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ECONOMIC ASSESSMENT OF HUMAN LIFE AS A DIAGNOSTIC INDICATOR OF THE CRISIS PHENOMENA[1]

In the paper to reveal the essence of the term "economic assessment of human life" the methodological approaches used in the economic theory and estimation theory are applied, the categorical apparatus revealing the meaning of the economic cost, price and value of human life is created. To define the cost of human life, the income, cost-based, and comparative approaches are analyzed. Various types of living costs depending on the purpose of assessment application are allocated. For the state purposes and definition of social payments, the concept of cadastral value of human life is introduced. The introduction of the macroeconomic indicator reflecting level and quality of life in the country is substantiated. The author's technique of the economic assessment of human life is given in the article and is approved on the example of the Russian Federation. Besides, the interrelations between manifestations of the crisis phenomena and their tendencies in society, quality of life and a size of life assessment at the calculation of regional coefficients for an assessment of risks to the citizens' life or health are revealed.

Keywords: quality of life, crisis phenomena, economic valuation of human life, cost of living, price of living, risk to human life and health

The crisis phenomena arise in the economy when in this or that sphere of life there is a resource problem. The society remains stable when its basic needs are satisfied i.e. quality of life remains at an acceptable level. The decrease of living standards is the decrease of life quality and human potential. In our opinion, as the indicator diagnosing the crisis phenomena emergence in society is the «quality of life» indicator.

Term development of «quality of life» has begun since the end of the 1950th and passed stages from «embryonic» development until the modern conceptual. At first, this term had publicist character: «the American quality of life is the highest in the world», then J. Galbraith for the first time used the term of «quality of life» to compare the developed high living standards to its relative lag in connection with appearing social issues of the USA population [8].

The concept «quality of life» appeared in the Russian scientific literature in connection with drastic transformations in the economy and country life in the mid-nineties of the last century. Its emergence caused a number of discussions about distinction and identity with more traditional categories, such as «standard of living», «welfare», «wellbeing». In the absence of the single concept, the «quality of life» began to be used by scientists as the complex synthesized concept, which is concretized depending on the purposes of each research. In our opinion, the modern concept «quality of life», includes quantitative and qualitative aspects of the living environment assessment from the point of view of human development opportunities The review and discussion of nowadays existing and noteworthy numerous models and the indicators revealing the economic maintenance of the «qualities of life» phenomenon is being outside of the article. [3, 9]. The paper discusses economic evaluation of human life as one of quality life diagnostic.

The assessment of life is the complex interdisciplinary challenge, which to solve, is important both for a certain person, and for society, and the state as a whole.

The starting moment at discussion of life assessment as economic category is the terminological aspect, which allows to open its gnosiological roots, the self actualizing through assessment of human life cost. Framework of the article does not allow us to pay sufficient attention to the review of this issue, but our position is presented in a number of publications [7].

The economic assessment of human life is seemed to us as a set of three processes: assessment of human life cost, calculation of the price and determination of life value (fig.). The cost of human life as an indicator is settlement scientifically, economically, socially reasonable size to which definition the various indicators, factors, methods, models and algorithms are applied.

The price of human life is the sum of money accumulated by society (the state, employer, insurance company), necessary for reproduction, security, compensation in case of death, taking into

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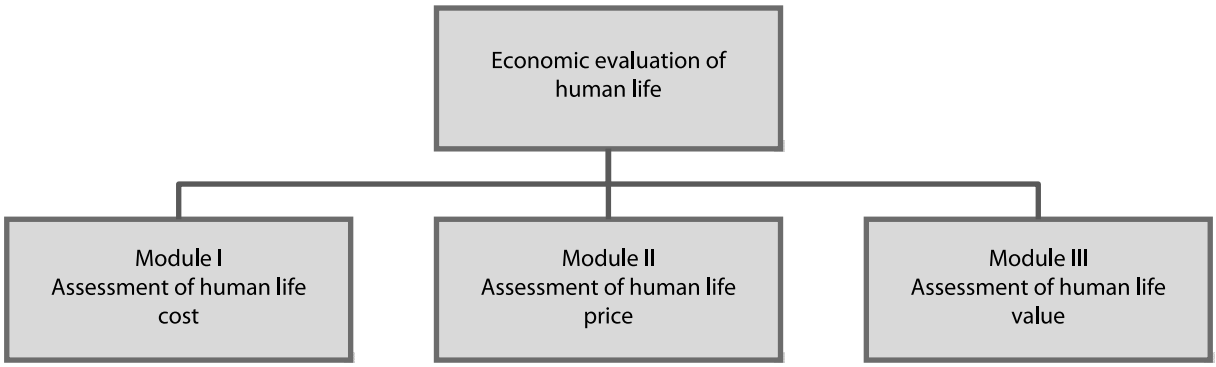

Fig. *Components of economic assessment of human life*

account nature of life risks and health to which a person is exposed during the life.

The value of human life is moral and ethical concept containing an individual assessment of each person. The intelligence and moral qualities determine the value of each human person at each stage of his or her physical, moral and intellectual development.

Basic design value is a human life cost. A person (work), according to the economic theory, along with the land, and the capital is an obligatory factor of public reproduction. Also, as the earth and the capital — the person (work) is the evaluated object and has a cost.

There is a reason to believe that approach and methods used in the evaluated theory are quite relevant to define a cost of human life. According to the estimation theory, there are four types of the cost defined depending on the purpose of its use.

The object cost of assessment is defined by approaches and reasonable coordination (generalization) of results received within an application of various approaches to assessment. Approach to assessment represents a set of methods for the assessment united by general methodology [11, 12]. A central tenet of the theory are given in table 1 in relation to the cost of human life.

Thus, the cost of human life can differ depending on the purposes of its use. «Quality of life» is a macroeconomic category, which is estimated within the certain state, or region. In the state

Table 1

Applicable approaches, methods, and types for the assessment of human life cost

Cost type	Purpose of the result assessment use	Methods and approaches	Approach applicability
Market	Judicial payments Insurance	Profitable: discounted method	Forecasting of future income
Investment	Expected income definition	Unprofitable: assessment method of expenses	Taking into account reproduction expences, taking into account an aging factor
Cadastral	State social insurance State compensation payments	Comparative: supply and demand method “willingness to pay”	Comparison with object analogs (cost of human life in other countries close to the economic development level)
Liquidating	Burial		

Table 2

Age model for Russian Federation

Age group	Age category	Expenses
0–3	Younger children	Maternity allowance; Prenatal one-time allowance (when child stays with his or her family); Nursing benefit until a child is 1.5 years old; Nursing benefit until a child is 3 years old
3–7	Preschool children	Maintenance (compensations) in preschool institutions
7–8	School-aged children	Cost of school training
18–21	Students	Cost of secondary, higher education
21–60	Working (active) population	Salary
60–70	Pensioners	Pension coverage

Table 3

Metrics assessment of human life cost in Russian Federation [1, 2]

Indicator name	Unit of measure	Symbol	Value
Maternity allowance	thousand rubles	E_1	186.9
Prenatal one-time allowance (when child stays with his or her family)	thousand rubles	E_2	13.087
Nursing benefit until a child is 1.5 years old	thousand rubles per month	E_3	13.8
Nursing benefit until a child is 3 years old (monthly compensatory payment)	rubles per month	E_4	50.0
Maintenance (compensations) in preschool institutions	rubles per month	E_5	5.3
Cost of school training: standard budgetary financing of 3,5 thousand a year for a pupil	thousand rubles	E_6	38.5
Cost of a secondary, higher education	thousand rubles per year	E_7	from 18.0 rub. up to 280.0 rub.
Average accrued wages in 2012 Average seniority for calculation of 40 years	thousand rubles per month	E_8	36.45
Average pension 1.02.2013. Average life expectancy after retirement to calculate 10 years	thousand rubles per month	E_9	10.3
Refinancing rate for 01.03.13	%	$I_{\text{refin.}}$	8.25
A minimum wage in 2013	thousand rubles	Minimum wage	5.205
Inflation rate in 2012	%	I	6.6

there has to be a single cost of life, let us call it cadastral value. For such cost assessment of human life, in our opinion, the following postulate is important: the cost of human life within a state has to be identical to women and men, and also for a child, a person at work, pensioner, despite his or her features (level of the income, education, etc.). Such approach allows to reach the principle of the highest social justice at assessment of human life cost. The cadastral value of life can serve as a calculated value for various state compensation payments and when planning social expenses.

Nevertheless, at united cost assessment of life in a state, there are changing the current cost and a cost assessment of forthcoming life of a certain person of a certain age. In fact, with the changing of a person age the ratio of labor potential and volume of expenses for its reproduction changes. So, in childhood a person has higher labor potential, but lower costs of reproduction and vice versa, people at considerable age have low labor potential, but in past essential costs of reproduction are made.

In this case, in our opinion, cost-based approach of assessment of human life cost is accepted. It defines the expenses for birth, education, security and also physical, intellectual, professional development of the personality as a fund-creation base for cost calculation of each person at all stages of his or her development.

1) The algorithm of assessment of cost of human life:

2) Designing age model;

3) Creating assessment metrics of human life cost;

4) Formation expences' flows.

The population will fall into six groups depending on generation in the age model. People have the same type of experience, common interests and demands during a certain period of life (tab. 2).

The cost of human life represents a complex indicator of cumulative expenses' assessment for a certain date and is made with application of the following indicators (tab. 3).

Algorithm of assessment of human life cost (*HLC*) is presented in the following formula (1) (designations see in tab. 3):

$$HLC = E_1 + E_2 + (E_3 \times 18) + (E_4 \times 18) + (E_5 \times 48) + E_6 + (E_7 \times 5) + (E_8 \times 12 \times 40) + (E_9 \times 12 \times 10), \quad (1)$$

The conducted calculation shows that cost of human life in RF for 01.01.2013 is equaled to:

$$HLC_{2013} = 20.224 \text{ mln rub. (674 thous. \$)} \quad (2)$$

For comparison: the living cost in RF for 01.01.2012 calculated according this formula is equaled 17.411 million rubles, adjusted for inflation it is 18,560:

$$HLC_{2012} = 17.411 \times 1.006 = 18.560 \text{ mln rub. (619 thous. \$)} \quad (3)$$

Besides, the indicator can be used to calculate current cost of life. Applying discounting coefficient to this flow of money, it is possible to determine the current life cost for certain age. The

Table 4

Demographic determinants for calculation of human life price

Indicator	Unit of measure	Symbol	Calculation
Population at age x	people	l_x	people/ 100000
Number dying from age x to age $x + 1$	people	d_x	$d_{x=lx} \times q_x$
Number living up to x years	people	l_{x+1}	$l_{x+1} = l_x \times (1 - q_x)$
(Survival) mortality rate	unit	R	d_x / l_x
A number of person years at age x and older	people	T_x	$T_x = l_x + l_{x+1} + l, x = 0, 1, \ldots, w$
Average life expectancy	years	e_x^0	T_x / l_x

rate of refinancing or consumer price index of date of assessment can be applied to the calculation of coefficient taking into account the survival period, for example, untill 70 years (4):

$$HLC_{age} = HLC\left(\frac{1}{\left(1+I_{refin.}\right)^{a}}\right), \quad (4)$$

For instance, let us calculate current human life cost for age of 40:

$$HLC(40) = 20.224 \text{ mln rub.} \times (^{1}/_{(1+0.0825)^{30}}) = 1.875 \text{ mln rub. (62.5 thous. \$)} \quad (5)$$

Therefore, at single cost of human life depending on age of a person the current cost of life is varied. In our opinion, at the assessment of human life, it is reasonable to assess «year of life» nevertheless it is not necessary to forget that different years of life will have different costs. Taking into account this circumstance various indexes of life years can be used. Use of one of these indicators excludes the use of another the researcher can give to young years bigger weight, than to older years, or to measure the received benefit in additional years of life.

As it was noted above, the author shares concepts of cost and price of human life. A price of human life is the sum of money accumulated by society (state, employer, insurance company), necessary for maintenance of reproduction, security, compensation in case of accident (death) taking into account risks of life and health. In other words, it is a payment for risks to which a person is exposed during his or her life.

A price of human life is defined using actuarial calculations taking into account the factors influencing on assessment of risks for a person's life and health during his or her life. We distinguish the following:

— person's age;

— sex;

— demographic characteristic (population, mortality, life expectancy);

— kind of activity (profession);

— working conditions;

— region of residence.

Actuarial calculations for assessment of human life price are carried using demographic statistics according to the results of the last population census (tab. 4):

When carrying out actuarial calculations at assessment of human life price the probabilistic characteristics of approach of accidents in the course of activity (6) have high degree of the importance:

$$P(A) = \frac{M}{N} \times 100, \quad (6)$$

$P(A)$ — accident probability; M — a number of accidents for a certain period (a year); N — a number of people.

Besides, the field of a person's activity has essential value for the assessment of human life price the raising coefficients are applied depending on risk degree.

Further as valuation multiples for assessment of risks to health and life of the population, it is offered to introduce indicators of quality of life depending on a person's region of residence. For this purpose, we will use a complex technique of diagnostics of quality of life in the region, developed by a group of authors in the economic security center of the Institute of Economics of the Ural Branch of the Russian Academy of Sciences [4]. At the heart of this technique lies the method of the indicative analysis. The structure of the quality of life indicators in the region territories is created according to eight indicative levels, which reflect this or that characteristic of the quality of life category:

1) population quality;

2) population employment;

3) living standards of the population;

4) living conditions of the population;

5) acceptability for accommodation in the natural environment;

6) safety of the personality;

7) determinants of internal and external migration of the population;

8) social security and population service.

Classification signs are defined. All subjects of the Russian Federation are grouped on their basis according to the values of threshold levels on each of population's quality of life indicators. They are following:

— number, age composition and population density of the territory.

— level of demographic stability of the territory.

— level of production potential, extent of development of industrial production and its structure.

— level of territory development and climatic conditions.

— income level of the population.

— geographical position of the territory in relation to the CIS states and China [4].

All RF regions are fallen into eight groups according to different characteristics, made in the order of coefficient increasing (a group 1 of the regions corresponds to the lowest value of quality of life, a group 8 corresponds to the highest value) (tab. 5).

Actuarial calculations for assessment of human life price are carried using demographic statistics according to the results of the last population census

An algorithm for the calculation of assessment human life price is a composition of three base rates using a correction factor:

— base rates for survival ($T_{survival}$);

— base rates in case of death (T_{death});

— base rates against accident or disablement (T_{acc}).

$$PL = PCL \times (T_{survival} + T_{death} + T_{acc}) \times \times R_1 \times R_2 \times 100, \quad (7)$$

R_1 — risk-benefit ratio of professional class; R_2 — risk-benefit ratio depending on region of residence.

The price of human life is calculated on a certain date and a certain age, both for a certain person and some population united by similar living conditions.

In the works [5, 6, 10, 13] the certain abnormal tendencies taking place in various spheres of activity and influencing living conditions of a person are considered.

Table 5

Indicators of region typology for assessment of human life price (R_2)

Number of the regions' group	Coefficient	Number of the regions' group	Coefficient
Group 1	3.0	Group 5	1.6
Group 2	2.5	Group 6	1.5
Group 3	2.0	Group 7	1.4
Group 4	1.8	Group 8	1.2

At calculation of price of human life, it is important to allocate responsibility institutes. Institutes of responsibility are the subjects responsible for the development and maintenance of citizens' life safety and health according to the Russian Federation legislation. Responsibility institutes within the existing insurance system using insurance contributions to participate in the creation of the trust monetary funds providing social guarantees and maintenance of life and health of the population in the state. Liability for human life is the essential way of investment stimulation into security for population that certainly, conducts to quality life improvement in the state.

To sum up, we will note that an economic assessment of life, reflecting a level of quality of life, in essence, is an indicator of socioeconomic development of society and a diagnostic indicator of crisis phenomena arising in society. Cost assessment of human life is a dynamic process, being in a constant movement reacts to change of macroeconomic indicators of the economy: income level of the population, level of social security, level of pension coverage, level of the living wage. Negative dynamics of this indicator diagnoses emergence of the crisis phenomena in society, respectively, positive dynamics distances from the crisis. Under cost of human life means its unsatisfactory quality, therefore, a low living standard in his or her country. The majority of research confirms: the richer is a country the higher is the value of citizens' lives there.

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