HOW DO BANKS DETERMINE THEIR CAPITAL BUFFER? EVIDENCE FROM INDONESIAN BANK

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ABSTRACT

Objective: This study aims to investigate how banks determine their capital buffer. Return on Equity (ROE), Non-Performing Loans (NPL), Capital Buffer Lag ($BUFF_{t-1}$), Loan to Total Assets (LOTA), and Income Diversification (IDIV) are some of the variables examined in this study. **Research Design & Methods**: Purposive sampling was used to collect samples for this study. It was 20 of the 42 conventional commercial banks that were listed on the Indonesia Stock Exchange in 2012-2016. In this study, multiple regression analysis was used, as well as the ordinary and two-stage least squares methods. **Findings:** The results of this study have shown that the capital buffer has a negative impact on return on equality (ROE) and income diversification (IDIV). The capital buffer was affected by Lag of Capital Buffer. This research examines how a bank can make a profit from the negative impact of ROE. Based on the results of the tests, the Indonesian Bank has not pursued the highest possible capital buffer. **Implications & Recommendations:** Companies will use their profit to further profitable activities when they fulfill a minimum capital buffer requirement. **Contribution & Value Added:** The results of this study try to give an idea for the management of capital and capital buffers and to determine the ideal strategy for investors and banks to meet the Basel and Government regulation. This research tries to add insight into the internal factors that determine capital buffers at conventional commercial banks in Indonesia, as well as research references in the field of financial management, particularly capital buffers.

Keywords: capital buffer; ROE; NPL; lag of capital buffer; LOTA; IDIV.
JEL codes: G21, G32, L84
Article type: research paper

INTRODUCTION

Banks are business entities that carry out the intermediary function (financial intermediary). Banks collect funds from parties that have excess and (surplus) in the form of deposits which then channel it to parties who need funds (deficits) in the form of credit or other forms. As an intermediary institution, banks have many risks, especially during the crisis period. If the risk is realized, the bank will lose. To avoid these losses, the bank needs to have a capital buffer as safety when facing losses.

For banks, the capital buffer is an important reserve fund provided to fulfill government regulations. Capital buffers are amounts of bank capital held in detention exceeding those determined by national regulations (Jokipii & Milne, 2008). In other words, the capital buffer is a difference between the Capital Adequacy Ratio (CAR) or the capital adequacy ratio in each bank with the minimum CAR

ratio set by banking regulations) (Jokipii & Milne, 2008; Shim, 2013). The reason for having capital buffers is usually because a bank has an assessment of the amount of risk in contrast to the regulations set by the government. In addition, the minimum capital requirements set by the government cannot necessarily cover all losses that may be experienced by banks. Therefore, banks need to provide the capital buffer as a guarantee of costs that might occur if the bank experiences capital shock and difficulties in obtaining new capital (Shim, 2013). If the bank experiences capital shock, the bank cannot meet minimum capital requirements set by the government which will then trigger adverse supervision interventions, even leading to the closure of the company.

Banking in Indonesia maintains the Capital Adequacy Ratio (CAR) to be above the capital requirements imposed by the central bank which is above 8%. It is far above the requirements of BASEL III which imposes a minimum CAR of 13%. When CAR value is too high it is also not worthy for banks since it indicates too much-detained capital which should be used for the operations and functions of the bank to generate profits.

The development of Capital Adequacy Ratio (CAR) from year to year, which continues to increase, will certainly affect the level of provision of banking capital buffers. Therefore, it is important to supervise conventional commercial banks in Indonesia that hold their capital above the requirements set by the central bank as a capital buffer (reserve).

Some previous studies discussed how government regulation affects capital buffers owned by banks (Ayuso et al., 2004; Marcus, 1984; Noreen et al., 2016). Some previous studies also compare how banks determine their capital buffer (Fonseca & González, 2010; Jokipii & Milne, 2011). But how do capital buffers reveal how banks handle risk and probability? To respond to these concerns, we may say that "overly" large capital reserves can have negative consequences for smaller banking sectors, such as reduced lending (Schoors, 2002). Given that the regulatory requirement depends on the number of loans granted, a link between bank capital and lending is established, with the additional assumption that banks face an imperfect market for their equities (Calomiris & Hubbard, 1993; Cornett & Tehranian, 1994; Myers & Majluf, 1984; Stein, 1995). The increasing regulator's reliance on capital requirements makes some issues: How banks react to capital requirements? Like the consequences when a bank is failing to fulfil regulatory guidelines. Is it enough to stimulate banks to increase their capital ratio? How do banks increase their capital ratio when they approach the regulatory minimum?

Table 1. CAR Average and Capital Buffer in Indonesian Banks (%)

Year	CAR	CAR Minimum	Capital Buffer
2012	17.43	8	9.43
2013	18.13	8	10.13
2014	19.57	8	11.57
2015	20.82	8	12.82
2016	22.27	8	14.27

Source: Processed data from Financial Services Authority (Otoritas Jasa Keuangan/ OJK) Indonesia
Note: This table provides Indonesian Bank data about Capital adequacy Ratio, CAR minimum by regulation and Capital Buffer from 2012-2016.

Coming from an explanation about capital buffer condition in Indonesia bank in Table 1, this research tries to explain which factors affect capital buffers, and whether the bank internal factors itself will affect the amount of capital buffer owned by a bank. These factors are Return on Equity (ROE), Non-Performing Loans (NPL), Capital Buffer Lag (BUFF$_{t-1}$), Loan to Total Assets (LOTA), and Income Diversification (IDIV) in this study. Even though the government regulation has determined the minimum limit of bank capital buffer, the bank would still struggle with the internal conditions itself to meet the regulation of minimum capital buffer. Value added of this research gives an idea for the management of capital and capital buffers and to determine the ideal strategy for investors and banks to meet the Basel and Government regulation. This research tries to add insight into the internal factors that determine capital buffers at conventional commercial banks in Indonesia, as well as research references in the field of financial management, particularly capital buffers.

LITERATURE REVIEW

Banking Regulation

The regulatory basis used by Bank Indonesia was adopted from the Basel Committee on Banking Supervision (BCBS) regulations. In 2008, the Basel Committee on Banking Supervision re-issued a global financial reform package, or better known as Basel III to strengthen the resilience of the quality and quantity of higher bank capital availability and the need for reserves adequacy (buffer) capital must be owned by the bank. Through Basel III, it is expected to invigorate micro prudential regulation to improve the bank health and resilience in facing a crisis. In the context of micro-prudential regulation, the Basel III framework explains about the importance of available capital buffer sufficiency for banks to require the establishment of a conservation buffer. In addition, Basel III also covers macroprudential aspects by developing indicators to monitor the level of financial system procyclicality and make the banks must be prepare buffers when good economic condition (boom period) to absorb losses with countercyclical capital buffers (Noreen et al., 2016; Shim, 2013), as well as capital surcharge which serves to reduce the negative impact on the financial system stability and the economy in the event of a bank failure on absorbing losses (Financial Services Authority, 2016). Basel III would be implemented in Indonesia in 2019, with a minimum capital regulation of 13%.

Capital Buffer

Jokipii & Milne (2008) define capital buffer as the amount of bank capital held in detention that exceeds the number of needs determined by national regulations. In other words, the capital buffer is a difference between the Capital Adequacy Ratio (CAR) or capital adequacy ratio of each bank with the minimum CAR ratio set by banking regulations (Jokipii & Milne, 2008; Shim, 2013), which in Indonesia regulation is 8% under Basel II. Prasetyantoko & Soedarmono (2010) also define capital buffer as a risk-based capital adequacy ratio of less than 8%, because the minimum capital requirement is equal to 8% for all banks in accordance with Basel I. Bank Indonesia Regulation No.12/12/PBI/2013, banks in Indonesia are required to form a capital buffer that is a capital conservation buffer of 2.5% from common equity while the countercyclical buffer ranges from 0─2.5%.

Mishkin (2008) states that banks hold their capital based on several reasons. First, capital aims to anticipate failure, a bank holds its capital to reduce the risk of not being solvable or absorbing losses. Second, the amount of capital affects the return of shareholders. Greater the capital held in the hold, smaller profits would be received to shareholders. Third, to fulfill the bank's minimum capital regulation. Therefore, having sufficient capital buffers can serve as a buffer against possible risks. With a sufficient level of capital buffer, the bank will be better prepared to deal with various risks that will occur in the future.

Effect of Return on Equity on Capital Buffer

Ayuso et al. (2004) and Jokipii & Milne (2008) use Return On Equity (ROE) as a proxy for the cost of holding capital. ROE can also exceed the remuneration demanded by shareholders and has so far been used to measure revenue versus costs. ROE is a method that can be used to measure the level of investment returns made by investors by comparing net income with equity. The higher ROE shows the greater the ability of the company to generate net income for its capital.

The higher ROE will be greater capital buffers provided by the bank because the bank retains high profit for bank reserve, so that if a shock occurs then bank is still able to carry out its business activities. High ROE indicates high profits for banks. The profit then becomes a retained asset which is used to increase the buffer for the bank. This is consistent with the explanation Pecking Order Theory, which states that the company prefers to use retained earnings as compared to having to obtain additional capital resources because it is relatively expensive. Thus, Return on Equity has a positive effect on the capital buffer.

Effect of Non-Performing Loans on Capital Buffer

Risks that are considered to have a great effect on development and growth of a bank are credit risks. This credit risk occurs as a result of bad credit or the inability of the debtor to repay the loan. When bad credit arises, it must be accompanied by a risk reserve for bad credit, because every credit given will contain an unpaid risk. Credit risk can be measured using Non-Performing Loans (NPL).

Non-Performing Loans ratio relates non-performing loans to total loans. The higher the Non-Performing Loans ratio of a bank indicates that the bank is increasingly at risk. Therefore, the bank needs to reserve funds as preparedness to deal with by charging a certain percentage of the credit disbursed (Harjito & Martono, 2014). The high level of risk faced by banks has driven banks to increase the level of the capital buffer. So, the higher Non Performing Loans will encourage banks to provide higher capital buffers. Thus the Non-Performing Loans have a positive effect on the capital buffer.

Effect of Loan to Total Assets on Capital Buffer

The loan to Total Assets ratio shows whether the growth of higher credit will have an impact on the capacity of bank capital reserves. The loan-to-total-assets ratio compares the amount of credit extended by a bank to the total amount of assets owned by the bank. When the conditions are more credit-disbursed it would face the lower credit risk, which would make the capital buffer small because the loans are financed by ownership assets. The relation between credit risk and loans for total assets is negative.

The negative relationship between LOTA and capital buffers shows at Fonseca & González (2010) when the number of loans disbursed has a negative effect on the capital buffer, banks will be taking greater risks by using the assets and will hold smaller capital buffers. When the amount of outstanding loans is high, it will reduce the capacity for banks to provide capital reserves (capital buffer) and choose to increase the number of assets in anticipation of those risks. Thus, Loan to Total Assets has a negative effect on the capital buffer.

Effect of Income Diversification Influence on Capital Buffer

Bank revenue sources no longer depend solely on earning assets, but also on fee-based revenues such as securities, investments in other banks and equity holdings in financial institutions or others. Income Diversification is a combination of interest income with non-interest income. Interest income is the bank's main income derived from the payment of funds distributed to other parties outside the bank, while non-interest income is secondary income. The ability of banks to earn fee-based income, the diversification of fund assets, and the implementation of accounting rules in the recognition of income and costs are all examples of income diversification. Elsas et al. (2010) indicate that the diversification of income increases bank profitability.

By diversifying, the bank's activities are not focused on one thing so reduce the level of bank risk, especially to reduce dependence on credit interest income. Through income diversification, banks can increase production and sales of fee-based financial services to exploit economies of scope costs by dividing inputs. The more diversified, the bank becomes independent and the business capital buffer will decrease. This is because the profits earned are re-allocated to expand the bank's market share so that capital reserves are reduced. Diversification into various business segments can reduce the company's cost of risk capital. Where income diversification activities provide benefits for banks to reduce capital buffers and can also help banks withstand shocks during a crisis. Thus income diversification activities negatively affect capital buffers.

Effect of Lag of Capital Buffer on Capital Buffer

Ayuso et al. (2004) and Estrella (2004) stated that the lag of Capital Buffer is the coefficient that interprets the measurement adjustment cost on the capital buffer. This proxy is used to reveal the cost of changes required to achieve the bank's desired model standard. A large Lag of Capital Buffer will tend to maintain and increase the level of capital buffer in the coming year. Because banks tend to

keep and enhance their capital level at an ideal position, this proxy is used to depict the costs of adjustment to obtain a higher level of capital optimally wanted by banks (D'Avack & Levasseur, 2007). So in this case, the large level of capital buffer in the previous period tends to have a positive effect on the capital buffer for the next period. The higher the level of the previous capital buffer ($BUFF_{t-1}$) will increase the level of the capital buffer in period t. In this study, the Lag of Capital Buffer is expected to have a positive effect on capital buffers.

METHODS

Data and Variable Definitions

Table 2 provides information about variables used in this research. The definition of variable and the formula for each variable are also included in this table.

Table 2. Definition of Variables

Variable	Definition	Formula
Return on Equity (ROE)	Ratio of income after tax divided by equity capital	$\dfrac{\text{Earning After Tax}}{\text{Total Equity}} \times 100\%$
Non-Performing Loans (NPL)	The total non-performing loan ratio is divided by the total loan	$\dfrac{\text{Total Nonperforming Loan}}{\text{Total Loan}} \times 100\%$
Lag of Capital Buffer	Capital Buffer for the previous period (t-1)	$\text{Lag of Capital Buffer} = BUFF_{t-1}$
Loans to Total Assets (LOTA)	The ratio of the total amount of credit distributed by the bank compared to the total assets	$\dfrac{\text{Amount of Credit Given}}{\text{Total Asset}} \times 100\%$
Income Diversification (IDIV)	The ratio of comparison between net noninterest income and net operating income of the bank	$\dfrac{\text{Noninterest Income}}{\text{Net Operating Income}} \times 100\%$
Capital Buffer (BUFF)	Difference in CAR's capital adequacy ratio with minimum capital adequacy regulation (8%)	CAR Ratio - Minimum Regulatory Requirement (8%)
Capital Adequacy Ratio (CAR)	The ratio of the ratio of own capital to bank assets that contain risks	$\dfrac{\text{Capital}}{\text{Bank Asset Based on Risk}} \times 100\%$

The criteria used in determining the sample of this study include (details in Table 3):

a. Conventional Commercial Banks in Indonesia are listed on the Indonesia Stock Exchange during the period 2012-2016.
b. Conventional Commercial Banks in Indonesia publish financial statements in a row during the period 2012-2016.
c. Conventional Commercial Banks that have suffered losses without success during the period 2012-2016.

Table 3. Research Sample

No.	Information	Number of Total
1	All Conventional Commercial Banks listed on the Indonesia Stock Exchange	42
2	Conventional Commercial Banks that do not issue financial statements	(5)
3	Conventional Commercial Banks that suffered losses	(8)
4	Conventional Commercial Banks that do not have the data needed in the study	(9)
	Number of companies that are sampled	20
	The number of observations is 20 x 5 years	100

Analysis Method

Pearson Correlation Coefficient Analysis

This coefficient analysis is used to determine the degree of relationship between the variables under study. The correlation technique used is the Pearson Product Moment correlation that is to determine the degree or strength of the reciprocal relationship between variables.

Simultaneous and Multiple Linear Analysis for Data Panel

Before regressing all the data, this study does the chow test, Hausman test, and Lagrange test to get the estimated model which can be used, after some result, this study gets Fixed Effect to be Panel Data regression model.

This research adopted the following Model 1 to investigate how banks determine their capital buffer (in Equation 1 and 2):

$$YBUFF_{it} = \beta_0 + \beta_1 ROE_{it} + \beta_2 NPL_{it} + \beta_3 LOTA_{it} + \beta_4 IDIV_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{ Equation 1}$$

$$YROE_{it} = \beta_0 + \beta_1 BUFF_{it} + \beta_2 NPL_{it} + \beta_3 LOTA_{it} + \beta_4 IDIV_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{ Equation 2}$$

To test the impact of the lag of the capital buffer, the following Model 2 used (Equation 3 and 4):

$$YBUFF_{it} = \beta_0 + \beta_1 ROE_{it} + \beta_2 NPL_{it} + \beta_3 LOTA_{it} + \beta_4 IDIV_{it} + \beta_5 BUFF_{it-1} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\text{ Equation 3}$$

$$YROE_{it} = \beta_0 + \beta_1 BUFF_{it} + \beta_2 NPL_{it} + \beta_3 LOTA_{it} + \beta_4 IDIV_{it} + \beta_5 BUFF_{it-1} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\text{ Equation 4}$$

To further test, 2SLS Model 3 used (Equation 5 and 6):

$$YBUFF_{it} = \beta_0 + \beta_1 ROE_{it} + \beta_2 NPL_{it} + \beta_3 LOTA_{it} + \beta_4 IDIV_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{ Equation 5}$$

$$YROE_{it} = \beta_0 + \beta_1 BUFF_{it} + \beta_2 NPL_{it} + \beta_3 LOTA_{it} + \beta_4 IDIV_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{ Equation 6}$$

FINDING

Analysis of Results

Table 4 gives a summary of the dependent and independent variables' descriptive statistics.

Table 4. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
BUFF	100	2.440	17.000	9.42760	3.034438
ROE	100	0.926	28.802	11.95504	6.240419
NPL	100	0.240	4.156	2.26836	1.053390
LOTA	100	49.080	79.685	66.48470	6.146382
IDIV	100	1.688	35.331	17.16524	8.066396
$BUFF_{t-1}$	100	2.440	15.800	8.44230	2.761541

Source: Data processed

Table 4 shows the minimum, maximum, and mean values of each variable. We will concentrate on the dependent variables in this study, ROE and BUFF. The BUFF variable reveals that the BUFF value in the sample ranges from 2.440 to 17.00, with a mean of 9.42760. This demonstrates that the average value of the Capital Buffer used exceeds the Basel and government rules. The ROE variable ranges from 0.926 to 28.802, with a mean of 11.955. This study will concentrate on these two variables.

Table 5 provides a summary of the correlation with Pearson Correlation for each variable. This coefficient analysis determines the degree of association between the variables studied. According to the results of Table 5, there is no correlation between the variables used in this study. As a result, it is hoped that the variables used will be able to demonstrate the conditions and phenomena that exist using appropriate statistical calculations.

Table 5. Pearson Correlation

		BUFF	ROE	NPL	LOTA	IDIV	BUFF$_{t-1}$
BUFF	Pearson Correlation	1	-0.064	-0.215	-0.149	-0.078	0.732
	Sig, (2-tailed)		0.528	0.031	0.139	0.440	0.000
ROE	Pearson Correlation	-0.064	1	-0.277	-0.351	0.234	-0.030
	Sig, (2-tailed)	0.528		0.005	0.000	0.019	0.769
NPL	Pearson Correlation	-0.215	-0.277	1	0.017	0.019	-0.156
	Sig, (2-tailed)	0.031	0.005		0.867	0.851	0.120
LOTA	Pearson Correlation	-0.149	-0.351	0.017	1	-0.515	-0.200
	Sig, (2-tailed)	0.139	0.000	0.867		0.000	0.046
IDIV	Pearson Correlation	-0.078	0.234	0.019	-0.515	1	-0.017
	Sig, (2-tailed)	0.440	0.019	0.851	0.000		0.869
BUFF$_{t-1}$	Pearson Correlation	0.732	-0.030	-0.156	-0.200	-0.017	1
	Sig, (2-tailed)	0.000	0.769	0.120	0.046	0.869	

Source: Data processed

DISCUSSION

In this research several tests were conducted (Table 6), where the first model showed the effect of ROE, NPL, LOTA, IDIV on BUFF, which is a proxy of Capital Buffer. In the first test, ROE and IDIV variables have a negative effect on the capital buffer. Negative results on the IDIV variable indicate that the company is more diversified, the capital buffer owned by the company will be smaller. Still in the first model, the second test added a lag of capital buffer. The lag of capital buffer reflects the cost of adjustments to achieve optimal capital levels. The higher the capital buffer level in the previous year will follow a higher capital buffer level in the following year. From the second test, by adding a lag of buffer, the regression results show the variables of ROE, IDIV and lag of capital buffer affect the capital buffer. This means that the banking industry in Indonesia tends to maintain and increase capital buffers in the periods ahead. The results of this study are consistent with the research conducted by Ayuso et al. (2004) and Estrella (2004), which state that Lag of Capital Buffer Loans positively and significantly influence Capital Buffers.

Table 6. Significance Table

Variable	Model 1 (Fixed Effect)		Model 2 (Fixed Effect)		Model 3 (Fixed Effect 2SLS)	
	BUFF	BUFF	ROE	ROE	BUFF	ROE
BUFF	-	-	-0.4678***	-0.3515***	-	-0.467***
ROE	-0.233**	-0.1680**	-	-	-2.233***	-
NPL	-0.0813	-0.2438	-2.497***	-2.199***	-0.0813	-2.497***
LOTA	-0.0088	-0.01795	-0.0583	-0.04511	-0.0088	-0.058
IDIV	-0.1422**	-0.1353**	0.0848	0.0868***	-0.1422	0.084
BUFF$_{t-1}$	-	0.3459***	-	-0.3662***	-	-

Source: Data processed

Several previous studies linking profitability and capital buffers get a positive direction. The first test in this study finds a negative ROE significance value. Regression results in the first model show a negative relationship between ROE and the Capital Buffer. Based on these results from the first model that uses capital Buffer as the dependent variable, in model 2, ROE is employed as dependent variable to assess whether the two variables are interrelated directly. In model 2, NPL variables and also IDIV have a negative effect on ROE. This means, the fewer bad loans occurred and also the less diversified company income, the amount of income owned by the company will increase. Again focusing on the ROE variable with Capital Buffer, the results of this regression show the same direction with the first model that is negative. From 2SLS tests, mean profitability and capital buffer interrelate negatively with ROE and BUFF.

This result means the more profit companies can get, the less capital buffer the company will have (shown in Figure 1). If the ROE is high, it is more expensive if the bank still holds its excess capital.

To maximize profit banks, a lower capital buffer should be maintained if the cost of capital is high. In the previous research, Ayuso et al. (2004) and Jokipii & Milne (2008) discovered that banks are trying to reduce their holding when the cost of capital is high. The Capital Buffer- ROE relationship is negative. In more studies, Ayuso et al. (2004) and Jokipii & Milne (2008) found out about the cyclical conduct of Finland's European bank buffer of money. This research uses ROE as a capital buffer determinant, which has negative consequences. Jokipii & Milne (2008) claim that ROE can surpass the shareholders' remuneration demand and that ROE is a revenue measure instead of the cost before this condition is met. Banks can try to get a high level of earnings substitutes, and make these earnings as a capital buffer against the incoming unpredicted shocks. Capital raising is therefore costly and banks often employ retained revenue to boost capital buffers.
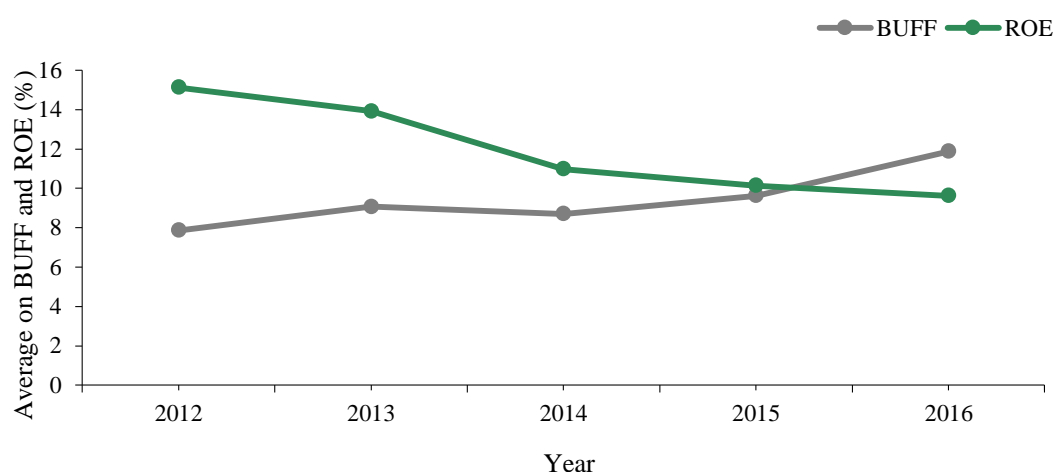

Figure 1. Capital Buffer and Profitability Condition
Source: Data processed

CONCLUSION

The main purpose of this study was to investigate which factors determine Indonesian banks' capital buffers, which in this study shows that Return on Equity, Income diversification, and lagged capital buffers negatively affect capital buffers. The result of this research is that banks can try to get a high level of earnings substitutes, and make these earnings as a capital buffer against the incoming unpredicted shocks. Capital raising is therefore costly and banks often employ retained revenue to boost capital buffers. For future research about capital buffers in Indonesia banks can expand the data range to account for effects not seen yet in this research. The next study might focus on a specific event, such as a crisis or the implementation of a new regulation, which could have an impact on defining the capital buffer. Further research could discuss the impact of income diversification. This research tries to give an idea for the management of capital and capital buffers and to determine the ideal strategy for investors and banks to meet the Basel and Government regulation. This research tries to add insight into the internal factors that determine capital buffers at conventional commercial banks in Indonesia, as well as research references in the field of financial management, particularly capital buffers.

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