International Journal of Engineering & Technology, 7 (4.26) (2018) 270-273

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Structural Decomposition as the Method of Industry Priority Monitoring for Regional Development

Marat R. Safiullin[1*], Azat R. Safiullin[1], Guzel Z. Mukhametova[1]

[1] Kazan Federal University
**Corresponding author E-mail: safiullin.ar@gmail.com*

Abstract

The work is devoted to the study of economic activity types at the sectoral and regional levels in order to form the sectoral priorities of economic development as the strategic guidelines for sustainable economic growth and the investment attractiveness of the territories. The theoretical and the methodological basis of the study was the fundamental provisions and the concepts of economic theory, the scientific works of domestic and foreign scientists in the field of socio-economic development of the region and regional economic systems, investment activities, strategic territorial and sectoral planning, periodicals, regulatory documents of the federal and regional levels, the modern methods of competitiveness and investment attractiveness evaluation. The study was carried out on the basis of information from the Federal State Statistics Service (ROSSTAT), the Territorial Body of the Federal State Statistics Service for the Republic of Tatarstan (Tatarstanstat), as well as on the basis of analytical information from the Center for Advanced Economic Research of the Academy of Sciences of RT. The methodological approach is a multi-level study consisting of a structural and dynamic analysis of economic activity types, the assessment of localization level and a structural decomposition of key indicator dynamics. The presented methodology allowed to carry out a comprehensive monitoring and the diagnostics of economic activity types, to determine the competitive positions of the Republic of Tatarstan for each type of activity and identify industry priorities that ensure the region investment attractiveness increase.

Keywords: *investment attractiveness, structural decomposition, growth rates, types of activities, industry priorities, industrial portfolio.*

1. Introduction

The main role in the socio-economic development of RF regions is played by investment activities carried out in these territories. With investment capital, the companies with new technologies and experience in the industry come to the regions, and thus, regional budget revenues increase, which are necessary to fulfill the social obligations of the region, and citizen living standards improve with the growth of investment in the regions.

One of the tasks that society faces today is the development of the necessary and favorable conditions for economic growth increase and population life quality improvement. The achievement of the tasks faced by the subjects is possible through the attraction of investment capital to the real sector of economy, which in its turn depends on the degree of the investment potential development in the regional economy. The main indicators territory investment attractiveness are the volumes of investments in fixed assets and their growth rates. The increase of investment potential, and thus the investment attractiveness of the territories, contributes to the additional inflow of capital, the growth of the regional economy and the development of small business, as a highly dynamic sector adapting to the changes in external environment [7], [10], [11].

2. Methods

The most important tool for sectoral priority highlighting to develop a territory is to draw up various development scenarios, which allow to evaluate various options for a studied object development by the evaluation of certain assumptions [5], [7]. Thus, the development scenarios are a consistently coordinated system of alternatives for possible development options. The complexity of scenario preparation during the evaluation of industry priority sustainability degree determines the need to take into account the dynamics not only at the territorial level, but also at the regional and national levels, which cover both external and internal factors influencing the object of study.

The dynamics of the indicator values for the monitoring of research object development determines the transition from one development scenario to another. The achievement of a threshold (critical) indicator indicates a significant change in economic conditions and requires the adjustments of regulatory impacts in order to prevent the negative impacts of competitive advantage loss among priority industries, which in its turn may lead to negative financial and social consequences for the territory as a whole.

Due to the fact that the determination of indicator threshold values requires the analysis of a large amount of statistical information that can reflect the experience of the phenomenon being studied in the past, and also taking into account the instability of the economic conditions of the objects of study, it is rational to use the interval critical values of indicators. In order to highlight the general structural dependence, to find the most critical deviations, as well as to establish the trends of indicator change, it is rational to use the structural decomposition of indicator dynamics.

At the basis of the calculations carried out to develop a structural decomposition of indicators, they used the methodology proposed in the works of domestic economists [1], [2], [4], [10]. In contrast to the proposed works, the methodology described in this study considers the enlarged types of economic activity by OKVED

sections. Besides, this methodology has been modernized and supplemented with three indicators of growth dynamics in the whole national, regional, territorial components, as well as by their components in the context of economic activity. In this paper, the structural decomposition is considered by two indicators: the volume of turnover and the average number of employees (without external part-time workers), in order to find out in which types of economic activity the over-employment takes place and in which types the efficiency of activity is organized better. This will allow us to choose the right regulatory impact in order to increase the investment attractiveness of territories for small business development.

The essence of the structural decomposition consists in the determination of the studied indicator statistical characteristics by the means of a structural representation of its dynamics. This indicator is divided into several components:

- national component (shows the trend in the economy of the country);

- the regional component (reflects the specifics of the regional economy development);

- territorial component (shows the influence of territorial features);

- national sectoral component (reflects the specifics of the country industry development);

- regional sectoral component (reflects the specifics of the industry development in the region);

- territorial sectoral component (reflects the specifics of the industry development on territory).

The ratio of these components allows you to distribute economic activities that have external and (or) internal competitive advantages and to highlight the sectoral priorities of territory development.

If the national component (NS) exceeds all other components: (Situation A: ΔNS>Δ (RS; KS; NIS; RIS; KIS)), this means that the indicator increase over the studied period was mainly due to the favorable macroeconomic situation in the country. At the same time, the tendencies of the other components are late. The stability of such a structure of positive growth indicates a rather low strategic potential of these types of economic activity in the long-term period.

In the situation when the regional component (RS) is ahead of all other components, in other words, the regional growth demonstrates the maximum dynamics (situation B: ΔRS> Δ(NS; KS; NIS; RIS; KIS)), this means that the indicator was provided mainly by favorable socio-economic conditions in the region during the analyzed period.

The third situation is the ratio of components, when the territorial component (KS) exceeds all other components (situation B: ΔKS> Δ(NS; RS; NIS; RIS; KIS)). This means that the development of entrepreneurial activity was greatly influenced by internal (territorial) factors, therefore, there are clear competitive advantages for the development of economic activities on this territory.

The fourth situation is the ratio of components, when the national sectoral component (NIS) exceeds the growth of the remaining components (situation G: ΔNIS>Δ (NS; RS; KS; RIS; KIS)). These types of economic activities do not have competitive advantages in this region and territory, which indicates a low strategic potential in the long term.

A more attractive situation is when regional industry components (RIS) in dynamics exceed all other components (situation D: ΔRIS> Δ(NS; RS; KS; NIS; KIS)). Such economic activities may be possible regional priorities.

The competitive advantages in situation (D) and (G) are provided to a greater degree due to external factors (price conjuncture, effective demand, new technologies, incentive initiatives at the federal and regional levels, etc.). If the structure of positive growth presented in the situation (D) persists for a long time, then in the absence of restrictions conditioned by territorial characteristics, these types of economic activities are recommended to be considered as strategic guidelines for socio-economic policy at the regional level.

The most attractive is the situation when the territorial component (KIS) dominates in the structure of indicator growth (situation E: ΔKIS> Δ (NS; RS; KS; NIS; RIS)). This situation suggests the presence of domestic sources of competitive advantages, which ensure the leading dynamics of the territory economic activities over the rest growth rates. The increase of the positive growth of the territorial component in the structure serves as a target indicator of regulatory action effectiveness to stimulate the competitiveness of such economic activities that are the basis of the territory competitive profile.

The general formula for competitive advantage analysis:

$$\Delta T_j = NS + RS + KS + NIS + RIS + KIS \quad (1)$$

where NS − the national component of growth;

RS – the regional component of growth;

NS – the territorial component of growth;

NIS − the national growth component by foreign economic activity;

RIS − the regional growth component by foreign economic activity;

KIS – the territorial growth component by foreign economic activity.

The calculation of each component in terms of turnover is the following one:

$$NS = KazV_j^{t-1}\left(\frac{RusV^t - RusV^{t-1}}{RusV^{t-1}}\right) \quad (2)$$

$$RS = KazV_j^{t-1}\left(\frac{TatV^t - TatV^{t-1}}{TatV^{t-1}} - \frac{RusV^t - RusV^{t-1}}{RusV^{t-1}}\right) \quad (3)$$

$$KS = KazV_j^{t-1}\left(\frac{KazV^t - KazV^{t-1}}{KazV^{t-1}} - \frac{TatV^t - TatV^{t-1}}{TatV^{t-1}}\right) \quad (4)$$

$$NIS = KazV_j^{t-1}\left(\frac{RusV_j^t - RusV_j^{t-1}}{RusV_j^{t-1}} - \frac{TatV^t - TatV^{t-1}}{TatV^{t-1}}\right) \quad (5)$$

$$RIS = KazV_j^{t-1}\left(\frac{TatV_j^t - TatV_j^{t-1}}{TatV_j^{t-1}} - \frac{TatV^t - TatV^{t-1}}{TatV^{t-1}}\right) \quad (6)$$

$$KIS = KazV_j^{t-1}\left(\frac{KazV_j^t - KazV_j^{t-1}}{KazV_j^{t-1}} - \frac{TatV_j^t - TatV_j^{t-1}}{TatV_j^{t-1}}\right) \quad (7)$$

where $RusV^t$ and $RusV^{t-1}$ − the volume of turnover of

products in the country for the period t and $t-1$;

$TatV^t$ and $TatV^{t-1}$ – the turnover of products in the region for the period t and $t-1$;

$KazV^t$ and $KazV^{t-1}$ – the volume of turnover of products on the territory for the period t and $t-1$;

$RusV_j^t$ and $RusV_j^{t-1}$ – the turnover of products by the j-th type of economic activity in the country for the period t and $t-1$;

$TatV_j^t$ and $TatV_j^{t-1}$ – the volume of turnover of products by the j-th type of economic activity in the region for the period t and $t-1$;

$KazV_j^t$ and $KazV_j^{t-1}$ – the volume of turnover of products by the j-th type of economic activity on the territory for the period t and $t-1$.

Similarly, each component is calculated by the average number of employees (without external part-time workers).

Thus, if the growth rates of the j-th foreign economic activity of the territory are ahead of the national, regional and sectoral development dynamics (especially if the current trend is clearly expressed in the long term), it can be argued that there are certain competitive advantages that allow us to consider this type of economic activity as potentially attractive (target) for further development in the area. A full list of potentially attractive economic activities may be the subject of socio-economic policy at the regional level.

3. Results and Discussion

Let's consider the features of the practical application of structural decomposition methodology concerning the dynamics of indicators on the example of turnover volume analysis among small businesses (million rubles) and the average number of employees (without external part-timers) (people) of the Republic of Tatarstan and the city of Kazan. The object of the study were 13 integrated types of economic activity according to the All-Russian Classifier of Economic Activity Types (OKVED, Sections A-O).

Such economic activities as "Section J. Financial Activity"; “Section L. Public administration and the provision of military security, compulsory social security”; “Section R. The provision of housekeeping services”; "Section Q. The activities of extraterritorial organizations" in this work were not considered due to the lack of historical data.

The study of indicator growth rates has led to the conclusion that the currency crisis of 2014-2015 adversely affected the national dynamics of considered economic activity types (the component NS). Taking into account the scale of activity, the negative national dynamics of turnover made the greatest influence on the following activities:

- healthcare and social service provision;
- construction;
- processing industries;
- transport and communication;
- hotels and restaurants.
- fishing and fish farming;
- wholesale and retail trade; the repair of motor vehicles, motorcycles, household goods and personal items.

It should be noted that the highest positive regional growth rates (RS component) for 2014-2015 (outpacing regional dynamics) accounts for the types of economic activities that have demonstrated negative national dynamics.

A negative territorial dynamics (KS component) was significantly reflected in the following economic activities in terms of turnover:

- processing industries;
- transport and communication;
- agriculture, hunting and forestry;
- fishing and fish farming.

The negative dynamics due to the national industry component NIS of turnover by the studied types of economic activity ranged from 4.4% (fishing, fish farming) to 71.8% (education).

Despite the crisis trends in economy, the positive dynamics of the regional sectoral growth rate (RIS component) was observed in many types of economic activity:

- the provision of other community, social and personal services (the increase by 80.1%);
- mining operations (by 65.6%);
- hotels and restaurants (by 29.1%);
- real estate operations, rent and provision of services (by 29.0%);
- wholesale and retail trade; repair of motor vehicles, motorcycles, household goods and personal items (by 23.0%);
- construction (by 16.5%);
- agriculture, hunting and forestry (by 10.1%);
- processing industries (by 4.9%).

The types of economic activity dominated by the dynamics of territorial growth in turnover are of particular interest in terms of competitive advantage determination. These activities include:

- education (territorial growth amounted to 1.953 with national industry growth NIS = 0.282 and regional industry growth RIS = 0.933);
- production and distribution of electricity, gas and water (1.762 at 0.634 and 0.539, respectively).

The analysis of the average number of employee dynamics by the method of structural decomposition of growth rates showed that the development of this indicator is significantly influenced by the territorial dynamics of development.

More than half of the studied types of economic activity had a positive growth rate of the territorial dynamics concerning the average number of employees (component KS):

- mining operations (the territorial growth amounted to 76.154);
- electricity, gas and water production and distribution (87.983);
- transport and communication (8,687);
- healthcare and social services (12,177);
- hotels and restaurants (2,750);
- fishing, fish farming (2,114);
- construction (1,480).

Besides, the structural decomposition of the average number of employees dynamics allowed to identify the types of economic activity of Kazan, with competitive advantages, the largest contribution to the overall growth of which was made by the territorial components of KIS:

- mining operations (the value of the territorial component of KIS was 75.412);
- electricity, gas and water production and distribution (87,766);
- transport and communication (8,323);
- healthcare and social services (12,330);
- hotels and restaurants (2,779);

- fishing, fish farming (1,930);
- construction (1,677).

4 Conclusion

The performed structural analysis of the indicator dynamics revealed a number of negative factors that affect the choice of industry priorities. First, the national components of the turnover of all types of economic activity turned out to be negative, which indicates the high dependence of these types of activities on the crisis situations that occurred in the country economy during 2014-2015. Secondly, the national sectoral components also made negative impact on the choice of sectoral priorities. The negative dynamics due to this component makes from 4.4% (fishing, fish farming) to 71.8% (education). Thirdly, for all types of activities, with the exception of education, there is a negative trend in the development of the territorial component.

At the same time, all kinds of economic activity showed a positive regional dynamics of the city small business, but the greatest value is accounted for by the extraction of minerals; the provision of other community, social and personal services; hotels and restaurants; wholesale and retail trade, as well as real estate transactions, rent and service provision. If such trends persist in the long term, these activities can be considered as potentially attractive for investment activities and capable of strategic growth provision for the economy of the Republic of Tatarstan.

The outstripping territorial growth of the indicator in terms of turnover is accounted for education and electricity, gas and water production and distribution.

According to the results of the study, it became clear that the territorial components KS and KIS make the greatest influence on the average number of employees. Mining; electricity, gas and water production and distribution; healthcare and social services; hotels and restaurants; fishing, fish farming, and construction made the greatest impact on this indicator.

5. Summary

Thus, according to the results of the study based on a comparison of the obtained results for two indicators - the volume of turnover and the average number of employees - it can be concluded that the sectors of the first priority are the following ones (high dependence on the territorial industry component): education; mining; electricity, gas and water production and distribution. The second priority industries are the following ones: construction; hotels and restaurants, as well as healthcare and social services. Since the growth rates of the marked types of territorial activity are ahead of the national, regional and sectoral dynamics of development (especially if the current trend is clearly expressed in the long term), it can be argued that there are certain competitive advantages that allow these types of economic activity to be considered as potentially attractive for further development in this area. A full list of potentially attractive economic activities may be the subject of socio-economic policy at the regional level.

Acknowledgement

The work was performed at the expense of subsidies allocated to Kazan State University for the performance of the state task in the field of scientific activity (№26.9776.2017/БЧ).

References

[1] Antonakakis, N., Chatziantoniou, I., Filis, G. Dynamic spillovers of oil price shocks and economic policy uncertainty Energy Economics, 2014, 44. ¬ pp. 433-447

[2] Carlino, G., Defina, R. Regional Income Dynamics // Journal of Urban Economics, 1995, 37(1). ¬ pp. 88-106

[3] Global Competitiveness Index // World economic forum. Available at: http://reports.weforum.org/global-competitiveness-index/competitiveness-rankings/, (accessed 20.04.2017)

[4] Jaimovich, N., Floetotto, M. Firm dynamics, markup variations, and the business cycle. // Journal of Monetary Economics, 55(7), 2008. - pp. 1238-1252

[5] Safiullin, A.R., Ravzieva, D.I. Reasons and benefits of region manufacturing profile specialization // Source of the Document Journal of Economics and Economic Education Research, 2016, 17 (Specialissue). pp. 27-35.

[6] Strohmaier, R., Rainer, A. Studying general purpose technologies in a multi-sector framework: The case of ICT in Denmark // Structural Change and Economic Dynamics, 2016, 36. pp. 34-49.

[7] V. Inozemtsev. The future of Russia is in new industrialization // Economist, 2010, №11. - pp. 45-52.

[8] The rating of investment attractiveness among Russian regions // "Expert RA" rating agency. Access mode: http://raexpert.ru/ratings/regions, free (reference date: 12.01.2017)

[9] Investment attractiveness rating in the regions of Russia: trends by the end of 2016 // National Rating Agency. Moscow, 2017. p.13. Access mode: http://www.ra-national.ru/sites/default/files/analitic_article/, free (reference date 20.02.2017)

[10] Safiullin M.R., Safiullin A.R. Regional competitive advantages (on the example of the Republic of Tatarstan). Kazan: Kazan University Publishing House, 2011. - 716 p.

[11] Safiullin M.R., Safiullin A.R., Mukhametova G.Z., Gubaidullina A.I. Investment attractiveness of territories by the types of economic activity of the Republic of Tatarstan. Kazan: “Artifact” publishing house, 2017. - 123 p.