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Transformations of the Socio-Economic Space in the Context of the Implementation of the "New Model" of the Development of the Russian Far East: an Industry Aspect

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Abstract. The outstripping development of the Far Eastern macro-region of Russia is a task of a national scale. To solve it, a «new model» of the development for the Russian Far East was approved in 2013. Among the expected positive effects from the introduction of tools for accelerated development – an increase in the number and consolidation of the population in the Far East, the achievement of indicators of the quality of life and socio-economic development of the eastern regions exceeding the average Russian level, an increase in the share of the high-tech sector in the structure of the economy. In the context of studying the impact of institutional decisions taken, the authors estimate the intensity of structural shifts that occurred in the Eastern Russian regions' economies in the periods before and after the start of the implementation of the «new model» of advanced development of the Russian Far East. The estimates were made using the Ryabtsev index. The analysis showed a relatively high intensity of changes in the sectoral distributions of investment in fixed capital and gross regional product (GRP) and insignificant changes in the employment structure. Investment related to the implementation of the new policy has not yet transformed into an improvement in the structure of the economy of the considered regions and the expected shifts in the sectoral structure of employment in the direction of sectors associated with high-tech production have not occurred. Comparative analysis of the GRP structure showed the consolidation of the raw material nature of development in many regions of the East of Russia. Despite some positive changes in economic and investment activity in recent years, it was not possible to overcome the unfavorable trends in the demographic situation. Both the number and the share of the working-age population are declining; the number of the economically active population employed in the real economy is also declining.

Keywords: Far Eastern macro-region, institutional changes, structural shifts, gross regional product, average annual number of employees, sectoral employment structure, investments in fixed capital, Ryabtsev index.

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Трансформации социально-экономического пространства в условиях реализации «новой модели» развития российского Дальнего Востока: отраслевой аспект

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Аннотация. В настоящее время опережающее развитие Дальнего Востока РФ рассматривается как задача общенационального масштаба. На ее решение направлена принятая в 2013 г. «новая модель» развития Дальнего Востока РФ. В числе ожидаемых положительных эффектов от введения инструментов ускоренного развития – увеличение численности и закрепление населения на Дальнем Востоке, достижение показателей качества жизни и социально-экономического развития восточных регионов, превышающих среднероссийский уровень, увеличение доли высокотехнологичного сектора в структуре экономики. В контексте исследования влияния предпринятых институциональных решений оценивается интенсивность отраслевых структурных сдвигов, произошедших в экономиках восточных субъектов РФ в периоды до и после начала реализации «новой модели» опережающего развития Дальнего Востока РФ. Оценки выполнены с использованием индекса Рябцева. Анализ показал относительно высокую интенсивность изменений в отраслевых распределениях инвестиций и валового регионального продукта и незначительные изменения в структуре занятости. Инвестирование, связанное с реализацией новой политики, пока не привело к улучшению структуры экономики рассмотренных регионов, не произошло ожидаемых сдвигов в отраслевой структуре занятости в сторону отраслей, связанных с высокотехнологичным производством. Сравнительный анализ структуры ВРП показал, что во многих регионах Востока России отмечается закрепление сырьевого характера развития. Несмотря на отдельные позитивные изменения в экономической и инвестиционной деятельности за последние годы, неблагоприятные тренды демографической ситуации преодолеть не удалось. Сокращается как численность, так и доля трудоспособного населения; снижается и численность экономически активного населения, занятого в реальной экономике.

Ключевые слова: Дальневосточный макрорегион, институциональные изменения, структурные сдвиги, валовой региональный продукт, среднегодовая численность занятых, отраслевая структура занятости, инвестиции в основной капитал, индекс различий В.М. Рябцева.

Научная специальность: 08.00.00 – экономические науки.

Introduction

Russian regions are characterized by significant spatial heterogeneity of the economy, differing not only in production specialization, but also in the level and nature of socio-economic development, investment activity, natural resources and human potential. In the last decade, special attention has been paid to the eastern regions of the country, where the population continues to decline, although the rate of depopulation is decreasing; almost everywhere there is an unfavorable migration situation, noted by many authors, including (Aganbegyan, 2019; Antonova, Lomakina, 2020; Faleychik, Faleychik, 2021; Glazyrina et al., 2020; Gritsko, 2020; Minakir, 2020; Motrich, 2020; Shvorina, Faleychik, 2018; Zabelina, Parfenova, 2021 and others).

The outstripping development of the Far Eastern macro-region of Russia is a task of a national scale. To solve it, a «new model» of the development for the Russian Far East was approved in 2013 (Aganbegyan, 2019; Antonova, Lomakina, 2020; Minakir, Prokapalo, 2021). Among the expected positive effects from the introduction of tools for accelerated development – an increase in the number and consolidation of the population in the Far East, the achievement of indicators of the quality of life and socio-economic development of the eastern regions exceeding the average Russian level, an increase in the share of the high-tech sector in the structure of the economy. The expected positive effects from the introduction of the accelerated development tools are population growth and its consolidation in the Far East, the achievement of the indicators of the life quality and socio-economic development of the eastern regions, which exceed the average Russian level, an increase in the share of the high-tech sector in the economy structure, etc. In 2014, a new version of the development program was approved with subsequent numerous changes (including the Program name) and additions. It presented the main tools that ensure the accelerated economic development of the region and the attraction of labor and investment resources. This is, first of all, the creation and development of territories of advanced socio-economic development with favorable conditions for attracting investments and the development of centers of economic growth in the Russian Far Eastern regions (Minakir, 2020).

The main drivers of socio-economic growth and the implementation of the «new model» are investments in fixed and human capital (Aganbegyan, 2020; Minakir, Nayden, 2020; Minakir, Prokapalo, 2021). However, despite the fact that stimulating investment activity is one of the most important tasks of the new economic policy in the Russian Far East, and in recent years a number of major measures have been taken in the region to regulate it, «investment dynamics as a whole shows so far a stable invariance with respect to investment stimulating measures» (Minakir, 2020). Moreover, these measures did not lead to a significant increase in the demand for labor resources, to an increase in the inflow of migrants from other Russian regions; there is no significant growth in the economy and the people's life quality. One of the possible significant reasons for this situation in the macroregion is the relatively low quality of human capital (Aganbegyan, 2019, 2020; Minakir, Nayden, 2020).

Numerous studies by various authors have shown that human capital is becoming the main limiting factor in the socio-economic development of the Russian East. Even the very important problem of investing in the economy recedes into second place. Therefore, it is advisable to look at the problem of their development in this aspect as well.

The change in the socio-economic development model is accompanied by the transformation of the sectoral structures of the economy: some sectors and industries are shrinking, others are developing; resources, including labor, are being redistributed. «Structural shifts in labor and capital distributions follow the structural shifts in investment» (Lyakin, 2020).

The objective of this study is to consider the structural transformations of the economies of the subjects of the Far Eastern Federal District (FEFD) and the Baikal Region (BR) in the context of the impact that the institutional decisions have had on them.

Data and methods

To assess the significance of structural changes in the economic systems of countries and regions, various indicators are used, including the Gatev integral coefficient, the Salai index of structural changes and the Ryabtsev index (Aralbaeva, Afanasiev, 2011; Elkhina, 2015; Regional'naia statistika, 2006; Zabelina, Klevakina, 2016). In this paper, we will use the Ryabtsev index to assess changes in the sectoral structures of the economy and employment. It can be calculated for any data set, does not depend on the number of gradations of the statistical aggregate and has a scale for assessing the significance of the difference in structures (Regional'naia statistika, 2006; Zabelina, Klevakina, 2016). The following formula is used to calculate this indicator:

$$I_R = \left(\frac{\sum_{i=1}^{n} (d_1^i - d_0^i)^2}{\sum_{i=1}^{n} (d_1^i + d_0^i)^2} \right)^{1/2},$$

where d_1^i and d_0^i – are the proportions of the *i*-th aggregate in the current and base periods; n – is the number of groups.

The value of the Ryabtsev index varies in the range from 0 to 1 (i.e., from the identity to the complete opposite of the structures). According to the scale of assessment of the significance of structural differences (Regional'naia statistika, 2006; Zabelina, Klevakina, 2016) we have formed the following classes:

1 class – $0 \le I_R \le 0.03$ – the identity of structures;

2 class – $0.03 < I_R \le 0.07$ – quite a low level of structures diversity;

3 class – $0.07 < I_R \le 0.15$ – a low level of structures diversity;

4 class – $0.15 < I_R \le 0.30$ – an essential level of structures diversity;

5 class – $0.30 < I_R \le 0.50$ – a significant level of structures diversity;

6 class – $0.50 < I_R \le 0.70$ – a significant level of structures diversity;

7 class – $0.70 < I_R \le 0.90$ – the opposite type of structures;

8 class – $0.90 < I_R \le 1.00$ – the direct opposite structures.

In this study we consider the sub-federal units that are part of the FEFD and BR. They are united by their border position, rich natural resource potential and the historically developed raw material orientation of economies, as well as by their cross-border cooperation with the countries of the Asia-Pacific Region, primarily China.

We use the official data of the Federal State Statistics Service (Rosstat) that characterize the economy and labor resources of the Russian regions: investments in fixed capital (FC investments) and the gross regional product (GRP), their distributions by types of economic activity (TEA), the population and its age composition, the coefficient of migration growth, the level of economic activity of the population, the average annual number of employees and its sectoral structure.

In the study we identified the following time periods:

– 2010–2015 – the period preceding the creation of new advanced development institutes and the beginning of the manifestation of the results of institutional changes in the Russian Far East;

– 2015–2019 – the period of possible manifestation of the first results of the implementation of a «new model» of advanced development of the Russian Far East.

The research methodology is based on the theories of spatial and regional economics. Methods of comparison, retrospective and abstract-logical analysis were used to systematize and evaluate the spatial differentiation of the studied indicators by regions.

Results and discussion

The analysis of the calculated Ryabtsev indices for the FEFD and BR regions for the considered periods showed that only the first six classes of the Ryabtsev's scale are sufficient to assess the changes in the industrial structures of GRP, investments in fixed capital and employment (Fig. 1).

The results shown in Fig. 1 show that the intensity of changes in the industrial structure of production and employment of the eastern regions is undoubtedly related to that in the FC investments distribution. However, there are no unambiguous trends: in one third of the regions in the 2015–2019-year period the in-

tensity of structural changes is lower than in the previous period. In with the others it is the other way around. The most significant changes are observed in the sectoral structures of FC investments. The intensity of changes in employment structures, as a rule, is significantly lower.

An analysis of *the sectoral structures of FC investments* in the eastern regions showed the heterogeneous nature of the occurred changes, both by direction and by their intensity. If in the Sakhalin Region within both periods there were relatively small changes (class 3 – a low level of structures diversity), then in most regions the FC investments distribution by types of economic activity changed more significantly: the values of their index belong to 4–6 grades of the Ryabtsev's scale.

The most significant changes in the FC investments distribution by TEA took place in the mining, manufacturing and transport industries. In the production and distribution of electricity, gas and water. In the Magadan Region, the share of investment in the *mining sector* for 2010–2015 increased by almost 52 percentage points (pct), reaching 75.8 %, and in 2015–2019 it declined to 65.6 %. A similar dynamics is seen in the Sakhalin Region – an increase from 67.4 % to 75.1 %, and then a decrease to 63.4 %. In the Republic of Sakha (Yakutia), the share of this TEA increased from 28.2 % in 2010 to 42.8 % in 2015 and to 59.3 % in 2019. A similar situation is observed in the Republic of Buryatia – a drop from 24.7 to 18.5 and further to 9.7 %. In the Amur Region and the Republic of Buryatia, the share of the mining sector fell from 11.6 and 24.7 % in 2010 to 4.6 and 18.5 % in 2015, and then another – up to 3.2 and 9.7 % in 2019.

In *the manufacturing industry*, significant changes in the share of FC investments were observed in the Primorye and Khabarovsk territories – an increase of 18.1 and 16.1 pct over the period 2010–2015, and then a drop by 11.1 and 17.7 pct over 2015–2019, the maximum growth – from 2 % to 63 % – in the Amur Region for 2015–2019. In almost all eastern regions, as well as in Russia as a whole, the share of FC investments in *transport and communications* decreased, with some exceptions. In particular: in 2015 – the Republic of Buryatia and the Chukotka Autonomous Area (growth by 25.5 and 7.9 pct). In 2019 – Jewish Autonomous Region (Jewish AR), Khabarovsk and Primorye territories (growth by 29.5, 15.5 and 12.5 pct, respectively).

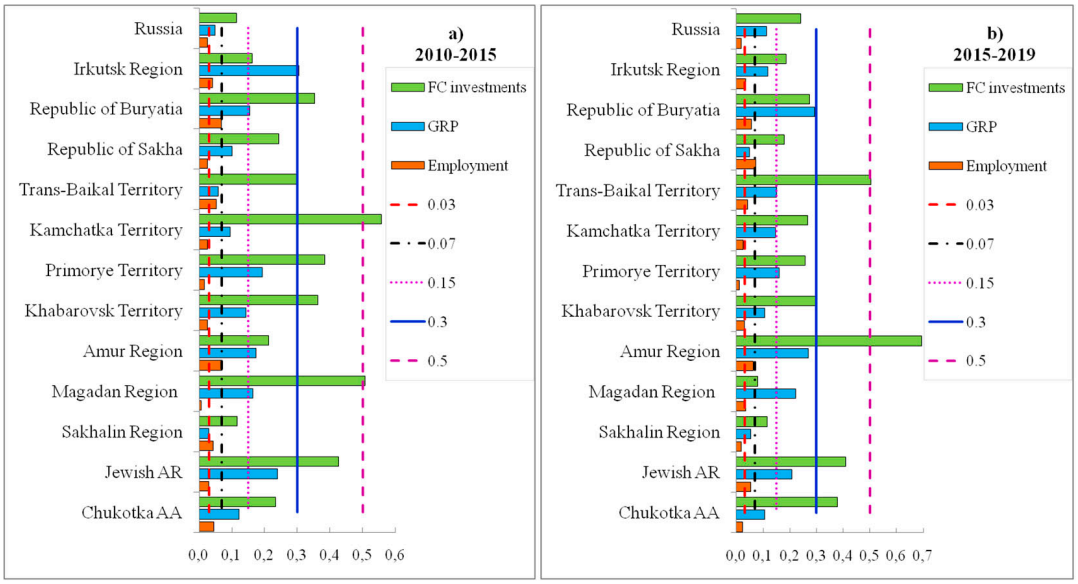

Fig. 1. The Ryabtsev index for Russian Federation and analyzing regions; the vertical lines show the class boundaries of the Ryabtsev's scale

Investments were also directed to education and healthcare, but in most regions the share of these TEAs did not change significantly, although there are exceptions here: in the Kamchatka Territory in 2015, the FC investment share in an *Education* was the highest among the considered group – 7 %, having increased by 6.1 pct, and then in 2019 it decreased to 4.4 %; in the Primorye Territory – a decrease from the group maximum of 13.8 % in 2010 to 4.3 % in 2015 and further to 2.6 % in 2019; in Buryatia – a drop by 4.8 pct. in 2015 and growth to the maximum for the group in 2019–12 %.

In the *Healthcare sector* in 2015, the leaders of investment in terms of the share of this TEA were the Jewish AR (17.5 %) and Kamchatka Territory (7.2 %), their shares increased by 17 and 5 pct, respectively, but in 2019 they decreased, respectively, by 15.5 and 3.9 pct; in the Republic of Buryatia, the dynamics is similar to that in investment in education – first a decrease from the group maximum of 6.9 % to 3.6 %, and then an increase to 5.5 % – also the maximum in the group.

In the *sectoral structure of GRP*, the most significant transformations in 2010–2015 occurred in the Irkutsk Region and the Jewish AR. Noticeable changes occurred in some border regions: the Primorye Territory, the Amur and Magadan regions, the Republic of Buryatia. For 2015–2019, the highest values of the Ryabtsev index in the GRP structure are noted in the Republic of Buryatia, the Amur and Magadan regions, and the Jewish AR (Fig. 1).

The analysis of changes in the GRP structure showed that the most significant ones were noted in the mining, building and transport industries. The *mining* share in the GRP structure in almost all regions increased during both periods. In 2010–2015, growth was significant in the Irkutsk Region and the Chukotka Autonomous Area (Chukotka AA) – by 17.1 and 10.2 pct. In 2015–2019 – in the Magadan Region (by 16.6 pct). In the Trans-Baikal Territory, the Republic of Buryatia and the Sakhalin Region, this indicator decreased slightly in 2010–2015 – by 1.6, 0.8 and 0.8 pct, respectively. In 2015–2019 the decrease was observed in the Chukotka AA, the Amur Region and the Primorye Territory – by 8.8, 6.0 and 0.1 pct, respectively.

During the period from 2010 to 2015, the share of the *building industry* decreased in nine regions. The largest decrease was noted in the Jewish AR and the Primorye Territory – by 13.8 and 12.4 pct, respectively. During the same period, a decrease in the share of *transport and communications* sector was observed in seven regions, the most significant – in the Irkutsk Region and the Republic of Buryatia (by 10.4 and 9.2 pct). During the implementation of advanced development tools (2015–2019) there were no positive changes in the development of these industries. In most regions a decrease in the share of these industries in the GRP structure was noted.

The contribution of the *manufacturing industries* in GRP varied in a narrower range. In the period from 2010 to 2015, positive dynamics was observed in the Republic of Buryatia, the Amur Region, the Kamchatka, Primorye and Khabarovsk territories. In a number of regions, including the Trans-Baikal Territory and the Jewish AR bordering China, there was a decrease in the share of manufacturing industries in each of the considered periods. It is noteworthy that at the stage of implementation of institutional reforms in the Far East (2015–2019), almost all regions have seen a decrease in the share of the manufacturing sector in GRP, with the exception of the Primorye Territory and the Sakhalin Region.

Social and economic growth is increasingly dependent on human capital, its knowledge, experience and skills. People are the main productive force, and their life quality determines the labor efficiency, economic development, and the society's well-being (Aganbegyan, 2019, 2020; Glazyrina et al., 2020; Gritsko, 2020; Naiden, Belousova, 2018).

An analysis of the Rosstat data characterizing the labor resources of the regions of the East of Russia in the 21st century showed that the population of these regions has been steadily decreasing over the past 20 years. A relatively small positive dynamics of population growth in recent years has been observed only in the Republic of Buryatia (since 2007), the Republic of Sakha (Yakutia) (since 2014)

and Chukotka AA (since 2018). The stratum of the working-age citizens in the eastern regions continues to decline: if in the first decade of the 21st century its share was 61–72 %, then in the second it was already 55–67 %, and by the end of 2019 – from 55.7 % (the Republic of Buryatia) to 63.1 % (Chukotka Autonomous Area). The average annual number of the employed citizens in most of the eastern regions also tends to decline, especially in the last decade.

Most of the employed citizens in this group of regions in 2010–2019 worked in trade (10.3–21.8 %) and agriculture (4.4–10.7 %), transport (5.1–11 %) and building (5.1–15.4 %) industries. The share of the manufacturing sector stably exceeded 10 % only in four regions – Irkutsk Region, Primorye and Khabarovsk territories, the Republic of Buryatia, although in the latter region in 2019 it decreased to 9.9 %. In 2019, three regions also had a relatively high share of employment in the mining sector: Chukotka AA (18 %), Magadan Region (14.3 %) and the Republic of Sakha (Yakutia) (10.3 %). During the entire period under review in Chukotka AA the employed citizens share in the supply of electricity, gas, and steam was the highest among all Russian regions (more than 12 %).

Analysis of the *distribution of the average annual number of employed citizens by TEA* showed that in most eastern regions, as in Russia as a whole, the structural shifts intensity in employment for the considered periods is relatively low: classes 1–2 on the Ryabtsev's scale, only in the Amur Region and the Republic of Sakha (Yakutia) there was class 3 – a low level of structures diversity.

Analysis of the time series of the studied indicators (in comparable prices) for the considered region group *for the entire study period – 2010–2019* – showed that there is no trend common for all regions in the dynamics of FC investment volumes. Moreover, for half of them, the growth in investment and GRP volumes does not coincide in sign: a positive growth in one is combined with a negative growth in the other (Faleychik, Faleychik, 2021; Glazyrina et al., 2021). The growth of GRP was almost everywhere accompanied by a decrease in the number of employed citizens. This allows us to speak about an increase in the efficiency of the labor resources use in these regions. The intensity of transformations of the sectoral structures of the eastern regions economies for the decade 2010–2019 can be judged from Fig. 2 and 3.

In the distribution of FC investments over the past decade, the most significant shifts have been observed in the mining and manufacturing sectors, in the transport and building industries, in the production and distribution of electricity, gas and water, in agriculture, forestry and fish farming. However, in the sectoral GRP structure, the most significant shifts occurred only in the mining, building and transport industries.

The most significant changes in regional employment structures for the period of 2010–2019 occurred in the field of *trade*: the share of this TEA increased in almost all considered regions, except for the Chukotka AA (unchanged) and the Jewish AR. The maximum change is an increase of 6 pct in the Republic of Buryatia. The maximum decrease in employment occurred in TEA *Agriculture, forestry, hunting, fishing and fish farming*. Employment in this area has declined in almost all regions of the group. The exception is Primorye Territory, Jewish AR and Chukotka AA. The largest decrease is observed in the Amur and Irkutsk regions. Employment in the *building* industry increased by 5 pct in the Republic of Sakha (Yakutia) and the Amur Region.

In the *mining* sector, a noticeable increase in employment was observed only in the Jewish AR, the Chukotka AA and the Irkutsk Region. But in the Trans-Baikal Territory, employment in this area has fallen. Employment in the *manufacturing* industry decreased in almost all group regions, as well as in Russia as a whole, with the exception of the Trans-Baikal and Kamchatka territories, Chukotka Autonomous Area. The maximum decrease is observed in the Amur, Sakhalin and Irkutsk regions – by 2.2, 1.9 and 1.7 pct respectively.

The *trade* share in the GRP of all group regions for 2010–2019 decreased significantly, and the employed citizens share in this area increased almost everywhere (except for the Chukotka AA and the Jewish AR).

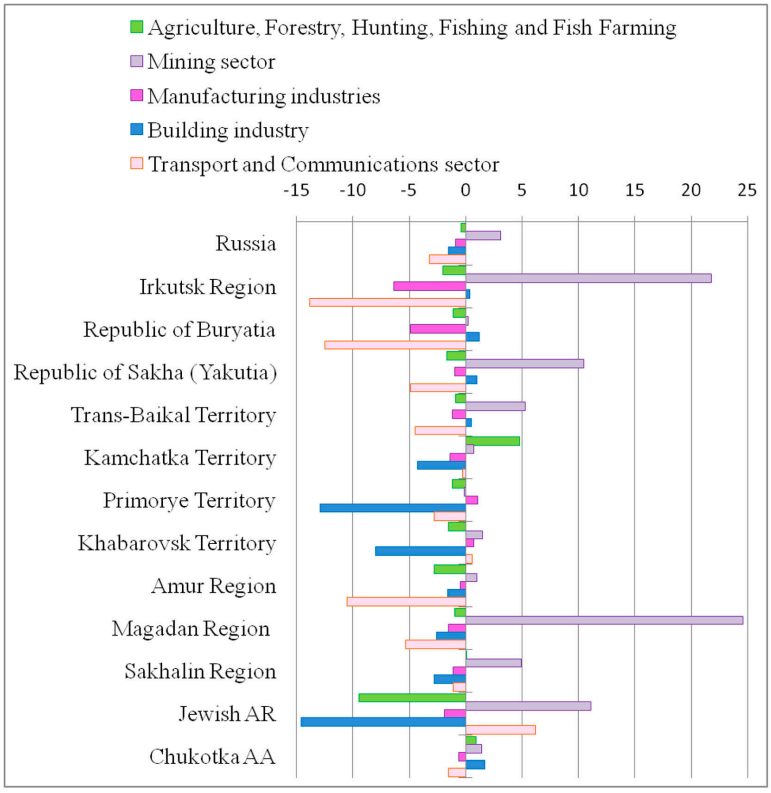

Fig. 2. Change in the shares of the main TEAs in the GRP structure of the eastern regions of Russia for 2010–2019, (pct)

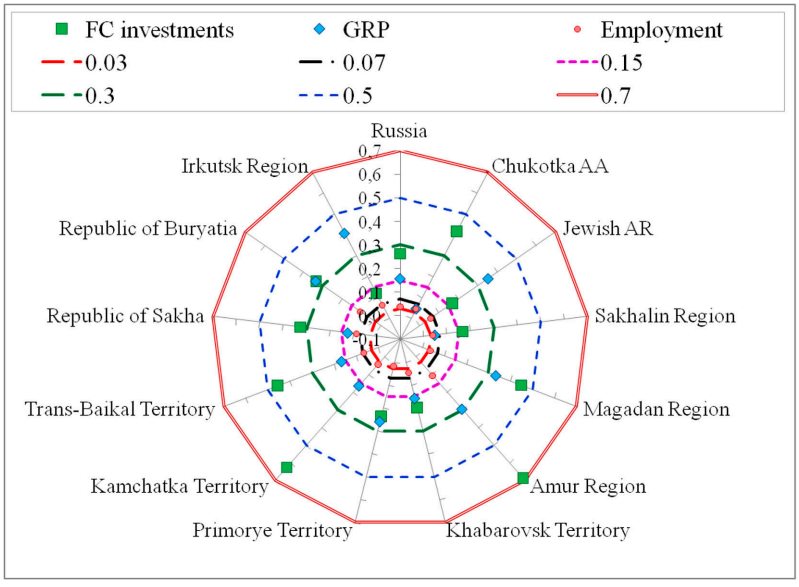

Fig. 3. The Ryabtsev indices characterizing the changes intensity in the sectoral structures of the economies of the eastern regions of Russia for 2010–2019; the curves show the class boundaries of the Ryabtsev's scale

Particular attention should be paid to the almost universal decline in employment in *Education* and *Healthcare*, in *Activities in the field of information and communication*.

Conclusion

Thus, the presented research results confirm the presence of multidirectional trends in the socio-economic development of the eastern regions of Russia. Despite some positive changes in economic and investment activity in recent years, it was not possible to overcome the unfavorable trends in the demographic situation. Both the number and the share of the working-age citizens are declining; the number of the economically active citizens employed in the real economy is also declining. In the context of the geopolitical tasks facing Russia and national security in the conditions of the sparsely populated borderlands of the eastern regions, these alarming trends do not disappear, and there are fears that the situation will only worsen (Antonova, Lomakina, 2020; Glazyrina et al., 2020; Motrich, 2020; Shvorina, Faleychik, 2018; Zabelina, Parfenova, 2021).

Investment related to the implementation of the new policy has not yet transformed into an improvement in the structure of the economy of the considered regions and the expected shifts in the sectoral structure of employment in the direction of sectors associated with high-tech production and requiring highly qualified personnel have not occurred.

Comparative analysis of the GRP structure showed the consolidation of the raw material nature of development in many regions of the East of the Russia. Attention is drawn to the fact that in the period from 2010 to 2019, the share of manufacturing industries decreased in almost all regions. This raises some concerns, since the resource economy is very sensitive to external shocks.

To improve the structure and modernization of regional economies, to overcome their resource orientation, it is necessary to develop human capital, both in quantitative and qualitative terms, which will provide additional opportunities for the development of the macroregion.

The solution to the problem of saving and increasing the people of Russia is indicated by the highest goal and national priority of our country, the achievement of which in the eastern regions is impossible in the conditions of high negative migration. Therefore, the Far Eastern macroregion development strategy should be aimed at leveling not so much the production and growth rates across the territory, but primarily the life quality of its population. For the successful implementation of large-scale development plans for the Far East, it is necessary to stop the territory depopulation processes and maintain optimal proportions between economic and demographic reproduction (Aganbegyan, 2019; Faleychik, Faleychik, 2021; Glazyrina et al., 2020; Shvorina, Faleychik, 2018).

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