

## **Analysis of Financial Ratio to Distinguish Indonesia Joint Venture General Insurance Company Performance using Discriminant Analysis**

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### **ABSTRACT**

*Insurance industry stands as a service business that plays a significant role in Indonesia economical condition. The development of insurance industry in Indonesia, both of general insurance and life insurance, has increased very fast. The general insurance industry itself divided into two major players which are local private company and Joint Venture Company. Lately, the use of statistical techniques and financial ratios models to asses financial institution such as insurance company have been used as one of the appropriate combination in predicting the performance of an industry. This research aims to distinguish between Joint Venture General Insurance Companies that have a good performance and those who are less performing well using Discriminant Analysis. Further, the findings led that Discriminant Analysis is able to distinguish Joint Venture General Insurance Companies that have a good performance and those who are not performing well. There are also six ratios which are RBC, Technical Reserve to Investment Ratio, Debt Ratio, Return on Equity, Loss Ratio, and Expense Ratio that stand as the most influential ratios to distinguish the performance of joint venture general insurance companies. In addition, the result suggest business people to be concerned toward those six ratios, to increase their companies' performance.*

*Keywords: general insurance, financial ratio, discriminant analysis*

### **1. Introduction**

Insurance industry as a service business plays a significant role in Indonesia economical condition. The development of insurance industry in Indonesia, both of general insurance and life insurance, has increased very fast. This significant increase indicated by an increasing number of insurance companies which also caused a tight competition among these businesses.

Business competition in the insurance industry in Indonesia, particularly the general insurance industry, is divided into two big players the local general insurance companies and joint venture general insurance company. Local private insurance companies are dominating the insurance market more than joint ventures (JV) insurance companies based on gross premium during the year 2007.

Isa Rachmatarwata, the head of BAPEPAM-LK, revealed that there is an increasing trend of local insurance company

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market share compared to joint venture companies. It is because joint venture companies targeting specific market which is different with target of the local insurance companies.

As the market for joint venture general insurance company is smaller compared to that of local general insurance company then it has resulted in keen competition and forces them to perform at their best. Therefore, insurance companies should work in balance between pursuing productivity and profits with the ability to be the risk shelters. Same with other industries, insurance industry need comprehensive management strategies to handle the complexity of this industry. In this time, there are a lot of insurance companies that operating in Indonesia was ditched from market.

According to the experts in insurance industry, there are several main parameters that could be used as a benchmark to asses the healthiness and performance of an insurance company. One of the elements to measure the performance of an insurance company is its financial ratios in term of profitability, solvency, and management efficiency.

This research uses technique – Discriminant Analysis Technique to distinguish two groups of the Joint Venture Insurance Companies

The problems that will be investigated are:

1. Is there any significance difference between JV (Joint Venture) general insurance companies that have a good performance and JV general insurance companies that are less performing?
2. Can Discriminant Analysis Technique can be used to distinguish the performance of joint venture general insurance company?
3. What factors that distinguish between JV (Joint Venture) general insurance companies that have a good performance and JV general insurance companies that are less performing?

4. What is the prediction model resulted from discriminant analysis that could predict a joint venture general insurance company performance?

## 2. Theoretical Foundation

### 2.1. Insurance

Nowadays, insurance is a common issue around people. Some experts in Insurance described the true meaning of insurance. Accordingly to Mark R. Green in the book of “Principles of Insurance”, “*Insurance is an economic unit which tackle risk by combining the various parties that have the same situation, in the face of financial losses which arise unexpectedly into a management (economics sense) or it can be said that an insurance is an agreement between the insurer and insured, where insurer with a benefit (consideration = premium) will take over the burden of financial loss suffered by the insured, that arises unexpectedly (legal sense)*”. Insurance is basically function as risk transfers which enables individual or business entity in an uncertain transfer to other parties, with a certain value of premium that is relatively small compared with possible losses. Uncertainty was transferred to insurance.

However, according to Indonesia Trade Government and law, Insurance or coverage is an agreement by which an insurance corporation binds itself to the insured, by accepting the premium, to provide financial compensation to the insured for any damage, loss of expected profit, which may be suffered because of an event that is not necessarily (Undang-Undang RI No.2 Tahun 1992)

Further, in accordance to the book of “*Principle of Risk Management and Insurance*” by George E. Redja insurance can be classified as private and government insurance. Private insurance includes life insurance and property and casualty insurance or generally called general insurance. Government insurance includes social insurance programs. And the major types of private insurance and

government insurance are life and health insurance, General Insurance or Property-Casualty Insurance, and Social insurance.

## 2.2. Financial Ratio Analysis

Based on the book of "The Analysis and Use of Financial Statement" by Gerald I. White, Ashwinpaul C. Sondhi, and Dov Fried to asses a firm financial performance for the use of its internal or external necessity, "*Financial ratio and its analysis are useful to compare the risk and return in comparison with firms of different sizes. Ratios Analysis can also provide a profile of a firm, its economic characteristics and competitive strategies, and its unique operating, financial, and investment characteristics. In addition, such decisions require both an evaluation of changes in performance over time for a particular investment and a comparison among all firms within a single industry at a specific point in time.*"

Further financial ratios can be divided for convenience into five basic categories which are liquidity, activity, debt, profitability and market ratios. Liquidity, activity, and debt ratios primarily measure risk. Profitability ratios measure return while market ratios measure both risk and return.

In the view of profitability insurance company usually makes a number of targets profitability. For example, many insurance companies are setting targets targeted or capital they want to deliver results; targets is designated for the company as a whole and for each business line of insurance company. Other general profitability targets focus on the targeted level growth. For example, an insurance company can set goals to increase their income or increase the value of asset-with a percentage of its assets which are valued every year.

In the terms of solvency, it reflects the situation where a company is able to meet its financial obligations in a timely fashion. For

insurance companies, more specific definitions of solvency, the ability of an insurance company to maintain capital and surplus on the capital and surplus standards prescribed minimum laws. Because of the above minimum standards is a legal requirement, the company's solvency is sometimes called statutory solvency. If the above condition is not met, the insurance regulator may take control of insurance companies. The inability of insurance companies to maintain capital and surplus above the minimum standard of capital and surplus as provided by law is called insolvency.

## 2.3. Discriminant Analysis

In the book of "Multivariate Data Analysis" sixth edition, Discriminant Analysis involves deriving a variate. The discriminant variate is the linear combination of the two (or more) independent variables where in this research it refers to financial ratios of insurance industry. Then those variables will discriminate best between two samples which in this research refers to Top Seven Joint Venture General Insurance Companies and Least Seven Joint Venture General Insurance Companies to define apriority. Further, Discrimination is achieved by calculating the variate's weights for each independent variable to maximize the differences between the groups (i.e, the between-group variance relative to the within-group variance). The variate for a discriminant analysis, also known as the discriminant function which is derived from an equation much like that seen in multiple regressions. It takes the following form:

$$Z_{jk} = a + W_1X_{1k} + W_2X_{2k} + \dots + W_nX_{nk}$$

Where,

$Z_{jk}$  = Discriminant Z score of discriminant function  $j$  for object  $k$

$a$  = Intercept

$W_i$  = discriminant weight for independent variable  $i$

$X_{ik}$  = independent variable  $i$  for object  $k$

Further, discriminant analysis is the appropriate statistical technique for testing the hypothesis that the group means of a set of independent variables for two or more groups are equal. By averaging the discriminant scores for all the individuals within a particular group, we arrive at the group mean. This group mean is referred to as a centroid. When the analysis involves two groups, there are two centroids; with three groups there are three centroids; and so forth. The centroids indicate the most typical location of any members from a particular group, and a comparison of the group centroids shows how far apart the groups are in term of that discriminant function.

The objective in using discriminant analysis in this research is to develop a weighted combination of the three scales for predicting the likelihood of a joint venture general insurance company's performance. In addition to determining whether the Top Seven Joint Venture General Insurance Company can be distinguished from Least Seven Joint Venture General Insurance Companies. The author also wants to know which financial ratios are useful in differentiating the performance of Least Seven Joint Venture General Insurance Companies.

### **3. Research Methodology**

#### **3.1. Sample and Data Collection**

Type of data used to complete this research is quantitative and qualitative data. Data necessary to complete this research was obtained from AAUI (Indonesia General Insurance Association), published and audited financial report of joint venture general insurance companies that being observed. Secondary data such as Indonesian local newspapers, magazines, textbooks, and also international journal are also used in this research to help the author to be fully understood about theoretical foundations that has to be used in this research and also to analyze the industry qualitatively.

Sample that will be used are 14 Joint Venture General Insurance Companies in Indonesia in the time period of 2005-2009 which are PT Asuransi Allianz Utama Indonesia, PT Asuransi MSIG Indonesia, PT Asuransi Permata Nipponkoa Indonesia, PT QBE Pool Indonesia, PT Asuransi Samsung Tugu, PT Sampo Japan Insurance Indonesia, PT Asuransi Tokio Marine Indonesia, PT Ace Ina Insurance, PT Pacific International Indonesia, PT China Insurance Indonesia, PT Zurich Insurance Indonesia, PT Asuransi Hanjin Korindo, and PT Asuransi AIOI Indonesia.

They had divided into two major criteria which are Top Seven Joint Venture General Insurance Companies for the seven first companies and Least Seven Joint Venture General Insurance Companies for the other seven companies, and was rated by AAUI based on its GWP (Gross Written Premium).

#### **3.2. Variables**

In this research there are 13 selected financial ratios that will be used as the variables in this research. Those variables are chosen refer to the appropriate financial ratios for General Insurance Companies in Indonesia as the empirical evidence in this research and majorly divided into three points of view which are profitability, solvency, and management efficiency. The determination of those ratios are also adapted the needs of the industry and also in the correlation of the insurance industry culture and business process.

Variables to be analyzed are as follows:

##### **1. Profitability**

- a. Return on Assets
- b. Return on Equity
- c. Net Profit Margin
- d. Investment Income Ratio
- e. Claim Expense / Net Premium

##### **2. Solvency**

- a. Risk Based Capital
- b. Liquidity Ratio
- c. Debt Ratio Technical
- d. Technical Reverse to Investment Ratio

3. Management Efficiency

- a. Average Collection Period
- b. Loss Ratio
- c. Expense Ratio
- d. Combined Ratio

In addition, the determination of those ratios is based to the literature review from textbooks and also strengthens by several journals that also used those ratios in order to asses' insurance company financial performance. As it stated about a significant difference between financial ratios that are used in insurance company, therefore the authors use several ratios that specifically use in the term of insurance company.

Based on those dimensions above there are 7 ratios that specifically used for insurance company which are Risk-based capital, Claim expense/net premium, Liquidity ratio, Technical reserve to Investment Ratio, Loss Ratio, Expense ratio, and Combined Ratio.

3.3. Hypothesis

H0: There is not any significance difference between the performance of Top Seven Joint Venture General Insurance

Companies to the performance of Least Seven Joint Venture General Insurance Companies based on its financial ratios.

H1: There is a significance difference in the performances of Top Seven Joint Venture General Insurance Companies to the performance of Least Seven Joint Venture General Insurance Companies based on its financial ratios.

4. Data Analysis

4.1. Independent Variables Suitability Test Analysis

In the data analysis to predict financial ratio that distinguish joint venture general insurance company performance using discriminant analysis, firstly the variables have to be tested using Multi-Collinearity Test in order to see the correlation between each independent variables that being analyze. Further the independent variable that has a high correlation between one another would later be eliminated to avoid bias in this research.

RATIO	RBC	TCHNIV	LIQUIDITY	DEBT	ROA	NPM	TCNP	INVINC	AVGCP	LOSS	EXPENSE	COMB
RBC	1	-0.093	-0.235	-0.46	0.611	0.731	-0.454	0.072	-0.055	-0.82	-0.348	-0.581
TECHNIVEST	-0.093	1	-0.12	0.163	-0.253	-0.266	0.172	0.267	-0.07	-0.053	-0.068	-0.067
LIQUIDITY	0.235	-0.12	1	-0.431	0.242	0.273	-0.144	-0.07	0.024	-0.301	-0.069	-0.175
DEBT	-0.46	0.163	-0.431	1	-0.778	-0.741	0.074	-0.153	-0.052	0.363	-0.052	0.124
ROA	0.611	-0.253	0.242	-0.778	1	0.096	-0.697	0.088	0.095	-0.563	-0.118	-0.32
ROE	0.632	0.063	0.301	-0.331	0.057	0.068	-0.481	0.105	0.147	-0.711	-0.339	-0.528
NETPROFITMARGIN	0.731	-0.266	0.273	-0.741	0.096	1	-0.69	0.071	0.134	-0.681	-0.203	-0.427
TOTALCLAIMTPREMIUM	-0.454	0.172	-0.144	0.074	-0.697	-0.69	1	-0.545	0.016	0.341	-0.204	-0.427
INVESTMENT INCOME	0.072	0.267	-0.07	-0.153	0.088	0.071	-0.545	1	-0.198	-0.087	-0.006	-0.041
AVGCOLLECTPER	-0.055	-0.07	0.024	-0.052	0.095	0.134	0.016	-0.198	1	0.127	0.178	0.17
LOSS	-0.82	-0.053	-0.301	0.363	-0.563	-0.681	0.341	-0.087	0.127	1	0.067	0.088

EXPENSE	-0.348	-0.068	-0.069	-0.052	-0.118	-0.203	-0.204	-0.006	0.178	0.067	1	0.095
COMBINED	-0.581	-0.067	-0.175	0.124	-0.32	-0.427	-0.427	-0.041	0.17	0.088	0.095	1

Figure 1. Multi-collinearity test result

The above result shows the correlation between one ratio to another, and ratio that has Multi-Collinearity value above 0.5 will be classified as the ratios that have a high correlation. Further based on the table above there are three ratios that have high correlation and those ratios are ROA, Net Profit Margin, and RBC where those ratios are considered to

be independent variables that have strong linkage between the variables. Therefore, in order to ensure that only those variables which contributed significantly to the discrimination were included in the final function, ROA and Net Profit Margin have to be eliminated. Then the final variables will be shown as follow:

Table 1. The final variables

Original Variables	Final Selected Variables
1. Return on Assets	1. Return On equity
2. Return On equity	2. Investment Income Ratio
3. Net Profit Margin	3. Claim Expense/Net Premium
4. Investment Income Ratio	4. Risk-Based Capital
5. Claim Expense/Net Premium	5. Liquidity Ratio
6. Risk-Based Capital	6. Debt Ratio
7. Liquidity Ratio	7. Technical Reserve to Investment Ratio
8. Debt Ratio	8. Average Collection Period
9. Technical Reserve to Investment Ratio	9. Loss Ratio
10. Average Collection Period	10. Expense Ratio
11. Loss Ratio	11. Combined Ratio
12. Expense Ratio	
13. Combined Ratio	

**4.2. Interpretation of Model Accuracy and Significance Difference Test**

Wilk's Lambda Model is used to see whether the independent variables tested are appropriate enough to distinguish the variable y, where the variable y in this research refers to the performance of joint venture insurance company. Further, this model also one of the part in Discriminant Analysis to see whether this is sufficient enough to be used in this research. From the data above can be seen that the p value or significance level is 0 percent means that the independent variables are sufficient to distinguish the variable y. Significance level with value of zero is also able to answer the hypothesis made earlier. Based on the Wilk's Lambda Model above, H0 is rejected and accept H1 due to the value

of significance level that is < 95%, this is proved that there is a significance different in the performance of Top Seven Venture General Insurance Companies to the performance of Least Seven Joint Venture General Insurance Companies based on its financial ratios. Further, by this model it also can be conclude that financial ratios that are used in this research are sufficient to distinguish the performance of joint venture general insurance companies. In addition, by the value of its Chi-Square that is 112.697 it is high enough to prove that Discriminant Analysis is can be used to distinguish between JV (Joint Venture) general insurance companies that have a good performance and JV general insurance companies that are not performing well in the view of its financial ratios.

Table 2. Wilk's lambda test result

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.48	112.697	6	.000

### 4.3. The Most Influential Ratios Prediction Analysis and Result

After all predictor variables are suitable to distinguish between populations 1 and 2 by testing it using Multi-Collinearity test in the

previous section, then such a question arises: which variables are significantly distinguish between populations 1 and 2. To answer these questions, one can through stepwise discriminant analysis.

Table 3. Stepwise test result (1)

#### Variable Entered/Removed a,b,c,d

Step	Entered	Min D Squared					
		Statistic	Between Groups	Statistic	df1	df2	Sig.
1	RBC	14.621	.00 and 1.00	153.520	1	40.000	.000
2	LOSS	24.214	.00 and 1.00	123.946	2	39.000	.000
3	EXP	31.874	.00 and 1.00	105.981	3	38.000	.000
4	DEBT	54.565	.00 and 1.00	132.492	4	37.000	.000
5	TECHINIVEST	66.031	.00 and 1.00	124.798	5	36.000	.000
6	ROE	76.099	.00 and 1.00	116.833	6	35.000	.000

At step, the variable that maximizes the mahalanobis distance between the two closet groups in entered.

- Maximum number of steps is 22
- Maximum significance of F to enter is .05
- Minimum significance of F remove is .10
- F level, tolerance, or VIN insufficient for further computation

Table 4. Stepwise test result (2)

<b>Structure Matrix</b>	
	Function
	1
RBC	.438
LOSS	-.420
ROE	.254
COMBINED <sup>a</sup>	-.187
AVGCOLLECTPER <sup>a</sup>	-.164
EXP	-.097
DEBT	-.068
LIQUIDITY <sup>a</sup>	.044
TECHNIVEST	.029
INVESTINC	.020
TOTALCLAIMTONETPREMIUM <sup>a</sup>	-.002

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions variables ordered by absolute size of correlation within function.

a. This variable not used in the analysis

In the stepwise test, all of 11 variables that will be analyzed were tested to know their significance level to distinguish population 1 and 2. From the result there are only six variables that are significantly distinguishing Top Seven Joint Venture General Insurance Companies to Least Seven Joint Venture General Insurance Companies.

Moreover, those variables are RBC, Loss Ratio, Expense Ratio, Debt Ratio, Technical Reserve to Investment Ratio and ROE, those variables are placed as the most influential ratios that distinguish between JV (Joint Venture) general insurance companies that have a good performance and JV general insurance companies that are not performing well. In addition, the other variables such as Combined Ratio, Liquidity Ratio, Investment Income Ratio, and Total Claim to Net Premium Ratio were eliminated due to their insufficient level of significance to distinguish population 1 and 2.

Further, the significance level from six selected variables can be shown by each significance level that resulted to be below 5% which reflect a high degree of significance from each variable. Based on six variables that

were selected to be significantly distinguish population 1 and 2, then the analysis can be deepened to know which ratio that give the highest significance level to differentiate between joint venture general insurance companies with good performance and those that are not performing well, and it can be shown by each statistic value in the stepwise test. Ratio that has highest value of statistic in stepwise test will be placed as the strongest ratios that differentiate between joint venture general insurance companies with good performance and those that are not performing well.

The result shows that ROE placed as the most significant ratio that differentiate between joint venture general insurance companies with good performance and those that are not performing well, and it is shown by it shown in its statistic value from stepwise test that is 76.299, then it is followed by Technical Reserve to Investment Ratio with the value of 66.031.

Further, Debt ratio placed at the third position with the value of 54.565 then followed by expense ratio and loss ratio with value of 31.874 and 24.214. RBC placed as the last



ratio that differentiate between joint venture general insurance companies with good performance and those that are not performing well with the value of 14.621. But to be notice those ratios above are already chosen previously to be the most influential ratios to distinguish the performance of joint venture general insurance companies with good performance and those that are not performing

well. In addition, to know the contribution value of those six variables to the variable y, or in other word to measure the closeness between those variables to the population we could see it from the Summary of Canonical Discriminant Function. Moreover, Summary of Canonical Discriminant Function is also used to strengthen of the result from stepwise test, and the result will be shown in the table below:

Table 5. Summary of canonical discriminant function

<b>Eigenvalue</b>				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	20.028 <sup>a</sup>	100.0	100.0	.967

a. First 1 canonical discriminant functions were used in the analysis

Table above shows the value of canonical correlation which 0.976 or 97.6% which means those six variables give 97.6% contribution to the variable y. This result is strengthen the earlier statement from stepwise test that those six variables are highly influent the performance of joint venture general insurance company and considered as the most influential financial ratios that distinguish between JV (Joint Venture) general insurance companies that have a good performance and JV general insurance companies that are not performing well.

#### 4.4. Discriminant Function Analysis and Interpretation

One of the main objective in this research is to make a Discriminant function that later could be use to classify whether a joint venture general insurance company is classified to be performing well or not. In other way it can be conclude that this is final stage of Discriminant Analysis that is to establish a discriminant function for the use of joint venture general insurance company. Below table show a

Canonical Discriminant Function Coefficients that later could formulate a function based on Discriminant Analysis.

#### 4.5. Canonical Discriminant Function Coefficient Result

Table below shows a Discriminant Function that is gathered from all of steps in Discriminant Analysis that uses as the method in this research. Then based on the table above it could be analyzed that variable which has a higher value of coefficient showing a positive relationship to the performance of joint venture general insurance company while variable that has lower or minus value of coefficient shows a negative relationship to the performance of joint venture company. Then the financial ratio that has the highest positive value to the performance of joint venture general insurance company is ROE with the value of 4.082 while financial ratio that has the highest negative value to the performance of joint venture general insurance company is Loss ratio with the value of -8.684.

Table 6. Canonical discriminant function coefficients

	Function 1
RBC	1.125
TECHNIVEST	1.452
DEBT	2.168
ROE	4.082
LOSS	-8.684
EXP	2.580
(Constant)	-1.809

Unstandardized Coefficients

Finally the established Discriminant Function in this research will be shown below:

$$z \text{ Scores}$$

$$= -1.809 + 1.125RBC$$

$$+ 1.452\text{Technical Reserve to Investment Ratio}$$

$$+ 2.168\text{Debt Ratio} + 4.082ROE$$

$$- 8.684\text{Loss Ratio} + 2.580\text{Expense Ratio}$$

In the using of z Scores above to know whether a joint venture company performance is classify as a company with good performance or not, Functions at Group Centroid will be used in order to make a cutoff value to distinguish it, which will be shown in the table below.

Table 7. Functions at group centroid

	Function 1
.00	-4.367
1.00	4.367

Unstandardized canonical discriminant functions evaluated at group means

The table of functions at group centroid above shows the cutoff value to classify a joint venture general insurance company's performance is 0 as the functions for both populations have same number, which are -4.367 for population 0 and 4.367 for population 1. Therefore as the cutoff value use as the midpoint, then if an object (Insurance Company) that being tested has a z Scores above zero then it will be classified as a joint venture general insurance company that has a good performance while if that object (Insurance Company) has a z Scores below

from 0 (Zero) then it will be classified as a joint venture general insurance company that has not performing well.

Furthermore, that z Scores has to be tested its accuracy in classifying the performance of a joint venture general insurance company by using one last test named Predicted Group Membership Test. This test is using to see the reliability of the above Discriminant Function and table below will show the result of its Predicted Group Membership Test.

Table 8. Predicted group membership test result

		Predicted Group Membership			Total
		.00	1.00		
Original	Count	.00	35	0	35
		1.00	0	35	35
	%	.00	100.0	.0	100.0
		1.00	.0	100.0	100.0

a. 100.0% of original grouped cases correctly classified

Table above shows that the predicted value of 100% means that the actual number is 100% correctly classified after it has been test with the established Discriminant Function. That result also means the accuracy of the Discriminant Function made in this research are 100% applicable to be use in other cases and also 100% could be use to predicted a performance of a joint venture general insurance company.

### 5. Conclusion

According to data calculation and data analysis the result show that the aid of Discriminant Analysis is appropriate to discriminate significantly between Joint Venture General Insurance Companies that performing well and Joint Venture General Insurance Companies that are not performing well. Further, by using Discriminant Analysis the result answer the earlier hypothesis made and it is rejected H0 and accept H1 which means there is a significance difference between Top Seven Joint Venture General Insurance Company that consider to have a good performance and The Least Seven Joint Venture General Insurance Company that consider to not performing well in the view of its financial ratios. And based on the data analysis using Discriminant Analysis there are six variable the highly affected the variable y due to their significance level, or in other way

there are six financial ratios that considered to be the most influential ratio in predicting performance of joint venture general insurance company. Then those ratios are ROE, Technical Reserve to Investment, Debt Ratio, Expense Ratio, and Loss ratio. As one of the main objective of using Discriminant Analysis in this research is to establish a Discriminant Function that can be used to predict the performance of joint venture general insurance company, therefore the Discriminant Function resulted in this research is :

$$z \text{ Scores} = -1.809 + 1.125RBC + 1.452\text{Technical Reserve to Investment Ratio} + 2.168\text{Debt Ratio} + 4.082ROE - 8.684\text{Loss Ratio} + 2.580\text{Expense Ratio}$$

Moreover, Discriminant Function made in this research are 100% applicable to be use in other cases and also 100% could be use to predicted a performance of a joint venture general insurance company, and this is resulted from the accuracy test for this Discriminant Function in the previous part.

### 6. Limitations and Further Research

Data that will be used are limited to financial report of general insurance companies which are classified as joint venture company both of published and audited from year 2005-2009 and AAUI ( Association of Indonesia General Insurance) Insurance Industry report from 2005-2009.

The result suggest business people in joint venture general insurance industry to focus on six financial ratios in order to maintain their company's performance because those ratio considered to be the most influential ratios to the performance of joint venture general insurance industry. Further, ROE tend to be the most influential ratios to predict the profitability of a joint venture general insurance company. Therefore business people in joint venture general insurance company should be aware in this ratio and maintain the efficiency from stockholders' equity to more than 8%, by concerning into this ratio a company could get a maximum return from stockholders' investments.

In the view of Solvency Aspect there are three most influential ratios which are Technical Reserve to Investment ratio, Debt Ratio, and RBC. According to those three ratios, business people in joint venture general insurance industry should protect its technical reserve to be able to cover any risk from their investment activities. Moreover, business people also should maintain their company's assets to more than their company's liabilities. It is better for them to decrease commercial loans, in order to not adding more liabilities to the company, because the increasing rate of return could endanger the company. And last is to always maintain the RBC level to be above

120% in order to maintain the capital adequacy of a company. To maintain this RBC level, a company should maintain its admitted assets to be bigger than its liabilities, a condition when the assets of a company is smaller than the liabilities could led that company into insolvency condition.

In the view of management efficiency there are two ratios that need to be concerned by business people in joint venture general insurance industry to maintain their company's performance, and those ratios are Loss Ratio and Expense Ratio. Business people should strive to get more and more premiums with the optimum price, and not by radically decreased the price because it will increase the risk for the company.

Company's management should make an appropriate pricing strategy that could increase market share while maintaining the risk for the company. Customer satisfaction and loyalty play a big role in this part; therefore a good service would be very important in this case. Further to maintain Expense Ratio in the company, management should increase underwriting profit while decreasing the operational expense in the company. Any unimportant expenses should be eliminated, and also focus on the strength of underwriting team to attract more and more customers.

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