IMPACT OF GENERAL INSURANCE FINANCIAL RESULTS ON ECONOMIC GROWTH (BASED ON ECONOMETRIC MODELING)

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Abstract

The role of the general insurance industry in the country's insurance market and its importance in the socio-economic life of the population are mentioned in the article, as well as the impact of the financial results of the organizations operating in the general insurance industry on the country's gross domestic product was analyzed econometrically, and the impact on increasing the investment opportunities of insurance companies was studied.

Keywords: Insurance, general insurance sector, insurance premium, insurance payments, GDP, investments, reserves.

INTRODUCTION

The fact that more than 76 percent of the funds collected in the country's insurance market correspond to the general insurance sector means that the sector has a direct impact on the socio-economic development of the country. The formation of large reserves in insurance companies encourages them to be directed to sectors of the economy that need financial support through commercial banks and stock exchanges. In economically developed countries, large financial problems are solved through the insurance system, such a situation indicates the accumulation of a large amount of resources in insurance companies and the high level of use of insurance services. The demand for the use of insurance services is directly related to the income level of the population. In a society with a high standard of living of the population, there is an aspiration to preserve one's life, property, valuable objects, to protect them from the negative effects of various unpleasant events. This ensures not only personal well-being of people, but also the well-being of the society, the networks and sectors serving this society. From this point of view, insurance can be recognized as a factor that stimulates the movement of the economy, below we will study the importance of the main indicators that evaluate the development index of the sector in the economy, the analysis of the impact on macroeconomic indicators, we will analyze it based on econometric models.
METHODS
Systematic analysis and approach, logical and structural analysis, grouping and generalization, expert assessment and forecasting, econometric modeling, mutual and comparative comparison methods were used during the research.

RESULTS AND ANALYSIS
Annual values of general insurance premiums and payments do not represent a general trend. For this purpose, it is important to determine their growth rate and bring them to a comparable price. Table 1 shows the real state of development of the general insurance industry in Uzbekistan in 2014-2022, taking into account the inflation rate.

<table>
<thead>
<tr>
<th>Years</th>
<th>Insurance premiums</th>
<th>Insurance payments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>at current valuation</td>
<td>in 2022 estimates</td>
</tr>
<tr>
<td>2014</td>
<td>417,6</td>
<td>1077,27</td>
</tr>
<tr>
<td>2015</td>
<td>518,1</td>
<td>1231,82</td>
</tr>
<tr>
<td>2016</td>
<td>633,4</td>
<td>1384,15</td>
</tr>
<tr>
<td>2017</td>
<td>788,9</td>
<td>1513,57</td>
</tr>
<tr>
<td>2018</td>
<td>1217,9</td>
<td>1988,64</td>
</tr>
<tr>
<td>2019</td>
<td>1727,5</td>
<td>2463,52</td>
</tr>
<tr>
<td>2020</td>
<td>1879,3</td>
<td>2373,78</td>
</tr>
<tr>
<td>2021</td>
<td>3015</td>
<td>3437,10</td>
</tr>
<tr>
<td>2022</td>
<td>4707</td>
<td>4707,00</td>
</tr>
</tbody>
</table>

The volume of insurance premiums in 2022 compared to 2014 will be 3629.73 billion. to soum, and we can see that the rate of change has increased by more than 4.3 times. Insurance payments have increased by 6.7 times compared to 2014 in comparison to 2022.

The level of coverage of the insurance industry in Uzbekistan is very low, which can be expressed by the share of insurance premiums in GDP, the amount of insurance per capita. In this study, we analyze the impact of the population's income on the volume of general insurance premiums and the amount of resources collected in the field of general insurance on the volume of investments directed by companies based on econometric modeling. First, we will get acquainted with the research results of foreign economists in this regard and form appropriate conclusions.

In international scientific research, there are a number of scientific works related to the impact of the population's income on insurance revenues and their impact on investment in financially needy sectors of the economy. Badalov A.D. (2020), Borisov V.A. (2015) and Petrov V.S. & Ivanova E.N. (2016) research on the investment climate examined the impact of investment on economic growth.
Basic scientific research on the relationship between insurance premiums and insurance investments Kozlova A.A. (2018) and Smirnov I.V. (2017) analyzed by: Badalov A.D. (2020) in their paper econometrically modeled the possibility of investment in economic development. Oxford University professor Kallenberger M. (2016) analyzed the relationship between the economic efficiency of insurance companies and insurance activities in the scientific article entitled "Insurance and Power: Analytical Problems and Solutions". In this analysis, the factors that affect the economic and financial activities of companies are studied.

The dependence of population income on the demand for insurance is the result of a number of scientific studies, in particular, Lee H. & Lee X. (2018), Hardy D., Lee H. & Miller R. (2016), Smith A., Lee H. & Brown M. (2014), Johnson R., Lee H. & Brown M. (2012) is one of the central problems of their works. This literature serves as a source for conducting scientific research on the issue of the relationship between insurance and the general income of the population. In the scientific research conducted on the issue of general income of the population with insurance, the main conclusions are given: the role and importance of insurance activity in the solution of social problems, the activation of the use of insurance services with the increase of the income of the population. Also, an increase in the stability of the financial position of the insurance activity was observed with the increase in total income. At the same time, scientific studies have studied the relationship of economic factors such as the demand for insurance and the state of unemployment with the total income of the population.

Based on the research conducted by foreign and local scientists on insurance activities, the following two main hypotheses were formulated by the dissertation student.

H1: the increase in the income of the population is the main factor affecting the growth of the total insurance premiums.

H2: an increase in the total insurance volume causes an increase in the investment volume of insurance companies.

The following model was created using the SEM method to scientifically verify these hypotheses in the economy of the Republic of Uzbekistan.

\[
\begin{align*}
Y_{INS} &= \beta_0 + \beta_1 X_{INC,PC} + \varepsilon \\
Y_{INV,INS} &= \alpha_0 + \alpha_1 Y_{INS} + \varepsilon 
\end{align*}
\]

- in the model, two equations form a system of mutual equations.

This is called the SEM method in international practice. Complex economic processes are represented by a system of simultaneous equations.

The presented form of the model is expressed as follows:

\[
\begin{align*}
\hat{y}_1 &= \hat{1} \cdot x_1 + \ldots + \hat{1}_m \cdot x_m \\
\hat{y}_2 &= \hat{2} \cdot x_1 + \ldots + \hat{2}_m \cdot x_m \\
&\vdots \\
\hat{y}_n &= \hat{n} \cdot x_1 + \ldots + \hat{n}_m \cdot x_m 
\end{align*}
\]
here are the coefficients of the given form of the model.

The SEM model is not based on the method of least squares, but on the basis of the method of maximum likelihood. The maximum likelihood method was first used in scientific research by Carl Friedrich Gauss, Pierre Simon Laplace, Torvard Tillar. However, this method was widely used between 1912 and 1922. Ronal Fisher, one of the founders of econometrics, explained the advantages of this method, as well as its differences from least squares, in his research.

Maximum likelihood estimation method indicators are found through the log likelihood function.

The log likelihood function looks like this:

$$P(y_i = 1)^{y_i}P(y_i = 0)^{1-y_i}$$

If in this case $y_i = 1$ $P(y_i = 1)^{1}P(y_i = 0)^{1-1} = P(y_i = 1)$, if $y_i = 0$, will be $P(y_i = 1)^{0}P(y_i = 0)^{1-0} = P(y_i = 0)$.

In general view log likelihood function:

$$\sum_{i=1}^{n} (y_i \times logP(y_i = 1) + (1 - y_i) \times logP(y_i = 0))$$

If we substitute $G(x)$ for $P(y=1)$, the log likelihood function also changes:

$$\sum_{i=1}^{n} (y_i \times \log(G(x \beta)) + (1 - y_i) \times \log(1 - G(x \beta)))$$

coefficient is found by maximizing this equation.

Thus, to find a coefficient based on the method of maximum likelihood estimation, the following equation represents the state when it has a maximum:

$$\max \sum_{i=1}^{n} (\lambda_i \times \log \delta_b(\lambda_i = 1) + (1 - \lambda_i) \times \log \delta_b(\lambda_i = 0))$$

Statistical significance of the coefficient based on maximum likelihood estimation method is checked by Wald test, score test, likelihood ratio test.

We will develop a model using the STATA statistical program based on the data on the total insurance premiums collected in the general insurance sector of the Republic of Uzbekistan, the volume of premiums per capita, and the investments of insurance companies in the period 2010-2022.
As a result of the model, it was possible to make a correct and accurate conclusion, which is determined based on the statistical and economic significance of the model. While the t test values represent the reliability of the model parameters in the least squares models, the z test is important in the maximum likelihood method. The probability values of each parameter are equal to zero, indicating that the parameters are statistically significant. The main hypothesis is rejected and the alternative hypothesis is accepted. With 95 percent confidence, it can be concluded that all parameters of the two models make economic sense. It will be correct to visualize the result of the research conducted on the hypothesis in the following picture.

![Image](image_url)

**Figure 2. The relationship of general insurance premiums to population income and investment**

In the Republic of Uzbekistan, a one percent increase in the income level of the population confirmed an increase in the total insurance premiums by 1.82 percent. In order to ensure a regular increase of this amount, first of all, it will be necessary to increase the insurance literacy of the population, not only to acquire knowledge related to the field, but also to understand the social importance of insurance, aimed at
compensating for damages. This makes the use of insurance services one of the primary needs, even if material well-being is not high.

A one percent increase in general insurance premiums leads to a 0.86 percent increase in the investment activity of insurance companies.

\[
\begin{align*}
Y_{lnins} &= -9.52 + 1.82X_{lninc_{pc}} \\
Y_{lninv_{ins}} &= 1.35 + 0.86X_{lnins}
\end{align*}
\]  

(2)

In countries with a developed insurance system, insurers cover the losses from the main activities from the income from investment activities, which is the first reason for the need to engage in investment activities for insurance companies, and the second reason is represented by the calculation of the funds attracted through insurance as a convenient investment capital. As a result of the implementation of such capital investments, an increase in the level of employment, the well-being of the population, and the economic growth of the country will be achieved.

A number of scientific studies have used cointegration models, where the main goal is to determine how traits interact with each other. Based on these studies, we analyze the impact of insurance on economic growth. For this, we formulated the following hypothesis.

H0: There is a cointegrating relationship between the development of the general insurance industry and economic development.

In the formation of data, we formed the growth of the GDP volume by referring to the website of the Statistics Agency, and we prepared the data on the general insurance industry using the index method. In particular, we divided the total insurance volume in a chain-like manner, and then determined the ratio of the resulting values to the inflation rate.

<table>
<thead>
<tr>
<th>Table 2. Model results</th>
</tr>
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<tbody>
<tr>
<td>gdp_g</td>
</tr>
<tr>
<td>ins_g</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>Mean dependent var</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>F-test</td>
</tr>
<tr>
<td>Akaike crit. (AIC)</td>
</tr>
</tbody>
</table>

*** p<.01, ** p<.05, * p<.1

gdp_g = 96.76 + 0.07 ins_g

(4.12) (0.02)
A one percent increase in total insurance premiums will increase GDP by 0.07 percent. Reliability of the model was checked by Brosh-Pagan test for heteroscedasticity, Durbin-Watson test for autocorrelation and multicollinearity.

The coefficient of determination is equal to 0.43, which means that insurance income affects the gross domestic product up to 43 percent. F test is sufficient for the true value to be 4.549 with probability 0.000 for us to reject the main hypothesis. At 95 percent confidence, the model is statistically and economically significant.

A t test value of 3.5 ensures that the parameter is statistically significant with 90 percent confidence.

It is important that the fit values of the model fulfill the condition of mutual homoscedasticity with the residuals.

![Figure 3. 95 percent confidence interval of the model](image)

The results of the study showed that there is a regression and correlation relationship between GDP and insurance premium amounts. A one percent increase in total insurance premiums in the insurance market of Uzbekistan causes an increase in the gross domestic product from 0.01 percent to 0.15 percent.

**DISCUSSION**

Several suggestions and conclusions were formed during the econometric modeling performed as part of the research work:

First, there is a cointegrating relationship between total insurance premiums and GDP growth, an increase in insurance premiums leads to an increase in GDP, and the need for insurance services increases with an increase in GDP. We explain it as follows: as a result of goods and services produced by economic sectors and business entities, the income of the population increases, the standard of living improves, the range of needs expands, and the demand for the use of financial and insurance services is formed, following the principle of "against all odds". By providing customized insurance services, growth in the insurance market is achieved and reflected in the share of GDP. Second, a one percent increase in total insurance premiums affects a 0.07 percent increase in GDP.
Currently, the rapid development of the insurance sector is recognized as one of the important factors and directions of deepening the structural change and diversification of our economy, and improving the quality of life of the population.

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