INSTITUTE OF DEVELOPING ECONOMIES

IDE DISCUSSION PAPER No. 229

Related Lending and Bank Performance: Evidence from Indonesia

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March 2010

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Keywords: related lending, bank, performance, financial development

JEL classification: G21, G38, O1

I. Introduction

Lending to interested or related parties of a bank is generally restricted or regulated. Related lending to insiders and affiliated companies increases bank risk; however, banks are inclined to provide credit to related parties. After Asia's currency crisis, it was confirmed that related lending existed in many countries and ownership structures in Asian counties which aggravated the crisis (Claessens, Djankov, and Lang [1998]).

There are two views of the reason for related lending: the information view and the looting view (La Porta et al. [2003]). The information view sees related lending has a function to alleviate

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the problems of asymmetric information; the looting view sees it as a transfer of profits from depositors and minority shareholders to related parties. Tunneling is one of the examples set forth by advocates of this view. Which view finds support in practice depends on the results of empirical studies. Several studies examined the practice of crony and relation lending in Thailand and Korea in 1990s. This article examines related lending by Indonesian banks.

The Asian currency crisis in 1997 severely affected the Indonesian economy. It led in May of the following year to the collapse of the Soeharto government which had stood for 32 years. There were runs even on the biggest private banks as many depositors sought to withdraw their money, and the Indonesian rupiah dropped to less than one seventh of its pre-crisis value. These successive events devastated the Indonesian economy especially the banking sector.

Before the crisis related lending prevailed. Banks generally breached the legal lending limit by channeling more than the allowed 20 percent credit to affiliated parties (Jakarta Post, September 11, 1998), and capitalized banks especially had lent between 70 percent and 90 percent of their equity capital to affiliated parties (Jakarta Post, September 29, 1998). The extraordinary amount of related lending caused the central bank (Bank Indonesia) to introduce regulations distinguishing "related party" borrowers from "third party" one. Thereafter banks were obligated to report the total amount of lending and funding for related parties carried on their balance sheets.

Third party funds comprise a large portion of bank assets and liabilities; however, a certain level of credit is continuously disbursed to related parties. The percentage of related parties fluctuates depending on banks and economic situations. This article will examine whether related lending affects the risk and performance of banks.

Since the financial crisis, the Indonesian banking system has been changed and improved through bank restructuring. Before the crisis the Indonesian banking sector was characterized by problems common to developing economies. State owned banks dominated the markets and served as conduits to channel state funds to subsidized sectors, while major private banks poured funds into their group companies. The government often intervened in financial policy and supervisory authority did not function well. During the Soeharto era, the government's stance was not to close any banks, and lax bank management was pervasive. After the crisis institutional reform was carried out, and prudential regulation was reviewed and reintroduced in the proper way. This article will examine how banking sector restructuring policies have affected banking behavior toward related lending.

The next section reviews studies on related lending and tunneling, and bank performance. Section III gives a short overview of the Indonesian banking sector. This is followed by an explanation of the data set and methodology in section IV, and the results of the regression analysis in section V.   Section VI contains a summary of the article and its conclusions.

II. Preceding studies on related lending and bank performance

There are few studies addressing related lending issues directly, La Porta et al. (2003) examine the benefits of related lending in Mexico. They found that related lending was a large fraction of the banking business (20 percent of commercial loans) and the fraction of related lending almost double for the banks that subsequently went bankrupt. Furthermore related lending received better terms than unrelated ones. The probability of default of related lending was much higher. These findings are consistent with the looting view and related lending can be considered as a potential source of bank fragility.

Tunneling relates to the looting view. Johnson et al. (2000) defined "tunneling" as the transfer of assets and profits out of firms for the benefit for those who control them. They examined whether tunneling occur in emerging markets where law enforcement is poor or also happen in developed countries. They found that tunneling also occurs in developed country and legally. At any rate weak law system may relate to tunneling. Bae et al.(2002) study existence of tunneling examining whether firms belonging to Korean business groups (chaebols) benefit from acquisitions. They found some evidences consistent with the tunneling hypothesis.

Many evidences indicate that a firm's business transaction with their related parties benefit control shareholder of the firm, however, it still seems meaningful to examine related business transaction from the information view because it may compensate for insufficient system in developing countries (Khanna and Palepu [1999, 2000]).

This article analyze effects of related lending on bank performance, profitability and risk Demirguc-Kunt and Huizinga (1998) examined determinants of interest margin and bank profitability using the cross-country data of 80 countries covering both developed and developing countries. They showed that a bigger banking sector and low concentration ratio bring lower bank profitability and margin, while foreign banks make higher profits in developing counties but lower ones in developed counties. Molyneux and Thornton (1992) examined the determinants of bank performances across eighteen European countries between 1986 and 1989 using concentration of top ten banks.

How to measure bank risk is not simple. Garcia-Marco and Robles-Fernandez (2008) analyses the determinants of risk-taking in Spanish financial intermediaries and two different measures: Z-score and solvency margin are examined as proxy of risk. Konoshi and Yasuda (2004) examined the determinants of risk taking measured by Z-score at Japanese commercial banks. Gonzalez (2005) analyzes the impact of bank regulation on bank charter value and risk-taking using a panel database of 251 banks in 36 countries. Two different measures of bank risk are used: credit risk and overall bank risk. Credit risk is measured as the ratio of non-performing loans to total bank loans and other

types of bank risk, such as market and operations risk, the standard deviation of daily bank stock returns for each year is also applied as a measure of overall risk.

III. Indonesian Financial Sector

a. Overview

The Indonesian financial sector has been dominated by banking (Hamada 2003). In the 1970s state-owned banks dominated the banking sector which channeled the abundant public funds brought in by the soaring oil prices to government subsidized sectors. During the 1980s the fall in oil prices reduced government revenues and worsened the economy. The Indonesian government implemented two sets of comprehensive and radical banking reforms in 1983 and 1988 as part of its structural adjustment policy.

Indonesia's banking sector expanded rapidly due to the reforms. The number of commercial bank increased rapidly from 115 in 1983 to 240 in 1995, the increase attributed to the growth in the number of private commercial banks. In 1995 these banks took over the dominant position from state-owned banks.

This rapid expansion was supported by massive capital inflows in the 1990s, and the rapid quantitative expansion easily induced sloppy bank management under the country's development dictatorship. The expansion continued until the crisis in 1997. In the 1970s, preceding the banking reforms in the 1980s, Indonesia had completed liberalization of its capital account. Having opened its capital account very early in the process of financial liberalization, Indonesia's financial sector experienced much more serious and acute financial problems in the wake of the crisis than did other countries such as Thailand and Korea.

After the Asian currency crisis, the government closed sixteen private national banks in November 1997 in compliance with the conditionality of IMF. The closures were executed without a safety net for depositors which created complete turmoil in the Indonesian banking sector. This was followed by the political turbulence of 1998 which led to the collapse of the rupiah. This deep devaluation hit the performance of many companies holding huge debts in US dollars, and the rate of non-performing loans (NPLs) leaped. In March 1999 the average non-performing loan rate of all commercial banks jumped to 59%. Huge NPLs and swelling debts in foreign currency deteriorated bank balance sheets and for almost all banks debts exceeded assets. Ailing but important banks were re-capitalized by the government, and their irrecoverable loans were transferred to the Asset Management Unit of the Indonesian Bank Restructuring Agency (IBRA). A total of 430.4 trillion rupiah, which was equivalent to 60% of GDP, was injected into the banking sector. Sixty-eight banks were closed, thirteen were nationalized, twenty-seven were re-capitalized, four state-owned banks

were merged into one new state-owned bank, and several major private banks were merged. A set of restructuring policies decreased the total number of banks to 164 in 2000.

Restructuring measures were implemented by 2000 however, the banking sector continued to struggle in the aftermath of the crisis. In 2002 bank credit resumed expansion.

b. Institutional Reform

After the financial crisis, the government and Bank Indonesia formulated or amended several laws of the banking system and introduced prudential regulations. In May 1999 the central banking law was amended. It secured the independence of Bank Indonesia. Henceforth the bank was no longer required to supply direct credit to such sectors as agriculture, housing and small and medium enterprises[i]. Thus Bank Indonesia's function was redirected to maintaining the stability of exchange rates and devising monetary policy from fiscal distribution.

In January 2005 Bank Indonesia enacted a regulation of legal lending limits (LLL). Following the 1997 crisis, group lending or related lending became a serious issue. In the banking reform of 1988, Bank Indonesia had already stipulated limits on lending: 20% of the capital of a bank or financial institution could be lent to a debtor, and 50% of capital could be to a debtors' group. And there was a lending limit of 10% of capital to the stakeholders of a bank or non-bank institution, 25% to a stakeholder's corporate group, 5% to auditors-not-stakeholders and to corporations owned by auditors. In addition, there were limitations on lending to board members, auditors and families of stakeholders (Central Bank Directors Determination, No21/50, 1988).   The crisis revealed that the LLL regulation was not being observed, so in 2005 new regulation was introduced to strengthen the legal lending limits. A related party is now defined as any natural person or company/entity exercising control over the bank, whether directly or indirectly, through ownership, management, and/or financial links. The prescribed maximum limit of the entire portfolio of provision of funds to related parties is to be no more than 10% of a bank capital. A number of prohibited matters concerning related parties was also introduced[ii], and along with these prudential regulations, Bank Indonesia also strengthened the capacity of supervision and financial due diligence to create a robust banking system.

IV. Methodology

What impact does related lending have on bank performance in Indonesia? Does related lending in Indonesia support the information view or looting view? It is assumed in this article that the weak institutional system under the Soeharto regime before the crisis might have enhanced the lax management of banks. At the same time, related lending might compensate for the lack of

information on borrowers under Indonesia's weak information disclosure system. If related lending had some function in managing informational problems in the premature banking system, the function has likely changed in line with the banking sector's restructuring. In this section two issues will be examined: the effects of related lending on bank performance and the changed of the effects over time.

a. Data and variables

As of June 2008, 123 banks were operating in Indonesia's banking sector. They are divided into five types: state-owned banks, regional government banks, private banks (foreign exchange (forex) banks and non-foreign exchange (non-forex) banks) joint banks, and foreign banks. The data set is panel data comprised of a total of 74 banks (four state-owned banks and 32 private forex banks, and 32 private non-forex banks) using annual financial data from 1994 to 2007. During the observation period Indonesia experienced several crucial events such as the Asian currency crisis, the fall of the Soeharto regime and its subsequent social and economic turmoil, and the drastic economic reform that followed thereafter. In order to measure and compare the changes, the observation period is divided into four sub-periods: 1994 to 1997 (period I), 1998 to 2000 (period II), and 2001 to 2003 (period III), and 2004 to 2007(period IV). The first period can be characterized as one of lax management under the old banking system before the crisis. The second period was one of turmoil due to the Asian currency crisis and economic dislocation in Indonesia which played havoc with the banking sector. During the third period the country stated to get back on the track to recovery. Bank restructuring policies took effect; banks resumed lending. During the fourth period the banking sector returned to a new normal situation under sector restructuring policy and an ordered banking system.

First the effects of related lending on profits will be examined regarding return on assets (ROA) and net interest margin (NIM)[iii]; then the effects on bank risk will be analyzed. Since few Indonesian banks are listed on the Indonesian stock market, stock prices are not available for this study. Thus the Z-score calculated based on financial data and non-performing loan rate are examined as a risk indicators.

 Dependent variables are the following:

Bank definitions

Related lending variables:

$\left\{ \begin{array}{l} \textit{Related}\text{: total amount of related lending divided by total lending} \\ \textit{LLL\_med} \text{ : 1 if related lending ratio is more than median ratio; otherwise 0} \\ \textit{LLL\_ave}\text{: 1 if related lending ratio is more than average ratio; otherwise 0} \end{array} \right.$

Equity: Ratio of equity capital divided by total assts

BOPO: Ratio of operational expense by divided operational income

Lnasset: Natural logarithm of total assets

Credit: ratio of total amount of credit divided by total assets

Macroeconomic indicators

GDP_g: Annual growth rate of real GDP

Exchg: Changes in exchange rate

b. Bank Profitability

$$ROA_{it} = \beta_0 + \beta_1 Equity_{it} + \beta_2 BOPO_{it} + \beta_3 Lnasset_{it} + \beta_4\ Credit_{it} + \beta_5\ Related_{it} + \varepsilon_{it} \qquad (1)$$

$$NIM_{it} = \beta_0 + \beta_1 Equity_{it} + \beta_2 BOPO_{it} + \beta_3 Lnasset_{it} + \beta_4\ Credit_{it} + \beta_5\ Related_{it} + \varepsilon_{it} \qquad (2)$$

Equation (1), (2) use three related lending variables: *Related* (related lending ratio), dummy variables (*LLL_med, LLL_ave*). *LLL_med*$_{it}$ shows whether the related lending ratio of Bank i is larger than the median of all banks in each sub-period. If it is larger than the median, *LLL_med*$_{it}$ is 1; if less than the median, it is 0. *LLL_ave*$_{it}$ uses an average of related lending ratio instead of the median ratio.

Figure 1 shows the changes in the related lending ratio from December 1994 to June 2008. The median ratio and average ratio respectively in each observation period are: 0.017 and 0.051 in the first period, 0.011 and 0.048 in the second period, and 0.007 and 0.029 in the third period, and 0.008 and 0.027 in the fourth period; the median of the ratio is continuously reduced while the average of the ratio fluctuates, and the average ratios exceed the median ratios in all periods. Both of them are declining, but it is clear that related lending jumped in the second period. Figure 2 shows changes in the variables from 1994 to 2007 and presents how severe the crisis affected the Indonesian banking sector, for example ROA dropped to -15% in 1998. Table 1 shows the descriptive statistics of variables.

c. Bank Risk

Bank risk is measured by the Z-score which is calculated as the following equation.

$$Z = \frac{\sum ROA + \sum Equity/Asset}{S_r}$$

S_r is the standard deviation of ROA. A Z-score is calculated in each observation period. Equation (3) measures the effects of related lending on level of bank risk. In this estimation the explanatory

variables are the average of each explanatory variable in the observation period.

$$\text{Z-score}_{it} \quad = \quad \beta_0 + \beta_1 Equity_{it} + \beta_2 BOPO_{it} + \beta_3 NIM_{it} + \beta_4\, Credit_{it} + \beta_5\, Exchange_t$$
$$+ \beta_6\, GDP\text{-}g_t + \beta_7\, Related_{it} + \varepsilon \tag{3}$$

The non-performing loan ratio (NPL) is one of the major indicators of bank risk. Indonesia began disclosing NPL information publicly since 1998.

$$NPL_{it} \quad = \quad \beta_0 + \beta_1 Equity_{it} + + \beta_2 Lnasset_{it} + \beta_3 Credit_{it} + \beta_4 Exchange_t + \beta_5\, GDP\text{-}g_t + \beta_6 Related_{it} + \varepsilon$$
$$\tag{4}$$

V. Results

a. Profitability

i)ROA

This section evaluates whether related lending has effects on return on assets (ROA). ROA is a comprehensive indicator of profitability. The estimations of equations (1) are showed in Table 2. In the first period, the regression results indicate that the coefficient of related lending (*LLL_ave*) is positive (coefficient =0.006) and statistically significant at the 1% level. The equity ratio is positive and significant at the 10% level. Several studies confirmed that higher equity ratio contributes to higher ROA, the result here supports this position. The operational expense ratio (BOPO) is positive and significant, and total asset is negative but insignificant and credit ratio is negative and significant at the 5% level.   The fact that the determination coefficients (overall R^2) of all the equations in the first period are less than 0.05 implies that these explanatory variables cannot explain the changes in ROA accurately.

In the second period, the estimation of equation (1) shows that related lending has negative effects on profitability. The coefficient of related lending ratio is -0.128 and significant at the 10% level. The results of using the related lending dummy are negative but insignificant. Other explanatory variables exhibit the same results in all models. The equity ratio and total assets are positive and significant, and the BOPO and credit ratio are negative and significant. The determination coefficient has improved to 0.58.

In the third period, related lending turns to having positive effects on profitability. The coefficients of related lending are positive and significant at the 5% level, except related lending dummy (*LLL_med*). The other variables exhibit the same results. The equity ratio is positive and significant at the 1% level, and total assets are positive but insignificant. The BOPO and credit ratio

are negative and significant. The determination coefficient is around 0.5. In the fourth period related lending *(LLL_ave)* turns to having negative effects on profitability. The equity ratio is positive and significant at the 1%, BOPO and credit ratio are negative and significant at the 1% level. The determination coefficient has increased to 0.9.

ii)NIM

This section examines the effects of related lending on net interest margin (NIM). NIM is an indication of the profitability and efficiency of a bank's investments. The estimations of equations (2) are showed in Table 3. Only in the second period, the related lending has effects on NIM.

In the first period the equity ratio is not significant. The BOPO and total assets are negative and significant at the 1% level. In the second period, the related lending ratio is negative and significant at the 5% level (except related lending dummy, *LLL_med)*. The equity ratio and the BOPO are positive and significant at the 1% level. The total asset is negative and significant. The results that a higher equity ratio leads to higher NIM, and higher expense (BOPO) decreases NIM are reasonable. The third and fourth periods the related lending ratios are all insignificant. In third period the equity ratio and the credit ratio are positive and significant at the 1% level, and the BOPO is negative and significant at the 5% level. In the fourth period the effects of equity ratio turn into insignificant. The BOPO and total assets are negative and significant and credit ratio is positive and significant.

iii) Effects on bank profitability

During the crisis the related lending ratio jumped, and until the end of 2001 the ratio remained high. It is apparent that banks increase lending to related parties during the period of economical difficulties. Charumilind, Kali and Wiwattanakantang (2006) found that the presence of close ties of Thai firms with banks and politicians was associated with preferential access to long-term debt prior to the Asian Crisis of 1997–98. Chiu and Joh (2004) examined Korean bank loans to distressed firms and showed that crony lending, related lending and poor bank governance likely facilitated increased bank loans to failing firms. The evidence of these other Asian countries may be applicable to Indonesia too.

During Indonesia's economic difficulties (period II) banks tended to increase lending to related parties and the related lending decreases bank profits. This was a kind of profit transfer from banks to related parties, which is the nature of tunneling. The regression results also support this view. Table 2 and 3 indicate that a higher related lending ratio affected bank profitability negatively, and this was especially clear in the second period. Thus the looting view is supported in Indonesia during the economic difficulties.

However, results also show the opposite evidence that a higher credit allocation to the related

parties increased ROA before and after the crisis (period I and III). In this article it is assumed that the Indonesian banking system had the weak institutional and information disclosure system before the crisis. The fact that higher related lending ratio more than the average has positive effect on ROA (period I) supports the information view which compensates for the lack of information on borrowers. In period III effects of related lending is positive. In this period the Indonesian economy had begun to slowly recover. The annual growth rate of real GDP in 2001 was 3.8% and it had continuously increased. Banks started to expand credit since 2002. The growth rate of bank credit in 2002 was 16% on an average of all banks, however, the expansion of credit owed middle size private banks because state owned banks and major large private banks were still under restructuring. In addition large companies were closely linked to the bank restructuring and their assets were managed by Asset Management Unit or IBRA. Thus large banks and companies were stuck in restructuring and the main borrowers shifted from large companies to non-large companies and individuals.

Figure 3 and 4 show the average of related lending ratio and credit ratio of each period by bank types: state owned bank, private forex bank, and private non-forex bank. Private non-forex bank is much smaller than private forex bank and state owned bank. Private forex bank reduced largely related lending in the period III. It was mainly attributed to restriction of credit disbursement to restructuring companies. Private non-forex banks also reduced related lending but increased credit in the period III. The percentage of total assets of private non-forex banks is small around 2% of all banks. Their information production capacity is smaller than large banks and they are inclined to rely on related lending to alleviate problems of information asymmetry. Therefore the results that increase in related lending has positive effects on bank profitability; it reflects the economic environment of the third period.

In the fourth period the effects return to negative as the Indonesian economy became has normalized. It can be said that if the banking system is improved and economy is back to normal, role of related lending to compensate for insufficient institutional system may be terminated.

NIM is the difference between interest income and expense of interest, thus credit ratio is assumed to affect NIM directory. Seeing the coefficients of credit ratio, the results in period I and II are insignificant, but afterwards turned to positive and significant in period III and IV. Higher credit ratio indicates that a bank is carrying out the original function of financial intermediation. Thus the result that a higher credit ratio contribute to increase profitability is a reasonable one for the banking business. And it implies that the Indonesian banking sector increasingly functions well and profit structure is improved.

b. Bank risk

i)Z-score

The Z-score indicates the probability of bankruptcy. A lower Z-score implies a higher probability of bankruptcy. The estimation of equation (3) is showed in Table 4. The coefficient of related lending is insignificant. The equity ratio and credit ratio is positive and significant at the 1% level. As the equity ratio is an indicator of soundness, it is reasonable that a higher equity ratio decreases the risk of bankruptcy.

The BOPO is negative and significant at the 1% level; it implies a higher expense increase risk. Concerning net interest margin, the coefficient of NIM is negative and significant at the 1% level. Higher profitability is not necessarily an indicator of low risk. In equation (3) the annual growth rate of real GDP is added so that the estimation reflects the effects of the different time points of the panel data. The coefficient of the GDP growth rate is positive and significant.

ii) Non performing loans

In 1999, the average rate of non-performing loans for commercial banks jumped to 59%, and that for private foreign banks soared to 77%. Table 5 shows the regression results of equation (4); the coefficient of related lending is positive but insignificant except the fourth period in which coefficient of the dummy variable (*LLL_med*) of related lending is positive and significant at the 5% level. The total assets has negative effects on NPL in the fourth period, however, the coefficient of determination of all models are less than 0.01. The upper table in Table 5 which examines the pooled data of entire period, the coefficients of exchange rate is positive and significant at the 5% level and growth rate of GDP is negative and significant at the 5% level.

iii) Effects on bank risk

The examination of related lending effects on Z-score shows that it has not any effects on bankruptcy risk.   Concerning effects on NPLs the effects of related lending are not clear. A low coefficient of determination (Table 5) indicates that there is no significant relationship between the bank variables examined in equation (4) and NPLs. The rapid increase in NPLs in 1998 was caused by a large devaluation of rupiah and deterioration in the economy. The upper table in Table 5 supports this position. A lower rupiah value increases NPL ratio and positive growth of GDP decreases NPL ratio.

VI. Conclusion

The banking system in developing countries is more likely to be inefficient and information problem is severe. Related lending can be seen in many such economies. This article used the panel data of 74 commercial banks to examine the effects of related lending on bank performance in Indonesia, and the changes in these effects in the course of banking sector restructuring. The observation period from 1994 to 2007 was divided into four periods.

The increase in related lending in the second period implies that banks were obliged to extend credit to related parties during Indonesia's economic turmoil, and its negative effect on ROA and NIM indicates that banks transferred profits to related parties. This supports the looting view. By contrast, regression results before and after the crisis (period I and III) show the opposite evidence that a higher credit allocation to related parties increased ROA. This fact supports the information view to compensate for the lack of information on borrowers. Concerning risk, the results did not confirm the effects of related lending on bank risk.

The observation period of this study encompassed the major macro shock of the Asian currency crisis. Thus along with the effects of related lending, it was also possible to examine the effects of banking sector restructuring on banking performance and changes in related lending. The estimations of ROA in the first period were not enough to explain the effects of related lending on bank performance. The specification of models was the same in all period, thus the insufficient results for the first period can be attributed to inadequate information disclosure under the old banking system before the crisis. The explanatory variables were able to explain profitability more effectively in the third and fourth period which implies indirectly that Indonesia's information disclosure system has improved and the profit structure of banks has changed.

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[i] Heretofore one of the functions of Bank Indonesia was providing credit to these sectors.

[ii] For example, banks are prohibited from extending funds to related parties in contravention of the generally applicable procedures for the provision of funds. Banks are prohibited from purchasing low quality assets from related parties.

[iii] NIM is calculated based on total interest income minus total interest expense divided by productive assets.

Figure 1 Related Lending Ratio (1994-2007)
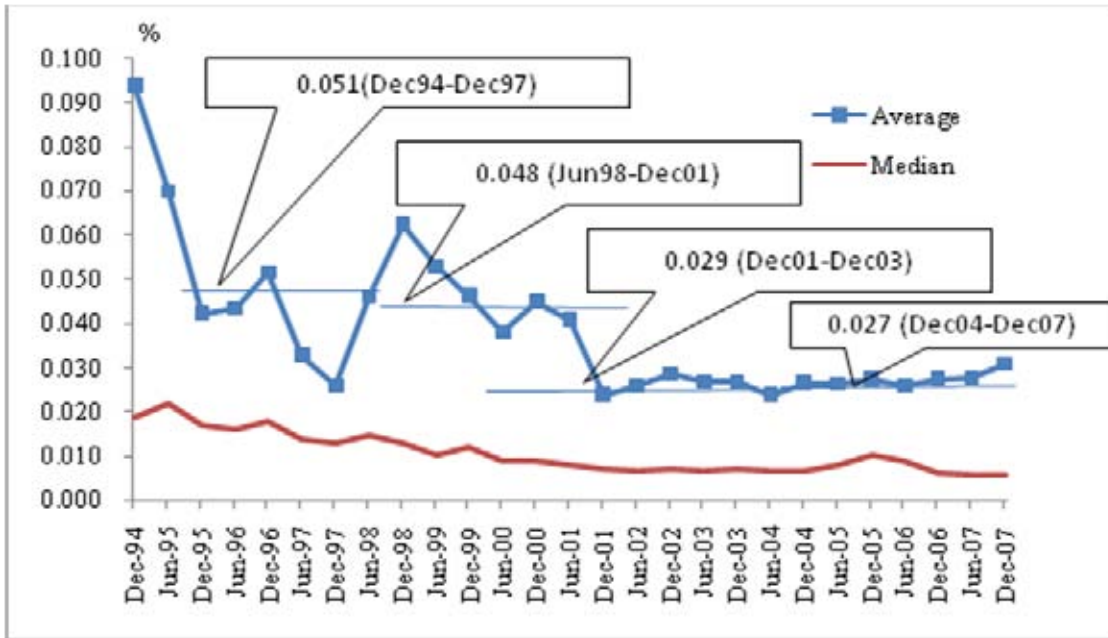
Figure 2 Changes in the Average of Variables
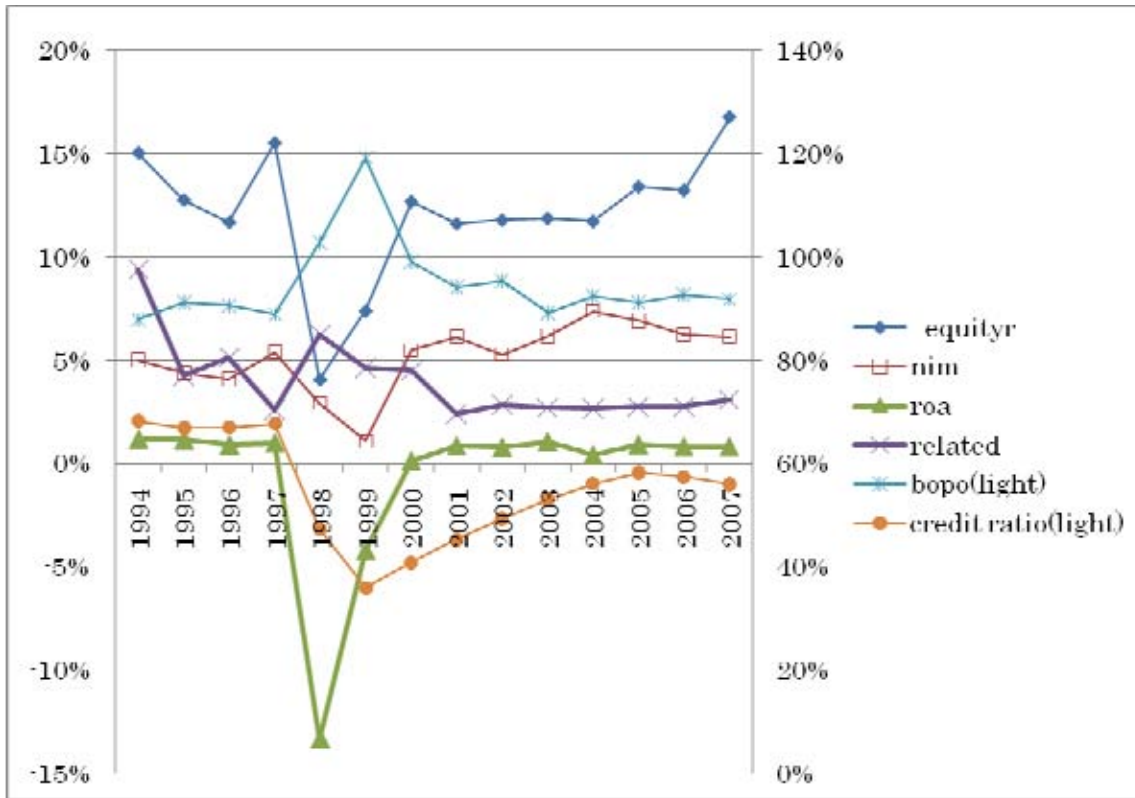
Figure 3   Related Lending Ratio
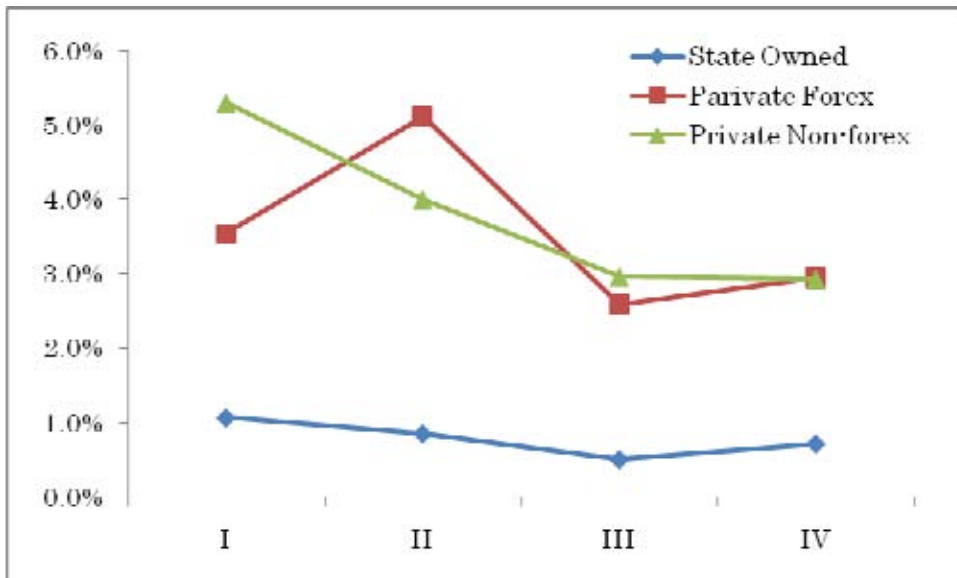
Figure 4 Credit ratio
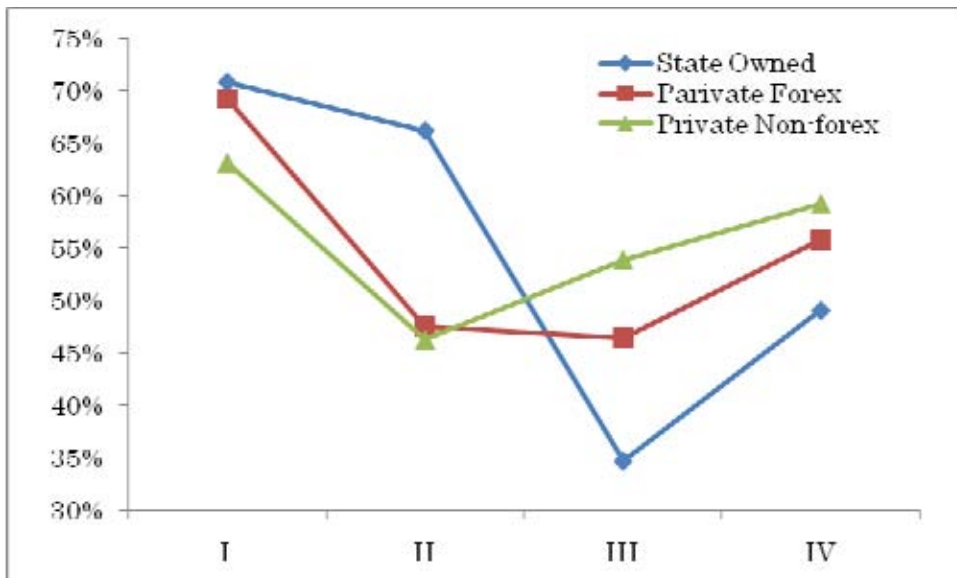
Table 1 DescriptiveSstatistics

Period	Sample size	ROA	NIM	Equity Ratio	BOPO	Asset (Million of Rupiah)	Related lending Ratio	Credit Ratio
I	455	0.011	0.045	0.132	0.900	2,196,296	0.063	0.674
		0.015	0.023	0.088	0.160	8,504,214	0.119	0.168
II	324	-0.035	0.039	0.105	1.010	7,471,713	0.043	0.502
		0.149	0.075	0.207	0.402	26,700,000	0.093	0.255
III	216	0.009	0.059	0.117	0.930	12,600,000	0.026	0.493
		0.025	0.049	0.084	0.193	36,900,000	0.051	0.205
IV	288	0.007	0.067	0.138	0.921	17,400,000	0.028	0.570
		0.044	0.035	0.115	0.404	44,900,000	0.059	0.180
Total		-0.002	0.051	0.124	0.938	8,680,174	0.044	0.577
		0.081	0.049	0.134	0.308	30,400,000	0.093	0.216

Upper: average

Lower: standared deviation

Table 2 Return on Assets (ROA) Panel Regression (Fixed Effects)
Dependent Variable is ROA

Perioad	roa	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
I	equityr	0.035	0.020	*	0.033	0.019	*	0.042	0.019	**
1994-1996	bopo	0.036	0.005	***	0.035	0.005	***	0.035	0.005	***
	lnassets	-0.001	0.002		-0.002	0.002		0.000	0.002	
	creditratio	-0.015	0.007	**	-0.015	0.007	**	-0.014	0.007	**
	related	0.005	0.007							
	LLL-med				0.001	0.002				
	LLL-ave							0.006	0.002	***
	Number of obs =	455			455			455		
	R2 (overall)=	0.042			0.042			0.050		
	F(5,297)	12.87			12.75			14.74		
	Prob > F	0.0000			0.0000			0.0000		
II	equityr	0.529	0.039	***	0.539	0.038	***	0.531	0.039	***
1997-2000	bopo	-0.074	0.017	***	-0.079	0.017	***	-0.077	0.017	***
	lnassets	0.035	0.017	**	0.031	0.018	*	0.031	0.017	*
	creditratio	-0.124	0.032	***	-0.134	0.033	***	-0.134	0.033	***
	related	-0.128	0.077	*						
	LLL-med				-0.021	0.015				
	LLL-ave							-0.028	0.018	
	Number of obs =	324			324			324		
	R2 (overall)=	0.575			0.595			0.593		
	F(5,211)	77.84			77.42			77.58		
	Prob > F	0.0000			0.0000			0.0000		
III	equityr	0.196	0.045	***	0.208	0.046	***	0.180	0.046	***
2001-2003	bopo	-0.085	0.010	***	-0.083	0.010	***	-0.086	0.010	***
	lnassets	0.000	0.007		0.004	0.007		0.001	0.007	
	creditratio	-0.029	0.017	*	-0.033	0.017	**	-0.027	0.017	
	related	0.091	0.043	**						
	LLL-med				0.002	0.004				
	LLL-ave							0.011	0.005	**
	Number of obs =	216			216			216		
	R2 (overall)=	0.509			0.503			0.521		
	F(5,427)	28.33			26.65			28.83		
	Prob > F	0.0000			0.0000			0.0000		
IV	equityr	0.066	0.013	***	0.066	0.013	***	0.063	0.013	***
2004-2007	bopo	-0.122	0.003	***	-0.122	0.003	***	-0.121	0.003	***
	lnassets	0.000	0.002		0.000	0.002		0.000	0.002	
	creditratio	-0.027	0.008	***	-0.027	0.008	***	-0.028	0.008	***
	related	-0.013	0.031							
	LLL-med				-0.001	0.002				
	LLL-ave							-0.007	0.003	**
	Number of obs =	288			288			288		
	R2 (overall)=	0.900			0.900			0.901		
	F(5,211)	587.41			587.85			599.54		
	Prob > F	0.0000			0.0000			0.0000		

***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Related Lending rate	Median	Average
I	0.018	0.063
II	0.013	0.043
III	0.008	0.026
IV	0.007	0.028

Table 3 Net Interest Margin(NIM) Panel Regression
Dependent Variable is NIM

	nim	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
I Fixed Effects	equityr	0.019	0.020		0.020	0.020		0.020	0.021	
	bopo	-0.069	0.005	***	-0.069	0.005	***	-0.069	0.005	***
	lnassets	-0.011	0.002	***	-0.011	0.002	***	-0.011	0.002	***
	creditratio	0.002	0.007		0.002	0.007		0.002	0.007	
	related	-0.001	0.007							
	LLL-med				0.000	0.002				
	LLL-ave							0.000	0.002	
	Number of obs =	455			455			455		
	R2 (overall)=	0.284			0.285			0.286		
	F(5,297)=	49.20			49.19			49.19		
	Prob > F	0.000			0.000			0.000		
II Random Effects	equityr	0.158	0.018	***	0.164	0.018	***	0.161	0.018	***
	bopo	-0.067	0.008	***	-0.069	0.008	***	-0.068	0.008	***
	lnassets	-0.003	0.002	*	-0.003	0.002	*	-0.003	0.002	**
	creditratio	-0.007	0.012		-0.008	0.012		-0.009	0.012	
	related	-0.075	0.032	**						
	LLL-med				-0.007	0.006				
	LLL-ave							-0.016	0.007	**
	Number of obs =	324			324			324		
	R2 (overall)=	0.515			0.509			0.514		
	Wald chi2(5)=	337.39			329.23			335.96		
	Prob > chi2	0.000			0.000			0.000		
III Random Effects	equityr	0.140	0.052	***	0.143	0.052	***	0.151	0.052	***
	bopo	-0.044	0.018	**	-0.043	0.018	**	-0.041	0.018	**
	lnassets	-0.003	0.002		-0.002	0.002		-0.003	0.002	
	creditratio	0.051	0.018	***	0.054	0.018	***	0.049	0.018	***
	related	-0.095	0.066							
	LLL-med				0.000	0.007				
	LLL-ave							-0.012	0.008	
	Number of obs =	216			216			216		
	R2 (overall)=	0.231			0.225			0.231		
	Wald chi2(5) =	43.75			41.52			43.72		
	Prob > chi2	0.000			0.000			0.000		
IV Fixed Effects	equityr	0.013	0.026		0.012	0.026		0.015	0.026	
	bopo	-0.031	0.006	***	-0.031	0.006	***	-0.032	0.006	***
	lnassets	-0.019	0.005	***	-0.019	0.005	***	-0.018	0.005	***
	creditratio	0.081	0.016	***	0.079	0.016	***	0.081	0.016	***
	related	0.015	0.061							
	LLL-med				-0.005	0.004				
	LLL-ave							0.006	0.006	
	Number of obs =	288			288			288		
	R2 (overall)=	0.166			0.173			0.166		
	F(5,211) =	9.97			10.27			10.16		
	Prob > F	0.000			0.000			0.000		

***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Tabel 4 Z-score Panel Regression (Random Effects)

Dependent variable ＝Z-score

(1) Explanatory variables are the average in the sub-period.

z	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
equityr-ave	332.43	83.22	***	331.04	83.31	***	332.40	83.16	***
bopo-ave	-111.25	36.73	***	-110.95	36.74	***	-110.46	36.70	***
nim-ave	-871.31	270.83	***	-840.54	268.44	***	-864.69	268.58	***
credito-ave	15.65	45.21		17.34	45.49		15.18	45.15	
exchng-ave	-44.52	230.22		-38.81	229.67		-32.53	230.16	
gdp_g-ave	1442.63	232.06	***	1427.64	231.06	***	1434.93	230.96	***
related	-44.70	95.97							
LLL-med				3.74	13.69				
LLL-ave							-7.92	15.52	
Number of obs =	359								
R2 (overall)	0.2327			0.2329			0.2327		
Wald chi2(7)	118.95			118.84			118.74		
Prob > chi2	0			0					

(2) Explanatory variables are the last year data of the sub-period.

z	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
equityr	339.57	72.84	***	339.09	73.26	***	340.08	72.78	***
bopo	-73.01	34.13	**	-72.90	34.15	**	-73.14	34.12	**
nim	-372.23	169.95	**	-377.00	169.32	**	-385.52	169.62	**
creditratio	104.51	39.44	***	104.98	39.55	***	104.25	39.35	***
exchng	668.74	169.97	***	665.95	169.85	***	668.99	170.11	***
gdp_g	690.08	215.97	***	694.19	215.71	***	691.07	216.00	***
related	19.18	74.67							
LLL-med				0.72	13.69				
LLL-ave							-7.46	16.87	
Number of obs =	357			357					
R2 (overall)	0.2078			0.2076			0.2075		
Wald chi2(7)	100.85			100.67			100.72		
Prob > chi2	0								

***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Tabel 5 Non perfoming loan ratio Panel Regression (Random Effects)
Dependent variable ＝NPL

All(II-IV)	npl	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Random Effect	equityr	-0.147	0.179		-0.134	0.177		-0.168	0.177	
	lnassets	-0.017	0.013		-0.015	0.013		-0.020	0.013	
	creditratio	-0.121	0.122		-0.108	0.122		-0.138	0.122	
	exchng	0.883	0.397	**	0.887	0.397	**	0.881	0.397	**
	gdp_g	-1.479	0.602	**	-1.477	0.600	**	-1.469	0.600	**
	related	-0.075	0.318							
	LLL-med				0.043	0.049				
	LLL-ave							-0.087	0.060	
	Number of obs =	718			718			718		
	R2 (overall)=	0.104			0.1049			0.1061		
	Wald chi2(5)	83.82			84.63			86.14		
	Prob > chi2	0								
II	npl	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Random Effect	equityr	-0.227	0.445		-0.199	0.440		-0.275	0.445	
	lnassets	-0.053	0.046		-0.053	0.046		-0.058	0.047	
	creditratio	-0.166	0.405		-0.095	0.408		-0.209	0.404	
	exchng	0.718	0.881		0.728	0.884		0.750	0.880	
	gdp_g	-1.470	1.415		-1.408	1.421		-1.457	1.412	
	related	-0.147	0.733							
	LLL-med				0.169	0.161				
	LLL-ave							-0.186	0.190	
	Number of obs =	214			214			214		
	R2 (overall)=	0.0702			0.0757			0.0744		
	Wald chi2(5)	16.07			17.11			17.07		
	Prob > chi2	0.0134			0.0089			0.009		
III	npl	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Random Effect	equityr	-0.085	0.141		-0.086	0.141		-0.085	0.141	
	lnassets	0.002	0.006		0.002	0.006		0.002	0.006	
	creditratio	-0.042	0.055		-0.045	0.056		-0.043	0.056	
	exchng	1.618	1.299		1.606	1.300		1.615	1.300	
	gdp_g	2.760	2.794		2.740	2.797		2.757	2.795	
	related	0.004	0.190							
	LLL-med				-0.006	0.019				
	LLL-ave							-0.001	0.023	
	Number of obs =	216			216			216		
	R2 (overall)=	0.0321			0.0338			0.0321		
	Wald chi2(5)	8.42			8.5			8.42		
	Prob > chi2	0.209			0.2036			0.2089		
IV	npl	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Fixed Effect	equityr	0.023	0.060		0.026	0.059		0.027	0.061	
	lnassets	-0.040	0.012	***	-0.038	0.012	***	-0.040	0.012	***
	creditratio	-0.003	0.038		0.002	0.037		-0.003	0.038	
	exchng	-0.264	0.345		-0.158	0.342		-0.249	0.346	
	gdp_g	0.181	0.199		0.121	0.197		0.176	0.199	
	related	0.026	0.150							
	LLL-med				0.026	0.010	**			
	LLL-ave							0.007	0.015	
	Number of obs =	288			288			288		
	R2 (overall)=	0.0233			0.0207			0.0237		
	F(6,210)	2.65			3.86			2.68		
	Prob > F	0.0168			0.0011			0.0157		

***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.