The Effect of Bad Credit and Liquidity on Bank Performance in Indonesia

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Abstract

The objective of this research is to analyze the effect of bad credit and liquidity on bank performance with the mediation of capital adequacy. Data were provided by banking institutions listed on the Indonesia Stock Exchange from the period of 2011–2019. The analysis technique was PLS-SEM supported by an application named WarpPLS 6.0. The results of the research show that the effect of bad credit and liquidity on bank performance is not significant. A high level of bad credit is associated with a low level of bank performance. Bank earnings decline along with low profitability. This relationship is not significant because banks can still cover some proportions of bad credit through capital availability. Capital adequacy as an intervening variable has mediated partially the effect of bad credit and liquidity on bank performance. Besides, capital adequacy has a strong effect on credit distribution. Agency theory says that the owner of the fund (the savers of saving account, current account, deposit account) is called principal while the bank as the trusted institution to manage the fund is called an agent. If customers fulfill their duty, then bad credit never happens.

Keywords: NPL, ROA, Capital Adequacy, Agency Theory

JEL Classification Code: E51, G21, G30

1. Introduction

The banking system plays an important role in the modern economic world. The existence of a bank not only helps a state to advance its economic growth but bank also becomes a state-owned agency with a great effect on economic activity. Banks have control over a large part of the supply of money in circulation, and they can influence the nature and character of production in any country. A banking institution is an economic backbone for a nation because it functions as an intermediary between the capital owner (*fund supplier*) and capital user (*fund user*). According to Law No.10/1998, a bank is a business entity that collects funds from people to be processed as a loan and then distributes the loan to people in form of credit or other services to improve people's livelihood (Power et al., 2007).

Therefore, it is necessary to measure the banks' performance to determine their contribution to business development. Banks inevitably continue to attract significant attention from the public and scrutiny by financial regulators as there is a growing need to evaluate banks more efficiently. Not only supervising institutions, regulators, and bank management bodies but also clients of banks, are becoming increasingly concerned about the stability and sustainability of these financial institutions.

Better bank performance may attract potential customers to save their money with the bank and make financial transactions with the bank. Risk management in banking is theoretically defined as "the logical development and execution of a plan to deal with potential losses". Usually, the focus of the risk management practices in the banking industry is to manage an institution's exposure to losses or risk and to protect the value of its assets. When the environment surrounding the bank is changing, then the bank will encounter several risks such as credit risk, liquidity risk, exchange rate risk, and market risk. Only a bank with good risk management will survive successfully (Power et al., 2007).

Risks that banks must bear are closely related to the economic conditions and the business cycles. Disruption of banking and credit relationships engendered by bank failure may lead to broader economic effects of interest to

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policymakers, regulators, and other stakeholders. A failing bank may leave local depositors and creditors with losses, reducing spending as a result of a wealth effect. An economic boom is the expansion and peak phases of the business cycle. It is also known as an upswing, upturn, and a growth period. During a boom, key economic indicators will rise. Gross domestic product, which measures a nation's economic output, increases. The cause of a boom is an increase in consumer spending. As the economy improves, families become more confident. They are buoyed by better jobs, rising home prices, and a good return on their investments (Gizaw et al., 2015).

If the economy is in good condition, the bank's risk credit goes down. With respect to Law No.10/1998, credit supply level depends on third-party funds collected by the banking institution. In reality, not all funds collected from people can be distributed. Credit distribution may be hampered due to credit risk. Credit risk is a risk of default on a debt that may arise from a borrower failing to make required payments (Noman et al., 2015). In the first resort, the risk is that of the lender and includes lost principal and interest, disruption to cash flows, and increased collection costs. The loss may be complete or partial.

Besides third-party funds, there is another factor influencing credit supply, which is, banking capital adequacy. By virtue of the Bank of Indonesia's Decree No.3/21/PBI/2001 concerning minimum capital provisioning for the bank, it was declared that every bank must have a minimum capital level of 8% from its risk-weighted asset. This capital standing is proxied by CAR (*Capital Adequacy Ratio*). The availability of capital influences the number of credits that can be distributed whereas non-performing loans (NPLs) influence credit distribution. The level of NPL determines the level of credit risk. Precisely, if the NPL level is high, the credit risk level is also high. A non-performing loan (NPL) is a loan in which the borrower is in default and has not paid the monthly principal and interest repayments for a specified period. Non-performing loans occur when borrowers run out of money to make repayments or get into situations that make it difficult for them to continue making repayments towards the loan. Banks mainly make money from the interest they charge on loans, and when they are unable to collect the owed interest payments from NPLs, it means that they will have less money available to create new loans and pay operating costs. As the consequence, credit risk level may force the bank to bear high-interest rate risk, and interest rate risk is the most influencing risk that banks must bear (Atahau & Cronje, 2019).

The objective of this research is to analyze the effect of bad credit on bank performance with the mediation of capital adequacy. There is a research gap due to contradictive findings regarding this effect relationship. Some researchers (Gizaw et al., 2015; Isanzu, 2017) stated that bad credit has

a positive effect on bank performance. Other researches (Noman et al., 2015) indicate that bad credit has a negative effect on bank performance.

2. Literature Review

2.1. Basel

The Basel Accords are three series of banking regulations set by the BCBS. The accords are designed to ensure that financial institutions have enough capital on account to meet obligations and absorb unexpected losses. It was preceded by the establishment of the Basel Committee on Banking Supervision (BCBS) by the Governor of Central Banks of G-10 States in 1974. Later, the Basel Committee enacted the International Convergence of Capital Measurement and Capital Standards, or popularly called Basel I, which implemented by every bank in Indonesia since 1992. Basel I is the round of deliberations by central bankers from around the world, and in 1988, the Basel Committee on Banking Supervision (BCBS) in Basel, Switzerland, published a set of minimum capital requirements for banks. This is also known as the 1988 Basel Accord and was enforced by law in the Group of Ten (G-10) countries in 1992 (Gizaw et al., 2015). Basel I is a set of international banking regulations put forth by the BCBS that sets out the minimum capital requirements of financial institutions with the goal of minimizing credit risk (Noman et al., 2015). A new set of rules known as Basel II was later developed with the intent to supersede the Basel I accords. The Basel II Accord was published initially in June 2004 and was intended to amend international banking standards that controlled how much capital banks were required to hold to guard against the financial and operational risks banks face. These regulations aimed to ensure that the more significant the risk a bank is exposed to, the greater the amount of capital the bank needs to hold to safeguard its solvency and overall economic stability. The Basel I classification system groups a bank's assets into five risk categories, classified as percentages: 0% (cash, govt debt, OECD govt debt), 10% (, 20% (Development bank debt, OECD bank debt, OECD securities firm debt, non-OECD bank debt (under one year of maturity), non-OECD public sector debt and cash), 50% (residential mortgages), and 100% (private sector debt, non-OECD bank debt (maturity over a year), real estate, plant and equipment, and capital instruments issued at other banks) (Ratnovski, 2013). A bank's assets are placed into a category based on the nature of the debtor.

2.2. Financial Intermediation

The financial intermediation process channels funds between third parties with a surplus and those with a lack

of funds. A financial intermediary does not only act as an agent for other institutional units but places itself at risk by acquiring financial assets and incurring liabilities on its account (for example banks, insurance corporations, investments funds) (Diamond, 1984). The theory of financial intermediation is based on minimizing the cost of monitoring information which is useful for resolving incentive problems between borrowers and lenders. It presents a characterization of the costs of providing incentives for delegated monitoring by a financial intermediary. Diversification within an intermediary serves to reduce these costs, even in a risk-neutral economy (Diamond, 1984). In the environment assumed in the model, debt contracts with costly bankruptcy are shown to be optimal.

2.3. Bank's Risk Management

Risk management in banking is theoretically defined as "the logical development and execution of a plan to deal with potential losses". Usually, the focus of the risk management practices in the banking industry is to manage an institution's exposure to losses or risk and to protect the value of its assets (Tursoy, 2018). The banking industry has considered risk management as a necessary way to control the exposure on four risks, respectively credit risk, interest rate risk, foreign currency risk, and liquidity risk (Pyle, 1999). Bank's risk management is a process where a manager must do several activities, such as identifying the prominent risks; taking steps to ensure that operational risk is consistently understandable; selecting which risk and how the risk can be reduced; and determining the procedure to monitor risk position (Ratnovski, 2013).

2.4. Hypothesis

A bank with a high level of non-performing loans (NPLs) that exceeds the Bank of Indonesia's standard will easily find its profitability declining. A high level of NPL is associated with a low level of credit quality. This situation represents a high level of bad credit. A bank with great loss in its operational activity will suffer low earnings (Atahau & Cronje, 2019). Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. Banks need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. Banks need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization. Several studies have been conducted on the effect of bad credit on bank performance (Noman et al., 2015; Gizaw et al., 2015;

Isanzu, 2017). By taking into consideration the explanations above, the following hypothesis is proposed:

H1: Bad credit has a negative effect on bank performance.

The capability of the bank to provide adequate funds to fulfill all duties and commitments to customers in time of demand is called liquidity. The assessment of bank health level (*banking soundness*) is done using an approach called CAMEL (Capital adequacy, Asset quality, Management, Earnings, and Liquidity). In this context, the focus is given on liquidity, which is proxied by Loan-to-Deposit Ratio (LDR). If banks lend too much of their deposits, they might overextend themselves, particularly in an economic downturn. However, if banks lend too few of their deposits, they might have opportunity cost since their deposits would be sitting on their balance sheets earning no revenue. Banks with low LTD ratios might have lower interest income resulting in lower earnings. Empirical studies showed that LDR has a positive effect on Return on Asset (ROA) (Paleni et al., 2017; Zaineldeen, 2018). Relative to the explanations above, the following hypothesis is put forward:

H2: Liquidity has a positive effect on bank performance.

Credit risk is the possibility of a loss resulting from a borrower's failure to repay a loan or meet contractual obligations. Traditionally, it refers to the risk that a lender may not receive the owed principal and interest, which results in an interruption of cash flows and increased costs for collection. Credit risk dominates the composition of capital adequacy ratio (CAR) in which the 70% proportion of capital is allocated for credit risk while the remaining 30% of capital is allocated for market risk and operational risk. Therefore, credit risk is the main cause of bank failure and is the most visible risk to bank managers (Garr, 2013). In regard to the explanations above, the next hypothesis is written as follows:

H3: Bad credit has a negative effect on capital adequacy.

Liquidity is the ability of the bank to fulfill its short term obligation. A bank is said to liquid if it has the capability to serve several financial necessities such as settling the withdrawal from the current account, saving account, and deposit account; paying a bank loan within the due date; and fulfilling credit demand without delay (credit realization) (Schmaltz, 2009). Banks are often evaluated on their liquidity, or their ability to meet cash and collateral obligations without incurring substantial losses. In either case, liquidity management describes the effort of investors or managers to reduce liquidity risk exposure (Marozva, 2015;

Zaineldeen, 2018). Regarding the explanations above, the current research proposes a hypothesis as following:

H4: *Liquidity has a positive effect on capital adequacy.*

Bank capital is the difference between a bank's assets and its liabilities, and it represents the net worth of the bank or its equity value to investors. (Bhattacharya, 2013). Capital is a key ingredient for safe and sound banks and here is why. Banks take on risks and may suffer losses if the risks materialize. To stay safe and protect people's deposits, banks have to be able to absorb such losses and keep going in good times and bad. Adequate capital can increase public trust because it indicates that the bank can absorb the possible loss risk due to unfortunate banking operational activity. The most commonly used assessment of a bank's capital adequacy is the capital adequacy ratio (CAR). CAR is the ratio of a bank's capital in relation to its risk-weighted assets and current liabilities. It is decided by central banks and bank regulators to prevent commercial banks from taking excess leverage and becoming insolvent in the process. (Mayes & Stremmel, 2012; Owoputi et al., 2014; Jha & Hui, 2012). The current research uses CAR as the intervening or mediation variable in the effect of bad credit (NPL) on bank performance (ROA). In this case, CAR is a determinant factor to bank operational activity in collecting and distributing the fund.

H5: *Capital adequacy has a positive effect on bank performance.*

3. Methods

3.1. Type and Source of Data

The form of the data is financial statements (precisely annual reports) of banking institutions listed at the stock exchange. The data type is secondary data and the source of these data is the Indonesia stock exchange. Data-related files are downloaded from www.idx.co.id and Bloomberg. Data specification is panel data (pooled data), which is consolidated data comprising of time-series data and cross-section data. By using such data, then it is not surprising if the sample size of this research is big.

3.2. Operational Definition of Variable

3.2.1. Independent Variable

1. **Bad Credit**
Banks may suffer a loss of credit risk even before the credit becomes a default. In general, credit risk is defined as a potential loss of market-to-market value

after the bank distributes the credit. The change in the market price of a security and the change of credit rating are perceived as credit risk. Therefore, there is an overlap between credit risk and market risk. This risk also forces the lender to suffer loss after the borrower settles the final payment (Manab et al., 2015). A high level of bad credit (NPL) has a bad effect on the bank performance (ROA) and this position is written in a formula as follows:

$$NPL = \frac{Default\ Credit}{Total\ Credit} \times 100\%$$

2. **Liquidity**
A bank with an intermediary function is a bank that collects the saving fund and distributes it in form of credit in a balanced way. In the banking context, such a bank usually has a good loan-to-deposit ratio (LDR) (Alzorqan, 2014). The formula of LDR is written as follows:

$$LDR = \frac{Total\ Credit}{Third-Party\ Fund} \times 100\%$$

3.2.2. Dependent Variable

Return on Asset (ROA) is a ratio that measures how efficiently a company can manage its assets to produce profits (Maryam Piri, 2017). This ratio is formulated as following:

$$ROA = \frac{Pre-Tax\ Earnings}{Total\ Asset} \times 100\%$$

3.2.3. Mediation Variable

Capital Adequacy Ratio (CAR) is a ratio of capitalization that indicates the capability of the bank in providing funds for business development and to accommodate the risk of fund loss due to unfortunate bank operational activity (Khaled & Daas, 2017; Boadi et al., 2016).

$$CAR = \frac{Bank\ Capital}{Risk-Weighted\ Asset} \times 100\%$$

3.3. Data Analysis Technique

The data analysis technique of this research is Partial Least Squares (PLS)-Structural Equation Modeling (SEM).

This technique is carried out with a computer application named WarpPLS 6.0. The current research is predictive and also explorative. The use of PLS-SEM is decided based on two benefits. The first benefit is that PLS-SEM can work efficiently for small sample size and on a complex model. The second benefit is that the assumed data distribution with PLS-SEM is normal (Sholihin & Ratmono, 2013).

For testing Hypothesis 1 to 5, two equations are created as follows:

$$ROA = \alpha_1 + \beta_1 CARt + \beta_2 NPL + \beta_3 LDR + \varepsilon_1 \qquad (1)$$

$$CAR = \alpha_2 + \beta_4 NPL + \beta_5 LDR + \varepsilon_2 \qquad (2)$$

4. Results and Discussion

4.1. Model's Fit Test

Evaluation of Structural Model (Goodness-of-fit) as follows:

By virtue of the contents in the table above, it can be said that the research model is fit. This decision is supported by the AVIF value of 1.025 and the AFVIF value of 1.040, where both these values are less than 3.3. This result confirms that there is no multicollinearity problem across indicators and exogenous variables. The predictive capacity of the research model is shown by the goodness of fit (GoF) value of 0.391. This result signifies that the research model has quite a large predictive capacity because the value is larger than 0.36.

Table 1: Research Model's Fit Test

Provisions	Conclusion
Average path coefficient (APC) = 0.245, P = 0.007	FIT
Average R-squared (ARS) = 0.153, P = 0.0046	FIT
Average adjusted R-squared (AARS) = 0.121, P = 0.074	FIT
Average block VIF (AVIF) = 1.025, acceptable if <= 5, ideally <= 3.3	FIT
Average full collinearity VIF (AFVIF) = 1.040, acceptable if <= 5, ideally <= 3.3	FIT
Tenenhaus GoF (GoF) = 0.391, small >= 0.1, medium >= 0.25, large >= 0.36	FIT

4.2. Tests on Effect Size and Variance Factor (VIF)

Tests on Effect Size and VIF are conducted to seek an explanation of whether there is a vertical collinearity problem or not in the research model. Result of the tests shows that all variables of research have a strong effect and their VIF values are less than 3.3, which signify that there is no vertical collinearity problem.

4.3. Full Model Test

The first hypothesis stating that bad credit has a negative effect on bank performance was tested. The result shows that the coefficient value of this hypothesis is 0.252 and its p-value is 0.013. This result confirms that the first hypothesis is accepted but the relationship is not significant. The second hypothesis stating that liquidity has a positive effect on bank performance was tested. The result indicates that the coefficient value of this hypothesis is 0.0292 with a p-value of 0.005. This result confirms that the second hypothesis is accepted. Furthermore, the third hypothesis stating that bad credit has a negative effect on capital adequacy was also tested. The result of the test reveals that the coefficient value of this hypothesis is −0.199 with a p-value of 0.040. The results indicate that the third hypothesis is accepted. The fourth hypothesis stating that liquidity has a positive effect on capital adequacy was tested. The result of the test shows that the coefficient value of this hypothesis is −0.0298 and its p-value is 0.004. This result confirms that the fourth hypothesis is accepted but the relationship is not significant.

Table 2: Tests on Effect Size and Variance Factor (VIF)

Path Description	Effect Size	VIF
LDR → ROA	0.086	1.032
NPL → ROA	0.065	1.036
CAR → ROA	0.018	1.045
LDR → CAR	0.093	1.005
NPL → CAR	0.044	1.005

Table 3: Result of Path Coefficient and P-Value

Path Description	Path Coefficient	P-Value
LDR → ROA	0.292	0.005
NPL → ROA	0.252	0.013
CAR → ROA	0.181	0.056
LDR → CAR	−0.298	0.004
NPL → CAR	−0.199	0.040

Finally, the fifth hypothesis stating that capital adequacy has a positive effect on bank performance was tested. The result of the test indicates that the coefficient value of this hypothesis is 0.181 and its *p*-value is 0.056. This result confirms that the fifth hypothesis is accepted, which is, capital adequacy can act as an intervening variable in mediating the effect of bad credit on bank performance.

4.4. Test on Mediation Effect

A mediator variable is a variable that explains the relationship between a predictor variable and a criterion variable. Mediators tell us how or why something works. The mediator is considered an intervening variable that explains the relationship between a predictor variable and a criterion variable. The Baron and Kenny (1986) method is an analysis strategy for testing mediation hypotheses. In this mediation method, there are two paths to the dependent variable. The independent variable must predict the dependent variable, and the independent variable must predict the mediator. Mediation is tested through three regressions: independent variable predicting the dependent variable; independent variable predicting the mediator; independent variable and mediator predicting the dependent variable. The following conditions must be met in the results to support mediation: the independent variable is shown to significantly influence the dependent variable in the first regression equation;

independent variable is shown to significantly influence the mediator in the second regression equation; mediator must significantly influence the dependent variable in the third equation. Here, the independent variable and mediator are entered as predictors (Baron & Kenny, 1986).

Complete mediation is present when the independent variable no longer influences the dependent variable after the mediator has been controlled and all of the above conditions are met. Partial mediation occurs when the independent variable's influence on the dependent variable is reduced after the mediator is controlled. Partial mediation implies that there is not only a significant relationship between the mediator and the dependent variable but also some direct relationship between the independent and dependent variable. Partial mediation is that the independent variable can still influence the dependent variable directly without involving the mediation variable. In this case, the mediation variable will be involved because the independent variable can predict the dependent variable directly but its predictive value is smaller than the predictive value of the mediation variable (Baron & Kenny, 1986). In this context, if the coefficient value of the effect of the independent (predictor) variable on the dependent variable is greater than the coefficient value of the effect of the mediator variable on the dependent variable, then there is no mediation effect. The indirect effect relationship and the total effect relationship are tested to determine the coefficient value of the indirect relationship. The procedure of formulating and implementing a mediation test is done by referring to the procedure proposed by Baron and Kenny (1986).

As shown by the contents in the table above, after conducting the test on mediation hypothesis involving LDR → CAR → ROA, the coefficient value of the indirect effect is 0.054 with a *p*-value of 0.016 ($p < 10\%$). This result signifies that capital adequacy is mediating significantly the effect of liquidity on bank performance. The direct path of LDR → ROA is significant with a value of 0.005, which confirms that the mediation relationship can be tested. Another mediation relationship involves NPL → CAR → ROA. After testing this mediation hypothesis, it is found that the coefficient value is −0.036 and its *p*-value is 0.009. The result shows that there is partial mediation because non-performing loan (NPL) affects bank performance (ROA) through capital adequacy (CAR).
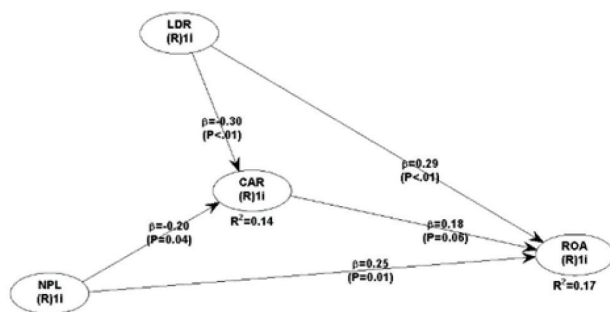

Figure 1: Full Scale of Research Model

Table 4: Indirect Effect and Total Effect

Indirect effect	Path coefficient	*P*-value
LDR → CAR → ROA	0.054	0.016
NPL → CAR → ROA	−0.036	0.009
Total effect	Path coefficient	*P*−value
LDR → CAR → ROA	−0.299	0.004
NPL → CAR → ROA	−0.199	0.040

4.5. Discussion

A hypothesis test was conducted on the first hypothesis stating that bad credit has a negative effect on bank performance. The result of the test shows that the coefficient value obtained was 0.252 whereas its *p*-value is 0.013. Hence, the first hypothesis is accepted but the relationship is not significant. The direction of this relationship is negative.

The effect of bad credit on bank performance is not significant because a high level of bad credit does not give a serious impact on the low level of bank performance. It is said so because the bank still has other fund sources to cover the NPLs. This finding is consistent with Serwadda (2018). A hypothesis test was also carried out on the second hypothesis which states that liquidity has a positive effect on bank performance. The result of the test indicates that the *p*-value of this hypothesis is 0.005, which confirms that the second hypothesis is accepted. This result is in line with the finding given by Zaineldeen (2018), which shows that there is a positive relationship between liquidity and bank performance. The direction of the effect of liquidity on bank performance is positive. This position conforms to commercial loan theory, shiftability theory, and the doctrine of anticipated income. All these theories stated that a bank with the capacity to implement intermediation function is a bank with the capability to collect saving funds and distribute this fund in a balanced way. This finding supports a tenet that liquidity plays an important role in bank performance. If liquidity is high, then the fund source owned by the bank has been used productively, and the productive use of this fund will increase bank profitability.

Furthermore, the hypothesis test was applied for the third hypothesis which states that bad credit has a negative effect on capital adequacy. The result of the test shows that the *p*-value of this hypothesis is 0.040, or precisely < 0.001, which signifies that the third hypothesis is accepted. This position corresponds with a finding that capital adequacy has a positive effect but partially on the bank performance (Margono et al., 2020).

Bank management bears primary responsibility for ensuring that the bank has adequate capital to support its risks. Banks must be able to demonstrate that chosen internal capital targets are well-founded and that these targets are consistent with their overall risk profile and current operating environment (Ezike & Oke, 2013). Good credit distribution can minimize the occurrence of defaults (Margono et al., 2020; Le & Diep, 2020; Le & Nguyen, 2020).

A hypothesis test was also done for the fourth hypothesis which states that capital adequacy has a positive effect on bank performance. It was found that good capital adequacy is associated with a large amount of capital reserve owned by the bank to cover asset depreciation. Bank management must ensure that bank must have adequate capital. Capital is a key ingredient for safe and sound banks and here is why. Banks take on risks and may suffer losses if the risks materialize. To stay safe and protect people's deposits, banks have to be able to absorb such losses and keep going in good times and bad. That's what bank capital is used for.

So far as it concerns, bad credit and liquidity are partially mediated by capital adequacy. Capital adequacy is a variable that mediates the effect of bad credit and liquidity on bank performance. If bad credit happens or the bank is not adequately liquid, then the bank management must find the best solution. Among the solutions that the bank management must consider is using the capital fund to cover customer default. The reasons for default varies but the most prominent reason is the increase in interest rate. This position is consistent with several studies including Safitri et al. (2020a, 2020b). In general, these studies found that a high level of bad credit is marked by a high level of customer default, which the consequence is the decrease in bank performance.

5. Conclusion

This research aims to conduct an empirical test on the effect of bad credit and liquidity on bank performance through capital adequacy. The research was conducted on banking institutions listed on the Indonesia Stock Exchange from 2011 to 2019. The results of this research show that bad credit and liquidity have direct and indirect effects on bank performance. Hypothesis 1 and Hypothesis 4 are accepted but the relationship of both is not significant. Hypothesis 2 and Hypothesis 3 are accepted and the relationship of both is significant. Hypothesis 5 is accepted with partial mediation of capital adequacy. Based on these findings, it is concluded that a high level of bad credit is related to a high level of potential loss suffered by the bank. On the other hand, bad credit and liquidity have a multiplier effect on the increase of bank performance. Bad credit and liquidity can interact with each other and this interaction improves bank performance.

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