"The impact of banking risk on regional development banks in Indonesia"

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BUSINESS PERSPECTIVES

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THE IMPACT OF BANKING RISK ON REGIONAL DEVELOPMENT BANKS IN INDONESIA

Abstract

Financial performance of a bank represents its financial condition for a certain period of time, either in relation to fund raising or fund allocation, which is usually observed for several indicators, such as capital adequacy, liquidity, and bank profitability. In banking industries, profitability is the most accurate indicator to measure bank performance. Instruments used to measure profitability are Return on Equity (ROE) and Return on Assets (ROA). In this study, the impact of banking risk is analyzed using the ratio of Non-Performing Loans (NPL), Net Interest Margin (NIM), the Loan-to-Deposit ratio (LDR), and the ratio of Operational Cost to Operational Income (OCOI/BOPO) on financial performance of regional development banks in Indonesia. The data used in this study were obtained from the annual reports disseminated on the website of each bank. The number of samples includes 26 Indonesian regional development banks for 2013–2015. The study includes 4 hypotheses for testing. The results show that simultaneously, NPL, NIM, LDR, and OBOI/BOPO are significant to ROA; while NPLs are significant and negatively affect ROA, NIM is significant and positively affects ROA, LDR is not significant and negatively affects ROA, and OCOI/BOPO is significant and negatively affects ROA. This means the banks should minimize the ratio of NPLs, LDR, and BOPO, as they have a negative influence on ROA. Conversely, banks should maximize the ratio of NIM since the latter has a positive effect on ROA.

Keywords	financial performance, Indonesian banking, risk management in banking, financial system
JEL Classification	G21, G32

INTRODUCTION

Nowadays, banking has become dominant in the financial system. Indeed, it expands its significance in supporting the economic progress of certain countries. A bank is an enterprise operating in the financial sector or in the field of financial services. In Indonesia, the banking sector is strictly regulated by Bank Indonesia as the country's central bank, as it involves several parties in the communities. Therefore, to achieve good performance and profitability of banks requires good understanding and management of the financial system itself.

Bank performance can be measured by seeing the financial position of banks. In addition, banks' future performance can be predicted based on their current condition. On the other hand, reviewing bank's financial system can be conducted based on the financial statements of banks, which contain information on the optimal management in terms of funds.

One indicator that can be used to determine whether or not a bank is healthy is profitability ratio. Generally, a bank is considered healthy when its financial performance is good as measured by its profitability ratio. The bank's financial performance represents its financial condi-

tion in a particular period of time, either in relation to fund raising or fund allocation, which is usually observed through several indicators, such as capital adequacy, liquidity, and bank profitability. In banking industries, profitability is considered as the most accurate indicator to measure bank performance using Return on Assets (ROA) and Return on Equity (ROE).

ROA is defined as a company's ability to gain profits in operating the enterprise, or in other words, this is the financial ratio used to measure the bank's ability to gain profit in general. The higher the ROA, the higher the profit and the better the bank position in terms of asset management. Nevertheless, not only internal factors but also external ones influence the improvement of the bank's financial performance. ROA and ROE have a positive and negative impact on the bank's performance. The latter refers to banking risks on which this paper will focus, particularly four types of risks that can be measured using several ratios.

Based on the abovementioned, the paper examines the banking risk and its impact on regional development banks (BPD) in Indonesia. According to the Regulation of Financial Service Authority Number 18/PJOK.03/2016 on the Implementation of Risk Management for a Bank, there are eight types of risks that need to be reviewed: credit, market, operation, liquidity, law, strategy, obedience, and reputation. However, only several indicators can be measured and required by Bank Indonesia. There are four major banking risks that need to be assessed using the ratio. They are credit, market, liquidity, and operational risks. With regard to these types of banking risks – credit, market, liquidity, and operation – this paper attempts to conduct an observation on all regional development banks, which are 26 in total. Those banks have played significant roles in supporting the regional autonomy and the regional economic development.

The purpose of this study is to investigate the impact of banking risk on regional development banks in Indonesia during the period of 2013–2015.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

According to the Regulation of Bank Indonesia Number 5/2003, banking risk means the potential events that can damage a bank. Risk will always be related to the banking sector due to external and internal factors in the rapid development of banking business activities. Banking risk focuses on financial problem, as it operates in the field of financial services. A bank provides facilities to allow the public, as the customers, to expedite all things related to the financial problem. There are eight types of banking risks, namely credit risk, market risk, liquidity risk, operational risk, law risk, reputation risk, strategic risk, and obedience risk, as stated in the Regulation of Financial Services Authority Number 18/PJOK.03/2016 on the implementation of Risk Management for a Conventional Bank. The failure in fulfilling the obligation causes a bank to suffer from the loss, as it fails to obtain the calculated returns. Therefore, it is necessary to anticipate the possible risks when doing business. The management needs to minimize risks when managing production factors, funds, and other resources. Risk measurement is closely related to the measurement of return, because a bank experiences the risk arising in an attempt to obtain return. According to Hempel, Coleman, and Smon (1986), there are four categories as a basis for measuring the risks of the banking business – liquidity risk, interest rate risk, credit risk, and capital risk. Ericsson and Renault (2006) measure the liquidity of the bond with many indicators. One of the banking risks, according to the Regulation of Bank Indonesia, is credit risk. It is defined as the risk arising from the counterparty's failure to fulfill the obligations. Furthermore, Li and Zinna (2018) stated that banks strongly differed both in the magnitude and type of their sovereign exposure. They used a data for the 2008–2015 period, and found about one third of banks' credit risk was sovereign.

Similar to other companies in general, banking business also meets various risks. Among them is credit risk. In this research, the financial ratio used as a proxy of the value of credit risk is the NPL ratio. The ratio shows bank management ability to manage non-performing loans. Therefore, the higher the ratio is, the worse is the credit quality. Such a condition is usually followed by bigger non-performing loans, which consequently results in bigger problems for a bank. In this case, the credit is given to the third party. Non-Performing Loans include credit with substandard quality, doubted, and loss. Bank Indonesia has established the standard that is less than 5%. This percentage minimizes the removal of Allowance for Possible Losses on Earning Assets that should be provided by a bank to cover losses incurred by non-performing earning assets.

The previous study conducted by Usman (2003) on the influence of NPLs on the changes in the next year's earning shows that NPLs do not significantly influence the changes. Thus, this needs further study, particularly in observing the influence of NPLs on ROA. The latter represents the profit performance, as it has calculated assets. This is in line with Sudiyanto and Suroso (2012) who found a negative influence of NPLs on ROA. Based on such arguments, the first hypothesis is generally as follows:

H1: *Non-Performing Loans (NPLs) have a negative influence on Return on Assets (ROA).*

As stated in the Regulation of Bank Indonesia Number 5/2003, market risk results from the movement of market variables from the portfolio owned by a bank, where the movement is potentially damaging. It includes interest rate and exchange rate. In general, bank performance is measured by the variables of market share growth, profitability, and rate on return (Tainio, Korhonen, & Santalainen, 2000). Bank performance may decrease or increase, depending on the environmental factors, strategies, and structures.

The previous study on NIM by Sudiyanto and Suroso (2012) shows that NIM has a positive influence on ROA in which the higher the NIM, the better the performance and thus, the higher the profits will be. The increasing profit is predicted to increase the bank's ROA.

H2: *Net Interest Margin (NIM) has a positive influence on Return on Assets (ROA).*

LDR indicates the availability of funds and resources currently and in the future, which is conceptually known as liquidity. Liquidity increases when assets are mostly non-liquid with shorter terms of funds. Liquidity indicators include the amount of secondary reserves for daily liquidity needs, relatively less stable concentration ratio on dependence, and the distribution of good financial sources from the third party. Petria, Capraru, and Ihnatov (2015) state that the loan-to-customer deposits ratio (LDR in Indonesia) is used to find out the bank's ability to pay to the depositors using the given loan guarantee or as a proxy to liquidity risk. In this study, LDR is used to find out whether it has a positive influence on ROA, which is aimed at proving the research finding by Prasanjaya and Ramantha (2013) on commercial banks in Indonesia. Since profit is one of the ROA components, it can be stated that LDR has a positive influence on ROA. Thus, it can be assumed as follows:

H3: *Loan to Deposit Ratio (LDR) has a positive influence on Return on Assets (ROA).*

Operational efficiency also influences bank performance, in that it shows whether the bank has appropriately used all the production factors (Kalish and Gilbert, 1973). Based on Bank Indonesia's standards, operational efficiency is measured by Ratio of Operational Cost to Operational Income, commonly known as BOPO in Indonesia. The ratio is aimed at measuring the ability of operational income to cover operational costs. The increasing ratio represents the bank's inability to minimize operational costs and maximize operational income. These situations may harm the bank, since it is less efficient. Bank Indonesia has established the best standard for the BOPO ratio, which is below 90%. If a bank reaches almost 100%, it is categorized less efficient. In this research, the BOPO ratio is taken as one of the influential variables or factors having an impact on a bank's financial performance. Ratio, which is often called efficiency ratio, is used to measure the bank management's ability to control operational cost and operational income. The smaller the ratio, the more efficient the cost. Hence, the assumption can be made as follows:

H4: Operational Cost to Operational Income (BOPO) ratio has a negative influence on Return on Assets (ROA).

Given the data available, the study will focus on the influence of NPLs, NIM, and BOPO on ROA and examine whether the theory on NPLs, NIM, and BOPO having a positive or negative influence on ROA is true. It will also attempt to find out the influence of banking risks (credit, market, liquidity, and operation), as well as the ratios of NPLs, NIM, LDR, and BOPO on banking performance, which is measured using ROA, in regional development banks. The study aims to find out the influence of banking risks, particularly that of all regional development banks in Indonesia, on banking performance in 2013–2015.

2. METHODS

This study is empirical in nature, as it explores regional development banks throughout Indonesia using available data. It is also aimed at explaining the relations between variables. The research is conducted based on data taken from banks' annual statements for 2013–2015 to describe their respective NPLs, NIM, LDR, BOPO, and ROA. The population and samples of the study include all regional development banks (BPDs) throughout the country with the total number of 26.

The study uses a multiple regression analysis technique, which is a dependent technique. Thus, it needs to divide variables into dependent and independent. Regression analysis is also a statistic instrument that is used when dependent and independent variables form a matrix. However, in a particular condition, an independent variable, which is in the form of non-metric data (dummy variable, ordinal or nominal form) can also be used. Multiple regression analysis is used in this research to find out the influence of NPL, NIM, LDR, and BOPO on ROA in those regional development banks.

Simultaneous hypothesis test is designed to determine the independent variable with $X1$ – credit of the indicator of Non-Performing Loans (NPLs), $X2$ – price with the indicator of Net Interest Margin (NIM), $X3$ – liquidity with the indicator

of Loan-to-Deposit Ratio (LDR), $X4$ – efficiency with the BOPO indicator. They significantly influence ROA of BPD banks in Indonesia. Table 1 presents the definitions of those operational variables.

Table 1. Definition of operational variables

Source: Processing data, 2019.

Variable	Variable definition	Ratio	Scale
Credit risk (*NPL*) (*X*1)	Credit repayment rate given by a depositor to the bank	NPL	Ratio
Market risk (*NIM*) (*X*2)	The ratio of interest rate to average earning assets	NIM	Ratio
Liquidity risk (*LDR*) (*X*3)	The ratio describing the capability of deposits in lending support	LDR	Ratio
Operational risk (*BOPO*) (*X*4)	Comparison of operational costs and operational income	BOPO	Ratio
Financial performance (*ROA*) (*Y*)	The ratio of profit after tax to total assets	ROA	Ratio

3. RESULTS

Table 2 provides descriptive statistics of variables used in the paper. The number of samples used is 78, all of which are taken from financial statements of all 26 BPD banks in Indonesia within 2013–2015.

Table 2. Descriptive statistics

Source: Processing data, 2019.

Variable	Mean	Std. deviation	N
ROA	2.3476	.81378	78
NPL	2.3805	2.08432	78
NIM	7.9315	1.35852	78
LDR	97.9940	33.97969	78
BOPO	74.3497	7.63855	78

The mean of *ROA* is 2.35%, exceeding the standard established by Bank Indonesia, which is below 1.5%. If you look at the standard deviation, which is 0.81%, this proves that *ROA* is in a good position because the mean exceeds the standard deviation. The mean of *NPL* is 2.39%, with the standard deviation smaller than the mean (2.08%). This shows that the data on *NPL* is appropriate. The mean of *NIM* is 7.93%, with the standard deviation of

1.36%. The smaller number of standard deviations shows small distribution of data variables or small *NIM* difference. *LDR* determined for public bank is above 92%. From the statistic test result, the mean of LDR is 97.99%, which is in line with the standard given by Bank Indonesia. The result is good because the mean exceeds the standard deviation, which is 33.98%. The mean of *BOPO* of all the BPD banks in Indonesia is 74.35%. It is good in terms of operational activities because it exceeds the standard deviation, which is 7.64% (see Table 2).

Table 3 shows that the F-value is 17.687 with the significance of 0.000. Since the significant value is smaller than the confidence rate of 5%, there is a significant influence of the variables of *NPL*, *LDR* < *BOPO* < and *NIM*, on *ROA* > based on the tables, it can be seen that, partially, *NPL* significantly influences *ROA*, for the significant value of *NPL* is below 5%, which is 0.1%. The variable of *NIM* significantly influences *ROA*. This is because the significant value of *NIM* is below 5%, which is 2.5%. *LDR* does not significantly influence *ROA*, as it is above 5%, which is 62.7%. *BOPO* significantly influences *ROA* because it reaches the score below 5%, which is 0.0%. The result shows coefficient correlation (*R*) and coefficient determination (*R* square). *R* value explains the relationship between independent variables (*x*) and dependent variables (*y*). As shown from the data, the coefficient correlation is 70.2%, meaning that the *x* variables (*NPL*, *NIM* < *LDR*, and *BOPO*) and the *y* variables (*ROA*) are in the strong category.

R-squared explains the amount of variable *y* as the result of *x*. The calculation obtains the R^2 value of 0.492 or 49.2%, which means *ROA* is influenced by independent variables (*NPL*, *NIM* < *LDR*, and *BOPO*), while 50.8% of it is influenced by other factors outside the model. Adjusted *R*-squared is the score of R^2 which is adjusted so that it is almost similar to the quality of the model. According to the calculation, the score of adjusted *R*-squared is 46.4%. Standard error of the estimate means the standard error from the estimation, which is 0.595%. The problem that may arise when using multiple regression formulation is multicollinearity. It is a condition where independent variables correlate to other independent variables, or a particular independent variable is the linear func-

tion of the other. Multicollinearity can be seen from the tolerance value or the Variance Inflation Factor (VIF) value. The limit of tolerance value is above 0.10, or the VIF value below 10.

Table 3. Regression result on the impact of NPL, NIM, LDR and BOPO on ROA of BPD banks in Indonesia

Source: Processing data, 2019.

Variable	T-test	Sig.	Collinearity statistics	
			Tolerance	VIF
NPL	−3.321	.001	.864	1.158
NIM	2.294	.025	.867	1.153
LDR	−.488	.627	.974	1.026
BOPO	−4.798	.000	.775	1.290
Variable	**F Test**	**Sig.**	**–**	
NPL, NIM, LDR, BOPO	17.687	.000[b]	–	
Observations	78	–	–	
R	.702[a]	–	–	
R^2	.492	–	–	
Adjusted R^2	.464	–	–	

Note: b – Predictors: (Constant), BOPO, LDR, NIM, NPL.

As Table 3 shows, the tolerance value of independent variables is above 0.10 and VIF below 10. Thus, it can be concluded that there is no multicollinearity in the regression model, then it can be tested. In Table 3, the constant shows the score of 5.345. It means that if independent variables are assumed to be in fixed condition, the *ROA* will increase to as much as 5.345%. The variable of *NIM* has a positive and significant impact on *ROA*. Meanwhile, the variables of *NPL*, *LDR*, and *BOPO* are negative and significant. The regression analysis (see Table 3) shows that most independent variables significantly influence the dependent variable. It is proven by the significance rate of independent variables, which are mostly below 0.05. As for the impact of *NPL* on *ROA*, the score is −0.116, and it is below 0.05. It means that NPL has a negative influence on *ROA*.

The statistic number of *NIM* on *ROA* is 0.123, and the significance is below 0.05. It means that *NIM* has a positive influence on *ROA* > *LDR*, since *ROA* reaches the score of −0.001. It also means that *LDR* has a negative influence on *ROA*. In addition, the statistic number of *BOPO* on *ROA* is −0.048, meaning that it has a negative influence. From the calculation, *F*-value is 17.687, and the significance rate is 0.000. As it is smaller than the confidence rate, which is 5%, it means that the variables of

CAR, NPL, LDR, BOPO, and NIM, simultaneously influence ROA.

4. DISCUSSION

4.1. Hypothesis (H1): Test for the influence of NPL on ROA

The first hypothesis states that NPLs have a negative and significant influence on ROA. The research finding shows that the significance value is 0.001, while the regression coefficient is −0.116. As for the significance rate, it is below 0.05. Meanwhile, the value of the coefficient regression means that a 1% decrease in NPLs will decrease the value of ROA to as much as 0.116%. Therefore, the first hypothesis is accepted. Based on the regression equation, it can be seen that the coefficient for this variable is positive, meaning that the influence is positive. The condition proves that the higher the NPL, the higher the ROA will be. The relation between ROA and the bank's NPL shows the potential of Non-Performing Loans to arise. Lending is expected to result in bigger profit for a bank, leading to an increase in its ROA. As mentioned above, NPL results from the decrease in loan quality due to the debtor's declining financial condition, such as in terms of late payment, other problem payment, poor prospect of the debtor's business, and the effect of Bank Indonesia's implemented regulation (Regulation of the Bank Indonesia Number 7/2/PBI/2005 on the Assessment of Bank Quality).

A bank can manage the business well if its score of NPL is below 5%. The range of 5-8% is in a quite good category. The regression equation shows that the coefficient of this variable is positive. Therefore, the increase in NPL does not decrease the ROA because Provision for Loan Losses on Earning Assets can cover non-performing loans. The banking profit can increase with the high score of NPL because other profit sources from the interest, as fee-based income is relatively high. Besides, NPL may take place not only because debtors are not able to pay, but also because of the strict regulation of Bank Indonesia in terms of categorizing the credits. It is possible that the debtors in performing loans can be classified as non-performing. The results are confirmed by the findings of studies conducted by Tulung and Ramdani (2016).

4.2. Hypothesis (H2): Test for the influence of NIM on ROA

While the first hypothesis states that NPLs have a positive and significant influence on ROA, the second hypothesis assumes that NIM has a positive influence on ROA. The result shows that the significance value is 0.025, while the coefficient regression is 0.123, meaning that NIM has a positive influence because the score is below 0.05. For the coefficient regression, the value means that a 1% increase in NIM will increase ROA to as much as 12.3%. Therefore, the second hypothesis is acceptable. The findings support the results by Tulung and Ramdani (2018) who state that NIM has a positive and significant influence on ROA. It means that bank's ability in gaining interest influences the bank's income on total assets.

4.3. Hypothesis (H3): Test for the influence of LDR on ROA

The third hypothesis states that LDR has a positive influence on ROA. The research results show the significance rate of 0.627, while the coefficient regression is −0.001. This shows that LDR has a negative influence on ROA, and it is not significant because the value is above 0.05. In other words, LDR has a negative influence on ROA. Therefore, the third hypothesis is rejected. The higher the LDR, the lower the ROA rate is. The higher the LDR, the lower the ROA rate and the riskier the bank liquidity will be. If the percentage of lending on the funds from the third party ranges between 80% to −110%, the bank can be considered to have good profitability. However, the rate of ROA of regional development banks is likely to decrease if lending turns to non-performing loans. The findings are not in line with the research by Prasanjaya and Ramantha (2013) on commercial banks in Indonesia. Since profit is one of the ROA components, it can be stated that LDR has a positive influence on ROA.

4.4. Hypothesis (H4): Test for the influence of the BOPO ratio on ROA

The research results show that the significance value is 0.000, while the coefficient regression is −0.048. This means that BOPO has a negative influence on ROA, which is significant since the value

is below 0.05, which is 0.0000. The value of coefficient regression, −0.048, means that a 1% increase in *BOPO* will cause *ROA* to decrease by 4.8%. Thus, the fourth hypothesis, which states that the *BOPO* ratio has a negative influence on ROA, is accepted.

The findings support the research by Tulung and Ramdani (2018), which shows that *BOPO* has a negative and significant influence on *ROA*. Hence, the bank's efficiency rate in managing the business will influence its income rate or earnings.

CONCLUSION

Given the data analysis and hypothesis testing, evidence is supported by calculating ratios using SPSS (Statistical Package for the Social Sciences), as mentioned elsewhere in the previous section on the influence of credit risk (NPL), market risk (NIM), liquidity risk (LDR), and operational risk (BOPO) on the financial performance (ROA) of regional development banks in Indonesia in 2013–2015.

First, credit risk has a significant and negative influence on bank financial performance, thus the first hypothesis (*H1*) is accepted. Second, market risk has a significant and positive influence on financial performance; therefore, the second hypothesis (*H2*) is accepted. Third, liquidity risk does not have any significant and negative influence on financial performance. Hence, the third hypothesis (*H3*) is rejected. Fourth, operational risk has a significant and negative influence on financial performance; therefore, the fourth hypothesis (*H4*) is accepted. Fifth, credit risk, market risk, liquidity risk, and operational risk significantly influence bank financial performance simultaneously. Therefore, the fifth hypothesis (*H5*) is accepted.

In general, for the banking, the implementation of banking risk assessment should be more optimized. It may include a quantitative analysis, approaches to using financial ratios, as well as qualitative approaches involving reliable human resources to manage financial risks of a bank. Future studies are expected to produce better results and use more samples with various characteristics, especially dependent variables that influence financial performance of a bank.

AUTHOR CONTRIBUTIONS

Conceptualization: Herman Karamoy, Joy Elly Tulung.
Data curation: Herman Karamoy, Joy Elly Tulung.
Formal analysis: Joy Elly Tulung.
Investigation: Joy Elly Tulung
Project administration: Herman Karamoy.
Supervision: Herman Karamoy.
Validation: Herman Karamoy.
Visualization: Herman Karamoy, Joy Elly Tulung.
Writing – original draft: Joy Elly Tulung.
Writing – reviewing & editing: Herman Karamoy, Joy Elly Tulung.

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