DETERMINANTS OF BANKING CAPITAL BUFFER IN INDONESIA

[*1]**Fauziah, Nurhikmah**, [2]**Pangestuty, Farah Wulandari**

[*1]*Faculty of Economics and Business, Universitas Brawijaya, Malang, Indonesia*
[2] *Faculty of Economics and Business, Universitas Brawijaya, Malang, Indonesia*

*Note: * Indicates corresponding author*

ARTICLE DETAILS	ABSTRACT
Article History *Published Online:* publisher use only **Keywords** Healthy bank, risk, Basel, capital buffer. [*]**Corresponding Author** *Email:* *nurhikmahfauziah@gmail.com*	Banks as intermediary institutions that play an important role in the economy are required to be in a healthy state since the bank conditions reflect macroeconomic conditions. To achieve the goal of financial system stability, the banking regulator issued Basel regulations. The regulation contains provisions for banks to provide a capital buffer as an effort to strengthen bank capital from risks that may arise. The purpose of this research is to find out what factors affect the bank's capital buffer with the object of research on conventional commercial banks in Indonesia from 2010 to 2019. The method used in this research is panel data regression with independent variables, i.e. GDPG, SIZE, ROE, LOTA, NPL, BIRATE, LDR, and BOPO, as well as the dependent variable capital buffer. The results showed that all the dependent variables used had a significant effect both simultaneously and partially on the capital buffer.

1. Introduction

Banking in Indonesia functions as an intermediary institution and has an important role in the economy (Lindgren et al, 1996). Therefore, a bank must be in good condition since its condition reflects the macroeconomic conditions. According to Kasmir (2004), the more developed a country is, the greater the role of the bank in its economy. This can be proven from the value of domestic credit provided by Indonesian banks using the benchmark for GDP, which shows significant growth from 24.35% in 2010 to 32.74% in 2018 (World Bank, 2018).

To maintain public trust in banking, Bank Indonesia uses regulations based on Basel I-III formulated by the Basel Committee on Banking Supervision or BCBS regarding banking supervision (Bank Indonesia, 2012). Each Basel regulation presents improvements regarding strengthening bank capital by preparing a capital buffer. The goal is to make banks more sensitive to risk, be able to absorb losses at a later date, indicate that the bank is healthy, and maintain the stability of the bank's financial system and macroeconomic conditions.

Based on Basel regulations, Bank Indonesia together with the Financial Services Authority as the institution that regulates and supervises banking in Indonesia issued a POJK regulation number of 11 of 2016 concerning the Minimum Capital Adequacy Requirement for Commercial Banks, which states that the minimum bank Capital Adequacy Ratio (CAR) is 8%. Banks are required to have a capital buffer obtained from the difference between the bank's real CAR and the required minimum CAR. This occurs since a bank with strong capital will be able to encourage bank operational activities, reduce the risk of bankruptcy and loss, avoid liquidation, and serve as capital to be able to compete in global competition (Deelchand, 2009).

In Indonesia, the CAR value of banks has far exceeded 8%, which indicates that the capital buffer value is also high. At the end of 2018, Indonesia's banking capital buffer stood at 14.97%. This value was high when compared to neighboring countries, for example, Malaysia 10.1% and Thailand 10.33% (CEIC, 2018). The high capital buffer value of banks in Indonesia is expected to be able to describe the bank in a healthy condition and be able to absorb losses that may occur. Besides, it can increase public trust in making transactions at the bank.

The provision of the capital buffer is related to three cost factors, namely, *the cost of funding, the cost of financial distress, and the adjustment cost* (Ayuso et al., 2004). The first is the cost of funding, which arises from holding excess capital from investments. It can be measured by knowing the value of ROE (Return on Equity). Second is the cost of financial distress, which arises because of the high ownership of bank assets in the form of credit provision. Several previous researchers used LOTA (Loan to Total Assets) as a measuring tool. Lastly, the adjustment cost, which usually arising from adjustments to events that occur at the bank.

According to Nier and Baumann (2006), to maintain the capital buffer, banks are increasing the capital level from the minimum capital requirement. For this reason, a bank whose capital buffer is below or equal to the specified minimum capital, it will increase the capital and reduce the level of risk. On the other hand, banks that have a high capital buffer will continue to increase their capital buffer along with an increase in their risk level (Milne et al., 2001). This shows the relationship between the capital buffer and banking risk.

Figure 1. Risk of Conventional Commercial Banks from 2013 to 2018.
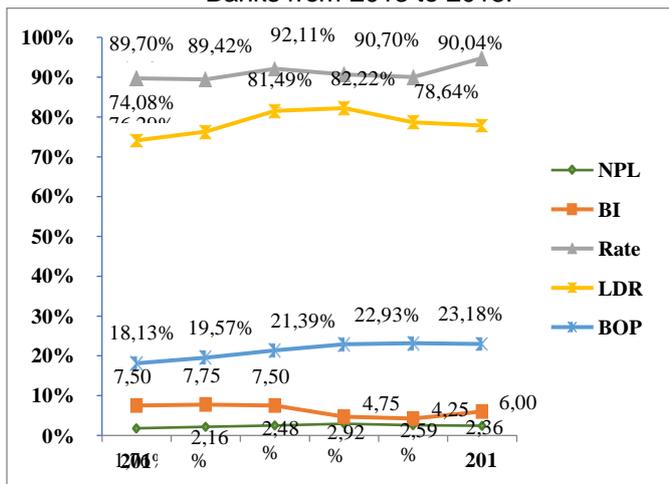
Source: OJK (2018) and the BI (2018); compiled by the author (2019).

From the graphic data above, it can be seen that the ratio of bank risk that has a positive trend with CAR as a capital buffer (i.e. an upward trend) is credit risk (NPL), liquidity risk (LDR), and operational risk (BOPO). This is in line with the findings of Maatoug et al. (2019) and Aguustuty et al. (2019) who stated that LDR and BOPO have a significant positive relationship with capital buffer. However, research conducted by Atici et al. (2012) states that the relationship between NPL & LDR and CAR is

significantly negative. Then, for market risk (BI rate), the trend is negative with CAR. This is in line with the findings of Ogege, Williams, and Emerah (2012), who state that the Domestic Interest rate has a significant negative effect on the Capital Adequacy Base/CAB. Meanwhile, based on the results of research conducted by Wulaningsih (2012), it is stated that the BI Rate has a significant positive effect on CAR.

Apart from dealing with bank risk, the capital buffer is also related to macroeconomic factors, i.e. GDP (Atici et al., 2012). The GDP itself will describe the business cycle in the country's economy. Based on the World Bank report (2018), regarding the value of domestic credit provided by Indonesian banks, which using the benchmark for GDP mentioned earlier, the direction of growth is in line with CAR growth in Indonesia, which is a positive direction. This is not in line with the results of research conducted by Stolz et al. (2005) in which the relationship between GDP and the capital buffer is negative. Besides, research conducted by Fonseca et al. (2009) with a sample of banking in Indonesia from 1992 to 2002 also shows the results of a negative directional relationship between GDP growth and capital buffer. Since when the country's economy is increasing (expansion), the risk that exists in the economy will decrease, so that banks will feel safer holding relatively low capital rather than holding the same amount of capital when the economy is decreasing (contraction).

Besides, the more increasing role of banks in Indonesia, the more banks have emerged and developed. This development will increase the size of the bank (SIZE), which can be seen from the total value of its assets (Bounchinha, 2008), banks with high assets tend to have a low capital buffer. This can occur because these banks feel that the high total assets, they have will make it easier to seek additional capital in the capital market to fulfill the capital buffer (Kleff et al, 2003). This shows that the SIZE of a bank, which is seen from the total asset ownership, will affect the bank's capital buffer.

However, if the value of the capital buffer is too high, which is not recommended, this will cause losses to the bank. This is because there are funds that should have the potential to increase operational activities and increase bank income that is not used instead, or it can be said that there are funds deposited in the bank (Pramono, 2015). For this reason, banks must take into account the factors that will affect the bank's capital buffer so that the value is not too high or excessive. Banks should be able to cover the risks faced in the future, both from internal and external sources.

Previously, several studies had been conducted on the factors that affect bank capital buffer, but the variables used were not the same as this research. To further describe the banking situation in more detail and in real terms about what are the factors that influence the current bank capital buffer, given the increasing scope of bank business in the economy, this research will use a more complete independent variable, namely, GDPG (GDP Growth) that describe the business cycle. Second is SIZE, which describes the size of the bank. Third and fourth, ROE and LOTA, which describe the costs of providing a capital buffer. The next independent variables are NPL, BI rate, LDR, and BOPO, which describe the risks faced by banks in providing a capital buffer. For the dependent variable itself, the researcher uses a capital buffer. The object of research is conventional commercial banks for the period 2010 to 2019. This is because in 2010 the implementation of Basel II regulation, which was more sensitive to risk, was implemented in Indonesian banks, and in that year, banks began to publish quarterly financial reports.

2. LITERATURE REVIEW

a. *Capital Buffer*: The Origin and Its Relationship among Bank Soundness and Economic Conditions.

The term capital buffer was conceived by the Basel Committee on Banking Supervision or BCBS as an international banking supervisor, which means as a bank buffer capital from all future losses that are unexpected (Yumanita, 2013). Learned by the crises that have occurred that some of the causes are default, excess credit, and lack of bank liquidity, BCBS issued a Basel regulation to regulate bank capital buffer so that bank capital is stronger and sensitive to risk. This is one of the macro-prudential policies aimed at maintaining overall financial system stability by minimizing possible risks (IMF in Bank Indonesia, 2014).

The capital buffer value is obtained from the difference between the real CAR and the minimum CAR of 8% (Carvallo et al, 2015). For the calculation of real CAR, we can use the following calculations :

$$\text{Real CAR} = \frac{\text{Capital}}{\text{RWA}}$$

Note:
    Capital   : The sum of Tier 1 and 2.
    RWA : The sum of RWA for credit risk, operational, and market.
From the calculations above, it can be seen that each capital includes how much risky asset (RWA) is owned. Here, the capital buffer is used

to back up from the risk of loss that exists in the asset. So, if at any time the bank experiences a risk of loss, the bank can finance or cover the loss using the capital buffer that has been previously prepared.

From the explanation above, it can be concluded that banks need to have a capital buffer as a sign that the bank is healthy (bank soundness). Healthy banks are perceived if they have sufficient capital buffer when unexpected events occur, able to pay off their debts, and banks have a high profit (Lindgre et al., 1996). Banks must have a sufficient capital buffer. Note that the value is not too high, which causes losses to the bank, because there are potential funds to develop the bank's business, but they are not used. For this reason, the bank must adjust its value to the risks and circumstances at hand. The soundness of the bank is important because the role of banking is quite dominant and is the focus of economic and financial activities, such as (i) a place to collect public funds, (ii) a starting point for other sectors to obtain financing through credit, and (iii) a place for carrying out all payment activities.

When a bank does not have sufficient capital buffer, the bank is very vulnerable to failure (bankruptcy). In a condition sample, due to risky assets and uncertainty about future debtor defaults, which will result in the bank being illiquid, so that the bank is not healthy and public trust in the bank is lost. This will cause the bank to fail. Besides, in unsanitary conditions, banks will find it difficult to keep up with changes in the market. Therefore, banks need to maintain stability and soundness.

The function of the capital buffer is not only used to maintain the health of a bank, but also to maintain the health of the banking system as a whole. Because the health of the bank reflects the health of the customer, which means that it describes the economy in general. For this reason, the health of the bank will influence macroeconomic policies taken by the regulator (government). However, the implementation of these policies must be flexible and require coordination from each policymaker. Because banks are connected (contagion effect), which can affect the macroeconomic conditions of a country.

b. Costs Associated with Capital Buffer.
1. Cost of Funding

The cost of funding is a cost that arises directly from holding excess capital above the provisions of the Central Bank (Ayuso et al., 2004). One of them is seen from the ratio of ROE or Return on Equity (Atici et al, 2012). If the value of ROE increases, it shows that bank profits have increased. So that the bank's capital buffer

will also increase (Atici et al., 2012). From this explanation, it can be seen that there is a possible positive relationship between ROE and capital buffer.

2. Cost of Financial Distress

The cost of financial distress is a cost borne by the bank due to the risks faced by the bank. The ratio that can be used to measure this cost is LOTA (Loan to Total Assets). The higher the LOTA, the lower the bank's capital buffer (Fonseca et al, 2009). It can be seen that there may be a negative relationship between LOTA and capital buffer.

3. Adjustment Cost

For a bank achieving an optimal capital ratio, the bank must bear the adjustment costs incurred. This cost arises because of the lag of the capital buffer.

c. **Basel Regulations as Guidelines for Bank Capital Buffer**

The existence of a capital buffer is also motivated by the crisis. This can occur because of the contagion effect that has an impact on macroeconomic or economic conditions at large (Rahutami, 2009). Banks are related to one another on the money market (contagion effect). If it will increase the cost of overcoming a crisis that is of high value. For this reason, a preventive measure is needed, by preparing a capital buffer for each bank (Acharya, 2009). So that the stability of the money market and the macroeconomic conditions of a country can be maintained. For this reason, the existence of a capital buffer is expected to absorb the risk of loss from changing conditions on the money market and be able to maintain public confidence in banks.

Therefore, to prevent the contagion effect of the risk of loss and for guiandce on bank capital buffers, BCBS as one of the international bank supervisors issued regulations regarding bank capital buffers in the Basel Capital Accord regulations or Basel regulations (Fonseca et al., 2009). This regulation focuses on the adequacy of bank capital, as it is one of the regulatory focuses on banks in many countries and as a focus on international coordination. Capital adequacy in this regulation is referred to as the Capital Adequacy Ratio (CAR).

Based on data Financial Services Authority (OJK), Basel regulation have some improvements, that are:

a. Basel I

Basel 1 was issued in 1988 based on debt crisis in Brazil, Argentina, and Mexico in early 1980s, that could raising internationally bank risk. This rule including capital adequacy using minimum CAR 8% from Risk Weighted Asset (RWA), where the rule only cover credit risk. The value of capital buffer can be obtained from the difference between the real bank's CAR and minimum CAR (8%).

b. Basel II

Basel II was issued in 2004 based on changes in banking industry and financial market, and also financial crisis in Southest Asia and South Asia in 1997 to1998. There was three main pilars in this rule, that are:

1. Minimum Capital Requirement

The purpose of this rule is to make bank capital more sensitive to risk by calculate credit risk, market risk and operational risk.

2. Supervision Review Process

This is necessary to ensure the bank's capital is sufficient to deal with all the risks faced by the bank.

3. Market Discipline

Banks are encouraged to increase transparency to the public regarding risks and bank capital.

c. Basel III

Basel III was issued in 2010 based on global financial crisis in 2007-2009. The purposes are: (i) increasing the capacity of the banking sector to absorb financial and economic crises, (ii) improving risk management and governance practices and strengthening transparency and disclosure in the banking sector, and (iii) strengthening resolutions for systemic banks. This rule covers 2 main points namely:

1. Strengthening the Capital Framework

Apart from the capital buffer in Basel I (minimum CAR 8%) there are also other capital buffers, namely: (i) *conservation buffer*, (ii) *Countercyclical capital buffer*, and (iii) *capital surcharge*.

Figure 2 Basel III Capital Strengthening

Callibration of the Capital Framework Capital requirements and buffers (all numbers in percent)			
	Common Equity (after deductions)	**Tier 1 Capital**	**Total Capital**
Minimum	4,5	6	8

Conservation Buffer	2,5		
Minimum + Conservation Buffer	7	8,5	10,5
Countercyclical Buffer Range	0 – 2,5		

Source: Bank Indonesia, 2012

Conservation buffer is a reserve of capital that can be used in the event of a booming economy and is used during a crisis. The value is 2.5% of the RWA. This is necessary because when the economy booming, banking tends to not increase their capital buffer, they think that risks faced are low. For this reason, another addition is needed in the form of a conservation buffer so that the risk during a boom is properly taken into account. And in times of crisis, it tends to be more difficult to get additional capital, banks can use this conservation buffer to cover the shortfall and keep the bank healthy. In Indonesia, this rule must be enforced in BUKU (Commercial Bank based on Business Activities) 3 and 4.

Countercyclical Capital Buffer (CCB) is used when the value of credit extended by banks is excessive. To prevent losses that may arise from excess credit, banks need to prepare this CCB to reduce the value of credit growth. The value of the CCB that needs to be prepared is 2.5% of the RWA. In Indonesia, the CCB applied is still 0%, due to excessive lending.

Then the capital surcharge which applied to banks with systemic risk with a value 1% of the RWA. And not all bank back this up. Banks that fall into the systemic risk category tend to have a broad scope of business, so the risks they face are also high. However, the list of banks in this category is not published. Because it is feared that it will affect public confidence in the bank.

2. Introducing Liquidity Standards
The standards introduced were (i) Liquidity Coverage Ratio / LCR for short-term liquidity standards and (ii) Net Stable Funding Ratio / NSFR for long-term liquidity standards. These two standards can be used to complement existing monitoring tools, with the aim of monitoring bank liquidity and can be used as a comparison for interbank liquidity conditions. Basel III were implemented in Indonesia in stages in 2013 until January 2019.

d. Effect of Bank Risk on Bank Capital Buffer
Based on the Basel regulation that takes into account credit risk, operational risk, and market risk in the provision of CAR, as well as from the initial calculation of CAR, which the RWA value also includes the three risks, this research will also take it into account in the determinant of the capital buffer. Then the three risks will also be related to bank liquidity.

1. Credit risk
Credit risk arises from the risk resulting from the failure of the debtor to fulfill his obligations (usually in the form of loans or debts) to the bank. The ratio that can be used to calculate credit risk is NPL or Non-Performing Loans. This ratio describes non-performing loans. Based on Bank Indonesia Regulation 15/2 / PBI / 2013, the maximum NPL ratio is at 5%. For this reason, one way to prevent non-performing loans or keep NPLs below the minimum limit is to increase capital (Latumaerissa, 2014). The higher the NPL, the lower the value of the bank's capital buffer (Atici et al., 2012). It can be concluded that it is assumed that the relationship between NPL and capital buffer is negative.

2. Market Risk
Market risk occurs in the balance sheet position or bank portfolio due to changes in market position, which consists of interest rates, exchange rates, equity, and commodities. This risk is related to the market price of the asset (Cecchetti et al., 2015). In this research, to describe market risk using interest rates, one of which can be measured is the BI rate.

If the BI rate is high, this will have an impact on banking through three channels (Warjiyo, 2003). They are the interest rate line, the credit line, and the asset price channel. Because if the BI rate increases, the impact on the capital buffer will decrease (Cecchetti et al, 2015). Therefore, it is assumed that the relationship between the BI rate and the capital buffer is negative.

3. Liquidity Risk
This risk is also commonly referred to as the risk of the bank's inability to meet its short-term obligations. One of the liquidity measurement tools is the LDR or Loan to Deposit Ratio. A bank is said to be in a liquid or sound if the LDR is at a value of 78% to 92% (Bank Indonesia

Regulation 17 of 2015). The higher the LDR, the higher the liquidity risk the bank has. If it exceeds 92%, it can be said that the bank is intensively increasing its credit, but without being matched by an increase in funding (third party funds). This is because of the negative relationship between loan (credit) and deposit ratio (LDR). Later, if the bank experiences liquidity risk because of the above, the bank can cover the shortfall in deposits through income from loan interest (Agustuty et al, 2019). So that banks do not need to reduce their capital, and the capital buffer can still increase due to additional credit interest income (Ogege et al, 2005). This shows that it is assumed that the LDR relationship with the capital buffer is positive.

4. Operational Risk

Operational risk arises due to inadequacy and/or malfunction of internal processes, human error, system failure, and/or external events that can affect the bank. For a ratio that can describe this risk, it is usually calculated using the BOPO ratio or Operating Expenses to Operating Income. Later, the higher the BOPO value, the lower the bank's capital buffer. So, it can be assumed that the relationship between BOPO and the capital buffer is negative.

e. The Business Cycle and the Importance of a Capital Buffer

Basel emerged because of the crisis in several countries, making BCBS feel the need to make regulations on the importance of capital buffers in banks. One of the macroeconomic variables that can be used to measure the business cycle is GDP Growth. Based on several studies by Alfon et al. (2005), it is stated that if the economy is experiencing an increase, banks tend to have a low capital buffer. It occurs since they think it will be easy to get additional capital and will first be saved by the government if they experience a crisis (Alfon et al., 2005). Therefore, it can be concluded that it is assumed that the relationship between GDP Growth and the capital buffer is negative.

f. Classification of Banks based on Capital to Bank Size

The bigger the role of banks in a country, the more banks appear. The banks are then grouped based on their core capital. The higher the core capital, the greater the scope of business activities, which the size of bank assets will also be higher.

Banks that have high total assets tend to have a low capital buffer (Kleff et al., 2003). The advantage of a large-sized bank is easy to get additional capital in the capital market and also

assistance from the government in case of any crisis. From this explanation, it can be concluded that it is assumed that the relationship between a bank's size (total assets) and the capital buffer is negative.

3. RESEARCH METHOD

This study used a panel data from conventional commercial banks in Indonesia from 2010 to 2019. Thus, it made up for 920 observations, obtained from their own website. The research method used is panel data regression with independent variables are GDPG, SIZE, ROE, LOTA, NPL, BIRATE, LDR, and BOPO, as well as the dependent variable capital buffer. . The panel data regression model used is as follows:

$$CaptBuff_{it} : \alpha + \beta1\ GDPG_{it} + \beta2SIZE_{it} + \beta3ROE_{it} + \beta4LOTA_{it} + \beta5NPL_{it} + \beta6BIRATE_{it} + \beta7LDR_{it} + \beta8BOPO_{it}$$

4. FINDINGS AND DISCUSSION

Due to there is a relationship between the independent variables, panel data regressions are carried out twice. The first results are as follows:

Table 1. First Stage Regression Correction Results

Variable	Coefficient	Prob.
C	51.96091	0.0000
GDPG	-1.257792	0.0000
SIZE	0.326757	0.0208
LOTA	-0.535736	0.0000
NPL	-0.596557	0.0000
BIRATE	-1.374476	0.0000
LDR	0.012466	0.0053
BOPO	0.123873	0.0000
R-squared		0.845629
Adjusted R-squared		0.840599
Prob(F-statistic)		0.000000

The second result shows the following:

Table 2. Second Stage Regression Correction Results

Variable	**Coefficient**	**Prob.**
C	63.66314	0.0000
GDPG	-0.912864	0.0000
SIZE	0.343311	0.0029
ROE	-0.152632	0.0000
LOTA	-0.576607	0.0000
NPL	-0.525715	0.0000
BIRATE	-1.205969	0.0000
LDR	0.013987	0.0019
R-squared		0.861124
Adjusted R-squared		0.856599
Prob(F-statistic)		0.000000

The two results found that simultaneously all the independent variables used have a significant effect on the capital buffer as the dependent variable. All the independent variables used have a significant effect on the capital buffer simultaneously. The interpretation of the results will be explained in the sections below.

a. Relationship between GDP Growth and Capital Buffer

From the analysis above, it can be seen that the relationship between GDP Growth and the capital buffer is significant in a negative direction. This is under previous studies conducted by Alfon et al. (2005), Bounchinha (2008), and Stolz et al., (2005). The significance of GDPG for the capital buffer can be explained if the economy is experiencing an increase (with one of the factors being that credit extended to the public is increasing). This will make the bank feel that the risk they face is low due to increased economic growth so that the expectations of the bad credit value that is faced is low. Therefore, banks do not need to increase their capital buffer.

b. Relationship between Size and Capital Buffer

As is known from the results of the analysis above, the relationship between the calculated size based on the bank's total assets to the capital buffer is significant and its direction of the relationship is positive. This result is in line with the findings of Tabak et al. (2011). Inclusion in banking is also the largest sector compared to other sectors. Therefore, it affects the increase in the deposit. If banking assets increase, it surely will also affect the value of RWA since banks will as much as possible increase their assets in productive assets.

However, despite the increasing asset value followed by increased RWA, bank capital is also increasing day by day. This is based on the Basel regulations applied in Indonesian banking. With the increasing capital strengthening that must be met, banks must also continue to increase the capital they have. This act will increase the real bank CAR that affects the increase of the bank's capital buffer.

c. Relationship ROE and Capital Buffer

From the results of the analysis above, it can be seen that the relationship between ROE as a proxy for the cost of funding to the capital buffer is significant in a negative direction. This occurs as it is known that if ROE increases, it is a sign that the bank has a high income with low total equity or capital value. Over the time that bank's capital must be further strengthened (which means that it requires a higher capital buffer), the retained earnings will be used by the bank first, which will reduce the value of the ROE.

Besides, since the cost to increase the capital buffer originating from the capital market is quite expensive, banks will delay dividend payments to investors (which will reduce ROE). It affects the increase of the bank's capital buffer through increasing retained earnings (Tabak et al. 2011). As a result, this proves that the relationship between ROE and the capital buffer is negative.

d. Relationship between LOTA and Capital Buffer

Based on the results of the analysis above, it is known that the relationship between LOTA and the capital buffer is significant in a negative direction. These results are in line with research from Fonseca et al. (2009). By having a high LOTA value, it also indicates a higher risk of assets owned since the value of credit extended has also increased. Besides, credit is one of the productive assets that have a high-risk weight. It makes the value of RWA increased that will cause a decreased capital buffer.

According to Kleff et al. (2003), if the total assets of a bank are high, then the bank tends to have a low capital buffer because they think that it will be easy to get additional capital from the capital market and assistance from the government if at any time a crisis occurs. So, this proves that there is a negative relationship between LOTA and the capital buffer.

e. Relationship between NPL and Capital Buffer

Based on the analysis above, it is known that the relationship of NPL, which is a proxy for credit risk to capital buffer, and the capital buffer is significant in a negative direction. This is in line with research conducted by Atici et al. (2012). By the increasing number of loans disbursed to the public, banks will reserve higher Provision for Loan Losses according to the credit quality of each customer (Yumanita et al., 2013). Besides, the higher assets will increase the RWA value. So that this will reduce the value of the bank's capital buffer.

Furthermore, if the bank has a high NPL, it will make the bank use its capital for its operational activities. This is because bank income from credit interest has decreased. This will also lower the capital buffer. From that, it can

be seen that the relationship between NPL and capital buffer is negative.

f. Relationship between BI Rate and Capital Buffer

Based on the results of the analysis above, it can be seen that the relationship between BI Rate, as a proxy for market risk to capital buffer, and the capital buffer is significant in a negative direction. This is in line with the findings of Ogege et al. (2012). If the BI rate increases, it will affect banks through several channels, including the interest rate channel, the credit line, and the asset price channel (Bank Indonesia website on monetary policy transmission and Warjiyo, 2003).

First, the interest rate channel, if the BI rate rises, it will have an impact on increasing bank rates. In terms of rising credit interest rates, credit applications will decrease and costs for investment will increase. This will cause investment to decline and have a decreasing impact on capital. As a result, it will reduce the bank's capital buffer. At the same time, while the deposit interest rate has also increased, it affects the increasing number of deposit (savings, current accounts, and deposits) that enter the bank and makes the bank to pay more funding interest rate obligations to customers. It will also reduce the bank's capital buffer accordingly.

Second, the line of credit and the asset price channel that are interconnected. From the perspective of the credit channel, seen from the balance sheet channel side, when the BI rate rises, it will affect the money market interest rates, which will also be increased. This will have an impact on the asset price path through declining asset prices (stocks and bonds). The bank has to pay more for the debt the bank has on the money market. At the same time, the bank's wealth and income decrease due to the decreasing asset price accordingly. It makes the bank must use capital to cover this deficiency (Cecchetti et al, 2015). It accordingly will reduce the value of the bank's capital buffer. From that, it can be seen the negative relationship of BI rate to the capital buffer.

g. Relationship between LDR and Capital Buffer

Based on the analysis above, it is known that the relationship of the LDR, as a proxy for liquidity risk to the capital buffer, and the capital buffer is significant in a positive direction. This is in line with the research of Agustuy et al. (2019) and Stolz et al. (2005). The direction of the relationship between LDR and the capital buffer is positive. This can be seen from the negative relationship between total credit and deposits owned by banks. For instance, if banks lower their interest rates, people tend to apply for credit rather than save. This will make bank credit increase accompanied by fixed (or decreasing) deposits and will make the value of the LDR increase. This increase will provide additional income for the year through the receipt of lending rates. This year's profit will be included in the tier 1 capital calculation then (Regulation number 11 of 2016), which will increase the capital buffer.

Besides, high credit interest receipts can be used to meet bank liquidity if a customer withdraws funds from the bank, even the deposit value is fixed. So that banks do not need to use their capital to cover the shortage of bank liquidity. This proves that the relationship between LDR and the capital buffer is positive.

h. Relationship between BOPO and Capital Buffer

Based on the results of the regression analysis above, it is known that the relationship between BOPO, the proxy of operational risk, to the capital buffer is significant in a positive direction. This is in line with the results of research by Agustuty et al. (2019). A significant relationship can occur because, in this case, BOPO is a proxy for operational risk, one of the objectives of the bank in carrying out its operational activities to gain a profit. Due to the benefits obtained, the bank can develop its business.

The positive directional relationship between the two shows that if a bank experiences a high BOPO value due to high operating expenses, this will erode capital. However, to cover the shortfall, the bank is also fixing the issue (one of them is by selling the assets the bank owns). The proceeds from the sale of assets will be included in the capital (because they are not an operating income). Also, the sale of these assets will reduce the value of RWA that will increase the capital (Chaterine et al, 2014).

5. Conclusion and Suggestions
a. Conclusion
Based on the research problem, which aims to determine what factors affect the capital buffer of conventional commercial banks in Indonesia from 2010 to 2019, which is then carried out on this research, the conclusion that can be drawn from the research results are as follows:
a. The GDPG, SIZE, LOTA, NPL, BIRATE, LDR, and BOPO variables simultaneously affect the capital buffer of conventional commercial banks in Indonesia for the period of 2010 to 2019.

b. GDPG affects the capital buffer partially in a negative direction. As Kasmir (2004) states that the more developed a country is, the greater the role of banks in the economy. Thus, if the economy as described by GDPG increases, the bank will consider the risks they face is low so that causing a low capital buffer.

c. SIZE, as a proxy for bank size, affects the capital buffer partially in a positive direction. Due to the increasing size of the bank, the bank will adjust the capital buffer following the regulations for strengthening bank capital that is implemented based on Basel regulations.

d. ROE, as a proxy for the cost of funding, affects the capital buffer partially in a negative direction. As time goes by, following the regulations of increasing capital strengthening, it makes banks must have a high capital buffer as well. The bank will increase it through the profit they get (ROE will decrease). It occurs since if they have to go through the capital market, it will require higher costs.

e. LOTA, as a proxy for the cost of financial distress, affects the capital buffer partially in a negative direction. It occurs since credit is one of the highest asset risks, as a result, the higher the LOTA, the higher the RWA value that causes a low capital buffer.

f. NPL, as a proxy for credit risk, affects the capital buffer partially in a negative direction. It occurs since lending is the main activity of a bank. If the NPL value is high, the reserve value will increase that will reduce capital. Besides, since credit is high, the RWA value will also increase. Furthermore, if the NPL is high, it will reduce revenue, so that the bank experiences a shortage of funds for operational activities. As a result, it will reduce the bank's capital buffer.

g. BI rate, as a proxy for market risk, affects the capital buffer partially in a negative direction. An increased BI rate will be directly related to banking through three channels. If the BI rate is high, the interest rate channel will cause banks to pay higher deposit rates. Besides, credit lines and asset prices make banks to repay debts on the money market whose value is higher while followed by falling asset prices. This will make the bank use its capital that consequently will reduce the value of the capital buffer it has.

h. LDR, as a proxy for liquidity risk, affects the capital buffer partially in a positive direction.

This is because, to maintain public trust, banks must maintain sufficient liquidity according to Bank Indonesia regulations. A higher LDR (within a safe limit) indicates that the credit channeled increases so that the credit interest income will also increase. This will increase the amount of Tier 1 capital that can be used to cover liquidity shortages without having to reduce capital. This also will increase the bank's capital buffer.

i. BOPO, as a proxy for operational risk, affects the capital buffer partially in a positive direction. By looking at this risk, it can describe bank operational activities that will affect public confidence. If the bank's operating costs increase, the bank will cover it as much as possible by selling its assets. The proceeds from the sale will be used to cover the previously used capital. The sale of assets will also reduce the RWA that will increase the bank's capital buffer.

b. **Suggestion**

This research is certainly not free from limitations; therefore, the following suggestions can be given, namely:

a. For further research, the next researcher can use the Basel III regulations for capital buffers too. This is because the regulations regarding capital buffers are more refined and more sensitive to risk, which has taken into account future risks, such as systemic risk, excess credit, and when the economy is booming.

b. The next researcher can use the Provision for Loan Losses to describe credit risk. This is because the value has taken into account the quality of the customer's credit risk.

c. The next researcher can add the lag value of the capital buffer to describe the adjustment costs. According to the results in this research, the researcher found a correlation between times.

d. For further research, the next researcher can see the effect per Commercial Bank based on Business Activities since this research has a limitation that not all of the data are available.

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