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Efficiency Assessment of Regional Social and Demographic Process Management: Global Trends and Regional Specifics

Elena Vasilyeva

General Theme C. Demography, migration and population

Abstract

The problem of management of regional social and demographic process becomes the most actual whereas its consideration through the lenses of global trends (small number of children in a nuclear family, higher life expectancy rate, objective ageing of the population). This population reproduction level is an irreversible consequence of the urbanization processes and entrance into the phase of postindustrial development. Nevertheless, this is not to say that management of regional social and demographic process is impossible. It indicates that there are limits of management opportunities. The irreversible nature of this change is more or less typical for all regions; however, it should not be reduced to a single direction of social and demographic change in the regions. Spatial differentiation and extremely unbalanced social and economic development of the Russian regions have a significant effect both on the social and demographic situation, and on the development of the respective management tools. The problem of management of regional social and demographic process lies in acceptance of the irreversible nature, and in taking into account of simultaneous impact of the global trends and regional specifics on social and demographic processes. In this connection, the research objective is identification of social and demographic processes which are in the social and demographic global trend line and its deviations that the efficiency of management of regional social and demographic process is assessed. This paper presents methodology for assessment of efficiency of the social and demographic processes management on a regional level. The methodology is based on indicative analysis techniques and procedures. Since the development of any management techniques recommendations should be based on a clear understanding of the nature of social and demographic processes in the region, this methodology also addresses the task of identification of social and demographic processes following the global reproduction of population trends, as well as any variations from these trends. In addition, for the purposes of assessing efficiency of management of social and demographic processes in the region, the authors recommend monitoring the amounts of financing of the socially significant budget items, which would provide a tool for rationalizing

the investment requirements for the specific social and demographic projects. This paper presents the results of the methodology approbation in the Ural Federal District.

Keywords: social and demographic processes, management efficiency, region, social and demographic transformations and anomalies, socially significant budget items, indicative analysis, methodology

JEL Codes: R53, R58, J11, J18

I. Introduction

Over the past twenty years Russia has suffered significant changes both in its social and political system, and in economic management, which has first and foremost affected the state of society. The long-term accumulation of unfavorable changes in the social health of the population and the unsatisfactory rate of social sphere development hinder the positive solution of social and demographic problems (increase of the demographic burden on the working-age population, decrease in potential mothers number and the general population decrease). Potential options for further social and demographic growth depend on the underlying reasons of the ongoing processes. The current situation must be taken into account in the process of developing the tools for managing the social and demographic processes in a region. The regions of Russia differ significantly in their social and demographic dynamics. This reality creates a problem of the need for regional differentiation for the purposes of developing specific management tools. Scientifically substantiated management tools, closely related to the specifics of the social and economic development and conditions in each particular region may be developed only on the basis of a full understanding and incorporation of the prevailing social and demographic processes and the specifics of their manifestation on a regional level.

In a global context the *regional, social, and demographic trends* on the one hand closely follow the patterns in other European countries, demonstrating lots of characteristics in common with such countries, and on the other hand have their own specific features. The common pattern can be seen in the sequence of the demographic and epidemiological transition stages and their determinants. Social and demographic development takes place within the context of the global development patterns, under the influence of the changing system of values and the way of life, as well as the attitude towards education, health care and other aspects of the social sphere. E. Tishuk noted that the process of a certain territory approaching modern population reproduction patterns correlated directly with the rate of

technological progress in that territory. One of the factors of such dependence was, for instance, the average level of women's education, which was inversely proportional to their reproductive activity. In the same way the study established a relationship between the birth rate changes and the rate of urbanization¹. According to A. Vishnevsky the modern type of reproductive behavior was characterized in addition to the number of births also by the value-rational motivation of a married couple, primarily of a woman².

The **specifics of the regional, social, and demographic trends** consists in the delay of the main transition stages, which reflects the effect of unsolved problems of the previous transition stages overlapping with the following ones, as well as the trends and specifics of the social and economic development of the Russian regions. **Modern social and demographic trends in Russia are conditional to the social and economic changes.** The literature dealing with the problems of the local, social, and economic development has even coined a special term "glocalization", which is a merger of the two terms – globalization and localization – and means strengthening of the effect of the local factors in the global processes³. To a certain degree this is a more optimistic description of the regional development compared to globalization per se, which views the development of a region as in a certain sense a fatal process.

Within the global trends context the problem of manageability of the regional, social and demographic processes gains a particular importance. The natural reproduction of population trend is predetermined by a higher life expectancy rate (objective ageing of the population) and the decrease of the rate of reproduction (small number of children in a nuclear family). This population reproduction level is an irreversible consequence of the urbanization processes and entrance into the phase of postindustrial development. The irreversible nature of this change is more or less typical for all regions; however, it should not be reduced to a single direction of social and demographic change in the regions. The social and demographic processes in a region depend, primarily on a certain sum of factors that are significant specifically on the regional level. The specifics of these factors' manifestation can be seen in the first place in the fact that in different social and economic conditions there is a variation from the regular social and demographic processes, i.e. their regional manifestation is determined by the conditions of the region's functioning. Therefore the potential for social

¹ Tishuk, E. (2003), *Prognoznie ostenki mediko-demograficheskikh prestessov*, Problemi sostialinoy gigieni, zdravooxraneniya i istorii medistini, № 5.

² Vishnevsky, A. (2005), *Demograficheskay refolustiya*, Moskva, 176-178.

³ Animitsa, E. and N. Vlasova (2010), *Chelovecheskiy faktor v razvitii krupneyshikh gorodov*, Upravlenets, №7-8 (11-12), 13-15.

and demographic development is restricted by the global regular population reproduction patterns, as well as the regional specifics. The regional specifics may obscure or slow down the manifestation of the global trends, but never override them.

This understanding of the social and demographic processes presuming the irreversibility of global trends is incorporated in the description of the processes as transformation. According to V. Yadov, the freedom from “vector burden” makes “transformation” the most adequate concept for the study of contemporary Russian society⁴. For this reason the notion of social and demographic transformations was proposed for describing the social and demographic processes reflecting the characteristics of the regularities of reproduction of population. ***The social and demographic transformations mean qualitative changes in the social and demographic processes under the influence of changes in the system of values and the way of life of the population, manifesting themselves in the transformation of:***

- *birth rate pattern – via the shift of the age of marriage and motherhood towards the older age periods with the simultaneous birth rate drop;*
- *mortality pattern – via the gradual disappearance of exogenous factors and better fulfillment of endogenous population’s health potential with the simultaneous decrease of mortality rate and the life expectancy growth.*

Deviation from transformations under the effect of external factors and the manifestation of the regional specifics (financial difficulties, uncertainty about future economic stability, low quality of social services, unacceptable living conditions, etc.) represent the *social and demographic anomalies* (significant social differentiation of the population, high mortality rates, particularly of males and from avoidable causes, etc.).

Spatial differentiation and extremely unbalanced social and economic development of the Russian regions have a significant effect both on the social and demographic situation, and on the development of the respective management tools. The specifics of managing the social and demographic processes in the territory of a region are first of all conditional to the specifics of the regional processes themselves. In order to achieve optimization of the social and demographic processes in a region the managing strategy must take into account the nature of the existing social and demographic trends. The process of implementation of this task may be broken into three methodological positions:

- 1) acknowledging the historical and social-economic dependence between the population and the social and economic development of a region;

⁴ Yadov V. (2001), *A vse ge umom Rossiu ponyat mogno*, Rossiya: transformiruscheesya obschestvo, Moskva, 12.

- 2) the need for a differentiated approach in implementing social and demographic processes management model, which follows from the previous position;
- 3) the use of a comprehensive approach to problems of managing the social and demographic processes in a region.

At present the development of management solutions is difficult, since they are oriented towards the quantitative improvement of the population reproduction indices, ignoring at the same time the structural transformations, with the inevitable decrease in the efficiency of the social and demographic processes management in a region. Therefore assessment of the efficiency of social and demographic processes management in a region requires defining the nature and the reasons of the social and demographic processes in such region. Review of the literature on the subject leads to a conclusion that mostly traditional economic analysis methods are used for the assessment of management efficiency, which are often reduced to the calculation of the individual performance indicators of the technical and economic efficiency of the available resources used. Such calculations are quite simple; however, they are useless for the purposes of strategic management, since they cover only individual aspects of the economic activity. The official methodology for efficiency assessment of the work of executive authorities of the subjects of the RF was approved in 2007⁵. This methodology is industry oriented reflecting the sector-centered interests of the governing bodies. From this point of view this methodological approach may be characterized as resource oriented.

II. Methodology

In order to shift the emphasis from “managing budget resources (expenses)” to “managing results” the authors have developed the **methodology for assessment of social and demographic processes management in a region**. The methodology is based on indicative analysis techniques and procedures. The purpose of the indicative analysis is obtaining the integrated assessment based on a combination of indices. The algorithm of the methodology consists of 4 stages.

Stage 1. Developing of a list of indices reflecting the social and demographic transformations (characteristics of the second demographic transition and the epidemiologic transition) and anomalies, as well as the level of financing of the socially significant budget items of the RF subjects (Table 1).

⁵ On assessment of efficiency of the work of executive authorities in the subjects of the RF: Decree of the President of the RF of June 28 2007 № 825.

Table 1. List of social and demographic processes and financing of the socially significant regional budget items indices

Name of modules and indices	Unit
Social and demographic processes	
1. Aggregated birth rate	unit
2. Number of interruptions of pregnancy (abortions) per 100 births	occ. / 100 births
3. Average mother's age	years
4. Extramarital birth percentage in the total number of births	%
5. Synthetic indicative population mortality rate factor (by causes of death)	
5.1. Population mortality rate ratio from endogenous causes	per./ 100000
5.2. Population mortality rate ratio from exogenous causes	per. population
6. Synthetic indicative population mortality rate factor (by age groups)	
6.1. Infant mortality rate	per./ 1000 births
6.2. Working age population mortality rate	per./ 1000 per. of rel. age
7. Synthetic indicative life expectancy factor	
7.1. Life expectancy at birth, men	years
7.2. Life expectancy at birth, women	
Financing of socially significant budget items	
1. Financing of healthcare, physical culture and sport	
1.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for public health care, physical culture and sports to the GRP	%
1.2. Per capita expenses of consolidated budget of the RF subject and the territorial public non-budgetary fund for public health care, physical culture and sport	rub. thou./per.
2. Financing of social policy	
2.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for social policy to the GRP	%
2.2. Per capita expenses of consolidated budget and the territorial public non-budgetary fund for social policy	rub. thou./per.
3. Financing of education	
3.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for education to the GRP	%
3.2. Per capita expenses of consolidated budget and the territorial public non-budgetary fund for education	rub. thou./per.
4. Environmental protection financing	
4.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for environmental protection to the GRP	%
4.2. Per capita expenses of consolidated budget and the territorial public non-budgetary fund for environmental protection	rub. thou./per.
5. Housing and utilities financing	
5.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for housing and utilities to the GRP	%
5.2. Per capita expenses of consolidated budget and the territorial public non-budgetary fund for housing and utilities	rub. thou./per.

Stage 2. Defining threshold values of indices based on expert assessments. Taking into account the characteristics of the second demographic transition and the epidemiologic transition⁶ the threshold values of individual indices were obtained. These values were used for the qualitative differentiation of social and demographic processes into the transformations and the anomalies (Table 2).

⁶ Lesthaege R. (1992), *The Second Demographic Transition in Western Countries: An Interpretation*, Brussels IPD Working Paper; Van de Kaa, D.J. (1988), *Europe's Second Demographic Transition*, Population Bulletin, Vol. 42, №1; Omran, A. (1977), *Epidemiologicheskii aspekt teorii estestvennogo dviganiya naseleniya*, Problemi narodonaseleniya. O demograficheskikh problemakh stran Zapada. Moskva, 57-91.

Table 2. Threshold values for the region's social and demographic processes indices

Indices	Completed social and demographic transformations stage	Social and demographic transformations	Social and demographic anomalies
Aggregated birth rate, unit*	2.0 – 2.5	1.7 – 2.0	≤ 1.7
		2.5 – 3.0	≥ 3.0
Number of interruptions of pregnancy (abortions) per 100 births, occ. / 100 births	≤ 30.0	30.0 – 66.3	≥ 66.0
Average mother's age, years*	28.0 – 33.0	20.9 – 28.0	≤ 20.9
		33.0 – 40.1	≥ 40.1
Extramarital birth percentage in the total number of births, %*	35.0 – 40.0	8.0 – 35.0	≤ 8.0
		40.0 – 49.0	≥ 49.0
Population mortality rate ratio from endogenous causes, per./ 100000 per. population	≤ 300	300.0 – 840.0	≥ 840.0
Population mortality rate ratio from exogenous causes, per./ 100000 per. population	≤ 100.0	100.0 – 190.0	≥ 190.0
Infant mortality rate, per./ 1000 births	≤ 4.0	4.0 – 11.0	≥ 11.2
Working age population mortality rate, per./ 1000 per. of rel. age	≤ 150.0	150.0 – 600.0	≥ 600.0
Life expectancy at birth, men, years	≥ 72.0	63.0 – 72.0	≤ 63.0
Life expectancy at birth, women, years	≥ 80.0	71.0 – 80.0	≤ 71.0

* the "dual-threshold" indices

The threshold values by indices of financing the socially significant budget items are scaled for the Federal Districts and the RF subjects (Table 3).

Table 3. Threshold values for the region's socially significant budget items financing indices

Indices	Group number	Average financing level	Low financing level
Ratio of consolidated budget and the territorial public non-budgetary fund expenses for public health care, physical culture and sports to the GRP	Group 1	4.0	2.5
	Group 2	5.5	4.0
	Group 3	9.0	5.2
Per capita expenses of consolidated budget of the RF subject and the territorial public non-budgetary fund for public health care, physical culture and sport	Group 1	9.0	4.2
Ratio of consolidated budget and the territorial public non-budgetary fund expenses for social policy to the GRP	Group 1	10.0	5.0
	Group 2	12.0	7.0
	Group 3	15.0	10.0
Per capita expenses of consolidated budget and the territorial public non-budgetary fund for social policy	Group 1	4.0	2.5
Ratio of consolidated budget and the territorial public non-budgetary fund expenses for education to the GRP	Group 1	4.0	3.0
	Group 2	5.5	4.5
	Group 3	7.0	6.0
Per capita expenses of consolidated budget and the territorial public non-budgetary fund for education	Group 1	8.0	4.0
Ratio of consolidated budget and the territorial public non-budgetary fund expenses for environmental protection to the GRP	Group 1	0.06	0.02
	Group 2	0.08	0.04
	Group 3	0.1	0.06
Per capita expenses of consolidated budget and the territorial public non-budgetary fund for environmental protection	Group 1	1.2	1.0
	Group 2	1.0	0.8
	Group 3	0.8	0.6
	Group 4	0.6	0.4
	Group 5	0.4	0.2
	Group 6	0.2	0.03

Table 3 continuation

Indices	Group number	Average financing level	Low financing level
Ratio of consolidated budget and the territorial public non-budgetary fund expenses for housing and utilities to the GRP	Group 1	3.0	1.5
	Group 2	4.0	2.5
	Group 3	5.0	3.5
Per capita expenses of consolidated budget and the territorial public non-budgetary fund for housing and utilities	Group 1	3.0	1.5
	Group 2	4.0	2.5
	Group 3	5.0	3.5
	Group 4	6.0	4.5

Based on the classification parameters all territories are grouped into uniform comparable groups by the threshold values of indices. The algorithm of the territories grouping by classification parameters for individual indices of financing the socially significant budget items is represented in Fig.1. The grouping of the Federal Districts and the subjects of the RF by these indices is shown in Table 4.

Stage 3. Creation of an electronic database based on statistical reports of the Russian Federal Statistics Service, the Ministry of Healthcare of the RF, the Ministry of Labour and Social Protection of the RF, the Federal Treasury.

Stage 4. Assessment of results for each index was obtained by comparing the actual index values with the respective threshold values. For the purposes of the qualitative assessment of the *social and demographic processes* in a region the following *states* have been identified depending on the manifestation of characteristics of the second demographic transition and the epidemiologic transition, as well as the regional specifics:

- *Social and demographic anomalies* characterize processes subject to the effect of the regional specifics. The anomalies include such reproductive performance and mortality rate structure, which have a negative effect on the dynamics of the number and the structure of the region's population, creating a threat to the economic growth and the social stability of the region.
- *Social and demographic transformations* determine the type of processes occurring during the second demographic transition and the epidemiologic transition. Under unfavorable conditions the processes may change from this state into the state of anomalies, this fact requires continuity of actions on the part of the public authorities aimed at maintaining the favorable social-economic and demographic environment in the region.
- *Completed social and demographic transformations* describe the characteristics of the completed second demographic transition and the epidemiologic transition resulting in fundamental qualitative changes in the reproductive performance and the mortality rate

structure. At this stage the main responsibility for the social and demographic development lies on the population itself, whereas the state performs only those functions that are required for maintaining favorable social and economic conditions in the region.

Figure 1. Regional grouping algorithm by classification factors for the individual socially significant budget items financing indices

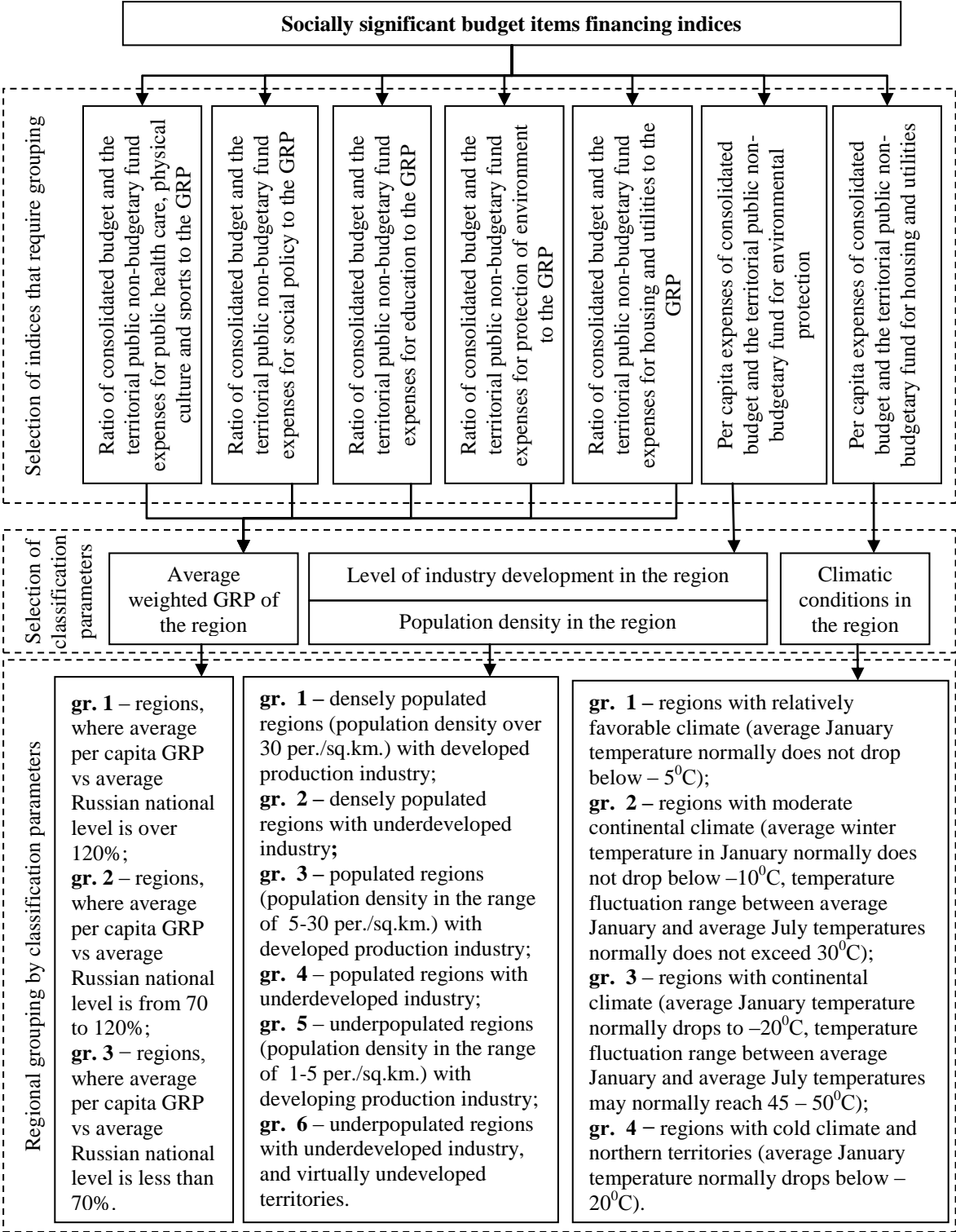


Table 4. Grouping of the Federal Districts and subjects of the RF by threshold values of indices of financing of the socially significant regional budget items

Region	Group number						
	1.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for public health care, physical culture and sports to the GRP	2.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for social policy to the GRP	3.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for education to the GRP	4.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for environmental protection to the GRP	4.2. Per capita expenses of consolidated budget and the territorial public non-budgetary fund for environmental protection	5.1. Ratio of consolidated budget and the territorial public non-budgetary fund expenses for housing and utilities to the GRP	5.2. Per capita expenses of consolidated budget and the territorial public non-budgetary fund for housing and utilities
The Central Federal District	2	2	2	2	1	2	2
Belgorod region	2	2	2	2	2	2	1
Bryansk region	3	3	3	3	2	3	2
Vladimir region	3	3	3	3	1	3	2
Voronezh region	3	3	3	3	2	3	1
Ivanovo region	3	3	3	3	2	3	2
Kaluga region	3	3	3	3	2	3	2
Kostroma region	3	3	3	3	4	3	2
Kursk region	3	3	3	3	1	3	1
Lipetsk region	2	2	2	2	1	2	2
Moscow region	2	2	2	2	1	2	2
Oryol region	3	3	3	3	2	3	2
Ryazan region	3	3	3	3	1	3	2
Smolensk region	3	3	3	3	3	3	2
Tambov region	3	3	3	3	2	3	2
Tver region	3	3	3	3	3	3	2
Tula region	3	3	3	3	1	3	2
Yaroslavl region	2	2	2	2	1	2	2
The City of Moscow	1	1	1	1	1	1	2
The North West Federal District	2	2	2	2	3	2	2
Republic of Karelia	2	2	2	2	5	2	3
Republic of Komi	1	1	1	1	5	1	4
Arkhangelsk region	2	2	2	2	5	2	4
Nenets autonomous district	2	2	2	2	6	2	4
Vologda region	1	1	1	1	3	1	3
Kaliningrad region	3	3	3	3	2	3	2
Leningrad region	2	2	2	2	1	2	2
Murmansk region	1	1	1	1	3	1	4
Novgorod region	3	3	3	3	4	3	2
Pskov region	3	3	3	3	4	3	2
The City of Sankt-Petersburg	2	2	2	2	1	2	2
The South Federal District	3	3	3	3	3	3	1
Republic of Adygeya	3	3	3	3	2	3	1
Kabardino-Balkarian Republic	3	3	3	3	5	3	1
Krasnodar territory	3	3	3	3	2	3	1
Astrakhan region	3	3	3	3	4	3	1
Volgograd region	3	3	3	3	3	3	2
Rostov region	3	3	3	3	1	3	1
The North Caucasian Federal District	3	3	3	3	2	3	1
Republic of Dagestan	3	3	3	3	2	3	1
Republic of Ingushetia	3	3	3	3	2	3	1
Kabardino-Balkarian Republic	3	3	3	3	2	3	1
Karachaevo-Cherchessian Republic	3	3	3	3	2	3	1
Republic of North Ossetia – Alania	3	3	3	3	2	3	1
Chechen Republic	3	3	3	3	2	3	1
Stavropol territory	3	3	3	3	2	3	1

Table 4 continuation

Region	Group number						
	1.1	2.1	3.1	4.1	4.2	5.1	5.2
The Privolzhsky (Volga) Federal District	2	2	2	2	1	2	2
Republic of Bashkortostan	2	2	2	2	3	2	2
Republic of Marij El	3	3	3	3	2	3	2
Republic of Mordovia	3	3	3	3	2	3	2
Republic of Tatarstan	2	2	2	2	1	2	2
Udmurtian Republic	3	3	3	3	1	3	3
Chuvashi Republic	3	3	3	3	2	3	2
Perm territory	3	3	3	3	6	3	3
Kirov region	2	2	2	2	3	2	3
Nizhni Novgorod region	3	3	3	3	1	3	2
Nizhni Novgorod region	2	2	2	2	3	2	2
Penza region	2	2	2	2	3	2	2
Samara region	2	2	2	2	1	2	2
Saratov region	3	3	3	3	3	3	2
Ulyanovsk region	3	3	3	3	2	3	2
The Urals Federal District	1	1	1	1	3	1	3
Kurgan region	3	3	3	3	4	3	3
Sverdlovsk region	2	2	2	2	3	2	3
Tyumen region	1	1	1	1	5	1	4
Khanty-Mansijsk autonomous district	1	1	1	1	5	1	4
Yamalo-Nenets autonomous district	1	1	1	1	6	1	4
Chelyabinsk region	2	2	2	2	1	2	3
The Siberian Federal District	2	2	2	2	5	2	3
Republic of Altai	3	3	3	3	5	3	3
Republic of Buryatia	3	3	3	3	5	3	3
Republic of Tuva	3	3	3	3	5	3	3
Republic of Khakasia	3	3	3	3	4	3	3
Altai territory	3	3	3	3	4	3	3
Zabaikalsk territory	3	3	3	3	5	3	3
Krasnoyarsk territory	1	1	1	1	5	1	3
Irkutsk region	2	2	2	2	5	2	3
Kemerovo region	2	2	2	2	1	2	3
Novosibirsk region	2	2	2	2	3	2	3
Omsk region	2	2	2	2	3	2	3
Tomsk region	1	1	1	1	5	1	3
The Far East Federal District	2	2	2	2	5	2	2
Republic of Sakha (Yakutia)	1	1	1	1	6	1	4
Kamchatka territory	2	2	2	2	6	2	3
Primorsky territory	2	2	2	2	3	2	2
Khabarovsk territory	2	2	2	2	5	2	2
Amur region	2	2	2	2	5	2	2
Magadan region	1	1	1	1	6	1	4
Sakhalin region	1	1	1	1	4	1	2
Jewish autonomous region	3	3	3	3	4	3	2
Chukotka autonomous district	1	1	1	1	6	1	4

Note. Numbers of indices correspond to the indices numbering in Table 1.

Levels of financing the socially significant budget items are broken into above average, average and low groups depending on the average Russian and the generally accepted foreign financing values and the recommendations of the international non-profit organizations.

The methodology is used for solving the problem of obtaining both assessment of the current state by the individual social and demographic process indices, and the overall state of the

processes. In order to obtain such assessments it is necessary *to convert values of the social and demographic process indices* expressed in various units into normalized values following certain conversion rules. Such conversion is performed with the use of the following rules:

1. If in the source (denominated) system of units the decrease of an indicative factor value results in deterioration of a state (conventional name of such index is “diminishing”) then its normalized value shall be determined by the following equation:

$$(1) \quad \begin{cases} \text{if } X_{ji}^t \geq X_{T,ji}, & \text{then } X_{ji}^H = 0; \\ \text{if } X_{ji}^t < X_{T,ji}, & \text{then } X_{ji}^H = \frac{X_{T,ji} - X_{ji}^t}{X_{T,ji} - X_{A,ji}} \end{cases}$$

where X_{ji}^H – is the normalized value of index i for region j in the analyzed period, rel. unit;

X_{ji}^t – actual value of index i (index i , value expressed in denominated units system) for region j in the analyzed period;

$X_{T,ji}$ – threshold value of social and demographic transformations for index i of region j in the source (denominated) units system;

$X_{A,ji}$ – threshold value of social and demographic anomalies for index i of region j in the source (denominated) units system.

2. If in the source (denominated) system of units the increase of an indicative factor value results in deterioration of a state (conventional name of such index is “incremental”) then its normalized value shall be determined by the following equation:

$$(2) \quad \begin{cases} \text{if } X_{ji}^t \leq X_{T,ji}, & \text{then } X_{ji}^H = 0; \\ \text{if } X_{ji}^t > X_{T,ji}, & \text{then } X_{ji}^H = \frac{X_{ji}^t - X_{T,ji}}{X_{A,ji} - X_{T,ji}} \end{cases}$$

It should be noted that for the normalized values the deterioration of a state by indices is always accompanied by the increase of their normalized values, regardless of whether the indices belonged to the “diminishing” or the “incremental” type.

3. Alongside the aforementioned indicative factor types there is also a third type – the “dual-threshold” indices. The completed transformation processes stage for these indices would have the top and the bottom threshold values. In this case, when the value of an index falls to a zone lying below the stage of completed transformation processes (the “diminishing” zone), the calculation of its normalized value shall be

performed in the same way as for the “diminishing” indicative factors. Whereas, when the value of an index falls to a zone lying above the stage of completed transformations (the “incremental” zone), calculation of its normalized value shall be performed in the same way as for the “incremental” indicative factors.

The rules for classification of states by indices based on normalized values are shown in Table 5.

Table 5. Classification of situations by indices and numerical score of the current situation

Stages of social and demographic processes	Ratio of normalized values of indices to threshold values	Numerical score of the current state
Completed social and demographic transformations stage	$X_{ji}^H = 0 \text{ AND } X_{ji}^t \neq X_{T,ji}$	1
Social and demographic transformations stage	$0 < X_{ji}^H < 1$	2
Social and demographic anomalies stage	$1 \leq X_{ji}^H < 2.5$	5

After obtaining the state assessments by individual indices it is necessary to perform the general assessment by the current social and demographic processes occurring in the region. Results of calculations of the economic, energy and social, and demographic security and the drug addiction situation by the Federal Districts and the subjects of the RF⁷ demonstrated that the most suitable rule for the purposes of such assessment would be the *average weighted normalized assessment* rule, where numeric scores by indices are used as the applicable weights. The normalized value by the state of the social and demographic processes C_{kj} is determined by the formula:

$$(3) \quad C_{kj} = \frac{\sum_{i=1}^{N_{kj}} b_{ji} X_{ji}^H}{\sum_{i=1}^{N_{kj}} b_{ji}}$$

where X_{ji}^H – the normalized value of index i for region j in the analyzed period, rel. units;

b_{ji} – numerical score of a state (Table 5).

All normalized assessments by indices with values over 2.5 are assumed to equal 2.5.

Assessment by the level of financing of the socially significant budget items of the RF subjects is performed on the basis of the same mathematical tools and rules, as the assessment of the state of social and demographic processes.

⁷ Tatarkin, A., Lviv, D., Kuklin, A., Myzin, A., and L. Bogatyryov (1999), *Modelirovanie ustoychivogo razvitiya kak usloviya povsheniya ekonomicheskoy bezopasnosti*, Ekaterinbugr, Izdatelstvo Uralyskogo universiteta.

Tatarkina, A. and A. Makarov, eds. (2004), *Modelirovaniye sostoyaniya i prognozirovaniye razvitiya regionalnykh ekonomicheskikh i energeticheskikh sistem*, Moskva, Izdatelstvo «Ekonomika».

Assessment of the efficiency of management of social and demographic processes in the region is performed by comparing the calculated normalized values of social and demographic processes indices with the calculated normalized values of the level of financing of the socially significant budget items:

$$(4) \quad \beta_u^t = \frac{X_{ji}^H}{X_{jk}^H},$$

where β_u^t – the assessment of the efficiency of the social and demographic processes management, rel. units;

X_{ji}^H – the normalized value of the social and demographic process index i for territory j in the analyzed period, rel. units;

X_{jk}^H – the normalized value of financing of the socially significant budget item index i for territory j in the analyzed period, rel. units;

Depending on this ratio it is possible to determine the efficiency of managing the social and demographic processes by 6 zones with the varying degree of efficiency, which is graphically represented in Fig. 2.

Managing the social and demographic processes is considered efficient provided the following *three conditions* are met:

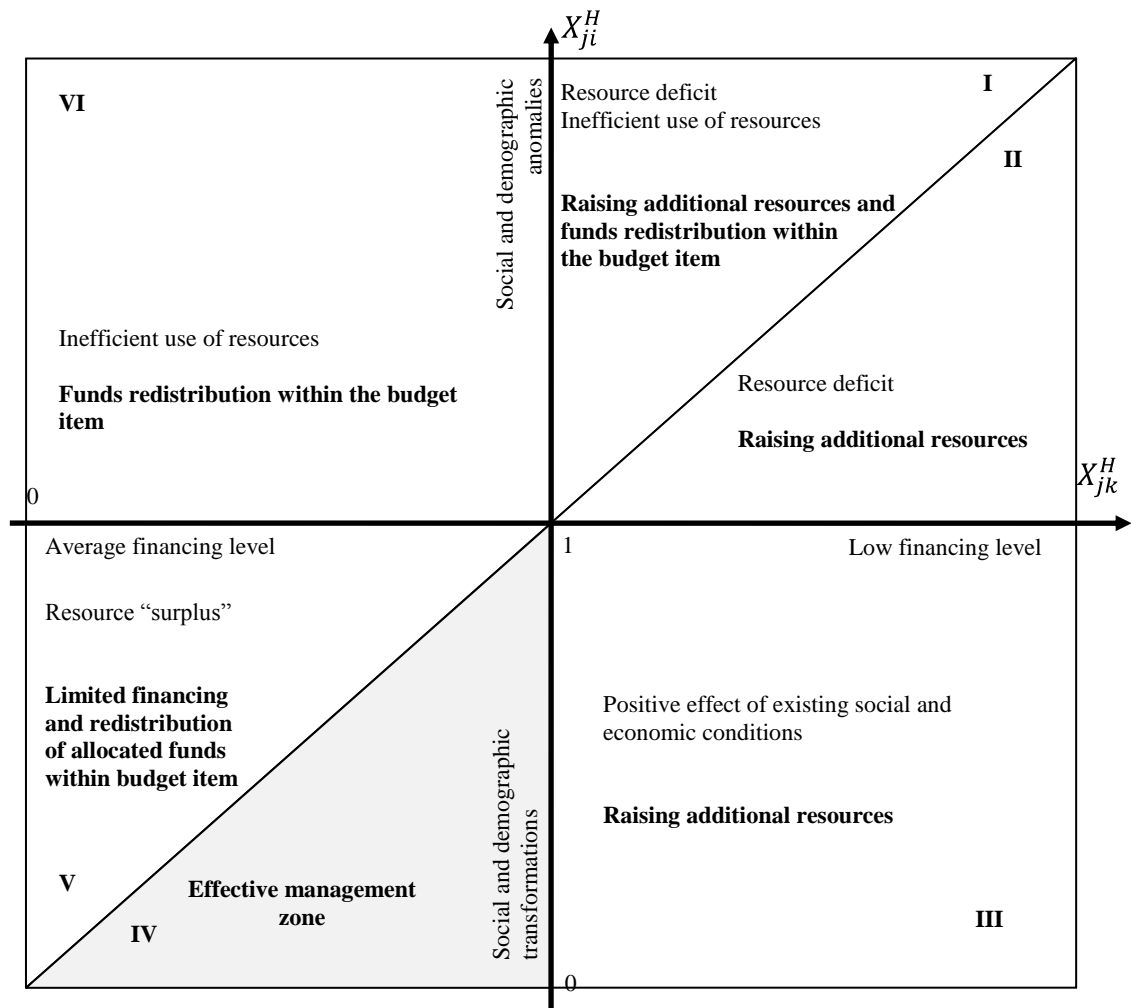
- 1) the state according to the social and demographic process index is characterized as the transformation stage, i.e. $X_{ji}^H < 1$;
- 2) financing of the socially significant budget item is at the average level, i.e. $X_{jk}^H < 1$;
- 3) normalized social and demographic process index value is lower than the normalized value of the level of financing of the socially significant budget item, i.e. $X_{ji}^H < X_{jk}^H$.

Zone IV meets the set conditions and is the efficient social and demographic processes management zone – all other zones are considered inefficient.

Zone I – social and demographic anomalies and a low level of financing of the socially significant budget items. Exit from this zone requires a combination of the rational redistribution of financial resources inside the given budget item and the increase of financing volume.

Zone II is characterized by the social and demographic anomalies at a low level of financial expenses, which dictates the need for raising additional funds for financing of a particular budget item that will result in the best performance.

Figure 2. Efficiency zones of the social and demographic processes management in a region



Zone III, describing a region where at the low level of financing there are certain social and demographic transformations owing to the positive effect of the existing social and economic conditions in the region. Raising additional funds for financing of the socially significant budget item will improve the efficiency of management.

Zone V embraces the regions with the social and demographic processes at the stage of transformation and an average level of financing, in order to stimulate the more efficient management of the available resources, the existing “surplus” in the financing level of a particular budget item must be rationally redistributed inside the item, with the simultaneous limiting of financing volume for this item.

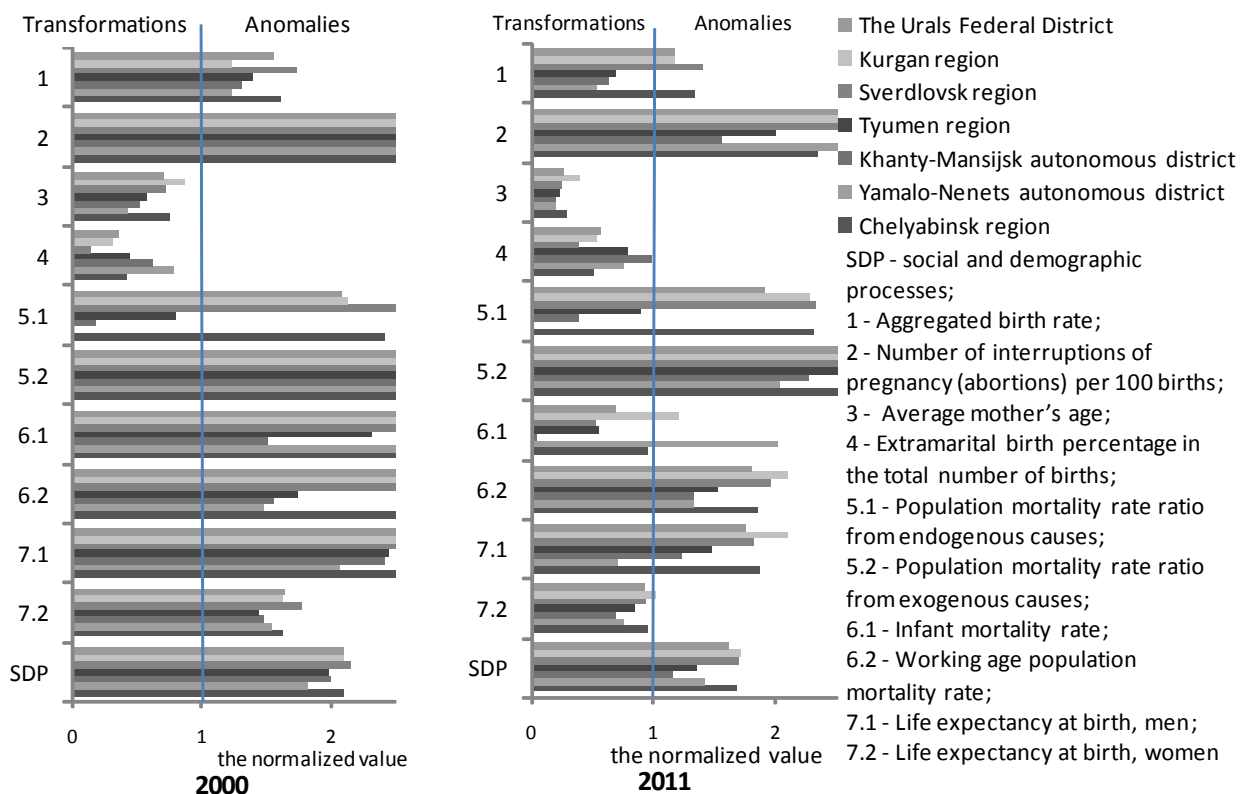
Zone VI describes a region with the social and demographic anomalies and average financial expenses, which is considered an inefficient use of the socially significant budget item resources, and requires a review of the available resources distribution within the given budget item.

III. Results

The methodology was tested on the RF subjects of the Ural Federal District (UrFD). The UrFD may serve as an example of a closer relationship between the level of the economic and the social and demographic development, where the purely resource oriented regions have the highest economic development level; the territories with competitive industries - the average; and the predominantly agrarian RF subjects have a relatively low level of economic development. This fact results in different financial capabilities of the District's territories: from the subsidized region (the Kurgan region) to the regions generating a significant portion of the national budget income (the Khanty-Mansiysk AD, the Yamalo-Nenets AD). In view of such differences in financial resources the capabilities for managing the social and demographic transformations and anomalies in the region also differ.

Results of assessment of the state of the social and demographic processes in the UrFD for 2000-2011: According to the achieved results of the territories of the UrFD by the social and demographic processes despite the overall favorable trend demonstrated anomalies throughout the analyzed period, particularly with regard to the population mortality rate processes (Figure 3).

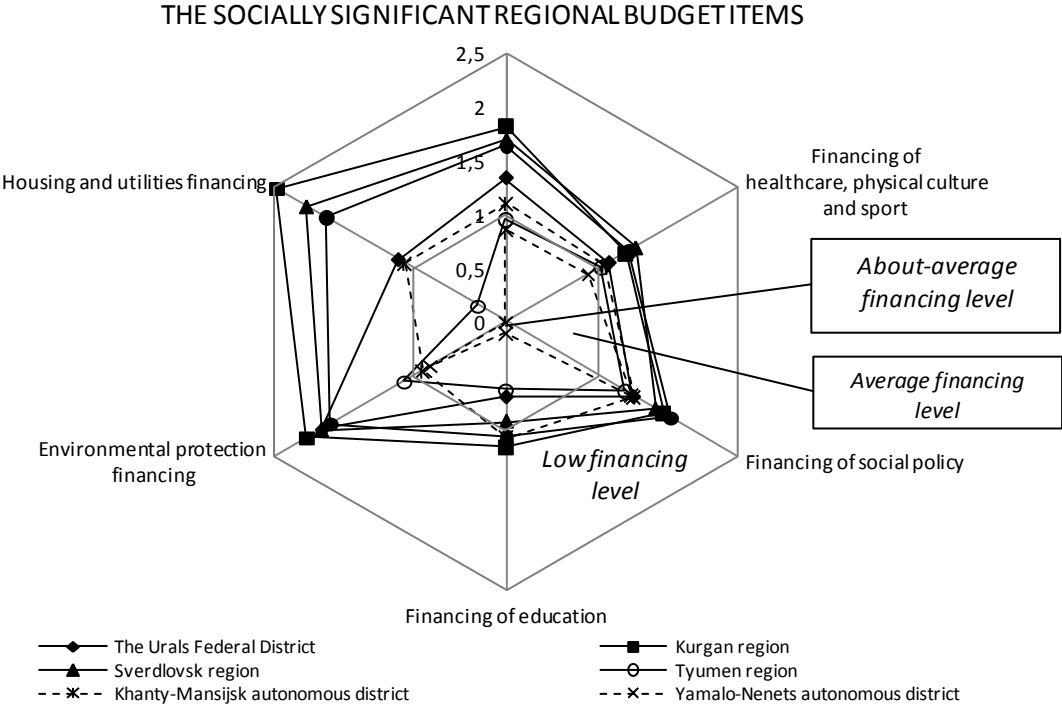
Figure 3. Results of assessment of the social and demographic processes by regions of the Ural Federal District for 2000 and 2011



It should be noted that the low birth rate was definitely the main reason for the population reduction. However unlike the extremely high mortality rate it was not an exceptional phenomenon. A similar birth rate level could be observed in many developed economies during the second demographic transition period. In all RF subjects of the District the final birth rate numbers correlated with a significantly more mature age. Pregnancy interruption still carries a significant weight in the birth rate regulation methods despite the general positive trend towards the reduction of the number of abortions. Mortality rate of the UrFD population may be best characterized as abnormal, the degree of acuteness and continuity of this problem is strongly dependent on the social and economic development of the region. In this sense the Kurgan region was the most backward territory of the UrFD, the Sverdlovsk and the Chelyabinsk regions demonstrated better performance. In the Tyumen region and the Autonomous Districts the generally younger population structure affected the mortality rate structure: there was a higher rate of mortality from exogenous causes and in the working age group.

Results of assessment of the level of financing of the socially significant budget items in the UrFD in 2011: In 2011 the level of financing of the socially significant budget items of the RF subjects in the UrFD was classified as low, though the dynamics of the main financing indices indicated an overall increase of financing (Figure 4).

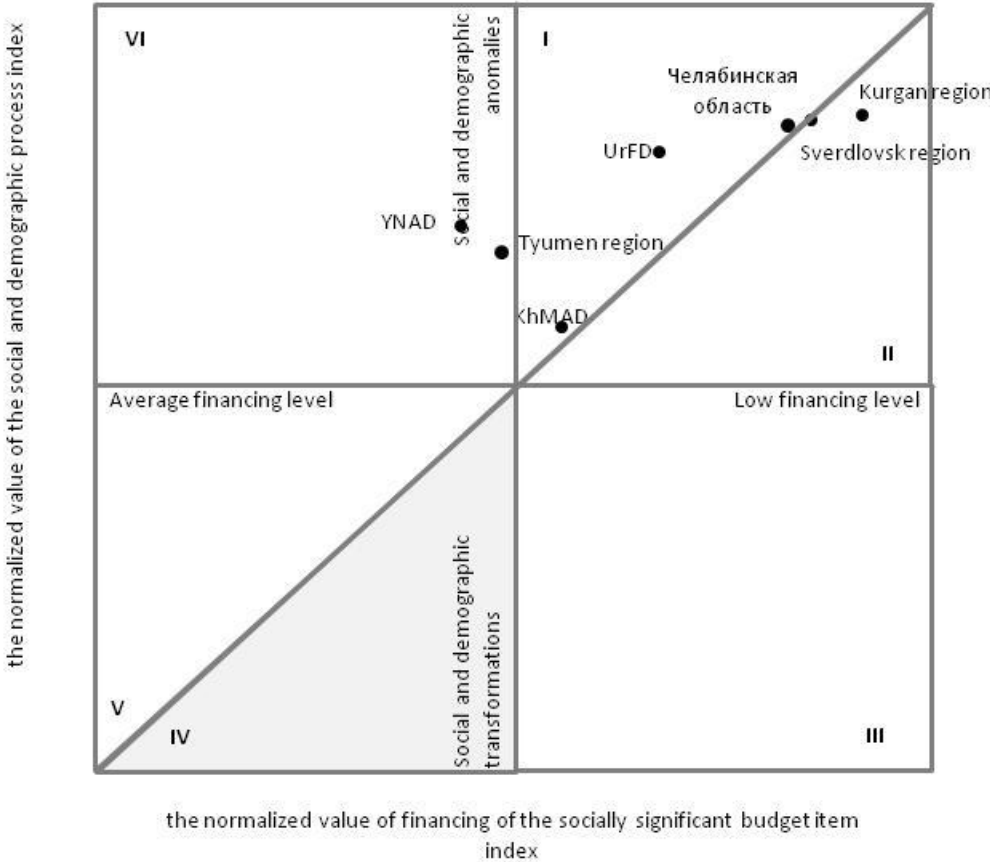
Figure 4. Results of assessment of the level of financing of the socially significant budget items in the UrFD in 2011



Thus the financing volume growth was rather a result of the higher level of social and economic development approaching the level of developed economies, than of the effect of the social and demographic processes. Because of their higher incomes the Khanty-Mansiysk and the Yamal-Nenets Autonomous Districts had greater financial leverage for solving their social and demographic problems.

Results of assessment of the efficiency of social and demographic processes management in the UrFD in 2011: According to the assessment results the social and demographic processes management in the region has been classified as inefficient: the Chelyabinsk region and the Khanty-Mansiysk AD corresponded to Zone I parameters, the Sverdlovsk and the Kurgan regions were classified as Zone II regions, the Tyumen regions and the Yamal-Nenets Autonomous District – Zone VI regions (Figure 5). It is necessary to pay closer attention to the management decision making process in all the RF subjects of the UrFD, as the insufficient financing problems there were aggravated by the presence of social and demographic anomalies.

Figure 5. Results of assessment of the efficiency of social and demographic processes management in the UrFD in 2011



According to the assessment results the social and demographic processes management in the Kurgan region was the least efficient of all the UrFD territories with regard to all the socially

significant budget items. In addition to the need to raise additional resources for the reduction of the rate of abortions, population mortality rate and increase of the birth rate and life expectancy, there is also the need of resource redistribution inside the socially significant budget items with regard to improvement of abortions rate, population mortality rate from exogenous causes, the working age population mortality rate, and the male population life expectancy indices.

Management efficiency in the Sverdlovsk and the Chelyabinsk regions may be improved by means of raising additional funds for the healthcare and social policy for the purposes of improving birth rates, life expectancy, reduction of abortions rates, mortality from endogenous and exogenous causes, and the working age population mortality rates. In addition it is necessary to redistribute financial resources in the expense budget lines of the healthcare system and the social policy with regard to abortions rate, mortality rate and life expectancy, as well as review the healthcare system expense budget for the improvement of birth rate situation. In addition, improvement of management efficiency in the Chelyabinsk region requires additional financing of the healthcare system and the social policy with regard to the reduction of infant mortality rate.

According to the assessment results in the Tyumen region efficiency of managing such social and demographic processes as the number of abortions, mortality rate from exogenous causes, working age population mortality rate, and male population life expectancy may be improved by means of a more rational use of the available funds for financing the healthcare system and the social policy, as well as raising additional resources for the social policy.

According to the assessment results in the Khanty-Mansiysk AD the combination of low financing and inefficient use of available financial resources in the healthcare system resulted in anomalies in such social and demographic processes as abortions, mortality rate from exogenous causes, working age population mortality rate, and life expectancy. In addition the same negative combination was identified in the social policy of KhMAD particularly with regard to reduction of abortions rate and mortality rate from exogenous causes, as well as insufficient financing of social policy – with regard to working age population mortality rate, and male population life expectancy.

According to the performed assessment results the social and demographic processes management in the Yamal-Nenets AD was classified as inefficient, since the social and demographic transformations in the regions occurred only owing to the existing favorable social and economic conditions. Managing such social and demographic processes as the number of abortions, mortality rate from exogenous causes, infant mortality and working age

population mortality rate was classified as inefficient. In addition to the requirement of increasing the volume of financing for the healthcare system and social policy in the aforementioned areas, the first three indices values may be improved by means of reviewing of the existing expense items for the healthcare system and the social policy. It is also necessary to ensure further stable development of the remaining processes under study.

IV. Conclusion

Overall none of the territories of the UrFD demonstrated efficient social and demographic processes management pattern, this was particularly true for the population mortality rate index. In addition the volume of resources allocated to the social sphere financing can not by itself generate improvement of the social and demographic processes performance, it is very important to maintain correct distribution of the available funds. Thus the proposed methodology may be used for adjustment and strengthening of the regional, social and demographic development management, as well as for the rationalization of financing priorities within a particular area of the social sphere, and for identifying the optimal scenarios for investment in the efficiency of management of social and demographic processes in the region.

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