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Test Quality of Variance and Tabulation : Case study from Indonesia

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ABSTRACT

This paper aims to examine the relationship between financial ratios of banks namely NIM, ROA, CAR and NPL variables in 43 banking industry in Indonesia. This paper uses the analysis of quality of variance and tabulation to see the relationship between the financial ratios of banking in detail, based on data published in the financial statements during the period of 2011 to 2015. From the paper that has been completed studies, it was concluded that the test quality od variance and tabulation of banking financial ratios are carefully distributed simultaneously showing the positive effects and negative effects as presented in table 2 and table 3. While the value for the range of data generated, the amount of data, the average value of each data, and the resulting median values are presented normally as shown in table 1 results.

Keywords : Test Quality of Variance, Tabulation Test, Banking Industry.

I. INTRODUCTION

To see the banking industry and to find banks with financial ratios, capital, deposit amount, or the amount of credit and good assets, always viewed from the financial performance that is owned. No exception by looking at the profitability and operational efficiency levels and in managing the value of assets owned, indirectly can affect the operational value and financial performance of the banking. In theory and some empirical studies [See Study 1,2,3,4,5] provide explanations related to operational performance and assess the level of efficiency in asset management and can directly affect the financial ratios of banks in value with ROA, CAR, NIM, NPL and others. In the literature, reviewing how the commercial banking in the State Country in doing research such as Jordan, Pakistan, India Romania, and the American continent to make banking ratios such as ROA, CAR, NIM, NPL in making measurement tools performance in the banking industry.

With this background, this research is done by the authors to see how the analysis of banking in performance ratio with test equality of variance dan tabulation, with case studies in Indonesia on 43 banks listed on the BEI during the period 2011-2015.

II. LITERATURE REVIEW

In a study conducted [6,7,8], empirically see how the performance value of banking industry ratios in several countries in doing research, by taking case studies of some commercial banks and state banks as a tool of financial performance analysis of banks. The use of variable operating income and other banking financial ratios, is considered as a dependent variable that can be made in the size of research in the banking industry. Management of asset management and operational level of banking efficiency, made as a measure of independent variables in their research. Some of these studies provide results that, the value of ROA that is owned by banks in doing research, strongly influence the size of the banking indirectly. Values Efficiency in terms of banking operations

occurs a negative relationship to the variable rate of return on assets, which is indirectly valued statistically significant. So it can be concluded that the hypothesis is accepted with the assumption that the value of Interest income in the made as other dependent variable of the banking in doing research, significantly influence the SIZE banking in the perusal.

There is a relationship between interest income that shows a negative value with the level of banking efficiency in doing research and operational values that significantly influence. Empirically and practically, the research they have done has helped the banking industry and bankers in making decisions for the banking world and can see firsthand the improvement and financial performance as well as banking operations. The existence of positive correlation value among the variables in doing research such as ROA, CAR, SIZE, and asset management value with variable interest income in which indicate the level of efficiency achieved by the banking industry.

See paper [9,10,11] describes the study of the effects of a banking crisis caused by the global financial crisis. In their paper, to ownership of the banking sector which is a State-Owned Public Bank and Private Bank owned by Private. If you look specifically, there are some fundamental factors of macroeconomics, which cause and influence the value of efficiency of banking sector in the country in doing research. They assess how the performance of banks in the country in doing research by using data analysis methods such as: Database Based Envelopment Analysis, Ordinary Least Square (OLS) analysis based on panel data regression, Generalized Least Square and Fixed Effect Effect model and Random Effect . Some models of this analysis, believed to be adopted to test the performance of banks and the ability of banks in generating profits. Empirically shows the level of efficiency in the banking sector that continues to increase from three point seven percent to five point eight percent during the period of global financial crisis. Furthermore, from the research they have done, empirically also showed the level of profit efficiency that decreased by thirty eight point seven percent became Nine point nine percent. This is very significant difference in the relationship between variables SIZE bank, the level of banking liquidity, economic growth in the country in doing research and market orientation to the efficiency of profit.

III. RESEARCH METHOD

This research was conducted during November and December 2017, using banking financial ratio data, for banks have financial statements listed on the BEI as many as 34 banks for the year ending 2011-2015. The financial ratios used in this study consist of ROA, NPL, NIM and CAR. In this study using descriptive statistical data analysis with histogram method, cumulative data tabulation test and equality of variance analisys test. The following is presented in the data analysis using descriptive statistics, as attached to table 1:

Table 1 : Result for statistic descriptive

	ROA	NPL	NIM	CAR
Mean	1.595628	1.631814	5.365023	17.90265
Median	1.570000	1.450000	5.190000	16.39000
Maximum	5.420000	4.910000	16.64000	68.60000
Minimum	-7.580000	0.000000	1.640000	8.020000
Std. Dev.	1.761945	1.184174	2.091927	6.214754
Skewness	-1.597669	0.740042	1.773864	3.525161
Kurtosis	9.853022	2.737930	8.86591	25.16679

			9	
Jarque-Bera	512.1846	20.23981	421.0003	4847.116
Probability	0.000000	0.000040	0.000000	0.000000
Sum	343.0600	350.8400	1153.480	3849.070
Sum Sq. Dev.	664.3521	300.0852	936.4978	8265.358
Observations	215	215	215	215

Source : Proceed author by statistic program

in table 1, the results of analysis are statistically descriptive for ROA, NPL, NIM and CAR variables for 34 banks in doing research. There are mean, median, maximum, minimum, skewness and kurtosis with 215 observations of data obseration.

IV. RESULT AND DISCUSSION

Histogram statistical results

In the picture below, we can see the frequency distribution of the panel data by histogram. Histogram statistics divide the time range for the valued data between the maximum and minimum values into the same length interval form and show some calculations of the number of observations made on the data, included in each bin. Using the histogram analysis model, there is a greater possibility of control over the width and placement of the bin count, or in other words the analysis with the histogram makes it easier to create related graphics such as kernel density plots or polynomial histograms. Here is the display of histogram analysis using data from ROA, NIM, NPL and CAR ratio at 43 banks registered in BEI during 2011-2015 period.

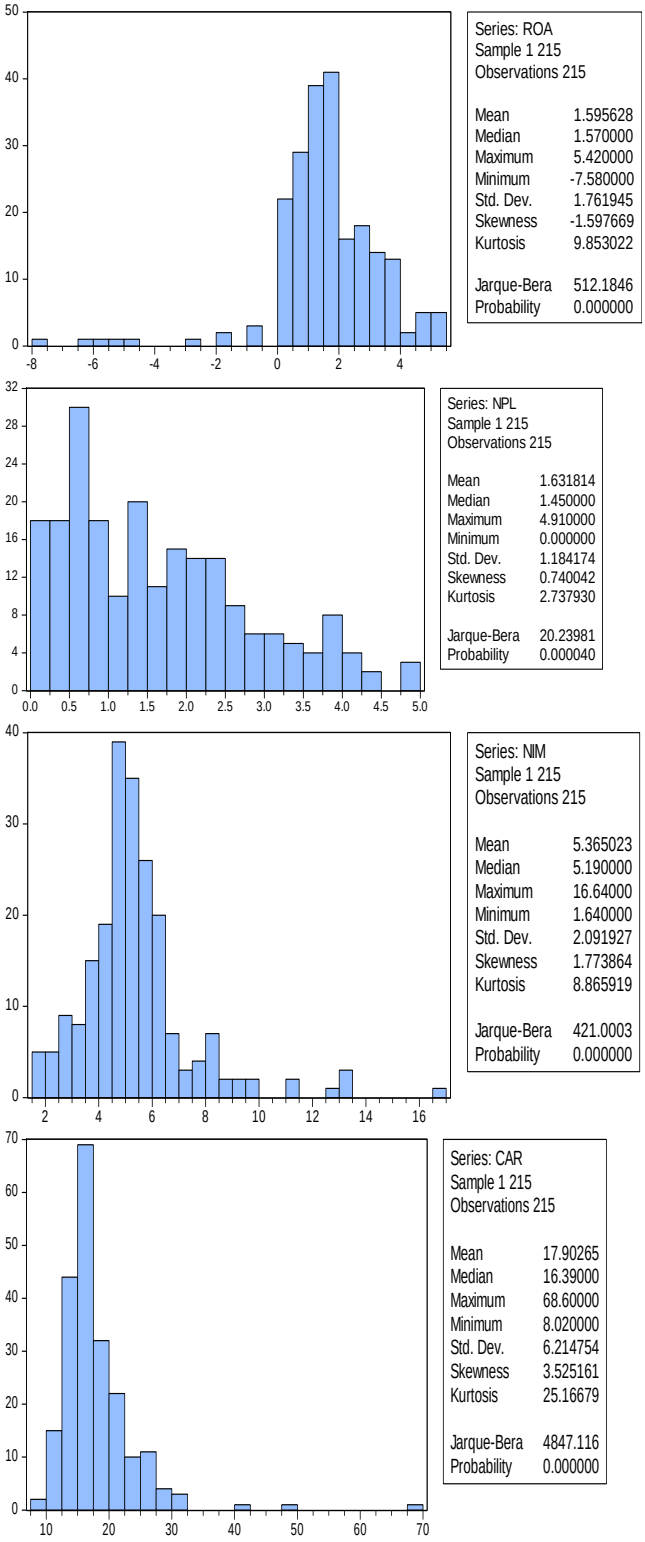

Figure 1 : Result for statistic histogram

Source : Proceed author by statistic program

From figure 1 above, there is a complementary value of descriptive statistics that is displayed together with the result of histogram analysis. All statistics are calculated using observations on the current sample.

Visible and presented the value of Mean which is the average value of the circuit, obtained by adding the circuit and dividing by the number of observations. Then there is a Median value that displays the middle value (or average of the two middle values) of the circuit when the value is ordered from the smallest to the largest. The median is a strong measure of the distribution center that is less sensitive to the outlier than the mean. And lastly the value of Max and Min which is the maximum and minimum value of the circuit in the current sample. Furthermore, in doing cumulative test tabulation of variable ROA, NIM, NPL and CAR on 43 banks in the perusal

Test cumulative tabulation of variable

The test of the cumulative frequency distribution of the tabulation can provide a description of one variable, but it does not provide information thoroughly about how two or more variables relate to each other simultaneously. To understand the relationship between several variables, we can use this cross-tabulation test. Thus if we want to see whether the variables in the research tend to want another variable or vice versa, then the table can be used as a reference or commonly known as a contingency table. This table allows us to evaluate the number and percentage, such as the frequency distribution. But while the frequency distribution provides information for each level of one variable, the cross tabulation shows the results for all combinations of second-rate variables [12,13,14,15].

Table 2 : Result for tabulation statistic

Tabulation of ROA				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[-10, -5)	4	1.86	4	1.86
[-5, 0)	7	3.26	11	5.12
[0, 5)	199	92.56	210	97.67
[5, 10)	5	2.33	215	100.00
Total	215	100.00	215	100.00

Tabulation of NPL				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 1)	84	39.07	84	39.07
[1, 2)	56	26.05	140	65.12
[2, 3)	43	20.00	183	85.12
[3, 4)	23	10.70	206	95.81
[4, 5)	9	4.19	215	100.00
Total	215	100.00	215	100.00

Tabulation of NIM				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 5)	100	46.51	100	46.51
[5, 10)	108	50.23	208	96.74
[10, 15)	6	2.79	214	99.53
[15, 20)	1	0.47	215	100.00
Total	215	100.00	215	100.00

Tabulation of CAR				
			Cumulative	Cumulative
Value	Count	Percent	Count	Percent
[0, 20)	162	75.35	162	75.35
[20, 40)	50	23.26	212	98.60
[40, 60)	2	0.93	214	99.53
[60, 80)	1	0.47	215	100.00
Total	215	100.00	215	100.00

Source : Proceed author by statistic program

In table 2 above or referred to as cross tabulation table, it shows that ROA variable is approaching more than 1.86% to 3.26% and other variables choose ROA ranged between 2.33%. The value of value denotes the value of the range variables and is located where, while the percentage makes some variables that will select other variables, while the cumulative is the number of the data variables in detail, in detail in the form of numbers. To evaluate the statistical significance of cross-tabulation results, it can be done by using a hypothesis test called a chi-square test. This test compares the observed numbers in the data we have collected to the counts we expect if there is no relationship between variables then using the test of quality of variance.

Test equality of variance

If it is common in many studies that use independent sample t test and ANOVA or commonly known as statistical tests t and F, which are generally strong against assumption violations during group size are the same. So in this study we use the equality of variance test, a test that explains how much the size of the same group can be determined by the ratio of the largest and smallest group of less than 1.5. If the value of the group size is very unequal and the homogeneity of the variance is violated, then the F statistic will be biased when the large sample variance is associated with the small group size. When this happens, the level of significance will be underestimated, which can cause the null hypothesis to be rejected incorrectly. On the other hand, F statistics will be biased in the opposite direction if large variance is associated with large group sizes. This means the level of significance will be too high. This does not cause the same problem by rejecting the null hypothesis incorrectly, but may lead to a decrease in test strength. The following test results equality of variance for variable ROA, NIM, NPL and CAR bank in doing research.

Table 3 : Result for statistic quality of variance

Test for Equality of Variances of ROA				
Method		df	Value	Probability
Bartlett		3	11.13879	0.0110
Levene		(3, 211)	2.452819	0.0643
Brown-Forsythe		(3, 211)	1.998371	0.1153
Category Statistics				
			Mean Abs.	Mean Abs.
ROA	Count	Std. Dev.	Mean Diff.	Median Diff.
[-10, -5)	4	1.003826	0.730000	0.730000
[-5, 0)	7	1.439183	1.072245	0.950000
[0, 5)	199	1.122252	0.898857	0.884623
[5, 10)	5	0.171610	0.124000	0.108000
All	215	1.761945	0.883341	0.865814
Bartlett weighted standard deviation: 1.120551				

Test for Equality of Variances of NPL				
Method		df	Value	Probability
Bartlett		4	4.236326	0.3750
Levene		(4, 210)	1.971285	0.1001
Brown-Forsythe		(4, 210)	1.603777	0.1746
Category Statistics				
			Mean Abs.	Mean Abs.
NPL	Count	Std. Dev.	Mean Diff.	Median Diff.
[0, 1)	84	0.255688	0.221508	0.220595
[1, 2)	56	0.274662	0.222883	0.220714
[2, 3)	43	0.262650	0.211325	0.208837
[3, 4)	23	0.339353	0.294858	0.293913
[4, 5)	9	0.348477	0.299012	0.284444
All	215	1.184174	0.230921	0.228791
Bartlett weighted standard deviation: 0.275834				

Test for Equality of Variances of NIM				
Method		df	Value	Probability
Bartlett		3	3.318210	0.3451
Levene		(3, 211)	0.912912	0.4356
Brown-Forsythe		(3, 211)	0.456417	0.7130
Category Statistics				
			Mean Abs.	Mean Abs.
NIM	Count	Std. Dev.	Mean Diff.	Median Diff.
[0, 5)	100	0.932409	0.771840	0.740500
[5, 10)	108	1.108829	0.851706	0.786204
[10, 15)	6	0.843366	0.715556	0.623333
[15, 20)	1	NA	0.000000	0.000000
All	215	2.091927	0.806798	0.756744
Bartlett weighted standard deviation: 1.023844				

Test for Equality of Variances of CAR				
Method		df	Value	Probability
Bartlett		3	1.345250	0.7184
Levene		(3, 211)	0.414917	0.7425
Brown-Forsythe		(3, 211)	0.267451	0.8488
Category Statistics				
			Mean Abs.	Mean Abs.
ROA	Count	Std. Dev.	Mean Diff.	Median Diff.
[-10, -5)	4	3.587357	2.635000	2.265000
[-5, 0)	7	6.714673	5.467755	5.037143
[0, 5)	199	6.193805	3.904677	3.648342
[5, 10)	5	5.517874	4.835200	4.042000
All	215	6.214754	3.953586	3.676977
Bartlett weighted standard deviation: 6.167809				

Source : Proceed author by statistic program

From table 3 above shows and presented results for testing the value of the homogeneity of variance, there are several statistical tests that can be used. These tests include: Hartley's F max, Cochran's, Levene and Barlett tests. Some of these judgments are too sensitive to abnormal circumstances and are not often used. From this test, the most common assessment for the homogeneity of variance is the

Levene test. Just like the Levene Test uses the F test to test the null hypothesis that the variance is the same between groups. A p value less than 0.05 indicates a violation of assumptions. In case of violation, the possibility of conducting a non-parametric assessment is more appropriate. When viewing the results from Levene's original paper only proposed using the mean. However, looking at the study [12,13] further extends the Levene test to use a median or a mean that is pruned besides the mean. There are several studies that do this by using the Monte Carlo test which shows that using a cropped average is best done when the underlying data follows the Cauchy distribution (ie, the weight tail) and the best median when the underlying data follows the $\chi 24$ distribution (ie, tilt). Although the optimal choice depends on the underlying distribution, the median definition is recommended as an option that provides good resistance to many types of non-normal data while maintaining good strength. In [16,17] for example, there is a test using the hypothesis that group variance is the same. And there is a failure and reject the null hypothesis at the 0.05 significance level because the Levene test statistic value is less than the critical value. It can thus be concluded that there is not enough evidence to claim that the variance is not the same.

V. CONCLUSION

From the studies that have been done look how the data distribution of variable ROA, NIM, NPL and CAR bank by histogram. In this study also used cumulative test table variabel and equality of variance test. With the test can be explained how the distribution of data in doing the research in separate values for the mean, median, max and min distributed in table, with the value of the range described in the table. And also the equality of variance test, for example, can explain the probability of the value described in the form of bartlet and levene test. How much of the amount of data distributed by numbers can be explained by the range of count and value generated in the table presented.

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