Financial deregulation, banking development, and the likelihood of banking fragility: the case of Indonesia

Siti Astiyah
University of Wollongong
NOTE

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CHAPTER 4

LITERATURE REVIEW OF FINANCIAL DEREGULATION IN DEVELOPING COUNTRIES

4.1. Introduction

The experience of financial deregulation in Indonesia has succeeded in removing financial repression and increasing the intermediation function of the banking sector but it also has contributed to the weaknesses of the banking sector during the process of financial deregulation. The weaknesses of the banking sector and poor economic fundamentals contributed to vulnerable to currency attack and the domestic currency depreciated to the unexpected level. As there were substantial part of short term foreign borrowing and a weak banking sector the currency crisis trigger to the financial and banking crises. Hence, financial deregulation policy was not sufficient to maintain sustainable growth and it ended in financial collapse.

The objective of this chapter is to discuss the literature of financial repression that induced many developing countries to adopt financial deregulation and other related literature about financial deregulation in developing countries in order to develop the theoretical analysis of the important issues affecting financial deregulation in Indonesia, which is the focus of this thesis.

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69 This is frequently called financial repression literature. Under financially repressive conditions, McKinnon (1973) and Shaw (1973) suggested that countries should liberalise the financial sector to enhance economic growth.
The focus of this thesis is to analyse the relationship between interest rates, saving through the banking sector, credit from the banking sector, and private investment by using the financial deregulation hypothesis; and the determinants of the likelihood of banking fragility for the Indonesian case.

The organisation of this chapter is as follows. Section two presents the theory of financial repression. Section three discusses financial deregulation, over borrowing and investment collapse. Section four presents financial deregulation and the likelihood of banking crisis. Section five will present the literature of the sequencing of financial deregulation. Section six presents the evidence and the results of the econometric testing of the financial deregulation hypothesis and the related variables. Section seven discusses the theoretical application of the financial deregulation hypothesis to the relationship between interest rates, saving through the banking sector, credit from the banking sector, and private investment for the Indonesian case and determinants of the probability of banking fragility in Indonesia. The last section is the conclusion of this chapter.

4.2. Financial Repression Theory

McKinnon (1973) and Shaw (1973) developed an influential theoretical analysis for liberalising the financial sector to stimulate economic growth in developing countries. McKinnon (1973) argued that a financially repressed economy would reduce economic growth. Financial repression is often characterised by setting interest rates at low levels, which often results in a negative real interest rate, quantitative restrictions on credit (credit ceiling policy), and a high minimum reserve requirement for banks.
McKinnon (1973) argued that negative real interest rates discouraged demand for broad money balances (the definition of money which includes saving and time deposits). Consequently the ability of the financial sector to finance investment will be low. In addition, financial repression will fragment domestic capital markets, with highly adverse consequences for the quality and quantity of real capital accumulation as follows (pp.386-387, McKinnon (1988) and pp.11-12, McKinnon (1991)):

- The flow of loanable funds through the banking system is reduced, forcing potential borrowers to rely more on self-finance.
- Interest rates on the truncated flow of bank lending vary arbitrarily from one class of favoured or disfavoured borrower to another.
- The process of self financing within enterprises and households is itself impaired.
- Significant financial deepening outside the repressed banking system becomes impossible when firms are dangerously illiquid and/or inflation is high and unstable.
- Inflows of foreign financial capital may be unproductive when the domestic capital market is in disarray and foreign exchange rates are unpredictable.

To remove financial repression, McKinnon suggested deregulating the financial sector by removing interest rate ceilings, reducing allocation of direct credit and reducing banks’ reserve requirements. Removing ceilings on interest rates induces interest rates to move to the market rates and real interest rates will adjust to close to the equilibrium level and real interest rates become positive. An increasing and positive real interest rate will increase demand for broad money balances.

The important element of the McKinnon (1973) model is the complementarity hypothesis between real money balances and investment. The hypothesis is based on two assumptions: first, investment is self financed as capital markets are imperfect in
developing countries and the consequence of this assumption is that an economic agents have to accumulate real cash balances before investment can be undertaken. Second, investment expenditure is indivisible. The key point of complementarity between real money balances and investment is reflected in the demand for money which introduces the ratio of investment to income as follows (pp.59-61, McKinnon (1973)):

\( (M/P)^D = L(Y, I/Y, d - P^*) \)

\( I/Y = F(\bar{r}, d - P^*) \)

where \( \frac{\partial L}{\partial Y} > 0, \frac{\partial L}{\partial (I/Y)} > 0, \) and \( \frac{\partial L}{\partial (d - P^*)} > 0 \)

\( \partial F / \partial \bar{r} > 0, \) and \( \partial F / \partial (d - P^*) > 0 \)

\( M/P = \) real stock of money

\( I/Y = \) Investment/Income ratio

\( \bar{r} = \) average return of investment

\( Y \) and \( d - P^* \) are income and real return on holding money respectively. The complementarity hypothesis is reflected in \( \frac{\partial L}{\partial (I/Y)} > 0 \).

McKinnon (1973) argues that an increase in the average return on investment increases the desire to hold real cash balances because an increased return on investment is associated with the ratio of investment to income. Consequently, to increase investment, real money balances need to be increased. Moreover, an increase in nominal deposit rates and/or reduced expected inflation will increase real money balances.
A positive and moderate real interest rate\(^{70}\) will relax the saving-investment bottleneck through increasing demand for real money balances. The consequence of the complementarity hypothesis is related to capital formation which is also positively related to real interest rates\(^{71}\). McKinnon (1973), however, recognised that beyond a certain level of interest rates "a conduit effect" of real money balances to investment will become an "asset competing effect" leading to a negative relationship between interest rates and investment\(^{72}\).

On the other hand, Shaw's theory (1973) of a financially repressed economy did not analyse the complementarity hypothesis. Shaw stressed the "debt intermediation view" which emphasises the important role of financial deregulation in increasing financial deepening in developing countries. Shaw (1973) did not mention the complementarity between real money balances and investment. The effect of financial deregulation by increasing real deposits rate will increase saving and discourage low yield investment. Financial deregulation will increase the role of financial intermediaries since financial deregulation can reduce the cost of intermediation between savers and investors.

An increase in interest rates close to equilibrium rates will reduce inefficient investment, which is investment that can be undertaken by low and subsidised interest rates. Therefore, financial deregulation is also intended to increase efficiency of

\(^{70}\) McKinnon initially suggested increasing institutional interest rates to positive levels. It implies that positive and high real interest rates are favorable to encouraging real money balances and in turn to increasing investment. However, McKinnon also recognised that if real interest rates are too high, it will discourage investment ("asset competing effect"). He did not formalise the optimum real interest rates that can enhance economic growth. Pill (1997) reinterpreted the McKinnon theory as positive and moderate real interest rates.

\(^{71}\) Fry (1995), however, interpreted that the investment function has a negative relationship with real lending interest rates. It implies that interest rates has negative relationship with investment. The initial McKinnon theory implied that interest rates has a positive relation with investment, but at certain level in their relationship become negative.

\(^{72}\) McKinnon (1973) did not determine the maximum real interest rates that still have a function to encourage investment.
investment. Fry (1995) argues that positive real deposit rates will increase aggregate output through increasing the quality of investment. That is, the quality of the capital stock is directly and positively related to the real interest rate since adverse selection of investment projects will occur when real interest rates are set too low and can even be negative.

The view that financial deregulation in developing countries will increase the quality of investment is also supported by Galbis (1977). Galbis (1977) argued that interest rate equilibrium, under a deregulated financial sector, could be used as a channel for savings to flow to most to the productive sectors that generate the greatest efficiency in investment projects. Therefore financial deregulation by removing administered interest rates leads to a shift in resources from low yielding investments to higher yielding investments and consequently the overall result will accelerate economic growth.

During the transition to deregulation, exchange rate policy plays an important role (pp. 150-169, McKinnon (1973)). Financial deregulation may lead to capital inflow since domestic interest rates are often higher than world rates. A large capital inflow may jeopardise the transition period of financial deregulation policy and may destabilise the stabilisation program.

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73 Fry (1995) analysed in more detail the negative effect of financial repression especially related to the effect of negative real interest rates. In addition, one of the benefits of financial deregulation by increasing deposits rates is to improve the quality of investment.

74 Galbis (1977) developed a two-sector model that is the backward (traditional) sector with a low return on its capital and the modern sector with a high return on capital. Investment in the traditional sector is characterised by self-financing with no access to borrowing from the banking system. The modern sector, however, has credit access to the banking system. Financial liberalisation by removing administered interest rates will affect the traditional sector by shifting from holding money to bank deposits and the modern sector can borrow more from banks in order to increase its capital stock. Therefore financial liberalisation will shift resources from traditional low return investments to modern higher return investments and the overall result will increase growth.
Both McKinnon (1973) and Shaw (1973) view exchange rate policy as an important element in developing an optimal financial deregulation policy.

Mathieson (1979) extended the model to include exchange rates as a policy instrument by analysing the effect of capital flows on stabilisation programs and financial deregulation in an open economy. The model allows movement of capital by including real domestic and foreign interest rates in the financial market. An increase in the relative domestic deposits rate will generate capital inflow. Mathieson has shown that both interest rates and exchange rates directly impact on economic growth.

The McKinnon and Shaw theories of a financially repressed economy have influenced many developing countries to deregulate their financial sectors. However, there have been numerous criticisms of these theories. The criticisms are mainly related to the following.

- The existence of the curb market in developing countries might influence the credit market (for example Buffie (1984) and van Wijnbergen (1982, 1983, 1985)). Consequently, financial deregulation policy is not guaranteed to increase the total supply of loanable funds if there is a shift from curb market loans to saving through the banking sector.\(^5\)

- Post-Keynesian\(^6\) criticisms of financial deregulation policy especially relate to the argument that saving cannot finance investment. In the Post-Keynesian lens, banks do not intermediate from depositors to borrowers, but from borrowers to depositors. Saving through the banking sector is created when banks make a loan,\(^6\)

\(^5\) There is no minimum reserve requirement in the curb market, while there is minimum reserve requirement in the banking sector. If there is a shift from curb market loan to saving through the banking sector, the total supply of credit is not increased but might decreased due to the existence of minimum reserve requirement in the banking sector.

\(^6\) The post-Keynesian theory of money and finance is developed along the theme of the endogeneity of money. The money supply is treated as endogenous. It has the consequence that the banking system will respond to credit demands that will create credit money.
therefore saving through the banking sector can not finance investment and prior saving is not necessary for investment. This view is contrary to the McKinnon (1973) theory that prior saving is needed to finance investment.

- Studart (1995) also criticised the idea that financial deregulation policy is related to financial efficiency. Studart (1995) argues that financial deregulation should be related to financial functionality instead of financial efficiency. Studart defines the financial functionality is a financial system that is functional to the process of economic development with the minimum possible increase in financial fragility.

- Grabel (1997) criticised the idea of financial deregulation for increasing interest rates in developing countries. Grabel argued that financial deregulation in developing countries leads to "speculation-led economic development" that is characterised by large risky investment projects and fragile financial structures. Moreover, Grabel (p.118, 1997) argues that financial deregulation in developing countries affects three reinforcing developments on the demand side of financial deregulation as follows. An increase in lending rates attracts an adverse class of borrowers, institutional innovation generates new opportunities for more speculative practices, and interest rate spreads may increase to encourage to short term speculative activities. These changes in demand induce development to become "speculative-led" and investment projects move to higher risk projects following financial deregulation.

- Stiglitz and Weiss (1981) argued that an increase in interest rates will increase the riskiness of the loan portfolio of the banking sector, and consequently will lower the profitability of banks. This argument is mainly related to the asymmetric information between lenders and borrowers in the banking sector. The existence of imperfect information has opened avenues for adverse selection and moral hazard
problems. Therefore, Stiglitz and Weiss (1981) argued credit rationing is more optimal.

The lack of success from financial deregulation policies may also relate to overconfidence about domestic and foreign economies expectations for the future that may create an overborrowing problem (McKinnon and Pill (1996, 1997, 1998)). McKinnon and Pill (1996, 1997, 1998) extend the McKinnon theory of financial repression (1973) by considering the possibility of the existence of over borrowing that might contribute to the lack of success of financial deregulation in developing countries.

4.3. Financial Deregulation, Over-borrowing, and Investment Collapse

McKinnon and Pill (1996, 1997, 1998) analyse the impact of excessive confidence as a result of deregulation by focusing on excessive capital inflows to a liberalising country which leads to over-borrowing. Financial deregulation that is followed by massive capital inflows initially can improve economic performance and contribute to creating excessive optimism about the results of the deregulation policy. Over optimism can result in unsustainable capital inflows which in turn have the potential to create economic problems and lead to financial collapse (McKinnon and Pill (1996, 1997, 1998)).

77 Schadler et al. (p.2, 1993) and McKinnon and Pill (pp.12-13, 1996) argue that excessive capital inflows have consequences for the recipient country and potential to lead to overborrowing that includes:

- Widening current account deficit, an increase in foreign financing has the potential to increase the current account deficit.
- Rapid growth of domestic credit and higher consumption financed by inflows, the large inflows are often intermediated through the domestic banking system and consequently have the potential to increase domestic credit and lead to increased consumption financed by the inflows.
- Weaker domestic monetary control and increasing or sustained high inflation, an increase in capital inflows has the potential to increase the money supply with problems in attempting to sterilise the capital inflows and consequently this will increase domestic inflation.
- Appreciation of the real exchange rate, large capital inflows lead to an appreciation of the real exchange rate and the appreciation of the exchange rate will increase the trade account deficit over time.
McKinnon and Pill (1996, 1997, 1998) use a Fisherian framework\(^7\) to analyse their theory of over-borrowing to the financially deregulated country. They argue that excessive capital inflows following financial deregulation relate to the “credible” policy of the deregulation (especially from the private sector point of view) and over borrowing will occur as a result of uncertainty about the results of deregulation programs especially deregulation in the real sector. In addition, McKinnon and Pill argue that over borrowing and its consequences of market failure might occur under an open capital account regime.

Under an open capital account regime, excessive confidence is manifested through excessive capital inflows. The McKinnon and Pill model (1996, 1997, 1998) argues that a large inflow will shift the production function that created over consumption and over investment which is partly is financed by foreign borrowing, beyond that which would maximise welfare ex ante in the absence of market failure. With market failure, aggregate borrowing is higher than the desired level of aggregate borrowing when the financial system is well behaved. McKinnon and Pill called it the over-borrowing syndrome.

McKinnon and Pill (1998) argue that setting the banks’ credit conditions, that is the price and availability of bank lending, implicitly offers a signal about the country’s macroeconomic prospects and the private sector will rely on those implicit signals to assess the success of the deregulation. Moreover, McKinnon and Pill argue

Cont.:
- **Greater vulnerability to reversal**, if inflows suddenly reverse this will create a serious problem that may lead to financial collapses and consequently the need for painful adjustment. A sudden reverse may culminate in a financial crisis, capital flight, and recession, often forcing an uncontrolled, deep devaluation of the currency followed by skyrocketing domestic inflation

\(^7\) The Fisherian framework was initially used by McKinnon (1973). The Fisherian two period analysis has been used to illustrate economic dualism. There are two technologies in the production process: a traditional technology which exhibits decreasing returns to scale over all possible levels of production and modern technology which has increasing returns but requires a large initial fixed investment.
that an increase in credit through the banking sector will affect the economy through two interrelated channels. A rapid expansion of credit is a signal of the success of the deregulation and it will stimulate real economic activity indirectly. Credit expansion also offers firms the opportunity to move to modern technology and as a result increases real activity directly. If the financial system is in good condition, it will ensure a consistency between signaling and direct effects. However, when there is a market failure in the banking system that might be caused by moral hazard problems, it will open the possibility for contradictions between the signals and the effects of real activity (McKinnon and Pill (1998)) that lead to an unsuccessful financial deregulation policy.

The lack of success of financial deregulation is also can be related to the collapse of borrowers’ net worth which leads to an investment collapse. Gertler and Rose (1996) argue that a sudden drop in borrowers’ net worth will reduce investment and this influences the banking sector indirectly. If the borrower’s net worth becomes negative, investment is no longer feasible. The supply curve will move to left to the point where it no longer intersects the demand curve at a positive value of investment, hence investment collapses, as is shown in Figure 4.1
Figure 4.1 illustrates the impact of changes in the net worth of borrowers to investment. At the same level of real lending rates ($\rho$), an increase in the net worth of the borrower ($W$ to $W'$) will increase the supply of credit (the supply curve moves to the right, $S_0 \rightarrow S_1$) as the borrower has more collateral and it might followed by an increase in demand (the demand curve also moves to the right, $D_0 \rightarrow D_1$). A sudden drop in the borrowers' net worth will shift the supply curve to the left. If the borrowers' net worth becomes negative ($W'$), the supply curve shifts to the left where the supply curve does not intersect with the demand curve ($S_2$) and it will contribute to an investment collapse and in turn it will contribute to increasing problems in the banking sector.

A sudden drop in the borrowers' net worth might relate to many factors such as increased interest rates, depreciation of the domestic currency, and unsound practices in extending credit. The "mark-up" of the value of investment will influence the sudden drop in the net worth of the borrower when the project is not performing well and consequently it will affect the bank. These conditions are possible when there...
is a lack of supervision and regulation in the banking sector. Therefore, financial deregulation policy inherently requires strengthened supervision and regulation of the banking sector. In addition, a large increase credit to the private sector in the short period following financial deregulation might contributed to increasing non-performing loans in the future and in turn contributed to increasing the likelihood of banking crisis.

4.4. Financial Deregulation and the Likelihood of Banking Crisis

Demirguc-Kunt and Detragiache (1998b) studied the impact of financial deregulation on banking crisis for 53 countries for the period 1980-1995 by using a multivariate logit model. They found that financial deregulation strongly affect to the probability of banking crisis. They included a set of control variables in the explanatory variables which covered macroeconomic developments which affected bank performance especially through the level of non-performing loans and characteristics of banking system growth. Demirguc-Kunt and Defragiache (1998b) found that the financial deregulation dummy variable is strongly positively related to the probability of a banking crisis even after controlling the macroeconomic variables. It suggests that even if financial deregulation is carried out after macroeconomic stabilisation is achieved, financial deregulation still increases the likelihood of banking crisis. The effect of financial deregulation on the probability of a banking crisis does not appear to be immediate but occurs 5 and 6 years after the deregulation (pp.14-16, Demirguc-Kunt and Detragiache (1998b)).

The view that financial deregulation contributed to the banking crisis in developing countries is also supported by Sundararajan and Balino (1990). Sundararajan and Balino (1990) examined the channels through which financial
deregulation increased the fragility of both financial and non-financial sectors. These were:

- Opening entry to the banking industry and removing administration of interest rates may lead to excessive risk taking if the deregulation policy is not followed by strengthening banking supervision and regulation.
- The institutional structure of the banking system which can lead to concentration of power in banking, interlocking ownership and lending patterns that are vulnerable to market failure due to moral hazard, adverse selection and oligopolistic pricing.
- Deregulation of the financial sector might lead to excessive increases in interest rates if euphoric expectations coupled with unsound liability structure of the non-financial sector firms caused a sharp increase in credit demand.
- The authorities might lack an adequate set of instruments of monetary control to influence interest rates following financial deregulation.
- Following financial deregulation, instability of the credit markets could arise not only from an inelastic demand for credit, but also from credit rationing due to a high lending rate.
- Lack of preparation of the supervisory authority to deal with a deregulated financial sector environment. In addition, it is argued that adequate supervision if followed by weak law enforcement and political interference might also lead to unsuccessful financial deregulation policy.

Another argument that financial deregulation has contributed to banking crises is associated with the lack of preparation for financial deregulation in that deregulation policy is often followed by a large credit expansion which often leads to excessive risk taking and unsound financing during the expansion phase of the business cycle (Goldstein and Turner (1996)). If financial deregulation leads to rapid credit expansion,
an increase in non-performing loans will occur when banks have weak credit evaluation and there is inadequate supervision (Goldstein and Turner (1996), Goldstein (1997), Honohan (1997)). The banking problem, however, might also related to other variables such as macroeconomic and bank specific variables.

Caprio and Klingebiel (1997) argue that financial deregulation is regarded as a cause of bank insolvency because many insolencies came on the heels of deregulation attempts. In their study of twenty-nine episodes of bank insolencies, they found that the main causes of bank insolencies are related to lack of supervision and regulation, poor bank management, declining terms of trade, recession, government intervention and bank lending to affiliated companies. Under these circumstances, macroeconomic and microeconomic factors also influence bank insolencies. In addition, the explanatory or indicators variables related to the likelihood of the banking crisis is also often to include macroeconomic variables and banking specific variables (Demirguc-Kunt and Detragiache (1998a), Honohan (1997), Hardy and Pazarbasioglu (1998), and Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997), among others).

Hardy and Pazarbasioglu (1998) found that banking distress is associated with a fall in GDP growth, high inflation, credit expansion, capital inflows, high real interest rates, declining ICOR, decline in real exchange rates, and an adverse trade shock. Gonzalez-Hermosillo et al. (1997) found that bank specific variables and banking sector variables are important determinants of the likelihood of bank failure. The macroeconomic variables play important role in influencing the timing of the likelihood of bank failure. Demirguc-Kunt and Detragiache (1998a) found that low GDP growth, high real interest rates, and high inflation rates are associated with increasing the probability of banking fragility. Two years lagged growth of credit also positively influences the probability of banking fragility but not for all model specifications. It
indicates that there is not very strong evidence that a boom in credit precedes banking problems. On the other hand, the size of the fiscal deficit and the depreciation of foreign exchange rates do not significantly influence the probability of banking fragility. Moreover, Demirguc-Kunt and Detragiache (1998b) examined the impact of financial deregulation on the probability of banking fragility by introducing the dummy variable of financial deregulation. They found that financial deregulation strongly increases the probability of banking fragility.

The financial deregulation variables, however, might be proxied by other variables such as the ratio of credit to GDP\(^79\), spread of lending and deposit interest rates, and the ratio of credit to GDP (Kaminsky, Lizondo, and Reinhart (1998)). Some of the variables which can be classified as financial variables, such as the ratio of credit to GDP and the lag of growth of credit (in the study of Demirguc-Kunt and Detragiache (1998a)) can also be classified as financial deregulation variable based on the proxy of the financial deregulation variable by Kaminsky et al (1998). In addition, Villanueva and Mirakhor (1990) recognised the potential dangers from inadequate supervision and regulation of the banking sector and they relate to the role of supervision and regulation to the sequencing of financial deregulation.

4.5. Sequencing of Financial Deregulation

The design and sequencing of financial deregulation is an important issue. It is associated with sequencing of deregulation in internal and external sectors, the trade regime, and the initial conditions of banking regulation and supervision. Edwards (1984, 1987) analyses the sequencing of financial deregulation in developing

\(^79\) Pill and Pradhan (1995) found that the ratio of credit to the private sector to GDP is the best captures to proxy the progress of financial deregulation (in p.92, Demirguc-Kunt and Detragiache (1998a)).
countries. Edwards argues that controls on the capital account should not be removed before the domestic financial sector is deregulated (also see McKinnon (1991)). If the capital account is deregulated while domestic interest rates are set at low or negative levels, it will induce capital outflow. Therefore restrictions on capital movements should not be removed before inflation can be controlled and interest rates deregulated. If inflation has been controlled and interest rates deregulated, the opening capital of the capital account often encourages capital inflows since interest rates in developing countries are often higher than those in industrial countries.

A massive inflow creates a dilemma for the monetary authority regarding the real exchange rate. Under a floating exchange rate, a massive capital inflow will appreciate the domestic currency since financial markets adjust faster than goods markets. Real appreciation of the domestic currency leads to a deterioration in the trade balance. On the other hand, a massive inflow will increase the monetary base and increase domestic inflation under a fixed exchange rate system.

To address those problems, McKinnon (1991) argues that the government should strictly limit capital inflows during the process of deregulation and should strive for a balance between imports and exports, and should not allow imports to grow rapidly relative to exports as the real counterpart of a large inflow of foreign capital. Consequently, the capital account and current account should not be deregulated simultaneously.

The study especially for middle-income economies that before undertaking financial deregulation are characterised as follows:
(a) fairly high inflation; (b) large fiscal deficit; (c) domestic securities markets are limited and interest rates are controlled; (d) high trade tariffs; (e) controls on capital movements (see Edwards, 1987). There is an alternative view that deregulation of capital account can be based on domestic political economy considerations (see p.19, Johnston (1998)). Capital account deregulation can be taken in the early or middle stage of economic reform.
The trade account should be deregulated first before removing capital controls in order to maintain the real exchange rate at an internationally competitive level. The unsustainability of a real appreciation in the domestic currency as a result of massive capital inflows generated by an opening of the capital account make the integration of domestic and foreign goods markets more difficult (Dooley and Mathieson (1987)).

Blejer and Sagari (1988) argue that there are other reasons for sequencing the deregulation of the capital account and interest rates. If capital controls are deregulated first (or simultaneously), only a few large borrowers will get the benefits of accessing international markets due to information problems, with the majority of financial players excluded. The few with international access can undertake monopolistic rent seeking, especially if a large spread exists between domestic and international interest rates, leading to undue concentration and monopolistic behaviour in the financial markets.

Sequencing of financial deregulation in developing countries also has to be related not only to the stability of the macroeconomy but also to the initial condition of banking supervision and regulation (Villanueva and Mirakhor (1990)). They argue that sequencing of financial deregulation should be related to whether banking supervision and regulation during the pre-financial deregulation is adequate or inadequate. If banking supervision is unsound even if the macroeconomy is stable, a country will need to boost banking supervision and regulation first. While improving supervision and regulation, interest rates still need to be regulated temporarily. On the other hand, if banking supervision is sound but macroeconomic conditions are unstable, deregulation of interest rates can be done gradually while improving the macroeconomic environment leading to more stable conditions. Moreover, Villanueva and Mirakhor (1990) argue that deregulation of interest rates can only be done
instantaneously when macroeconomic conditions are stable, and banking supervision and regulation are sound. Banking supervision and regulation are important not only to achieve a sound banking industry but interest rate deregulation will not be effective without strict supervision and prudential regulation.

The important role of adequate supervision and regulation is also consistent with the Stiglitz’s argument (1998). He argues that successful financial deregulation should not only change the regulation framework by eliminating regulation but also improve the regulatory framework to ensure an effective financial system. Consequently, the establishment of an adequate framework for prudential regulation and supervision of financial institutions is important during the process of financial deregulation. Either removal or a relaxation of prudential regulations might contribute to increasing the moral hazard of the banks’ owners and it might lead to financial breakdown, even in a stable macroeconomic environment.

World Bank (1989) argued that there are four types of mismanagement that may occur in the banking system when banking supervision and regulation is not adequate and in turn contribute to an unsuccessful financial deregulation. The four types of mismanagement that commonly occurred when banking supervision and regulation are not adequate are as follows (p.77, World Bank (1989)).

- **Technical mismanagement.** Poor lending policies are a form of technical mismanagement as a consequence of deficient internal controls, inadequate credit analysis, or political pressure.

- **Cosmetic management** occurs when a bank experiences losses and bankers try to hide the past and current losses. Strong supervision would ensure that such losses are reported in order to take correction measures.
- **Desperate management** occurs when losses are too large, so that bankers may adopt more desperate strategies including lending to risky projects at higher loan rates and speculating in stock and real estate markets.

- **Fraud behaviour** occurs when bankers attempt to get loans for themselves

In addition, the evidence from the analysis of financial deregulation policies showed that financial deregulation without adequate banking supervision and regulation contributed to the Asian financial crisis of 1997 (World Bank (1998)).

### 4.6. Evidence and Econometric Testing Related to Financial Deregulation Hypothesis

Many developing countries that have implemented financial deregulation have different objectives. The objectives of financial deregulation in developing countries can be generalised into two categories, which are related to improving the monetary control system and to improving the mobilisation and allocation of domestic savings (Villanueva (1988)). Table 4.1 shows the objectives and scope of financial deregulation in a number of developing countries. Table 4.1 suggests that the objectives and the scope of financial deregulation were differing among countries.
Table 4.1: The Objectives and scope of Financial Deregulation in Developing Countries

Source, International Monetary Fund, in Villanueva (1988)
On the other hand, there are many developing countries that have deregulated their financial sector but faced a lack of success in their efforts to sustain their economic growth. Financial deregulation in the Southern Cone countries (Chile, Argentina and Uruguay) in the mid 1970s by allowing interest rates to be determined by the market, failed in the early 1980s. Diaz-Alejandro (1985) argued that financial deregulation in those three countries led to excessively high real interest rates and large risk taking by banks. A lack supervision of the banking system contributed to conglomerates borrowing heavily from their own banks and led to excessive risk taking in the banking system that contributed to the banking crisis and financial collapse in the 1980s.

Financial deregulation in the Philippines in the early 1980s also resulted in destabilising effects on the economy which resulted in 131 banks being closed between 1983 and 1987 (Vos (1997)). The experience of three Asian countries (Korea, Thailand, and Indonesia) also showed evidence of unsuccessful financial deregulation. Those three countries deregulated their financial sectors in the early 1980s. Financial deregulation policy contributed to increasing economic growth substantially in all those countries. However, financial deregulation also contributed to financial weakness, especially in the banking sector, which was an important contribution to the Asian financial crisis of 1997 (Alba et al. (1999)).

Failures in financial deregulation policy do not mean that financial repression does not matter. Testing using cross-section data shows that various financial repression dummies have negative effects on economic growth (Roubini and Sala-i-Martin (1992)). The evidence also shows that financial distortion has negative effects on economic growth as found by Fry (1997). Fry (1997) found that a relatively undistorted financial sector would stimulate investment and growth of exports and in
turn stimulate economic growth. Therefore, higher output growth rates and undistorted financial and foreign exchange markets increase both saving and investment ratios.

Table 4.2 shows the summary results of econometric tests of the financial deregulation hypothesis associated with related economic variables. The econometric tests show that financial sector development makes a positive contribution to economic growth (for example see Roubini and Sala-i-Martin (1992), King and Levine (1993b), De Gregorio and Guidotti (1995)). Their findings, however, did not necessarily support the McKinnon hypothesis for financial deregulation in developing countries.

The key variable of the McKinnon model is real interest rates as a proxy for financial intermediation that has a positive relationship with saving and investment. The relationship between real interest rates and saving, however, is ambiguous since there are substitution and income effects working in opposite directions (World Bank (1989)) and have been found to be insignificant (Gupta (1984), Warman and Thirwall (1994)) or significant but only small (pp.163-164, Fry (1995)).

Pill (1997), however, argues that the insignificance of interest sensitivity to saving might be related to mismeasurement of the real interest rate variable. Pill (see also McKinnon (1973)) provides an adjusted measurement for real interest rates. The real interest rate is corrected with the wholesale price index (WPI) rather than consumer price index (CPI).

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82 Warman and Thrilwall's findings suggest that the interest rate does not significantly influence total saving but significantly influences financial saving.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Sample</th>
<th>Method estimation</th>
<th>Major findings</th>
<th>Policy implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khatkhate (1988)</td>
<td>64 LDCs</td>
<td>Using a non parametric rank sum test (the Mann-Whitney test), to test whether the mean differences in real interest rates are related to the growth of real GDP, growth of real financial assets, gross of saving/income ratio, gross investment/income ratio, and incremental output/capital ratio</td>
<td>The relationship between real interest rates and any of the 5 macroeconomic variables is not significant.</td>
<td>The real interest rates has no impact on the selected macroeconomic variables.</td>
</tr>
<tr>
<td>World Bank (1989)</td>
<td>33 LDCs</td>
<td>Estimating an equation of growth function by decomposing interest rates to financial depth and to saving and from financial depth to the productivity of investment</td>
<td>Real interest rates has an impact on growth through the greater impact on financial depth on the productivity of investment</td>
<td>A modest real interest rate has an impact on growth.</td>
</tr>
<tr>
<td>Warman and Thirlwall (1994)</td>
<td>Mexico</td>
<td>Estimating an equation for types of saving and investment functions</td>
<td>Real interest rates and rate differentials have a positive significant impact on financial saving; but are insignificant to domestic saving and private savings. Real investment has a negative relationship with real interest rates</td>
<td>No support for the financial deregulation hypothesis of a positive relationship between real interest rates and investment</td>
</tr>
<tr>
<td>Athukorala (1996)</td>
<td>India</td>
<td>Estimating types of saving, private investment and bank lending behaviour functions</td>
<td>The real interest rate has a positive influence on financial and total private savings. Financial saving has a positive impact on credit from bank. Finally the real deposit rate has a positive impact on private investment through increasing the supply of real credit from banking sector</td>
<td>Support for financial deregulation hypothesis that is high real interest rates promote both financial and total savings. Strongly supports the McKinnon hypothesis that an increase in real interest rates promotes private investment.</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Country Sample Size</td>
<td>Methodology</td>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------</td>
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<td></td>
</tr>
<tr>
<td>Pill (1997)</td>
<td>35 developing countries</td>
<td>Estimating an equation for growth as a function of real interest rates</td>
<td>Real interest rate is significantly related to growth</td>
<td></td>
</tr>
<tr>
<td>Fry (1997)</td>
<td>16 developing countries</td>
<td>Estimating simultaneously equations for saving, investment and growth by using iterative three-stage least squares</td>
<td>Financial distortion that measured by real interest rate squared and black market exchange rate premium reduce investment ratio (and export). In turn, it reduces growth</td>
<td></td>
</tr>
</tbody>
</table>

2. The Financial deepening/development hypothesis

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Country Sample Size</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>King and Levine (1993b)</td>
<td>80 countries</td>
<td>Testing the relationship between the financial development and growth by using several indicators for both of them</td>
<td>The relationship for financial development has a positive and significance impact on economic growth</td>
</tr>
<tr>
<td>De Gregorio and Guidotti (1995)</td>
<td>100 countries that used by Barro (1992)</td>
<td>Estimating the degree of financial intermediation, that is proxied by the ratio of domestic credit to the private sector to GDP, and investment with growth, the equation includes other independent variable.</td>
<td>There is a positive and significant effect of financial intermediation and growth, especially in the middle and low income countries. The transmission channel of financial development to growth is through the efficiency of investment</td>
</tr>
<tr>
<td>De Gregorio and Guidotti (1995)</td>
<td>12 Latin American countries</td>
<td>Estimating the degree of financial intermediation, investment, inflation and growth as above by using Latin American countries data</td>
<td>There is a strong but negative relationship between financial intermediation and growth</td>
</tr>
</tbody>
</table>

3. Financial deregulation and probability of banking crisis hypotheses

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Country Sample Size</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demirgüç-Kunt and Detragiache (1998b)</td>
<td>53 developed countries</td>
<td>Estimating the probability of banking crisis when certain variables are controlled by multivariate logit model.</td>
<td>There is a strong positive correlation between financial deregulation and probability of a banking crisis.</td>
</tr>
</tbody>
</table>

Financial deregulation policy must be taken carefully and followed by strengthening banking supervision and regulation.
4. Financial deregulation and bank behaviour

Gupta and Lensink (1997) Estimating the effect of financial deregulation on the behaviour of the commercial banks. Inflation has negative effect on supply of loans but the lending rate is insignificant to influence supply of loans. Excess reserves and government securities are dominant in bank portfolios. Financial deregulation did not improve the bank intermediary function of the banking sector as most funds are idle in the form of excess reserve. It is in the transition to the market system.

Many studies have been carried out to examine the relationship between interest rates – saving – credit – investment – growth using the financial deregulation hypothesis and most of them using cross-country data (for example, Gupta (1984)). However, only few studies have been performed using specific country data. Table 4.2 indicates the study by Warman and Thirlwall (1994) for Mexico and Athukorala (1996) for India. Warman and Thirlwall (1994) carried out econometric testing of the relationship between interest rates, saving, and investment by using the financial deregulation hypothesis in Mexico. In these relationships, credit from banks is used as a key channel between saving in the banking sector and investment. They analyse the relationship of those variables by using the equations as follows:

\[ FS = f(GDP, r, r - r_{US} - e, P_v) \]  
\[ FS = DS, PS \]  
\[ I = f(r, C, GDP_{t-1}) \]  
\[ C = f(FS) \]

---

\[83\] Saving is desegregated into three types which is financial saving (FS), private saving (PS), and domestic saving (DS). GDP=real GDP, r=real deposits rates, \( r_{US} = \) real rate of US government bond, \( P_v = \) volatile (changes) of inflation, \( e = \) exchange of exchange rates, \( I = \) investment, and \( C = \) credit from banks.
Warman and Thrilwall (1994) found that real deposit rates positively influenced financial saving but were insignificant in influencing domestic saving and private saving. Moreover, the impact of real interest rates on investment worked in opposite directions. First, positively through the supply side of the credit channel and negatively impacted on investment by holding supply of credit constant. They found that the total impact was negative.

The same link was tested for India (Athukorala (1996)), but the result was different and gave support for the financial deregulation hypothesis. Athukorala (1996) estimated three behavioral relationships in India for the period 1955-1994. To investigate the relationship of interest rates, saving, credit, and investment by using the financial deregulation hypothesis for India is shown as follows (Athukorala (1996))

\[
DS_i = f(YR_i, RID_i, PE_i, TOT_i, TRN_i, AGS_i, BDN_i, D1, D2) \tag{4}
\]

\[
DS_i = TDS_i, DPS_i, DFS_i
\]

\[
BCP_i = f(DFS_i, BDN_i, PRIV_i, D1, D2) \tag{5}
\]

\[
PRIV_i = f(BCP_i, GYR_i, RRCC_i, PBIV_{-1}, RID_i, D1, D2) \tag{6}
\]

The model uses financial saving as a channel to supply credit from the banking sector, which is shown by including financial saving as one of explanatory variables in the bank lending function (equation (5)). Furthermore, credit to the private sector constitutes the key link between financial saving and private investment, which is

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\[^{84}\text{YR= real GDP, RID= real deposit rates, PE= expected inflation rates, TOT= terms of trade, TRN= real remittances by Indian expatriates, AGS= share of agriculture in total GDP, BDN= population per bank branch ("bank density"), GYR= growth rate of real GDP, RRCC= an index of real rental cost of capital, PBIV= real public sector fixed investment, D1= dummy variable with value 1 for 1983-1986 and 0 otherwise, and D2= dummy variable with value 1 for 1991-1993 and 0 otherwise.}\]
shown by including the credit from banks in the private investment function (equation (6)).

Athukorala (1996) found that real interest rates have a significant positive impact on financial saving and private saving. Financial saving also has a positive impact on the supply of credit in the banking sector and in turn the supply of credit has a positive impact on private investment. It implies that financial deregulation has a positive contribution to economic growth.

The relationship between real interest rates and economic growth, however, shows non-monotonicity (De Gregorio and Guidotti (1995), Fry(1997)). De Gregorio and Guidotti (1995) argue that relationship between interest rates and economic growth showed an inverted U-curve. Very low (and negative) real interest rates tend to cause financial disintermediation and tend to reduce growth. On the other hand, high real interest rates do not guarantee increasing efficiency of investment but may indicate a lack of confidence in economic policy. At an intermediate level, real interest rates do not appear to relate to growth, reflecting no clear cut relationship between real interest rates and saving and investment (p.437, De Gregorio and Guidotti (1995)). Therefore, De Gregorio and Guidotti (1995) argue that interest rates are a poor indicator for financial intermediation. They provide an alternative indicator to measure financial intermediation as a ratio of domestic credit to private sector to GDP (as a "CREDIT" variable). They found that the per capita real output growth is significant and positively related to CREDIT. However, when the sample is divided into three groups: high income, middle income, and low income countries; the strong relationship of CREDIT and growth is more apparent in middle and low income countries. The insignificant effect of CREDIT and growth in high-income countries might relate to the large sources of funds outside the banking sector such as through
capital markets. They also find that the transmission of financial intermediation to
growth mainly comes from the efficiency of investment rather than the volume of
investment. However, the relationship of CREDIT and growth becomes significantly
negative when the equation is tested for Latin American Countries. This negative
relationship between financial intermediation and growth might be related to the
failure of the financial deregulation which was followed by financial collapse.

Financial deregulation will also change the behaviour of the banking sector. Gupta and Lensink (1997) analyse the impact of financial deregulation on bank behaviour for Poland. They found that the supply of credit from the banking sector was not influenced by lending rates and other yields from an asset portfolio. Supply of credit both to households and firms were strongly influenced by the availability of funds including deposits in foreign currency denominations. Since Poland was in the transition to the market system, most of the funds were allocated to excess reserves and government securities. It implies that financial deregulation did not increase bank intermediation. In addition, Demirguc-Kunt and Detragiache (1998b) found that financial deregulation strongly affect on the likelihood of banking crisis by using 53 sample countries. Hence, the evidence shows that there are different impact of the financial deregulation among countries. Therefore, it is interesting to explore the theoretical application for the Indonesian case.
4.7. Theoretical Application of the Financial Deregulation Hypothesis of The Relationship between Interest Rates, Saving through the Banking Sector, Credit from Banks, and Private Investment; and Determinants of the Probability of Banking Fragility: the Indonesian Case

Financial repression literature states that saving precedes investment. The fundamental theory of financial repression is based on the implicit assumption that banks are only used as saving depositors, so that supply of credit from banks depends on the saving through the banking sector (deposits). In Indonesia, the following institutional factors were present in financial markets.

1. Financial repression in Indonesia was mainly related to the policy of the monetary authority in setting deposits rates for state banks and lending rates for priority economic sectors before June 1983.

2. The monetary authority regulated credit policy by applying credit ceilings in the banking sector before the 1983 financial deregulation. The central bank supplied a substantial part of funds through the banking sector (it is called liquidity credit) to finance the priority sectors. The role of financing from the central bank during the pre-1983 financial deregulation was important. The administration of interest rates and the existence of the credit ceiling policy accompanied by the existence of liquidity credits contributed to discouraging the intermediation function of the banking sector. Banks were not encouraged to mobilise funds and the expansion of credits were not through the market mechanism. These conditions contributed to

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85 Sundararajan and Molho (1988) argue that by the end of 1982 loans supported by liquidity credits accounted for nearly 80% of total credits by deposit money banks.
creating distortions in the financial sector and, in turn, it created the financially repressed system in Indonesia during the pre-1983 financial deregulation period.

3. Financial deregulation which was introduced in June 1983 has given state banks the ability to determine deposit and lending rates. As discussed earlier, one of the objectives of the financial deregulation policy in Indonesia was to increase mobilisation of funds by banks. It implies that banks had to finance their credit from private fund mobilisation. The central bank gradually reduced its provision of funds, through liquidity credit, to finance priority economic sectors.

4. Bonds and other security investments are not well developed in most developing countries including Indonesia. The development of capital markets was in line with the process of financial deregulation in the banking sector and securities market improved dramatically after 1993.

5. The lack of a capital market has consequences in that the banking sector has an important role as a supplier of funds for both investment and working capital for non-bank firms in the domestic market. Besides, a major measure of the 1983 financial deregulation was related to encouraging banks to mobilise funds from the private sector to finance their credit.

Based on those arguments, the paradigm of financial repression leading to financial deregulation is appropriate for the Indonesian case.

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86 Characteristics of a financial repression system in Indonesia during the pre-1983 financial deregulation period were associated with the negative real interest rates and a high level of banks reserve requirements.

87 Government bonds were issued following the 1997 financial crisis to finance recapitalisation of the banking sector. It implies that the recapitalised banks received government bonds in their assets portfolio as part of government ownership in the bank.

88 Equity market capitalisation was 22.8% and 30.2% of GDP in 1993 and 1994 respectively compared with 2.4% of GDP in 1989 (pp.5-6, Montgomery (1997)).
The Indonesian financial deregulation of 1983 removed the credit ceiling policy and the administration of interest rates in state banks\(^8\). The financial deregulation policy freed the banking sector to determine interest rates and the amount of credit to be extended to economic sectors. Consequently, interest rates will be determined by the intersection of demand and supply. In other word, interest rates became market determined.

Financial deregulation forced the banking sector, including state banks, to mobilise funds from the private sector to finance their credit extension. At the theoretical level, the allocation of credit from banks became market oriented. Consequently, credit from banks and monetary policy will influence the level of investment especially private investment through interest rates and market mechanisms. Under these circumstances, the role of interest rates and the intermediation function of the banking sector are becoming important to channel funds between the financial and real sectors. Hence, financial deregulation affect on the relationship between interest rates, saving through the banking sector, credits provided by the banking sector, and private investment. Financial deregulation, however, often contributed to excessive risk taking associated with excessive real credit growth that contributed to the likelihood of banking fragility. Those two important aspects of financial deregulation issues, with Indonesian case, are the focus of this thesis.

The relationship between interest rates, saving through the banking sector, credit from banks, and private investment can be used to examine the impact of financial deregulation on private investment through credit availability effects. It is hypothesised that credit from the banking sector has an important role in channeling

---

\(^8\) As state banks were dominant during the pre-financial deregulation period, administration of interest rates in state banks would influence interest rates of the banking sector.
funds from the banking sector to the real sector which is represented in private investment. This hypothesis is in line with the “debt intermediation view” (Shaw (1973))\(^90\), which is an increase in the intermediation function of the banking sector contributed to the process of economic development.

An increase in the intermediation function of the banking sector following financial deregulation, however, might contribute to increasing banking fragility if the banking sector was not performing well. Excessive risk taking in extending credit to the private sector during the process of financial deregulation contributed to increasing the likelihood of banking fragility. Besides, excessive risk taking of the banking sector might also contribute to the extension of credit to speculative sectors that are vulnerable to economic shocks and in turn contributed to investment collapse. Consequently, an increased intermediation function of the banking sector should be in the “safe zone” in order to maintain the sustainable private investment. In addition, the theoretical application of the relationship between interest rates, saving through the banking sector, credit from banks and private investment by using the financial deregulation hypothesis for the Indonesian case; and determinants of the probability of banking fragility in Indonesia are discussed as follows.

\(^90\) As discussed earlier, Shaw (1973) argues that financial deregulation increases the role of financial intermediaries of the banking sector. Shaw stresses the important role of financial deregulation in increasing financial deepening in developing countries.
4.7.1. The Relationship between Interest Rates, Saving through the Banking Sector, Credit from Banks, and Private Investment by Using Financial Deregulation Hypothesis for the Indonesian Case.

To assess the financial deregulation hypothesis, the relationship between interest rates, saving through the banking sector, credit from banks, and private investment can be represented as the following.

\[
FSR_i = f(GDPR_i, RDR_i, RDIF_i) \quad (7)
\]
\[
CREDITR_i = f(FSAR_i, BIR_i, CAPER_i, RL_i, INF_i, RSBI_i) \quad (8)
\]
\[
CREDITSR_i = f(FSASR_i, BISR_i, CAPERS_i, RLS_i, INF_i, RSBI_i) \quad (9)
\]
\[
CREDITNR_i = f(FSANR_i, BINR_i, CAPERN_i, RLN_i, INF_i, RSBI_i) \quad (10)
\]
\[
IPR_i = f(CREDITR_i, CFPR_i, IGR_i, GROWTH_i) \quad (11)
\]
\[
FSA_i = FS_i - \phi FS_i \quad (12)
\]
\[
FSAS_i = FSS_i - \phi FSS_i \quad (13)
\]
\[
FSAN_i = FSN_i - \phi FSN_i \quad (14)
\]

where:

- \( FSR \) real saving through the banking sector (total banks)
- \( GDPR \) real income which is proxied by real Gross Domestic Product (GDP)
- \( RDR \) real deposit rates which is calculated as deposit interest rates (\( RD \)) minus expectation of inflation rates (\( INF^e \))
- \( RDIF \) effective differential between domestic and foreign interest rates adjusted by expectation of depreciation in the domestic currency (\( E^e \))
- \( CREDITR \) real credit from total banks
- \( CREDITSR \) real credit from state banks
real credit from national private banks

saving through the banking sector (total banks) after reduced by minimum reserves requirement, and $FSAR$ is real value of $FSA$.

saving through state banks after reduced by minimum reserves requirement, and $FSASR$ is real value of $FSAS$.

saving through national private banks after reduced by minimum reserves requirement, and $FSANR$ is real value of $FSAN$.

real borrowing from Bank Indonesia to the banking sector (total banks)

real borrowing from Bank Indonesia to state banks

real borrowing from Bank Indonesia to national private banks

real capital equity of total banks

real capital equity of state banks

real capital equity of national private banks

lending interest rates of total banks

lending interest rates of state banks

lending interest rates of national private banks

inflation rates

interest rates of SBI (Certificate of Bank Indonesia)

real investment of the private sector

real net capital flows of the private sector

real investment of the public sector

percentage change of real GDP

In addition, the specification of the expectation hypothesis for both inflation rates and depreciation of the domestic currency is assumed to be rational expectations. It implies
that changes in foreign exchange and inflation rates are incorporated without delay in the expectation process. Therefore, it is assumed that $INF = INF^e$ and $E = E^e$.

The financial deregulation hypothesis has emphasised the role of saving to finance investment. As discussed earlier, the main impact of financial deregulation on saving comes from saving through the banking sector not aggregate saving and the role of this type of saving is the most important for the financial deregulation hypothesis (Gupta (1984), Warman and Thirlwall (1994), Athukorala (1996)). Therefore, the saving function ($FSR$) in this study is associated with saving that is channeled through the banking sector (saving through the banking sector), which consists of demand deposits, saving deposits and time deposits both in domestic and foreign currency denominations.

It is hypothesised that saving through the banking sector depends on real income, the real deposit rate\(^9\), and the effective differential between domestic and foreign interest rates. This formulation of the saving function is in line with Mathieson (1979), which allows for varying degrees of capital mobility. If capital is completely immobile internationally, the effective real return on foreign assets will not affect saving through the banking sector. However, if the capital is perfectly mobile internationally, the real return on saving through the banking sector will be identical. If domestic interest rates are higher than the effective foreign interest rates, this will induce capital inflows. On the other hand, an increase in expected depreciation with other variables assumed to be constant will lead to capital outflows.

\(^9\) In the formulation of the saving function, expected inflation rates have been included in deposit rates and it becomes real deposit rates. It implies that the expected inflation rate has a negative influence on real saving through real interest rates. The negative impact of inflation rates indicates that an increase in expected inflation rates will encourage savers to switch from real saving through the banking sector to other kinds of saving such as holding real assets. Consequently, higher expected inflation rates will reduce saving through the banking sector.
The saving function in (9) is also can be expressed as follows:

\[ FSR_i = a_0 + a_1 GDPR_i + a_2 RDR_i + a_3 RDIF_i + e_i \]  \hfill (15)

To estimate equation (15), not all variable can be denoted in the logarithm form as some variables have negative values during the sample period of study. Therefore, equation (15) is estimated in the form of semi logarithm as follows:

\[ LFSR_i = a_{10} + a_{11} LGDPR_i + a_{12} RDR_i + a_{13} RDIF_i + e_i \]  \hfill (16)

where \( LFSR \) and \( LGDPR \) are logarithm of real saving through the banking sector and logarithm of real GDP.

The expected coefficient parameter is expressed as follows:

\[ a_{11}, a_{12}, a_{13} > 0 \]

A positive hypothesis of the real interest rates responsiveness of saving through the banking sector suggests that an increase in real deposit rates will increase saving through the banking sector. It implies that financial deregulation as hypothesised has a positive relationship with saving through the banking sector. An increase in saving through the banking sector is expected to increase the ability of banks to supply credit to the private sector. It is consistent with Shaw’s argument for deregulating the financial sector in developing countries. Shaw (1973) considered the importance of interest rates to increased saving and he emphasised the role of saving through the banking sector as a source of funds for financial intermediaries, in turn, increasing investment through the credit availability effect.

Not all saving through the banking sector can be used to finance credit. Part (\( \varphi \)) of the saving through the banking sector, however, should be kept as a minimum reserve requirement. Consequently, saving through the banking sector that can be used to extend credit (loanable funds) is as follows:
\[ FSA = FS - \varphi FS = (1 - \varphi)FS \]  

where \( FSA \) is saving through the banking sector (saving in total banks) reduced by minimum reserve requirements. In line with Shaw’s debt intermediation view (1973), saving through the banking sector plays an important role in determining credit from the banking sector to finance efficient investment. Therefore, the variable saving through the banking sector reduced by minimum reserve requirement (\( FSA \)) is included in the credit function and it is expected to have a positive sign.

The credit function for the Indonesian case, however, is also influenced by other variables associated with the balance sheet of the banking sector. The consolidated bank balance sheet in Indonesia can be simplified as follows:\(^{92}\):

\[ BRES + NSBI + CREDIT = FS + BI + CAPE \]  

Variables borrowing from Bank Indonesia (\( BI \)) and capital equity of the banking sector (\( CAPE \)) are included in the credit function as borrowing from Bank Indonesia and capital equity can also be used as a source of funds to extend credit to the private sector.

On the other hand, the returns on loans which is proxied by the lending interest rates is hypothesised to influence the supply of credit. The impact of lending rates is separated from the impact of inflation rates. The argument for separation is that the effect of a 1% increase in nominal lending rates is not clearly identical to the effects of a 1% decline in inflation rates.

---

\(^{92}\) The major assets in the consolidated bank balance sheet consist of bank reserves (BRES), net securities of the open market transaction (NSBI), and credit to the private sector (CREDIT). On the other hand, the major liabilities of banks’ consolidated balance sheet consist of deposits liabilities (FS-saving through the banking sector), borrowing from Bank Indonesia (BI), and real capital equity (CAPE).
The asset portfolio of the banking sector is not only credit but banks might also invest in central bank securities (SBI). The certificate of Bank Indonesia (SBI) is one of the instruments in open market operations (OMO). Open market transactions by the central bank are used for policy purposes. If the central bank reduces the reserves of the banking sector, the ability of banks to extend credit decreases. Under a tight monetary policy stance by the central bank, for example, interest rates are increased and the banking sector will buy open market securities and their reserves will be absorbed by the central bank. As a result, the ability of the banking sector to extend credit will decrease. Therefore, the interest rates of the SBI is hypothesised to influence the credit function.

The credit function is separated into real credit from total banks \( (CREDITR) \), real credit from state banks \( (CREDITSR) \), and real credit from national private banks \( (CREDITNR) \). The estimation of real credit from both state banks and national private banks as a group are based on the argument that either state banks or national private banks as a group held the major share of the Indonesian banking system during the most time of the study. As discussed in Chapter 2, the market share in extending credit to the private sector of state banks and national private banks was close and those group of banks held the major share in extending credit to the private sector during most of the period studied. Besides, the credit extending behaviour of state banks and national private banks might be different. Therefore, the credit from state banks and credit from national private banks are estimated separately. By estimating the credit functions of state banks and national private banks separately, it will deepen the analysis of the

\[93\] During the most period of study, the government did not issue the government securities as an instrument of monetary policy. Therefore, the Central Bank issued its securities to use as one of instruments for conducting monetary policy following financial deregulation.
credit function from total banks. Hence, the credit function of total banks, state banks, and national private banks in (8), (9), and (10) are also can be expressed as follows:

\[ CREDITR_t = b_0 + b_1 FSAR_t + b_2 BIR_t + b_3 CAPER_t + b_4 RL_t + b_5 INF_t + b_6 RSBI_t + e_t \] (19)

\[ CREDITSR_t = c_0 + c_1 FSASR_t + c_2 BISR_t + c_3 CAPERS_t + c_4 RLS_t + c_5 INF_t + c_6 RSBI_t + e_t \] (20)

\[ CREDITNR_t = d_0 + d_1 FSANR_t + d_2 BINR_t + d_3 CAPERN_t + d_4 RLN_t + d_5 INF_t + d_6 RSBI_t + e_t \] (21)

Not all variables related to real credit from total banks, real credit from state banks, and real credit from national private banks can be denoted in the logarithm form as some variables have negative values especially following the 1997 financial and banking crises. Therefore, equations (19), (20) and (21) are estimated in semi logarithmic form and it can be written as follows:

\[ LCREDITR = b_7 + b_8 LFSAR + b_9 LBIR + b_{10} CAPER_t + b_{11} RL + b_{12} INF_t + b_{13} RSBI_t + e_t \] (22)

\[ LCREDITSR = c_7 + c_8 FSASR + c_9 BISR + c_{10} CAPERS_t + c_{11} RLS + c_{12} INF_t + c_{13} RSBI_t + e_t \] (23)

\[ LCREDITNR = d_7 + d_8 FSANR + d_9 BINR + d_{10} CAPERN + d_{11} RLN + d_{12} INF_t + d_{13} RSBI_t + e_t \] (24)

where

\[ LCREDITR, LCREDITSR, and LCREDITNR \] are logarithm of real credit from total banks, state banks, and national private banks respectively

\[ LFSAR, LSASR, and LFSANR \] are logarithm of real saving adjusted with its minimum reserves through total banks, state banks, and national private banks respectively

\[ LBIR, LBISR, and LBINR \] are logarithm of real borrowing from Bank Indonesia to total banks, state banks, and national private banks respectively.
However, if the unit root test for the level of the inflation rates indicates that the inflation rates is stationary in the level which is \( I(0) \), the inflation rates and nominal interest rates can not be separated as variable \( I(0) \) can not be included in the cointegration test. Consequently the interest rates should be presented in the real term and the equations (22), (23) and (24) will be presented as follows:

\[
\text{LCREDIT}_R = b_0 + b_{11} \text{LFSAR}_R + b_{12} \text{LBIR}_R + b_{13} \text{CAPER}_R + b_{14} \text{RLR}_R + b_{15} \text{RSBIR}_R + \epsilon, \quad \text{(25)}
\]

\[
\text{LCREDITSR}_R = c_0 + c_{11} \text{LFSASR}_R + c_{12} \text{LBISR}_R + c_{13} \text{CAPERS}_R + c_{14} \text{RLRS}_R + c_{15} \text{RSBIR}_R + \epsilon, \quad \text{(26)}
\]

\[
\text{LCREDITNR}_R = d_0 + d_{11} \text{LFSANR}_R + d_{12} \text{LBINR}_R + d_{13} \text{CAPERN}_R + d_{14} \text{RLRN}_R + d_{15} \text{RSBIR}_R + \epsilon, \quad \text{(27)}
\]

where

\( \text{RLR}, \text{RLRS}, \text{and RLRN} \) are real lending rates from total banks, state banks, and national private banks respectively.

\( \text{RSBIR} \) = real SBI rates

The expected sign of parameters are as follows:

\[
\begin{align*}
&b_{11}, b_{12}, b_{13}, c_{11}, c_{12}, c_{13}, d_{11}, d_{12}, d_{13} > 0 \\
b_{15}, c_{15}, d_{15} < 0
\end{align*}
\]

\[
\begin{align*}
b_{14}, c_{14}, d_{14} & \text{ can be either positive or negative}
\end{align*}
\]

An increase in deposit interest rates will increase saving through the banking sector, furthermore it will increase the ability of banks to supply credit. It implies that an increase in interest rates to the level of market interest rates will increase financial intermediation. Moreover, it is hypothesised that credit from banks plays important role in financing private investment efficiently.

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94 It will be discussed more detail in chapters 5 and 6.
This hypothesis is consistent with the paradigm of Shaw's financial deregulation hypothesis. The availability of credit to finance investment efficiently is important in the process of economic development. Therefore, credit from total banks (\textit{CREDITR}) is included in the real private investment function\textsuperscript{95}.

Credit from total banks plays a key link between the financial sector and the real sector, in this case between saving through the banking sector and private investment. This link is associated with the role of credit in the banking sector in financing private investment. In addition, it is expected that credit from total banks has a positive relationship with private investment. The positive relationship between credit from total banks and private investment does not necessarily confirm the hypothesis of McKinnon\textsuperscript{(1973)}\textsuperscript{96} since the impact of interest rates on private investment can come from two opposite directions (Warman and Thirlwall (1994)).

Financing of private investment, however, is also related to foreign sources under a liberalised capital account regime. With a liberalised capital account, an increase in domestic interest rates following financial deregulation opens the possibility for capital inflow. It is argued that the transmission of foreign borrowing, in the Indonesian case, is not through the banking sector as in the McKinnon and Pill (1996, 1997, 1998) hypothesis of over borrowing to the financially deregulated country but directly to private non-bank firms.

\textsuperscript{95} Credit from the banking sector has an important role in financing private investment (Tun Wai and Wong (1982), Blejer and Khan (1984), Larrain and Vergara (1993), Warman and Thirlwall (1994), and Athukorala (1996)).

\textsuperscript{96} The McKinnon hypothesis based on the assumption that private investors in developing countries have to accumulate money balances before undertaking investment. Since real money balances are influenced by real deposit interest rates, the relationship of real interest rates and private investment becomes positive. This hypothesis rejected the normal model of investment, that is the negative influence of real interest rates on investment through increasing capital cost.
As discussed in Chapters 2 and 3, capital inflows to the private sector increased substantially from 1990/91 following the tight monetary stance up to the onset of the 1997 financial and banking crises.

An increase in capital inflows to the private sector inherently increases foreign borrowing by the private sector. Most foreign borrowing by the private sector was associated with non-bank firms. It indicated that the transmission of capital inflows was not through the banking sector but directly to the non-bank private sector. As a result, the source of financing private investment might be from domestic banks and foreign sources. Therefore, real net capital flows of the private sector ($CFPR$) are also included in the private investment function.

Private investment in developing countries is also influenced by public investment (Serven and Solimano (1993), Blejer and Khan (1984), Tun Wai and Wong (1982)), and changes in income which proxied by changes in real GDP (Athukorala (1996)). Therefore, real public investment ($IGR$) and changes of real GDP ($GROWTH$) are also included in the private investment function. Therefore, the presentation of the private investment function in (11) can also be represented as follows:

$$IPR_t = a_{20} + a_{21}CREDITR_t + a_{22}CFPR_t + a_{23}IGR_t + a_{24}GROWTH_t + \epsilon,$$

(28)

As there are variables in the real private investment have negative values, not all variables related to real private investment can be denoted in the logarithm. Therefore, to estimate equation (28) and to make it consistent with the previous equations, it will be applied semi logarithm form as follows:

$$LIPR_t = a_{30} + a_{31}LCREDITR + a_{32}LCREDITR + a_{33}LIGR_t + a_{34}LIGR_t + \epsilon,$$

(29)
where

$\text{LIPR}$ and $\text{LIGR}$ are logarithm of real private investment and public investment respectively.

The expected sign of the parameters is as follows:

\[ a_{31}, a_{32}, a_{34} > 0 \]

\[ a_{33} \text{ can be either positive or negative}. \]

The hypothesis that credit from the banking sector affects private investment implicitly suggests that banks have a special role in the economy. At the same time, credit from the banking sector is hypothesised to depend strongly on saving through the banking sector and this saving is hypothesised to be positively related to interest rates. Hence, it is hypothesised that an increase in interest rates will increase private investment through increasing the supply of credit from the banking sector. In other words, financial deregulation is hypothesised to affect private investment positively through the credit availability effect.

An increase in credit to the private sector, however, might not only increase private investment but also increase the likelihood of banking fragility. A large growth in credit from the banking sector following financial deregulation, if followed by a lack of supervision and regulation to the banking sector and minimal law enforcement might contribute to unsustainable investment and contribute to increasing the likelihood of banking fragility.

\footnote{The impact of public investment on private investment is ambiguous, it might be positive or negative. It depends on the relationship between private and government investment. If private investment is complementary to public investment, the impact of public investment on private investment will be positive. On the other hand, if private investment is a substitute for public investment, the impact of public investment on private investment will be negative.}
Therefore, the role of the financial deregulation variables in the determinants of the probability of banking fragility in Indonesia is investigated.

4.7.2. The Determinants of the Probability of Banking Fragility: The Indonesian Case

Several studies of banking crises have been carried out by using the criteria for banking crisis as follows. Honohan (1997) used the various types of banking crisis. Caprio and Klingebiel (1997) used a large number of non-performing loans. Demirguc-Kunt and Detragiache (1998a, 1998b) used the dummy for banking fragility that covers non-performing loans, nationalisation, extensive bank run, and cost of bail outs. Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997) used bank intervention.

Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997) applied a survival model of time to crisis by using 31 individual data banks subject to direct “intervention” for the Mexican case 1991-1995. They define bank intervention or bank “failure” as when a bank received financial assistance, other than short-term liquidity support, from a third party. The analysis of the survival model and individual data bank might be appropriate for analysing banking fragility in Indonesia. The problem, however, is that there is no available official data to determine the time and type of financial support which was received by individual banks before the onset of the 1997 financial and banking crises. As the time and type of financial support is not officially available for individual banks and also the data for individual banks are not available continuously for a long time period, the analyses of banking fragility in Indonesia is approached by

98 The public data (not official) of financial support to individual banks is mainly related to liquidity assistance from the central bank following the financial and banking crises of 1997. Using this period as a start of weaknesses in the banking sector might gave biased results.
adapting the Demirguc-Kunt and Detragiache (1998a, 1998b) studies by using a dummy variable for banking fragility in the Indonesian case.

As discussed in the previous chapter, the impact of Indonesian financial deregulation differed among groups of banks especially between state banks and national private banks. The market share which is measured by saving that can be mobilised by banks, credit extended to the private sector, and assets of national private banks following financial deregulation was substantial, while the role and the market share of state banks was substantial but not dominant. Consequently, state banks and national private banks hold the major market share in the Indonesian banking system during the most time period being studied. Therefore, it is argued that if either state banks or national private banks as a group are fragile, it could significantly contribute to the fragility of the banking sector. As a result, the analysis of the determinants of the probability of banking fragility is associated with state banks and national private banks as a group.

If the weaknesses in either state banks or national private banks are substantial, it means that the fragility in those group of banks might precipitate a full-pledged banking problem in the system. The analysis of the fragility is not related to individual banks. The problems of an individual bank might not be substantial enough to contribute to the fragility to the system.

Banking sector, based on group of ownership, is classified into: state bank, national private banks, regional government banks, joint venture and foreign banks. As discussed in Chapter 2, the state banks and national private banks held the major share, which is based on saving through banks (deposits), credit extended to the private sector, and assets, during the most time of study in the Indonesian banking sector. Consequently if regional government banks, for example, is fragile it might not affect the fragility of the banking sector as a whole as the share of the regional government banks is not major. On the other hand, if either state banks or national private banks as a group is fragile, it should impact on the banking sector as the share of either state banks or national private banks as a group is very substantial in the Indonesian banking system during the most time of study.
Therefore, the weaknesses are related to the group of banks which have the major market share in the banking system in the period being studied, that is state banks and national private banks as a group.

The selection of the independent variables of the probability for banking fragility in the Indonesian case is consistent with the literature and the availability of data. Honohan (1997) used three groups indicators, which are: macroeconomic, microeconomic, and government involvement. Honohan (1997) included the indicator of the government involvement based on the argument that government involvement contributed to the activities of banks and as banks were not autonomous, in turn, banks will act as a quasi fiscal mechanism. In addition, Honohan (1997) also argued that the change in regime from financial repression to financial deregulation is often followed by increasing exposure to market risk, which in turn, might increase the risk of banking crisis. Meanwhile, Demirguc-Kunt and Detragiache (1998a) used three groups variables as an explanatory variables. Those three groups variables are macroeconomic, financial, and institutional variables. Demirguc-Kunt and Detragiache (1998b) extend their analysis by introducing the dummy variable for financial deregulation to examine the impact of financial deregulation on the probability of banking fragility. As discussed earlier, they found that financial deregulation strongly influenced the increasing probability of banking fragility. Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997) use three group explanatory variables: bank-specific variables, banking sector variables, and macoeconomic variables.

In line with the literature and the availability of data, the explanatory variables of the determinants of banking fragility for the Indonesian case are divided into three groups of variables. Those three groups of variables are as follows: macroeconomic
variables, group bank specific variables, and the proxy for the progress of the financial deregulation variables. Variables included in those groups of variables are as follows.

1. Macroeconomic Variables:
   - Economic growth
   - Short term interest rates
   - Depreciation of the domestic currency

2. Group Bank Specific Variables:
   - Growth in share of credit to agricultural sector
   - Growth of share of credit to industry sector
   - Growth of share of credit to trade sector
   - Growth of share of credit to services sector
   - Growth in ratio of saving through banks to total assets
   - Ratio of capital to total assets

3. The Proxy of Financial Deregulation Variables:
   - The ratio of credit to total assets
   - Lagged of growth of real credit
   - Spread between lending and deposit interest rates

Economic growth is included in the explanatory variables as low economic growth will lower the capability of borrowers to repay their debts and in turn increase non-performing loans and weaknesses in the banking sector. The weaknesses of the banking sector might also be related to interest rate shocks. Short term interest rates is measured by the interest rate on the Certificates of Bank Indonesia (SBI). It suggests
that the variable short term interest rates is not a proxy of financial deregulation variables but represents an interest rates shock associated with macroeconomic conditions. The short term interest rate is included in the explanatory variables in an attempt to measure the effect of interest rate shocks on the probability of banking fragility. An increase in short term interest rates might influence the balance sheet of banks, even if banks can pass the higher interest rates to borrowers. Higher lending interest rates might contribute to increased non-performing loans in the future and in turn increase the fragility of the banking sector. In addition, the impact of the short term interest rates shock might not immediate aftermath of the change in policy but rather need overtime and it is indicated in the lagged of the short term interest rates.

Another variable included in the macroeconomic group of determinants of banking fragility is depreciation of the domestic currency. Depreciation of the domestic currency is included to test the hypothesis of the fragility being driven by either excessive foreign exchange risk exposure associated with the bank itself or borrowers. It is argued that depreciation of the domestic currency will influence banks either through the profitability of banks or loan quality of banks and these contributed to increasing banking fragility. Mishkin (1999a) argues that a large depreciation of the domestic currency will affect the balance sheets of financial and non-financial firms in developing countries. The problems in the banking sector, however, might not only be related to macroeconomic fluctuations but also microeconomic factors which affect the condition of the banking sector (Hardy and Pazarbasioglu (1998), Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997), and Honohan (1997) among others).

Honohan (1997) argued that the role of macroeconomic fluctuations might not act as a trigger for the underlying the fragility of the banking sector, but the behaviour of the banking sector itself especially following changes in regime, such as from financial
repression to financial deregulation, which contributes to large increases in the growth of credit from the banking sector. Therefore, a specific variable for groups of banks is included in testing the determinants of banking fragility.

Variables included in group bank specific variables are the exposure of credit from the groups of banks by economic sector, the ratio of capital to total assets, and changes of deposit liabilities of banks to total assets. It is argued that the expansion of credit to the riskier sectors or the speculative sectors is more likely to lead to banking fragility. Therefore, the extension of credit from the banking sector by economic sectors\(^\text{100}\) is included to test the bank exposure to the risk sectors. It is measured by the growth in the ratio of credit to the agricultural sector to total credit, growth in the ratio of credit to the industry sector to total credit, growth in the ratio of credit to the trade sector to total credit, and growth in the ratio of credit to the services rendering industry sector to total credit. These portfolios of credit are hypothesised to influence the probability of banking fragility.

Meanwhile, capital is an important cushion to absorb losses by banks which can be caused in many ways. Therefore, low capital for a bank is often associated with an increase in the fragility of the bank to any shocks. In addition, a low level of capital held by banks is also often associated with excessive risk taking by the bank. If the shareholder of a bank expects to get bailed out if the bank failed, it tends to increase the moral hazard of the bank owner by choosing to maximize the expected return from a high-risk portfolio. Berger and De Young (1997) argue that low capital will encourage the moral hazard of a bank to taking excessive risks and will result in increasing levels of non-performing loans in the future. The inclusion of the ratio of capital to total assets

\(^{100}\) Credit to mining is not included in the explanatory variables as the share of credit to mining was relatively small.
is to test the hypothesis of whether the moral hazard of the group of banks influences the fragility of the banking sector. In addition, the changes of saving through the banking sector (deposits liabilities of banks) to total assets is included as a proxy for the existence of deposit runs and loss of confidence in groups of banks.

The last group of explanatory variables for the probability of banking fragility is associated with financial deregulation variables. Kaminsky, Lizondo, and Reinhart (p.10 and p.36, 1998)) argue that the proxies for financial deregulation variables can be as follows:

- Real interest rates.
- Credit growth.
- Growth in the ratio of credit to GDP.
- Lending-deposit interest rates spread.
- Growth in M2 multiplier.

In addition, Pill and Pradhan (1995) found that the variable that best captures the progress of financial deregulation is the ratio of credit to the private sector to GDP\(^{101}\). In line with this, in this study the proxy of the progress of the financial deregulation variables are as follows: the ratio of credit to the private sector to total assets, lagged growth of real credit, and spread between lending and deposit interest rates.

The ratio of credit to total assets is used as a proxy for how far a group of banks extend credit to the private sector following financial deregulation. The impact of the credit exposure to the banking problems, however, might not immediate but it might need overtime and it is shown in the lagged of ratio of credit to total assets. Moreover, a rapid growth in real credit from banks following financial deregulation indicates the

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growing strain in the banking sector. Rapid credit growth, however, often leads to declines in credit standards. Besides, if the financial deregulation is not followed by strengthening supervision and law enforcement, large credit expansion might go to related companies. Caprio and Klingebiel (1997) found that real credit growth of one to two times GDP growth is safe. But if the growth of real credit is higher than twice of the growth of real GDP, it contributed to the banking problem. This higher credit growth is unlikely to be sustainable. Excessive credit growth, however, often indicates excessive risk taking and contributes to increasing non-performing loans in the future and in turn contributes to increasing banking fragility. Therefore, the lagged growth of real credit is included to test whether lagged real credit growth influences the probability of banking fragility through increasing non-performing loans. In addition, many banking problems are often preceded by a lending boom (boom to bust cycle).

Another variable which proxies the progress of financial deregulation is the spread between lending and deposit interest rates. Financial deregulation is often associated with an increase in interest rates. An increase in interest rates, however, if too high might have negative consequences. High deposit rates will encourage high lending rates. As discussed earlier, high lending rates might contribute to increasing non-performing loans in the future. A high lending rate, however, might also be related to high short term interest rates. It is argued that an increase in short term interest rates is often followed by an increase in other interest rates including deposit and lending interest rates. As the adjustment of lending rates is slower than the adjustment of deposit rates, an increase in short term interest rates might contribute to a negative spread between lending and deposit interest rates. The negative spread between lending and deposit interest rates will influence the profitability of banks and in turn will affect the
fragility of the banking sector. Besides, a large spread between lending and deposit interest rates might indicate inefficiency in the banks.

On the other hand, the dependent variable, as discussed earlier, is the dummy variable of banking fragility. Consequently, the construction of the banking fragility dummy variable is important to carry out the estimation of the probability of banking fragility. Demirguc-Kunt and Detragiache (1998a, 1998b) classified the episode as banking fragility if at least one of the following four conditions hold:

1. The ratio of non-performing assets to total assets exceeded 10%
2. The cost of the rescue operation was at least 2% of GDP
3. Banking sector problems resulted in a large scale nationalisation of banks
4. Extensive bank runs took place or emergency measures such as deposits freezes, prolonged bank holidays, or generalised deposit guarantees were enacted by the government in response to the crisis

By adapting the primary study by Demirguc-Kunt and Detragiache (1998a, 1998b) the classification of episodes of banking fragility in Indonesia depends on a minimum of one of the following conditions\(^{102}\).

1. The ratio of non-performing loans to total loans exceeds 10%.

Caprio and Klingebiel (1997) argue that the administration of non-performing loans is biased downward and there is a practice of "evergreening". They argue that non-performing loans at 5% can be considered as a sign of systemic risk and they argue that this definition of systemic crisis is quite conservative. In addition, the threshold range, which prevailed before the first wave of bank "intervention" in Mexico, was identified as 6%-8% of the ratio of non-performing loans to total loans (p.309,

\(^{102}\) The cost of the rescue operation is not included in the classification as there is no data available publicly regarding the cost of the rescue of group of banks before the onset of the 1997 financial and banking crises.
Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997)). Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1997) found that the likelihood of an individual bank exceeding the threshold increases with the fragility of the banking sector as a whole. Hence, the selection of the ratio of non-performing loans to total loans in excess of 10% for a group of banks is relatively prudent to identify banking fragility.

2. *The generalised deposits guarantee* were enacted in response to a decline in depositors' confidence.

3. *The problem of banks has resulted in a large-scale government take over.*

   If a minimum of one of those three conditions holds, it is considered that the group of banks is weak or fragile. But if none of the conditions hold, the weaknesses of the banks might be individual or relatively minor.

4.8. Conclusion

   The theory of financial repression which was presented by McKinnon (1973) and Shaw (1973) argues that financial deregulation will enhance economic growth in developing countries. The viewpoints of McKinnon and Shaw, however, differ with respect to the transmission mechanism of the relationship of interest rates, saving, investment, and economic growth. The important element of the McKinnon (1973) approach is the complementarity hypothesis between real money balances and investment. Shaw (1973), however, did not recognise the complementarity hypothesis but he stressed the debt intermediation view in order to increase financial deepening in developing countries. Shaw (1973) also recognised the important role of interest rates, in a financially repressed economy, to increase saving through the banking sector as an important source of funds for financial intermediaries. An increase in financial intermediation between savers and investors due to an increase in real interest rates
will contribute to stimulating efficient investment. Therefore, financial deregulation is also associated with discouraging low yield investment. This argument is supported by Galbis (1977) and Fry (1995) who argue those financial deregulation leads to a shift in resources from low to higher yielding investments and consequently will accelerate economic growth.

Financial deregulation might lead to capital inflows. A massive inflow, however, might contribute to creating excessive optimism about the result of the deregulation policy that can result in unsustainable capital inflows and it might contribute to creating over-borrowing to the financially deregulated country (McKinnon and Pill (1996,1998)) that can lead to an unsuccessful financial deregulation policy. The lack of success in financial deregulation policy in developing countries might also be related to the collapse of borrower’s net worth which leads to investment collapse (Gertler and Rose (1996)). A sudden drop of the borrowers’ net worth will affect the banking sector indirectly. There are many causes of the sudden drop the net worth of borrowers, such as a sudden large depreciation of the domestic currency and past unsound practices in extending credit. Therefore, the strengthening of supervision and regulation of the banking sector play important role not only for soundness of the banking sector but also to sustain economic growth.

Financial deregulation is also positively contributed to the likelihood of banking crisis (Demirguc-Kunt and Detragiache (1998b), Sundararajan and Balino (1990), among others). The argument that financial deregulation contributed to the banking crisis is often associated with excessive risk taking and unsound practices in extending credit following financial deregulation. Banking crisis, however, is also influenced by macroeconomic variables and banking specific variables (Demirguc-
The objectives and the results of financial deregulation differ among countries. The evidence for financial deregulation in developing countries shows that the effect of financial deregulation on savings is inconclusive. The effect of real interest rates on saving through the banking sector for investment works through the channel of the credit availability effect. The credit availability effect is more strongly supported by the evidence. Testing supports the proposition that credit availability is important. In addition, financial distortion does matter. The econometric testing also supports the proposition that financial deregulation contributes to the likelihood of a banking crisis.

In addition, the relationship between interest rates, saving through the banking sector, credit from banks, and private investment using the financial deregulation hypothesis; and the determinants of the probability of banking fragility are developed for Indonesian case.

It is hypothesised that real interest rates positively influence saving through the banking sector and this saving is assumed as an important variable to supply credit from banks. Consequently saving through the banks is included in the explanatory variables of credit function. Credit from banks, however, is not only influenced by saving through the banks but also influenced other variables including borrowing from Bank Indonesia. In addition, credit from banks is separated into credit from total banks, credit from state banks, and credit from national private banks.

Credit to the private sector from total banks constitutes the key link between saving through the banking sector and private investment. Consequently, credit from total banks is recognised as one important variable in the private investment function. Private investment, however, is also hypothesised to be influenced by other factors.
such as net capital flows of the private sector. Moreover, by using a saving function, credit function, and private investment function together, we can analyse the impact of financial deregulation policy (which is proxied by real interest rates) on real private investment through the credit availability effect. This argument is in line with Shaw's debt intermediation view. The availability of credit from banks is important to finance investment, which implies that increased banking intermediation enhances economic development.

A large increase in credit from banks following financial deregulation, however, is also often associated with increasing the likelihood of banking fragility. Banking fragility, however, might also be influenced by other factors. Therefore, it is hypothesised that the explanatory variables for the probability of banking fragility in Indonesia are classified into three groups of variables: macroeconomic variables, financial deregulation variables, and group bank specific variables. On the other hand, the dependent variable is the dummy variable for banking fragility. The construction of the dummy variable for banking fragility adapted from the study of Demirguc-Kunt and Detragiache (1998a, 1998b) as follows: the ratio of non-performing loan to total loans minimum 10%, the generalised deposit guarantee, and large-scale government take over. In addition, the econometric method will be proposed to measure the relationship between interest rates, saving through the banking sector, credit from banks, and private investment; and also to test the determinants of the probability of banking fragility for the Indonesian case.