A STUDY OF CAPITAL ADEQUACY RATIO AND ITS DETERMINANTS IN INDONESIAN BANKS: A PANEL DATA ANALYSIS

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Abstract - The purpose of this study is to determine the determinants of capital adequacy ratio of Bank BUKU 3 and Bank BUKU 4 in Indonesia. Determinants and its effect toward capital adequacy ratio of Indonesian banks are covered by the study. Data are gathered from monthly financial statement of Indonesian banks during 2005—2014. Regression analysis is used in this study toanalyzethe relationships between independent variables; bank size (asset), deposits, credits, nonperforming loan, liquidity coverage ratio (LCR), profitability (ROA and ROE), and net interest margin (NIM) and a dependent variable which is capital adequacy ratio (CAR). The results of this study are assets, nonperforming loan, and ROA have positive effect toward the capital adequacy ratio, while ROE, NIM, credit, and deposit have negative effect toward the dependent variable. On the other hand, liquidity coverage ratio not has any significant effect toward the capital adequacy ratio.

Keywords - Banking, Finance, Capital Adequacy Ratio, Financial Ratio, Indonesia.

I. INTRODUCTION

Banking industry in Indonesia has been growing rapidly from the past decade. Their growth is not an instance since this industry was suffered several major challenges. Challenges for this kind of industry usually comes from government's new policy and mostly from world's crisis. This industry suffered a huge financial crisis in 1997 and another financial crisis in 2008. In the end of 20th century crisis, there were many bank that got liquidated and mergered due to their poor financial performance and inability to liquidate customer's money. After suffering financial crisis, banking industry in Indonesia has enough experience in facing crisis and can perform much better than before. Nowadays, the better performance and the rapid growth of Indonesian banking industry are due to Indonesian high economic growth and the shifting of financial lifestyle by it's citizen. The number of people who use banking services is keep growing due to the need of easy, cashless, and life-time transaction without compromising with distance problem. This customer help bank get additional short-term loan from people's deposit, so they can make performing loan from customer's deposit.

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Due to bank's risk in managing their assets and customers deposit, regulators in Indonesia has set a minimum capital adequacy ratio. This ratio determines bank's ability in absorbing unexpected losses from assets that contain different level of risks. Bank regulator has createregulacy and monitor bank's capital adequacy ratio to protect depositors and maintain customer's trust. The committee whose secretariat is at the Bank of International Settlement (BIS) established in 1974 with the purpose of strengthening the stability of the international financial system (Abel and Rafael, 2007). They required active banks to hold a minimum 8% of capital adequacy ratio, with capital consisting Tier 1 capital (equity capital and disclosed reserves) and Tier II capital (long term debt, undisclosed reserves, subordinated debt, convertible securities, and loan-loss reserves) In 2004 the Committee (Basel II) on banking supervision proposed the economic capital and regulatory capital for the analysis of a new framework for bank capital regulation (Simon A. Yunisa, 2013).

The primary aim of new regulations that created by the Basel II committee as stated by Caruana (2005), is to set "…more risk-sensitive minimum capital requirements so that regulatory capital is both adequate and closer to economic capital". Economic capital is the capital level that required to cover bank's losses with a certain probability or confidence level, which is related to a desired rating (Abel and Rafael, 2007).

Capital adequacy that used for explaining bank's ability in handling assets that contain different level of risk may depend on several specific bank's variables which are bank size, deposits, loans, loan-loss reserve, liquidity, return on assets, return on equity, net interest margin, and leverage. The problem that would be examined in this research is to

know which independent variables become the determinants of the dependent variable (Bank BUKU 3 and BUKU 4's capital adequacy ratio in Indonesia) and how are their relationship.

II. LITERATURE REVIEW

Capital Adequacy Ratio

Capital adequacy ratio is one of the important concepts in banking industry, which measures the amount of a bank's capital in relation to the amount of its risk weighted credit exposures. This ratio can be determined by dividing bank's total capital to it's risk weighted assets as follows:

The result that come the calculation will tell the bank about how able they are in absorbing their losses. If their capital adequacy ratio is 10%, then the bank can lose 10% of their assets without having liquidity problem and facing the threat of bankruptcy.

Applying minimum capital adequacy ratios serves to promote testability and efficiency of the financial system by reducing the likelihood of banks becoming insolvent. When a bank becomes insolvent, this may lead to loss of confidence in the financial system, causing financial problems for other banks and perhaps threatening the smooth functioning of financial markets (Gabriel Ogere Abba 2013, p.1).

Bank Size

Bank size is determined by the total assets that they own. Bank's size is important because of its relationship to bank ownership characteristics and access to equity capital (Ahmet Büyükşalvarcı1* and HasanAbdioğlu 2011, p.6). Jackson et al. (2002) propose that the large banks wish to keep their good ratings and therefore have considerable market-determined excess capital reserves. Contrary to Jackson, Gropp and Heider (2007) found that a banking organization's asset-size is an important determinant of its capital ratio in an inverse direction, which means that larger banks have lower capital adequacy ratios. This may occur because firm size might serve as a proxy for a banking organization's asset diversifications, which reduces their risk exposure.

Deposits

Deposits is an account in bank's balance sheets in liabilitites side. Deposits is an amount of money that kept by customer in bank in order to gain interest. This account become liabilities to bank because they need to pay interest to customer in order to replace customer's opportunity in using their money.

In banking industry balance sheets, deposits usually divided into three kind of deposits which are demand deposits, saving deposits, and time deposits.

Liquidity Coverage Ratio

Bank's liquidity is a measure of how easy bank's assets can be converted to cash quickly without affecting assets' price. Bank need to liquidate their assets quickly if they need to meed their financial obligations (usually short-term obligations).

A liquid asset to customer and short term funding are included to proxy bank liquidity. Angbazo (1997) states that as the proportion of funds invested in cash or cash equivalents increases, a bank's liquidity risk declines, leading to lower liquidity premium in the net interest margins. Therefore, an increase in bank liquidity may have a positive impact to capital ratio

Profitability Ratio

Profitability ratio is usually divided into two ratios which are return on assets (ROA) and return on equity (ROE). These two ratios are usually used as a picture of bank's profitability. ROA ratio is generated from dividing net income of a bank with it's total assets while ROE ratio is generated from dividing net income with shareholder's equity.

Bank's profitability will increase when a profit-generating assets is also increase. This will make the bank hold more risky assets in order to gain more profit. Gropp and Heider (2007) found that the more profitable banks,the more chance they tend have more capital relative to assets.

Net Interest Margin

Net interest margin is a ratio which defined the ratio of net interest income to average earning assets. This ratio summarized bank's net interest rate of return. This ratio is also become an important part of bank profitability. More specifically, adequate net interest margins should generate adequate income to increase the capital base as risk exposure increases (Angbazo, 1997).

Credits

Credits arethe total amount of money that bank lends to the borrower. The credits can be in local currency and also in foreign currency. This account can gain income since the borrower who borrow an amount of money to the bank need to pay interest for it.

The major source of banks credits are from customer who has deposits in the bank and also usually from the central bank in the country where they operating at.

Nonperforming Loans

Nonperforming loans is loans that are no longer gaining income for the bank that owns them. Loans become nonperforming when borrowers facing problems in making payments and the loans enter default. The exact classification of nonperforming loans varies for each institution. Regarding the classification, a loan is usually considered a nonperforming if it has been in default for three until six consecutive months.

Banks usually report their ratio of nonperforming loans to total loans as a measure for the quality of their outstanding loans. A small NPL ratio indicates

small losses for the bank and good quality of credits, while a larger NPL ratio defines larger losses for the bank as they need to writes off the bad loan.

III. METHODOLOGY

In this research, the author uses linear regression analysis and panel data methodology to examine the correlation between Bank BUKU 3 and Bank BUKU 4 ‘s capital adequacy ratio (dependent variable) and their determinants (bank size, deposits, credit, liquidity coverage ratio, return on assets, return on equity, net interest margin, and non performing loan) of Bank BUKU 3 and Bank BUKU 4 in Indonesia during 2005-2014. Bank’s capital adequacy ratio and it’s determinants will be processed using Eviews. Below is the picture of methodology used in this research:

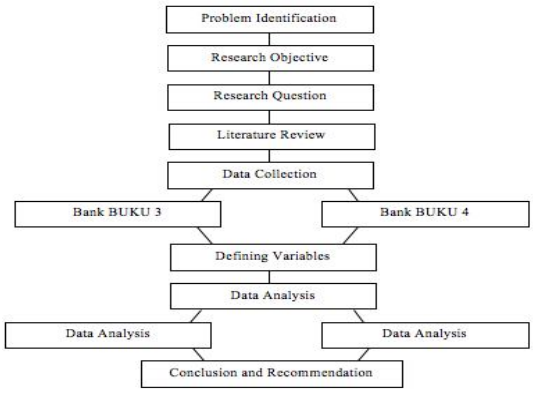


Figure 1

In order to analyze the relationship between the capital adequacy ratio and its determinants, a model is required to do regression analysis. The following econometric model are created in order to find the relationship significance of assets, credits, deposits, ROA, ROE, NIM, LCR, and NPL toward the dependent variable.

$$CAR = \beta_0 + \beta_1 ASSETS + \beta_2 ROA + \beta_3 ROE + \beta_4 NIM + \beta_5 CREDITS + \beta_6 DEPOSITS + \beta_7 LCR + \beta_8 NPL + e$$

IV. DATA ANALYSIS

Regression analysis using statistical software is done in order to find the correlation between capital adequacy ratio and its determinants.

Descriptive Statistics									
	CAR	ASSET	ROA	ROE	NIM	CREDIT	DEPOSIT	LCR	NPL
Mean	0.189881	1.06E+08	0.013773	0.104300	0.029671	66209282	84532106	0.286198	0.030983
Median	0.170264	54525672	0.011748	0.088988	0.025244	35327292	43369738	0.275207	0.025364
Maximum	0.684713	6.77E+08	0.059242	0.415419	0.157779	4.90E+08	6.00E+08	0.729646	0.280043
Minimum	0.063909	3625026.	-0.005605	-0.057384	0.000996	2674266.	2772242.	0.079191	4.82E-09
Std. Dev.	0.072043	1.26E+08	0.009908	0.075332	0.023048	81405559	1.04E+08	0.099010	0.031124
Skewness	2.58225	2.11315	1.06082	0.978572	1.68916	2.52129	2.12944	0.640442	4.43835
Kurtosis	12	7,390,085	4,072,037	3,691,816	7,362,574	9,959,633	7,401,967	3,422,334	2,976,167
Jarque-Bera	10976.44	3,527.768	536.8076	409.3575	2,892.278	7,017.096	3,563.957	172.8078	75523.39
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	4,329,282	2.42E+11	3,140,213	2,378,051	6,764,909	1.51E+11	1.93E+11	6,525,317	7,064,124
Sum Sq. Dev.	1,182,829	3.62E+19	0.223732	1,293,301	1,210,613	1.51E+19	2.47E+19	2,234,087	2,207,606
Observations	2280	2280	2280	2280	2280	2280	2280	2280	2280

Figure 2

As shown in the table above (Figure 2), the capital adequacy ratio has mean value of 0.13773, which mean that 19 banks that categorized as Bank BUKU 3 and Bank BUKU 4 has maintain their capital adequacy. Meanwhile, these banks that categorized as Bank BUKU 3 and Bank BUKU 4 has mean value of 1.06E+08 (in million rupiah), 0.013773, 0.104300, 0.029671, 66209282 (in million rupiah), 84532106 (in million rupiah), 0.286198, 0.030983 for asset, ROA, ROE, NIM, Credit, Deposit, LCR, NPL respectively.

4.1. Hausman Test

Hausman Test is conducted in order to determine whether it is better to use fixed effect or random effect.This test needs to be done before doing the regression analysis.

Hausman Test			
Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.66560400	8	0.0081

Figure 3

The hausman test (figure 3) showed that this study should use fixed effect instead of fixed effect (prob>chi2 smaller than 0.05)

4.2 Regression Analysis

Fixed Effect				
Fix effect weighted and white cross section				
Dependent Variable: CAR				
Method: Panel EGLS (Cross-section weights)				
Date: 07/14/15 Time: 16:06				
Sample: 2005M01 2014M12				
Periods included: 120				
Cross-sections included: 19				
Total panel (balanced) observations: 2280				
Linear estimation after one-step weighting matrix				
White cross-section standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.183868	0.003200	57.457950	0.0000
ASSET	3.88E-10	7.69E-11	5.050820	0.0000
ROA	3.254394	0.257537	12.636620	0.0000
ROE	-0.300182	0.038304	-7.836821	0.0000
NIM	-0.458960	0.075334	-6.092317	0.0000
CREDIT	-2.55E-10	7.63E-11	-3.345876	0.0008
DEPOSIT	-3.44E-10	1.03E-10	-3.328331	0.0009
LCR	0.003208	0.007719	0.415614	0.6777
NPL	0.324727	0.019634	16.539320	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
Weighted Statistics				
R-squared	0.577712	Mean dependent var		0.241628
Adjusted R-squared	0.572839	S.D. dependent var		0.085030
S.E. of regression	0.037859	Sum squared resid		3.229236
F-statistic	118.5472	Durbin-Watson stat		0.329059
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.691866	Mean dependent var		0.189881
Sum squared resid	3.64470	Durbin-Watson stat		0.229753

Figure 4

From the regression analysis that has been done using fixed effect (Figure 4), it could be seen that asset, ROA, ROE, NIM, credits, deposits, and NPL are statistically affecting Capital Adequacy Ratio (each of it has P>|z| smaller than 0.05) with ROE, NIM, Credit, and Deposit has negative effect on CAR, while Liquidity Coverage Ratio is not significantly affecting the dependent factor (LCR P>|z| larger than 0.05).

Each of these determinants has their own coefficient that will explain the impact of determinant's change toward the capital adequacy ratio. Looking at the coefficient, determinant with positive coefficient such as asset can increase the capital adequacy ratio by 3.88E-10, every change in 1 ROA can increase the dependent variable by 3.254394, and every change in 1 NPL can increase CAR by 0.324727. Contrary to the determinants with positive coefficient, every change in 1 ROE, NIM, credit, deposit can decrease CAR by-0.30018, -0.458960, -2.55E-10 and -3.44E-10 respectively.

Beside, all of these determinants can explain 57.7712% of change in Bank's Capital Adequacy Ratio

4.3 Result Summary

Capital adequacy ratio of Bank BUKU 3 and Bank BUKU 4 in Indonesia seems to be affected by almost all of its determinants except liquidity coverage ratio. Several Determinants such as assets, ROA, and NPL has positive effect toward the capital adequacy ratiowhile the other (deposits, credits, ROE, NIM) has negative effect to the dependent variable. Different from the other determinants, liquidity coverage ratio is the only one, which has no significant effect toward the capital adequacy ratio.

CONCLUSION AND RECOMMENDATION

The main objective of this study is to investigate the relationship between the capital adequacy ratio and its determinants (assets, deposits, credits, ROA, ROE, NIM, LCR, and NPL) in Bank BUKU 3 and Bank BUKU 4 in Indonesia during 2005-2014.

For the conclusion of this whole study, all determinants except liquidity coverage ratio are statistically significant affecting the capital adequacy ratio. The assets, ROA, and NPL have positive effect toward the capital adequacy ratio while credits, deposits, ROE, and NIM has negative effect.

For recommendation, managers of Indonesian Bank that categorized as Bank BUKU 3 and Bank BUKU 4 should pay more attention on determinants that has significant effect toward the capital adequacy ratio of their company such as assets, deposits, credits, ROA, ROE NIM, and NPL. The managers need to pay attention on these determinants in order to maintain their safe level of capital adequacy since every change in these determinants will affect their company's capital adequacy ratio.

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