Excess capital and bank behavior : evidence from Indonesia

	Hamada Miki
	Copyrights / Institute of Developing Economies, Japan External Trade Organization (IDE-JETRO) http://www.ide.go.jp
journal or publication title	IDE Discussion Paper
volume	588
year	2016-03-01
URL	http://hdl.handle.net/2344/1542

INSTITUTE OF DEVELOPING ECONOMIES

IDE DISCUSSION PAPER No. 588

Excess capital and bank behavior: Evidence from Indonesia

Miki HAMADA*

Abstract

The Indonesian banking sector has been restructured since Asian financial crisis and restored to soundness. The capital adequacy ratio (CAR) returned to a sound level; however, the average excess capital has become too high, while credit disbursement has remained low. This paper investigates the determinants of excess capital among Indonesian banks and its effects on credit growth during the 2000s. The results indicate that the determinants of excess capital vary widely depending on bank type. Return on equity (ROE) affects excess capital negatively among domestic banks, and the effect of non-performing loans is mixed, differing for various bank types. Excess capital affects credit growth positively, except among foreign banks.

*Development Studies Center, IDE, miki_hamada@ide.go.jp

The Institute of Developing Economies (IDE) is a semigovernmental, nonpartisan, nonprofit research institute, founded in 1958. The Institute merged with the Japan External Trade Organization (JETRO) on July 1, 1998. The Institute conducts basic and comprehensive studies on economic and related affairs in all developing countries and regions, including Asia, the Middle East, Africa, Latin America, Oceania, and Eastern Europe.

The views expressed in this publication are those of the author(s). Publication does not imply endorsement by the Institute of Developing Economies of any of the views expressed within.

Excess capital and bank behavior: Evidence from Indonesia

March 2016

Miki HAMADA**

Abstract

The Indonesian banking sector has been restructured since Asian financial crisis and restored to soundness. The capital adequacy ratio (CAR) returned to a sound level; however, the average excess capital has become too high, while credit disbursement has remained low. This paper investigates the determinants of excess capital among Indonesian banks and its effects on credit growth during the 2000s. The results indicate that the determinants of excess capital vary widely depending on bank type. Return on equity (ROE) affects excess capital negatively among domestic banks, and the effect of non-performing loans is mixed, differing for various bank types. Excess capital affects credit growth positively, except among foreign banks.

1. Introduction

In 1997, the Indonesian banking sector was heavily damaged by the Asian financial crisis. In 1998, the average capital adequacy ratio (CAR) of commercial banks sharply dropped to minus12.9% due to the devaluated rupiah. The banking restructuring process restored the soundness of banks; the CAR has increased to an adequate level. In fact, the CAR became too high for some banks, and the average excess capital remained at a high level during the 2000s. Although soundness was restored, credit disbursement remained low (Figure 1).

---

* Development Studies Center, Institute of Developing Economies, miki_hamada@ide.go.jp
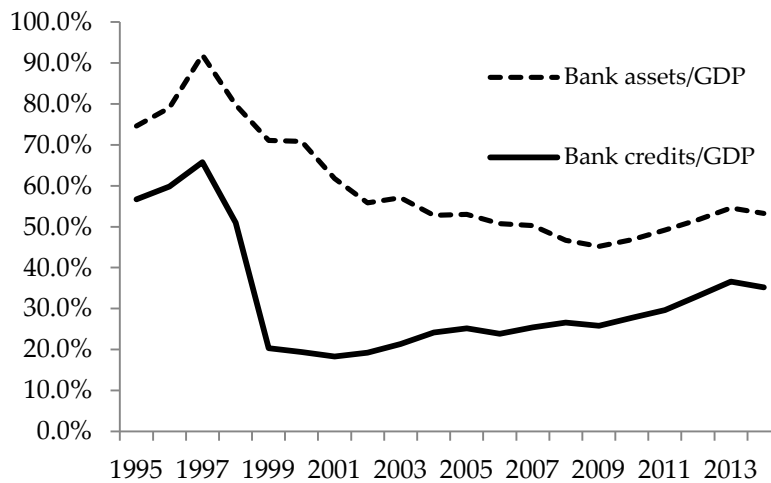
Figure 1 Bank assets and bank credits per GDP (1995-2014)

Source: Bank Indonesia, *Indonesian Financial Statistics*.

Bank soundness is mainly evaluated via the capital adequacy ratio. The introduction of a minimum capital requirement set by Basel I Accord enhanced studies of bank capital. Regulation of capital requirement raised questions about bank's reaction to capital requirements; whether banks increase capital or alter the risk-weighted assets. A lot of empirical studies suggested that capital requirements affect banks' capital ratios (Jackson et al., 1999) In recent years, many studies focus on cyclicality of bank capital. Many literatures suggested significant negative relationship between the business cycle and the capital buffers (Ayuso et al., 2004, Stolz and Wedow, 2005 Jokipii and Milne, 2009).

Another research concerns is the impact of capital requirements. Several theories explain how bank capital effects bank lending. Capital shortage relative to the regulatory minimum may decrease in credit (Gambacorta and Mistrull, 2004, Berrospide and Edge, 2010).

This paper investigates the determinants of excess capital and examines the effects of excess capital on bank lending in the Indonesian banking sector.   Holding excess capital over the regulatory minimum creates an adjustment cost. Also, a breach of this regulation triggers costly supervisory actions; hence, banks have an incentive to hold more capital than required (a "capital buffer") as insurance against a violation of the regulatory minimum capital requirement (Heid, Porath and Stolz, 2004). However, having too much excess capital may interfere with the financial intermediation function.

The rest of paper is organized as follows: Section 2 describes a brief overview of the Indonesian banking sector. Section 3 examines the determinants of excess capital and its effect on lending behavior. Section 5 explains the results of a qualitative analysis of

2

individual banks' financial data from 2001 to 2009. Section 5 presents the conclusions.

2. Bank Regulations in the Indonesian Banking Sector

2.1 Banking Sector in Indonesia

The Indonesian banking sector has changed since the Asian financial crisis of 1997. Before the crisis, the Indonesian banking sector was underdeveloped. It was focused on quantitative expansion, not on the soundness of banks. Therefore, bank restructuring greatly changed the Indonesian banking sector, encouraging sound and prudent management.

There are five types of Indonesian commercial banks. Banks are categorized by ownership: state-owned banks; regional development banks; local private banks, which are comprised of private foreign-exchange banks (forex banks) and private non-foreign-exchange banks (non-forex banks); joint banks; and foreign banks. More than 60% of state-owned banks' shares are held by the Indonesian government. Regional development banks are held by regional governments. Local private banks were originally fully owned by local capital, but now, major local private banks have been acquired by foreign capital (Hamada, 2014) whiles still being categorized as local private banks. Joint banks are held by local capital and a foreign bank jointly. A foreign bank is fully owned by a foreign bank.

Table 1 Bank performance indicators by bank type.

	ROA	ROE	NIM	LDR	NPL	Operational exp./ Operational income
December 1998						
State	-84.6%	117.9%	-11.6%	102.8%	64.9%	169.7%
Forex	-10.6%	46.0%	3.3%	66.9%	46.3%	101.3%
Non-forex	-5.2%	-67.7%	6.8%	47.2%	46.5%	97.0%
Joint	-8.8%	54.9%	10.6%	253.6%	47.8%	56.3%
Foreign	6.1%	786.9%	15.1%	89.7%	43.8%	43.8%
Regional	1.6%	-29.2%	9.0%	75.4%	21.1%	82.5%
December 2009						
State	2.5%	25.0%	6.2%	76.3%	4.0%	80.3%
Forex	-0.1%	-17.9%	5.8%	73.9%	3.9%	122.2%
Non-forex	0.0%	-3.8%	6.6%	80.8%	4.0%	106.5%
Joint	3.6%	10.7%	5.1%	94.6%	3.5%	64.2%
Foreign	3.9%	12.9%	4.4%	102.7%	5.1%	56.3%
Regional	3.7%	27.5%	9.1%	89.2%	2.3%	71.7%

Each bank type engages in a specific kind of banking business. Domestic banks (state-owned banks, regional development banks, and forex banks) provide both wholesale and retail banking. Non-forex banks' business is mainly retail baking in the form of rupiah transactions. Joint and foreign banks provide wholesale banking for foreign companies, mainly those of their home country. Table 1 shows the major performance indicators in 1998 and 2009.

The indictors show that the worst performance occurred in 1998 due to the Asian crisis and political turmoil. Though it took over 10 years, bank performance had improved by 2009, except for the profit ratio, which had decreased due to the global financial crisis.

Figure 2 shows the development of outstanding bank credit by bank type. Financial liberalization and rapid economic growth have expanded the banking sector. During the 1980s and 1990s, state-owned banks dominated the Indonesian banking sector. However, with development, local private banks had have grown to the same size as state-owned banks. As the figure indicates, state-owned banks and forex banks are the main players in the Indonesian banking sector, and regional development banks doubled their share of the total outstanding credit.
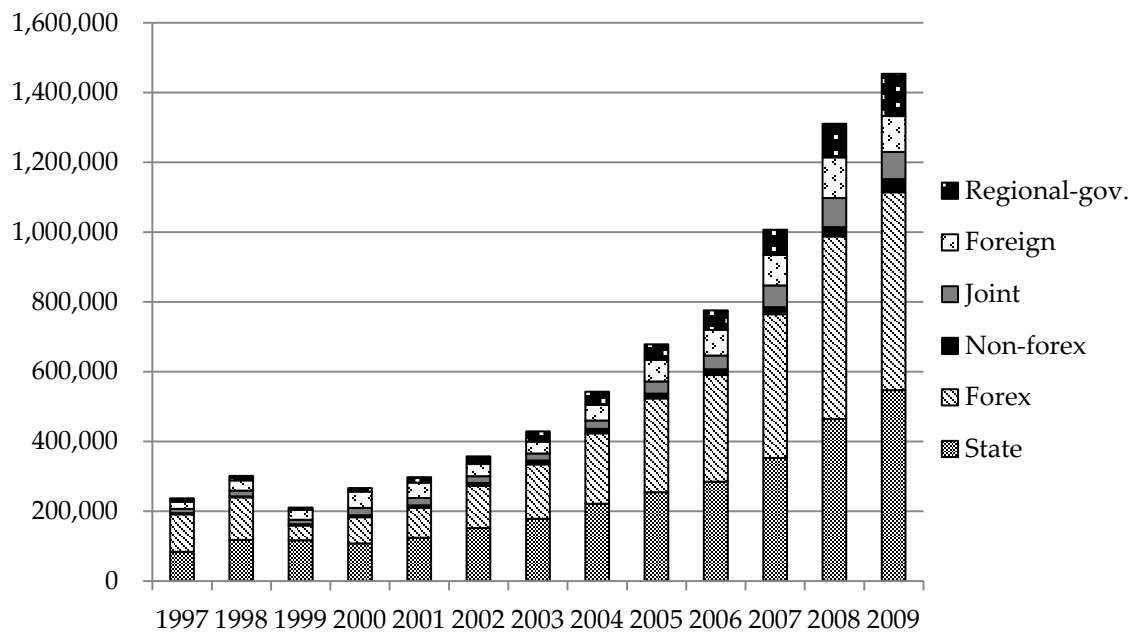

Figure 2 Outstanding credits by bank type (1997-2009).

Source: EKOFIN.

3. Determinants of Excess Capital and Lending behavior

3.1 Empirical examination

Figure 3 shows changes in excess capital by bank type from 1998 to 2009. Due to the Asian crisis, state-owned banks had a net capital deficiency until 1999. Since the beginning of the 2000s, state-owned bank's level of excess capital has remained relatively stable at around 10%. Forex banks had high levels of excess capital, 33.7% in 1999 and 25.9% in 2000; since then, this value has been maintained a level from 13% to 20%. Non-forex banks' excess capital is always maintained at a high level of 20% to 35%. Joint banks hold very high levels of excess capital, ranging from 30 to 50%. Foreign banks and regional development banks keep excess capital at around the 25% and 13% levels, respectively. The level of excess capital varies with bank type, and since 2006, non-forex banks, joint banks, and foreign banks have increased their levels of excess capital.
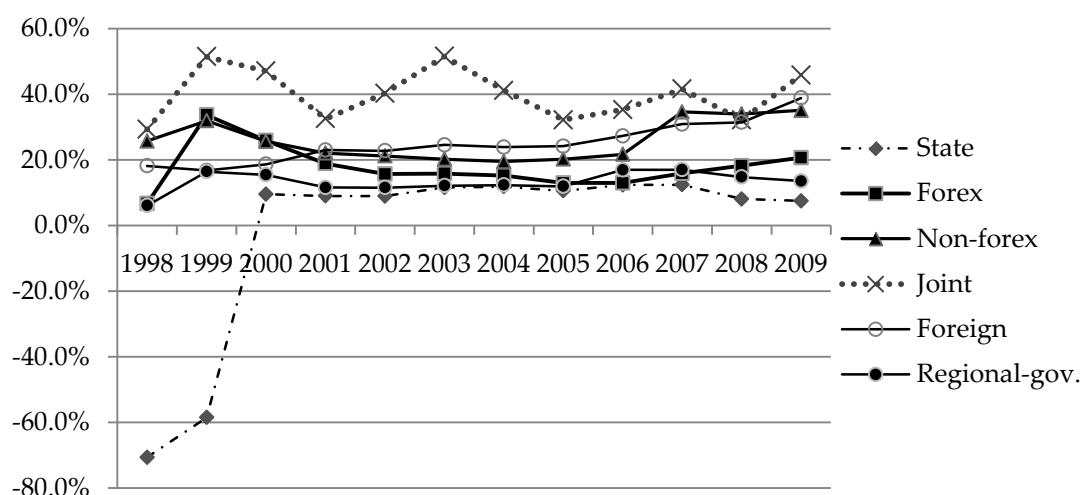
Figure 3 Excess capital by bank type (1997-2009).
Source: EKOFIN.

Figure 4 describes a range of excess capital by bank type. A crossbar indicates the mean of excess capital, a vertical line indicates the range from the minimum to maximum excess capital. The variances of forex bank, non-forex bank and joint banks are large; that of joint bank is exceptionally large. This implies that even within the same bank type group, there is great variety among banks. Therefore, the determinants of excess capital depend on an individual bank's characteristics.

5

Figure 4 Range of excess capital by bank type (1997-2009).

Source: EKOFIN.

Gambacorta and Mistrulli explain the differences in capital level by bank size. Larger banks' capital levels have been constantly below the average. Very small banks are better capi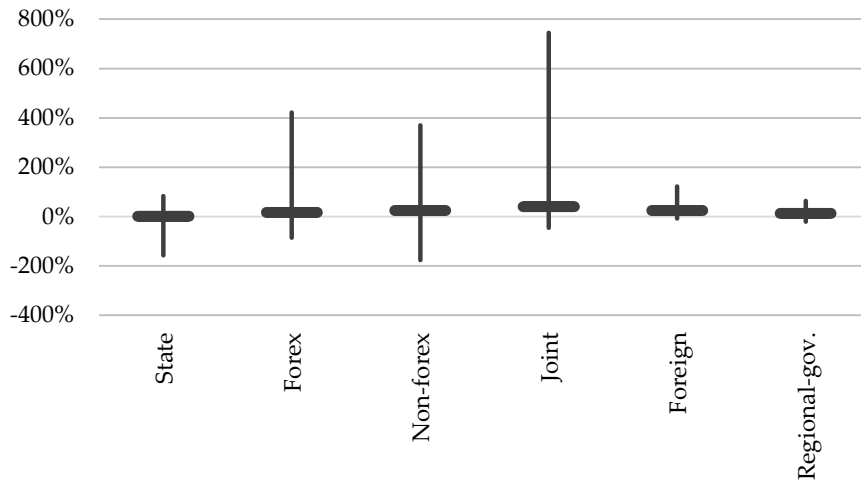talized. These different capital ratios could reflect heterogeneity in their capacity to issue capital (Gambacorta and Mistrulli, 2004) In other words, larger banks, such as state owned-banks in Indonesia, have an advantage in terms of access to funds and the flexibility to raise funds in response to changes in their performance and macro-economic situation. Meanwhile, for small banks, such as non-forex banks in Indonesia, the capacity to raise funds is lower, and the adjustment cost is higher. Thus, smaller banks', such as non-forex banks' and joint banks', capital levels are much higher than those of other, larger banks.

3.2 The date and empirical model

Our dataset was comprised of 118 banks: four state-owned banks, 34 forex banks, 30 non-forex banks, 15 joint banks, nine foreign banks, and 26 regional development banks, which were in a database of Indonesian Banking Indicators, EKOFIN in Indonesia.

The determinants of excess capital and its effect on credit growth are examined by System Generalized Method of Moments (SGMM) and panel data regressions, using the 118 banks' semi-annual financial data from 1998 to 2009. We estimate the following equations:

$$EXCESS_{it} = \alpha_{it}EXCESS_{it-1} + \beta_{it}ASSET_{it-1} + \gamma_{it}RISK_{it-1} + \delta_{it}ROE_{it-1} + \varepsilon_t GDP_t + u_{it}, \quad (1)$$

where the dependent variable is excess capital (EXCESS) and the independent variables are total assets (ASSET); nonperforming loan ratio (NPL), which is a proxy of RISK; return of equity (ROE); and GDP, which represents macro-economic variables.

ASSET is the natural log of the book value of total assets. Because larger banks' capital adjustment cost is lower than that of smaller banks, the coefficient of ASSET is expected to be negative. RISK is the ratio of the number of non-performing loans to total loans; a riskier loan portfolio will increase capital; therefore, RISK positively affects excess capital. However, if it effects excess capital negatively, this implies moral hazard behavior (Francis and Osborne, 2012). ROE is the ratio of the total equity to the total assets in book value. It is a proxy of capital cost.

$$\Delta LOAN_{it} = \alpha_{it}EXCESS_{it-1} + \beta_{it}ASSET_{it-1} + \gamma_{it}RISK_{it-1} + \delta_{it}CREDIT_{it-1} + \varepsilon_t GDP_t + \theta_t INT_t + u_{it},$$
(2)

where the dependent variable is growth of credit (Δ LOAN). The independent variables are ASSET, RISK, and CREDIT, which is the ratio of total credits to total assets. CREDIT is used to control for the effect of a bank's intermediation level.

Table 2 Data description (mean) by bank type (December 1997-December 2009)

	All banks	State	Forex	Non-forex	Joint	Foreign	Regional
No. of banks	118	4	34	30	15	9	26
EXCESS CAPITAL	0.22	0.02	0.18	0.26	0.41	0.25	0.14
	(0.39)	(0.3)	(0.35)	(0.42)	(0.65)	(0.26)	(0.1)
ASSET *	10,600,000	128,000,000	13,800,000	677,208	3,549,976	12,500,000	3,389,304
	(33,300,000)	(97,300,000)	(30,100,000)	(1,535,761)	(3,985,694)	(11,700,000)	(4,498,906)
ROE	0.14	0.32	0.06	-0.03	0.14	0.76	0.20
	(1.27)	(1.4)	(1.05)	(0.72)	(0.32)	(3.52)	(0.66)
NPL	0.11	0.15	0.12	0.11	0.17	0.16	0.06
	(0.36)	(0.19)	(0.55)	(0.31)	(0.27)	(0.19)	(0.11)
CREDIT	0.52	0.51	0.53	0.53	0.63	0.47	0.44
	(0.22)	(0.21)	(0.21)	(0.21)	(0.25)	(0.22)	(0.17)
ΔLOAN	0.16	0.07	0.14	0.15	0.19	0.28	0.15
	(0.73)	(0.17)	(0.36)	(0.74)	(0.89)	(1.78)	(0.18)

Note: Standard deviation is in parenthesis.

*In millions of rupiah.

4. Empirical results

4.1. Excess capital

The results of the estimation are summarized in Table 3. The models are estimated using the System Generalized Method of Moments (SGMM). Regarding the results of the estimation for all banks, the only coefficient of lagged EXCESS CAPITAL is significant. As already explained, banks' features differ depending on bank type; thus, all banks are divided into four categories, government banks (state-owned banks and regional development banks), forex banks, non-forex banks, and foreign banks (joint banks and foreign banks), to investigate determinants.

ROE is a proxy for the direct costs of remunerating excess capital (Jokipii and Milne, 2008), and the coefficient of ROE is negative and significant, except for foreign banks. Ayuso et al. (2004) and Jokipii and Milne (2008) showed a negative relationship between ROE and excess capital. Our results are consistent with their findings. The results of RISK are mixed and depend on bank type. In the model of private banks, for both forex and non-forex banks, RISK is significant and positive. This suggests that banks cope with increase in risky portfolios by holding more capital. Meanwhile, in the model of government banks and foreign banks, RISK is negative and significant for government banks but not significant for foreign bank. This result is consistent with moral hazard behavior.

Concerning GDP, representing economic growth, the coefficianet of government banks is negative but not significant. Those for forex banks and non-forex bank are positive and strongly significant. The value for foreign banks is not significant. This implies that during an economic upturn, forex banks and non-forex banks increase their capital because the cost of capital funding is lower. The coefficients of ASSET are insignificant for all models.

4.2 Credit growth

The results of the estimation of credit growth are summarized in Table 4. The models are estimated using fixed-effect panel regressions. Concerning the effect of excess capital on credit growth, the coefficients of EXCESS CAPITL are positive and significant, except that for foreign banks, which is negative and significant at the 10% level. This indicates that a well-capitalized bank can increase credit. In other words, it is possible to assume from the previous results that smaller banks, whose fundraising capabilities are lower than those of larger banks, attempt to increase their capital in order to expand credit. RISK negatively affects credit growth, but significant for only government banks. CREDIT has a negative

effect on credit growth. This indicates that banks adjust their ratio of credit to total assets to a certain level. ASSET and interest rate (INT) affect credit growth negatively. GDP growth has a positive effect on government banks, but its coefficient is very small.

5. Conclusion

This paper examines the determinants of excess capital among Indonesian commercial banks and the effects of excess capital on credit growth during the 2000s. The results indicate that the determinants of excess capital vary widely depending on bank type. Smaller banks, such as forex bank, hold high levels of excess capital due to their lower capacity of issue capital. This is reflected in the results of the estimation of ROE, which affects excess capital negatively among domestic banks.

The effects of the non-performing loan ratio are mixed, depending on bank type. GDP growth is not necessarily a determinant of excess capital for all banks. Excess capital affects credit growth positively, except for foreign bank. This indicates that well-capitalized banks can increase their credit. In other words, smaller banks attempt to increase their capital due their lower fundraising capabilities in order to expand credit.

Table3 Determinants of banks' excess capital

Dependent Variable = EXCESS(CAR-0.08)

	All Banks		Government (State and regional government)		Private				Foreign (Joint and Foreign)	
					(Forex)		(Non-forex)			
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
EXCESS(t-1)	0.871 ***	0.290	0.721 *	0.377	0.716 ***	0.033	0.524 ***	0.144	0.631 ***	0.055
ASSET(t-1)	0.002	0.049	0.007	0.008	0.005	0.009	-0.029	0.037	0.007	0.045
RISK(t-1)	-0.219	0.407	-0.407 **	0.167	1.043 *	0.517	0.482 *	0.242	-0.324	0.260
ROE(t-1)	-0.019	0.049	-0.117 **	0.046	-0.107 ***	0.034	-0.301	0.179	0.149	0.151
GDP	-0.014	0.012	-0.012	0.014	0.041 ***	0.015	0.047 ***	0.015	0.041	0.049
CONS	0.089	0.826	0.051	0.154	-0.304	0.188	0.227	0.446	-0.174	0.768
Number of obs.	2558		644		736		651		527	
Sargan test(*P*-value)	0.739		1.000		0.981		0.524		0.997	
AR(1)	0.047		0.085		0.131		0.027		0.090	
AR(2)	0.328		0.928		0.193		0.857		0.497	

Note: Estimated using the System Generalized Method of Moments.

*, **and *** Significant at the 10%, 5% and 1% levels, respectively.

Table 4 Effects of excess capital on credit growth

Dependent variable = credit growth

| | ALL | | | Government | | | Private | | | | | Foreign | | |
| | | | | | | | Forex | | | Non-forex | | | | |
	Coef.		SE	Coef.		SE	Coef.		SE	Coef.		SE	Coef.		SE
EXCESS(t-1)	0.106	**	0.051	0.084	**	0.044	0.131	**	0.050	0.651	***	0.125	-0.208	*	0.118
ASSET(t-1)	-0.085	***	0.025	-0.056	***	0.008	-0.043	*	0.024	-0.208	***	0.068	-0.177	***	0.053
RISK(t-1)	-0.051		0.040	-0.236	***	0.054	-0.008		0.022	-0.042		0.102	-0.315		0.233
CREDIT(t-1)	-0.687	***	0.104	-0.313	***	0.050	-0.836	***	0.090	-0.216		0.249	-1.061	***	0.243
INT	-0.016	***	0.005	0.000		0.002	-0.015	***	0.004	-0.019	*	0.010	-0.028	*	0.017
GDP(t-1)	0.002		0.007	0.009	***	0.003	0.003		0.006	0.004		0.015	-0.015		0.025
CONS	1.909	***	0.366	1.098	***	0.127	1.384	***	0.354				3.971	***	0.921
Number of obs.	1389					647	737			651			528		
R-sq: within =				0.247			0.209			0.096			0.033		
between =	0.9953			0.658			0.001			0.022			0.519		
overall =				0.226			0.105			0.035			0.033		

Note: Estimated using fixed-effects panel regression, except for foreign banks, which were estimated using random effects.

*, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

References

Ayuso, J. et al. 2004. Are capital buffers procyclical? Evidence from Spanish panel data. Journal of Financial Intermediation13, 249-264.

Berrospide, J., Edge, R., 2010. The effects of bank capital on lending: what do we know, and what does it mean? International Journal of Central Banking 6 (4), 5–54.

Francis, W., Osborne, M., 2012. Capital requirements and bank behavior in the UK: Are there lessons for international capital standards? Journal of Banking and Finance 36, 803-816.

Gambacorta, PE Mistrulli, 2004. Does bank capital affect lending behavior?

Journal of Financial intermediation 13 436-457

Jokipii, T., Milne, A., 2008. The cyclical behavior of European bank capital buffers. Journal of Banking and Finance, 32, 1440-1451

Hamada, M., 2014. Financial development: The case of Indonesia"in Kinyo, Matsubayashi and Hamori (ed.) Financial Globalization and Regionalism in East Asia, Routledge

Heid, F., Daniel Porath and Stphanie Stolz,2004. Does capital regulation matter for bank behaviour? Evidence for German savings banks, Discussion Paper Series 2: Banking and Financial Supervision No 03/2004, DOETSCHE BUNDESBANK.