

Bank Performance and Its Underlying Factors: A Study of Rural Banks in Indonesia

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Abstract

This study determines the effect of variables recommended by the central bank of Indonesia on the performance of rural banks (BPRs) which has the particularity that serve the needs of communities in rural areas, small and medium enterprises (SMEs) in the form of deposits (savings and time deposits) and credit. The analysis technique employed in this study is panel data regression using expenses ratio (BOPOs), capital adequacy ratios (CAR), nonperforming loans (NPLs), loan-to-deposit ratios (LDRs) as independent variables. Return on asset (ROA) and net interest margin ratio (NIM) are used as the proxies of BPRs performance. The data used are from 164 BPRs operating in Java island between 2009 and 2012 period (totaling 656 company years). The results showed that BOPOs and NPLs played crucial role in explaining the BPR performance in Indonesia. The findings in this study indicate that efficiency and prudence in management policies for banking industry in Indonesia becomes more important.

Keywords: Bank Performance, Indonesia, Rural Bank (BPR)

1. Introduction

The banking industry in Indonesia has faced numerous types of economic crises. After a severe crisis in 1998, the industry began to implement reforms. Capital adequacy regulation was modified to increase the quality of commercial banks in Indonesia (Hadad, Agusman, Monroe, Gasbaroo, & Zumwalt, 2011; Mulyaningsih, Daly, & Riyana, 2015). During the 2008 global economic crisis, the Indonesian banking industry was more prepared to manage the downturn as demonstrated by the number of bankrupt banks are fewer than that of the 1998 crisis.

The Indonesian banking industry must continue to improve its risk management practices as part of its core banking standards. For example, before the 1998 crisis, the prudential aspect was not considered critical in loan management, leading to an increase in the number of nonperforming loans (NPLs). Previous research finds that this variable inhibits to the growth of the industry. In addition, several studies (Arafat, Warokka, Buchdadi, & Suherman, 2013; Buchdadi, Utamingtyas, Mardiyati, & Sahir, 2012) report that NPLs have a significant negative relationship with listed bank profitability in the Indonesian capital market.

Rural banks, in Indonesia commonly referred to as *bank perkreditan rakyat* (BPRs), are categorized as small banks that operate in only one province and primarily finance small and medium enterprises (SMEs). BPRs are one of the main financial intermediary entity for the SMEs. So, They play an important role for the SMEs development. As of October 2011, according to Bank Indonesia (n.d) regarding the BPRs statistics there were 1,683 BPRs operating in Indonesia.

According to BPRs' Business Model which is published by Bank Indonesia (BI), the condition of a BPR is indicated by four main variables: capital, productive asset, rentability, and liquidity (Direktorat Kredit, BPR, dan UMKM, 2011). The explanation on each variables are mentioned in the regulation of BI regarding the rating system for commercial bank (Bank Indonesia, 2004). The capital in rating assessment system includes capital adequacy, capital composition, capital projections, and capital ability to cover the nonperforming assets. The capital in this term also means the bank's ability to meet the need for additional capital, the bank's capital plans for supporting the business

growth, and the performance of shareholders to increase the capital of bank. The assessment on productive asset includes the assessment on asset quality, concentration of credit risk exposure, growth of troubled asset, the allowance adequacy for covering the troubled asset, and system management for handling the troubled asset. In addition, the assessment on rentability includes the assessment on the achievement of ROA, the achievement of return on equity (ROE), the achievement of NIM, the development of operating profit, application accounting principles in the recognition of revenues and costs, and prospects operational profit. Whereas, the assessment on liquidity includes the assessment on achievement of asset to liquid liabilities ratio, achievement of LDR, the potential maturity mismatch between asset and liabilities, cash flow projection, the concentration of funding, asset and liabilities management (ALMA), and access and stability to funding sources.

To further develop BPRs in Indonesia, we conducted research examining their performance by using variables derived from previous relevant research as well as the key variables published by Bank Indonesia (BI), which passes regulations and monitors bank performance. We hope that this study can be used by BI in its policies for evaluating and monitoring the health of BPRs. This study also provides information to BPRs on how to improve their business operations and demonstrates how SMEs can select the most appropriate BPR.

2. Literature Review and Hypothesis Development

Evaluation of company performance involve measuring the efficiency financial operations (Cuervo & Villalonga, 2000). For this purpose, the banking system uses the capital, asset quality, management, earnings, liquidity, and sensitivity (CAMELS) model which was developed in 1979 by the U.S Federal Reserve (Dincer, Gencer, Orhan, & Sahinbas, 2011; Nurazi & Evans, 2005). It is also noted that many scholars have examined bank performance in previous decades (Arafat et al., 2013; Berger, Humphrey, & Humphrey, 1997; Brissimis, Delis, & Tsionas, 2010). Arafat et al. found that an interest in bank performance estimation is related to the examination of which characteristics of the banks will make better performing institutions. Riasi (2015) mentioned that some studies have also identified that a high emphasis on these performance measures can result in lower levels of banks' competitiveness in developing economies.

There are some variables used for measuring bank performance. Olson and Zoubi (2011) stated that accounting-based research on bank performance often uses either return on asset (ROA) or return on equity (ROE) for performance measurement and uses bank specific, industry specific and macroeconomic factors as determinant variables. They found that loan ratios, expense ratios, capital strength, credit risk, inflation, and the proportion of government ownership have significant effect on both dependent variables. Furthermore, Sufian and Habibullah (2012) examined the impact of globalization on bank performance in China. They used ROA to measure bank performance and used bank specific information, macroeconomics, and factor related to economics globalization as the determinant variables. Their findings show that highly capitalized banks tend to be more profitable, whereas expense preference behavior has negative relationship with bank profitability. In addition, Heffernan and Fu (2010), in their study of bank performance in China, suggested that economic value added and the net interest margin (NIM) are more accurate measures of performance than are ROA and ROE. They found that some macroeconomics and financial ratios are significant to performance. In addition, in their paper examining bank performance in Indonesia, Arafat et al. (2013) used ROA, ROE, and net interest income to total asset (NIITA) as proxies for bank performance and NPLs as the proxies for bank efficiency. The results indicate that bank characteristics play crucial roles in determining bank performance measurements; however, these variables have a weaker influence on bank efficiency measurement.

Following the example of Arafat et al. (2013); Heffernan and Fu (2010); Olson and Zoubi (2011); Sufian and Habibullah (2012), we use ROA and NIM as the proxies of BPR performance. Then, in the following section, we develop hypotheses considering the results of previous research on the usefulness of variables such as capital, quality of productive asset, and liquidity in measuring bank performance, so the hypotheses development are build on the following section.

2.1 Effects of Capital on Bank Performance

Bank require capital to manage risk. In general, banks with high capital ratios are considered safer than those with low capital ratios (Dietrich & Wanzenried, 2014). Roman and Şargu (2013) stated that capital adequacy is one of the most crucial indicators of the financial health of the banking sector because it guarantees the capacity of the sector to absorb the eventual losses generated by the manifestation of certain risks or macroeconomic imbalances. The quality of capital possessed by a bank is an indication of the ability of a bank to operate properly. Djililov and Piesseb (2016) mentioned that a number of scholars have argued that higher capital asset ratio increases funding costs and thus lowers profitability, but empirical studies find a positive effect of capital ratio on bank performance. Studies provides

two hypotheses for this phenomenon, that increasing capital lowers payments on unsecured debt, and that banks provide signals of improved future prospects by increasing their capital. In addition, Dincer et al. (2011) showed that capital adequacy ratios have a positive relation with the financial soundness of bank and a negative relationship with possible failure. Meanwhile, Djalilov and Piesseb (2016) find a positive relationship between capital and bank performance in transitioning countries in central and eastern Europe, and in the late-transitioning countries of the former Soviet Union. Yet, the results are not consistent and depend on at what stage the countries transitioned to market economies. Additionally, although the relationships were positive, only some were statistically significant. Furthermore, Dietrich and Wanzenried (2014); Fungáčová and Poghosyan (2011); Mergaerts and Vennet (2016) report that banks characterized by high capital ratios exhibited more favorable performance in terms of NIMs and ROAs. Meanwhile, Olson and Zoubi (2011) find a positive statistically significant relationship between capital strength and ROA in the banking industry of countries in middle east and north Africa. By contrast, Yin, Yang, and Mehran (2013) observe a negative relationship between capital ratios and bank profitability in China after WTO crisis. In an attempt to confirm to these findings we develop our first the hypothesis to supporting the argument that capital is required for ensuring favorable bank performance:

H1: Capital ratio is positively associated with bank performance

2.2 Effect of Expense Ratios on Bank Performance

The more efficiently banks manage their expenses, the more profitable they are. This argument is supported by numerous empirical studies of bank performances : such as that of Yin et al. (2013) which find that overhead expense has a significant negative relationship with bank profitability. However, Curak, Poposki, and Pepur (2012) suggests that in the case of the Macedonian banking sector, this negative relationship existed because improvements in management operating expenses (lower cost to asset ratio) improved efficiency and eventually lead to higher profits. Olson and Zoubi (2011) also reveal a negative relationship between overhead expense and bank profitability. However, Were and Wambua (2014) report a positive relationship between expense ratios and net interest margin among banks in Kenya because a higher expense ratio indicated that the bank would ask for a higher spread. Considering these results, we posit the second hypotheses as follow:

H2: Expense ratio is negatively associated with bank performance

2.3 Effect of Loan-to-deposit Ratios on Bank Performance

Loans are the main sources of profit among banks. The business model for BPRs published by BI also suggests the favorability of a higher loan-to-deposit ratio (LDR). Trinugroho, Agusman, and Tarazi (2014) noted that the use of loans to deposits ratio (LDR) as the proxies of liquidity risk has a positive impact on bank margins. By contrast, Olson and Zoubi (2011) observe no significant relationship between loans and bank profitability. Accordingly, we developed the following hypothesis:

H3: Loan to deposit ratio is positively associated with bank performance

2.4 Effects of Nonperforming Loan on Bank Performance

Roman and Şargu (2013) demonstrate that the ratio nonperforming loans to total loans ratio is used for measuring loan quality. The quality of bank assets is demonstrated by NPLs. The higher the rate of NPLs, the lower the assets quality of bank. This measures future threats to bank's profitability and viability (Dincer et al., 2011). Arafat et al. (2013); Dietrich and Wanzenried (2014) find significant relationships between NPLs and bank performance. This type of loan had a negative relationship if bank performance was measured by (ROA) and (ROE), and a positive relationship if the bank performance was measured by (NIITA). Moreover, Sun, Mohamad, and Ariff, (2016); Were and Wambua (2014) identify positive relationship between asset quality which was measured by the proportion of loan loss and NIM among banks in the organization of Islamic countries (OIC). The greater the default risk of a bank, the higher the interest margin required. Furthermore, Fungáčová and Poghosyan (2011); Trinugroho, Agusman, and Tarazi (2014) find that the ratio of (NPLs) has a significant negative effect on interest margins. Dietrich and Wanzenried (2011) also observe a negative relationship for the bank performance in Switzerland during the crisis period. However, Hainz, Horváth, and Hlaváček (2014) find vary direction relationship for the loss loan provision on the interest spread in Czech banking industry. It is depend on the loan categories. Finally, despite consulting and citing various results from previous studies, in this paper, we assume that lower level on the NPLs lead to more favorable bank performance:

H4: Non performing loan is negatively associated with bank performance

3. Methodology

3.1 Definition of Variables

The variables used in this study (Table 1) were derived from those suggested in the business model for BPRs published by BI (Bank Indonesia, 2001).

Table 1. Definition of variables

Variable	Definition	Formula
Capital Adequate Ratio (CAR)	a ratio between the capital owned by bank and the assets of bank that bear the credit risk on it.	$CAR = \frac{\text{Bank Capital}}{\text{Risk Weighted Assets}} \times 100\%$
Non Performing Loan (NPL)	the amount money of loan that is in default or close to default.	$NPL = \frac{\text{Non Performing Loan}}{\text{Total Loan}} \times 100\%$
Return on Assets (ROA)	a ratio between the company earning and its total assets	$ROA = \frac{\text{Net Income}}{\text{Total Assets}} \times 100\%$
Net Interest Margin (NIM)	A ratio between the spread between interest gain from the loan and interest payment from debt with its interest bearing assets.	$NIM = \frac{\text{Net Interest Income}}{\text{Interest Bearing Assets}} \times 100\%$
Operational Expense ratio (BOPO)	a ratio between operational expense and operational revenue.	$BOPO = \frac{\text{Operating Expenses}}{\text{Operating Revenues}} \times 100\%$
Loan to Deposit Ratio (LDR)	a ratio between loan that is distributed and total deposit from the bank creditor.	$LDR = \frac{\text{Total Loan}}{\text{Total Deposit}} \times 100\%$

3.2 Data

The sample population used in this study comprises BPRs operating in Java Island between 2009 and 2012. Java is selected because more than 50% of Indonesia economic activities occurred in the island. Data are obtained from the record of BI. Certain BPRs were excluded from analysis if complete financial reports are not available for all periods. We eventually obtained a sample size of 164 BPRs, all of which offer 4-years reports, equal to total 656 samples years. We then divide the data into three classes of banks: 33 BPRs with assets under IDR 5 billion (approximately: USD 360,000), 31 BPRs with assets of IDR 5 – 10 billion (approximately: USD 360,000 – 720,000), and 100 BPRs with assets exceeding IDR 10 billion (greater than USD 720,000)

3.3 Model Equation

We modified the work of Arafat et al. (2013) to construct the models used in this study. We examined the performance and efficiency of BPRs using the recommended variables as independent variables whereas Arafat et al. uses bank characteristics in their model. We employed using panel data regression analysis in our calculation. The models are:

$$\text{Performance (ROA and NIM)} = \beta_0 + \beta_1 \text{ CAR} + \beta_2 \text{ NPL} + \beta_3 \text{ BOPO} + \beta_4 \text{ LDR} + \varepsilon$$

4 Research Results and Discussion

4.1 Descriptive Statistics

The outcome of the descriptive statistics tests are shown in table 2 which reveals that the NPLs, CARs, LDR, and ROA are less volatile than NIM, and BOPO.

Table 2. Descriptive statistics

Item	N	Mean	Median	Std. Dev.	Min	Max
NIM	656	1.08	0.20	17.78	0	434.71
BOPO	656	16.34	0.83	205.75	0	3471.11
NPL	656	0.07	0.04	0.09	-0.02	.91
CAR	656	0.35	0.26	0.39	-0.27	6.12
LDR	656	0.80	0.80	0.30	0.05	7.30
ROA	656	0.06	0.04	0.25	-0.35	5.92

In addition, we conduct tests for normality, multicollinearity, heteroscedasticity, and autocorrelation. For the normality test, we use specification provided by Jargue-Berra. The results showed that our data violate the normality test. We then used the assumption that if the number of data point is greater than 30, then the data would approximately follow normally distribution. This aspect was a notable limitation of our study. For multicollinearity test, we used Pearson correlation matrix test. We find that there is no multicollinearity among the dependent variables for each model in three different class assets (table 3). We then conducted a Breusch-Pagan-Godfrey heteroscedasticity test. Because the value of Obs*squared is largerr than $\alpha=5\%$, we find a heteroscedasticity effect on all models. This phenomenon was solved by using Eviews software. Finally, we conducted a Breusch-Godfrey autocorrelation test. The findings indicated that is no autocorrelation was present in the data.

Table 3. Pearson Correlation

Assets < IDR 5 Billion				
Variable	BOPO	CAR	LDR	NPL
BOPO	1	-0.0103	-0.1528	0.2238
CAR		1	-0.4268	0.0027
LDR			1	-0.1481
NPL				1
Assets = IDR 5 Billion- IDR 10 Billion				
Variable	BOPO	CAR	LDR	NPL
BOPO	1	0.0886	0.0973	-0.0512
CAR		1	-0.3079	0.2132
LDR			1	-0.0932
NPL				1
Assets > IDR 10 Billion				
Variable	BOPO	CAR	LDR	NPL
BOPO	1	-0.3901	-0.0003	0.2047
CAR		1	-0.1657	-0.0652
LDR			1	-0.0331
NPL				1

4.2 Discussion

This study uses panel data regression. Therefore, we conducted Chow test and Hausman test to decide whether the fixed effect model (FEM) or random effect model (REM) is a more appropriate fit for each models. In models 1 and 2, we use bank performance measurement as dependent variable, and using BOPO, CAR, LDRs, NPLs as the determinant variables. All of the models we built develop involved F test value at 1% significance. The results are shown in tables 4a and 4b.

The results reveal that the capital variables (H1) had inconsistent results. For the performance measured using ROA, we observe a positive relationship but not statistically significant relationship between them. We then find

statistically insignificant positive relationship for the smallest asset class (under IDR 5 bio), and a negative relationship for the two others asset classes when the performance is measured using NIM. This indicates that our results for capital variables do not support the conclusions of Dietrich and Wanzenried (2014), Fungáčová and Poghosyan (2011), Mergaerts and Vennet (2016), Olson and Zoubi (2011), Yin et al. (2013). Thus, the argument that capital adequacy improves bank performance because it signals more favorable future prospect and function a buffer for risk in BPRs is not valid in this context. A probable explanation is that a competitive market for financing SMEs means that BPRs must optimize its business practice. Therefore, the variable of capital adequacy does not play major role in compared with others variable.

In addition, BOPO (H2) is critical in both models. The negative and significant values are founded on the medium asset class in models 1 and 2 and the high asset class asset for model 1. This indicates that the higher the expense ratio, the poorer the performance which aligns with the conclusions of Babalos, Kostakis, and Philippas (2009), Curak, Poposki, and Pepur (2012), Olson and Zoubi (2011), and Yin et al. (2013). However, a positive relationship between BOPO and small asset BPRs is also observed in models 1 and 2. This indicates that small BPRs should optimize their use of capital while their revenue is relatively low to ensure strong industry competitiveness business industry because this type of BPR must compete with other financial intermediary such as cooperative alliances and pawnshops.

Furthermore, as stated by Lee and Kim (2013); Titko, Skvarciany, and Jureviciene (2015) the results for LDRs (H3) do not demonstrate statistically significant effect on bank performance when measured using ROA. These findings indicate that the higher the LDR the more favorable the performance of BPR. However, the results were inconsistent depending on whether or not bank performance is measured using NIM and further research is required to confirm this finding. A positive relationship is observed between the LDRs and BPRs performance of the small-and-medium asset classes. A negative relationship is observed between the LDRs and BPRs performance in the large asset class. These findings differ from the results described by Trinugroho et al. (2014). Therefore, similarly to Lee and Kim, we concluded that higher LDR it does not guarantee greater efficiency in generating profitability. Instead, it more likely is an indicator that BPRs have difficulty delivering the loan because of the high levels of competition in financial intermediary industry.

In addition, we find an inconsistent relationship among NPL (H4) variables supporting the conclusions of Hainz, Horváth, and Hlaváček (2014). Negative relationships are found in models 1 and 2 for lower assets class. Yet, positive relationships are found on model two for medium and higher asset class. These results for model 1 support the conclusions of Arafat et al (2013), Roman and Şargu (2013), Dincer et al. (2011) that indicate NPL will decreasing the bank profitability. However, the results for the model 2 align with those of studies conducted by Fungáčová and Poghosyan (2011) and Trinugroho et al. (2014) which indicated that NPL has a negative relationship with NIM. For the others classes of asset, the findings correlate with several studies (Arafat et al, 2013; Sun, Mohamad, & Ariff, 2016; Were & Wambua, 2014). Following the argument presented by Arafat et al., we concluded that the positive relationship between NPL and NIM model is probably caused by problems related to intermediary functioning in Indonesia BPRs. The NIM values are relatively constant because the BPRs only derived revenue from financial instruments such as the Indonesian government note rather than generating credit.

5. Conclusions

Our study confirms that optimizing expense ratio (BOPO) and avoiding non performing loan (NPL) are crucial in improving BPRs performance. This indicates that BPRs which are the main source of support for Small and Medium Enterprises (SMEs) learnt from economic crisis occurred in Indonesia and implemented changes. However, BPRs must still improve their business management strategies including those related to intermediary functions and business efficiency. The results of this study could also be used by the central bank of Indonesia (BI) to regulate and monitor the banking industry and further increase the emphasis on efficiency and prudence in BPR management policies. The limitations of this study are including inconsistency in some variables, the methodology, and the financial ratio variables chosen. We suggest that research on this topic be continued to confirms our conclusions or find additional factors that contribute to BPRs performance.

Table 4a. Regression results for bank performance measurement (Y = ROA)

Variable	ROA (< 5 Bio)	ROA(5 – 10 Bio)	ROA (> 10 Bio)
Model	Fixed effect	Fixed effect	Random effect
Constant	0.0097	0.0446	0.2310
BOPO	1.74E-05 (3.6910)***	-0.0480 (-2.7618)***	-0.2427 (-3.6910)***
CAR	0.0078 (1.1335)	0.0110 (0.9983)	0.0169 (1.1335)
LDR	0.0298 (1.4174)	0.0064 (0.2393)	0.0101 (1.4174)
NPL	-0.0808 (-3.0075)***	-0.0040 (-0.1558)	-0.0179 (-3.0075)***
R ²	0.6504	0.5959	0.7747
Adj R ²	0.4912	0.5606	0.7716
F	4.1234***	5.4487***	249.7154***
N	33	31	100

***, **, * Significance at the 1%, 5%, and 10% respectively

Table 4b. Regression results for bank performance measurement (Y = NIM)

Variable	NIM (< 5 Bio)	NIM (5 – 10 Bio)	NIM (> 10 Bio)
Model	Fixed effect	Fixed effect	Random effect
Constant	0.1947	0.1922	0.1830
BOPO	1.54E-05 (1.4787)	-0.0443 (-2.5695)**	-0.0239 (-1.6473)
CAR	0.0102 (0.9360)	-0.0199 (-1.7338)*	-0.0098 (1.0713)
LDR	0.03315 (1.1348)	0.0636 (2.3118)**	-0.0344 (-3.534)***
NPL	-0.1231 (-1.6579)	0.0141 (0.5195)	0.022 (0.8670)
R ²	0.6196	0.6867	0.7079
Adj R ²	0.3381	0.5606	0.5487
F	2.2012***	5.4487***	4.4473***
N	33	31	100

***, **, * Significance at the 1%, 5%, and 10% respectively

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