

# The Relationship between Bank’s Credit Risk, Liquidity, and Capital Adequacy towards its Profitability in Indonesia

Rifqah Amaliah S, Hafinaz Hasniyanti Hassan

**Abstract:** The purpose of this research is to analyze the relationship between bank’s credit risk, liquidity, and capital adequacy towards its profitability in Indonesia. The main indicators used in this research are Net Interest Margin, Return on Asset, Non-Performing Loan Ratio, Loan to Deposit Ratio, and Capital Adequacy Ratio. This research uses the data from publicly annual report of four state-owned banks in Indonesia during 10 years period (2007 to 2016). The data analysis is conducted by finding the significant relation and the degree to which the relation exists among variables. The result of the research shows that there is a significant relationship between dependent variable (NIM, ROA) and overall independent variables (NPLR, LDR, CAR) yet in a negative correlation.

**Keywords:** profitability, credit risk, liquidity, and capital adequacy.

## I. INTRODUCTION

Indonesia is known as the emerging economic country and is one of the biggest economy in Southeast Asia. It has a great potential arises from the rising in manufacturing industry in the market. The recent updates of Indonesia’s credit ratings from S&P 500, Fitch ratings, and Moody’s added on to the international recognition of Indonesia. The reason being is because the low government debt, prudent fiscal management and its resilient economic growth are contributed to the economic upgrades (Indonesia Investment, 2018). However, back to 2016, Indonesia’s banking sector faced an economic slowdown due to the inability of the customers to pay their loans. It is indicated by the increasing in bad loans to 3.2% in 2017 (Wisnubroto, 2017). Pervin, Banna, Noman, and Chowdhury (2015) illustrates the role of the bank as the blood arteries in human body because bank is the main source of the economic and financial for any country. Banks are crucial to the economic growth since most of the economies in the world are influenced by banking system (Mendoza & Rivera, 2017). Most of the bank’s profit comes from the advanced loans to support the ones who are in need of financial assistance, in which can boost the economic growth of the country.

Loans that the individuals or institutions obtain from the bank, are able to assist them in either starting or improving their business, in which by expanding their business, they are able to achieve their goals. The quality of loan that banks offer to their customers is the indicator to determine the health and the soundness of the bank itself, since credit provision is the main product of the bank, the poor loan quality will subject them to bank insolvency.

Banking is the business of taking and managing the risk instead of avoid it (Mendoza & Rivera, 2017). In doing their business activities, banks are exposed to several risks, such as credit risk, c, operational risk, interest rate risk, regulatory risk, business risk, reputation risk, insolvency risk, and foreign exchange risk. However, among those risks faced by the banks, credit risk is considered the most crucial risk as huge amount of bank’s profit comes from credit as a result of interest charged on credit (Almekhlafi, et al., 2016). Credit risk is a risk resulted from the inability of the customers to pay back their credit or the money that they owed to the bank on time and in a full amount (Yimka, et al., 2015). The Basel Committee on Banking Supervision underlined the major causes that lead to credit risk is the lenient on credit standard for the borrowers. Where default on loans is not only a drawback for the bank and the borrower itself but as well as the whole economy of the country (Mendoza & Rivera, 2017). In 2015, credit risk ranked as the 4<sup>th</sup> pressing concern and liquidity risk ranked as the 10<sup>th</sup> pressing concern in Asia Pacific (Khushrushahi, 2016). Banks in Asia Pacific are concerned about the losses that incurred due to the sovereign borrowers, consumers, and business. However, credit risk has moved up to the second place, and liquidity risk has significantly moved up at 4<sup>th</sup> place as the most pressing concern in Asia Pacific in 2017, as it is shown in the table 1 below:

	Rank 2017	Rank 2015
Macro-economic	1	1
Credit risk	2	4
Regulation	3	9
Liquidity risk	4	10
Interest rates	5	3
Technology	6	7
Currency	7	2
Human Resources	8	12
Risk pricing	9	14
Risk management	10	11
Business model	11	13
FinTech disruption	12	-
Capital availability	13	15
Political interference	14	8
Conduct practices	15	5
Corporate Governance	16	16
Economic Crime	17	6

**Table 1: List of the Most Pressing Concern in Asia Pacific. Source: Wake & Wibisama (2017)**

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Ting, Qun, Yee, Wei, Cheng (2015) stated that credit risk will also reduce the bank's reputation and result in liquidity problem. The bank's reputation will be affected since the confidence level of the customer decreases which will cause them to withdraw a huge amount of money and make the banks become illiquid.

In 2016, banking sector in Indonesia faces a challenging period due to the slowdown of economic growth (Wirayani, 2017). This economic slowdown reduced the customers' ability to pay their loan, results in bad loans and business slowdown. In October 2016, the loan growth decreased to 7.4% from 10.4% in December 2015 and in contrast, the non-performing loan increased to 3.2% which result in higher provisioning expenses in 2016 compared to the previous year (Wisnubroto, 2017).

Business News (2017) reveals that Indonesia's biggest assets bank, Mandiri Bank, has more than double provision from previous year. At the end of 2016, its provision was at 24.6 trillion rupiah or RM8.2 billion, while its gross non-performing loan (NPL) was at 4% of the total loans. Therefore, by this year, Kartika Wirjoatmodjo, CEO of Mandiri Bank expects to cut off their provisions for bad loans to 16 trillion - 18 trillion rupiah (RM5.3 billion to RM6.0 billion) and reduce its NPL to 3% of the total loans.

From the macro perspective, US Federal Reserve Fund has increased its Fed Fund Rate by 25 basis points (bps), it is between 0.5% to 0.75% on December 2015 (Wisnubroto, 2017). Therefore, there is a risk of tightening liquidity in the domestic financial sector because of the possibility of an outflow of foreign investor from the stock and bond market. The uncertainty from US economic policies also will have a significant impact on the global economy recovery, moreover the higher interest rate trend in 2017 will affect the fluctuation of the currency and the exchange rate. Responding to the increasing in US interest rate, some banks in Indonesia has increased its deposit rate with the expectation to increase the lending rate to maintain their interest margin.

However, Indonesia's banking industry is expecting an improvement in profitability in 2017 as the state-owned banks in Indonesia is seemed to be bullish on loan growth compare to Syariah and foreign banks, according to the estimation of Bank of Indonesia. The researcher believes that the state-owned banks tends to have stronger influence and dominate the market in the banking industry, they have stronger power to improve the level of financial inclusion and loan growth in Indonesia as they have more networks and access to the customers (Wake & Wibisama, 2017). The banks are responsible to fulfil the need for financial inclusion and loan growth but at the same time they also need to manage the risk exposure. The problem here is not whether the NPL is high or low, but whether the banks are able to measure and score the exposure and ensure the management operates properly and assertively. Hence, the banks need to understand the relationship between the risk and profitability, given the situation in the country, which in this research is a developing country to measure, forecast, and determine the proper step in managing the risk at the same time maximizing the service to the customers.

This research mainly aims to investigate the relationship between bank's credit risk, liquidity, and capital adequacy

towards its profitability in Indonesia during 2007 to 2016. These factors have a high interdependence among each other. According to the bank's nature, credit risk is the most significant risk faced by the banks (Saeed MS & Zahid N, 2016). And when the bank is highly exposed to credit risk, it will reduce the customers' confidence level toward the bank, which will affect the bank's liquidity and reputation in the market.

From the theoretical contribution, this research will help to support future research of another individual, giving some ideas and provide a better picture and understanding on the bank profitability and the risks exposed to it. This research also gives more information to the investors regarding their banking activities. The investors will look for an investment which offers a return with a lower risk profile, since according to Ting, Qun, Yee, Wei, Cheng (2015), risk inclines to illustrate a failure rather than a success. Thus, the higher the risk exposure, the greater the possibility that the investors will lose the money they invest in that particular bank. From management perspective, this study will provide a guide that can lead management in their decision making regarding the management of risk and its profitability. It also assists in identifying the impact of those risks towards the bank's profitability. From academic perspective, this research aims to provide an additional knowledge and better understanding to the banks regarding the relationship of the bank's performance and their risk exposure. It can be a guideline to the people who are interested to study in the field of risk and banking profitability. Most importantly it will benefit others in understanding risk management of a company.

## II. LITERATURE REVIEW

### A. Profitability

Profitability is the ability to make profit from the overall business activities. It indicates how efficient a company can earn a return from the use of its assets on a given investment (Tulsian, 2014). Sometimes, the people are using the term "profit" and "profitability" in the same manner. But in real life, profit and profitability are a slightly different thing. Profit refers to an absolute amount of income generated by the company within a period of time, while profitability is the ability of the firm to make profit based on its sales (Shodhganga, 2003). Therefore, Weston and Brigham conclude that profit is a measurement of control toward the firm's investment, a margin safety for the creditors, a tax capacity measurement for government, and an index of economic condition and GDP factors for the country (Njoku & Alexandra O.U., 2015). Where the profitability is the outcome of profit, measurement of the efficiency and the soundness of the firm.

Profitability can be measured using the profitability ratio. There are several types of profitability ratio. From the perspective of the management, it can be measured by gross profit ratio, net operating profit ratio (net interest margin) and return on capital employed. From the perspective of the shareholders, it can be measured by net profit ratio and return on owner's equity (ROE).

## B. Credit Risk

According to Almekhlafi, et al., (2016), among the risks faced by the banks, credit risk is considered the most crucial risk as huge amount of bank's profit comes from credit as a result of interest charged on credit. Credit risk is defined as a risk resulted from the inability of the customers to pay back their credit or the money that they owed to the bank on time and in a full amount (Yimka, et al., 2015). Therefore, when the bank faces more credit risk, the will likely to experience the financial distress. Kolapo et al. (2012) also stated the main factors that leads to credit risk is the poor management, inappropriate credit policies, fluctuation of the interest rate, low capital and liquidity level, inappropriate credit assessment, poor lending practices, poor loan underwriting, government interference, and inadequate supervision by the central bank. There are several indicators which are used as a measurement of credit risk, which are: nonperforming loan ratio (NPLR), nonperforming loan to loan advance ratio (NPL/LA), total loan and advance to total deposit ratio (TLA/TD), and loan loss provision to classified loan ratio (LLP/CL). However, according to Garissa (2013), the commonly used among the researchers is nonperforming loan to total loan ratio (NPLR) since non-performing loans is a major threat in banking sector and will directly affect the performance of the bank due to the bad loans. Non-performing loan (NPL) is the amount of borrowed money by the debtors, where the debtors aren't able to make a payment within the payment schedule. Therefore, it is considered as a debtor's default in payment. NPL influences the profitability and the bank's solvency. It generates an adverse effect for the growth and survival of the banks. When NPL increases, it may imply the increasing in credit default as well.

## C. Liquidity

Liquidity is an ability of the bank to increase the funds and meet its short-term obligation without incurring unreasonable loss (Basse, et al., 2016). The inability of the bank to provide liquidity may result in a liquidity risk, which is caused by the mismatch between the asset and the liability maturity or because of an unexpected event occurs at that time (Maaka, 2013). For instance, in the global crisis in 2008-2009, liquidity is one of the key factors contributed to that crisis. Where the banks found out that they were short of cash. In general sense, it is because the banks were not fully take into account the importance of liquidity management and the effect of that liquidity in the economy. Learn from this crisis, the banks should manage their liquidity properly and hold more liquid assets. Liquidity affects the bank's profitability; therefore, it is important for the bank to maintain a sufficient cash to meet the customers demand in the future. It is not only affected the profitability of the bank but also the reputation of the bank in the market. The customers may lose their confidence toward the bank and withdraw a huge amount of money which leave the bank become illiquid. Maaka (2013) also stated that the vulnerability of liquidity comes from the credit risk. In this case is the nonperforming loan. NPL reduces the liquidity of the banks because increasing in credit will make the growth of the banks become slower when the bank defaults and might affect the whole economy of the country (Somoye, 2010). Espinoza and Prasad (2010) also found that the

similar thing that a high NPL ratio will lower the economic growth, and that a high NPL in the future can be caused by a high credit growth in the past.

## D. Capital Adequacy

Capital adequacy is the minimum reserves of capital that the bank must have available. It encourages the strength of the bank and improve the solvency of the bank as it acts as a cushion to absorb the unexpected expenditure/losses incurred by the banks (Noman, et al., 2015). Practically, adequate capital is deemed as the amount of capital that can effectively prevent the bank failure by absorbing the losses. An adequate capital will provide a protection against the insolvency and liquidation arising from the risks that the bank is facing. Therefore, the management have to work effectively on how to raise capital and maintain sufficient capital in reserves (Olalekan & Adeyinka, 2013). Hence, capital prevails as an insurance for depositors, regulatory authorities, and the general public to ensure that the bank is still on operation and be able to sustain in the market. For the depositor, capital adequacy also provides a confidence that the bank is safe and is able to pay them on demand regardless in the good or bad times (Mendoza & Rivera, 2017).

## E. The Relationship between Credit Risk and Profitability

Various former studies have analyzed the relationship between credit risk and the bank's profitability. The following current studies are:

Tan, Floros, and Anchor (2017) studied the impact of risk, competition, and efficiency of the banks toward their profitability and found that credit risk significantly impacts the profitability of the commercial banks in China. Specifically, they stated that credit risk is negatively correlated to the bank's profitability. They argued that the negative relationship occurred due to the large volume of nonperforming loan will increase the bank's cost and reduce the bank's profitability. The measurement of profitability level using Return on Asset (ROA) and Net Interest Margin (NIM) and measurement of the credit risk using Nonperforming Loan Ratio (NPLR).

Mendoza and Rivera (2017) studied the effect of credit risk on the profitability of rural banks in Philippines and found that credit risk has a negative relationship with the bank's profitability. They measured the profitability level using Return on Asset (ROA) and measured the credit risk by using Nonperforming Loan Ratio (NPLR).

However, Saeed MS and Zahid N (2016) studied the impact of credit risk on the profitability of five commercial banks in UK and found that credit risk has a positive relationship with the bank's profitability. It means even after the crisis, banks in UK are still able to take credit risk and make some profits. They measured the profitability level using Return on Asset (ROA) and Return on Equity (ROE) and measured the credit risk by using Nonperforming Loan Ratio (NPLR).

Gizaw, Kabede, and Sujata (2015) studied the impact of credit risk on the commercial bank's profitability in Ethiopia and found that credit risk has a significant relationship with the bank's profitability. They measured the credit risk by using Nonperforming Loan Ratio (NPLR) and loan loss provision over total of loans ratio (LLPTL).

Noman, Pervin and Chowdhury (2015) studied the effect of credit risk on the bank's profitability in Bangladesh and found that credit risk has significant effect on the bank's profitability. They specifically stated that credit risk has a negative relationship with the bank's profitability. They measured the credit risk by using NPLGL and LLRGL and measured the profitability level by using ROA, ROE, and NIM.

Li and Zou (2014) studied the impact of credit risk management toward the bank's profitability in Europe. They measured the credit risk by using NPLR and measured the level of profitability by using ROA and ROE. They found that there is a significant relationship between credit risk and the profitability. As NPLR has a significant impact on both ROA and ROE. However, this relationship is a fluctuating relationship instead of stable relationship.

Kolapo, Ayeni, and Oke (2012) studied the relationship between the credit risk and the commercial bank's profitability in Nigeria. They measured the profitability level by using ROA and measured the credit risk by using nonperforming loan to loan advance ratio (NPL/LA), total loan and advance to total deposit ratio (TLA/TD), and loan loss provision to classified loan ratio (LLP/CL). They found that NPL and LLP have a negative significant relationship to the ROA, where a 100% increasing in nonperforming loan will reduce the profitability of the banks up to 6.2%, a 100% increasing in the loan loss provision will reduce the profitability of the banks about 0.65%. Yet, TLA has a positive significant relationship with ROA, where a 100% increasing in the total loan and advance will increase the profitability up to 9.6%. It is inferred that regulation, loan loss provision and management quality are important since the regulation is required to build a uniformity among the product and services that the bank offer, the quality of management is required in the cases of loan dominant bank in the emerging economy and loan loss provision can be significant potential for credit risk. This study also found that the credit risk in emerging economy is higher than in the developed economy.

Therefore, based on the literatures above, the following hypothesis is being developed:

H<sub>0</sub>: there is no relationship between credit risk and the bank's profitability

H<sub>1</sub>: there is a relationship between credit risk and the bank's profitability

## F. The Relationship between Liquidity and the Bank's Profitability

Various former studies (Tan, et al., 2017; Ishak, et al., 2016; Ndoka & Islami, 2016; Menicucci & Paolucci, 2016; Li & Zou, 2014; Ruziqa, 2013; Kolapo, et al., 2012; Kithinji, 2010) have shown the relationship between liquidity and the bank's profitability.

Tan, Floros, and Anchor (2017) studied the impact of risk, competition, and efficiency of the banks toward their profitability and found that liquidity significantly impacts

the profitability of the commercial banks in China. Specifically, they stated that liquidity is negatively correlated to the bank's profitability. The relationship can be explained as the lower liquidity means the higher loan exposure and higher bank's profitability as there is more assets to be given out as loan rather than to be kept by the bank. Tan (2016) also argued that his research towards the Chinese commercial banks found that the Chinese banks have the ability to monitor and manage the loan well, therefore the subsequent cost can be reduced and lead to increasing in bank's profitability.

However, there are other researchers found a positive relationship between the variables (Waemustafa & Sukri, 2016; Yazdanfar & Ohman, 2016; Ahmad, 2016; Alshatti, 2015; Njure, 2014; Macharia, 2013; Ruziqa, 2013; Lartey, et al., 2013; Olalekan & Adeyinka, 2013; Ayodele & Oke, 2013; Vieira, 2010). According to those researchers, the banks with a better access to cash tend to have a higher profitability levels. It is due to the efficiency in working capital management which has a huge impact on the liquidity, including receivables management and inventory management. These management is positively affected the bank's overall performance, such as market share price, profit, and the growth of business. Therefore, the banks may generate a higher profit while maintaining a higher liquidity.

Therefore, based on the above literatures, the following hypothesis is being developed:

H<sub>0</sub>: there is no relationship between liquidity and the bank's profitability.

H<sub>1</sub>: there is a relationship between liquidity and the bank's profitability.

## G. The Relationship between Capital Adequacy and the Bank's Profitability

Various former studies have analyzed the relationship between credit risk and the bank's profitability. The following current studies are:

Noman (2015) studied the relationship between capital adequacy and bank's profitability in Nigeria. Practically, they found out that capital adequacy is positively related to the bank's profitability. However, in further analysis, the capital adequacy is insignificant to the bank's profitability. They argued that such result is because the profitability of either domestic or the foreign bank is affected by the bank specific characteristic.

Gizaw, Kabede and Sujata (2015) studied the impact of credit risk and capital adequacy on the profitability performance of commercial banks in Ethiopia and found that the results of the regression analysis indicate that capital adequacy is significant to the bank's profitability, since the value of CAR is significant at 5% level in terms of ROA. He stated that the reason for the result is because the banks were having high excess capital which is more than enough to cover the unexpected losses arising from the risk. The high capital adequacy is deemed to be due to the over-cautiously bank's operation and a tendency to ignore the chance of potential profitable trading.

Olalekan and Adeyinka (2013) studied on capital adequacy as a determinant of profitability of banks and found that the correlation implies a positive relationship between the capital and bank profitability. At the same time, banks with higher capital will normally have lower needs of external funding and therefore higher profitability. They also revealed that a high capital adequacy ratio should signify a bank that is operating over-cautiously and ignoring potentially profitable trading opportunities.

Meanwhile, the current empirical study found that capital adequacy is insignificant to the bank's profitability. Ndoka and Islami (2016) studied the impact of credit risk management in the profitability of the Albanian commercial banks during 2005-2015. They used ROA and ROE as the indicators of profitability, NPLR as the indicator of credit risk, and CAR as the indicator of capital adequacy. They conducted the research from 16 bank operates in Albanian and found that no significant relationship between capital adequacy and the bank's profitability since the value of CAR is not significant at 5% for both ROA and ROE. They argued that the systematic risk during the financial crisis back in 2008 might be one of the factors that affects the result.

Therefore, based on the above literatures, the following hypothesis is being developed:

H<sub>0</sub>: there is no relationship between liquidity and the bank's profitability.

H<sub>1</sub>: there is a relationship between liquidity and the bank's profitability.

### III. RESEARCH METHODOLOGY

This research is a quantitative research which examines the relationship between variables, is measured numerically, and analyzed using a statistical tool. Therefore, it is a causal research design. Causal research is deemed to be appropriate since it attempts to explain the relationship between the variables (Team, 2014) which is aligned with the objectives of this research, to investigate the relationship between credit risk, liquidity, and capital adequacy towards the bank's profitability.

For the sampling purpose, this research uses the non-probability sampling method, where the samples are selected based on the judgmental sampling. It is a sampling method where the samples are chosen because they possess the required characteristic to qualify as representatives of the population. It is considered as the most appropriate

sampling method since it will provide an assurance in its quality of response and an easier access to reach the targeted sample.

Indonesia's Financial Service Authority (OJK) reports that the total number of banks in Indonesia up to the first quarter in 2017 is 116 banks (Kontan.co.id, 2017), consist of four state-owned banks, 65 private banks, 10 foreign banks, 16 Syariah banks, and 20 regional banks. The focus area on this study will be conducted on the four state-owned banks in Indonesia, which are Bank Negara Indonesia (BNI), Bank Mandiri, Bank Rakyat Indonesia (BRI), and Bank Tabungan Negara (BTN) in Jakarta, Indonesia. Since the data from state-owned bank is considered more accessible compare to the private banks and the researcher believe that the state-owned banks have the bigger influence to the economy and dominate the market in the industry.

The data collection will be using secondary data. The data will be collected through the past journals, articles, and the annual report of the banks. The data from the banks' annual reports will be collected for a ten-year period, starting from 2007 to 2016. The researcher considers that the long-term period data will likely produce more accurate data since the trend of the data can be seen clearly with or without certain event which may affect the data, compared to the short-term period of time. The secondary data source is considered due to its time saving, economical (save efforts and expenses in obtaining the data), and provision of data comparison.

The collected data will be analyzed by using EViews. Once the information is collected, the data will be transferred to the computer program EViews for initial descriptive data analysis. It can assist in saving time compared to manual analysis using Microsoft Excel. In order to analyzed the relationship between the dependent and independent variables, a Multiple Regression Method will be used to find the correlation coefficient which measures the strength of the effect of the independent variables toward the dependent variable and Pearson Product Moment Correlation which measures the direction between the variables, the extent of the dependent and independent variables move in sympathy or inversely and to find the coefficient of determination which measures how much the proportion of the independent variables variance affect the dependent variable. The table below shows the independent variables and the technique used to measure them.

Variables	Relationship	Analysis tools
Credit Risk	Relationship between credit risk and profitability	Multiple Regression method and Pearson Product Moment Correlation
Liquidity	Relationship between liquidity and profitability	Multiple Regression method and Pearson Product Moment Correlation
Capital Adequacy	Relationship between capital adequacy and profitability	Multiple Regression method and Pearson Product Moment Correlation

#### Measurement of Profitability Level

Profitability ratio is a measurement of profitability level, it is a way to measure a company's performance in terms of making profit. Profitability ratio shows the overall performance and the efficiency of the business. Muthee (2010) divided the profitability ratio into two types which are margin ratio and returns ratio. Margin ratio indicates the business' ability to transform the sales into profit and the

returns ratio indicates the business' ability to efficiently generate returns for their shareholders. These profitability ratios are mostly used by the managers in managing the firm's operations, credit analyst,

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who analyzing the ability of the firm to pay its obligations, and stock analyst, who are interested at the firm's growth and its efficiency (Lesacova, 2007).

This study will be using net profit margin and return on asset to determine the profitability level.

## Net profit margin

Net profit margin shows how much the income can be generated from the total sales of the products. It measures the overall efficiency of the business in converting its sales into profit. The higher the value, the more efficient the business is. Profit can be generated through the efficiency of the business activities such as, the production, pricing, financing, selling, administration, inventory and tax management. Even if only one of these departments performs badly, net profit margin will reflect it (Borad, 2018).

$$\text{Net Profit Margin} = \frac{\text{net income}}{\text{net sales (revenue)}}$$

Net profit margin is calculated by taking the net income divided by its total sales. It shows the total margin that can be distributed to the shareholders. It is considered a suitable calculation to measure the level of company's profitability since it includes all of the cost that may influence the net profit generated by the company (Wikinson, 2013). It also can be used as a comparison with other companies in both the same and different industry. It indicates how well the company performs (management and operation) compared to the other company in the same industry. In a different industry, it shows which industry is more profitable than others. However, it depends on the company's size and complexity.

The previous studies such as Berrios (2013), Noman (2015) and Tan et al., (2017) used Net Profit Margin as the measurement to measure the company's profitability level.

## Return on Asset (ROA)

Return on Asset measures the company's performance relatively, yet it doesn't take into account the size of the company's invested capital. It indicates how efficient the company can use its assets to generate return from the sales and investment. Return on Asset is calculated using the following formula:

$$\text{Return on Assets} = \frac{\text{net income}}{\text{total assets}}$$

The former studies such as Kolapo et al., (2012), Berríos (2013), Li and Zou (2014), Gizaw, Kebede, and Sujata (2015), Noman et al., (2015), Saeed MS and Zahid N (2016), Mendoza and Rivera (2017), and Tan et al., (2017) used ROA as the measurement to measure the level of company's profitability.

## Measurement of Credit Risk Exposure

Nonperforming loan ratio (NPLR) is the main indicator of the bank's credit risk. It can be obtained by taking the

amount of nonperforming loan over the total amount of loan. It represents the portion of the loan which become nonperforming and indicates the extent of the credit risk. Where the higher the NPLR, the higher the probability of non-recovering the assets. Thus, the lower the ratio is the indication of better asset quality and lower doubtful loan, therefore, lower credit risk. NPLR is calculated using the following formula:

$$\text{Nonperforming Loan Ratio} = \frac{\text{nonperforming loan}}{\text{total loans}}$$

The former studies such as Kithinji (2010), Kolapo et al., (2012), Gizaw, Kebede, and Sujata (2015), Noman et al., (2015), Saeed MS and Zahid N (2016), used Nonperforming Loan Ratio (NPLR) as the indicator of credit risk.

## Measurement of Liquidity

This research is using Loan to Deposit ratio (LDR) as the indicator of bank's liquidity. It is one of the useful instrument to determine the liquidity of the banks (Rengasamy, 2014). The ratio can be calculated by taking the average net loans divided by the average deposit. A high ratio implies that the bank issues more deposit as the loans which is expected to generate more income. Meanwhile, a low ratio implies that the bank is at low risk, however, it doesn't effectively use the assets to generate income and may end up at loss (Taillard, 2012).

The former studies such as Tan, et al., (2017); Tan, (2016); Menicucci & Paolucci, (2016); Waemustafa & Sukri, (2016); Yazdanfar & Ohman, (2016); Alshatti, (2015); Macharia, (2013); Ruziqa, (2013); Lartey, et al., (2013); Olalekan & Adeyinka, (2013); and Ayodele & Oke, (2013) used liquidity to deposit ratio (LDR) as the indicator of liquidity.

## Measurement of Capital Adequacy

This research is using capital adequacy ratio (CAR) as the indicator of capital adequacy. It measures the ability of the banks to meet its obligation by comparing the capital to its assets. The ratio can be calculated by taking the total of tier 1 and tier 2 capital divided by its risk-weighted asset. A high ratio indicates that the banks have a sufficient capital to absorb the unexpected losses. Meanwhile, a low ratio indicates that the bank needs to add more capital as it may lead to a bank failure. The former studies such as Mendoza & Rivera, (2017); Ndoka & Islami, (2016); Noman, et al., (2015); Li & Zou, (2014); Ruziqa, (2013); and Kithinji, (2010) used capital adequacy ratio (CAR) as the indicator of capital adequacy.

## IV. RESULTS

In this research, the researcher focuses on 4 state-owned banks in Indonesia, which is listed in the table below:

Banks	Abbreviation
Bank Negara Indonesia	BNI
Bank Rakyat Indonesia	BRI
Bank Mandiri	-
Bank Tabungan Negara	BTN

Table 2: List of Banks

**Descriptive Statistic**

Variables	Mean	Medium	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Net Interest Margin	6.48%	5.90%	10.86%	4.47%	0.017	1.219	3.306
Return on Asset	2.92%	2.90%	5.15%	0.90%	0.012	0.229	2.053
Credit risk	3.22%	2.82%	8.20%	1.55%	0.014	1.706	6.595
Liquidity	82.64%	84.14%	108.86%	54.30%	0.153	0.082	2.025
Capital adequacy	17.06%	15.99%	26.97%	13.18%	0.031	1.078	3.934

**Table 3: Descriptive Analysis. Source: EViews (2018)**

Based on the table above, the descriptive statistic includes mean, maximum and minimum value, standard deviation, skewness and kurtosis of each variable. The result shows that Net Interest Margin ranges from 4.47% to 10.86% with a mean of 6.48% and standard deviation of 0.017. A low standard deviation indicates that the data is very close to its mean. This statistic implies that from the sample of four banks, they have Net Interest Margin of 6.48% on average. Meanwhile, the skewness and kurtosis indicate the normality of the data. It is given that Net Interest Margin has a skewness of 1.219 and kurtosis of

3.306 which indicates that the data is normally distributed. However, kurtosis of Capital Adequacy and Credit Risk are more than 3 which means that the data is not normally distributed. Therefore, as for further research, the data needs to be transformed into a logarithmic form (Thadewald & Büning, 2004).

The table below shows the skewness and kurtosis after the Log-transformation has been conducted. The skewness and kurtosis indicate a normal data for all variables. Hence, further analysis can be carried forward.

Variables	Net Interest Margin	Return on Asset	Credit risk	Liquidity	Capital Adequacy
Skewness	.920	-.496	.520	-.209	.685
Kurtosis	2.717	2.523	3.083	2.108	2.896

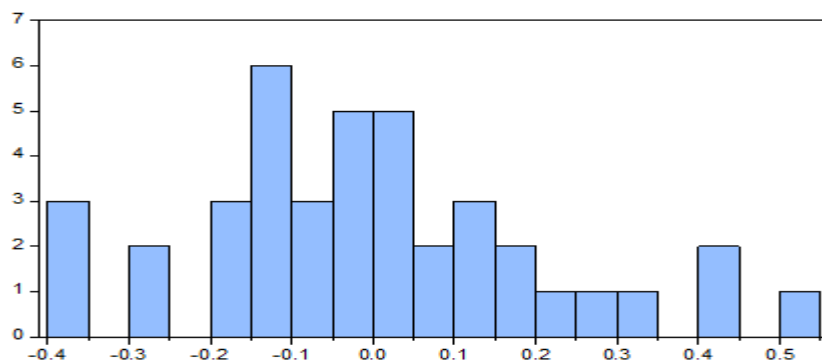
**Table 4: Normality Test. Source: EViews (2018)**

**Reliability and Normality Test**

Before proceeding to further analysis, the data for each variable should be analyzed in order to identify whether the data need to undergo a data transformation (Thadewald & Büning, 2004). In this study, the researcher used a logarithmic transformation. This Log-transformation is useful in assisting the skewed distribution of the data. Hence, before running the log transformation, the researcher will do a verification on the skewness and kurtosis of the variables.

**Histogram**

The normality test is carried out by finding the skewness and kurtosis for each variable. The result on Table 4.3 shows that the data for each variable is normally distributed. The skewness of net interest margin, credit risk, and capital adequacy is moderately skewed, and the skewness of return on asset and liquidity is approximately symmetric. Meanwhile the kurtosis of all variables is less than 3 which indicates a normal data.



**Figure 1: Normality of NIM Series. Source: EViews (2018)**

Based on the Figure 1 above, the data of series is normally distributed due to the value of skewness which equals to zero and kurtosis value which is exactly three. The pattern of the histogram is curved with longer tail to right that implies that the data is skewed to the right/positively skewed (Siyavula, 2018). Similarly, Figure 2below also

shows the data of series is normally distributed due to the value of skewness which equals to zero and kurtosis value which is close to three. The pattern of the histogram is closely symmetric, where the data is almost distributed equally around the mean (Siyavula, 2018).

# The Relationship between Bank's Credit Risk, Liquidity, and Capital Adequacy towards its Profitability in Indonesia

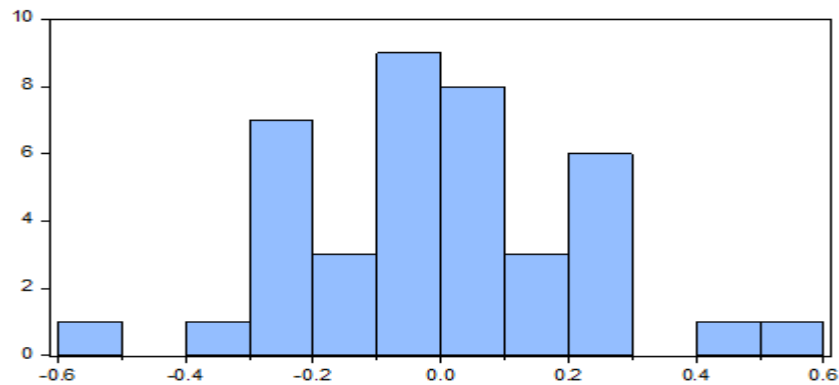


Figure 2: Normality of ROA Series. Source: EViews (2018)

## Jarque-Bera Test

In addition, Jarque-Bera test is used to test the normality of data. The larger the numbers, the more it deviates from the normal data. The table below shows the value of Jarque-Bera and the probability (p-value) for each variable.

Variables	Jarque-Bera	Prob. (p-value)
Net Interest Margin	5.775	.056
Return on Asset	2.022	.364
Credit Risk	1.816	.403
Liquidity	1.612	.445
Capital Adequacy	3.149	.207

Table 5: Jarque-Bera Test. Source: EViews (2018)

According to the Table 5 above, the p-values of Jarque-Bera are more than 0.05 which indicates that the data of all variables are normally distributed. The value of Jarque-Bera is derived from the skewness and kurtosis of the data. The larger value of Jarque-Bera, the more the data deviates from normal distribution, which may lead to the rejection of normality assumption (Das & Imon, 2016). The table above shows that Net Interest Margin has the lowest p-value, which result in highest value of Jarque-Bera. Meanwhile,

Liquidity has the highest p-value, hence it has the lowest value of Jarque-Bera.

## Multiple Regression Analysis

Multiple Regression analysis is carried out to test whether there is a significant relationship between the dependent and independent variables. There are two models which are being tested in this research. The first model is using Net Interest Margin (NIM) as the indicator of the probability and the second model is using Return on Asset (ROA) as the indicator of the probability.

Dependent Variable	Independent Variables	Coefficient Value	Prob. (Significant Value)	F-Statistic	R <sup>2</sup>
Profitability (Net Interest Margin)	Credit Risk	-.290	.006	.014	.253
	Liquidity	-.401	.066		
	Capital Adequacy	-.125	.577		

Table 6: Multi Regression Analysis on NIM. Source: EViews (2018)

F-Statistic measures the overall correlation among the variables, whether they are significant or not significant. The F-Stat is significant at 5%, according to the corresponding probability of .014 which indicates that there is a significant relationship between the overall variables. Since the overall independent variables is significant to the dependent variable, the assessment for each variable can be carried forward. The R2 shows that 25.29% of the variance in the model can be explained by the independent variables

presented in the study, while the remaining 75.21% of the variance in the model is influenced by the other factors. The significance value for each variable indicates that there is a rejection of null hypothesis for credit risk and the acceptance of null hypothesis for liquidity and capital adequacy. Therefore, it can be concluded that only credit risk has a significant relationship with the bank's profitability in the first model.

Dependent Variable	Independent Variables	Coefficient Value	Significant Value	Prob. (F-Stat)	R <sup>2</sup>
Profitability (Return on Asset)	Credit Risk	-1.063	0.00	0.00	.769
	Liquidity	-1.212	0.00		
	Capital Adequacy	.222	.338		

Table 7: Multi Regression Analysis on ROA. Source: EViews (2018)



F-Statistic measures the overall correlation among the variables, whether they are significant or not significant. The F-Stat is significant at 5%, according to the corresponding probability of 0.00 which indicates that there is a significant relationship between the overall variables. Since the overall independent variables is significant to the dependent variable, the assessment for each variable can be carried forward. The R2 shows that 76.88% of the variance in the model can be explained by the independent variables presented in the study, while the remaining 23.12% of the variance in the model is influenced by the other factors. The significance value for each variable indicates that there is a Model 1: Net Interest Margin

rejection of null hypothesis for credit risk and liquidity, and the acceptance of null hypothesis for capital adequacy. Therefore, it can be concluded that only credit risk and liquidity that have a significant relationship with the bank's profitability in the second model.

**Pearson Correlation Analysis**

The analysis of Pearson correlation looks at the correlation between the dependent variable (Profitability) and independent variables (Credit Risk, Liquidity, Capital Adequacy). The correlation among variables is presented in the table below.

	Net Interest Margin	Credit Risk	Liquidity	Capital Adequacy
Net Interest Margin	1.00	-.366	-.214	-.230
Credit Risk	-.366	1.00	-.292	.055
Liquidity	-.214	-.292	1.00	.372
Capital Adequacy	-.230	.055	.372	1.00

**Table 8: Pearson Correlation Analysis on NIM. Source: EViews (2018)**

The table above shows the correlation among the variables in the first model. According to the table, the profitability shows a very low correlation in respect to the credit risk, liquidity, and capital adequacy. The correlation ranges from to -.366 to -.214 which indicates a weak

negative relationship among the variables. Moreover, credit risk also shows a very low correlation with liquidity. However, capital adequacy shows a moderate correlation with credit risk and a low correlation with liquidity.

**Model 2: Return on Asset**

	Return on Asset	Credit Risk	Liquidity	Capital Adequacy
Return on Asset	1.00	-.745	-.219	-.155
Credit Risk	-.745	1.00	-.292	.055
Liquidity	-.216	-.292	1.00	.372
Capital Adequacy	-.155	.055	.372	1.00

**Table 9: Pearson Correlation Analysis on ROA. Source: EViews (2018)**

The table above shows the correlation among the variables in the second model. According to the table, the profitability shows a very low correlation in respect to the credit risk, liquidity, and capital adequacy. The correlation ranges from to -.745 to -.155 which indicates a strong negative relationship with credit risk, and weak negative correlation with liquidity and capital adequacy. Moreover, credit risk also shows a very low correlation with liquidity. However, capital adequacy shows a moderate correlation with credit risk and liquidity.

**The relationship between the credit risk and the bank's profitability**

The result of this study shows there is a significant relationship between credit risk and bank's profitability for both model. Based on the regression analysis, the F-Statistic is significant at 5% for both model. According to this, the models are fit. The result also shows that NPLR is significant at 5% level with the probability of .006 and 0.00, coefficient of -.290 and -1.063 for NIM and ROA respectively and implies a negative correlation between variables. Keeping all the other coefficient constant, an increasing of 1 unit in NPLR will lead to a decreasing of .290 units in variable NIM and decreasing of 1.063 units in variable ROA. Based on this result, it can be concluded that the banks in Indonesia need to focus more on the credit risk management due to a high effect of non-performing loan to their return on asset. As credit risk is negatively correlated

to the bank's profitability, the bank needs to strengthen its credit risk management in order to minimize the credit risk exposure. For instance, the bank may increase the credit quality, tighten the credit rating system policy, monitoring the loan performance, or having an adequate loan loss reserves to cover any losses on the loan. Hence, the banks are able to generate an optimum profit.

This finding is compatible with the former researches (Tan, et al., 2017; Ishak, et al., 2016; Ndoka & Islami, 2016; Menicucci & Paolucci, 2016; Li & Zou, 2014; Ruziqa, 2013; Kolapo, et al., 2012; Kithinji, 2010) who are doing the same analysis using the same proxy for both dependent and independent variables. A possible reason for this result is that the greater the non-performing loan, the less profit will be generated, and less capital for the banks to make an investment. A large volume of non-performing loan will also increase the bank's cost of capital which reduce the bank's profitability. Moreover, some researchers (Mendoza & Rivera, 2017; Yazdanfar & Ohman, 2016; Noman, et al., 2015) also used Loan Loss Reserve as their indicator of credit risk and also found a negative relationship between profitability and credit risk.



The reason being is because every time the loan is made, the reserve also increases correspondingly in order to buffer against the loan loss which will reduce the bank's profitability. However, there are other researchers found a positive relationship between the variables (Zahid & Saeed, 2016; Menicucci & Paolucci, 2016; and Gizaw, et al., 2015). The difference in result is might be influenced by another factors (country, policy, government, research period, significance level). In this case, some of the former researchers used the same indicator, nevertheless, a contradicting result still occurs. Gizaw, Kebede, and Sujata (2015) argued another possible reason that causes the positive relationship is because the bank's managers in Ethiopia was successfully recognized the risk arising from their business and strengthen their credit risk management. Therefore, eventhough their credit risk is increasing, if the banks are able to effectively utilize the credit risk management to recognize the risk and solving the issue, they may obtain a higher profit.

### **The relationship between the liquidity and the bank's profitability**

The result of this study shows there is a significant relationship between liquidity and bank's profitability for only one model. Based on the regression analysis, the F-Statistic is significant at 5% for both model. According to this, the models are fit. The result also shows that LDR is significant at 5% level for the second model with the probability of 0.00 and coefficient of -1.212 and implies a negative correlation between variables. Keeping all the other coefficient constant, an increasing of 1 unit in LDR will lead to a decreasing of 1.212 units in variable ROA. This finding is in accordance with the former researches (Tan, et al., 2017; Tan, 2016; Menicucci & Paolucci, 2016; Irawan & Faturohman, 2015) who are doing the same analysis using the same proxy for both dependent and independent variables. The relationship can be explained as the lower liquidity means the higher loan exposure and higher bank's profitability as there is more assets to be given out as loan rather than to be kept by the bank. Tan (2016) also argued that his research towards the Chinese commercial banks found that the Chinese banks have the ability to monitor and manage the loan well, therefore the subsequent cost can be reduced and lead to increasing in bank's profitability. However, there are other researchers found a positive relationship between the variables (Waemustafa & Sukri, 2016; Yazdanfar & Ohman, 2016; Ahmad, 2016; Alshatti, 2015; Njire, 2014; Macharia, 2013; Ruziqa, 2013; Lartey, et al., 2013; Olalekan & Adeyinka, 2013; Ayodele & Oke, 2013; Vieira, 2010). The reason being is might be the different location of the research and the indicators used in conducting the research. According to those researchers, the banks with a better access to cash tend to have a higher profitability levels. It is due to the efficiency in working capital management which has a huge impact on the liquidity, including receivables management and inventory management. These management is positively affected the bank's overall performance, such as market share price, profit, and the growth of business. Therefore, the banks may generate a higher profit while maintaining a higher liquidity. Meanwhile, in terms of Net Profit Margin, the result shows that there is no significant relationship between profitability and liquidity. This finding is in accordance with some of the past researchers, such as

Gizaw, et al., 2015 and Ruziqa, 2013. According to Frost (2017), the test can produce a conflicting result due to the the number of variable tested. Where F-Statistic analyzes all of the coefficient of three independent variables together, the T-Test only analyzes the coefficient of a particular variable alone. Therefore, the result may occur. He also added that the sample may provides an enough evidence to prove that it is significant but not enough to deduct that the individual variable is significant.

### **The relationship between the capital adequacy and the bank's profitability**

The result of this study shows there is no significant relationship between capital adequacy and bank's profitability for both model. Based on the regression analysis, the F-Statistic is significant at 5% for both model. According to this, the models are fit. However, the individual result shows that CAR is not significant at 5% level with the probability of .577 and .338, coefficient of -.125 and .222 for NIM and ROA respectively. The p-value of capital adequacy shows an insignificant result towards both Net Interest Margin and Return on Asset. This finding is in accordance with Mendoza & Rivera, 2017; Ndoka & Islami, 2016; Noman, et al., 2015; Li & Zou, 2014; Kithinji, 2010. However, the result implies a negative correlation between the variables. Keeping all the other coefficient constant, an increasing of 1 unit in CAR will lead to a decreasing of .125 units in variable NIM and decreasing of .222 units in variable ROA. This finding is compatible with the former researches (Li & Zou, 2014; Ruziqa, 2013; Olalekan & Adeyinka, 2013) who are doing the same analysis using the same proxy for both dependent and independent variables. The reason may arise is that it depends on the capital requirement and the policy of the bank itself. Some banks may depends heavily on their equity as the source of funding but can't make the use of it properly to generate profit.

On the other side, there are other researchers found a positive relationship between the variables (Menicucci & Paolucci, 2016; Gizaw, et al., 2015; Alshatti, 2015; Noman, et al., 2015 NIM). The reason being is the banks with large capital tend to be more profitable since they can reduce the cost through the economic of scale. They are able to engage in prudent lending which only require a small capital but generate a higher return. Therefore, the banks is able to achieve the profitability improvement. In addition, the banks with high capital is able to finance their operations with their own capital. Thus, they don't need to borrow funds from external sources which will charge them interest. Hence, they can increase their profitability. The difference of overall and individual analysis result might be due to the the number of variable tested (Frost, 2017). Where F-Statistic analyzes all of the coefficient of three independent variables together, the T-Test only analyzes the coefficient of a particular variable alone. Therefore, the result may occur. He also added that the sample may provides an enough evidence to prove that it is significant but not enough to deduct that the individual variable is significant.

## V. CONCLUSION AND RECOMMENDATIONS

The main objective of this research is to investigate whether the bank's credit risk, liquidity, and capital adequacy are significant to the bank's profitability in Indonesia's banking sector. The sample in this research is the four state-owned banks in Indonesia which is considered to be the most influenced bank for Indonesia's economy. The research used secondary data which is obtained from the publicly annual report of each bank within 10 years period (2007 to 2016). For the analysis purpose, EViews 9 is used to analyze the data collected. The normality test shows that all of the data are normally distributed, therefore, further analysis can be carried forward. The result from analysis on Multiple Regression shows that only credit risk is significant at 5% significance level to the profitability in the first model (Net Interest Margin as the proxy). Moreover, it indicates there is a negative relationship between credit risk and bank's profitability (net interest margin). Therefore, if the banks are seeking to generate a higher profit, then they should reduce the credit risk (non-performing loan). On the other side, only credit risk and liquidity are significant to the profitability in the second model (Return on Asset as the proxy). It is also significant at 5% level and implies a negative relationship to the return on asset. This means it is better for the banks to reduce the non-performing loan and keep a lower liquidity in order to maximize profit.

Banking sector is a business of taking and managing the risk, instead of avoiding it (Mendoza & Rivera, 2017). In doing their business activities, banks are exposed to several risks, such as credit risk, liquidity risk, operational risk, interest rate risk, regulatory risk, business risk, reputation risk, insolvency risk, and foreign exchange risk, which affect the bank's profitability. Hence, it is important for the banks to have a good risk management, to know their risk exposure and how to overcome the risk. Since this research only focuses on the credit risk, liquidity, and capital adequacy, the future research is expected to expand the scope of study by doing more research focuses on the risks mentioned above in order to find the variability of factors that affecting the bank's profitability.

This research found that the bank's profitability (net interest margin and return on asset) is negatively correlated to credit risk (non-performing loan). The two proxies used in this research shows the similar result, that increase in non-performing loan will decrease the bank's profitability. Therefore, the banks may try to strengthen the credit risk management and increase the credit quality, tighten the credit rating system policy, monitoring the loan performance, or having an adequate loan loss reserves to cover any losses on the loan. Thus, the non-performing can be reduced and the banks will be able to generate optimum profit. The result also shows that the bank's profitability is negatively correlated to the liquidity. Where the lower liquidity, the higher the bank's profitability. From this result we can conclude that the bank will be able to maximize the profit by having less liquidity, as there is more funds to be distributed as loans and there is more capital for the banks to make an investment. However, the less liquidity that the banks have, will expose them to a liquidity risk.

Accordingly, the future research is also expected to conduct a research especially in liquidity risk, as this research only discuss the liquidity of the banks. Since there are only a few researches conducted in liquidity risk, it is quite difficult to find any literature regarding the liquidity risk. Moreover, according to Khushrushahi (2016), liquidity is ranked as the 10th pressing concern in Asia Pacific in 2015. However, it moved up to the 4th place in 2017. Hence, it is crucial for the banks to understand the liquidity risk as it might have a greater impact on the bank's financial performance.

In addition, knowledge of the underlying factors that affect the banking sector's profitability is also essential for the managers of banks and the investors. The awareness of the central banks, government, and the other financial authorities will be useful in assisting the financial authorities (OJK) and the bank's manager to establish a new policy in order to improve the banking's profitability in Indonesia's banking sector. Regarding to the liquidity, the banks have to ensure the efficiency of their working capital management, including the receivables and the inventory management. As they have a big impact to the growth, sales, market share, and also the profitability. Therefore, the managers should ensure that they are able to maintain the working capital at optimum level.

Also, this research only takes four state-owned banks in Indonesia as the sample. Meanwhile, Indonesia has more than 100 banks in operation. Thus, more sample is needed in order to fully represent the whole banking sector in Indonesia.

Last but not least, this research found that capital adequacy is not significant at 5% level with the bank's profitability in terms of both net interest margin and return on asset. Therefore, another proxy for profitability may be included in the next research to ensure the relationship between capital adequacy and the bank's profitability. Since even though the result is insignificant, yet the capital adequacy still affects the profitability negatively.

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