International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 2, Issue 9, September, 2023
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

Linking Profit Margin, Seo, and Roe: A Case of Uzbek Insurance Companies

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Abstract
In this article, based on the financial reports of the participants of the insurance market of Uzbekistan, the relationship between their financial indicators, in particular, the relationship between the return on capital, profitability, insurance reserve, is studied. As a control factor, the impact of companies' online search engine optimization (SEO) on financial performance was also assessed. Also, in the article, these relationships were statistically analyzed using two different models

Keywords. Return on capital, profitability, SEO, insurance reserve, marketing, periodic costs, multifactor regression, logit model, marginal effects.

Introduction

The insurance sector consists of companies that offer risk management in the form of insurance contracts. The basic concept of insurance is that one party, the insurer, guarantees payment to the insured for an uncertain future event. At the same time, the other party, the policyholder or the insured, pays a lower premium to the insurer in exchange for this protection in an uncertain future event.

Regulation is an important component of ensuring consumer safety, financial stability and ethical practice in the insurance sector. Insurance companies must comply with the laws and regulations established by the supervisory and state authorities. With few exceptions, insurance companies are classified as either mutual or stock ownership. In a mutual ownership structure, the policyholders are the owners of the company. They can vote at board meetings and are contractual creditors. In this respect, it is similar to takaful in Islamic finance. Takaful is a form of corporate insurance covering all types of risks under the management of a special company that adheres to the rules and principles of Islamic Shariah. In accordance with Islamic finance, the insurance contract is drawn up on the basis of mutual assistance and charity, the damage or losses caused by various risks are fairly distributed among the members (that is, the losses are covered by the funds contributed by the members) (Abdurasulov, 2022).

In a joint-stock structure, policyholders are not responsible for the company's losses or profits and are not considered owners of the company. Maybe the company will be owned by shareholders. To become a stock insurance company, companies must obtain approval from state regulators.

An insurance reserve is a reserve of money set aside by an insurance company to pay policyholders who have made or are expected to make legal claims under their policies. Insurers use the fund to pay outstanding claims. An insurer's reserve policy can have a significant impact on its profits. Over-provisioning is an opportunity cost for the insurer, as it leaves less money available for investment. Conversely, holding less can increase profitability because more funds are freed up to invest. However, regulators closely monitor insurance companies' reserve policies to ensure that adequate reserves are set aside on the balance sheet.

Literature review

In the course of the research, we got acquainted with the results of a number of scientific literature and researches. In particular, according to L. Agarkova (2020), analysis of current liquidity plays an important role in determining the ability of the organization to cover insurance obligations and improving asset management.

According to Deepali Singh (2011), branding in insurance companies is more important than product naming. Considering that brand equity is the value accumulated in a brand due to positive customer perception, branding is essential to improve and manage the relationship between an insurer and its customer and the general public.

According to another study, organizational brand awareness is the most important factor influencing consumer purchasing behavior in the insurance industry. Company loyalty and advertisements have no significant effect on consumer buying behavior (Sudha et al., 2019). However, brand loyalty and advertising are still important to the insurance product offering itself.

In our research, we also considered the insurance reserve as a separate factor. The regulator regularly monitors its compliance with certain standards. But according to research by Jennifer J. Gaver (2004) and others, insurance companies manipulate insurance reserves to avoid violating regulators' standards for solvency reporting. Reserve manipulations can sometimes delay necessary regulatory intervention for long periods of time.

Another article with similar aspects to our study analyzed financial indicators such as ROI, ROE and ROA of insurance companies and evaluated their impact on stock prices (Kabajeh et al., 2012). Eva Grmanova et al. (2017) studied the panel data of financial indicators of insurance organizations in Slovakia and analyzed the relationship between their tech efficiency and profitability. They also used ROE, ROI, and ROA as measures of profitability.

These financial indicators are calculated on the basis of balance sheet data and financial statements of insurance organizations. However, it should be noted that these indicators may be different for takaful organizations. Because their accounting standards do not fully match the traditional system. This is discussed in another article of ours (Abdurasulov, 2023).

Methodology

We used Selenium and BeautifulSoup algorithms to create the database and collected 2-quarter data of insurance organizations from the corporate information portal of the Ministry of Economy

and Finance by webscraping method. As a result, it was possible to monitor the data of the last two quarters of 2022 of more than 40 companies in our analysis.

In the study, we formed two different models. as an independent variable, we first included the return on equity (ROE) coefficient, and then an indicator variable that can be seen as a proxy for brand awareness, which is also the keyword "insurance" in the Google search engine brand name appears on the first two pages when the word is entered. We tentatively named this factor "top".

We used multifactorial regression analysis and logit model in conducting the research, we tried to remove the effects of heteroscedasticity, multicollinearity and non-normal distribution in the model when testing the given hypotheses.

Results and discussion

When determining the coefficient of return on capital, it is necessary to calculate the ratio of retained earnings in the current reporting period to capital investments in the previous reporting period.

$$ROE = \frac{Retained\ profit}{K_0}$$

Here, ROE is the coefficient of return on capital, $K_0$is the cost of capital in the previous reporting period. One of the variables in our research was this coefficient, and we called it roe in the STATA program.

Also, another variable named "top" is an indicator factor. When the keyword "insurance" is entered into the Google search engine, the "top" value of the companies whose names appear on the first two pages is considered equal to 1, if not, equal to 0. This allows us to indirectly evaluate several different indicators of companies, including search engine optimization performance, brand awareness, competition policy effectiveness, online marketing strategy, and potential to attract customers.

Another variable is insurance reserves, as this factor is important in determining the stability and solvency of insurance companies.

First, we created a multifactor regression model and it looked like this:

$$roe = \beta_0 + \beta_1 \cdot \ln(reserve) + \beta_2 \cdot top + \beta_3 \cdot share\_of\_profit + e$$

The reason for taking the natural logarithm of the insurance reserve is that it approximates a large range of data to the values of the other variables in the model, and it also helps the data to have a normal distribution. Below are 10 selections from the data:

roe	Share_of_ profit	lnreserve	top
0.099	0.007	18.321	0
0.254	0.258	18.623	0
-0.060	0	18.203	1
-0.028	0	17.301	0
-0.195	0	17.647	1
0.159	0.058	18.022	0
0.025	0.181	17.077	0
-0.436	0	19.292	1
0.055	0.203	20.130	1
0.046	0.110	16.217	0

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1-Example from the dataset.

Descriptive statistics of the data are as follows

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
roe	42	.029	.154	-.436	.425
Lnreserve	42	17.769	.969	16.165	20.13
Share_of_profit	42	.103	.195	0	1.012
Top	42	.19	.397	0	1

According to our main hypotheses, the reserve ratio has a positive effect on the capital return of insurance organizations, and the effect of brand recognition is also positive. The effect of profitability is clearly positive, since retained earnings are included in the calculation of both ROE and profitability. But the quantitative value of the effect is not clear, we try to determine it through the model. Our hypotheses look like this:

a) $H_0: \beta_1 \leq 0, H_A: \beta_1 > 0$

b) $H_0: \beta_2 \leq 0, H_A: \beta_2 > 0$

The results of multifactor regression were as follows:

Linear regression

roe	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Lnreserve	.065	.021	3.06	.004	.022	.107	***
Top	-.148	.051	-2.87	.007	-.252	-.044	***
Share_of_profit	.443	.094	4.73	0	.253	.633	***
Constant	-1.137	.37	-3.07	.004	-1.886	-.387	***

Mean dependent var	0.029	SD dependent var	0.154
R-squared	0.486	Number of obs	42
F-test	11.971	Prob > F	0.000
Akaike crit. (AIC)	-58.870	Bayesian crit. (BIC)	-51.920

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

If we evaluate the model itself, it is safe to say that the parameters of the model are different from zero due to the fact that Prob>F is close to 0. So our regression analysis makes sense. The determination coefficient of 0.486 means that the independent variables in our model explain 49% of the independent variables. If we take into account that the coefficient of determination in the analysis of spatial data is often from 0.1 to 0.4, we can conclude that our indicator is good.

Student's $t-test$ tests the hypotheses for each parameter separately. According to the results of this test, the parameters of all three independent variables ($\beta_1, \beta_2, \beta_3$) are statistically significant at the p value of 0.05, that is, both are clearly non-zero. The value of the constant can be said to be statistically significant.

According to the data in the table, a one percent increase in the amount of insurance reserves in insurance organizations increases the coefficient of capital return by 0.065 units, in other words, the capital return is 6.5% more. It can be said with 95% confidence that this value can vary between 2.2% and 10.7%. Therefore, the change in the insurance reserve has a multiplier effect.

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An increase in profit margin by 1 unit increases the capital return coefficient by 0.44 units. It can be said with 95% confidence that this value lies between 0.25 and 0.63, but is clearly different from zero. It is logical that profitability increases the ratio of return on capital, and through this study we evaluated its effect. Therefore, insurance organizations should try to increase the share of profit in gross income in exchange for reducing the cost of their services and periodic expenses. The influence of our variable named "top" turned out to be negative, contrary to our hypothesis. First of all, we do not yet have theoretical conclusions that this factor is primary in causality. But this relationship can be expressed as follows. Companies using SEO (Search Engine Optimization) marketing to appear on the first pages of search engines may not be limited to this and may incur other periodic costs. This, in turn, can lead to lower ROI if marketing strategies are not working well enough. From the data we have, we can give a preliminary conclusion that the marketing campaigns of insurance organizations are currently lacking in order to increase the return on capital. But when this factor is formed by another model in place of the independent variable, the causal relationship changes.

Below we can see the graphs that express the influence of factors other than the indicator variable on the return on capital:

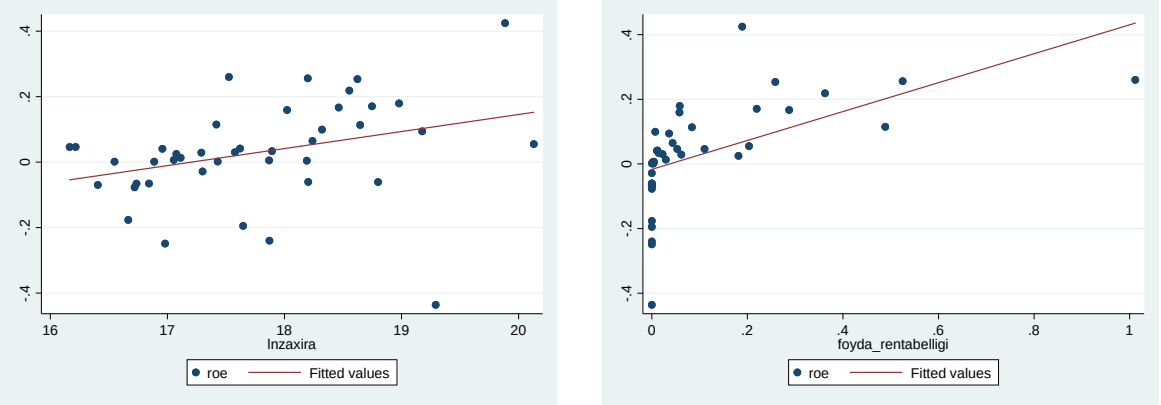

Figure 1. Effect of insurance reserve and profitability on capital return ratio

As can be seen from the graph, both the insurance reserve and the profit margin have a positive correlation with the capital return ratio.

We used Breusch-Pagan's heteroscedasticity test to check that the error variance was constant in our model. As a result, it turned out to be $Prob > chi^2 = 0.26$. In this test, the hypothesis H_0 is "variation of errors is unchanged", since our result is greater than 0.05, we remain in the null hypothesis, that is, the results of our analysis do not have the characteristic of heteroskedasticity.

We used VIF analysis to determine the presence of multicollinearity between independent variables, and its average was 1.2. As a rule, if the mean of VIF is less than 10, it can be said that there is no problem of multicollinearity between the factors, so our result is statistically satisfactory.

We used the Shapiro-Wilk test to test whether the data in our model were normally distributed and obtained the following results:

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Variable	Obs	W	V	z	Prob>z
roe	42	0.959	1.694	1.112	0.133
lnzaxira	42	0.974	1.077	0.156	0.438
foyda_rent~I	42	0.598	16.496	5.916	0.000

In this test, the hypothesis H_0 is "data is normally distributed", and in our results, since the value of p in two factors is greater than 0.05 in all independent variables, we stay with that hypothesis. That is, the capital return and insurance reserve data are normally distributed. Only profitability did not pass the normal distribution test. But since it is an independent variable and we are working with spatial data, it does not interfere with the interpretation of the model. Because in the conditions of the regression model, it is enough if the independent variable itself is normally distributed.

As we mentioned earlier, we wanted to see the indicator factor as an independent variable in another model. For this we use the logit model.

$$P(top = 1) = \beta_0 + \beta_1 \cdot roe + \beta_2 \cdot \ln(reserve) + \beta_0 \cdot share\_of\_profit$$

That is, in this analysis, we examine how the return on capital, insurance reserve, and profit margin would be if insurance companies implemented SEO. The results of the logit model were as follows:

Logistic regression

top	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
roe	-13.329	6.303	-2.11	.034	-25.683	-.976	**
lnzaxira	3.031	1.335	2.27	.023	.414	5.647	**
foyda_rentabelligi	7.433	3.538	2.10	.036	.499	14.367	**
Constant	-56.839	24.556	-2.31	.021	-104.968	-8.709	**

Mean dependent var	0.190	SD dependent var	0.397
Pseudo r-squared	0.438	Number of obs	42
Chi-square	17.902	Prob > chi2	0.000
Akaike crit. (AIC)	30.999	Bayesian crit. (BIC)	37.950

As can be seen from the table, the coefficients of all independent variables are statistically significant, as $p < 0.05$ for all three factors. It is known that coefficients are not interpreted in probit-logit models, only the direction of the relationship can be stated. That is, an increase in the return on capital decreases the probability of SEO, but an increase in the return on reserves and profit increases this probability.

In order to calculate how much each factor changes the likelihood that an insurance company will implement SEO, it is necessary to determine the marginal effects. As a basis, we take the average of our observations for:

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Delta-method

	dy/dx	Std.Err.	z	P>z	[95%Conf.	Interval]
roe	-0.848	0.530	-1.600	0.109	-1.887	0.190
lnreserve	0.193	0.098	1.960	0.050	0.000	0.386
Share_of_pr	0.473	0.279	1.700	0.090	-0.074	1.020

dy/dx w.r.t. : roe lnzaxira foyda_rentabelligi
at : roe = .029412 (mean)
lnreserve = 17.76878 (mean)
share_rent~i = .1033815 (mean)

Looking at the marginal effects, a 0.029 point increase in the ROE ratio by one unit reduces the probability of insurance companies implementing SEO by 84%. A 1 percent increase in insurance reserves increases it by 0.19 units, and a one unit increase in profit margin increases it by 0.47. The average of independent variables was taken as the basis of marginality.

The percentage of correct forecasts in the model is 85.7%. This means that the analysis and forecast are reasonable.

In the course of our research, using the financial statements of insurance companies operating in Uzbekistan, we first studied the impact of insurance reserves, profit margins, and SEO implementation of organizations on the coefficient of return on capital. As a result, the influence of factors other than the indicator variable turned out to be positive. Insurance organizations are required to maintain insurance reserves on their balance sheets within the framework of the regulator's requirements. The reason is that the influence of insurance reserves on the solvency and financial stability of the organization was also proven in our research. Also, organizations should seriously work on reducing periodic expenses and the cost of insurance services, because the increase in profitability largely depends on it.

In addition, our research has shown that the effectiveness of marketing activities of insurance companies is not so satisfactory, because SEO optimization, taken as an indirect factor in evaluating this activity, has an inverse correlation with return on capital.

Also, in our logit model, we can conclude on the same issue that companies with high return on capital do not consider it necessary to focus on marketing activities. A higher return on investment naturally reduces the need for marketing. However, in order to increase the absolute value of profit, serious work is required in this regard.

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