

REGIONAL ECONOMY

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METHODOLOGY FOR THE HEALTH CAPITAL LOSSES' ASSESSMENT IN THE GLOBAL RISK MANAGEMENT CONTEXT

The global world development is associated with increasing uncertainty about the future and increasing global risks. How to ensure the humanity survival in the face of growing global risks, including social and environmental, is becoming a relevant scientific field of sustainable development researches. According to the «Global Risks Report 2021» to published by the World Economic Forum [1], among the highest likelihood risks of the next ten years are extreme weather, climate action failure and human-led environmental damage and among the highest impact risks of the next decade, infectious diseases are in the top spot. Today, the COVID-19 pandemic, natural disasters can serve as an example of the «Black Swan» events for the global economic system, which in the near future will be caused to the health capital losses.

The category «health capital» is considered as the necessary investment in a people for maintain and improve his health and performance. Health capital is one of the main components of human capital. According to Michael Grossman's theory [2], health is a durable commodity that is both an investment and a consumer commodity that is constantly depreciating. Health is a durable commodity necessary for the formation and human capital development. The basic postulate of the

Grossman model arises from the assumption that individuals accumulate health capital H in a similar fashion as they accumulate human capital in form of education. In any instant of time, health capital depreciates and is potentially augmented by health investment. The health capital stock of an individual of age t thus assesses, in continuous time, according to $H_t = H_{t-1} + I - \delta$, in which I is investment, δ – the depreciation rate. In the Grossman model, human behavior is corresponded to the rational investor behavior, who faces a choice: what he is willing to sacrifice at present to improve his health and increase life expectancy in the future. It should be noted that the scientist did not analyze the problems of the health impact on economic growth and the health capital losses' assessment. But his research has become the basis for considering health as an economic growth important factor. Environmental and social risks insurance is based on the assessment of economic damage from health loss and the statistical life cost.

The general principle of methods for health capital losses' assessment is to assess the cost of lost working time due to the victim incapacity and the cost of dealing with the consequences. The content of the basic methods for the health capital losses' assessment in the Table 1 is presented.

Table 1

The basic methods for the health capital losses' assessment

Method	The matter
Assessment of human capital	Evaluation of lost earnings as a result of illness or premature death due to negative risk events; valuation of one year of life, determined as a ratio from dividing the average annual salary by the coefficient that characterizes the share of wages at the created benefits value; assessment of the tax revenues loss due to lower profits resulted from the loss of working time.
Differentiation of wages	Assessment of the differences in wages in the areas with different levels of negative risk events.
Avoiding expenses	Evaluation of the cost on disposal activities or reducing the impact of negative risk events.
Costs of disease	Estimation of lost working days taking into account medical and related additional costs due to negative risk events.
Contingent valuation	Establishing the price people are willing to pay to avoid pollution based on surveys.

The basis of health capital losses' assessment is to account the current and future periods' social costs of health capital loss on the following several organizational and economic levels:

- at the macroeconomic level as the sum of three values - the medical care budgetary costs, temporary working disability payment and compensation to the families due to the breadwinner's loss from the social insurance funds, and the costs (turnout shortage or lost profit in GDP) of production for the period of illness and premature death of the younger and the working age people;
- at the household level (or from the actually patient's own point of view);
- losses from the morbidity rate increases - consist of additional costs for drugs, paid medical services and others (Fig. 1).

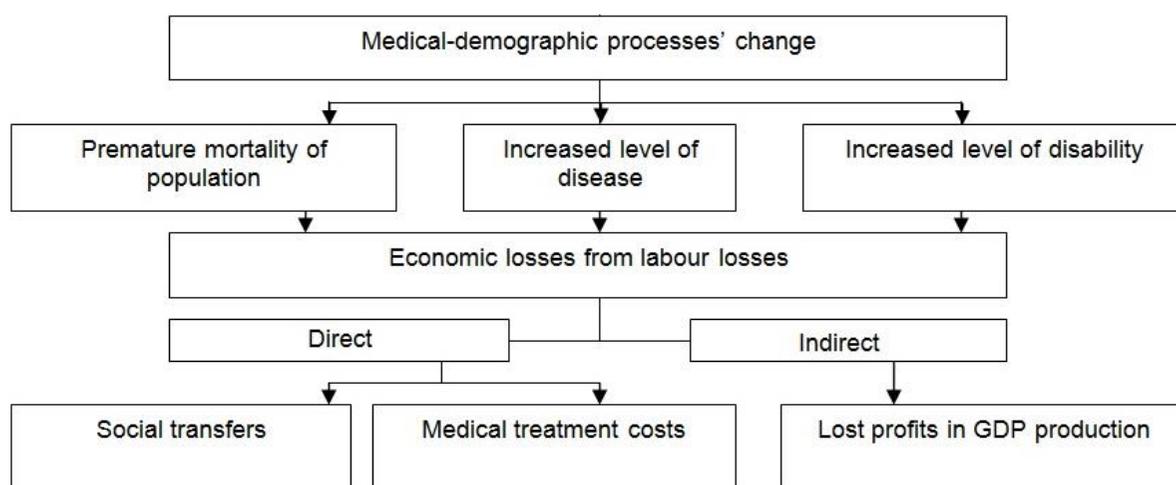


Fig. 1. Structure of economic losses due to negative risk events

At present, two main areas for the human health capital economic losses' research have been formed. The first area is based on the concept of the disease burden cost, where its' direct and indirect costs are economically estimated. The direct costs are consisted the cost of treatment, care and rehabilitation of patients, other costs fall on the public health protection measures and also on social transfers (disability pension, social security payments). The indirect costs are the lost profits resulting from labor time losses.

The second is based on the human life value concept and is based on the valuation of the human life itself, excluding the cost of healthcare and the social

transfers and the losses related to the shortfalls products. This value, for example according to [3], can be calculated by the formula:

$$PLt = St (Lt - A),$$

where PLt - the cost of lost years as a result of death of a person at the age A in the year t ; St - the value of a statistical life in the year t ; Lt - the life expectancy in the year t ; A - the age of the deceased person.

Value PLt characterizes the economic cost to society resulting from the premature death of a person who did not reach the average life expectancy.

Methodological approaches to assessing the value of statistical life are divided into two directions:

- 1) the human capital evaluation methods;
- 2) the willingness to pay evaluation methods (contingent valuation).

Sociological and statistical studies show that people's assessment of their life's costs often corresponds to the size of annual earnings multiple of the size of the average life expectancy. Valuation of the lost years of life has humanitarian nature, as it is designed to reflect the value of every life.

According to structure of economic losses due to negative risk events, the economic damage (Ed) from health loss in the year t is equal to:

$$Ed = Ce (Lt + Dt + Mt),$$

where Lt - the total loss from the population morbidity in the year t ; Dt - total loss due to disability in the year t ; Mt - economic losses resulting from premature mortality of younger and working age population in the year t ; Ce - factor that corresponds to the share of the health capital losses due to negative risk events.

Disease losses for the year are related to the loss of part of the benefits in the production of GDP, medical expenses and social insurance payments. The damage caused by disability is also characterized by the lost benefit in the production of GDP of the current and future periods, the cost of treatment of the disabled and pensions paid to them. Different groups of disability are established by patients depending on the degree of disability.

Frequently, in the majority of the approaches valuation of the human health capital loss is made excluding the time factor and reducing the value of costs and revenues to one time point, or the value of annual losses is forecasted based on the hypothesis of a zero' growth rate. Therefore, the procedure for discounting future economic cost under the compound interest rule should be used to correctly estimate economic costs.

The reviewed methodology for the health capital losses' assessment provides a means for regular quantitative assessment of the negative global risk impact on human health and enables consideration of these results for:

- calculating integrated sustainable development indicators characterizing emergent risk capacity of the economy;
- forming the optimal ecology and social tax policies based on considering economic consequences of the negative risk impact as well as the social costs;
- justifying the amount of losses compensation due to negative risk events.

References:

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