



**Article history:**

Received: 2019-02-11

Revised: 2019-03-19

Accepted: 2019-06-29

**Keywords:**

Bank size, Capital adequacy ratio, Leverage, Liquidity, Loan asset ratio, Loan loss reserve, Net interest margin

**JEL Classification:** C33, G21, G30

**Kata kunci:**

Ukuran bank, Rasio kecukupan modal, Leverage, Likuiditas, Rasio aktiva pinjaman, Cadangan kerugian pinjaman, Margin bunga bersih

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## Determinants of capital adequacy ratio on banking industry: Evidence in Indonesia Stock Exchange

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### Abstract

Capital adequacy ratio (CAR) is an important indicator of bank safety sustainability. Banks that can guarantee CAR means the bank has the power to resist the financial crisis, protecting the bank itself and funds from depositors. This study aimed to determine the factors that affect the CAR. The sample used in this study is the banking industry listed on the Indonesia Stock Exchange (IDX) from 2007 until 2018. Independent variables are bank size, leverage, loan loss reserves, net interest margin, loan assets ratio, and liquidity. The dependent variable is CAR. The number of samples is 27 conventional banks by using purposive sampling. By using panel data regression analysis by estimating ordinary General Least Squares (GLS) method. The results of this study indicate that bank size, leverage, loan loss reserve, net interest margin, and loan asset ratio has an effect on CAR significantly while liquidity has no effect on CAR. The results of this study are expected to be used as a reference for bank managers and investors in looking at the factors that affect the CAR in the banking industry.

### Abstrak

Rasio kecukupan modal (CAR) merupakan indikator penting untuk keberlanjutan keselamatan bank. Bank yang dapat menjamin CAR berarti bank memiliki kekuatan untuk melawan krisis keuangan, melindungi bank itu sendiri dan dana dari deposan. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang memengaruhi CAR. Sampel yang digunakan dalam penelitian ini adalah industri perbankan yang terdaftar di Bursa Efek Indonesia (BEI) dari tahun 2007-2018. Variabel independen adalah ukuran bank, leverage, cadangan kerugian pinjaman, margin bunga bersih, rasio aset pinjaman, dan likuiditas. Variabel dependen adalah CAR. Jumlah sampel adalah 27 bank konvensional dengan menggunakan purposive sampling. Dengan menggunakan analisis regresi data panel dengan metode pendekatan General Least Square (GLS). Hasil penelitian ini menunjukkan bahwa ukuran bank, leverage, cadangan kerugian pinjaman, margin bunga bersih, rasio aset pinjaman berpengaruh signifikan terhadap CAR sedangkan likuiditas tidak berpengaruh terhadap CAR. Hasil penelitian ini diharapkan dapat digunakan sebagai referensi bagi manajer bank dan investor dalam melihat faktor-faktor yang memengaruhi CAR di industri perbankan.

**How to Cite:** Usman, B., Lestari, H. S., & Puspa, T. (2019). Determinants of capital adequacy ratio on banking industry: Evidence in Indonesia Stock Exchange. *Jurnal Keuangan dan Perbankan*, 23(3), 443-453. <https://doi.org/10.26905/jkdp.v23i3.2981>

## 1. Introduction

Banking is one of the most important industries in the world and bank capital regulations are one of the most important aspects of regulation. This advantage comes from the central role of banks in financial intermediation, the importance of bank capital for bank soundness and the efforts of the international community to use the same bank capital standards (Santos, 2001). Banking has a strategic role whose main function is as a financial intermediary, an institution that can raise funds and channel funds to the community effectively and efficiently.

King & Levine (1993) argue that the banking sector facilitates the function of financial intermediation by transferring deposits to productive investments. Taswan (2010) explains that a bank is an institution or company whose activities raise funds in the form of demand deposits, deposits, savings and other savings from the surplus spending unit and then put them back to deficit spending units through sales financial services that can improve the welfare of the people.

Thoa & Anh (2017) argue that regulations for bank safety operations and the adequacy of bank capital have been standardized by the capital, asset quality, management, earnings, and liquidity (CAMEL) method and protection, effective financial structure, asset quality, rate of return and cost, liquidity and sign of growth (PEARLS) method. CAMEL method codifies operational areas in commercial banks such as capital, asset quality, management, earning and liquidity through qualitative methods and quantitative indicators. Capital assessment on CAMEL method is an assessment based on capital owned by a bank. The bank's CAR ratio is indispensable to prevent bankruptcy of banks and to protect depositors' funds based on standards set out in Basel I with a minimum CAR of 8 percent. CAR is an important indicator for bank safety sustainability. Banks that can guarantee CAR means the bank has the power to resist the financial crisis,

protecting the bank itself and funds from depositors.

Capital adequacy ratio (CAR) is the ratio used by regulatory authorities in the banking sector to assess the soundness of the banking system and ensure that banks can determine the level of capital adequacy from the possibility of losses arising from bank operations (Aspal & Nazneen, 2014). The higher the CAR ratio indicates the strengthening of banks and the increased ability of banks to protect funds from investors. This ratio ensures that banks are able to meet other obligations and risks such as operational risk, credit risk and market risk. Dang (2011) argues that the capital adequacy ratio shows the bank's internal strength to bear the losses incurred when the bank is in a period of crisis.

Thoa & Anh (2017) conducted research on commercial banks in Vietnam by using bank size, leverage, loan loss reserve, net interest margin, loan to assets ratio, and liquidity that have influence on capital adequacy ratio. The result of his research stated that bank size and leverage have no effect to CAR while loan loss reserve, loan to asset ratio, net interest margin and liquidity have influence on CAR.

Bank size is a description of the size of a small company (Taswan, 2010). Thoa & Anh (2017) use the natural logarithm of total assets to measure bank size. The more assets a bank has, the larger the size of the bank. Bank size is the number of assets owned by the bank. The balance sheet of large banks with small banks has a difference where large banks tend to conduct securities trading to get short-term profit, while small banks prefer to invest in securities and loans. Buyuksalvarci & Adioglu (2011) argue that bank size is important because bank size is closely related to bank ownership and its access to capital reflects the interests of a bank in avoiding bankruptcy or managerial risk. Thoa & Anh (2017) in his research revealed that bank size has no effect on CAR. A study conducted by Al-Sabbagh (2004) on commercial banks in Jordan found that bank size had a negative influence on CAR. Another study

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conducted by Gropp & Heider (2009) revealed that bank size is an important factor affecting the risk of capital having the opposite effect in which large size banks have smaller capital adequacy ratios. Bateni, Vakilifard, & Asghari (2014) conducted research on banks in Iran by measuring the size of a bank using natural logarithms of total assets owned by banks. The results revealed that if the size of the larger the bank's capital adequacy ratio is lower. Large-size banks have high levels of security and lower risk so that the level of capital adequacy is not as big as smaller banks.

Edson (2015) argues that financial leverage in banks is when the bank is financed by debt derived from all types of deposits such as loans, income tax payable, and other liabilities. Leverage is a fundamental concept in finance that means the extent to which banks fund their assets by using more loans than bank equity (Ingves, 2014). Banks that use more loans than owned equities mean banks have high leverage ratios. Thoa & Anh (2017) stated that bank leverage ratio can be measured by calculating total equity to total liabilities. Dreca (2013) argues that banks with high leverage ratios use more equity to finance their assets than using their liabilities. Buyuksalvarci & Adioglu (2011) in his research revealed that leverage has a negative effect on CAR. Thoa & Anh (2017) revealed that leverage has no effect on capital adequacy ratio. Dreca (2013) revealed that leverage has a significant influence on capital adequacy ratio. Ho & Hsu (2010) conducted research on banks in Taiwan during 2001-2006 found that leverage has a positive influence on capital adequacy ratio. Aktas et al. (2015) conducted a study on capital adequacy ratio in South Eastern European found that leverage ratio has a negative effect on CAR and significant at 1% level. The impact is very weak because the coefficient is close to zero. Negative influence shows that when leverage ratio increases then CAR will decrease. High risk can be measured with high leverage, which can motivate managers to use higher debt financing because more expensive equity financing is used as an alternative.

Loan loss reserve is a prudential regulation and supervisory concept against a bank to ensure that banks establish LLP (loan loss provisions) at a rate equivalent to the level of risk in their loan portfolio (Isa et al., 2015). Loan loss provisions represent funds derived from a portion of bank cash or cash equivalents and are set aside to cover potential loss estimates in the loan portfolio. When the loan is repaid this reserve account will shrink, because there is no need to hold the existing backup fund. Thoa & Anh (2017) stated that loan loss reserve in a bank can be calculated by using measuring instrument that is calculate loan loss provision ratio to total loan (total loan). In his research revealed that loan loss reserve has a significant negative effect on capital adequacy ratio. Based on research conducted by Buyuksalvarci & Adioglu (2011) indicates that loan loss reserve (LLR) has a positive effect on CAR. The higher the LLR level of a bank indicates that reserves for credit losses are high as well. CAR ratios are also required to accommodate losses faced by banks from any risky credit.

Net interest margin is the measurement of the difference between the interest income generated by the bank and the amount of interest paid to the creditor (for example customer deposits) on the amount of bank assets (Ongore & Kusa, 2013). The calculation of net interest margin is expressed as a percentage of what a financial institution obtains on a loan within a certain period of time and other assets less the interest paid on loan funds divided by the average amount of the income-generating assets in that time period. The net interest margin of a bank can be calculated by dividing net interest income against productive assets (Mekonnen, 2015). In a study conducted by Dreca (2013) argues that higher profitability provides better opportunities to raise new capital. NIM variable has positive effect with CAR. Research conducted by Thoa & Anh (2017) in his research found that NIM has a positive influence on CAR because banks that maintain a lot of income allows banks to increase capital through retained earnings and give a positive signal on the

value of the company. This high revenue value provides easy access for bank managers to manage equity capital and minimize risk taking. Iloska (2014) found a positive influence between net interest margin and bank capital in Macedonian State. The high net interest margin shows high profitability because it can increase bank capitalization. This condition is expected to bring positive impact where the bank is in an optimal position as an intermediary institution as well as a business entity (Sidabalok & Viverita, 2011).

Loan asset ratio is the ratio used to measure the impact of the loan in the asset portfolio (Dreca, 2013). If the credit (loans) provided by the bank increases then the risk faced by the bank is also high. Banks need to be alert to the risks of bad loans. An increase in risk leads to high capital ratios to compensate depositors' funds because banks have taken a high risk. The loan asset ratio measures the amount of credit granted by the bank against the amount of assets owned by the bank. The higher the LAR ratio, the worse the liquidity of a bank, this means that the bank is unable to meet its short-term liabilities because the amount of assets owned by the bank is insufficient to finance the loan already promised by the bank (Batani, Vakilifard, & Asghari, 2014). Thoa & Anh (2017) stated that the loans to asset ratio in a bank can be calculated using the formulation by dividing the total loans to the total assets. The research done by Batani, Vakilifard, & Asghari (2014) found that the loan assets ratio has a positive effect on capital adequacy ratio. Thoa & Anh (2017) revealed that the loan to asset ratio has a negative influence on capital adequacy ratio. Buyuksalvarci & Adioglu (2011) analyzed the factors affecting the capital adequacy ratio of LOA results showed that credit (LOA) had a negative effect on CAR. Mili et al. (2017) argue that an increase in the loan tends to decrease CAR. This explains the regulation of capital may decrease after the extension of the crediting period.

Taswan (2010) argues that bank liquidity is the ability of banks to meet the possibility of with-

drawal of deposits and other liabilities or meet the needs of the community in the form of lending (credit) and other placement of funds. Liquidity in banks is an issue on both sides of the bank's balance sheet. On the liabilities side of the bank must be able to meet the obligations to customers when the withdrawal of customer deposits. On the assets side of the bank must be able to afford the credit disbursement promised at the beginning. Thoa & Anh (2017) revealed that liquidity has a positive influence on capital adequacy ratio. (Jaber & Alkhawaldeh, 2014) conducted a study using data from Saudi Arabia for the period 2007-2011 regarding the determinants of the capital adequacy of banks. The results of this study found that liquidity risk, interest risk and asset returns have a positive effect on capital adequacy. Research conducted by Abusharbeh et al. (2013) states that liquidity positively affects the capital adequacy ratio because banks have sufficient funds to maximize the withdrawal of funds made by customers and protect the bank's capital from potential losses.

Prior research conducted by Dreca (2013) on capital adequacy ratio in banks in Bosnian state by using ordinary least square regression revealed that loans, ROA, deposits, bank size, ROE, and leverage have a significant influence on CAR while loan loss ratio and net interest margin has no significant effect. Buyuksalvarci & Adioglu (2011) conducted a study of the determinants of CAR on banks in Turkish countries using annual financial report data during 2006-2011 for 120 observations using secondary data. Capital adequacy ratio is used as the dependent variable while the independent variables are bank size, loans, loan loss reserve, liquidity, net interest margin and leverage. The result of the research found that the loan, loan loss reserve, leverage, ROA and ROE have significant influence with CAR while bank size, liquidity and net interest margin have no effect on CAR. From the above explanation, the researcher is interested to know how the influence of bank size, leverage, loan loss reserve, net interest margin, loan to assets ratio, and

liquidity to capital adequacy ratio at Conventional banks in Indonesia to can provide benefits for bank managers in making decisions when bank capital is insufficient to bear the risk of each credit and for helping investors before deciding to invest capital in a Conventional bank. Investors should invest their capital in banks that have a high CAR.

## **2. Hypotheses Development**

Al-Sabbagh (2004) examined commercial banks in Jordan on the determinants of capital adequacy ratio to find the bank size negatively affect the capital adequacy ratio. Banks with large size indicate that the bank has a high level of security. The bank has a capital large enough to bear any risky assets which means the bank has a lower level of risk so that the CAR owned is getting lower. Yu (1996) argues that large banks in Taiwan have significantly lower capital ratios than small banks that are consistent with previous studies in which large banks do not think of failure because the numbers are large enough. Reynolds, Ratanakomut, & Gander (2000) studied the financial structure and performance of banks from 1987 to 1997. Capital adequacy has a negative influence with bank size, so that large banks have lower capital adequacy ratios, and more profitable banks have more capital adequacy high. Based on the above studies, it can be formulated hypotheses as follows:

H<sub>1</sub>: bank size has negative significant effect on capital adequacy ratio

Jucá, Sousa, & Fishlow (2012) analyzed banks in Brazil and North America to determine the main factor of capital requirement for the period 2004-2010 using multiple linear regression. They found that the determinants of capital structure also had an influence on determining bank leverage levels. Ho & Hsu (2010) analyzed the effect of leverage on capital adequacy in Taiwan during 2001-2006. They found that the limitation of CAR effects firm performance significantly and positively effects lever-

age. Banks that have a low level of leverage will have low equity capital which will be difficult to find an increase in new equity and will continue to be sustainable. Based on the above studies, it can be formulated hypotheses as follows:

H<sub>2</sub>: leverage has positive significant effect on capital adequacy ratio

Dreca (2013) argues that the negative ratio to loan loss reserves means that when banks are in a difficult period, banks will be slower to adjust capital ratios. Blose (2001) found a negative influence between the capital adequacy ratio and the loan loss reserves. Banks that make announcements of loan loss reserves and impairment will result in a decrease in the capital adequacy ratio. Thoa & Anh (2017) found that loan loss reserve has a negative effect on capital adequacy ratio. Based on the above studies, it can be formulated hypotheses as follows:

H<sub>3</sub>: loan loss reserve has negative significantly effects on capital adequacy ratio

Dreca (2013) argues that higher profitability provides better opportunities to raise new capital so net interest margin (NIM) has a positive effect on CAR. The high NIM in a bank shows a high level of profitability because it can increase the capitalization of the bank. The results of the Dreca (2013) study show that NIM variables have a positive effect on CAR. Aktas et al. (2015) found that net interest margin had a positive effect on CAR. Thoa & Anh (2017) found that net interest margin has a positive influence on capital adequacy ratio. Based on the above studies, it can be formulated hypotheses as follows:

H<sub>4</sub>: net interest margin has positive significantly effects on capital adequacy ratio

Thoa & Anh (2017) found that the loan asset ratio has a negative effect on capital adequacy ratio. Dreca (2013) conducted a study on CAR results

from his research showed that the LOA variable has a negative effect on CAR. Buyuksalvarci & Adiglu (2011) revealed that credit (LOA) has a negative effect on CAR. Aspal & Nazneen (2014) found that Loans had a negative effect on CAR. In the research Nuviyanti & Anggono (2014) found that the Loans have a negative influence on CAR indicates an increase in loans, interest income and profitability will increase so that banks have a high incentive to provide protection for the owner's capital. Based on the above studies, it can be formulated hypotheses as follows:

H<sub>5</sub>: loans asset ratio has negative significantly effect on capital adequacy ratio

Jaber & Al-khawaldeh (2014) conducted a study of Saudi Arabia's country data for the period 2007-2011 on the determinants of the capital adequacy of banks. In this study found that liquidity risk, interest risk and asset return are positively correlated with Capital Adequacy. In the research of Distinguin, Roulet, & Tarazi (2013) use the company's Balance Sheet data to determine the effect of bank liquidity and capital regulation. Their study used data from publicly traded banks in the EU and the United States from 2000-2006. Their study found that banks tend to reduce capital regulation when the bank faces higher liquidity. The study also found that small banks in the US increase their capital when the bank faces higher liquidity or when the bank creates more liquidity.

Aktas et al. (2015) who found that liquidity has a positive effect on CAR. The study was also supported by Aspal & Nazneen (2014) which found that liquidity has a positive effect on CAR with significant value at 5% level. Thoa & Anh (2017) found that liquidity has a positive influence on capital adequacy ratio because banks have sufficient funds to

maximize the withdrawal of funds made by customers and protect the capital owned by banks from potential losses. Based on the above studies, it can be formulated hypotheses as follows:

H<sub>6</sub>: liquidity has positive significant effect on capital adequacy ratio

### 3. Method, Data and Analysis

In this study, the data used are all Indonesian conventional banks that have been listed on the Indonesia Stock Exchange (IDX) and publishes their financial statements from 2007 to 2018. In Indonesia, the total conventional banks are 44 banks that have been listed on the IDX. This data can be retrieved via the data stream. After banks with incomplete financial information, we use 27 banks for 12 years, 324 bank-year observations.

The research design used in this study a causal-comparative research is the type of research with problem characteristics like causality relationship between two variables or more because this study was conducted to determine the effect of independent variables namely bank size, leverage, loan loss reserve, net interest margin, loan to assets ratio, and liquidity to the dependent variable, namely capital adequacy ratio. The analysis method in this study uses panel regression analysis.

$$CAR = \alpha + \beta_1 SIZE_{i,t} + \beta_2 LEV_{i,t} + \beta_3 LLR_{i,t} + \beta_4 NIM_{i,t} + \beta_5 LOA_{i,t} + \beta_6 LIQ_{i,t} + \varepsilon_{it} \quad (1)$$

Where:  $CAR_{i,t}$  = Capital adequacy ratio  $i$  in year  $t$ ;  
 $SIZE_{i,t}$  = Bank size;  $LEV_{i,t}$  = Leverage;  $LLR_{i,t}$  = Loan loss reserve;  
 $NIM_{i,t}$  = Net interest margin;  $LOA_{i,t}$  = Loans to assets ratio;  
 $LIQ_{i,t}$  = Liquidity;  $\beta_{1, 2, 3... n}$  = Regression coefficient;  $\alpha$  = Constant;  $\varepsilon_{it}$  = statistical error.

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**Table 1.** Research variables measurements

Variable	Measurements	Symbol
<b>Independent Variables</b>		
Bank size	Natural Logarithm of Total Assets	SIZE
Leverage	Total Liabilities / Total Equity	LEV
Loan loss reserve	Loan Loss Provision / Total Loans	LLR
Net interest margin	Net Interest Income / Productive Assets	NIM
Loans to assets ratio	Total Loans / total assets	LOA
Liquidity	Total loans / Total Deposits	LIQ
<b>Dependent variables</b>		
Capital adequacy ratio	Capital / Risk - Weighted Assets	CAR

**Table 2.** Descriptive statistics

Variables	Obs.	Mean	Maximum	Minimum	Std. Dev
CAR	324	0.173844	0.513800	-0.238900	0.064730
SIZE	324	24.15821	27.61900	-20.86830	1.746124
LEV	324	0.132804	0.350300	0.031200	0.052161
LLR	324	0.022832	1.847400	0.000200	0.116268
NIM	324	0.056212	0.165400	-0.009500	0.025230
LOA	324	0.616120	0.837900	0.206800	0.107243
LIQ	324	0.754527	1.041200	-0.277700	0.140537

## 4. Results

Table 2 shows that it is seen that Conventional banks in Indonesia are still dominated by banks that have low CAR levels. This can be seen from the average value of CAR variables far compared to the maximum value of each variable. The average level of CAR is 17.38 percent and a high maximum value of 51.38 percent. Similarly, if measured through SIZE, the average Conventional banks in Indonesia has 24.15 percent, which is fair compared to its maximum value.

Based on Table 2, it can also be seen the NIM value by Conventional banks in Indonesia. The average Conventional banks in Indonesia has NIM is 5.62 percent. Negative value at the minimum value of NIM can be interpreted that PT. Bank Jtrust Indonesia Tbk has a lowest level of profitability.

**Table 3.** Best model selection

Model Test	Best Model
Uji Chow	Fixed Effect
Uji Hausman	Random Effect
Uji LM	Random Effect

The best model in this research is the random effect model. The estimation in random effect model based on General Least Square (GLS) until the examination of classic assumption can be ignored. The result on the analysis of the effect among the funding size, leverage, loan loss reserve, net interest margin, loan asset ratio and liquidity towards capital adequacy ratio on random effect model (LM test) can be seen through Table 3.

The model built based on random effect model still has cross-sectional dependency because, at cross section dependent test, all values of p-value are

under 0.05. In order to overcome the cross-section dependency, the next coefficient estimation needs to be done based on white cross-section estimation until the model has been invulnerable towards the dependency infraction among cross sectionals.

Based on the results of the t test using CAR as the dependent variable and using data of conventional banks listed on the Indonesian Stock Exchange in 2007-2018 are as Table 4.

**Table 4.** T-test result

Variables	Coefficient	Prob.
Size	-0.010019	0.0039
Lev	0.752734	0.0020
LLR	-0.226122	0.0010
NIM	0.159493	0.0454
LOA	-0.268099	0.0012
LIQ	0.048194	0.3725

## 5. Discussion

The first hypothesis of this study indicate that bank size negatively affect the capital adequacy ratio. The larger the size of a bank viewed from its total assets, the bank has a low CAR ratio. In contrast to research conducted Thoa & Anh (2017) found that size banks have no effect on capital adequacy ratio. The results of this study are in accordance with research conducted by Bateni, Vakilifard, & Asghari (2014) who found the negative effect of bank size on capital adequacy ratio. Where a bank that has a larger size has a smaller risk so that the CAR ratio is not as big as a bank with a smaller size. Other research that supports the research conducted by Gropp & Heider (2009) found a negative influence between the bank size to capital adequacy ratio. Banks of large size indicate that the bank has a high level of security. Because banks have large enough capital to bear any risky assets. Capital adequacy has a negative influence with bank size, so that large banks have lower capital adequacy ratios and more profitable banks have more capital adequacy high.

The second hypothesis of this study indicate that leverage has a positive effect on capital adequacy ratio. The higher the leverage level of a bank, the higher the CAR ratio of a bank. In contrast to research conducted Bateni, Vakilifard, & Asghari (2014) found that leverage has no effect on capital adequacy ratio. The results of this study in accordance with research conducted by (Ho & Hsu, 2010) where leverage has a positive influence on capital adequacy ratio. They found that a restriction on the CAR ratio would affect the performance of a bank, which significantly had a positive effect on the level of leverage. Another supporting study is (Workneh, 2014) who found that leverage has a positive effect on capital adequacy ratio. Banks that have low levels of leverage will have low equity capital. This means that banks with low leverage will find it difficult to find improvements in new equities and this will continue to do so. This study is in line with Ahmad, Ariff, & Skully (2008) also found that leverage has a positive effect on capital adequacy ratio. Banks with high leverage can find improvement in new equity.

The third hypothesis of this research stated that loan loss reserve has negative effect to capital adequacy ratio. The higher the loan loss reserve rate of a bank, the lower the CAR ratio of a bank. This study is in line with research conducted Thoa & Anh (2017) found that loan loss reserve has a significant negative effect on capital adequacy ratio. The research supporting this research result is Workneh (2014) which found that loan loss reserve has negative effect on capital adequacy ratio. The negative impact of loan losses in capital reserves is when banks experiencing financial crisis banks will have difficulty in increasing the ratio of capital adequacy. This is consistent with the research conducted by Blose (2001) in his research revealed that there is a negative influence between loan loss provisions which is a variable to calculate loan loss reserve to capital adequacy ratio. Banks that make announcements on loan losses and impairment losses will result in a decrease in the capital adequacy ratio.



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The fourth hypothesis of this study indicate that net interest margin has a positive effect on capital adequacy ratio. The higher the net interest margin of a bank, the higher the CAR ratio of a bank. This study is in line with research conducted Thoa & Anh (2017) found that net interest margin has a significant positive effect on capital adequacy ratio. Banks that have a lot of income allow banks to increase capital through retained earnings and provide a positive signal on the value of the company. High bank income values make it easy for bank managers to manage equity capital and minimize risk taking. Another study supporting the results of this study is (Iloska, 2014) who found a positive influence between net interest margin and capital adequacy ratio. The high net interest margin in a bank shows a high level of profitability because it can increase the capitalization in banks. This research is in line with Kleff & Weber (2008) research results indicate that there is a positive influence using net interest income as an indicator of profitability where the bank will increase its capital from income received by the bank. This positive influence is also consistent with research conducted by Aktas et al. (2015) found a positive effect of net interest margin on capital adequacy ratio at regression coefficient of 0.374.

The fifth hypothesis of this study indicate that the loan asset ratio has a negative effect on capital adequacy ratio. The higher the rate of a bank's asset ratio, the lower the CAR ratio of a bank. This study is in line with research conducted Thoa & Anh (2017) found that the loan asset ratio has a significant negative effect on capital adequacy ratio. This research is supported by research conducted by Mili et al. (2017) who argued that the loan asset ratio has a negative effect on capital adequacy ratio. An increase in the loan tends to decrease the CAR, which explains that capital regulation may decrease after the extension of the crediting period. Another supporting study is Aspal & Nazneen (2014) which revealed that the loan asset ratio has a significant nega-

tive effect on the capital adequacy ratio which indicates an increase in loans, interest income and profitability will increase so that banks may have high incentives to provide protection for owner's capital. The CAR ratio required by the bank should not be high because the bank is able to protect its owner's capital by earning interest earned. This result is also consistent with Dreca (2013) study which found that the loan asset ratio has a negative effect on capital adequacy ratio.

The sixth hypothesis of this study states that liquidity has no effect on capital adequacy ratio. The large or small ratio of liquidity bank does not affect the capital adequacy ratio. In contrast to research conducted Thoa & Anh (2017) found that liquidity has a significant positive effect on capital adequacy ratio. The research supporting the results of this study is a study conducted by Buyuksalvarci & Adioglu (2011) who found that the liquidity does not affect the capital adequacy ratio. This is also in line with research conducted by Irawan & Anggono (2015) who found in his research only liquidity that does not affect the capital adequacy ratio with probability value of 0.6777. This is because in the discussion of Basel III liquidity and capital adequacy ratio describes the level of bank resilience ratio in the face of financial crisis.

## 6. Conclusion, Limitations and Suggestions

### Conclusion

This study aims to determine the significant effect of bank size, leverage, loan loss reserve, net interest margin, loan asset ratio and liquidity to capital adequacy ratio. This study used 27 banks listed on the Indonesia Stock Exchange during the period of 2007-2018. Based on the description in the previous analysis and discussion, it can be concluded as follows into that bank size, loan loss reserve and credit asset ratio have significant negative effect to capital adequacy ratio. Leverage and net interest margin have a significant positive effect on capital

adequacy ratio. Liquidity does not affect the capital adequacy ratio.

### Limitations and suggestions

From the results of the research and discussion that has been done, the suggestions that can be

recommended for further research: using different proxy to obtain better results than this research and adding other variables as independent variables that can affect capital adequacy ratios such as Non-Performing Loans (NPL) in accordance with research conducted Yuanjuan & Shishun (2012).

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