Analysis of Efficiency Stimulation of Reproductive Labour in Russian Federation

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Abstract— **Nowadays there is a demographic crisis in Russia, its result is longstanding decline in population and it has negative consequences for the country. The negative consequences are the following: the number of working age people is decreasing, their structure is declining, the quality of human resources is also decreasing. In this article the approaches to the assessment of production labour activation process are considered, the multistage assessment of reproductive labour process is presented. As follows from the analysis there were identified the regions within the discovered period there were an activation of reproductive labour, and in other regions there were an opposite tendency. The achieved results should be taken into account during the development of efficiency measures for the population policy aimed at increasing quantitative and qualitative characteristics of reproductive labour results on all stages of reproductive activity.**

Keywords— reproductive labour, reproductive activity, labour efficiency, regions of Russia.

I. INTRODUCTION

Nowadays in Russia the number of personalities that enter the active working age is decreasing, their structure is constantly worsened. Taking into account the stable decline of Russian population, the increase in the requirements for the quality of labour resources, the insufficiency of the scientific researches and developments, there is an urgency of studying the problem of stimulating reproductive activity, involving the expanded reproduction of quality human capital in modern Russia.

In Russia, in order to increase the birth rate since 2007, combine measures has been used such as: lump sum payment for the birth of the second child in the family ("maternity capital"); payment of maternity leave; payments for the care of a child up to 1.5 years; maternity leave without pay1ment for the care of a child up to 3 years; and from the 1st of January 2018 monthly payments from the birth of the first child moment and up to 1.5 years.

The contribution of domestic and foreign economists and scientists to the development of various aspects of the scientific problem under the study is highly appreciated, but it should be noted that to date the range of tools and methods of stimulation in the field of reproductive labour is not fully discovered. Due attention has not been paid to the problems of assessment of reproductive activity and the possibilities of its formation through the incentive system.

1.1 Scientific insights developments of the labour in the reproductive sector of economy

Reproductive labour, by which is meant the process of conscious and purposeful human activity by which people form quantitative and quality indicators of human capital so that they can satisfy the social and personal need during this labour process [13]; so the reproductive labour is implemented in the reproductive economy sphere (this sphere was noted in the previous articles [14,15]). Underestimation and non-recognition of the reproductive labour significance realized in the initial process, results it being unpaid and left out of the Russian economic process.

Meanwhile, in science the idea of the existence of this kind of reproduction appeared in the writings of the classics of Marxism. In present-day science, household labour is also the research subject, and in the context of different scientific fields and even disciplines. In particular, English economic sociology traditionally studies this form of labour as a part of informal economy (informal sector, grey economy) [17,19,20]. The informal sector is not monitored or controlled by any form of government. At the same time, J. Gershuni (other representatives of European economic sociology also agree with him, in particular P. Renuy, A. Oekley, etc.), for example, believes that the household labour should be given the status of full-fledged labour. The peculiarities of the household labour are monotonous and routine manner, lack of prestige [18]. The main development stages of the scientific ideas about reproductive labour, its content and characteristics are presented in Table No.1.

labour are consumed by society and economy, the products are necessary for the society. In this connection the society or the government should formulate that kind of "order" for this or that level of reproductive activity (or in some countries it can be reproductive passivity). If the received results if reproductive labour for this or that period of time are correspond in their quantity and quality to the economic needs and society need in the human capital, so one can use traditional methods and tools in furthering reproduction activity, or in some cases even not to implement such methods and tools. In case of reproductive passivity though, when the products of reproductive activity do not meet economic and social needs neither in terms of its quantity, nor quality (which is unfortunately true for Russia these days), it is obligatory that innovative methods and techniques of stimulation of reproductive activity should be applied, so that they

simultaneously aim at the enhancement of its contents and features in order to adapt to certain local conditions at a given time.

Table No. 1. Genesis of scientific insights about reproductive labour content and characteristics

Scientific field (discipline)	Main provisions, that develop scientific insights about reproductive labour in general	Contribution to the study of issues related to the reproductive labour content and characteristics	
		Reproductive labour content	Reproductive labour characteristics
Marxism	▪ Recognition of the equivalence of the reproduction of material life and life itself; ▪ Identification of the characteristics of work in the family (diversity, complexity, public underestimation of its results, non-inclusion in social production)	The ideological prerequisite for identifying the field of reproductive labour	Reproductive labour characteristics were identified
Human capital theories	Parental labour as a form of investment in the human capital of children		The most important economic principles of reproductive labour within the family are identified
Economic sociology	Consideration of reproductive labour as an element of the home economy that is part of the informal sector of the economy	Reproductive labour belonging to a certain sector of economy	Reproductive labour characteristics within the domestic economy are identified
Time-use statistics	Development and implementation issues concerning time-use for care and upbringing children in the context of use non-working time for the population		
Economy of reproductive labour	Development of theoretical (identification of the main categories, determination of the methodology for their research) and practical problems in the implementation of reproductive labour (mechanisms for activating reproductive labour in modern Russia, strategies for its inclusion in the national economy).	Identification of a reproductive labour special sphere, its most important branches	Identification of aspects of reproductive labour connected with the practical implementation of tasks of expanded reproduction of human capital in modern Russia

Considering the fact that the products of reproductive

1.2 Multistage dynamic assessment of reproductive labour process

The methodology for analyzing the processes of reproductive labour activation on the basis of a multistage dynamic assessment includes four stages (Table No.2).

Table No. 2. Assessment stages of reproductive labour activation

Stage	Stage description
1st	Definition of analytical indicators for every stage of reproductive labour implementation
2nd	Definition of assessment period
3rd	Tendency determination for reproductive labour activation (or vice versa) on every stage of its implementation
4th	Prevailing tendency determination during implementation process of reproductive labour

In the process of the 1st stage implementation of the developed methodology, the following analytical indicators were suggested:

for perinatal stage of reproductive labour:

a) fertility index per 1.000 women aged 15-49 (calculated on the basis of standard demographic determinants of birth rates per 1.000 women aged 15-49 and abortion rates per 1,000 women aged 15-49);

b) birth index, defined as the number of births divided by the number of abortions (based on the standard demographic determinants of abortion rates per 100 births);

c) number of births per 100 individuals (similar to standard general mortality rate);

d) perinatal birth/death index (calculated on the basis of perinatal birth/death index).

for infant stage of reproductive labour

a) infant birth/death index (calculated on the basis of infant death rate).

for child (pre-school) stage of reproductive labour:

a) child birth/death index (calculated on the basis of predicted child mortality rate for children aged 0-5);

for school (minor) stage of reproductive labour:

a) proportion of successfully socialized minors (calculated on the basis of standard demographic determinants of juvenile offences);

b) proportion of successful (with honors) school-leavers (statistics of the education department).

Period of assessment was calculated during the period from 2007 to 2016 years. The basic data for assessment was derived from official statistics on each federal subject of the Russian Federation, namely standard demographic determinants (mortality and births rates) [1;2]; other statistical data of Russian federal subjects [3;4] and available statistics provided by the Russian education department.

In the process of the 3rd and the 4th stages implementation of the developed methodology, regions were identified in which the majority of stages of reproductive labour during the period under study had a tendency to activate it, and regions with the opposite tendency (with increasing passivity in this sphere). In addition, in a number of regions the tendency in the reproductive situation change has not been unambiguously

assessed: multidirectional trends predominate on different stages of reproductive activity.

The results of the assessment demonstrate the urgent need for the development and implementation of complex reproductive policies in Russia, aimed at boosting the quantity and quality of reproductive labour results at each stage of reproductive processes. These policies must focus on activating reproductive labour processes in Russia, population growth, and enhancing the quality of prospective human capital. These processes should be promptly managed, as the evolution of family throughout the history has been accompanied by its transformation, alteration of its functions and other parameters, which could potentially affect the population reproductive activity. One of the major consequences of these developments is transformation of its *needs*. It can be described as the process of isolation and realization of procreative needs. These procreative needs are now getting personalized; the connection between the stages of reproductive process and its contents at all stages of human reproduction is becoming obvious.

Social needs must be perceived by human, social needs must be accepted as his or her own. If it goes, the motivation for the reproductive-labour behavior is going to be formed. This process cannot be implemented successfully without some adequate stimuli. Determination of these stimuli is one of the tasks of reproductive policies.

The set of reproductive policy measures must influence on the formation of corresponding needs as well as on creation of necessary conditions for the quality labour realization in reproduction sphere. In a modern Russian family, e.g., children are becoming a value in them; taking care for them, upbringing, and education is turning into a high-cost process. The solution of problems of reproductive labour efficiency and cost recovery will facilitate the necessary conditions to activate this kind of labour in Russia in terms of quantity and quality, which will satisfy the demands of future innovative economy.

II. EFFICIENCY ANALYSIS OF POPULATION REPRODUCTIVE ACTIVITY IN RUSSIAN REGIONS

It should be noted that the usage a single set of measures to solve demographic problems in different regions of Russia is far from being effective. For instance, in Russia the so-called "maternity capital" is paid for the birth of the second child to stimulate the birth rate. The results of this policy are represented in Table No. 3.

The analysis shows that starting from 2007 the birth rate had been slowly increasing, and the mortality rate had been decreasing. However, since 2016 there has been a decline in the birth rate, which indicates the lack of stability of the positive trend. According to the Russian Statistics Service, the situation will have become even worse by 2025, when the number of fertile women will have dropped by 7,2%, and by 2030 - by 10,3%, which will lead to the decrease in the overall birth rate. Consequently, the government should focus on

supporting families with more than two children. It is worth mentioning that in Russia the monetary stimulation addresses only one aspect of human reproductive labour, namely its quantity, not quality. That is why the analyzed problem is extremely relevant nowadays.

Table No.3. Implementation results of "maternity capital" policy

Time period, year	Maternity capital		Overall number, persons		Per 1.000 population	
	sum, in RUB	sum, in USD (January)	who have been born	who have been died	who have been born	who have been died
2007	250.000,00	9.455,37	1 610 122	2 080 445	11,3	14,6
2008	276.250,00	11.284,72	1 713 947	2 070 954	12,0	14,5
2009	312.163,00	10.621,40	1 767 687	2 010 543	12,3	14,1
2010	343.379,00	11.284,23	1 788 948	2 028 516	12,5	14,2
2011	365.698,00	12.325,51	1 796 629	1 925 720	12,6	13,5
2012	387.640,00	12.768,12	1 902 084	1 906 335	13,3	13,3
2013	408.961,00	13.618,42	1 895 822	1 871 809	13,2	13,0
2014	429.409,00	13.147,86	1 942 683	1 912 347	13,3	13,1
2015	453.026,00	8.055,23	1 940 579	1 908 541	13,3	13,0
2016	453.026,00	6.491,32	1 888 729	1 891 015	12,9	12,9
2017	453.026,00	7.563,00	1 689 900	1 824 300	11,5	12,4

As a result of the study of the measures that used to stimulate the birth rate, it was found that the payment of "maternity capital" can be used to improve living conditions, to educate a child, to the mother's pension savings, or to pay monthly allowances for the birth of the second child. Ever since "maternity capital" has been enforced, these state certificates have been given to 8.2 million Russian families, but only 60% of them improved their living conditions. In 2007 the "maternity capital" was equaled to $9.455,00 while in 2017 it was equaled to $7.563,00. Even though this sum of money is enough to buy property in some regions, but in regions with a high standard of living this money is largely insufficient to improve one's living conditions. Overall, the "maternity capital" policy has proved its efficiency as a means of solving the problem of low birth rates, as it has led to the growth in natural human reproduction and the number of children per 1 woman.

The analysis, which we undertook to evaluate the showings of reproductive labour in the Russian Federation in 2007-2016 based on the above mentioned criteria of reproductive activity, indicated that overall in most aspects the reproductive situation has improved. The index of quantitative labour productivity at the perinatal stage has changed due to two factors: the growth of births per 1.000 women aged 15-49 and the decrease in abortions per 1.000 women aged 15-49.

These changes could be considered as positive if the substitution of a decrease in the number of abortions with an increase in the number of births occurred at the same time. However, if the first indicator decreased by 14,3 units per 1.000 women of fertile age, the second increased by 12,2 units (Table No. 4).

Table No. 4. Dynamics of the coefficient components of quantitative labour productivity at the perinatal stage during the period from 2007 to 2016 years

Indicators	2007 year	2016 year	Absolute increase	Rate of growth, %
1. Number of births per 1.000 women aged 15-49 years	41,4	53,6	12,2	129,5
2. Number of abortions per 1.000 women aged 15-49	38	23,7	-14,3	62,4
3. The coefficient of quantitative labour productivity at the perinatal stage	79,4	77,3	-2,1	97,3

Consequently, it is deemed impossible to interpret this data as a positive trend indicative of the growth in reproductive labour efficiency at the perinatal stage of reproduction, as it relies mainly on the positive dynamics of quantitative efficiency.

At the same time, three other activity indicators at the primary stage of reproductive activity attest to the opposite. During the given period of time the birth rate had increased (births/abortions ratio); similarly, the birth rate per 1.000 individuals had risen as well, just as did the perinatal birth/death index. It must be noted that the first two figures can be affected by the reducing number of abortions, the changing population structure, whereas the positive dynamics of perinatal birth/death index signifies the improvement of reproductive labour results at its early stage.

As a result, the recorded changes at the first stage of reproductive activity indicate the presence of divergent trends during the period 2007-2016 all over the country. Even though the indices in most criteria indicate a certain growth, the drop in the quantitative index of reproductive labour efficiency at the perinatal stage, connected with the decreasing number of abortions as related to the number of births, cannot serve as sufficient evidence of fully formed reproductive activity trend at the above mentioned reproduction stage.

The analysis of the total birth rate index indicates that since 1989 it has never risen above the simple reproduction of population level. The index reached its lowest value in 1999 (1,16), when it was below the simple reproduction of population level by 43,6% [12]. In 2000-2015 years the situation got a little better and the total birth rate index was 1,78, which was below the reproduction level only by 13,14%. In 2016 this index started to decrease. Even though the total fertility rate (hereinafter referred to as TFR) in 2015 was the highest in the last 20 years, it cannot be indicative of the stabilization for the following reasons: firstly, the index 1,78, reached in 2015, is still lower than the population reproduction level by 13,14%; secondly, the last decade which gave signs of steady growth of the total birth rate index was followed by 2016 and 2017, when the index started to decrease, which demonstrates the lack of stability concerning positive demographic trends.

The assessment of the total fertility rate index in Russian regions reveals that there are obvious outsiders, such as Leningrad Oblast, Voronezh Oblast, Smolensk Oblast,

Tambov Oblast and Moscow. The index is slightly higher (about 2,00) in Nenets Autonomous Okrug, Khanty-Mansi Autonomous Okrug Yugra and Chukotka Autonomous Okrug, the Chechen Republic, the Altai Republic, the Buryatia Republic, the Tuva Republic, the Sakha Republic (Yakutia), Kurgan Oblast, Tyumen Oblast and Sakhalin Oblast.

Further analysis of reproductive activity index in Russian regions revealed that 40 regions indicated the same trends as the rest of the country. Most of these federal subjects are located in Volga Federal District, Siberia Federal District and Far East Federal District.

The analysis helped to determine a number of Russian federal subjects, where in the given time period there was an evident positive trend of reproductive activity at all four reproductive stages under consideration. They are the following: the Komi Republic, Nenets Autonomous Okrug, the Kalmykia Republic, the Dagestan Republic, the North Ossetia-Alania Republic, the Chechen Republic, the Bashkortostan Republic, the Mari El Republic, the Udmurt Republic, Perm Krai, Tyumen Oblast, Khanty-Mansi Autonomous Okrug Yugra, , the Altai Republic, the Buryatia Republic, Tuva Republic, the Khakassia Republic, the Sakha Republic (Yakutia), Krasnoyarsk Krai, Irkutsk Oblast, Omsk Oblast, Sakhalin Oblast, Kamchatka Krai, Khabarovsk Krai and Chukotka Autonomous Okrug.

The results of the analysis demonstrate that in the abovementioned Russian federal subjects the positive reproductive trend had been evident at all four primary reproductive labour stages: perinatal, infant, child (pre-school) and minor (school). These regions can be considered as leaders in generating positive reproductive activity trends in Russia in the given period, as they show the complex development and growth of the reproductive labour results at all reproductive labour stages.

A more detailed and reliable classification of Russian regions can be given on the basis of multi-staged statistical cluster analysis. The source data for this analysis is the variable indices characterizing the reproductive activity of Russian federal subjects in 2007-2017, calculated on the basis of statistics [5; 6; 7; 8; 9; 10; 11].

The breakdown of Russian federal subjects into a number of clusters according to corresponding federal districts is represented in the Table No. 5. Let us characterize each cluster in view of reproductive activity and social economic indices in 2016 [10].

Cluster 1. This cluster includes 29 federal subjects, mostly from Central, Northwest and Volga federal districts. The analysis of dynamics of population reproductive activity from this cluster indicates certain passivity. Most indices reveal slight falling behind the average Russian key figures. These regions can be characterized by a high mortality rate as compared to the other federal subjects. Besides, this cluster is also falling behind in its economic activity in a number of vital economic indices.

Cluster 2. This cluster includes 12 federal subjects, situated in 6 federal districts, mainly in Central and North Caucasus federal districts, including Moscow. This cluster is

characterized by a high level of pregnancies and the lowest level of abortions per 100 births among the clusters. As a result, this cluster can be considered relatively successful in terms of its economic activity.

Table No. 5. Distribution of Russian Federation federal subjects upon the clusters during the period from 2007 to 2016 years

Federal district	Number of fedral subjects incl. in the analysis	Including		
		in cluster 1	in cluster 2	in cluster 3
Central	18	13	4	1
Northwestern	10	4	1	5
Southern	7	1	2	4
NorthCaucasus	7	1	3	3
Volga	15	7	1	7
Ural	5	-	-	5
Siberian	11	2	1	8
Far Eastern	8	1	-	7
Total	**81**	**29**	**12**	**40**

Cluster 3. This cluster includes 40 federal subjects, located in all federal districts, although they are mainly concentrated (64%) in Volga, Siberia and Far East federal districts. This cluster can be characterized as a big segment, which accounts for more than a half of total Russian population in general, and employed population in particular. The main features of this cluster are the following: the highest birth rate among the clusters; a slight increase in the pregnancy rate; a considerable decline in abortions.

The research brings us to the following conclusions:

1) The regions in Cluster 1, which can be described by a low level of activity on the first stage of reproductive labour and a slow growth at other primary stages, indicate a medium efficiency of reproductive labour at further stages of domestic and social reproduction. The total characteristics allow us to refer to Cluster 1 as a set of regions with medium-low indices of reproductive activity, which calls for a specific set of measures aimed at the stimulation of reproductive labour at all stages.

2) The regions in Cluster 2 indicate a high level of efficiency of reproductive labour at its primary stages during the period from 2007 to 2016, which in the course of further analysis is followed by an opposite trend. Cluster 2 reveals uneven development trends at different stages of reproductive labour, which can pose a threat of diminishing the high rates of reproductive labour efficiency at its primary stages due to the poor results at further stages. Consequently, a set of measures to stimulate reproductive activity in this Cluster should be focused on working processes at the later stages of reproductive labour as well as on determining and regulating the factors, which account for the current results;

3) The regions in Cluster 3, which previously showed the trends of steady growth at different primary stages of reproductive activity, also indicated a high rate of reproductive labour efficiency at further stages.

Hereby, it should be recommended to take into account specific demographic, economic and political features of the country or region before setting the task of designing measures

to stimulate the birth rate. If the birth rate stimulation is concentrated only on its quantitative results regardless of the quality of human capital, it will result in a higher morbidity rate and a drop in education level.

III. CONCLUSION

The results of the multi-staged statistical method of cluster analysis helped to determine a number of regions to apply a set of measures to stimulate the birth rate, applying an individual approach to each cluster.

It's suggested to develop a set of measures for each cluster regarding their specific features. The results of the research allow us to put forward an effective set of measures to stimulate the birth rate and improve the quality of human capital for each cluster. For instance, Cluster 1 would require some social economic development to facilitate birth rate and childcare, namely, it would be advisable to make free medical care for women during pregnancies, birth and childcare more available, and to develop a set of complex measures to reduce abortions.

The technique of the assessment of reproductive activity indices based on the analysis of primary stages of reproductive labour, which we designed for this research, can be carried out on the basis of available Russian statistics. The implementation of cluster analysis will make it possible to gain a complex understanding of the efficiency of reproductive labour productivity at most of its stages.

The cluster analysis allowed to specify the main problems in each set of regions and to determine additional means of governmental support in order to enhance its quantitative and qualitative indices.

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