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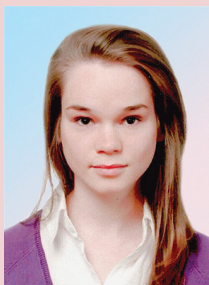
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## Methodological Aspects in Analyzing the Level of Non-Uniformity of Socio-Economic Development of Regions



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**Abstract.** This article considers uneven socio-economic development of territories. The experience of many countries convincingly demonstrates that the heterogeneity of space is a significant obstacle to the sustainable development of regions. Having analyzed the works of foreign and domestic scientists, the authors prove that in the course of transformation of the views on spatial development, there gradually evolved an idea of uneven socio-economic development as an objective feature of any territory. The study classifies factors that influence the socio-economic inequality of territories and determine

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its complexity. The authors pay attention to the fact that when studying development unevenness the researchers use different terms (“differentiation”, “asymmetry”, “polarization”, “disproportion”) that are often treated as similar. Therefore, the paper puts forward a hypothesis that there exists a relationship between these concepts that have similar meaning, and the special nature of this relationship is manifested in the fact that these concepts represent different stages of unevenness. This hypothesis is confirmed by the analysis and synthesis of a number of works of domestic and foreign researchers. The authors conclude that each stage of unevenness reflects a certain degree of fragmentation of the territory (or territories) by socio-economic indicators. Transition from one stage to another (from differentiation to asymmetry, from asymmetry to polarization) is caused by a combination of factors that reinforce differences in the direction specified. Taking into account the fact that uneven development of territories can lead to negative consequences affecting their socio-economic development, it should be noted that the government should play an important role in their elimination. The authors attempt to expand the existing notions of uneven socio-economic development of the territory. Theoretical generalizations contained in the article can be used as materials for discussion in the scientific discourse. In addition, they may be of interest to the scientific and educational activities.

**Key words:** unevenness of socio-economic development of the territory, differentiation, asymmetry, polarization, disproportion.

Unevenness in the development of territories is one of the key problems in many countries; specific features of this problem are largely determined by the size of the territory, climatic features, national composition, historical and cultural factors, heterogeneity of economic space, distribution of resources and degree of development. This problem has taken on new shape and new features at the present stage of development of productive forces under the influence of rapid introduction of innovations in all the spheres of human activity, universal dissemination of information technology and telecommunication systems that form a single information space and development of network forms of production organization.

The configuration of the socio-economic space of Russia is distinguished by its heterogeneity and imbalance; all this hinders the movement toward sustainable development and leads to increased inter-regional contrasts. The processes of differentiation of the Russian economy formed under the conditions of centralized planning increased in the period of transition to a market model of economic management that caused the decline of its competitiveness, and deepening disparities in socio-economic development levels. These circumstances emphasize the relevance of the study of uneven development in the territory, its causes and possible consequences and the specifics of its manifestation.

It is worth noting that scientists have been interested in the problem of unevenness and studied it for over two hundred years. We agree with the authors of a monograph [11, p. 26], and it is confirmed in [34, p. 42] that uneven regional development is the spatial manifestation of irregularity in the development of society, the changes in which are largely due to the change in the stages of development. During these changes, the views of scientists on the space and its features also changed, thus the very space was transformed under the influence of the development of productive forces and production relations.

For a long time, uneven development was considered to be a result of certain phenomena and processes occurring in a territory, so in many studies, scientists have tried to answer the question: what are its causes? A. Smith was one of the first to identify the causes of uneven development, highlighting among them the level of accumulated resources and spatial position [35, p. 204, 248].

In the 19th century the works of J. Thünen and W. Launhardt appeared, which marked the beginning of the theory of production location [3; 37]. The science of economic space started to be developed when people began searching for answers to the questions about how to place the enterprises to achieve better economic results; under the influence of which factors the location of the production is carried out; how the location of production affects the system of population

settlement. It is necessary to note that the spatial aspect in the economic science of the West in the 19th century was studied mainly from the standpoint of location theory, where the economy first started to be considered as a “spatial” category, which indicates the interrelation between the issues of production location and the uneven development of territories. Summarizing the works of J. Thünen and W. Launhardt who developed the fundamentals of the classical location theory, A. Weber proposed a model for the location of industry, identifying not only industrial location factors, but also the spatial and temporal regularities of their action [3, p. 578; 5].

The work of these authors determined the factors such as transportation, labor and agglomeration that have a significant influence on the distribution of agricultural and industrial production. Despite the fact that feature of these studies was the assumption about the homogeneity of economic space, as a consequence of a number of assumptions required to prove the ideas of optimal allocation of the economy, they were of great importance for the further development of economic thought.

But, if we turn to the reality of the late 19th – early 20th century, it becomes noticeable how along with the development of productive forces there was a stratification of economic space on different hierarchical levels, and this was particularly evident at the

country level. Confirming this idea, we can refer to K. Marx's fundamental work "The Capital", in which the author came to the conclusion about the origin of polarization of economic space caused by the uneven distribution of income not only between classes but also between regions (both within the country and between countries) [26, p. 660, 763]. These provisions were further developed in the works of V.I. Lenin, which stated that "the irregularity and discontinuity in the development of enterprises, industries and countries are prerequisites for the capitalist mode of production" [24, p. 59].

Changes occurring in the economies of individual countries in this period, served as an impetus to further research. A great contribution to the development of location theory was made by T. Palander and A. Predel. Criticizing location theory, the authors suggest that the heterogeneity of the territory is its property caused by geographical factors that determine the dominance of certain industries. In T. Palander's work, in particular, special attention is paid to territorial differences in demand, differentiation in the prices of resources and also in opportunities to use alternative technologies depending on the location of the company [44]. The study of these authors marked the transition to a new stage in the development of location theory and the theory of economic space.

A special place among the works of the first half of the 20th century belongs to a

fundamental work by A. Loshch "The spatial organization of the economy", where economic space was considered not only at the level of individual enterprises and settlements, but also on the level of economic regions [25]. Moreover, the author expanded the composition of the factors (these include technological progress, the tax system, proximity to national borders) affecting the location, showing their mutual impact on the spatial organization of the economy.

A great contribution to the study of the problem of location of productive forces and economic space was made by the Soviet scientists N.N. Baranskii and N.N. Kolosovskii, who stood at the origins of the "regional school" of economic geography. In the works of these scientists, not only the issues of economic regionalization of the country, but also the issues of formation of clusters received theoretical justification [2; 18]. In fact, the scientists proposed the real instruments of territorial management, the use of which was aimed at rational distribution of production that helps smooth the socio-economic imbalances. However, under the centralized command economy and the priority of industrial management, the application of the proposed tools did not bring the expected result.

In the second half of the 20th century, against the background of the processes of internationalization of economic life and regional integration, the theoretical and

practical interest to problems of functioning of economic space was revived. During this period, works of W. Isard, who is called the founder of modern regional science, were published. They were “Location and Space Economy” and “Methods of Regional Analysis”. In these works, the author made an attempt to adapt methods of macroeconomics to the study of regions, presented a model of spatial equilibrium and proposed mathematical methods to study economic space [13; 42]. The works of this period are distinguished by an important feature: when studying economic space, the authors draw attention to its heterogeneity as a special property.

Among the works that developed the theory of economic space, we should distinguish the works by the French economist F. Perroux, who developed the concept of “growth poles” [45; 46]. According to this concept, economic growth does not occur evenly, but is manifested in the centers of economic space (“growth poles”), but then may spread with different intensity to other areas. F. Perroux made an important methodological conclusion: inequality should be considered as a fundamental principle of economic development, and it arises from differences in the sizes of production and capital, from the different degrees of awareness of partners, from belonging to different areas of the economy. Ideas of F. Perroux were developed in the works of J.

Boudeville who distinguished the types of economic spaces and proposed a hierarchy of growth centers; H. Richardson, who pointed out the role of agglomerations in the formation of growth poles; J.R. Lasuen, who described a number of important features of growth poles [10; 21; 22; 47].

A significant role in the studies that reveal the mechanisms of spatial development (including its unevenness) belongs to the work “Regional Development Policy” by founder of the theory of “center–periphery” J. Friedmann [41]. According to the scientist, one of the main reasons of uneven development is scientific and technological progress, which leads to the fact that centers at any spatial level attract resources from the periphery, thereby forming not only opportunities for innovation development, but also disparities between territories. This “center–periphery” model confirms the idea that the stratification of regions in terms of development is an indispensable companion of growth.

Thus, in scientific literature gradually develops an understanding of spatial development as uneven. It is necessary to emphasize that along with the development of productive forces and production relations, the authors explore the forces that lead the economy to a non-equilibrium state and expand the range of factors affecting the unevenness of development. For instance, if in the works of the late 18th and 19th

centuries the main driving forces contributing to uneven development were location factors and transport factor, then, starting with the first half of the 20th century, the composition of the factors increased significantly. The most important result of the scientific works of this period is the recognition of unevenness as an objective property of the territory. At the present stage, it is the innovative factor that is of great importance in strengthening (as well as in reducing) uneven development.

At the same time the emphasis in research has shifted to studying the structural characteristics of economic space [12; 20; 27], the specifics of manifestation of uneven development of territories of different hierarchical levels [1; 16], since the strengthening of unevenness begins to form threats to continuous progressive development. In this regard, there arises an increasing practical interest in the issues related to the development of techniques for examining and evaluating non-uniformity [14; 17; 33], which in turn makes relevant the search for new mechanisms to reduce the negative consequences.

Analysis of scientific literature devoted to the problems of uneven development of territories shows that there are quite similar definitions of this category, which differ from one another in the characteristics determined by the direction and the sphere in which unevenness is considered. In general it can be noted that in many studies, uneven

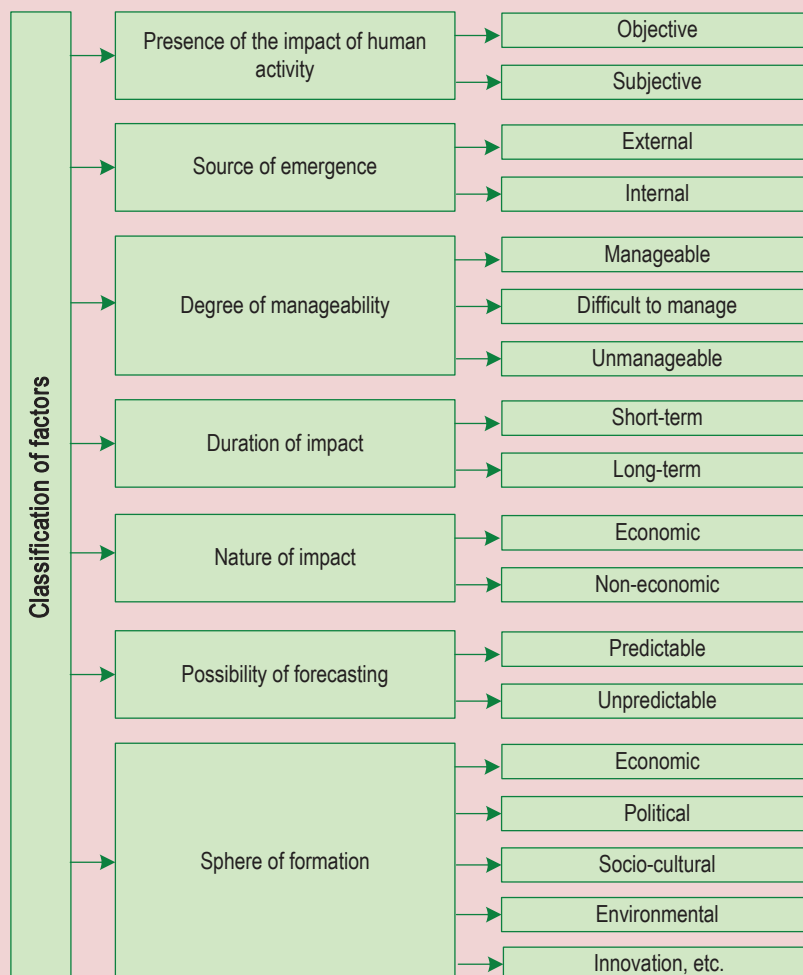
development of the territory is identified with the differences. Therefore, *uneven development of the territories is understood as the presence (existence) of differences in a specific set of parameters that reflect a particular area of functioning and development of the territory.*

Unevenness as a property of the territory is determined by various reasons and factors. The works of a number of authors identify factors influencing the inequality of territories, however, they do not give evidence to understand how these factors are classified. However, some authors focus on the selection, for example, objective and subjective, internal and external factors determining the emergence and transformation of unevenness of territories. Classification of the factors extends the opportunities of not only a better understanding of the reasons for the change in the uneven development of regions, but also a more accurate assessment of the place and role of each of them in the process. We note also that this creates opportunities for the substantiated management of socio-economic development. In this regard, we would like to acknowledge the work of P. Krugman, Nobel laureate in Economics in 2008, in which he identifies two groups of factors: one of them does not depend on human activity, and the other, on the contrary, is determined by this activity [43]. In relying on these factors created by human activities, one can exert a certain

influence on spatial development, smoothing imbalances, decreasing their negative effect on the development of society. Understanding the opportunities and the need to influence these processes makes it possible to expand a list of features that form the basis for the allocation of the following groups of factors (Fig. 1).

Special attention, in our opinion, should be given to objective and subjective factors, which can also be separated on other grounds. The objective factors include: geographic location (in certain latitudes, in relation to waterways, seas, boundaries, areas of consumption of finished products, areas where natural resources are concentrated,

Figure 1. Factors influencing the uneven development of territories



etc.); natural and climatic characteristics (climate type, soil type, geomorphologic features, configuration of river networks); natural resource endowment (presence or absence of certain types of fuel and energy, ore, rock, land, forest and water resources). These factors, in turn, affect the degree of economic development of the territory, the settlement pattern of the population, and the industrial structure of the economy. This allows us to conclude that objective factors determine the effect of subjective ones, which include economic conditions, political and economic institutions, management system, scientific and technological progress, human capital, social institutions, infrastructure, market conditions, etc.

Each of these factors affects socio-economic processes, while the joint effect of a combination of factors shapes a trend, in the direction of which the distinctions in a specific circle of parameters can either increase or decrease. Meanwhile, one and the same factor may have different direction of influence on the specific territory: in some cases it can affect the development positively, in others – negatively, and still in others – to exert no influence at all.

Functioning specifics of modern economic systems (transition to an innovation type of development, achievements in various fields of science, etc.) have caused a decline in the role of objective factors and enhanced the role of subjective factors. However, it

is impossible to eliminate non-uniformity factors completely: they are inherent in any territorial social system.

Thus, the diversity of factors and their mutual influence on each other determine not only the complex nature of unevenness, but also the ability to change it.

According to the analysis of scientific literature, the researchers studying uneven socio-economic development denote it with the use of various terms such as “differentiation”, “asymmetry”, “polarization”, “disparity”. Thus, describing the unevenness in the development of territories, each of them “reflects separate aspects of the phenomenon of unevenness” [31, p. 87]. One should also agree with the author of the work [28], in which differentiation, polarization, imbalance, disharmony, and enclavization of territories are referred to as the forms or degrees of inequality.

This became the basis for a hypothesis about the existence of a connection between these concepts (unevenness, differentiation, asymmetry, polarization) that bear a similar meaning, and about the special nature of this relationship, which is manifested in the following:

- these concepts characterize unevenness;
- changing the unevenness of development of the territory undergoes three stages (differentiation – asymmetry – polarization);



- at each of these stages the differences increase, which suggests that each stage corresponds to a certain degree of uneven development;
- deepening the differences is due to the impact of a set of certain factors.

Arguments supporting this assumption can be found in the results of studies of uneven development, based on which it is possible to establish the specific features of differentiation, asymmetry and polarization that help distinguish between these concepts and establish a relationship between them.

Scientific works related to the study of socio-economic inequality note that the basis of differentiation is formed by objective differences in the basic assumptions of economic activity that are natural. According to researchers [8, p. 8; 36, p. 12], differentiation is the process of *formation* and development of discrepancies between territories, and this process is determined by differences in the conditions, drivers and results of development. The authors emphasize that differentiation is one of the laws of development of the economy, leading to disequilibrium, disparities and imbalance of the territory. The study [29, p. 10] considers differentiation as an integral part of the economic space, as an objective condition of space heterogeneity, which is manifested in the differences in certain social and economic parameters. The authors of [23, p. 39-40] provide convincing arguments in favor of

the fact that differentiation is an indicator of integrity of space and territories. In their opinion, differentiation is both a process and a result of formation of differences between the territories, which reflect the “quality and degree of unity of economic space, social, political and other society within the borders of a particular state”.

Taking into account these viewpoints, one can argue that the beginning of differentiation (differences) indicates the beginning of the process of “stratification” of the territory that is conditioned to some extent by objective factors (like geopolitical position of the region, climatic conditions, cultural and historical factors, availability of the most important resources in the region, and others). The presence of these reasons confirms the idea that the state of heterogeneity of the space is a regularity of economic development. But, as mentioned above, objective factors bring into action subjective factors, the combined action of which alters socio-economic space.

The above allows us to define *differentiation as a phenomenon of occurrence of initial differences in the level of socio-economic development of the territory due to the impact of objective and subjective factors.*

One of the most important properties of complex systems such as the region (as a territory) is its openness. It manifests itself in constant interaction of the territory with the external environment (changing in time), with other regions, etc. In the course of this,

there is a marked increase in the number of factors influencing development processes. For example, as a result of the influence of external factors, especially uncontrollable, difficult to forecast and long-term, both economic and non-economic in nature, there is a gradual change of the initial condition of heterogeneity and an increase in social and economic differences. Note that along with this, some factors can influence separate parts of the territory with a different depth and direction, generating increased non-uniformity. This is reflected in the fact that the indicators showing the increase in interregional differences (stratification) move farther apart from each other [20, p. 525]. Some authors consider that the emergence of the so-called deviations (breaks, shifts) in the parameters characterizing the state of the territory is associated with the concept of asymmetry. So, the author [6] understands the asymmetry of socio-economic development as an increase in variance between territories; according to the author [7, pp. 10-11], asymmetry is a deviation in the conditions and results of development of the social and economic spheres of the region; the same view is held by the authors [19, p. 8; 32, p. 10; 39, p. 9], they link asymmetry to the gaps (deviations) in the results.

This suggests that the uneven development of the territory under the influence of certain factors is moving from the stage of differentiation, where differences arise that

violate the integrity of the space, to the stage of asymmetry, at which the shift of the level of development of territories relative to each other is going on and the destabilization of reproductive processes becomes more significant.

Therefore, *asymmetry* can be defined as *a phenomenon of increasing socio-economic differences between territories caused by a mixed combination of internal and external factors*.

It should also be noted that as a result of increasing asymmetry, the fragmentation of the territory by socio-economic parameters increases, and due to the decreasing asymmetry the differences can be smoothed and there can be a gradual alignment of the level of socio-economic development of the territory. It becomes clear that the vector of change in the asymmetry to a certain extent may depend on regulatory effects of the state.

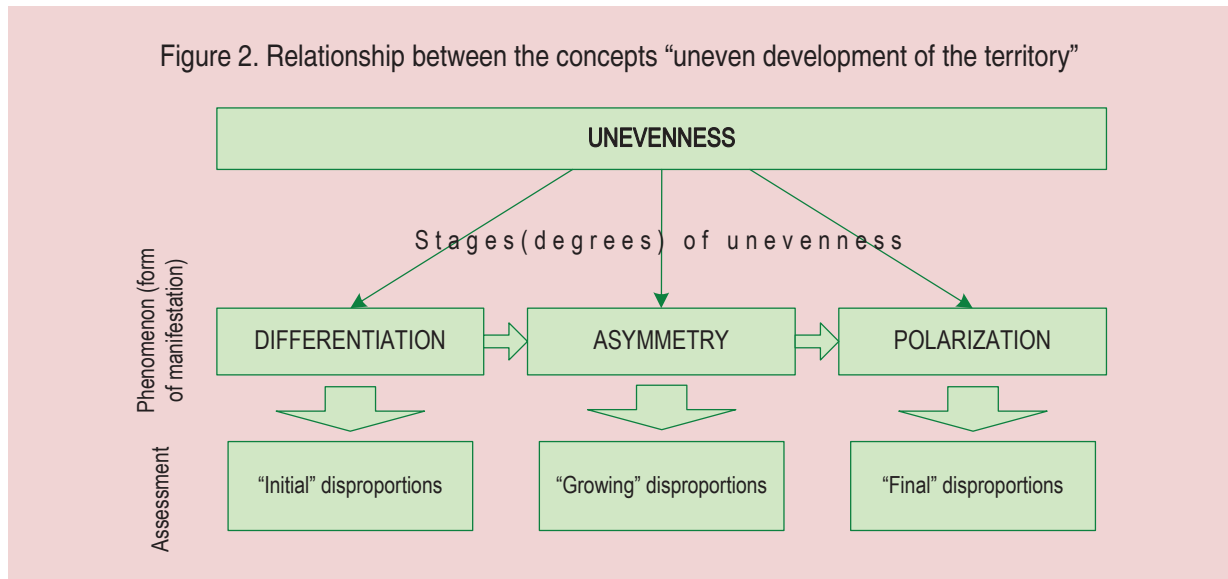
However, the influence of the state does not always lead to positive results for the development of territories. The lack of attention to the regularities of the socio-economic system, to certain internal and external risks, the choice of methods of regulation without taking into account the properties of the object of exposure and the random nature of the appearance of some factors can cause a significant increase in socio-economic differences – up to a critical level. This will inevitably aggravate the

separation of areas (or their parts), which in turn can be a serious threat to the economic integrity and security of the country.

Such a condition under which there is a “juxtaposition of territories by individual signs, as well as the process of dividing a single space into the territories opposite in a number of features [9, p. 10] is called the polarization of space in scientific literature. Despite some differences in wording used in the definition of the essence of polarization, many authors associate it with the “separation of two relatively independent but interrelated components in the framework of the relations that have economic nature” [4, p. 15], leading to excessive territorial unevenness, which in turn “opposes territories to one another on individual characteristics” [15]. Such separation of territories inevitably leads to a redistribution of resources, changes in the level of attractiveness of territories, their competitiveness and the formation of leading territories and outsider territories. This allows us to conclude that polarization is the final stage in the uneven development, in which the aggravation of the differences in the socio-economic parameters reaches significant extent. *Polarization* represents the highest level of uneven development of territories, its maximum, threshold level in the current conditions, it is *a phenomenon when territories achieve diametrically opposite (or maximum possible) remoteness from one another according to certain parameters under specific conditions.*

Socio-economic development unevenness is manifested through imbalances that increase along with increasing differences that take place when the stages change (differentiation – asymmetry – polarization). Violating the proportional balanced development may exacerbate economic and social tensions. Determining the degree of development unevenness necessary for making managerial decisions can be based on the assessment of imbalances. According to some researchers, the disparity is understood as the difference in the parameters characterizing socio-economic development, which exceeds some (marginal, critical) level [20, p. 525; 30, p. 9]. Therefore, we can assume that by identifying imbalances it is possible to estimate the unevenness of development as a whole and in the individual stages (differentiation, asymmetry, polarization) of the territory (*Fig. 2*). Such quantitative assessment helps determine not only the extent of differences between territories according to socio-economic parameters, but also the tools of state influence for the purpose of reducing the differences.

At the initial stage, under the influence of mostly objective factors, there is a change in the equilibrium of socio-economic development, and the so-called “initial” imbalances are formed. Further increase in the differences is due to the impact of not only internal but also external factors and it is accompanied by the disturbances



of the equilibrium of development and leads to “growing imbalances”. In the end, when the interaction of factors increases, the differences, reaching a significant size, influence the formation of opposites, and the “outcome” imbalances are formed.

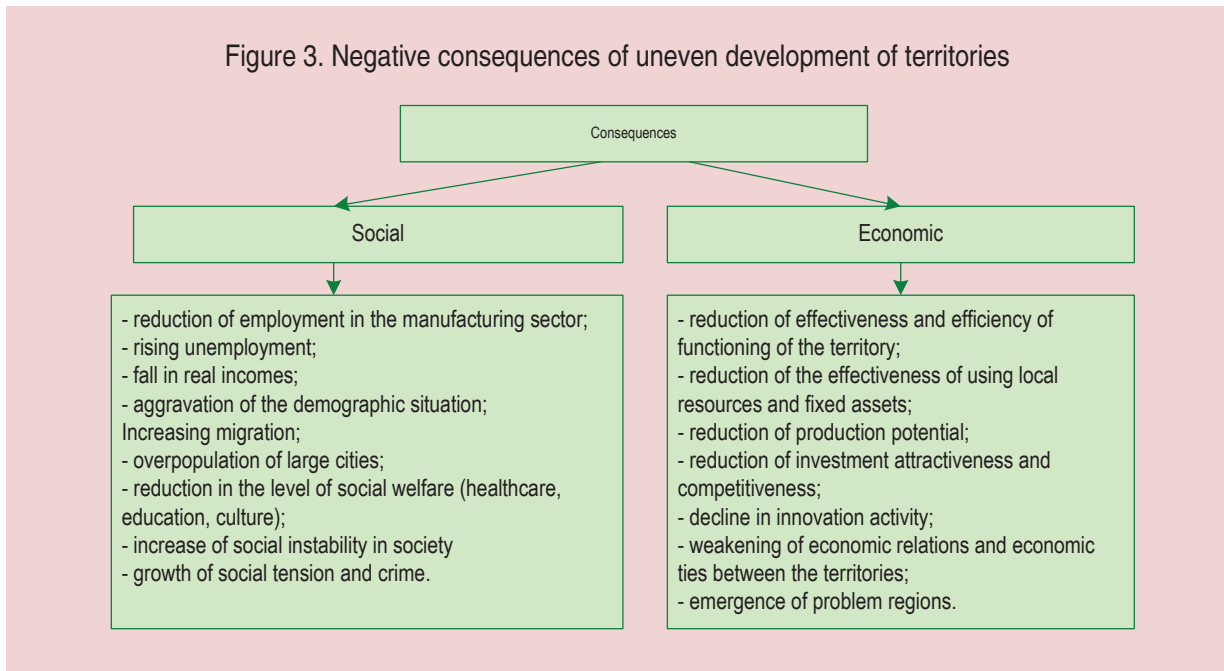
In the works of many domestic and foreign authors it is stressed that uneven development, as a property of socio-economic space, is a natural normal phenomenon typical of a territory at any level of the hierarchy. At that, there is an ambivalent influence of non-uniformity [10; 23; 40]. This is manifested in the existence of both positive and negative components of its impact on economic and social spheres.

The positive impact of uneven development on the functioning of the regional socio-economic system can be manifested in the fact that some territories get an opportunity to develop through a

more effective use of their own resources and attraction of external resources, thereby enhancing their competitiveness and sustainability. Here we can add that under certain conditions and regulatory effects of the state the impetus to the development can spread to other territories where economic processes are promoted and the opportunities for the realization of competitive advantages are unfolded.

At the same time it must be borne in mind that in terms of significant differences, some territories accumulate advantages and develop at the expense of constraining other territories, which increases the risks of crisis phenomena, leads to the stratification of socio-economic space and disruption of its homogeneity. The negative impact of socio-economic inequality is reflected in the slowdown in economic growth, depletion of human capital, technological backwardness,

Figure 3. Negative consequences of uneven development of territories



decrease in public confidence in the government, weakening of economic and social ties.

However, as practice shows, in most cases the unevenness in the development of territories causes negative effects (Fig. 3).

Of interest is the fact that between the extent of unevenness and the consequences a close connection and dependence can be traced. When unevenness shifts from the stage of differentiation to the stage of polarization, then the social and economic implications may threaten the sustainable development of the territory: reduction of employment in various sectors of the economy can lead to social tension in society; reduction in the efficiency and effectiveness of functioning of the economy – to the emergence of a problem territory.

The emergence of problem regions that require significant support from the state entails growing inequality in the standard of living of people and their migration to more favorable territories, and this, in turn, leads to the “decline” of development and “extinction” of entire settlements [38, p. 65]. The increase in differences between territories by several socio-economic parameters destabilizes the development of the economy and social sphere and violates the sustainable development of the territories, the integrity and unity of socio-economic space.

Thus, comparing and analyzing the concepts under consideration (differentiation, asymmetry, polarization) have shown that each of them is associated with substantial differences, which characterize uneven socio-economic development. The emergence and

change of the differences are caused by the combination of various factors. First, the effect of certain factors (mostly objective) initiates the emergence of unevenness, then the combination of factors increases and the relations between them and socio-economic processes became more complicated that leads to increasing variation, after that the differences are exacerbated, as the effect of many factors is compounded not only by the instability of the conditions and uncertainty of outcomes of many phenomena, but also by the random nature of some processes. This sequence of changing forms of unevenness (qualitatively and quantitatively) allows us to make a conclusion that in the development of unevenness it is possible to distinguish separate stages, at each of which the studied property of the space takes on its own specific features. Therefore, each stage of unevenness

(differentiation – asymmetry – polarization) reflects a certain degree of fragmentation of the territory (or territories) by socio-economic indicators, and this fragmentation increases in the indicated direction. The growth of unevenness (as well as its negative consequences) may threaten not only the integrity of the socio-economic space, but also national security. In order to prevent negative consequences of this phenomenon it is necessary that the state take active part in the regulation of territorial development. When choosing the methods, tools and forms of state influence it is necessary to rely on the determination of the stage of unevenness of socio-economic development, identification of its features and the factors contributing to the differences that could be influenced for the purpose of achieving the best result.

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