

Determinants of Capital Adequacy Ratio: An Empirical Study on the Conventional Banks in Indonesia

Bambang Sudyatno^a, Elen Puspitasari^b, Yeye Susilowati^c, Sri Sudarsi^d,
Udin Udin^e, ^{a,b,c,d}Stikubank University, Semarang, Indonesia, ^eUniversitas
Muhammadiyah Yogyakarta, Yogyakarta, Indonesia, Email:
^absuditato@edu.unisbank.ac.id, ^eudinlabuan@yahoo.com

The capital adequacy ratio shows the bankability to provide funds used to eliminate the risk of loss, which is caused by a lack of capital. The purpose of this study is to test the determinants of the capital adequacy ratio. This study was conducted at conventional banks that have been listed on the IDX in 2014-2017. The purposive sampling technique was used in this study to determine the sample. The data panel is analyzed using EViews 8 software. The results show that bank performance, efficient ratio and non-performance loan have no effect on capital adequacy ratio. In contrast, the bank size and loan to deposit ratio have a negative effect and significant on capital adequacy ratio. Furthermore, the equity has a positive effect and significant on capital adequacy ratio.

Key words: *Capital adequacy ratio, size, equity, efficient ratio, non-performance loan, loan to deposit ratio.*

Introduction

Starting in 2018, the capital condition of the Indonesian banking industry is still quite good. According to data from the Financial Services Authorities in Indonesia, known as OJK, the capital adequacy ratio (CAR) of the conventional banks per February 2018 reached 23.51%. This amount is higher than the position at the end of February 2017 which reached 23.18%, wherein, the position has also moved from the level of 23.18% at the end of 2017.

At the beginning of 2019, the condition of banking liquidity is still normal and not as tight as

it is feared by many parties. This is reflected in the maintained ratio of third-party funds to the loan to deposit ratio (LDR), which is stagnant at the level of 88% - 90% as of February 2019, especially the government-owned banks. Data from Bank Indonesia (BI) recorded that bank lending in February 2019 grew 12% year on year (YOY) becomes Rp 5.254.7 trillion. This was higher than the previous month, which only grew 11.9%. While the LDR grew 5.8% YOY to RP 5.401.9 trillion, higher than January which grew 5.1%.

This condition is inseparable from the fulfillment of OJK rules related to the issuance of debt securities in the framework of the recovery plan contained in POJK No.14/POJK.03/2017. The improvement of the national banking industry is also indicated by several indicators, including, until February 2018, the total assets of the banking industry reached RP. 7.368 trillion, growing by 9.25 percent on an annual basis.

National banks must work hard to strengthen capitals and maintain healthy liquidity. This is very important to maintain the authority and guarantee of the continuation of bank operations in order to increase public trust (Behera, 2015). With regard to these problems, it is urgent for management to carry out strict supervision of their capital adequacy ratio, by increasing bank capital each year to suit the development of the bank.

Strategies to increase the bank's capital can be done in several ways, including (1) conduct a limited public offering to shareholders (rights issue), (2) inviting strategic investors and new strategic partners, both local and foreign, (3) an initial public offering - IPO, (4) through additional capital from profit provision and (5) reducing the dividend payout ratio to increase capital.

The things that are also important to be considered by bank management are the factors that influence bank capital, as measured by their capital adequacy ratio (CAR). CAR shows the ability of banks to provide funds that used to face off the risk of losses. This CAR is important because it maintains safe limits to protect customers and maintain their financial stabilities. Bank Indonesia sets a safe limit of at least 8%, so the bank's obligation to meet the safe limit by maintaining a CAR is at a minimum of 8%.

Several studies on CAR have been carried out, among others, by Bateni et al. (2014), Mouss (2018), Nuviyanti and Anggono (2014) and Dreca (2013). Bateni et al. (2014) in their research conducted in Iran found that bank size had a negative effect on CAR while the loan asset ratio (LAR), return on equity (ROE), return on assets (ROA) and equity ratio (EQR) have a positive effect on CAR. While the risk asset ratio (RAR) and deposit asset ratio (DAR) did not affect

CAR.

Hafez (2018) conducted a study in Egypt, which found that LDR had no effect on CAR, both before the crisis period and after the crisis period, while the size of the effect was positive for CAR, both before the crisis period and after the crisis period. Another finding is the return on asset has a positive effect on capital adequacy ratio in the pre-crisis period but has no effect after the crisis period.

Research conducted by Mousa (2018) conducted in Tunisia found that size, capitalization of banks (CAP), loans to total assets (TLA), ROE and deposits to total assets (T Deposit) negatively affected CAR, while ROA, capital in credits operations (CFC), operating expenses to total assets (CEA) and the rate of inflation (TINF) had no effect on CAR.

Nuviyanti and Anggono's (2014) research conducted at the Indonesia Stock Exchange found that the efficient ratio (BOPO), ROE and Net Interest Margin (NIM) had a negative effect on CAR. While Non-Performance Loans (NPL) and ROA have a positive effect on CAR. The results of other studies were carried out by Dreca (2013) in Bosnia who found that loans, deposits, size and ROA had a negative effect on CAR, while ROE and Leverage had a positive effect on CAR. While Loan Loss Reserves (LLR) and NIM have no effect on CAR. Based on the contradictory findings related to the factors that influence CAR, it is necessary to re-examine these factors to strengthen the results of previous studies.

Literature Review and Hypotheses Development

Capital for a bank is an important part that will determine the operations of the bank. A healthy bank is a bank that has strong capital to carry out its business activities. Bank capital is used to maintain liquidity health, so banks are able to carry out operating activities without experiencing liquidity problems.

Adequate bank capital requirements are absolutely necessary to encourage credit expansion and anticipate every risk threat. By definition, the bank's capital is funds invested by the owner in banking to form a banking business. Bank capital has a very important role as an absorber if losses arise. Bank capital is also an investment made by shareholders who must be in the bank and there is no obligation to return to its use.

In accordance with Bank Indonesia Regulation (PBI) No. 15/12 / PBI / 2013 concerning Minimum Capital Provision Obligations for Commercial Banks, bank capital consists of core

capital (Tier 1) and supplementary capital (Tier 2). Core capital consists of core capital the main, yes it was a paid-up capital, capital reserves and additional core capital. The main core capital (Tier 1) is a high-quality capital instrument in the form of ordinary shares and does not have a preference feature in dividend payments. Additional core capital (Tier 1), which is the improvement of innovative capital components in the form of preferred shares or subordinated debt instruments, has no time period, dividend payments are non-cumulative and do not have a step-up feature. Working complement consists of reserves that are established from profit after tax as well as loans that are equivalent to the capital. Complementary capital component (Tier 2), which is a subordinated debt instrument, has a minimum period of 5 years and does not have a step-up feature.

The capital adequacy ratio shows that the capability of banks to set up funds that are used to respond to possible losses, which result from operating activities only. This ratio is very important because it protects customers and maintains the overall financial stability of the bank. The large CAR value reflects the ability of banks to deal with the possibility of risk of loss.

CAR is determined by the Bank for International Settlement (BIS) of 8%. Banks must have a high CAR if the loans disbursed are also high because the amount of credit channelled must be backed up by large capital. Every addition of bank asset must be backed up with CAR. Bank with a high CAR will be more resistant to risk, namely the risk of default on the credit disbursed. With a high CAR, banks have sufficient capital reserve funds to bail out in the event of a default.

The CAR component is a ratio that every banker must watch out for, even if he fails to understand his interests. The failure of a bank can be caused by a failure of credit. Many loans fail to pay because there is a conflict of interest and also cannot solve loan-problems. Uncontrolled loan-problem banks can cause income to continue to decline, so they can suffer losses. Worse, these losses cannot be covered by their capital capabilities. Whatever the size of a bank's CAR, it will not be able to guarantee its ability to overcome failure. If the loan the problem cannot be solved, then a healthy credit should be the main focus in order to avoid the risk of bank failures.

The cause of his failure of other banks is liquidity. Liquidity problems are if a bank does not prepare sufficient funds to service the withdrawal of funds of its depositors so that when there are depositors who will disburse funds, the bank cannot pay it. If a bank fails to pay, then confidence in the bank collapsed. The bank will be invaded by other depositors who panic, rush and no bank can survive. Because it is necessary to have good management in credit

management so that banks can be healthier and CAR can balance liquidity and profitability interests, so that bank operations can continue to run well.

Many studies have been conducted on CAR, even though the results are still not consistent. This has become very interesting for many researchers to conduct research again on various factors that influence CAR in order to get a more definite answer empirically. Research conducted by Bateni et al. (2014) in Iran found the size of bank had a negative effect on CAR. This study have the same results with Moussa (2018) and Dreca (2013). But research This is different from the results of the study by Masood and Ansari (2016), who found that the size did not affect CAR.

Mousa (2018) conducted a study in Tunisia found that size, capitalization of banks (CAP), loans to total assets (TLA), ROE and deposits to total assets (T Deposit) had a negative effect on CAR, while ROA, capital in credits operations (CFC), operating expenses to total assets (CEA) and rate of inflation (TINF) have no effect on CAR. Nuviyanti and Anggono (2014) conducted their research on the IDX found that BOPO, ROE and NIM had a negative effect on CAR. While NPL and ROA have a positive effect on CAR.

Dreca (2013) conducted a study in Bosnia found that loans, deposits, size and ROA had a negative effect on CAR, while ROE and leverage had a positive effect. Masood and Ansari (2016) conducted a study in Pakistan found that loan loss reserves (LLR), deposit asset ratio (DAR), equity asset ratio (EAR) had a positive effect on CAR, while the loan to asset ratio (LAT) had a negative effect on CAR. While ROA, ROE, NPL and size have no effect on CAR. Therefore,

- H1:** ROA significantly effect on CAR.
- H2:** ROE has a significant effect on CAR.
- H3:** Bank Size has a significant effect on CAR.
- H4:** CAP has a significant effect on CAR.
- H5:** BOPO has a significant effect on CAR.
- H6:** NPL has a significant effect on CAR.
- H7:** LDR has a significant effect on CAR.

Methodology

This study is conducted on the conventional banks that listed on the Indonesia Stock Exchange in 2014 - 2017. The sampling method used in this study is purposive sampling. The data panel is analyzed using EViews 8 software.

The panel data regression model with the regression equation is as follows:

$$CAR = a + b_1ROA + b_2ROE + b_3Bank\ Size + b_4Cap + b_5BOPO + b_6NPL + b_7LDR + e$$

Note:

ROA = Return on asset; ROE = Return on equity; Bank Size = Total asset; CAP = Equity; BOPO = Efficient ratio; NPL = Non-performance loan; LDR = Loan to deposit ratio

Results and Discussion

Data analysis was first conducted through a descriptive to see the condition of the listed banks in general in Indonesia Stock Exchange of the periods 2014 - 2017. Table 1 below shows a description of ROA, ROE, Bank Size, Capital, BOPO, NPL and LDR.

Table 1: Description of Variables

	ROA	ROE	SIZE	CAPITAL	BOPO	NPL	LDR	CAR
Mean	0.017327	2.043686	247034.7	35181.96	0.858500	0.026954	0.853514	0.191611
Median	0.014600	0.082650	49412.50	7011.500	0.868350	0.023550	0.866200	0.184050
Maximum	0.172000	250.0000	5004795.	676190.0	1.806200	0.196000	1.125400	0.351200
Minimum	-0.074700	-0.489100	1641.000	183.0000	0.072100	0.001600	0.502700	0.017700
Std. Dev.	0.024009	22.08923	643216.5	91745.27	0.164998	0.021235	0.122950	0.047763

Skewness	2.95714 0	11.1803 7	5.40176 2	5.07663 2	1.15300 0	4.27699 0	- 0.54290 3	0.16516 7
Kurtosis	24.6993 0	126.003 1	35.9078 0	31.4168 5	15.8914 3	33.0721 4	3.71902 0	4.66975 8
Jarque- Bera	2697.80 4	83358.7 1	6398.07 9	4856.56 7	914.701 6	5213.35 5	9.04515 1	15.4518 0
Probabilit y	0.00000 0	0.00000 0	0.00000 0	0.00000 0	0.00000 0	0.00000 0	0.01086 1	0.00044 1
Sum	2.21790 0	261.591 8	316204 42	450329 1.	109.888 0	3.45010 0	109.249 8	24.5262 0
Sum Sq. Dev.	0.07320 8	61967.6 3	5.25E+1 3	1.07E+1 2	3.45747 6	0.05726 8	1.91982 1	0.28972 5
Observati ons	128	128	128	128	128	128	128	128
Cross sections	34	34	34	34	34	34	34	34

Based on Table 1, it can be concluded that:

1. The minimum value of ROA -0.0747, maximum value of 0.172, mean of 0.0173 and standard deviation of 0.024, so it can be concluded that the ability of banks to produce ROA is very different.
2. The lowest ROE value of -0.489100 and the highest value of 250, a mean of 2.043686 and a standard deviation of 22.08923. This shows that the ability of banks to generate ROE is likely to be varied.
3. The minimum value of size 1641, the maximum value is 5004795, the mean is 247034.7 and the standard deviation is 643216.5. This shows that the wealth value of each bank is very different from one bank to another.
4. The lowest CAP value of 183.0000 and the highest value is 676190.0, the mean is 35181.96 and the standard deviation is 91745.27. This shows that the bank's equity value is different from one bank to another.
5. BOPO has a minimum value of 0.072100, the maximum value is 1.806200, the mean is 0.858500 and the standard deviation is 0.164998. This shows the ability of banks to manage operating costs fairly well and efficiently.

6. The minimum value of LDR 0.502700, the maximum value is 1.125400, the mean is 0.853514 and the standard deviation is 0.122950. This shows that the bank's ability to distribute the credit is quite good.
7. The lowest NPL value of 0.001600, the maximum value is 0.196000, the mean is 0.026954 and the standard deviation is 0.021235. This shows that the ability of banks to manage loan portfolios is quite good, so that bad loans are relatively low.
8. CAR has a minimum value of 0.017700, the maximum value is 0.351200, the mean is 0.191611 and the standard deviation is 0.047763. This shows that the level of banking compliance is very good to carry out the rules and regulations.

Data analysis in this study is done electronically using EViews 8.0. The model selection is based on two test models:

Selection of the Common Effect or Fixed Effect Model

Determination of the fixed effect or common effect model to estimate panel data is using Chow test. The probability value is over or equal on 0.05, that means the pool least square model will be used, but if the probability value is < 0.05 , it must use the fixed effect model. The results of Chow test shows that the probability value of cross section $F = 0.0000$ and means < 0.05 . Therefore, the fixed effect model is more appropriate to use than the common effect model.

Table 2: Chow Test

Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.950431	(33.87)	0.0000
Cross-section Chi-square	96.128658	33	0.0000

The Sale of Random or Fixed Effect Model

Hausman test is used to choose whether the fixed effect model or random effect model is the most appropriate to use. The random effect model has the requirement that the number of unit cross sections must be greater than the number of time series. If the Chi-Square probability value is α (0.05), the random effect is accepted. However, if the Chi-Square probability value $< \alpha$ (0.05), the fixed effect is accepted. From the results of the Hausman test, it shows that the probability value is 0.0356, it means that the fixed effect model is better than the random effect. This can be seen in Table 3 below:

Table 3: Hausman Test

Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	15.031383	7	0.0356

Based on the results of testing the best model selection, it can be concluded that the most appropriate model in this study is using the fixed effect model.

Table 4: Results of Analysis of Fixed Effect Model Dependent Variable: CAR

Dependent Variable: CAR				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.466597	0.091902	5.077097	0.0000
ROA	0.167505	0.242323	0.691248	0.4913
ROE	-0.000105	0.000170	-0.615719	0.5397
LOG (SIZE)	-0.080718	0.020597	-3.918898	0.0002
LOG (CAPITAL)	0.085196	0.020492	4.157510	0.0001
BOPO	-0.027838	0.029098	-0.956699	0.3414
NPL	0.064727	0.194406	0.332947	0.7400
LDR	-0.159391	0.068803	-2.316640	0.0229
R-squared	0.735551	Mean dependent var		0.191611
Adjusted R-squared	0.613966	S.D. dependent var		0.047763
S.E. of regression	0.029676	Akaike info criterion		-3.942459
Sum squared resid	0.076617	Schwarz criterion		-3.028918
Log-likelihood	293.3174	Hannan-Quinn criter.		-3.571283
F-statistic	6.049660	Durbin-Watson stat		2.601917
Prob (F-statistic)	0.000000			

The results show that the coefficient of determination is 61.4% with a significance level of 0.000. The test results of bank size, CAP and LDR have a significant effect on CAR, while ROA, ROE, ROA and NPL have no effect on CAR.

The Effect of ROA and ROE on CAR

The test results show that ROA and ROE have no effect on CAR. This result is in accordance with Masood and Ansari (2016) which shows that ROA has no effect on CAR. Hafez (2018) also found that ROA has no effect on CAR in the period after the economic crisis.

The results of this study are incompatible with the study of Büyükşalvarcı and Abdioğlu (2011), Aktas et al. (2015), Olarewaju and Akande (2016) who found that ROA had a positive effect on CAR. Likewise, Yuanjua and Shisun (2012) found that ROA had a positive effect on CAR. Yuanjua and Shisun (2012), Nuviyanti and Anggono (2014) and Akande (2016) also found that ROE had a negative effect on CAR.

The Effect of Bank Size on CAR

The test results show that the bank size has a negative effect on CAR. The results of this study are in accordance with Aktas et al. (2015) and Akande (2016) who found that bank size had a negative effect on CAR. However, the results of this study are not in accordance with Hafez (2018) who found that bank size had a positive effect on CAR, both during the period before the economic crisis (2002-2008) and the period after the economic crisis (2009-2015).

The Effect of CAP on CAR

The results of this study indicate that CAP has a positive effect on CAR. The results of this study are incompatible with Mousa (2018) who found that CAP has a negative effect on CAR. CAP describes the value of long-term capital used for bank operations. The greater the capital itself will increase the number of assets. Therefore, the greater the capital invested in the bank will increase the value of CAR.

The Effect of BOPO on CAR

The results of this study show that BOPO has no effect on CAR. These findings are not in line with Nuviyanti and Anggono (2014) who found that BOPO has a negative effect on CAR. The results of this study indicate that BOPO size does not affect management in maintaining bank liquidity through the amount of CAR determined. This is due to BOPO relating to inside liquidity, while CAR relates to outside liquidity, so the two variables are not directly related.

The Effect of NPL on CAR

The results of this study show that the NPL has no effect on CAR. The results of this study are not in accordance with Nuviyanti and Anggono (2014) who found that NPL had a positive effect on CAR. The results of this study are also not in accordance with Chabachib, Yudha, Hersugondo, Pamungkas, & Udin (2019), Yuanjua and Shisun (2012) and Dhouibi (2016) who found that NPL had a negative effect on CAR.

NPL has no effect on CAR indicates that banks do not need high liquidity reserves to cover the occurrence of problem loans. This is due to the fact that the average value of the banking NPL is 2.70%, so there is no concern about the occurrence of problem loans.

The Effect of LDR on CAR

The results of this study show that LDR has a negative effect on CAR. The results of this study are consistent with Yuanjua and Shisun (2012) who found that LDR had a negative effect on CAR. However, the results of this study are not in accordance with Hafez (2018) who found that the LDR has no effect on CAR, both in the period before and after the economic crisis in 2008. This finding indicates that banks maintain their liquidity. If LDR rises, CAR will also increase to maintain bank liquidity. The average 85.35% of LDR is still within the corridor stipulated by Bank Indonesia. With this LDR, the level of bank compliance to maintain liquidity is quite good, so that the risk of liquidity problems can be reduced.

Conclusions

This study has proven the performance of conventional banks, both state-owned and private owned banks are still relatively good. Management efficient ratio, loan portfolio and liquidity are very good, although there are still some banks that require special attention. Compliance with regulations is very good, so the risk of losses such as bad credit is very low. Accordingly, bank management has done fund distribution activities selectively to society, so that the quality of credit provided is good. Therefore, the bank does not need to maintain a high CAR (an average of 19.16%) to guarantee the risk of losses due to bad credit

REFERENCES

- Aktas, R., Acikalin, S., Bakin, B. and Celik, G. 2015. The Determinants of Banks' Capital Adequacy Ratio: Some Evidence from South Eastern European Countries. *Journal of Economics and Behavioral Studies*, Vol. 7, No. 1, pp. 79-88.
- Batani, L., Vakilifard, H. and Asghari, F. 2014. The Influential Factors on Capital Adequacy Ratio in Iranian Banks. *International Journal of Economics and Finance*, Vol. 6, No. 11, pp. 108-116.
- Bokhari, I. H. and Ali, S.M. 2012. Determinants of Capital Adequacy Ratio in Banking Sector: An Empirical Analysis from Pakistan. *Academy of Contemporary Research Journal*, pp. 5-17.
- Behera, J. (2015). Examined the energy-led growth hypothesis in India: Evidence from time series analysis. *Energy Economics Letters*, 2(4), 46-56.
- Büyüksalvarcı, A. and Abdioğlu, H. 2011, Determinants of capital adequacy ratio in Turkish Banks: A panel data analysis. *African Journal of Business Management*, Vol. 5, No. 27, pp. 11199-11209.
- Chabachib, M., Yudha, A., Hersugondo, H., Pamungkas, I. D., & Udin, U. 2019. The Role of Firm Size on Bank Liquidity and Performance: A Comparative Study of Domestic and Foreign Banks in Indonesia. *International Journal of Economics and Business Administration*, 7(3), 96-105.
- Dhouibi, R. 2016. Bank Transparency and Capital Adequacy Ratio: Empirical Evidence from Tunisia. *International Journal of Economics, Finance and Management*, Vol. 5, No. 1, pp. 9-20.
- Dreca, N. 2013. Determinants of Capital Adequacy Ratio in Selected Bosnian Banks. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi EYİ 2013 Özel Sayısı*.
- Hafez, H. M. M. 2018. Examining the Relationship between Efficiency and Capital Adequacy Ratio: Islamic versus Conventional Banks: An Empirical Evidence on Egyptian Banks. *Accounting and Finance Research*, Vol. 7, No. 2, pp. 232-247.



- Masood, U. and Ansari, S. 2016. Determinants of Capital Adequacy Ratio: A Perspective From Pakistan Banking Sector. *International Journal of Economics, Commerce and Management*, Vol. IV, No. 7, pp. 247-273.
- Nuviyanti and Achmad Herlanto Anggono. 2014. Determinants of Capital Adequacy Ratio (CAR) in 19 Commercial Banks (Case Study: Period 2008 – 2013). *Journal of Business and Management*, Vol . 3, No.7, pp. 752-764
- Olarewaju, O.M and Akande, J.O.. 2016. An Empirical Analysis of Capital Adequacy Determinants in Nigerian Banking Sector. *International Journal of Economics and Finance*, Vol. 8, No. 12, pp. 132-142.
- Wahyudi, S., Sari, S. P., Hersugondo, H. and Udin, U. 2019. Capital Adequacy Ratio, Profit-Sharing and Return On Asset: Case Study of Indonesian Sharia Banks, *Wseas transactions on business and economics*, Vol 16, pp. 138-144.
- Yuanjua. and Shisun, X. 2012. Effectiveness of China's Commercial Banks' Capital Adequacy Ratio Regulation a Case Study of The Listed Banks, *Interdisciplinary journal of contemporary research business*, Vol 4 No.1, pp. 56-58.