# Capital Adequacy as Intervening Variable in The Effect of Bad Credit and Liquidity�

*by* Suyanto Suyanto

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# Capital Adequacy as Intervening Variable in The Effect of Bad Credit and Liquidity on Bank Performance in Indonesia

Suyanto[1]*

E-mail: suyanto.ipwija1993@gmail.com

Orcid ID: 0000-0003-1186-8828

School of Economics Science of IPWI Jakarta, Indonesia

## 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 at Indonesia Stock Exchange on period of 2011-2019. Analysis technique was PLS-SEM supported by an application named WarpPLS 6.0. Result of research shows that the effect of bad credit and liquidity on bank performance is not significant. High level of bad credit is associated with low level of bank performance. Bank earnings decline along with low profitability. This relationship is not significant because bank can still cover some proportions of bad credit through capital availability. Capital adequacy as intervening variable has mediated in partial way the effect of bad credit and liquidity on bank performance. In addition, capital adequacy has 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 bank as the trusted institution to manage the fund is called agent. If customers fulfill their duty, then bad credit never happens.

*Keywords*: NPL, ROA, Capital Adequacy, Agency Theory

## Introduction

Bank plays two important roles for any states in modern world. The existence of bank not only helps a state to advance its economic growth but bank also becomes a state-owned agency with great effect on economic activity. Banking institution is an economic backbone for a nation because it functions as intermediary between capital owner (*fund supplier*) and capital user (*fund user*). According to the Law No.10/1998, bank is a business entity that collects fund from people to be processed as a loan and then distributes the loan to people in form of credit or other services in order to improve people livelihood. Recalling to this fact, then the assessment of bank performance is surely influencing the pleasure and trust of potential customers. Better bank performance may attract potential customers to save their capital with the bank and make financial transaction with bank. Indeed, bank is a financial institution and it is not surprising to say that bank is a part of financial system. The function of bank as economic agent is always affected by macro economic factor, bank's internal factor, and bank specific factor. Risk management is basically the implementation of caution principle in bank management. When environment surrounding bank is changing, then bank will encounter several risks such as credit risk, liquidity risk, exchange rate risk, and market risk. Only bank with good risk management will survive successfully (Power et. al, 2007).

Risks that bank must bear are closely related with economic condition and business cycle. During economic setback (apathy), bad credit level is increasing whereas during economic booming, the volume of cash held by business people or households is increasing. This situation also makes purchase ability ascending, which then strengthens the ability to settle loan. If the economic is in good condition, bank's risk credit goes down. With respect to the Law No.10/1998, credit supply level depends on third-party fund collected by banking institution. In reality, not all funds collected from people can be distributed well. Credit distribution may be hampered by repayment failure from borrower to the bank, which the consequence is bad credit. Besides third-party fund, there is another factor influencing credit supply, which is, banking capital adequacy. By virtue of 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 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 credit that can be distributed whereas *non performing loan* (NPL) influences credit distribution. The level of NPL determines the level of risk credit. Precisely, if NPL level is high, credit risk level is also high. As the consequence, credit risk level may force bank to bear high interest rate risk, and interest rate risk is the most influencing risk that bank must bear (Antasov, 2016).

*Non performing loan* is a ratio used to measure bad credit level of a bank. If NPL is in high percentage, then bank management must consider it as a problem. High level of NPL can put bank health in danger because credit provided by bank may risk of repayment failure by debtor. Bank of Indonesia allows NPL level to be maximally 5%. High NPL level signifies that bank is not professional in managing its credit that later implicates to bank loss.

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 researches (Gizaw et al., 2015; Isanzu, 2017) said that bad credit has positive effect on bank performance. Other researches (Noman et al., 2015; Poudel, 2018; Tangngisalu et al., 2020) indicate that bad credit has negative effect on bank performance.

**Literature Review**

**Basel**

Basel Accords refer to a set of rules designed to maintain banking industry at a certain state to ensure that bank will be running well and properly managed. It was preceded by the establishment of Basel Committee on Banking Supervision (BCBS) by the Governor of Central Banks of G-10 States in 1974. Later, the Basel Committee enacted International Convergence of Capital Measurement and Capital Standards, or popularly called as Basel I, which is then implemented by every bank in Indonesia since 1992. Basel I provided a red-line connecting business risk and capital reserve owned by the bank to anticipate that risk. Basel I was a term referring to a set of policies made by worldwide central banks. The Basel Committee authenticated the name of Basel I on 1988 in Basel, Swiss. Basel I contained explanations regarding minimum limit of bank capitalization. Due to its authentication year, Basel I was also called as Basel Accord 1988 and this Accord was enacted to become law by G-10 States on 1992. However, Basel I was replaced by more comprehensive platform called Basel II, which so far has been applied by several countries in the world.

Basel I only focused on anticipating credit risk that bank must bear in case of business failure. In many financial and banking systems, many banks are failed or bankrupted because of market risk, operational risk and other risks. Due to its main focus upon credit risk, Basel I classified bank asset into five categories by credit risk. These categories are respectively zero percent risk, ten percent risk, twenty percent risk, fifty percent risk, and one hundred percent risk. The case of zero percent risk can be found in state debt house, while one hundred percent risk can be seen in case when bank takes debt using all its assets as collateral. International banks must have capital level at 8% of their risk-weighted assets.

Related with Basel II, there are three pillars supporting its standing. First pillar is the fulfillment of regulatory capital (*capital adequacy requirement*) to cover three main risks that bank must bear, respectively credit risk, market risk and operational risk. Other risks are considered trivial and not necessarily to be concerned. Credit risk is measured from two approaches that each other has different complexity. These approaches are standardized approach and internal rating-based approach (IRB). The latter approach consists of two approaches, respectively Foundation IRB and Advanced IRB. Operational risk is counted with three approaches, namely basic indicator approach (BIA), standardized approach (STA), and advanced measurement approach (AMA). Second pillar talks about the conduct of supervision (*supervisory review*) on the implementation of first pillar. This pillar provides framework to deal with other risks that bank may possibly bear such as systemic risk, retirement risk, concentration risk, strategic risk, reputation risk, liquidity risk, and legal risk. Third pillar emphasizes on the importance of enforcing bank disclosure. This pillar is designed to provide better description to market player about risk position of the bank (*market discipline*). Therefore, it is like giving opportunity to the entity that has a deal with bank to set price and cope with risk in proper manner.

**Agency Theory**

Agency theory perceived agency situation as a contract between owner (principal) and manager (agent) (Michael et al., 1976). A contract must accommodate the interests of owner and manager, and this becomes a problem that agency theory wants to deal with. Pertinent to the Law No.10/1998, bank is a business entity that collects fund from people or third-party in the form of saving account, current account, and deposit account, or the equivalent, and then distribute the fund to people in the form of credit, financing and the equivalent in order to improve the participation of people in economic activity.

Principally, there are two business models that represent banking institutions. First model is considering bank as an institution collecting fund from people. Fund collecting activity is called *funding*. In agency theory, the owner of the fund (the savers of saving account, current account, deposit account) is called principal while bank as the trusted institution to manage the fund is called agent. Second model is the activity for distributing fund from third-party (community fund). In agency theory, this model put bank as an entity that trusts third-party fund to the selected customer. In such arrangement, bank acts as credit provider, which makes bank become creditor, or in this theory, called as principal. The entity that uses third-party fund as a debt is called debitor or in this theory, called as agent. The example of agency relationship involving creditor and debitor is on issues concerning with receivable and payable.

### Financial Intermediation

Financial intermediation is a key to understand the benefit of position that gives authority to supervise over any financial functions and the savers are never in such position (Diamond, Douglas W, 1984). Financial intermediation enables the entities in transaction to produce the best contract and the highest allocation. Enabling financial transaction is the most important role played by financial intermediation. In general, saving-loan activity with high leverage can decrease the possibility of default (payment failure). Financial model that delegates supervision and diversification of saving-loan activity may keep default lower. Financial intermediation theory on moral hazard was developed by Diamond (1984). This theory says that bank acts as monitoring delegate and this position can reduce monitoring cost that must be paid by customer (investor) in supervising borrower (debitor). This mechanism makes the process more efficient and such efficiency enables borrower to minimize their production cost. Capital provider (fund owner) delegates bank to monitor borrower. Bank will examine all activities of debitor in present days and its prospect in the future to protect the interests of stockholder and deposit owner.

### Bank's Risk Management

Theoretically, risk management in banking institutions is defined as the construction of logics and the implementation of plans to deal with potential loss. Practical focus of risk management in banking industry is to manage institutional exposure on loss or risk and also to protect asset value (Tursoy, 2018). 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 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 increased; and determining the procedure to monitor risk position (Ratnovski, 2013).

### Risk Management Theory

Risk management in a bank operation involves identification, measurement and assessment of risks. The purpose of risk management is to minimize the negative effect of risks on bank's financial outcome and capitalization. Bank is required to estalish a special organization unit to implement risk management. As a financial intermediary institution that receives people fund and distributes fund in form of credit, then bank must apply the principle of caution in doing its operational activity in order to be trusted by the people (*prudential banking activity*). Credit risk is a risk where customer or debitor fails to fulfill their financial obligation as stated in the contract or predetermined agreement. This definition is enhanced to more extensive scope, which the result is that credit risk is risk that occurs because credit quality is decreasing (Boffey and Robson, 1995). According to Boffey and Robson (1995), main reason why credit risk should be properly managed is because bank has limited capacity to absorb loan loss. The capacity of the bank to absorb loan loss is built from two sources. First source is the income received from good performing loan while second source is bank capital. Income from good performing loan is usually simple (not much).

### Hypothesis

Bank with high level of non performing loan that exceeds Bank of Indonesia's standard will easily find its profitability declined. High level of non performing loan is associated with low

level of credit quality. This situation represents high level of bad credit. Bank with great loss in its operational activity will suffer low earnings (Atahau and Cronje, 2019).

Bank may still experience loss although there is no default case. The reason of this loss is uncontrolled credit risk. With respect to this situation, credit risk is defined as a potential loss of market-to-market value after credit distribution by the bank. Several researches 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 of the explanations above, the following hypothesis is proposed:

H1: Bad credit has negative effect on bank performance.

The capability of the bank to provide adequate fund to fulfill all duties and commitments to the customer 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) (Bank of Indonesia, 2004). Bank with low LDR has relatively low quantity of credit distribution, which as the consequence, income from credit's interest rate is also relatively low. Bank with high LDR has relatively high opportunity to get income from credit's interest rate. Money that represents income is usually in the form of security (Eichengreen and Gibson, 2001). If bank lends large amount of money, then bank profitability increases. Empirical studies showed that LDR has positive effect on Return on Asset (ROA) (Paleni et al., 2017; Zainelden, 2018). Relative to the explanations above, the following hypothesis is put forward:

H2: Liquidity has positive effect on bank performance.

Credit risk is a risk that the promised cash flow from loan income and other securities owned by financial institutions is not entirely paid. Credit risk dominates the composition of capital adequacy ratio in which the 70% proportion of capital are allocated for credit risk while the remaining 30% of capital are allocated for market risk and operational risk. Therefore, credit risk is main cause of bank failure and becoming the most visible risk to bank manager (Garr, 2013). In regard of the explanations above, next hypothesis is written as following:

H3: Bad credit has negative effect on capital adequacy.

Liquidity is the ability of the bank to fulfill its short term obligation. A bank is said as liquid if it has capability to serve several financial necessities such as settling the withdrawal from current account, saving account, and deposit account; paying bank loan that has been due date; and fulfilling credit demand without delay (credit realization) (Schmaltz, 2009). Liquidity management refers to an activity to make continuous estimation of bank's cash necessity at immediate term, short term and long term. Liquidity has been examined by several researches (Marozva, 2015; Zaineldeen, 2018). Regarding to the explanations above, the current research proposes a hypothesis as following:

H4: Liquidity has positive effect on capital adequacy.

Capital adequacy is a policy or regulation of a company, including banking institution, to manage its capital. Capital is the fund invested by the owner for establishing business entity, which is a bank in this context, for financing business activity, which is banking activity in this

context, and for complying with regulation made by monetary authority (Hrishikes Bhattacharya, 2013). Adequate capital can increase public trust because it indicates that bank can absorb the possible loss risk due to unfortunate banking operational activity. Capital adequacy implicates to the increase of profitability achieved by the bank through credit loan's interest rate. Capital Adequacy Ratio (CAR) is an indicator used to measure capital adequacy level of a bank. This ratio is obtained by making comparison between self-owned capital and risk-based weighted asset (Mayes and Stremmel, 2012; Owoputi et al., 2014; and Jha and Hui, 2012). The current research uses CAR as 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 positive effect on bank performance.

## Method of Research

### Type and Source of Data

The object of research is banking institutions listed at Indonesia Stock Exchange on period of 2011-2019. The form of the data is financial statements (precisely annual reports) of banking institutions listed at the stock exchange. Data type is secondary data and the source of these data is Indonesia stock exchange. Data-related files are downloaded from www.idx.co.id and Bloomberg. Data specification is panel data (pooled data), which is actually consolidate data comprising of time-series data and cross-section data. By using such data, then it is not surprising if sample size of this research is big.

Research population is banking institutions listed at Indonesia Stock Exchange on period of 2011-2019. Sampling technique is purposive sampling. This technique takes sample with certain purpose or criterion. In this research, two criteria are involved:

1. Banking institutions have listed at Indonesia Stock Exchange and published their financial statements on period of 2011-2019.
2. Banking institutions have complete data regarding variables of this research.

### Data Collection Method

Data collection method uses documentation technique that involves data collection from documents. The data of this research are financial statements (annual reports) of banking institutions, especially banks that are indicated on Indonesia Capital Market Directory (ICMD), listed at Indonesia Stock Exchange, and registered with Financial Service Authority (FSA).

### Operational Definition of Variable

Research model is simultaneous in nature. According to Ferdinand (2014), a simultaneous model contains more than one dependent and independent variables. Normally, dependent variable is explained by independent variable. But, in such research model, dependent variable also acts as independent variable in other relationship. Three variables are examined in this research, respectively independent variable, dependent variable, and mediation variable. Two independent variables are involved in this research, namely bad credit and liquidity. Only one dependent variable is examined in this research, namely bank performance. Mediation variable is referred to capital adequacy.

**Independent Variable**

1. Bad Credit

   Bank may suffer loss of credit risk even before the credit becomes default. In general, credit risk is defined as a potential loss of market-to-market value after bank distributes the credit. The change in market price of security and the change of credit rating are perceived as credit risk. Therefore, there is an overlap between credit risk and market risk. Credit risk may take several forms. One of these forms is sovereign risk (power risk) that emerges when a state (country) implements supervisory measure on its foreign exchange (or called as *foreign exchange control*) but in the other side, the other party becomes difficult to fulfill its obligation. Sovereign risk differs from default risk because sovereign risk is country risk whereas default risk is corporate risk. Other form of credit risk is settlement risk, which emerges when two payments in foreign currency are made in the same day. This risk also forces the lender to suffer loss after the borrower settles the final payment (Manab et al., 2015). High level of bad credit (NPL) has bad effect on bank performance (ROA) and this position is written in a formula as following:

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

2. Liquidity

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

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

**Dependent Variable**

Return on Asset (ROA) is a ratio that measures the capability of then bank in getting earnings from its asset possession (Maryam Piri, 2017). This ratio is formulated as following:

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

**Mediation Variable**

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

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

## Data Analysis Technique

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 in nature. The use of PLS-SEM is decided based on two benefits. First benefit is that PLS-SEM can still work efficiently in small sample size and on complex model. Second benefit is that the assumed data distribution at PLS-SEM is relatively loose than other techniques such as CB (Covariance-based)-SEM (Sholihin and Ratmono, 2013).

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

$$ROA = \alpha1 + \beta_1 CARt + \beta_2 NPL + \beta_3 LDR + \epsilon_1 \qquad (1)$$

$$CAR = \alpha2 + \beta_4 NPL + \beta_5 LDR + \epsilon_2 \qquad (2)$$

## Result and Discussion

### Model's Fit Test

Evaluation of Structural Model (Goodness-of-fit)

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 |

Source: Data processing with WarpPLS 6.0

By virtue of the contents in the table above, it can be said that research model is fit. This decision is supported by AVIF value of 1.025 and AFVIF value of 1.040, which all these values are less than 3.3. This result confirms that there is no multicollinearity problem across indicators and across exogenous variables. Predictive capacity of research model is shown by GoF value of

0.391. This result signifies that research model has quite large predictive capacity because the value is larger than 0.36.

**Tests on Full Colinnearity VIF, Adjusted R Squared and R Squared**

Table 2. Test on Full Colinnearity (VIF), Adjusted R Squared and R Squared

|  | ROA | LDR | NPL | CAR |
| --- | --- | --- | --- | --- |
| Full collinearity | 1.071 | 1.019 | 1.054 | 1.016 |
| R-Squared | 0.168 |  |  | 0.137 |
| Adj R Squared | 0.131 |  |  | 0.111 |

Source: Data processing with WarpPLS 6.0

Based on the contents of the table above, it can be asserted that research constructs are in very good category because the rule of thumb for <3.3 is fulfilled. This situation indicates that research model is free from problems of vertical collinearity, lateral collinearity, and common method bias.

**Tests on Effect Size and Variance Factor (VIF)**

Table 3. 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 |

Source: Data processing with WarpPLS 6.0

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

**Full Model Test**

Table 4. 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 |

Source: Data processing with WarpPLS 6.0

First hypothesis stating that bad credit has negative effect on bank performance was tested. The result shows that coefficient value of this hypothesis is 0.252 and its p-value is 0.013. This result signifies that first hypothesis is accepted but the relationship is not significant. Second hypothesis stating that liquidity has positive effect on bank performance was tested. The result indicates that coefficient value of this hypothesis is 0.0292 with p-value of 0.005. This result confirms that second hypothesis is accepted. Furthermore, third hypothesis stating that bad credit has negative effect on capital adequacy was also tested. Result of the test reveals that coefficient value of this hypothesis is -0.199 with p-value 0.040. In accordance with this result, third hypothesis is accepted. Fourth hypothesis stating that liquidity has positive effect on capital adequacy was tested. Result of the test shows that coefficient value of this hypothesis is -0.0298 and its p-value is 0.004. Based on this result, fourth hypothesis is accepted but the relationship is not significant. Finally, hypothesis test was also conducted on fifth hypothesis stating that capital adequacy has positive effect on bank performance. Result of the test indicates that coefficient value of this hypothesis is 0.181 and its p-value is 0.056. By virtue of this result, it can be said that this hypothesis is accepted, which is, capital adequacy can act as intervening variable in mediating the effect of bad credit on bank performance.
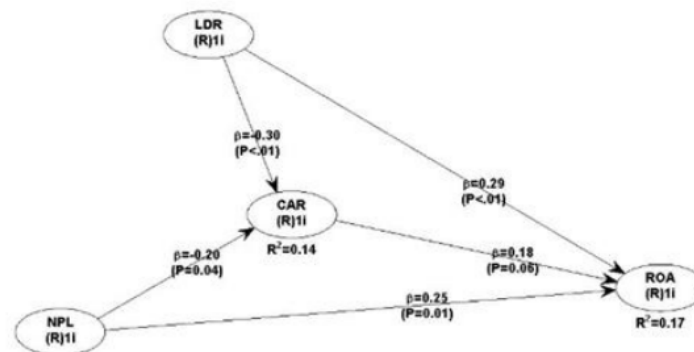


Figure 1. Full Scale of Research Model

**Test on Mediation Effect**

Baron and Kenny (1986) said that analysis model can use mediation variable to ensure whether there is full mediation or partial mediation in the model. Full mediation is a situation when independent variable does not have significant effect on dependent variable because there is no mediation involved. Partial mediation is that independent variable can still influence dependent variable directly without involving mediation variable. In this case, mediation variable will be involved because independent variable can predict dependent variable directly but its predictive value is smaller than the predictive value of mediation variable. In this context, if the coefficient value of the effect of independent (predictor) variable on dependent variable is greater than the

coefficient value of the effect of mediator variable on dependent variable, then there is no mediation effect. Indirect effect relationship and total effect relationship are tested to determine the coefficient value of the indirect relationship. The procedure of formulating and implementing mediation test is referring to the procedure proposed by Baron and Kenny (1986).

Table 5. 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 |

Source: Data processing with WarpPLS 6.0

As shown by the contents in the table above, after conducting test on mediation hypothesis involving LDR → CAR → ROA, the coefficient value of the indirect effect is 0.054 with p-value of 0.016 (p<10%). This result signifies that capital adequacy is mediating significantly the effect of liquidity on bank performance. Direct path of LDR → ROA has been found to be significant with value of 0.005, which confirms that mediation relationship can be tested. Other 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).

**Discusssion**

Table 6. Result of Hypothesis Test

| No | Result of Hypothesis Test | P-Value | Description |
|---|---|---|---|
| 1 | Bad credit has negative effect on bank performance | 0.013 | Accepted but not significant |
| 2 | Liquidity has positive effect on bank performance | 0.005 | Accepted |
| 3 | Bad credit has negative effect on capital adequacy | 0.040 | Accepted |
| 4 | Liquidity has positive effect on capital adequacy | 0.004 | Accepted but not significant |

| 5 | Capital adequacy has positive effect on bank performance | 0.056 | Accepted |
|---|---|---|---|

Source: Data processing with WarpPLS 6.0

Hypothesis test was conducted on first hypothesis stating that bad credit has negative effect on bank performance. Result of the test shows that the coefficient value of this hypothesis is obtained at 0.252 whereas its p-value is 0.013. Regarding to this result, first hypothesis is accepted but the relationship is not significant. The direction of this relationship is negative. Descriptively, it can be said that credit payment is still problematic and it is rather difficult for creditor to get outcome. However, the effect of bad credit on bank performance is not significant because high level of bad credit does not give serious impact on low level of bank performance. It is said so because bank still have other fund sources to cover the non performing loan. This finding is consistent to Serwadda (2018).

Hypothesis test was also carried out on second hypothesis stating that liquidity has positive effect on bank performance. Result of the test indicates that the p-value of this hypothesis is 0.005, which confirms that second hypothesis is accepted. This result is in line with the finding given by Ahmad (2016), which shows that there is positive relationship between liquidity and bank performance. The direction of the effect of liquidity on bank performance is positive. This position is in conformity to commercial loan theory, shiftability theory, and the doctrine of anticipated income. All these theories generally said that a bank with capacity to implement intermediation function is a bank with capability to collect saving fund and distribute this fund in a balancing way. This finding supports a tenet that liquidity plays important role to bank performance. If liquidity is high, then fund source owned by the bank has been used productively, and the productive use of this fund will increase bank profitability.

Furthermore, hypothesis test was applied at third hypothesis stating that bad credit has negative effect on capital adequacy. Result of the test shows that the p-value of this hypothesis is 0.040, or precisely <0.001, which signifies that third hypothesis is accepted. This position corresponds with a finding that capital adequacy has positive effect but in partial way on bank performance (Margono et al., 2020). Bank management has responsibility to ensure that bank capitalization is always adequate to cover bank operational. At least, bank must have capability to plan its capital demand to support its financial service (Ezike et al., 2013). Hypothesis test was also implemented on fourth hypothesis stating that capital adequacy has positive effect on bank performance. It was found that good capital adequacy is associated with large amount of capital reserve owned by the bank to cover asset depreciation. Bank management must ensure that bank must have adequate capital. It can be said that bank is not only fulfilling banking regulation but also important to have capital adequacy.

So far as it concerns, bad credit and liquidity are mediated by capital adequacy in partial way. Capital adequacy is a variable that mediates the effect of bad credit and liquidity on bank performance. If bad credit happens or bank fails to be liquid, then bank management will find the best solution. Among the solutions is using capital fund to cover customer default. The reason of default is varying but the most prominent reason is the increase of interest rate. This position is in accord with several studies including Safitri, Kadarningsih, et al. (2020), Wahyudi et al. (2020), and Safitri, Taolin, et al. (2020). In general, these studies found that high level of bad

credit is marked by high level of customer default, which the consequence is the decrease of bank performance.

**Conclusion**

This research is aimed to conduct empirical test on the effect of bad credit and liquidity on bank performance through capital adequacy. Research was conducted on banking institutions that list at Indonesia Stock Exchange on period of 2011-2019. Result of this research shows that bad credit and liquidity have direct and indirect effect 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 high level of bad credit is related with high level of potential loss suffered by the bank. In the other hand, bad credit and liquidity have multiplier effect on the increase of bank performance. Bad credit and liquidity can interact each other and this interaction improves bank performance. Agency theory says that the owner of the fund (the savers of saving account, current account, deposit account) is called principal while bank as the trusted institution to manage the fund is called agent. If customers fulfill their duty, then bad credit never happens.

**Managerial implication**

Credit risk is a risk where customer/debitor or the counterpart cannot fulfill their financial obligation as stated in the contract or predetermined agreement. According to Boffey and Robson (1995), credit risk is a risk emerged because credit quality is decreasing. Manager plays a role as a factor that stabilizes bank performance. Credit trustworthiness of potential customer is determined through three measures, respectively 5C (*character, capacity, capital, collateral, condition of economic*), 5P (*party, purpose, prospect, payment, protection*) and 3R (*return, repayment, risk*). Therefore, manager should have information regarding potential customer before the customer applies for credit. Principle of caution must be used to determine credit trustworthiness of the customer.

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# Capital Adequacy as Intervening Variable in The Effect of Bad Credit and Liquidity�