THE IMPACT OF MARKET DISCIPLINE ON BANKS' BEHAVIOR: EMPIRICAL EVIDENCE FROM INDONESIA

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ABSTRACT

This study aims to investigate the influence of market discipline on the behavior of commercial banks with respect to their capital adequacy compliance and pricing behavior. We used panel data of listed commercial banks in Indonesia Stock Exchange in the year of 2007-2012. We used capital adequacy and pricing behavior as the dependent variable and we included size of bank, deposits, liquidity risk, asset quality and profitability as the explanatory variables and type of ownerships as dummy variable. The findings indicate that bank size, liquidity risk, profitability, market discipline and type of ownership significantly effect on the bank capital adequacy. It showed that state-owned banks are percieved more secure than private-owned banks due to state-owned banks maintain superior capital adequacy. On the other edge, deposits, liquidity risk, market discipline and type of ownership effect on banks pricing behavior. According to type of ownership, state-owned banks earn higher net interest margin than private-owned banks due to state-owned banks set lower deposits rate and higher loans rate.

Keywords: market discipline, capital adequacy, interest margin, bank behavior

INTRODUCTION

Recently, banks have shifted their traditional function as providers of financial services as well as banks with fee-based activities, trading-based activities, etc. A decade ago, financial entities in Indonesia suffered from economic failure with devastating concequences for individuals and society as limited liabilities of insolvent companies is not responsible for losses exceeding its financial resources. Indonesian banking market put up with terrible crises and became increasingly expensive to deal with. Prudential regulations of banks supposed to prevent or at least to reduce the frequency of such crises. Many issues that fails under the heading of bank minimum capital adequacy deeply considered by regulators, banker and academics in recent years and is likely to continue as a subject for debate for many years to come (Morgan, 1984). The Basel Accord was partly in response to a series of international bank failures and corncern over unequal national capital standards.

Any workable standard for measuring capital adequacy should be expressed in terms of function of bank capital (Stegall, 1986).

Further, commercial banks are legally required to maintain adequate capital funds. In substance, the primary function of capital is to provide resources to absorb possible future losses on assets. How much capital ought to provide by banks? This is an enormously dubious. Regulators and bankers have difference opinion on it. Regulators always seem to insist on more capital but bankers are always require less. As of bank shareholders' point of view, the function of capital is to deserve an adequate rate of return. In order to prevent bank failures and protect banks depositors' benefit, it is necessary to require banks to maintain a significant level of capital adequacy. Due to its importance, Bank Indonesia has established *Arsitektur Perbankan Indonesia* (API) or Indonesia Banking Architecture. Based on API, banks in Indonesia are encourage to implement minimum capital adequacy to ensure their capability in absorbing unexpected losses in the future. The capital adequacy regulations are also aimed to establish a strong and stable financial system.

Capital adequacy typically measured by capital to risk-weighted asset ratio generally known as the capital adequacy ratio (CAR). It is defined as the ratio of a bank's capital to its total risk-weighted assets. Regulatory authorities all over the world impose capital adequacy norms on their banking sector in order to absorb unexpected losses due to risky investments by banks. The function of capital adequacy norms would create a competitive situation where a particular bank with higher capital adequacy ratio possibly will attract customers deposits at lower cost. It is due to authenticity that customers prefer to sheltered returns on their deposits, therefore well-capitalized banks capable of reduce their cost of borrowing in the form of deposits rates (Keeley, 1990). Based on this, we can say that capital adequacy regulations positively effect on bank behavior in terms of minimum capital adequacy complition.

As well as regulatory pressure, market discipline has come to play a greater role in ensuring financial stability and also affecting banks behavior related to capital adequacy (Genschel and Plumper, 1997). Market discipline is a market-based promotion of the transparency and disclosure of the risks associated with a business or entity. It works in concert with regulatory systems to increase the safety and soundness of the market. Market discipline increases the information available to the public by encouraging the release of timely information detailing a bank's assets, liabilities and general financial information. This reduces the uncertainty and promote the function of the market as an exchange between lenders and borrowers. Market discipline encourages banks to keep a higher amount to increase the confidence of their depositors and to reduce their liquidity risks. Many studies suggest that there is a negative correlation between share price and capital adequacy (Dowd, 2000).

The existing literature on market discipline primarily focuses on whether market discipline exists in a particular country during a given period. Most of the papers focus on the U.S. commercial banking industry. Baer and Brewer (1986), Hannan and Hanweck (1988), Ellis and Flannery (1992), and Cook and Spellman (1994), among others, analyze how yields on deposits respond to bank risk taking, as captured by balance sheets and by market measures of risk. Goldberg and Hudgins (1996) and Calormiris and Wilson (1998) examine this question by concentrating on the level or change of deposits. Park (1995) and Park and Peristiani (1998) combine both approaches mentioned above. Calomiris and Mason (1997) study whether bank failures are related to bank risk characteristics. Overall, these papers support the hypothesis that market discipline is at work in the U.S.

The results of this study exhibit that market discipline, type of ownership, net interest margin, profitability, and liquidity risk significantly effect on the bank behavior (capital adequacy). In relation to type of ownership, this study demonstrate that state-owned banks are percieved more safe and sound than private-owned banks due to state-owned banks usually maintain privileged capital adequacy. In contrast, deposits and loan loss reserve did not effect on bank capital adequacy. Further, bank size, deposits, asset quality and market discipline effect on banks behavior (NIMs). Type of ownership (D1--state-owned banks) reveal positively significant effects on banks NIMs. It implies that state-owned banks earn higher NIMs and they set lower deposits rate with higher loans rate.

This study intend to investigate the impact and the consequence of capital adequacy regulations and market discipline to banks CAR and banks NIM in Indonesian banking industry. The remainder of paper is as follows. Second section describes the literature review and hypotheses, third section is Indonesian banking system in brief, fourth section presents research methods and describes the data, fifth section presents the empirical results and the last sixth section offers some concluding remarks.

LITERATURE REVIEW

The Importance of Market Discipline

The burden on the banks, financial institutions and sovereigns to conduct business while considering the risks to their stakeholders. Market discipline is a market-based promotion of the transparency and disclosure of the risks associated with a business or entity. Market discipline increases the information available to the public by encouraging the release of timely information detailing a company's assets, liabilities and general financial information. This reduces the uncertainty and promote the function of the market as an exchange between lenders and borrowers. It works in concert with regulatory systems to increase the safety and soundness of the market. For example, the capital requirements for a bank might be to keep 1% in reserves. Market discipline, on the other hand, encourages banks to keep a higher amount to reduce their liquidity risks and increase the confidence of their depositors. Together with the ultimate threat of the demise of the enterprise, these mechanisms can deter excessive risk taking.

The disciplinary strength of market forces derives from the immense power of the price system to aggregate information. The views of economic agents, sharpened by profit maximising instincts, are reflected in the constellation of prices at which funds are allocated and risks exchanged. In turn, these prices are a powerful and economical mechanism to summarise and convey information about those views. Market forces can raise the cost or restrict the volume of funding for those activities with unattractive risk or return trade-offs.

Empirical Evidence on Market Discipline on Bank Behavior

Market discipline refers to the obligation by banks and financial institutions (FIs) to manage their stakeholders' risk in the course of their day-to-day operations. Banks and other FIs assume some level of risk with

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each loan they disburse. This risk is passed on to other borrowers and clients as well as stockholders. Banks are required to prepare publicly-available financial and operational documentation to federal regulations in order to ensure financial transparency and disclosure of information. In this way, market discipline discourages banks and financial companies from assuming excessive or dangerous levels of risk. Doing so might affect not only their ability to make loans, but also compromise the interests of existing stockholders and clients (checking account holders, depositors, and borrowers).

There is a substantial literature on market discipline with respect to risk- taking in banking and financial institutions (FIs) more generally. Two aspects are emphasized. First, market discipline requires that the cost of funding reflects an FI's risk-taking in the sense of probability of default. Second, an FI's management must respond properly to the information provided by the costs of different sources of funding. In well functioning markets the management of an FI would choose asset- and liability positions that maximize shareholder value.

The first aspect of market discipline refers to pricing of default risk. It is well- known that imited liability of shareholders of corporations provides incentives for the latter to shift risk to creditors and these incentives become stronger when equity capital is low. For this reason creditors of corporations in general have incentives to monitor default risk and "loss given default" and demand compensation for this risk. The credit risk premium can be viewed as the premium on a put option on the corporation's assets purchased by the shareholders with a trike price equal to value of the debt. If the credit risk premium on a corporation's debt is too ow shareholders have an incentive to take on too much relatively low cost debt and increase default risk at the expense of debt holders. The second aspect of market discipline refers to governance issues. For market discipline to be effective, the corporate governance structure must provide incentives for management to maximize shareholders value. Those two aspects of market discipline are both parts of what is often called direct market discipline in the banking literature. Furthermore, indirect market discipline refers to the use of price signals with respect to risk being used by supervisors as indicators that may trigger intervention.

Direct market discipline may fail in the financial industry for several reasons providing arguments for regulation of risk-taking and supervision. Creditors may not be able to obtain information to assess an FI's riskiness. The opaqueness of banks in particular is often referred to as an argument for supervision of banks based on the presumption that supervisors are better able to gather the information required to assess risk. The second common argument for market discipline failure is that FI's creditors are explicitly or implicitly protected from losses in case of default. In particular, explicit insurance of banks' depositors reduce their incentives to monitor banks and to demand a risk-premium on deposits. Implicit insurance exists if an FI's creditors expect to be bailed out in case of insolvency because the financial institution's is considered "too big to fail" or a government blanket guarantee is expected in case FI's face distress. Explicit and implicit insurance of creditors induces FIs to take on too much debt and to shift default risk to a deposit insurance funds and/or tax payers.

Empirical Evidence on Bank Capital Adequacy

Many researcher have worked on capital adequacy issue which provided insights, theoritical as well as empirical, into the capital adequacy. Capital adequacy is an important indicator of the financial health and strength of banking system. It is measured by the capital adequacy ratio (CAR) whisch is defined as the ratio of bank's capital to its total risk-weighted assets. CAR is also indicate to the regulatory compliance. A lower than minimum capital required by authorities imply that companies did not comply with regulation. Foremost regulatory authorities all over the world impose a capital adequacy norm on their banking industries in order to provide a support to admit unanticipated losses due to risky investments. A well continued adequacy regime plays a critical role in minimizing the tumbling effects of banking and financial sector crises.

Commercial banks are officially required to maintain adequate capital funds to provide resources to absorb possible losses on assets. According to the required capital adequacy, regulators and bankers have a different viewpoint regarding a minimum capital should be hold by banks. Regulators always emerge higher supplementary capital but bankers always require a smaller amount. Accordingly, both part call for a well-defined goals for setting up a capital adequacy strategy and both side should be taking a broader view of the costs that are relevant in setting the strategy.

The implementation of the capital adequacy standards will create a competitive environment where particular bank with higher capital adequacy knows how to attract deposits from customers at lower cost due to the fact that consumers prefer to the secure returns on their deposits. As a results, well-capitalized banks go on reducing their cost of borrowing in the form of deposits interest rate (Keeley, 1990). At the side of capital adequacy regulations, market discipline is one of the important factors which star as a significant influence on banks behavior. Market discipline is shareholders as studies suggest that there is negative correlation between share prices and

capital adequacy (Dowd, 2000; Madura and Zarouk, 1993).

Modigliani and Miller (1958) stated that in a world with perfect financial markets, capital structure and hence, capital regulation is irrelevant. Hahn (1966) analysed factors determining adequacy of capital in commercial banks. Hahn (1996) investigated factors influencing the quantity and quality of capital with size, growth and profitability as independent variables, and capitalization as the dependent variable. Capitalization is a function of size and growth factors which vary in their influences according to   growth conditions and policies affecting   structure. Profitability is a function of size and growth. The principle that secular changes in capitalization occur through changes in capital rather than changes in deposits and assets established by multiple correlation analysis for banks in the U.S for the period 1953-1962.

Santomero and Watson (1977) showed that too tight capital regulation lead banks to reduce their credit offering, and as a consequence deepen fall in productive investment (Barrios & Blanco, 2003). They argue that, from society viewpoint, the optimal level of capital for banking system should be determined by the point at which the marginal public returns to bank capital exactly equal to marginal public costs of bank capital. However, regulators may not consider the social costs, therefore, it will require more capital in the system than in society. Marcus (1983) explained the dramatic decline of capital to asset ratio in U.S commercial banks during the last two decades. He proposed that the increase in nominal interest rate might contribute to the decrease in capital ratio.

Jeff (1990) gave an overview of capital requirements for banks and financial instituions showed that there were no difference in capital standards for these two types of financial institutions. Jeff (1990) argued that capital adequacy was reflected to the assets size as a proxy of well-managed bank. In 1990's, capital adequacy as a primary measure for safety and soundness of banking become the major benchmark for financial institution.

Yu (2000) documented banks size, liquidity and profitability as the main determinants of bank capital ratio in Taiwan. Yu (2000) sumarizes that large banks in Taiwan have much lower capital ratios than small banks which is consistent with the previous study that large bank excecute that they are "too bing to fail". The remarkable finding of the study is that the relationships between equity-to-assets ratio and liquidity ratio is significantly positive for small banks, but significantly negative for medium size banks.

Aggarwal and Jacques (2001) reported that the U.S banks incereased their capital ratio without increase in credit risk. They concluded that early corrective action significantly possitive affected by capital adequacy ratio in both high capital and low capital banks with a faster speed of adjustment in undercapitalized banks. Saunders and Wilson (2001) recomended that the relationship between charter value and capital structure decision is procyclical. Their results showed that during economic booms condition, high charter value banks holds higher capital ratio. However, in economics ressesions, higher charter value banks suffer from higher losses of charter value. The most significant finding of their study is that charter value may not able to reduce the number of risky activities that banks involved.

Ghoshi *et al*. (2003) showed that Indian public sector banks did not add to assets substitution across the risk-weight categories by substitute low risk goverment securities for high risk loans in order to meet their capital requirement. So, we can say that the capital regulation does not influence banks decision making. Chen (2003) showed that while goverment support is proved to be the invisible treasure of state banks, capital enhancement is always desired and the most practical method is to use subordinated debt to increase their supplementary capital. Chami and Cosimano (2003) showed that the overemphasis by regulators and market practitioners on tier-I or equity capital as the relevant constraint for banks is not necessarily supported by the Basel Accord intended for total capital, a minimum of

8%, and not for equity capital to be the binding constraint. Thampy (2004) showed the impact of capital adequacy regulation on loan growth. As loans have the highest risk weight, a capital constrained bank would need to conserve its capital by allocating fewer assets to loans. This trend turns into worse as the capital constraint becomes binding which is the case for banks with less capital adequacy than minimum level officially required. However, for banks with high capital adequacy ratios, there is low impact on loan growth.

Ahmad et al. (2008) reported some findings on the determinants of banks capital ratios in Malaysia banking sector. They showed that capital requirement regulations introduced 1996 was ineffective whereas those mandated in 1997 are proved succesful in financial crises period. Toby (2008) found that the use of minimum liquidity ratio is irrelevant in controlling industry of non-performing loans. The cash reserve ratio is more effective tool in controlling the level of non- performing loans in the industry as a whole and the distressed banks in particular. Mathuva (2009) found that bank profitability is positively related to the core capital ratio and tier-I risk based capital ratio. Mathuva (2009) used the return on assets and return on equity as proxies for bank profitability for the period of 1998-2007. He found a negative relationship between equity-capital ratio and equity. Ho & Hsu (2010) found the relationship between firm's financial structures and their risky investment strategy in

Taiwan's banking industry. The results of their study confirmed that restrictions on capital adequacy ratio affected firm's risky investment strategies. Also firm performance is significantly and positively related to firm size, leverage, and financial cost. Finally, financial structures for banking firms are positively related to the states of business cycle.

Empirical Evidence on Bank Net Interest Margin (NIM)

Banks provide three main transformation functions with which they generate income, namely term, liquidity and risk transformations. With these transformation functions, banks fulfill an important role for economic prosperity; the income generated with these transformation functions, or more precisely banks' net interest margin, determines the social costs of financial intermediation (Maudos and de Guevara, 2004).

Research on banks' interest margins, defined as the difference between interest revenues and expenses per unit of assets, has a long tradition and has identified key determinants explaining differences in the level of interest margins (Ho and Saunders, 1981; Angbazo, 1997; Wong, 1997; Saunders and Schumacher, 2000; Maudos and de Guevara, 2004; Kasman *et al.*, 2010). Bank loans are naturally the main source of income, being the most risky and having the highest yield (in terms of expected return) among bank assets as well as the highest operational costs, as they need to be originated, serviced and monitored. Other things constant, the more deposits are transformed into loans, the higher the interest margin and profits. Hence, an increase in loans may result in wider margins and reflects the banks' ability to integrate risk and cost considerations in their loan pricing behavior. However, if a bank needs to increase risk to have a higher loan-to-asset ratio, then profits may decrease. The findings of Claeys and Vander Vennet (2007) indicate that loan to total assets ratio is significant in explaining a substantial part of interest margins in accession countries and can be mainly considered as a compensation for risk taking.

Indonesia Banking System Overview

Banking is uniqe sector that perform very important role in the economic growth of a particular society. The failure of banks results in widespread of impact affecting retail and institutional customers who hold funds at the banks. Therefore it must run its business based on the prudential principles. In Indonesia the functions of banks are basically as financial intermediary that acquire deposits from surplus units and finance to deficit units. According to Indonesian banking law, Indonesian banking institutions are typically classified into commercial and rural banks. Commercial banks differ with rural banks in the sense that the latter did not involve directly in payment system and have restricted operational area. In term of operational definition, banks in Indonesia are classified into non-sharia and sharia- based principles of commercial banks.

For the last two years, Bank Indonesia (BI) has been working towards a better future for the Indonesian banking industry through implementation of the programs under the Arsitektur Perbankan Indonesia (API). In this role, BI has both initiated programs and provided facilitation. To initiate improvements, BI issued many regulations to enable banking industry to operate prudently in line with international standards, and pay greater attention to customer rights. In the area of facilitation, BI has sought to build constructive cooperation with the relevant stakeholders in the API programs in order to create a stimuli for the development of a sound, strong, and efficient banking industry. After declared on Januari 9, 2004, API has met wide range of suggestion and constructives critisisms for better intergration of the API programs into programs of the national economy. Global developments in banking also require various changes to be made so that in time the nastional banking industry will be capable of compete in international competition with the support of competent human resource, adequate information technology, and appropriate supporting infrastructre. In response to these needs, BI has redesignes API programs. In substanse, the revised API programs set out a more concrete direction and strategy for consolidation of banking system, long-term development of sharia banking including expansion financing for small,medium, and micro enterprises (SMMEs) and the institutional strenghtening of rural banks (Bank Perkreditan Rakyat or BPR). Overall, the improvements to API progrtams has resultes in additonal programs and activities. These programs and activities, which are to be progressively implemented until 2013 have increased from initially 19 programs covering 34 activities to 20 activities program set out in 55 activities. The importance of the banking role demands proper regulation, in which the primary objective is to maintain customer confidence in the banking system. An essential part of the regulatory framework for the banking system involves the regulations governing bank capital, which functions as a buffer against losses.

In the view of the importance of capital to banks, BIS issued a capital framework concept more

commonly known as the 1988 accord (Basel I). This system was designed as a framework for measurement of credit risk and established a minimum capital standard at 8%. The Basel Committee designed Basel I as a simple standard requiring banks to disaggregate their exposures into broader categories reflecting debtor similarities. Exposures to customers of the same type (such as exposures to all corporate customers) are subject to the same capital requirements without taking account of differences in loan repayment capacity and specific risks associated with the individual customer. The growing diversity and sophistication of products in the banking system led BIS to introduce improvements to the capital framework in the 1988 accord with the launching of a new capital concept known as Basel II.

More than a decade later, prompted by the evolution of banking worldwide and the reality that the best method for calculating, managing and mitigating risks would be different from bank to bank, the Basel Committee embarked on the initiative for revision of Accord 1988. The first proposal was released in 1999 and was slated for implementation at end-2006. The revised capital accord --Basel II-- is a comprehensive agreement that establishes a spectrum of more risk-sensitive capital allocation and incentive for improvements in the quality of risk management at banks. This was achieved by adjusting capital requirements to credit risk and operational risk, and introducing changes in calculation of capital to cover exposures to risks of losses caused by operational failures. In addition to the calculation of minimum bank capital, Basel II also provides for a supervisory review process to ensure that banks maintain a level of capital commensurate to their risk profile and promotes market discipline through disclosure requirements.

All banks in Indonesia are also subject to the Basel II and to the provisions of other laws regarding to banks. Table 1 summarizes the number of banks and branches in Indonesia banking sector. As of 2012, there are a total of 120 commercial banks operating with branches 16,625 in Indonesia. Indonesian commercial banks sector consist of a diverse group of private and public sector banks and so we have conducted a comparative analyze of the banking sector with focus on CAR.

Table 1. Number of banks and branches in Indonesia banking sector period 2007-2012

	2007	2008	2009	2010	2011	2012
Commercial banks:						
Number of banks	130	124	121	122	120	120
Number of branches	9680	10,868	12,837	13,837	14,797	16,625
Rural banks:						
Number of banks	1,817	1,772	1,733	1,706	1,669	1,653
Number of branches	3,250	3,367	3,644	3,910	4,172	4,425

Sources: Indonesia Banking Statistic, various years

The data for bank-specific variables were collected for the period of 2007-2012. The data for tier-I and tier-II capital, banks CAR and NIM were compiled from individual banks. We also attempted to analyze reasons for the difference between actual CAR compared to the expected CAR and distinguish how market forces impose discipline on banks' capital adequacy.

METHODOLOGY
Data description and variable definitions

The purpose of this study is to investigate the influence of market discipline and bank-specific factors to the capital adequacy of banks. This study used secondary data obtained from the annual report of banks. We observed 28 commercial-publicly banks for seven years (from 2007 to 2012) that consist of four state-owned banks and 24 privately-owned banks. All of publicly banks are used to accomplish this research. Appendix 1 summarizes the banks selected under each group.

Panel data metodology used in this study and analysis the relationships between bank specific variables (as explanatory variables), capital adequacy ratio and bank behavior (interest margin). Table 2 presents the explanatory variables, dependent variables and measurements.

Table 2. Variables and measurements

	Variables	Symbol	Measurements
Explanatory variables: Bank specific variables	Bank size	LNASET	We take the natural logarithm of total assets of the bank.
	Deposits	SHDEP	We take the ratio of total deposits to total assets (expressed in percent).
	Capital risk (proxy by loans to total assets)	LOA	We take the ratio of total loans to total assets (expressed in percent).
	Bank risk (proxy by loans loss reserve)	LLR	We take the natural logarithm of the bank's loan loss reserve.
	Profitability (proxy by return to total assets)	ROA	Return on total assets (expressed in percent).
	Tier-I capital	K_{it}	Capital adequacy ratio (Tier-I) bank i year t.
	Average of tier-I capital for all banks	K_t	Average of Tier-I Capital for all banks.
	Market discipline	K	$K = K_{it} - K_t$
	Dummy type of ownership	D	D_1 = 1 if state-owned and 0 if others; D_2 = 1 if private-owned and 0 if others.
Dependent variable	Capital adequacy ratio	CAR	We take the total risk-weighted capital adequacy ratio at 8%.
	Interest spreads	NIM	We take the ratio of net interest income to average earning assets (expessed in percent).

Basel II requires banks to allocate capital at 8% of risk-weighted assets. It is used as the proxy for bank capital adequacy ratio in this study. Table 3 presents the summary of the selected bank-specific variables that affect the capital adequacy ratio. The predicted signs of relationship between bank-specific variables and the bank capital adequacy ratio are also indicated.

Table 3. Variables and predicted signs

Variable	Predicted sign
Dependent: CAR Independents:	
a. Bank size (LNASET)	
b. Amount of deposits (SHDEP)	+
c. Loan to total assets (LOA)	+
d. Loan-loss reserve (LLR)	+
e. Profitability (ROA)	+
f. Market discipline (K)	+
g. Dummy variable type of ownership (D)	+
	+

ICOBAME

Variable	Predicted sign
Dependent: NIM	+
Independents:	+
	+
a. Bank size (LNASET)	+
b. Amount of deposits (SHDEP)	+
c. Loan to total assets (LOA)	
d. Market discipline (K)	
e. Dummy variable type of ownership (D)	

Econometric model

This study examined the effects of bank-specific variables on capital adequacy ratio and interest spreads using a multivariate panel regression model. Based on both theoritical and empirical literature reviewed, we modify the econometric model proposed by Ghosh and Das (2005) as follows.

$$CAR_{it} = {}_1.LNASET + {}_2.SHDEP + {}_3.LOA + {}_4.LLR + {}_5.ROA + {}_6.K + {}_7.D + \ \text{........ (1)}$$

$$NIM_{it} = {}_1.LNASET + {}_2.SHDEP + {}_3.LOA + {}_4.K + {}_4.D + \ \text{.. (2)}$$

where CAR_{it} is the tier-I capital adequacy of bank i for the period t; LNASET is natural logarithm of total asset of bank i; SHDEP is the amount of deposits of bank i; K_{it} is tier-I capital adequacy ratio weighted assets for bank *i*; K_t is the average capital adequacy ratio for all banks; (K_{it} -K_t) identical with K that is used as a proxy for market discipline. If the coefficient of K is non negative then competition can help to reduce the free riding problem (market discipline will take place); LLR is the ratio of loan loss reserve to gross loans as proxy for bank risk; ROA is return on total assets proxy for banks' profits; SIZE is calculated by means of natural logaritm of total asset; LOA as proxy for liquidity risk calculated by means of divide up total loans to total assets; NIM is net interest margin proxy for bank behavior (pricing behavior).

RESULTS AND DISCUSSIONS

Various descriptive statistics of variables are calculated in order to describe the basic characteristics of those variables. Table 4 below demonstrated those descriptive statistics.

Table 4. Descriptive Statistics

	CAR	LNASET	SHDEP	LOA	LLR	ROA	K	D
Mean	16.42932	10.39916	91732.4	0.828132	75334.57	59.25966	1.650593	1.668536
Median	15.35	10.58383	39491.71	0.805549	31915.5	61.95	21.98	
Maximum	33.27	13.36235	635619	1.988846	482914.1	78.91	6.14	6.14
Minimum	-22.29	7.215152	1359.88	0.585759	1053.8	27.01	-52.09	-52.09
Std. Dev.	6.000774	1.595951	128268.3	0.191043	107081.5	11.30335	5.146595	4.950316
Skewness	-1.553499	-0.124	2.033278	4.215748	1.970262	-0.5595	-9.75323	-10.1038
Kurtosis	16.99759	2.034091	6.868328	23.8818	6.12925	2.554749	102.4978	110.3914
Jarque-Bera	1010.797	4.889535	154.8791	2493.436	124.4897	7.131096	50544.86	63686.72
Probability	0.0000*	0.046746**	0.0000*	0.0000*	0.0000*	0.028281**	0.0000*	0.0000*
Observations	118	118	118	118	118	118	118	118

Note: (*) and (**) denote the null of normality was rejected at 1% and 5% significance level respectively

Based on table 4, we can say that all variables are assymetrical. More precisely, skewness is negative for five series (i.e. CAR, LNASET, ROA, K and D). On contrary, SHDEP, LOA and LLR have a positive skewness which indicates that fat tails on the right-hand side of distribution. Kurtosis value of all variables also showed that data was not normaly distributed because values of kurtosis are deviated from 3. The calculated Jarque-Bera statistics and corresponding p-values are used to test for the normality assumption. Based on Jarque-Bera statistics and p-values, then normality assumption is rejected at 1% level of significance for capital adequacy (CAR), deposits (SHDEP), liquidity risk (LOA), asset quality (LLR), market discipline (K) and dummy type of ownership (D) and rejected at 5% level of significance for total asset (LNASET) and profitability (ROA). Also, there was no collinearity problem exist stand on correlation test amongst those variables. We can conclude that none of bank specific variables are highly correlated and no multicolinearity amongst these variables exist. We will discuss the regression results based on table 5 below.

Table 5. Panel Regression Results

Variable	Dependent Variable : CAR	
	Model: $CAR_{it} = {}_{1}.LNASET + {}_{2}.SHDEP + {}_{3}.LOA + {}_{4}.LLR + {}_{5}.ROA + {}_{6}.K + {}_{7}.D +$	
	Model I:	Model II:
	Cross-Section (Fixed Effect)	Cross-Section (Random Effect)
C	69.92714* (6.09259)	53.47971* (7.234392)
LNASET	-3.986083* (-3.693283)	-1.776082* (-3.377271)
SHDEP	1.15E-05 (0.250413)	1.28E-05 (0.391821)
LOA	-9.235591** (-1.86633)	-5.059389** (0.09010)
LLR	-9.28E-06 (-0.157815)	-1.22E-05 (0.76040)
ROA	-0.096923*** (-1.864958)	-0.105923* (-2.859925)
K $(= K_{it} - K_t^*)$	0.601416* (10.7243)	0.620364* (11.63164)
D_1	-0.056982 (-0.082309)	-0.188757* (-3.453780)
D_2	8.36E-06 (0.389211)	1.62E-05 (1.189614)
R^2 (D1; D2)	0.885293 ; 0.886077	0.17736 ; 0.186928
Adj. R^2 (D1; D2)	0.75966 ; 0.761305	0.021728; 0.033103

| F-Stat. (D1; D2) | 7.046725* ; 7.101557* | 1.139608 ; 1.215200 |
| D-W Stat. (D1 ; D2) | 1.9013; 2.301978 | 2.316604 ; 2.321839 |

Note: (*), (**), (***) denote the significance level at 1%, 5%, 10% respectively, () t-test

In both models (fixed effect and random efect), all the regression coefficients revealed consistent signs and significant relationships with CAR excluding D_1 (state- owned banks). However, further analysis will be based on fixed-effects model (Table 5, 2nd column).

Table 5, 2nd coloumn reports Adj. R^2 value = 0.75966 which is greater than in the 3rd coloumn (Adj. R^2 = 0.021728). Therefore we can state that fixed effect model perfoms in determining the effect of bank specific variables on banks CAR. We can also state that 75.97% variability of banks CAR can be explained by the model. The D-W statistics = 1.9013 confirmed that there is no serial correlation problem. On

behalf of F-value = 7.046725* (p<0.0000) we reject the null that all coefficients are simultaneously zero and accept that the regression is significant overall. More on table 5, 2nd coloumn, bank size (LNASET) indicated negatively significant effect on capital adequacy ratio. The sign negative of coefficient of LNASET indicated that to the large banks the effect of size could be negative due to bureaucratic or other reasons. For instance, a well-capitalized bank is less likely to fail so that the bank can thus attract funding at lower cost by improving its relative attractiveness through a higher individual (relative to other banks) capital-asset ratio. The large banks (identical with state-owned banks) convinced to have lower capital adequacy than the smaller banks (identical with private-owned banks) where the large banks benefit from reputation effect ("too big to fail") and also the larger banks may be seen by customers as more secure and may thus benefit from a lower cost of external resources. It was supported by the results of type of ownership which revealed negatively-insignificant for the D_1 (state-owned banks) but positively-insignificant for D_2 (private-owned). So, we can also assert that state-owned banks were disadvantaged by market discipline (proxy with K) but private-owned banks were benefited by market discipline. If the depositors are more concerned about whether she should place her money in a bank account at all rather than in a competing non- bank asset (e.g. government bonds, stocks, etc., the investors consider deposits offered by different banks that differ in terms of capital-asset ratios as close substitutes. In this case, a bank will not have a strong incentive to select a high capital-asset ratio to distinguish itself from its competitors. In this case, a bank will not have a strong incentive to select a high capital-asset ratio to distinguish itself from its competitors. As a results, the larger banks will tend to choose low levels of capital relative to the socially optimal level.

Why market discipline did not effect on banks CAR in Indonesia? It could be due to complete government deposit insurance which protect banks from runs and also leads to moral hazard. When the government provides deposit insurance, depositors know that they will not suffer losses if a bank fails. They thus do not impose the discipline of the marketplace on banks by withdrawing deposits when the bank is taking on too much risk, and do not demand an interest payment that reflects the risk that the bank takes. Deposit insurance insulates banks from potential market discipline, and leads to lower levels of bank capital. Moreover, small banks are assumed to suffer from informational asymmetry problems more than large banks do.

Deposits was measured by the ratio of total deposits to total assets (SHDEP). Deposits are generally considered cheaper sources of funds compared to borrowing and similar financing instruments for banks. When deposits increase, bank should be more regulated and controlled to guarantee the depositors rights and to protect bank from insolvency. If depositors can not assess financial soundness of their banks, banks will maintain lower than optimal capital ratios but if depositors can assess a bank's capital strength, a bank will maintain a relatively strong capital positions because greater capital induces depositors to accept lower interest rates on their deposits. However, the finding of this study showed that deposits effects positively but not significant on bank capital adequacy ratio.

Further, bank liquidity risk (LOA) was predicted positively affects on banks capital adequacy. LOA measures the impact of loans in assets portfolio on capital. The higher the ratio the higher the bank risk. As risk increase, depositors should be compensated for losses therefore capital adequacy (CAR) should increase. Subsequently, the relationship between liquidity risk (LOA) and capital adequacy ratio (CAR) is emerged positive. However, the

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coefficient of liquidity risk (LOA) was proved negatively significant. It implies that the higher the risk did not encourage banks to increase their capital adequacy. It is possibly due to banks in a capital constrained position. In general, a capital constrained bank would like to conserve its capital by assigning fewer assets to loans. This tendency becomes more severe since capital constraint becomes binding which is the case for banks with less than required capital level. Therefore, we can state that banks risk has encouraged small banks to lessen their loans disbursement, thus the growth of loans declined. Contrary, banks with higher capital adequacy there just a little impact of bank risk on loans growth. Thampy (2004) support the negative impact of capital adequacy regulation on loan growth.

Broaden, return on assets (ROA) is utilized as proxy for profitability. According to Myers and Majluf (1984), profitable banks, in the long run, tend to maintain lower CAR based on these two factors : (1) profitable banks aware that they do not need to maintain high capital ratio due to they can maximize earning utilization to finance the investments (Myers and Majluf, 1984); (2) tax deductability advantage magnetize banks to employ more debt (Modigliani and Miller, 1958; Miller, 1977). Therefore, theoriticaly there is a positive effect of banks ROA on banks NIMs. The more profitable bank the lower capital adequacy. However, the result of this study was contrary with the expected sign; ROA significantly negative effects on banks capital adequacy. It confirmed that large banks tend to not maintain capital adequacy minimum level since they can utilize their funds to generate greater earnings.

The coefficient of K (= $K_{it}-K_t$), as proxy for market discpline, proved positively significant effects on bank's CAR. We then can state that market discipline effects on banks behavior particularly on banks' capital adequacy. It might be due to well-capitalized banks were perceived by depositors as more secure managers of their funds than the less-capitalized banks. Depositors recognize bank healthiness and soundness by means of greater capital adequacy. It highlights that banks could increase in their capital level in order to satisfy the market which is controlled by the shareholders. The coefficient of D_1 (state-owned banks) negatively significant affects on bank capital adequacy. It implies that if large banks reduce their capital adequacy optimal level, market discipline becomes more intensively occur so that the large banks improve their capital adequacy. On the other edge, the coefficient of D_2 (private-owned banks) positively insignificant effects on banks capital adequacy. We then can say that for private-owned banks, they must provide supplementary capital above the capital level required to be perceived by consumers as more secure than state-owned banks. When the government provides deposit insurance, depositors know that they will not suffer from losses if a bank fails. They thus do not impose the discipline of the market place on banks by withdrawing deposits when the bank is taking on too much risk, and do not demand an interest payment that reflects the risk that the bank takes. Deposit insurance policy insulates banks from potential market discipline, and leads to lower levels of bank capital.

Table 6 and Table 8 reported the Hausman test to investigate the appropriate model between fixed effect and random effect.

Table 6. Hausman test for correlated random effects

Model : CAR$_{it}$ = 1.LNASET + 2.SHDEP + 3. LOA + 4.LLR + 5. ROA + 6.K + 7.D +			
Correlated Random Effects - Hausman Test			
Pool: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	22.851151	6	0.0008

The results of Hausman test (table 6) suggested that the corresponding effects are statistically significant, hence the null hypothesis is rejected by our data and fixed effects model is preffered.

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Table 7. Panel Regression Results

Variable	Dependent variable : NIM	
	Model: $NIM_{it} = {}_1.LNASET + {}_2.SHDEP + {}_3.LOA + {}_4.K + {}_4.D +$	
	Model I:	Model II:
	Cross-Section (Fixed Effect)	Cross-Section (Random Effect)
C	2.54455 (0. 940248)	43.97241*(7.116996)
LNASET	-0.019436 (-0.792839)	0.907759*(2.920406)
SHDEP	1.826133* (4.845013)	1.28E-05 (0.69590)
LOA	0.140081***(1.732555)	0.061217 (0.964362)
K	-1.15E-05*(-3.939673)	-8.79E-06*(-3.311996)
D_1	-2.879794*(-3.970588)	-1.758050 (-1.198597)
D_2	-7.48E-06*(-0.356363)	-3.75E-06 (-1.012014)
N x T = 26 x 5	118 (Unbalanced)	118 (Unbalanced)
R^2 (D_1 ; D_2)	0.876563 ; 0.87355	0.124834 ; 0.112979
Adj. R^2 (D_1 ; D_2)	0.834984 ; 0.830960	0.088967 ; 0.076626
F-Stat. (D_1 ; D_2)	21.0819* ; 20.50984*	3.480424* ; 3.107809**
D-W Stat. (D_1 ; D_2)	1.854224 ; 1.825036	1.416942 ; 1.400517

Note: (*), (**), (***) denote the significance level at 1%, 5%, and 10% respectively, () t-test

Table 7, 2nd coloumn reports Adj. R^2 value = 0.935286 which is greater than in the 3rd coloumn. Therefore we can state that fixed effect model perfoms in determining the effect of bank specific variables on banks NIMs. We can also state that 93.53% variability of banks NIMs can be explained by bank size (LNASET), deposits (SHDEP), liquidity risk (LOA), market discipline (K) and dummy type of ownership. The D-W statistics = 2.079233 confirmed that there is no serial correlation problem. On behalf of F-value = 60.20909* (p<0.0000) we reject the null that all coefficients are simultaneously zero and accept that the regression is significant overall.

More on table 7, 3rd column reports that bank size (LNASET), deposits

(SHDEP), liquidity risk (LOA), market discipline (K), and dummy type of ownership (DO_1) revealed consistent signs and significant relationships with NIMs excluding banks size (LNASET). However, further analysis will be based on fixed-effects model provided in table 7, 2nd column (first model) due to this model has greater Adj. R^2 (0.834984) than the second one that was 0.088967 (table 7, 3rd coloumn). In other words, 83.49% variability of bank interest margin can be explained by banks deposits (SHDEP), liquidity risk (LOA), market discipline (K) and type of

ownerships (DO_2). We can affirm that the first model (*fixed effect*) explain the variability of the dependent variables better than the second model (*random effect*).

We start from the first independent variable bank size. Bank size (LNASET) revealed positively significant effects on banks interest margins (NIMs). The larger the bank the higher the NIM. It is due to banks with greater assets are able to diversify their products better than those with lesser amount of assets. Therefore, they can serve more demand so its market share increases. Subsequently, the increases in market share results in higher interest margins (NIM).

Further, deposits (SHDEP) was proved positively significant effects on banks NIMs. It means that banks with larger market share (base on deposits market) can enjoy higher interest margins due to they have huge source of cheaper funds so that they can serve more demand with lower deposits rate and higher lending rate.

Broaden, the liquity risk (LOA) measures the impact of loans in assets portfolio on capital. Base on the regression results, LOA showed postively significant effect on banks interest margins (NIMs). When risk increases, depositors should be compensated for loss so capital adequacy ratio should increase. Therefore, the relationship between LOA and capital adequacy ratio is emerged positive.

Market discipline (K) showed significantly negative effects on banks interest margins. This means that banks might lower their cost of deposit by increasing their tier-1 capital adequacy ratio. Further, dummy type of ownership (state-owned banks-

-D_1) positively insignificant effects on banks interest margins. It means that state- owned banks tend to set higher loan interest rate and lower deposits rate compare with private-owned banks. We can also say that private-owned banks set deposits interest rate higher to attract more funds. Hence, private-owned banks can not attain wider margin.

Table 8. Hausman test for correlated random effects

Model : NIM$_{i,t}$ = 1.LNASET + 2.SHDEP + 3.LOA + 4.K + 5.D +			
Correlated Random Effects - Hausman Test			
Pool: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16.807235	6	0.0100

The results of Hausman test (Table 8) suggested that the corresponding effects are statistically significant, hence the null hypothesis is rejected by our data and fixed effects model is preffered.

CONCLUSIONS

The findings of this study indicate that bank size (LNASET), liquidity risk (LOA), bank profitability (ROA), market discipline (K) significantly effect on the banks capital adequacy (CAR). It proposed that private-owned banks maintain higher capital adequacy in order to get a positive impression from the society. It is due to state-owned banks which identical with large banks are experience with "too big to fail". Both of the society and banks were not worry about their funds and liabilities since there was government blanket guarantees on them. Further, deposits (SHDEP) and asset quality (LLR) did not effect on bank capital adequacy (CAR).

On the other part, bank size (LNASET), deposits (SHDEP), liquidity risk (LOA) and market discipline (K) effects on banks NIMs. Type of ownership (D_1- state-owned banks) positively significant effect on banks NIMs. In Indonesia, state- owned banks are perceived by society as more secure than private-owned banks, therefore they are more likely to locate their funds at state-owned banks. Consequently, state-owned banks own a huge source of funds and they possibly earn higher NIMs than private-owned banks. Contrary, private-owned banks have difficulties in attract third party funds unless they offer higher deposits rate than those offered by state-owned banks. As a results, private-owned banks earn lower profit than those earned by state-owned banks due to private-owned banks set higher deposits rate and lower loans rate.

Lastly, many empirical studies of banking market discipline report mixed results. Market discipline of such risk would tend to be more effective if banks were forced to absorb losses in a more consistent manner in bank failure cases. Therefore, we leave for future research the task of identifying the specific channels through which depositors obtain information regarding banks fundamentals. Depositors may be getting the information directly from balance sheets, financial advisors, newspaper articles, or rumors. Future research on this subject (market discipline) could shed light on what mechanisms may help depositors to distinguish "good" from "bad" banks in the Indonesian banking industry.

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