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METHODIC APPROACH TO THE EVALUATION OF SUSTAINABLE AND SAFE SOCIAL AND ECONOMIC DEVELOPMENT OF THE TERRITORIES

Major problems of social and economic development of the country under the conditions of the world financial crisis are described in the article. Methodological basics of the research of sustainable and safe social and economic development (SSSED) of the territories of different levels are suggested in the article. Major components in the scheme of research of SSSED are characterized. A methodological approach to differentiate SSSED of the territories of the regional level is analyzed in the article. Algorithms evaluating the state of the economy from the view-point of SSSED provision and from the view-point of the indicators of sustainability of the direction of social and economic development are provided in the article.

The world economic crisis has demonstrated that the economic growth in Russia had not been of sustainable character and had been mainly stipulated by high oil prices at the world raw materials market. Considerable decrease in these prices has lead to the shift of the direction of development of the Russian economy. It has found its reflection in the setback in production, as well as in the problems connected with the liquidity of banking system; in difficulties of large Russian enterprises facing maintenance of the external debt; in substantial decrease of the income level of a considerable part of the population; in quick unemployment growth and many other unfavourable trends. For example, in 2009 GDP decrease in Russia amounted to 7,9%. At the same time industrial production which is the "engine" of the development of the majority of other brunches of economy decreased by 11% and in some regions it even dropped by 15–25%. In other words, within a very short period of time Russian economy turned from one of the fastest-growing to one of the "fastest-falling" which demonstrates that its development was unsustainable. If data about the GDP growth in Russia and world leading economies are compared (Fig. 1), it can be seen that the Russian economy is characterized by the highest fluctuations and highest GDP in 2009.

On the other hand, it is impossible to say that the development of Russia in "safe" periods of 2000s had a stable character. Vice versa, data characterizing the state of the social sphere and demographic processes speak about the opposite. For example, in the demographic sphere beginning from 1992 the country suffers constant population decrease. According to the results of the year 2009, natural growth in population amounted to (-1,8) persons per every 1000 citizens or (-249,4) thousand person in absolute figures. The country has a relatively low average life interval especially if compared with the world leading states (Fig. 2).

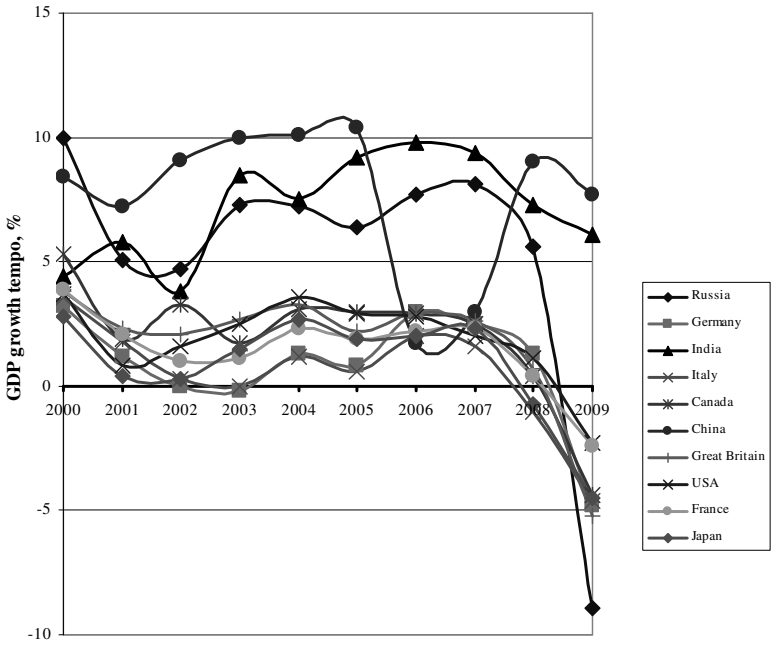


Fig. 1. GDP growth dynamics of the world leading economies in 2000-2009.

The source of information: Data provided by the Federal Statictics Service Bureau. Data about year 2009 are provided acoording to the results of II-III quarters.

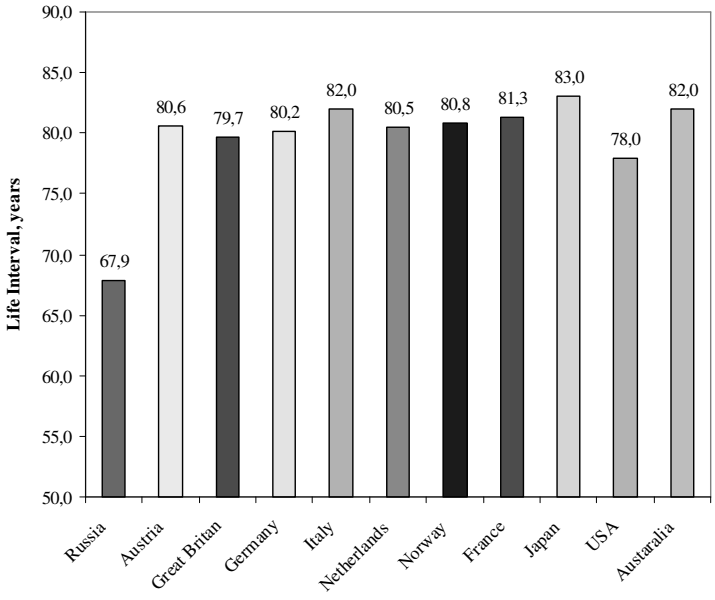


Fig. 2. Life expectancy at birth in russia and other leading countries of the world in 2007-2008.

The data provided supports the idea that the problem of sustainable and safe social and economic development (SSSED) being one of the major tasks which any government may face is as urgent for Russia at the current stage as for many other world economies. Until recently this problem has been mainly considered at the global intergovernmental level and preservation of balance between human-beings and natural environment has been one of the main priorities. Thus the main stipulations of the concept of sustainable development were presented at the UN conference about the environmental protection and development in Rio-de-Janeiro by the Gro Harlem Bruntland commission. The notion of sustainable development was understood as the development under which all the current needs are satisfied without infringing or threatening the rights of the coming generations for such possibilities [1].

The notion of sustainable development was first formulated and applied to economics by John Hartwick in the 1970s. The rule of Hartwick says that it is possible to provide sustainable development if the whole rent coming from natural resources and defined as difference between market price of the natural resources and costs of its produce is invested into the reproduced capital [2–4, etc.].

Among other basic concepts of sustainable development of the economy the theory of maximum flow of aggregated income by Hicks-Lindal should be singled out. This income may be received only under the conditions of preservation of the aggregated income with the help of which this income has been produced. This concept implies optimal use of limited resources and application of ecological nature-, energy-, and material-saving technologies, including extraction and processing of raw materials, creation of ecologically acceptable produce, minimization, processing and delition of wastes [5].

One should remember that abovementioned approaches along with the majority of other approaches aimed at providing sustainable development (including economic sphere as well) may be characterized as “global” and long-term. Thus they are not suitable from the viewpoint of market regulation processes and when taking current measures aimed at reaching targets of sustainable and safe social and economic development. Moreover, these approaches require serious adaptation measures if applied to management of SSSED of the territories of the regions and smaller territorial structural units. That is the reason why a task to research and manage SSSED of the territories of different levels appears. The basis for this research and management should be formed by modern economic realities and be aimed both at reaching global targets of sustainable development (as explained above) and at reaching private targets of sustainable development in relatively short time frames (3, 5. 10 and more years). These last targets depend a lot on the economic situation and recent trends of its development.

The research of the Russian scholars devoted to the problem of SSSED of the domestic economy has mainly been about provision of economic safety of the country. The basic works in this sphere are those by V. Senchagov [6, 7, etc.], S. Glazyev [8, etc.], E.Oleinikov [9], A.Tatarkin [10, 11, etc.], I.Bogdanov [12], and a number of other Russian scholars. Keeping these works in mind and taking into consideration their own research experience, the authors of this article come forward with their own definition of **economic safety of the territory**. Economic safety of the territory is defined as such a state of the territorial economy under which there always is some possibility to preserve acceptable level of criterial indicators - the indicators of the economic safety – which are chosen in advance. The economic system should be capable of reacting at arising internal and external threats without avalanche-like development of the crisis processes; at the same time the conditions of SSSED and reproduction are created [13].

The issues connected with formation of theoretical and methodological basics to research SSSED of the territories remain almost unattended. In our opinion, SSSED of the territory is the ability of the economic system of a certain territory to preserve sustainable

positive dynamics and direction of the development of the main social and economic indicators without sharp leaps and fluctuations. It is also the ability to reach in the course of its development satisfactory indicators of the level of economic safety and to support balanced development of different spheres of business activity at the territory without "preferences" of some particular spheres. The ultimate target of SSSED of the territory is constant growth of welfare and improvement of the quality and conditions of life of the population of the territory [13, etc.].

It is well-known that social and economic system is always at the point of unstable equilibrium, as it tends to develop system economic crises and to turn from sustainable to unsustainable state even under minor disturbances. In many cases such disturbances are outside the economic system and are connected with the political situation in certain regions of the world or in certain countries.

Instability of modern social and economic systems is investigated and proven in the work of I. Prigozhin (a Nobel Prize laureate of 1977). His research is based on the idea that modern reality is characterized by disorder, instability, non-equilibrium, non-linear relations, where a small signal at the entrance may cause whatever strong response at the exit. Moreover, under certain conditions insignificant changes may lead to system "overthrow" [14–15, etc.].

In this connection the only way to provide SSSED of the states and their regions as understood by the authors of the present article is to constantly regulate the basic criterial indicators – features of SSSED and to support their value within given limits. Thus the major tasks are the formulation of a complex of such indicators and definition of allowed limits of their change which will not disturb stability; the evaluation of sustainability of the direction of social and economic development of the territory taking into consideration different variants of deviations of indicators from the set limits due to different scenarios of external conditions development; evaluation of the results of state regulation measures taken to neutralize crisis displays hampering SSSED; as well a number of other tasks. The overall scheme of research of SSSED of the territories of different levels is exemplified in Fig. 3.

While researching SSSED as applied to the conditions of the Russian Federation four major territorial levels are singled out in accordance with the system of federative structure of the state and territorial hierarchical structure forming the authoritative bodies:

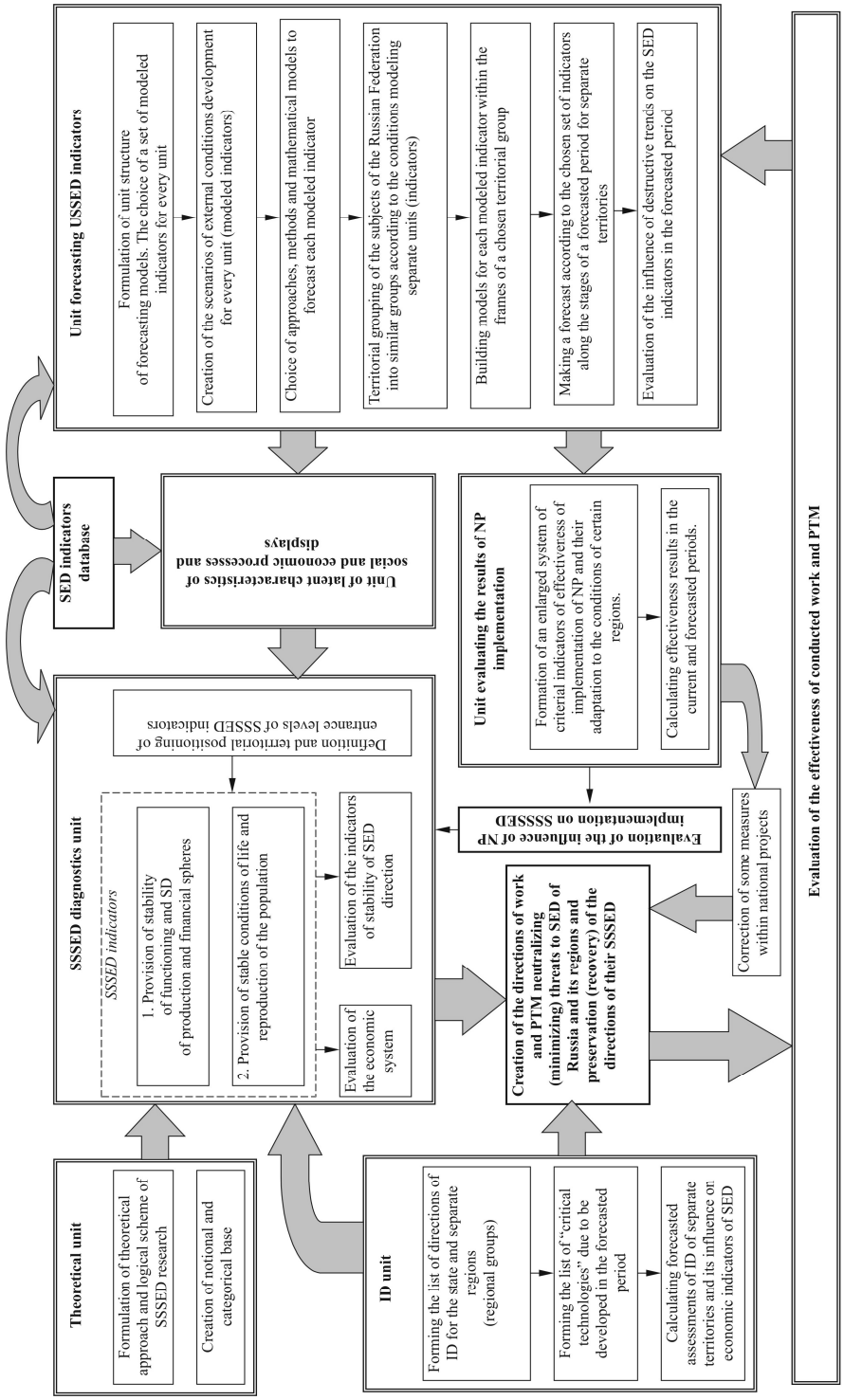
1. The federal level (the level of state as a whole). At this level the object of research is the Russian Federation as a united independent state which is characterized by a set of national state macroeconomic indicators and features.

2. Subregional level. Here the objects of research are federal okrugs as unities of several subjects of the Russian Federation according to the geographical principle.

3. Regional level, where the objects of research are the subjects of the Russian Federation as territorial units having their own authorities in the sphere of economics responsible for their own economic policy within the frames of the federal one.

4. Municipal level. This level is the lowest one and is the least economically independent subject of research. Management of sustainable and safe development and economic safety at this level is mainly related to solving national and regional tasks as local bodies of government have limited power in solving social and economic tasks. It is very often that the development of the territories of municipal level is connected with the development of economy forming enterprises operating at a given territory.

As is clear from Fig.3, the overall scheme of SSSED of the territories of different levels includes the following basic units:



Abbreviations used: SSSED – sustainable and safe social and ecoromic development; SD – sustainable development; SED – social and economic developmentмми; NP – national progects; PTM – programme-target measures; ID – innovational development.

Fig. 3. the scheme of research of sustainable and safe social and economic development of the territories of different levels

1. Theoretical. Here the theoretical basics and logical scheme of research of SSSED are provided.

2. SSSED diagnostics. It is conducted according to a set of indicators grouped together along the types of activity at the territories. The ultimate target of this unit is the evaluation of the state of economy of the territory and the state of the indicators of sustainability of the direction of social and economic development.

3. Unit of latent characteristics of social and economic processes and displays. Here understanding of the real scale of separate social and economic processes and displays not seen by the system of statistical analysis is achieved. The basis of such definition is the application of special mathematical methods together with the data of sociological, epidemiological and other researches as well as expert evaluations.

4. Unit forecasting SSSED indicators. It includes certain procedures, algorithms and approaches to modeling and forecasting SSSED indicators. Here it is suggested to use economic and statistic methods, methods of mathematical theory of management and evaluation, methods of multi-criteria optimization, and approaches and methods of the theory of decision making, the mathematical model of competition life cycle as basic for modeling and forecasting.

5. Unit of innovational development (ID). It is one of the central units in the system of modeling as it defines the state and direction of the innovational sphere at the territory. First and foremost, such development is connected with stage by stage implementation at the territories of “critical technologies” which in turn serve as a basis for science and technical progress (STP).

6. Unit evaluating the results of conducted work and programme-target measures. The effectiveness of programme-target measures to neutralize (minimize) the threats of social and economic development of the regions of the Russian Federation in the direction of preservation (recovery) of sustainable development is evaluated in this unit. It is particularly planned to work out methodology analyzing deviations of the existing figures from the planned ones and to define the elasticity coefficients of influence of certain measures on the indicators of SSSED.

Summarizing the characteristics of the unit structure of SSSED research it should be noted that one of its most important units is the unit of diagnostics. It is in this unit where the methodological basis of research is formulated, the system of criterial indicators of the degree of achieving the demands of SSSED in different directions of activity is formed, the main threats and “narrow places” in the economic systems of the territories are defined that, on the one hand, allows making judgments about stability of the direction of social and economic development, and on the other hand, serves as the basis when taking measures to neutralize threats.

The indicative analysis is used by the authors of the present article as the basis for SSSED of the territories diagnostics. Its essence comes down to the following: SSSED diagnostics is conducted relying on a set of criterial indicators – SSSED indicators, each characterizing this or that aspect or possible threat. Here all the indicators are grouped together to form certain units. It is done so because of the scope of the tasks set and because many features are analyzed while examining SSSED. Nine major units are singled out which in turn are further analyzed within two directions:

1. Provision of stability of functioning and sustainable development of production and financial sphere. It is further subdivided into 4 indicative units:

1.1. The unit of investment processes and capital reproduction stability.

1.2. The unit of production and scientific and technological potential.

1.3. The unit of financial sustainability.

1.4. The unit of reliability and continuity of energy and power supply.

2. Provision of decent conditions of life and population reproduction. Here five indicative units are singled out:

2.1. The unit of the level of life and financial well-being of the population.

2.2. The unit of labour potential and situation at the labour market.

2.3. The unit of population growth and sustainability of demographical processes.

2.4. The unit of law and order and intensity of the criminal situation.

2.5. The unit of food provision and food security.

At the moment the system suggested contains more than a hundred indicators.

It should be mentioned that the systems of indicators characterizing sustainable development including that of social and economic spheres as well have been used since 1970s. The World Bank is one of the leaders in working out criteria of sustainable development. The World Bank publishes its annual report "The indicators of the world growth". This system is in reality a complex of basic macroeconomic indicators, indicators of natural resources consumption and the environment situation, as well as basic indicators characterizing social and demographic spheres which are defined for every country [16].

The factors of sustainable development which are monitored by UNO are also worth mentioning. The index of human potential development (HPDI), index of life quality and security, the index of human development, the index of ecological measurements, the index of economic management deserve being mentioned [4, 17, etc.].

It is worth noting that from the view-point of sustainable social and economic development it is important to know not only the current value of the indicative indicator but also the ability of the economic system to support stable level of sustainability along some particular criterion (or grout of criteria) within a certain integral period (3, 5 or more years). The following levels of importance of indicators of social and economic development and integral periods to calculate the abovementioned indicators are suggested:

1. Stability in the short term. Traditionally one year is meant here (the value of the indicator is that at the end of the reported year) or sometimes even shorter periods (such as half-year, quarter, month). From the view-point of evaluation of sustainability of direction of social and economic development it is not very informative. The evaluation of SSSED of the territory is to solve the following tasks:

- To characterize the state of the economy at a certain period of time from the view-point of meeting the demands of SSSED and the degree of influence of some certain threats;
- To define the dynamics of system as compared to the previous periods and to evaluate the effectiveness of target measures aimed at neutralizing (localizing) threats of SSSED and taken in the current or previous period.

2. Stability in the midterm. As a rule such a term amounts to 5 years. Though sometimes for some dynamically developing spheres 3 years may be understood as a midterm period. To conduct the diagnostics of SSSED average indicators of the analyzed integral period are taken. The evaluation of SSSED from the point of view of stability of the ongoing processes is more informative as compared to the results of the short term period. In reality they shape the direction in which the economic system will move in the long-term period. If the process of dynamic change of the indicator has fluctuating character, all the levels of stability in the short-term period are going to be relatively low in spite of their high results of some particularly analyzed short-term periods.

An addition should be made that for a number of indicative indicators the evaluation of the situation is limited to short term and midterm periods because of the influence of the factors defining the change of the indicators, because of the periods of cyclic or irreversible changes, and because of the economic essence of the indicators.

3. Stability in the long term. Average integral value of an indicator within 10 years is understood as a long term period. It is no use to consider even longer periods as cyclic changes of external conditions for the state as a whole and its certain regions take place within such periods. From the viewpoint of stability SSSED indicators of the long term periods characterize the direction of the system development within a long economic cycle. Very often such indicators have the highest level of importance regarding SSSED provision.

As is clear from Fig. 3, while analyzing SSSED two groups of indicators are defined: indicators of the state of economy and of sustainability of social and economic development.

The evaluation of the state of the economic system in short, mid and long terms is conducted according to a whole set of indicators. From the viewpoint of a current state of economy the results of evaluation of one and the same indicator in different periods are understood as having equilibrium value without any priority attributed to any of them.

Each of the indicators is classified according to the level of stability (classes of state) from the viewpoint of SSSED provision:

- *high.* This level is characterized, on the one hand, by the value of indicative indicators which correspond to the generally accepted norms of certain economic processes and displays, and, on the other hand, by a higher "safety factor" (more than 20 – 30%) in relation to the point of possible instability. Notice that through the whole period the indicators with high level of stability do not enter the state of instability though at times they may border such states. Summing up, a conclusion may be made that states with high level of stability should serve as standard to be striven for;
- *sufficient.* The level indicates preservation of stability in processes and displays which are characteristic for the analyzed factor. At some certain stages of mid and long term periods the situation may cross the border and enter the states threatening to disturb the indicator under consideration, but the time within which the system remains in such a state is relatively short (as a rule, not longer than 1 or 2 years). The state of sufficient stability as opposed to the state of high stability is characterized by a lower "safety factor" of the economic system relating to the negative displays of the possible threats. All in all, the state of sufficient stability may be understood as favourable for SSSED of the territory;
- *low.* The state is characterized by constant disturbances of stability of the direction of social and economic development in short term as well as in mid- and long term periods. Here the dynamics of the indicator change, as a rule, tend to be fluctuating. In such conditions the development of the system is under threat and normally appears to be distorted. If a system remains in such conditions for a long time, complete stability disturbance is possible and negative social and economic consequences may be expected, some of them even of irreversible character. It is often very inexpensive for the system to reach the state with a higher level of stability. Under favourable circumstances (external conditions of development, market situation, etc.) the system is capable of returning to such states without any special regulatory interference;
- *unacceptable.* It is a state when SSSED of the territory is completely disturbed. The direction of the system development leads to further accumulation of negative consequences with every passing year. In this state the targets of long term development become the targets of second importance giving way to the tasks of "survival" of social and economic system under conditions of strong impact of threats and negative trends. It is very expensive to take the system out of such a state – help

from outside and mobilization of internal resources is required. If a system is in such a state efforts should be taken to bring it to the states with higher levels of stability. The longer the system remains in such a state the more irreversible the negative trends become for its further development.

The following stages may be singled out in the process of economic state evaluation from the viewpoint of meeting the requirements of SSSED:

1. Receiving the evaluation of the state according to some particular SSSED indicators.

Such evaluations result from comparison of current value of SSSED indicators with their critical value. The main problem of the stage is to reliably define threshold value of indicative indicators under which the error would be minimum. The following methods and approaches are supposed to be used to define the threshold value of indicative indicators:

1) the method of expert evaluation;

2) the application of the indicators of the developed countries;

3) the value of a number of indicators may be regulated by law;

4) the application of some certain mathematical apparatus. However the majority of methods originally rely on the opinion of experts and the result quite often correlates to the opinion of experts.

Attention should be paid that the threshold zones to be defined are the ones between the levels of sufficient and low efficiency and low and unacceptable zones. It is very complicated to define the border between the levels of high and sufficient stability as both of these states are understood as the states not violating SSSED. In this respect the threshold border dividing these zones is set basing on the assumption that the zones of sufficient and low stability are equal, i.e. the threshold value dividing these zones is summed up with (or is deducted from) the difference between the threshold value of the zones with low and unacceptable stability.

2. Receiving the value of the state according to the indicative unit.

To receive the evaluation a well known procedure of indicators rate setting is performed. The main targets of rate setting are transfer of all the values of the indicators into a universal system of measurements and provision of comparability of different indicators. Rate setting occurs in relation to the zone situated between high and unacceptable stability using the following algorithm:

$$\begin{cases} If\ x_i > x_{S,i}\ and\ \ x_{S,i} > x_{IA,i}, then\ x_i^* = 0, \\ if\ x_i < x_{S,i}\ and\ \ x_{S,i} < x_{IA,i}, then\ x_i^* = 0, \\ if\ x_i < x_{S,i}\ and\ \ x_{S,i} > x_{IA,i}, then\ x_i^* = \dfrac{x_{S,i} - x_i}{x_{S,i} - x_{IA,i}}, \\ If\ x_i > x_{S,i}\ and\ \ x_{S,i} < x_{IA,i}, then\ x_i^* = \dfrac{x_i - x_{S,i}}{x_{IA,i} - x_{S,i}}, \end{cases} \quad (1)$$

where x_i is the value of i indicator of SSSED in the original system of units;

$x_{S,i}$, $x_{L,i}$, $x_{IA,i}$, are the corresponding threshold values of sufficient, low and insufficient levels of stability for i indicator of SSSED in the original system of units;

x_i^* – fixed value of i indicator of SSSED.

It is very easy to notice from the equation (1) that in the fixed rate system of units all the indicators characterized by high level of stability have zero value, and the value of the ones characterized by inacceptable level exceeds “1”. The borders (threshold levels) of some certain states according to the level of stability come to the following figures: for sufficient level – “0”; for low level – “0,5”; for unacceptable level – “1”.

Such way of rating the value of indicators was used in diagnostics of economic safety and its components [13, etc.].

The evaluation of the level of stability according to indicative units (synthetic indicators) is defined as below:

$$F_j = \frac{\sum_{i=1}^{n} a_i \cdot b_i \cdot x_i^*}{\sum_{i=1}^{n} a_i \cdot b_i}, \qquad (2)$$

Where F_j is the evaluation of the level of stability according to *j* indicative unit;

a_i – weighting coefficient of the importance of *i* indicator of SSSED within *j* indicative unit. Usually the value of a_i is set in an expert manner if the equation $\sum_{i=1}^{n} a_i = 1.$ is true. However in practice all the indicators tend to be equilibrium;

b_i – weighting coefficient taking into consideration the level of stability of of the state basing on *i* indicator of SSSED. It is set from the following assumption: the lower the level of stability of the state, the higher b_i, as in this case the consequences of SSSED disturbance have a more irreversible character;

n – the number of indicators comprising *j* indicative unit..

While evaluating the state of SSSED according to indicative units the threshold levels correspond to set rate threshold levels in some certain indicators. Complex evaluation of the state of economy of the territory according to the level of stability of SSSED is conducted in a similar way.

There are a lot of approaches in literature to calculate stability indicators or their temporal oscillations. To be more precise, one may find recommendations in the works of Afanasiev V.N. and Yuzbashev M.M. [18, 19], Tchetverikov N.S. [20], Rasutina A.E. and Kunitsina N.N. [21] and others. In the majority of works stability is understood from the point of view of "fluctuations amplitude" of the indicator in the process of its change with time. Basing on the abovementioned works the authors single out the major indices evaluating the stability of the direction of the social and economic development.

1. Stability index of the direction of social and economic system development. .

Its definition is directly connected with fixed rate evaluation of the indicators received before. For certain indicators this index may be expressed in the following way:

$$\Delta x_i^{mt} = x_i^* - x_i^{*(t-m)}, \qquad (3)$$

where *t* is year (period) for which the index is calculated;

m – temporal period aggregated in the value of the indicator (reference to the period is contained in the name of the indicator). Normally *m=1* for a short term period*, m=5* for a midterm one and *m=10* for a long term.

It is also supposed that if $\Delta x_i^{mt} < 0,$ then it denotes the direction of growth (recovery) of the level of stability; $\Delta x_i^{mt} \approx 0$ – denotes the situation when the level remains unchanged; while $\Delta x_i^{mt} > 0$ speaks about level decrease (the higher is Δx_i^{mt}, the greater is the possibility of sustainable development disturbance).

Calculation of stability index for indicative units as well as for complex evaluation of SSSED of the territories is done according to the following formula:

$$\Delta F_j = \frac{\sum_{i=1}^{n} h_i \cdot k_i \cdot \Delta x_i^{mt}}{\sum_{i=1}^{n} h_i \cdot k_i}, \quad (4)$$

where h_i – weighting coefficient considering temporal period which is aggregated in the value of the indicator. The longer the period, the more important is the indicator from the viewpoint of evaluation of stability of development and the higher should be the value of h_i for such an indicator;

k_i – weighting coefficient considering irreversibility of the consequences under high tempo of instability development. When $\Delta x_i^{mt} < 0{,}5$ (the directions of preservation or increase of the level of stability, and the direction of decrease of the level of stability but not more than for one state of stability zone) $k_i = 1$; when $0{,}5 \le \Delta x_i^{mt} < 1$ $k_i = 2$; when $\Delta x_i^{mt} \ge 1$ $k_i = 3$.

The value of h_i depends on the temporal period for which the indicator is calculated and is received through the following equation:

$$h_i = \sum_{t=1}^{m} \frac{1}{t}, \quad (5)$$

It is easy to understand that if m = 1 the value is $h_i = 1$; if m = 5 – $h_i \approx 2{,}283$; if $m = 10 - h_i \approx 2{,}929$. Such method of calculating h_i attributes more importance to later periods and less importance to earlier ones.

2. Fluctuatability of development index.

This index is only defined on the basis of the indicators of the short term and characterizes the midterm period within which the change of the direction of development of the index occurs. Every change of the sign Δx_i^{mt} or ΔF_j is considered to be the change of direction (while calculating indices for indicative units or complex indicator of the level of stability of social and economic development). A formula is used:

$$g_i = \frac{T}{s_i}, \quad (6)$$

where g_i – index of fluctuatability of development;

s_i – frequency of changes of social and economic development according to *i* indicator (indicative unit) of SSSED within the period under discussion *T.*

The bigger is the value of g_i, the more stable is the direction of social and economic development. At the same time, when s_i=0 , the calculations are not conducted and the direction of development is understood to be stable. However the direction of such development should be taken into consideration as it may be stably negative.

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