THE EVALUATION OF STATE SUPPORT TO INNOVATION PROJECT BASED ON PUBLIC-PRIVATE PARTNERSHIP PRINCIPALS: FEDERAL AND REGIONAL INITIATIVES IN RUSSIA[1]

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The efficiency of state support to innovation projects has been estimated quantitatively using a number of methods. Evaluation as an important component includes the project analysis, which allows to assess the commercial effectiveness of project participants. We are developing a methodology for assessing the effectiveness of government support for innovation, since Russian researchers had previously attempted to take into account the consequences of supporting innovative projects by the federal authorities. The interest in participating in projects was not assessed based on public-private partnership (PPP) with different institutional measures applied to the territory. However, comparative analysis fails to study in detail the effect exerted by federal and regional support on the innovation projects based on public-private partnership. Our study has applied the well-known methods of project analysis to a variety of PPP participants. An original financial-institutional model has been developed taking into account the amount of direct and indirect state support and comparing its impact on the financial statements of innovative enterprises in operational tax surroundings. Experiments based on the model comprising different scenarios of state support to enterprises located in the Novosibirsk Oblast have been performed. Our study has revealed that, within the implemented scenario of an innovation project, direct state support is more important than indirect one. A comparative assessment of the alternatives to indirect state support to a project has showed clearly that regional initiatives were less efficient than the federal initiatives provided by such innovation development institutions as Skolkovo Innovation Center, Special Economic Zones and Priority Development Areas. The latter provides the largest amount of indirect support to high technology enterprises. Special coefficients describing mutually beneficial partnership within the projects have been introduced and calculated. It has become evidently that the "quasi profitability" coefficient is higher for the state than for other partners of the PPP projects.

Keywords: *public-private partnership, innovation development institutions, skolkovo innovation center, special economic zone, priority development areas, direct government support, tax exemptions, project analysis, special coefficients.*

Eficacitatea sprijinului acordat de stat pentru proiectele de inovare a fost evaluată cantitativ prin intermediul mai multor metode. Evaluarea, o componentă importantă, include analiza proiectului, care permite evaluarea eficacității comerciale a participanților la proiect. Autorii au elaborat o metodologie de evaluare a eficacității sprijinului acordat inovării de către stat, deoarece cercetătorii ruși, anterior, au încercat să ia în considerare consecințele sprijinirii proiectelor de inovare doar de către autoritățile federale. Interesul pentru participarea la proiecte nu a fost estimat pe baza parteneriatului public-privat (PPP), ținând seama de diferitele aranjamente instituționale pentru sprijinirea inovării în regiune. Totuși, analiza comparativă nu studiază în detaliu consecințele impactului sprijinului federal și regional pentru proiecte de inovare bazate pe parteneriat public-privat. În prezentul studiu au fost utilizate metode bine cunoscute de analiză a proiectelor pentru diferiți participanți PPP. De asemenea, a fost elaborat un model financiar și instituțional original luând în considerare valoarea ajutorului de stat direct și indirect și

[1] The paper was implemented within the framework of RFBR grant 17-02-00060 "Evaluation of the influence of innovation development factors on the economic growth of Russian regions".
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comparând impactul acestuia asupra rezultatelor financiare ale întreprinderilor inovatoare în domeniul impozitării operaționale. Experimentele au fost efectuate pe baza unui model care include diferite scenarii de sprijin al statului pentru întreprinderile din regiunea Novosibirsk. Cercetările autorilor au arătat că, în cadrul scenariului implementat al unui proiect inovator, sprijinul direct al statului este mai important decât sprijinul indirect. Evaluarea comparativă a scenariilor de susținere indirectă a statului pentru proiect a demonstrat că inițiativele regionale au fost mai puțin eficace decât inițiativele federale oferite de astfel de instituții de dezvoltare inovatoare ca „Skolkovo", zone economice speciale și teritoriile de dezvoltare avansată (TDA). TDA oferă cel mai mult sprijin indirect pentru întreprinderile de înaltă tehnologie. Totodată, au fost introduși și calculați coeficienții specifici, care descriu parteneriatul reciproc avantajos în cadrul proiectului. Este evident că coeficientul „cvasi-profitabilitatea" este mai mare pentru stat decât pentru alți parteneri ai proiectului PPP.

Cuvinte-cheie: *activitate inovatoare, sprijin financiar și indirect de stat, stimulente fiscale pentru teritorii, povară fiscală, parteneriat public-privat, abordarea proiectului, venitul net actualizat, interacțiunea participanților, eficiență.*

Эффективность государственной поддержки инновационных проектов оценивалась количественно с использованием ряда методов. Оценка как важный компонент включает анализ проекта, который позволяет оценить коммерческую эффективность участников проекта. Мы разрабатываем методологию оценки эффективности государственной поддержки инноваций, поскольку российские исследователи ранее пытались учитывать последствия поддержки инновационных проектов только федеральными властями. Интерес к участию в проектах не оценивался на основе государственно-частного партнерства (ГЧП), принимая во внимание различные институциональные меры поддержки инноваций в регионах, подробно не сравнивались последствия влияние федеральной и региональной поддержки инновационных проектов на основе государственно-частного партнерства. Наше исследование развило известные методы анализа проектов для различных участников ГЧП. Была разработана оригинальная финансово-институциональная модель, позволяющая учитывать объем прямой и косвенной государственной поддержки и сравнивать ее влияние на финансовые результаты инновационных предприятий в области оперативного налогообложения. Проведены эксперименты на основе модели, включающей различные сценарии государственной поддержки предприятий, расположенных в Новосибирской области. Наше исследование показало, что в рамках реализованного сценария инновационного проекта прямая государственная поддержка важнее косвенной поддержки. Сравнительная оценка сценариев косвенной государственной поддержки проекта показала, что региональные инициативы были менее эффективными, чем федеральные инициативы, предоставляемые такими институтами инновационного развития как «Сколково», особые экономические зоны и территории опережающего развития (ТОР) на Дальнем Востоке. ТОР обеспечивает наибольшую косвенную поддержку высокотехнологичным предприятиям. Были введены и рассчитаны специальные коэффициенты, описывающие взаимовыгодное партнерство в рамках проекта.

Ключевые слова: *инновационная деятельность, государственная финансовая и косвенная поддержка, налоговые стимулы для территорий, налоговая нагрузка, государственно-частное партнерство, проектный подход, чистый дисконтированный доход, взаимодействие участников, эффективность.*

JEL Classification: H25, O38, O22, O32.
UDC: 001.895(470)

Introduction. State support for innovation is a complex of interrelated measures aimed at pursuing the state policy in R&D, industry and innovation. They focus on improving the functionality of all structural elements of the national innovation system (NIS) including sectoral and regional subsystems and developing the institutional environment. State support stimulates the private sector capital to participate in innovation projects and companies to compete for innovations.

The PPP in the innovation sector represents a state support area with concrete participants including direct state participation (targeted support from the state budget) and indirect state participation (tax reduction and preferences) with respect to a specific project. The assessment of state support efficiency has been made mostly for two project groups where the state is the major participant:

– *construction of the innovation infrastructure* which should stimulate the startup of production. For example, the state finances the establishment of technological parks (technoparks) to create favorable terms for all projects satisfying the selection criteria for receiving innovation infrastructure services;

– *innovation production projects backed by the government*. These regional projects are selected by an Expert Advisory Body of the authorities of the RF federal subjects or development institutions and can obtain budgetary transfers or other kinds of federal or regional support.

In both cases the direct and indirect support instruments are meant to be used in high-tech production on the federal and regional level of government resulting in the proximity of terms. The estimate of PPP efficiency on the regional level should take into account different kinds of support that can come simultaneously from different sources.

Four basic factors underlie the PPP development. They are private sector business performance (private execution), public investment financing, providing services and investing on the part of the private sector, and, finally, the redistribution of grave risks by the state for the benefit of the private sector (Public-private partnership…, 2006). International practices show similar trends in the development of PPP. In Russia, the partnership develops with varying intensity and has specific features, mostly with respect to infrastructure projects. In the recent years, however, PPP has been developing in some social areas, such as medicine, education, and research (Varnavsky V. 2011, Kaneva M., Untura G. 2014).

So far, no clear definition of PPP has been given for the areas of research and innovation. Initially, the term "PPP" in the research and innovation area was used to denote institutional and organizational alliance between the state and business with a view of supporting socially important projects and programs in a wide range of industrial and research areas. The following characteristics of PPP in the above-mentioned spheres have been specified in the literature (Gosudarstvenno-chastnoe partnerstvo…, 2012):

1. Partners are both the state and private business;
2. Arrangements between PPP participants should be documented (written agreements, programs etc.);
3. PPP players should be on equal footing (pari passu relations) and should share risks, expenses and profit;
4. PPP players should have common purposes and a specific state interest (public significance);
5. PPP players should mutualize their holdings to achieve common purposes.

Relevance. In the current context of the innovation projects implementation in a partnership with the government most above-mentioned PPP characteristics are kept. However, the characteristic number 3 (*on partnership and mutually beneficial relationship*) for the state and business is still not fully studied. Therefore, it seems quite interesting here and now to study this characteristic from the standpoint of quantitative efficiency estimation of the *actors' participation in a project under a variety of types of the federal and regional support.*

As noted by politicians and PPP's researchers, the particular role of the government in the present Russian innovation economy can perfectly find expression in a PPP, especially in case of domestic resource limitation and strong international competition context (Primakov E. 2015, Varnavsky V. 2011, Klimova M.V., 2011).

The authors assume that an economic downfall is slowly surmounted and sometimes even escalates in view of imposing anti-Russia sanctions and the slowdown of national economic development in general. We would like to note several meaningful constraints hindering a large scale state support for innovations in Russia within 2009-2016 periods:

- Cutting down the share of investment from budget (Conclusion of the Accounts Chamber of the Russian Federation…, 2015);
- Increasing business tax burden (Nechaev A.A. 2015);
- Indistinct control of the standards of PPP partners' relations in research and innovation areas run by the legal framework of PPP innovation projects (Federal Law dated 13.06.2015 no. 224-FZ);
- Decreasing the share of regional consolidated budget (Zverev D.V., Kolomak E.A. 2010).

Over the past decade the government has allotted investment for innovation infrastructure formation (SEZ – special economic zones, technoparks etc.) and established favorable legal and institutional conditions for the innovation projects' implementation. However quite a lot studies point out that both state support and PPP are still decelerated both by legislative uncertainties in the process of forming all needed types of partnership, namely in the innovation area and innovation resource insufficiency. Probably for this reason the efficiency of state supported innovations at the enterprises in Russia is still low (Nalogovoe stimulirovanie…, 2009, Nauchnaja i innovacionnaja…, 2013, OECD, 2013a). Good expectations from the creation of numerous

facilities of innovation infrastructure failed. These facilities also appeared to be sensible to the budget constraints (Agenda for the Development of Innovative Infrastructure in the Russian Federation…, 2015).

Thus the importance of research on the efficiency assessment of state support including support on the federal and regional levels in order to motivate the participants of innovation projects is only increasing.

Prior studies of the problem. Many researchers make an expert comparative analysis of particular measures of government support for innovations and the performance results of enterprises producing innovations in various OECD countries (OECD, 2003; OECD, 2013a; OECD 2013b; OECD, 2014). Certain international papers on the empirical analysis and the verification of experimental types of government support, in particular on tax burden reduction for enterprises that implement innovation projects, have appeared (Hall B., Mairesse J., Mohnen P., 2009; Hsu F.-M., Hsueh Ch.-Ch., 2008).

A separate part of the research is dedicated to the evolution of PPP in scientific and innovation area. In every country the volume of investment resources and a system of institutions have an impact on innovation activity and interaction of participants within R&D and manufacturing cycle of innovations period (Trochim William M., Marcus Stephen E., Mâsse Louise C., Richard P. Moser, Weld Patrick C., 2008); PRI, 2014; Public-private partnership, 2006).

Russian published papers paid certain attention to government policies as a whole and the behavioral models of actors in national innovation system (Gosudarstvennaj politika…, 2016). They have presented several empirical analyses estimating how successful was government support in the areas where participation of the state was often a decisive factor for:

1) establishing innovation infrastructure (Agenda for the Development of Innovative Infrastructure in the Russian Federation, 2015; Untura G.A. 2014; Pavlov P., 2010; Lenchuk E., Vlaskin G., 2008).

2) supporting innovation projects with the participation of R&D in technological projects of enterprises abroad and inside Russia (Simachev Ju.V., Kuzyk M.G., Fejgina V.V., 2014; Ivanov D.S., Kuzyk M.G., Simachev Ju.V., 2012; Gokhberg L., Kitova G., Roud V., 2014).

3) developing industry-specific tools of innovation policy (Industrial Instruments for Innovation Policy /Ed. By N.I. Ivanova, 2016).

The results of named papers will be set out in Section1.

As it appears from the international and Russian experience, the government support of PPP projects in scientific-technical and innovation areas is implemented in the following basic forms:

1. Direct (transfers from the budgets) or indirect (preferential taxes, warranty liabilities etc.) financial supports;

2. Contribution to the sustainability of PPP project by means of supplying equipment, staff personnel, intangible assets and carrying out expert examinations. All these flows are estimated in cash (money terms) that is an equivalent of contribution in shared financing of a PPP project;

3. Legal and regulatory framework aimed at the intensification of scientific-research and innovation activities (priority areas, "lists for support", targeted support of innovation projects in regions, etc.);

4. Development institutions supporting the PPPs in innovation area such as institutions upon which special federal laws or resolutions have been initiated. These special institutions give federal preferences to enterprises located inside the "legislatively granted special status" territories, including compensation of recovery of the part of expenses for credit repayments received from commercial enterprises and government-owned corporation "Vnesheconombank" etc.

State support system in innovation area is taking more and more an interrelated form. Regions initiate their own programs, and the federal government creates new kinds of support. High-tech businesses implementing innovation projects deal with the task of choosing most efficient measures of state support among all its variety. However, the economic impact of such forms of government support on the financial results of enterprises implementing innovation projects based on the PPP principles is not sufficiently studied. The authors of the paper intend to partially fill in this niche by their study.

Purpose of the study. The purpose of this paper represents the impact assessment of the measures of federal and regional support[1] on the financial effects of an enterprise implementing a large innovation project based on the PPP principles in a region.

[1] ***Preferences approved by regulation of the Russian Federation or laws of a subject of the Russian Federation.***

The tasks of the proposed research include the following:

– *practical testing of the proposed project analysis procedure* for the efficiency assessment of the innovation project implemented by several participants on the basis of PPP principles. The authors' approach allows them to evaluate the contribution of direct and indirect state support to the financial results of the project and the net benefits of its participants (by means of a case study of „NEVZ-CERAMICS", a closely-held stock company located in Novosibirsk);

– *performing calculations* of how state support influences NPV (net present value) of a project, which is done in the framework of a model experiment with alternative scenarios. The first scenario reflects actual measures of state support provided to a high-tech Russian enterprise, and the other three scenarios present different versions of tax preferences at the federal level in case of hypothetical location of such enterprise in different territories (SEZ – special economic zones, Skolkovo Innovation Center or PDA – priority development areas)[1].

– *calculation of coefficients characterizing the efficiency of project implementation* for the enterprise in general and for particular participants (government, enterprise, venture investor or bank), as well as mutually beneficial participation in the project for both government and private business on the basis of comparison of costs and benefits.

The authors will seek to show the feasibility of a quantitative estimation method on a specific example. However, it seems to us that the methodical scheme can be used for any innovative project deal with a multitude of participants and with different types of state support.

1. Brief summary of the consequences of state support of innovation activity in Russia (Prior studies)

Analysis of a summary of publications on the efficiency estimation of state support for innovations in worldwide and Russia has highlighted the following methods and approaches to the estimation:

1. Empirical studies on the basis of available samples of enterprises and studies undertaken by econometrical methods (Kuzik et al., 2014).

2. Monitoring of state support of innovation infrastructure facilities created with the help of development institutions by the methods of expert comparative analysis of investment and earnings, expert estimations and interviews (Povestka…, 2016, Pakhomova N. V., Tkachenko D. S., 2014).

Hereafter we briefly summarize the conclusions on productivity of state support in innovation area for Russia obtained by various researchers. Similar hypotheses for the impact of state support will be tested for a PPP project in a definite region on the basis of authors' methodology in Sections 2-3.

Assessment of state support for innovations at Russian enterprises

Several research groups have unveiled the consequences of direct and indirect state support of companies' innovation activity in Russia (AMR, RVK, HSE, 2011, Ivanov D.S., Kuzyk M.G., Simachev Ju.V., 2012). One group, for example, made an estimate of state support efficiency with the help of expert and econometrical methods using the sample of more than 600 enterprises from different industries in Russia (Simachev Ju.V., Kuzyk M.G., Fejgina V.V., 2014). Interpretation of the efficiency of different kinds of support has been made both from the standpoint of the state giving support, and innovation enterprises, taking this support. As a result, there were some changes of volumetric indicators of these enterprises' activity, measures of performance and efficiency, innovation behavior etc.

Financial and tax support absorbs sufficient public money that happens under the conditions of enforced paternalism. The point is that in Russia, quite often, a lot of innovation projects could not be realized without participation of the government at all. However, for both types of support the effect of substituting private funds by public funds without substantial change of innovation policy's productivity is still observed. *This fact cannot be considered as an efficient result of innovation policy in the country*.

[1] The term „tax preferential territories of federal importance" in this context we mean the territories in respect of which the special federal laws were enacted: the Federal Law of the RF dated December 29, 2014. Number 473-FZ „On the territories of priority social economic development in the Russian Federation" (as amended by the Federal Law dated July 13, 2015. Number 213-FZ); the Federal Law of the RF dated July 22, 2005 Number 116-FZ (as amended by the Federal Law dated July 23 2013 and as varied by the Federal Law dated June 23, 2014) „Concerning Special Economic Zones in the Russian Federation"; the Federal Law of the RF dated December 28, 2013 „Concerning Skolkovo Innovation Center".

The results of econometric analysis have confirmed the ambiguity of positive estimation of state support for innovation. Anyway, state support did not deteriorate the value of volumetric indicators. Important positive link between acquiring state support and other indicators has been detected only for export turnover (Simachev Ju.V., Kuzyk M.G., Fejgina V.V., p.19, 2014). The evident confirmation of strong impact of state support on the growth of labor productivity and production efficiency indicators in the analyzed sample has not been found. From this fact, the authors concluded that the increase of cost effectiveness and labor productivity in preceding period was not the main task of companies' innovation activity. It has been confirmed that financial and tax mechanisms have a different impact on companies' behavior. For example, government financial support appeared to be more efficient from the standpoint of startup and reduction of risks of innovation activity. The innovation companies, on the other hand, hold that the use of tax instruments is more operative for implementing projects with long payback period. At the same time, the choice of "ideal" mechanism is scarcely possible. We think that it is necessary to make a preliminary assessment of common use of financial and tax stimulus measures in financial management of these companies. It is of interest for the PPP projects, when cash flows of separate participants in time are taken into account.

1.2. Efficiency assessment of state support for innovation infrastructure facilities

Innovation development institutions are important participants of public private partnership in Russia. Analysis made by the Project office of OAO RVK and the Ministry of Economic Development of the Russian Federation on the development of innovation infrastructure facilities showed, that the state support of these facilities was large scaled.

„From the beginning of 1990s, more than 1000 innovation infrastructure facilities have been established in the Russian Federation, including five special economic zones of technology and innovation type, 10 nanotechnology centers, 13 prototyping centers, 16 certification bodies and test laboratories, 29 centers of information and consulting infrastructure, more than 50 engineering centers (including 28 regional engineering centers, 20 engineering centers based on leading technical institutes, 9 engineering centers of pilot innovation territorial clusters and others), 114 technology transfer centers, 160 technological parks (technoparks), 200 business incubators and 300 common use centers. Innovation infrastructure facilities, including the Advanced Research Foundation, Federal Agency for Scientific Organizations, the Russian Foundation for Basic Research, two national research centers and 14 naukograd science cities have been created for the development of science. The system of development institutions including Rusnano State Corporation (Russian Corporation of Nanotechnologies), Skolkovo Innovation Center, Russian Venture Company, VEB (Bank for Development and Foreign Economic Affairs) – innovation and others is in operation. The establishment of more than 200 regional clusters (including 25 pilot innovation territorial clusters receiving state support from federal budget) and 35 technological platforms, also belonging to the innovation infrastructure has been initiated".

Moreover, the authors of monitoring consider, that at present, the problem of return to self-repayment of the innovation infrastructure facilities is pending (Strategy of Innovative Development…, 2011). „For the period of 2007 to 2014 years the sum of 684.4 billion rubles from the federal and regional budgets has been spent on innovation infrastructure including the sum of 92.1 billion rubles given in the framework of programs for small and medium entrepreneurship support, 281.1 billion rubles from the capitalization of development institutions, 67.7 billion rubles for the formation of innovation infrastructure in the constituents of the Russian Federation, 243.5 billion rubles from the guarantee funds and government guarantees" (Agenda for the Development of Innovative Infrastructure in the Russian Federation, 2015).

It was noted, that sufficient government expenses in PPP projects have not been supported by the planned amount of non-budgetary financing. The increase of expenditures has not been accompanied by the adequate growth of proceeds of innovation infrastructure facilities and by the increase of their contribution to the economic development of the country. This moment has slowed down the turn of innovation infrastructure to self-repayment. It was demonstrated, that the "sensibility" of particular innovation infrastructure facilities to the state support has been quite different.

The highest level of budget risk (failure to obtain proceeds from the budget) had regional engineering centers (75%), special economic zones (76%), and Skolkovo (budget financing of the projects amounted to 47%). This estimation has been made on the basis of data ratio about the budget support of particular innovation infrastructure facilities and their revenues from the provision of various services.

Along with this, the success of state support of technoparks sufficiently differs in various regions and parks. For example, the eight-year period monitoring of the activity of small innovation business companies,

located in the technopark of Novosibirsk Akademgorodok (about 200 companies annually gave sales proceeds of innovation products over 5 billion rubles) showed, that about the half of residents grew the economy without evident financial or tax state support. Investments from the federal and regional authorities into infrastructure development have exerted a positive effect. This effect materialized in active entering of residents into the technopark. About half of them could further develop using their own resources. For another half part of residents, the most important was federal support in the amount of at least 10 billion rubles per one company. Such a support allowed to provide an average annual rate of growth of innovation production sales of about 30% (Untura G.A., 2014).

Further the paper gives the authors' approach of the assessment of the impact of government support developing the traditional method of project analysis, taking into account the plurality of PPP participants. In our paper, on the example of a specific innovation PPP project (production of nano ceramics in the Novosibirsk Oblast, territorial entity of the RF), we have estimated and compared the alternative action of federal preferences of development institutions and targeted support of the Oblast's authorities on the financial results of participants. Traditional indicator of the project efficiency has been used to calculate several coefficients presenting the motivation to participate in the project and mutual benefits from that participation.

2. Project analysis method considering the plurality of participants and different options of government support

2.1. Methodology

Financial performance of a high-tech enterprise depends on the balance between time distribution of cash flows from investment, operational and financial activities of the enterprise and its turn to break-even point within cost recovery expectancy period. The method of project analysis permits treatment of economic operations of a high-tech enterprise as an implementation of a large scale innovation project (Shahray S.M. et al., 2010). In this case the calculation of commercial efficiency, budget efficiency, payback time and break even rate develops into standard procedure in investment analysis for decision making about the suitability of initiating an innovation project. Government support for an enterprise affects cash flows of innovation project, which changes the net present value (NPV) and other financial figures both for the entire project in general and its individual participants. This approach permits comparison (in the mode of simulation modeling) of various scenarios of government support from the point of view of financial effects of different participants that create motivations for joint participation.

In general terms the cash flows on an investment project for the assessment of commercial efficiency in an option with government support can be presented in the following proportion (ratio):

$$CFF_t = X_t - M_t - T_t + \Delta T_t - U_t - R_t^U + I_t + L_t; t = 1,..., T, \quad (1)$$

where,

CFF_t – amount of balance of cash resources for period t in the framework of analysis of a project's commercial efficiency in an option with government support;

X_t – sales proceeds of the project for period *t* by application of value added tax and other indirect taxes;

M_t – operating expenses in the project for production and sale expenditures for period *t* in view of value added tax in the operating expenses without depreciation expenses;

T_t – taxes that should be paid by an enterprise when producing products of investment project for period *t*;

ΔT_t – tax change at the cost of government support to the project for period *t*;

U_t – investment taking into account value added tax for period t without R&D expenses;

R_t^U – R&D expenses in the project by application of value added tax for period t;

I_t – part of investment and operating expenses with value added tax financed at the cost of budget allocations for period t;

L_t – salvage value of the project with value added tax for period t.

Cash flows balance in the options with government support and without it can be presented in the following view:

$$CFF_t^{NG} = CFF_t - \Delta T_t - I_t; t = 1,..., T, \quad (2)$$

where, CFF_t^{NG} – amount of balance of cash resources of the project for period *t* in the framework of analysis of commercial efficiency in conditions without government support.

A combination of commercial efficiency indicators is calculated on the basis of cash flows generated for

each option of the project's support. Most frequently used indicators are the indicators of NPV (net present value). Specifically, in the framework of commercial efficiency analysis on the basis of ratio (2), it is easily shown that NPV of the project in the main scenario with government support differs from corresponding NPV of the scenario with no support, and the difference is equal to the discounted value of government support coming from the tax change and provision of budget allocations for financing the part of investment and operating expenses.

Explicated presumptions and assessment methods

In our study the estimation of how government support has an effect on financial results of both a project and enterprise, is based on the standard methodology of project analysis. The authors have adapted it as a financial institutional model (1) and (2) for the analysis of innovation projects with multiple participants acting under the different scenarios of indirect support.

The authors use three stages of analysis in the framework of project approach.

During the first stage financial results of all participants of a PPP project under actually working federal and regional supportive measures in this region are calculated.

During the second stage the model experiment conditions are introduced, i.e. financial results for the same project are estimated under various scenarios of government support that are in force in the region (Skolkovo, SEZ and PDA). This method permits comparison of the potential NPV for each scenario with the NPV with actually working measures in the area of real location in the Novosibirsk Oblast. An additional point is that the coefficient of tax burden is calculated in different scenarios.

During the third stage non-traditional coefficients characterizing interactions between participants are calculated. The authors proposed new coefficients (previously not mentioned in research literature), that can be calculated in the project analysis and then used in financial management of the enterprise. Coefficients defining mutually profitable relations of PPP can be used as addition to the traditional indicators of project efficiency such as NPV, payback time, internal rate of return etc. We gave them the name *"Tax burden ratio of a project" and "Quaszi profitability"*. The last name is close in meaning to the term *profitability*, but is considered somewhat differently than is accepted in financial analysis. They are calculated on the basis of corresponding data about NPV of entire project and NPV of each "i^{th}" participant, and common expenses of the project (Z) and expenditure incurred by each "i^{th}" participant (Zi) for the basic version of a model and for specifications including every target allocation of investing. Also it is quite useful, in our opinion, to introduce a coefficient that enables comparison of the share of taxes and NPV of the project as a measure of benefits from participation of the state (from tax revenue) and losses (tax burden) for individual enterprise in PPP project. Let us briefly describe the ways of their calculation.

Coefficient K0 designate as "Tax burden ratio of a project". It characterizes the ratio of tax payments (with account of an employer's social transfers) to the earnings of enterprise.

Tax burden reduction is one of incentives to enhance the efficiency of financial activity of enterprises and develop innovations. This incentive is assured by the measures of tax policy of the state. In the economic literature the term "tax burden level (TBL)" was introduced and its definition is a "ratio of total tax liabilities (without personal income tax) to gross value added". This indicator averaged countrywide (over Russia) amounted to 0.412 (Sajfieva S.N. 2010). It differs in industries and varies over time. There is one paradox in manufacturing sector, where the state tends to lay the groundwork for more innovation activity, the TBL appears to be higher than in other sectors and therefore the lack of proprietary resources for the crucial technological re-equipment happens.

In case the tax burden decreases because of a project's indirect support, then a cash flow becomes available. In addition, more incentives to develop innovation activities in a company emerge, which can be observed when calculating NPVs for a company and the state.

Coefficient K1 designate as "Quazi profitability". By analogy with profitability, the coefficient is understood as a certain characteristics of the efficiency of participating in the project, i.e., *the receipt of 1 ruble of NPV of a participant per one ruble of the financial costs incurred by the participant*. This coefficient of the efficiency of the process of the NPV formation can be calculated for each of the participants of the state-private partnership project (as the ratio of a participant's NPV (net profit) to the costs incurred by the participant) as well as for the project as a whole as the ratio of NPV of the entire project to the aggregate costs of all the project's participants.

The coefficients of mutually profitable relation of PPP participants, obtained in the framework of model experiment under different scenarios of indirect support of development institutions, have been presented and analyzed in Section 3.3 of this paper.

2.2. Measures and Data Collection

Focus in the project analysis procedure is brought on cash flows interactions of different participants involved in a PPP project, such as high tech enterprise, state structures, venture investors and banks.

Financial institutional model (1) takes into consideration cash flows of different participants. In this model, the changes of financial result produced by innovation project (NPV of the project and NPV of individual participants) are calculated. This moment helps detect the differentiation of the costs and benefits of each participant under the actual or experimental scenario of tax burden.

Factual data for model calculations were based on the indicators of financial reports of an enterprise and currently working rates of taxation and stimulation on a period under report. In the project analysis model we will consider only certain kinds of government support, mentioned in a classification, including those available to an innovation enterprise within the area of the Novosibirsk Oblast. Our model simulates the introduction of direct and indirect support's measures which we highlighted a priori in the innovation policy of the Russian Federation and selected for an analysis of three development institutions. The types of federal support of innovations by the development institutions within the particular territories of the RF are shown in table 1, which will be considered in other scenarios of comparative analysis.

3. Key results. Comparative analysis of financial results of innovation project under a variety of scenarios of government support

3.1. State support impact assessment on the financial results of an innovation enterprise by the case of NEVZ Ceramics (first stage)

Quantitative assessment of the financial effects has been determined on the basis of modified model of discounted cash flows (DCF) with an allowance for the adjustment of calculations of the discount rate (*r*), suggested by A. Damodaran (Damodaran A. 2012). This model has been developed on the modern principles of cash flow division for investment, operational and financial activities and on the calculation of traditional indicators of efficiency (NPV, IRR, BI etc.) along with the use of data of practical tax regime within the territory of the Novosibirsk Oblast (big region, federal subject of the RF) (Proektnajaj ekonomika…, 2013).

Empirical study of the indirect government support's financial effects is based on the project analysis of business activities of a large high-tech enterprise (JSC "NEVZ-CERAMICS" in Novosibirsk) with the number of staff more than 300 employees producing innovation production (nanoceramics) from 2010 year. The aggregate of investment and operational cash flows, connected with the production of nanoceramics, can be presented as a certain innovation project implemented in a PPP way. Cash flows (resulted from financial activities) originate thanks to the participation of various partners of the project.

This fact determines the stability of the PPP. In the list of participants, the following actors are included:

• State structures: the Ministry of Education and Science of the Russian Federation, the Government of the Novosibirsk Oblast;

• Private business: high-tech enterprise JSC „NEVZ-CERAMICS" as a main initiator and realizer of the project;

• Commercial banks;

• State corporation JSC RUSNANO;

• Scientific and education institutions: Novosibirsk State Technical University, Tomsk Polytechnic University and scientific institutes of the Siberian Branch of the Russian Academy of Sciences.

At first we would like to show on the example of scenario ("de facto") what is the impact of different measures of state support, actually working at the moment, on the financial results of a PPP project. The participation of the state as a strategic partner in the project is carrying out in the way of direct and indirect government support:

• Direct budget financing in the framework of educational grant of the Ministry of Education and Science of the Russian Federation and internal targeted program of the Government of the Novosibirsk Oblast (direct state support);

• Payments cutting until 2017 on property tax in the budget of Novosibirsk region (indirect state support);

• Use of advanced coefficient of cost recovery for R&D for the priority fields of research (k=1,5) (indirect state support).

This project demonstrates the typical for innovation industries elements of investment: R&D (8% of total investment); education programs (8%) and purchase of patents and licenses (5%). The structure of financing sources shows the relative size of both investments from private participants of the project and the volume of direct state support (in a body 8% of total amount of financial assets for the project). (Gorbacheva N.V., Untura G.A., 2015). The ratio of project expenditures to the participants' NPV one can see at the picture. A degree of impact of each kind of state support can be detected through calculations.

The other participants are burdened with project costs much more than the state. In addition, the higher degree of interaction of contract arrangements with the project profitability is, the smaller a gap

between benefits and expenses for a participant are. The biggest gap among private participants can be observed for a bank which interaction conditions have short term nature with fixed interest payments. Benefit-cost ratio between two key participants of the project (RUSNANO and NEVZ-CERAMICS), whose net income is directly connected with the positive effect of the project is better balanced (figures 1, 2, 3, 4).

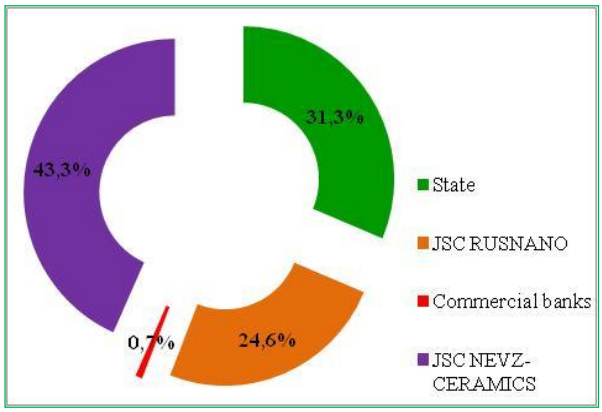

Figure 1. Structure of discounted benefits for different participants of investment project "Production of Nanoceramics Goods" (r=10%)

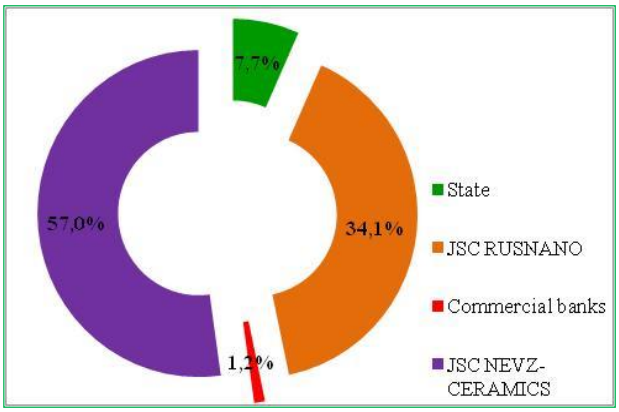

Figure 2. Structure of discounted costs for different participants of investment project "Production of Nanoceramics Goods" (r=10%)

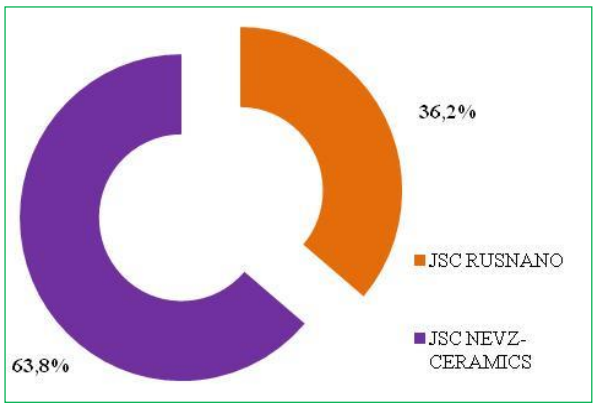

Figure 3. Distribution of discounted benefits between two core participants – RUSNANO and NEVZ-CERAMICS (r=10%)

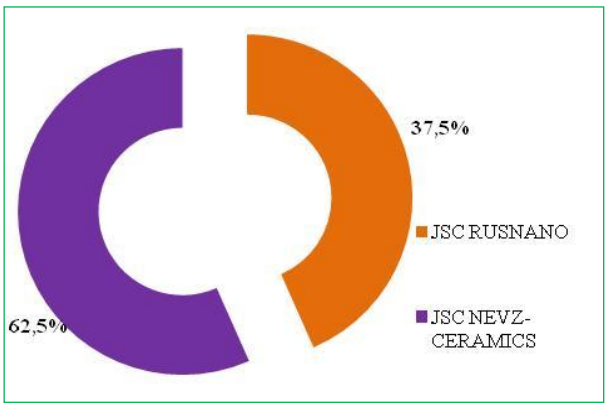

Figure 4. Distribution of discounted costs between two core participants – RUSNANO and NEVZ-CERAMICS (r=10%)

Source: Elaborated by authors.

Thus a variety of the project's financial sources (project "Production of Nanoceramics Goods") generates special conditions for searching the parity of PPP in order to get a wide range of benefits from the interaction potential of all participants.

The size of direct state support is clearly seen from the structure of the project's financial sources. Though in order to reveal a size of indirect state support, the project analysis methods should be used. The modification of cash flow from operations allows catch the size of indirect state support, strongly depending on the project characteristics. As a rule, this type of calculations has specific economic character. Project analysis procedure can give an integral evaluation of financial effects from the direct and indirect government support in the process of implementing a project and show the contribution of particular support instrument in the NPV of a project at each step of account period.

Let us check the hypothesis H1: direct state support is more important than indirect state support.

For a conditional "zero" step of our model it has been simulated the scenario of project implementation without any state support measures. Then, through a step-by-step adding in the simulation model each successive type of state support (first step – direct support, second step – indirect support on property taxes, third step – indirect support for the accelerated depreciation of R&D capital expenditures), we have obtained an actual (basic) scenario. This scenario has a whole combination of factual measures of state support for an enterprise at present moment. In the actual scenario we accepted the order of steps according to the time when information about the type of state support appeared.

In general, at the expense of state support the NPV for an enterprise increases one and half fold. This increase is resulting from the direct state support on 71%, from the property tax privilege on 28.7% and from the use the method of accelerated depreciation on R&D capital expenditures on 0.03%. Then we note that the higher a discounting rate, the bigger a significance of direct state support in comparison with indirect support. So, when r (discounting rate) equals to 10% the increments of NPV of an enterprise is provided at 74% due to the direct state support and 26% – indirect support. Thus for an enterprise the opportunity cost of one ruble given as direct budget financing becomes bigger than one ruble saved at the cost of tax payments. Therefore, the hypothesis H1 has been confirmed and one could expect the high efficiency of indirect state support in the stable macroeconomic conditions with the low opportunity cost of capital.

3.2. Impact assessment of indirect state support to financial results of a project: model experiment with the use of scenarios for special tax treatment of development institutions (second stage)

After the 1990s, the development of PPP in Russia has been accompanied with the establishment of new development institutions, namely Special Economic Zones (SEZs). In Russia, this concept has been realized at the second attempt after a bad experience of free economic zones from 1992 to 2005 year. Special tax treatment has become one of the key incentives in attracting residents. As noted by P. Pavlov, one of the key incentives to attract investments in SEZs has been preferential administration-financial policy, which should not "call into question the general economic and financial feasibility of the establishment of SEZs" (Pavlov P., p.10, 2010). Therefore, in spite of a variety of preferences (special administrative regime and free customs mode and the entire necessary infrastructure at lower prices), the special tax treatment acts as one of major instruments of PPPs. In the meantime, as noted by Animica P.E., the tax regulation of SEZ activities in Russia has a set of peculiarities that "artificially enlarges the competitiveness of SEZ enterprises in comparison with the enterprises located within other areas of a region under consideration or Russia as a whole" (Animica P.E., p. 32, 2012).

In 2010, in order to overcome some negative effects of SEZs functioning in Russia, there was formed a special infrastructure area for accelerating innovation development. This area – Skolkovo Innovation Center (or simply Skolkovo) has been established for the purpose of breakthrough innovation projects. Then, in 2014, it has been initiated the creation of PDAs – Priority Development Areas, first of all in Siberia and Russian Far East (Siberia…, 2014).

Comparative analysis of the consequences of indirect state support of the authorities of the Novosibirsk Oblast in the form of targeted preferences, on the one side, and development institutions of federal importance, namely PDAs, SEZs and Skolkovo, on another side, allow clarify the competitiveness of supportive measures at the level of particular region with federal initiatives.

Each government initiative on the development of a region with tax preferences of federal importance (Skolkovo, SEZs and PDAs) had its own idea and state support goals. Despite different economic activities of the regions selected in legal regional regulations, they all provided with a wide array of specified types of indirect state support (table 1).

A statement under testing is an indirect state support on the side of regional authorities and federal development institutions. This statement manifests itself in several aspects:

- H1: targeted indirect support on the part of the Novosibirsk Oblast Government is less significant for the participants' NPVs in comparison with special tax treatments of federal importance, which have been provided by the innovation development institutions in another regions;
- H2: tax burdens for PPP projects fall stronger in case of indirect support of development institutions;
- H3: there are competing measures to support different development institutions for a PPP project, in particular the indirect support on PDAs is mostly attractive for high-tech businesses compared with Skolkovo and SEZs. The search for the conditions of parity partnership is quite probable.

By the way, the president of Russia Vladimir Putin considered the creation of a PDA in Russian Far East as a development institute, which could attract also high-tech business in this region (Siberia…, 2014).

In our model experiment, a fixed value of financial state support of particular PPP innovation project is taken as a constant, and then we consider four different scenarios of the provision of indirect support, which basic conditions are presented in table 1:

1) Scenario of a SEZ;
2) Scenario of the Skolkovo Innovation Center;
3) Scenario of a PDA;
4) Scenario of the targeted support for the regions of the Novosibirsk Oblast (base scenario, i.e. business as usual).

Table 1

Indirect State Support provided by Priority Development Areas, Special *Economic Zones, Skolkovo Innovation Center and Novosibirsk Oblast Government

Type of taxes	Priority Development Areas[1]	Special Economic Zones[2]	Skolkovo Innovation Center[3]	Novosibirsk Oblast Government[4]
VAT	No	No	Exemption from value-added tax during 10 years	No
Depreciation	No	Accelerated depreciation rate up to 2	No	Accelerated depreciation rate up to 1.5
Corporate Income tax	In Federal Budget – 0%. In Regional Budget – up to 5% during first 5 years, and above 10% during next 5 years.	From 13,5% up to 15,5%	Exemption from profit tax during 10 years if sales revenue isn't above 1 billion roubles or profit isn't above 300 mil. roubles.	No
Property tax	No	Exemption from corporate property tax	Exemption from corporate property tax	Exemption from corporate property tax
Land tax	No	Exemption from land tax during 5 years	No	Exemption from land tax during 7 years
Social contributions and labor taxes	Reduced rate on insurance premiums – 7,6%	Reduced rate on insurance premiums – 14% up to 2017 year, 21% in 2018 year, 28% in 2019 year.	Reduced rate on insurance premiums – 14%.	No

Sursa: Elaborated by authors.

The core of our model experiment is the comparative financial effect analysis of real state support of an innovation project in form of a PPP (within the area of the Novosibirsk Oblast) and hypothetical options of indirect support, which is presented by three development institutions: SEZs, PDAs and Skolkovo. Economic profile of the NEVZ-Ceramics Company in many ways meets the key PPP characteristics, which are governed by the jurisdiction of PPP development institution. The significant innovation component of a project offer the possibility to be among the residents of the Skolkovo Innovation Center. Sizeable R&D investments and vigorous technology development activities equate the analyzed enterprise with similar enterprises located in SEZs. High-tech production of this company and the connectivity of the Novosibirsk Oblast, where NEVZ-Ceramics Company is presently located, with other Siberian regions included in PDAs (for example, the Krasnoyarsk Krai), give ground to the hypothetical dislocation of the project in a PDA.

For checking H1 и H2, the coefficient K0 has been determined. It is the level of tax burden ratio of an enterprise. This coefficient is a traditional indicator of financial management and demonstrates the level of taking away the enterprise's financial resources in profit of state depending on the introduction of different ways of indirect state support. As one can see in figure 5, this enterprise now works under the business tax burden of 18.2% (base scenario) while the tax burden ratio increases up to 25.3% of revenues with account of social insurance funds' payments (the Pension Fund of the Russian Federation – PRF; the Fund of Social Insurance of the Russian Federation and the Fund for Mandatory Medical Insurance). The location of the enterprise within PDA territory provides both minimum tax burden ratio (13.7%) and minimal social embarrassment, i.e. minimum gap between tax burden ratio (black color line in figure 5) and tax burden ratio with social contributions and labor taxes (red color line in figure 5).

[1]Federal Law dated 29.12.2014 no. 473-FZ

[2]Ministry of Economic Development of the Russian Federation, table of tax exemptions for different types of Special Economic Zones. URL: http://economy.gov.ru/minec/activity/sections/sez/preferences/taxconcession (accessed 01.03.2017).

[3] Federal Law dated 28.09.2010 No. 244-FZ (ed. 28.12.2013)

[4] Tax exemptions, which are addressed to particular technology-based enterprise on behalf the Novosibirsk Oblast Government.

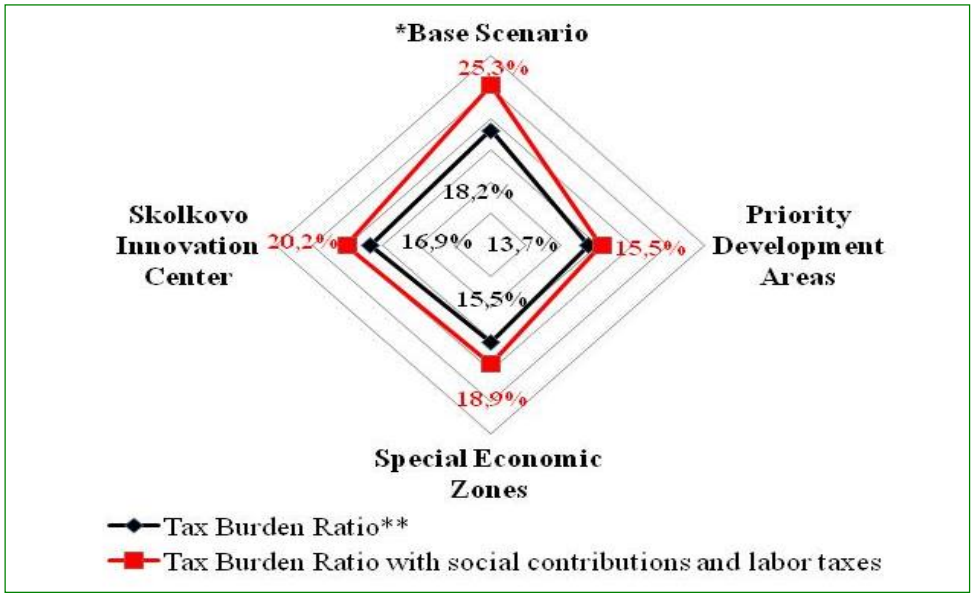

Figure 5. Tax Burden Ratio for NEVZ-CERAMICS on different indirect state support (as % of sales revenue)

*Notes: *Base scenario is a set of realistic conditions under which investment project "Production of Nanoceramics Goods" is realized, including indirect state support on behalf the of the Novosibirsk Oblast Government;**Tax Burden Ratio is computed by dividing the actual corporate tax payable on sales revenue.*

For checking H3 it has been analyzed the benefits and costs of each PPP participant that shows the change of NPV for each of the participants under all four scenarios. Figure 6 presents the financial results of PPP participants depending on the indirect state on the various territories.

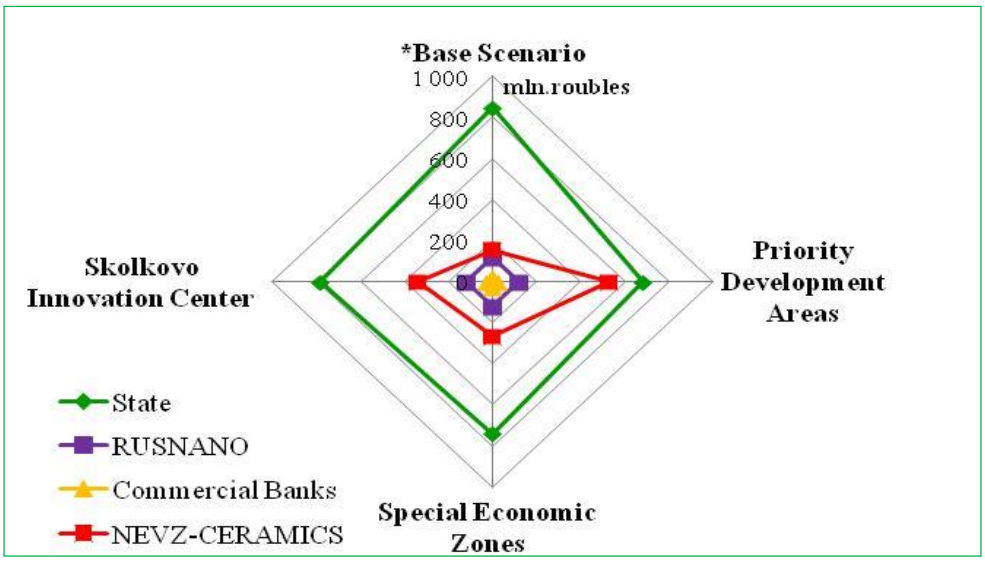

Figure 6. NPV for participants of investment project "Production of Nanoceramics Goods" on different indirect state support (r=0%)

Source: Elaborated by authors.

As one can see in figure 6, the state is the main beneficiary in the process of the project realization despite various tax preferences. The net benefits of the state not only exceed the costs connected with the direct investments' budget financing and lost short-received federal taxes, but strongly overtop the net benefits of the enterprise. Of all scenarios, the maximum NPV convergence of the state and enterprise occurs in case of tax liabilities for PDAs. Therefore, from the standpoint of a PPP, this option gives the best balance of financial effects both for the state and high-tech enterprise. Net benefits of a venture investor and bank,

whose cash flows fixed during life cycle of the project, are constant and independent of the location of an enterprise on "modelled" territories. Thus the indirect state support affects firstly the NPV of both state and enterprise.

It would seem that the results of our calculations correspond with the conclusions of other authors (see Section 1). The fact that different types of indirect support lead to the increase of volumetric outcome indicators of innovation activities. In addition, the decrease of tax burden on enterprises providing additional stimulation in order to expand the scale of innovation activity.

In addition, the tools of project analysis helps calculate the indicators of mutually profitable relations for the state and business in the process of realization of PPP innovation project within various territories. These indicators characterize the motivation for future development and stability of the project that will be scrupulously described in Section 3.3. Then we consider the results of model calculations from the standpoint of how the state support affects the efficiency and motivation of the participants to incorporate in PPP while implementing an innovation project in the areas of special tax treatments of federal level.

3.3. Targeted support impact on efficiency and parity of participation in PPP project for state and individual participants (third stage)

We have succeeded in calculating coefficients 1-3, mentioned in Section 2 with respect to above described PPP innovation project. Let us illustrate the meaning of some of them.

Quasi-profitability (K1). By analogy with the indicator of profitability for the financial assessment of enterprise efficiency, one can consider some coefficient, indicating the change of project efficiency under the different conditions of state tax support, by putting in correspondence the NPV and incurred costs.

In figure 7 in graphic form it is apparent, that the indicator "Quasi profitability" of NPV for the state in any scenario of the targeted preferences keeps higher value than for each of the participants as the costs incurred by the state of this project is quite small (195 thousand rubles) while the tax payments to the budgets of all levels amount to 1.6 billion rubles, i.e. per 1 ruble of invested costs there is an effect of approximately 7-9 rubles. For the rest participants even when the value of NPV is positive and quite high (table 1) the return on investments is not so high and even multiply lower than for the state. However, K1 increases notably compared with factual situation of the taxation of an enterprises, located outside marked territories (SEZs, PDAs and Skolkovo) if this enterprise got the targeted tax preferences similar to those of the territories of innovation development (SEZs, PDAs and Skolkovo). Maximum efficiency is for the participant (enterprise) in the scenario for a PDA. It increases from 0.40 to 0.90 ruble/ ruble, i.e. about twofold compared with the similar indicator for factual scenario. In the meantime, one can see the increase of "Quasi profitability" of NPV for the project as a whole in any of hypothetical scenarios of the transfer of the state support conditions in the framework of development institutions.

Model experiment shows, that in case of additional providing special PDA tax preferences for one and the same enterprise, the efficiency of NPV for the state is slightly reducing from 8.7 to 7.0 rubles, compared with factual situation. Nevertheless, the local efficiency of an enterprise and the entire project is significantly rising.

In our opinion, by so doing the state stimulates an enterprise to implement the project since cost recovery becomes more reasonable for a shorter period.

The same thing can be noted for the project as a whole though both for a venture investor and a bank the change in tax regime has no impact on the efficiency improvement. It should be noted that the tax preferences given to the enterprises located in PDAs (determined by the Federal Law of the RF dated December 29, 2014. Number 473-FZ „On the territories of priority social economic development in the Russian Federation" (as amended by the Federal Law dated July 13, 2015. Number 213-FZ), appear to be the most profitable among all scenarios of targeted support for three territories of innovation development, not only for a NPV as a volumetric indicator in figure 6, but also from the side of innovation process efficiency.

Coefficients *K0 and K1* considered in empirical analysis prove the hypothesis on positive impact of tax support on PPP innovation projects and the improvement of individual participants' activities in case the state agrees to the situation when the budget efficiency is slightly diminishing.

Thus an innovation enterprise de facto located in the territories with tax preferences of development institutions can feel a strong effect, while an enterprise implementing PPP innovation project in the Novosibirsk Oblast finds itself in the situation of lost profits or, in other words, conditional discrimination in spite of direct state support and tax advantages of the regional Government.

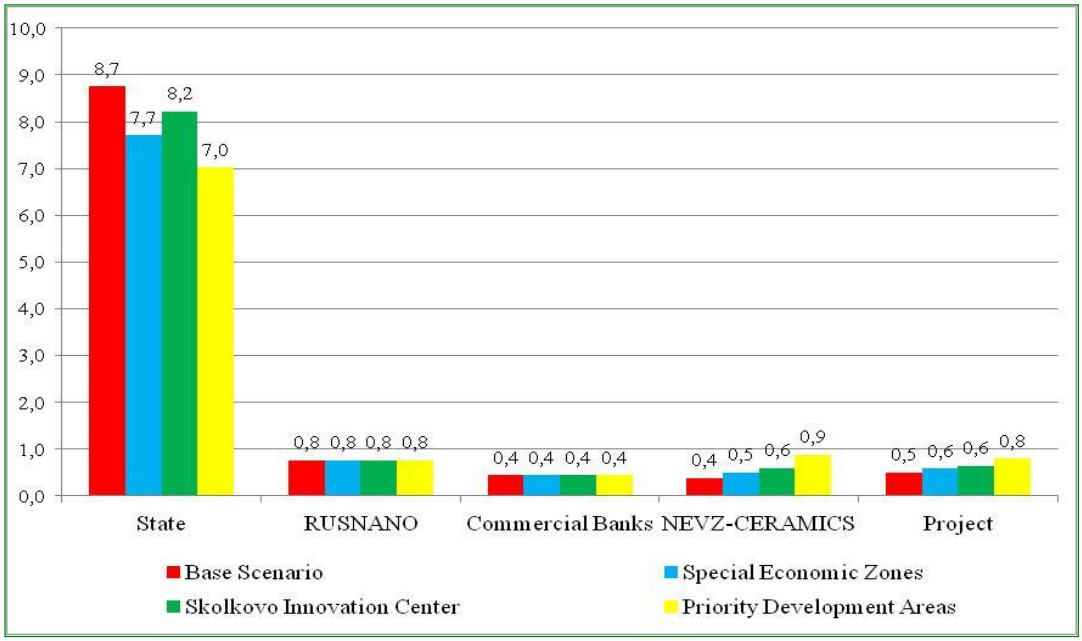

Figure 7. Coefficient "Quasi- profitability" for participants of investment project "Production of Nanoceramics Goods" on different indirect state support (r=0%)

Source: Elaborated by authors.

Performed model experiment demonstrates that, from one side, it has been proved the validity of the state support in stimulating innovations in the territories with acting preferences of development institutions. Though from another side, our experiment showed the failure of the federal subjects of the RF to compete with federal authorities (in particular, in the Novosibirsk Oblast because of budget limitation). This fact acts as a brake on the innovation development of PPPs in the RF regions, which are not judicable to the supportive measures of development institutions, such as Skolkovo and others.

Discussions

In our opinion, the procedure of project analysis is quite universal. It helps estimate the consequences of any pre-selected "kit of state support measures" for a PPP innovation project. The results of the analysis have confirmed the conclusions made by other authors in the studies mentioned in the overview in Section 1.In our example, a relatively stronger impact on the project efficiency of direct state support in comparison with indirect support can be attributed to the forecasting period of cash flows (only seven years with the deemed settlement (liquidation period) by 2018), size of budgetary allocation (195 billion rubles), and opportunity cost of capital (10% nominal discount rate).

In Russia, the long-term life cycle of high-tech businesses increases the importance of indirect state support in the conditions of limited budget financing. Though in a stable macroeconomic situation with a low opportunity cost of capital, where tax payments savings are not devaluated, indirect state support will give maximum profit. However, this conclusion must be interpreted with caution, and the calculations need to be verified on the basis of a group of companies specializing in a certain area.

The methodology developed and tested by the authors allows focusing on the size and dynamics of the following two indicators:

1) The NPV of the participants, to compare the economic efficiency of a project from the standpoint of PPP partners;

2) The quasi-profitability and quasi-parity coefficients showing the net benefits of PPP and revealing the motivation of participating in PPP. We believe that this aspect helps avoid short-term determinism when evaluating the financial effects of the certain types of state support for a PPP project on the whole and for its participants. A simultaneous increase in efficiency and justice in benefit distribution among the PPP participants should allow making long-term decisions based on the Principles of Reasonable Investment (PRI) developed by the UNO (PRI, 2014). It appears that this trend should develop in Russia since the search for a mutually beneficial partnership between the state and private sector in a long-term period must focus on the opportunity cost of capital (rate of discount) and the possibility of balancing the interests of the partners of PPP projects.

In this particular calculation, it has been found that it is the state and not the private business that benefits (and benefits substantially) from PPPs. The new law about PPPs provides an alignment of public and private interests. In this case, the coefficients considered can play their analytical role in project analysis and development of the innovation policy. The parity of relations between the PPP participants as a motive for raising long-term investments has not been studied sufficiently yet and is much less observed in practice. In our opinion, the institutional regimes of tax support of "special" areas have reached some short-term goals, such as a partial increase in tax relief. In the future, the authors are planning to study the various treatments of the essence of parity and social justice with a view to evaluating the mutual benefits of the PPP participants gained in different variants of state support.

Conclusions

1. The assessment of the efficiency of state support provided to innovations, which was obtained in an empirical study using different methods and approaches, has shown that, on the whole, state support contributes to the improvement of certain volumetric financial indicators of enterprises and PPP.

2. Special tax treatment materially reduces tax burden on companies and creates incentives for implementing projects with long-term payback time. In our opinion, the conclusions obtained do not contradict the economic meaning of the innovation support policy. It is logical that a tax burden decrease deriving from indirect state support leads to an improvement of financial results of the enterprise implementing an innovation project.

3. The assessment (using the methods of project analysis) of the impact of state support provided to a specific high-tech company, NEVZ-Ceramics, has shown that owing to state support the NPV has increased altogether by 50%. The net benefit has increased mainly thanks to direct state support (71%), indirect state support (28.7%), and indirect non-tax support including accelerated depreciation of expenditures on R&D (0.03%). Note that the higher the rate of discount, the more important is direct state support vis-a-vis the indirect one. Direct state support reduces the risks companies face in the beginning of their operation. Also, it creates opportunities for the stable implementation of a project with its original members and increases the mutual interest of both the state and company in accomplishing the project.

4. The results of the model experiment have confirmed that federal tax regimes encourage the entering of PPP innovation projects into innovation development areas. The “quasi-parity” coefficient has proved that the interests of all the partners have been taken into account in the scenario of tax preferences for the Russian Priority Development Areas. Tax sharing asymmetry in favor of the federal center reduces the range of potential supportive measures for local high-tech businesses, i.e. in Russian regions.

5. When selecting the project’s location (compared with its actual location), the degree of preference grows in the following order: SEZs, Skolkovo, and the Russian Far East declared as a PDA (note that this preference is much higher for the PDAs). An advantage of the federal taxation scheme is that preferences upgrade the overall efficiency of a PPP project and improve its performance for the participants. On the other hand, there are some minuses from the standpoint of the general promotion of innovations throughout the country since the comparison of factual and hypothetical scenarios have demonstrated lost profits from the use of the “selectively targeted” tax system for the companies participating in PPP in the other regions of Russia.

Another consequence of such a strong decrease of tax burden because of indirect state support provided by federal development institutions as compared with targeted support in regions has shown regional authorities have to act under constraints in developing decentralized mechanisms for stimulating innovations. Asymmetry in tax allocation to the benefit of the federal center restricts the range of potential support measures for high-tech businesses based in specific regions. As a whole, the expansion of the experimental types of state support of certain projects is necessary for the pilot testing of some institutional design schemes for the tax system. Model experiments with the types of state support and their generalization for other sectors of economic activity may help detect advantages and disadvantages of the decisions to be made on the deduction rates and taxation procedure before the recommendations go to the legislative level.

To sum up, PPP stimulation through the state support of various types should promote the achievement of long-term goals of innovation development and form a mutually beneficial partner relationship between the state and private sector. Therefore, the state providing indirect support for innovation businesses implementing PPP projects in the areas having different development institutions (PDA, SEZ, Skolkovo) should aim not only for high budget efficiency but also for steady benefits for private investors in the long-term period.

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Recommended for publication: 08.02.2018