EMPIRICAL ANALYSIS OF ECONOMIC FACTORS INFLUENCED ON THE LIFE EXPECTANCY

[1]NINO SVANIDZE, [2]ASIE TSINTSADZE

[1]Department of Mathematics,
[2]Department of Finance, Banking and Insurance
Batumi Shota Rustaveli State University. Batumi. Georgia
E-mail: nino.svanidze@bsu.edu.geasie.tsintsadze@bsu.edu.ge

Abstract - According to the changes in the country's economic system, the development rate and the results achieved the dependence between the demographic condition and economic development is different.The study of the state of developed countries confirms that high level of life corresponds to the high level of life expectancy. in developing countriesIncreasing economic factors does not have a major impact on the growth of life expectancy.In the articlebased on the analysis of economic factors on the life expectancy, it has formed the reasons whichsupport the aggregation of the demographic situation, and the conclusions are drawn.

Keywords - Demography, Life expectancy, Births, Mortality, Regressionanalysis, Education, GDP.

I. INTRODUCTION

One of the fundamental features of the population is its self-evolving process in the process of consistent change of generations. Research of the compiler and trends of the regeneration of reproduction and its researchers and trends allows developing recommendations for socio-economic and demographic policy.The problem of demographic development in the modern world does not lose its importance. In a number of countries, there is a steady increase in population, and in other countries (including Georgia) the population is reduced. The cause may be anexcess of mortality compared to thebirth as migration.Each region is a unique demographic object, of which quantity dynamics of the population has the characteristics.One of the reasons which lead the decreasein the quantity of population is the adverse socio-economic condition.Deterioration in the demographic situation in recent years is the result of the economic transformation in post-Soviet countries. Regardless of the economic development of all countries, the demographic transition period was characterized by low births. As a result, workers were opposed to less disabled population. This contributed to the creation of savings for investment, and the economy was developing. In the demographic literature, this source of investment is called "demographic dividend", ie the achieved possibility achieved by the demographic condition. Practice has shown that a reduction in birth rate returns to the country as boomerang after years: decreasing workforce and the number of " to be feed" population increases, which reduces savings in contrast to the dividends. It should be noted that in developed countries where life insurance and pension insurance is developed, the process is painless, as the financial resources accumulated in life insurance and pension funds increases investment opportunities in the financial market, increasing national income. The article analyzes the demographic and economic conditions of the developing country that can not fit into the above-mentioned structure, although it has the peculiarities that describe life expectancy and the regularities of changes of the connected economic parameters. According to the statistical data of 2005-2017 in Georgia, thenumber of deaths and births are characterized by the growing dynamic, as well it isdecreasing the dynamic of the economically active population. In modern times the demands of the population are growing on socio-economic development. The socio-economic development depends on the achievement of scientific and technological progress, the possibilities for the implementation in the country and the life expectancy of the population, especially the economically active population in the entire population of the country.

II. DESCRIPTION OF THE PROBLEM

In many scientific studies, it is made a lot of research for determination of dependence between the level of the population lives and indicators of mortality, but the example of another country can not be a reliable source for the study of a particular country.According to the changes in the country's economic system, the development rate and the results achieved, the demographic condition and economic development are different.Researchers from highly developed countries say that the share of GDP per capita is high, according to this the life expectancyis high too.In developing countries, GDP per capita is low, which reflects a high mortality rate.In the post-soviet countries from the 90s to 2003, the demographic situation escalated.Due to the catastrophic reduction of population incomes, the kind of illnesses and the number of illnesses has increased, the visits to the doctorhave been reduced and the inadequate change in demographic parameters has increased, in particular: the mortality rate has increased and the rate of births has decreased.All of these have formed the poor population, whose level of life is 1 dollar

and 25 cents a day.One of the authors of the report"Poverty Geography, Disasters, and Climatic Conditions by 2030" by Britain's Foreign Development Institute Tom Mitchell discusses natural cataclysms as a cause of poverty and focuses on the settlement of citizens on the inappropriate living conditions.This fact is a real cause for deepening the poverty, but the main factor that has forced some of the population to settle in these conditions is often stayed beyond the attention of policymakers. It is impossible to discuss all the factors in the article, so the aim of the authors is to study the dependence of the main economic factors on the life expectancy bythe method of regressive analysis. The studied parameter, the average expectancy of life is the variable, which is determined by the life-level determinants. Factors that create this or that demographic situation in the country can be the same for all countries, but their so-called "Quality" and results are different.According to the authors of the study of the economic and demographic situation of different countries and comparison with Georgia can only draw a pessimistic picture and hinder the ways for correcting the problem. Therefore, analyzing the demographic and economic condition of our country in the longer term will give us a specific indication of action.

III. REGRESSION ANALYSIS

Using econometric methods to study the average life expectancy, we have introduced a linear multiple regression model in which we analyzed the dependence of life expectancy(y) on the following factors:Births coefficient(x_1), The share of health insurance for all population(x_2), education index(x_3), GDP per capita(x_4), mortality coefficient (x_5), poverty index (x_6).

Table №1 presents data from 2003-2007, using the data it was introduced to the regressive model, based on the data of the National Statistics Office of Georgia.

Table1:Life expectancy and determinants of determining factors (2003-2017Y)

Years	Average life expectancy	Births coefficient	The share of health insurance for all population	Education index	GDP per capita, US dollar	GDP Million dollars	Mortality coefficient till 1 year, 1000births	Poverty index (%)
2003	70.6	11.5	0.01	0.75	919	3928.4	31.8	54.5
2004	70.0	11.6	0.01	0.78	1188	5397.8	32.6	35.7
2005	69.8	11.8	0.12	0.83	1,483.5	6492.1	29.5	35.5
2006	70.4	12.1	0.02	0.91	1,763.5	11467.1	23.5	36.9
2007	70.6	12.6	0.27	0.91	2,314.6	10688.1	20.6	38.8
2008	69.7	13.6	0.83	0.88	2,921.1	11490.9	26.4	34.9
2009	69.9	14.8	0.37	0.99	2,455.2	10705.9	22.5	34.9
2010	71.3	14.6	0.46	0.91	2,623.0	11636.5	16.9	37.3
2011	72.1	13.7	0.42	0.88	3,230.7	14438.5	13.8	34.1
2012	72.1	13.4	0.58	0.84	3,523.4	15846.8	14.6	30.0
2013	72.5	13.4	0.60	0.77	3,599.6	16139.9	13.1	26.2
2014	72.8	16.3	0.19	0.78	3,676.2	16 507.8	9.5	23.5
2015	73.0	15.9	0.17	0.79	3,766.6	13 959.9	8.6	21.6
2016	73.5	15.2	0.34	0.83	3,864.6	14377.9	9.0	22.0
2017	70.6	14.3	0.23	0.82	10231.3	15164.5	9.6	21.9

Source: The data of National Statistics Office of Georgia, Calculation of the authors.

The relevant model of regression got the following look:

$$y = 80.84 - 0.1x_1 + 0.11x_2 - 3.35x_3 - 0.0004x_4 - 0.18x_5 - 0.03x_6$$

Despite of that, multiple coefficient of determination $R^2 = 0.943$.943, which indicates that over 94% of data is explained by the regression model,the calculation of variance inflation factor (VAF)for each independent factor shows that, the poverty index is not a statistically significant factor to affect the average life expectancy. This is caused by a strong correlation between the poverty coefficient and the mortality coefficient up to 1 year, in particular with a strong linear connection.The correlation coefficient between these factors is $r = 0.84$, and the equation of the line of regression is$x_6 = 0{,}98x_5 - 12{,}5$. Reducing of poverty index, which is actually in recent years, reduces the mortality coefficient of up to 1 year. This latter affects the average life expectancy.In order to increase the value of the proposals based on the results obtained from the calculation, we exclude the poverty coefficient from factors.

The regression model gets the look:

$$y = 80.54 - 0.05x_1 + 0.06x_2 - 4{,}795x_3 - 0.0003x_4 - 0.19x_5.$$

In this case,multiple coefficient of determination$R^2 = 0.941$ has been reduced slightly, but still,we can say

that 94% of the data is explained by the regression model. At that, each factor is statistically significant.

IV. RESULT

The results obtained by regressive analysis assure us that the model used reflects in high quality (94%) dependence between the factors.This allows explainingtheoreticallythe problemsaccording to each factor's influence,that affects the average life expectancy.The statistical data shows that the average life expectancy does not change with a large range, but the poverty coefficient despite reducing cannot be reflected on the increasing of life expectancy, and the quality of education, which data belong the country to the developed countries does not have a significant impact. Dependence between GDP per capita and Poverty Index according to each year, besides the increase in income is the result of financing the social programs of the population beyond the poverty line. It should be noted that the Education Index is calculated according to the statistical data and the quality of education is not recognized in it. In particular, 80-90% of the population is educated and still in the country up to 30% of the population lives beyond the poverty line.The problems that change the real situation are: the low quality of education, a large share of self-employed in determining the level of unemployment, at the same time incorrect definition of self-employed category, vulnerability to healthy lifestyle, dependence of the the country's food supply on import, food security-insecurity, low quality of disease prevention, quality of medical service and high prices. Assessment oflisted components statistically improper levels hinders to show the real situation.

CONCLUSION

Based on the studied materials and conducted regressive analysis, it is important to increase the accuracy of the statistical information of the factors in the model. Along with quantitative assessment, in the parameters for determining each factor should be reflected the qualitative indicator.For example, in the calculation of the Education Index, besides the share of the recipient population, the major component must include the quality of education, which should be determined according to the speciality and according to the employment condition. When determining the causes of mortality, attention should be paid to food safety, quality of medical service, etc. There is no doubt that the quality of authenticity of statistical information increases the quality of time to detect and solve the problem.

REFERENCES

[1] E.M. Andreyev, V.M. Shkolnikov "Communication between death rates and economic development in Russia and its regions",Demographic review, Volume 5, No. 1, pp.6-24. 2018

[2] Economic Development and the Escape from High Mortality JAVIER A. BIRCHENALL * University of California, Santa Barbara, CA, USA, Elsevier, Vol. 35, No. 4, pp. 543–568, 2007.

[3] Ro-Ting Lin, Ya-Mei Chen, Lung-Chang Chien, Chang-Chuan Chan, Political and social determinants of life expectancy in less developed countries: a longitudinal study, BMC Public Health. 2012; 12: 85.Published online 2012 Jan 27. doi: [10.1186/1471-2458-12-85]

[4] G.Tsuladze, A.Sulaberidze, N.Maglaperidze, G.MamardaShvili "Demographic development of Georgia: yesterday, today, tomorrow", Tbilisi, 200

[5] E. Scherbakova "The expected life expectancy will increase from 65 to 75 years" the World demographic barometer, No. 233 – 234, 2006

[6] Mahfuz Kabir, „Determinants of Life Expectancy in Developing Countries", Journal Of Developing Areas 41(2): 185-204, 2008.

[7] Ronald Lee and Andrew Mason, What is the Demographic Dividend? J. Finance & Development, September 2006.

[8] Tom Mitchell "geography of poverty, disasters and climatic conditionsBy 2030 ", October, 2013 (E.Rurse).https://www.amerikiskhma.com/a/natural-disasters-greatly-poverty/1771564.html)

[9] National Statistics Office of Georgia-2003-2017.

★★★