STATISTICAL METHODS IN INVESTMENT INSURANCE

Zhibek Omarkhanova [1], Dinara Amerzhanova [2], Laura Mardenova [3], Anna Zayakina [4], Rysty Sartova [5]

[1]*S.Seifullin Kazakh AgroTechnical University,* Zhenis Avenue 62*, Astana, Kazakhstan*
[2,3,4] *Ekibastuz Engineering and Technical Institute named after Academician K. Satpayev, Ekibastuz, Kazakhstan*
[5] *Almaty Technological University, Almaty Tolebi 100 Street, Kazakhstan*

E-mails: [1] *zhynysova@mail.ru ;* [2] *dididara@mail.ru;* [3] *eitiekb@mail.ru;* [4] *anet0101@mail.ru ;* [5] *sartova2010@mail.ru*

Abstract. The economy of Kazakhstan is becoming more and more integrated into the global economy every year, and this process will continue. Kazakhstan's accession to the WTO has opened the insurance market to foreign insurers even more. At the same time, foreign companies have more experience in conducting insurance operations and actively apply the latest economic and statistical methods for assessing and managing risks. In the Republic of Kazakhstan, the practice of risk management of the insurance company is not widespread, which makes the results of this study relevant and of practical importance.The development of the insurance business is associated with attracting investment. In these conditions, company management is faced with a difficult task: on the one hand, they are interested in attracting additional capital to develop and improve the reliability of the business, and on the other hand, investors demand a return on invested capital no less than alternative investments can bring. Therefore, in order to answer the challenge, you need to be able to calculate the optimal amount of attracted capital, adequate to the risks of the company. The development of methods to optimize the investment strategy is an urgent problem for the development of the Kazakhstan insurance market, the solution of which is also reflected in this article.

Keywords: insurance; statistical methods; insurance market

1. Introduction

Currently, insurance plays an increasingly important role in the system of financial and economic relations. Issues of guaranteeing the reliability and sustainability of the insurance company are of paramount importance to the insured. In the absence of confidence in the availability of such guarantees, insurance loses all meaning. Indeed, the insurance process involves the transfer of risk to the insurer and an increase in the financial stability of the

insured, whether it is an individual or an enterprise (Badyukov&Rozhkov&Feoktistova 2007). At the same time, the increase in the volume of risks for the insurer should be compensated by various methods:
- increase in the volume of insurance operations;
- reinsurance;
- accumulation of reserves, etc.
The influence of the volume of insurance operations on the financial stability of an insurance company is directly related to the operation of the statistical law of large numbers. The larger the number of insured objects, the less likely the deviation of the actual amount of insurance payments from the average expected amount of losses for a certain period. An estimate of the average amount of losses under insurance contracts is included in insurance rates. Deviation to a larger side from the average value of losses is fraught with failure by the insurer to fulfill its obligations, i.e. its insolvency. Although the calculation of insurance rates provides for the so-called risk premium for this case, and the insurer can accumulate a certain part of the funds as a result of investing insurance reserves, nevertheless, the only way to minimize the possible deviations of expected losses from the average value is to adequately estimate them and develop appropriate measures.

The concentration of significant financial resources in the hands of insurance organizations makes insurance the most important factor in the development of the economy through an active investment policy. Insurers convert passive funds received from various policyholders into active capital in the market.

2. Literature review

It can be noted that "collecting and accumulating colossal money, bourgeois insurance nourishes the banking system with its contributions and makes it possible to use insurance capital extensively and for a long time by turning them into stock values for the state's needs" (Reicher 1974).

Back in 1925, K.G. Voblyi noted that insurance companies, satisfying a need that would otherwise have been unsatisfied, managed to accumulate capital that would not have been collected without such accuracy and in such an amount (Voblyi 1993).

A.A. Mamedov points out that the insurance market has a regulatory function, which is manifested in ensuring the continuity and balance of social production through the investment of temporarily free funds of state social extra-budgetary funds and reserve funds of insurance structures (Mamedov 2003).

According to the some scientists and their studies, the ability to accumulate financial flows and direct them to the development of the economy; it turns insurance organizations into a powerful institutional investor. In all countries of the world, insurance is a strategic sector of the economy. Thus, the total investment of insurers in Europe is about 28% of GDP, which corresponds to approximately 2.2 trillion euro. In the early 90s of the twentieth century, insurance companies in Europe, Japan and the United States managed total investments of $ 4,000 billion. More than 80% of these investments were secured by life insurance operations, 50% were placed in private or public debt, of which 12 - in bonds and 15 - in the mortgage (Gvarliani & Balakireva 2004).

I.A. Krasnova in works on insurance marketing notes that the insurer does not acquire the product as such, but its ability to satisfy its specific need. That is why for the insurance organization it is important to present and distribute not the product itself and its properties, but the benefits and benefits of it for policyholders (Krasnova 1997).

The specialized literature on insurance offers a large number of definitions of "insurance market". Since insurance is a relationship associated with the formation and use of trust funds, often the content of the insurance market is identified with a study of only the economic basis of insurance (Gvozdenko 1998; Horsch et al., 2018).

In the monograph of Zhilkina A.N. the theoretical justification is given that the economic importance of insurance consists not only in compensation for damage resulting from the occurrence of an insured event, thereby ensuring stability, security of business activities, increasing the competitiveness of business entities, but also in the fact that it is one of the areas of entrepreneurship, the results of its activities contribute to the formation of GDP, and obtaining insurance profit is the financial basis for its development, improvement modernization on the basis of innovation, as well as creating opportunities for investment (Zhilkina 2014).

Thus, insurance companies should be considered as an institutional investor, i.e. a kind of financial institution, which, due to the specifics of its activities, can be described as a specialized investment institution (Electronic resource: https://kursiv.kz/news/strakhovanie/2019-01/v-kazakhstane-vveden-novyy-vid-strakhovaniya-unit-linked).

3. Methodology

In conditions of market relations, increasing the level of complexity of functioning socio-economic systems is reflected in the requirements for managing their quality and effectiveness. In modern practice, the insurance process is closely interconnected with the general management of the company's assets and liabilities and covers the entire set of actions aimed at eliminating or at least reducing entrepreneurial risk. In Kazakhstan, insurance of business risks is not as widespread as insurance of motor vehicles, property, liability, etc. However, foreign experience shows that this type of insurance is economically viable and in the near future should become the normal financial practice of enterprises (Alzhanova 2013; Grmanová & Strunz, 2017; Malyovanyi et al., 2018).

Analysis of the insurance market involves the processing of large volumes of information characterizing the studied objects; therefore this is one of the most critical stages of the study, largely determining its effectiveness. (Myšková & Hájek, 2017; Boyko and Derun, 2016; Derun and Mysaka, 2018).

The statistical reporting system allows you to obtain data on the number of insurance organizations, types, distribution by ownership and legal forms. The main indicators of the activities of insurance companies are the size of insurance premiums and payments, the number of concluded contracts, existing contracts for groups of consumers of insurance services.

Bureeva N.N. notes that among the many possible probabilistic-statistical models, one can reasonably choose the one that best fits the initial statistical data characterizing the actual behavior of the studied set of objects, evaluate the reliability and accuracy of conclusions made on the basis of limited statistical material (Bureeva 2007).

Due to the fact that the insurance market is integrated into the socio-economic environment, in addition to using direct information from insurance statistical reporting, it is advisable to use performance indicators of other sectors of the economy for the diagnosis of insurance markets according to the Figure 1 (Badyukov & Rozhkov & Feoktistova 2007).
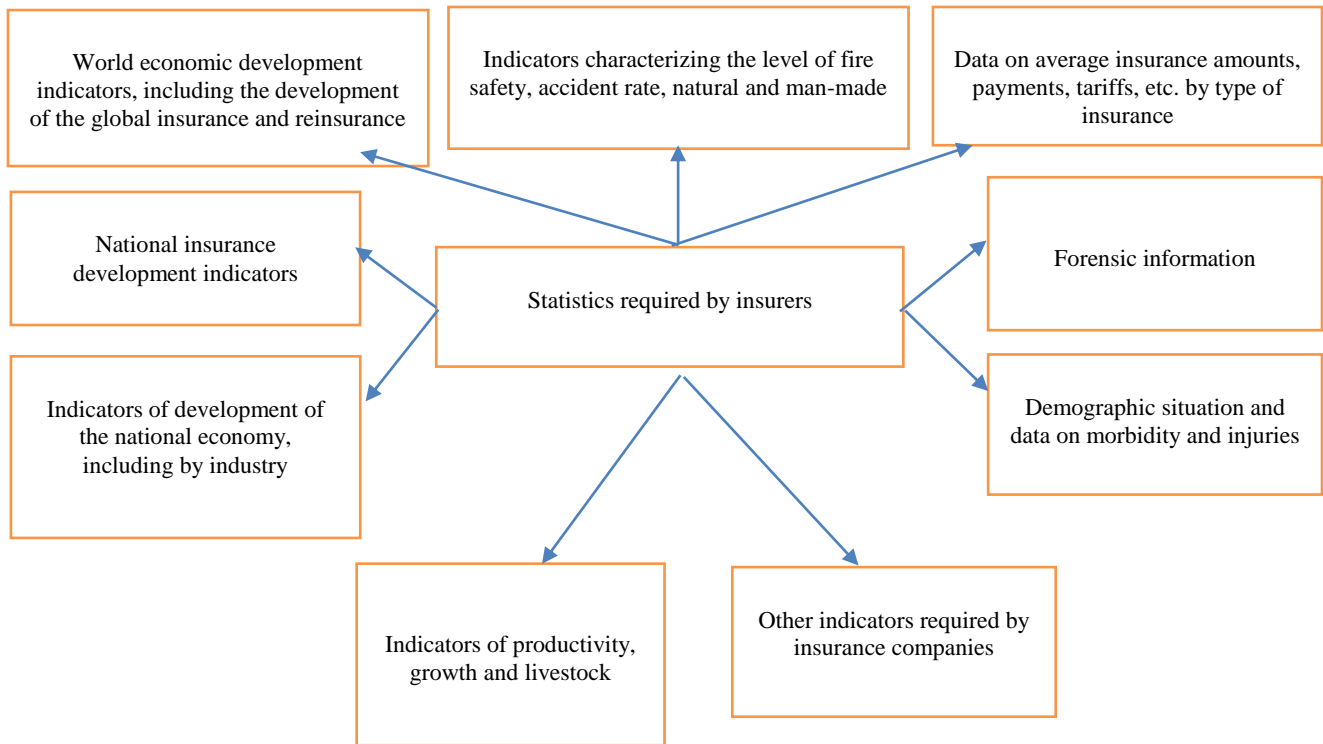
Figure 1. Indicators used to diagnose the insurance market.
Source: compiled according to the source Badyukov & Rozhkov & Feoktistova (2007)

Before considering insurance methods, it is necessary to analyze the dynamics of development indicators of the insurance market of the Republic of Kazakhstan. In the study, using a selective statistical observation, an initial database was formed to determine the current state of the insurance market of the Republic of Kazakhstan. Through a scientifically organized collection of information on the number of insurance payments and premiums, a database has been formed to analyze the state and identify trends in the insurance market. The collection of information on the number of insurance transactions made it possible to form a database for the quantitative perception of the level of efficiency and concentration of the insurance market of the Republic of Kazakhstan.

According to the Report of the National Bank of the Republic of Kazakhstan at the end of 2018, the insurance sector of the Republic of Kazakhstan was represented by 29 insurance organizations, 15 insurance brokers and 56 actuaries. The total assets of insurance companies in 2018 increased by 13.3% and amounted to 1,048.5 billion tenge at the end of the year.

Total equity for 2018 increased by 13.7% and amounted to 468.3 billion tenge. The amount of liabilities of insurance organizations amounted to 580,2 billion tenge, which is 13.0% more than in 2017. The amount of insurance reserves amounted to 519,5 billion tenge, or 89.5% of the total liabilities, which is 12.8% more compared to 2017 (Report of the National Bank of the Republic of Kazakhstan for 2018, 2019).

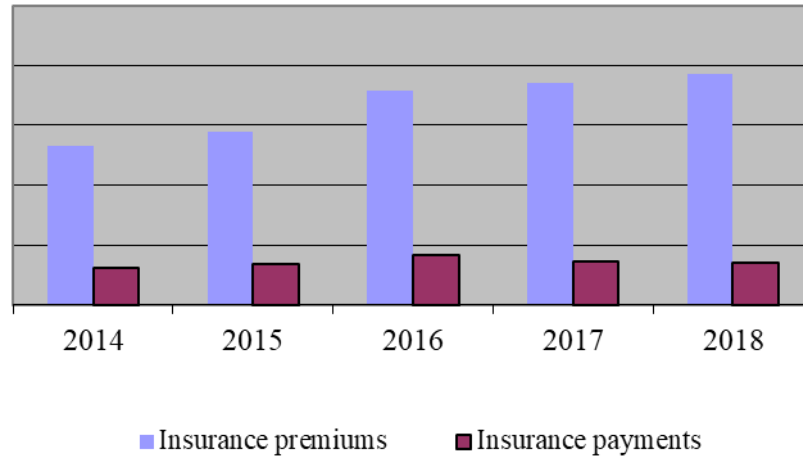Dynamics of insurance premiums and insurance payments is presented in Figure 2.

Figure 2. Dynamics of insurance premiums and insurance payments.
Source: compiled according to the source Decree of the President of the Republic of Kazakhstan dated May 23, 2019 No. 49 Report of the National Bank of the Republic of Kazakhstan for 2018 - Almaty, 2019

Taking into account the importance of investments for the economy of Kazakhstan, the possibility of using the potential of insurance resources in attracting long-term investments is extremely important. Moreover, it is possible that the transformation of insurance reserves into various sectors of the economy will contribute to the further development of the stock market in Kazakhstan.

4. Results

Based on the foregoing, it becomes clear the need to formalize the activities of the financial analysis of the insurance organization, which is an assessment of the effectiveness of managing the insurance portfolio in order to make a managerial decision.

Possessing economic and statistical tools for ensuring scientifically organized collection of information on the number of insurance payments and premiums, we consider it necessary, when studying the data of economic and statistical phenomena, to identify the interrelated patterns between the phenomena developing over time and conduct a related analysis of the dynamics. For this purpose, multi-factor models of interconnected time series are being constructed.

As the studies described in the works of various authors have shown, the results of forecasts of economic and statistical processes according to a model constructed from the series of dynamics are quite satisfactory. Therefore, it seems appropriate to consider in more detail just this technique for constructing a dynamic model of multifactorial forecasting.

For each year l of the studied period L, a multivariate model is constructed taking into account the exclusion of multicollinearity and the justification of the analytical form of the model. It is necessary that the estimates of the main factor be unbiased, consistent and effective in the considered period of time. The linear model of the studied process will take the following form: $\hat{Y}_l = a_0 x_0 + a_1 x_1 + a_2 x_2 + ... + a_m x_m$,

Where Y_l – simulated indicator of l year;

x_i – factors affecting this indicator, i $= \overline{0, m}$;

a_i – model parameters, i $= \overline{0, m}$;

m – number of factor signs.

We obtain a system of L such models, each of which is checked for adequacy by the F-criterion and t-criterion. To predict the dependent variable (resultant sign) by L steps forward, it is necessary to know the predicted values of all factors included in the model. Predicted values of factors are substituted into the model and receive point forecast estimates of the studied indicator.

To determine the range of possible values of the resultant indicator for known values of factors, i.e. confidence interval of the forecast, it is necessary to consider two possible sources of errors. Errors of the first kind are caused by the scattering of observations relative to the regression line, and they can be taken into account, in particular, by the value of the standard error of the studied parameter using the regression model. Errors of the second kind are due to the fact that the regression coefficients specified in the model are random variables distributed according to the normal law. These errors are taken into account by entering the correction factor when calculating the width of the confidence interval; the formula for its calculation includes the tabular value of t-statistics at a given level of significance and depends on the type of regression model.

Consider the forecasting process based on multifactor models on specific economic and statistical data shown in Figure 2.

The variable y (insurance premiums) depends on insurance benefits x1. Assuming a linear multiple regression model in the form of: $\hat{y} = a_0 + a_1 \cdot x_1$ define estimates a_0 , a_1 least squares parameter estimation.

Let us evaluate the regression equation:

We define the vector of estimates of the regression coefficients. According to the least squares method, the vector s is obtained from the expression: $s = (X^T X)^{-1} X^T Y$

Add a unit column to the matrix with variables X_j:

1	62
1	67
1	83
1	73
1	71

Matrix Y

266
288
357
370
385

Matrix X^T

1	1	1	1	1
62	67	83	73	71

Multiply matrices, $(X^T X)$

$X^T X =$

5	356
356	25592

In the matrix, $(X^T X)$, the number 5 lying at the intersection of the 1st row and the 1st column is obtained as the sum of the products of the elements of the 1st row of the XT matrix and the 1st column of the X matrix.

Multiply matrices, $(X^T Y)$

$X^T Y =$

1666
119764

Find the inverse matrix $(X^T X)^{-1}$

$(X^T X)^{-1} =$

20,908	-0,291
-0,291	0,00408

The vector of estimates of the regression coefficients is

$Y(X) =$

20,908	-0,291
-0,291	0,00408

$*$

1666
119764

$=$

0,235
4,676

Regression equation (estimation of the regression equation):

$$Y = 0.2353 + 4{,}6756 X_1$$

We turn to the statistical analysis of the obtained regression equation: checking the significance of the equation and its coefficients, studying the absolute and relative approximation errors.

For an unbiased estimate of variance, we perform the following calculations:

Unbiased error $\varepsilon = Y - Y(x) = Y - X*s$ (absolute approximation error)

Y	Y(x)	$\varepsilon = Y - Y(x)$	ε^2	$(Y-Ycp)^2$	$|\varepsilon : Y|$
266	290,122	-24,122	581,892	4515,84	0,0907
288	313,5	-25,5	650,273	2043,04	0,0885
357	388,31	-31,31	980,318	566,44	0,0877
370	341,554	28,446	809,173	1354,24	0,0769
385	332,203	52,797	2787,54	2683,24	0,137
			5809,196	11162,8	0,481

Estimation of standard deviation (standard error for estimating Y):

1588

$$S = \sqrt{S^2} = \sqrt{1936,3986} = 44,005$$

We find the estimate of the covariance matrix of the vector $k = S^2 \cdot (X^T X)^{-1}$

Y(X) = 1936.4

20,908	-0,291
-0,291	0,00408

=

40487,185	-563,201
-563,201	7,91

Comparative assessment of the influence of the analyzed factors on the effective sign:
5. A comparative assessment of the influence of the analyzed factors on the effective sign is made:
- an average coefficient of elasticity, showing how many percent the average of the aggregate will change the result y from its average value when the factor x_i changes by 1% from its average value;
- β – coefficients showing that if the value of the factor changes by one standard deviation S_{xi}, then the value of the resultant attribute will change on average by β of its standard deviation;
- the share of each factor in the total variation of the effective attribute is determined by the coefficients of separate determination (separate definition): $d_i^2 = r_{yxi}\beta_i$.

$$d_1^2 = * = 0$$

In this case, the equality

$$\sum d_1^2 = R^2 = 0$$

Coefficient of determination: $R^2 = 0.6925^2 = 0.4796$

A more objective assessment is the adjusted coefficient of determination:

$$\bar{R}^2 = 1 - (1 - R^2) \cdot \frac{n-1}{n-m-1}$$

$$\bar{R}^2 = 1 - (1 - 0,4796) \cdot \frac{5-1}{5-1-1} = 0,306$$

The closer this coefficient is to unity, the more the regression equation explains the behavior of Y.

New explanatory variables are added to the model as long as the adjusted coefficient of determination increases.

Testing hypotheses regarding the coefficients of the regression equation (checking the significance of the parameters of the multiple regression equation):

The number $v = n - m - 1$ is called the number of degrees of freedom. It is believed that when evaluating multiple linear regression, to ensure statistical reliability, it is required that the number of observations be at least 3 times greater than the number of estimated parameters.

We calculate t - statistics:

T_{tabl} (n-m-1; α/2) = (3; 0,025) = 3,182

$$t_i = \frac{b_i}{S_{b_i}}$$

$$t_0 = \frac{0{,}235}{201{,}214} = 0{,}00117 < 3{,}182$$

The statistical significance of the regression coefficient b_0 is not confirmed.

$$t_1 = \frac{4{,}676}{2{,}812} = 1{,}662 < 3{,}182$$

The statistical significance of the regression coefficient b_1 is not confirmed.

Confidence interval for the coefficients of the regression equation:
We determine the confidence intervals of the regression coefficients, which with a reliability of 95% will be as follows:

$$(bi - ti \cdot Sbi; \; bi + ti \cdot Sbi)$$

b_0: (0,235 − 3,182·201,214 ; 0,235 + 3,182·201,214) = (-640,029; 640,499)

b_1: (4,676 − 3,182·2,812 ; 4,676 + 3,182·2,812) = (-4,274; 13,625)

Checking the overall quality of the multiple regression equation (F-statistics and Fisher test):
Let us verify the hypothesis of general significance - the hypothesis of the simultaneous equality to zero of all regression coefficients with explanatory variables:

$$H_0 : R^2 = 0; \; \beta_1 = \beta_2 = \cdots = \beta_m = 0$$

$$H_0 : R^2 \neq 0.$$

This hypothesis is tested using F-statistics of the Fisher distribution (right-hand check).

If $F < F_{kp} = F_{\alpha \, ; \, n\text{-}m\text{-}1}$, then there is no reason to reject the hypothesis H_0.

$$F = \frac{R^2}{1 - R^2} \frac{n - m - 1}{m} = \frac{0{,}4796}{1 - 0{,}4796} \frac{5 - 1 - 1}{1} = 2{,}765$$

Table value with degrees of freedom $k_1 = 1$ and $k_2 = $ n-m-1 = 5 - 1 - 1 = 3, Fkp(1; 3) = 10.1

Since the actual value is $F < Fkp$, the determination coefficient is not statistically significant and the regression equation is statistically unreliable (the joint insignificance of the coefficients for factors x_i is confirmed).

As a result of the calculations, the multiple regression equation was obtained: $Y = 0,2353 + 4,6756X_1$.

An economic interpretation of the model parameters is possible: an increase in X_1 by 1 unit of measurement leads to an increase in Y by an average of 4.676 units. The statistical significance of the equation was verified using the coefficient of determination and the Fisher test. It is established that in the studied situation 47.96% of the total variability of Y is explained by a change in factors X_j.

The national insurance market remains one of the stable suppliers of domestic investment resources, the Kazakhstan economy, especially its real sector, is in dire need of increasing its demand. The structure of the investment portfolio of insurance companies in Kazakhstan does not differ in high differentiation. Up to 90% of the insurance fund is placed in classic financial instruments - deposits and securities.

Such a tool as the issuance of loans, actively used by insurance companies in European countries, in Kazakhstan can only be used by insurance organizations licensed in the class of "life insurance". Its share does not exceed 0.1% of the total investment portfolio. Over the past 3 years, insurance companies have not invested in other instruments, including refined precious metals and metal deposits (old.kase.kz/ru/page/rfca_reports & www.Ranking.kz).

The structure of the investment portfolio of insurance companies in Kazakhstan is presented in Figure 3.
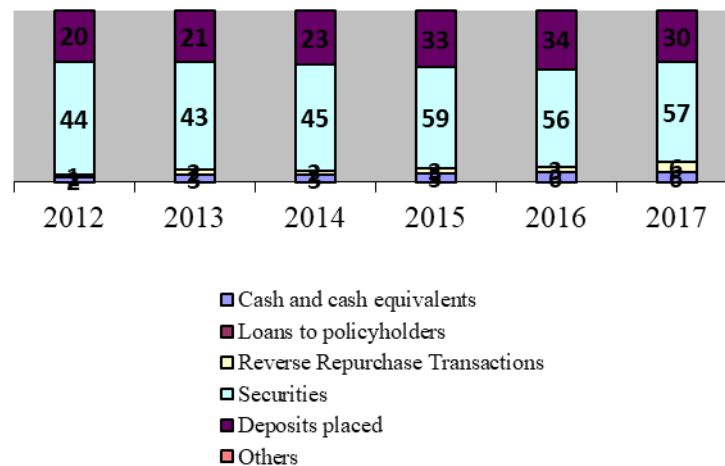

Figure 3. The structure of the investment portfolio of insurance companies in Kazakhstan, %.
Source: compiled by authors using the data of National Bank of the Republic of Kazakhstan of 2017 year

In 2017, insurance organizations invested about 39 billion tenge in the economy of Kazakhstan, the investment portfolio totals about 705 billion tenge. The largest increase was demonstrated by reverse repos - almost 83%. To date, this type of instrument is of interest from insurers due to their short-term and moderate profitability. The securities portfolio will be characterized by moderate growth - 8% or about 403 billion tenge at the end of 2017. The deposit portfolio, on the contrary, decreased by 5-6% due to high price risks due to revaluation.

The main source of profitability of the sector remains the income from insurance activities, the share of which in the total income varies from 83% -93%. The exception was 2015, when income from investment activities exceeded insurance income more than 2 times due to the transition to a free-floating exchange rate.

According to estimates, income from insurance in 2017 amounted to about 260-270 billion tenge. Income from investment activities was calculated at the level of 50-55 billion tenge (http://www.nationalbank.kz & old.kase.kz/ru/page/rfca_reports).

Financial results of the insurance sector is presented in Table 1.

Table 1. Financial results of the insurance sector, billion tenge.

Financial results	2012	2013	2014	2015	2016	2017
Total income	194	220	236	452	300	321
Total expenses	157	181	182	238	218	244
Total net profit (loss) before tax	37	39	53	214	83	76

Source: compiled by authors using the data of National Bank of the Republic of Kazakhstan of 2017 year

More than half in the structure of assets are securities: 599 billion tenge, or 53.7%, over the year the amount increased by 31.8%. Placed deposits and reinsurance assets concentrated 19.6% and 10.1% of assets, respectively, in total their amount is 331.6 billion tenge (http://www.nationalbank.kz & www.Ranking.kz).
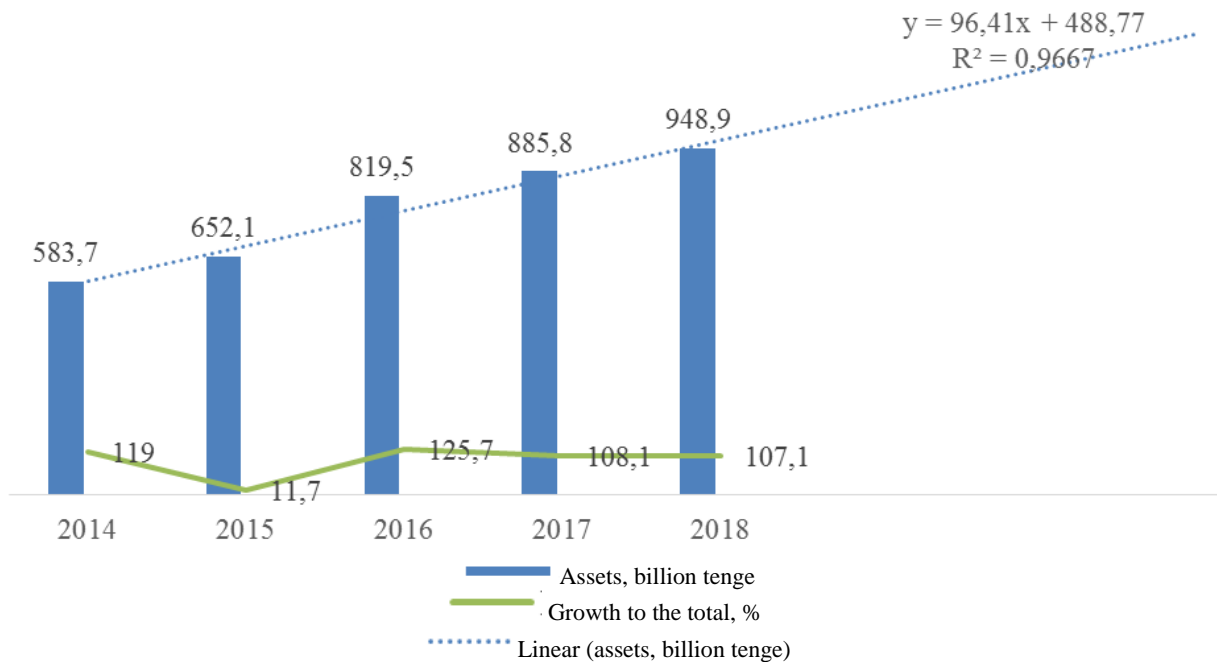

Figure 4. Assets of insurance companies of the Republic of Kazakhstan for the period from 2014-2018**.**
Source: compiled by authors according to the electronic sources http://www.nationalbank.kz; www.Ranking.kz

Over the past few years, the Kazakhstan insurance sector has been earning investment. The explosive growth in investment income is due to the simultaneous (2015) and permanent devaluation of the national currency. The main factors that S&P Global Ratings pays attention to when assessing the risks of investment activity of insurers are the level of concentration on one sector and the level of concentration on one counterparty. The volume of insurance premiums transferred for reinsurance amounted to 89.8 billion tenge, or 23.3% from the total amount of insurance premiums. At the same time, 83.7% of insurance premiums were transferred for reinsurance to non-residents of the Republic of Kazakhstan (https://forbes.kz/.../sp_global_ratings).

In Kazakhstan, insurance companies have requirements for the structure of the investment portfolio. But these requirements are more likely to relate to investments in individual counterparties than to investments in a particular sector. The graph shows the average sample of those insurance companies that S&P Global Ratings ranks in a particular country. In general, we see a sufficient concentration of investments in one sector in emerging markets. The main common feature of these markets is that most insurance companies invest in the financial sector, mainly in local banks.

In developed countries, taking into account risk-based approaches, the share of concentration in one sector and one counterparty is significantly lower. In general, S&P Global Ratings evaluates as neutral for assessing diversification of investment portfolios if the concentration share in one sector is less than 30%, and accordingly, on one issuer less than 10%. The lower concentration, the more positive the assessment (https://forbes.kz/.../sp_global_ratings).

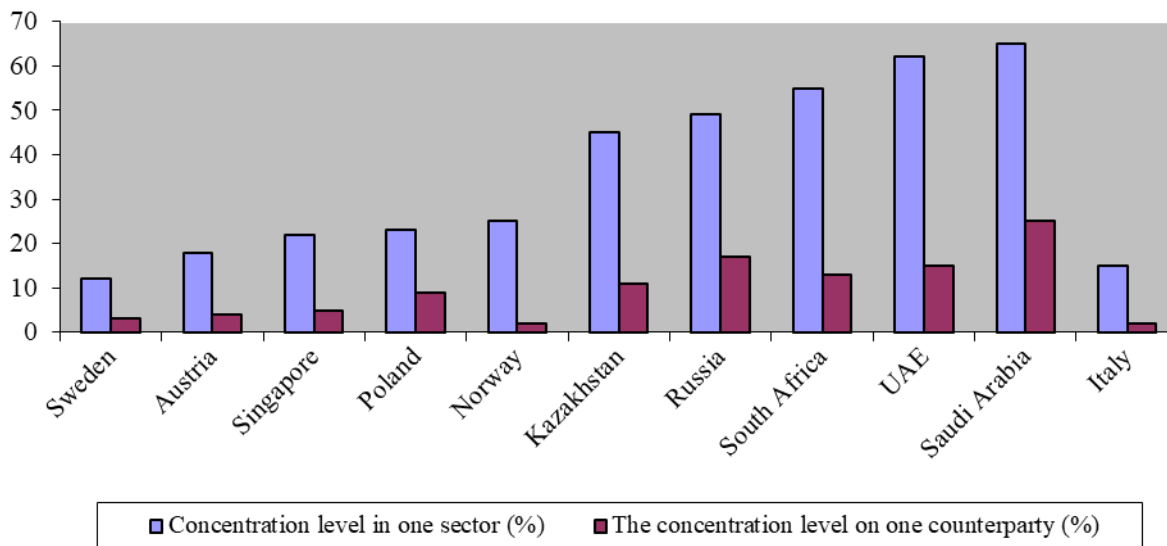Country portfolio diversification indicators is presented in Figure 5.

Figure 5. Country portfolio diversification indicators.
Source: compiled by authors according to the electronic source https://forbes.kz/.../sp_global_ratings

According to Figure 6, diversification of the investment portfolio: neutral assessment - if the concentration level is not higher than 15-30% for one sector, for one issuer in the investment portfolio.

Another component of diversification is the analysis of the level of high-risk assets (https://forbes.kz/.../sp_global_ratings & www.Allinsurance.kz).

Accordingly, S&P Global Ratings considers high-risk assets investments in fixed-income instruments with a rating below "BB +", shares, real estate, investments in partnerships and joint ventures. We include investments in real estate, with the exception of objects that the insurance company uses for its own activities. Or, for example, real estate in Switzerland is, in accordance with our criteria, a low-risk investment.

The share of high-risk assets varies from company to company. This is due to the available financial instruments that are currently on the market. We understand that the number of financial instruments with high credit quality is limited, therefore, the share of high-risk assets is significant in Kazakhstan. And, first of all, it is determined by the development of the banking sector (https://forbes.kz/.../sp_global_ratings).

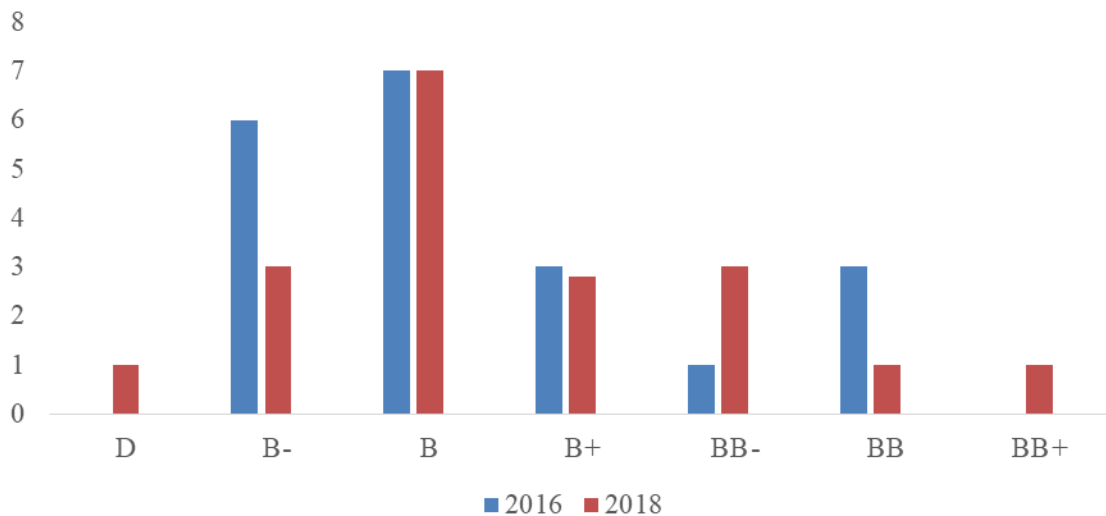Risk assessment in insurance of the banking system of Kazakhstan is presented in Figure 6.

Figure 6. Risk assessment in insurance of the banking system of Kazakhstan**.**
Source: compiled by authors according to the electronic source https://forbes.kz/.../sp_global_ratings

Analyzing Figure 7, we can distinguish positive and negative factors:
1 Positive factors:
- The ability and willingness of the Government of Kazakhstan to provide support to banks with high and moderate systemic importance;
- the ability and willingness of shareholders to inject new capital and provide support to banks in the form of liquidity;
- stable funding and liquidity indicators of most banks.
2 Negative factors:
- unfavorable operating conditions for banks in Kazakhstan;
- low capitalization and profitability;
- high in the international context, the concentration of the loan portfolio on individual counterparties and sectors;
- high level of problem loans.

In general, we see that the ratings of banks in Kazakhstan remain low: most of the banks are in the rating category "B".

Vulnerabilities in the banking sector may subsequently affect the insurance sector, especially since more than 35% of all insurers' investments are in the banking sector. Therefore, the situation in the banking sector remains a pressing issue for insurance companies, and it will take time to overcome the difficulties that exist in the banking sector. But no less important is the question of diversifying the investment portfolio not only for general insurance companies, but also for life insurance companies, since financial instruments are limited, obligations are long, and investments are short.

Considering the currency risks of the Kazakhstan insurance market, it can be stated that the result from investment activities and the revaluation income in 2018 were not bad, just due to the revaluation of the currency (https://forbes.kz/.../sp_global_ratings&www.Allinsurance.kz).

Forecasted values of investment income of the Kazakhstan insurance market of Kazakhstan for 2019-2021is presented in Figure 7.

The chart shows $y = 1{,}4286x^2 - 20{,}739x + 204{,}09$ and $R^2 = 0{,}3808$.

Figure 7. Forecasted values of investment income of the Kazakhstan insurance market of Kazakhstan for 2019-2021, %
Source: compiled according to the source Sedelev (2009)

A significant discrepancy between assets and liabilities in foreign currency - approximately 10% (the volume of unhedged assets denominated in foreign currency) of the capital of the insurance company - leads to a negative assessment when determining the rating of the insurance company.

Investment income of Kazakhstan insurers from the placement of deposits and investments in bonds averages about 7%. If we compare the return on investment of Kazakhstani insurers with developed markets, the situation is much better, because in some countries in developed markets there are negative interest rates, in others - income does not exceed 3%. This confirms the thesis that insurance companies in developed markets earn more on insurance than on investment.

In general, instruments with investment grade ratings prevail in the portfolios of European insurers. This is mainly due to the requirements of Solvency II, according to which insurance companies are guided by a balanced approach to the level of accepted risk and profitability; therefore many insurance companies invest in instruments with a higher rating. In comparison with developed markets, we see that the average weighted credit quality of fixed-income instruments (mainly deposits and bonds) in the portfolios of insurance companies in Kazakhstan varies approximately in the rating category "B" to "BB", which refers to the non-investment category, although we see that some insurance companies invest in government securities quasi-government instruments as more reliable.

Conclusions

The formation of a socially oriented market economy in the Republic of Kazakhstan required a radical change in the principles of managing, attracting new and improving traditional tools for managing the economy (Kindurys V. 2011). In modern conditions, as evidenced by best practice, the most effective is the insurance system, which is the most important category of a system of market economic relations and is designed to protect the property interests of citizens and economic entities by market methods.

An essential condition for the normal development of the state is to ensure the safety of society in a market economy. In the conditions of the functioning of the market, the state ceases to be liable for compensation for damage to business entities and citizens in the event of adverse events, natural disasters and catastrophes. The tool that can compensate for losses in the process of market relations is insurance. The results of the provision of insurance services are an important factor in stimulating the economic activity of hotel entities and have a positive effect on the entire economy of the republic as a whole.

Kazakhstan received high marks in a survey conducted by Ernst & Young. According to the EY 2016 study, "investor confidence in Kazakhstan's potential is also at a record high: 47.3% of respondents expect Kazakhstan to become more attractive over the next three years. The main reasons for its attractiveness were the high level of economic, political and social stability and the competitive corporate tax rate in Kazakhstan. A 2017 OECD investment policy review noted that "big steps" were taken to open up opportunities for foreign investors and improve the policy of attracting FDI (OECD Investment Policy Reviews 2017).

Therefore, the leaders of insurance companies face many challenges. Political and regulatory changes in the world are transforming a number of basic rules for operating insurance companies. Innovation and high expectations of customers are a factor accelerating the change in business practices, and new advanced insurance companies are striving to take the place of traditional market participants. In particular, insurance companies are trying to keep pace with the development of technology in the field of insurance. From the perspective of today, the extremely important role of the insurance market in creating conditions for the stable functioning of the economy predetermines increased attention to aspects of insurance. In modern conditions, insurance is a tool to protect the interests of society and entrepreneurship and a supplier of investment capital for the country's economy. This is the two main role-playing functions of the insurance market. In addition, insurance is the only way to transfer the burden from budgets of all levels in the aftermath of emergency situations to extrabudgetary funding mechanisms.

Based on the results obtained, it can be concluded that the insurance market of the Republic of Kazakhstan today, first of all, depends on global economic development trends and on the productivity of bank lending to individuals in the state.

In general, characterizing the current state of the insurance market and the methods that are used in investment insurance of the Republic of Kazakhstan, we can talk about the need for a comprehensive study and development

of the problems of forming the organizational, managerial and financial potential for sustainable development of the national insurance market. The methodology of sustainable development of the insurance system should be based on the strategy and goals of the country's socio-economic development. On the basis of the chosen strategic goals for the development of the national economy, its priorities and basic guidelines, as a socially oriented market economy, a theoretical and methodological basis for the development of the insurance business, the formation of its sustainable growth should be developed.

Therefore, the fundamental principles and methods of organizing the activities of the insurance business, questions of mechanisms and criteria governing the activities of the insurance market and reflecting strategic goals and objectives for the qualitative development of the national insurance system, form the basis of this study.

References

Alzhanova, N.Sh. 2013. Insurance Development in Kazakhstan: Risks and Ways of Real Competition Development, *KazNU Bulletin. Economics series,* 1(95), 25

Badyukov, V.F., Rozhkov, Yu.V., Feoktistova, N.A. 2007. *Diagnostics of Regional Insurance Markets.* Khabarovsk. 196 p.

Boyko K., Derun I. 2016. Disclosure of non-fi nancial information in corporate social reporting as a strategy for improving management eff ectiveness, *Journal of International Studies*, 9(3), 159-177. https://doi.org/10.14254/2071-8330.2016/9-3/13

Bureeva, N.N. 2007. *Multivariate statistical analysis using the STATISTICA IFR.* Educational material on the continuing education program "Application of software in scientific research and teaching mathematics and mechanics". Nizhny Novgorod. 112 p.

Electronic resource: http://RARFCAold.kase.kz/ru/page/rfca_reports

Electronic resource: http://www.Allinsurance.kz

Electronic resource: http://www.Ranking.kz

Electronic resource: https://forbes.kz/.../sp_global_ratings

Electronic resource: https://kursiv.kz/news/strakhovanie/2019-01/v-kazakhstane-vveden-novyy-vid-strakhovaniya-unit-linked

Decree of the President of the Republic of Kazakhstan dated May 23, 2019 No. 49 Report of the National Bank of the Republic of Kazakhstan for 2018. Almaty.

Derun, I., & Mysaka, H. 2018. Stakeholder perception of financial performance in corporate reputation formation. *Journal of International Studies*, 11(3), 112-123. https://doi.org/0.14254/2071-8330.2018/11-3/10

Grmanová, E., & Strunz, H. 201). Efficiency of insurance companies: Application of DEA and Tobit analyses. *Journal of International Studies*, 10(3), 250- 263. https://doi.org/10.14254/2071-8330.2017/10-3/18

Gvarliani, T.E., & Balakireva, V.Yu. 2004. *Cash flows in insurance*. Moscow: Finance and Statistics. 336 p.

Gvozdenko, A. A. 1998. *Fundamentals of insurance*. Moscow: Finance and Statistics.

Horsch, A., Sysoyeva, L., & Bogma, S. 2018. Deposit insurance systems of postSoviet countries: A comparative analysis. *Journal of International Studies,* 11(4), 22-44. https://doi.org/10.14254/2071-8330.2018/11-4/2

Kindurys, V. 2011. *Life assurance business and its development tendencies and manifestations in Lithuania: theoretical and practical aspects: monograph*. Vilnius: Vilnius University 574 p.

Krasnova, I. 1997. Research of the insurance field. *Insurance Review,* 3, 4.

Malyovanyi, M., Nepochatenko, O., Nesterchuk, Y. 2018. Conceptual Approaches to Improving the Functioning of Non-state Social Insurance Institutions in Ukraine. *Economics and Sociology*, 11(2), 289-304. https://doi.org/10.14254/2071-789X.2018/11-2/20

Mamedov, A. A. 2003. *Theoretical foundations of tax relations in the insurance industry. Insurance business,* 456 p.

OECD Investment Policy Reviews: Kazakhstan 2017 (June) dated June 15, 2017

Official website of the National Bank of the Republic of Kazakhstan. 2019. Current Status of the Insurance Sector of the Republic of Kazakhstan http://www.nationalbank.kz.

Reicher, V.K. 1974. *Socio-historical types of insurance.* Moscow: Publishing House of the Academy of Sciences of the USSR. 367 p.

Sedelev, B.V. 2009. *Regression models and methods for assessing the parameters and structure of economic processes.* Moscow: MEPhI. 240 p.

Zhilkina, A.N. 2014. *An innovative approach to managing the insurance business: a monograph.* St. Petersburg: Publishing House of the St. Petersburg University of Management and Economics. 126 p.

Zhibek OMARKHANOVA is Candidate of Economic Sciences, Associate Professor of S.Seifullin Kazakh AgroTechnical University, Astana, Kazakhstan. Research interests: finance, insurance, banks.
ORCID ID: orcid.org/0000-0002-8015-2383

Dinara AMERZHANOVA is Doctor of Economic Sciences, Associate Professor of the Ekibastuz Engineering and Technical Institute named after Academician K. Satpayev, Ekibastuz, Kazakhstan. Research interests: housing financing, development of mortgage lending, investments, banking system problems.
ORCID ID: orcid.org/0000-0002-4357-0287

Laura MARDENOVA is the teacher at the Department of Economics and Management of the Ekibastuz Engineering and Technical Institute named after Academician K. Satpayev, Ekibastuz, Kazakhstan. Research interests: investment, innovation, human resources.
ORCID ID: orcid.org/0000-0001-6811-0212

Anna ZAYAKINA is the Senior Professor at the Department of Economics and Management of the Ekibastuz Engineering and Technical Institute named after Academician K. Satpayev, Ekibastuz, Kazakhstan. Research interests: investment, innovation, human resources.
ORCID ID: orcid.org/0000-0003-0333-7867

Rysty SARTOVA is Candidate of Economic Sciences, Associate Professor, Almaty Technological University, Almaty, Kazakhstan. Research interests: financial aspects of economic development, investment, lending; financing of the economy, development of banking system, problems of functioning of country's financial system.
ORCID ID: orcid.org/0000-0001-7982-0957