Cost of Fund (COF) and Operating Expenses on Operating Income (BOPO) on Profitability in PT Bank Rakyat Indonesia (Persero) Tbk from 2012 to 2021

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Abstract

This study aims to determine the effect of COF and BOPO on ROA at PT Bank Rakyat Indonesia (Persero) Tbk. This research method uses a quantitative descriptive design. The sample selection was done by purposive sampling method. The population used in this study was a financial summary report and equity participation in PT Bank Rakyat Indonesia (Persero) Tbk. The sample used is the company's financial statements for 2012-2021. The data method used in this research is multiple linear regression analysis, classical assumption test which includes normality test, multicollinearity test, heteroscedasticity test and autocorrelation test. The result shows that there is autocorrelation in multiple regression model so the autoregressive (1) is used to fix the problem. The new model shows that BOPO has negative effect significantly effect on ROA partially, contrast to COF has not significant on ROA. ROA are significantly affected by COF and BOPO with AR(1) model.

Keyword: *Cost of Fund; BOPO; ROA*

JEL Classification: G20; G21

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Introduction

All operational activities certainly require costs, without costs it is impossible for these activities to be carried out. Operational costs will be related to operating income. Operating Costs on Operating Income (BOPO) is interrelated. If the income is greater than the operating costs the bank will get a greater profit.If the bank cannot control its operational costs, this will have a bad impact on the bank.

BOPO also has a big influence in measuring the level of efficiency and also the ability of banks to carry out their operational activities. For this reason, the bank must make a comparison between the total operating costs and the operating income it earns.

In banking, the operating income earned is interest from customers while the operational costs are interest costs from third parties. This bank's income will be much better if the interest cost is much lower, but to get the small interest fee, the bank must be good at choosing a third party.

In general, parties who provide funds to banks have demands to ask for higher interest rates. The high interest rates desired by these third parties have caused banks to become more critical in terms of the interest rates charged to their customers. To get a large operating income, of course, the bank must also be good at finding a lot of customers and the bank can reduce interest costs even more.

Without operating income, the bank will not run well. This operating income will be used to finance several operational costs, improve bank performance and also for capital. Banks should not always depend on third parties. Even though there are many credit applications, banks still have to be selective, especially if the funds owned by the bank are not large.

Operating income earned by the bank consists of all income from direct operational activities that have actually been received. The operating income can be in the form of interest, commissions and fees, income from foreign exchange transactions and other income. Interest income earned is the main income obtained from the distribution of bank funds to customers, investment income from banks to customers.

Interest income can be earned every month when customers pay their obligations to the bank, while interest income from investments such as demand deposits, time deposits and bonds, can be obtained monthly or annually. Banks also get income other than interest, the income is called fees and commissions.

These fees and commissions are obtained by the bank when the bank collects them from activities carried out by the bank such as transfer fees, purchase and sale commissions as well as other fees and commissions recognized and approved by the bank. Banks can also get other income from foreign exchange transactions they do. This foreign exchange transaction income is not included in the dividend income account.

What about bank operating expenses? Bank operating expenses are all expenses incurred to finance the bank's business activities. Operating expenses include interest expense, commitment and contingent loss expense, earning asset write-off expense and also other expenses related to the bank's business activities. Interest expense is an expense paid by the bank and given to depositors or to customers who save and the amount of interest costs is determined by the bank.

In addition to paying interest costs, the bank can also issue the expense of writing off productive assets, in this case there can be a bank receivable from a customer that cannot be billed anymore. This cost is in the form of depreciation or amortization which is expressed in the value of rupiah or foreign currency.

Earning assets in question are assets used by banks to earn bank income or to carry out operational activities. Earning assets that can be depreciated include loans, securities, interbank fund placements, investments and others. Meanwhile, other expenses that can also be incurred by banks are administrative and general expenses, expenses incurred for insurance licenses, rental and promotion expenses, taxes and other expenses that are not included in the above expenses.

The cost of bank funds is the cost for funding purposes, namely the costs that must be incurred by the bank for each fund that has been collected from various sources, before deducting the minimum reserve requirement that the bank must maintain.

Targetting good ROA is important for many companies including banks. It also is being consideration on healthy level banks which calculated in RGEC (Risk Profile, Good Corporate Governance, Earnings, and Capital). The ROA formula will give managers,

investors, or analysts a picture of how efficient the company's management is in using assets to generate income.

Table 1 COF, BOPO, and ROA (in percent) from 2012 to 2021

Year	*COF* (%)	BOPO (%)	*ROA* (%)
2012	2.9160	56.24	3.3895
2013	3.0449	55.65	3.4102
2014	3.8051	59.63	3.0243
2015	4.0590	58.85	2.8928
2016	3.6065	57.26	2.6190
2017	3.6373	56.07	2.5762
2018	3.6734	56.22	2.4997
2019	4.0195	56.60	2.4291
2020	3.8789	63.09	1.3069
2021	2.5843	57.02	1.9758

Source: Self-processed

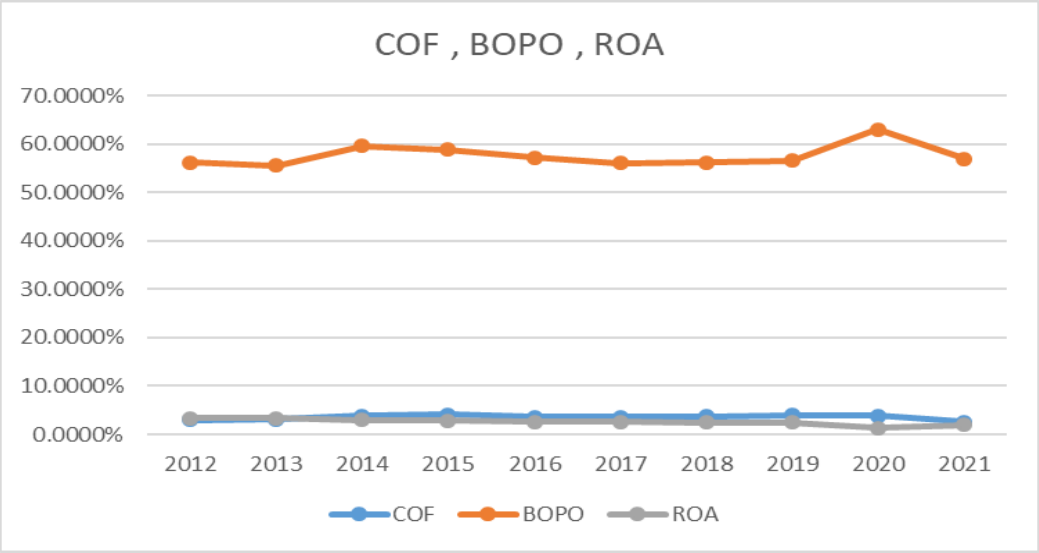

Figure 1 COF, BOPO, and ROA (in percent) from 2012 to 2021

Figure 1 above tell us about the movement COF, BOPO, and ROA from 2012 to 2021. It shows that BOPO has remained constant between 55 % and 64%. COF has remained constant between 2.5% and 4.2%. ROA is between 1.3% and 3.5%. COF is under 5% but BOPO is until 64%. It means that costs from 50% to 60% come from other sources.

The fact can analyze that the BOPO is high as well but COF and ROA is lower than the rest of 1- BOPO. It makes motivation research come up and become one of considerations

starting this research. It can be concluded that this research investigates COF and BOPO on ROA in Bank Rakyat Indonesia (Persero) Tbk from 2012 to 2021

Literature Review

There are previous studies about COF and BOPO on ROA. BOPO has negative effect on ROA(Rifansa & Pulungan, 2022)(Alam et al., 2022)(Fauziyyah & Sugiyanto, 2022)(Putranto, 2022). BOPO has no significant effect on ROA(Aryani, 2022)(Erlangga, 2022). The COF has insignificant on ROA (Tibebe & Gujral, 2022).

According to the Financial Services Authority (OJK), the cost of funds in a bank is the basis for determining loan interest rates after calculating the expected profit including administrative costs and other costs (cost of funds). The cost of funds is one of the most important input costs for financial institutions because lower fees will result in better returns when the funds are used for short-term and long-term loans to borrowers.

The calculation of the cost of funds (Cost of Fund) is used to determine the average interest cost that can be obtained by the bank, which is basically to measure the efficiency of the bank's business. will affect the total cost of funds. The greater the liquidity or the minimum required reserve, the greater the cost of bank funds. Funds that are successfully collected after deducting the minimum mandatory liquidity that must be maintained are called the cost of loanable funds. The method of calculating the cost of bank funds is divided into 3, namely: Historical Average Cost of Fund Method, Weighted Average Cost of Loanable Fund Method, and Marginal Cost of Fund Method.

: Historical Average Cost of Fund Method is a method that is widely used by banks in measuring the cost of bank funds. Many banks calculate the cost of funds by simply adding up all costs incurred related to the calculation of funds and other loans divided by the total funds raised. This method is accurate when the interest rate is always stable. When the

interest rate changes, the calculation results will also change. The historical average cost of funds method is relatively easy and simple to implement. This method focuses on calculating the weighted average cost of funds from previously collected funds. The average cost of funds is obtained by transferring the amount of funds to the interest rate of each source of funds. This method is a relatively simple concept used in estimating the cost of bank funds. Thus, this concept is more relevant to be used in evaluating the performance and cost of bank funds in the previous period. This concept gives a misleading picture if the bank determines the type of data to be collected, or the bank increases the amount of its assets and/or determines the interest rate on its credit. According to this concept, if interest rates rise, it is clear that the cost of funds calculated by the historical average cost concept will be lower than the funds that replace them.

Based on the concept of the cost of funds, the bank then determines the loan interest which may be less profitable. This method focuses more on funds collected in the past and the dominant interest rate collected by banks. The formula is below.

$$Historical\ Average\ Cost\ of\ Fund = \frac{Total\ Cost\ of\ Funds}{The\ Amount\ Funds\ cost} \quad (1)$$

Or

$$Historical\ Average\ Cost\ of\ Fund = \frac{Total\ Cost\ of\ Funds}{The\ Amount\ Funds} \quad (2)$$

Weighted Average Cost of Loanable Fund method is a a method that can describe the actual condition of the bank's cost of funds. This method is more realistic because it pays attention to the composition of the types of funds and the factors that directly affect the cost of funds, such as interest rates and reserve requirements. The calculation of the bank's cost of funds uses the weighted average cost of loanable funds. This is because the source of bank funds consists of various types, both in nature, the amount of funds collected, as well as the burden that must be paid by the bank to the source of funds, for example to the public. Bank

funds can be in the form of demand deposits, savings, loans outside the bank, and the bank's own capital.

In calculating the cost of funds, banks according to this approach should pay attention to the role of each type of fund and other factors that directly affect the cost of funds, such as the provisions on reserve requirements. This method directly determines the cost of funds that must be paid by the bank for each rupiah and after deducting the portion of funds that must be maintained by the bank as a mandatory reserve called the cost of loanable funds. The minimum reserve that must be maintained by every bank, both in rupiah and in foreign currency, in accordance with Bank Indonesia regulations is a certain percentage of the total third party funds that can be collected. The greater the statutory minimum reserve requirement, the greater the effect on the cost of funds that must be borne by the bank.

In Marginal Cost of Fund, the bank will use its marginal cost, namely the cost paid to obtain additional funds and obtain an acceptable profit (spread) on the addition of assets financed with the funds obtained. This method is different from the historical cost of funds method which focuses more on the costs and profits of the bank in the past, whereas it should take into account ongoing and future activities. The marginal cost of funds method calculates the cost of funds according to the current market interest rate. The calculation of the cost of funds with this method is relatively simple and many people use it in determining the loan interest rate for its main customers (prime customers). This method establishes a single type of fund as the basis for setting pricing or new assets, so that in calculating the cost of marginal funds it is assumed that all required funds are obtained from one source, namely either through the interbank money market or the bank can issue certificates of deposit. The fees for the funds obtained are used as the basis for determining the interest (pricing) of loans given to customers. To fulfill customer credit applications that have been approved by the bank, the bank collects funds through a 12-month time deposit with an interest rate of 11%

per year and fees other 22.5% and to meet the minimum mandatory liquidity requirement of 5% the marginal cost of funds is calculated as follows:

$$Marginal\ Cost\ of\ Funds = \frac{interest+other\ costs}{1-reserve\ requirement} \quad (3)$$

The operational efficiency ratio analysis according to (Dendawijaya, 2018) uses the following calculations. Operational costs are costs related to bank business activities, namely interest costs, other foreign exchange costs, labor costs, depreciation and other costs. Operating Income is all income that is a direct result of the bank's business activities that are actually received, such as interest, fees and commissions, other foreign exchange income and other income.

According to Bank Indonesia Circular Letter Number 15/29/DKBU dated July 31, 2013 Operational Cost of Operating Income (BOPO) is: "The ratio that measures the comparison of Operating Expenses to Operating Income to determine the level of efficiency and ability of the Bank in carrying out its operational activities by dividing between Total operating expenses and total operating income calculated per position (not annualized)."

Based on the Circular Letter of Bank Indonesia No.15/15/PBI/2013 dated December 24, 2013. The ideal BOPO ratio is between 50% - 75% in accordance with the provisions of Bank Indonesia must have a maximum BOPO of 85%. If a bank has an BOPO of more than the provisions of Bank Indonesia, the bank is categorized as unhealthy and inefficient. According to the Circular Letter of Bank Indonesia Number 15/29/DKBU dated July 31, 2013, the formula for BOPO is:

$$BOPO = \frac{Operating\ Expenses}{Operating\ Incomes} \quad (5)$$

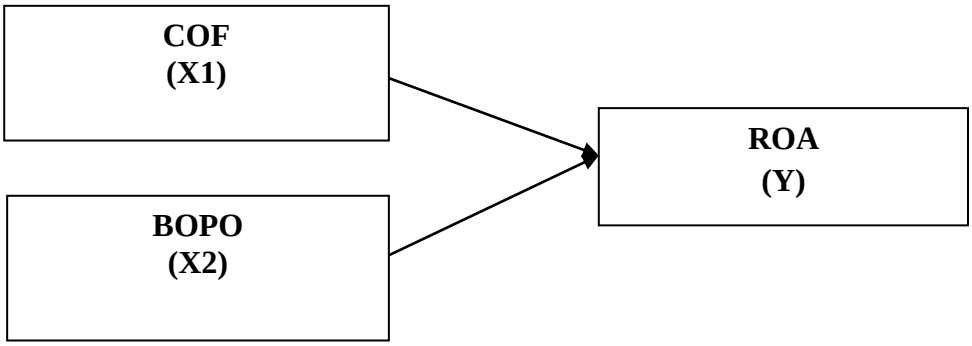

Figure 2 Framework Research

H1 : Cost of Fund (COF) has significant effect on Return on Assets (ROA) partially on Bank Rakyat Indonesia (Persero) Tbk from 2012 to 2021

H2 : BOPO has significant effect on ROA partially on Bank Rakyat Indonesia (Persero) Tbk from 2012 to 2021

H3 : COF and BOPO have significant effect on ROA simultaneously on Bank Rakyat Indonesia Tbk from 2012 to 2021.

Research Method

This research uses quantitave research. The data are secondary from https://bri.co.id/en/report-detail-annually?typeId=1. Multiple regression is used with BLUE (Biest Linear unbiased Estimator) such as normality test (Histogram), autocorrelation test (Lagrange Multiplier Test), multicollinearity test (Variance Inflation Factors), heteroscedasticity test (Breush Pagan Godfrey) and linearity test (Ramsey RESET Test). If the model does not complete the BLUE the model will be fixed in accordance the violation.

Table 2 Operational Variables

Variables	Variables definition	Indicators	Scala
COF (X1)	The cost of funds by first calculating the total composition of savings funds and then multiplying by the effective interest rate.	$\frac{Cost\ of\ Fund}{Total\ Third\ Fund}$ X 100%	Ratio

Variables	Variables definition	Indicators	Scala
BOPO (X2)	Operating expenses are calculated by dividing operating expenses by operating income and then multiplying by 100%.	$\frac{Operating\ Expenses}{Operating\ Income}$ X 100%	Ratio
ROA (Y)	This ratio is used to measure the ability of bank management in obtaining profits or overall profits. It is calculated by dividing earning after interest and taxes by total assets.	$\frac{Earning\ After\ Tax}{Total\ Assets}$ X 100%	Ratio

Source: Self-processed

Results and Discussions

Results

Table 3 Descriptive Statistics COF, BOPO, and ROA

Statistics	COF	BOPO	ROA
Mean	3.522490	57.66300	2.612350
Median	3.655350	56.81000	2.597600
Maximum	4.059000	63.09000	3.410200
Minimum	2.584300	55.65000	1.306900
Std. Dev.	0.501209	2.288454	0.636475
Skewness	-0.750886	1.461027	-0.645525
Kurtosis	2.209089	4.128510	2.914965
Jarque-Bera	1.200359	4.088307	0.697518
Probability	0.548713	0.129490	0.705563
Sum	35.22490	576.6300	26.12350
Sum Sq. Dev.	2.260894	47.13321	3.645899
Observations	10	10	10

Source: Self-processed by eviews 12

Table 3 shows the descriptive statistics of COF, BOPO, and ROA PT Bank Rakyat Indonesia Tbk. According to skewness, COF, BOPO, and ROA are betwen -2 and 2 that means the data are normal. BOPO's kurtosis is above 3 that means the data is leptokurtic. BOPO shows the data with high percentage is small or rare.

Table 4 COF between 2012 and 2021

Year	Cost of Fund (in Million Rupiah)	Total Third Fund (in Million Rupiah)	COF (%)
2012	13.126.655	450.166.383	2.9160
2013	15.354.813	504.281.382	3.0449
2014	23.679.803	622.321.846	3.8051
2015	27.154.270	668.995.379	4.0590
2016	27.211.975	754.526.374	3.6065
2017	29.894.281	821.884.395	3.6373
2018	33.917.032	923.309.860	3.6734
2019	40.048.971	996.377.825	4.0195
2020	42.180.448	1.087.424.950	3.8789
2021	29.428.900	1.138.743.215	2.5843

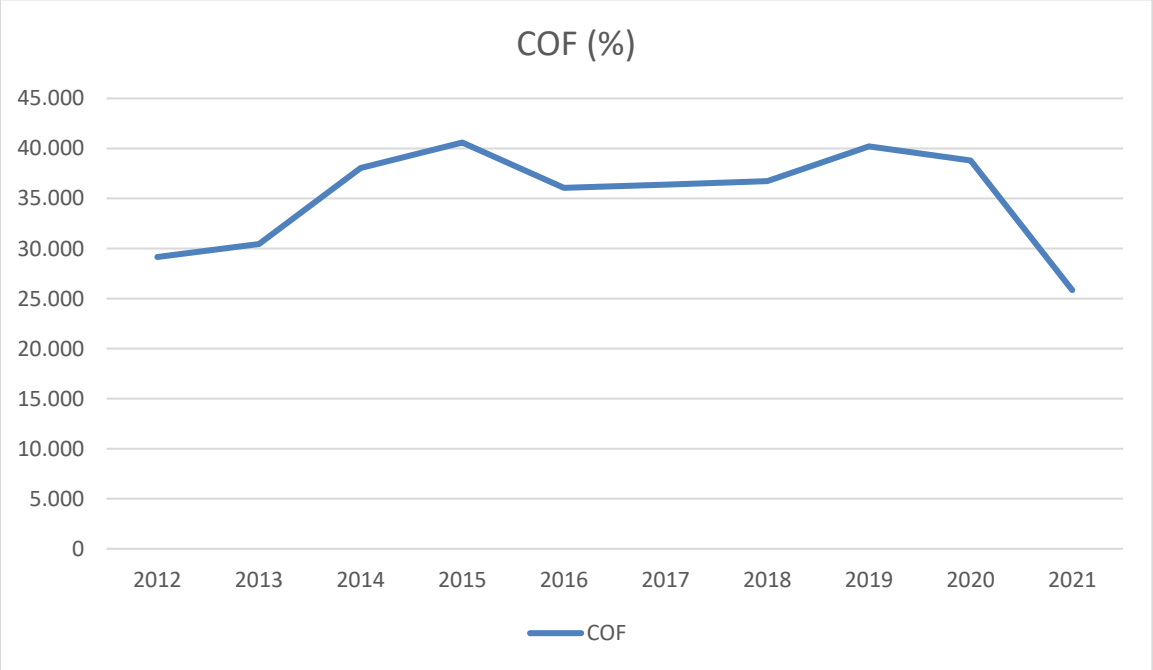

Figure 3 COF between 2012 and 2021

Figure 3 shows Cost of Fund has increase between 2013 and 2019. Between 2020 and 2021 the COF is dropped.

Table 5 BOPO between 2012 and 2021

Year	Total Financing Interest Expenses (in Million Rupiah)	Operating Income (in Million Rupiah)	Operating Expenses (in Million Rupiah)	Interest Income, Sharia Investment (in Million Rupiah)	BOPO (%)
2012	13.126.655	8.389.732	19.491.032	49.610.421	56.237
2013	15.354.813	8.348.459	22.380.778	59.461.084	55.649
2014	23.679.803	9.299.140	26.660.314	75.122.213	59.630
2015	27.154.270	13.855.484	31.275.696	85.434.037	58.848
2016	28.576.804	17.213.112	35.156.837	94.015.994	57.261
2017	29.894.281	19.271.287	38.614.076	102.912.375	56.070
2018	33.917.032	23.425.430	41.990.284	111.582.804	56.224
2019	40.048.971	28.439.130	44.965.625	121.756.276	56.603
2020	42.180.448	38.099.755	67.503.849	135.764.561	63.086
2021	29.428.900	41.215.807	75.918.108	143.523.329	57.025

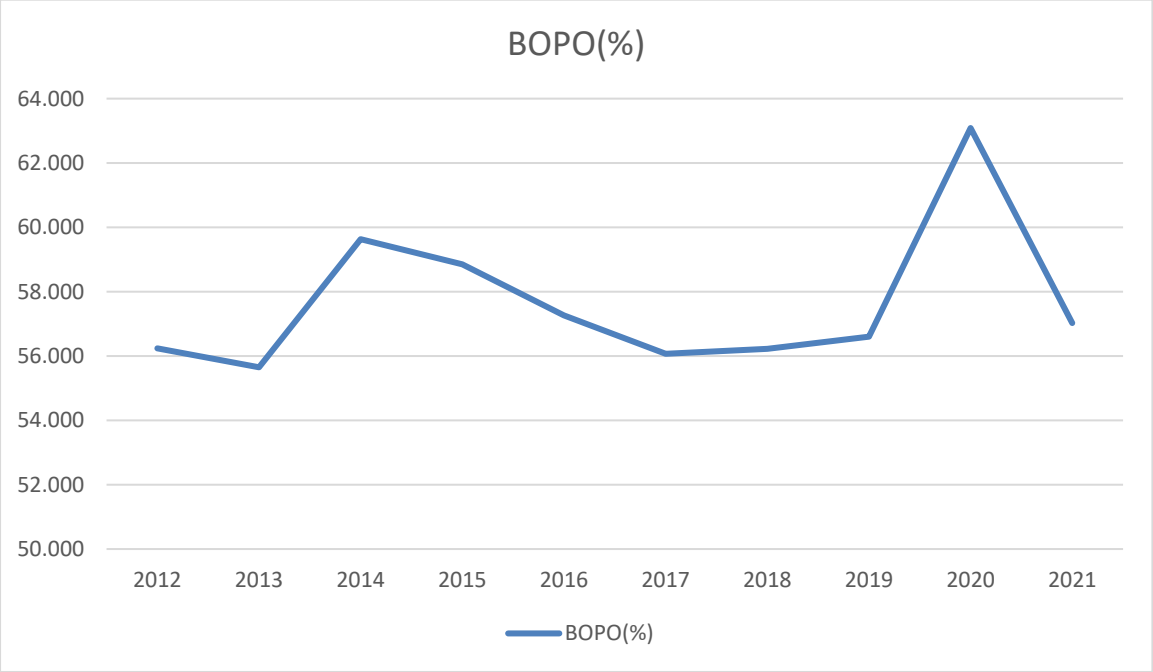

Figure 4 BOPO (in percent) between 2012 and 2021

BOPO had increase in 2014 and the highest in 2020. Other years were decrease

Table 6 ROA (in percent) between 2012 and 2021

Year	Earning After Tax (in Million Rupiah)	Total Assets (in Million Rupiah)	ROA (%)
2012	18.687.380	551.336.790	3.3895

Year	Earning After Tax (in Million Rupiah)	Total Assets (in Million Rupiah)	ROA (%)
2013	21.354.330	626.182.926	3.4102
2014	24.253.845	801.955.021	3.0243
2015	25.410.788	878.426.312	2.8928
2016	26.285.251	1.003.644.426	2.6190
2017	29.045.049	1.127.447.489	2.5762
2018	32.418.486	1.296.898.292	2.4997
2019	34.413.825	1.416.758.840	2.4291
2020	21.041.435	1.610.065.344	1.3069
2021	33.156.457	1.678.097.734	1.9758

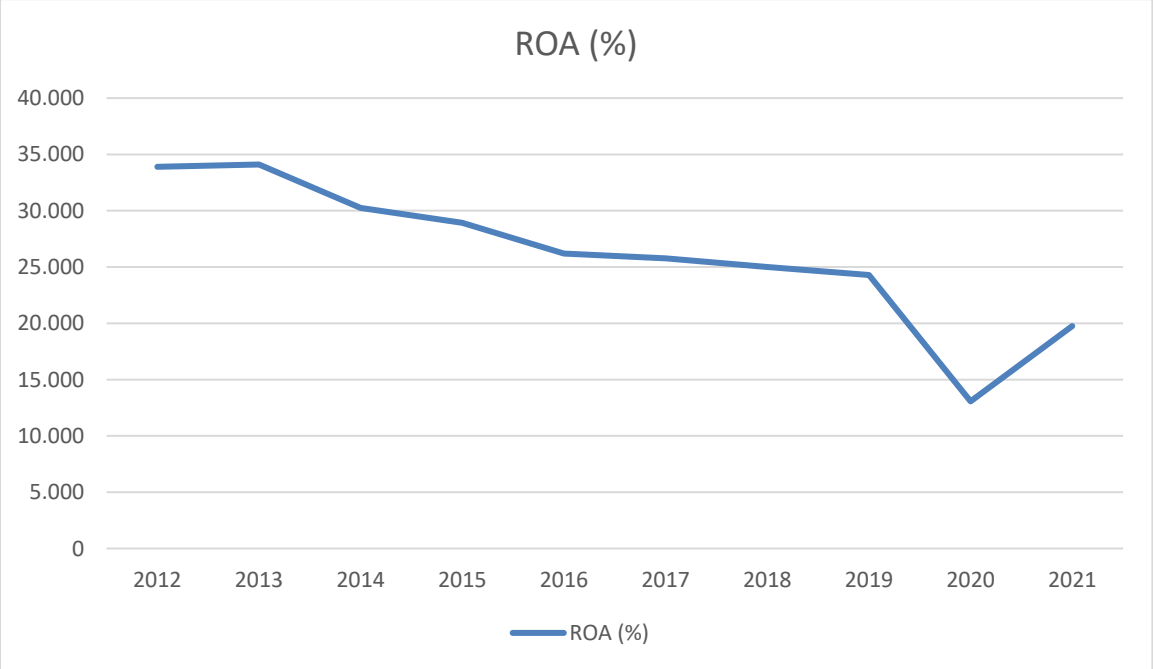

Figure 5 ROA (in percent) between 2012 and 2021

Figure 5 shows ROA from 2012 to 2021. The sinking is 2020 after that the ROA goes up to 2o percent.

Table 7 Multiple Regression with Y (ROA)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	124393.7	49246.11	2.525960	0.0395
X1	0.109487	0.427520	0.256098	0.8052
X2	-1.771090	0.936942	-1.890287	0.1006
R-squared	0.363608	Mean dependent var		26123.50
Adjusted R-squared	0.181782	S.D. dependent var		6364.746

S.E. of regression	5757.257	Akaike info criterion	20.39763
Sum squared resid	2.32E+08	Schwarz criterion	20.48841
Log likelihood	-98.98817	Hannan-Quinn criter.	20.29805
F-statistic	1.999756	Durbin-Watson stat	0.237329
Prob(F-statistic)	0.205606		

Source: Self-processed by Eviews 12

Table 7 show multiple regression of COF (X1) and BOPO (X2) on ROA. The X1 and X2 have insignificant on ROA about probability 0.8052 and 0.1006 partially. The coefficient of determination is 0.3636. This model explain the ROA only 36.36%. The prob (F-statistic) is 0.2056. It means that COF and ROA have not affected ROA significantly.

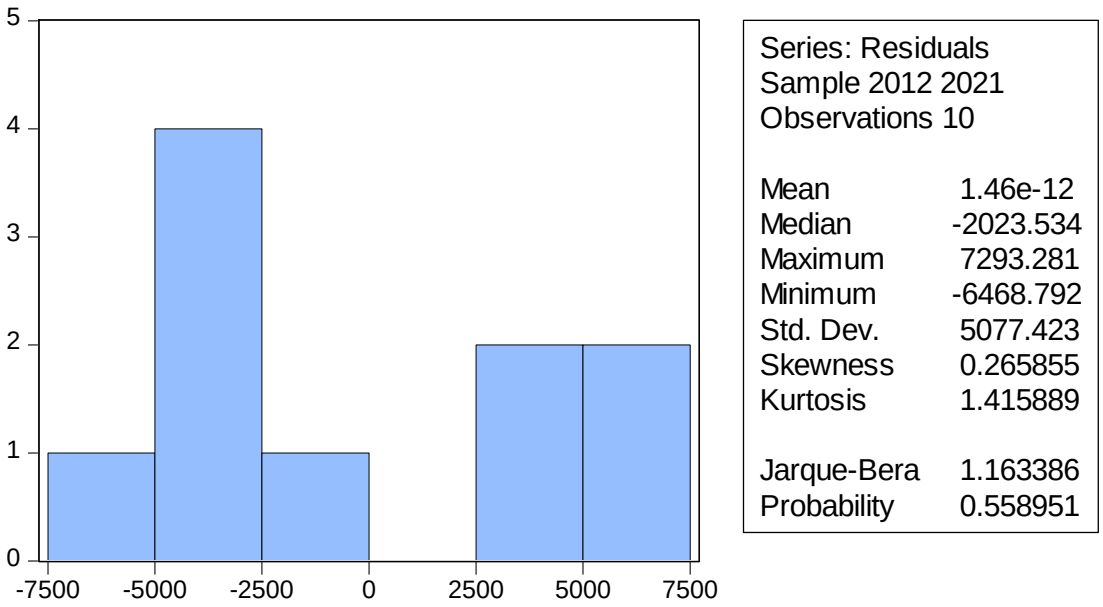

Figure 6 Normality Test with Histogram

Figure 6 shows normality test. Probability is 0.558951 that shows normal distribution because of above five percent.

Table 8 Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.986004	Prob. F(2,5)	0.0645
Obs*R-squared	6.660435	Prob. Chi-Square(2)	0.0358

Source: Self-processed by Eviews 12

Table 8 shows autocorrelation test. Prob. Chi-Square(2) is 0.0358. It means that there is autocorrelation on model.

Table 9 Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.163183	Prob. F(2,7)	0.3663
Obs*R-squared	2.494398	Prob. Chi-Square(2)	0.2873
Scaled explained SS	0.254161	Prob. Chi-Square(2)	0.8807

Source: Self-processed by Eviews 2012

Table 9 shows the heteroscedasticity test. Prob. Chi-Square(2) is 0.2873. It means that the model has homoscedasticity

Table 10 Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.43E+09	731.6655	NA
X1	0.182773	69.66643	1.246700
X2	0.877861	881.8767	1.246700

Source: Self-processed by Eviews 12

Table 10 shows that the multicollinearity has not detected on that model. It is shown by the centered VIF under 10 that is about 1.2467

Table 11 Linearity Test

	Value	df	Probability
t-statistic	1.045185	6	0.3362
F-statistic	1.092411	(1, 6)	0.3362
Likelihood ratio	1.672659	1	0.1959

Source: Self-processed by Eviews 12

Table 11 shows linearity test. Prob. (F-statistic) is 0.3362. It means that the model is linear.

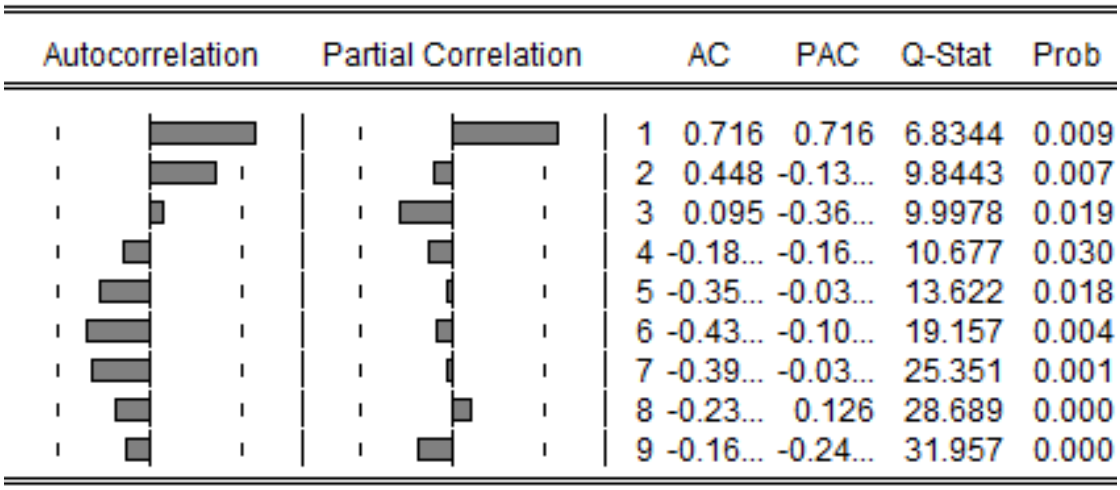

Figure 7 Correlogram-Q-Statistics before Adding AR(1) model

Figure 7 shows that AC and PAC are between 1 and 9. Probabilities are under five percent from lag 1 to lag 9. It shows the autocorrelations are happened from all of nine lag.

Table 12 Multiple Regression Adding AR(1) model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.44404	2.339222	4.464749	0.0066
X1	0.238386	0.272868	0.873632	0.4223
X2	-0.149068	0.040005	-3.726281	0.0136
AR(1)	0.938634	0.262436	3.576627	0.0159
SIGMASQ	0.038324	0.032542	1.177661	0.2919

R-squared	0.894886	Mean dependent var	2.612350
Adjusted R-squared	0.810795	S.D. dependent var	0.636475
S.E. of regression	0.276852	Akaike info criterion	0.789078
Sum squared resid	0.383235	Schwarz criterion	0.940371
Log likelihood	1.054610	Hannan-Quinn criter.	0.623111
F-statistic	10.64184	Durbin-Watson stat	0.775918
Prob(F-statistic)	0.011596		

Inverted AR Roots	.94

Source: Self-processed by Eviews 12

Table 12 shows multiple regression with adding AR(1). It shows that BOPO has negative effect significantly. The probability is about 0.0136. AR(1) has significantly positive effect on ROA. The probability's AR(1) is 0.0159. The Coefficient of Determination is 0.8949. It means that 89.5 % ROA is explained by this model. The prob. (F-statistic) is 0.0116. It means that COF, BOPO, and AR(1) have significantly affected on ROA simultaneously

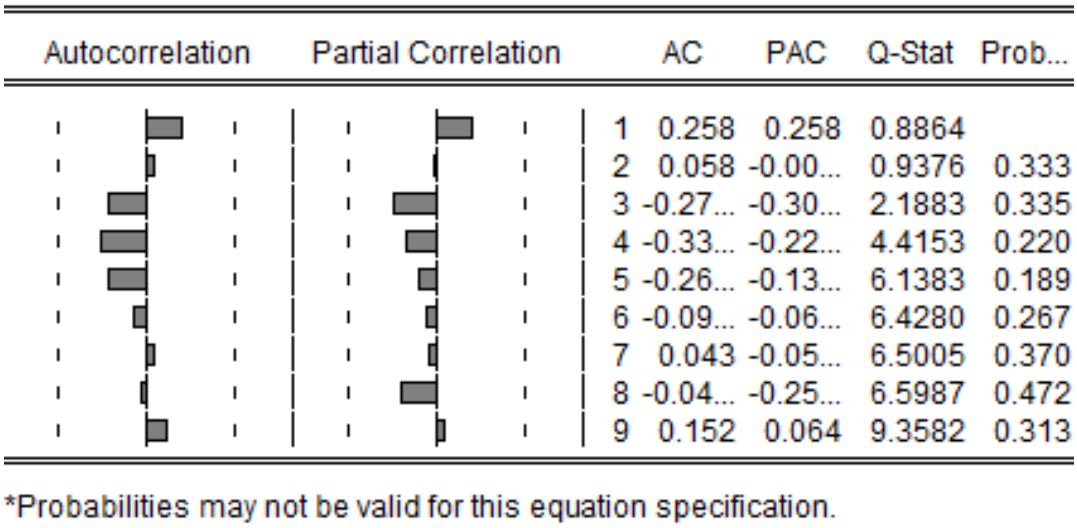

Figure 8 Correlogram-Q-Statistics after Adding AR(1)

Figure 8 shows that Autocorrelation (AC) and Partial Correlation (PAC). Those shows the AC and PAC are not significant and the model is Best Linear Unbiased Estimation (BLUE).

Discussions

This research is correlated to previous studies that still debate for the connection COF and BOPO on ROA. There are two studies that BOPO has no significant effect on ROA(Aryani, 2022)(Erlangga, 2022). This research shows that the autocorrelation makes the connection of BOPO disappear. The model multiple regression short fall to capture the impact of COF and BOPO on ROA. The future research is suggesting to use arch family and look for new independent variables to explain ROA

Conclusions

This research investigates COF and BOPO on ROA. COF and BOPO have an insignificant effect on ROA partially and simultaneously when using the multiple regression because there are autocorrelation. Previous studies are that BOPO has no significant effect on ROA(Aryani, 2022)(Erlangga, 2022). After correcting model, adding autoregressive (1) model BOPO has negative significant on ROA.

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