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**DOES PUBLIC-PRIVATE PARTNERSHIP LEVEL AFFECT  
INVESTMENT ACTIVITY IN RUSSIAN REGIONS?**

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*Abstract*

The article considers the influence of the development level of the state-private partnership of the region on its investment attractiveness. In this study, the task of rigorous justification and assessment of the level of public-private partnership influence on the investment activity of the Russian regions has been set and solved. At the same time, the importance of the conditions and mechanisms for the formation of infrastructure capital (within the framework of public-private partnership projects) and its impact on the economic growth of regional economic systems was indirectly assessed. The regression model confirms the influence of the level of PPP development on the volume of investments in the region. The parameters of the model also indicate that in the dynamics of recent years (in 2015 relative to 2014), the influence of the PPP level of the region increased in absolute terms by four times, according to the corresponding increase in the value of the coefficient over the independent variable. At the same time, the degree of explanation within the framework of the model of differences in the regions of Russia in terms of investment volume in 2015 decreased to 20% (in 2014 this figure was 33%). Such dynamics indicate an increase in the range of factors (in addition to the level of PPP development) affecting the volume of investments in Russia in 2015 compared to 2014. Such factors could be external financial and economic factors caused by the complication of the geopolitical situation around Russia.

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**Keywords:** Public-private partnership (PPP), infrastructure capital, investment activity, investment attractiveness, investments, PPP rating.



## 1. Introduction

For today, Russia is characterized by signs of "growth without development," which occurs in an inefficient economic structure. Many modern instruments of state regulation in the sphere of investment are not being used to the full extent.

Evaluation of the investment activity of the regions is currently a popular area of research. However, at the same time, the methodological tools of such assessments are controversial among economists and expert practitioners. In this regard, the studies of the Agency for Strategic Initiatives (ASI), the rating agency Expert and other similar organizations can be considered as a first approximation for carrying out these assessments of the development of the subjects of the Russian Federation (Tikhomirov et al., 2016).

When examining these ratings in detail, taking into account the importance of our public-private partnership impact on the general level of the subject's development, we can draw conclusions about different approaches to assessing the investment activity of our regions. In the ASI rating the Republic of Tatarstan retains the leading position in 2014, 2015, and, for example, St. Petersburg in 2014 was not included even in the 20 leading regions. In the same time, in the rating of the RA "Expert" St. Petersburg in 2014, 2015 takes 1 place, and the Republic of Tatarstan takes place in the middle of the first ten.

This suggests different methodologies for carrying out such research on the one hand, and on the other, makes us think about the level of universality and the range of applicability of such ratings, because they pursue one goal - to determine the most investment-active region, its investment potential, as well as other regional characteristics.

This study aims to assess the possibilities of applying PPP Rating data to the regions of Russia to estimate their investment potential and the degree of its use. One such research is the annual "Rating of the development of public-private partnership in the regions of the Russian Federation", developed by the PPP Center of Russia in 2013.

The impact of PPP mechanisms on the investment activity of the regions in the work is considered in a broader context: as one of the channels of influence of investments in the infrastructure capital of the region on its economic growth and economic development in general.

The main focus of public-private partnership projects is investment in infrastructure capital. Investigation of infrastructure investments in the economy was subject to repeated and then fading "speculative bubbles of economic research" (Gramlich, 1994, p. 1176). Aschauer (1989) caused the most recent of these outbursts of activity, especially in empirical literature. In a series of his works, it was proposed to establish an econometric relationship between investment in infrastructure at the macro level and aggregate productivity.

Krugman (1991) showed that infrastructure facilities such as roads and railways reduce transportation costs, increasing the profitability of production, reinforced the intuition underlying the empirical work by Aschauer. The results of the work of Munnell (1990a, 1992) confirmed the findings of Aschauer (1989) and Munnell (1990b) concluded that those US states that invested more in infrastructure tend to have more production, more private investment and employment growth. These data confirm the results obtained in previous studies. Similar empirical studies show that public investment is the basis of

economic activity. However, further research is required to describe the specifics of the relationship between public infrastructure capital and economic indicators.

In the macroeconomic studies by D. Aschauer and A. Munnell and the "new economic geography" à la Krugman, a tone was set for a variety of publications over the next two decades in academic economic journals that, despite their nuances, put forward the primary requirement that Large public investment in infrastructure is useful when considering other investment alternatives. For example, Sanchez-Robles (1998, p. 106) substantiated the positive impact of public capital on the growth rate of production during the transition to a stable state of the economic system in two different country samples.

Fernald (1999) found that the system of US interstate highways was highly productive. In particular, for the road construction industries with intensive use of vehicles were used.

Similarly, Shenggen & Zhang (2004) and Donaldson (2010) proposed that the infrastructure supports increased revenue and productivity: using data on rural infrastructure, Shenggen & Zhang (2004, p. 213) found that: first, investment in rural infrastructure is the key to increasing the total incomes of the rural population; secondly, the lower productivity in the western region is due to its lower level of rural infrastructure, education and science and technology.

They proposed increasing the level of state capital to "reduce" the productivity gap between poor regions and other regions. Similarly, using data on trade flows between 45 regions in India, Donaldson (2010, p.1) advocated that increased investment in rail transport lead to a reduction in trade costs, a reduction in interregional price gaps and an increase in trade flows.

Despite its wide appeal, the line of thinking of D. Aschauer and A. Munnell was not widely accepted even among other macroeconomic scientists. A number of works - for example Eisner (1991), Evans & Karras (1994), Gramlich (1994), Holtz-Eakin and Schwartz (1995), Delmon (2017) although generally sympathetic to the underlying Aschauer's argument, questioned the design of his research, the methods and reliability of the causal conclusion of research in the Aschauer's style. However, instead of refuting the results of previous studies, macroeconomists have discussed the directions for further research. Where it has been found that the effects of direct productivity are weak or do not exist at all, macro-studies have begun to search for the indirect effects of infrastructure capital through side effects and externalities. For example, using aggregate and regional level data from Spain, Pereira & Roca-Sagalés (2003, p.238) argued that the aggregate effects of social capital cannot be fully represented by direct effects for each region. Ultimately, cumulative effects are due to almost equal parts of the direct and indirect effects of public (infrastructure) capital. Using data on fixed-line networks, Roller and Waverman (2001) argue that such networks have a positive causal relationship with economic growth, but usually only with the provision of a universal service. This feature is attributed to network externalities: the more users, the more valuable services are for these users (Roller and Waverman, 2001, p. 911).

The study of the conditions for the formation of infrastructure capital and the channels of its influence on the economic growth of economic systems in this study is based on the example of public-private partnership - one of the modern mechanisms for creating infrastructure capital within the framework of PPP projects.

## **2. Problem Statement**

In the paper we assess the impact of the development level of public-private partnership in the regions of Russia on their investment activity.

## **3. Research Questions**

The paper makes the assumption that the level of direct investment is influenced by the development of public-private partnership in the region, which in turn develops as an integrated assessment of a set of indicators. It should be noted that the state of the institutional environment, the experience of attracting PPP projects, the existence of a regulatory and legal framework and its qualitative nature affect the level of investment activity in the region directly and indirectly. For the practical verification of this hypothesis, this study uses regression modeling.

## **4. Purpose of the Study**

In this study, the task of rigorous justification and assessment of the level of public-private partnership influence on the investment activity of the Russian regions has been set and solved. At the same time, the importance of the conditions and mechanisms for the formation of infrastructure capital (within the framework of public-private partnership projects) and its impact on the economic growth of regional economic systems was indirectly assessed.

## **5. Research Methods**

In work, econometric modeling, least squares method on cross-section sample are applied.

### **5.1.Hypothesis statement**

Based on the foregoing, the hypothesis was advanced that public-private partnership as a phenomenon positively affects the socio-economic development of regional systems.

### **5.2.Sample and data**

In order to test the above hypothesis strictly mathematically on the basis of empirical data, we used the socio-economic indicators of regional economies and the rating of the development of public-private partnership in the regions of Russia in the dynamics from 2013 to 2015. "The rating of the development of public-private partnership in the regions of the Russian Federation", the data from which were used in this work, is annually formed by the PPP Development Center in 2013. The model considered in this study uses data from the annual reports "Regions of Russia. Socio-economic indicators", presented by the Federal State Statistics Service of the Russian Federation (hereinafter referred to as the RRSEP). The sample of the study included all subjects of the Russian Federation, except for the Crimea and Sevastopol.

## **6. Findings**

The following interrelationships in the dynamics for the period 2013-2015 were built:

1. A stable significant part (from 20% to 33%) of fluctuations in the level of direct regional investment among Russian regions is determined by the level of PPP development in them. The indicator of the above level in the model is the value of the generalizing rating RV in the regional PPP rating (see Table 01).

2. Differences in the volume of investment in the Russian Federation to a significant extent (from 50% to 72%) are determined by the value of this indicator in the previous year (see Table 02); therefore, we are dealing with the presence of a certain trajectory of regional development in this sphere.

**Table 01.** A model for assessing the impact of the level of PPP development in a subject of the Russian Federation on the level of investment activity in it. Dependent variable: the volume of investments by a subject of the Russian Federation for the year.

| Explaining variables        | 2014 год  |                        | 2015 год |                        |
|-----------------------------|-----------|------------------------|----------|------------------------|
|                             | Coeff-t   | Prob. H <sub>0</sub> . | Coeff-t  | Prob. H <sub>0</sub> . |
| C                           | -18849,72 | 0,6081                 | 37217,56 | 0,3015                 |
| RV(-1) <sup>2</sup>         | 1234890,  | 0,0000                 | 899017,0 | 0,0000                 |
| R <sup>2</sup>              | 0,330506  |                        | 0,208725 |                        |
| F-statistics                | 39,98695  |                        | 21,36649 |                        |
| Probability by F-statistics | 0,000000  |                        | 0,000014 |                        |

Note: «Prob. H<sub>0</sub>» - the probability of the null hypothesis in t-statistics; (-1) in the variable designation corresponds to the use of the value of this variable with a time lag of one year.

Source: authors

According to Table 01, the following conclusions can be made about the model output presented in it and the relationships obtained:

1. The model is well specified from the econometric point of view: the coefficient of the dependent variable is statistically significant, so the probability of the null hypothesis for t-statistics for it is practically zero; the statistical adequacy of the model as a whole is justified by the very close to zero probability value for F-statistics.

2. The level of PPP development in the region positively affects the volume of investments in it. At the same time, the relationship is non-linear, that is, as the level of PPP development increases, its positive effect is strengthened in accordance with the quadratic functional dependence. It should also be noted that the effect of the level of PPP in the region has a lag (deferred effect) for one year, that is, the indicator of the region's rating affects the volume of investments next year. Such a result is quite realistic considering that the investment process requires preliminary preparation and, therefore, time.

3. The parameters of the model also indicate that in the dynamics of recent years (in 2015 relative to 2014), the influence of the PPP level of the region increased in absolute terms by four times, according to the corresponding increase in the value of the coefficient over the independent variable. At the same time, the degree of explanation within the framework of the model of differences in the regions of Russia in terms of investment volume in 2015 decreased to 20% (in 2014 this figure was 33%). Such dynamics indicate an increase in the range of factors (in addition to the level of PPP development) affecting the volume of investments in Russia in 2015 compared to 2014. Such factors could be external financial and economic factors caused by the complication of the geopolitical situation around Russia (expansion of Western sanctions against Russia), oil prices and other macroeconomic aspects.

**Table 02.** The model for assessing the relationship between the volume of investments in the regions of Russia in the reporting period and the volume of investments in it in the previous year.  
 Dependent variables: the volume of investments in the Russian region in 2014 and 2015 (INVEST)

| Explaining variables        | 2014     |           | 2015      |           |
|-----------------------------|----------|-----------|-----------|-----------|
|                             | Coeff-t  | Prob. Ho. | Coeff-t   | Prob. Ho. |
| C                           | 0,128165 | 0,0000    | -0,083753 | 0,0010    |
| INVEST(-1)                  | 0,675281 | 0,0000    | 0,917026  | 0,0000    |
| R <sup>2</sup>              | 0,503056 |           | 0,723738  |           |
| F-statistics                | 81,99628 |           | 212,1999  |           |
| Probability by F-statistics | 0,000000 |           | 0,000000  |           |

Source: authors

According to Table 02, a number of important conclusions should be drawn about the model presented in it:

1. The model is well specified from the econometric point of view: the coefficient before the dependent variable is statistically significant, so the probability of the null hypothesis for t-statistics for it is practically zero; the statistical adequacy of the model as a whole is justified by the very close to zero probability value for F-statistics.

2. According to the model, during the observation period 2014-2015, there was a stable positive correlation between the volume of investments in the region in the reporting year (2014 and 2015), with investments in the previous year (2013 and 2014 respectively). This fact indicates a certain stability (continuity) of the relative level of investment activity in the regions of Russia. In particular, in general, the leading regions in terms of investment volume remained the same for the period under review. This fact shows, on the one hand, the stability of the relative level of investment attractiveness in the Russian regions, and on the other hand, the preservation of the unevenness of Russian regions in terms of the level of investment activity.

3. Comparison of the models constructed for 2014 and 2015 is indicative and the fact that there is a decrease in the volume of investments in the Russian regions during the period under review. This follows from the fact that the value of the coefficient in front of the independent variable in both models is less than one. At the same time, this decrease in 2015 (8.3%) is significantly reduced relative to 2014 (32.5%). At the same time, the level of explanation for differences in the dependent variable in the model increases to 72% in 2015 (relative to 50% in 2014).

## 7. Conclusion

In general, the models reviewed confirm the hypothesis that the level of development of PPPs in the Russian region has a significant impact on its investment activity. As a result, the influence of the most important channel for the formation of the infrastructure capital of the region, the level of development of public-private partnership, on its economic development was justified and evaluated.

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