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LOAN LOSS PROVISION INDEX AND BANK RISK: AN EMPIRICAL STUDY IN INDONESIA

Abstract

The purpose of this study is to determine an index for loan loss provision as a new measurement and examine its effect on bank risk. The study also compared the results with a commonly used measurement, which is the ratio of loan loss provision (LLP). The population of this study is all conventional banks, including foreign banks with branch offices in Indonesia. The period of observation is from 2015 to 2018. The sample selection based on the purposive sampling method resulted in 86 banks. This study used panel data analysis. The data were collected from the annual reports of each bank and the website of the Financial Services Authority. The research findings show that the index of loan loss provision can decrease credit risk, liquidity risk, and operational risk. Meanwhile, the ratio of the loan loss provision only affects operational risk and does not affect credit risk and liquidity risk. The findings of this study suggest that the index for loan loss provision is more suitable to be used as an alternative measurement in the research design related to loan loss provision because the implementation of IFRS 9 requires more detailed disclosure of how banks estimate the amount of loan loss provision.

Keywords loan loss provision index, credit risk, liquidity risk, operational risk

JEL Classification E44, E58, G21, G32

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INTRODUCTION

Loan loss provision (LLP) is an income statement expense set aside to allow for uncollected loans and loan payments. Banks are required to account for potential loan defaults and expenses to ensure they are presenting an accurate assessment of their overall financial health (Cho & Chung, 2016). The provision for loan losses is a huge accrual that has a considerable impact on the banking business (Huang & Wang, 2013). Loan loss provision has a significant effect on bank accounting profits and capital requirements (Kanagaretnam et al., 2004). Previous empirical studies have proven that the loan loss provision is used for earnings management (Agénor & Zilberman, 2015; Im et al., 2016; Jasman et al., 2021; Kanagaretnam et al., 2004; Muliati et al., 2021). Estimation of the provision for credit losses is also important to determine the performance of a bank when performing its function of providing loans.

In previous studies, there is still no consensus on deflator options for loan loss provision measurement in the research design. Various deflators that are commonly used are average total credit (Ahmed et al., 1999), total credit (Agénor & Zilberman, 2015; Bushman & Williams, 2012; Gambacorta & Mistrulli, 2004; Leventis et al., 2011), average total assets (Bikker & Metzemakers, 2005), total assets at the end of the year (Bouvatier et al., 2014; Curcio & Hasan, 2015; Laeven & Majnoni, 2003; Ozili & Outa, 2017), and total assets at the beginning of the year

(Lassoued et al., 2017; Shrieves & Dahl, 2003). In addition, some use natural logarithms of the provision for credit losses. Furthermore, the enactment of IFRS 9 on financial instruments, which requires more disclosure of how banks deal with credit problems and evaluate its credit risk for estimating the amount of loan loss provision, is required by IAS 39 or IFRS 9 (Laeven & Majnoni, 2003; Ozili, 2015; PwC, 2016). Therefore, the use of the provisioning ratio for loan losses is considered less relevant. The accuracy in determining the provision for loan losses is largely determined by the role of bank management and the existing system used.

Bank risks associated with provision for loan losses are credit risk, liquidity risk, and operational risk (Ozili & Outa, 2017; Rasa, 2021). Basel 2 has emphasized the importance of three categories of bank risk, namely credit risk, market risk, and operational risk that are included in pillar 1 capital requirements. However, market risk is not caused by improper measurement of the loan loss provision; rather, it is the risk in balance sheet and off-balance sheet positions, including derivative transactions due to changes in overall market conditions, including the risk of changes in price options (Klomp & Haan, 2012; Majumder & Li, 2018).

The significance of this study is to develop an alternative measurement for the variable of loan loss provision (LLP). There are two main reasons for the need to develop an index as a new measurement for loan loss provision. The first is to provide an alternative measurement for LLP, since there is still no consensus on deflator options for loan loss provision as discussed above. The second reason is the enactment of IFRS 9 (financial instruments), which required banks to disclose additional disclosure of how banks deal with credit problems and evaluate its credit risk for estimating the amount of loan loss provision required by IAS 39 or IFRS 9 (Laeven & Majnoni, 2003; Ozili, 2015; PwC, 2016). The accuracy in determining the provision for loan losses is also largely determined by the role of bank management and the existing system used.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The LLP index is identified based on recommendations from Bank for International Settlements (BIS) through the Basel Committee on Banking Supervision (BSBC) that published guidance on credit risk and accounting for expected credit losses (BIS, 2015). The guidance establishes several principles in the form of "supervision of sound credit risk practices" with respect to the accounting framework for expected credit losses (ECL), also known as ECL. The guidance explains how estimated credit losses should be linked to bank credit risk. There was no guidance on how banks could implement the latest standards when the IASB issued the full version of IFRS 9 in July 2014. The guidance is in response to various banking questions and needs (PwC, 2016). The guidance states that it does not contradict the accounting standards issued by IASB and specifies the principles that banks must follow while implementing ECL.

As previously stated, the loan loss provision index is developed based on guidance on credit risk and accounting for expected credit loss (ECL), which is issued by BIS in 2015. The index is considered more appropriate and relevant as proxy for LLP measurement because the quality of the provision for credit losses is largely determined by the eleven principles or dimensions as stipulated in the guidance, which consists of eight principles related to supervisory guidance and three principles related to supervisory evaluation. In the index, the principles of the supervisory evaluation are not included because the results of the supervisory evaluation conducted by the bank are not published for the public and are only for the internal benefit of the bank concerned (BIS, 2015). The eight principles of supervisory guidance consist of (1) Board and management responsibilities, (2) Sound ECL methodologies, (3) Credit risk rating process and grouping, (4) Adequacy of the allowance, (5) ECL model validation, (6) Experienced Credit Judgment, (7) Common data, and (8) Disclosure.

The eight principles or dimensions contain 59 indicators. The indicators are then synchro-

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nized with reference to the Financial Reporting Framework that defines three aspects in preparation and presentation of financial statements, namely recognition, measurement, and disclosure (IASB, 2018). By summarizing these indicators and referring to the framework, 27 out of 59 indicators are obtained.

The first principle or dimension, namely "Board and management responsibilities" in the guidance consists of three indicators. The three (3) indicators are adopted in this index such as: (1) The board of directors requires senior management to periodically report the results of the process of measuring and assessing credit risk; (2) Senior managers are responsible for implementing a credit risk strategy approved by the board of directors and developing approved policies and processes; (3) Senior managers in carrying out their duties for credit risk assessment and measurement apply an effective internal control system; The credit risk division, compliance division, commercial division, and internal audit division all have a functioning mechanism that specifies how they collaborate with other departments to measure and assess credit risk.

The second principle or dimension, namely "Sound ECL Methodologies" in the guidance defines 13 indicators which are then summarized into three (3) indicators. This is because there are several indicators that overlap or are almost the same meaning and purpose. The indicators are the following: (1) In considering the quality of lending exposures, senior managers acquire information on the process of measuring and assessing risk, (2) which is calculated using a sound credit risk methodology; The bank's credit risk methodology clearly defines the key requirements related to the measurement and assessment of credit losses such as loss rates, loss events, or defaults; (3) The bank adopts and implements written policies and procedures detailing the credit risk system and controls inherent in the methodology; Banks involve the customer (the debtor) in getting direct information about their ability to pay off loans and the continuity of their business.

The third principle or dimension, namely "Credit risk rating process and grouping" in the guidance defines 12 indicators which are summarized into seven (7) indicators. The reason is that there are several indicators that are nearly the same. The indicators include (1) The bank implements supervisory systems and procedures to monitor the quality of loans; (2) The credit risk rating process involves a function of independent review; (3) he credit risk rating set by the bank starts from initial recognition based on a number of criteria including type of product, type and amount of collateral, borrower characteristics, and geography or a combination thereof depending on the level of complexity of the bank; (4) The credit risk rating system considers the borrower's current and expected financial condition and repayment capacity over the expected period of exposure or portfolio of loan exposures; (5) Credit risk ratings are reviewed whenever new relevant information is received or bank expectations of credit risk have changed; (6) Credit exposure is divided into categories based on the characteristics of joint credit risk, allowing changes in credit risk to adapt to changes in information; (7) The basis for classification is always reviewed to ensure that the exposure in the credit exposure group remains homogeneous in terms of its reaction to credit risk triggers

The fourth principle or dimension, namely "Adequacy of the allowance" in the guidance defines seven (7) indicators. The indicators are summarized into three (3) indicators on the index because of the same meaning and purpose. The indicators include: (1) The bank applies a sound and reliable credit risk methodology with the objective of all reserves being determined in accordance with the applicable accounting conceptual framework; (2) At the reporting date, relevant factors that affect the collectability of cash flows over the life of a set of credit exposures are considered in the allowance assessment; (3) Estimation of losses is carried out periodically in accordance with financial reporting requirements and bank regulations.

The fifth principle, namely "ECL model validation" in the guidance defines three (3) indicators, each of which is more technical and detailed. For practical purposes, it is divided into four (4) indicators on the index which are the following: (1) Banks have procedures and policies implemented adequately for the approval of the credit risk determination model; (2) The credit risk determination model is used in various aspects of the

credit risk measurement and assessment process at both the individual transaction and the portfolio level; (3) The scope and methodology of model approval include a systematic evaluation of the strength, consistency, and accuracy of the model and its relevance to the underlying portfolio; (4) The bank maintains detailed records of the model validation process, including any modifications to the methodology, the data set used, the validation findings, and any corrective actions taken.

The sixth principle or dimension, namely "Experienced Credit Judgment" in the guidance defines seven (7) indicators. It can be summarized into three (3) indicators on the index because several indicators have similarities. The indicator are as follows: (1) Banks use their credit experience judgment to estimate and measure credit losses; (2) The bank has a mechanism in place that links selected past- and present-oriented data to the credit risk triggers of a specific loan or portfolio; (3) The bank considers various information, for risk management and capital adequacy requirements.

The seventh principle, namely "Common data" in the guidance defines six (6) indicators. The six indicators share the same meanings and rather overlap one to another. Thus, they can be summarized into one (1) indicator on the index which is the general processes, systems, tools, and data used in assessing credit risk and measuring credit losses for accounting purposes, expected losses, and capital adequacy purposes include a credit risk rating system, estimation for the probability of default, past status, loan to value ratio, historical loss rate, product type, amortization schedule, advance payment terms, market segment, geographic location, and type of guarantee

The eighth principle, namely "Disclosure" in the guidance defines eight (8) indicators. By referring to the framework of financial reporting, it is classified into three (3) indicators on the index: (1) The purpose of public disclosure is to offer information to various users that is clear and easy to understand, and that is useful in making decisions about the financial position, performance, and changes in financial condition; (2) Disclosure of credit and financial risk management is carried out in accordance with applicable accounting standards; (3) The quantitative and qualitative disclosures provide users with a comprehensive view of the inputs used to create the estimated credit loss (ECL) and their sensitivity to changes in these assumptions.

Furthermore, two (2) indicators are added to the index. Both indicators are not yet in the supervisory guidance on credit risk and accounting for expected credit losses. The first indicator falls under principle number one or indicator number 4: "bank credit risk division, the regulatory division, the commercial division, and the internal audit division which have a working mechanism that describes the coordination function with related departments in measuring and assessing credit risk level". The inclusion of this indicator is due to the fact that securing credit occurs not only at the start of the credit giving process by using the four-eye principle but also after credit has been approved, establishing the level of credit risk until the loan has been returned (Novotny-Farkas, 2016). Furthermore, the second indicator falls under principle number two or indicator number 8: "Banks involve the customer (the debtor) in getting direct information about their ability to pay off loans and the continuity of their business." This indicator is important because banks should obtain information not only from internal sources but also from external sources, such as directly from potential borrowers (Customer insight) in monitoring and measuring credit exposure (EBA, 2020). Thus, the total becomes 29 indicators in the index.

Banks can manage risk by using their judgement through credit loss provisions (Lobo, 2017). Credit risk is due to the failure of other parties to fulfill obligations to the bank, including credit risk due to debtor failure, credit concentration risk, counterparty credit risk, and settlement risk (Majumder & Li, 2018). The LLP index contains indicators for achieving sound credit risk practices with respect to the ECL accounting framework. The more banks meet the index's indicators, the more fair the provision for credit losses is, and the healthier the credit risk practice becomes, thus reducing credit risk. Literature studies show that empirical research related to credit risk measures credit risk by proxying the ratio of non-performing loans to total credit (Fiordelisi et al., 2013; Majumder &

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Li, 2018; Zhang et al., 2013). They say that a high ratio of non-performing loans to total credit indicates a bank is more at risk of credit default. However, Bushman and Williams (2012) stated that banks that recognize appropriate or relatively high loan loss provisions show greater discipline and have low bank risk. Also, Jin et al. (2018) stated that accounting discretion in determining the provision for credit losses is used as a risk management tool rather than earnings management.

Liquidity risk is due to a bank's inability to meet its maturing obligations from cash flow funding sources and/or from high-quality collateralized liquid assets, without disturbing the activities and financial condition of the bank (Calomiris et al., 2018). The more banks meet the LLP index indicators, the more reasonable the provision for credit losses is and the healthier the practice of credit risk is. This healthy credit risk practice prevents banks from increasing non-performing loans allowing them to boost bank liquidity through smooth interest and loan principal payments. In previous empirical research, liquidity risk was proxied by the ratio of liquid assets to the total assets (Ghenimi et al., 2017; Klomp & Haan, 2012). Insufficient liquidity could threaten the survival of the bank, especially if there were many mismatches in credit maturities. Banks must maintain liquid assets that enable them to face liquidity risk and manage and monitor the risks faced (Calomiris et al., 2018).

Operational risk is due to inadequacy or malfunctioning of internal processes, human error, system failure, and/or events that affect bank operation (Shehzad & De Haan, 2013). In relation to the index, the more banks comply with the indicators of LLP index, the more reasonable the provision for credit losses is and the healthier the practice of credit risk is. This sound credit risk practice reduces or prevents banks from increasing non-performing loans, which implies a decrease in operating expenses in the form of provision for credit losses. With a decrease in the provision for credit losses, the impact on the increase in operating profit is that the ratio of operating expenses to operating income is low. Bank operational risk is measured by operating costs divided by operating profit (Ghenimi et al., 2017; Lee & Chih, 2013; Shehzad & De Haan, 2013). They say that this ratio shows managerial efficiencies. Also, bad loans require additional costs to manage increased NPLs (Abidin et al., 2021). If operating costs on operating profit are low, then managerial efficiency will be better and banks can more quickly restore investors' confidence which has implications for the growth of bank share prices.

This study aims to develop an index of loan loss provision and examines the effect of the LLP index on bank risk. As a comparison, test results using the index of LLP are compared with using the old measurement, namely the LLP ratio. Measurements using the index of LLP are expected to be able to complement the old one using the ratio of LLP.

Based on the literature review, the following hypothesis is developed:

H1: LLP index has a negative effect on credit risk.

H2: LLP index has a negative effect on liquidity risk.

H3: LLP index has a negative effect on operational risk.

2. METHODS

2.1. Sample

The population of this study is all conventional banks in Indonesia, including foreign banks that have branch offices in Indonesia. The period of observation is from 2015 to 2018. Samples are selected with the purposive sampling method. The sample criteria are:

1) Indonesian conventional banks and foreign banks with branches in Indonesia and operating in the period 2015–2019.

2) Those that are not subsidiaries of other banks.

3) Those that publish annual reports and complete financial statements which can be accessed on their official website.

2.2. Measurement of variables

2.2.1. *Dependent variable*

- Credit Risk

Credit risk is measured using the ratio of non-performing loans to total loans (Fiordelisi et al., 2013; Majumder & Li, 2018; Zhang et al., 2013).

- Liquidity Risk

Liquidity risk is measured using the ratio of liquid assets to the total assets (Ghenimi et al., 2017; Klomp & Haan, 2012).

- Operational Risk

Operational Risk is measured using the ratio of operating expense to operating income. The ratio is used by previous researchers (Ghenimi et al., 2017; Lee & Chih, 2013; Shehzad & De Haan, 2013).

2.2.2. *Independent variable: LLP index*

The LLP index variable is measured by the scoring method (Gavana et al., 2017). The disclosures of the bank's annual report in accordance with the LLP index indicator are divided by the total LLP index of the 29 indicators developed and modified by Jasman and Murwaningsari.

2.2.3. *Control variable*

This study uses control variables to capture differences in bank characteristics such as Size, Liquidity, and Leverage (Bitar et al., 2016). Size is a control variable measured as the natural logarithm of total bank assets (Kolsi & Grassa, 2008; Saunders et al., 1990). Liquidity is proxied with LDR (Loan to Deposit Ratio), which is the ratio between the banks' total loans and total deposits (Jreisat & Bawazir, 2021). Leverage is a control variable measured by total debt divided by total equity at the end of the year (Kanagaretnam et al., 2010).

2.3. Sensitivity analysis

The sensitivity test was carried out by replacing the LLP Index with the LLP ratio used as a measure for bank risk by previous researchers (Bouvatier et al., 2014; Curcio & Hasan, 2015; Laeven & Majnoni, 2003; Ozili, 2017). The formula is the provision for loan losses divided by total assets. The purpose of the sensitivity test is to examine the robustness of the regression using the LLP index in hypothesis testing.

3. RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics. Variables that have higher standard deviation as compared to mean are LLP, Credit Risk, Operational Risk, Size, Leverage, and LDR. This means that the data variability for those variables is quite high. Meanwhile, the LLP index and Liquidity risk have a lower standard deviation than the mean. This means that the data for those variables is homogeneous and has low variability.

A classical assumption test was conducted before the hypothesis test to get the best linear unbiased estimator. The results showed that the data distribution is normal and free from autocorrelation, heteroscedasticity, and multicollinearity. Subsequently, Chow and Hausman tests were conducted for panel data regression model

Table 1. Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Std. deviation
LLP index	344	0.3448	0.9655	0.6452	0.1584
LLP	344	–0.1387	8.3341	0.1309	0.6246
Credit risk	344	0.0000	0.4421	0.0387	0.0477
Liquidity risk	344	0.0519	0.4059	0.1741	0.0676
Operational risk	344	–121.1871	202.5539	4.9893	19.4126
Size	344	494,605	1,296,898,000	76,728,759	188,805,404
Leverage	344	0.1600	1231.2938	14.7866	82.1597
LDR	344	0.0732	12.7282	1.0808	1.1094

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Table 2. Hypothesis testing

Independent variable	Dependent variable					
	Credit risk		Liquidity risk		Operational risk	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
LLP Index	−0.001	0.039**	−0.002	0.003***	−0.056	0,028**
	Adj R2 = 0.51		Adj R2 = 0.56		Adj R2 = 0.34	
	Prob. (F statistic) = 0.0000 (4.8647)		Prob. (F Statistic) = 0.0000 (5.7843)		Prob. (F statistic) = 0.0000 (2.9199)	
LLP Ratio	−0.002	0.560	−0.003	0.658	−0.987	0.031**
	Adj R2 = 0.52		Adj R2 = 0.55		Adj R2 = 0.34	
	Prob. (F statistic) = 0.0000 (5.1439)		Prob. (F Statistic) = 0.0000 (5.5355)		Prob. (F statistic) = 0.0000 (2.9156)	
Loan to Deposit Ratio	0.016	0.001***	7.634	0.984	0.864	0.535
Leverage	0.009	0.784	0.073	0.074*	−18.602	0.216
Size	0.019	0.020**	−0.003	0.753	−0.653	0.862

Note: *** significant at 1 percent, ** significant at 5 percent, and * significant at 10 percent.

selection. The model selection testing concludes the fixed effect model is better for regression equation in which the dependent variable is either for the LLP index or the LLP ratio.

Table 2 shows hypothesis testing results. Hypothesis 1 examines the effect of the LLP index on credit risk. By using the LLP index, the results obtained that Prob. = 0.039 < 0.05 and a coefficient of −0.001. These results indicate the LLP index has a negative effect on credit risk. Meanwhile, the test with the LLP ratio shows that Prob. 0.560 with a coefficient of −0.002. These results indicate that the LLP ratio has no effect on credit risk. Then, hypothesis 2 investigates the effect of the LLP index on liquidity risk. The results show that Prob. = 0.003 < 0.005 with a coefficient of −0.002. These results prove that the LLP index has a negative effect on liquidity risk. In contrast, the test with the LLP ratio shows Prob. = 0.658 with a coefficient of −0.003. These results indicate that the LLP ratio has no effect on liquidity risk. Furthermore, hypothesis 3 analyzes the effect of the LLP index on operational risk. Tests with the LLP index shows Prob. = 0.028 < 0.05 with a coefficient of −0.056. The results indicate that the LLP index has a negative influence on operational risk. Moreover, hypothesis testing using LLP ratio indicates Prob. =0.031 with a coefficient of −0.987. These results demonstrate that the LLP ratio also has a negative effect on operational risk.

3.1. The effect of loan loss provision index on credit risk

Based on the results, LLP index has a significant and negative effect on credit risk. The indicators in the LLP index contain something that shows the accuracy and fairness of the bank in determining the value of its provision for credit losses. These indicators are guidelines for achieving sound credit risk practices by taking into account the ECL accounting framework (PwC, 2016). This means that the more banks that meet the indicators, the more equitable the provision for credit losses will be, and the sounder credit risk practices will be, thereby reducing credit risk. The results of this study support previous empirical studies conducted by Fiordelisi et al. (2013), Majumder and Li (2018), Zhang et al. (2013).

In contrast, the results of the analysis using LLP ratio show that the LLP ratio has no effect on credit risk. This finding does not support the previous research. The difference in the results of this study may be caused by the use of the LLP ratio which cannot measure the quality of how banks estimate the amount of LLP disclosed in financial reporting as required by IFRS 9 (financial instrument).

3.2. The effect of loan loss provision index on liquidity risk

The LLP index has a significant and negative effect on liquidity risk. This means that the more

banks meet the indicators in the supervisory for ECL disclosure index, the more reasonable the provision for credit losses and the sounder credit risk practices will be. This sound credit risk practice prevents banks from incurring non-performing loans; thus, enabling banks to increase bank liquidity through smooth payments of interest and principal. The results of this study support previous empirical studies conducted by Ghenimi et al. (2017) and Klomp and Haan (2012).

Meanwhile, the result of the analysis using the LLP ratio proved to have no effect on liquidity risk. These results do not support previous studies. This may also be because the LLP ratio may not be able to measure the quality of how banks estimate LLP as it is described in the financial reporting disclosures.

3.3. The effect of loan loss provision index on operational risk

LLP index has a negative influence on operational risk. This means that the more banks meet the indicators in the LLP index, the more reasonable the provision for credit losses is and the sounder credit risk practices will be. This sound credit risk practice reduces or prevents banks from bearing non-performing loans, which has implications for reducing operating expenses in the form of provision for credit losses. With the decrease in the provision for credit losses, the impact on the increase in operating profit is that the ratio of operating expenses to operating income will be low. In addition, analysis using the LLP ratio also has a negative effect on operational risk. The results of this study support previous research conducted by Ghenimi et al. (2017), Lee and Chih (2013), and Shehzad and De Haan (2013).

CONCLUSION

This paper develops an index of loan loss provision for alternative measurement of LLP in research design and examines its effects on bank risk. The index contains indicators of sound credit risk practices. This empirical study has proved that LLP index can mitigate credit risk, liquidity risk, and operational risk. The more a bank meets the LLP index indicators, the smaller the credit risk, liquidity risk, and operational risk faced by the bank. These results also indicate that LLP index can be used as a complement to the old measurement using the LLP ratio. The adequacy of the LLP estimation is not only based solely on the ratio of LLP itself; rather, it really depends on how the bank estimates the amount of LLP. Therefore, the use of this index as a measure of LLP for further research is more in line with the application of IFRS 9 (financial instruments) which requires banks to disclose more in financial reporting about their LLP estimates.

AUTHOR CONTRIBUTIONS

Conceptualization: Jasman Jasman, Etty Murwaningsari.
Data curation: Jasman Jasman.
Formal analysis: Jasman Jasman, Etty Murwaningsari.
Funding acquisition: Jasman Jasman.
Investigation: Jasman Jasman, Etty Murwaningsari.
Methodology: Jasman Jasman, Etty Murwaningsari.
Project administration: Jasman Jasman.
Resources: Jasman Jasman.
Software: Jasman Jasman.
Supervision: Etty Murwaningsari
Validation: Jasman Jasman, Etty Murwaningsari.
Visualization: Jasman Jasman, Etty Murwaningsari.
Writing – original draft: Jasman Jasman.
Writing – reviewing & editing: Jasman Jasman, Etty Murwaningsari.

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REFERENCES

1. Abidin, Z., Prabantarikso, R. M., Wardhani, R. A., & Endri, E. (2021). Analysis of bank efficiency between conventional banks and regional development banks in Indonesia. *Journal of Asian Finance, Economics, and Business, 8*(1), 741-750. https://doi.org/10.13106/jafeb.2021.vol8.no1.741
2. Agénor, P. R., & Zilberman, R. (2015). Loan loss provisioning rules, procyclicality, and financial volatility. *Journal of Banking and Finance, 61,* 301-315. https://doi.org/10.1016/j.jbankfin.2015.08.035
3. Bank for International Settlements (BIS). (2015). *Guidance on credit risk and accounting for expected credit losses*. Retrieved from https://www.bis.org/bcbs/publ/d350.htm
4. Bikker, J. A., & Metzemakers, P. A. J. (2005). Bank provisioning behavior and procyclicality. *Journal of International Financial Markets, Institutions, and Money, 15*(2), 141-157. https://doi.org/10.1016/j.intfin.2004.03.004
5. Bitar, M., Saad, W., & Benlemlih, M. (2016). Bank risk and performance in the MENA region: The importance of capital requirements. *Economic Systems, 40*(3), 398-421. https://doi.org/10.1016/j.ecosys.2015.12.001
6. Bouvatier, V., Lepetit, L., & Strobel, F. (2014). Bank income smoothing, ownership concentration, and the regulatory environment. *Journal of Banking and Finance, 41*(1), 253-270. https://doi.org/10.1016/j.jbankfin.2013.12.001
7. Bushman, R. M., & Williams, C. D. (2012). Accounting discretion, loan loss provisioning, and discipline of Banks' risk-taking. *Journal of Accounting and Economics, 54*(1), 1-18. https://doi.org/10.1016/j.jacceco.2012.04.002
8. Calomiris, C. W., Heider, F., & Hoerova, M. (2018). A theory of bank liquidity requirements. *SSRN Electronic Journal, 4,* 41-63. https://doi.org/10.2139/ssrn.2477101
9. Cho, M., & Chung, K. H. (2016). The effect of commercial banks' internal control weaknesses on loan loss reserves and provisions. *Journal of Contemporary Accounting and Economics, 12*(1), 61-72. https://doi.org/10.1016/j.jcae.2016.02.004
10. Curcio, D., & Hasan, I. (2015). Earnings and capital management and signaling: The use of loan-loss provisions by European banks. *European Journal of Finance, 21*(1), 26-50. https://doi.org/10.1080/1351847X.2012.762408
11. European Banking Authority (EBA). (2020). *Final report: Guidelines on loan origination and monitoring*. Retrieved from https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Guidelines/2020/Guidelines on loan origination and monitoring/884283/EBA GL 2020 06 Final Report on GL on loan origination and monitoring.pdf
12. Fiordelisi, F., Soana, M. G., & Schwizer, P. (2013). The determinants of reputational risk in the banking sector. *Journal of Banking and Finance, 37*(5), 1359-1371. https://doi.org/10.1016/j.jbankfin.2012.04.021
13. Gambacorta, L., & Mistrulli, P. E. (2004). Does bank capital affect lending behavior? *Journal of Financial Intermediation, 13*(4), 436-457. https://doi.org/10.1016/j.jfi.2004.06.001
14. Gavana, G., Gottardo, P., & Moisello, A. M. (2017). The effect of equity and bond issues on sustainability disclosure: Family vs non-family Italian firms. *Social Responsibility Journal, 13*(1), 126-142. https://doi.org/10.1108/SRJ-05-2016-0066
15. Ghenimi, A., Chaibi, H., & Omri, M. A. B. (2017). The effects of liquidity risk and credit risk on bank stability: Evidence from the MENA region. *Borsa Istanbul Review, 17*(4), 238-248. https://doi.org/10.1016/j.bir.2017.05.002
16. Huang, D. F., & Wang, C. L. (2013). Book-tax differences and earnings quality for the banking industry: Evidence from Taiwan. *Pacific Accounting Review, 25*(2), 145-164. https://doi.org/10.1108/PAR-12-2011-0052
17. Im, C. C., Kim, J. H., & Choi, M. K. (2016). Dividend policy and earnings management: Based on discretionary accruals and real earnings management. *International Journal of U- and E-Service, Science, and Technology, 9*(2), 137-150. https://doi.org/10.14257/ijunesst.2016.9.2.15
18. Jasman, J., Murwaningsari, E., Mayangsari, S., & Mulyani, S. D. (2021). The effect of earnings management and signaling on loan loss provision: the role of bank capitalization. *Journal of Finance and Banking Review, 6*(1), 43-50. https://doi.org/10.35609/jfbr.2021.6.1(1)
19. Jin, J., Kanagaretnam, K., & Lobo, G. J. (2018). Discretion in bank loan loss allowance, risk-taking, and earnings management. *Accounting and Finance, 58*(1), 171-193. https://doi.org/10.1111/acfi.12210
20. Jreisat, A., & Bawazir, H. (2021). Determinants of banks profitability in the Middle East and North Africa Region. *Journal of Asian Finance, Economics, and Business, 8*(6), 701-711. https://doi.org/10.13106/jafeb.2021.vol8.no6.0701
21. Kanagaretnam, K., Lim, C. Y., & Lobo, G. J. (2010). Auditor reputation and earnings management: International evidence from the banking industry. *Journal of Banking and Finance, 34*(10), 2318-2327. https://doi.org/10.1016/j.jbankfin.2010.02.020
22. Kanagaretnam, K., Lobo, G. J., & Yang, D.-H. (2004). Joint tests of signaling and income smoothing through bank loan loss provisions. *Contemporary Accounting Research, 21*(4), 843-884. https://doi.org/10.1506/UDWQ-R7B1-A684-9ECR
23. Klomp, J., & Haan, J. D. (2012). Banking risk and regulation: Does

one size fit all? *Journal of Banking and Finance, 36*(12), 3197-3212. https://doi.org/10.1016/j.jbankfin.2011.10.006

24. Kolsi, M. C., & Grassa, R. (2008). Did corporate governance mechanisms affect earnings management? Further evidence from GCC Islamic banks. *International Journal of Islamic and Middle Eastern Finance and Management, 34*(10). https://doi.org/10.1108/mf.2008.00934jaa.001

25. Laeven, L., & Majnoni, G. (2003). Loan loss provisioning and economic slowdowns: Too much, too late? *Journal of Financial Intermediation, 12*(2), 178-197. https://doi.org/10.1016/S1042-9573(03)00016-0

26. Lassoued, N., Ben Rejeb Attia, M., & Sassi, H. (2017). Earnings management and ownership structure in an emerging market: Evidence from the banking industry. *Managerial Finance, 43*(10), 1117-1136. https://doi.org/10.1108/MF-11-2015-0312

27. Lee, T. H., & Chih, S. H. (2013). Does financial regulation affect the profit efficiency and risk of banks? Evidence from China's commercial banks. *North American Journal of Economics and Finance, 26*, 705-724. https://doi.org/10.1016/j.najef.2013.05.005

28. Leventis, S., Dimitropoulos, P. E., & Anandarajan, A. (2011). Loan loss provisions, earnings management, and capital management under IFRS: The case of EU commercial banks. *Journal of Financial Services Research, 40*(1), 103-122. https://doi.org/10.1007/s10693-010-0096-1

29. Lobo, G. J. (2017). Accounting research in banking: A review. *China Journal of Accounting Research, 10*(1), 1-7. https://doi.org/10.1016/j.cjar.2016.09.003

30. Majumder, M. T. H., & Li, X. (2018). Bank risk and performance in an emerging market setting: The case of Bangladesh. *Journal of Economics, Finance and Administrative Science, 23*(46), 199-229. https://doi.org/10.1108/JEFAS-07-2017-0084

31. Muliati, M., Mayapada, A. G., Parwati, N. M. S., Ridwan, R., & Salmita, D. (2021). Does audit matter in the earnings quality of Indonesia Banks? *Journal of Asian Finance, Economics, and Business, 8*(2), 143-150. https://doi.org/10.13106/jafeb.2021.vol8.no2.0143

32. Novotny-Farkas, Z. (2016). The interaction of the IFRS 9 expected loss approach with supervisory rules and implications for financial stability. *Accounting in Europe, 13*(2), 197-227. https://doi.org/10.1080/17449480.2016.1210180

33. Ozili, P. K. (2015). Loan loss provisioning, income smoothing, signaling, capital management, and procyclicality: Does IFRS matter? Empirical evidence from Nigeria. *Mediterranean Journal of Social Sciences, 6*(2), 224-232. https://doi.org/10.5901/mjss.2015.v6n2p224

34. Ozili, P. K. (2017). Bank earnings smoothing, audit quality and procyclicality in Africa: The case of loan loss provisions. *Review of Accounting and Finance, 16*(2), 142-161. https://doi.org/10.1108/RAF-12-2015-0188

35. Ozili, P. K., & Outa, E. (2017). Bank loan loss provisions research: A review. *Borsa Istanbul Review, 17*(3), 144-163. https://doi.org/10.1016/j.bir.2017.05.001

36. PricewaterhouseCoopers (PwC). (2016). *A look at current financial reporting issues*. Retrieved from https://www.pwc.com/gx/en/audit-services/ifrs/publications/ifrs-9/ifrs-9-in-depth-basel-committee-guidance.pdf

37. Rasa, R. (2021). The effects of credit risk on the profitability of commercial banks in Afghanistan. *Journal of Asian Finance, Economics, and Business, 8*(7), 477-489. https://doi.org/10.13106/jafeb.2021.vol8.no7.0477

38. Saunders, A., Strock, E., & Travlos, N. G. (1990). Ownership structure, deregulation, and bank risk-taking. *The Journal of Finance, 45*(2), 643-654. https://doi.org/10.1111/j.1540-6261.1990.tb03709.x

39. Shehzad, C. T., & De Haan, J. (2013). Was the 2007 crisis really a global banking crisis? *North American Journal of Economics and Finance, 24*(1), 113-124. https://doi.org/10.1016/j.najef.2012.04.002

40. Shrieves, R. E., & Dahl, D. (2003). Discretionary accounting and the behavior of Japanese banks under financial duress. *Journal of Banking and Finance, 27*(7), 1219-1243. https://doi.org/10.1016/S0378-4266(02)00252-2

41. The International Accounting Standards Board (IASB). (2018). *IASB publishes a revised conceptual framework for financial reporting*. Retrieved from https://www.iasplus.com/en/news/2018/03/cf

42. Zhang, J., Jiang, C., Qu, B., & Wang, P. (2013). Market concentration, risk-taking, and bank performance: Evidence from emerging economies. *International Review of Financial Analysis, 30*(71303255), 149-157. https://doi.org/10.1016/j.irfa.2013.07.016

http://dx.doi.org/10.21511/bbs.17(2).2022.03