The statistical analysis of insurance development in Azerbaijan

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ABSTRACT

Insurance protects people and assets against risks. Through the premiums paid by the policyholders to the insurance companies, an important source of savings is created for the national economy, and funds are provided to the capital markets. In other words, the insurance sector contributes to the healthy functioning of the financial economy, which is a complement to the real economy. In this study, general information about insurance was given and the relationship between the insurance sector and economic growth, which is a frequently researched subject in foreign literature, was tested in the example of Azerbaijan. The present study analyzes the relationships between the development of insurance and economic growth of Azerbaijan. A strong influence and interrelation of the country’s indicators of the insurance and economic growth is shown. Paired nonlinear models of the insurance dependence of the income on factors are made. The result of the analysis showed that if the GDP and national income of Azerbaijan change by 1%, the insurance income of Azerbaijan increases on average by at least 2%.

Key words: Azerbaijan insurance market, insurance, GDP dependence on insurance market, correlation and regression analysis, economic growth, insurance, econometric model.

Jel Code: A19, C02, G22

INTRODUCTION

Today, an insurance is associated with all types of trade, industry and is an important part of the social structure. An insurance is also an element of trust. For this reason, the insurance is one of the most important activities faced by developed countries.

Insurance is a sector that becomes more important as the economic development and growth levels of countries increase. In addition, the insurance sector has a positive effect on economic development and growth processes. Along with the diversified economic activities, the service area and scope of the insurance sector is also expanding. With the development of the insurance sector, the risks in the economy are minimized. Thus, risks can be eliminated and more efficient results can be obtained from economic activities. The aim of this study is to reveal the importance of the insurance sector in terms of economic growth (Çelik and Memiş, 2021).

Insurance is a system that secures assets and persons against risks that were previously unknown, but likely to arise, in return for a certain premium (Özüdögru, 2017). The insurance sector helps financial markets to function effectively. According to experts, at least two-thirds of the world’s funding sources are in the insurance sector. As a matter of fact, the insurance sector is important in terms of financial markets in terms of long-term fundraising as well as in repairing damage or losses. The sector, which has gained such importance in the world, continues to deepen in Azerbaijan, which is a developing country. In fact, the capacity of the sector to create funds for financial markets is very important. Insurance is the transfer of risk to the insurance company by individuals or institutions. Insurers pay a risk premium to the insurance company. Insurance companies collecting this premium also play an intermediary role in transferring these funds to the financial...
markets. On the other hand, insurance covers natural disaster, fire, accident etc. plays an important role in compensating for such damages. As a matter of fact, insurance is important not only with its economic dimension but also with its social and psychological dimension.

In other words, there is a close connection between the insurance activity and economic activity. Social privileges and also economic privileges and the pension funds are important in this field.

The share of the insurance sector in GDP is traditionally high in developed countries. But this percent grows in developing states as well.

In this study, the theoretical basics of the insurance, the types of insurance in the Azerbaijan Republic are covered; the comparative analysis of Azerbaijan insurance market is carried out. In this article it is revealed that Azerbaijan insurance market is in the condition of development. For this reason, it is necessary to analyze the insurance sphere as the separate sphere and also to analyze an influence of the insurance sphere on GDP of the country on the basis of the theory and practice.

LITERATURE REVIEW

In world practice, there is a lot of literature about the factors affecting the economic growth, and various factors supporting this process. Much of the literature is devoted to specific problems related to the banking industry or capital markets and possible solutions of the problems. In recent decades, there has been a General consensus that there is a significant positive correlation between the development of the banking/financial sphere and the economic growth of the country.

The insurance sector is an important both in creating savings and eliminating risks in terms of economy. When we look at the literature, there are different studies that examine the insurance sector with various indicators and methods. While some studies deal with insurance sector macroeconomic level and others deal with different indicators as gross insurance, premium, total insurance volume, insurance consumption and individual retirement insurance etc. Moreover, in this study we focus on the effect of insurance on economic growth. There are numerous literature on insurance and economic growth. For instance, Apergis and Pofinas (2020), Kaya and Beşer (2020), Kumar et al. (2020), Pradhan et al. (2015), Horng et al. (2012), Adetunji et al. (2018), Pradhan et al. (2015), Horng et al. (2012), and Ege and Sarac (2011) show that insurance sector positively affect economic growth. In a study conducted for G-8 countries, it is expected to have a positive impact (Celik and Memis, 2021:1018).

In a study by Apergis and Pofinas (2020), 27 OECD countries were discussed. Total gross insurance premiums for life and non-life for these countries for the period 2006-2016, plus real GDP per capita data, private investment, public spending to GDP, ratio, trade openness, secondary education, financial development and foreign direct investment entries are taken into account. The findings are that the growth of the insurance sector will contribute to economic growth.

In the study conducted by Kaya and Beşer (2020), it is investigated how and in what way the volume of insurance premiums in 25 European Union countries affects the economic growth of these countries. Johansen cointegration, Kao cointegration, panel FMOLS, panel causality methods were used in the article. It has been observed that there is a cointegration relationship between economic growth and insurance premium volume. According to the results of the panel FMOLS test, an increase of 1% in insurance premium volumes increases economic growth by 0.113%. According to the panel causality results, one-way causality was found from insurance volumes to economic growth.

In a study conducted by Gümüş (2020), the relationship between financial development and human development indices and insurance premiums is examined by panel causality and cointegration method. The study was carried out with the data of OECD countries for the years 2009-2016. As a result of the causality tests, one-way causality was obtained from human development and financial development to insurance premiums.

Kumar et al. (2020) aims to explore the relationship between economic growth and insurance consumption in India during the period 1990-2016. In the article, annual insurance penetration, insurance density and GDP per capita are used to examine the relationship between economic growth and insurance consumption with the Johansen cointegration technique. In the long run, a unidirectional causality ranging from insurance penetration to economic growth emerges. Similarly, insurance intensity drives long-term economic growth. Insurance penetration in India leads to short-term economic growth. However, economic growth does not cause insurance prevalence or intensity in the short run as it does in the long run.

In the study conducted by Yenisu (2019), the relationship between the insurance sector and economic growth for Turkey was examined. Data for the period 2010Q1-2018Q4 were used in the analyses. It has been concluded that the relationship between the insurance sector and economic growth is significant both in the short and long term.

Islamoglu et al. (2020), the private pension system in G7 countries and Turkey has been comparatively examined. In the next stage, SWOT analysis of the private pension system was carried out. The data obtained in the study are shown with the help of tables, the year the participants were included in the system, their distribution by age and funds. As a result of the study, it has been seen that Turkey has brought the private pension system to a better level as compared with other countries.

Akbulayev and Sakhillova (2018) in a study, carried out
the analysis of the insurance sphere development in Azerbaijan: the theoretical sides of the insurance market are considered, an influence of the market on the national economy is studied and also the classification of services in the insurance sphere is considered.

The strategy Azerbaijan-2030 (2017) assesses the current state of the insurance and makes forecasts for development in the next ten years.

Futkaradze Ya. (2014) focuses on the study of the insurance market's impact on the economic growth in the countries with economies in transition, including Azerbaijan.

The theoretical bases of economic growth and insurance

An economic growth can be expressed through the growth rates of the gross domestic product, national income, changes in the gross domestic product and national income per capita (Stojakovich, 2016). An economic development is considered as an indicator of the macroeconomic units' interrelations, such as national product, national income, employment, accumulation, investments, consumption and also some other economic and non-economic factors, therefore it is defined as multidimensional process.

Economic growth is also an increase in the production of goods and services over a certain period. The economic growth creates more profit for businesses. A gross domestic product is the best way to measure an economic growth. It takes into account all the economic output of the country. It includes all goods and services that businesses in the country produce for sale. It does not matter whether they are sold domestically or abroad.

Insurance is an economic model which allows to transfer financial risks from a person to an insurer under the bilateral contract (Akbulaev and Salihova, 2018). The insured person receives a certain quantity of a covering from an uncertain event less, but for a certain payment. Insurance is a tool for protection against monetary losses. It is one of the types of the risk management.

Insurance protects people from economic losses. The economic losses can arise as a result of any number of accidents and without insurance, and then the participant who has suffered losses will be forced to bear full economic effect. Insurance acts in such cases allow distributing the risk of economic losses among as many customers as possible. The insurance consists of various forms that provide protection against economic losses related to damage or loss.

The organization which provides insurance is known as the insurer or insurance company. The client who buys insurance is known as insured or the insurer (Akbulaev and Salihova, 2018). The insurance transaction assumes insurance of the client on the terms of the guaranteed and known rather small loss in the form of payment of an insurance premium of an award in exchange for a promise of an insurance company to indemnify to the insurer loss. The loss can be or not be financial, but it has to be specified in the financial plan.

AN ECONOMIC VALUE OF THE INSURANCE: THE INTERRELATION OF THE INSURANCE WITH GDP OF THE COUNTRY

Rising of the living standards and developing productive capacities are the two most important goals (Stojakovic, 2016). In addition to the main factors that determine the economic growth (such as GDP components, banking sector, public policy, etc.), insurance markets can be seen as closely related to the economic growth and overall financial stability of a country.

The insurance sector contributes to the economic development by the release of insurance policies, effectively exchanging savings for financing real investment projects. Besides, insurance is considered as an addition to a banking system and promotes growth, contributing to the financial development of the country.

So, the insurance sector plays an important role in our society and other countries with economies in transition, namely:

- promotes better risk management in the country and protects the insured in the worst case;
- the protection gives individuals and businesses confidence that they can engage in economic activities that lead to overall development.

For effective economic growth, the insurance norms have to be rather strict for protection, but not such to prevent insurance companies to support an economic activity. At the same time, the healthy insurance industry is also necessary for the economic growth.

It is necessary to consider that the quantity and variety are more whole and their dynamism complicate the choice of priorities of the development. The purposes of further economic development depend on the extent of the current economic development of the country and its sizes. Therefore, it is necessary that each country considered a right choice of priorities of development and also provided material conditions which are important for achievement of these purposes. One of the indicators of economic development is a share of insurance premiums in the gross domestic product. Through activities for insurance which are a part of the financial sector it is possible to see the ratio of the general gross insurance premiums to the gross domestic product (GDP) expressed as a percentage.

INSURANCE MARKET IN AZERBAIJAN

The insurance market of Azerbaijan is rapidly developing and improving. Currently, the law has developed a legal framework governing this area of activity. There are 22
insurance companies on the market. However, the main share of insurance products in the market are the products of the compulsory insurance, for the development and implementation of which the legislator is responsible.

As for voluntary insurance, this area of insurance companies shows the inefficiency, namely lack of competent advance of insurance products in combination with the population habits inherited from the Soviet Union – all rely on the state, but not on their own independence.

As in any other country, Azerbaijan has a developed health insurance market. The compulsory health insurance is being implemented as a pilot project in the administrative districts of Mingachevir and Yevlakh district. 228.1 thousand people (100% of the population) registered in pilot districts participate in the framework of the compulsory health insurance. Its health insurance includes a preferential package of medical services (Azerbaijan – 2030, 2017). The insurance covering all population was established as the purpose on the future.

In 2018 in Azerbaijan, against the background of economic activity, revival and in the insurance market was observed. However, considering the potential of the local market, the scale of this revival is insufficient (https://www.wem.az/ru/news/tsifry/12194.html). The share of the insurance sector assets in the total amount of assets of the national financial sphere does not exceed and 2%.

Nevertheless, the Azerbaijan insurance market has a sufficient potential to increase the collection of insurance premiums to at least 1.6 billion manats.

One more important point is the limitation the offered services in this sphere. In the world market there are more than 300 products in this sphere, in Azerbaijan – only 40 services (http://zerkalo.az/standard-poors-strahovye-kompanii-azerbaijdzhana-zavisvat-ot-bankov/) are used. It is necessary to intensify the efforts on the application of microinsurance, joint insurance, obligatory medical insurance, agrarian insurance, to make changes to the legislative base in this sphere.

**METHODOLOGY AND MATERIALS**

The theoretical methods of studying the relationship between the economic growth of Azerbaijan and the insurance industry include comparative analysis, generalization and analysis of the literature.

The unit of this observation in the article is the dependence of Azerbaijan’s GDP on the main results in the insurance industry. For this purpose, the elasticity coefficients of the analysis models were calculated in this study.

**EMPIRICAL RESULTS**

The resulting feature in the development of insurance in Azerbaijan is chosen the amount of insurance income, thousand manats (Y).

The factor features are selected:

1-gross domestic product, million manats (GDP);
2-gross national income, million manats (GNI);
3-insurance benefits (payments), thousand manats (IB).


Based on the initial data, a matrix of paired correlation coefficients is constructed using the "Correlation" tool in Excel (Table 1).

Matrix of paired correlation coefficients (Table 1) shows that the insurance income has a very high direct relationship with insurance payments and a strong direct relationship with economic growth. Also, there is a close relationship between the indicators of economic growth and insurance benefits (factor signs), which indicates the presence of multicollinearity of factors. In this regard, the construction of a multiple regression model is impractical, since unreliable estimates of the model will be obtained.

The preliminary visual analysis based on the correlation field showed that the dependence of insurance income on factors has a nonlinear form, since the reliability of the approximation R² in nonlinear models is higher than in linear models.

As a result, three pairwise regression models are obtained:

1) Insurance income and GDP (exponential model):

\[ Y = 25816,657 \cdot e^{0,00005 \cdot GDP}, \]  
\[ (1) \]

2) The national income and insurance income (power model):

\[ Y = 0,000003 \cdot GNI^{2,365}, \]  
\[ (2) \]

3) Insurance benefits and insurance income (semilogarithmic model):

\[ Y = - 3933467,251 + 371597,262 \cdot \ln IB. \]  
\[ (3) \]

All three nonlinear models are statistically significant according to the Fisher criterion at the significance level \( \alpha = 0.05 \), as are the regression parameters according to the student’s criterion. Therefore, all three models are 95% likely to be statistically significant.

Model (1) shows that 73.7% of variation in the insurance income is due to variation in GDP, model (2) – 77.4% of variation in the insurance income is due to variation in the national income, and model (3) - 95.8% of variation in the insurance income is due to variation in the amount of insurance benefits.

For the quality of the model to be considered good, the approximation error should not exceed 12-15% (Rusilko and Khatskevich, 2014). The average approximation error
The elasticity coefficients show that insurance income changes by an average of 2.6% when GDP changes by 1%; when national income changes by 1%, the insurance income changes by 2.4%; and when insurance payments change by 1%, the insurance income changes by an average of 0.8%.

The regression model has reliable and adequate estimates when the assumptions of the least squares method (Gauss–Markov) (Yeliseyeva, 2017) are fulfilled.

1. The population mean of the remains is equal to zero.
2. Dispersion of the remains is constant for all observations.
3. There is no systematic communication between values of the remains in any two observations (autocorrelation of the remains).
4. The remains have normal distribution.

The expectation in all three result models is zero.

The Goldfeld-Quant test is carried out according to the formula:

\[ F = \frac{\sum e_i^2}{\sum e_i^2} \]  
(4)

As, the hypothesis of the heteroscedasticity’s lack is accepted, therefore, the homoscedasticity – constancy of the residual sizes’ dispersions takes place.

Darbin-Watson’s statistics for each model is calculated by a formula:

\[ DW = \frac{\sum (e_i - e_{i-1})^2}{\sum e_i^2} \]  
(5)

Since the calculated value of the Durbin-Watson criterion for all three models (1.466, 1.435 and 1.992, respectively) falls within the domain, there is no reason to reject the null hypothesis, hence there is no autocorrelation of residues.

The normality of the residue distribution is estimated using the RS-criterion:

\[ RS = \frac{|\epsilon_{max} - \epsilon_{min}|}{\sigma} \]  
(6)

The calculated values of the RS-criterion of each of the resulting models (3.39, 2.93 and 3.47, respectively) fall into the interval limited by the table values $RS_{min} = 2.67$ and $RS_{max} = 3.69$ at $n = 10$ (Orlova and Polovnikov, 2007), therefore, at the significance level $\alpha=0.05$, the hypothesis of the normality of the residual component distribution is accepted.

Thus, the estimates received by a method of the smallest squares have properties of non-shifting, solvency and efficiency.

**DISCUSSION**

**Theoretical and practical research results**

The theoretical significance of the article consists of:

- in a comprehensive coverage of the essence of the problem - the relationship of economic growth of the country from its insurance market;
- to identify specific advantages and disadvantages of the insurance market for the development of the economy of any country, including Azerbaijan;
- that its results will serve as an incentive to increase the level of GDP from the insurance industry in Azerbaijan;
- in presenting a new look at the question, about statistical data confirming the dependence, which will expand the approach to its study.

The practical significance of the work is to generalize the experience of calculating the elasticity coefficients of the analysis models, which help to characterize the dependence of the economic growth of Azerbaijan on the results of activities in the insurance industry.

The practical significance of the work also lies specifically in:

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>GDP</th>
<th>GNI</th>
<th>IB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>0.847</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNU</td>
<td>0.862</td>
<td>0.997</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IB</td>
<td>0.953</td>
<td>0.857</td>
<td>0.861</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Matrix of paired correlation coefficients.
- updating the academic and pragmatic base of the industry with new information, filling gaps in the theory;
- proof of the prospects of the scientific direction;
- proof of the dependence of the economic development of the country on the insurance industry;
- a confirmation of the effectiveness of the insurance market development in Azerbaijan.

**CONCLUSIONS AND RECOMMENDATIONS**

The development of insurance in Azerbaijan expressed by the insurance income directly depends on the insurance payments' level, a gross domestic product and a national income of the country.

The received productive nonlinear models of regression characterizing dependence of the insurance results upon indicators of economic growth of the country are statistically significant, their estimates are reliable, and the adequacy to real data is good. At change of GDP and the national income of Azerbaijan by 1%, insurance income of Azerbaijan increases on average by not less than by 2%.

The semi-logarithmic model of the dependence of insurance income on the level of insurance payments is statistically significant, qualitative, and the adequacy of real data is highly accurate, hence the model is suitable for forecasting. Therefore, the economic growth of the country stimulates the development of insurance business in Azerbaijan.

The lack of significant empirical data in the support of interrelation between the economic growth and insurance indicates the need for further study of this interrelation. Similar researches will help to define whether can and in what degree the regulation of the market insurance promote the economic growth.

**REFERENCES**


**Table 2:** Elasticity coefficients of analysis models.

<table>
<thead>
<tr>
<th>Model name</th>
<th>Model equation</th>
<th>Analysis model</th>
<th>The formula of coefficient of elasticity</th>
<th>Elasticity coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicative (exponential)</td>
<td>$y = ae^{bx}$</td>
<td>$Y = 25816.657 \cdot e^{0.000005 \cdot GDP}$</td>
<td>$\bar{x} \ln (e^b)$</td>
<td>2.6</td>
</tr>
<tr>
<td>Sedate</td>
<td>$y = ax^b$</td>
<td>$Y = 0.000003 \cdot \text{GNI}^{2.365}$</td>
<td>$b$</td>
<td>2.4</td>
</tr>
<tr>
<td>Semi-logarithmic</td>
<td>$y = a + b \ln x$</td>
<td>$Y = -3933467.251 + 371597.262 \cdot \ln \text{IB}$</td>
<td>$\frac{b}{a + b \ln (\bar{x})}$</td>
<td>0.8</td>
</tr>
</tbody>
</table>

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