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Building of the rating assessments of the Russian Federation subjects by the blocks of socio-economic indicators

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Abstract. The article implements the econometric approach to the building of rating assessments of the constituent entities of the Russian Federation. The author defines three blocks of indicators for the construction of integral indices: "quality of the population", "welfare of the population" and "quality of the social sphere". They serve as the basis for determining the value of a single combined integral indicator. The author also gives recommendations on the improvement of the medical and demographic situation and enhancement of the "quality of the population" at the regional level.

Key words: rating, econometric approach, quality of the population, medical and demographic situation.

The quality of the population is a certainty inseparable from the life of the population and arising from the very fact of its existence, an integral part of more private properties possessed by the population and appeared in the interaction with different phenomena in the world [1]. The idea about the population quality is based on the following data: demographic and health indicators (fertility, mortality, morbidity, life expectancy); level of education (share of population with secondary and higher education, average duration of the study); skill level. This research focuses on demographic and health indicators, as they are key indicators of the population quality reflecting physical, mental and social health of the nation.

The population quality has a direct impact on future generations, that is why the complex of economic, social, health and ecological measures aimed at preventing adverse trends is required even today. Success can not be achieved only due to the efforts being taken in a health sector. As the largest country, Russia has recently been giving ground in the number and quality of the population. The number of RF resident population on January 1, 2012 was 143.1 million, of which 105.7 million people (73.9%) are citizens and 37.4 million (26%) – rural inhabitants. For the 1990– 2011 period the population has declined by 5.3 million people.

Despite significant increases in life expectancy (LE) of the population in 2005–2011 (from 65.3 to 69.83 years), the Russian Federation is in line with Azerbaijan (68 years), Bolivia (66), Guatemala (69), leaving behind only the countries of Africa and several countries in Asia. The LE average in Russia is 11 years lower than in developed European countries, including men – 15 years, and women – 8 years. There are significant regional differences. So, LE in federal districts differs almost by 5 years. The highest indices of life expectancy persist in the republics of the North Caucasus and Moscow. In these regions LE at birth exceeded 71 years for men and 79 – for women in 2011. The lowest life expectancy of both men and women is in the Tuva Republic and Chukotka Autonomous Okrug (men – 56 years, women – 66 years).

According to the Rosstat data [10], the 2006–2012 period witnessed a slight decrease in the population mortality, including that from accidents, poisoning, injuries. Taking it into account we can see that the Russians three times more often die from external causes than the population in EU countries. Of all the decedent almost 30% are persons of working age (over 560 thousand people per year), 80% of them are men.

The Russian population is not only declining, but it is becoming less and less healthy. Demographic data indicate a population crisis and a worsening crisis in public health. According to N.M. Rimashevskaya, serious problems are related not only to the quantity but also the quality of the population, to the gene pool state as a basis for development of society and the state. One can just consider physical, mental and social health of people, change in their moral standards [9].

Therefore, the territories rating by the indicators "Quality of the population", "Welfare" and "Quality of the social sphere" is a major challenge for the scientific community as it promotes socio-economic and political decisions to stabilize and improve the situation at the regional level. The problem is difficult due to its interdisciplinary character; its solution requires the use of special methods of mathematical statistics and simulation.

The rating is a set of objects or phenomena, put in order by an index or ordinal indicator that shows the importance, significance, prevalence, popularity and other similar qualities of that object or phenomenon, as well as the method of this ordering. The examples can be the following: credit rating, banks rating, investment rating of regions, etc. [4, 6, 7, 8].

For example, the rating Agency "RIA Rating" has proposed a rating method, based on a comprehensive analysis of the socio-economic situation in RF subjects. Analyzed indicators are conditionally divided into four groups-subsets: a scale of economy, efficiency of economy, a public sector and a social sphere.

It ranks RF subjects in descending order by the value of integral rating points. The integral rating point for each region is calculated in three stages. The first stage identifies a rating point of separate indicators, the second stage – a rating point of the indicators group and the third – an integral rating point of the RF subject. The rating point of the RF subject for each indicator is calculated in the interval from 100 to 1 by processing multiple values of this indicator for all RF subjects so that the region with the best indicator value scores 100 points, and the worst – 1. However, the rating point calculation involves not only the rank of each RF subject by this indicator, but also the extent of the gap with the best result. The rating point of the indicators group is considered as the average of rating points of all members of the indicators group. The integral rating of the RF subject is calculated as a geometric mean of rating points of the indicators groups [6, 7].

Nowadays ratings are very popular, but very little attention is paid to building the rating based on demographic and health indicators and its relation to the socio-economic indicators [4, 6, 7, 8]. This research uses the method of S.A. Aivazyan, a detailed description of the algorithm and interpretation of results is presented in the work [1]. The Rosstat data for 2012 serve as an information base. The article discloses main stages of the calculation and obtained results.

Stage 1. The preliminary analysis singles out indicators to calculate indices "Quality of the population", "Welfare" and "Quality of the social sphere". They are presented in *table 1* (a post test set of separate indicators) [3, 5].

Stage 2. The second research stage typifies measurement scales of all analyzed variables in the following way:

1. If the initial indicator (separate indicator) x is associated with the analyzed integral property "Quality of the popu-

Table 1. System of indicators to calculate integral rating estimates

Block	Indicators
Block 1 "Quality of the population"	Life expectancy at birth (both sexes)
	Number of deaths before the age of 1 per 1 thousand born alive (infant mortality)
	Mortality from infectious and parasitic diseases (number of deaths per 100 thousand people)
	Mortality from neoplasms (number of deaths per 100 thousand people)
	Mortality from diseases of the cardiovascular system (number of deaths per 100 thousand people)
	Mortality from respiratory diseases (number of deaths per 100 thousand people)
	Mortality from diseases of the digestive system (number of deaths per 100 thousand people)
	Mortality from accidents, traumas and poisonings (number of deaths per 100 thousand people)
	Number of the disabled (per 1 thousand people)
	Contingent of patients with mental disorders and behavioral disorders (per 100 thousand people)
	Contingent of patients with alcoholism and alcohol psychosis (per 100 thousand people)
	Contingent of drug addicts (per 100 thousand people)
	Contingent of inhalants addicts (per 100 thousand people)
	Contingent of patients with syphilis (per 100 thousand people)
	Education level of the population (per 1 thousand population aged 15 and over, who have reported that they have higher education, according to the 2010 All-Russia population census)
	Number of educational institutions of higher professional education
	Number of specialists with higher professional education
	Number of students of educational institutions of higher professional education per 10 thousand people
Block 2 "Welfare"	GRP per capita (rubles)
	Per capita income (rubles)
	Level of the cost of living (rubles)
	Ratio of per capita income and cost of living
	Share of population with income below cost of living
	Share of the total area of housing per 1 resident (square meters)
	New housing supply per capita (square meters)
	Number of cars in private use (per 1 thousand people)
	Share of dilapidated housing (%)
Block 3 "Quality of the social sphere"	Arrears of wages (million rubles)
	Number of registered crimes (per 100 thousand people)
	Ratio of marriages and divorces (per 1 thousand marriages)
	Level of economic activity of the population (%)
	Number of doctors per 10 thousand people
	Number of nurses per 10 thousand people
	Number of hospital beds per 10 thousand people
	Termination of pregnancy (abortion) per 1 thousand women
	Number of theater spectators on 1 thousand people
	Number of museum visitors per 1 thousand people

lation", "Welfare" and "Quality of the social sphere" and with the monotonically increasing dependence (i.e. the higher the x is, the higher the quality is), the value of the corresponding uniform variable $\tilde{x}$ is calculated by the formula:

$$\tilde{x} = \frac{x - x_{\min}}{x_{\max} - x_{\min}} \cdot N, \qquad (1)$$

where $x_{\min}, x_{\max}$ are the lowest (the worst) and the highest (the best) values of the initial indicator.

2. If the initial indicator (separate indicator) x is associated with the analyzed integral property "Quality of the population", "Welfare" and "Quality of the social niches" and with the monotonically decreasing dependence (i.e. the higher the x is, the higher the quality is), the value corresponding to the uniform variable x_{max}, x_s is calculated by the formula:

$$\tilde{x} = \frac{x_{\max} - x}{x_{\max} - x_{\min}} \cdot N, \qquad (2)$$

where $x_{\min}, x_{\max}$ are the lowest (the worst) and the highest (the best) values of the initial indicator, $N=10$.

Stage 3. The method to calculate integral indicators by blocks includes several computational procedures. At first the method of principal components is implemented by the values of the post test set of separate indicators. The results are presented in *Table 2*.

The 50–55% threshold is chosen and the appropriate number of principal components for each block of variables is singled out for the indicator "accumulated percent of the explained variation". The calculations are conducted in the module "Factor analysis" of the statistical program Statistica 6.0.

The formation of block individual indicators and their weight coefficient for synthetic categories is presented in *tables 3, 4, 5*.

Depending on the number of principal components, the block contains either three or two sub-blocks of individual indicators. The criteria partition in sub-blocks is carried out on the basis of values of eigenvectors. The criteria number in the j sub-block is p_j. So, for the first sub-block of the block "Quality of the population", for the second – $p_2 = 4$, and third – $p_3 = 5$.

The weight $w_s(j)$ coefficients for the s individual indicator of the j sub-block are defined by the components $c_{1s}(j)$ of the first eigenvectors $C_1(j) = (c_{11}(j), c_{12}(j), ..., c_{1p_j}(j))$ of the covariance matrix of the set of individual indicators $(\tilde{x}^{(1)}(j), \tilde{x}^{(2)}(j), ..., \tilde{x}^{(p_j)}(j))$ by the formula:

$$w_s(j) = \begin{cases} c_{1s}(j) / \sum_{v=1}^{p_j} c_{1v}(j), & \text{if all... } c_{1v}(j), \\ & v = \overline{1, p_j}, \text{ of one sign;} \\ c_{1s}^2(j) & \text{otherwise.} \end{cases} \qquad (3)$$

Table 2. Method of principal components for blocks "Quality of the population", "Welfare" and "Quality of the social niches"

Number of main component (j)	Eigenvalues ($\lambda_j^{(1)}$, $\lambda_j^{(2)}$, $\lambda_j^{(3)}$)	Percent of the variance explained by the main component	Accumulated percent of the explained variation
Block 1 "Quality of the population"			
1	4.84	26.91	26.91
2	3.12	17.33	44.24
3	2.34	13.00	57.24
Block 2 "Welfare"			
1	3.546	39.403	39.40
2	1.788	19.865	59.26
Block 3 "Quality of the social sphere"			
1	3.164	31.635	31.63
2	1.831	18.315	49.95

Table 3. Block individual indicators and their weight coefficients for the block "Quality of the population"

Sub-block 1		Sub-block 2		Sub-block 3	
Variables	Weighs	Variables	Weighs	Variables	Weighs
Life expectancy at birth (both sexes)	0.143	Number of deaths under 1 year per 1 thousand born alive	0.394	Mortality from infectious and parasitic diseases (number of deaths per 100 thousand people)	0.379
Mortality from respiratory diseases (number of deaths per 100 thousand people)	0.100	Mortality from neoplasms (number of deaths per 100 thousand people)	0.344	Mortality from diseases of the cardiovascular system (number of deaths per 100 thousand people)	0.036
Mortality from diseases of the digestive system (number of deaths per 100 thousand people)	0.105	Contingent of inhalants addicts (per 100 thousand people)	0.054	Number of the disabled (per 1000)	0.132
Mortality from external causes (number of deaths per 100 thousand people)	0.136	Number of students of educational institutions of higher professional education (per 10 thousand people)	0.209	Contingents of drug addicts (per 100 thousand people)	0.296
Contingents of patients with mental disorders and behavioral disorders (per 100 thousand people)	0.065			Contingents of patients with syphilis (per 100 thousand people)	0.156
Contingents of patients with alcoholism and alcohol psychosis (per 100 thousand people)	0.107				
Education level of the population (per 1 thousand population aged 15 and over who have reported that they have higher education, according to the 2010 All-Russia population census)	0.107				
Number of educational institutions of higher professional education	0.118				
Number of specialists with higher professional education	0.118				

Table 4. Block individual indicators and their weight coefficients for the block "Welfare"

Sub-block 1		Sub-block 2	
Variables	Weighs	Variables	Weighs
GRP per capita, rubles	0.180	Cost of living (rubles)	0.068
Per capita income (rubles)	0.179	Share of the total area of housing per 1 resident (square meters)	0.389
Ratio of per capita income and the cost of living	0.214	Share of dilapidated housing (%)	0.542
Share of population with income below the cost of living (%)	0.158		
New housing supply per capita (square meters)	0.161		
Number of cars in private use (per 1 thousand people)	0.109		

Table 5. Block individual indicators and their weight coefficients for the block "Quality of the social sphere"

Sub-block 1		Sub-block 2	
Variables	Weighs	Variables	Weighs
Number of registered crimes per 100 thousand people	0.129	Arrears of wages (million rubles)	0.047
Ratio of marriages and divorces (per 1 thousand marriages)	0.140	Number of theater spectators per 1 thousand people	0.496
Level of economic activity of population (%)	0.046	Number of museum visitors per 1 thousand people	0.456
Number of doctors per 10 thousand people	0.078		
Number of nurses per 10 thousand people	0.190		
Number of hospital beds per 10 thousand people	0.222		
Termination of pregnancy (abortion) (per 1 thousand women)	0.195		

The value of the sub-block index $y_i(j)$ for i territory of each synthetic categories "Quality of the population", "Welfare" and "Quality of the social sphere" is calculated by the formula:

$$y_i(j) = \sum_{s=1}^{p_j} w_s(j) \cdot \tilde{x}_i^{(s)}(j), \qquad (4)$$

where $\tilde{x}_i^{(s)}(j)$ is an uniform value of the s individual indicator of the j block for the i territory, and $w_s(j)$ – weight coefficients defined by the formula (3).

So, for example, for the block "Quality of the population" $j = 1$ the value = 9, $j = 2$, the value = 4 and $j = 3$, the value $p_i = 5$. Consequently, we get three sub-blocks of indices for all RF subjects – $y_i(1)$, $y_i(2)$, $y_i(3)$. The similar calculations are applied to blocks "Welfare" and "Quality of the social sphere".

Stage 4. The integral indicator for each analyzed synthetic categories is calculated. At this stage, we move from $k(l)$=3 (or 2) of the sub-block indices of the given (l) synthetic category to a single composite integral indicator, a scalar measure of the synthetic category $\hat{y}^{(l)}$ (l=*1, 2, 3*):

$$\hat{y}_i^{(l)} = N - \left[\sum_{j=1}^{k(l)} q_l(j) (y_i^{(l)}(j) - N)^2 \right]^{1/2}, \quad (5)$$

where $$q_l(j) = \frac{\tilde{\lambda}_j^{(l)} \cdot s_l^{\,2}(j)}{\sum_{v=1}^{k(l)} \tilde{\lambda}_v^{(l)} \cdot s_l^{\,2}(v)},$$

$$s_{(l)}^2(j) = \frac{1}{n} \sum_{i=1}^{n} (y_i^{(l)}(j) - \overline{y}^{(l)}(j))^2,$$

$$\overline{y}^{(l)}(j) = \frac{1}{n} \sum_{i=1}^{n} y_i^{(l)}(j),$$

$$\tilde{\lambda}_j^{(l)} = \frac{\lambda_j^{(l)}}{\sum_{v=1}^{3(\text{либо } 2)} \lambda_v^{(l)}},$$

where n is a number of RF subjects, j is a number of sub-blocks of the l block, N=*10* (a reference value).

Stage 5. The calculation of a single composite integral indicator for the synthetic category of the highest level of commonality $\hat{y}^{св.}$ between three total indices for the i territory is carried out by the same method as the construction of

block indices, particularly:

$$\hat{y}_i^{cв} = N - \left[\sum_{j=1}^{3} \tilde{q}_l (\hat{y}_i^{(l)} - N)^2\right]^{1/2}, \qquad (6)$$

where $$\tilde{q}_l = \frac{\tilde{\lambda}^{(l)} \cdot \tilde{s}_l^2}{\sum_{l=1}^{3} \tilde{\lambda}^{(l)} \cdot \tilde{s}_l^{\,2}},$$

$$\tilde{\lambda}^{(l)} = \sum_{j=1}^{k(l)} \tilde{\lambda}_j^{(l)},$$

$$\tilde{s}_l^2 = \frac{1}{n}\sum_{i=1}^{n} (\hat{y}_i^{(l)} - \overline{\hat{y}}^{(l)})^2,$$

$$\overline{\hat{y}}^{(l)} = \frac{1}{n}\sum_{i=1}^{n} \hat{y}_i^{(l)}.$$

The results of the calculations carried out by formulas (5) and (6) and the ranks for RF regions are presented in *table 6*.

The data presented in table 6 reveal that there are considerable differences in the rankings by the indicators blocks in the regions. By the indicator "Quality of the population" the first places are occupied by Moscow, the Republic of Ingushetia, Saint Petersburg, the Republic of North Ossetia, the Kabardino-Balkar Republic, the Republic of Dagestan, the Tyumen Oblast, the Karachay-Cherkess Republic, the Republic of Tatarstan, the Belgorod Oblast; the last – by the Pskov Oblast, the Novgorod Oblast, the Republic of Khakassia, the Sakhalin Oblast, the Kemerovo Oblast, the Irkutsk oblast, the Amur oblast, Jewish Autonomous Okrug, Chukotka Autonomous Okrug and the Tyva Republic.

Demographic indicators are essential for the assessment of health condition and

Table 6. Distribution of RF subjects on a single composite integral index on the basis of integral indices of 3 blocks: "Quality of the population", "Welfare" and "Quality of the social sphere"

RF subject	single composite integral index	Rank of the region	Quality of the population	Rank of the region	Welfare	Rank of the region	Quality of the social sphere	Rank of the region
Moscow	6.86	1	7.97	1	7.83	1	6.37	2
Saint Petersburg	5.94	2	6.66	3	6.38	3	7.23	1
Voronezh Oblast	5.30	3	5.55	18	5.01	18	3.20	33
Omsk Oblast	5.11	4	5.06	31	4.80	23	4.49	3
Novosibirsk Oblast	4.87	5	5.58	16	7.50	2	2.32	76
Moscow Oblast	4.82	6	4.97	41	5.15	13	3.44	21
Ivanovo Oblast	4.81	7	4.98	38	4.68	33	3.72	11
Nizhny Novgorod Oblast	4.79	8	4.17	70	4.12	56	3.42	22
Republic of Karelia	4.76	9	5.87	9	6.02	5	3.45	20
Republic of Tatarstan	4.73	10	4.74	52	4.63	35	3.37	26
Yaroslavl Oblast	4.65	11	5.05	32	4.46	42	4.32	4
Tula Oblast	4.62	12	5.81	12	5.03	17	3.15	36
Murmansk Oblast	4.57	13	4.61	58	4.74	26	3.47	19
Sverdlovsk Oblast	4.57	14	5.83	10	5.48	8	3.05	44
Belgorod Oblast	4.54	15	4.91	44	4.73	28	3.36	27

The continuation of the table 6

Kamchatka Krai	4.53	16	5.37	24	5.33	9	3.15	38
Tomsk Oblast	4.52	17	5.38	23	4.05	58	3.49	18
Tyumen Oblast	4.52	18	5.91	7	6.11	4	2.54	69
Republic of Bashkortostan	4.49	19	5.79	13	5.67	7	2.51	71
Krasnodar Oblast	4.45	20	4.91	43	5.97	6	3.38	25
Rostov Oblast	4.44	21	5.57	17	4.80	24	3.17	34
Kaliningrad Oblast	4.43	22	5.02	35	4.70	30	3.52	15
Ryazan Oblast	4.43	23	5.17	28	4.43	43	3.22	31
Volgograd Oblast	4.43	24	5.21	27	5.13	14	2.75	63
Lipetsk Oblast	4.42	25	5.51	19	4.73	27	2.82	61
Arkhangelsk Oblast	4.40	26	5.07	30	4.28	52	3.51	16
Astrakhan Oblast	4.36	27	4.83	49	4.07	57	3.82	8
Ulyanovsk Oblast	4.36	28	5.03	33	4.93	20	3.03	46
Novgorod Oblast	4.33	29	5.11	29	4.38	48	3.35	29
Kostroma Oblast	4.32	30	4.99	37	5.07	16	2.99	50
Kaluga Oblast	4.31	31	4.94	42	4.63	36	3.31	30
Mari El Republic	4.31	32	4.50	62	3.32	74	3.92	7
Kursk Oblast	4.30	33	4.15	72	4.70	31	3.39	24
Krasnoyarsk Oblast	4.30	34	5.45	21	4.41	44	3.08	41
Chelyabinsk Oblast	4.29	35	4.72	53	4.69	32	3.81	9
Bryansk Oblast	4.28	36	4.82	50	3.94	60	3.95	5
Orel Oblast	4.28	37	4.68	57	4.49	41	3.04	45
Vladimir Oblast	4.26	38	4.70	56	5.11	15	3.01	49
Penza Oblast	4.26	39	4.83	48	4.25	54	2.98	53
Perm Oblast	4.24	40	5.42	22	3.71	66	3.58	14
Tambov Oblast	4.23	41	4.97	40	4.96	19	2.87	57
Republic of Mordovia	4.23	42	4.97	39	3.89	63	3.71	12
Chuvash Republic	4.18	43	4.91	45	4.16	55	3.95	6
Samara Oblast	4.17	44	4.88	46	4.02	59	3.11	39
Udmurt Republic	4.17	45	4.42	63	5.19	12	3.76	10
Vologda Oblast	4.16	46	4.85	47	4.37	50	2.88	55
Magadan Oblast	4.11	47	4.33	68	4.74	25	3.50	17
Kirov Oblast	4.11	48	5.03	34	4.39	45	3.17	35
Republic of Khakassia	4.06	49	4.08	73	3.81	64	3.07	42
Komi Republic	4.04	50	5.25	26	4.54	40	2.26	77
Primorsky Krai	4.01	51	4.15	71	4.38	49	3.07	43
Altai Krai	3.99	52	4.57	60	5.32	10	3.10	40
Pskov Oblast	3.99	53	4.75	51	3.57	70	2.85	58
Republic of Adygea	3.97	54	4.70	55	4.57	37	2.87	56
Khabarovsk Krai	3.96	55	4.58	59	4.38	46	2.98	52
Smolensk Oblast	3.93	56	4.71	54	4.38	47	2.62	67
Republic of Buryatia	3.93	57	4.38	67	3.70	67	2.99	51
Orenburg Oblast	3.92	58	5.76	14	2.66	78	2.66	66
Amur Oblast	3.91	59	4.21	69	4.56	38	3.20	32
Chukotka Autonomous Okrug	3.90	60	3.28	79	5.32	11	2.81	62
Kemerovo Oblast	3.90	61	4.56	61	3.58	69	3.35	28
Zabaykalsky Krai	3.88	62	5.02	36	4.90	22	2.34	74
Leningrad Oblast	3.87	63	5.49	20	3.32	75	3.15	37

The ending of the table 6

Sakhalin Oblast	3.81	64	3.99	74	4.91	21	2.83	59
Republic of Kalmykia	3.80	65	3.60	77	3.90	61	2.96	54
Sakha (Yakutia) Republic	3.75	66	3.92	75	4.68	34	2.70	65
Kurgan Oblast	3.74	67	4.40	65	4.72	29	3.02	47
Tver Oblast	3.71	68	4.39	66	3.89	62	2.60	68
Altai Republic	3.63	69	6.21	4	4.55	39	3.39	23
Republic of North Ossetia	3.61	70	7.04	2	0.83	79	2.40	72
Saratov Oblast	3.60	71	6.02	6	2.73	77	2.54	70
Republic of Dagestan	3.58	72	5.25	25	4.27	53	3.62	13
Republic of Ingushetia	3.55	73	4.42	64	3.10	76	2.07	80
Jewish Autonomous Oblast	3.40	74	3.58	78	3.39	72	2.20	78
Tyva Republic	3.18	75	5.82	11	4.30	51	2.32	75
Stavropol Krai	3.08	76	6.08	5	3.57	71	2.73	64
Irkutsk Oblast	3.07	77	2.92	80	0.81	80	2.82	60
Kabardino-Balkar Republic	2.99	78	5.90	8	3.62	68	2.40	73
Karachay-Cherkess Republic	2.92	79	3.71	76	3.79	65	3.01	48
Chechen Republic	2.81	80	5.70	15	3.38	73	2.15	79

quality of the population in Russia. They have very high regional specificity. The highest LE value is observed in the North Caucasian Federal District, and the lowest – in the Siberian and Far Eastern federal districts. However, the degree of completeness of death records and certainty in the population's estimates in some regions of North Caucasus are questionable. The example a are the following: the LE values in the republics of Ingushetia (78.3 years), Dagestan (74 years), Chechen (73.2 years) are comparable with the figures in Japan, Finland and Germany for the same year. What is more, the structure of morbidity and mortality is very different for areas with younger and older populations.

By the composite index "Welfare" the leaders are Moscow, the Moscow Oblast, Saint-Petersburg, the Tyumen Oblast, the Republic of Tatarstan, the Sverdlovsk Oblast, the Krasnodar Oblast, the Belgorod Oblast, the Republic of Bashkortostan, the Samara Oblast and the outsiders – the Kabardino-Balkar Republic, Jewish Autonomous Okrug, the Chechen Republic, the Mari-El Republic, the Sakha (Yakutia) Republic, the Altai Republic, the Republic of Dagestan, the Republic of Kalmykia, the Republic of Ingushetia and the Tyva Republic.

By the index "Quality of the social sphere" the first places are occupied by Saint Petersburg, Moscow, the Omsk Oblast, the Yaroslavl Oblast, the Astrakhan Oblast, the Udmurt Republic, the Mari El Republic, the Kostroma Oblast, the Krasnoyarsk Oblast, the Magadan Oblast, the last – by Krasnodar Krai, the Republic of Ingushetia, the Karachay–Cherkess Republic, the Leningrad Oblast, Stavropol Krai, the Moscow Oblast, Jewish Autonomous region, the Republic of Adygea, the Chechen Republic and the Altai Republic.

By the single composite integral index the first 10 places are occupied Moscow, Saint Petersburg, the Voronezh, Omsk, Moscow, Nizhny Novgorod, Novosibirsk and Ivanovo oblasts, the Republic of Tatarstan and Karelia; the last places – by the Republic of Dagestan, the Saratov oblast, the Altai Republic, Jewish Autonomous Okrug, Stavropol Krai, the Kabardino-Balkar Republic, the Tyva Republic, the Karachay-Cherkess Republic, the Irkutsk Oblast and the Chechen Republic.

The identification of the correlation between single composite integral index and integral indices of block indicators (*tab. 7*).

All correlation coefficients turn out to be significant at the level of $p<0.05$. The highest correlation is observed between the integral index and other blocks due to conducting computational procedures. However, if the regions of the North Caucasian Federal District are not considered due to the specific situation with statistics, the correlation value increases dramatically between all blocks (*tab. 8*).

We can conclude that the quality of the population is directly connected with the population's wellbeing and quality of social sphere. The ratings indicate the priorities of socio-economic policy at the regional level. Maintaining and improving the quality of the population directly depends on the successful solution of a wide range of tasks of socio-economic development (ensuring stable economic growth, population welfare, poverty reduction, intensity of human capital development and creation of effective social infrastructure (health, education, social security, affordable housing market, flexible labor

Table 7. Pearson correlation between a single composite integral index and integral indices of block indicators ($p<0.05$)

Blocks	"Quality of the population"	"Welfare"	"Quality of the social sphere"	Single composite integral index
"Quality of the population"	1.00	0.27	0.28	0.41
"Welfare"	0.27	1.00	0.37	0.67
"Quality of the social sphere"	0.28	0.37	1.00	0.70
Single composite integral index	0.41	0.67	0.70	1.00

Table 8. Pearson correlation between a single composite integral index and integral indices of block parameters ($p<0.05$) (without the North Caucasian Federal District)

Blocks	"Quality of the population"	"Welfare"	"Quality of the social sphere"	Single composite integral index
"Quality of the population"	1.00	0.58	0.45	0.76
"Welfare"	0.58	1.00	0.31	0.69
"Quality of the social sphere"	0.45	0.31	1.00	0.68
Single composite integral index	0.76	0.69	0.68	1.00

market, improvement of sanitary and epidemiological situation, etc.). The measures to improve the demographic situation should be comprehensive due to the reorientation of target programs to the solution of demographic policy problems, taking into account regional specifics.

The conducted research and calculation results reveal such priority directions to improve health state of the population and stabilize demographic processes as socio-economic methods, formation of healthy lifestyle, development of the health system, formation of moral and ethical values.

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