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Maximizing efficiency and profit through productive asset management and risk control

Abstract. This study aims to examine data and information related to the effect of productive asset management and risk control, both on operational efficiency (OER) and on the profitability of rural banks in West Java, Indonesia. This study was designed with the Ex Post Facto research method with descriptive-verification/associative objectives, namely providing descriptions and testing the relationship between variables (hypothetical testing) with the investigation type of causal relationship and correlation between variables. The unit of analysis is rural banks in West Java, with 26 cities/regencies, and one of the rural banks with the largest assets and complete financial data were chosen. This study observed its financial performance sourced from Bank Indonesia and the Financial Services Authority (2014), in the form of financial reports from each rural bank from 2010 to 2019, with consideration prior to the COVID-19 pandemic. The research findings resulted in a novelty, namely the «Model of OER and Profitability (NPM and NIM) of rural banks» which revealed that efforts to improve the performance of a healthy rural bank in West Java need to be supported by good management of productive assets and risk control.
Keywords: Bank; Rural Bank; Productive Asset Management; Risk Control; Operational Efficiency; OER; Profitability; Financial Performance; West Java; Indonesia
JEL Classifications: E24; E41; E64; I18; J28; J31
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1. Introduction and Brief Literature Review

Previous studies have shown that the management of productive assets has an effect on the efficiency of bank operations. Herwany (2006) examined the determinants of bank efficiency in Italy with logistic regression. They found that the factors that affected banking efficiency

were capital strength and non-performance loan (NPL), and there was no significant correlation between asset size and bank efficiency. Furthermore, Awojobi & Roya (2011) examined the factors that affected the efficiency of banking in India. The results showed that CAR, Liquidity, Asset quality, LDR, Profitability and loan portfolio had an effect on operation efficiency. Similar results were also shown by Viverita & M. Arief (2011), Jamalpour & Derabi, (2023), Anwar et al., (2020). Other studies also showed that risk control had an effect on banking efficiency. For example, Awojobi & Roya (2011) on risk management in banking in Nigeria, found that bank efficiency as measured by Capital Adequacy, was influenced by bank-specific factor variables (including credit exposure, profitability, operation efficiency, interest sensitivity gap market risk) and macroeconomic factors (covering cyclicality and inflation). Similar results were found by, Konishi & Yashuda (2004), and Kithinji (2010). The effect of operation efficiency on profitability was shown by Levine et al., (2008), Ross et al., (2005). They found a strong relationship between banking efficiency and profitability. Indications of problems related to the management of productive assets and risk control are related to the efficiency of the rural banks' operations as well as their profitability. Therefore, this study examines data and information related to the effect of productive assets management and risk control, both on OER and on the profitability of rural banks in West Java Province.

In this research, the concepts of financial and banking management as grand theory, asset liability management theory as a middle range theory were used. The applied theory is the management of productive assets, banking risk control, bank operating efficiency, and bank profitability. Based on the conceptual framework, the paradigm of this study can be described as proposed in Figure 1.

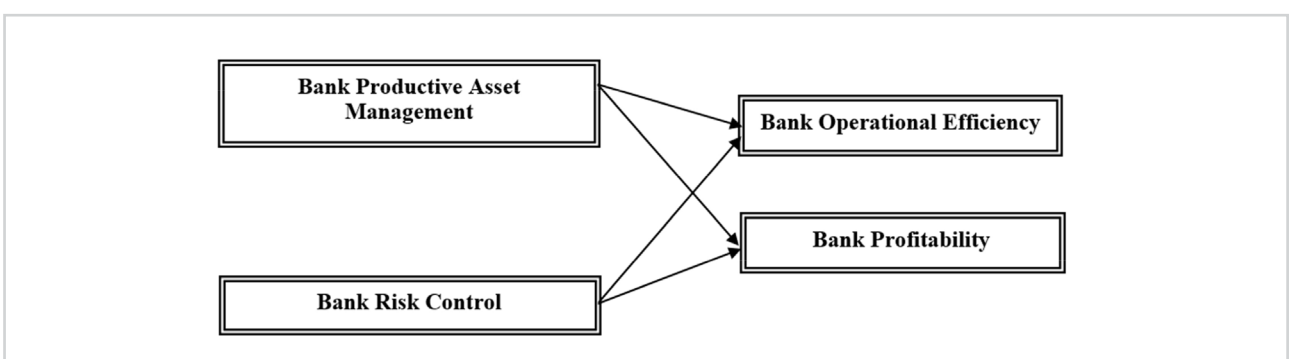

Figure 1:
Research Paradigm
Source: Compiled by the authors

Productive Asset Management Variables:
X1 = Loan to Asset Ratio (LAR);
X2 = Net Call Money (NCM);
X3 = Retention Rate (RR); Risk Control Variable:
X4 = Capital Adequacy Ratio (CAR);
X5 = Loan to Deposit Ratio (LDR);
X6 = Debt to Equity Ratio (DER); OER Variable:
Y1 = Operating Cost to Operating Income Ratio or BOPO (Operational Costs to Operational Income);
IV. Profitability Variable;
Y2 = Net profit margin (NPM);
Y3 = Net interest margin (NIM).

The first test was conducted with the t-statistics test to see the significance of the influence of the individual explanatory variables on the dependent variable. In this t-statistical test, the following hypotheses were used:
H0: $\beta = 0$ (the explanatory variables do not affect the dependent variable);
H1: $\beta \neq 0$ (the explanatory variables significantly affect the dependent variable).

If the probability value < the significant level, H0 was rejected and H1 was accepted. Hence, it can be concluded that the significant level (α) individually on the explanatory variables significantly affects the dependent variable. The F-statistic test shows whether all independent variables

included in the model have a simultaneous effect on the dependent variable. In other words, the following is the hypothesis were used in the test:
H0: Simultaneously, the explanatory variables do not affect the dependent variable;
H1: Simultaneously, the explanatory variables affect the dependent variable.

This test can be done by comparing the probability value on the F test with the significant level (α). If the probability value < the significant level, it can be concluded that simultaneously, the explanatory variables affect the dependent variable, which indicated H0 is rejected.

2. Research Method

The unit of analysis in this study is rural banks in West Java in a total of 26 cities/regencies, and one rural bank with the largest assets and complete financial data was chosen by observing and seeing its financial performance sourced from Bank Indonesia and OJK, in the form of financial reports of each rural bank from 2010 to 2019, with consideration prior to the COVID-19 pandemic. The data collected were secondary data (rural banks financial reports in West Java), with a cross sectional data time span. The data were analyzed using hypothesis testing with statistical methods.

The research model was regressed using PLS and GLS analysis with the help of EViews 6 software. To analyze the data, the authors performed descriptive statistical analysis to determine the limits of the regression model, and R^2 testing and hypothesis testing on the regression results using t-statistics and F-statistics. While the general form of the panel data regression model was formulated in the following equation:

$$Yit = \alpha 1t + \beta 1X1it + \beta 2X2it + \beta 3X3it + ... + \beta nXnit + Uit . \quad (1)$$

3. Result

The Development of Management of Productive Assets and Risk Control at Rural Banks in West Java in 2010-2019 was presented in Table 1.

X1 showed Loan to Assets Ratio (LAR) from the Variable of Productive Asset Management at Rural Banks in West Java, descriptively showing a minimum value of 0.302312 and a maximum value of 5.890496 with an average of 260 data that has been processed was 0.780498 or 78%. It shows that the distributed amount of bank funds through credit to the public (customers) was 78% of the total assets or assets owned by rural banks in West Java. The higher this ratio, the lower the bank's liquidity, due to the larger number of assets needed to finance its credit (Subaciene & Villis, 2010)).

X2 showed Net Call Money from the Variable of Productive Asset Management at Rural Banks in West Java, descriptively showing a minimum value of 0.033852 and a maximum value of 16.19750 with an average of 260 data that has been processed was 0.351772 or 35%. It shows that 35% of the current assets of rural banks in West Java were financed with Call Money-loans from other banks that must be repaid in a short time. The smaller this ratio, the better the liquidity of this bank because the banks can cover interbank liabilities with their liquid assets as studied Yang (2009), Young & O'Byrne (2001), Tightiz & Yoo (2022), and Balcerzak & Rajchel (2022).

X3 showed Retention Rate (RR) from the Variable of Productive Asset Management at Rural Banks in West Java, descriptively shows a minimum value of -487.2200 and a maximum value of 214.0395 with an average of 260 data that has been processed was 3.365642. It shows that rural

Table 1:
Data Description of Independent Variables

Items	*X1 (LAR)*	*X2 (NCM)*	*X3 (RR)*	*X4 (CAR)*	*X5 (LDR)*	*X6 (DER)*
Mean	0.780498	0.351772	3.365642	0.517981	1.747623	9.55856
Median	0.768223	0.216611	6.795000	0.406328	1.159149	9.171116
Maximum	5.890496	16.19750	214.0395	3.239073	79.56313	37.34580
Minimum	0.302312	0.033852	-487.220	0.061427	0.336727	0.088897
Std. Dev.	0.466959	1.068481	52.29423	3.052336	4.953499	16.92662
Skewness	7.439137	13.27589	-3.38061	14.10760	15.01719	6.070839
Kurtosis	70.62224	191.1375	41.25439	213.4870	236.0699	50.61489
Jarque-Bera	51936.41	391090.9	16348.72	488592.6	598256.1	26158.14
Probability	0.000000	0.00000	0.00000	0.000000	0.000000	0.000000
Sum	202.9296	91.4608	2330.65	213.6179	454.3820	3081.211
Sq. Dev.	56.47508	295.687	708283	2413.040	6355.123	74206.24
Observations	**260**	**260**	**260**	**260**	**260**	**260**

Source: Processed by the authors (2021)

bank capital in West Java was obtained from 3.36 times retained earnings. The higher this ratio, the greater the retained earnings that can be used in bank operations so that the possibility of a bank being in an unhealthy condition is getting smaller (Levine et al., 2008; Shamsiev, 2022).

X4 showed Capital Adequacy Ratio (CAR) from the Variable of Productive Asset Management at Rural Banks in West Java, descriptively shows a minimum value of 0.061427 and a maximum value of 3.239073 with an average of 260 data that has been processed was 0.517981 or 51.79%. According to the reference to OJK Regulation No.5/POJK.03/2015, the minimum critical limit for CAR is 12% and the AR value is 51.79%, which is higher than the OJK Standard. The higher the CAR ratio, the better risk control as has been studied in the works by Awojobi & Amel (2011), Kithinji (2010), Konishi & Yashuda (2004).

X5 showed LDR from the Variable of Productive Asset Management at Rural Banks in West Java, descriptively shows a minimum value of 0.336727 and a maximum value of 79.56313 with an average of 260 data that has been processed was 1.747623. It shows that credit given to the public (customers) was 1.74 times the total public funds and own capital. In other words, the funds distributed by rural banks in West Java to customers were greater than the funds received from customers and their own capital. The LDR value of 174% was higher than the BI Standard based on SEBI No.13/24/DPNP in 2011, which is between 85% - 100% or 0.85 - 1.00. The higher the ratio, the lower the bank's liquidity, meaning that the risk is higher as prove the works by Awojobi & Roya (2011), Konishi & Yashuda (2004).

X6 showed DER from the Variable of Productive Asset Management at Rural Banks in West Java, descriptively shows a minimum value of 0.088897 and a maximum value of 37.34580 with an average of 260 data that has been processed was 9.55856. It shows that the average debt of rural banks in West Java was 9.55 times greater than the total equity. In other words, the higher the DER value, the more the company uses debt compared to its capital. The higher this ratio, the smaller the ability to pay debts from own capital which also discussed in the works of Kithinji (2010) and Konishi & Yashuda (2004).

The Development of OER and Profitability at Rural Banks in West Java is presented in Table 2.

Table 2:
Data Description of Independent Variables

Items	*Y1 (OER)*	*Y2 (NPM)*	*Y3 (NIM)*
Mean	1.001888	0.124992	2.129721
Median	0.809666	0.204608	1.988402
Maximum	22.98356	0.841740	18.39930
Minimum	0.369372	-5.355778	0.051279
Std. Dev.	1.654541	0.590175	1.579206
Skewness	10.79260	-6.760231	7.133070
Kurtosis	132.2030	53.43183	69.98442
Jarque-Bera	185892.7	29533.54	50813.05
Probability	0.000000	0.000000	0.000000
Sum	260.4908	32.49799	553.7276
Sum Sq. Dev.	709.0139	90.21150	645.9180
Observations	**260**	**260**	**260**

Source: Processed by the authors (2021)

Y1 showed Operating Expenses to Operating Income (OER) or BOPO from the Variable of Operation Efficiency at Rural Banks in West Java, descriptively shows a minimum value of 0.369372 and a maximum value of 22.98356 with an average of 260 data that has been processed was 1.001888 or 100.18%. This average OER/ BOPO was higher than the ratio of National OER/ BOPO of 77.57% and higher than the critical limit of 89% based on the OJK circular letter No.28/SE OJK.03/2019 regarding rural bank rating standards at OJK, which means that rural banks had not efficient. The higher the value of the OER ratio, the more inefficient the bank.

Y2 showed NPM from the Variable of Profitability at Rural Banks in West Java, descriptively shows a minimum value of -5.355778 and a maximum value of 0.841740 with an average of 260 data that has been processed was 0.124992. The higher the NPM, the better the bank's profitability.

Y3 showed NIM from the Variable of Profitability at Rural Banks in West Java, descriptively shows a minimum value of 0.051279 and a maximum value of 18.39930 with an average of 260 data that has been processed was 2.129721. The higher the NIM, the better the bank's profitability.

Testing for Model Selection

In analyzing the effect of productive assets and risk control on operation efficiency and profitability, panel data regression was used with the model of Common, Fixed Effect Model (FEM), and Random Effect Model (REM). To find a more precise model between the Common Effects model and the Fixed Effect Model (FEM), the Redundant Fixed Effect test was carried out for the three models. The result is the FStat probability value for each of the three models was 0.0000, which was smaller than = 0.01, it can be concluded that the Fixed Effect Model (FEM) was more fit or more suitable used in estimating the equation model compared to that of the Common Effect Model for all models in this study. Afterward, further testing was carried out, namely the Hausman test to select the model from the FEM or REM, which was more appropriate to use (Table 3).

Table 3:
The Hausman Test for the Dependent Variable

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random (Y1)	13.182409	6	0.0402
Cross-section random (Y2)	22.944438	6	0.0008
Cross-section random (Y3)	11.195650	6	0.0825

Source: Processed by the authors (2021)

Based on the Table 4 and Table 5, the FStat probability value of the Hausman test for each of the three models was 0.0000: 00008 and 0.0825, which was smaller than = 0.10. In other words, the FEM was more suitable or more suitable to be used in estimating equations compared to the REM for all models.

The Classic Assumption Test was conducted on multiple linear regression models before interpretation. The results of the multicollinearity test obtained the value of each correlation coefficient between independent variables: LAR (X1), NCM (X2), RR (X3), CAR (X4), LDR (X5), and DER (X6) were lower than 0.8. Therefore, the independent variables did not have a strong relationship (there was no multicollinearity). Furthermore, based on the Heteroscedasticity Test with Breusch-Pagan LM, each prob. of 0.0000 was smaller than 0.05, meaning that there was heteroscedasticity. Since the OLS model showed symptoms of heteroscedasticity, it was necessary to improve this multiple linear regression model using the Panel EGLS (Cross-section weight) method. Based on the results of the model selection test and the classical assumption test, an interpretation of the model results was carried out successively, namely the results of multiple regression equations with the dependent variable OER (Y1) in model 1; the dependent variable was NPM (Y2) in model 2 and the dependent variable was NIM (Y3) in model 3, where the relationship between the three models was based on the fact, a bank that was able to be efficient (relatively small OER) was a relatively small ratio of expenditure to income, meaning that the bank already had good internal processes and had carried out proper evaluation and learning as one of the requirements to become a healthy bank. Another requirement was that the bank must also generate a return on its operating income (large NPM) or at least have interest income on its operating activities (large NPM). Thus, a healthy bank was able to carry out its operations efficiently and generate high profits at the same time. A healthy bank was able to carry out the intermediation function by maintaining the continuity of its business development from time to time (sustainable).

The results of data processing related to the influence of variables based on the EGLS Panel method or the Generalized Least Square model and the results of hypothesis testing both partially and simultaneously in Table 4.

Table 4 shows that partially, there were three variables that significantly affected the change (Y1) in a negative direction, namely: LAR (X1), CAR (X4), and LDR (X5) variables. This was indicated by the probability value for X1, which was lower than 0.10, and for X4 and X5, which was lower

Table 4:
Partial Testing of Hypothesis I (1-6)

Hypothesis	β_i	Prob	Conclusion	Significant Level
(1) LAR → OER	-0.047	0.09	H0 was rejected	0.10
(2) NCM → OER	0.006	0.55	H0 was accepted	-
(3) RR → OER	-0.002	0.18	H0 was accepted	-
(4) CAR → OER	-0.002	0.03	H0 was rejected	0.05
(5) LDR → OER	-0.033	0.00	H0 was rejected	0.05
(6) DER → OER	-0.000	0.25	H0 was accepted	-

Source: Processed by the authors (2021)

than 0.05. These results showed that if the three variables of LAR (X1), CAR (X4), and LDR (X5) had increased, it caused a decrease in the OER variable (Y1). In the following section, the results of simultaneous hypothesis testing will be explained in Table 5.

Table 5 shows that changes in LAR (X1), NCM (X2), RR (X3), CAR (X4), LDR (X5), and DER (X6) simultaneously had a significant effect of 44.7% on changes in BOER (Y1) with a probability value of 0.000, which was smaller than the significance level (α) of 0.05. And the remaining changes in Y1 were affected by other variables outside this study by 55.3%.

Table 5:
Simultaneous Testing of Productive Asset Management and Risk Control on BOPO

Hypothesis	R^2	Prob	Conclusion
LAR, NCM, RR, CAR, LDR, DER → OER	0.447	0.000	H0 was rejected on α = 0.05

Source: Processed by the authors (2021)

4. Conclusion

The research findings resulted in a novelty, namely the «Model of OER and Profitability of Rural Banks». The novelty revealed that OER is dominantly influenced by the management of productive assets, which is the level of bank liquidity in its ability to meet credit demand with its total assets LAR as well as risk control, or CAR, and the ratio of LDR. Furthermore, Productive Assets Management (LAR, NCM, RR) and risk control (CAR, LDR, DER), dominantly affected The Bank's Profitability (NIM) was compared to the Bank's Profitability (NPM). RR and LDR were two variables that were consistent in the profitability model (NPM and NIM). Based on the efficiency model and the profitability model of rural banks, there is a relationship that efficient rural banks (with relatively small OER), i.e. the ratio of expenditure is relatively small to income, meaning that rural banks already have good internal processes and has carried out proper evaluation and learning as one of the requirements to become a healthy bank. On the other hand, rural banks must also generate a return on their operating income (large NPM) or at least have interest income on their operating activities (large NIM). Thus, a healthy rural bank is indicated by the ability to carry out its operations efficiently and generate high profits at the same time because a healthy bank can carry out the intermediation function by maintaining the continuity of its business development from time to time (sustainable).

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