ECONOMIC ASSESSMENT OF HEALTHY LOSS AS A RESULT OF POPULATION MORTALITY AT THE FAR EAST OF RUSSIA
Komarova T., Sukhoveeva A.

Introduction

The population of the country is its most important resource, the base of economic growth, scientific and technical development, and defensibility. Population decline is common for modern Russia because of bad health, fertility decline and rapid mortality increase, especially male of working age. The situation is often discussed by demographers and medics, but traditionally economic aspects of people’s health in Russia are paid little attention. From this perspective, the problem of the economic evaluation of health advantage as a component of human capital requires a comprehensive study to determine the cost-effectiveness of social policies and development programs, as well as for understanding the scale of losses incurred to the economy of our country due to deteriorating health and demographic situation, characterized by high levels of morbidity, disability and mortality. In the most pessimistic demographic projections, Russia could lose a third of the population by 2050, and poor health would adversely affect the employment potential.

The aim of our study is a critical analysis of modern methods of calculation of economic damage and the development (modification) of the optimal methodologies to assess the extent of economic losses due to mortality in the Far East Federal District, taking into account the valuation of the average life. This study is based on the concept of human capital, which considers health as one of the most important conditions for social and economic development of any territory.

Methods and data

In calculating the economic loss due to mortality FEFD we take into account not only the "obvious" economic losses to which it leads (loss of revenue shortfall in the gross regional product (GRP) on disposal of workers from the manufacturing
process, funeral allowance and other payments to families) but the cost of a lost one year (lost years) of a statistical human life.

Since we have no data on the distribution of deaths by age, it is impossible to calculate the value of GRP, which they could produce up to retirement and the value of all years lost as a result of their death. Therefore, when we determine the damage caused by mortality we count nonproduced GRP only one year, and the average cost per year of life is multiplied by the number of deaths. The cost of one year of statistical life is calculated, taking into account the average life expectancy in the region.

Thus, the calculation of economic loss as a result of mortality, taking into account the average cost per year of life and GDP per capita is as follows:

\[ M_{1nt} = n_t \times C_{1t} + n_t \times GRP_t, \]

where:
- \( M_{1nt} \) - economic damage as a result of death \( n \) number of people in year \( t \);  
- \( n_t \) - number of deaths in year \( t \); 
- \( C_{1t} \) - the cost per year of life lost due to death \( n \) the number of people in year \( t \); 
- \( GRP_t \) - gross regional product per capita in year \( t \).

**Results**

Describing the medical-demographic situation in Russia's regions, especially in the Far East (Far Eastern Federal District), it is important to point out the widespread deterioration of health, manifested in a significant reduction in life expectancy, higher rates of mortality and morbidity. Far Eastern Federal District is the largest district in area and with the lowest population among all federal districts of Russia (36.4% of the area of the Russian Federation, with a population share of 4.5% (on 01.01.2010 - 6.17 million people.)). The rate of natural increase in Russia's Far East in the mid-XX - early XXI centuries was always higher than in the whole of Russia and in other federal districts (except the North-Western and Siberian federal districts) and in 2010 amounted to -0.6‰ (in Russia in 2010 -1.7‰). High natural increase was due to a favorable age structure of the population and did contributed, along with migration, a rapid increase of demographic potential in the region. However, since 1993 in the district, as well as the whole of Russia, the process of depopulation began, which was formed under the influence
of economic crisis, living standards decline. Mortality in the Far East began to grow steadily, with a rate exceeding the same index for Russia by 2.5 times. For example, if during the 1990-2010 the growth in the Russian Federation increased by 26.7%, in the Far Eastern Federal District - 68%, due to the varying intensity of migration of population and change in its structure to aging. Therefore, the problem of preservation of health is one of the hottest in modern Russian society, and especially at the level of macro-regions, as the expenditures on social services (investment in human capital) are small in a tense socio-economic conditions, low incomes of state budget.

The decline of health of the population leads not only to loss of population (population reduction), but also to the economic damage that has a large regional differences. To date, in the scientific literature, there are only scattered, rough estimates of economic losses due to disease, disability and mortality of the population, and some methodological developments (Prokhorov et al, 2002; Shmakov, 2004; Bezrukov et al, 2009; Orlov, 2009).

The problem of determining of the material damage being done to the economy as a result of mortality is closely connected with the task of assessing the value of the average person's life. The basis for calculating the cost of the average life and economic damage was the method of D. Shmakov with some modifications and additions (Shmakov, 2004). In our calculations, the average cost of one life is made up of costs and expenses of the citizens and society to support human life during some stages of his life (from birth to death), and includes the values of the average salary, the average monthly pension, the minimum subsistence level, consolidated budget expenditures on health and education, etc. (Table 1). The initial data were the statistical material of GoskomstatRF and expertise.

Table 1 - The cost of one average human's life in the Far East and in Russia in 2003, 2005, 2009 and 2010, millions of rubles.

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2005</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td>Far East</td>
<td>4,0</td>
<td>7,1</td>
<td>14,4</td>
<td>14,7</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>3,3</td>
<td>5,1</td>
<td>11,5</td>
<td>12,9</td>
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It is obvious that the average cost of living is the higher, the greater the investment in human capital (spending on health, education), the level of salary, pensions and life expectancy. Therefore, its value will have the greatest importance in the countries and regions with high levels of social and economic development.

Table 2 shows the calculations of the economic impact of health capital losses due to mortality of the Far East and Russia.

Table 2 - Economic losses due to mortality in the Far East and Russia in 2003, 2005, 2009 and 2010, bln. of rubles.

<table>
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<th>2003</th>
<th>2005</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td>Far East</td>
<td>14,8</td>
<td>23,7</td>
<td>41,9</td>
<td>42,7</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>299,8</td>
<td>473,5</td>
<td>794,4</td>
<td>798,5</td>
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Analysis of the table 2 showed that, overall the Far East the total damage from the mortality of all ages increased by 2.8 times in 2003-2010, amounting to 42.7 billion of rubles or 2.4% of GRP in 2010. In Russia the growth rate of this indicator amounted to 2.6 times (in 2010 - 798 billion rubles or 2.5% of GDP). These estimates show that the mortality rate in the Far East and Russia as a whole, is associated with very significant economic losses, which couldn’t be ignored in the current circumstances, considering the low level of health, high mortality in the working age and the reduction of population.

References


