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RISK BASED CAPITAL FACTORS' IMPACT FOR REINSURANCE'S BUSINESS AND PROFITABILITY

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ABSTRACT

Reinsurance is one of important aspect from insurance business. To ruin their business, insurnaces don't only rely on their capacity, but to their back up capacity behind them. For arising financial strength and intercalation to Indonesia's GDP, OJK as regulatory has obligatory for insurance to ceded their insurance cession to domestic Reinsurance. Insurance business would be always linked with reinsurace due to their requirements for spreading risk (by reduce the variability of the financial costs to insurance companies arising from the claims). The prior researches give indicator that financial strenght will affect how sevice company ruin their business and profitability making. This paper aim to empirically inquire intercouse between financial strength of the company with their running business. Financial strenght for reinsurance business is the most important component due to their business characteristic, business to business. RBC as one of the parameter will be the one which impose the insurance company to lay their business. So with RBC's component we could inquire how reinsurance's business and profitability. This study used quantitative research method. The analysis framework is based on relationship between risk based capital' factor in reinsurance with their business and profitability effectivity. Data will be provided secunderly by companies annual report with total 5 local reinsurance in Indonesia. And will be examined by regression model. The finding will indicate how Risk Based Capital's factor involve business and profitability both for reinsurance company. The findings may help industry to better understand how financial power' factor work for profitability.

KEYWORDS *risk based capital; reinsurance; profitability*

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INTRODUCTION

Indonesia has potencial capacity for insurance business. It is obviously shown from insurance's penetration increment during the last 5 years (Febriyanti et al., 2021). Regarding to post pandemi Covid-19 happened, Central Bank of Indonesia forecast there will be any decrement global growth during 2022 (Nugraha et al., 2022). However World Bank has different insight about Indonesia's growth. Global Economic Profect predict Indonesia will have positive growth years ahead. Febrio, Director of the Fiscal Policy Department at the Ministry of Finance, said: Indonesian government will continue to insist that performance of the domestic economy will continue to improve amidst various global challenges. This has great potential for economic growth in Indonesia, including in the insurance sector.

Tabel 1. Data BPS terkait Premi Bruto dan Produk Domestik Bruto 2016-2020

Year	Gross Premium (Trilion Rupiah)	Gross Domestic Product (Trilion Rupiah)	Insurance Penetration
2016	361,78	12406,8	2,92%
2017	407,71	13588,8	3,00%
2018	433,38	14837,36	2,92%
2019	481,1	15833,94	3,04%
2020	503,3	15434,15	3,26%

According to macro economic's growth at 2022 that 5,02% higher than 2021, Otoritas Jasa Keuangan gives objective about growing of Life Insurance 4,66% and 3,14% for non-life Insurance and Reinsurance. Wimboh Santoso, as the OJK board of commissioners, stated that the financial services sector will record growth, among the insurance sector, and believes that people will be increasingly motivated to buy insurance in order to protect their assets, as the economy grows. So that increasing public interest in buying insurance will be able to increase income as well as asset insurance.

Potencial growth's industry will conduct competitive market in Insurance business's maximum profitability (Ritha, 2023). The profit's components of an insurance company include the net guarantee results, or also called net profit if it is analogous to companies other than insurance, as well as investment returns (Tika, 2022). Net Underwriting Calculation, includes the component of Total Premiums Earned, reduced by commissions incurred, claims paid and recorded, as well as the amount of reserves, bearing in mind that Insurance companies have a long tail type of business as well. Different from insurance, even though both of them are service business, insurance would be dirrect to the consumers, and reinsurance will ruin business from insurance, so they will be B2B characteristic (Johnson, 1977).

When running their business, by regulation and capacity, insurance require reinsurance to fulfil their capacity. If insurance demand the capacity they must have reinsurance behind them to fulfil their capacity so they could cover the business. However, there so many big reinsurance company in the world with strong assets, equity, services and financial streghts. Domestic Reinsurance itself might be don't

have capacity as strong as overseas reinsurance company. In order to support domestic reinsurance, OJK as Indonesia's financial services authority oblige all of insurance in Indonesia to ceded their cession to domestic reinsurance with POJK 14/POJK.05/2015 (Keuangan, 2015). Beside from how insurance select their reinsurance, even the strongest financial health and capacity's reinsurance also have their risk appetite to mainteir their financial health. With the lower capacity if compared with overseas reinsurance company, RBC as one of the parameter will be the one which impose the Indonesia's insurance company to lay their business. So with RBC's component we could inquire how reinsurance's business and profitability.

From the Insurance industries's income component, the thing that can limit a company's acceptance of business is the amount of its assets and equity. In Insurance and Reinsurance companies, Equities have an important role in Insurance companies to determine the capacity of the amount of risk that is acceptable, and the health of the company. Indonesia itself has a minimum RBC (Risk Based Capital) standard of 120% for Insurance and Reinsurance companies (Faidz, 2019). What makes the difference between insurance and reinsurance are that the Reinsurance Company has a b2b (Business to Business) type of business, namely making the Insurance Company and its portfolio a partner, while the Insurance Company is b2c (Business to Customer) (Abdullah & Sari, 2018; Subagiyo, 2019). Indonesia itself currently has 7 Reinsurance Companies, 1 of which is a State Owned Enterprise, and 1 of them only reinsures Earthquake Insurance as a form of Cathastropic protection. The financial health of a Reinsurance Company is as important as an Insurance Company because Insurance requires additional capacity from Reinsurance. Therefor it is important for a Reinsurance Company to maintain its RBC value in order to maintain the trust of the Insurance Company to session its portfolio. Where the optimum income and profit of a Reinsurance Company originating from premiums is also limited by capacity, one of which is determined by the Total Equity and the determined RBC value. The previous research ever summon that the higher RBC of The insurance company, they will took higher risk insured (Chen et al., 2019).

Based on the background regarding the potential premiums and benefits that can be obtained from Insurance and Reinsurance companies, as well as the existence of risk restrictions which can be described from the capital adequacy ratio, under Risk Based Capital, the study aims to find out; (1) the risk based capital factor influences the reinsurance company's premium income, (2) the risk based capital factor influences the underwriting quality of reinsurance companies, and (3) the risk based capital factor influences the profitability of reinsurance companies.

RESEARCH METHOD

Data and Variables

The study used quantitative research method, and to see how factors from RBC work on reinsurance business, from the research framework obtained variables that are the subject of research.

Dependent Variables

The dependent variables chosen are gross premium, which describes premium income; loss ratio, which describes underwriting quality; and ROE, which describes profitability. The gross premium shows how the company seeks income and also shows the company's aggressiveness in accepting business. Therefore, the gross premium was chosen as a parameter to show premium income from reinsurance companies (Upreti et al., 2022). In calculating the gross premium parameter, a logarithmic naturalization of the gross premium value is carried out.

The quality of reinsurance underwriting is indicated by the high loss ratio (Tornoa & Tiub, 2014). The calculation of the loss ratio is generally seen as the underwriting expense divided by the underwriting income. The better the type of business obtained, the smaller the resulting loss ratio. The parameter scale in research that describes the profit or loss of reinsurance companies is selected in the form of a ratio, namely Return on Equity (ROE) (Tamuntuan, 2015). The ROE calculation itself will be carried out by comparing the profit and loss results of the company with the total equity of the reinsurance company.

Independen variables are the factors of RBC.

In research, the independent variable is the reinsurance company's risk-based capital ratio (Chen et al., 2019). The risk-based capital ratio shows how healthy the financial health of a reinsurance company is (Cummins & Sommer, 1996). This ratio is evidenced by the adequacy of the reinsurance company's capital compared to its liabilities. Every year, every reinsurance company will explain how risk-based capital (RBC) is included in its financial reports as a form of responsibility to shareholders. The value of the RBC used in the study was obtained from the financial statements of each reinsurance company.

Control Variable

The selected control variables are divided into internal and external parameters. The internal parameters used are equity and leverage (Chen et al., 2019). For external parameters, premium growth data in Indonesia is used for the period 2017–2021 (Hogan et al., 2013).

Data and samples

The data used by the authors are secondary data obtained from sources of official websites belonging to governmental or official annual report from the companies. The data collected is data related to the insurance industry finances. The data is obtained by looking at the financial reports of the OJK and the annual financial report of the Insurance Company.

The sample selected is a registered reinsurance company in Indonesia that actively reports on assets in the OJK and provides its financial reports openly to the public. In Indonesia, the number of reinsurance companies is 7. As for the number of reinsurance companies that will be checked is as many as 5 reinsurances companies in the north that provide complete information about their financial reports to the public.

Model

The research method used in this study is empirical research using quantitative methods (Creswell & Creswell, 2017). The quantitative method used is with regression. The regression research model is used to look at the relationship between an independent variable and control with a dependent variable. The method of double linear regression.

Double linear regression describes the relationship between more than one independent variable and its dependent variable, whether each of the related variables has a positive or negative relationship, or even is not related at all. The method is chosen because of the correlation between the element of risk and capital that affects the business (Butsic, 1994). Chen (2019) stated that the Marginal Cost of RBC will influence how risk appetite insurance companies, which will scan on results. From each variable, the double linear regression analysis model is generally noted as Eq. (1):

$$Y\_i=\beta\_0+ \beta\_1 X\_i1 + \beta\_2 X\_i2 + \beta\_3 X\_I3 + \varepsilon \quad (1)$$

X = RBC factor as an independent variable
Y = reinsurance business result as a dependent variable
β = coefficient of regression parameter
ε=Galat

From the modeling made, the researchers had the hypothesis that each factor from RBC would have an impact on the outcome of the reinsurance business.

Methods of Data Processing

On the double linear regression method, tests are performed to see which method is more appropriate to use in the research. Testing is carried out through the Chow and Haussman tests. In the Chow test, it will be seen whether the analysis is better used using a Common Effect Model or a Fixed Effect model. The results of the modeling will determine whether the research can use OLS (Ordinary Least Square) where modeling is obtained without distinguishing between the time and individual dimensions of each value or sequence. In the Fixed Effect Model, it can be seen based on individual variations, but it does not vary over time. In the Haussman test, it will be seen whether the analysis is better using a fixed effect model or a random effect model. When it is seen on the Chow Test that the modeling using CEM is not suitable, then the following tests, FEM and REM, are performed. In the Random Effect Model, variables are assumed to have a relationship between time and individuals. If the Haussman test finds that FEM is not suitable for the data obtained, then it is done with the Lagrangge Multiplier test. This test is done to see if the Random Effect Model is more suitable for use in research.

The classic assumption test was conducted to see whether the research met the requirements by having the BLUE criteria (Best Linear Unbiased Estimator). BLUE will show that the resulting regression has the character of a perfect relationship, is linear and correct. One of the BLUE parameters is that the research

results do not have multicollinearity, autocorrelation, and heteroscedasticity problems. Simultaneous significance test was carried out with the F statistical test. The basis for decision making was

H0 = The independent variables as a whole have no effect on the independent variables

H1 = The independent variables as a whole have an effect on the independent variables

The test is carried out by comparing the results of the F table and F which are calculated manually.

RESULT AND DISCUSSION

Descriptive analysis of RBC factors with gross premiums, hubs, and profits

The companies that were used as samples in the research analysis included reinsurance companies in Indonesia. The selected companies are companies that published their complete annual financial reports in the 2017-2021 period. Of the five data samples, PT. Maipark Insurance is a reinsurance-based company that only runs one business, earthquake insurance. Research data was obtained from financial reports issued by each reinsurance company, as well as data from BPS and OJK reports as support for external factors. The descriptive analysis obtained results in table 2.

Table 2. Descriptive Analysis

	Count	Mean	Minimum	Maximum	STD
Dependen Variable					
Gross Premium (in Million Rupiah)	25	3.087.571	253.524	9.271.333	2.521.775
Loss Ratio (in procentage)	25	91,88%	57,06%	115,16%	13,40%
ROE (in procentage)	25	7,46%	-25,08%	28,06%	11,24%
Independen Variable					
RBC	25	533,10%	133,10%	2934,50%	571,50%
Control Variable (internal)					
Equity (in Million Rupiah)	25	1.353.148	310.204	3.429.624	984.123
Leverage	25	85,00%	13,70%	348,30%	66,80%
Control Variable (External)					
Premium Growth	5	8,02%	4,60%	12,70%	3,19%

In the independent variable, the difference from the gross premium is quite large between the maximum and minimum. Whereas in the loss ratio, the distribution is random every year and does not depend on the amount of gross premium. Not always a company that has a high gross premium has a good loss ratio. Vice versa, a low gross premium does not always make for a bad loss ratio.

A high loss ratio indicates that the company's reinsurance business is experiencing bad conditions and even losses, while a low loss ratio indicates that the business is making a profit. The effectiveness of the gross premium obtained can be seen from the magnitude of the loss ratio. For ROE, random distribution is shown as well. Unlike the loss ratio, ROE is not only determined by the gross premium and the core business of reinsurance companies. Other components, such

as investment returns, operational costs, taxes, and others, also determine the amount that is obtained.

The control variable shows that when RBC approaches the limit of the OJK standard, then in that year the profit is negative. However, the magnitude of whether the greater the value of RBC increases premium income, underwriting quality, and profitability cannot be shown. The highest RBC is obtained from the most recently established company and is their first-year RBC. The first year's RBC tends to be high due to reserves, and the required financing needs are not so great as to keep the RBC value high. From the research sample, it was found that when the company experienced a decline in profitability, the RBC obtained also decreased. However, the magnitude is not always linear with a decrease in profitability. This is caused by equity, one of the main factors forming RBC.

The selected control variable is divided into two categories, namely internal and external. The internal control variables selected include equity and leverage. On external control variables, an analysis is carried out to see the growth of insurance premiums in Indonesia. Insurance premium growth always has a positive value. Independent of GDP growth. But has the lowest growth value in 2020.

Multiple linear regression tests

Prior to carrying out regression modeling, tests were performed that were used to determine the best method for this type of research. Modeling is done using original data and using natural logarithms for data that has units that are not yet in decimal or percentage form. The variables used in the natural logarithm include gross premium and equity because they still have the rupiah unit rate. The first test performed was the Chow Test. The results of the submission are as follows:

Table 3. Chow Test Results

	F	Results
Gross Premium	0,0000	H0 declined
LR	0,0001	H0 declined
ROE	0,0237	H0 declined

In testing with the Chow test, the H0 value was rejected for the three independent variables. Therefore, it is concluded that the common effect model is not the right model for testing. Therefore, continued testing using the Haussman Test.

Table 4. Haussman Test Results

	F	Results
Gross Premium	0,5887	H0 declined
LR	0,1136	H0 declined
ROE	0,0037	H0 accpeted

Obtained H0 is rejected for the free variable gross premium and loss ratio, so it is concluded that the fixed effect model is not an appropriate model. Most likely, the model used is the random effect model and will be proven in thelagrage multiplier test. For the ROE variable, H0 is accepted, so it can be concluded that

the Fixed Effect Model (FEM) is used for the ROE variable. Then for further testing, see table 5.

Table 5. Lagrage Multiplier Test Results

	P value	Results
Gross Premium	0,0000	H0 accepted
LR	0,0010	H0 accepted
ROE	0,2537	H0 declined

It is proven that for gross premium and loss ratio, the H0 results are accepted, so the model chosen for both is the random effect model. The conclusion of the model chosen in this study is Gross Premium and Loss Ratio using REM and ROE using FEM. In the heteroscedasticity test, it was found that there was heteroscedasticity in the gross premium and loss ratio variables. Therefore, to overcome the problem of heteroscedasticity, modeling is carried out using generalized least squares (GLS).

Classic assumption test

In order for the research to meet the BLUE standard, a multicollinearity test was carried out to test whether there was collinearity in the decision-making. Multicollinearity is not detected if the VIF value is less than 10. The results are shown in Table 6.

Table 6. Multicolinearity Test Results

	VIP	**Conclusion**
RBC	2,090	Multicolinearity was not occured
Equity	1,922	Multicolinearity was not occured
Leverage	1,244	Multicolinearity was not occured
GDP Growth	1,150	Multicolinearity was not occured

From the test results, the VIP value is below 10, so it can be concluded that there is no multicollinearity in the selected variables. Another test that was carried out was the autocorrelation test with the Breusch-Godfrey LM test. From the test results obtained in Table 7.

Table 7. Autocorrelation Test Results

	P value	**Conclusion**
Gross Premium	0,0010	Autocorrelation occured
LR	0,0051	Autocorrelation occured
ROE	0,6062	Autocorrelation was not occured

In the autocorrelation test, it was found that there was an autocorrelation in the gross premium and loss ratio variables. Therefore, to overcome the problem of heteroscedasticity, data processing is carried out using generalized least squares (GLS).

The next test is the heteroscedasticity test. The test was carried out using the Goldfelt-Quant (G-Q) test. The G-Q test was carried out by eliminating 4 panels of data in the middle, so that the df value was 6 (11 samples for each section minus 5

variables). The Ftable value obtained is 4.29. Heteroscedasticity is indicated if the value is greater than Ftable. The results obtained are shown in Table 8.

Table 8. Heteroscedasticity Test Results

	F_{table}	Conclusion
Gross Premium	13,41	Heteroscedasticity occured
LR	0,0538	Heteroscedasticity was not occured
ROE	0,4133	Heteroscedasticity was not occured

In the heteroscedasticity test, it was found that there was heteroscedasticity in the gross premium and loss ratio variables. Therefore, to overcome the problem of heteroscedasticity, modeling is carried out using generalized least squares (GLS).

Analysis of the relationship between the reinsurance business and the RBC factor

In the research conducted, the results obtained showed the magnitude of the coefficient of each variable that had been determined. Regression is carried out using the selected model based on the tests in the previous sub-chapter. For significance of more than 99%, it will be marked **, and * if more than 90%. The results obtained can be seen in Table 9. From the regression that has been done, on the gross premium side, there are 2 variables that have a significance of more than 99%, namely RBC and equity.

Table 9. Regression Results and the Probability of Each Variable

	Gross Premium	Loss Ratio	ROE
RBC	-0,101167	0,000134	-0,00185
	(0,0000**)	(0,9729)	(0,738)
Equity	0,937851	-0,019942	0,427064
	(0,0096**)	(0,7315)	(0,0084**)
Leverage	0,008417	0,005524	0,005102
	(0,9299)	(0,8333)	(0,8879)
Premi Growth	1,59216	0,701514	2,493313
	(0,3637)	(0,1448)	(0,0015**)
Constant	1,877994	0,296037	-6,040932
	(0,6906)	(0,7205)	(0,0084**)
Observations	25	25	25
R squared	0,8556	0,1229	0,6190
Cluster	Reasuransi	Reasuransi	Reasuransi

On the independent variable gross premium, RBC has a significant negative effect, and the rest have a positive effect. For ROE, a significance of more than 99% is obtained for the variable equity and premium growth in Indonesia. Just like the gross premium, RBC has a significant negative effect on the ROE parameter. As for the Loss Ratio, it was found that there were no independent or control variables that had a significance above 90%. The effectiveness of the variables used for the Loss Ratio variable will be seen again from the simultaneous significance test that was carried out.

Significance test of research results

In the regression analysis, a significance test was carried out to see whether the independent variables simultaneously and together had an influence on the dependent variable. In research, the Ftable used based on the table is 2.866. As for the Ftable and Fstatistik produced as in Table 10

Table 10. Significance Test Results Influence simultaneously

	F statistic	F table	Conclusion
Gross Premium	29,632	2,866	Influence simultaneously
Loss Ratio	0,7005	2,866	Was not influence simultaneously
ROE	3,2489	2,866	Influence simultaneously

From the significance test, it was found that the gross premium and ROE variables, the dependent and control variables, simultaneously influenced each other on the independent variables. As for the Loss Ratio, the dependent and control variables do not simultaneously affect the independent variables.

Discussion

In the classic assumption test and the selected model test, it was found that for the gross premium and loss ratio variables, the REM model and GLS would be used. This shows that there is suitability between the modeling options selected from the resulting tests. So it can be concluded that the possibility of modeling is appropriate. As for the ROE variable, no problems were found in the classical assumption test, and it consistently shows FEM as the most appropriate model.

Gross premium is income earned by reinsurance companies without reducing anything. The amount of gross premium cannot yet reflect net income because reinsurance companies still have to pay commissions and retrocession (reinsurance reinsurance). The gross income earned by reinsurance also depends on the strategy used, whether the reinsurance will carry out more retention or even only act as an intermediary for sessions to be carried out by larger reinsurers. As an advantage, the company that becomes a retrocession will provide a commission, which can be income for the reinsurance company.

The amount of gross premium is an illustration of the aggressiveness of reinsurance companies in obtaining income. The greater the income, it is hoped that the final results from underwriting and profits will also be greater (Cummins & Sommer, 1996). Therefore, the RBC itself can describe how it moves. RBC and equity have high significance in determining the value of the gross premium. The amount of RBC can also determine how aggressive the insurance company is in taking on its business (Chen et al., 2019). Capability Other factors outside of research related to business strategy do not rule out the possibility of being a determinant of the amount of gross premium. So the 1st hyphotesis found that RBC' factor have impact for gross premium.

Meanwhile, on the quality of underwriting, the results of regression and significance tests do not show any linkages or relationships between variables. The R value obtained is also small when compared to other equations. So it can be concluded that the equations that have been determined cannot show the right

results and are not suitable for use. Surprisingly it came out that 2nd hyphotesis is rejected. RBC' don't impact quality of underwriting.

The goal of the reinsurance company itself is to be able to generate the maximum possible underwriting profit from existing sources and capital. So that strategies regarding reinsurance retention capacity as well as acceptance capacity are also calculated carefully (Upreti et al., 2022). In calculating the maximum capacity that can be provided by reinsurance companies, as well as the minimum and maximum retention limits of this capacity, it is calculated from the amount of equity held. So that it can achieve its targets and objectives, the reinsurance company will determine its business strategy and the percentage of each capacity in order to produce a better loss ratio.

On profitability, it was found that the RBC factor has a significant influence on the value of ROE. ROE itself is calculated from the total profit or loss divided by the equity of the reinsurance company, which of course also has a share. The value of ROE itself is determined by combining the profit from the loss ratio with other components such as profit or loss from investment, other operating costs, other income, and taxes. The amount of investment that can be made cannot be separated from the capital owned by the company. Therefore, the amount of equity has high significance in regression modeling.

From the regression results of the determined independent variables, the RBC value itself does not always have an effect on each independent variable. However, because reinsurance companies must maintain their RBC values, RBC and RBC factors are still significant determinants of gross premium and ROE. Because to keep the RBC value within the specified limits, every company will try to avoid experiencing losses. Another fact found in the research results is the importance of equity in the reinsurance business. The greater the equity (capital) owned by reinsurance, the better the resulting business.

CONCLUSION

The researcher explored the relationship between factors from RBC to business from reinsurance. The results of the research resulted in the fact that the factors of RBC influenced how gross premium earnings generated by reinsurance companies. Underwriting quality and profitability are influenced by other factors, namely risk appetite and how the company manages business and company portfolios. Researcher suggest that the research could be continued if there were more complete data on how the capacity portfolio of each company. In addition, research can also be further elaborated if the population elections are carried out including with foreign reinsurance companies which have much larger capital than in Indonesia.

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