

## BOOSTING REGIONAL COMPETITIVENESS LEVEL VIA BUDGETARY POLICY OPTIMIZATION

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**Abstract:** *The paper is devoted to the analysis of budgetary policy of region's administration in terms of its impact on regional competitiveness level. We stick to one of the most commonly used approaches to assessing the level of competitiveness based on advantages of this approach over the others. The main goal of the paper is to figure out whether budgetary policy does affect overall competitiveness level of a region. In order to achieve that, we conduct correlation analysis of competitiveness index and share of expenses for a certain budget category in the Russian Federation. By tracking the dynamics of correlation coefficients, we can prove their consistency in time and thus make reliable recommendations for region's administration how to boost competitiveness level of a region by redistributing budget expenses. The paper was prepared within the research project #15-32-01327, supported by Russian Foundation of Humanities.*

**Keywords:** *integral index of competitiveness, budgetary policy, correlation analysis, development planning, time series analysis, innovation policy on regional level.*

### 1. INTRODUCTION

Management and evaluation of regional competitiveness is one of the most popular areas of research in economics. Recent literature has presented a number of approaches to assessing the competitiveness level of country's single region. For example, in (Kuznetsova, *et al.* 2015) authors developed various integral indices, reflecting regional competitiveness and social and economic development based on statistical data. These indices include index of current competitiveness, index of industrial competitiveness, index of infrastructure development and communications, index of innovative regional development and index of foreign economic activities. The same idea of selecting and integrating macroeconomic indicators prevails also in (Benzaquen, *et al.* 2011; Gagarina and Chainikova 2014; Komarova and Zjablova 2014; Martin 2005). In (Rubtzov, *et al.* 2015) the emphasis is made on including territorial, natural and ecological components in a process of competitiveness evaluation. (Porter 2003; Voynarenko and Bohatchyk 2014). focus on clustering approach to grounding the competitive advantages of regional economic subsystems. Some studies, such as (Safiullin *et. al.* 2013) elaborate matrix

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approach to assessing regional competitiveness incorporating Herfindahl-Hirschman Index of market concentration. There is also some literature with non-traditional approaches to the discussed problem, for example, refer to (Boschma 2012) where the author regards competitiveness from an evolutionary perspective. The proposed methods differ not only in methodology of competitiveness computation, but also directly determine its characteristics, such as tolerance region, sensitivity to changes in the total competitiveness, dependence on maximum and minimum values of macroeconomic indicators, etc. Excellent reviews of most popular methods were conducted in (Kovalska 2013; Shorokhov and Kol'kin 2007; Turginbayeva and Abildaev 2013). Despite the high interest in the topic of regional competitiveness evaluation, relatively small amount of literature is devoted to optimization of budgetary policy in order to reach a higher level of competitiveness. We consider this fact as a significant omission, as reliable recommendations on budgetary policy of a region may significantly affect its performance and thus attraction of foreign and domestic investments.

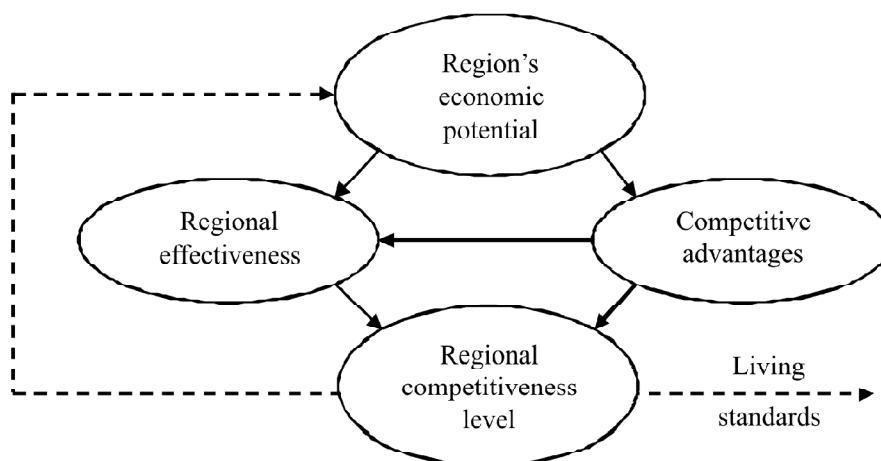
The paper is organized as follows: section 2 deals with existing methods of estimating the regional competitiveness. Section 3 is devoted to correlation analysis of competitiveness index and share of expenses for a certain budget category. Section 4 discusses the results and determines directions for further research.

## **2. ESTIMATION OF REGIONAL COMPETITIVENESS INDEX**

Competitiveness of a region is its capacity to produce goods that can compete on the market using existing and creating new competitive advantages, incorporating economic potential and maintaining people's quality of living according to international environmental standards, see figure 1.

Here we explain in more detail what is implied by the term "competitiveness level". This term means that integral assessment of a region's capacity to compete should be compared to the same index of the reference region. As the reference region researchers commonly use the one that actually exists and has medium or best statistical indicators. Such an assessment may be calculated, based on the identification of the socio-economic level of regional development, as well as the region's ability to attract foreign capital (Kovalska 2013; Savič 2012; Staničková and Poledníková 2011).

To calculate the competitiveness of a region we will use the methods of quantitative analysis, which are based on macroeconomic characteristics in order to identify trends in the development of a subject of country's economy and social sphere. Quantitative methods of assessment are integral type evaluation of performance. Such integrality can be achieved by counting the collective of individual performances, showing the dynamics of regional internal processes,



**Figure 1: Mechanism of regional competitiveness formation**

see for example (Kovalska 2013; Kuznetsova, *et al.* 2015; Nevima and Meleckı 2011; Turginbayeva and Abildaev 2013; Zubakin, *et. al.* 2015).

In this paper we compute the integral index of competitiveness by three systems of macroeconomic indicators, see Table 1.

**Table 1**  
**System of regional competitiveness indicators**

<i>System of indicators of economic potential of a region</i>	<i>System of indicators of regional efficiency</i>	<i>System of indicators of competitive advantages</i>
Economically active population, ths. people.	Production of GRP (GVA) per 1 employed in the economy of the region, ths. rub./person	Cost of fixed assets per 1 employed in the economy, ths. rub.
Cost of capital assets in all industries, mil. rub.	Production of GRP (GVA) per 1 ruble of fixed assets value in the region, rub.	Depreciation of fixed assets in the region, %
Gross domestic expenditure on research and development, ths. rub.	Cost of wages per 1 ruble of GRP (GVA), rub.	Investments in fixed capital per 1 employed in the economy of the region, ths. rub.
Net financial result of the region, mil. rub.	Share of unprofitable organizations, %	Unemployment rate, %
Investments in fixed capital, mil. rub.	Retail trade turnover per 1 employed in the economy, ths. rub.	The number of people with income below the minimum wage, %
Gross regional product, mil. rub.	Population immigration rate per 10,000 people.	Innovation activity, %

In order to synthesize all integrated indicators related to economic potential, as well as regional performance, competitive advantages and competitiveness, we should resort to using non-parametric statistical analysis techniques. The main advantage of using the above methods has always been a decrease in the dimension of the original data matrix using the method of shrinkage of the original data. It is worth noticing that non-parametric methods, including multivariate statistical comparisons do not possess significant sensitivity to changes in statistics. They can be used in small samples and do not require a comparable basis of measurements of individual parameters.

The above-mentioned disadvantages are eliminated by multidimensional non-parametric methods, which are based on the principle of relative valuations. Hence we consider the most relevant of them – the method of relative difference. It stipulates assessments of individual performance with the help of normalization by formulae (1) and (2). In other words, the excess of the  $i$ -th value for the  $j$ -th region over the smallest value that relates to the variance of  $i$ -th individual index over the entire set of regions. Here we note that formula (1) is used in case when a larger value of the index is a positive characteristic of a region (GRP, the value of fixed assets, the financial result of a region, etc.), and formula (2) – when a greater value of the index is a negative characteristic of a region (depreciation of fixed assets, unemployment, wage costs per 1 ruble of GRP, etc.).

$$t_i = \frac{P_i - P_{i\min}}{P_{i\max} - P_{i\min}}, \quad (1)$$

$$t_i = \frac{P_{i\max} - P_i}{P_{i\max} - P_{i\min}}, \quad (2)$$

where  $P_i$  – actual value of  $i$ -th individual indicator,  $P_{i\min}$  – minimum value of  $i$ -th individual indicator on all considered regions,  $P_{i\max}$  – maximum value of  $i$ -th individual indicator across all considered regions.

The value of the integral coefficient is obtained by simple average of the individual factors – formula (3).

$$U = \sum_{i=1}^n \frac{t_i}{n}, \quad (3)$$

where  $n$  – total number of individual indicators.

Considering that the values of  $t_i$  belong to the range  $[0;1]$ , then  $U=1$  can be reached only if  $i$ -th region has the best values across all individual indicators.

In our opinion, this method of construction of integral competitiveness index has the following key benefits. It does not impose restrictions on individual non-

negative indices in a region, also no difficulties arise with indicators that take both positive and negative values, for example, with the balance of payments. The resulting index of competitiveness due to its strict positivity is easily translated into continued and reference growth index, which can visually monitor the trends of development of regions. Finally, the relative difference method allows obtaining an informative measure by which it is possible to assess the competitiveness of a region without resorting to a comparison with other regions of a country: the values close to one testify unique superiority of one region over the others and vice versa, the values close to zero – low level of competitiveness.

### 3. CORRELATION ANALYSIS OF BUDGET EXPENSES AND COMPETITIVENESS LEVEL

To conduct correlation analysis we built a statistical database of macroeconomic indicators on the subjects of the Russian Federation from 2005 till 2013. First, we evaluate the level of regional competitiveness according to indicators specified in table 1. Second, we upload statistics on regional budgets split into six following categories: federal affairs, national economy, housing and public utilities, education, health care and sports, social policy. By obtained data we computed shares of expenses going on a particular category in the total regional budget and consequently Pearson's correlation coefficients for the same time period and for lagged expenses shares. In table 2 we present correlation values for the same period of time, i.e., showing dependences between competitiveness level of a region for period  $t$  and a share of budget expenses spent on a particular category in the same period  $t$ .

Table 2  
Correlations of regional competitiveness and same year budget expenses in the Russian Federation

	<i>federal affairs</i>	<i>national economy</i>	<i>housing and public utilities</i>	<i>education</i>	<i>health care and sports</i>	<i>social policy</i>
2005	- 0.199	0.115	0.166	- 0.193	- 0.134	0.135
2006	- <b>0.262</b>	0.049	<b>0.327</b>	- <b>0.212</b>	- 0.088	- 0.009
2007	- <b>0.324</b>	0.027	<b>0.310</b>	- <b>0.217</b>	- 0.125	0.037
2008	- <b>0.312</b>	0.113	<b>0.333</b>	- 0.192	- 0.147	- 0.016
2009	- <b>0.272</b>	<b>0.225</b>	0.163	- <b>0.224</b>	- 0.038	- 0.115
2010	- <b>0.255</b>	0.133	0.178	- 0.199	0.041	- 0.124
2011	- <b>0.297</b>	<b>0.249</b>	<b>0.284</b>	- <b>0.275</b>	- <b>0.296</b>	- 0.166
2012	- <b>0.305</b>	<b>0.273</b>	0.183	- <b>0.289</b>	- 0.137	- 0.068
2013	- <b>0.333</b>	<b>0.217</b>	0.191	- <b>0.268</b>	- 0.098	- 0.049

numbers in bold denote 0.95 two-tailed significance

As can be inferred from table 2 there are four categories that in general show significant correlation with competitiveness level: federal affairs and education

have a negative relation whereas national economy and housing and public utilities have a positive one. These correlations are quite sustainable in time whatich can be seen in figure 2.

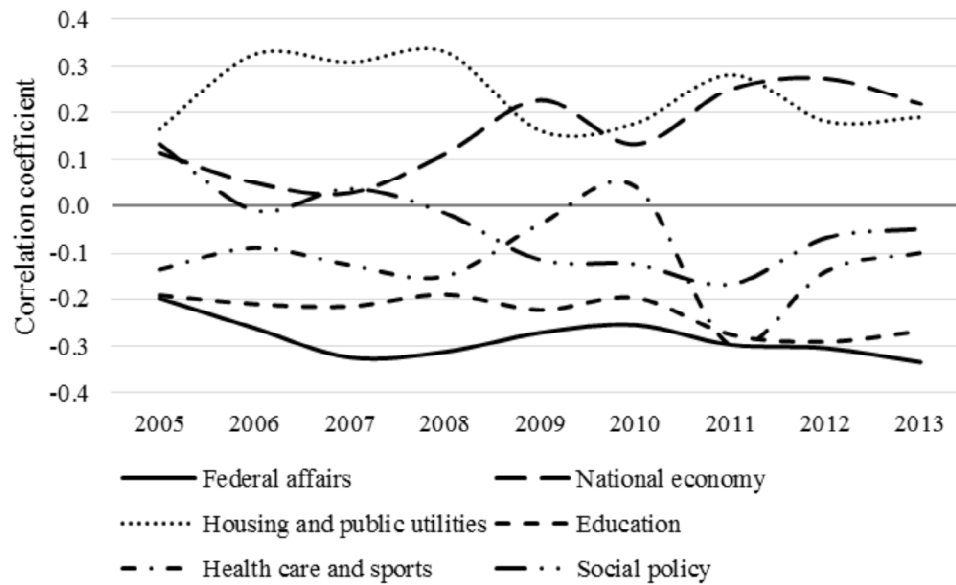


Figure 2: Dynamics of correlation coefficients from Table 2

Federal affairs display the utmost negative relation to the competitiveness index followed by spendings on education. Furthermore, we provide correlation analysis for lagged shares of spendings, i.e., how expenses on a certain category at time  $t-m$  affect regional competitiveness at time  $t$ . Results for lag  $t-1$  are presented in table 3 and figure 3.

Table 3  
Correlations of regional competitiveness and previous year budget expenses in the Russian Federation

	<i>federal affairs</i>	<i>national economy</i>	<i>housing and public utilities</i>	<i>education</i>	<i>health care and sports</i>	<i>social policy</i>
2006	- 0.225	0.065	0.180	- 0.146	- 0.066	0.117
2007	- 0.245	0.050	<b>0.331</b>	- 0.239	- 0.086	0.032
2008	- 0.321	0.047	<b>0.319</b>	- 0.219	- 0.173	0.039
2009	- 0.330	0.145	<b>0.315</b>	- 0.189	- 0.185	- 0.009
2010	- 0.271	0.191	0.122	- 0.235	- 0.025	0.002
2011	- 0.246	0.143	<b>0.277</b>	- 0.225	- 0.016	- 0.191
2012	- 0.294	<b>0.229</b>	0.189	- 0.249	- 0.242	- 0.090
2013	- 0.290	<b>0.285</b>	0.180	- 0.303	- 0.151	- 0.054

numbers in bold denote 0.95 two-tailed significance

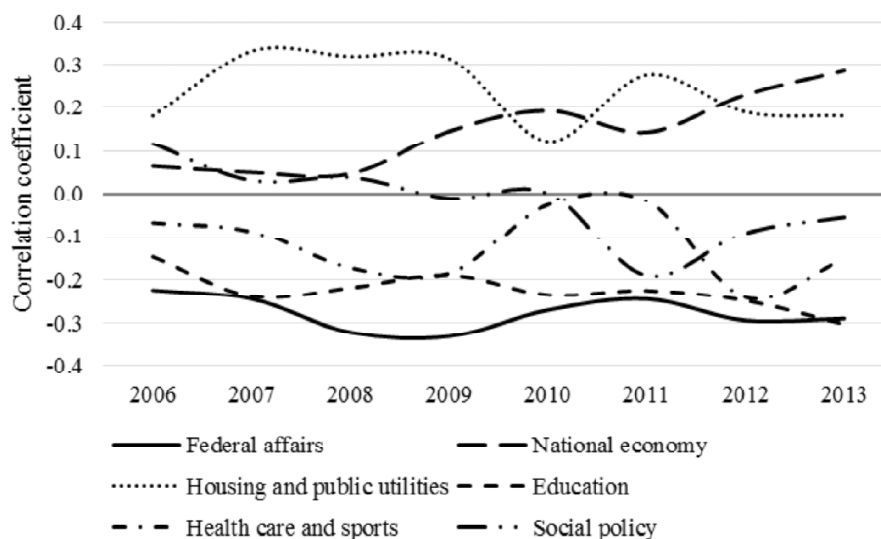


Figure 3: Dynamics of correlation coefficients from Table 3

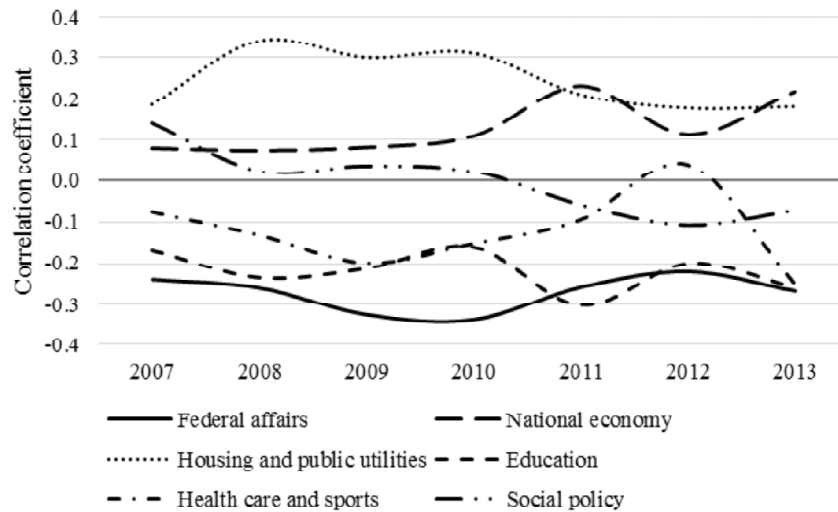
Comparing the results, obtained from table 2 and table 3, we do not find any significant difference in the correlation structure. As above federal affairs and education have significant negative relation to regional competitiveness, whereas national economy and housing and public utilities have a positive one. Moving forward, the results for lag  $t-2$  are presented in table 4 and figure 4.

Table 4  
Correlations of regional competitiveness and budget expenses two years ago in the Russian Federation

	<i>federal affairs</i>	<i>national economy</i>	<i>housing and public utilities</i>	<i>education</i>	<i>health care and sports</i>	<i>social policy</i>
2007	- 0.239	0.080	0.188	- 0.168	- 0.076	0.143
2008	- 0.260	0.074	<b>0.341</b>	- 0.235	- 0.131	0.025
2009	- 0.325	0.082	<b>0.300</b>	- 0.212	- 0.197	0.038
2010	- 0.337	0.109	<b>0.311</b>	- 0.159	- 0.151	0.023
2011	- 0.258	<b>0.231</b>	<b>0.212</b>	- 0.303	- 0.094	- 0.059
2012	- 0.220	0.112	0.179	- 0.200	0.039	- 0.107
2013	- 0.267	<b>0.218</b>	0.183	- 0.259	- 0.249	- 0.072

numbers in bold denote 0.95 two-tailed significance

Looking at table 4, we can make the same conclusion as from table 1 and 2. That gives us a good reason to confirm consistency of revealed relations. Thus, our main findings from the correlation analysis are the following:



**Figure 4: Dynamics of correlation coefficients from Table 4**

- Regions with a high share of spendings on federal affairs and on education in region's total budget display in general a lower level of competitiveness than regions with a low share of spendings on respective categories;
- Regions with a high share of spendings on national economy and on housing and public utilities in region's total budget display in general a higher level of competitiveness than regions with a low share of spendings on respective categories.

Since correlation does not imply causality, one cannot assert that if a region simply increases its expenses on national economy or housing and public utilities by retrenching spendings on federal affairs and education, the region's competitiveness level will necessarily rise. Still we deem that these interdependencies have some rational implications. Economy normally rises if subjects of economic trade having consumed a certain amount of goods produce commodities or services with additional value over the sum that has been consumed. Such process ensures an exponential development of GRP. Expenses on federal affairs generally do not have the same efficiency as investments in the commercial sector. That is why we recommend that region's administrations reconsider current structure of business processes and staff hierarchy in order to retrench costs without loss of functionality. Concerning negative relation of competitiveness level and expenses on education, one might suppose that spendings on this category have a delayed effect. However, even if we measure the relation between regions' competitiveness in 2013 and share of spendings on education in 2005, we will still observe a negative correlation coefficient equal to -0.14. Based on these calculations we make a conclusion that overimproving education system does not bring its benefits in terms of raising region's

competitiveness. This phenomenon can be explained by the fact that if a region develops its education level to such an extent that drastically exceeds the common living and economic standard in the region, then well-educated people will have a propensity to relocate to wealthier regions. That is why we recommend that the level of education in a region should correspond to the overall economic situation. In addition, to raise the competitiveness one should start rather with investing into economy and then into education and not the other way around.

#### **4. CONCLUSION**

The paper presents a comprehensive correlation analysis of regional budgetary policy in Russian Federation and its competitiveness level, computed according to one of the existing methods. We investigate whether the way a local administration allocates its finances actually affects region's competitiveness. Our findings reveal significant positive relations of competitiveness level and shares of budget spendings on two categories: national economy and housing and public utilities. Two significantly negative relations include expenses on federal affairs and education. Displayed correlations are confirmed to be sustainable in time and are also not subject to significant perturbations if lagged expenses are taken. Based on conducted correlation analysis we express some recommendations to administration of a region on optimizing its budgetary policy. In particular, we recommend retrenching spendings on federal affairs by optimizing the structure of municipal bodies and increasing their efficiency. Concerning education, we recommend improving it at a pace, which is slightly lagging behind the overall quality of live and level of economic development of a region, as overdevelopment in education induces people to relocate to wealthier regions.

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