

FINANCIAL DEREGULATION IN INDONESIA AND THE CONTINUING POLICY ISSUES

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This work is the result of research carried out by the author,
except as cited in the text

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Dedicated to the next generation,
Palimo and his generation

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Abstract

In many countries, different degrees of banking instability occurred following a complete financial deregulation, although the reasons for the instability varied. It was widely recognised that macroeconomic instability was responsible for the failure of financial deregulation in several countries. Another important reason for banking instability was the moral hazard problem that emerged after financial deregulation. Under central bank guarantees of bank deposits, the complete removal of traditional regulations led banks to take on excessive risk. Several other reasons for the banking failure such as inappropriate sequencing of economic reform and inadequate supervision of banks were identified.

Responding to concerns about banking instability, this thesis examines the positive and negative effects of financial deregulation on the development of banking in Indonesia. The Indonesian experience is a classic example of the trade-off between financial deepening and banking instability under financial deregulation with central bank guarantees and without adequate supervision of banks. The presence of externalities associated with the use of money on the one hand, and systemic risk such as the risk of a run on the payments system on the other, makes free market competition in banking, without central bank intervention, not feasible.

This thesis, therefore, models the relationship between the central bank and commercial banks in the context of a loan insurance scheme. The model extends the literature on optimal risk-sharing contracts to the banking sector. In so doing, different utility functions, which are more representative of the banks' utility functions, are introduced. The model aims at allowing the central bank to eliminate the moral hazard problem in bank lending and at the same time give assurance or confidence to depositors. As the model is a theoretical exposition of the relationship between a central bank and commercial banks, it stops short of providing a 'blueprint' for such an optimal risk-sharing contract. To achieve this, simulations of the theoretical model will need to be done, and this is the subject of further work in the future.

The loan insurance scheme envisages that the bank pays an insurance premium to the central bank that varies proportionately with the expected size of the default loans. When there is a default, the central bank will pay an amount to the bank equal to the size of the default. The model finds that in the presence of the moral hazard problem, the optimal contract allows the commercial bank to reap marginal benefit from efforts towards prudent lending, reflected in the decreased losses to the bank. This will induce the bank to increase its efforts towards prudent lending, hence eliminating the incentives to shirk. The optimal contract thus requires the commercial bank to bear some of the lending risk by sharing the loss increase.

Loan insurance can clearly eliminate the moral hazard problem in banking. It cannot, however, fully prevent bank bankruptcies. This is so because bank bankruptcies can occur for other reasons, such as lack of skilled labour and weak management of risk. For this reason, effective regulation and supervision of banks becomes very necessary, primarily to ensure that an efficient and sound payments system can be sustained. In this case, banking regulation can be seen as a minimum requirement for achieving the soundness of banks joining the insurance scheme.

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Chapter 1

Introduction

Over the past two decades many countries, both developed and developing, have adopted financial deregulation. This was motivated by the realisation that financial liberalisation, as opposed to financial repression, allows savings to be effectively mobilised and financial resources to be efficiently allocated, and hence is growth promoting.¹ Direct government intervention into the banking sector results in financial repression associated with large efficiency costs. Reductions in international bank lending in the 1980s forced borrower countries to release more domestic resources for investment and growth. In response to such a realisation, the Indonesian government initiated financial deregulation in 1983. Ceilings on credits and interest rates were eliminated, restrictions on market entry and operations of banks were removed, and reserve requirements were lowered. The government also introduced measures of banking supervision such as lending limits and capital adequacy requirements.²

The deregulation brought about dramatic changes in the financial sector, especially banking. The number of banks and their branches more than doubled within only 18 months from October 1988 when the restrictions on opening new banks and bank branches were removed. The total assets of deposit money banks grew by more than 31 per cent annually from 1982 to 1993. The average value of loans outstanding surged by 23 per cent annually during the same period. Domestic interest rates rose sharply from 1984, well above those of international money markets. It should be noted that Indonesia experienced negative real interest rates before undertaking financial deregulation.

Although there were significant benefits from banking deregulation for both the banking sector and the community (especially the previously neglected small businesses and individuals with low asset base), the extremely rapid expansion of banking could lead

¹The details of the theoretical background are presented in Chapter 4.

²For further details, see Chapter 3.

to inefficiencies and the possibilities of financial bubbles. The evidence shows that a number of countries experienced financial crisis following a financial liberalisation. These included Chile, Argentina, and Uruguay in the 1970s. Several developed countries such as the United States and Australia in the 1980s, and Japan in the early 1990s, also experienced financial 'bubbles'.

The very rapid expansion of Indonesian banking, together with a number of factors such as poor management and lack of experienced staff, led to several banking failures at the beginning of the 1990s. The total of non-performing loans (loans on which no interest has been paid for three months or more) mounted both in private and state banks. Indonesia also experienced relatively high positive real interest rates (positive by three or more percentage points greater than zero) compared to countries such as Malaysia, Korea, Thailand, and the Philippines. It is widely considered that Indonesian banking was in a 'vicious' circle of non-performing loans and high real interest rates.

Noting concerns about financial instability, this thesis addresses issues regarding financial deregulation and the continuing policy in Indonesia. Unfortunately, data on non-bank financial institutions is limited, so the analysis has to focus on the banking sector and, in particular, on commercial banks as distinct from people's credit banks.³ Banks (including Bank Indonesia) hold over 90 per cent of the gross assets of the financial sector. The 1992 banking law requires non-bank financial institutions to operate like commercial banks. In fact, several of them have changed into commercial banks. The shallowness of the capital market made it impossible for them to survive as non-bank financial institutions in the newly competitive conditions following deregulation. The discussion of banks thus covers most of the financial sector.

For purposes of the analysis, the issues will be divided into two main categories: the issues which face the central bank, and the issues which face commercial banks. In principle, the issues which face the central bank would consist of issues related to the

³People's credit banks are banks that accept only savings and time deposits. Apart from giving credit to people, they can only put their funds into Bank Indonesia (Indonesia's central bank) certificate (*Sertifikat Bank Indonesia*) time deposits and/or certificate deposits and/or savings deposits of other banks. (Bank Indonesia certificate is described in detail in Chapter 2). There are certain activities open to commercial banks but not the people's credit banks. These include foreign exchange, insurance, and pension funds activities.

extent and ways in which government intervention (through the central bank) should occur in the banking sector under financial deregulation. This would include issues such as: the ability of the central bank to control money supply indirectly and hence maintain price stability; supervision of banks together with the enforcement of the legal system; and the role of the central bank in a deposit insurance system and lender-of-last-resort function.

The issues which face commercial banks would comprise those related to the commercial banks' difficulties in adjusting from a restricted, 'cartel-type' banking system to the new competitive, market-oriented environment. This would include issues such as: professionalism on the part of both bankers and owners; adequacy of skilled staff; bankers' understanding of the macro consequences of their banking activities; and the management of risks.

This thesis focuses on moral hazard problems in banking resulting from a combination of inadequate central bank supervision and the presence of the central bank's deposit guarantees on the one hand, and the lack of professionalism and risk management skills in commercial banks, on the other hand. This thesis develops a theoretical model of the relationship between central bank and commercial banks that can contribute towards an efficient and sound banking system. The model identifies elements of an optimal contract to alleviate moral hazard problems in banking associated with deposit guarantees by the central bank. It modifies the risk-sharing and incentive contract theory to construct an optimal risk-sharing relationship between central banks and commercial banks in the form of loan insurance. The model is based on Indonesia's experience in deregulating its financial (or banking) sector. However, it can also be applicable for countries that have experienced banking instability in the same way that Indonesia has.

The organisation of the rest of the thesis is as follows. Chapter 2 discusses the institutional aspects of Indonesian banking and the changes from a repressed to a liberalised financial system in Indonesia. Chapter 3 examines current difficulties and general issues in Indonesian banking. Chapter 4 presents a review of the literature of the theoretical arguments that have been advanced in areas relating to financial deregulation. It also analyses the difficulties in Indonesian banking in the context of the Stiglitz and

Weiss (1981) model. Chapter 5 develops a theoretical model of state loan insurance for the commercial banks and the central bank. Chapter 6 discusses the policy implications of the model of state loan insurance. The conclusions are presented in Chapter 7.

Chapter 2

From a repressed to a liberalised financial system in Indonesia

Introduction

Before deregulation in June 1983, the central bank (Bank Indonesia) and five large state-owned banks accounted for most of Indonesia's financial sector. Interest rate and credit ceilings were rigidly controlled and a considerable proportion of lending was centrally directed. Exchange rates were set by the central bank, but there were no restrictions on capital flows. It will be argued that under such a system domestic savings were discouraged, the cost of intermediation was high, and financial resources were misallocated.

The sharp fall in petroleum earnings beginning in 1982 necessitated comprehensive reforms to sustain non-inflationary growth and balance of payments viability. Administered interest rates and direct monetary policy controls were considered inappropriate for efficient resource allocation and the growth target of 5 per cent per annum. Mobilisation of domestic savings through the financial system was urgent. Financial deregulation thus began to be introduced on 1 June 1983.

The June 1983 deregulation package included the removal of ceilings on all credits, all deposit rates of interest, and most loan rates of interest. Bank Indonesia's preferential credits given to priority sectors at subsidised interest rates, known as 'liquidity credits', were reduced by terminating a number of the high priority credit schemes.

From the time of this package until 1988, there were no further banking reforms. In this period, Bank Indonesia concentrated on developing the money market. It was busy with experimenting and getting used to its new indirect measures of monetary control, especially during heavy speculative attacks against the rupiah in September–October 1984 and in May–June 1987. A very significant devaluation also took place in September 1986.

A second major deregulation package was prepared in October 1988. The three most important measures were the free entry and operation of banks and non bank financial institutions (NBFIs), the reduction of reserve requirements from 15 per cent to 2 per cent, and the setting of maximum legal lending limits on banks and NBFIs for purposes of prudential supervision. This package was followed by several other measures from March 1989 to May 1993, which mainly aimed at strengthening the prudential supervision of banks.

This chapter describes the regulated financial system and its impact on the development and performance of the financial sector in Indonesia. It then discusses the deregulation measures undertaken from 1983 to 1993 and the changes from a repressed to a liberalised financial system.

2.1. The financial system before deregulation

Prior to 1983 the financial system of Indonesia consisted (and still consists) of the banking sector, non-bank financial institutions (NBFIs), and other financial institutions. The banking sector comprised the central bank (Bank Indonesia), commercial banks, development banks, saving banks, and rural banks. The NBFIs included development, investment, and housing financial institutions, while other financial institutions consisted of insurance and leasing companies.

As in the past, the financial institutions of Indonesia are government-owned, private-owned (both domestic and foreign private), and joint ventures of domestic and foreign governments or private investors. The NBFIs and other financial institutions are mostly owned by the Indonesian government and Indonesian private sector.

Prior to deregulation in 1983, the central bank and deposit money banks dominated the Indonesian financial system. Table 2.1 shows that Bank Indonesia held 43 per cent of total assets of the financial system in 1982. The deposit money banks held another 49 per cent with state banks dominating this group. The rest of the total gross assets—about 8 per cent— were held by the NBFIs and the other financial institutions.

Table 2.1 Number of financial institutions and their assets,
December 1982

Types of financial institution	Number	Assets (Rp bn)	Share of assets (%)
Central bank	1	13,700	43.00
Deposit money banks:	119	15,922	49.00
State owned	5	11,529	36.00
Private domestic	75	1,885	6.00
Foreign/Joint venture	11	1,172	3.00
Development	28	1,336	4.00
Savings banks	1	451	1.50
Rural financial institutions	5807	86	0.30
Money changers	..	..	..
Pawnshops	1	80	0.20
State security and investment companies	1	149	0.50
NBFIs	13	805	2.00
Other financial institutions:	206	979	3.00
Insurance	91	578	1.80
Leasing	17	114	0.30
Pension funds	79	278	0.90
Others	39	..	..
Total	6149	32,179	100

Source: Bank Indonesia, *Indonesian Financial Statistics*, various issues, Jakarta.

Instruments of monetary control. Indonesian monetary policies were characterised by direct controls, namely interest rate ceilings, domestic credit controls, direct credit schemes and high reserve requirements.

Interest rate ceilings. Interest rate restrictions took the form of ceilings on deposit and loan rates of the state banks. Private commercial banks and foreign banks were not included in these restrictions. A regulation issued in 1967, however, required that all public sector entities deposit only with state banks, providing a very large captive market for those banks because of the dominant role of the public sector in the economy (Nasution 1989, 1991). The explicit and implicit guarantee by the government for savings, time, and demand deposits, as well as loan returns, on state banks, and the absence of deposit insurance for the other financial institutions, contributed to the monopoly position of state banks.

Table 2.2 M1 and M2 to GDP ratios,
1968-82 (per cent)

Year	M1/GDP (a)	M2/GDP (b)
1968	5.44	6.01
1969	6.77	8.61
1970	7.75	10.22
1971	7.33	10.72
1972	8.90	13.02
1973	8.90	13.12
1974	7.84	12.15
1975	8.97	14.19
1976	9.48	15.56
1977	10.26	15.30
1978	10.26	15.71
1979	9.72	14.99
1980	10.21	15.72
1981	11.16	16.71
1982	11.40	17.73

Notes: (a) M1= currency +
demand deposits
(b) M2= M1 + time and
saving deposits

Source: Bank Indonesia, *Indonesian Financial
Statistics*, various issues, Jakarta.

The purpose of the regulations was to provide low-cost funds to encourage investment, particularly for priority sectors such as small scale firms and export oriented activities, and to guard against increases in interest rates that were viewed as socially or politically unacceptable.

As can be seen from Table 2.2, money supply—indicated by the ratio of narrow money (M1) to GDP—rose from 5 per cent in 1968 to 9 per cent in 1972 and 11 per cent in 1982. This rise was associated with a relatively high average inflation rate between 1972 and 1982 of 17.64 per cent. Consequently real rupiah interest rates on both deposits and loans of the state banks were consistently negative (Table 2.3). The average nominal deposit rate of interest between 1972 and 1982 was 9.27 per cent, while the average nominal lending rate of interest from 1976 to 1982 was 9 per cent.

Credit ceilings. Private Indonesian and foreign branch banks in Indonesia were subject to ceilings on the level or growth of bank credit. The credit ceilings were

implemented in April 1974 to control the monetisation of windfall "petroleum money" resulting from the petroleum boom of 1974 to 1982. Petroleum revenues received by Pertamina—the monopoly government-owned petroleum company—were placed in state banks, mostly in the form of savings and time deposits. The state banks acted as providers of funds in interbank money markets. By imposing credit ceilings on private banks, the increase in the money supply (M1) resulting from petroleum income was controlled. Credit ceilings were used as instruments of monetary policy. They proved effective in controlling domestic credit.

Table 2.3 Deposit and lending rates of interest of state banks, 1972-82 (per cent)

Year	Nominal deposit rate (a)	Nominal lending rate (b)	Inflation rate	Real deposit rate	Real lending rate
1972	15.00	14.30	6.40	8.10	7.40
1973	12.00	14.30	31.00	-14.50	-12.70
1974	12.00	14.30	40.60	-20.30	-18.70
1975	12.00	14.30	19.10	-6.00	-4.00
1976	12.00	14.30	19.80	-6.50	-4.60
1977	9.00	14.30	11.00	-1.80	3.00
1978	7.50	12.00	8.10	-0.60	3.60
1979	6.80	12.00	18.30	-9.70	-5.30
1980	7.70	12.00	18.00	-8.70	-5.10
1981	8.40	12.00	12.20	-3.40	-0.20
1982	7.90	12.00	9.50	-1.50	2.30

Notes: (a) average of 3, 6 and 12 month maturities

(b) average of working capital and investment loan rates

Source: Bank Indonesia, primary data.

Directed credit schemes. Directed credit schemes included direct central bank lending to priority sectors (usually state enterprises) and preferential Bank Indonesia refinancing facilities or liquidity credits. In 1983 these credits accounted for more than 34 per cent of total credits in banking. In December 1982, about 40 per cent of the state banks credits were in forms of subsidised and small credits (MacIntyre 1991). The state banks held over 72 per cent of total deposit money banks' assets in 1982.

These credits were inflationary since they increased the money base. Liquidity credits often went to inefficient investments with low rates of return which burdened banks with large non performing loans (Tseng and Corker 1990). It was fortunate, in a sense, that there was imperfect compliance under this scheme so that the credit was not actually used for the intended sectors. Therefore, the effectiveness of directed credit programs, through not providing adequate credit to the so called priority sector, may actually have been more efficient than appeared to be the case.

Reserve Requirements. Reserve requirements set by the central bank were 15 per cent of the so called "third party liabilities of banks". In calculating "third party liabilities", state banks had to count only one third of time deposits, while private banks had to count 100 per cent of time deposits. In the late 1970s and early 1980s time deposits accounted for about 55 per cent of total deposits in banking. Thus the effective reserve requirement was between 6 per cent and 8 per cent for most banks. There was no interest paid on reserves. This served as an implicit tax on commercial banks that increased the cost of financial intermediation.

Development of financial markets. Besides direct controls of the banking sector, the financial system was also characterised by segmented financial markets and underdeveloped money and capital markets.

Segmented financial markets. There was a high degree of segmentation in the financial system. Each type of financial institution was restricted to conduct business within its explicitly prescribed sphere. The activities of the limited number of foreign banks' were restricted. They were not allowed to open branches outside Jakarta. Entry of new institutions into particular market segments was prohibited from 1971. These restrictions were allegedly adopted to maintain confidence in the stability of the financial system. The provision of credit to 'priority' sectors and to promote the development of domestic financial institutions were also cited as reasons.

Underdeveloped capital and money markets. Before deregulation, money and capital markets played a very small role in intermediating funds between savers and borrowers. Offshore foreign exchange markets provided much of the liquidity needed by the Indonesian private sector and banks. Indonesian banks had close relationships with

offshore banks. They cooperated to arrange loans, deposits, and other activities for fees. These activities were 'off-balance sheet' for domestic banks (Cole and Slade 1990b). Interbank loan markets, which were set up to allow banks to manage their short-term liquidity had a very high overnight rate during this period.

2.2. Impacts of direct monetary controls on the financial sector

A repressed financial system is thought to lead to inefficient allocation of investible funds, inefficient investment, and hence low economic growth. Shaw (1973) and McKinnon (1973) were the first to identify the relationship between financial sector and economic growth in developing countries by emphasising the functions of the financial system as financial intermediaries between savers and investors. Gurley and Shaw (1960) and Goldsmith (1969) suggested that as real income and wealth increase, the size and the complexity of the financial superstructure grow. They did not, however, specify how the financial sector affects the real sector.

Shaw and McKinnon argued that if interest rates were administratively fixed below their equilibrium level, financial intermediation would not be optimal and the allocation of investible funds not efficient. A low level of interest rates would reduce incentives to save in financial form and raise the real costs of loanable funds to investors. The negative impact of administered interest rates on financial intermediation would take the form of increasing information costs to savers and investors, reducing operational efficiency and increasing risks. Overall, a less efficient allocation of investible funds, resulting in sub-optimal investments, would reduce economic growth.

Credit ceilings caused financial disintermediation as savers and investors sought alternative outlets outside the financial system. This stimulated unregulated 'curb' or 'informal' financial markets that had to charge interest rates above the levels that market interest rates might have been. Because of the lack of prudential and other government support their costs were high.

The negative real domestic interest rate, together with generally positive real dollar interest rates paid abroad and in Indonesia after 1979, and the open foreign

exchange system, encouraged the movement of both short-term and longer-term funds abroad. Some of the movement could be considered as capital flight. Suwidjana (1984) showed that the foreign exchange assets and the net foreign asset positions of the deposit money banks grew rapidly, especially after 1978, when a sharp devaluation took place because of the appreciation of the real effective exchange rate.

Real growth and financial growth were not highly correlated because of capital flight (Cole and Slade 1990b). After a spurt of financial growth (1968 to 1972) the financial sector languished during the petroleum boom of the 70s. One interpretation is that increases in domestic savings during the boom period were siphoned offshore in the form of overseas deposits. A second financial boom began with financial deregulation.

Domestic credit ceilings limited the banks' abilities to mobilise deposits, and inhibited growth and competition, as well as contributing to financial disintermediation. The offshore markets hence became the main sources of funds. They were used firstly to place excess domestic liquidity abroad, and then to accommodate customers whose borrowing needs could not be met domestically.

The size and growth of the financial sector can be measured by the ratio of financial assets to GDP. There was a significant change of the deposit money banks' net assets during the period 1969 to 1982. In 1969 these banks' net assets were about half of the total assets of Bank Indonesia, but by 1972 they were about 25 per cent greater than that of Bank Indonesia. By 1982 they were again less than the total assets of Bank Indonesia.

The rapid growth of the deposit money banks' assets from 1969 to 1972 was due to government increases in nominal interest rate ceilings on bank time deposits. The government partially offset the interest rates increase by subsidising banks. In 1972, the ceiling on nominal deposit rates of interest was reduced from 21 per cent to 15 per cent. In 1982 it was further reduced to 6 per cent. As a result, the growth of the banks' assets slowed during the period 1972 to 1982. This demonstrated that the assets of deposit money banks were very sensitive to interest rate changes.

Another way of looking at financial growth is through the ratio of broad money (M2) to GDP as shown in Table 2.2 (page 8 above) The ratio of M2 to GDP rose by 116

per cent from 1968 to 1972 when interest rates were high. But as interest rates fell in the following ten years from 1972, the ratio of M2 to GDP rose from 13 per cent to 18 per cent in 1982—a rate of increase of only 36 per cent in the ten years. The quasi money to GDP ratio(not shown in the table) rose from 0.5 per cent in 1968 to 4 per cent in 1972 and 6 per cent in 1982. The quasi money to GDP ratios were very low compared to 50 per cent in Thailand, 80 per cent in Singapore and 90 per cent in Malaysia in 1985. In all three countries the ratio of M2 to GDP ratio was over 60 per cent in 1985 (*International Financial Statistics Yearbook*, IMF). These numbers indicate that interest rate controls and credit ceilings led to financial disintermediation which was reflected in the slow growth of financial assets. The prohibition on entry of new banks discouraged competition among financial institutions and further reduced the effectiveness of savings mobilisation.

The Shaw (1973) and McKinnon (1973) hypothesis that a financially repressed economy lowers the incentive to saving in financial assets has been widely demonstrated to hold true empirically (Balassa 1989a, 1989b; World Bank, 1989). It also appears to be supported by the Indonesian experience.

2.3. Financial deregulation: 1983 to 1993

In Indonesia, as in other countries, economic difficulties from early 1982 provided the catalyst for financial deregulation. High public revenues from the petroleum boom were used to fuel high economic growth in the 1970s. At the beginning of 1982 the government could no longer rely on petroleum revenues or foreign lenders to balance its budget. Earnings from petroleum and gas, almost US\$19 billion in 1981/82, dropped to US\$14.7 billion in 1982/83, and fell further to US\$6.9 billion in 1986/87 (Bank Indonesia, *Annual Report*). Real economic growth fell from an annual average of 7.5 per cent in 1973–81 to 2.2 per cent in 1982. It became widely recognised that rigid financial controls and restrictions reduced mobilisation of savings and hence held back growth.

Before financial deregulation in June 1983, several steps were taken to stabilise the economy. To bring the fiscal budget under control, the government scaled down

budgetary commitments sharply for large investment projects. A large devaluation of the rupiah (by 38 per cent) at the end of March 1983 followed. Bank Indonesia reduced its swap margin from 2 per cent to 0.25 per cent in February 1983 to attract more foreign investments. The swap margin is the premium charged by Bank Indonesia for a (re)swap arrangement between itself and a commercial bank for a swap contract between the commercial bank and borrowers of foreign exchange abroad.¹ Liberal economists within the government finally obtained the political power to push ahead with a general reform program of which financial reforms were an important component.

With stabilisation policies in place, a major financial deregulation package was announced. The June 1983 deregulation was basically aimed at assisting market mechanisms in banking to work. Interest rates on both deposits and lending were freed, thereby allowing savings to be more effectively mobilised. Combined with deregulation in real sector, this would allow financial resources to be efficiently allocated. Since it was believed that the efficiency in the allocation of financial resources depended also on the structure of the banking industry, a major institutional deregulation followed in October 1988. To increase competition in banking activities, new banks were allowed to enter the market and requirements on branching and foreign activities were simplified.

Deregulation of the credit system was introduced in January 1990. Bank Indonesia liquidity credits were restricted to only cooperatives and food procurements. Credit activities of banking, however, were not completely free from government regulation. The government considered that intervention in the credit market was needed in promoting equity. This was done by directing banks to provide a minimum of 20 per cent of their loans to small-scale enterprises. The 1990 deregulation was followed by another package in February 1991 which mainly consisted of guidelines for a prudent banking system. The legal framework for the operations of Indonesian banking was introduced in the 1992 Banking Act.²

¹ The swap mechanism is discussed in greater detail later in the Chapter, see pages 19–20.

² A chronology of financial deregulation measures is presented in Appendix 2.A. Parallel reforms in fiscal, trade, and exchange rate policies in the period 1983–90 were crucial to boosting economic activity (Appendix 2.B).

The financial deregulation measures were thus aimed at enhancing competition through a greater reliance on market forces, thus promoting the growth and deepening of financial markets, encouraging the domestic financial market to become more integrated with international financial centres and decreasing the segmentation in the financial sector. It was judged that a competitive financial system would improve efficiency, encourage domestic saving mobilisation, reduce the cost of intermediation, and increase the efficiency of allocation of financial resources in the economy.

Deregulation of interest rates (1983). The removal of interest rate restrictions was intended to generate attractive interest rates in the state banks so that they could mobilise deposits, and hence, reduce the dependency of these banks on 'liquidity credits' (refinancing of cheap loans) by the Bank Indonesia.

It has been widely argued that reducing interest rate restrictions was necessary to help the economy to improve efficiency in the use of financial resources. It was hence growth promoting. Balassa (1989b) reviewed empirical evidence on the effects of interest rates on savings, including that presented by Fry and Mason (1982), Giovannini (1985), Leite and Makonnen (1986) and Khatkhate (1988). He found that the effects of changes in interest rates on savings in a two-period model were determined by the relative strengths of substitution and income effects. Higher interest rates encourage savings because of the substitution effect, but higher interest rates also mean higher incomes, and hence higher consumption via the income effect.

The empirical evidence suggests that positive real interest rates favour financial over non-financial savings, leading to the deepening of financial markets. Greater financial intermediation tends to ensure that the more productive investments are financed. Positive real interest rates contribute to economic growth by promoting financial deepening and improving the productivity of investment (Calvo and Vegh 1990; Sundararajan and Molho 1988).

Private banks were more competitive in lending than in mobilising funds relative to state banks. In the absence of deposit insurance and the explicit and implicit guarantee by the government for savings, demand, and time deposits of the state banks, state banks were considered safer than the private banks, but they offered lower interest rates. The

extensive branch network of the state banks also contributed to their competitive edge. On the other hand, the more complicated and slower lending procedures of state banks compared to those of private banks made the private banks more attractive to private borrowers even at higher nominal interest rates than those charged by the state banks.

Deregulation of credit ceilings (1983) and directed credit schemes (1983 and 1990). Direct credit controls on bank lending were eliminated in 1983. Most directed sectoral credits were discontinued. Selective credit ceilings were removed. Preferential Bank Indonesia rediscounting, in the form of liquidity credits to banks that lent to priority sectors, was partly continued, but a large proportion of credits outstanding at the end of March 1983 became ineligible for renewal. The elimination of credit ceilings was aimed at increasing the banks' ability to mobilise deposits, promote growth and competition, and contribute to financial intermediation.

The reduction of subsidised credit was intended to decrease the segmentation of the credit market. The loan markets, however, remained distorted. As late as January 1990 credit policy required that domestic banks allocate a minimum of 20 per cent of their credits to small firms and cooperatives. Foreign banks had to assign 50 per cent of their lending for export-oriented activities. The continuation of such credit direction prevented banks from maximising profits as well as undermining efforts to allocate capital efficiently in the economy.

In May 1993 several new regulations sought to reduce these distortions. Penalties for banks that could not meet their allocated target were softened. Bank Indonesia permitted banks not to meet their targeted allocations of credits to small firms. They could buy other banks' small scale loan promissory notes. This meant that banks that did not have experience in lending to small firms could pass such lending to other banks that did have this experience.

To enhance the development of small scale firms, the maximum subsidised loans to small firms were increased from Rp 200 million to Rp 250 million. The government also implemented new regulations to develop the small business sector by allocating one

to five per cent of state enterprises' profits to that sector, channelled through the banking system.

Relaxation of regulations on market entry and permissible business activities (October 1988). Restrictions on entry were relaxed to enhance efficiency in the banking sector by increasing competition. Restrictions on the activities of foreign banks were relaxed. New foreign banks were allowed to create joint ventures with domestic banks, with a maximum share of 85 per cent foreign ownership. Existing foreign banks were allowed to open branches in five large cities (Medan, Bandung, Semarang, Surabaya, and Ujung Pandang) as well as Jakarta (to which they had previously been restricted). Joint-venture banks could in addition have branches in Denpasar.

During the period 1968–87, each state bank formally had to specialise in specific economic sectors. After 1987 they were allowed to diversify their assets and incomes by expanding operations to different sectors and to undertake activities to reduce the risks of their asset portfolios and lessen the segmentation of financial markets. However, privatisation of the state banks, was not, and is not, under consideration.

The scope of permissible business activities for different types of financial institutions was increased. Commercial banks were allowed to conduct capital participation activities in banks or other financial enterprises, such as venture capital and security companies. To reduce the dominance of state banks in the financial sector, in 1988 the state enterprises were allowed to place up to 50 per cent of their deposits in non-government-owned financial institutions with a maximum of 20 per cent in any one institution. Cole and Slade (1990b) argued that because state banks were the main financiers of speculative activities, this policy would also tend to reduce speculation against the rupiah. The government also implicitly guaranteed private bank deposits by always rescuing troubled banks.

Deregulation of reserve requirement ratios and legal lending limits (1988). Reserve requirements were reduced from 15 per cent to 2 per cent on all third party

liabilities (deposits) for all banks in 1988. This reduction was intended to bring down the cost of financial intermediation (since reserves earned no interest) and to increase the effectiveness of monetary control. At the same time, however, all banks had to buy 'certificate Bank Indonesia' (SBIs) up to an amount of 80 per cent of their increased funds. SBI is a short-term discount bill issued by Bank Indonesia, ranging from 7 to 180 days. The banks had to buy the so called *Pakto* (October package) SBIs. The maturity of these SBIs was between 3 and 6 months.

The commercial banks considered that the 13 per cent reduction in legally required reserves was excessive. As a result, banks were not able to reduce their cash balance with Bank Indonesia below 6 per cent inspite of the legally required minimum of 2 per cent. Cole and Slade (1990) reported that the level of actual reserves of the banks declined from Rp3,129 billion to Rp1,957 billion between the end of October and the end of November 1988. But the banks were required to buy Rp1,904 billion of SBIs, or Rp732 billion more than the reduction in their actual reserves. Thus the forced purchase of SBIs initially put a severe squeeze on the liquidity position of the commercial banks. Interbank loan interest rates rose rapidly as a result. This tendency disappeared quickly as most banks managed to meet their legal reserve requirement by increasing their efficiency and by borrowing abroad.

To prevent the concentration of loans to a few groups of borrowers, maximum legal lending limits were imposed on banks and non bank financial institutions in 1988. The maximum lending to a single borrower was set at 20 per cent of the banks' capital. To a group of borrowers it was 50 per cent. In May 1993, the maximum lending to a group of borrowers was reduced to 20 per cent of the banks' capital. Old loans that embodied old regulation were to be reduced to 35 per cent by the end of 1995 and to 20 per cent by March 1997.

Introduction of money-market instruments as indirect measures of monetary controls. Bank Indonesia introduced several instruments to control the

monetary aggregates indirectly. The instruments are the certificate Bank Indonesia (SBI), the private sector commercial paper (SBPU), and the reswap facility.

The certificate Bank Indonesia (SBI). The SBI is a liability of Bank Indonesia. Bank Indonesia used this instrument to reduce or increase liquidity through selling or rebuying. The SBIs were introduced in 1970 but discontinued in 1971 since there was little market interest in them. In February 1984 SBIs were re-introduced when Bank Indonesia was looking for a new instrument to control the supply of reserve money in banking. SBIs were sold directly to banks or through market dealers. A secondary market for SBIs and rebuying of SBIs by Bank Indonesia was introduced in 1989.

The *Surat Berharga Pasar Uang* (SBPU). SBPU is a short-term bill in the form of a promissory note or trade bill cosigned by a bank or NBFIs that could be rediscounted at Bank Indonesia either directly or through an appointed agent. It was introduced in February 1985 as a potential instrument for providing liquidity to the banking system through a secondary market. The rebuying of SBPUs was not introduced until 1989.

The rediscount rate of SBPUs is determined in auctions and is dependent on how many of these bills are offered by banks (and/or non-bank financial institutions), how much liquidity Bank Indonesia wishes to provide and what return it is willing to accept. Reserve money is thus influenced through this mechanism. Rediscount rates on SBPUs are usually above those of SBIs.

The foreign exchange swap facility. This facility was introduced by Bank Indonesia in 1979 to eliminate foreign exchange risk for foreign investors, while at the same time, providing rupiah liquidity. Indonesian residents borrowing foreign exchange abroad would arrange a swap contract with an onshore bank and have the right to exchange the rupiah in the future at the current spot exchange rate. The onshore bank could then arrange a swap with Bank Indonesia. By entering into such an arrangement, Bank Indonesia stood ready to take over the risk of the swap. Bank Indonesia would buy foreign currencies from the commercial bank at the current spot exchange rate and agree to sell the same amount of foreign currencies back to the commercial bank at a specified

future date at the current spot rate. Bank Indonesia would charge the bank a swap margin for the arrangement. The swap margin was set by Bank Indonesia based on the difference between the average rupiah deposit rate in Indonesian banks and dollar deposit rate in international banks in Singapore.

The swap mechanism was one-way, that is, it guaranteed a future exit rupiah per dollar rate for dollars entering Indonesia but not a future re-entry rate for rupiahs leaving Indonesia. The one-way mechanism induced capital inflows whenever the domestic interest rate was higher than the international (dollar) interest rate plus the swap margin (Woo and Hirayama 1994). Initially the swap margin was set at 2.5 per cent per annum, with the maturity of the swaps ranging from 30 to 180 days. The increasing domestic interest rate after the first financial deregulation in 1983 made Bank Indonesia raise the margin to 4.5 per cent in March 1983, to 8 per cent in October 1986, and to 9 per cent in 1987 in order to discourage capital inflows.

The interbank loan market is based on SBPUs, SBIs, and promissory notes. The Jakarta Clearing System is the interbank call money market organised by Bank Indonesia in 1974. Before 1988 Bank Indonesia adjusted the level of interbank borrowing by lowering and raising the ceilings of third party liabilities that could be obtained from interbank transactions. In October 1988 these ceilings were removed.

Despite the introduction of new money market instruments in 1984, the money market grew slowly until 1989. A sharp drop in world petroleum prices led to an acceleration in the rate of depreciation of the Rupiah by Bank Indonesia in 1984. A further devaluation followed in 1986. From 1984 through 1986, there was a consistent net outflow of foreign exchange from Bank Indonesia, while commercial banks built up their foreign exchange holdings (Cole and Slade 1990). The money market therefore grew slowly.

Speculation against the rupiah continued until 1987 when the government contracted reserve money and set out to create stable expectations. The main aim of the contraction was to reduce the liquidity of the state banks which funded speculation

against the rupiah. The major instrument for stabilising expectation was the rate of depreciation of the rupiah against US dollar, set by the Bank Indonesia (Cole and Slade 1990b). The October 1988 deregulation package activated the domestic money market. The growth of the money market was pushed further by the 1989 deregulation that removed ceilings on offshore borrowing by banks and replaced them by a limit on the net foreign exchange position of foreign exchange banks (banks that engage in foreign exchange transactions) at 25 per cent of their total capital. Ceilings on offshore borrowing by banks, however, were reimposed in October 1991.

Capital Adequacy Ratio (1991). The policy package of February 1991 included regulation on capital adequacy which provided guidelines for bank supervision. They aimed to prevent banks from taking excessive risks and to increase bank safety. Before 1991 capital adequacy was based on a capital adequacy ratio based on the quality of assets and capital availability. Off balance sheet items were not included in calculating capital adequacy.

In February 1991 Indonesia adopted capital adequacy standards set by the Bank for International Settlements, of 8 per cent of the risk-weighted assets. Banks were allowed to meet this requirement in steps: 5 per cent by the end of March 1992, 7 per cent by the end of March 1993, and 8 per cent by the end of December 1993. Capital was defined as the sum of paid-in capital, general and specific reserves and retained earnings, and sub-ordinated and two step loans. Sub-ordinated and two step loans were government guaranteed foreign borrowings, mainly channelled through state banks (Nasution 1992a). In February 1991 only 50 per cent of retained earnings were counted as capital. To ease the banks' burdens, in May 1993 Bank Indonesia increased the percentage of retained earnings that could be counted as capital to 100 per cent. Risk-weighted loans to state enterprises and unused credit facilities were reduced from 100 per cent to 50 per cent of weighting.

In February 1991 and October 1992 regulations regarding the opening of new bank branches as well as bank ownership were tightened. Banks had to have sound

performance and adequate capital for 12 months before opening new branches. Family ties, including husbands, wives, parents-in-law and daughters and sons-in-law were not to be in the majority of a bank board and among commissioners of banks. Foreigners were permitted to buy domestic private banks' shares up to 49 per cent of total shares.

2.4. The changes in banking

Restructuring the banking sector to create a competitive environment produced impressive results.³ The number of private domestic and foreign/joint-venture banks rose dramatically within five years from December 1988. In December 1993 there were 232 banks with some 4,500 branches (Table 2.4). This is a high number compared with 39 banks in Malaysia, 25 in the Philippines, and 15 in Thailand (though these economies are admittedly smaller). It is also high compared to bank numbers in large advanced countries with branch banking system. The relatively large number of banks plus non bank financial institutions led to intense competition to attract depositors and borrowers. The growth of banking accompanied a rapid expansion of private sector investment and (non-petroleum) exports, which were the driving forces behind rapid growth during the period 1987–90. Non-petroleum exports grew by 23.9 per cent a year and private sector investment grew by 22.4 per cent a year (Appendix 2C).

The banking sector was highly fragmented in terms of size (many banks established after 1988 were very small). They offered widely differing interest rates. However, between 1988 and the end of 1992 there were no bank mergers. As will be seen in Chapter 3, only recently, when banks faced solvency difficulties, did merger moves begin. But it was too late. Solvency problems hindered the merger process.

³Data on non-bank financial institutions (NBFIs) is limited, so analysis has to focus on the banking sector and, in particular, on commercial banks as distinct from people's credit banks. Banks (including Bank Indonesia) hold over 90 per cent of the gross assets of the financial sector. The 1992 banking law requires NBFIs to operate like commercial banks. In fact, several NBFIs have changed into commercial banks. The shallowness of the capital market made it impossible for them to survive in the newly competitive conditions following deregulation (Nasution 1992a). The discussion of banks thus covers most of the financial sector.

Table 2.4 Number and assets of deposit money banks and central bank, selected years

	1988	1993	1982	(Apr)1994	1982	1994
Types of Banks	Number		Total assets (Rp trillion)		Share of assets (%)	
Central Bank	1	1	13.71	62.44	46.2	21.9
Deposit money banks:	108	232	15.92	223.33	53.8	78.1
State	5	5	11.53	88.99	38.9	31.1
Private domestic	63	158	1.88	93.62	6.5	32.8
Foreign/joint venture	11	39	1.17	18.33	3.9	6.4
Development	29	29	1.34	18.82	4.5	6.6
State saving (a)	1	1		3.57		1.2
Total	109	233	29.62	285.77	100	100
Total bank branches	1874	4522				

Note: (a) State saving bank was not included in deposit money banks before May 1989.

Sources: Bank Indonesia, *Indonesian Financial Statistics*, various issues, Jakarta.

The restructuring of banking was reflected in a shifting composition of bank assets. As shown in Table 2.4, the central bank's share of total bank assets declined continuously, falling from 46 per cent of total assets of the banking sector in December 1982 to 22 per cent in April 1994. The deposit money banks' asset share rose from nearly 54 per cent to almost 78 per cent. The asset share of state commercial banks decreased less rapidly from nearly 39 per cent to 30 per cent of total assets of the banking sector in the same period.

Among deposit money banks (excluding Bank Indonesia), the state banks' asset share decreased from 72 per cent in 1982 to 40 per cent in 1994, while those of private commercial banks increased from 12 per cent to 42 per cent. This shift of asset shares resulted from a combination of the reduction of preferential credits, the elimination of credit ceilings, and the rapid expansion in the number of commercial banks and their branches. It was believed that liquidity credits from Bank Indonesia accounted for a large percentage of the total credits of the state banks before 1983. The rapid expansion of private banks which offered higher deposit interest rates than the state banks, made the state banks less attractive for depositors. Together with the reductions of liquidity credits in 1983 and 1990, and the elimination of credit ceilings, this led to lower growth of assets of the state banks. The dominance of the state commercial banks was ended.

Table 2.5 Average annual growth of time and saving deposits by groups of banks, selected years (per cent)

	1988-90	1990-93	1988-93
Saving deposits			
State banks	59	56	57
Private Banks	315	54	158
Development Banks	83	63	71
Foreign/joint venture	120	30	42
Total	114	55	78
Time deposits			
State banks	36	8	19
Private banks	65	15	35
Development banks	41	27	33
Foreign/joint venture	57	8	28
Total	48	11	26

Source: Bank Indonesia, primary data.

The assets share of foreign/joint-venture banks increased only slightly from 7 per cent in 1982 to 8 per cent in April 1994 because regulations still limit their opening of branch offices and other activities. These regulations persist because it is feared that foreign banks would otherwise take too great a domestic market share. These banks are also not permitted to compete with domestic banks in the retail/middle level to mobilise savings.

Rising interest rates led to rapid mobilisation of funds. Indonesian domestic savings during the period 1968–88 were positively correlated to real deposit interest rates (Nasution 1992a). Several new savings products offered by private commercial banks after 1988 proved very attractive. Private commercial banks took the lead from the state banks in attracting saving deposits. In the five and a half years to May 1994 commercial banks' saving deposits share increased from 19 per cent to 51 per cent of the total for the banking sector, while that of the state banks decreased from 77 per cent to 45 per cent (Table 2.8). Between 1988 and May 1994 private banks saving deposits grew very rapidly, leaving other banks far behind (Table 2.5).

The high interest rates on deposits of private commercial banks changed the share of time deposits in the banking sector. Table 2.8 indicates that the state banks

experienced a decrease in the share of time deposits from 58 per cent in December 1988 to 42 per cent in May 1994, while the share for private commercial banks increased from 34 to 50. The time deposits of private banks grew most rapidly (Table 2.5).

Table 2.6 Monetary indicators, 1982-93

Year	M1 (Rp trill.)	M2 (Rp trill.)	M1/GDP (%)	M2/GDP (%)
1982	7.12	11.07	11.40	17.73
1983	7.57	14.66	9.74	18.88
1984	8.58	17.94	9.56	19.99
1985	10.10	23.15	10.43	23.91
1986	11.68	27.66	11.39	23.97
1987	12.68	33.88	10.19	27.21
1988	14.39	41.99	10.32	30.12
1989	20.11	58.70	11.85	35.37
1990	23.82	84.63	12.04	42.80
1991	26.34	99.06	11.59	43.60
1992	28.78	119.05	11.22	46.41
1993	37.04	145.60	..	..

Sources: Bank Indonesia, *Indonesian Financial Statistics*, various issues, Jakarta; International Monetary Fund, *International Financial Statistics Yearbook*, various issues, Washington, DC.

The commercial banks' expansion also resulted in financial deepening. M2/GDP increased significantly, from 18 per cent in December 1982 to 30 per cent in December 1988 and to 43 per cent in December 1990. M2 increased by more than 28 per cent annually from December 1988 to December 1993 (Table 2.6).

Loans outstanding grew most rapidly during the period 1988-90. Outstanding loans of private and foreign/joint-venture banks grew annually by more than double those of state banks (Table 2.7). The share of credit outstanding of the state banks fell by 40 per cent from 1982 to 1994. The share of credit outstanding of private commercial banks increased by 266 per cent during the same period (Table 2.8).

Table 2.7 Average annual growth of credit outstanding by groups of banks, selected years (per cent)

	1982-88	1988-90	1990-93	1982-93
State banks	24	37	10	21
Private banks	44	81	21	45
Development banks	22	39	16	24
Foreign/joint venture	20	81	24	32
Sub total	27	51	15	28
BI direct credits (a)	-3	-26	-13	-10
Liquidity credits	25	2	-2	13
Total	23	39	13	23

Note: (a) BI is Bank Indonesia.

Source: Bank Indonesia, primary data.

Table 2.8 Share of saving and time deposits and share of outstanding credits by groups of banks, selected years (per cent)

	State banks	Private banks	Development banks	Foreign banks
Saving deposits				
1988	77	19	4	0
1994	45	51	4	0
Time deposits				
1988	58	34	1	7
1994	42	50	1	7
Outstanding credits				
1982	77	12	4	7
1994	46	44	2	8

Source: Bank Indonesia, Primary data.

2.5 Conclusion

This chapter shows that, as expected, under implicit and explicit guarantees on bank deposits as well as loans for both state and private banks, financial deregulation led to banking expansion in terms of numbers of banks, assets and liabilities. In addition to increasing savings and investment as suggested by Shaw (1973) and McKinnon (1973), the main objective of financial deregulation was also to achieve an efficient capital

allocation in the economy as first hinted by Goldsmith (1969). In fact, many studies have supported the argument that the main channel of transmission from financial development to growth is the efficiency of investment, rather than its volume (Diaz-Allejandro 1985; Bencivenga and Smith 1990; Lee 1991; Levine 1992; de Gregorio and Guidotti 1992).

Hence, financial deregulation must be aimed at not only increasing the quantity of investible funds, but also improving the quality of bank assets and liabilities. To have an optimal impact on growth, financial deregulation should be done under prudential supervision. Financial intermediation and growth may have a negative correlation resulting from financial deregulation in a poor regulatory environment (de Gregorio and Guidotti 1992). In the presence of deposit insurance by the government, financial deregulation without prudential supervision may lead to moral hazard problems in banking. For example, banks undertake very risky lending at unnaturally high real loan rates of interest. In Indonesia, banking supervision was not introduced until 1989, six years after the first major financial deregulation. There were also explicit and implicit guarantees on bank deposits by the government. The next chapter discusses the effects of financial deregulation under explicit and implicit guarantees on banks deposits as well as loan returns in a poor supervisory environment.

Chapter 3

Current difficulties in Indonesian banking

Introduction

Banking grew rapidly, especially since deregulation began in 1983 until mid-1990. The series of deregulation packages, aimed at reducing government intervention and enhancing market forces, markedly improved competitiveness in banking and led to financial deepening. The growth of banking accompanied a rapid expansion of private sector investment, consumption expenditures, and (non-petroleum) exports, which were the driving forces behind rapid growth during the period 1987–90. During this period, private sector investment grew by 22.4 per cent annually, while consumption expenditure and non-petroleum exports grew annually by 13.5 and 23.9 per cent respectively. Reforms in fiscal, trade, and exchange rate policies, initiated in the period 1983–90, had been crucial in boosting economic activity.

While there were clear benefits from financial deregulation for economic activity, the extremely rapid expansion of banking—in terms of the number of banks, assets and liabilities—was not costless. The less beneficial effects of deregulation began to be felt in mid-1990 to the present.

This chapter examines current difficulties in the banking sector and identifies the factors most responsible. The main emphasis is on the post-banking boom or the consolidation phase, from mid-1990 to the present time. It emphasises the incidence of high real interest rates following financial deregulation in 1983, after a period of negative real interest rates before deregulation. For the purposes of this chapter, interest rates are considered high if they are positive by three or more percentage points in real terms. Indonesia's real interest rates were relatively high compared with other countries as discussed in the next section. The purpose of this chapter is to define the issues which the theoretical model in Chapter 5 will explore.

3.1. Difficulties in the banking sector post-deregulation

Rapid expansion of the number of commercial banks and their branches from 1988 resulted in a highly competitive environment that stimulated deposits. Relatively high real interest rates continued after 1984. Table 3.1 indicates that from 1980 to 1983 the average real deposit rate of interest was 1.32 per cent. It jumped to 9.25 per cent between 1984 and 1993. Table 3.2 shows that from 1985 to 1993 the average real loan rate of interest was 11.9 per cent. The average real deposit rate between 1984 and 1990 was 9.24 per cent, and the average real loan rate was 12.4 per cent (1985 to 1990). These numbers are relatively high compared to Malaysia, Korea and Chile. The real deposit rates were also higher in Indonesia than in Thailand.

Table 3.1 Average real deposit rate of interest, selected countries (per cent)

Year	Indonesia	Malaysia	Thailand	Korea	Chile
1980	-4.20	-0.40	-6.40	-7.20	1.70
1981	1.80	..	-0.10	-4.20	17.70
1982	4.30	3.70	7.40	0.80	34.50
1983	3.40	4.20	8.90	4.40	0.50
1984	7.50	5.40	12.00	6.70	6.50
1985	11.50	8.40	10.30	7.40	1.00
1986	8.90	6.40	7.80	7.10	-0.40
1987	7.20	2.10	6.90	6.70	4.50
1988	9.40	..	5.40	2.70	0.40
1989	10.8	1.70	3.90	4.10	9.10
1990	9.4	3.20	6.00	1.30	11.30
1991	11.4	..	..	..	0.50
1992	12.7	..	..	..	..
1993	3.7	..	..	..	..

Note: the real interest rates were calculated by the following formula: $R_t = ((r_t - \Delta p/p) * 100)$, where R_t is per unit real rate of interest (for loans and deposits as used by Galbis 1993), r_t is per unit nominal rate of interest, and $\Delta p/p$ is per unit change in the consumer price index.

Sources: Bank Indonesia, *Monthly Report*, various issues, Jakarta; Galbis, V., 1993.

High Real Interest Rates Under Financial Liberalization: is there a problem?, Working Paper WP/93/7, IMF, Washington, DC.

High real interest rates may not be a problem if they reflect high real rates of return on investment. They can, however, be undesirable if they are the result of causes

such as high inflation, stabilisation effort that failed to be fully credible and 'moral hazard' resulting from explicit or implicit deposit insurance. Galbis (1993) examined 28 countries (both developed and developing) which experienced high real interest rates after financial deregulation. He claimed that the high real rates of interest were caused by inflation, less than credible stabilisation programs and moral hazard resulting from explicit and implicit deposit insurance. Galbis argued that financial deregulation also had many favourable effects such as increased competition in banking, but the negative results led to lower investment growth and corporate and financial distress. They also destabilised capital inflows and increased budget deficits and government debt. Before the aggressive behaviour of banks in lending and other businesses took effect in late 1991, banks had been run efficiently. This was reflected in the continuous decrease in margins (the difference between lending and deposit rates of interest) from 1986 to 1991, before they rose significantly in 1992 and 1993 (Table 3.1 and Table 3.2).

**Table 3.2 Average real lending rate of interest
selected countries (per cent)**

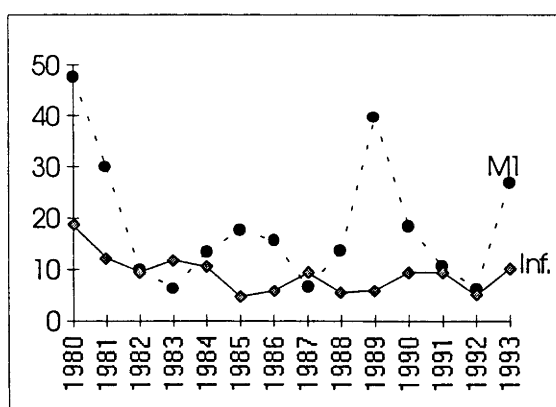
year	Indonesia	Malaysia	Thailand	Korea	Chile
1980	..	1.00	-1.40	-8.30	8.90
1981	..	-1.10	5.60	-3.30	27.00
1982	..	2.80	13.10	4.30	49.10
1983	..	7.10	13.40	6.40	12.20
1984	..	7.20	17.70	7.50	15.40
1985	15.40	11.20	16.20	7.40	7.70
1986	13.50	10.00	14.90	7.10	5.70
1987	10.20	7.30	12.20	6.70	10.80
1988	12.00	5.20	10.70	2.80	5.70
1989	13.20	4.10	9.20	5.30	16.10
1990	10.10	4.40	..	1.30	18.10
1991	11.60	..	..	..	5.60
1992	14.50	..	..	..	..
1993	6.40	..	..	..	..

Note: see Table 3.1 for real interest rate formula.

Sources: Bank Indonesia, *Monthly Report*, various issues, Jakarta; Galbis, V., 1993. *High Real Interest Rates Under Financial Liberalization: is there a problem?*, Working Paper WP/93/7, IMF, Washington, DC.

The government's success in curbing inflation from 1990 to 1991 exacerbated the high real interest rates¹. Money supply had grown significantly, especially in 1989. The growth of M1 increased from 13.5 per cent in 1988 to 39.8 per cent in 1989 but fell to 18.4 per cent in 1990 before it increased again to 28.9 per cent in 1993. Until 1990, the growth of M2, however, continued to rise from 23.9 per cent in 1988 to 39.8 per cent in 1989 and to 44.2 per cent in 1990, but fell to 22.3 per cent in 1993. The increase in the growth of money supply—both M1 and M2—in 1989, coupled with the rise of domestic petroleum prices and transportation costs in 1990, put pressure on domestic inflation in the first half of 1990 (Figure 3.1). The average rate of inflation during the 1980s and the early 1990s was around 9 per cent. The relatively high inflation rate pushed up nominal interest rates. The nominal deposit rate of interest from 1984 to 1993 averaged 19 per cent per annum, and the nominal lending rate of interest averaged 21 per cent. Both deposit and lending rates of interest experienced their peak levels in 1991 at 23 per cent and 27 per cent respectively as a result of a severe monetary contraction to curb the upward pressure on inflation. In 1993, these levels dropped to around 11 per cent and 18 per cent respectively.

Figure 3.1 **Rate of growth of money supply and inflation** (per cent)



Source: Bank Indonesia, *Annual Report*, various issues, Jakarta.

To reduce inflationary pressures, Bank Indonesia tightened domestic liquidity in the following ways: Bank Indonesia's liquidity credits were reduced; the maximum net

¹The expectation of sharp depreciations of exchange rate was also a significant component of the high interest rate in this year (Woo and Hirayama 1994).

open foreign exchange position, which was set at 25 per cent of bank capital in October 1989 when ceilings on offshore borrowing by banks were lifted, was reduced to 20 per cent in February 1991;² by October 1991, ceilings on offshore borrowing by banks were reimposed. Bank Indonesia's outstanding liquidity credits fell by more than 25 per cent (Rp 4,390 billion) from March 1990 to March 1991; Bank Indonesia raised the annual interest rate on SBIs from 11.33 per cent in March 1990 to 22 per cent in March 1991. Several large state-owned enterprises were instructed to convert their deposits with domestic banks into SBIs. As a result, Rp 8.1 trillion of state-owned enterprise deposits were converted into SBIs (Bank Indonesia, *Annual Report* 1990/91). Within a few days, however, Bank Indonesia purchased SBPU's of Rp 6.1 trillion.³ The net liquidity squeeze from contractionary non market operations in February 1991, therefore, amounted to Rp 2 trillion, or about 3.6 per cent of base money.

Monetary tightening brought a slow down in the expansion of banking between 1990 and 1993. Savings deposits grew by 55 per cent annually during this period compared to 114 per cent from 1988 to 1990. Time deposits' growth fell from more than 48 per cent to 11 per cent. The growth of total outstanding loans also declined from about 39 per cent to 13 per cent. In addition, the already high rates of interest were increased further. As pointed out earlier, average real loan rates of interest had not been less than 10 per cent since 1988 and rose to 16.5 per cent in June 1991. The high rates of interest caused many borrowers to default. The banking system ran into a 'vicious circle' of bad debt, that is, default loans (loans written off) and non-performing loans (loans on which no interest has been paid for three months or more) and high interest rates. Soedradjat Djiwandono—governor of the Bank Indonesia—announced that the amount of bad debt in banking in May 1993 was about Rp 3.66 billion or nearly three per cent of the total outstanding credits of banks. The amount of non performing loans was much larger than the amount of bad debts (*Kompas* 31 May 1993).

²In September 1994, the maximum net foreign exchange position was again increased to 25 per cent of bank capital.

³The conversion of state enterprise deposits into SBIs was primarily intended to reduce the ability of state banks to finance speculative activities. This was the reason for having the opposing actions by Bank Indonesia.

Furthermore, the expansion of the number of banks and their branches, especially of commercial banks, made it difficult for the central bank (Bank Indonesia) to put into operation an 'early warning system' to monitor banks and to spot problem areas before they became critical. Three small private banks collapsed at the end of 1990 and at the beginning of 1991, although ultimately no depositor suffered losses. The liquidation in December 1992 of Bank Summa, formerly one of the ten largest private banks, was a shock to the financial community. Almost 70 percent of its loan portfolio consisted of non-performing loans. The government, in a tough stance, forced the bank to be liquidated. Many people in the industry believed that other private commercial banks had similar problems to Bank Summa's, although to lesser degrees. The banking system was placed in a difficult position when Bank Indonesia ruled that banks had to meet capital adequacy ratios of 7 per cent by the end of March 1993, and 8 per cent by the end of December 1993. (In February 1991, the capital adequacy was set at 8 per cent of the risk-weighted assets. It rose from 5 per cent at the end of March 1992 to 7 per cent at the end of March 1993 and to 8 per cent at the end of December 1993).

In the first few months of 1993, several other worrying problems occurred. Large domestic depositors pulled out their money in 'mini' runs on several banks in January and February. The victims included Bank Central Asia, the largest private bank, and Bank Bali, which is considered one of the soundest. Some funds left Indonesia for Singapore, while others shifted from private banks to state banks. Foreign creditors were also pulling back. Japanese banks and a Singapore bank, two major sources of offshore borrowing, reduced their lending (*Far Eastern Economic Review* 1 April 1993).

The condition of the five largest state banks (including a development bank and a saving bank) was even more difficult than that of the private banks. They started with many debts related to subsidised and small credits. After years of functioning more as managers of government development funds than as bankers, by providing subsidised credits to government determined priority sectors, small business credits, and state enterprise credits or politically tied lending, these banks did not know how to lend in competitive circumstances. Many of the projects to which they lent had no commercial justification, for example, a loan scandal concerned approximately Rp1.3 trillion given at

the beginning of 1994 by the state owned Indonesian Development Bank (Bapindo) to a petrochemical project, Golden Key. The loan was granted mainly because of the influence of the Minister of Politics and Safety Coordination, Sudomo, and Finance Minister, J.B. Sumarlin. Industry sources believe that many state banks loans to big projects reflected political influences.

The situation was already deteriorating when formerly creditworthy borrowers began to stop servicing their loans, partly as a result of the economic slow-down and high rates of interest, but partly because they thought they could get away with it. The exact percentage of non-performing loans for each bank is not available, but in February 1994 Djiwandono announced that non-performing loans held by the seven state banks amounted to US\$7 billion in October 1993, or 21.2 per cent of all outstanding state banks' credit and 15.8 per cent of total outstanding credit in the banking sector. Many observers believe that the state banks were in very serious difficulties with only government backing enabling them to continue operating.

3.2. Causes of the banking difficulties

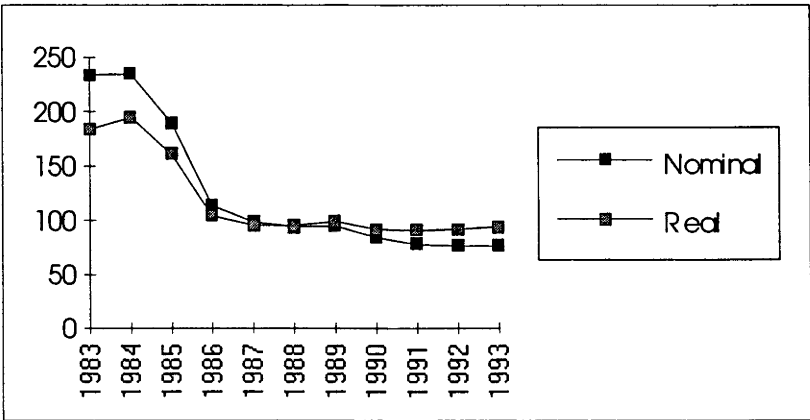
Three main factors caused the high real interest rates: high exchange rate risk, a thin money market and supervision difficulties.

(i) **High exchange rate risk.** Attempts to hold exchange rates constant in the face of substantial inflationary pressures are inevitably followed by large depreciations. Galbis (1993) showed how extreme policy stances of this type led to high real interest rates in, among other countries, Chile in 1982, Argentina especially in 1981–82 and 1989, and Brazil in the early 1980s. Dominguez (1993) found that unpublicised central bank exchange rate policy or interventions (which make up most of all intervention operations in Indonesia), increased volatility in exchange rates in the United States and Germany. Furthermore, any exchange rate system based on a preannounced managed floating or crawling peg in an inflationary period, tends to perpetuate overvaluation of the exchange rate and increase exchange rate risks. Real rates of interest rise to compensate for the (expected) declining international value of the domestic currency.

Indonesian foreign exchange controls were abolished in 1971. From 1971 to 1978 (the 'petroleum boom' period) the rupiah was pegged to the US dollar. Domestic inflation was above that of the United States so that the rupiah became overvalued. In November 1978 the rupiah was devalued by 50 per cent and a managed float system was adopted. The nominal exchange rate was depreciated 3 per cent per annum to 1982. However, these devaluations were not sufficient to compensate for the inflation differential between Indonesia and its trading partners (Rasyid 1992). From 1978 to 1982, the real effective exchange rate index appreciated by approximately 50 per cent. The real effective exchange rate index is defined as the relative price index of domestic to foreign non petroleum and gas traded goods multiplied by the nominal exchange rate. An increase in the real effective exchange rate index means appreciation of the rupiah. The drop in petroleum prices led to a further rupiah devaluation (by 39 per cent against the US dollar) in March 1983 to stimulate non petroleum exports.

As petroleum prices continued to fall , the current account deficit widened. The public expectations of another large devaluation increased. The rupiah came under heavy speculative attacks in September–October 1984. The real effective exchange rate index between 1983 and 1985 appreciated by about 80 per cent and the nominal exchange rate index appreciated by 120 per cent (Figure 3.2). The rupiah was then devalued by 50 per cent in September 1986.

Figure 3.2 **Real effective and nominal exchange rate index, 1983-93**
(1988=100)



Source: Bank Indonesia, primary data.

In May–June 1987 another speculative attack on the rupiah took place. In 1987 the nominal exchange rate depreciated by 5 per cent per annum to stem speculation. However, another speculation against the rupiah took place in February–March 1991, as petroleum prices rose during the Gulf War. By the end of 1991, the real effective exchange rate was 59 per cent below its 1980 level and 40 per cent below its 1971 level (Rasyid 1992). Figure 3.2 shows that from 1987 to 1993 (January) there was no appreciation of the rupiah.

Continuing speculations against the rupiah indicated that a substantial exchange rate risk resulted from both small, constant depreciations and the series of major devaluations from 1978 to 1986. Exchange rate management was not only difficult because of 'booming sector' effects but because in a small open economy like Indonesia's, international price changes in the booming sector were inevitably translated into changes in domestic prices. The exchange rate risk was thus to a significant degree the result of exogenous forces. A fully flexible market exchange rate would have also resulted in high exchange rate volatility. It has been argued, moreover, that in the presence of capital flows, even freely floating exchange rates cannot insulate countries from real external disturbances (Caves, Frankel, and Jones 1993:527).

The managed float system adopted by Indonesia in an inflationary period led to overvaluation of the exchange rate and increased exchange rate risks. To compensate for the declining international value of the domestic currency, real rates of interest had to rise.

(ii) **A thin money market.** The scope for direct controls of the money supply was significantly reduced by financial liberalisation. Direct controls over the money supply were abandoned before a money market was fully established. But to enable the government to manage the money supply indirectly, a money market had to be developed.

It has to be expected that an increase in interest rates would lead to increased capital inflows, both of foreign capital and of the repatriation of domestic funds placed abroad during previous periods of financial repression. Together with the removal of

credit ceilings, this would raise the money supply. Relying on open market operations in an underdeveloped money market could not reduce the supply of money.

The Indonesian case did not follow this expected theoretical pattern in the early 1980s. Although there was some inflow of foreign funds after devaluation and the rise in domestic interest rates, there was not a large increase in bank credit, domestic spending, or inflation. The highly bureaucratic state banks, which still held over 72 per cent of total bank assets in December 1982, responded sluggishly to the removal of loan ceilings. As discussed above, when the petroleum price was falling, and the current account deficit widening, the rupiah coming under heavy speculative attacks in September–October 1984, a capital outflow drained the monetary base. A transfer of government deposits from the state banks to Bank Indonesia to reduce speculation, further reduced the supply of reserve money in the financial system.

The absence of a money market left Bank Indonesia without effective instruments to increase the liquidity to the banks. As a consequence, the domestic inter-bank interest rate on overnight funds sky-rocketed to 90% per annum. Bank Indonesia had to bring this rate down by supplying large amounts of 3 to 6 month credits through its discount facility into the banking system. The two money market instruments, SBIs and SBPUs, which were introduced in February 1984 and February 1985 respectively, came too late to affect liquidity.

The situation was repeated in two other speculative attacks on the rupiah in May–June 1987 and in February–March 1991. Instead of raising the interest rates on money market instruments, the government forced banks and state enterprises to buy SBIs and repurchase SBPUs before maturity. The use of non-market instruments shifted profitability from the banks to Bank Indonesia. A sharp increase in the inter-bank interest rate following the reduction in reserve money indicated a shortage in the money supply. The government's inability to influence base money smoothly thus resulted in excesses and shortages of bank liquidity, and increased the volatility and level of interest rates.

Rigidly controlled interest rates and the limited nature of government money market instruments delayed the development of the money market. The generally lower interest rates of SBIs and SBPUs than banking deposit interest rates also made these

instruments relatively unattractive. There were no SBPU's outstanding at the end of 1987, 1988, 1989, and 1990. SBPU's outstanding declined dramatically from 1991 until 1993. The amount of SBIs outstanding fell drastically from 1989, so that they could not be used to increase the reserve base. In times of liquidity shortages, banks would rather go to the inter-bank market or borrow offshore. As increasing foreign liabilities show, offshore borrowing by banks became very significant after the abolition of the ceilings on borrowing from March 1989 until October 1991 when the ceilings were reimposed. Within one year from March 1989, foreign borrowing jumped by more than 900 per cent (from \$575 million to \$5,856 million), and from December 1990 to January 1992 it increased by 45 percent (Nasution 1992b).

Another source of difficulty in using market-based open market operations lay in the inability of Bank Indonesia to monitor the growth of monetary aggregates quickly and accurately. The M1 aggregate was known only after a three month lag, after Bank Indonesia received deposit data from every bank in the country. With an open capital account regime, the computation of M1 became too slow for policy needs. Bank Indonesia could not quickly detect growth in money aggregates. It had to use non-market operations to influence the money supply quickly.

There is a technical problem (communications with other islands outside Java) that makes definitive bank balance sheets unavailable for three months. Reasonable approximations, however, can be made on the basis of accounts from almost all (if not all) the banks where there are no communication problems and these should be available very shortly after the month-end, if not daily. Woo (1991) suggested that Bank Indonesia should require the largest banks (the 5 state banks and 10 private banks which control about 57% of bank branches and 89% of M1), to report their deposit information on the following day, but this was not done.

The government has been reluctant to borrow domestically via bond issues to finance, at least partly, the fiscal gap between domestic revenues and expenditures. Besides reducing the debt burden, issuance of domestic bonds would also diversify money market instruments. 'Soft foreign borrowing' is not a reason for the government to borrow abroad except to satisfy very parochial auditing requirements. The

government should determine its domestic debt issues on the basis of domestic liquidity requirements.

(iii) **Policies that encourage banks to make poor loans.** Lack of bank supervision, especially prior to 1993, is believed to be an important factor for banks to make poor loans. The goal of bank supervision is to enhance the safety and soundness of the banking system (Friesen 1986; Snoek 1989). While supervision has to be adequate, however, it should not impede competition. Inappropriate supervision—whether inadequate or excessive—leads to problems in banking.

Enforcement of the bank supervision measures was hindered by several problems. Inadequate accounting standards represented a major difficulty. Accounting standardisation of banks is necessary to simplify the supervision of banks. Another problem was inadequate staff, in terms of its number as well as experience, to inspect the soundness of banks (Bank Indonesia has recruited skilled and experienced inspectors more recently from abroad).

The government implicitly and explicitly guaranteed bank deposits as well as bank loans, and protected depositors directly and indirectly. This led to 'moral hazard' problems. In the mid-80s, Bank Indonesia helped several private banks (Bank Perkembangan Asia, Bank Wanita Mataram and Bank Angkasa Pura), that experienced solvency problems. At the end of 1990 the government helped another bank (Bank Duta) which experienced large losses from speculation in the foreign exchange market. Recently Bank Indonesia has been arranging bank mergers to prevent banks from failing. The government will not permit its banks (the seven state banks, including the state saving bank and Export Import bank) to fail.

Until the liquidation of Bank Summa in December 1992, however, government support of the banking system in Indonesia was such that banks rarely suffered the consequences of poor lending. As the Chilean and Argentinean experiences in the 1970s and the American banking experience in the 1980s and 1990s attest, such deposit insurance, if incorrectly priced, creates potentially severe problems of moral hazard within the banking system itself (Kane 1985). McKinnon (1988:407) argued that under these circumstances, banks have little to lose by making very risky loans at high real

interest rates, because they are the beneficiaries of an unfair bet against the government. McKinnon (1993:89-90) claimed that the very risky loans at unnaturally high real interest rates are taken under the twin assumptions that (1) favorable outcomes, where the nonbank borrowers succeed in repaying their high-interest loans, will lead to large profits for the bank's shareholders; whereas (2) unfavorable outcomes, with highly correlated defaults among the nonbank borrowers leading to massive losses by the bank in question (and perhaps even the banking system as a whole), will be mainly borne by the monetary authority. Even though the bank owners might lose their equity or ownership claims with unfavorable outcomes, most of the losses will be covered by the deposit-insuring agency. Banks get to keep extraordinary profits without having to pay the full social costs of unusually large losses from risky lending.

Without adequate supervision of banks, 'distress borrowing' from banks by nonfinancial enterprises can contribute to maintaining high real interest rates. Many large corporations are highly leveraged (Nasution 1992b). They use new credits to pay old debts. High levels of debt financing lead to 'distress borrowing' from banks, with high interest rates reflecting the riskiness of the loans. But high interest rates reduce repayment prospects and accelerate defaults. Inadequate analysis and experience could lead the banks, in the hope of avoiding losses, to continue to provide funds (at high real interest rates), particularly during the boom years. It should be noted, however, that the government has put enormous efforts in bank supervision especially after 1993. These include an addition of one managing director in charge of bank supervision, reorganisation of banking departments to combine on-site and off-site bank supervision, and an advancement of human resource developments and recruitments.

Generally it might be in the national interest for some banks to undertake risky projects, for example in oil and mineral exploration. If all banks have a no-risk policy, it might negatively affect the growth rate of the Indonesian economy. However, there needs to be banking staff that are skilled in managing risks. It is undesirable if banks take on excessive risk as a result of factors such as: the presence of a 'bail-out' system by the government, high price volatility in financial markets, unhealthy competition among banks as well as from non-banks, and lack of professionalism in banking management. It

is argued that the state banks were often induced to finance risky projects because of the close relationship between the owners of the projects and high-ranking government officials. It is also argued that there was insufficient collateral in loan contracts, which made banks vulnerable to loan default.

The above behaviour of banks is reinforced by their ownership structure. Most major private banks in Indonesia are owned by business groups. Often these are family groups. A large part of the banks' loans flowed into intra group projects. Data are lacking, but the concentration of loans to relatively few borrowers is well known. Banks did not necessarily lend to projects on the basis of credit worthiness and business prospects, and might not have acted prudentially in spreading their credit risks. When borrowers' business slowed and they started facing difficulties in paying interest on loans, banks became burdened by high non-performing loans, but often continued to provide credits at high real interest rates.

Lack of professionalism on the part of both bankers and owners exacerbated banking conditions. Rapid expansion of the number of banks and bank offices created tremendous demand for skilled bankers which could not be met by the existing professional bankers. The increased competition in banking, especially after the October 1988 deregulation, led many bankers to aggressively expand their businesses without adhering to the principles of prudential banking. The problems were further aggravated by pressure from the owners of the banks to lend to their associated businesses (or groups of business as described in earlier section) —a deviation from the legal lending rule. Such aggressive behaviour of banks increased bank margins in 1992 and 1993 as discussed on page 30.

It is also believed that there was a lack of understanding among bankers, of the macroeconomic consequences of their banking activities. The dominant role of the banking industry in the Indonesian financial sector caused the rapid expansion of bank businesses to have enormous effects on aggregate demand and hence on the maintenance of macroeconomic stability. This was the situation in the period of 1988 to 1990, in which rapid expansion of banking led to an overheating economy. Monetary authorities reacted by tightening the supply of money, which squeezed the liquidity of banks and

raised interest rates. It is also possible that the lack of professionalism among bankers led them to not fully take into account this possibility of a down–turn in economic activities in the period of the banking 'boom' of the post–1988 banking deregulation.

3.3 Conclusion

This chapter argues that a thin money market and expectations of exchange rate instability in Indonesia led to high and volatile interest rates. The implicit and explicit guarantees on bank deposits (and loans), together with inadequate supervision, generated inefficiencies and moral hazard in banking which worsened the quality of bank assets. As a result real interest rates were high and non-performing loans mounted. Several other possible factors which might cause the high interest rates and high non-performing loans, such as the highly leveraged corporations and the close ties between banks and businesses, were also identified.

The next chapter discusses a review of the theoretical literature relating to financial deregulation. It also presents several studies on experiences of other countries in deregulating their financial sector. It then shows the difficulties in Indonesian banking after deregulation in the context of the Stiglitz and Weiss (1981) model. It discusses the background to the model of the commercial banking sector that will be constructed in Chapter 5.

Chapter 4

Financial deregulation: a theoretical review

Introduction

Ever since it became widely recognised that finance does matter in economic growth, the management of financial intermediaries to achieve an optimal role in economic development has remained an important issue.¹ Numerous theoretical and empirical works have been conducted to identify the advantages and disadvantages of a tightly regulated financial system for economic growth. Other studies have attempted to show the positive effects of a deregulated financial system on the efficient allocation of financial resources in the economy, and hence on growth. Most recent studies have questioned the feasibility of having unregulated free market competition in a financial system.

4.1. Theories of a regulated financial system

In the 1960s, many economists believed that financial intermediaries had to be strictly regulated to allow for the full effectiveness of monetary policy in economic management. This theory was motivated by the argument that monetary policy was the key instrument in promoting growth. The Chicago monetarists such as Mundell (1965) and Tobin (1965), for example, argued that an expansionary monetary policy was required to keep real interest rates at relatively low levels, thereby promoting capital formation and economic growth. This was so because they maintained a perfect foresight assumption, i.e. the actual inflation was equal to the expected inflation, and they also assumed that real cash balances and physical capital were substitutes in wealth holders' portfolios. An expansionary monetary policy would push up the expected rate of inflation, reduce real

¹Many studies supported the hypothesis that money has non-neutral effects on output. Several of them are: Barro (1977, 1978); Brillembourg and Khan (1979); Barro and Rush (1980); Mishkin (1982, 1983); Cecchetti (1986); Friedman and Schwartz (1986); Gochoco (1986); Manchester (1989); Spencer (1989).

deposit rates of interest, shift people's portfolio from holding money to physical capital, and hence raise economic growth. The theory also suggested that subjecting financial intermediaries to interest rate ceilings would help increase physical investment. Monetary growth rules, therefore, can only be implemented in a regulated financial system. Hence the monetarists, although supporting some financial deregulation, opposed free banking.

A study by the neo-Keynesians, Tobin and Brainard (1967), who examined the effectiveness of monetary controls in the presence of financial intermediaries, supported the above argument. Using general equilibrium models in financial and capital markets, they concluded that monetary controls through the supply of currency in the presence of financial intermediaries affected the real economy. They also argued that regulations that prevented expansion of the intermediaries, such as reserve requirements and interest rate ceilings, strengthened monetary controls. Consequently, the effectiveness of monetary policy depended upon the effectiveness of the controls over the expansion of the financial intermediaries. The more effective these controls, the more effective the monetary policy.

All the above theories, however, did not discuss the role of the financial system in intermediating funds between savers and investors. Perhaps this was because it was assumed that savers and borrowers were the same people. As a consequence, it was believed that holding monetary assets inhibited investment. Therefore, a repressed financial system was a necessary condition for economic growth.

Goldsmith (1969) pioneered a different school of thought on the role of the financial sector in economic growth. Although he did not specify the causal mechanism or how the financial sector affected the real sector, he clearly suggested that the size and the complexity of the financial superstructure grew as real income and wealth increased. He noted that financial development was very important for economic growth, and that the effects of financial deregulation on growth would rest upon its impact on the efficiency of investment:

...there is no doubt that it [the development of financial sector] results in a different allocation of capital expenditures among and within sectors, types of tangible assets, and regions (:398).

In the Goldsmith framework, both growth and financial intermediation were thought of as endogenous. He claimed that the process of growth had feedback effects on financial markets by creating incentives for further financial development.

4.2. Theories of a liberalised financial system

The case for deregulating the financial system had never been strong until the beginning of the 1970s when Shaw (1973) and McKinnon (1973) explored its function as a financial intermediary between savers and borrowers. Both authors reversed several assumptions of the Chicago monetarist and neo-Keynesian views and, consequently, proposed different conclusions.

In general, it was argued that the monetary system has two functions. One is to supply the appropriate stock and rate of growth of real balances, and the other is to intermediate, allocating the savings between alternative investments in physical capital. The second function of a monetary system makes the Shaw and McKinnon views very distinct from the Chicago monetarists and neo-Keynesians. Monetary deepening is not at the expense of capital deepening as the latter believed.

The 'debt intermediation' view of Shaw (1973) treats real cash balances as a debt (i.e. liabilities of banks), associated with capital accumulation on the asset side of the economy's aggregate balance sheet. Real cash balances are an important repository for savings that should be transmuted into productive new investments. When interest rates are administratively fixed below their equilibrium level, financial intermediation is not optimal and the allocation of investible funds is not efficient. A higher real interest rate will raise the incentive to save in financial forms, and increase the efficiency of investment. Financial intermediation is optimal when the interest rates are allowed to find their equilibrium level free from other regulations. If the optimal condition is achieved, the real costs to investors are lowered by accommodating liquidity preference, lowering information costs to savers and investors, increasing operational efficiency, and reducing risk through diversification. Overall, a more efficient allocation of investible funds together with more efficient investments, results in higher economic growth.

McKinnon's 'complementarity' hypothesis assumes that real money balances and physical capital are complements (arising from the nature of the economies of developing countries) rather than substitutes. This assumption implies that if the desired rate of capital accumulation (and hence private saving) increases at any given level of income, the average ratio of real cash balances to income will also increase. McKinnon also assumes that all economic units are confined to self finance and that investments are indivisible. Potential investors must accumulate money balances prior to their investments. The more attractive the process of accumulating money, i.e. the higher the real deposit rate of interest, the greater the incentive to invest. If the real return on holding money increases, so will self-financed investment over a significant range of investment opportunities. This is the 'conduit' effect of money. If the desirability of holding cash balances increases, the opportunity cost of saving internally for the eventual purchase of capital goods from outside the firm-household is reduced. McKinnon's hypothesis suggests that real deposit rates are the key element to induce investment. In repressed financial economies, where interest rates are set below their equilibrium level, incentives to invest are reduced, therefore, economic growth is inhibited.

Both Shaw and McKinnon favour financial deregulation, i.e. removing ceilings on interest rates, as a means of promoting economic growth. The focus of Shaw and McKinnon is on the effects of developments and policies regarding financial markets on savings and investments. The removal of financial repression not only will induce a higher savings rate, and hence a higher volume of investments and growth, but also higher productivity of capital.

The financial system and stabilisation models of Shaw and McKinnon have been developed further. These models have been formalised mathematically, extended to open economies in order to analyse exchange rate policies, and tested empirically. The extended models, including those of Kapur (1974, 1976), Galbis (1977), Fry (1978, 1980) and Mathieson (1980), are known as 'disequilibrium models' because they are models for developing countries in which disequilibrium is pervasive throughout the economies.

All the models are built on the premise that financial repression inhibits economic growth. Liberalising the financial system from restrictions is very important in helping the economy to mobilise savings, attract foreign capital and improve efficiency in the use of financial resources. Financial liberalisation is growth promoting.

4.3. Studies on financial deregulation

Theories in favour of financial deregulation or liberalisation are very convincing. During the 1970s and 1980s many countries, both developed and developing, adopted financial deregulation. Many others are still in the process of deregulation. In most of the developing countries, financial deregulation resulted in positive real interest rates. Galbis (1993) reports that 18 developing countries that freed their interest rate controls in the 1970s and 1980s managed to achieve positive real interest rates. In fact these countries experienced consistently high positive real interest rates, around three or more percentage points in real terms. All 18 countries experienced highly negative real interest rates before undertaking financial deregulation.

In the mid-1980s, concerns arose about the possible detrimental effects of high real interest rates under financial deregulation (Diaz-Alejandro 1985; Galbis 1987). It was widely agreed that high real interest rates could be efficient if they reflected a high rate of return on investments. High real interest rates, however, could be undesirable if they were the results of unfavourable micro and macroeconomic conditions such as for example, unabating inflationary expectations, anticipated exchange rate changes, stringent monetary policy without adequate fiscal consolidation and lack of credibility of economic policies (Calvo 1988; Calvo and Guidotti 1991; Guidotti and Kumar 1991). It also included other factors such as a fragile financial structure, poor supervisory environment which led to moral hazard in financial institutions and lack of a proper legal framework to safeguard property rights (Calvo and Coricelli 1991).

Regarding the efficiency gains of financial deregulation, many studies have been conducted on the relationship between positive real interest rates and savings in developing countries, on both time series and cross section estimates (Fry 1978, 1980;

Fry and Mason 1982; Yusuf and Peters 1984; Gupta 1984; Giovannini 1985; de Melo and Tybout 1986; Leite and Makonnen 1986; Khatkhate 1988; Balassa 1989a; the World Bank 1989; Dornbusch 1990). These studies conclude that there is no clear relationship between positive real interest rates and savings in developing countries. Positive real interest rates, however, lead to a shift from non financial to financial savings.

Following Goldsmith (1969), McKinnon (1973) and Shaw (1973), numerous studies have dealt with different aspects of the relationship between financial development and economic growth. Recently, this relationship has been incorporated into the 'endogenous growth' models, such as those proposed by Greenwood and Jovanovic (1990) and Bencivenga and Smith (1991). While the positive relationship between financial development indicators and growth has been supported empirically (Fry 1988; the World Bank 1989; Gelb 1989; Polak 1989; Easterly 1990; Khan and Villanueva 1991), the channel of transmission from financial development to growth remains a controversy. The controversy hinges upon whether the effect of financial intermediation on growth is due mainly to its impact on the productivity of investment (Goldsmith 1969) or the volume of investment (McKinnon 1973; Shaw 1973).

Recently many studies have found that the efficiency of investment, rather than its volume, is the main channel of transmission from financial development to growth (Diaz-Alejandro 1985; Levine 1992; Saint-Paul 1992; Roubini and Sala-i-Martin 1992; de Gregorio 1992; Jappelli and Pagano 1992; de Gregorio and Guidotti 1992).

Large numbers of studies have also concentrated on identifying the possible causes of failures in financial deregulation several developing countries, especially in Latin America, and contrasting them with the success of deregulation attempts in the Asian countries. Corbo and de Melo (1985) report that Chile, Argentina, and Uruguay experienced severe macroeconomic imbalances, characterised by high inflation rate and large fiscal and current account deficits, when financial deregulation was first implemented. Chile experienced serious policy mistakes in 1973–1975. In May 1974, it started a gradual liberalisation of its interest rate. Fortunately, soon after interest rate liberalisation was completed in April 1975, Chile became less subject to macroeconomic instability and further financial crisis. Argentina and Uruguay were less fortunate. For

several years, their macroeconomic instabilities worsened following the financial deregulation attempts. Korea, Taiwan, Singapore, and Malaysia, among the Asian countries, were successful in avoiding any adverse consequences from the deregulation, such as a sharp increase in real interest rates and bankruptcies of firms (Cho and Khatkhate 1989; Yang 1990; Shea 1990; Atiyas 1989).

It is widely accepted that macroeconomic stability is a necessary condition for financial deregulation. McKinnon (1982) convincingly shows that fiscal instability in Chile during the period 1973–1975 and in Argentina especially before 1976 is responsible for the failure of financial deregulation. Domestic price stability, which is partly a consequence of fiscal discipline, is the key element for the success of financial deregulation in Korea and Taiwan (see McKinnon 1991), Yang (1990), and Shea (1990). Villanueva and Mirakhor (1990) also show that macroeconomic stability is very important in the initial stage of financial deregulation, as are effective bank supervision and an appropriate sequencing of stabilisation.

Several other factors which contribute to the failure of financial deregulation are identified, such as the absence of well-functioning equity markets (Cho 1986), and asymmetric information between lenders and borrowers which leads to 'adverse risk selection' and 'adverse incentive' (Stiglitz and Weiss 1981). Villanueva and Mirakhor (1990) use the Stiglitz and Weiss assumptions to incorporate a macroeconomic instability problem into their argument. Macroeconomic instability is a situation in which large changes in the price of goods and factors of production lead to increased variance and positive covariances in project returns.

They argue that with the presence of macroeconomic instability, the government may require higher reserves against defaults which would lower the expected profit function of the bank at any given loan interest rate. The higher variance in project return increases adverse risk selection and lowers the optimal loan interest rate. The lower is the loan interest rate, the more severe is the credit rationing. Hence, macroeconomic instability would reinforce asymmetric information effects on the loan market.

The right sequencing of economic reform is also recognised as the main element of the success of financial deregulation. McKinnon (1982) and Edwards (1984) are the

main contributors in this issue. According to them, financial deregulation should take place after the public finances or the fiscal deficit finances are brought under control. This is so because financial repression is necessary to finance government budget deficits (see the inflation tax issue in the World Development Report, 1989). Exchange controls are required to prevent capital outflows resulting from the domestically repressed financial system.

After the fiscal deficit is under control, interest rates can be raised to get positive rates which are necessary to mobilise saving. Coincidentally with the fiscal improvement and deregulation of domestic finance, the current account of the balance of payments should be liberalised. Again exchange controls must be implemented to avoid massive capital inflow which will hurt the competitiveness of tradeable goods in the international market. Only after those three elements, fiscal stabilisation, financial deregulation, and current account liberalisation, are well underway, can the capital account be liberalised and a flexible exchange rate adopted.

Therefore, as Edwards stresses, exchange controls should only be lifted after the domestic financial markets have been reformed and domestic interest rates have been raised. In turn, interest rates can be raised only after the fiscal deficit is under control. He also says that it is more prudent to liberalise the current account before relaxing capital controls. This suggestion is also supported by Krueger (1983) and Frenkel (1982) who suggest that trade liberalisation prior to the opening of the capital account is preferable on welfare grounds.

Recent studies, however, indicate that there is no clear agreement on the sequencing of economic reform (Cole and Slade 1990a; Leung 1991; Woo 1991; Park 1991). Park in particular, contends that the McKinnon argument that domestic financial deregulation should precede the liberalisation of current account transactions should be reversed. He proposes that trade-first liberalisation may be safer, and hence preferable. Although domestic financial markets will adjust promptly to new arrangements induced by domestic financial deregulation, the commodity market will send out wrong relative price signals and will induce real investments in the wrong industries if the current account remains regulated. A liberalised domestic financial market could exacerbate the

wrong investment decision, because now firms with artificially good prospects brought about by trade restrictions may be able to borrow more easily than before. Park, however, is also aware that a repressed financial system could undermine the correct relative price signals resulting from a liberalised current account. Under such a system, the expected movement of resources to the sectors with the highest rates of return to capital could not be guaranteed, thereby negating the benefits of freer trade.

The southern cone experiences of financial deregulation in the 1970s in particular, continuously attract economists' attention. Besides several reasons mentioned above, many studies find that the undisciplined behaviour of financial intermediaries which do not always intermediate between savers and investors, contribute to the unsuccessful financial deregulation in this area. Financial intermediaries often transfer net savings of one group to finance consumption of other groups. Park (1991), Harberger (1984), Hanson and de Melo (1985) find that in all three countries, the financial intermediaries were active in financing the purchases of imported consumer durables by making credit available for such purchases. Diaz-Alejandro (1985), Harberger (1984) and Corbo and de Melo (1985), conclude that this undisciplined behaviour of financial intermediaries was critical in bringing down the entire liberalisation program.

The moral hazard problem is also pointed out as another factor which inhibits financial deregulation. The explicit and implicit guarantees by the government of the insolvent banks in taking over their bad debts lead domestic firms to overborrow. They also lead the banks to not lend on the basis of credit worthiness. This results in the accumulation of bad loans (see Park 1991).

All things considered, it appears that partial financial deregulation is preferable to complete deregulation. Indeed, this is the remaining debate over financial deregulation in developing countries. McKinnon (1986, 1989) has modified his earlier proposition. He suggests that perhaps the government should impose a ceiling on standard loan (and deposit) rates of interest in order to overcome the banks' moral hazard problem. However, he still holds macroeconomic instability as the main cause of financial deregulation failure.

4.4. Moral hazard and high real interest rates in Indonesian banking post-deregulation

The Stiglitz and Weiss (1981) model of credit rationing in markets with imperfect information shows that an efficient bank would rather ration credit than increase loan interest rates when there is excess demand for funds. This credit rationing equilibrium exists even in a competitive banking system. Extending the Stiglitz and Weiss model this section shows that in the presence of moral hazard, high exchange rate risk, a thin money market and the other problems discussed above, relatively high interest rates result. The Stiglitz and Weiss model assumes asymmetric information between lenders and borrowers in the loan market. Asymmetric information is defined as a situation in which borrowers have greater information about their own default risks than do lenders. Lenders can only obtain imperfect information about the default risks. (The model is summarised in Appendix 4.A).

Because of imperfect information interest rates and bank charges have an impact on the riskiness of the pool of loans through two channels. They are the adverse selection channel for sorting potential borrowers, and the adverse incentive channel for changing the actions of borrowers.

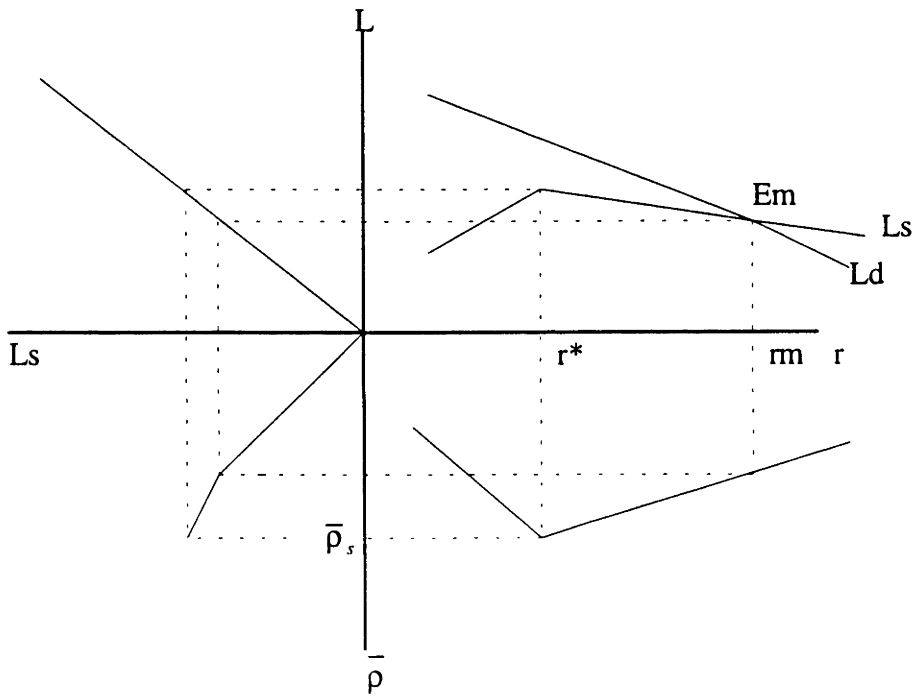
Since the expected return to the bank depends on the probability of loan repayment, which differs across borrowers, the bank needs to have screening devices to identify borrowers who are more likely to repay. Stiglitz and Weiss claim that the interest rate which an individual is willing to pay may act as a screening device; the higher the interest rate borrowers are willing to pay, the worse the risks, because borrowers perceive their probability of repaying the loan to be low. An increase in the interest rate will screen out safer borrowers who have a higher probability of repaying the loan. The average riskiness of the bank's assets rises. Beyond a certain point, this would lower the bank's profits. This provides the rationale for a credit rationing equilibrium.

The interest rate may also change the behaviour of borrowers. The relative attractiveness of riskier projects increases. Borrowers tend to prefer riskier projects which have higher returns but greater variance, over safer projects which have lower

returns but smaller variance (the greater the variance, the greater the risk). Banks therefore have another incentive to ration credit, rather than raise the interest rate when there is excess demand for loanable funds.

Stiglitz and Weiss also assume that banks behave efficiently, and that there is no moral hazard problem in banking, that is, deposit insurance is correctly priced with adequate (internal and external) supervision of banks so that moral hazard is not a problem amongst the banks themselves.

Figure 4.1 Credit rationing equilibrium



The adverse selection and incentive effects lead to a credit rationing equilibrium as illustrated in Figure 4.1. In the upper right quadrant, the demand for loans L_d depends on the interest rate charged by bank r . It is a decreasing function of r . The supply of funds L_s depends on $\bar{\rho}$, the expected return to the bank per dollar loaned. If banks are free to compete for depositors, then $\bar{\rho}$ will be the interest rate received by depositors, abstracting from operating costs, etc. The loan interest rate r can affect the supply of funds through its impact on the return on each loan, hence on the interest rate ($\bar{\rho}$) the bank can offer to attract loanable funds.

The lower right quadrant depicts the relationship between the loan interest rate r and the expected return to the bank ($\bar{\rho}$). $\bar{\rho}$ is a nonmonotonic function of r because as the loan interest rate increases, the riskiness of loans increases. Beyond a point, this will cause the return to the bank to decrease. The relationship between L_S and $\bar{\rho}$ is illustrated in the lower left quadrant.² And a forty five degree line is drawn in the upper left quadrant.

The adverse selection and incentive effects lead to the proposition that there must be a certain loan interest rate level, an equilibrium loan interest rate r^* , which will maximise the bank's expected return. Below this level, the supply of loanable funds L_S is a positive function of the loan interest rate. Also, the expected return to the bank $\bar{\rho}$ increases as interest rate increases. Increases in the loan interest rate above r^* would produce (excessive) adverse selection and adverse incentive effects, i.e. borrowers with high repayment probabilities withdraw and are replaced by those with high default risks. These effects would reduce the expected return to the bank, so that beyond r^* , $\bar{\rho}$ is negatively related to r because the repayment probability declines by more than the increase in the interest rate.

At r^* , the expected return to the bank is maximised. There may be an excess demand for loans if r^* is lower than the market clearing rate, which is likely to happen. It follows that at this level of loan interest rates, credit rationing would occur. Therefore, r^* is the credit rationing equilibrium corresponding to the bank's expected return of $\bar{\rho}_s$. This equilibrium exists even in competitive banking markets. r^m is the Walrasian equilibrium loan interest rate but not the equilibrium rate optimal to the bank, i.e., at r^* the bank could get higher expected return and attract at least all the borrowers attracted at r^m .

Thus far, it is assumed that banks behave efficiently and there are no moral hazard problems in banking. If these assumptions are relaxed, the Stiglitz and Weiss results will be affected. Moral hazard problems in banking, that is, the perception that the central bank would bail out banks in difficult times, will affect the credit rationing

² L_S and $\bar{\rho}$ is not necessarily an increasing function even in an open economy because of many kinds of risks.

equilibrium through two channels: through its effect on the expected return to the bank $\bar{\rho}$, and through the nonmonotonicity between $\bar{\rho}$ and the loan interest rate r .

The expected return to the bank will no longer vary with the riskiness of the loan that is reflected in the riskiness of the borrowers or their project returns (R) since the government guarantees the consequences of default for depositors (Equation 6 Appendix 4.A). Assuming that risk of default to shareholders can be ignored, i.e. highly competitive banking without adequate supervision, the return to the bank is dependent solely on the interest rate. The close ties in ownership between banks and businesses tend to encourage the banks to lend regardless of the riskiness of the project so long as the consequences of default for depositors is guaranteed. Since the bank is not concerned about adverse selection and incentive effects, it will raise the loan interest rate as long as there is an excess demand for loanable funds. The bank will continue raising the rate until demand equals supply of funds.³ Hence, up to this point there is a monotonic relationship between the expected return to the bank and the loan interest rate.

This situation is illustrated in the lower right quadrant of Figure 4.2. KK represents the new relationship between $\bar{\rho}$ and r , with $\bar{\rho}$ as an increasing function of r until point E at the loan interest rate r_m^* (when demand equals supply of funds). Unlike Stiglitz and Weiss, the loan interest rate would not stop at r^* when excess demand for funds exists. The supply of loans will actually increase with r . L_S is the new supply of loanable funds. r_m^* is the Walrasian equilibrium loan interest rate, and corresponds now to the optimising equilibrium rate for the bank. E_m and r_m are the Stiglitz and Weiss Walrasian equilibrium.

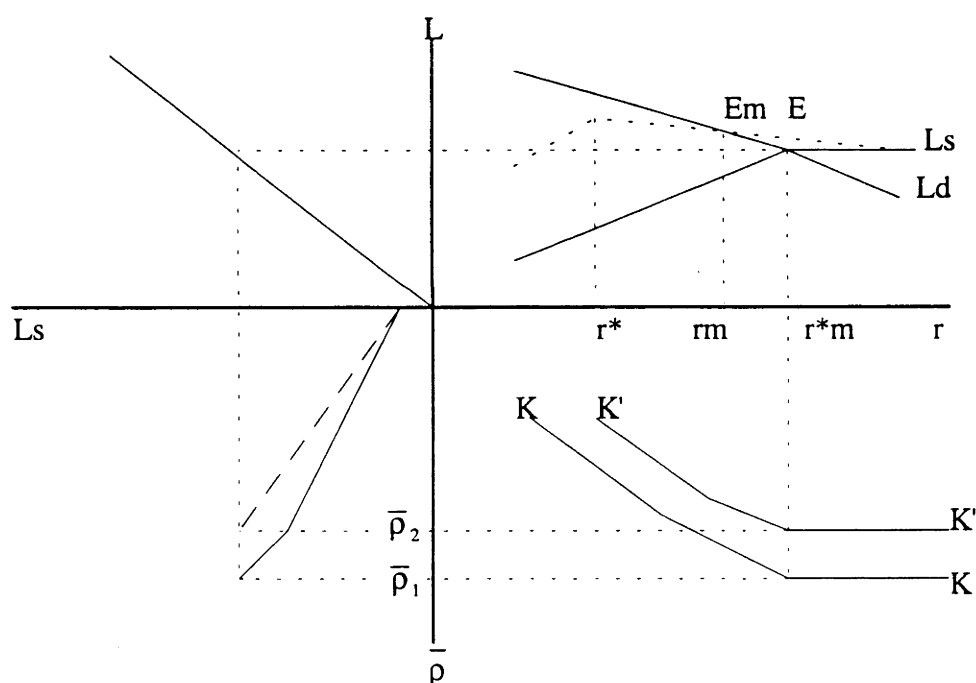
Several other (exogenous) factors may increase loan interest rates. A thin money market and high exchange rate risks cause volatility of interest rates and increase the long-term cost of funds. In the presence of these factors, the expected return to banks would be lowered since operating costs increase. Therefore, to achieve the same level of

³The absence of credit rationing after financial deregulation is not tested empirically here. A study by Harris, Schiantarelli and Siregar (1992), however, supported the argument that there was no rationing for credits to the manufacturing sector in Indonesia post-deregulation. These types of credits accounted for 33 per cent of the total credits in Indonesian banking.

bank returns as when these factors are absent, the bank has to raise the current loan interest rate.

The effect is indicated by the shift of the bank's expected return curve, KK , to the right and towards the r axis, to the new curve $K'K'$. At the equilibrium r_m^* the expected return will decrease from $\bar{\rho}_1$ to $\bar{\rho}_2$. The bank makes more loans at a riskier level of loan interest rate. Distress borrowing and close ties of ownership between banks and business help maintain the high level of interest rates.

Figure 4.2 Credit rationing equilibrium with moral hazard problems and inefficiencies in banking



The above modified (moral hazard) version of the Stiglitz and Weiss model suggests that bank interest rate margins would widen. Comparing the data in Tables 3.1 and 3.2 (Chapter 3), average bank net margins rose significantly from 1991 to 1993, after they continuously fell from 1986 to 1991. This is consistent with the description in section 4.4 above of Indonesian banking during crisis from 1990 onwards.

4.5. Conclusion

The widespread bankruptcies in financial sectors of both developed and developing countries in the 1980s led to renewed interest in the stability of banking competition and the government's role in this sector. Park (1991) agrees with the McKinnon assumption that in developing countries, money is the most attractive instrument of private wealth accumulation because it is a means of payment sanctioned by the state. Financial instruments other than money cannot be easily marketed, because lenders know little or nothing about either the honesty or the repayment capability of potential borrowers in developing economies (informational asymmetries).

Liberal reform, according to Park, will not make the marketing of non-monetary financial assets easier than before, but it could impair the viability of the payments system and will reduce the value of deposits as an attractive financial instrument. Greenbaum and Higgins (1983) and Friedman (1985) suggest that in the presence of asymmetric information, the role of government becomes necessary to reduce the problems of observability, breaches of contract and moral hazard. The financial system must be built on confidence in the integrity of both financial instruments and institutions, and trust that financial contracts will be honoured and that a legal framework exists for their enforcement. The confidence needed to resolve informational asymmetry is a public good, and the role of financial regulation is to provide that public good.

A number of theoretical models on the subject have been constructed, questioning the stability of free banking and the purpose served by central banking and financial regulation (Diamond and Dybvig 1983; Smith 1984; Anderlini 1986; Freeman 1988). They claim that because depositors' liquidity demands are uncertain and banks' assets are less liquid than their liabilities, banking instability arises. They suggest that this instability justifies government involvement in banking.

On the part of commercial banks, several issues related to their behaviour in the new competitive, market-oriented environment should also be noted. Lack of professionalism on the part of both bankers and owners, as well as poor management of risks, were likely to be the two most important factors which contributed to the failure of

financial deregulation. The business of banking is the business of managing risk. Prior to the 1970s, banks were either heavily regulated or comfortably cartelised. Bankers worked in a stable and cosy environment. Since the early 1970s however, deregulation, new technology and volatile markets in response to increased competition —among banks as well as from non-banks— have made banking a much riskier business. Well-trained bankers, who are able to foresee the volatility of future income and how it affects the value of the firm, are needed. The objective of risk management, therefore, is not to make banking risk free, but rather to minimise losses to banks.

If efficiency gains from financial deregulation are unquestionable, and therefore deregulation should continue, the central question is, should the central bank's provision of *de facto* loan guarantees be continued or would it be simpler just to abandon this practice? As shown in this chapter, in a poor supervisory environment, deposit guarantees by the government may lead to moral hazard problems in banking. Would it be feasible to have free market competition in banking with no central bank guarantees or "lender of last resort" activity? Starting from discussion on these particular questions, the next chapter devises a scheme of loan insurance to overcome the moral hazard problem. The model modifies the risk-sharing and incentive contract theory to construct an optimal risk-sharing relationship between commercial banks and central bank in the form of loan insurance.

Chapter 5

Models of state loan insurance

Introduction

Whilst it is recognised that many traditional regulations of the financial sector are damaging to economic growth and therefore should be removed on efficiency grounds, the extent and ways in which government intervention should occur in the financial sector are by no means settled. Friedman and Schwartz (1986) question the feasibility of free banking. They say that the market itself will not be able to provide a stable financial system. Tobin (1985) stressed that the use of a common monetary unit of account and the adoption of a generally acceptable medium of exchange in this numeraire carry positive externalities. Free market competition by itself cannot achieve and protect these externalities. Therefore, financial deregulation must be sought in ways that do not impair the payments system or subject it to interruptions and breakdowns.

Park (1991) similarly argued that as long as the government authority retains the deposit-insurance system and lender-of-last-resort function, a full scale financial deregulation will most likely produce serious moral hazard and other problems. Chapters 3 and 4 have shown how moral hazard and other problems in Indonesian banking led to relatively high real interest rates and high non-performing loans. Without these functions, however, the safety of the payments system under financial deregulation is in danger. The unavoidable trade off between efficiency gains and safety of the payments system associated with financial deregulation may explain why the success of partial deregulation does not ensure a similar success in full scale liberalisation efforts.

This chapter argues that the trade off between efficiency gains and safety of the payments system can be greatly reduced if deposit insurance is correctly priced. The risks that are present in loan markets should be internalised and incorporated into the insurance structure. Asymmetric information would not necessarily entail moral hazard in banking.

This chapter models the central bank and commercial bank relationship in the context of loan insurance. It seeks answers to the question: what are the elements of an optimal contract designed to alleviate moral hazard problems in banking associated with deposit guarantees by central banks? The model is a modification and an application of risk-sharing and incentive contract theories that were used extensively in designing optimal contracts for principal-agent relationship by, among others, Harris and Raviv (1976), Mirrlees (1974, 1976), Holmstrom (1979), Shavell (1979), Fried and Howitt (1980), and Osano and Tsutsui (1985). The approach is known as the 'standard' method or the 'first-order' approach for analysing the principal-agent problem.

The model is then extended by relaxing several restrictive assumptions used in the first-order approach. The extended model applies the 'uncertainty' approach proposed by Grossman and Hart (1983), and Chambers and Quiggin (1992, 1993).

5.1. A model of commercial banking in the presence of moral hazard: the 'first-order' approach

Let the principal be the central bank and the agent be the commercial bank (the bank). The bank takes an action $a \in A$, A being the set of all possible actions. a can be interpreted as a nonmonetary phenomenon that have a monetary equivalent, (e.g., prudential behaviour of the bank entails costs). It is assumed that a and a 'random state of nature' θ determine a monetary outcome $D = D(a, \theta)$. The outcome may be a default loan or a loss. $D'(a) \geq 0$, i.e. the more the bank behaves prudently, the smaller is the probability of a default or the smaller is the size of a default loan.

The central bank and the bank are each assumed to act so as to maximise expected utility. The central bank's utility function $U(\cdot)$ is defined over wealth w , and the bank's utility function $V(\cdot)$ is defined over wealth and action. $U'(w) > 0$, $V'(w) > 0$, $U'' \leq 0$, and $V''(w) < 0$. This implies that the central bank is less risk averse or indeed, is

risk neutral, and the commercial bank is risk averse.¹ Both U and V are strictly increasing and continuously differentiable in w . $V(\cdot)$ is separable, $V(w,a) = v(w) - h(a)$; $V'(a) < 0$.

The outcome D is assumed to be a random variable with a distribution $F(D,a)$. Given the distribution of θ , $F(D,a)$ is the distribution induced on D via the relationship $D = D(a,\theta)$ (Mirrlees 1974,1976), $D_a > 0$ and $F_a < 0$. F is assumed to have a probability density function (or a distribution mass) $f(D,a)$ —a probability function of D given a — with f_a and f_{aa} well defined for all (D,a) (Holmstrom 1979). The central bank may or may not have imperfect information about the bank's action. The problem is seeking the optimal sharing rules of the outcome and how to make the optimal rules enforceable. The model also assumes that the premium is set on the basis of an 'actuarially fair' contract (Kreps 1990:91–93) as explained in Appendix 5.A.

(i) **Central bank can only observe the outcome.** The central bank has no information about the bank's action. Therefore, the sharing rules have to be functions of the outcome D alone, that is $\phi = \phi(D)$. Let $\phi(D)$ be the share of outcome that goes to the bank and $D - \phi(D)$ be the share that goes to the central bank. Given $\phi = \phi(D)$ the bank maximises expected utility over a :

$$EV(\phi, a) = \int V(\phi(D), a) f(D, a) dD \quad (1)$$

where E denotes the expectation operator. The expected utility of the central bank is:

$$EU(\phi, a) = \int U(D - \phi(D)) f(D, a) dD \quad (2)$$

The constrained Pareto-optimal sharing rules $\phi(D)$ are obtained by solving the maximisation problem

¹An examiner commented that in practice, the situation is somewhat more complicated than the representation of banks as risk-averse decisionmakers suggests. Private banks have shareholders, and are run by risk-averse managers. The shareholders write optimal contracts to constrain the manager's behaviour, and the central bank designs optimal regulation to affect the manager's and owner's decisions. It is assumed that the utility function over profits induced for the managers by these contracts is risk-averse. For state banks, which have no shareholders other than the government, the model may be applied more directly to the managers utility function.

$$\max_{\phi, a} \int U(D - \phi(D))f(D, a)dD \quad (3)$$

$$\text{Subject to: } \int v(\phi(D))f(D, a)dD - h(a) \geq V^0 \quad (4)$$

$$\text{and } \int v(\phi(D))f_a(D, a)dD = h'(a) \quad (5)$$

where V^0 is the bank's reservation utility level determined by negotiation or market forces, i.e. the utility level the bank could achieve by not joining the scheme. Equation (4) is called the individual rationality or participation constraint to ensure the bank to take the contract and (5) is the incentive constraint to force the bank to choose the desired action. (5) indicates that the central bank can observe D but not a (Holmstrom 1979; Mirrlees 1974, 1976).

The solution of (3) subject to (4) is known as the first-best solution, which results in optimal risk sharing, as its solution describes a Pareto optimum when a and ϕ can be directly chosen. This happens when the central bank can observe a accurately. The central bank thus can stipulate the highest ϕ (since D is a loss or default loan) unless the bank chooses exactly the first-best level of efforts (Holmstrom 1979; Shavell 1979). The solution of (3) subject to (4) and (5) is called the second-best solution, as a cannot be observed with complete accuracy or cannot be observed at all. To avoid nonexistence of a solution $\phi(D)$ is restricted to lie in an interval, i.e. $[c, d+D]$ (Holmstrom 1979).

Another way of writing the maximisation problem of (3) subject to (4) and (5) is proposed by Kreps (1990:607–8). Let $x(D) = v(\phi(D))$ and let u be the inverse of v so that $u(v(\phi(D))) = \phi(D)$ or $u(x(D)) = \phi(D)$. The expected share the central bank must give to the bank is

$$\int u(x(D))f(D, a)dD \quad (6)$$

and the expected utility of the bank is

$$\int x(D)f(D, a)dD - h(a) \quad (7)$$

The maximisation problem can then be written as:

$$\min_{x,a} \int u(x(D))f(D,a)dD \quad (8)$$

$$\text{Subject to: } \int x(D)f(D,a)dD - h(a) \geq V^0 \quad (9)$$

$$\text{and } \int x(D)f_a(D,a)dD = h'(a) \quad (10)$$

The two maximisation problems will yield the same optimal sharing rules $\phi(D)$.

Let λ be the multiplier of (4) and η be the multiplier of (5). The optimal sharing rule of the Lagrangian pointwise optimisation will be characterised by:

$$\frac{U'(D - \phi(D))}{v'(\phi(D))} = \lambda + \eta \frac{f_a(D,a)}{f(D,a)} \quad (11)$$

for every D for which (11) has a solution $\phi(D) \in [c, d+D]$, a^* is determined by (5) and η is given as the solution to the adjoint equation:

$$\int U(D - \phi(D))f_a(D,a)dD + \eta \left\{ \int v(\phi(D))f_{aa}(D,a)dD - h''(a) \right\} = 0 \quad (12)$$

Perfect risk sharing can only obtain if the right hand side of (11) is a constant or if $\eta = 0$ (Borch 1962). Holmstrom (1979), however, shows that if $h'(a) > 0$ and $F_a < 0$, then $\eta > 0$ or the central bank would like to see the bank increase its action towards increased prudence in lending given the second best sharing rule. $\phi(D)$ must depend to an extent on the outcome D , and the bank never bears all the risk (Shavell 1979). Although the change in action will have no first-order effect on the bank's expected utility (by the Envelope theorem), it will increase the outcome in every state of nature θ , thus allowing the central bank to reward the bank which increases its action and makes itself better off as well.

If the bank's action only affects the probability of a default and not the size or the severity of a default, ϕ will consist of only a deduction which is paid when a default occurs, and is independent of D , i.e., $\phi(D) = -d$ where d is a deductible amount (Holmstrom 1979). If $p(a)$ is the probability when a default occurs then $f(D,a)=p(a).g(D)$, $p'(a)<0$ and $g(D)$ is a damage distribution independent of a . $f_a(D,a)/f(D,a) = p'(a)/p(a)<0$ for when default occurs. Hence f_a/f is independent of D . If the bank's action will also affect the severity (size) of default, the optimal sharing rule will depend on the outcome, i.e., $\phi(D) = -d - t(D)$, where $t(D)$ is the bank's additional share in the costs of a default.

Following Holmstrom's arguments, $|f_a|/f$ in (11) can be interpreted as a benefit-cost ratio for deviation from first-best risk sharing (when $\eta = 0$) from the bank's point of view. If the marginal return from action $f_a(D,a)$ is positive (negative) to the bank, then the second-best sharing rule will be greater (smaller) than the first-best sharing rule. So the larger is $|f_a|$ the stronger is the incentive to deviate from optimal risk sharing, and it is more costly the greater is f . The deviation from optimal risk sharing should be made in proportion to this ratio, with individual risk aversion taken into account.

From the central bank's point of view, f_a/f may be interpreted as a measure of how strongly the central bank is inclined to infer from D that the bank did not take the assumed action, since f_a/f is the derivative of the maximum likelihood function $\log f$, when a^* cannot be directly observed. Hence (11) says that penalties or bonuses should be paid in proportion to this measure.

(ii) **The central bank knows the outcome and has imperfect information about the bank's action.** If the bank's action cannot be observed, the commercial bank is forced (by the central bank) to carry excess responsibility for the outcome. The cost involved in deviating from the first-best sharing rule occurs regardless of whether the outcome or the deviation is generated fully by the bank's action or by factors beyond its control (Holmstrom 1979; Shavell 1979; Kreps 1990). Consequently, there are positive gains to observing the bank's action (Holmstrom 1979). Shavell (1979) shows that information about the bank's action is always of value.

Let real loan interest rate bank charges r be the signal of the bank's action. r gives imperfect information about the bank's action but it can be observed directly. Unlike the Holmstrom assumption, r directly reflects the bank's action instead of the factors outside the bank's control. For example, if the default occurred fully because of the bank's action, r may take a value of one or $r=1$, and $r=0$ otherwise. A high real loan interest rate, i.e. a positive by three or more percentage points in real terms (Galbis 1993), indicates a less prudent bank. In this case, higher real rate of interest corresponds to higher probability of the outcome (default) or higher value of the default loans.

The sharing rule ϕ would depend on the information r in addition to the outcome D , $\phi = \phi(D, r)$. A default can be caused by the bank's action or by factors beyond the bank's control, for example, government policy, economic recession, or natural disaster. The bank would have the share of $\phi(D, r)$ (or be partly responsible for the default loan) only if the real loan interest rate is higher than the 'standard' rate (more than positive three percentage points in real terms). By this arrangement, the bank would not have to carry the extra burden that exists when the bank's action cannot be observed at all.

Since r depends on a and the state of nature θ , then the distribution of r depends on D as well as on a . Let $q(r, D, a)$ be the distribution density function of r given D and a . The expected utility of the bank will be

$$EV(\phi, a) = \iint V(\phi(D, r), a) q(r, D, a) dr f(D, a) dD \quad (13)$$

The expected utility of the central bank is

$$EU(\phi, a) = \iint U(D - \phi(D, r)) q(r, D, a) dr f(D, a) dD \quad (14)$$

The maximisation problem can be written as

$$\max_{\phi, a} \iint U(D - \phi(D, r)) q(r, D, a) dr f(D, a) dD \quad (15)$$

$$\text{Subject to: } \iint v(\phi(D, r)) q(r, D, a) dr f(D, a) dD - h(a) \geq V^0 \quad (16)$$

$$\text{and } \iint v(\phi(D, r)) q_a(r, D, a) dr f_a(D, a) dD = h'(a) \quad (17)$$

The optimal sharing rule is characterised by

$$\frac{U'(D - \phi(D, r))}{v'(\phi(D, r))} = \lambda + \eta \left\{ \frac{q_a(r, D, a)}{q(r, D, a)} + \frac{f_a(D, a)}{f(D, a)} \right\} \quad (18)$$

As in section (i) $|q_a f_a|/q f$ can be seen as a benefit–cost ratio for the deviation from the optimal risk sharing rule. $q_a f_a/q f$ also measures how strongly the central bank is inclined to infer from D that the bank did not take the assumed action. In this case, however, any change in r may change $q_a f_a/q f$. Different contingencies (i.e. imprudent behaviour of the bank, government policy, etc.) signalled by r , will produce a different share $\phi(D, r)$, given the same value of D . Given r , the central bank is inclined to infer less about a^* via D , and so the bank's share would be small. If, given r , the central bank cannot infer anything about a^* via D , or $q_a f_a \equiv 0$, then the optimal sharing rule $\phi(D, r) = 0$ should be employed. Hence, the bank would not have to be responsible for any default loan. For example, the bank should only have to pay the deduction.

The optimisation problem of (13) subject to (14) and (15) is useful in identifying the types of contingencies. Does the default result from the bank's action or other factors? It is also useful to identify how much a particular signal r is responsible for a given outcome. The sharing rule would depend to some extent on r , represented by q_a/q .

The 'first-order' approach, however, contains a strong constraint (and is one of its weaknesses) that the agent choose an action at which her/his utility is at a stationary point, i.e. the agent satisfies her/his first-order conditions with respect to the choice of action. The agent's second-order conditions, i.e. the condition that the agent should be at a global rather than a local maximum, are ignored. Mirrlees (1975) has shown that this method will be valid only if at the optimum, the solution to the agent's maximisation problem is unique. Unfortunately, it is very difficult to guarantee uniqueness in advance.

Without uniqueness, necessary conditions for a contract to solve the first-order method are not generally even necessary conditions for the optimality of the risk-sharing contract. Grossman and Hart (1983) and Rogerson (1985) have shown this situation graphically in their papers.

Holmstrom (1984) has identified a class of problems where the first-order approach is valid. That is where the distribution function over outcomes is a convex combination of two fixed distribution functions and the agent's action determines the weights of the convex combination. Rogerson (1985) has also identified sufficient conditions—the monotone likelihood ratio (MLR) condition and convexity of the distribution function (CDF) condition—for the first-order approach to be valid. He found that this approach is valid only when the marginal return from action is positive to the agent, which is against the economic intuition which suggests that it should equal zero.

Grossman and Hart (1983) suggested an alternative approach for solving the principal-agent problem. He proved that when the principal is risk neutral and the sufficient conditions (the MLR and CDF conditions) hold, the pareto-optimal contract is nondecreasing in output. Jewitt (1988) claimed that even when MLR and CDF conditions hold, the first-order approach is no longer valid if the principal can observe more than one relevant variable. He replaced the CDF assumption and provided the conditions which are valid for problems with more than one variable.

Recently, Chambers and Quiggin (1992, 1993) proposed a different approach for the principal-agent problems. They claimed that the difficulties that arise in the first-order approach are primarily caused by an overly restrictive representation of outcome under uncertainty. In this approach, agents choose a scalar action prior to the realisation of a random variable or state of nature. The combination of action and the realisation of a random variable uniquely determines outcome. The agent's decision problem is thus reduced to one of choosing over a family of cumulative distribution functions indexed by action. Outcome in any one state uniquely determines outcome in every other state, whatever the reward structure facing the agent. Therefore, interstate differences in payments provide little incentive for interstate differences in outcomes. As

a result, rational properties of an incentive scheme, such as monotonicity, are difficult to achieve. The central idea of the Chambers and Quiggin approach is that agent chooses not only an input (or action) vector but a state-contingent outcome vectors as well. He found that the optimal moral hazard contract must have payments strictly monotonic in the level of outcome.

5.2. Uncertainty and moral hazard problem: a model of insurance as payment

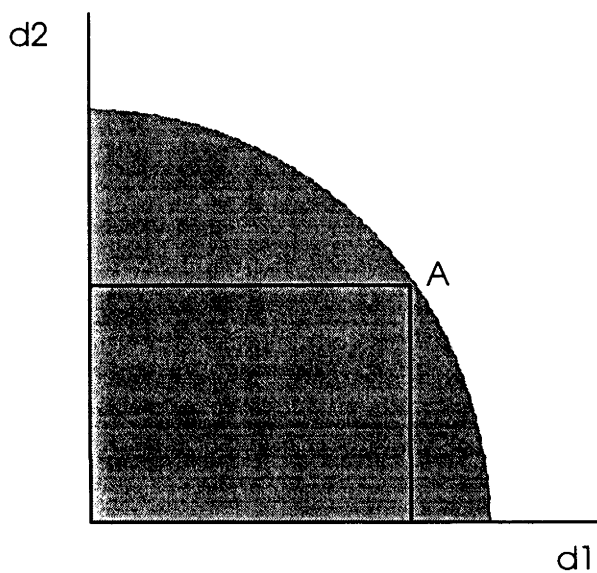
Consistent with the Chambers and Quiggin approach, an alternative model for the central bank and commercial banks' problem is presented in this section. The model emphasises the desirability of deregulation (or re-regulation). It models the way regulations affect the choice set of action and outcomes available for commercial banks.

In the first-order approach, the commercial bank is viewed as picking an action vector prior to the realisation of a continuous random state of nature to maximise expected utility. Once the commercial bank selects its action, it has no further control over the outcome. Chambers and Quiggin (1992) argue that if the random variable only assumes two values ("economic recession" and "economic boom"), the transformation function between "economic recession" and "economic boom" is necessarily of the fixed coefficient form illustrated by A in Figure 5.1 which implies no disposability of outcome. Hence, the commercial bank cannot allocate its available actions to prepare for different contingencies (stagnant or overheated economy).

Using the Chambers and Quiggin (1992) arguments, the following model instead assumes that the commercial bank chooses not only an action vector but a state-contingent outcome vector as well. For any set of action vector, a large set of state-contingent outcome vector is likely to be feasible. In the first-order approach, a given action vector and a given state determine one outcome level. The present model allows for a number of outcome levels to be consistent with a given action vector and a given state. It recognises that action or input may be assigned to specific tasks to prepare for different contingencies, or substitutability between *ex post* outcomes. This

allows the transformation function to assume something other than a fixed-coefficient form, ie. the dotted curve in Figure 5.1. The technology can afford this flexibility, ie, banking regulations can be designed to make banks organise their actions or inputs in this manner. The set of feasible outcomes, for a given action, consists of all outcome combinations on or below the production possibility frontier (free disposability of output).

Figure 5.1 Transformation function of the random variable with two values



The assumptions used in this model are the same as in the previous model. The central bank (the principal) is risk neutral and the commercial bank (the bank or the agent) is risk averse. The central bank is the residual claimant and has the right to specify the contract provision. The bank is free to take or to reject the contract offered by the central bank. There are two states of nature, and outcome is uncertain, that is the nature makes a choice between the two alternatives. Moral hazard arises because the central bank cannot observe either the bank's action or the state of nature that actually occurs.

Following the Grossman and Hart (1983) and Chambers and Quiggin (1993) procedures, the solution to the agency problem can be broken down into a two-step procedure. In the first step, the costs of achieving a particular vector of state-contingent outcomes are minimised to generate an "agency-cost" function. In the second step, the

"agency-cost" function is then used to compute the optimal vector of state-contingent actions.

Let a be the action vector committed prior to the resolution of uncertainty and d be the vector of state-contingent (ex post) outcomes, i.e. d_1 represents the ex post outcome if state-1 state of nature occurs, and d_2 the outcome if state-2 state of nature occurs. The outcome may be a default loan or a loss to the bank. The choices available to the bank are represented by a technology set $T=\{(a,d): \text{input } a \in R_+^n \text{ can yield outcome } d \in R_+^S\}$. T is a convex set and satisfies the property of free disposability of outcome.

The payment to the bank by the central bank, y , is the net return to the bank. That is,

$$y = 0 \text{ for } d \leq 0$$

$$y = (1-p)d \text{ for } d > pd > 0; 0 < p < 1, \text{ where } p \text{ is the premium rate.}$$

The bank utility function $V(\bullet)$ is defined over wealth or the bank's net profit, or

$$V(y,a) = v(y - g(a))$$

v is strictly increasing, strictly concave and twice differentiable, and g is nondecreasing, continuous and convex. This utility function differs from that of Chambers and Quiggin (1992, 1993) which is defined over wealth and action, and it is separable (the Von Neumann-Morgenstern utility function), or $V(y,a) = v(y) - g(a)$.²

Define an "effort cost" as the minimum of $g(a)$ consistent with a producing d (Chambers and Quiggin 1992):

$$C(d) = \min \{g(a): (a,d) \in T\}$$

²The difference between $g(a)$ and $h(a)$ in previous section is that a in $g(a)$ is an action vector corresponds to a state-contingent outcome vector (which consists of different levels of outcome) as opposed to a in $h(a)$, a given action which corresponds to one outcome level.

C is strictly increasing, strictly convex, and twice differentiable. Both the central bank and the bank share the same subjective probability distribution π ($\pi_i > 0$; $i = 1, 2$) about the state of nature.

The central bank objective function is:

$$W^C = \pi_1(d_1 - y_1) + \pi_2(d_2 - y_2) \quad (1)$$

The bank's objective function is:

$$W^B = E[v(y - C(d_1, d_2))] = \pi_1[v(y_1 - C(d_1, d_2))] + \pi_2[v(y_2 - C(d_1, d_2))] \quad (2)$$

(i) **Bankruptcy insurance.** The payment arrangement that $y = 0$ for $d \leq 0$ and $y = (1-p)d$ for $d > 0$; $0 < p < 1$, where p is the premium rate, causes the bank not to have any incentive to reduce its loss, since any loss to the bank will be covered by the central bank. In this case, the bank net return will be zero regardless of the amount of loss to the bank. Differentiate the bank's objective function (Equation 2) with respect to d_1 and d_2 to obtain the following first order conditions:

$$\begin{aligned} \pi_1[v'(\bullet)(y'_1 - C_1(\bullet))] - \pi_2[v'(\bullet)C_1(\bullet)] &= 0 \\ -\pi_1[v'(\bullet)C_2(\bullet)] + \pi_2[v'(\bullet)(y'_2 - C_2(\bullet))] &= 0 \end{aligned}$$

Without loss of generality, let state 1 be the 'bad' state associated with lower outcome, and state 2 be the 'good' state associated with high outcome. If the outcome is loss to the bank, the lower outcome means higher loss (higher negative amount) to the bank and *vice versa*. In the case of loss to the bank, if $d_1 \leq 0$ optimisation requires $C_1 = 0$ for some finite negative d_1 , which depends on d_2 with $C_{12} < 0$ in the relevant range. Because the size of loss to the bank does not matter, this may lead to bankruptcy. This implies that:

$$C_2 = \pi_2 y'_2$$

The bank will operate as a normal profit maximising agent. There are no incentives for the bank to produce more of the good state outcome and reduce the bad state outcome. This certainly is not the optimal solution to the case in which a moral hazard problem is present, or the second-best solution. There is neither punishment to the bank for producing the 'bad' state outcome nor reward for producing the 'good' outcome.

(ii) **The moral hazard problem.** The central bank knows $v(\bullet)$ and C , and can observe ex post outcome levels. It cannot observe either the bank's action vector or the state of nature which actually occurs. The bank knows which state of nature actually occurs. This informational structure is referred to as the 'second best' and involves an incentive or moral hazard problem. The moral hazard problem can be completely eliminated if the bank, at zero cost to the central bank, can be compelled to report truthfully the state of nature that occurs ex post.

The central bank's problem can thus be presented as:

$$\underset{d,y}{Max} \pi_1(d_1 - y_1) + \pi_2(d_2 - y_2) \quad (3)$$

Subject to

$$\pi_1[v(y_1 - C(d_1, d_2))] + \pi_2[v(y_2 - C(d_1, d_2))] \geq V^0 \quad (4)$$

$$\pi_1[v(y_1 - C(d_1, d_2))] + \pi_2[v(y_2 - C(d_1, d_2))] \geq \pi_1[v(y_1 - C(d_1, d_1))] + \pi_2[v(y_2 - C(d_1, d_1))] \quad (5)$$

$$\pi_2[v(y_1 - C(d_1, d_1))] = v(y_1 - C(d_1, d_1))$$

$$\pi_1[v(y_1 - C(d_1, d_2))] + \pi_2[v(y_2 - C(d_1, d_2))] \geq \pi_1[v(y_2 - C(d_2, d_2))] + \pi_2[v(y_2 - C(d_2, d_2))] \quad (6)$$

$$\pi_2[v(y_2 - C(d_2, d_2))] = v(y_2 - C(d_2, d_2))$$

$$\pi_1[v(y_1 - C(d_1, d_2))] + \pi_2[v(y_2 - C(d_1, d_2))] \geq \pi_1[v(y_2 - C(d_2, d_1))] + \pi_2[v(y_2 - C(d_2, d_1))] \quad (7)$$

Where V^0 is the bank's reservation utility level. If $\bar{y}$ denotes the certainty equivalent return (payment) to the bank, then $V^0 = V(\bar{y})$.

Equation (4) is the bank's participation constraint and in any solution should hold with equality (Chambers and Quiggin 1992). Equations (5)–(7) are the incentive constraints or the constraints arising from the requirements for truthful reporting of the

states. The solution of (3) subject to (4) is the first-best solution, and the solution of (3) subject to (4)–(7) is the second-best solution.

Given a twice continuous differentiable, strictly concave and strictly increasing utility function v , assume the utility function v takes the form of $v(x) = -e^{-\lambda x}$, where $\lambda(x) = -v''(x) / v'(x) > 0$ is the coefficient of absolute risk aversion. Equations (4) and (5) can be rewritten as:

$$\pi_1 \{-\exp[-\lambda(y_1 - C(d_1, d_2))]\} + \pi_2 \{-\exp[-\lambda(y_2 - C(d_1, d_2))]\} \geq V^0 \quad (4a)$$

$$\pi_1 \{-\exp[-\lambda(y_1 - C(d_1, d_2))]\} + \pi_2 \{-\exp[-\lambda(y_2 - C(d_1, d_2))]\} \geq -\exp[-\lambda(y_1 - C(d_1, d_1))] \quad (5a)$$

First-best contract. The first-best contract is obtained if there is no informational asymmetry, and hence no incentive or moral hazard problem, i.e. the central bank can choose the lowest payment unless the bank chooses the first-best level of action or effort. Therefore, the first-best contract is the one where the central bank gives the bank a fixed payment, that yields the bank its reservation utility in each state.

Substitute $V^0 = V(\bar{y})$ into (4a) to obtain:

$$\pi_1 y_1 + \pi_2 y_2 \geq \bar{y} + C(d_1, d_2)$$

$\bar{y} + C(d_1, d_2)$ represents the least cost to the central bank to induce the bank to produce the first-best outcome vector. In the first-best minimisation problem, the central bank always chooses a fixed payment to the bank equalling $\bar{y} + C(d_1, d_2)$ in each state. Therefore:

Lemma 1: For a given (d_1, d_2) , it should be the case that $\bar{y} + C(d) = y_1 = y_2$. At the optimal, any solution to the principal-agent problem must have the participation constraint bind exactly.

The central bank's first-best problem is then to solve the following problem:

$$\text{Max}_d \pi_1 (d_1 - y_1) + \pi_2 (d_2 - y_2)$$

subject to (4).

Solve the following Lagrangian:

$$L = \pi_1 (d_1 - y_1) + \pi_2 (d_2 - y_2) + \lambda [V^0 - \pi_1 (v(y_1 - C(d_1, d_2))) - \pi_2 (v(y_2 - C(d_1, d_2)))]$$

The Lagrangian pointwise optimisation will be characterised by :

$$C_1 = \pi_1$$

$$C_2 = \pi_2$$

i.e. if the bank put in an extra dollar, it would increase the outcome by one unit in both states 1 and 2. If the central bank paid the bank more than one dollar for every increase in the outcome in both states, the bank would be better off, and *vice versa*.

It follows that:

Result 1: If C displays constant cost, y is linear as a function of d ,

$$\text{i.e. } y(p\mathbf{d}) = py(\mathbf{d})$$

The insurance premium does not depend on the size of the bank.

If the central bank cannot observe both the bank's action as well as the state of nature that actually occurs, the above forced payment structure is not optimal. This is so because the bank can always shirk by producing a bad state outcome corresponding to lower cost to the bank and accepting the same payment as a good state outcome which requires higher cost. As in the case of bankruptcy, the fixed-payment structure involves neither punishment for producing a bad state outcome nor incentive for producing a good state outcome. If the net return to the bank is positive, the incentives to shirk will be worse than in the bankruptcy model. (Note that the net return in the

bankruptcy model is zero if there is loss to the bank). In this case, a different contract structure, that is the second-best contract structure, is needed to eliminate the incentive problem.

Second-best problem. Lemma 1, together with equations (4a) and (5a) yield:

$$\begin{aligned} \pi_1 \{ \exp[-\lambda(y_1 - C(d_1, d_1))] - \exp[-\lambda(y_1 - C(d_1, d_2))] \} = \\ \pi_2 \{ \exp[-\lambda(y_2 - C(d_1, d_2))] - \exp[-\lambda(y_1 - C(d_1, d_1))] \} \end{aligned}$$

This implies:

$$\text{if } C(d_1, d_1) \leq C(d_1, d_2) \Rightarrow y_2 - C(d_1, d_2) \geq y_1 - C(d_1, d_1) \Rightarrow y_2 \geq y_1 \quad (8)$$

Equation (8) yields monotonicity of the effort-cost function as in the Chambers and Quiggin model. This establishes:

Lemma 2: Any solution to the principal-agent problem in the presence of (4) to (7) must satisfy:

$$(y_1 - y_2)(d_1 - d_2) \geq 0$$

with strict inequality whenever $d_1 \neq d_2$.

The optimal second-best contract must be monotonic and the bank must be pushed to its reservation utility (V^0). The monotonicity result is established from the existence of a non-negative marginal cost for each state's outcome, which in turn, hinges upon the presumption that the technology T is consistent with free disposability of outcome.

"Agency-cost" function. The "agency-cost" function is the minimum cost of inducing the bank to produce a given state contingent outcome vector. The agency-cost problem is specified as for given d , choose y to:

$$\underset{y}{\text{Min}} \pi_1 y_1 + \pi_2 y_2 \quad (9)$$

Subject to (4) to (7).

The minimisation yields the minimum cost to the central bank of achieving a particular outcome vector by the bank that will satisfy the participation constraint and the requirements for truthtelling (Grossman and Hart 1983; Chambers and Quiggin 1993).

Lemma 2 implies that high outcomes must be matched by high shares. They do not determine which state of nature is the high or the low outcome state. This problem can be solved by what it is called the "state-ordering assumption" (SOA) introduced by Chambers and Quiggin (1993). The SOA saying that a pair of states 1 and 2 is ordered with $1 < 2$ if:

$$[\pi_1 C(d_1, d_1) + \pi_2 C(d_2, d_2) - C(d_1, d_2)] \geq 0 \Leftrightarrow (d_2 - d_1) \geq 0$$

with both inequalities strict or neither.

SOA means that it is always costly to disguise a high outcome state as a lower outcome state, and vice versa. This establishes the following monotonicity, that is assume that SOA holds, for any $1 \leq 2$ and $y_1 \leq y_2$, an outcome vector (d_1, d_2) is monotonic if $d_1 \leq d_2$, and strictly monotonic if $d_1 < d_2$.

Chambers and Quiggin (1993) show that any allocation of outcomes and utilities that satisfies (5) exactly is downward binding. A downward binding allocation is one for which the agent is just indifferent between always producing low outcome and producing what the central bank desires. It follows that, suppose SOA holds, then for d monotonic:

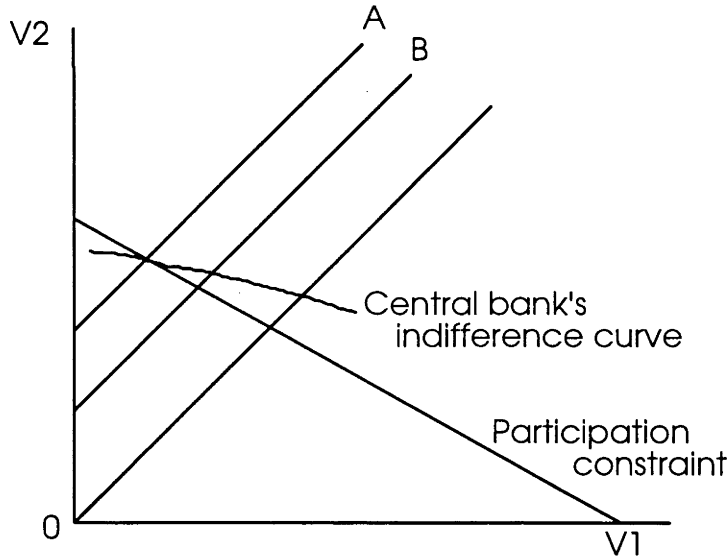
- i) A downward-binding allocation satisfies all the incentive constraints to the agency-cost minimisation problem, and
- ii) (6) and (7) are binding in the agency-cost minimisation problem if and only if both outcomes are equal.

Therefore:

Result2: Under SOA, for monotonic d , any solution to the agency–cost problem is *downward binding*.

Result 2 is best explained by Figure 5.2. In Figure 5.2, the feasible set, if it is nonempty, is given by the cylinder lying above the participation constraint and between A and B. At any point other than the intersection between B and the participation constraint, agency costs are higher, hence the Result. Intuitively Result 2 means that under SOA for d strictly monotonic, the incentive problem reduces to one of inducing the bank not to organise production so that the low outcome always occurs. For d monotonic, the bank also never has the incentive to arrange that a state–2 outcome always occurs because this is always costlier than the allocation that the central bank wants.

Figure 5.2 Solution to the agency–cost problem



Given Result 2, the agency–cost problem reduces to a simple closed form solution under SOA. Equations (4a) and (5a) yield:

$$V^0 = -\exp[-\lambda(y_1 - C(d_1, d_1))]$$

$$y_1 = C(d_1, d_1) - \ln(-V^0) / \lambda$$

or

$$y_1 = C(d_1, d_1) + \bar{y} \quad (10)$$

where $\bar{y} = -\ln(-V^0) / \lambda$

Hence, $V^0 = -\exp[-\lambda \bar{y}] = V(\bar{y})$

$$\text{Denote } V_1 = v(y_1 - C(d_1, d_2)) = v(\bar{y} + C(d_1, d_1) - C(d_1, d_2)) \langle V^0 \quad (11)$$

Equation (4) then can be rewritten as

$$\begin{aligned} \pi_1 V_1 + \pi_2 V_2 &= V^0 = \pi_1 V^0 + \pi_2 V^0 \\ V_2 &= V^0 + \pi_1 / \pi_2 (V^0 - V_1) \end{aligned} \quad (12)$$

Define $U^{-1}(V)$ such that

$$V(U^{-1}(V) + C(d_1, d_2)) = V$$

Hence

$$\begin{aligned} y_1 &= U^{-1}(V_1) \\ y_2 &= U^{-1}(V_2) \end{aligned} \quad (13)$$

where V_1 and V_2 are given by (11) and (12)

Equation (13) results in the following monotonicity:

Result 3: $y_2 = y_1 = \bar{y} + C(d)$ if and only if $d_1 = d_2$. Otherwise, $y_2 \rangle y_1$.

The difference between the payments in the two states is recognised as a moral-hazard premium. It measures the bank's gain from shirking by producing (d_1, d_1) instead of (d_1, d_2) . The difference increases as the moral-hazard premium increases, i.e. as the riskiness of the bank's balance sheet increases. Hence this difference in payments is

sufficient to motivate the bank to produce (d_1, d_2) as desired by the central bank. Since the insurance premium p depends on the moral hazard premium, the insurance premium increases as the riskiness of the bank's balance sheet increases.

Suppose SOA holds, for d monotonic, the agency-cost function is given by the twice differentiable function:

$$Y(d, \pi, V^0) = \pi_1 y_1 + \pi_2 y_2 \quad (14)$$

where y_1 and y_2 are given by (13)

For given $C(d_1, d_2)$ the agency-cost is increasing in $(V^0 - V_1)$, that is in $d_2 - d_1$.

U is convex, since V is concave, so

$$\pi U^{-1}(V_1) + \pi_2 U^{-1}(V_2) \geq U^{-1}(\pi_1 V_1 + \pi_2 V_2) = U^{-1}(V^0) = \bar{y}$$

As in the Chambers and Quiggin (1993) model, the simple closed form solution of the agency-cost function, equation (14), presented here makes the derivation of comparative statics results straightforward. Consider changes in d , that is for monotonic d , an increase in d_1 will reduce the severity of the moral hazard problem and hence the bank's moral-hazard premium. For a sufficiently risk-averse bank, this may offset the increase in production cost, leading to a reduction in agency cost. Any output vector d for which $\partial Y / \partial d_1 < 0$, however, cannot represent an optimal solution to the second-best problem. On the other hand, an increase in d_2 will always increase the moral hazard premium. The incentive problem facing the central bank becomes worse as d_2 increases holding d_1 fixed since the bank has an extra cost incentive to shirk. Hence, the central bank has to offer extra incentives to encourage the agent to produce d_2 . Thus:

Result 4:

- (i) Y is increasing and convex in d_2
- (ii) Y is not, in general, monotonic in d_1

Consider next the effect of changes in $\mathbf{d}$ on $C(d_1, d_2)$. If C displays constant cost, an increase in $\mathbf{d}$ that also increases d_2/d_1 will always increase Y since Y is convex and increasing in insurance premium p which depends on the moral-hazard premium. The convexity of Y in p also assures that an increase in the moral-hazard premium with $C(\mathbf{d})$ held constant must increase the agency cost. This implies that moving around the bank's isocost frontier from bad state to good state outcome vectors generates an increase in agency cost.

The central bank's second-best problem can now be written as a closed form problem subject only to linear constraint. That is,

$$\text{Max}_{d,y} \pi_1(d_1 - y_1) + \pi_2(d_2 - y_2) \quad (15)$$

where y_1 and y_2 are given by (13)

subject to:

$$d_1 \leq d_2$$

The convexity condition of the agency-cost function are sufficient to ensure that this problem has a unique solution. Defining $\alpha = d_2 - d_1$ or $d_2 = d_1 + \alpha$ and substitute this into (15) and differentiate to obtain the necessary first-order conditions for the second-best problem. The concavity of v implies that C_2 is increasing, and C_1 is not necessarily increasing.

The optimal second-best contract is also characterised by the monotonicity of the central bank's net return, $d-y$, in observed output. Chambers and Quiggin show that if $d_1 \prec d_2$,

$$C(d_1, d_2)(d_2 - d_1) \succ C(d_1, d_2) - C(d_1, d_1) = \pi_2(y_2 - y_1) + \dot{y} \geq \pi_2(y_2 - y_1) \quad (16)$$

where the first inequality follows from the convexity of C , the equality comes from the fact that the optimal contract is downward binding and the last inequality is because $\bar{y} \geq 0$. (16) implies that:

$$\begin{aligned} (d_2 - d_1) &\geq (y_2 - y_1); \text{ and} \\ (d_2 - y_2) &\geq (d_1 - y_1) \end{aligned} \tag{17}$$

The central bank's return increases as the outcome increases, or as loss to the bank decreases from state 1 to state 2.

Summarising the computations establishes:

Result 5: For monotonic d under SOA, the optimal second–best contract structure is characterised by:

$$(i) (y_1 - y_2)(d_1 - d_2) \geq 0$$

with strict inequality whenever $d_1 \neq d_2$.

$$(ii) (d_2 - d_1) \geq (y_2 - y_1); \text{ and}$$

$$(d_2 - y_2) \geq (d_1 - y_1)$$

$$(iii) y_1 = U^{-1}(V_1)$$

$$y_2 = U^{-1}(V_2)$$

where V_1 and V_2 are given by (11) and (12)

The monotonicity results (i) and (ii) imply that the optimal second–best contract requires the bank to bear some of the production risk by sharing in the outcome (loss) increase between state 1 and state 2. Similar to the Chambers and Quiggin (1993) model, Result (iii) implies that the optimal second–best contract allows the bank to reap the full marginal benefit from increasing outcome (reducing loss to the bank) from d_1 to d_2 . Therefore, it effectively makes the bank the residual claimant in state 2, the good outcome state of nature. This is the easiest way to solve the incentive problem, that is to prevent the bank from shirking by misinterpreting the good outcome state of nature as the bad outcome state of nature by arranging to always produce d_1 .

As a consequence, Result (iii) also implies that the payment, or net return, to the bank in state 2 should be greater than the payment in state 1. The difference equals the moral hazard premium. The difference in the payments is necessary to eliminate the moral hazard problem. The higher payment to the bank in state 2 will encourage the bank to shift its production pattern to state 2 outcome from state 1 outcome that the central bank desires. Hence, the incentive to shirk by always producing a bad state outcome is eliminated.

5.3. Conclusion

This chapter concludes that by internalising risks associated with a moral hazard problem into loan insurance structure, it is possible to arrive at an optimal contract between commercial banks and the central bank. The asymmetrical information may not lead to excessive risk-taking behaviour of commercial banks. This would necessarily reduce the trade off between efficiency gains and instability of the payments system resulting from financial deregulation.

The model, however, implies that in the absence of a well regulated environment, the optimal contract cannot fully prevent the payments system failures resulting from factors such as lack of skilled staff and poor risk management. To achieve a stable and efficient payments system, the contract should be accompanied by banking supervision. The next chapter discusses policy implications of the model together with banking supervision to support the application of the model.

Chapter 6

Policy Implications of the Model of State Loan Insurance

Introduction

It is widely believed that bank failures, which have occurred both in developed and developing countries in the last two decades, were largely caused by the so called "moral hazard" problem. The moral hazard problem arises because the (implicit and explicit) deposit insurance subsidy provided by the government creates incentives for shareholders of commercial banks to take on excessive risk. Many studies have been done and their results support the moral hazard argument. For example, studies have been done by Merton (1977), Markus and Shaked (1984), Kane (1985), Keeley (1990), and White (1991) for developed countries; and by Harberger (1984), Hanson and de Melo (1985), Corbo and de Melo (1985), Diaz-Alejandro (1985), and Park (1991) for developing countries.

In line with the above studies, Chapter 5 supports the argument that an effective banking sector cannot be sustained by unregulated free banking or market competition alone. Therefore, some kind of government intervention in banking is desirable. The chapter then explores the theory of loan insurance to avoid the trade off between efficiency gains and safety of the payments system in the context of financial deregulation.

The theoretical model of loan insurance is presented in two different approaches. The 'first-order' approach and the 'uncertainty' approach. Using risk-sharing and incentive contract theory, both approaches internalise the risks that are present in loan markets. Such internalisation is essential for an optimal contract between the central bank and the commercial bank.

The first-order approach makes it possible to identify the types of contingencies that cause default loans so that a 'fair' optimal sharing rule can be applied. The approach, however, contains several weaknesses. One implausible result is that it fails to satisfy the

monotonicity condition of the sharing schedule (i.e. the more prudent the bank, the lower the share of the loss the bank has to bear) which is a condition that must hold for an optimal sharing rule. Another weakness lies in the assumption that the commercial bank can choose only an 'action' vector, not an 'outcome' vector, from an infinite set of action vectors. This implies that the bank cannot *ex ante* allocate its available actions to prepare for different contingencies (states of nature) in order to achieve the desirable outcome. This assumption, together with the result that penalties will not be imposed if default loans were caused by factors outside the bank's control, gives enough room for breakdowns in the banking system to occur.

The uncertainty approach is set up to minimise the weaknesses of the first-order approach. Besides assuming that action can be taken from a finite set of action vectors consistent with a finite set of outcome vectors, the approach also recognises that action may be assigned to specific tasks to prepare for different contingencies. This means that the bank's action has to be a function of the state(s) of nature. Any state of nature has to be anticipated and be reflected in the action. For simplicity, it is assumed that there are two states of nature; state 1 is 'bad' state associated with high loss to the bank and state 2 is 'good' state associated with lower loss or even profits to the bank. Government intervention may be desirable to help banks in preparing for the contingencies, and hence minimising the possibility of breakdown. This is the main objective of this chapter, that is to seek the extent and ways in which government intervention can affect the choice set of action and outcome vectors for commercial banks, so that an efficient and stable banking system is sustainable. The analysis will be based mainly on the uncertainty approach.

The organisation of this chapter is as follows. Section one analyses the main results of the model. Government intervention and other explanations for banking behaviour, which are the main content of this chapter, are examined in section two. Section three presents the conclusions.

6.1. The results of the model

The assumptions used in the model are the standard assumptions for the risk-sharing rule in the literature on the principal-agent relationship. A risk-neutral central bank is contracting with a risk-averse commercial bank (the bank) in the context of loan insurance. The contract provision is specified by the central bank. The bank, however, is free to take or to reject the contract. The bank chooses an action vector as well as a state-contingent outcome vector from finite sets of action and outcome vectors.

As discussed in Chapter 5 the bank's action is assumed to be its prudence in lending, and the outcome can be the amount of default loans or the amount of profits to the bank. If the outcome is default loans, a better outcome is associated with a smaller amount of default loans. If the outcome is profits, a better outcome is associated with a higher level of profits. The bank's action may affect the probability and the size of the outcome. Both action and outcome vectors are monotonic, ie., $a_1 < a_2$ and $d_1 < d_2$ where a_i is action and d_i is outcome. If d is the amount of default loans, $d_1 < d_2$ means the amount of default loans of d_1 is higher than d_2 , ie. outcome d_2 is better than outcome d_1 . The more prudent the bank, the lower the amount of default loans, (or the higher the amount of profits to the bank).

The net return to the bank is $(y=d-pd)$. The bank pays the central bank the insurance premium, pd , where p is the insurance premium rate. In the case of a default, the central bank will pay an amount equal to the amount of the default loans to the bank.¹ The return to the central bank is $d-y=pd$.

The central bank cannot observe either the bank's action or the state of nature that actually occurs. This informational structure produces the moral hazard or the incentive problem. That is the incentive to shirk or to take on risk excessively by behaving imprudently (i.e. extending too much risky lending) and producing a low outcome state (i.e. having a high amount of default loans).

¹In the case of no default, the central bank will not give any payment to the bank. If the outcome (profits), d , is greater than the insurance premium, pd , the net return to the bank will be positive. For simplicity, the analysis here will focus on the amount of default as the outcome.

With these assumptions in place, the bases for an optimal contract between the commercial bank (the bank) and the central bank are established. Uncertainty of the outcome and the resulting moral hazard problem in banking are two important elements in modelling the contract. Several interesting results can be drawn from the model, which characterises the optimal (second-best) contract between the central bank and the bank. (The first-best contract is of course the one in which the incentive problem is not present).

Given the second best contract, one of the results states that the central bank, the insurer, would like to see the bank take more effort or action towards increased prudence in lending. One way to induce increased effort on the part of the bank not to shirk (or deviate from the first-best contract) is to allow the bank to reap fully the marginal benefit from its action. The marginal benefit from its action is reflected in the increased outcome from the 'bad' state to the 'good' state. If the outcome is the amount of default loans or loss to the bank, an increased outcome means a decrease in the loss to the bank.

As a consequence of the above result, the net return to the bank increases as the outcome increases. The net return to the bank in the 'good' state (i.e. lower losses to the bank) should be higher than the net return in the 'bad' state (i.e. higher losses). The difference between the 'good' state and the 'bad' state returns equals the moral-hazard premium or risk premium. The higher net return to the bank will encourage the bank to increase action (i.e. enhance prudence), hence producing more 'good' state outcomes (i.e. lower losses). With this arrangement, the incentive to shirk by always taking less action and producing 'bad' state outcomes is eliminated. This implies that, in the case of defaults, the net return to the bank, y , is not a fixed amount (as is the case in the first-best contract discussed in Chapter 5).

Another result from the model is that an increase in the moral-hazard premium increases the difference between net returns in the 'bad' state and the 'good' state. Since the insurance premium, p , depends on the moral-hazard premium, the insurance premium increases as the moral hazard premium increases. This result implies that the insurance premium is positively correlated to the riskiness in the bank's balance sheet, reflected in

the moral-hazard premium. If the cost of producing outcome in both the 'bad' and 'good' states displays constant cost, then the insurance premium does not depend on the size of the bank.

The optimal contract is also characterised by monotonicity of the bank's net return. The net return to the bank must increase as the loss to the bank decreases. This is consistent with the monotonicity results for moral hazard models that are established from the existence of a non-negative marginal cost for each state's outcome.

The optimal contract also produces monotonicity of the central bank return. The absolute amount of insurance premium decreases as the loss to the bank decreases. The implication of the two monotonicity results (the bank and the central bank returns) is that in the optimal second-best contract, the bank and the central bank bear (or share) the risk. An increase in loss to the bank will be shared among both parties. Note that the optimal first-best contract will be the one in which the net return to the bank in the 'good' state equals the net return in the 'bad' state. Since there is no asymmetry of information, a forcing contract could be used to guarantee that the bank chooses the desired action vector. In return, the central bank provides a fixed net return in each state of nature. In the presence of information asymmetry, however, the fixed net return arrangement is not optimal. The fixed net return arrangement does not give the bank incentive to increase efforts which are financially costly to the bank. It also gives incentives to the bank always to make low efforts in lending prudently as this involves lower financial cost and results in higher losses to the bank in the future. Hence, the fully efficient production pattern is unachievable.

The main objective of having a loan insurance system, however, is not only the welfare of either the central bank or the bank alone, but also the safety of the payments system as a whole. This may involve high effort associated with high financial costs for both the bank and the central bank.

The central bank does not have to be the provider of insurance. Both state-owned and private companies can do this. The central bank can simply mandate that banks must have some minimum package of insurance, and designs optimal regulations which affect the managers' and owners' decisions.

The model, however, cannot prevent bank failures that are caused by factors other than moral hazard, such as the lack of skilled staff and poor risk management in commercial banks. To enable the state loan insurance to work effectively, some kind of government regulation and bank supervision are necessary. The main issue, therefore, is finding the correct regulations that may act as linear constraints on the action, and hence, outcome vectors of the bank.² These regulations should also aim at encouraging commercial banks to improve their management skills and techniques through internal supervision and training.

Numerous studies have been conducted to analyse the interaction of firms in the market place (Tirole, 1988). These studies design a number of performance measures to limit managerial discretion. The measures rest on a comparison of the firms' (agents') performances, to enable the authority to reward firms when their performances are observable but not verifiable (the correctness or the truth of the performance is not verifiable) . There is also a measure, known as yardstick competition. "Yardstick competition relies on the correlation of the agents' [firms'] technologies, but not on the nonverifiability of performances" (Tirole, 1988:42). With uncertainty perfectly correlated among firms and the same level of action yielding the same profits, firms will automatically reveal how hard they work through the levels of profit they achieve. Firms which do not put in much effort will produce low profits and should be fined. The optimal contract is therefore one in which reward to one firm depends on rewards to other firms.

It should also be noted that the performance of a particular bank is only a 'garbled' measure of the bank's actions or efforts. Bad loans or losses to the bank may be due more to other factors such as an increase in costs and a decrease in demand than to managerial inadequacy. High exchange rate risk and a thin money market, as discussed in Chapter 3, are included among these other factors. This justifies the need for improvement in the government's ability to control macroeconomic conditions.

²If the government does not provide a loan insurance system, perhaps regulations will be difficult to implement because sanctions associated with regulations become inappropriate or inconsistent with banking liberalisation.

6.2. Regulations and other explanations for banking behaviour

The trade off between efficiency gains and safety of the payments system motivates the construction of the loan insurance scheme. The scheme entails requirements that should be fulfilled by banks in the scheme. The requirements may act as some kind of banking regulations. The nature of regulations in this model, however, is different to that suggested by Diamond and Dybvig (1983) on deposit insurance or lender of last resort function of the central bank; Smith (1984) and Anderlini (1986) on interest rate ceilings; or Freeman (1988) on reserve requirements.

Diamond and Dybvig examine why banks are subject to potential damaging runs, and what the government could do to protect them. Runs on a bank occur when many depositors 'panic' and withdraw their deposits because they anticipate that the intermediary will run out of assets. They find that banking instability is caused by uncertainty of depositors' liquidity demand and the fact that banks' assets are less liquid than their liabilities. Banking instability is harmful because it ruins risk-sharing arrangements and damages production. Bank runs are also a problem because if they occur, even healthy banks might fail because of the loss of value of their assets when they have to liquidate these assets quickly. The authors suggest that the instability creates a need for government intervention in the form of a deposit insurance system or lender of last resort function. Anderlini, Smith, and Freeman, among others, develop the Diamond and Dybvig model and use it to justify additional policies such as interest rate ceilings and reserve requirements.

The main criticism of these authors' suggestions on banking regulations is that they lack a sound foundation for government involvement in banking and that they are inconsistent with the existence of market discipline in financial intermediation, i.e. free banking (see, for example, Dowd 1992).

Banking instability used in the model of state loan insurance in this paper is not bank runs as in the Diamond and Dybvig model. The uncertainty of depositors' liquidity demand and the illiquid nature of bank assets relative to their liabilities are not the main causes of banking instability in Indonesia. Instead, instability is caused by banks taking on

excessive risk as a result of the bail out system adopted by the government. The bail out system makes banks rarely suffer the consequences of poor lending and other decisions. Lack of experienced staff and inadequate supervision, together with other factors explained in Chapter 3, reinforced banking instability.

Since a fully liberalised banking system may not be able to sustain a stable and efficient payments system, the model formalises the bail out system and incorporates risk-sharing rules into its structure to eliminate moral hazard or incentive problems. Therefore, the objective of the regulations arising from the model is primarily to ensure that the loan insurance system can effectively sustain the stability of banking. Because the regulations can be seen as the minimum requirements for joining the insurance scheme, they are not necessarily inconsistent with banking deregulation.

In the loan insurance model, the government can intervene in banking by setting constraints on the effort cost function of the banks, eg., minimum action requirements for prudence lending. In the model this means putting linear constraints on the outcome vector (and the action vector). Although the bank's action is unobservable by the central bank, the minimum action vector and the *ex post* outcome vector are observable.³ The minimum outcome in this context will be the maximum allowable default loans. Only banks with the required minimum action and outcome will be allowed to join the insurance scheme. The central bank can discontinue their membership when the banks' action and outcome fall below their minimum levels. Furthermore, only the minimum and better outcomes will be covered by the insurance scheme.

Regulations relevant to the model will be the ones that minimise risks associated with uncertainty either in credit markets or in other activities conducted by commercial banks. Maximum legal lending limits fall into this category of regulations. In Indonesia, the regulations were imposed since October 1988. The limits are calculated as a percentage of the bank's capital: namely 20 per cent to both a single borrower and a

³The effort cost function in the model then can be written as:

$$C(d) = \min\{g(a); (a, d) \in T; a \geq a^*, d \geq d^*\}$$

where a^* and d^* are minimum action and minimum outcome respectively.

group of borrowers. The goal of the limits is to prevent the concentration of loans, and hence, risks, to relatively few groups of borrowers.

Particular attention should be paid to the ownership structure of banks in Indonesia. Because most major private banks are owned by business groups and a large part of the banks' loans flow into intra group projects, the ownership of banks becomes a relevant issue. Besides increasing the concentration of loans to few (inside) borrowers, this type of ownership structure tends to make banks not lend to projects on the basis of credit worthiness and business prospects. If it is difficult to alter ownership structure by regulation, then the business group that owns the bank should be treated as one group of borrowers and they would only be able to receive loans up to 20 per cent of the bank's capital.

Since commercial banks are supposed to be encouraged to minimise risks of bad lending, the regulations that require banks to extend their loans to priority sectors are inconsistent with the optimal insurance contract. In Indonesia, the regulations include the requirements for domestic banks to allocate a minimum of 20 per cent of their loan portfolio to small business and for foreign banks to extend 50 per cent of their credits to export-oriented industries. These regulations distort the risk-sharing rules between the central bank and commercial banks.

Internal supervision and standardisation of accounting techniques in Indonesian banking are two important areas that must be improved to minimise credit risks. Lack of experienced staff and inadequate management techniques meant that internal supervision was inevitably poor. Risk management was particularly weak and accounting practices did not always value the quality of bank assets properly. Inadequate accounting standards were again a problem. This meant that bank supervision could not be efficient as supervisors did not have reports of adequate quality. An internal audit system in the banking industry is also crucial for safe and sound banking. It was believed that problems often arose because the internal audit system in many banks was inadequate and discipline in enforcing such a system was lacking. Weak and inefficient internal structures increased losses. Being aware of the problem, in January 1995 Bank Indonesia issued measures to achieve a minimum standard of requirements on bank internal audit systems.

The central bank as bank supervisors, on the other hand, should be equipped with adequate skilled and professional staff. Besides supervising banks, the central bank should also monitor the soundness of the commercial banks continuously. The monitoring system should aim at providing an 'early warning system' to troubled banks and supervising those banks immediately.

Any effort to improve the above problems will reduce risks, especially credit risks. For example, the government could set up training institutions for banking staff. (In January 1995, Bank Indonesia stipulated that a minimum of 5 per cent of a bank's personnel expenses be spent for training and education of bank staff; at the same time a measure to ban persons inadmissible for bank management and ownership due to criminal activity or other misconduct, was issued; also recently Indonesian Bankers' Institute has formulated and implemented a bankers' code of ethics). The government should also effectively enforce an appropriate legal framework for banking operations and sanctions against those breaking the rules of this framework. Legislation regarding bankruptcy and procedures to seize collateral in the event of defaults on loans should also be enforced.

There are several other issues that may affect the overall banking risks. They are issues related to balance-sheet risks, which include interest-rate mismatch risk, liquidity risk, and foreign exchange risk; price risks, such as market-liquidity risk, issuer risk, instrument risk, and the risk of changes in commodity prices, interest rates and exchange rates; and operating and liquidity risks, which consist of risk of loss due to technical failure to execute or settle a transaction and risk of loss due to adverse change in the cash flows of the transaction.

These three categories of risks are not covered by the loan insurance scheme developed in this paper. Their effects on banking stability, however, are quite significant. Their immediate effects are normally reflected in the volatility of the short-term interest rate (see discussion in Chapter 3). The government could reduce the volatility by encouraging interest-rate futures management by commercial banks through encouraging supervision and training.

Banking supervision, as well as training, is the key to control risk. The supervision involves defining, measuring, and understanding risk. A large amount of work has been done to study risk and incorporate it into financial modelling. Although each bank may have different definitions of risk, they agree with the common element of risk, that is the volatility of the potential outcomes. The volatility (riskiness) of a particular outcome is usually measured by the standard deviation of the outcome. The standard deviation is the square root of variance or how much an outcome is expected to deviate from the neutral outcome. *Ceteris paribus* the volatility of an outcome in the past can be used to predict its volatility pattern in the future. Understanding the pattern and the behaviour of the riskiness of outcomes and using market instruments to manage volatility, constitute the main elements of banking stability. It is the nature of banking to deal with all types of risk. It may also be socially acceptable for banks to take on risk in particular projects which have national interest. But it is not acceptable for banks to take on excessive risk which could endanger the stability of the payment system. The management of risk is therefore essential for banks. The objective is not to have a risk-free banking, but to manage risk and hence attain a safe and sound banking system.

In the early stages of supervision, the government may also impose several regulations to reduce risks. For example, it may set the maximum net open foreign exchange position (the amount of foreign currency claims and obligations, including off-balance sheet transactions) a bank can hold in proportion to its capital, the minimum capital in proportion to risk-weighted assets, and minimum reserve requirements.

The definition of foreign exchange position should be clearly specified. If it only involves financial assets and liabilities, the position can be defined as the net present value of all the relevant future cash flows in each currency discounted by the interest rates of risk-free zero coupon bonds denominated in the respective currencies. The net present value of foreign currency cash flows is significantly affected by changes in foreign interest rates. Since interest rate and exchange rate movements are often correlated, sometimes it is difficult to separate exchange rate and interest rate risk. If the foreign exchange position involves investment in foreign subsidiaries, the foreign currency convertible bonds issued by banks, and other assets and liabilities, the position

is difficult to define clearly. Fukao (1991) suggests that banks have to take account of the ratio of foreign currency assets to total assets in order to appropriately control their foreign exchange position. Furthermore, to maintain an adequate capital–asset ratio, it is advantageous for banks with large foreign currency assets to hold certain open long positions in the same currency.

Several important points regarding capital adequacy requirements also need attention.⁴ An adequate amount of capital can be used as a buffer against unexpected risk, i.e. to prevent runs by reassuring potentially nervous depositors. Banks issue both bond (debt) and equity claims. A study by Jacklin (1988) finds that demand for bonds is sensitive to uncertainty which leads to bank runs, while demand for equity is not subject to runs but is very sensitive to informational asymmetries about underlying portfolio values. The value of debt, for example, is not affected by the underlying project return, while the value of equity is affected by any information about the return to production. Banks that issue too much debt claims are vulnerable to runs. Therefore, an adequately capitalised bank is necessary for banking stability.

The central question really is how much capital is adequate to reassure depositors. Too low a capital base (that covers some conceivable loss) will lead to bank runs. On the other hand, too high a capital base will lower the return on bank equity, and hence, will make the equity harder to attract. It follows that the adequate level of capital will be positively correlated to depositors' risk aversion and the riskiness of the bank's portfolio, and negatively correlated to the return on equity elsewhere.

Reserve requirements are still imposed on Indonesian banks after all other direct monetary instruments had been lifted following banking deregulation. The most common justifications for their imposition are that they may help to stabilise the money base and thus facilitate the use of other monetary instruments; reserve requirements have also a fiscal impact, a means of taxing financial services; and reserve requirements can be used to ensure that banks hold a prudent level of liquid assets (Hardy 1993).

⁴Capital, in Indonesia, is defined as the sum of paid up capital, reserves and retained earnings, and government guaranteed foreign borrowings.

While their effectiveness as a monetary instrument is questionable, the design of reserve requirements can strongly influence their effect on banks' behaviour. Hardy (1993) shows that the variance of broad monetary aggregate due to fluctuations in the demand for excess reserves and for broad money is lower, the higher are the reserve requirements. The level of reserve requirements will also affect the variance of the interest rate. A higher reserve requirement ratio will increase the sensitivity of interest rates to disturbances in demand for broad money, and decrease the variance caused by disturbances in the market for reserve money.

However, Hardy also shows that positive reserve requirements are not necessary for monetary control if there is a stable demand for excess reserves. Even with zero reserve requirements, the central bank could intervene in the market for reserve money so as to affect interest rates and thus, eventually, broad money, provided that there are other instruments available, i.e. security or money markets are well developed to conduct open market operations.

As a means of taxing financial services, reserve requirements are also questionable. Unlike a deposit tax that will be directed at those receiving transaction services from banks, the cost of reserve requirements is distributed between borrowers and depositors in the form of a spread between lending and deposit rates. An increase in reserve requirements raises costs in banking and reduces the ability to obtain deposits and to lend. Therefore, reserve requirements entail a quantity constraint on the public's portfolio (Hardy 1993; Stiglitz and Greenwald 1992).

As for maintaining reserve requirements to ensure adequate liquidity, it is argued that what banks should have is prudential liquidity requirements which include many liquid assets and liabilities and not necessarily deposits with central banks as a proportion of banks' deposit liabilities. The inclusion of other types of liquid assets and liabilities into the reserve requirements category should be carefully specified. Inappropriate design of reserve requirements can even reduce bank liquidity. (For example, low interest bearing and illiquid government securities would increase the riskiness of a bank's portfolio).

6.3. Conclusion

Uncertainty of outcomes and the resulting moral hazard problem in banking motivate the exploration of appropriately priced loan insurance based on the risk-sharing contract theory. Several characteristics of an optimal (second-best) scheme are identified. Such a scheme, however, presents the possibility that banks will choose a low action vector to produce a low outcome vector (i.e. less resources devoted to prudential lending so that higher defaults result). The possibility arises from the fact that banks can choose any action vector and outcome vector from unconstrained sets of action and outcome vectors. With this set up, although the optimal contract can still be implemented, the stability of the payments system cannot be guaranteed.

This chapter proposes several types of government intervention that could be implemented to ensure that the insurance scheme will be able effectively to sustain the stability of the banking system. The characteristics of the intervention lie in banking supervision to minimise credit risks rather than traditional regulations which distort the market mechanism. The regulations include maximum lending limits to single and group of borrowers, and internal managerial supervision in banking. An appropriate legal framework for banking operations and sanctions against breaking the rules of this framework are also integral parts of the regulations.

This chapter also argues that there are several other factors that are potentially damaging to the stability of the payments system. They are issues related to balance-sheet risks, price risks, and operating and liquidity risks. Banking supervision and training, involving the definition and management of risk are the key. In the early stages of supervision, several government regulations, such as maximum net foreign exchange position and minimum reserve requirements, can be imposed on banks to reduce the risks. While at these early stages, the central bank may act as lender of last resort to reduce the effects of these risks on (short-term) interest rates. In the longer term, however, training commercial banks in the use of market instruments to manage risks associated with exchange rate and interest rate volatility, should be the goal.

Chapter 7

Conclusions

Financial deregulation in Indonesia has successfully improved banking competition and markedly increased financial deepening. This, however, was not accompanied by similar successes that would enable the central bank to shift smoothly from direct to indirect controls over monetary aggregates. For this to occur, there would need to be money market development, stable exchange rate expectations and banking supervision.

A thin money market and unstable exchange rate expectations led to high and volatile domestic interest rates. The highly leveraged corporations contributed to maintaining high real interest rates. High levels of debt financing led to distress borrowing from banks with high interest rates reflecting the riskiness of the loans. The difficulties in the enforcement of bank supervision measures, together with the bail out system adopted by the government to rescue troubled banks, resulted in moral hazard problems. Banks took on excessive risks in lending. This behaviour was exaggerated by the close ties between banks and businesses, which resulted in the concentration of loans to few borrowers. Banks became burdened by high non-performing loans when borrowers' businesses slowed and the borrowers started facing difficulties in paying interest on loans. Furthermore, lack of skilled staff and inadequate management knowledge and techniques led to poor management of risks. Banks continued to provide credits at high real interest rates.

As a result, for almost a decade from 1984, real interest rates were relatively high and at the end of 1993 both bad debts and non-performing loans in banking were mounting. As for the state-owned banks, the large amount of bad debts and non-performing loans were also caused by their role more as development agencies before and after deregulation than as commercial banks. Many of their loans to big projects were made based on political influences to them than on the credit worthiness of the borrowers.

The Indonesian experience showed a classic example of the trade-off between financial deepening and banking instability under financial deregulation in the presence of a bail out system by the central bank and inadequate supervision of banks. A free market competition in banking with no central bank guarantees, however, is not feasible. The market mechanism cannot provide the positive externalities associated with the use of money. Furthermore, the presence of the so called "systemic risk" —such as the risk of a run on the payments system— that can neither be diversified away nor hedged through capital markets, means that the market on its own cannot sustain a stable payments system. The high social costs of having bank failures —a possibility of an unregulated market system— could destabilise the economy. Therefore, some form of central bank intervention is needed to prevent the payments system from disruptions and breakdowns caused by such systemic risk.

Deposit insurance is one form of central bank intervention. The main objection to having a deposit insurance system is that it produces a moral hazard problem in banking. It encourages banks to take more risks than they otherwise would. This is so because the central bank insurance operates as a guarantee, so that the insurance premium charged to commercial banks is zero. All depositors are fully protected against loss, and hence banks rarely suffer from poor lending.

To overcome the above problem, a theoretical model of loan insurance is constructed. It internalises all the risks that are present in loan markets to obtain correctly priced insurance. The risks include not only those associated with uncertainty of the loan repayment, but also risks that arise from the uncertainty of banks' behaviour towards risks under such an insurance scheme. The incorporation of the second type of risks, which are not incorporated into the existing central bank guarantees, enables the central bank to eliminate the moral hazard problem in bank lending and at the same time give assurance or confidence to depositors. The model forms the basis for specifying an optimal risk-sharing contract between the central bank and commercial banks that can sustain an efficient and sound banking system. The actual 'blueprint' for such a contract, however, requires simulations of the theoretical model, and is the subject of future work.

The loan insurance model assumes that there are two states of nature, 'good' and 'bad' states associated with high and low 'outcomes' respectively, in which a bank, given an 'action' level, will produce a certain outcome level. The bank's action is the bank's efforts in prudence lending: the higher the action level, the greater the degree of prudence. The outcome is the loss to the bank from lending, or default loans, the higher the outcome, the lower the loss to the bank. 'Good' state outcome is associated with low loss to the bank and 'bad' state outcome is associated with high loss to the bank. The moral hazard arises because both the state of nature that actually occurs and the bank's action are unobservable by the central bank. In the event of loss to the bank through default loans, the bank's net return is $y = d - pd$ where d is the outcome and p is the insurance premium. The return to the central bank, therefore, is $d - y = pd$. The model can easily be extended to the case where there are more than two states of nature.

In the absence of moral hazard, that is the first-best case, the optimal contract would be the one in which the bank's net return, or the payment by the central bank, is fixed in both 'good' and 'bad' states to the bank. The payment in the 'good' state also equals the payment in the 'bad' state. Since there is no asymmetrical information, the central bank can always pay the lowest payment to the bank unless the bank chooses the first-best level of action.

The fixed payment is not optimal in the presence of moral hazard because it does not give the bank incentives to increase action or its prudence in lending, which involves a higher financial cost to the bank. The fixed payment also gives the bank incentives to shirk, that is to always make a low level of effort associated with lower financial costs. This corresponds to imprudent lending behaviour and high losses to the bank. By allowing the bank to reap the marginal benefit from greater prudence (higher level of action), reflected in the decreased loss to the bank, the bank will be induced to increase action.

Therefore, the optimal contract, known as the second-best contract, would require that net return (the payment) to the bank in the 'good' state should be greater than the net return in the 'bad' state. The difference between the two payments equals the moral-hazard premium or risk premium. This premium measures the difference in cost

to the bank between making low level effort and high level effort in lending. With this payments arrangement, the bank is encouraged to make higher effort in prudence lending, hence eliminating the incentives to shirk. The difference between the two payments increases as the moral-hazard premium increases.

The moral-hazard premium is reflected in the riskiness of the bank's balance sheet. The insurance premium, p , depends on the moral-hazard premium. It increases with the riskiness of the bank's balance sheet. If the cost of producing outcome in both the 'good' state and the 'bad' state is constant, then the insurance premium does not depend on the size of the bank.

The optimal contract is also characterised by monotonicities of the bank and the central bank's return. Higher outcome must be matched by higher return, and *vice versa*. The net return to the bank must increase as the loss to the bank decreases. The return to the central bank must also increase as the loss to the bank decreases. The optimal second-best contract thus requires the bank to bear some of the risk by sharing the increase in the bank's loss from the 'good' state to the 'bad' state.

Loan insurance clearly can eliminate moral hazard in banking. It cannot, however, fully prevent bank failures. Apart from moral hazard, bank failures can also occur because of factors such as lack of skilled labour and poor management of risks other than those present in loan markets. The risk-sharing contract implies that the central bank will allow banks to fail, for market discipline to work effectively.¹ It is sometimes optimal *ex post* to allow an individual bank to fail. It becomes undesirable to do so if this would lead to widespread failure and destabilise the payments system.

For the above reasons, effective regulation, supervision and monitoring of banks become very necessary, primarily to ensure that an efficient and sound banking system is sustained. Unlike the traditional regulations, banking regulations here emphasise the placing of minimum requirements on banks to ensure soundness of the banks for joining the insurance scheme, while the supervision focuses on the improvement of risk

¹Note that the monotonicity of the bank's net return implies that the bank would have negative net return, if the bank produced losses. If losses were too high, they could lead to the bank bankruptcy.

management in banking. This implies that commercial banks can join the insurance scheme after satisfying the requirements.

The regulations include effective enforcement of lending limits both to single and group borrowers. This regulation is intended to spread credit risks among borrowers. The ownership of banks by business groups, as is the case in Indonesia, also needs particular attention. Regulation regarding the ownership structure of banks is very important to remove the concentration of loans to a few groups of (inside) borrowers. It can also increase the amount of loans that go to projects on the basis of credit worthiness and business prospects. The existing regulation that requires banks to extend their loans to priority sectors is inconsistent with the optimal contract. This is because such regulation distorts the risk-sharing rules between the central bank and banks.

Minimum capital adequacy, that is the minimum capital to risk-weighted assets ratio, is another regulation necessary for banking stability. It can be used as a buffer against unexpected risk, i.e. to prevent runs by reassuring potentially nervous depositors. Deciding how much capital is adequate to reassure depositors is an area the central bank needs to study carefully. Too low a capital base will lead to bank runs. Too high a capital base, on the other hand, will lower the return on bank equity, and hence will make the equity harder to attract. The riskiness of assets should be assessed with care. Loans that go to a particular sector may be very risky only because this sector consists of risky borrowers and not because it is a risky sector. A risky sector for one bank may not be risky at all for another bank. The relative riskiness of assets should be recalculated frequently, i.e. every year. The central bank needs to have adequate skilled staff and knowledge to do the job properly.

Internal supervision in Indonesian banking is urgent. Lack of experienced staff and inadequate management techniques meant that internal supervision was inevitably poor, while external supervision was hindered by inadequate accounting standards since supervisors did not have reports of adequate quality. Accounting standardisation is also very important for accurate monitoring of banks by the central bank, and hence an early warning system can be performed effectively. For these reasons, the central bank should set up training institutions for banking staff, including the use of market instruments in

the management of risks arising from volatility of exchange rates and interest rates. The central bank should also improve the knowledge and professionalism of its staff to help achieve an effective system of monitoring of banks. At the same time, the legal framework for banking operations and sanctions against breaking the rules of this framework should be effectively enforced.

Appendices

Appendix 2.A

Chronology of monetary measures and financial deregulations, 1970–93

1970	Bank Indonesia (BI) issued SBIs as their own liability
1971	- SBIs discontinued - Rupiah pegged to \$US - No foreign exchange controls - Open capital account - No new entry and new operations of banks and NBFIs
1974	- BI organised an interbank call money market, including a local clearing system - credit ceilings imposed on all domestic banks except for credits extended in certain priority sectors which continued to receive subsidised liquidity credits from BI
November 78	- Devaluation of Rupiah (50%) - Rupiah was pegged to basket of currencies of Indonesia's main trading partners - A managed float system introduced, the nominal exchange rate was to be devalued on a regular basis by small amounts, and averaged about 3% per annum
1979	BI introduced foreign exchange swap facility — "swaps"—
October 82	BI takes 2% margin for swaps
February 83	BI reduced swap margin to 0.25%
1983	Severe pressure on Rupiah
March 83	- 39% devaluation of Rupiah
June 83	Financial Deregulation Package : - Elimination of credit ceiling - Elimination of all ceilings on deposit rates of interest and most loan rates of interest - BI liquidity credits significantly reduced by terminating a number of the high priority credit schemes
February 84	BI reissued SBIs once a week with 30– and 90– day maturity
September 84	SBI issued daily and made eligible for rediscount by BI
October 84	SBIs with 15–day maturity issued
February 85	- SBPU introduced with 30– to 90– day maturity - Ficorinvest, an NBFi and BI affiliate, named as market maker for SBPU
May 85	15-day maturity SBI discontinued
July 85	SBIs began to be auctioned daily
August 85	- Interbank loan limits raised to 15% for Rupiah funds from third parties - SBPU maturity raised to 180 days - SBI issued could be rediscounted at Ficorinvest or BI without penalty
August 86	SBI issued on weekly basis only
September 86	A major devaluation of Rupiah (50%)
October 86	- Banks' minimum swaps premium raised to 8% - Removal of ceiling on swaps

Dec.1986 - Jan.1987	Severe pressure on Rupiah
May - July 1987	- Banks' minimum swaps premium raised to 9% - SBI offer rate increased - BI discount rate raised to 19% - Banks required to repurchase large portions of own SBPU's before maturity - Basic discount rate increased to 30% - Bank deposits of major state enterprises (BUMN) transformed into SBI holdings - Foreigners allowed to invest in domestic portfolios
October 88	Financial deregulation package (PAKTO 27,88) - Freed up entry and operations of banks and NBFIs ie, all limits on domestic bank branching removed; foreign banks permitted to form joint venture with local partners (85% maximum foreign partner with a minimum paid up capital requirement of \$30 million); foreign banks already present in Jakarta allowed to branch out to six major provincial cities - Lower reserve requirements (from 15% to 2%), however, banks had to buy SBIs with 3–6 month maturity up to 80% of the increased funds - Swap tied to formula and maturity lengthened to 3 years - Two–day settlement for foreign exchange transactions - State enterprises allowed to put 50% of deposits outside the state banks - Maximum legal lending limits imposed on banks and NBFIs (as a % of lender's capital): 20% to a single borrower, and 50% to a group of borrowers
March 89	Financial deregulation package (PAKMAR 89) - Ceilings on foreign borrowings by banks with foreign exchange licences lifted - Net open foreign exchange position (overnight foreign exchange position) limits placed on banks equal to 25% of their capital
January 90	Financial deregulation package (PAKJAN 90) - Abolition of BI subsidised refinancing facilities (liquidity credits) which gave credits at (below market) interest rates from 3% to 14.5% to banks which then lent to priority sectors at below market interest rates except for : certain food stocks, investment credit for development banks, NBFIs and estates, working credits for farmers, and certain credits for cooperatives. However, interest rates on these credits were increased at least to near-market levels - National banks required within one year to allocate a minimum of 20% of loan portfolio to small business, defined as having assets of less than Rp 600 million, excluding land and each loan not exceeding Rp 200 million. Failure to do this allocation would affect "soundness of the bank" - Foreign /joint–venture banks required to extend 50% of their credits to export–oriented industries
February 90	State enterprises required to convert their deposits with domestic banks into SBI holdings.
February 91	Policy package on bank supervision - Capital adequacy based on the standard set by BIS, with a minimum amount of 8% of the risk-weighted assets and can be done in steps: 5% at the end of March 1992; 7% at the end of

	March 1993; 8% at the end of December 1993 - Liquidity credits subject to limits except for farm enterprises (KUT), credit to cooperatives, and to the State Logistic Agency (BULOG) - Net open position for all currencies at the maximum 20% of the capital, the maximum amount for each currency set at 25% of the capital - Maximum bank swap to Bank Indonesia 20% of the capital (from 25%), maturity of reswap longer than 1 month and up to 3 years - State enterprises and agencies' deposits with domestic banks converted into special SBI at the rate of 22 per cent - Regulations on opening new bank branches
October 91	Imposition of ceilings on offshore borrowing by banks
October 92	Financial deregulation package (PAKTO 30,92) - New banks paid-up capital increased from Rp10 billion to Rp50 billion for national commercial banks and from Rp50 billion to Rp 100 billion for foreign/joint-venture banks. - Rural banks (BPR) allowed to open branches in cities and local districts (Kabupaten) previously prohibited. - National commercial banks, state-owned banks, and rural banks allowed to merger if assets which resulted from merger not more than 20% of commercial banks' asset. - Foreign investors allowed to hold up to 49% of the shares of Indonesian banks - New rules for insurance companies; penalty for late financial reports
May 93	Financial deregulation package (PAKMEI 93): - Legal lending limit to a group of borrowers was reduced to 20 per cent of lender's capital - Banks that cannot meet their allocations of credits to small firms allowed to buy other banks small loans promissory notes -New regulations on items of capital for capital adequacy ratio

Sources: Bank Indonesia, *Annual Report*, various issues, Jakarta.

Cole, D.C. and Slade, B.F., 1990b. 'Development of money market in Indonesia', the Harvard Law School and Harvard Institute of International Development, mimeo, Boston, M.A.

Appendix 2.B

Macroeconomic adjustment policies 1983-93

Policies	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Exchange rate ¹	=====			=====							
Fiscal ²	=====										
Monetary & Financial ³	=====			=====	=====	=====	=====	=====	=====	=====	=====
Trade ⁴			=====	=====	=====	=====		=====		=====	
Others ⁵			=====	=====	=====	=====	=====	=====	=====	=====	=====

¹ Rupiah devalued; nominal exchange rate depreciated against US\$.

² Large projects rephased; government spending reduced; tax reforms initiated.

³ Interest & credit ceilings removed; new financial measures introduced; barriers to market entry removed; bank supervision; tight money policy.

⁴ Nominal tariffs reduced; import licensing restrictions reduced; non-tariff barriers greatly reduced.

⁵ Ports reorganised; foreign investment regulations relaxed; pharmaceutical & agricultural sectors deregulated.

Exchange rate policies. After removing foreign exchange controls in 1971, the rupiah was pegged to the US dollar until 1978. The much higher domestic inflation than that of the US, overvalued the rupiah and hence lowered competitiveness in international markets. The rupiah was then devalued by 50 per cent in November 1978 and a more flexible exchange rate system was adopted. The currency was depreciated at a steady rate (about 3 per cent per annum) against the dollar. In 1982 world petroleum prices dropped significantly and Indonesia faced balance of payments difficulties. The rupiah was again devalued by 39 per cent in March 1983 to stimulate non oil exports. The current account deficit dropped from US\$6.3 billion in 1983 to US\$1.8 billion in 1984. As petroleum prices continued to fall, the current account deficit widened to nearly US\$ 4 billion in 1986. Another significant devaluation (50 per cent) of the rupiah took place in September 1986. Supportive monetary and fiscal policies adopted following the devaluation made the real effective exchange rate depreciate by almost the same percentage. As a result, the

current account deficit was reduced to US\$ 2 billion in the following year and continued to decline until 1989, before climbing up again from 1990 due to the rapid increase in foreign borrowing.

Those three successive devaluations left the market vulnerable to currency speculation based on rumors or expectations of impending devaluations. Three heavy speculative attacks on the rupiah took place in 1984, 1987, and 1991. In response to the rapid build up of Indonesia's international reserves since 1992, the rupiah was allowed to appreciate modestly against the dollar during the last quarter of 1993, before beginning to depreciate again around the end of the year. This indication of the willingness of the authorities to exercise greater exchange rate flexibility may well have led to the emergence of a deeper foreign exchange market than has previously existed.

Fiscal policies. Since 1983 the government has been tightening its fiscal budget and improving tax structure. A major drop in petroleum prices motivated the government to rephase large capital and import-intensive projects in May 1983. To further reduce government expenditure, a major cutback in government real capital spending was initiated, followed by restraints on civil service employment and salaries. The government also tightly controlled the use of non-concessional import-related credits. From the revenue side, and also to reduce private spending, tax reforms were taken starting in January 1983. The reforms have included improving the tax structure and administration of all tax sources, and excluding taxes on foreign trade.

Trade policies. Prior to the 1980s Indonesia's trade regime was distorted, especially through import licensing. Besides misallocated resources, this created differences in incentives between importables and exportables production, between sales to domestic and export markets, and between tradeables and nontradeables. In the absence of a competent bureaucracy, this also created rent-seeking activities benefiting non exporters (Sjahrir and Pangestu 1992). Trade deregulation efforts undertaken since April 1985, therefore, have been primarily aimed at reducing (or

unifying) the incentives differences, eliminating rent-seeking activities, and improving resource allocation efficiency.

To reduce tariffs, an across-the-board reduction in nominal tariffs was implemented in 1985, 1986, and 1990. Further tariff reductions, mainly on manufactured goods, were taken in June 1993. This included reductions on 221 tariffs and 76 import surcharges. It was hoped that this would provide encouragement for non oil exports, both by reducing the cost of imported inputs, and through the exchange rate impact of stimulating the flow of imports. In this package it also contained measures to cut back the high level of protection on the automotive industry. But it appears that the level of protection was actually increased rather than decreased. Reductions on tariffs continued at the beginning of 1994, covering some 1,941 products imported from members of ASEAN under the Common Effective Preferential Tariff Scheme. Several other "politically sensitive" commodities such as plastics, steel, and soybean meal, however, remain highly protected.

From May 1986 to July 1992, a series of significant measures to reduce import licensing restrictions and promote exports were introduced. For example, measures to provide internationally-priced inputs to exporters. This scheme permits exporters and suppliers of inputs for exporters to bypass the import licensing system and to reclaim import duties, although the cost imposed by non-tariff barriers cannot be rebated. Significant reductions in import licensing restrictions was undertaken through a series of measures in October 1986, January and December 1987, November 1988, May 1990, and July 1992. This was combined with steps taken in December 1987 to reduce the anti-export bias of trade policy by reducing regulatory restrictions for exporters. To further reduce the high costs of the economy, major steps to remove and replace non-tariff barriers were initiated together with general reductions of tariff rates in May 1990 and July 1992.

Other economic policies. To increase efficiency, improve competition in the international market, and promote foreign investment, the above adjustment policies were accompanied by additional policies in different sectors of the economy. In April 1985 the government reorganised customs, ports and shipping operations to reduce

freight costs and cut processing time. This was followed by steps taken through the May 1986, October 1986, January 1987, and December 1987 packages to reduce investment and capacity requirements, relax foreign investment regulations, and reduce the role of the local content activities. A substantial deregulation of maritime activities was also announced in November 1988 in order to reduce costs and encourage private sector participation. In line with encouragement of investment, a restrictive positive list of areas open for investment was replaced with a short negative list. Some initial steps towards public enterprise reform were also undertaken. Deregulation was extended to pharmaceutical activities in the May 1990 package.

In the agricultural sector, several important regulatory changes were also taken from 1988 to 1991. The changes were intended to reduce rice production subsidies and controls on the importation of crop commodities that have been designed to achieve self-sufficiency and to protect domestic agricultural producers. The general moves to reduce and discontinue of subsidisation, and protect of the agricultural sector were perhaps motivated by the increasing capacity of manufacturing to absorb labour. The 1988 deregulation covers the elimination and replacement with tariffs of non-tariff barriers on a wide range of food items and the exemption from the 30 per cent duty on vegetable oils for the largest refiner and importer. Bulog's (the logistics board) appointment as the sole importer of maize was revoked in 1989.

In 1991, another important package was introduced. It consisted of deregulation on imports of fresh and frozen poultry, other fresh and preserved meats, fruits and nuts (with tariffs ranging from 10 to 20 per cent). The package also included: reduction in tariffs for palm and coconut oil from 30 to 10 per cent and for copra and palm kernel oil from 30 to 5 per cent; removal of the ban on soy meal imports and replacement with a 5 per cent tariff and 35 per cent surcharges; and elimination of licensing restrictions on tin-plate (a major input in the canning industry) and replacement with a 22.5 per cent duty.

The deregulation, however, was also combined with new domestic trade restrictions for some commodities. For example a consortium of clove traders was given the monopoly right to serve as middlemen between growers and cigarette manufacturers in return for operating a floor price system for producers. Similar monopoly right was also given for citrus fruit production and marketing. Other measures were announced in July 1992 to allow joint venture firms to hold land titles (right to use the land) and use them for credit collateral. The measures also included liberalisation of imports of used machinery, plant equipment and other capital goods, and liberalisation of expatriate work permits.

In response to the sharp decline in foreign investment through the beginning of 1993, the government introduced a new policy package intended to encourage a higher level of foreign investment, in October 1993. The time scale of divestment was lengthened considerably and can now be achieved by way of public flotation of foreign companies' shares, thus removing the need to find a suitable domestic partner. Small, fully foreign owned companies with capital as little as US\$ 2 million may now be established, provided their output is in the form of inputs for other industries. Foreign companies operating in industrial and bounded zones will be permitted to sell goods on the domestic market up to a value of 25 per cent of the value of goods they export.

Appendix 2.C

Table 1 Main economic indicators

	1980	1985	1990	1991	1992	1993
GDP (US\$ bn)	78	87.3	106.1	116.6	128.3	142.7
Growth (%)	9.8	2.6	7.2	6.9	6.4	6.7
Population (million)	140	164.6	182.7	186.1	189.5	192.9
Growth (% p.a.)	2.1	2.3	2	1.9	1.8	1.8
GNP per capita (US\$)	470	520	552	593	634	693
Share in GDP (%)						
Agriculture	24.8	23.2	21.5	19.6	19.2	18.4
Industry	34.4	35.8	39.4	41.4	40.5	39.1
Manufacturing	11.6	16	19.9	20.9	21.7	22.4
Mining and quarrying	25.7	14	13.4	13.8	11.9	8.9
Services	31.8	40.9	39.1	39	40.3	42.6
Share in GDP (%)						
Gross domestic investment	20.9	23.1	28.4	28.2	26.9	..
Gross domestic saving	37.2	29.8	37.3	35.5	37.7	38
Government expenditure	25.8	23.5	25.3	22.9	22.3	20.9
Government surplus	-2.3	-3.7	-5	-4.6	-4.2	-3.2
Inflation (% p.a. CPI)	18.5	4.7	9.9	9.9	5	10.2

Sources: *Asia Pacific Economics Group*, *Asia Pacific Profiles*, Australian National University, Canberra, various issues; *Bank Indonesia*, Annual Report, Jakarta, various issues.

Table 2 External economic indicators

	1980	1985	1990	1991	1992	1993
Merchandise exports (US\$bn)	21.9	18.6	26.8	29.6	33.8	33.4
% change	23.8	-6.5	16.7	10.5	14	-1.2
% GDP	28.1	21.3	25.3	25.4	26.3	23.4
Merchandise imports (US\$bn)	14.1	12.6	24.5	24.8	26.8	28
% change	32.7	-10.6	50.3	1.2	8.1	4.5
Merchandise trade balance (US\$bn)	7.8	6.1	2.3	4.8	7	5.4
Net invisibles (US\$bn)	-6.5	-7.9	-8.6	-9.2	-10.1	-10.7
Current account (US\$bn)	1.3	-1.8	-6.2	-4.4	-3.1	-5.3
% GDP	1.7	-2.1	-5.9	-3.8	-2.4	-3.7
Terms of trade (1985=100)	87.3	100	76.5	70.3	70.2	..
Export price index (1985=100)	63.1	100	163	157.3	162.8	..
Import price index (1985=100)	72.3	100	212.9	223.7	232	..
Foreign exchange reserves (US\$bn)	6.5	5.8	8.7	9.9	11.6	12.3
Exchange rate (Rp/US\$)	627	1111	1843	1950	2030	2081
Real exchange rate against major industrial economies (1985=100)	86	100	183	188	193	177
External long-term debt (US\$bn)	18.1	30.7	54	63.5	72.3	75.5
% GDP	25	35.2	50.9	54.5	56.4	52.9
External long-term debt service ratio (% exports)	12.7	24.9	24.9	23.5	26.7	24.5

Sources: *Asia Pacific Economics Group*, *Asia Pacific Profiles*, Australian National University, Canberra, various issues; *Bank Indonesia*, Annual Report, Jakarta, various issues.

Appendix 2.C continued

Table 3 Trade by destination and source (% share)

	1980	1985	1990	1991	1992	1993
Exports						
Destination (% share)						
ASEAN	12.6	10.6	9.8	11	11.6	12.8
Chinese economies	2.3	4.3	8.9	10.1	11.6	9.3
Korea	1.3	3.5	5.3	6.7	4.1	7.9
Japan	49.1	46	42.5	36.9	34.2	31.6
Australia and New Zealand	2	1.2	1.9	2.2	2.6	2.4
EEC	6.5	6.2	11.8	12.8	13.8	13.7
United States	19.6	21.6	13.1	12	13.7	14
Rest of the world	6.5	6.7	6.7	8.2	8.6	8.3
Imports						
Source (% share)						
ASEAN	12.4	9.4	8.2	9.5	10.2	12.4
Chinese economies	7.1	5.7	10.3	9.2	9.2	17.7
Korea	2.2	2	4.5	5.6	7.7	7.9
Japan	31.3	25.7	24.8	24.5	22.3	10.2
Australia and New Zealand	4.2	5.2	6	5.8	5.5	5
EEC	13.5	17.5	18.8	18.2	20.2	18
United States	12.9	16.7	11.5	13.1	11.1	9.2
Rest of the world	16.5	17.7	15.9	14.1	13.5	17.7

Sources: *Asia Pacific Economics Group*, *Asia Pacific Profiles*, Australian National University, Canberra, various issues; *Bank Indonesia*, Annual Report, Jakarta, various issues.

Table 4 Trade by principal commodities (US\$m)

	1980	1985	1990	1991	1992	1993
Total merchandise exports	21908	18587	25675	29142	33967	36264
Oil and natural gas	12858	12339	11071	10895	10671	9911
% merchandise exports	58.7	66.3	43.1	37.4	31.4	27.3
% annual growth	44.8	2	27.6	-1.6	-2.1	-7.1
Agriculture	4773	2963	3700	4214	4445	4730
% merchandise exports	21.8	16	14	14	13	13
% annual growth	..	-3.2	1	14	5	6
Mining and minerals	3744	830	1410	1642	2190	1998
% merchandise exports	17.1	4.5	5.5	5.6	6.4	5.5
% annual growth	..	-0.9	-19.8	16.5	33.4	-8.8
Wood and wood products	68	942	3630	4060	4691	6113
% merchandise exports	0.3	5	14.1	13.9	13.8	16.9
% annual growth	..	36.3	0.4	11.8	15.5	30.3
Manufacturing	465	1513	5864	8331	11970	13511
% merchandise exports	2.1	8.2	22.8	28.6	35.2	37
% annual growth	..	9.5	32.1	42.1	43.7	12.9
Total merchandise imports	9674	9103	21931	26114	27301	27612
Crude oil and oil products	1744	1273	1735	2299	2025	1961
% merchandise imports	18	14.1	7.9	8.8	7.4	7.1
% annual growth	..	-15.3	47	32.5	-11.9	-3.2
Consumer goods	2035	1338	1733	2035	2384	2457
% merchandise imports	21	14.9	7.9	7.8	8.7	8.9
% annual growth	..	..	17.4	17.1	3.1	..
Intermediate goods	2651	2823	8277	8963	9818	10167
% merchandise imports	27.5	31	37.7	34.3	36	36.8
% annual growth	..	..	8.3	9.5	3.6	..
Capital goods	3244	3639	10186	12817	13075	13037
% merchandise imports	33.5	40	46.4	49.1	47.9	47.2
% annual growth	..	..	25.8	2	-0.3	..

Sources: *Asia Pacific Economics Group*, *Asia Pacific Profiles*, Australian National University, Canberra, various issues; *Bank Indonesia*, Annual Report, Jakarta, various issues.

Appendix 4.A

Stiglitz and Weiss (1981) model

Assume each project has a distribution of gross return $F(R, \theta)$, where R is the gross return on a project, incorporating the mean and the variance and θ is a measure of the riskiness (i.e. the variance) of the project. An individual borrows the amount of L at interest rate r . The individual defaults if the return R plus the collateral C is insufficient to pay back the loan (L), i.e. if

$$C + R \leq L(1+r) \quad (1)$$

The net return to the borrower $\Pi_1(R, r)$ can be written as

$$\Pi_1(R, r) = \max (R - L(1+r); -C) \quad (2)$$

The return to the bank $\Pi_2(R, r)$, that is the loan plus interest or the maximum possible $R+C$, or

$$\Pi_2(R, r) = \min (R + C; L(1+r)) \quad (3)$$

Borrower and lender are risk neutral, i.e. the net return to the borrower and the return to the bank can be written as functions of the project return R . From (2), the net return to the borrower is a convex function of R and hence expected return increases with risk. Stiglitz and Weiss maintain that the interest rate can be used as a screening device. For a given interest rate r , there is a critical value $\hat{\theta}$ such that a firm

borrowers from the bank if and only if $\theta > \hat{\theta}$. The value of $\hat{\theta}$ for which expected net return are zero satisfies:

$$\Pi_1(r, \hat{\theta}) = \int_0^{\infty} \max[R - L(1+r); -C] \partial F(R, \hat{\theta}) = 0 \quad (4)$$

An increase in interest rate induces an adverse selection effect through the worsening of the mix of applicants, i.e. differentiating (4) over r

$$\frac{\partial \hat{\theta}}{\partial r} = \frac{B \int_{L(1+r)-C}^{\infty} \partial F(R, \hat{\theta})}{\partial \Pi_1 / \partial \hat{\theta}} > 0 \quad (5)$$

that is the critical value of θ increases as the interest rate increases.

In the presence of moral hazard problems in banking, Equation (3) would become:

$$\Pi_2(R, r) = \min(L(1+r)) \quad (6)$$

Appendix 5.A

The 'actuarially fair' premium

Assume that a bank that is assumed to be risk averse lends an amount of loan L at interest rate r .¹ The bank's gross return from the loan is subject to some uncertainty regarding the risks involve in credit markets which lead to a default on the loan. Let p be the probability of a default, and $1-p$ be the probability of no default. If there is no

¹One might worry about what would happen if the bank was risk neutral and the contract was actuarially unfair? In this case, it is possible that the first-order condition and the problem do not have a solution. For the sake of simplicity and for the later discussion and analysis, we will limit ourselves to assume that the bank is risk averse. For detailed discussion on this matter, see Kreps (1990).

default the bank would receive a gross return from the loan $\pi = L(1+r)$. If there is a default, the gross return would be π' , i.e. in an extreme case π' could equal zero. The central bank is willing to insure against the loss or the default loan $D = \pi - \pi'$. If the bank pays a premium of δ , the central bank will be prepared to pay D back if the bank sustains this loss. The bank may buy a partial coverage $a\delta$ and it will get back aD if it sustains the loss.

The bank is assumed to have a (indirect) utility function v , which is strictly increasing, concave, and differentiable. The bank's problem concerning how much insurance to buy can be written

$$\underset{a}{\text{Max}} (1-p) v(\pi - a\delta) + p v(\pi' + aD - a\delta) \quad (1)$$

The first-order condition of this problem is

$$(1-p)\delta v'(\pi - a\delta) = p(D-\delta) v'(\pi' - (1-a)D - a\delta) \quad (2)$$

as $\pi' = \pi - D$ and $\pi' + aD = \pi - (1-a)D$

Since the (direct) utility function u is concave and a is unconstrained, the first-order condition is necessary and sufficient for a solution.

The insurance contract is said to be 'actuarially fair' if the expected payout equals the premium, that is if $pD = \delta$. This equality can be rewritten as $(1-p)\delta = p(D-\delta)$. Hence, if the contract is 'actuarially fair', the first-order condition becomes

$$v'(\pi - a\delta) = v'(\pi' - (1-a)D - a\delta) \quad (3)$$

or when $a=1$, and the bank will purchase full insurance and pay a premium of δ . The central bank is thus prepared to pay the amount of the default loan back to the bank if the bank sustains the default.

References

- Anderlini, L., 1986. *Central Banks and Moral Hazard*, Economic Theory Discussion Paper No. 103, Department of Applied Economics, University of Cambridge, Cambridge, Massachusetts.
- Asia Pacific Economics Group, *Asia Pacific Profiles*, various issues, Australian National University, Canberra.
- Atiyas, I., 1989. *The Private Sector's Response to Financial Liberalization in Turkey : 1980 - 1982*, Policy, Planning, and Research Working Paper WPS147, The World Bank, Washington, D.C.
- Balassa, B., 1989a. *The Effects of Interest Rates on Savings in Developing Countries*, Policy, Planning, and Research Working Paper, WPS56, The World Bank, Washington, D.C.
- , 1989b. *Financial Liberalization in Developing Countries*, PPR Working Papers, WPS55, The World Bank, Washington, D.C.
- Bank Indonesia, *Annual Report*, various issues, Jakarta.
- , *Indonesian Financial Statistics*, various issues, Jakarta.
- Barro, R. J., 1977. 'Unanticipated money growth and unemployment in the United States', *American Economic Review*, 67:101-15.
- , 1978. 'Unanticipated money and price level', *Journal of Political Economy*, 86:549-80.
- and Rush, M., 1980. 'Unanticipated money and economic activity', in S. Fischer, ed., *Rational Expectations and Economic Policy*, University of Chicago Press, Chicago, Illinois.
- Bencivenga, V. and Smith, B., 1991. 'Financial intermediation and endogenous growth', *The Review of Economic Studies*, 58:195-209.
- Borch, K., 1962. 'Equilibrium in a reinsurance market', *Econometrica*, 30(3):424-44.
- Brillembourg, A. and Khan, M.S., 1979. 'The relationship between money, income, and prices : has money mattered historically?', *Journal of Money, Credit, and Banking*, 11(3):358-65.
- Calvo, G.A., 1988. 'Servicing the public debt: the role of expectations', *American Economic Review*, 78:647-61.
- and Coricelli, F., 1991. Stagflation effects of stabilization programs in reforming socialist countries: enterprise-side vs household-side factors, mimeo, International Monetary Fund, Washington, D.C.
- and Guidotti, P.E., 1991. Interest rates, financial structure, and growth: Bolivia in a comparative perspective, mimeo, International Monetary Fund, Washington, D.C.

- _____ and Vegh, C.A., 1990. *Interest Rate Targeting in a Small Open Economy: the predetermined exchange rate case*, Working Paper WP/90/21, International Monetary Fund, Washington, D.C.
- Caves, R.E., Frankel, J.A. and Jones, R.W., 1993. *World Trade and Payments: an introduction*, Harper Collins, New York.
- Cecchetti, S.G., 1986. 'Testing short-run neutrality', *Journal of Monetary Economics*, 17: 409-23.
- Chambers, R.G. and Quiggin, J., 1992. *Production Under Uncertainty*, Working Paper No. 92-03, University of Maryland, College Park.
- _____, 1993. *The Moral Hazard Problem*, Working Paper - forthcoming, Centre for Economic Policy Research, The Australian National University, Canberra.
- Cho, Y. J., 1986. 'Inefficiencies from financial liberalization in the absence of well-functioning equity markets', *Journal of Money, Credit and Banking*, 18(2):192-99.
- _____ and Khatkhate, D., 1989. *Lessons of Financial Liberalization in Asia: a comparative study*, Discussion Papers 50, The World Bank, Washington, D.C.
- Cole, D.C. and Slade, B.F., 1990a. Indonesia's financial development: a different sequencing?, Paper presented at seminar on Financial Sector Liberalization and Regulation, mimeo, Cambridge, Massachusetts, June 10-15.
- _____, 1990b. Development of money markets in Indonesia, the Harvard Law School and Harvard Institute of International Development, mimeo, Boston, Massachusetts.
- Corbo, V. and de Melo, J., 1985. 'Overview and summary', *World Development*, 13(8):863-66, (Special issue on 'Liberalization with Stabilization in the Southern Cone of Latin America").
- _____, de Melo, J. and Tybout, J., 1986. 'What went wrong with the recent reforms in the Southern Cone', *Economic Development and Cultural Change*, 34(3):607-40.
- de Gregorio, J., 1992. Liquidity constraints, human capital accumulation and growth, mimeo, International Monetary Fund, Washington, D.C.
- _____, and Guidotti, P.E., 1992. *Financial Development in Economic Growth*, Working Paper WP/92/101, International Monetary Fund, Washington, D.C.
- de Melo, J. and Tybout, J., 1986. 'The effects of financial liberalization on savings and investment in Uruguay', *Economic Development and Cultural Change*, XXXIV(April):561-88.
- Diamond, D.W. and Dybvig, B.H., 1983. 'Bank runs, deposit insurance, and liquidity', *Journal of Political Economy*, 91:401-19.
- Diaz-Alejandro, C.F., 1985. 'Good-bye financial repression and hello financial crash', *Journal of Development Economics*, 19(4):1-24.

- Dominguez, K.M., 1993. *Does Central Bank Intervention Increase Volatility of Foreign Exchange Rates?*, Working Paper No. 4532, National Bureau of Economic Research, Cambridge, Massachusetts.
- Dornbusch, R., 1990. 'Policies to move from stabilization to growth', *Proceedings of the World Bank Annual Conference on Development Economics*, the World Bank, Washington, D.C.
- Dowd, K., 1992. 'Models of banking instability: a partial review of the literature', *Journal of Economic Surveys*, 6(2):107-32.
- Easterly, W., 1990. Endogenous growth in developing countries with government induced distortions, mimeo, the World Bank, Washington, D.C.
- Edwards, S., 1984. 'The order of liberalization of the external sector in developing countries', *Essays in International Finance*, 156(December), Princeton University, Princeton, New Jersey.
- Far Eastern Economic Review*, 1993. 'Banking, new boys challenge', 1 April.
- Freeman, S., 1988. 'Banking as the provision of liquidity', *Journal of Business*, 61:45-64.
- Frenkel, J.A., 1982. 'The order of economic liberalization: lessons from Chile and Argentina: a comment', in *Economic Policy in a World of Change*, Carnegie-Rochester Conference Series on Public Policy, 17:199-201.
- Fried, J. and Howitt, P., 1980. 'Credit rationing and implicit contract theory', *Journal of Money, Credit, and Banking*, 12(3):471-87.
- Friedman, B.M., 1985. 'Monetary and regulatory policies for developing financial systems' in *Monetary Policy in a Changing Financial Environment*, Bank of Korea, Seoul.
- Friedman, M.S., 1969. *The Optimum Quantity of Money and Other Essays*, Aldine Publishing Company, Chicago, Illinois.
- and Schwartz, A.J., 1986. 'Has government any role in money', *Journal of Monetary Economics*, 17(January):37-62.
- Friesen, C.M., 1986. *International Bank Supervision*, Euromoney Publications, Great Britain.
- Fry, M.J., 1978. 'Money and capital or financial deepening in economic development?', *Journal of Money, Credit, and Banking*, 110(4):464-75.
- , 1980. 'Saving, investment, growth and the cost of financial repression', *World Development* 8(4):317-27.
- , 1988. *Money, Interest, and Banking in Economic Development*, the John Hopkins University Press, Baltimore.
- and Mason, A., 1982. 'The variable rate-of-growth effect in the life-cycle saving model: children, capital inflows, interest and growth in a new specification of the life-cycle model applied to seven Asian developing countries', *Economic Inquiry*, XX(July):426-42.

- Fukao, M., 1991. 'Exchange rate movements and capital-asset ratio of banks: on the concept of structural positions', *Bank of Japan Monetary and Economic Studies*, 9(2):91-104.
- Galbis, V., 1977. 'Financial intermediation and economic growth in less-developed countries : a theoretical approach', *The Journal of Development Studies*, 13(2):58-72.
- , 1987. Interest rate policy in developing countries, mimeo, International Monetary Fund, Washington, D.C.
- , 1993. *High Real Interest Rates Under Financial Liberalization: is there a problem?*, Working Paper WP/93/7, International Monetary Fund, Washington, D.C.
- Gelb, A., 1989. *Financial Policies, Growth, and Efficiency*, Working Paper WPS 202, the World Bank, Washington, D.C.
- Giovannini, A., 1985. 'Saving and the real interest rate in LDCs', *Journal of Development Economics*, XVIII(August):197-210.
- Gochoco, M.S., 1986. 'Tests of the money neutrality and rationality hypotheses: the case of Japan 1973-1985', *Journal of Money, Credit, and Banking*, 18(4):458-65.
- Goldsmith, R.W., 1969. *Financial Structure and Development*, Yale University Press, New Haven, Connecticut
- Greenbaum, S.I. and Higgins, B., 1983. 'Financial innovation', in *Financial Services: the changing institutions and government policy*, G.J. Benston, ed., Englewood Cliffs, Prentice-Hall, New Jersey.
- Greenwood, J. and Jovanovic, B., 1990. 'Financial development, growth, and the distribution of income', *Journal of Political Economy*, 98:1076-108.
- Grossman, S.J. and Hart, O.D., 1983. 'An analysis of the principal-agent problem', *Econometrica*, 51(1):7-45.
- Guidotti, P.E. and Kumar, M., 1991. *Domestic Public Debt of Externally Indebted Countries*, Occasional Paper, International Monetary Fund, No. 80(June), Washington, D.C.
- Gupta, K.L., 1984. 'Financial intermediation, interest rate and the structure of savings: evidence from Asia', *Journal of Economic Development*, IX(July):7-24.
- Gurley, J.G. and Shaw, E.S., 1960. *Money in a Theory of Finance*, Brookings Institution, Washington, D.C.
- Hanson, J. and de Melo, J., 1985. 'External shocks, financial reforms, and stabilisation attempts in Uruguay during 1974-1983', in V. Corbo and J. de Melo, eds., *Liberalisation with Stabilisation in the Southern Cone of Latin America*, special issue of World Development, 13(August):914-39.
- Harberger, A.C., 1984. 'Lessons for debtor-country managers and policy-makers', in *International Debt and Developing Countries*, G.W. Smith and J.T. Cuddington, eds., the World Bank, Washington D.C.
- Hardy, D.C., 1993. *Reserve Requirements and Monetary Management: an introduction*, IMF Working Paper WP/93/35, International Monetary Fund, Washington, DC.

- Harris, J., Schiantarelli, F. and Siregar, M., 1992. Financial and investment behavior of the Indonesian manufacturing sector and the effect of liberalization: evidence from panel data, 1981-1988, paper presented at the conference on The Impact of Financial Reform, April, the World Bank, Washington D.C.
- Harris, M. and Raviv, A., 1976. Optimal incentive contracts with imperfect information, mimeo, Carnegie Mellon University.
- Holmstrom, B., 1979. 'Moral hazard and observability', *The Bell Journal of Economics*, 10(1):74-91.
- _____, 1984. 'A note on the first-order approach in principal agent models', mimeo.
- International Monetary Funds, *International Financial Statistics Yearbook*, various issues, Washington, D.C.
- Jacklin, C., 1988. Demand equity and deposit insurance, mimeo, Stanford University, California.
- Jappelli, T. and Pagano, M., 1992. *Savings, Growth and Liquidity Constraints*, Discussion Paper, CEPR.
- Jewitt, I., 1988. 'Justifying the first-order approach to principal-agent problems', *Econometrica*, 56(5):1177-90.
- Kane, E.J., 1985. *The Gathering Crisis in Federal Deposit Insurance*, MIT Press, Boston, Massachusetts.
- Kapur, B.K., 1974. *Monetary Growth Models of Less Developed Economies*, Ph.D. thesis, Dept. of Economics, Stanford University, California.
- _____, 1976. 'Alternative stabilization policies for less developed economies', *Journal of Political Economy*, 84(4):777-95.
- Keeley, M., 1990. 'Deposit insurance, risk, and market power in banking', *American Economic Review*, 80(December):1183-1200.
- Khan, M. and Villanueva, D. 1991. *Macroeconomics Policies and Long-term Growth: a conceptual and empirical review*, Working Paper WP/91/28, International Monetary Fund, Washington, D.C.
- Khatkhate, D.R., 1988. 'Assessing the impact of interest rates in less developed countries', *World Development*, May:577-88.
- Kompas*, 31 May 1993.
- Kreps, D.M., 1990. *A Course in Macroeconomic Theory*, Harvester Wheatsheaf, New York.
- Krueger, A.O., 1983. Problems in liberalization, paper presented at a conference on The World's Economic Growth Problems, April, Mexico City.

- Lee, J., 1991. *Financial Sector and Economic Development: a survey*, Report No. 55, Economics and Development Resource Centre, Asian Development Bank, Manila.
- Leite, S.P. and Makonnen, D., 1986. 'Saving and interest rates in the BCEA countries: an empirical analysis', *Savings and Development*, July-September:219-31.
- Leung, S., 1991. 'Financial liberalization in Australia and New Zealand', in *Authority and Academic Scribblers: the role of research in East Asian policy reform*, S. Ostry (ed.), Economic Development Institute of the World Bank, Washington D.C.
- Levine, R., 1992. *Financial Structure and Economic Development*, Working Paper WPS 849, The World Bank, Washington, D.C.
- MacIntyre, A.J., 1991. The politics of finance in Indonesia: controls, confusion, and competition, Government, Financial Systems and Economic Development Project, mimeo, East West Centre, Honolulu.
- Manchester, J., 1989. 'How money affects real output', *Journal of Money, Credit, and Banking*, 21(1):16-31.
- Markus, A. and Shaked, I., 1984. 'The valuation of FDIC Deposit Insurance using option pricing estimates', *The Journal of Money, Credit and Banking*, 16:446-60.
- Mathieson, D.J., 1980. 'Financial reform and stabilization policy in a developing economy', *Journal of Development Economics*, 7(3):359-85.
- McKinnon, R.I., 1973. *Money and Capital in Economic Development*, Brookings Institution, Washington, D.C..
- , 1982. 'The order of economic liberalization: lessons from Chile and Argentina', *Carnegie-Rochester Conference Series on Public Policy* 17, North Holland Publishing Company, pp. 159-186.
- , 1986. 'Issues and perspectives : an overview of banking regulation and monetary control', in *Pacific Growth and Financial Interdependence*, A.H.H. Tan and B. Kapur (eds.), Allen and Unwin, Sydney.
- , 1988. 'Financial liberalization in retrospect: interest rate policies in LDCs', in *The State of Development Economics: program and perspectives*, G. Ranis and T.P. Schulz (eds.), Basil Blackwell Inc., New York.
- , 1989. 'Financial liberalization and economic development : a reassessment of interest rate policy in Latin America', *Oxford Review of Economic Policy*, 5(4):29-54.
- , 1991. 'Monetary stabilization in LDCs', in *Liberalization in the Process of Economic Development*, L.B. Krause and K. Kihwan (eds.), University of California Press, Berkeley and LA, California.
- Merton, R., 1977. 'An analysis derivation of the cost of deposit insurance and loan guarantees', *Journal of Banking and Finance*, 1:3-11.
- Mirrlees, J., 1974. 'Notes on welfare economics, information, and uncertainty', in M. Balch, D. McFadden, and S. Wu (eds.), *Essays on Economic Behavior under Uncertainty*, North-Holland, Amsterdam.

- _____, 1975. The theory of moral hazard and unobservable behavior - part I, mimeo, Nuffield College, Oxford.
- _____, 1976. 'The optimal structure of incentives and authority within an organization', *The Bell Journal of Economics*, 7(1):105-31.
- Mishkin, F.S., 1982. 'Does anticipated monetary policy matter?: an economic investigation', *Journal of Political Economy*, 90:22-51.
- _____, 1983. *A Rational Expectations Approach to Macroeconometrics*, University of Chicago Press, Chicago, Illinois.
- Mundell, R.A., 1965. 'Growth, stability and inflationary finance', *Journal of Political Economy*, 73(April):97-109.
- Nasution, A., 1989. Recent deregulation of the banking sector in Indonesia, Faculty of Economics, mimeo, University of Indonesia, Jakarta.
- _____, 1991. 'Survey of recent development', *Bulletin of Indonesian Economic Studies*, 27(2).
- _____, 1992a. *Reforms of the Banking Sector in Indonesia, 1983-1991*, Working Paper, Faculty of Economics, University of Indonesia, Jakarta.
- _____, 1992b. The years of living dangerously: the impacts of financial sector policy reforms and increasing private sector external indebtedness in Indonesia, 1983-1992, Paper presented at the East Asia Economic Association (EAEA) Third convention, August 20-21, Seoul.
- Osano, H. and Tsutsui, Y., 1985. 'Implicit contracts in the Japanese bank loan markets', *Journal of Economic Theory*, 20(2).
- Park, Y.C., 1991. 'Financial repression and Liberalization', in *Liberalisation in the Process of Economic Development*, L.B. Krause and K. Kihwan (eds.), University of California Press, Berkeley and LA, California.
- Polak, J., 1989. *Financial Policies and Development*, Development Center Studies, OECD, Paris.
- Rasyid, M., 1992. Exchange rate policy: the Indonesian experience, paper presented at the Federal Reserve Conference, September, San Fransisco.
- Rogerson, W.P., 1985. 'The first-order approach to principal-agent problems', *Econometrica*, 53(6):1357-67.
- Roubini, N. and Sala-i-Martin, X., 1992. 'Financial repression and economic growth', *Journal of Development Economics*, 39:5-30.
- Saint-Paul, G., 1992. 'Technological choice, financial markets and economic development', *European Economic Review*, 36:763-81.
- Shavell, S., 1979. 'Risk sharing and incentives in the principal and agent relationship', *The Bell Journal of Economics*, 10(1):55-73.

- Shaw, E.S., 1973. *Financial Deepening in Economic Development*, Oxford University Press, London.
- Shea, J., 1990. 'Financial development in Taiwan : a macro analysis', *Conference on Financial Development in Japan, Korea, and Taiwan*, August, The Institute of Economics, Academia Sinica, ROC.
- Sjahrir and Pangestu, M., 1992. 'Adjustment policies of small open economies: the experience of Indonesia', in *Economic Reform and Internationalisation China and the Pacific Region*, R. Garnaut and L. Guoguang (eds.), Canberra.
- Smith, B.D., 1984. 'Private information, deposit-interest rates, and the stability of the banking system', *Journal of Monetary Economics*, 14:293-317.
- Snoek, H., 1989. 'Problems of bank supervision in LDCs', *Finance & Development*, December:14-6.
- Spencer, D.E., 1989. 'Does money matter?: the robustness of evidence from vector autoregressions', *Journal of Money, Credit, and Banking*, 21(4):442-54.
- Stiglitz, J.E. and Weiss, A., 1981. 'Credit rationing in markets with imperfect information', *The American Economic Review*, 71(3):393-409.
- _____ and Greenwald, B., 1992. *Towards a Reformulation of Monetary Theory: competitive banking*, NBER Working Paper no. 4117, National Bureau of Economic Research, Cambridge, Massachusetts.
- Sundararajan, V. and Molho, L., 1988. *Financial Reform and Monetary Control in Indonesia*, Working Paper WP/88/4, International Monetary Fund, Washington, D.C.
- Suwidjana, N., 1984. *Jakarta Dollar Market: a case of financial development in ASEAN*, Occasional Paper no. 76, Institute of Southeast Asian Studies.
- Tirole, J., 1988. *The Theory of industrial Organisation*, The MIT Press, Cambridge, Massachusetts.
- Tobin, J., 1965. 'Money and economic growth', *Econometrica*, 33(4):671-84.
- _____, 1985. 'Financial innovation and deregulation in perspective', *Bank of Japan Monetary and Economic Studies*, 3(2):19-29.
- _____ and Brainard, W.C., 1967. 'Financial intermediaries and the effectiveness of monetary controls', in *Financial Markets and Economic Activity*, Hester and Tobin (eds.), Yale University Press, New Haven.
- Tseng, W. and Corker, R., 1990. *Financial Liberalization, Money Demand, and Monetary Policy in the SEACEN Countries During the 1980s*, Occasional Paper, International Monetary Fund, Washington, D.C.
- Villanueva, D. and Mirakhor, A., 1990. *Interest Rate Policies, Stabilization, and Bank Supervision in Developing Countries; strategies for financial reforms*, IMF Working Paper, WP/90/8, Washington, D.C.

- White, L.J., 1991. *The S+L Debacle: public policy lessons for bank and thrift regulation*, Oxford University Press, London.
- World Bank, 1989. *World Development Report*, Washington D.C.
- Woo, W.T., 1991. *Strengthening Macroeconomic Management in Indonesia*, Final Report, Economic Department and Pacific Rim Studies Program, University of California, Davis, California.
- _____ and Hirayama, K., 1994. Monetary autonomy in the presence of capital flows: never the twain shall meet?, paper presented in the NBER 5th Annual East Asian Seminar on Economics, June 15-18, Singapore.
- Yang, Y., 1990. A micro analysis of the financial system in Taiwan, Conference on Financial Development in Japan, Korea and Taiwan, August, The Institute of Economics, Academia Sinica, ROC.
- Yusuf, S. and Peters, R.K., 1984. *Savings Behavior and Its Implications for Domestic Resource Mobilization: the case of the Republic of Korea*, Staff Working Paper No. 628, the World Bank, Washington, D.C.