities, widening the gap between participating and non-participating universities (Lovakov et al. 2021).

Previous works do not cover the issue concerning the quantitative assessment of the effect in comparison with the universities of the control group. The control group includes Russian universities that did not participate in 'Project 5-100' and were comparable with participants in the pre-program period. In addition, previous studies do not provide disciplinary and qualitative analysis of publications written in collaboration with other organizations. One more open question arises: how similar are the collaboration patterns of participating universities after launching the program?

In the dissertation summary, the impact of the Russian Excellence program on the publication activity of participating universities is estimated for three years after the launch of the program. All estimates were made in comparison with the control group universities. The value of the effect is evaluated by taking into account the factors that

potentially affect publication output: individual publication dynamics of universities, funding, and the number of scientific staff. In addition, the share of publications in high- and low-quality journals changes with the increase in the publication output of universities was studied. The contribution of other organizations to the growing publication output of participating universities was analyzed. The collaboration patterns of participating universities with other Russian and foreign scientific organizations were analyzed in detail. Scientific collaboration is analyzed at the level of organizations and individual authors in publications of various disciplines and journal quartiles. In addition, using a co-authorship network analysis, the structure of scientific collaboration of participating and non-participating universities was analyzed.

3. Methodology

In the dissertation summary, bibliometric data about universities' publications to estimate the effect of the Russian Excellence program were used. Similar to many excellence programs in other countries (see above), the number of publications in peer-reviewed journals is a key indicator for participants of "Project 5-100". Nowadays, bibliometric data are used in many studies for the analysis of scientific activity of individual researchers or organizations (Ellegaard & Wallin 2015). A formal approach may eliminate individual features of estimated units (Abramo 2017). With that, taking into account individual characteristics allows to make units from different regions and countries comparable (Bornmann & Haunschild 2018).

The data on publications related to the profiles of the analyzed universities in Web of Science (SCI and SCIE indices, type of publications "article" and "review") were used. To eliminate errors in identifying universities, I have written a program in the R language that finds and matches different variants of universities' names and attributes them to a single profile. I also collect information about the journal quartile

of publications by comparing the ISI of uploaded publications with the list of Q1 and Q4 journals in each year. In addition, the data about the number of researchers at universities and the amount of R&D funding from the statistical repository of the Ministry of Education and Science were collected.

In the work (Matveeva 2020) I analyze statistical parameters of publication activity and scientific collaboration of 30 Russian universities. For different types of publications, average and median values and standard deviation were calculated in dynamics. In addition, I detect the borders of multi-authors' works using the cumulative density function of the number of authors by publications. The proposed method for determining the boundary is based on the analysis of the distribution function of papers with different numbers of authors and the correlation of these papers with the total number of publications (Matveeva, Sterligov & Yudkevich 2021).

“Project 5-100” includes a limited number of universities (treatment group). Universities that initially have an ability to perform key indicators were included in the project (self-selection problem). The control group of universities was used to eliminate the self-selection problem. The control group included universities subordinate to the Ministry of Education and Science of Russia. The following criteria were determined for the universities of the control group: 1) the number of publications comparable with the participants of "5-100" in the pre-program period; 2) the presence of publications in the journals of the first quartile Q1 of the SCIE and / or SSCI indexes of the WoS system; 3) profiles similar to universities "5-100" (classical, federal, technical). It is natural that five universities from the control group were included in the second wave of “Project 5-100” at the end of 2015. The decision to launch the second wave of the program was not predictable, and the universities received funding in 2016. Therefore, it can be assumed that participation in the program did not have a great impact on the publication output and collaboration

patterns of the second wave universities in the analyzed years (2010-2016). The final sample consists of 14 universities that participated in the project since 2013, and 13 universities of the control group. To study scientific collaboration of universities, the sample was supplemented by 3 universities: one university 5-100 (HSE) and two large research universities (Moscow State University and St. Petersburg State University) (Matveeva & Ferligoj 2020).

The Linear Mixed Effects (LME) model was used to estimate the effect of "Project 5-100" on universities' publication activity (Verbeke 1997; Pinheiro & Bates 2000; Zhang et al. 2013). The LME model consists of two parts: fixed and random. The fixed part is just the regression coefficients for all observations; the random part is deviation of individual observations from the average values. Thus, Linear mixed models allow the variation of individual publication dynamics of universities. A similar model has also been used in estimating the impact of the Chinese program (Zhang et al. 2013).

We observe that each university has its own publication dynamics, and the observations are not independent; there is a correlation over time (Poldin et al. 2017; Matveeva, Sterligov & Yudkevich 2021). The LME model was chosen to estimate the effect of the program because it allows variation in individual publication dynamics (Verbeke 1997). In addition, error independence is not critical for LME models (Pinheiro & Bates 2000). The error relationship structure can be specified before estimation (Gelman & Hill 2006). The assumptions of the model are: linear relationship between dependent and independent variables, and normality of errors (Wooldridge 2010). Depending on model specification, the dependent variable is the natural logarithm of the number of publications or the logarithm of the number of publications per person. Covariates are both the number of scientific staff and funding, or funding only.

An analysis of affiliations and co-authorship network analysis was used to investigate scientific collaboration of both participating and the control group universities. The

number of affiliated organizations and the number of authors were examined, as well as the average number of affiliations in papers with 1-4 authors. In analyzed co-authorship network, universities and scientific organizations are nodes, and publications between them are links. In each analyzed year, a co-authorship network of analyzed universities was built and its network parameters were calculated. Network parameters characterize the size of the network and the distance of participants from each other (Matveeva & Ferligoj 2020). Two types of co-authorship networks were built. The first includes all universities and organizations mentioned in the publications of the 30 selected universities and the Russian Academy of Sciences. The second includes only the 30 universities (treatment and control group). Both networks are unweighted and unnormalized. The following parameters were calculated: network diameter (maximum distance between nodes), average distance between nodes, density (number of possible links in the network), and degree centrality (number of nodes with which each node has a link).

A co-authorship network was used to analyze the similarity of universities' collaboration patterns. In particular, the blockmodeling procedure was applyed. This procedure allows to simplify a large network to a smaller one based on the similarity of nodes in a network (Doreian, Batagelj & Ferligoj 2005). Blockmodeling allows identifying universities with similar collaboration patterns and then grouping it into clusters (Matveeva & Ferligoj 2020). In the same cluster are universities that have a similar number of publications in affiliation with other organizations. This procedure was applied to the co-authorship network of 30 Russian universities for each year. Thus, the change in the scientific collaboration structure of Russian universities in the period 2010-2016 was studied.

4. Main findings

- The observed growth of publication activity at Russian universities is not the same across various scientific disciplines. For example, the average number of publications

per university in Technical sciences increased from 1743 to 6220, in Biomedicine from 1332 to 3517, in Social sciences from 150 to 591, WoS database, SSCI and SCIE indexes, publication type "article" and "review" (Matveeva 2020).

- Russian universities demonstrate a significant increase in scientific collaboration both at the level of authors and at the level of organizations. At the same time, there is an increase in the “special type” of collaboration, when one author works in several organizations at the same time. In addition, universities collaborate differently in different quality segments: in Q1 journals participating universities collaborate more than in Q4 publications. In Q1 journals, the analyzed universities more often collaborate with foreign institutions, in Q4 - with Russian organizations (Matveeva 2020; Matveeva & Ferligoj 2020).
- "Project 5-100" increased the total number of publications and the number of publications per scientific staff in participating universities. In 2014, participating universities outperformed the general publication trend (their own and the control group universities) by more than 35%, and in 2016 by more than 52%. In 2015, the most noticeable effect was observed - the superiority of participating universities over the general trend was 57.8%. Significant correlation between the number of scientific staff and the number of publications was not found. This result may be explained by heterogeneous dynamics of the number of scientific staff in the analyzed universities (Poldin et al. 2017).
- The size of the effect of the Russian program varies depending on the number of co-authors and the quartile of the journal in which the papers were published. Thus, for publications in Q1 journals, the value of the effect decreases over time (37% in 2014, 33% in 2015, and in 2016 the effect is not significant). In journals of Q4, on the contrary, it is growing: 26% in 2014, 48% in 2015 and 49% in 2016. The effect value is significantly higher for papers with 10 or more authors: 270% in 2014 and over 400% in 2016 (Matveeva, Sterligov & Yudkevich 2021).

- After the launch of the program, the scientific collaboration of participating universities with other organizations changed: it decreased with other Russian universities, and increased with foreign institutes and institutes of the Russian Academy of Sciences. In addition, the launch of “Project 5-100” changed the structure of the co-authorship network of Russian universities. After joining the program, the collaboration patterns of universities became similar, while collaboration patterns of non-participating universities did not change (Matveeva & Ferligoj 2020).

Thus, the presented work added to the existing scientific discussion about the ways and methods of the impact of government programs on the university environment. The study does not cover all Russian universities; however, the sample included 30 leading universities, the total publication output of which represents more than 80% of all Russian universities publication in WoS[2]. The Russian Government Excellence Initiative had a significant positive effect on the publication activity of participating universities, while the size of the effect is different for different types of publications. Observed publications growth in the first years of participation and dominance of papers in Q4 journals already indicate that the design of the "Project 5-100" stimulates the universities to demonstrate quick results. Whether this trend will change in the coming years is an open question. At the same time, the huge growth of multi-authored works and the number of publications in affiliation with other organizations indicate the significant influence of "Project 5-00" on the scientific collaboration of universities. Growing scientific collaboration is a resource that can be used by universities in the future to increase the quality and quantity of scientific publications. Prior to the launch of the program (2010-2012), this trend was not observed.

5. Contribution

[2] According to: https://monitoring.miccedu.ru/. Section "2.4. The number of publications of Web of Science Core Collection, per 100 faculty members". Date of the access: 06.05.2022

The scientific contribution of the works is the following:

- As part of the dissertation research, a comprehensive approach was proposed to assess the publication activity of scientific organizations. This approach includes not only an analysis of the dynamics of the number of publications, but also analysis of the type of publications and the number of affiliated organizations.
- Based on a sample of Russian universities, a methodology was proposed for determining the boundary of multi-author works, which allows taking into account the specifics of scientific collaboration in various disciplines.
- For the first time, quantitative assessments of the impact of the Russian program on the publication activity of participating universities are presented. The participating universities outperformed not only their own rates of publication activity, but also the general publication trend, calculated taking into account the control group. This distinguishes the work from previous studies based on the analysis of publication dynamics of participating universities.
- The dissertation evaluates, for the first time, the impact of the excellence program on publications of various types: publications in both Q1 journals and Q4 journals, and publications with more than 10 authors. The value of the effect is higher for papers in lower quality journals.
- Along with the growth of publication activity, participants increase scientific collaboration, including when one author works in several organizations at the same time.
- In the dissertation research, for the first time, an analysis of collaboration patterns of participating universities in various disciplines and qualitative segments is provided.
- Based on the analysis of co-authorship networks, it has been shown for the first time that government support for leading universities contributes to changing the structure of their scientific collaboration with other organizations. This method reveals the similarity of collaboration patterns of the participating universities: after the launch of the program, the participating universities began to collaborate with other Russian

universities not on the principle of geographical proximity, but on the principle of participation in the program.

6. Discussion and conclusion

The presented work is the first approach to assessing the general impact of excellence programs on the university environment and the research system as a whole. Already in the first years of implementation, participants in the Russian excellence program significantly increased the number of publications, including in high quality journals. At the same time, the outstripping growth of publications in the Q4 segment indicates that the program design, focused on short-term results, stimulates universities to demonstrate positive results every year. Under the current conditions, university staff not only master and deepen research skills, but also find opportunities to demonstrate their success in a short time. It remains an open question to what extent these practices will contribute to the long-term growth of the research skills of university staff.

Another important result that was reveald is the significant impact of "Project 5-100" on the patterns of scientific collaboration of participants. Annual monitoring of key indicators encourages universities to use all possible resources, including collaboration with other organizations. Participating in program universities increases the number of joint publications with organizations that have a good research experience (the Russian Academy of Sciences and foreign institutions). At the same time, collaboration with other Russian universities is decreasing. We analyze the structure of co-authorship networks of Russian universities and find that participating universities have similar models of collaboration, regardless of their geographical location. Further analysis will answer the question of whether this excellence program contributed to the formation of a university research cluster in Russia.

When evaluating the effects of the program, questions about the overall success and expediency of the program arise. A distinctive feature of the Russian program was its focus on short-term indicators. In comparison with other countries, the results of the Russian program, expressed in terms of publication activity, look more favorable than, for example, the South Korean ‘Project 21’ (Shin 2009) or Taiwan ‘World Class Universities’(Fu et al. 2018) programs. However, it should be noted that the Russian program was implemented in an environment where most of the universities did not have sufficient experience in scientific work. The impact assessments were carried out taking into account the control group - universities, which also did not have significant research experience. The low base effect and insufficiently strong control group do not lessen the positive effect that the program had on the participating institutions.

The results presented in our papers indicate that the program had a significant positive impact on the participating universities, which were approximately at the same level with the control group in the pre-program period. Participation in the program contributed to the growth of universities research practices and cooperation skills. However, the dissertation sammury does not address the impact of the program on the non-research activities of universities. In particular, dissertation summary does not cover questions about how the quality of teaching at participating universities has changed, how accessible education has become for different segments of the population, and how collaboration between universities and the corporate sector has changed. Also, the work do not analyze how the launch of the program affected the research and teaching activities of universities that were not participants in the program. These and other questions can be studied in the following papers concerning the evaluation of the Government Excellence Initiative on the national research system.

7. List of author's original articles

I. Matveeva N., Sterligov I., Yudkevich M. The effect of Russian University Excellence Initiative on publications and collaboration patterns // Journal of Informetrics. 2021. Vol. 15. No. 1. Article 101110.

II. Matveeva N., Ferligoj A. Scientific collaboration in Russian universities before and after the excellence initiative Project 5-100 // Scientometrics. 2020. Vol. 124. No. 3. P. 2383-2407.

III. Matveeva N.N. Bibliometric Analysis of Scientific Collaboration in Russian Universities: Cooperation vs Individual Productivity // University Management: Practice and Analysis**.** 2020. Vol. 24. No. 2. P. 26-43.

IV. Matveeva N., Sterligov I., Yudkevich M. Impact of government intervention on publication activity: Case of Russian universities, in: *Proceedings of the 17th International Conference on Scientometrics and Informetrics ISSI 2019.* 2019. Vol. 1. P. 896-907.

V. Matveeva N., Sterligov I., Yudkevich M. The Russian university excellence initiative: is it really excellence that is promoted? // NRU Higher School of Economics. Series EDU "Education". 2019. No. WP BRP 49/EDU/2019.

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7. Civera A. et al. Higher education policy: Why hope for quality when rewarding quantity? // Research Policy. 2020. Vol. 49. No. 8. Article 104083.

8. Doreian P., Batagelj V., Ferligoj A. Generalized blockmodeling. 2005. Vol. 25. Cambridge university press.

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