

4-30-2014

DETERMINANT OF CAPITAL RATIO: A PANEL DATA ANALYSIS ON STATE-OWNED BANKS IN INDONESIA

Pamuji Gesang Raharjo
Bogor Agricultural University

Dedi Budiman Hakim
Bogor Agricultural University

Adler Haymans Manurung
Bogor Agricultural University

Tubagus Nur Ahmad Maulana
Bogor Agricultural University

Follow this and additional works at: <https://bulletin.bmeb-bi.org/bmeb>

Recommended Citation

Raharjo, Pamuji Gesang; Hakim, Dedi Budiman; Manurung, Adler Haymans; and Maulana, Tubagus Nur Ahmad (2014) "DETERMINANT OF CAPITAL RATIO: A PANEL DATA ANALYSIS ON STATE-OWNED BANKS IN INDONESIA," *Bulletin of Monetary Economics and Banking*: Vol. 16: No. 4, Article 2.

DOI: <https://doi.org/10.21098/bemp.v16i4.451>

Available at: <https://bulletin.bmeb-bi.org/bmeb/vol16/iss4/2>

This Article is brought to you for free and open access by Bulletin of Monetary Economics and Banking. It has been accepted for inclusion in Bulletin of Monetary Economics and Banking by an authorized editor of Bulletin of Monetary Economics and Banking. For more information, please contact bmebjournal@gmail.com.

DETERMINANT OF CAPITAL RATIO: A PANEL DATA ANALYSIS ON STATE-OWNED BANKS IN INDONESIA

Pamuji Gesang Raharjo¹
Dedi Budiman Hakim
Adler Haymans Manurung
Tubagus Nur Ahmad Maulana

Abstract

Capital plays important role to support the operational of the banks and to create a sound banking system in aggregate. For this reason, the banks are required to have a sufficient amount of capital, both to support its business expansion as well as a buffer to prevent and to absorb any unexpected losses. This paper analyzes determinants of capital ratio of the state-owned banks in Indonesia. Using panel data regression model, the result shows that the capital ratio of these state-owned banks is affected by the size of the bank, the bank's leverage, the quality of management, and the interest rate risk. Contrary to the existing literatures, this paper does not support the effect of management capability to generate income on the bank's capital ratio.

Keywords: Capital structure, state-owned banks, panel estimation.

JEL Classification: C23, G21, G32

¹ Pamuji Gesang Raharjo is student of Business & Management Program of Postgraduate School, Bogor Agriculture University, Indonesia (corresponding author: pamujiaraharjo@yahoo.com); Dedi Budiman Hakim is supervising Committee Chairman, Lecture of Postgraduate School, Bogor Agriculture University, Indonesia; Adler Haymans Manurung and Tubagus Nur Ahmad Maulana are supervising Committee Members, Lecture of Postgraduate School, Bogor Agriculture University, Indonesia.

I. INTRODUCTION

Banking is the backbone of the Indonesian economy, since banking is still the main source of financing to drive the wheels of the economy and to create growth. Banks also play an important role in allocation of collected public deposits funds, both in the form of productive investment and lending to productive sectors. Moreover, the banks play important role in facilitating the efficient allocation of investment risk (Diamond and Dybvig, 1983). At macroeconomic level, bank is one of important means to transmit monetary policy (transmission belt), while at microeconomic level, the bank is a major source of financing for businesses and individuals (Koch and Donald, 2000).

Banks' capital structure is fundamentally different from capital structure of non-financial companies, because the characteristics of the banking business and operations are different. The banks also need to have a buffer in accordance with the provisions of the minimum capital requirement set by bank regulators (Saunders, 2008). Bank capital plays a very important role in maintaining safety and creating sound banking system.

Banks are required to have a sufficient amount of capital, both to support its business expansion as well as buffer, to prevent and absorb unexpected loss arising from variety of significant risks. Thus the purpose of minimum capital requirement is to ensure the banks to keep enough capital for the risks they take. It is impossible to eliminate altogether the possibility of a bank failure, but the governments can minimize the probability of bank default. By doing this, we may expect to have a stable economic environment where the private individuals and business will have good confidence on the banking systems.

Bank Indonesia as the central bank in Indonesia has been endeavored to improve the quality and the quantity of commercial bank's capital in Indonesia. Improving the quality of bank capital carried out by adjusting the terms of bank capital components and its instruments. On the other hand, increasing the quantity of bank's capital is done by requiring banks to form additional capital above the minimum capital adequacy requirements, based on bank's risk profile.

Minimum capital requirement based on risk profile is not intended only to anticipate the potential losses arising from risk weighted assets (based on the banks's credit risk, market risk, and operational risk), but also to anticipate the potensial losses from other risk in the future which has not been incorporated in the weight. The risk profil rating and the minimum capital adequacy requirements as stated on Table 1.

No.	Risk Profile Rating	Minimum Capital Adequacy Requirements
1	1	8%
2	2	9% up to < 10%
3	3	10% up to < 11%
4	4 or 5	11% up to 14%

Source: Bank Indonesia

Commercial banks in Indonesia are also required to have additional capital as a buffer, in accordance with the criteria set by Bank Indonesia. Additional capital consists of capital conservation buffer, countercyclical buffer, and capital surcharge. Capital conservation buffer is the additional capital that serves as a buffer in the event of a loss in the period of crisis. Countercyclical capital buffer is an additional function as a buffer for anticipated losses in the event of excessive credit growth that could potentially disrupt the stability of the financial system. Meanwhile, domestic capital surcharge for systemically important banks is the additional capital for certain bank that serves to reduce the negative impact in the event of a bank failure. Shortly, the domestic capital surcharge is aimed to increase the bank's ability to absorb losses. Bank Indonesia set the capital conservation buffer at 2.5 % of risk weighted assets, the countercyclical buffer is set in the range of 0% up to 2.5 % of risk weighed assets, and the capital surcharge is set in the range of 1% up to 2.5 % of risk weighted assets.

Commercial banks in Indonesia can be divided into 6 (six) groups; they are State-owned Banks (Bank Persero), National Private Commercial Banks (Bank Umum Swasta Nasional), Regional Development Banks (Bank Pembangunan Daerah), Joint Venture Banks (Bank Campuran), and Foreign Banks (Bank Asing). The group of state-owned Banks consist of Bank Mandiri, BRI, BNI and BTN. The share of state-owned banks' assets is 36.02 percent by the end of 2012. These state-owned banks enjoy close links with Indonesia's largest companies, including state-owned enterprises. On the other hand, the state-owned commercial banks are assigned to provide credit to specific sectors, to promote the access to bank services for groups of population or regions not covered by private institutions, to mitigate market failures due to the presence of asymmetric information, to finance socially valuable (but possibly financially unprofitable) projects, and to compete with private institutions to lower the costs of financial intermediation (Yeyati, 2004). Simply stated, the state-owned banks are required to have sufficient capital, both to support its own business operation and expansion, as well as to stand as agent of development in Indonesia.

The above illustration underlines the importance of capital for the bank. The purpose of this research is to analyze the determinants of capital adequacy ratio of state-owned banks in Indonesia. Research variables used in this study are divided into two, namely internal factors (bank specific factors) and external factors. Internal factors consist of variables derived from the bank's performance, as reflected in the balance sheet, income statement, and other financial reports are prepared and published by the bank. On the other hand, the external factors are variables that are not directly related to the bank's management, but reflect the economic conditions that affect the operation and performance of the bank.

Next section of this paper present theory and related empirical studies on the subject. Section three provide methodology and the data we used, while section four explain the result and analysis in details. Section five provide conclusion and will close the presentation of this paper.

II. THEORY

2.1. Capital Structure of the Company

Capital structure is concerned with how a firm finances its business by choosing right composition of equity and debt. Several theories are available related to the company's capital structure. David Durand in 1952 developed the theory on capital structure using net income approach. This approach suggests that the use of debt capital by a firm may increase or reduce the cost of capital.

Modigliani and Miller (1958) developed a financial theory that became the basic concept of modern capital structure theory; later known as MM Theory. MM theory presumes that capital markets are perfect with no corporate taxes, no bankruptcy costs, no information asymmetry and no agency costs. These assumptions are contradictory to reality, hence cannot be directly applied.

Modigliani and Miller (1958) provided the foundational impulse to the study of the capital structure problem by formally proving that, under conditions of complete, perfect and frictionless markets, a firm's market value and the welfare of its security holders remain unaffected by financing decisions (Gertler 1988 and Fama 1990). This theoretical proposition carries the implications that: (1) financing and investment policies are independent; (2) internal and external financing are perfect substitutes; and (3) specific type of financing contractual arrangement, either equity or debt, is also irrelevant.

The MM theory is widely used by researchers as basic ground on analyzing the capital structure. In 1963, the MM theory was revised by Modigliani and Miller to include the effect of taxes on the value and the cost of capital. With the corporate tax, the value of the firm can vary in accordance with the proportion of debt due to the taxshield of the lending bill (Baral,

1996). MM theory then known as *irrelevancy theory*, since this theory states that the proportion of equity and debt has no effect on the firm value (Manurung, 2011). In other words, value of the firm depends on the income generated by its assets, not by how the assets are financed or how the income is divided.

Another theory proposed by Donaldson (1961) is pecking order theory, which discusses order financing company. Solomon (1963) developed the theory of optimal capital structure where it is stated that the value of the company will increase up to a certain level, and after that firm value tends to remain constant. With moderate use of debt capital, the value of the company will in turn decrease. Stiglitz (1969), Haugen and the Papas (1971) and Rubenstein have developed a theory of capital structure, known as the trade-off models, which focused on financial distress and taxshield. Jensen and Meckling (1976) put forward the agency theory related to the value of the company due to the conflict between the company's management (agent) and the shareholders (the principal).

Myers and Majluf (1984) suggest that the capital structure can help to mitigate the inefficiencies in a firm's investment caused by asymmetric information. They show that managers use private information to issue risky securities when they are overpriced. There is a pecking order of corporate financing such that firms prefer internal financing, and if this internal financing is not sufficient, the firms will issue the cheapest security first as external financing source.

The theories of the capital structure described above are static and ignore the presences of an optimal capital restructuring in response to the fluctuations of asset value. In other words, the company will always make major adjustments in response to changes in debt the company's assets. To overcome these weaknesses, Zweibel (1986) and Zechner *et al.* (1989) developed a dynamic capital structure theory. Zweibel (1986) states that the selection of debt by managers was voluntarily with credible owned limitations.

Goldstein, Ju and Leland (2001) also introduced a dynamic structural model with EBIT - based models. They argue the firm policy is based on the dynamic capital gains, which depends on the taxshield, the bankruptcy costs, the variability of assets, the interest rate risk, and the size of the recapitalization costs. Baker and Wurger (2002) published a paper on market timing and capital structure stating that the company will issue preferred shares when the stock price is high, and issue bonds when the stock prices is low.

2.2. Bank Capital Structure

Bank is simultaneously a firm, a financial intermediary, and a highly regulated business entity. The imposed regulation on bank will determine their capital and their behavior (Marques and Santos, 2004). Given the operational of the bank is different with other industries, and then the business and financial risk of the bank are also different. Therefore, the capital structure of the bank will differ from the non-financial corporation (Buser, 1981).

Capital regulation affects the capital ratio maintained by the bank. Mishkin (2000) and Ghosh et al. (2003) found that capital requirements affect the bank's capital structure. Based on previous studies, the bank's capital ratio is also influenced by other factors, such as asset growth, risk, and profitability.

The capital structure taken by management is affected by the owners or shareholders. Ownership structure represents the power to control the management or the company, particularly in deciding important policies. The role of ownership structure on capital structure is inline with the agency cost theory. The agency relationship in banking is quite complex, since it involves the relationship between the shareholders and the management, the relationship between bank and borrowers, and the relationship between bank and regulators.

The bank's capital consists of voluntary and involuntary capital (Besanko and Kanatas, 1996; Cornett and Tehranian, 1992, and Keeley, 1989). Voluntary capital depends on the fundamental of the bank and is voluntarily chosen by the management. On the other hand, involuntary capital is set by the regulator.

It is possible for the bank to have excess capital above the minimum capital adequacy ratio for several reasons. One of them is as a hedging strategy when the banks require short term additional capital due to the worsening risk profile or other reasons. If the bank has limited capital, banks can only raise new capital in a short term by selling new shares. The sale of this new share will incur significant transaction costs or may result in share price decline, since investors and public know the bank experiences difficulty on their capital. When the bank's capital is low, an addition of new capital will also transfer the value to the fixed-income securities holder (including government safety nets). This is similar to the classic conditions when the debt is too big or debt overhang as proposed by Myers (1977). To that end, the bank tends to maintain higher capital ratios to avoid these problems, and it is also easier for banks to increase the capital when their income is high.

Commercial banks have deposits that are insured to protect depositors and to ensure financial stability. In order to mitigate the moral hazard of this insurance, commercial banks must hold minimum amount of capital. Banking regulators use minimum capital requirement to avoid bank failures and to limit the exercised risk taken by the bank. Nevertheless, Kahane (1977), Koehn and Santomero (1980), Kim and Santomero (1988), and Hovikimian and Kane (2000) argues that the capital adequacy ratio is not effective in limiting the bank risk. This is due to strict capital requirements will encourage the bank to maximize the use of their capital, in particular by increasing the risky assets.

Other studies explain that factors such as government guarantees (the implicit and explicit deposit insurance, the doctrine of too big - too fail and lender of last resort support), earnings value, and expected bankruptcy costs, will affect the level of capital hold by the bank.

Assurance given by the government will reduce expected bankruptcy costs as the risk of default is transferred from the bank to the government. This in turn reduces the incentives for depositors to monitor banks closely. At the same time, the bank's shareholders can take advantage of the slack supervision by increasing the amount of bank loans, which may decrease the ratio of capital and increase the earnings volatility due to inflating risk and the risk transfer to the lender and the guarantor (Hovikimian , Kane and Laeven, 2003). Therefore, the benefits to society arised from government guarantees highly depend on how effectively the regulators on controlling the behavior of banks in shifting risk (Hovikimian , Kane and Laeven 2003).

On the other hand, Berger, Herring and Szegö (1995) stated that even the banks are in a business environment that is not regulated and the absence of a government bailout, banks still have to maintain capital due to the demands of the market, which is called the capital adequacy of the market (*market capital requirement*). Since the failure of a bank could cause instability in the banking system, then the capital of the bank should be regulated.

In Indonesia, Yudhistira (2003) examined the impact of capital requirements for the bank using simple model. They found that capital regulation affect the behavior of the banks in Indonesia; hence possibly effect the economy. Tumiwa *et al.* (2013) found that banking regulations and good risk management practices affect the banks' capital structure.

III. MEHODOLOGY

3.1. Data

This study is based on secondary data obtained from the quarterly publication of financial statements of all Indonesia state-owned banks, Indonesian Banking Statistic issued by Bank Indonesia on a monthly basis, and other publications during the period of the first quarter of 2004 to the fourth quarter of 2012. Using panel data provide detailed information on bank behavior across time and space (Baltagi, 2005; Gujarati, 2003). Moreover, panel data is more robust to violations of the Gauss Markov assumptions, namely heteroskedasticity and normality (Wooldridge, 2010).

By the end of 2012 there were 120 banks operating in Indonesia and grouped into state-owned commercial banks, foreign exchange national private banks, non foreign exchange national private banks, joint venture banks, and foreign banks. This study analyzes the determinants of state-owned commercial banks capital ratio. Although only consists of four banks, namely Bank BRI, Bank Mandiri, Bank BNI, and Bank BTN, but these four state-owned banks record average market share of 36.02% of total commercial bank assets, savings deposits amounted to 27.25% of total third party fund from all commercial banks, and distributed loan of 35.29% of total commercial banks loan in Indonesia (as December 2012).

3.2. Empirical Model and Estimation

This study examined how the bank characteristic affect their capital adequacy ratio by using a multivariate panel regression model. To see whether the identified bank-specific variables could explain capital adequacy ratio (CAR), we specify the following empirical model:

$$CAR_{it} = \beta_0 + \beta_1 LNSIZE_{it} + \beta_2 NIM_{it} + \beta_3 EQTL_{it} + \beta_4 NPL_{it} + \beta_5 IRR_{it} + \varepsilon_{it}$$

Where CAR_{it} is capital adequacy ratio of bank i at time t ; $LNSIZE_{it}$ is the growth of total assets growth of the bank i at time t (in natural logarithms); NIM_{it} is the net interest margin of bank i at time t ; $EQTL_{it}$ is total equity to total liabilities ratio of the bank i at time t ; NPL_{it} non performing loan ratio of bank i at time t ; and IRR_{it} is interest rate risk of bank i at time t . In the above equation β_0 is constant and β is coefficient of variables, while ε_{it} is the residual.

We set the bank's capital adequacy ratio (CAR) as the dependent variable. CAR is one important indicator on assessing the health of a bank, since the bank's capital may reflect their ability to develop their business and to manage sufficient buffer to absorb potential losses. Given the observation period of this study is the first quarter of 2004 to the fourth quarter of 2012, the minimum capital adequacy ratio used in this study still base on Bank Indonesia Regulation No. 10/15/PBI/2008 dated 24 September 2008; where the minimum capital requirement is 8% of risk-weighted assets (RWA). Bank capital is the sum of the core capital (Tier 1 capital), the supplementary capital (Tier 2 capital), and the additional supplementary capital (Tier 3 capital), after taking into account certain deductions in accordance with Bank Indonesia. RWA covers the credit risk, the market risk, and the operational risk. Thus the CAR is calculated as follows:

$$Car = \frac{\text{Tier 1 Capital} + \text{Tier 2 Capital} + \text{Tier 3 Capital} - \text{Deduction Factor of Capital}}{\text{Total Risk Weighted Asset}} \quad (1)$$

In accordance with Bank Indonesia regulations, banks are required to provide core capital (Tier 1 capital) at least 5% of the risk weighted assets, which consist of paid-in capital, additional capital reserves (reserve disclosed), and innovative capital (innovative capital instruments). The additional supplementary capital (Tier 3 capital) can be used for market risk only, but should not exceed 250% of the core capital allocated for market risk. The supplementary capital (Tier 2 capital) and additional supplementary capital (Tier 3 capital) is maximum 100% of the core capital (Tier 1 Capital). Capital adequacy ratios used in this study are stated in the bank financial statements for each period.

There are five independent variables in accordance with previous literature; most of them are internal variables for the bank. We get or calculate these variables from the quarterly financial statements published by state-owned banks. The first is natural logarithm of the bank total asset (LNSIZE). The bank's asset represents the size of the bank as well as the scale of

economic of the bank, which potentially influence the amount of bank's capital. In accordance with previous research hypothesis, banks with high income tend to diversify and posses greater investment opportunities. To reduce the cost of capital and to avoid risk, they tend to hold larger equity capital. On this case, the size will positively affect the bank's capital. On the other hand, easier access to the capital markets and the government guarantee potentially lead the banks to maintain less capital. For this reason, the size of the bank may negatively relate to their capital. Thus, the estimated coefficient from the model can be positive or negative.

This study uses logarithm of total assets (LNSIZE) as a proxy of the size of the bank, following Demirguc-Kunt et al. (2004). The formula use in calculating the growth of the bank's assets as follows:

$$\text{LNSIZE} = \text{Logarithm} (\text{Asset}_{t+1} / \text{Asset}_{t0}) \quad (2)$$

The second explanatory variabel is the *non performing loan* (NPL). NPL ratio is one of the key indicators in assessing the performance and the quality of the bank assets. The NPL ratio shows the ability of bank to manage the loans. Higher NPL indicates worse quality of the bank credit, hence bigger credit risk (Nasser, 2003). The non performing loans is classified as substandard, doubtful and loss. NPL is calculated with the following formula:

$$\text{NPL} = (\text{Non Performing Loans} / \text{Total Loans}) \times 100\% \quad (3)$$

Another determinant of CAR is the quality of bank's management proxied by the net interest margin (NIM), which becomes the third explanatory variable on our model. NIM is used to measure the ability of management to generate net interest income. NIM may reflect the cost of financial intermediation, and is defined as net interest income divided by average earning assets of the bank. The net interest income is the interest income minus interest expense.

Interest income is generated from productive asset. The productive assets of the bank, in accordance with Bank Indonesia's regulations concerning Commercial Bank Asset Quality Rating, is the provision of bank funds in the form of loans, securities, interbank placements, bill acceptances, bills repurchase agreement, derivative receivables, investments, balance sheet transactions and other forms of similar provision.

NIM affects the bank capital positively. High revenue allows the bank to raise additional capital through retained earnings and provide a positive signal to the market (Rime, 2001). On the other hand, high incomes may mean lower probability of failure (Yu, 1995). As a result,

high income led the management to reduce “capital cushion” given the low risk of failure. Therefore, the NIM may also affect the capital negatively.

The fourth independent variable on the model is equity to total liabilities ratio (EQTL). The ratio of total equity to total liabilities (EQTL) is used as a proxy of leverage. A high EQTL signifies low leverage (low debt/liabilities), and accordingly low EQTL reflects high leverage. Banks with high leverage (low EQTL) may find themselves difficult to raise new capital; hence lower equity. We expect the EQTL to positively affect the capital of the bank.

The fifth independent variable is interest rate risk (IRR). The main activity of the bank is to collect funds and to distribute it. Interest rate risk is inherent within the bank’s assets and liabilities, ie the risk of losses associated with the different sensitivity of the productive asset and source of bank funds due to interest rate changes. It is also associated with the maturity gap between the assets and the liabilities.

We calculate the interest rate risk as follows:

$$IRR_{it} = \text{Productive Asset}_{it} / \text{Liabilities}_{it} \quad (4)$$

where IRR is the interest rate risk; productive assets is calculated as the ratio of bank’s total productive asset equity to total asset; and liabilities is the source of funds for the bank.

We estimate the above empirical model using panel data regression. To choose best model variant across Pooled Least Square (PLS), Fixed Effect Model (FEM) and Random Effect Model (REM), we use the Chow-test, Lagrange Multiplier test (LM-test), and the Hausman test. We use the Chow-test to choose between the Pooled Least Squares (PLS) and the Fixed Effect Model. Chow-test assumes the error of the regression is normally distributed with equal variance (σ^2). If the value of Chow Statistic (F-stat) generated from the test is greater than the F-table, the null hypothesis is rejected so that the model chosen for use is Fixed Effect Model, and vice versa. We use LM-test to chose between the PLS and the REM, while the Hausman-test is used to compare the FEM and the REM.

IV. RESULT AND ANALYSIS

Firstly we tested the correlation among Capital Adequacy Ratio (CAR), asset growth (LNSIZE), the ratio of non-performing loans (NPLs), net interest margin (NIM), the ratio of equity the bank’s liabilities (EQTL), and interest rate risk (IRR). The result is presented in Table 2.

The NPL had the strongest positive correlation with CAR (0.5862). The other independent variables with significant positive correlation with the CAR are the ratio of equity to total bank

liabilities (EQTL) and interest rate risk (IRR). On the other hand, net interest margin (NIM) and total equity to total liabilities (EQTL) have a positive correlation with bank's asset growth (LNSIZE).

Table 2
Correlation Analysis

	CAR	LNSIZE	NPL	NIM	EQTL	IRR
CAR	1.0000					
LNSIZE	-0.2399	1.0000				
NPL	0.5862	-0.2153	1.0000			
NIM	-0.1782	0.1692	-0.3053	1.0000		
EQTL	0.1197	0.0001	-0.0751	0.3135	1.0000	
IRR	0.0733	-0.2090	-0.3977	0.0436	0.4590	1.0000

Source: data processed

Tabel 3 provides the summary of descriptive statistics for state-owned banks used in this study. The capital adequacy ratio of state owned banks always above the minimum capital requirement set by Bank Indonesia (8%), for all time of observation (2004Q1 to 2012Q4). The lowest capital adequacy ratio was 12.02% and the highest was 27.81% with an average capital adequacy ratio was 17.50 %.

During the same period, the lowest asset growth rate was -12.21% and the highest was 21.65% with average asset growth was 3.42%. The lowest ratio of non-performing loans (NPLs) of state owned banks was 1.74% and the highest was 27.66% with an average of 6.24%, while the net interest margin (NIM) of 3.81% lowest and highest 12.36%. On the other hand, the lowest risk index of state-owned banks is 7.59 and the highest is at 45.64, with an average of 19.68.

From the results of the Chow and the Hausman test, the model to use best is FEM. This is in line with Nachrowi and Usman (2006) which states that if the data panels have held a greater amount of time than the number of individuals observed, it is advisable to use the FEM. Table 4 shows the complete results data processing using a data panel fixed effect model to analyze the factors that affected on the capital adequacy ratio of state-owned banks in Indonesia.

Tabel 3.
Descriptive Statistic

Independent Variable	Obs.	Min.	Max.	Mean	Std. Dev.	Skewness	Kurtosis	Jarque - Bera	Prob.
CAR	144	0.1202	0.2781	0.1750	0.0327	1.0261	3.5464	27.0617	0.0000
LNSIZE	144	-0.1221	0.2165	0.0342	0.0525	0.3525	3.7567	6.4181	0.0404
NPL	144	0.0174	0.2766	0.0624	0.0540	2.5104	8.9427	363.1452	0.0000
NIM	144	0.0381	0.1236	0.0661	0.0235	1.1780	2.9397	33.3252	0.0000
EQTL	144	0.0408	0.1619	0.1054	0.0269	-0.2038	2.9183	1.0364	0.5956
IRR	144	0.9035	1.4383	1.0678	0.0727	1.3220	7.8717	184.3417	0.0000

Source: data processed

The coefficient of determination (R-squared) is 53.97%. It states that the variation of explanatory variables (LNSIZE, NPL, NIM, EQTL, and ZRISK) can explain 53.97% the variation of CAR, while 46.03% is explained by other variables. The result indicates other determinant of the state-owned bank's capital ratio is not included in the model.

Tabel 4.
Panel Regression Model

Variabel	Coef.	SE	t-stat.	Prob.
C	0.1555	0.0433	3.5888	0.0005
LNSIZE	-0.1008	0.0381	-2.6435	0.0092
NPL	0.3899	0.0418	9.3360	0.0000
NIM	0.3763	0.2646	1.4224	0.1572
EQTL	0.5086	0.1023	4.9692	0.0000
IRR	-0.0748	0.0346	-2.1595	0.0326
R-square	0.5549	Mean dependent var		0.1750
Adjusted R-squared	0.5285	S.D. dependent var		0.0327
S.E. of regression	0.0224	Akaike info creation		-4.6960
Sum squared resid	0.0679	Schwarz criterion		-4.5104
Log likelihood	347.1145	Hannan-Quin criter.		-4.6206
F-statistic	21.0394	Durbin-Watson stat		0.6967
Prob(F-statistic)	0.0000			

The estimation shows that the growth of the bank total assets negatively affects the state-owned bank capital ratio and is statistically significant at $\alpha = 0.05$. This means a 1% addition of the bank's assets (in logarithm) led to a reduction of the bank's capital adequacy ratios by 0.08%. The growth of the bank's assets is mainly due to the increase of productive assets, both in loans and investments in other risky assets. The increase of growth in loans and risky financial instruments will raise the bank's potential losses from bad debts and losses from declining of financial instruments price hold by the banks. In accordance with the regulation on bank capital, the raise of bank's risk weighted assets will lower the bank's capital adequacy ratio. Our result is inline with research conducted by Kane (2000), Mishkin (2006), and Rime (2001), who obtained a negative relationship between the size and the capital ratio. From a safety net perspective (systemic risk), this findings confirm the common believe that larger banks are 'too-big-to-fail' or "too-big-to-discipline-adequately".

High non performing loans (NPL) are commonly associated with high risk and poor management (Barrios and Blanco, 2003). The estimation result shows that the non-performing loan positively and significantly effects the bank capital ratio. This indicates the bank anticipate any increase in potential losses from bad loan by raising their capital. This result is inline with Ahmad *et al.* (2009).

The net interest margin (NIM) has a positive coefficient but not statistically significant. The state owned banks in Indonesia have been very profitable, retained a lot of earnings, however, this finding indicates that it does not affect their capital ratios. Generally, the interest margin (NIM) positively affects the bank capital, since high revenues allow the banks to raise additional capital through retained earnings and to give positive signal to the value of the company, (Rime, 2001). A high earnings or franchise value provides bank managers an easier access to equity capital and a self-regulatory incentive to minimize risk taking (Cebenoyan *et al.* 1999; Saunders and Wilson 2001; Ahmad *et al.*, 2009). But again, the insignificant of the estimated NIM coefficient from our model, does not support those literatures.

The ratio of equity to total bank liabilities (EQTL) is statistically significant at the 0.01 level and has a positive effect on state-owned bank capital ratio. The state owned banks in Indonesia tend to hold high capital and low leverage. The positive sign of EQTL coefficient indicates a negative relationship between the bank leverage and the risk-weighted capital adequacy ratio (Ahmad *et al.* 2009).

The last explanantory variables, the variable interest rate risk (IRR), is statitically significant on affecting the state-owned banks capital ratio. The coefficient of IRR shows that a one unit increase in interest rate risk will reduce the bank's capital adequacy ratio by 0.07 units.

V. CONCLUSIONS

This paper analyzes the determinant of capital ratio of the state-owned bank in Indonesia. In line with other economies experiences and existing literatures, the capital ratio of the state owned banks in Indonesia is determined by the asset growth (LNSIZE), the amount of non-performing loans (NPL), interest rate risk (IRR), the equity to total liabilities ratio (EQTL), and the net interest margin (NIM). Except for the net interest margin (NIM), this paper did not find significant effect of the NIM to the bank's capital adequacy ratio.

This study covers only state-owned banks in Indonesia. With possible differences in business characteristics, incentives and organization structure, then future study should incorporate other types of bank, particularly those with different interest rate sensitivity.

REFERENCES

- Ahmad, R., Ariff, M., and Skully, M.J. (2009). *The Determinants of Bank Capital Ratios in a Developing Economy*. *Asia-Pacific Finan Markets* 15:255-272.
- Baker, Malcom, and Jeffrey Wurgler. (2002), *Market Timing and Capital Structure*. *Journal of Finance* 57, 1-32.
- Baltagi, B. H. (2005). *Econometric Analysis of Panel Data*, Chichester: John Wiley and Sons.
- Baral, Keshar Jung. (1996), *Capital Structure and Cost of Capital in Public Sector Enterprises in Nepal*. Ph.D thesis. Delhi University.
- Barrios, V.E.J. and Blanco, J. (2003). *The Effectiveness of Bank Capital Adequacy Regulations: An Empirical Approach*. *Journal of Banking and Finance*, 27, pp.1935-1958.
- Berger, A., DeYoung, R., Flannery, R., Lee, D., and Oztekin, O. (2008). *How Do Large Banking Organizations Manage Their Capital Ratios?*. The Federal Reserve Bank of Kansas City, Research Working Paper 08-01.
- Berger, A.N, Herring, H.J., and Szego G.P. (1995). *The Role of Capital in Financial Institutions*. Wharton School Center for Financial Institutions, Working Paper 95-01.
- Besanko, D. and Kanatas, G. (1996). *The Regulation of Bank Capital: Do Capital Standards Promote Bank Safety?*. *Journal of Financial Intermediation*. 5, 160-183.
- Buser, Stephen A., Andrew H. Chen, and Edward J. Kane. (1981). *Federal Deposit Insurance, Regulatory Policy, and Optimal Bank Capital*. *The journal of Finance*, 36 (1), 51-60.
- Cebenoyan S., Cooperman ES., and Register CA. (1999). *Ownership Structure, Charter Value, and Risk-taking Behavior of Thrifts*. *Financial Management*. 26, 43-60. doi: 10.2307/3666116
- Cornett, M. M. and H. Tehranian. (1992). *Changes in Corporate Performance Associated with Bank Acquisitions*. *Journal of Financial Economics*. 31, 211-234.
- Demerguc-Kunt A., L. Leaven and R. Levine (2003), *The Impact of Bank Regulation, Concentration and Institution on Bank Margin*, National Bureau of Economic Research. Working Paper 9890.
- Diamond and Dybvig (1983). *Bank Runs, Deposit Insurance, and Liquidity*. *The Journal of Political Economy*, Vol. 91, No. 3, pp. 401-419.
- Donaldson, G. (1961), *Corporate Debt Capacity*. Harvard University Press, Boston.

- Durand, David. (1952), *Cost of Debt and Equity Funds for Business: Trends and Problem Measurement*. Conference on Research in Business finance. The National Bureau of Economic Research. p. 215-262.
- Furlong, F. T. and Keeley, M.C. (1989). *Capital Regulation and Bank Risk-Taking: A Note*. Journal of Banking and Finance 13 (6): 883–91.
- Goldstein, Ju and Leland H. (2001). *An EBIT-Based Model of Dynamic Capital Structure*. Journal of Business, vol. 74, no. 4, pp.483-512.
- Gujarati, D. N. (2003). *Basic econometrics*. New York, USA, McGrawHill.
- Hovikimian, A., and E. Kane. (2000). *Effectiveness of Capital Regulation at U.S. Commercial Banks, 1985 to 1994*. Journal of Finance 55: 451-469.
- Hovikimian, A., E. Kane, and L. Laeven. (2003). *How Country and Safety-Net Characteristics Affect Bank Risk-Shifting*. Journal of Financial Services Research 23: 177-204.
- Jensen, Michael C. and William H. Meckling. 1976. *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*. Journal of Financial Economics 3: 305-360.
- Kane, E.J. (2000). *Incentives for banking megamergers: What motives might regulators infer from event study evidence?*. Journal of Money, Credit and Banking 32, 671-701.
- Kahane, Y. (1977). *Capital Adequacy and the Regulation of Financial Intermediaries*. Journal of Banking and Finance 1, 207-218.
- Kim, D., and A. M. Santomero. (1988). *Risk in Banking and Capital Regulation*. Journal of Finance 43 (5): 1219–33
- Koch TW and Mac Donald SS. (2000), *Bank Management*. Fourth Edition. Orlando. The Dryden Press. Harcourt Brace College Publishers.
- Koehn, M. and A. M. Santomero (1980). *Regulation of Bank Capital and Portfolio Risk*, Journal of Finance 35, 1235—1244.
- Manurung, Adler H. (2011), *Metode Penelitian: Keuangan, Investasi, dan Akuntansi Empiris*. PT. Adler Manurung Press.
- Mishkin, F.S. (2006). *How Big A Problem Is Too Big To Fail?*. Journal of Economic Literature 44, 988-1004.
- Modigliani, F, and Miller, M.H. (1958). *The Cost of Capital, Corporation Finance, and the Theory of Investment*. American Economic Review Vol.XLVIII, No.3, (June 1958), pp.261-97, reprinted in *The Theory of Business Finance (2e)*, Stephen H. Archer and Charles A. D'Ambrosio, eds., New York, Macmillan, 1976 (page references to reprint).
- Modigliani, Franco and Merton Miller (1963). *Corporate Income Taxes and the Cost of Capital: A Correction*. American Economic Review, vol.53, pp. 433-443

- Myers, S. C. (1977). *Determinants of Corporate Borrowing*. Journal of Financial Economics, 5, 147–175.
- Myers, S.C. and Majluf, N.S. (1984). *Corporate Financing and Investment Decisions When Firm Have Information That Investors Do Not Have*. Journal of Financial Economics 13, pp. 187-221.
- Nasser, Ety M. (2003). *Perbandingan Kinerja Bank Pemerintah dan Bank Swasta Dengan Rasio CAMEL Serta Pengaruhnya Terhadap Harga Saham*. Media Riset Akuntansi, Auditing dan Informasi, Vol. 3, No. 3.
- Nachrowi ND, Usman H. (2006). *Pendekatan Populer dan Praktis Ekonometrika Untuk Analisis Ekonomi dan Keuangan*. Lembaga Penerbit Fakultas Ekonomi Universitas Indonesia.
- Rime, B. (2001). *Capital Requirements and Bank Behaviour: Empirical evidence for Switzerland*. Journal of Banking and Finance 25: 789-805.
- Saunders A., and Wilson B. (2001). *An Analysis of Bank Charter Value and Its Risk-constraining Incentives*. Journal of Financial Services Research, 19, 185-195. doi: 10.1023/A:1011163522271
- Solomon, Ezra. (1963). *The Theory of Financial Management*. New York: Columbia University Press.
- Stiglitz, J.E. (1969). *A Re-Examination of the Modigliani-Miller Theorem*. American Economic Review, 59:5, pp. 784-793.
- Tumiwa RAF, Sudarma M, Salim U, and Djumahir. 2013. *Banking Regulation, Risk Management, and Capital Structure Decisions: A Study on Rural Banks in Indonesia*. Research Journal of Finance and Accounting, 4(15): 27-35.
- Wooldridge, J.M. (2010). *Econometric Analysis of Cross Section and Panel Data*. 2nd Edition. MIT Press.
- Yu, H. (1995). *The Determinants of Interest Rate Margins: Empirical Evidence on the Canadian Banking Industry*. International Journal of Finance, 7: 33-45
- Yudhistira, D. (2003). *The impact of Bank Capital Requirement in Indonesia*. Available: <http://129.3.20.41/eps/fin/papers/0212/02122002.pdf>
- Zweibel, J. (1996). *Dynamic Capital Structure under Managerial Entrenchment*. American Economic Review 86 (5), 1197–1215.

Halaman ini sengaja dikosongkan