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**THE LINKAGE BETWEEN BANKING SECTOR,
ECONOMIC FUNDAMENTALS AND
THE INDONESIAN CURRENCY CRISIS**

A thesis presented in partial fulfillment of the requirements for
the degree of Master of Applied Economics in
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Abstract

This study shows that a link exists between the weaknesses in the banking sector, economic fundamentals and the rapid depreciation of the rupiah exchange rate. The weakness in the banking sector was strongly associated with the number of insolvent banks and the rise in foreign liabilities of the banking sector in the pre-crisis period. The increase in the ratio of trade deficit to GDP and the rise in the domestic and foreign interest rate differential largely contributed to the deterioration in the Indonesian economic fundamentals during 1990-1998. Somewhat surprisingly, the interaction variable between the ratio of foreign reserves to imports and the foreign and domestic interest rate is statistically significant. This finding implies that the impact of the change in the ratio of foreign reserves to imports on the change in the rupiah exchange rate is moderated by the magnitude of the foreign and domestic interest rate differential. Similarly, the change in the rupiah exchange rate resulting from a change in the foreign and domestic interest rate differential is moderated by the value of the ratio of foreign reserves to imports. Finally, the dummy variable used to capture the effect of a change in the policy of exchange rate regime shows that the abandonment of the pegged exchange rate regime led to the rapid depreciation of the rupiah exchange rate.

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Glossary

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BPS	Biro Pusat Statistik (the central bureau of statistics of Indonesia)
BI	Bank Indonesia (the central bank of Indonesia)
BNI	Bank Negara Indonesia (one of the largest state banks)
BHS	Bank Harapan Sentosa (one of the Indonesian private bank, liquidated in November 1997)
BCA	Bank Central Asia (one of the largest private bank in Indonesia)
BDNI	Bank Dagang National Indonesia (one of the Indonesian private bank)
BPR	Bank Perkreditan Rakyat (people's credit banks, small urban and rural banks)
CAMEL	Capital Assets Capital Adequacy Ratio Management Earnings and Liquidity
CAR	Capital Adequacy Ratio
CPI	Consumer Price Index
ERM	European Exchange Rate Mechanism
EMS	European Monetary System
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IBRA	Indonesian Bank Restructuring Agency
IMF	International Monetary Fund
LDR	Loan-to-Deposit Ratio
MPR	Majelis Permusyawaratan Rakyat (the Indonesian High Representative Assembly)
NBFI	Non-bank Financial Institution
NOP	Net Open Position

PAKDES	Paket Desember 1987 (a banking deregulation issued 20 December 1988)
PAKFEB	Paket Februari 1991 (a banking deregulation issued 29 February 1991)
PAKJAN	Paket Januari 1990 (a banking deregulation issued 29 January 1990)
PAKMAR	Paket Maret 1989 (a banking deregulation issued 25 March 1989)
PAKTO	Paket Oktober 1988 (a banking deregulation issued 27 October 1988)
PEP-LIPI	Puslitbang Ekonomi dan Pembangunan, Lembaga Ilmu Pengetahuan Indonesia (Centre for Economic and Development Studies, the Indonesian Institute of Sciences)
PPP	Purchasing Power Parity
PRI	Institutional Revolutionary Party
Rp	Rupiah (the Indonesian currency)
SBI	Sertifikat Bank Indonesia (Bank Indonesia certificate, a security issued by Bank Indonesia)
SBPU	Surat Berharga Pasar Uang (money market security that can be sold to Bank Indonesia)
USA	United States of America

CHAPTER 1

INTRODUCTION

The occurrence of currency crises can not be avoided in the world economy today. For instance, the inability of Mexico to roll over its short-term debts caused the first currency crisis of Latin America in the 1980s (Kaminsky and Pereira, 1996). In the context of global financial market, a currency crisis also attacked and caused the collapse of Europe's financial market collapsing the Europe's Exchange Rate Mechanism (ERM) in 1992-1993. One year later, another crisis came to Mexico in 1994-1995 causing yet another currency crisis in Latin America (Dornbusch and Werner, 1994, Sachs, Tornell and Velasco, 1996, and Carstens and Schwartz, 1998). Recently, the meltdown of the Thai baht in May 1997 had brought about the Asian currency crisis, sweeping away the 1990's economic miracle of Thailand, Indonesia, Malaysia, the Philippine, and South Korea.

Following the Asian currency crisis in 1997, there have been a number of publications, from short papers to books, dealing with this issue. Most agree that the main cause of the crisis is the sudden loss of confidence by both domestic and foreign investors in the domestic currency. As investment portfolios change, that is, the sudden withdrawal of domestic assets that placed into foreign assets, which in turn, depreciates the domestic currency (Radelet and Sachs, 1998, Goldstein, 1998, and Montes, 1999). Similarly, in the case of Indonesia, the main cause of the crisis was the sudden loss of confidence in the Indonesian rupiah, producing the huge conversion of the rupiah into the US dollar, and therefore, the rapid depreciation of the rupiah. According to these studies, however, there were various factors as to why the Indonesian economy was vulnerable toward the lost confidence. These factors include the pegged exchange rate system, the weak banking sector resulting from a weak banking supervision and regulations, and also the weak economic fundamentals leading to the rise in external debts and the sustainability of current account deficit (McLeod, 1998, Sadli, 1998, Johnson, 1998, and Soesastro and Basri, 1998).

There are at least two points that can be made in regard to the above studies. Firstly, most studies on the Indonesia currency crisis tended to put Indonesia together with the other Asian crisis countries. Consequently, they paid less attention to specific characteristics of the Indonesian economy, particularly its banking sector. Secondly, most studies use a descriptive approach in analysing the onset of the Indonesian crisis. For this reason, a study on the origin of the crisis needs a formal statistical approach.

This thesis consists of six chapters. Chapter 1 provides an introduction capturing definition of the currency crisis, objectives of the study, and research methodology. Chapter 2 reviews literature of currency crises, emphasising the classical and modern approaches on the currency crisis. Chapter 3 examines the major banking reforms in Indonesia and its implication on the development of the banking sector, 1983-1994, the scope of the Indonesian banking supervision and regulations, and the linkage between the banking sector and the currency crisis of 1997-1998. Chapter 4 provides data analysis, reviewing descriptively the chronology of the currency crisis and the proximate causes of the Indonesian financial vulnerability, which focus on two symptoms: the deterioration of the Indonesian economic fundamentals and the banking sector. Chapter 5 presents an econometric approach of this study. Finally, Chapter 6 provides conclusions of this study and recommendations for further studies.

1.1 Definition of Currency Crisis

According to literature, there have been various definitions of currency crises. Kaminsky and Reinhart (1996) state that, generally, currency crises lead to unwanted events in the economy, such as a sharp devaluation of domestic currency, sudden international reserve losses, changes in exchange rate system, a capital control, and a temporary shutdown of foreign exchange market. However, a currency crisis is mostly defined as a rapid-continuous depreciation of domestic currency. For instance, Frankel and Rose (1996) state

that a currency crisis is at least 25% nominal depreciation of the currency or 10% increase in the rate of depreciation. Similarly, Kaminsky and Reinhart (1998) define a currency crisis as a large and rapid depreciation of the currency, which is mostly affected by speculative attacks.

In regard to the above definitions, this study defines the Indonesian currency crisis as a rapid depreciation of the nominal exchange rate of the Indonesian rupiah, in which the rupiah exchange rate is measured by the number of the rupiah (Rp) per unit of the US dollar (i.e. Rp/USD). The US dollar is used as the benchmark currency simply because most of foreign transactions of Indonesia use the US dollar. The United States is also the main destination of the Indonesian exports. Note, however, that in the econometric analysis (Chapter 5) this study measures the rupiah exchange rate by the number of US dollars per unit rupiah (i.e. USD/Rp). This calculation is to indicate that a negative sign means the depreciation of the rupiah exchange rate and a positive sign is the appreciation of the rupiah.

1.2 Objectives of the Study

This study has two objectives:

- To examine the relationship between the weakness in the banking sector and the rapid depreciation of the Indonesian currency in 1997-1998. This study assumes three factors indicating the weakness in the banking sector: the large number of insolvent banks and the massive increase in the amount of foreign liabilities and nonperforming loans of banks.
- To examine the relationship between the deterioration in the Indonesian economic fundamentals and the rapid depreciation of the Indonesian currency in 1997-1998. In this stage, four factors are argued being an indicator of the deterioration in the economic fundamentals: the rise in the ratio of trade deficit to GDP and domestic and

foreign interest rate differential, and the down fall of exports. The impact of the change in the exchange rate regime on the rapid depreciation of the rupiah exchange rate in 1997-1998 is also taken into account in this study.

1.3 Research Methodology

The research methodologies of the study are both descriptive and quantitative methods. The descriptive method will be utilised through examining the trend of main factors that theoretically affect the rapid depreciation of the Indonesian currency. For this purpose, descriptive statistics methods, such as percentage distribution and annual trend or growth will be used. The period of observation is from 1988 to 1998. The focus started from 1988 because it was the year that the Indonesian government intensively promoted financial deregulation. The quantitative analysis is employed through the application of regression method. Concerning that the available data in the period of 1988-1990 is yearly data, the regression analysis employs quarterly data from 1990 to 1998. The detailed explanation of the regression method is presented in Chapter 5.

CHAPTER 2

REVIEW OF LITERATURE

Following the collapse of the European Monetary System (EMS) in 1992-1993 and the Mexican peso crisis in 1994-1995, literature on the currency crisis have developed progressively. Most studies argue that speculative attacks on a currency play a central role in creating a currency crisis. However, we need to ask why a speculative behaviour which so suddenly and unexpectedly causes a currency to depreciate happens. On the one hand, some economists believe that the speculative behaviour emerges due to the deterioration of a country's economic fundamentals (Krugman, 1979 and 1996, and Flood and Garber, 1984) and on the other hand, others argue that the speculative behaviour leads to a rational self-fulfilling prophecy, regardless of a country's economic fundamentals (Eichengreen and Wyplosz, 1993, Obstfeld and Rogoff, 1995, and Obstfeld, 1984 and 1996).

This literature review is divided in three sections. Firstly, Section 2.1 focuses on the definition of currency, and on financial and economic crises. Secondly, Section 2.2 reviews Krugman's approach to balance-of-payment or currency crisis which includes the short-run and long-run behaviour of an economy under the fixed exchange rate system. In this section, a critical view of the Krugman approach is also taken into account. Thirdly, Section 2.3 outlines the modern approach to a currency crisis which focuses on the effects of a deterioration of economic fundamentals on a currency crisis, self-fulfilling currency crises, the effect of political factors on currency crises, and the linkage between banking sector and currency crises.

2.1 Currency, Financial and Economic Crises: A Definition

Generally speaking, in international finance literature, the terminology of currency, balance of payments, and financial crises are often used synonymously. Not surprisingly, this is

probably because previous evidence of crises in Latin America and more recently in East Asian countries show that this terminology provides a link to each of the above. In a broad sense, the links can simply be shown when a country experiences a currency crisis, for example, its banking and other financial institutions frequently collapse and then move rapidly to a state of economic crisis. The sequences of events from the beginning of the currency crisis to the collapse of the economy are also very short. In East Asian currency crisis in 1997-1998, for instance, the time range was just one and half years. Following the crisis in July 1997, the GDP growth of the East Asian crisis countries became negative. Unemployment rates were also high due to a number of bankruptcies among firms and other financial institutions (Furman and Stiglitz, 1998).

2.1.1 Currency Crisis

Past studies show that currency crises were defined differently which mostly lead to the rapid loss of foreign reserves, the rapid depreciation of currency and the abandonment of fixed or pegged exchange rate system. Most studies have, however, defined currency crises as depreciation episodes of a currency, which range from small and repeated depreciation to large and infrequent depreciation (Kaminsky, Lizondo and Reinhart, 1998). Frankel and Rose, (1996), for instance, define a currency crisis as the value of a currency that drops more than 25% a year. The depreciation of the currency must be at least 10% higher than depreciation in the previous year (similar definition can also be seen in Edwards, 1989; Montiel, 1989; and Edward Santaela, 1993). Even though, such a definition is simple and straightforward, it raises a big question of what exact percentage of the depreciation indicates a currency crisis. Unfortunately, the definition of currency crisis as more than 25% a year depreciation of currency (Frankel and Rose, 1996) is just arbitrary without any arguments supporting their determination. This is probably one of weaknesses in such a definition of currency crisis.

Other studies define a currency crisis in more general terms, which include unsuccessful speculative attacks on a currency without a large depreciation or devaluation of the currency that largely has a negative impact on a country's macro economy, such as a large decrease in a stock of foreign reserves or a rapid increase in domestic interest rates. Sachs, Tornell and Velasco (1996), for instance, measure a currency crisis by a crisis index which is calculated by a weighted average of devaluation and a percentage change in foreign reserves. Similarly, Kaminsky and Reinhart (1996) define a currency crisis not only as a large depreciation of domestic to foreign currency, but also as a significant loss of international reserves, and a rapid increase in domestic interest rate and interest rate differentials. Furthermore, they also state that, "...definition of [currency] crises coincides with 'events', such as devaluation, changes in exchange rate arrangements, capital control, the temporary shutdown of foreign exchange markets (particularly in the early crisis of 1970s), and indefinite suspension of convertibility" (p. 5).

By reviewing a number of empirical studies on currency crisis, Kaminsky, Lizondo and Reinhart (1998) show that there are 105 indicators of currency crises, which can be grouped into ten categories (Table 2.1). However, they conclude that the most powerful indicators in detecting the symptom of currency crisis are changes in the foreign reserves, real exchange rates, domestic credits, credit to public sectors, domestic inflation, a large increase in current account deficits, money growth, the real growth of GDP, and fiscal deficits.

Table 2.1
Indicators of Currency Crises

Sector	Indicators
1. Capital account	International reserves, capital flows, short-term capital flows, foreign direct investment, and difference between domestic and foreign interest rate.
2. Debt profile	Public foreign debt, total foreign debt, short term debt, share of debt classified by type of creditor and by interest structure, debt services, and foreign aid.
3. Current account	Real exchange rate, current account balance, trade balance, exports, imports, terms of trade, prices of exports, savings, and investment.
4. International variables	Foreign real GDP growth, foreign interest rate, and price level.
5. Financial liberalisation	Credit growth, changes, in money multiplier; real interest rates, and spread between bank lending and deposit interest rates.
6. Other financial variables	Central bank credit to the banking system, gap between money demand and supply, money growth, bond yields, domestic inflation, "shadow" exchange rate, parallel market exchange rate premium, central exchange rate parity, position of the exchange rate within the official band, ratio M2 to foreign reserves.
7. Real sector	Real GDP growth, output, output gap, employment/unemployment, wage, and change in stock prices.
8. Fiscal variables	Fiscal deficit, government consumption, and credit to the public sector.
9. Institutional factors	Openness, trade concentration, dummies for multiple exchange rate, exchange control, duration of the fixed exchange rate period, financial liberalisation, banking crisis, past foreign market crisis, and past foreign exchange rate market events.
10 Political variables	Dummies for election, incumbent electoral victory or loss, change in government, illegal executive transfer, left-wing government, and new finance minister; also, degree of political instability

Source: Kaminsky, Lizondo and Reinhart (1998) pp. 9-10.

In terms of methodology, Kaminsky, Lizondo and Reinhart (1998) accommodate four broad studies on currency crises. The first group of studies use qualitative methodologies in analysing cause and effect of currency crises. These studies usually analyse the trend of various indicators causing currency crisis without applying a formal statistical test on each indicator. In the case of currency crises in Latin America, for example, Dornbusch, Goldfajn and Valdes (1995) focus on the effect of overvalued exchange rate on currency crisis, Goldstein (1995) on a boom on bank lending, Krugman (1996) on high debt level, and Miesi-Ferretti and Razin (1996) on changes in the real exchange rate. Recently, in the case of the Asian currency crisis, Goldstein (1998) focuses on the financial-sector weaknesses and external sector problems of Asian crisis countries, Radelet and Sachs (1998) on the rapid increase in short-term debts, and sustainable fall in the growth of Asian crisis countries' exports, and Corbet and Vines (1998) on the weakness in the banking sector of the Asian crisis countries.

A second group of studies analyses a presence of systemic facts associated with a currency crisis. Such a group of studies employ both a particular country and cross country data. In a case study of a particular country, their analyses are mostly conducted by comparing pre-crisis behaviour of variables to a post-crisis period. In cross-country studies, a presence of stylised facts of currency crises are mostly analysed by data of crisis countries controlled by data of non-crisis countries. These groups of studies usually employ formal statistical tests in assessing whether stylised facts are different between pre- and post-crisis in a case study of particular country, and between crisis and non-crisis countries in cross-country studies. Such a group of studies can be found in Edwards (1989), Edwards and Santaella (1993), Eichengreen, Rose and Wyplosz (1995), and Frankel and Rose (1996) (Kaminsky, Lizondo and Reinhart, 1998).

A third group of studies tries to calculate the probability of devaluation one or more period ahead in a particular country or cross-country. The statistical exercises in these studies are usually the logit or probit method. Sachs, Tornell and Velasco (1996), for instance, try to

predict the contagious effect of the Mexican peso crisis of 1994 on countries whose economies are vulnerable to the crisis. Indicators used to predict the probability of devaluation include lending boom, reserves adequacy, real exchange rate and dummy variable representing weak economic fundamentals. This method is also used to analyse the onset of the Asian crises in 1997 in the work of Radelet and Sachs (1998). Similar studies can be found in Cumby and van Wijnbergen (1989) and Kaminsky and Leiderman (1998); in Otker and Pazarbasioglu (1994 and 1996) for a case study of a particular country, and Edin and Vredin (1993) for a cross-country study.

A fourth type of study employs a nonparametric method to assess the advantage of several variables in signalling the presence of a currency crisis. The first step in works of such a method is conducted by constructing a crisis index of 'exchange rate pressure'. This index is a weighted average of monthly percentage changes in exchange rate calculated as units of domestic currency to foreign currency (the US dollar) and of a monthly percentage reduction in foreign reserves in foreign currency (the US dollar)¹. The index then rises as a depreciation of domestic currency increases and as the foreign reserves reduce, indicating an increased pressure on the domestic currency. Therefore, a crisis is identified as being an increase in pressure on the currency exchange rate (Kaminsky and Reinhart, 1996 and 1999, and Kaminsky, Lizondo and Reinhart, 1998).

The second step is done by determining several indicators, which theoretically affect a presence of currency crises. Kaminsky, Lizondo and Reinhart (1998) focus on 16 indicators of the crisis: banking crisis, real exchange rate, real interest rate, import, M2 multiplier, Output, bank deposit, M1, exports, terms of trade, international reserves, stock prices, real interest rate differential, M2/foreign reserves, lending rate/deposit rate, domestic credit/GDP. Using a particular calculation, these indicators shall be a comparable across-country analysis that is free from statistical discrepancies between countries and over time.

¹ Similar method of such a calculation can also be found in Sachs, Tornell and Velasco (1996) and Radelet and Sachs (1998), although, with some differences.

Furthermore, they conclude that indicators of a banking crisis, real exchange rate provide an earlier warning than other indicators. Similarly, these two indicators also provide a persistence signal during crises relative to tranquil times. Not surprisingly, Kaminsky and Reinhart (1996 and 1999) conclude that because there is a close relationship between a banking crisis and currency crisis, it is named as a “twin-crisis”

2.1.2 Financial Crisis

As with the currency crisis, there is not a single definition of financial crises that has been accepted broadly. The definition of a financial crisis can be classified from a large bank experiencing a financial difficulty to a collapse of a country’s financial system. According to De Bonis, Diustiniani and Gomel (1999), studies on financial crises can be accommodated from two different approaches: ‘monetarist’ and ‘eclectic’.

The first approach can be reviewed from the work of Friedman and Schwartz (1986). These authors state that the root of a financial crisis is a bank panic leading to an enormous decrease in money supply and a subsequent fall in economic activities. As Schwartz (1986) states,

“A financial crisis is fuelled by fears that means of payment will be unobtainable at any price and, in a fractional-reserve banking system, leads to a scramble for high-power money. It is precipitated by actions of public that suddenly squeeze the reserves of banking system. In a futile attempt to restore reserve, the banks may call loans, refuse to roll over existing loans, or resort to selling assets (...) The essence of financial crisis is that it is short-lived, ending with a slacking of the public’s demand for additional currency” (Schwartz (1986, p.11), cited in De Bonis, Diustiniani and Gomel, 1999).

The monetarist approach stresses that a bank run is the main cause of financial crisis because, although, other shocks may reduce wealth, it cannot be a financial crisis unless a transformation of financial assets to money results in a bank run. The bank run occurs because banks have a particular characteristic in their role as a financial intermediary. The

banking system basically provides long-term credit for real economic activities from short-term liabilities obtained from deposit contracts. The most important thing is that banks' short-term liabilities are redeemable at any time, while long-term assets (credit) are illiquid. Thus, when a particular shock produces a sudden withdrawal of financial assets to money, or a bank run occurs, the liquidity of banks will likely be in trouble, leading to recalling loans or selling of assets at unprofitable prices. Correspondingly, real economic sectors will collapse creating a downfall in economic activities as a whole.

In the spirit of monetarist approach Espinosa and Russell (1996) point out that the occurrence of the Mexican financial crisis in 1994/1995 was comparable to the U.S. historical financial crisis. According to these authors, just as with the U.S historical experience, the Mexican financial crisis was mainly caused by a financial panic, even though the source of such a panic was completely different. As they state,

“A US financial panic usually got started because of a bad news suggesting that loans made by some U.S banks might not be repaid, making it difficult or impossible for the banks to cover their deposits. In Mexico, the “bad news” that triggered the financial crisis was somewhat less direct and took the form of political instability”. (p. 31)

Espinosa and Rusell (1996) suggest that the trigger of the Mexican crisis in 1994/1995 was the assassination of presidential candidate, Luis Donaldo Colosio. The assassination created a loss of confidence by foreign investors toward foreign deposits. As foreign deposits of the Mexican banks were short-term, the financial or banking panic of foreign investors produced difficulties for the banks. Correspondingly, this put a downward pressure on the value of the Mexican peso in terms of foreign currency.

The second approach, the 'eclectic' approach argues that the source of financial crisis is not only a bank run but also various shocks on an economy including a large decrease in asset prices, bankruptcies of large financial institutions, or disturbances in the foreign exchange market. According to this approach, the main source of financial crisis is a moral hazard problem in the financial system, resulting from asymmetric information between lenders

and borrowers. Mostly, lenders could not fully absorb information of borrowers' plans and activities. And therefore, lenders should choose a good borrower from among borrowers so as to minimise losses from potential defaults. According to Miskhin (1994), such a behaviour produces an adverse selection problem. Similarly, a moral hazard problem arises when lenders try to monitor a borrower's activities following the loan agreements. Furthermore, a financial crisis is defined as

“A disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunity” (Miskhin, 1994, p.9 cited in De Bonis, Diustiniani and Gomel, 1999).

It is important to note, however, that the two approaches cited above stress only a country's banking crisis in which they pay much attention to bank runs² that have been argued to be the main source of banking crises. Even though, a fair amount of literature on the bank run has been written, the relationship between a bank run or banking crisis and the wider concept of financial crisis is less discussed. Also, the links between international monetary factors and banking or financial crisis has not been explored deeply.

Recently, in the context of emerging economies, international economists have argued that the presence of a financial crisis leads to a disturbance of foreign exchange market, as well as domestic financial markets, corresponding to a failure of the financial system. A disturbance of the foreign exchange market leads to a massive devaluation of the domestic currency, while a disturbance of the domestic financial market leads to the presence of the banking crisis. In the case of the Mexican financial crisis in 1994/1995, for example, Calvo and Mendoza (1996) reveal that the crisis led to a sharp run against dollar-denominated assets by foreign investors which then resulted in the credit contraction, ending up with difficulties in Mexico's banking system. As a consequence, the Mexican government

² Studies on bank runs can be seen in Diamond Dybvig (1983), Gorton (1985), Fama (1985), Saunders (1987) and Bhattacharya and Thakor (1993) among others.

sharply devalued its currency in order to reduce the overvaluation of the real exchange rate and the large current account deficit.

In the case of East Asian Crisis in 1997, a disruption of foreign exchange market, currency crisis, resulted in a financial crisis. In particular, when the massive shock of devaluation of domestic currency emerged, this was then accompanied by a rapid increase in domestic costs and prices. In the financial sector, then, the value of assets of the financial system deteriorated, leading to a failure of the financial system. In the real economic sector, a massive devaluation resulted in a sharp increase in foreign liabilities due to the large unhedged borrowings in foreign currency. As a result of these two factors, there was a financial panic among economic agents in terms of converting their domestic-currency-denominated assets to foreign currency. The convertibility of loans then expanded rapidly because short-term debts of financial system were larger than short-term assets which could be used by the government to bailout the insolvency of financial system. Consequently, the collapse of financial system of Asian crisis countries could not be avoided (Corbett and Vines, 1999 and Corsetti, Pesenti and Roubini, 1998).

In the case of Indonesia, McLeod (1998) argues that the escalation of financial panic was mainly triggered by the lost confidence of investors toward the government's credibility to back up its currency as well as financial system. The lack of credibility resulted from inappropriate economic policy³ which was then reinforced by socio-political factors⁴. These two factors resulted in confusion and deep pessimism among investors

³ In the first step of currency crisis, the government launched a tight monetary policy through raising domestic interest rates and contracting government spending. However, these policies were broken down by the announcement of an unfavourable budget for 1998/1999 on January 1998, which was based on unrealistic assumption of the exchange rate at Rp 4,000/USD. Obviously, in foreign exchange markets the Indonesian rupiah already stood at Rp 7,500/USD when the budget was issued.

⁴ Following the crisis, the high prices of basic commodities and shortages created riots destroying hundreds of shops and causing the resignation of the former president, Suharto, after the occupation of the High Representative Assembly (MPR) building by thousand of students, produced unstable social and economic condition.

towards the ability of the Indonesian government to defend the value of rupiah. Consequently, the rupiah exchange rate moved dramatically from just Rp 2,599/USD in July 1997 to Rp 3,000/USD in July 1998, and to Rp 4,650/USD in December 1997.

Some analysts also argue that the resignation of the former president, Suharto played a significant role in the escalation of the currency crisis, moving to the collapse of the Indonesian financial system. The reason was that the fall of Suharto's political guarantee raised an uncertainty in foreign investors as well as domestic investors, towards their businesses in Indonesia. Thus, in an anticipation of the fall of Suharto, investors caused a massive capital outflow. As Cole and Slade (1998), state

“In the 1990s the ‘Suharto connection’ became the ‘guarantee’ or ‘collateral’ underlying the viability of many enterprises and financial institutions, most obviously in banking and securities market.The undermining of this Suharto-connection guarantee caused massive uncertainty for both domestic and foreign investor and exposed previously ignored weakness of both corporations and financial institution” (p. 65).

In emerging-developing economies, financial crises also lead to a foreign debt crisis. In particular, the main cause of a debt crisis is when foreign creditors suddenly recall their outstanding loans and stop providing new loans to debtor countries. This then results in a debt crisis which is indicated by rescheduling of debt payments, defaults and renegotiations of outstanding debts of debtor countries. Radelet and Sachs (1998) accommodate two existing arguments as to why debt crises emerged in developing countries:

“(1) abrupt changes in international market conditions that affect the ability of debtors to repay outstanding loans, such as shifts in interest rate, commodity prices, or trade conditions; and (2) abrupt shifts in the debtor country that cause creditors to reassess that country's ability or willingness to service the foreign debt, including changes in political leadership or economic policy, or in the burden of debt (for example, because of new information about overall size of external debt obligation)” (p. 5).

Similarly, Dornbusch and Werner (1994) show that in the case of Mexican debt crisis in the 1980s the high accumulation of foreign debts raised a vulnerability of Mexico's economy toward a financial crisis. For example, when the real exchange rate was overvalued, this was

then followed by a large capital outflow leading the collapse of exchange rate, as well as the downfall of financial system, asking for debt rescheduling. The large capital outflow was reinforced by the rise in the US interest rate due to the contraction of monetary policy at that time. Consequently, Kaminsky and Pereira (1996) state that following Latin America's debt crisis in the 1980s, their economic growth dropped sharply, and inflation rates increased substantially⁵.

2.1.3 Economic Crisis

The terms of economic recession, meltdown, and crisis generally lead to “negative indicators” of economic achievement of a country including the rapid fall in real GDP, a large increase in unemployment rate, and nation-wide collapse of firms as well as financial institutions. In the case of the emerging market financial crisis in the 1990s, the presence of an economic crisis was mostly as a result of financial crises due to the currency crisis. As Espinosa and Russell (1996) note in reviewing the Mexican economic crisis,

“For Mexico, the devaluation of peso marked the beginning of severe and persistent economic recession. By the end of 1995, Mexican real (inflation-adjusted) GDP had fallen by 7 percent, and the unemployment rate had increased from a pre crisis level of 4 percent to approximately 7 percent. A large number of private firms have failed and the Mexican government has been able to pay its debt only because of financial aid from International Monetary Fund (IMF) and the governments of the United States and Canada (\$25 billion dollars' worth to date). Domestic and foreign confidence in the prospects for the Mexican economy has been shaken severely” (p.22)

Similarly, in the case of Indonesia, the currency crisis of 1997 has resulted in dramatic contraction of its GDP. Johnson (1998) shows that, “following 8% growth in 1996,

⁵ Following Latin America's debt crisis of the 1980s, even though, most debtor countries continued to service their foreign debts, their ability to service foreign debts imposed a disincentive to investment and growth in the debtor economies. This was because part of returns to investment was transferred to creditor economies in a form of payments to foreign creditors. Such a phenomenon is known as a debt-overhang hypothesis (Kaminski and Pareira, 1996, Sachs, 1989 and Froot, 1989).

Indonesia's real GDP grew by only 4.6% in 1997. In the year to December quarter of 1997, growth had slowed sharply to 1.4%, and between the March quarters of 1997 and 1998 real economic activity recorded negative growth of -6.2% in 1998⁶ (p.18). As a result of an increase in the rupiah cost of imported goods and consequent shortages, general inflation rate rose sharply by 52.2% from January to May 1998, and similarly, food price inflation grew approximately 70.2%. In the labour market, the Ministry of Manpower revealed that unemployment increased to 17.1% of total labour force in June 1998, compared to just 5% of labour force before the crisis (Johnson, 1998).

To explore of why the presence of currency and financial crises result in an economic crisis is rather more important than explaining the indicators of economic crisis. Since financial market liberalisation has become the most recommended policy in the 1990s, international flows of capital have played a vital role in the rapid economic growth of emerging markets. The ASEAN-4 (Indonesia, Malaysia, the Philippines and Thailand), for instance, absorbed net private capital flows of from 3.3% of GNP in 1990 to 8.3% of GNP in 1996 (Furman and Stiglitz (1998). Even though, most of the capital inflow came in the form of foreign direct investment (FDI), short-term portfolio investment and bank lending had also increased significantly (Elek and Wilson, 1999). The result was a rapid increase in external borrowing, building a place for a financial fragility.

Similarly, when firms and financial institutions of Southeast Asian economies had accumulated a large number of foreign debts, the sharp devaluation of domestic currencies had a large effect on the solvency of their financial conditions. Consequently, as Thailand's crisis spread over the region, capital outflow from the Southeast Asia could not be avoided and a sharp depreciation of domestic currency appeared. The result was corporate failure and financial collapse. This widespread bankruptcy, then, rapidly moved to the large decline in output and the unemployment rate raised accordingly (Elek and Wilson, 1999).

⁶ Some private forecasters also predict a similar figure of the real GDP (e.g. ABN-Amro and Jardine Fleming: -15%; SBC Warburg Dillon Read: -11.7%) (Johnson, 1998).

The large increase in the domestic inflation rate, because of the rise in domestic-currency cost of imported goods due to the enormous devaluation of domestic currency. For this reason, the massive reversal of capital flows following the financial crisis has been argued to be the cause of the South East Asian economic meltdown.

2.2 Krugman's Approach to Balance-of-Payment Crises

2.2.1 The Short-run Behaviour of Economy under a Fixed System

The basic idea of Krugman's approach to the balance-of-payment crisis is that the crisis emerges because a country with a fixed or pegged exchange rate system has weak economic fundamentals. The deterioration of economic fundamentals may be the result of excessively expansionary fiscal and monetary policies leading to the persistent loss of its international reserves. Therefore, when economic agents figure out the loss of international reserves, they speculatively attack the currency because they believe that the government will no longer be able to defend its currency. The other reason for speculative attacks on a currency is because economic agents may sustain a capital loss of having domestic currency when the government moves to a flexible exchange rate system and the currency is depreciated largely (Kaminsky, Lizondo and Reinhart, 1998).

Krugman's analysis of the balance-of-payment crisis (1979) is mainly based on the following assumptions. Firstly, a country adopts a fixed exchange rate system and its domestic economy has two characteristics: the demand of domestic currency depends on the exchange rate, and the exchange rate resulting in the domestic money market equilibrium moves over time. Secondly, the country is a small country in a sense that the price of its single composite tradable good depends solely on the world market. Thirdly, the assumption of purchasing power parity (PPP) holds. Defining P^d and P^f as the domestic and foreign price level, respectively; and e as the exchange rate of domestic currency to foreign currency, the PPP condition can be defined as:

$$P^d = eP^f \dots\dots\dots(1).$$

Since the foreign price level is constant and equal to one ($P^f = 1$), equation (1) allows us to identify that the domestic price level is equal to the domestic exchange rate ($P^d = e$). Assume also that the asset market provides only two types of assets which are available for investors: domestic and foreign money which both have zero nominal interest. Therefore, the total real wealth of economy, W is the sum of the real value of their assets in domestic money M/P and foreign money F , that is,

$$W = M/P + F \dots\dots\dots(2).$$

For convenience, foreigners are assumed not to hold domestic currency. Then, in equilibrium domestic residents should only be willing to hold the domestic real money at the outstanding stock of domestic real money M/P . Their willingness of holding domestic real money are assumed to depend proportionately on their wealth. Therefore, the equilibrium of their portfolio will be:

$$M/P = L(\mu) P W, \quad L' < 0 \dots\dots\dots(3).$$

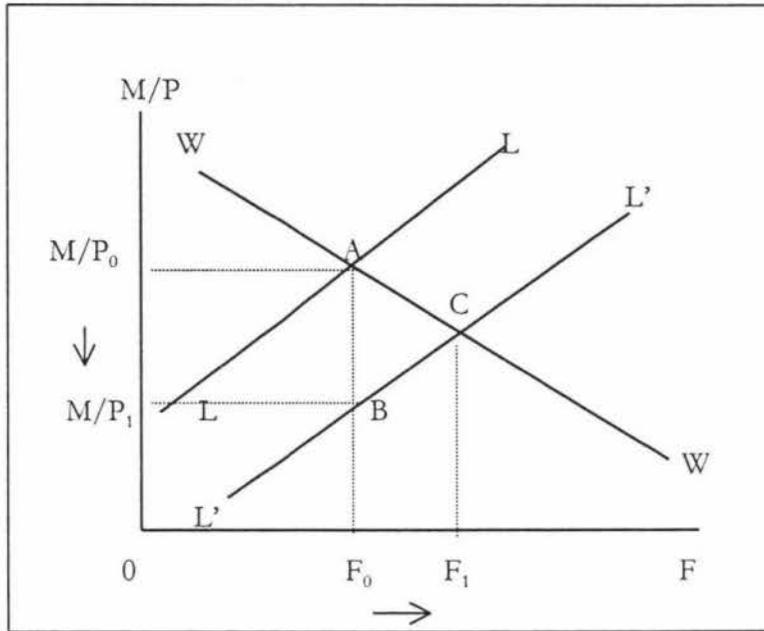
Where μ is the expected rate of inflation which is also defined as the expected rate of depreciation of domestic currency. The expected rate of inflation is assumed as being an exogenous variable.

The short-run equilibrium of domestic residents' portfolio of holding domestic and foreign money can be summarised in Figure 2.1. Schedule LL represents the portfolio balance of holding domestic and foreign money by domestic residents. The upward slope of this schedule indicates that the rise in holding real domestic money will be followed by the rise in holding foreign money. Schedule WW represents the wealth constraint in which the

downward slope of this schedule means that to increase foreign money, domestic residents should reduce in holding their domestic money.

Figure 2.1

The Short-run Effect of the Changes in the Expected Rate of Inflation on the Portfolio of Domestic Residents.



Source: Krugman (1979).

Suppose that the government with a fixed exchange rate system has reserves of foreign money R . The initial equilibrium of portfolio balance in the short-run is at point A. Now, suppose that the expected rate of inflation (μ) increases that pushes downward LL to $L'L'$. Then, the shift of the schedule changes the portfolio balance of domestic residents from point A to C. As a result, the raised demand for holding foreign money in the short run shall reduce in the stock of the government's foreign reserves, that is:

$$\Delta R = -\Delta F = \Delta M/P \dots \dots \dots (5).$$

However, if the government is reluctant to reduce the stock of its reserves and it moves from the fixed to the floating exchange rate system, the rise in demand for foreign currency produces an increase in the domestic price because F is held constant. Then the equilibrium moves from point A to B . Consequently, assuming the PPP condition holds, the domestic currency shall depreciate.

2.2.2 The Long-run Behaviour of Economy under a Fixed System

Now, the analysis of portfolio balance moves to the long-run equilibrium. In this step, the analysis is done in the context of dynamic behaviour of economy. To examine the long-run behaviour of domestic portfolio balance, the analysis focuses on the budget constraint of private sector as the representation of domestic residents and the government. In a simple way the private sector is assumed to be able to increase its assets only by spending less than its income. Then the private saving, S is defined as:

$$S = Y - C \dots \dots \dots (5).$$

Since the exchange rate is fixed, then the domestic price level is also constant over time. Furthermore, the private saving is equal to the dynamic change of wealth owned by domestic residents, that is:

$$W = M/P + F = S \dots \dots \dots (6).$$

Equation (6) implies that since the government is able to fix continuously the domestic price level, the expectation rate of inflation μ is equal to zero. This means that there is a constant link between wealth W and money holding $(M/P + F)$ over time. This implies that an increase in the wealth of residents will be allocated for holding domestic money or foreign money with a constant proportion over time.

Now, we turn to the government constraint. The government is assumed to be able to finance its deficit d either by printing new domestic money or by reducing its foreign reserves R . Then the government's budget constraint will be:

$$M/P + R = d \dots\dots\dots(9).$$

Equation (9) implies that since the government is required to maintain a stable exchange rate over time, it will not be able to restrain how its deficit will be funded. Because, if there is an excess supply of domestic money issued by the government that the private sector wants to hold, then the private sector will always withdraw this excess to purchase foreign money at the exchange window. In the other words, if the government finances its deficit by pumping up the domestic money, this will always be a consequence of reducing its foreign reserves. This relationship can be shown by Equation (10).

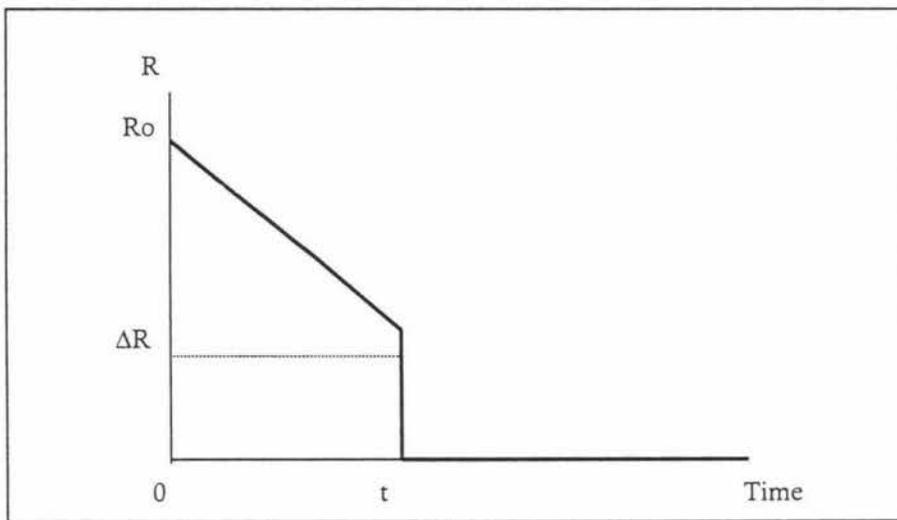
$$R = -d \dots\dots\dots(10).$$

Equation (10) suggests that to maintain the fixed exchange rate system is almost impossible if the government's budget is in deficit, even if its international reserves are large. The reason is simply because an increase in its deficit shall always be financed by running down its reserves. According to Krugman (1979), the fixed exchange rate system will soon be abandoned when its international reserves are exhausted. Even if its international reserves have not been exhausted, speculators may attack the domestic currency in anticipation of the abandonment of the fixed exchange rate system, thus creating a balance of payment crisis.

The chronology of a balance of payment crisis with the presence of speculative behaviour is outlined by Krugman (1979) as follows. Firstly, investors anticipate that the government's reserves will run out and the fixed rate system will be abandoned. In response to the abandonment of the fixed exchange rate system, investors will

speculatively attack the domestic currency by trading domestic money for foreign money in order to avoid a windfall of capital losses. If the speculative attack is responded by the liquidation of its reserves, the foreign reserves will run down, and becoming zero at time t (Figure 2.2). But if the speculative attack is anticipated by changing a policy from the fixed to the flexible exchange rate system, in order to maintain the stock of its reserves, it is accompanied by the rapid fall of exchange rate of domestic to foreign money. This then produces a balance of payment crisis.

Figure 2.2
The Krugman Approach to the Currency Crisis



Source: Calvo, 1996

According to Krugman (1979), a speculative attack may not produce a balance of payment crisis if speculators were unable to know with certainty the stocks of official foreign reserves. Suppose that the government has two stocks of its reserves: primary reserves R_1 and secondary reserves R_2 . Speculators only identify the primary reserves that will be committed to defend its currency. Then, if the primary reserves run out and the government is reluctant to use the secondary reserves to back up the value of its currency,

there will be a rapid fall of the exchange rate, producing a potential loss of capital. So the absence of secondary reserves forces speculators to attack on the currency to avoid capital losses. But if the secondary reserves are appointed, the potential loss of capital will be taken away, and hence, there may be no speculative attack on the currency.

2.2.3 A Critical View of Krugman's Model

The important point of Krugman's model of a balance of payments crisis is that the change in the government's reserves over time has a negative relationship with the size of fiscal deficit. This implies that credit liquidity from central bank to the government will reduce its reserves because residents will use the excess supply of additional money to purchase foreign money. Then, by assumption of purchasing power parity, the excess money supply should result in a constant domestic price level, corresponding to a stable exchange rate. But, when the exchange rate is allowed to fluctuate freely, then the price level jumps up and the domestic interest rate increases simultaneously. The rise in domestic interest rate then reduces the demand for domestic money. Instead, the demand for foreign money increases because speculators have a perfect foresight of when the reserves will run out and the fixed exchange rate system is abandoned. According to this theory, the interaction between the government policy and market expectation through speculative behaviour results in multiple equilibria. If the market expects that the government will be able to maintain fixed system, speculators will not attack, and the system will be continued. Whereas, if the market anticipates the fixed system to fall, speculators will attack, making the cost of maintaining the fixed system large; thus it will be abandoned, leading to a depreciation of exchange rate. For this reason, two factors have been argued to create the balance of payments crisis. The first factor is fiscal deficit policy associated with the government's ability to maintain the fixed system. The second factor is the market expectation through the role of speculative behaviour.

The argument of a fiscal deficit policy that results in the balance of payments crisis through the running out the government's reserves is not really obvious. The empirical evidence of the Mexican peso crisis, for instance, shows that before the Mexico crisis in 1994/1995, there was not an expansionary fiscal policy. In fact, Mexico reported fiscal surplus from 1990 to 1993, and the fiscal deficit in 1994 was just 0.5% of its GDP (Espinosa and Russell, 1996) (see also Calvo and Mendoza, 1996 and Melick, 1996). Similarly, as Dornbusch and Werner (1994) state

“[The] extraordinary reduction in the operational budget deficit –9 percent of GDP, or the equivalent of three Gramm-Rudman cuts, as many Mexicans puts it– set the stage for Mexico's strategy of disinflation, improved confidence in the currency, and ultimately lowered interest rates. With primary surplus averaging 5.3 percent of GDP over the 1983-92 period” (p.261).

The lack of evidence showing that the fiscal deficit policy is the only cause of currency crisis under the speculative attack has attracted some economists to develop the model of Krugman (1979). Most studies employ not only fiscal deficit policy as the main cause of a currency crisis, but also other factors, associated with changes in a country's economic fundamentals (Sachs, Tornell and Velasco, 1996) such as political circumstances (Espinosa and Russell, 1996), banking crisis (Kaminsky and Reinhart, 1996, and 1999), capital market crisis (Calvo, 1996), contagion effects (Uribe, 1996), self-fulfilling factor (Krugman, 1994; Obstfeld, 1996) and among others.

The Krugman approach on the currency crisis also gives no attention to the relationship between currency crisis and banking sector. Kaminsky and Reinhart (1999) accommodate two theories of the links between currency crisis and banking problems. The first theory developed by Stocker (1994) suggests that the links move from currency crises to banking crisis. Theoretically, when there is an initial external shock of the rise in foreign interest rate, for instance, a country with a fixed exchange rate system will more likely run out its foreign reserves resulting from its commitment to maintain the parity exchange rate. Consequently, this then largely moves to a credit crunch leading to the banking crisis.

Conversely, the second theory argues that a presence of a banking crisis leads to a presence of currency crisis. Hypothetically, when a country pays for insolvent banks by raising the stock of domestic money supply, then, just as with in the Krugman model, the excessive domestic money supply potentially results in the balance of payments crisis (Velasco (1987) cited in Kaminsky and Reinhart, 1999). Following the second theory of the links between banking crisis and currency crisis, this study postulates that the weakness in the Indonesian banking sector led to the currency crisis of 1997.

The model of Krugman (1979) is mainly based on the assumption of purchasing power parity (PPP) in explaining the origin of currency crisis. The basic idea of PPP is that, other things being equal, a particular amount of domestic currency is able to purchase the same quantity of goods in the domestic market that individual could purchase in a foreign market if the domestic money were converted into foreign money at the current exchange rate (Espinosa and Russell, 1996). This assumption implies that when foreign prices are fixed, the exchange rate should move with domestic prices. Suppose that a country maintains its currency's exchange rate and foreign prices are stable, an increase in domestic prices, then, leads to an exchange rate overvalue. The result is that the country will run a trade deficit. Furthermore, if the persistent trade deficit is financed by a fiscal deficit, its foreign reserves will run out, leading to an inability of the country to maintain its exchange rate without speculative attacks. But if the persistent trade deficit is financed by foreign capital, there will be capital inflows, that is, a capital account surplus. This, however, leads to a financial fragility against speculative attacks. The final result is when the country's foreign reserves are not enough to maintain its exchange rate against speculative attacks. There will then be a currency crisis. This hypothesis seems applicable to the Indonesian currency crisis of 1997. The persistent current account deficit during the pre-crisis period led to the rise in the Indonesian financial vulnerability. Therefore, as currency speculators attacked the rupiah following the depreciation of the Thailand baht, the rupiah exchange rate fell deeply soon after the Indonesian government abandoned the pegged exchange rate

system. This abandonment occurred mainly because the government was unwilling to defend rupiah by running down its foreign reserves.

The Krugman approach on currency crises, which is based on the assumption of PPP condition to hold, at least faced a crucial problem, however. In practice, each country has so many different commodities whose prices often change distinct directions which can be caused by both foreign and domestic factors. Although, a practical solution may be done using prices indexes of standard baskets of commodities, the items and quantities of goods in the standard baskets are different significantly across countries. Consequently, the consumer price indexes (CPI) of one country is incomparable to others. The other solution is probably by using a “relative PPP”, that is, if inflation rate of a country is 5% higher than a foreign country in a given period, then the currency exchange rate of the country in question should be depreciated by 5% against foreign currency. A problem, however, comes up when one attempts to determine whether a currency is under or overvalued. For instance, if one said that in the period of 1990 to 1995 a currency of country A against country B is overvalued, then the currency of country A must be exactly valued at the beginning of the period. The currency in question that is implicitly assumed as being exactly valued at the first period of calculation is perhaps the main problem of the analysis based on the relative PPP assumption (Espinosa and Russell, 1996). Consequently, as Espinosa and Russell (1996) state “...unless the problem of measuring absolute PPP can be solved, it is impossible to place much faith in conclusions based on measurements of relative PPP” (p.24).

2.3 Modern Approach to Currency Crises

While the Krugman approach focuses only on a decline in foreign reserves as the main cause of currency crises in a presence of speculative attacks, the “modern” approach suggests that the abandonment of fixed exchange rate system associated with currency crises leads to a number of economic and political factors (Kaminski, Lizondo and

Reinhart, 1998). Not surprisingly, the new currency crisis approach has been developed in various types and details. According to Krugman (1996), however, the approach mainly addresses that, "A government —no longer a simple mechanism like that in the classical model, but rather an agent trying to minimize a loss function— must decide whether or not to defend an exogenously specified exchange rate parity" (p.350).

The government's objective/loss function plays an important role in the modern currency crisis approach. According to Ozkan and Shuterland (1995), cited in Kaminsky, Lizondo and Reinhart (1998), such a loss function has a positive correlation with a certain gain obtaining from a fixed exchange rate policy, and negatively correlated with output differentials from a certain target level. For example, when the government commits to maintain exchange rate, the rise in foreign interest rate is parallel to the domestic rate⁷, leading to the decrease in domestic output. Consequently, maintaining the parity of exchange rate is costly for the government. The result is that when the cost of maintaining the parity is much larger than the benefit, then the government will no longer defend its currency, leading to currency crises. In the case of Indonesia, for instance, when the rupiah exchange rate depreciated firstly in July 1997, the government faced a contradict problem of whether it should defend the rupiah with a consequence of the loss in its foreign reserves or whether it allowed the exchange rate to fluctuate freely without running down foreign reserves. The government decided not to protect the rupiah against the currency speculators because it perceived that the cost of maintaining the pegged exchange rate system was costly in terms of running down its foreign reserves. As a result, the abandonment of the pegged system then led to the rapid depreciation of the rupiah.

⁷ The rise in the domestic interest rate also may lead to a weakness in banking system. Therefore, if the government is reluctant to face the high cost of bailout that has resulted from an implicit or explicit official guarantee on the banking system, it will abandon the fixed exchange rate system. Consequently, an indication of banking crisis which can be reflected by a decrease in bank assets, high increase in non-performing loans, or large decline in deposits can be taken into account for analysing a presence of currency crises (Kaminsky and Reinhart, 1996 and 1999).

There is no doubt that under a presence of foreign exchange speculation, the change in economic fundamentals is a key source of currency crises. It is important to note, however, that the relevant indicators of the deterioration of economic fundamentals causing currency crises were different across those countries that experienced currency crises. Jeanne (1997), for instance, states that the Mexican crisis in 1994/1995 was the real overvaluation of peso. Whereas, in the French franc crisis of 1993, it was because maintaining the parity became costly due to the rise in unemployment rate (Krugman, 1996). In fact, according to proponents of self-fulfilling crisis model, even, when a country's economic fundamentals are sound, its currency may collapse because of speculative attacks. Since speculation attacks a currency suddenly and unpredictably, the irrationality of such a speculative behaviour suggests that currency crises may be self-fulfilling rather than being caused by the weaknesses in economic fundamentals (Obstfeld, 1986 and 1996 and Obstfeld and Rogoff, 1995).

The basic idea of the currency crisis approach with self-fulfilling prophecy is that economic policies are likely to produce multiple equilibria and therefore, create a self-fulfilling crises. The multiple equilibria arise because, by assumption, the government's economic policies are set according to changes in economy. Such a government's policy behaviour is fully absorbed by economic agents and then it is used to form their expectations. Therefore, the expectations and actions of economic agents are able to influence the changes in economic factors to which the government policy respond. As a consequence, there will be multiple equilibria, that is, the economic equilibrium from one point to another with a lack of changes in economic fundamentals. The result is that, even though, the economy is in equilibrium, presenting stable economic fundamentals, and it also may be consistent with the exchange rate parity, an unpredictable worsening of economic agents' expectations may change economic policy which, in turn, results in a failure of fixed exchange rate system. Consequently, as an implication of a presence of self-fulfilling prophecy, the prediction of currency crises will be difficult (Kaminsky, Lizondo and Reinhart, 1998).

The modern approach to currency crises also suggests that under the globalised capital markets, a presence of shocks in a country's capital market will rapidly spillover to other countries. In this case, contagion effects account for the cause of currency crises. Recently, in Southeast Asia in 1997, for example, the contagion effect of the depreciation of the Thai baht resulted in the depreciation of the Indonesian rupiah as well as the currencies of other crisis countries (Korea, Malaysia, and the Philippines). However, the argument that the contagion effects of the depreciation of the Thai baht on the rapid depreciation of the rupiah resulting from fears of the lost competitiveness in its export was less plausible. The more plausible reason was because foreign investors paid less attention in channeling their funds and, consequently, they did not distinguish different characteristics of economic fundamentals among countries in the Southeast Asian region. Thus, when Thailand was unable to service its foreign loans, foreign investors believed that Indonesia would most likely face a similar problem. Consequently, they immediately reassessed, or recalled their loans on Indonesia as well as the other crisis countries. This then led to capital outflow and therefore, currency crises (Radelet and Sach, 1998). (For the case of Latin America in 1994/1995 see, for example, Calvo and Reinhart, 1996).

2.3.2 The Effects of Weakening Economic Fundamentals on Currency Crises

According to literature, it has been widely accepted that currency crises lead to the deterioration of a country's economic fundamentals. In the case of Latin America's currency crisis in 1994-1995, the crisis of Mexico and Argentina was caused by an overvaluation of their currency and poor economic policies (Dornbusch, Goldfajn and Valdes, 1995, and Sachs, Tornell and Velasco, 1996). In a cross-country study, Frankel and Rose (1996) argues that currency crises lead to deterioration of economic fundamentals which can be indicated by high growth in domestic credits, current account deficit and the overvaluation of real exchange rates. However, most studies employ various indicators representing a weakness in a country's economic fundamentals. The first question to be made is, therefore, what obvious indicators can be argued to be the main cause of currency

crises. Krugman (1996) accommodates at least five indicators in which deteriorating fundamentals may result in a currency crisis:

“(i) Persistent “inertia” inflation at rates greater than trading partners’ may make a fixed exchange rate increasingly overvalued, increasing the employment cost of maintaining that parity. (ii) Even a constant unemployment rate may have growing social costs, as families run down their saving, unemployment benefits are exhausted, and long-term unemployed workers are transformed from employable “insiders” to unemployable “outsiders”. (iii) External debt may accumulate due to large current account deficits, leading to questions about the ability or willingness of the country to honor its obligations to foreign creditors. (iv) Internal debt may accumulate at an accelerating rate, as interest payments exceed the primary surplus, leading to questions about the solvency of the government. (v) The political position of the government may approach a terminal condition, as mandatory elections approach of as a parliamentary majority is eroded by resignations, defections, and morality” (p.353).

The main point of Krugman’s hypothesis, cited above, is that the deterioration of economic fundamentals may largely result from: the exchange rate overvaluation because domestic inflation rate is larger than trading partners’ inflation rate, leading to high cost of fixed exchange rate system, the large accumulation of foreign debts because of large current account deficit; and, lastly, an unstable political situation. The new currency crisis approach suggests, however, that such a change in fundamentals does not directly lead to currency crisis. The deterioration of economic fundamentals may result in currency crises, only when such a deterioration reaches a point where the cost of maintaining fixed exchange rate parity is larger than its benefits. Then, if economic agents predict that the peg will be abandoned at that point, according to the new approach, speculators will attack the currency and the fixed system, therefore, will be abandoned. Yet, economic agents should know the government’s loss function. The big question is when speculators will attack the currency if they do not know with certainty about the government’s loss function; will they attack the currency before the deterioration of economic fundamentals reaches the point?.

According to Krugman (1996), uncertainty about the government's loss function need not generate the timing of speculative attack, instead of a "probing" speculative attack, that is, an attack that is used to test the government's willingness or ability to defend the parity. For example, if a probing speculative attack results in information that the government is willing to obtain the high cost of maintaining the parity of exchange rate, there will likely be no speculative attacks on currency that produce a currency crisis. The point of this hypothesis is that one should be very careful in making a conclusion of the timing of a speculative attack which is based on historical events. As Krugman (1996) criticises the conclusion of Obstfeld and Rogoff (1995) by saying that

"the speculative attack on the British pound in September would certainly have succeeded had it occurred in August [Obstfeld and Rogoff, 1995]. What do we mean by this? Given that we now know that Norman Lamont's rhetoric about defending the pound was largely bluff, we can conclude that if speculators had decided with certainty in August 1992 that sterling would drop out of the ERM, that expectation would have been validated; but speculators did not know then what we know now" (p. 357).

The uncertainty about future economic fundamentals also plays an important role in creating currency crises. This uncertainty means that there is a range condition, where a deterioration of economic fundamentals leads to currency crises that could but need not happen. Such a condition provides a potential profit/loss for speculative behaviour by attacking the currency. According to Krugman (1996), suppose that at a particular level of fundamentals, the government will abandon the parity of its exchange rate without speculative attacks. Then if speculators had known that the fundamentals will worsen and reach that level, they will attack the currency at the time when the fundamentals approach that level, thus leading to a currency crisis. Krugman (1996) states that the probability that fundamentals will worsen and reach that level determine whether speculators will be successful in producing a currency crisis or not. If the probability of future fundamentals to reach that level is large, speculators will be successful and therefore, a currency crisis will ensure. In other words, if possibilities of deteriorating future economic fundamentals are certain, then speculative attacks must occur as soon as they can succeed. In contrast, if

possibilities that the parity will be sustainable —probably because the government will defend its currency— speculations may or may not attack the currency. When speculators expect that the possibility of the deterioration in fundamentals will largely reach the level, speculative attacks will be successful and therefore, a currency crisis.

In the case of the French franc crisis in 1992/1993, Jeanne (1997) investigates whether the deterioration of French's economic fundamentals that reached a particular level led to self-fulfilling currency crisis. The economic fundamentals were shown by the real exchange rate, the ratio of trade balance to GDP, and the unemployment rate. The data was monthly data from January 1991 to July 1993. The conclusion is that the estimation of economic fundamentals indicated the soundness of France's economic fundamentals in the period of January 1991 to August 1992, which could anticipate the presence of self-fulfilling attacks. Conversely, in the period of August 1992 to July 1993, the deterioration of fundamentals reached to a level in which self-fulfilling speculation could successfully attack the French franc. According to the author, such a deterioration that pushed the economy into the level of the "zone of multiplicity"⁸ was due to the gradual rise in unemployment rate. Furthermore, the author concludes that once the deterioration of fundamentals reached the zone of multiplicity, self-fulfilling attacks occurred and therefore, the French franc crisis. In this case, the role of self-fulfilling speculation is indicated by the predicted probability of devaluation of the French franc in 1992 and 1993 (Jeanne, 1997).

According to Krugman (1996), however, where the economy of countries indicating a clear trend in which a country's economic fundamentals have been deteriorating, it is not obvious to conclude that a currency crisis is caused by self-fulfilling attacks. In the case of five-crisis countries in 1992-1993 (France, Italy, Sweden and the United Kingdom), for example, Krgman (1996) states that economic fundamentals of these countries had clearly

⁸ This means a condition in which a currency crisis is more likely to occur than not (Jeanne, 1997). This probably similar to Krugman (1996) in defining the uncertainty of fundamentals which means that there is a range condition where the deterioration of economic fundamentals lead to that a currency crisis could but need not happen.

deteriorated in terms of the rise in unemployment rates, output gaps, inflation rates and debt/GDP ratios. Under this circumstance, these countries should set the monetary expansion. But, when these countries had to maintain the fixed exchange rate due to the ERM, there would be incentives to abandon the parity and therefore, currency crises. As Krugman (1996) states

“Fundamentals relevant to the willingness of governments [France, Italy, Sweden and the United Kingdom] to continue pegging their currency had clearly worsened, and showed every sign of continuing to worsen. This trend caused many economists to forecast a crisis —correctly. ... The only argument that one might make on behalf of self-fulfilling-crisis story would be one that relies heavily on the absence of early warning in the financial markets” (p. 374).

2.3.2 Self-fulfilling Currency Crises

The self-fulfilling currency crisis models come in a variety of types, and varied widely in their details. However, the main point of the model is that currency crises mainly result from a presence of multiplicity of equilibria in which the crises may occur without any noticeable change in economic fundamentals. In other words, when an economy enters a given particular level of economic fundamentals, there are several expected levels of the devaluation probability, and currency crises may be self-fulfilling. That is, when economic agents expect that the pegged exchange rate system will be abandoned, this may change the government's policy that results in a collapse of exchange rate regime⁹. The reason is, as Jeanne (1997) assumes, because, “the self-fulfilling character of the devaluation expectations comes from a fact that a high devaluation probability tends to validate itself by decreasing the net benefit of staying in the fixed exchange rate arrangement the next period. In other terms, the devaluation expectation tends to be self-fulfilling because they make it more costly for the policy maker to maintain the fixed peg” (p. 272). These factors,

⁹ According to Obstfeld (1994), the expectation of the collapse closely relates to the rise in unemployment rate and wage, and in Obstfeld (1996) leads to the higher domestic interest rates. The rise in interest rates may increase the probability of banking crises and the raised cost of bailouts.

then, produce incentives for governments to abandon the parity of exchange rate, regardless of the soundness in economic fundamentals, thus leading to currency crises.

According to the recent self-fulfilling-currency-crisis model, the necessary condition of multiple equilibria in which a currency crisis may be self-fulfilling is when a country's economic fundamentals enter a particular level. Suppose that there are two conditions of fundamentals. Firstly, when the fundamentals are better than the level, currency crises may still be self-fulfilling because the probability of devaluation expectation will never be zero. This implies that, since the probability is not zero, the possibility that a negative shock in fundamentals will result in the abandonment of the parity, will produce self-fulfilling speculative attacks and therefore, a currency crisis. Secondly, when the fundamentals enter the level, currency crisis is not, once again, specifically caused by a deterioration of fundamentals, instead of self-fulfilling "animal spirit", which organises economic agents toward a high expected devaluation. According to Jeanne (1997) and Obstfeld (1995), the nature of animal spirit may be determined by an observable sunspot variable, such as a publication by foreign exchange market analysts that coordinates, and generates the expectation of devaluation. Furthermore, the presence of a sunspot variable makes a deterioration of fundamentals less important in causing currency crises. As Jeanne (1997) states that, "...It is important to note that this sunspot variable does need to be related to the fundamentals since it is sufficient for each individual market participant to see that the others are speculating against the currency to join them, irrespective of reason why they are doing so" (p. 273).

In the case of the Mexican currency crisis in 1994/1995, Sachs, Tornell and Velasco (1995), Kole and Kohoe (1995), and Calvo and Mendoza (1996) have argued that the currency crisis led to self-fulfilling panics. Calvo and Mendoza (1996) argue that the cause of self-fulfilling panics were the devaluation of the Mexican peso as means of restoring overvaluation of the real exchange rate, the large current account deficit, and the large loss of foreign reserves. Such panics potentially occurred because foreign investors lacked

incentives to measure the quality of domestic short-term portfolio assets, particularly when countries with a fixed exchange rate system are experiencing economic booms. This is supported by the fact that when a number of countries are experiencing a large increase in investments, the marginal gain from information-gathering eventually declines. Under this circumstance, foreign investors are sensitive toward a “rumour” information regarding a devaluation. Consequently, if there is a rumour that may affect benefits of their portfolio investments, it will rapidly be responded as an opportunity to reassess the diversification of their portfolio investments. According to the authors, this was why, following the December devaluation of the Mexican peso in 1994, foreign investors changed the diversification of their portfolio investment by a massive run against the dollar-denominated asset, labeled by the authors as a “herding behaviour”.

In the case of the Mexican crisis in 1994/1995, Sachs, Tornell and Velasco (1995) point out that self-fulfilling expectation created a substantial panics only when the Mexican government’s foreign reserve reduced substantially, and raised the short-term foreign debts. The reason was mainly because, following the shock of 1994, even though, the Mexican government kept maintaining the parity, it could not enhance its credibility since the foreign reserves were run down, and the debt arose substantially. Under this circumstance, the government credibility became weak, and so it established an environment for self-fulfilling panics.

According to Furman and Stiglitz (1998), the currency crisis approach with the self-fulfilling attack is consistent to what happened in Southeast Asian countries and Korea in 1997-1998. The authors, however, state that the existing model of self-fulfilling crisis could not fully emphasise why the economy of the Asian crisis countries were largely unsafe toward self-fulfilling currency attacks, for at least two reasons. Firstly, in the years before 1997 the economy of Asian crisis countries did not encounter a large temptation to devalue their currencies, in the sense of the successful economic record, such as high GDP growth and low unemployment rate. Secondly, the new currency crisis model argues that there will

be benefits of devaluation in the form of restoring self-fulfilling confidence. However, in the case of Asian currency crisis, the presence of devaluation created the large cost in terms of deteriorating their financial system, corresponding to the massive credit failure and a contraction of aggregate demand. According to these authors, this was more likely to occur because of the large foreign debt accumulation of the weak financial system in the Asian crisis countries.

From a different view, Radelet and Sachs (1998) point out that, even though, Southeast Asian and Korea recorded a successful economic performance in the 1990s, there was a rapid accumulation of short-term external debts into the weak financial institutions, particularly due to the financial liberalisation and the stable exchange rate system of this region. As a consequence, the economy of the Asian crisis countries had become vulnerable to a reversal in capital inflows, creating a situation for self-fulfilling panics. Therefore, when foreign capitals became outflow in the early 1997, financial panics could not be avoided in the form of speculative attacks on the domestic currency. To be more specific, the authors argue that, firstly, foreign creditors paid little attention to the solvency of the Asian crisis countries in channeling their funds. Therefore, when Thailand had a financial problem in the form of inability of a large firm to meet foreign debt payments, they immediately suspected that the other countries could largely face the same problem. This is the main argument of the contagion effect of the depreciation of the Thai baht on its neighbours. Lastly, when the exchange rate depreciation of these countries emerged in the early stage, foreign creditors became unwilling to provide new loans, and in fact, they recalled the existing loans because the cost of servicing foreign debts increased in terms of domestic currencies. Consequently, domestic debtors rushed in purchasing foreign currency to cover the increased payment of their unhedged debts, thereby pushing the domestic currencies to depreciate further.

To test the above hypothesis that the East Asian crisis was triggered by the sudden change in creditors' expectations about the behaviour of other creditors, that is, self-fulfilling panics, Radelet and Sachs (1998) employ a formal statistical model which analyses a panel data from 1994 to 1997 for twenty-two countries. They come up with five conclusions. Firstly, a higher ratio of short-term debt to foreign reserves strongly and positively leads to the origin of crisis. This is supported by the fact that the average of the debt-to-reserves ratio of nine-crisis country observations is 1.82, while the ratio for non-crisis country observations is just 0.82. On the other hand, the total debt-to-reserve ratio does not statistically lead to the origin of the crisis. Secondly, a rapid accumulation of private credits positively leads to the origin of the crisis. Thirdly, the larger current account deficit mildly leads to the origin of the crisis. Fourthly, the overvaluation of the real exchange rate has a small correlation with the origin of the crisis in the form that the estimated coefficient significantly approaches to zero. Finally, the level of corruption is statistically insignificant in relation with the crisis.

2.3.3 The Effects of Political Factors on Currency Crises

It has also been accepted widely that a country's political factors play an important role in a presence of currency crises. Such factors may act as a direct cause of currency crises or a factor underlying the cause of crises through the weakening a country's monetary institution and credibility of economic policies, a large accumulation of unhedged short-term foreign debts, among others. In the case of Indonesia as well as the other Southeast Asian crisis countries in 1997, for instance, the political factors underlying the crisis are a lack of transparency; inadequate supervision of banking institutions, widespread corruption, and crony capitalism (Goldstein, 1998 and MacIntyre, 1998).

The direct effect of a political factor on currency crisis can also be seen in the case of the Mexican currency crisis in 1994-1995. Espinosa and Russell (1996) argue that the assassination of the most favourable presidential candidate, Luis Donaldo Colosio in

March 23, 1994 produced an early warning of a currency crisis before the major crisis in December 1994. The reason is that such an assassination deteriorated the confidence of foreign investors in their short-term investment portfolio, followed by a sudden withdrawal of short-term peso-denominated assets into foreign assets¹⁰. Consequently, this put a large pressure on the dollar price of peso. The authors, however, show that the acceleration of panics occurred mainly in November and December 1994 because foreign investors believed that the elected president, Ernesto Zedillo was incapable of solving the internal conflict within the Institutional Revolutionary Party (PRI), or to resolve the negotiations with the Indian rebels. The rise in the political tension was then responded to by the willingness of foreign investors to extend new loans and roll over the existing loans. The reverse of capital inflow forced the government to sell large amount of foreign reserves to defend its currency. As a result, the foreign reserves nearly ran out, leading to the abandonment of the parity of peso in December 1994. The rapid depreciation of peso was then unavoidable.

In the case of Southeast Asian crisis in 1997, MacIntyre (1998) argues that the cause of the crisis had not only been forced by economic factors, such as a large short-term debt, the pegged exchange rate system and the weakness in financial institution, but also political factors. In the case of Thailand, such a political factor led to the weak coalition governments resulting from the combination of parliamentary system with multi parties. Under this political circumstance, the government faced some difficulties in establishing a credible economic policy due to weak coalition government, thus accumulating potential economic problems. As MacIntyre (1998) states that

“Under this political structure, party and faction leaders were compelled to work assiduously to generate resources to hold their members together, and prime ministers had to struggle to keep their coalitions together. Thus there were numerous veto players within the government, and it is therefore scarcely surprising that major policy initiatives of any sort were extraordinary difficult to undertake” (p. 148).

¹⁰ The political instability that caused the loss of confidence in foreign investors' portfolio of Mexican securities thus raising the expected devaluation of the Mexican peso has also been reviewed by Edwards (1998) and Calvo and Mendosa (1996).

Conversely, while the political instability of Thailand resulted from a parliamentary structure with multiple weak parties, Indonesia's political instability came from the extraordinary degree of centralisation in the presidency. While the economic and political stability under the 30-year-centralised government of Suharto had created a high economic growth in the 1990s attracting a huge foreign capital to inflow, this, however, created a potential treat to a massive loss of confidence among, both, domestic and foreign investors toward business environment, particularly when the centralised leader, Suharto, had no credibility anymore. For instance, regardless of the government's economic strategy to defend it currency in the beginning of the crisis in December 1997, such policies had been swept away by economic agents. The lack of the government credibility reached a peak in May 1998 when thousand of students occupied the High Representative Assembly (MPR) demanding Suharto to step down. Consequently, the massive depreciation of rupiah was unavoidable. From this view point, MacIntyre (1998) argues that the natural cause of the Indonesian currency crisis had changed from economic to political economic factors (see also Susastro and Basri, 1998, Sadli, 1998, and Cole and Slade, 1998).

2.3.4 The Linkage between Banking Sector and Currency Crisis

A number of studies on banking crises or fragility have been carried out intensively by monetary historians. According to these studies, however, the definition of banking crises can be classified from a particular bank, usually a large banks, facing financial difficulties to conditions in which most banks in a country are defaults (De Bonis, Giustiniani and Gomel, 1999). Kaminsky and Reinhart (1996 and 1999) point out that banking problems particularly involve, at least, two unwanted events in banking systems. Firstly, banking panics that are associated with a closure, merger, or take over by the public sector or other financial institutions. Secondly, banking crises that lead to a number of banks needing a large-scale of government's financial assistance because of financial problems. Following the currency crisis in 1997-1998, for instance, the Indonesian government liquidated 16

banks in November 1997 and 38 banks in April 1999. Most of existing banks were insolvent which need the government's financial assistance.

It is widely recognised that banking panics play an important role in creating banking crises. Banking panics take place when sudden-huge withdrawals of deposits from banking systems into currency can only be responded to suspending such convertibility (Gorton, 1988). Depositors rush to convert their deposits into currency because they suspect that banks are experiencing failure or likely to fail. In response to the sudden withdrawals, banks, in turn, liquidate their assets in unprofitable conditions (Diamond and Dybvig, 1983). According to Calomiris and Mason (1997), the main cause of banking panics is a presence of asymmetric information between depositors and bankers which is because depositors cannot precisely measure assets and liabilities of each bank, therefore, depositors can only absorb aggregate information on banks' assets and liabilities. Therefore, when there is an unexpected shock in banking system, depositors then run on both solvent and insolvent bank, producing the collapse of banking system, known as contagious bank runs or banking panics.

Moreover, Park (1991) provides a simple explanation about a relationship between asymmetric information and contagious effects of banking panics. Suppose that an economy only consists of two assets: deposits and currency. Economic agents behave rationally in the sense that they prefer assets that provide a higher rate of return. Holding currency assumed to provide a constant return and, in contrast, a return on deposits depends solely on bank soundness. This implies that when depositors observe banks being sound, the return on deposits is larger than currency, and it is smaller when banks became unhealthy.

Now, consider if there is a shock producing a number of bank defaults such as a decrease in prices of collateral or changes in interest rate. This failure will then be amplified by contagious effect when depositors cannot identify solvent banks from insolvent banks. This

means that depositors suspect that most banks are insolvent. Consequently, depositors convert their deposits into currency because, by definition, the return on deposits has become less than currency. Hence, the presence of bank-specific information is crucial because the contagious effect of banking failure is reduced when information about the financial structure of individual banks becomes available (Park, 1991).

The contagious effects plays a crucial role in banking panics because in its absence, bank panics tend to occur locally in the sense that depositors withdraw their deposits from insolvent banks and, then, they place their deposits into banks that are seen as being solvent. When there is a contagious effect, however, banking panics force depositors to withdraw deposits from both solvent and insolvent banks. Studies on such a phenomenon, using historical data from the US banks during the Great Depression, has been carried out intensively by economic historians such as Diamond and Dybvig (1983), Waldo (1985), Gorton (1985), Calomiris and Khan (1991), Park (1991), Saunders and Wilson (1996), and Calomiris and Mason (1997).

2.3.4.1 The Linkage: A Theory

Although, the economic historians above have explored deeply the occurrence of banking crises, they have paid less attention to the linkage between banking sector and currency crises. Whereas, the linkages between banking sector and currency crises have been reviewed intensively by international monetary economists, particularly in emerging markets. Basically, there are two opposite theories in exploring such a linkage. The first theory argues that banking crises result from the problems with balance of payments, corresponding to currency crises. In the Mexican peso crisis of 1994, for instance, the crisis triggered Mexico's banking crisis. Hypothetically, as the currency crisis emerged, domestic banks raised interest rates, which then resulted in borrowers' inability to meet interest rates or principle payments on their debts, leading to a large number of insolvent banks.

Accordingly, depositors began to panic, putting a deep pressure on Mexico's banking system (Rojas-Suárez and Weisbrod, 1995).

In contrast to the first theory, the second theory points out that banking problems have been argued being an important cause of currency crises. The basic argument is when a presence of banking crisis is responded by a policy of creating money to bailout the collapse of its banking system, the excess of money supply then results in currency problems (Kaminsky and Reinhart, 1999). In the Mexican crisis of 1994-1995, Calvo and Mendoza (1996) argue that under globalised capital markets, the anticipation of the Mexican government to bailout its banking system led to the large gap between stocks of financial assets and foreign reserves, corresponding to the rise in the Mexican financial vulnerability. Therefore, when currency speculators attacked on its foreign reserves, the ability of Mexico to maintain the pegged exchange rate system deteriorated, leading to the currency crisis.

These two theories seem applicable to the case of Indonesia in 1997-1998. As it has been examined in Chapter 4, the weakness in the Indonesian banking sector played an important role in underlying the currency crisis of 1997-1998. In this case, the long-surviving-pegged exchange rate system and the moral hazard problems in the banking sector became an implicit guarantee of insolvent banks as well as distrustful borrowers, in which this then raised the Indonesian financial vulnerability, creating a foundation for a currency crisis to occur. Furthermore, as the contagion effect of the depreciation of the Thai baht damped the rupiah exchange rate, the Indonesian government immediately set high domestic interest rates to defend the rupiah. This policy, however, deteriorated the financial solvency of the banking system, leading to sudden-massive withdrawals of deposits and therefore, the collapse of the banking sector.

CHAPTER 3

THE INDONESIAN CURRENCY CRISIS AND THE BANKING SECTOR

It has widely been accepted that the soundness of a domestic banking system plays a crucial role in a country's macroeconomic stability, promoting sustainable economic growth and prosperity. When the banking system is unhealthy, however, speculative credit allocations tend to be large, leading to banking system fragility. It has also been well documented that a presence of banking problems strongly leads to currency crises. Not surprisingly, Kaminsky and Reinhart (1996 and 1999) state that a link exists between banking and currency crises. In the case of the Indonesian currency crisis in 1997-1998, for instance, Nasution (1999) and Hadad (1998) argue that the root of the currency crisis was the weakness in the Indonesian banking system, particularly since such a crisis was followed by banking problems in the form of a number of bank closures and insolvent banks. Available data shows that between November 1998 and April 1999 fifty four private banks were closed, and twenty one banks had to restructure their capital. In 1999 around 37% of surviving banks had negative capital adequacy ratio (CAR) (Bank Indonesia, 1998).

This chapter aims at investigating the relationship between the Indonesian banking sector and the currency crisis. This chapter focuses on four aspects: the major banking reforms in Indonesia from 1983 to 1994 and its implication of the development of Indonesia's banking systems, the weakness in the Indonesian banking supervision and regulations, the links between the currency crisis and the Indonesian banking crisis, and the Indonesian bank-restructuring programme.

3.1 The Indonesian Banking Reform and Its Implications on the Banking Sector, 1988-1994

The impact of world recession in the early 1980s on the Indonesian economy was a down fall in real economic growth. This occurred mainly because the recession corresponded to a large decrease in the world demand for Indonesia's exports, thereby, reducing export revenue. The decrease in the export revenue, furthermore, raised the current account deficit, pressuring the annual growth of the Indonesian economy. The data cited in Binhadi (1995) shows that while Indonesia's current account deficit increased from US\$ 0.5 billion in 1981 to US\$ 5.5 billion in 1982 and US\$ 6.4 billion in 1983, the annual growth rate of real gross domestic product (GDP) was only 2.3% in 1982 compared to the annual growth rate of 9.9% in 1980.

In response to such a slow economic growth, the Indonesian government promoted the first banking deregulation in June 1983, covering the relaxation of the credit ceiling policy, introducing indirect monetary instruments, reducing the central bank's credit liquidity to the market, and allowing state-owned banks to be free to determine interest rates, and to mobilise funds from the public. The liberalisation of the domestic banking system was also set through abolishing the restrictions on accepting funds from abroad (Binhadi, 1995, Cole and Slade , 1996, and Suwandi, 1995).

In terms of monetary policy, the creation of indirect money market instruments were set by introducing the certificate of Bank Indonesia (SBI) and the money market securities called Surat Berharga Pasar Uang (SBPU)¹¹. Since then, the monetary policy has been set through the implementation of open market operations. Another indirect monetary instrument was the reserve requirement, in which according to the deregulation of 1983, it was maintained at the level of 15% of banks' current liabilities. Additionally, as a consequence of removing the credit ceiling system, the central bank launched the discount window facility, which was basically used to assist the short-term liquidity of banks (Binhadi, 1995, and Cole and Slade, 1996).

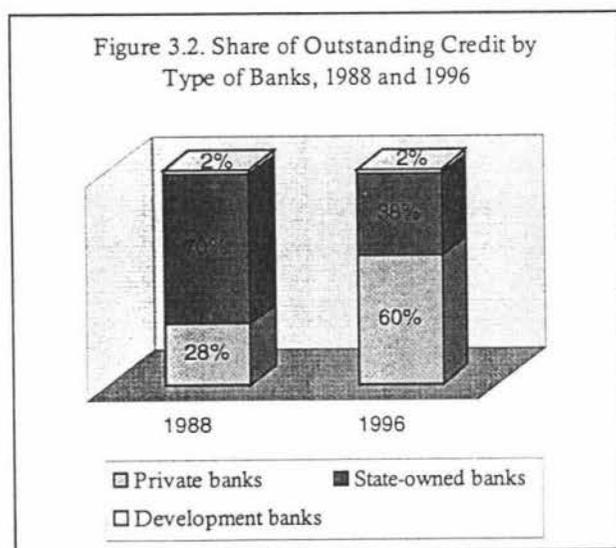
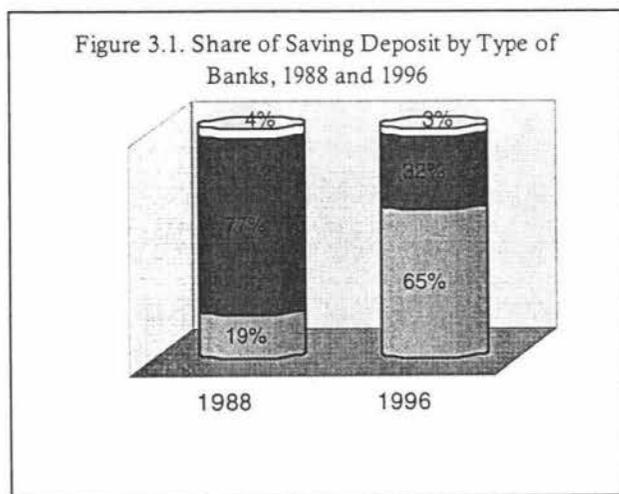
¹¹ SBI is used, particularly, to reduce the domestic money supply, whereas, SBPU is to expand the domestic money supply.

As a result of the banking deregulation in June 1983, the mobilisation of funds through the banking system increased significantly. In the period of 1983 to 1988 banking credit raised from Rp 10.6 trillion to Rp 33 trillion. Similarly, time deposits increased 40.7% annually achieving Rp 22.6 trillion. Correspondingly, macroeconomic indicators showed the recovering phase. In the period of 1984 to 1988, the GDP grew around 5% annually, and the current account deficit reduced from US\$ 6.4 billion in 1984 to just US\$1.9 billion 1988 (Binhadi, 1995).

Regarding the successful result of the first deregulation, the Indonesian government established the October 1988 package reform (PAKTO 1988), which consisted of five main aspects. Firstly, in order to raise the efficiency of banking system, restrictions on entry were removed by providing a possibility for running new private banks and new branch offices, both of which were highly restricted, and rural banks called Bank Perkreditan Rakyat (BPR). Foreign banks were also permitted to have a maximum 85% of share for a joint venture bank, and existing foreign banks were allowed to open new branches in the five main cities: Medan, Bandung, Semarang, Surabaya and Ujung Pandang. Secondly, it gave freedom to state-owned companies to place the maximum 50% of their deposits in private banks aiming at reducing the market dominance of state-owned banks in the banking system. Thirdly, it provided an opportunity for non-bank financial institution (NBFI) to mobilise funds by issuing certificates of deposits. Fourthly, it reduced the reserve requirement from 15% to just 2% of banks' liabilities. Fifthly, banks and NBFI were subject to a legal lending limit in providing credits to affiliated persons and to individual borrowers, groups of borrowers, shareholders, and executive staff, and managers (Binhadi, 1995, Suwandi, 1995, and Cole and Slade, 1996).

In terms of the number of banks, the impact of PAKTO 1988 to the development of banks has been impressive. Following the deregulation, the number of private banks (domestic private banks, foreign and joint venture banks) increased substantially. The rapid expansion in a number of private banks then increased its role in mobilising funds, ending the dominance of state-owned banks. Figure 3.1 presents while the deposit share of state-owned banks reduced from 77% in 1988 to 32% of total deposit in 1996, the deposit share of private banks increased from 19% to 65%. This was particularly

because private banks provided higher deposit interest rates and various types of banking products with marketing aggressive than state-owned banks. The credit share of private banks also increase substantially from 28% in 1988 to 60% of total outstanding credit in 1996, in contrast, state owned banks reduced from 70% to 38% (Figure 3.2).



Source: Bank Indonesia, *The Indonesian Financial statistics* (various Issues)

Note : Private banks include foreign and Joint venture banks.

The benefit of PAKTO 1988 to the economy, however, was only for a short-term. Following the deregulation of 1988, for instance, the rapid expansion of banking activity raised Indonesia's real GDP from 6% in 1988 to 7.5% in 1989, and inflation rates

reduced from 8.1% to 6.0%. In the period of 1990 to 1991, as a result of the rapid expansion of banking activity, however, the inflation rate increased sharply from 6.0% in 1989 to 9.5% in 1990. The theoretical reason for this was because of the excess domestic demand for domestic output resulting from the rapid expansion of domestic money supply. Table 3.1 shows that the ratio of narrow money supply (M1) to real GDP increased from 9.6% in 1988 to 11.3% in 1990. Similarly, the ratio of broad money supply (M2) to the real GDP grew from 28.1 % to 40.1%.

Table 3.1

Money Supply, Monetary Ratio, Inflation Rate, and GDP Growth, 1983-1991

	1983	1988	1989	1990	1991	1993
Narrow money (M1) (Billion of Rp)	7,569	14,392	20,114	23,819	26,342	45,662
Broad Money (M2) (Billions of Rp)	14,662	33,885	58,705	84,630	99,059	174,319
M1/GDP (%)	9.8	9.6	11.2	11.3	10.5	11.2
M2/GDP (%)	18.9	28.1	32.7	40.1	39.6	44.1
Inflation rate (%)	11.5	5.5	6.0	9.5	9.5	9.8
The real growth of GDP	4.2	5.8	7.5	7.2	6.9	6.7

Sources: Binhadi, 1995, and Cole and Slade, 1996

The deregulation of 1988 also largely contributed to aggressive competition among private banks in mobilising not only domestic but also foreign funds. As a result, private banks actively involved themselves in foreign exchange speculations. In August 1990 the Indonesian banking system was shocked by the huge losses in foreign exchange speculation of the second largest private bank, namely bank Duta. In response to such a situation and concerned about the overheated economy, the Indonesian government promoted the February 1991 package (PAKFEB 1991). This package was basically to improve the soundness of the banking system through strengthening banking supervisions. There were five main aspects of this package. Firstly, bank owners, members of board directors and commissioners should have good moral characters. Secondly, the board directors of banks should have at least three years banking experience. Thirdly, it provided the opportunities for banks to have new overseas

branches. Fourthly, it imposed capital adequacy requirements (CAR). Fifthly, it prohibited banks from owning equity securities and limited the foreign exchange position of banks (Cole and Slade, 1996).

The 1991 package resulted in slow credit growth during 1992 and early 1993. For this reason, the government launched a package in May 1993, namely PAKMEI 1993. The main features of banking improvements issued in May 1993 were: firstly, the capital adequacy requirements of the PAKFEB 1991 was eased by permitting banks to calculate all previous-year profits as components of capital. According to PAKFEB 1991, previous profits should be calculated only as 50% of total capital. Secondly, it reduced the weighted risk on lending to state-owned companies and unused credit facilities from 100% to 50%. Therefore, this would increase banks' CAR, enabling banks to increase credits. Thirdly, it simplified the rating procedure for rural banks and the relaxation of the loan to deposit ratio (LDR) by changing the definition of deposits. This deregulation defined deposits would not only include third party liabilities but also stockholder's equity, and the penalty point for the violation of LDR was reduced and simplified (Binhadi, 1995). The detailed evolution of Indonesian banking reforms can be seen in the Table 3.2.

Table 3.2
The Major Banking Deregulation in Indonesia, 1983-1994.

Date of Implementation	The name of Deregulation	Reform measure
June 1, 1983	The June 1983 package of Banking deregulation (PAKJUN 1983)	<ul style="list-style-type: none"> - Removing bank credit ceiling. - Giving state-owned banks a freedom in determining interest rate. - Giving opportunities to banks to mobilise funds from the public.
January, 1984	The supplement of PAKJUN 1983.	<ul style="list-style-type: none"> - Introducing indirect monetary instruments in the forms of discount window facilities and the issuance of the Certificate of Bank Indonesia.
September, 1985	The supplement of PAKJUN 1983.	<ul style="list-style-type: none"> - Issuing the money market securities, namely Surat Berharga Pasar Uang (SBPU).
October 27, 1988	The June 1983	<ul style="list-style-type: none"> - Giving opportunities to open new private banks

	package of Banking deregulation (PAKTO 1988).	and rural banks. - Requiring foreign exchange, and joint venture banks to allocate 50 % of loans to export loans. - Giving opportunities of non-bank financial institutions to issue certificates of deposits.
March 25, 1989	The March 1989 package of banking deregulation (PAKMAR 1989).	- The clarification of some aspects of PAKTO 1988. - Introducing provisions of banking mergers. - Introducing a new regulation related to rural banks.
December 1, 1989	The December 1989 package of banking deregulation (PAKDES 1989).	- Encouraging banks to create a variety of savings products, particularly low income people, such as Savings for pilgrims (Tabungan naik haji), rural savings (Simpedes), saving for low-down-payments of housing credits (TUM-KPR). - Giving a favourable tax for small savers.
January 29, 1990	The December 1989 package of banking deregulation (PAKJAN 1990).	- Reducing Bank Indonesia subsidised credit programs. - Requiring domestic banks to allocate 20 % of loans to small business.
February 27, 1991	The February 1989 package of banking deregulation (PAKFEB 1991).	- Issuing banking supervision measures. - Carrying out a tight money policy, namely Sumarlin Shock II.
November 1991		- Imposing limits on banks' offshore borrowing.
March 1992	The New banking Act 1992.	- All principal aspects of banking deregulation and other measures to strengthen the banking system are incorporated in the new Act.
May 29, 1993	The May 1993 banking reform (PAKMEI 1993).	- Relaxing, and adjusting bank prudent restraints of the PAKFEB 1991.
December 1993		- Indonesian Credit Rating Agency (Pemeringkat Efek Indonesia/ Pefindo) required banks to meet 7 % CAR. - Bank Indonesia increase the spread on purchasing, and selling foreign exchanges.
December 1994		- Requiring Banks to meet 8 % CAR.

Sources: Binhadi, 1995, and Cole and Slade, 1996.

3.2 The Weak Banking Supervision and Regulations in Relation to the Fragility of Banking Sector

In a market economy, the banking system plays a critical role in channeling funds from public to other economic activities. However, credit allocation decisions are potentially destroyed by unsound banking practices such as insider dealing and speculative activities which potentially result in mismatches of assets and liabilities and high-risk loan and investment portfolios (Baskom, 1997). The other reason is because the banking system is vulnerable toward systemic risks or widespread defaults. According to Loretan (1997), "...the systemic risk in banking institution is the possibility that unexpected withdrawal of deposits –a funding shock– cannot be covered by the liquid assets held by banking system as a whole" (p.41). This unexpected withdrawal is, in particular, because of the loss of confidence among depositors toward the soundness of banks. There has been much evidence indicating that a loss of confidence is mostly preceded by a large credit speculative in the banking system (see Suarez and Weisbrod (1995) for the case of Latin America banking crisis the 1990s, and Goldstein (1998) for the case of the Asian countries in 1997-1998). For this reason, banking supervision and regulation is crucial to protect depositors against systemic risks in a banking system.

Banking supervision and regulations across countries mostly include two aspects. The first aspect leads to preventative supervision and regulations by requiring banks to increase their ability to handle their own risks. The provisions of such a method may include market entry requirement, capital adequacy requirements, balance sheet control criteria that are set to control lending concentrations, and currency denomination of banking transactions, examinations that may be carried out by various ways such as formal and informal consultation, moral persuasion and regular reports. The second aspect relates to a deposit insurance scheme¹² which basically aims at strengthening

¹² It is important to note, however, that deposit insurance potentially tends to produce moral hazard problems by removing market disciplines in banking operations. The reason is that the relaxation of deposit-risk loss attracts depositors to supply funds to risky banks. Whereas, in the absence of deposit insurance, depositors will not place their funds in risky banks, pressuring risky banks to decrease their risk. Under this circumstance, the main objective of banking supervision is, therefore, to reinforce market discipline through limiting the excessive risk-taking behaviour of banks.

depositors' confidence in a banking system, avoiding bank runs (Bascom, 1997).

In terms of both theoretical and empirical explanations, there is no doubt that the weaknesses in banking supervision and regulations strongly lead to the presence of banking crises and possibly, currency crises. To avoid banking panics, not surprisingly, monetary authorities across countries have therefore claimed that they have implemented prudent banking supervision and regulations, of course, the terms of prudent banking supervision and regulation are different across countries. The question is why banking panics occur continuously in every corner of the world?. There have been numerous arguments addressing this issue.

In relation to the Mexican banking crisis of 1994/1995, Goldstein and Turner (1996) point out that the crisis was closely associated with the weak banking supervision which was reflected by the weakness in accounting, disclosure and legal frameworks. Garcia (1997), however, argues that banking supervision and regulation in most Latin America countries have been satisfactory in terms of adequate regulatory frameworks, codes of law and banking provisions. The weakness in banking supervision and regulations relied heavily on supervisors' willingness to believe in the market strength. Consequently, even though, they were aware of a particular banking problem, they were reluctant to make any immediate enforcement. As a result, the problem became much worse. Garcia (1997) states that, normally, the escalation of such a problem could often be anticipated by giving an immediate signal to the market about the problem.

From a different view, Meltzer (1997) states that the weakness in banking supervision leads to the method used in measuring banking risks. Prudent banking regulations and supervision addressing capital adequacy requirements, for example, has not focused on the core problem of banking failures because such regulation and supervision more likely assigns banking risks to individual assets rather than portfolio assets. Whereas, banking risks factually arise from the structure of portfolios. Banks can quickly change the position of their portfolios without making many structural adjustments in their total assets. They can easily make such a change by short or forward transactions of their derivative assets. Consequently, "...although banking supervisors could examine a

portfolio in one minute by applying the Basle accord, twenty minutes later all of their assessments become irrelevant” (p.87).

3.2.1 The Indonesian Case

Banking supervision and regulations in Indonesia are carried out by the central bank, Bank Indonesia (BI), which is fundamentally to protect depositors by maintaining soundness in the Indonesian banking system. The new Banking Act 1992 cited in Binhadi (1995) states that

“(a) Bank Indonesia, as bank supervisor, is granted the right to issue provisions related with prudential principles and banking soundness in general; (b) Bank Indonesia has the authority to conduct bank examinations and to ask a bank to: submit reports, publish its balance sheet and profit-loss statement, as well as be audited by public accountants; (c) Bank Indonesia may take action in case a bank suffers from difficulties that endanger its business; and (d) Bank Indonesia is granted the right to stipulate administrative sanctions, either for a bank or for affiliated parties (board of directors, board of commissioners, employees as well as service providers to a bank such as public accountants, lawyers, and appraisers)” (p. 197).

According to the banking deregulation of 1991, the scope of the Indonesian banking supervision and regulation mainly involve at least three aspects: prudential regulations, examination and sanctions, The first aspect includes licensing provisions, operational guidelines and bank rating criteria. The licensing provision is, primarily, a guideline that includes requirements to register bank ownership and management, opening new branches (both foreign and domestic branches), merger and consolidation. The operational guidelines cover capital adequacy requirements; asset quality assessments; provision for bad debt; credit operations (including legal lending limit); foreign exchange operation including net open position, swap, margin trading, bank guarantee. The rating classification covers six components: Capital, Assets quality, Management, Earnings and Liquidity (CAMEL) (Binhadi, 1995).

In response to the Basle accord, the 1991 banking provision required banks to meet the capital adequacy ratio (CAR) of 8% in 1994. The definition of banks' capital and the

calculation of CAR have also adopted the Basle accord. In 1993, however, some aspects of the 1991 provision had been adjusted, although, there was no change in the percentage of CAR. There were two phases in which banks could meet the 8% CAR: by the end of March 1993, banks should have reached the 7% of CAR, and then, by the end of December 1994 banks should meet the 8% of CAR. According to Hendrobudiyono (1994), at the end of March 1994 the average CAR of four types of banks: state-owned banks, private banks, regional development banks and foreign and joint venture banks was 9.8%, 10.8%, 13%, and 15.6%, respectively. The average CAR of all banks was 10.8%. This meant that most of the Indonesian banks already met the Basle capital accord at that time.

The provision on banks' net foreign exchange position (NOP) was firstly introduced in 1989, which was essentially to protect the banks from overexposure to foreign exchange fluctuation. In the 1994 banking regulation, the provision required that each bank should maintain its NOP at a rate less than 25% of their capital and at rate of 25% for each currency. Each bank should maintain NOP on a daily basis and submit the NOP report to the central bank at the end of each week. Banks which exceed the provision were subject to penalty and sanctions. The further provision on banks' exchange rate transaction was margin trading. According to the 1991 regulation, banks' margin trading activities should be based on the following provision. Firstly, such activities should be based on the availability of margin deposits and these should be reported to the central bank in the banks' weekly and monthly reports. Secondly, the bank's margin deposits should not exceed a maximum of 10% of their capital. Thirdly, banks were prohibited from conducting a margin trading on behalf of any company they are affiliated with, such as boards of directors, commissioners or the owner of the banks (Binhadi, 1995).

The other aspect of the prudent banking provision is a legal lending limit. This provision was firstly introduced in 1988, and was improved in 1991 and 1993. The 1993 regulation related to the legal lending limit involving three provisions. Firstly, the legal lending limit for a party or a non-affiliated group was 20% of the bank's capital. Secondly, loans to a group of debtors made before this regulation should be adjusted to

the following provisions: (a) before the end of December 1995, the credits should not be more than 50% of bank's capital. (b) By the end of March 1997, the credits should not exceed 20% of a bank's capital. Thirdly, by 1997, the legal lending limit for a party affiliated with a bank should not be more than 10% of a bank's capital. Fourthly, credits for a company within the same group should not exceed 20% of a bank's capital (Binhadi, 1995).

To identify the scope of banking supervision and regulations in Indonesia, it is important to make a brief comparison between Indonesia and the United States. The supervision and regulations in these two countries are summarised in Table 3.3, showing that the scope of banking supervision and regulations in Indonesia has largely adopted the banking supervision and regulation of the US, although, with different degrees for each provision. The legal lending limit to one borrower in the US, for instance, is 15% of capital and surplus (Hall, 1993) and in Indonesia is 20% of a bank's capital. Similarly, the bank lending to property business is limited by certain amount, while in Indonesia banks' loans to property is not subject to limits.

Even though, the Indonesian banking supervision and regulations correspond to the US banking supervision and regulations, as well as the Basle accord, the question is why Indonesia failed to prevent its banking system from contagious bank panics, following the currency crisis of 1997. The problem was not associated with the scope of banking supervision and regulation, but lay heavily with the implementation of banking regulations. Inadequate staff of Bank Indonesia in terms of numbers as well as experience to inspect the soundness of banks was a possible cause of the weak banking supervision. Nasution (1999) points out that the quality of personnel in banking supervisors lagged behind the rapid growing technology in banking institutions.

Table 3.3
The Banking Supervision and Regulations
in Indonesia and the United States.

Aspects of supervision	Indonesia	the US
Bank examination	Yes	Yes
Management Interviews	Yes	Yes
Licensing requirement		
- minimum capital requirement.	Yes	Yes
- Fit and proper.	Yes	Yes
Capital adequacy assessment.		
- Risk based approach	Yes	Yes
Liquidity adequacy assessment	Yes	Yes
Exposure limits		
- Single borrower or connected parties	Yes	Yes
- Loans to directors	Yes	Yes
- Property-related lending	No	No
- Exchange rate risk.	Yes	Yes
- Country risk.	No	Yes
Guidelines for LDC debt exposure.	No	Yes
Ownership rules.		
- Fit and proper test.	Yes	Yes
- Moral suasion.	Yes	No
Separation of banking from securities business.	No	No
Separation of banking from insurance business.	No	Yes
Branching restriction.	No	Yes
Merger restriction.	Yes	Yes
Deposit protection.	Yes	Yes

Source: Hall, 1993 for the US banking systems.

Another reason was that the weakness in the implementation of the prudent banking supervision led to a lack of transparency due to widespread corruption and nepotism in Indonesian banking supervision. This moral hazard problem implicitly insured insolvent banks from defaults. For instance, except for the liquidation of the Summa bank in 1992, the absence of bank closures for insolvent banks reflected that Bank Indonesia was reluctant to let insolvent banks fail, partly, because of concern over the danger of systemic risk of bank closure, and also partly due to the lack of transparency

in the banking supervision. Such a moral hazard potentially created the high risk loans corresponding to a number of non-performing loans¹³. Table 4.2 on Chapter 4, for instance, shows that in the pre-crisis period the ratio of non-performing loan of banks to total assets increased from 0.7% in 1990 to 3.5% in 1994. Though the ratio gradually decreased to 2.8% and 2.4% in 1995 and 1996, respectively.

From a different perspective, Cole and Slade (1998) argue that during the lending boom of the 1990s the government guarantee in the form of “Suharto connection,” on private banks, as well as large Indonesian firms, protected insolvent banks and distrustful bank debtors from prudent supervision of Bank Indonesia. Such an implicit guarantee, then, caused foreign as well as domestic investors to overlook weaknesses in the Indonesian banking system. As a consequence of the failure of the guarantee, indicated by the resignation of Suharto, then, investors were in a state of panic and became reluctant to extend new loans and roll over existing loans. Since debtors were in trouble, it then spread over the banking system. For this reason, authors argue that the moral hazard problem in the banking institution plays an important role in escalating the currency crisis of 1997-1998.

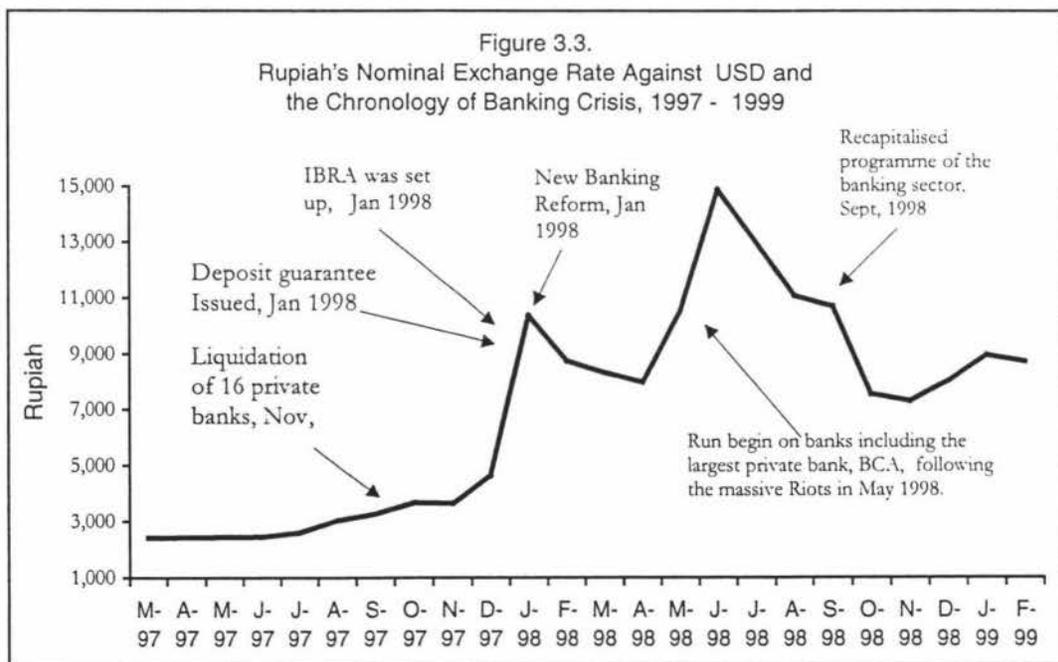
3.3 The Linkage between Banking Sector and the Currency Crisis of 1997-1998

As with in Nasution (1999) and Hadad (1999), this study argues that there is a linkage between the banking sector and the currency crises of 1997-1998. The reason was that the fragility of banking sector prior to the crisis created a circumstance for a currency crisis to occur and then as the currency emerged (see Chapter 4), the crisis resulted in the collapse of the Indonesian banking system. In this case, the collapse of the banking system was mainly through two channels. Firstly, as a response to the early depreciation of the rupiah exchange rate, the policy of raising domestic interest rates to defend the rupiah exchange rate provided information that banks' capital had deteriorated because

¹³ State-owned banks that always obtain the government financial support also have tended to produce risky loans. Following the economic slow-down and tight monetary policy of 1991 and 1992, the governor of Bank Indonesia, Sudrajat Jiwandono, announced in February 1994 that non-performing loans of seven state banks amounted to US\$ 7 billion in October 1993 (21.2% of all outstanding state banks loans) (Suwandi, 1995).

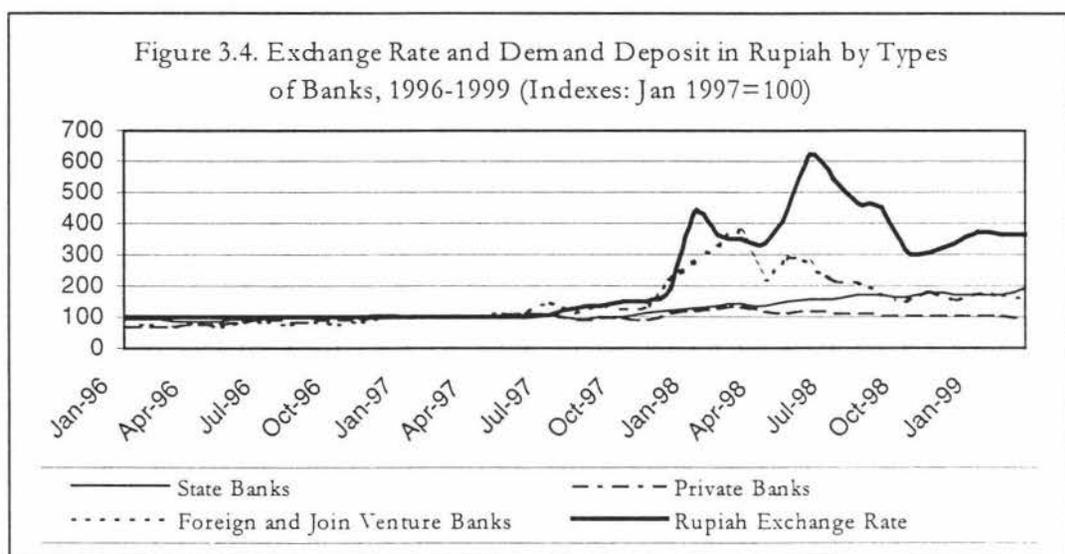
on the one hand, banks' domestic assets fell dramatically in terms of foreign currency, and on the other hand, banks' foreign debts increased drastically in terms of domestic currency. As a result, depositors began to panic and suddenly withdrew their deposits in the banking system, putting a deep pressure on the liquidity of the banking system. At the same time, since depositors converted their deposits into the US dollar, it then pressured the rupiah exchange rate to depreciate further.

Secondly, social and political unrest played a striking role in escalating the loss of confidence among depositors towards the banking system. Even though, since January 1998 the government guarantees all deposits in banks, soon after the Jakarta riots on 13 and 14 May and the resignation of Suharto on 21 May 1998, depositors run on a number of private banks including the largest private bank, BCA. Depositors running BCA particularly led to the close relationship between the owners of this bank and the former president. BCA was 70% owned by the largest Indonesian-Chinese conglomerate, Sudono Salim, who had a close relationship with the former president, Suharto.



Source: Bank Indonesia, *the Indonesian Financial Statistics*, September 1999.

The bank panic resulted in the mobility of deposits in the form of a large convertibility of deposits denominated in rupiah into US dollars, and a large withdrawal of deposits from private banks into both state-owned and foreign banks which were seen to be safer. Following the crisis, demand deposits from private banks fell from Rp 33,826 millions in July 1997 to Rp 31,265 millions in November 1998. Whereas, in the same period demand deposits in state-owned banks increased from Rp 17,461 millions to Rp 21,447 millions and Rp 34,320 millions in April 1998. Similarly, in foreign and joint venture banks demand deposits raised from Rp 10,673 millions in July 1997 to Rp 17,596 millions and Rp 32,345 millions in March 1998 (Bank Indonesia, 1999) (see also Figure 3.4).



Source: Bank Indonesia, *the Indonesian Financial Statistics*, September 1999.

The bank panics resulted in a numerous bank defaults signaling the need for restructuring the domestic banking sector. To restore the lost confidence of depositors, Bank Indonesia closed 16 banks in November 1997. Furthermore, the government announced also in September 1998 that all banks would be divided into three categories: Category A banks with capital adequacy ratios of better than 4% would join the recapitalised programme; category B banks with CAR between -25% and 4%; and category C banks with CAR less than -25%. Banks in category C would be liquidated if the owners could not add additional capital to meet the minimum 4% of CAR. In

April 1999 Bank Indonesia closed 38 private banks which could not meet the provision of recapitalised programme, and 9 private banks and all state-owned banks would later be recapitalised by the government. Table 3.4 reveals, however, that more than half of surviving banks have capital adequacy ratios of less than 8%. Considering the Basle's accord, most of banks could not meet the minimum of capital adequacy requirement. Banks with CAR of in excess of 8% are only around 30% of total surviving banks.

Table 3.4

Capital Adequacy Ratios of Surviving Banks, 1999

No	Classification of CAR	Percentage	Number of banks
1	< 0 %	37.1	43
2	0 - < 8 %	31.0	36
3	8 - < 16 %	14.7	17
4	16 - < 22 %	7.7	9
5	> 22 %	9.5	11
Total		100	116

Sources: Author's calculation based on Bank Indonesia, 1999.

3.4 The Bank Restructuring Programme

In response to a widespread default of banks, the Indonesian government established a bank restructuring programme by creating the Indonesian Bank Restructuring Agency (IBRA) on 27 January 1998. IBRA has two main purposes. The first is to control and manage the restructuring of banks. The second is to be the management agency for assets and liabilities of banks in the process of restructuring. According to Johnson (1998), since its development, IBRA supervises 54 banks, representing about 40% of banking assets. The financial source of IBRA was supported by issuing Rp 80 trillion worth of the government bonds, which IBRA was expected to sell to the central bank, BI (Johnson, 1998).

The banking restructuring programme began by announcing that seven small private banks were closed and their operations transferred into the biggest state bank, (Bank Negara Indonesia (BNI). Furthermore, six large private banks and one state bank,

Bapindo, continued to operate but were placed under the supervision of IBRA. The insolvent private banks included the largest private banks, Danamon and BDNI which had about 20% of total bank assets. The liquidity support to these banks involved 75% of the total liquidity support provided by the Central Bank. BI transferred liquidity support to them exceeding 500% of equity and 75% of their assets to support the liquidity of the banks (Johnson, 1998).

During July 1998, IBRA developed a plan for recapitalising the banks which was agreed to by BI and Finance Minister. The main point required that all bank owners must repay illegal-related party loans and the liquidity support provided by BI. By September 1998, the owners of the two largest private banks, BCA and BDNI, would pledge assets worth Rp 78 trillion. The owner of BCA, Sudono Salim, promised to repay Rp 35 trillion of BI's liquidity support and a further Rp 13 trillion of inter-group lending. The owner of BDNI, and Sjamsul Nursalim's Gajah Tunggal group promised Rp 30 trillion. The payment would be done by transferring the share of the two groups to IBRA (Asiamoney, 1998).

Regarding the large decrease in the value of banks' assets, the government changed the requirement of the repayments. On September 1998, the government announced that the bank owners should pay their liquidity support in cash, rather than assets and required the banks to submit assets disposal plans within a month. The President Habibie said to Asiamoney that "...We are not interested in owning these companies. [We] only want the money back, which is owned by the people" (Asiamoney, 1998 pp.18). Then, the government made a four-year phase for such repayments. The first payment was 30 % of their debt that should be completed by November 1999. The rest would be repaid over the following three years: November 2000 would be the second, November 2002, the third. By November 2003 all debts will be repaid. During the repayment period, banks were to be run by the owners under the supervision of IBRA (Asiamoney, 1998).

The bank restructuring programme also included the amendment of three new regulations relating to the banking system: the New Banking Act, the Bankruptcy Law

and the Central Bank Act. There are three main provisions for the amendment of the New bank Act: first, the bank licensing will be transferred from the Finance Ministry to the Central Bank, concentrating all banking authorities in the central Bank. Second, there was a redefinition of bank secrecy, banks should, now, provide information concerning their assets and the extent of related party loans. Third, foreigners were to be permitted to own banks with 100% of ownership (Asiamoney, 1998).

The revised bankruptcy law mainly includes: simplifying the definition of bankruptcy; giving the court no more than 30 days to register a decision; and allowing, at the request of debtors, a 45-day suspension of payments after which creditors and debtors have 270 days to agree to a restructuring plan. The strengthened bankruptcy law is, basically, directed to help ease Indonesia's liquidity crunch. The Central Bank Act (Chapter 14) mainly states that by 2002, the Indonesian banking supervision will be carried out by the independent banking supervision institution, instead of, by the central bank. This provision is to allow Bank Indonesia to concentrate on its main role as conducting monetary policies (Bank Indonesia, 1999).

3.5 Concluding Discussion

The collapse of the Indonesian banking sector in 1997-1998 was indicated by two major undesired events in the banking system: a number of bank closures and insolvent banks which have been taken over by the government. Two factors can be argued to be the cause of the collapse of the banking sector. One was bank panic that had pressured both solvent and insolvent banks into financial problems. The panic was primarily triggered by the policy of high domestic interest rates to defend the currency crisis of 1997-1998. This was because such a policy provided an information that the financial structure of banking system was in a serious trouble. The second was the social and political upheaval, which neutralised the impact of deposit guarantee policy on the returned confidence in the banking sector.

Defending the rupiah exchange rate through setting high domestic interest rates also created a serious problem in the banking system. The high interest rate damaged the

banking system in two ways. Firstly, it resulted in the inability of debtors to service their debts, increasing nonperforming loans. Secondly, it required banks to pay higher interest payments to depositors. Considering that the high interest rate produced an increased number of nonperforming loans, banks set loan interest rate, which was lower than deposit interest rates. This meant that the banking system was in an unprofitable condition, shrinking bank's capital. Not surprisingly, following the currency crisis of 1997-1998, the capital adequacy ratio of most banks had been very low, or even negative.

The scope of the Indonesian banking supervision and regulation have been adequate in terms of regulations, covering bank licensing provision, the capital adequacy requirement, banks' foreign exchange position and legal lending limits. The banking failure and the currency crisis of 1997-1998 were not because of the scope of banking supervision and regulation but the problem lay heavily on the weak implementation of prudent banking supervision and regulations. The weak implementation was mainly the result of a moral hazard problem which arose from a lack of transparency, associated with widespread corruption, collusion and nepotism in the Indonesian banking supervision. Another factor leading to the moral hazard problem was the "Suharto connection" insuring most insolvent banks in the 1990s. These problems then prevented insolvent banks from failing, accommodating a large number of insolvent banks, risky and nonperforming loans. This means that, under this circumstance, since the 1988 banking deregulation the government sowed the seeds of the currency crisis to occur in response to systemic risks.

CHAPTER 4

DATA AND DATA ANALYSIS

Studies on the Indonesian currency crisis in 1997-1998 have concluded that the weaknesses in the Indonesian economic fundamentals in the pre-crisis period played an important role in underlying the crisis (McLeod, 1998, Sadli, 1998, Johnson, 1998, and Soesastro and Basri, 1998). Note, however, that the linkage between the banking sector, economic fundamentals and the currency crisis has not been explored deeply in these studies. This chapter attempts to analyse this linkage. To examine the relationship between the Indonesian banking sector and the currency crisis, this study focuses on the following factors: the rise in foreign liabilities and non-performing loans of banks, short-terms foreign debts of banks, and the number of banks which are assumed as being a reflection of the weakness in the Indonesian banking sector prior to the crisis. Furthermore, to analyse the linkage between the deterioration of economic fundamentals and the crisis, this study investigates three factors: the ratio of trade deficit to GDP, foreign reserves-to-import ratio, and domestic and foreign interest rate differential.

4.1 Data

Most data of this study have been provided publicly by the Indonesian government, particularly Bank Indonesia (BI) and the Indonesian Bureau of Statistics (BPS). The banking and macroeconomic data are obtained mostly from the Indonesian Financial Statistics published by Bank Indonesia. The banking data includes a number of private banks, foreign liabilities of banks, bank assets, nonperforming loans of banks, a number of bank credit and deposits, and deposit and lending interest rates. The macroeconomic data includes foreign interest rates, Gross Domestic Product (GDP), balance of payments, the rupiah exchange rate, inflation rates and official foreign reserves. The GDP data is taken from the Monthly Report of the Indonesian Statistics, published by the Indonesian Bureau of Statistics. Foreign interest rate used in this study is three months interest rate of the US T-bill which is obtained from the International Financial Statistics of IMF.

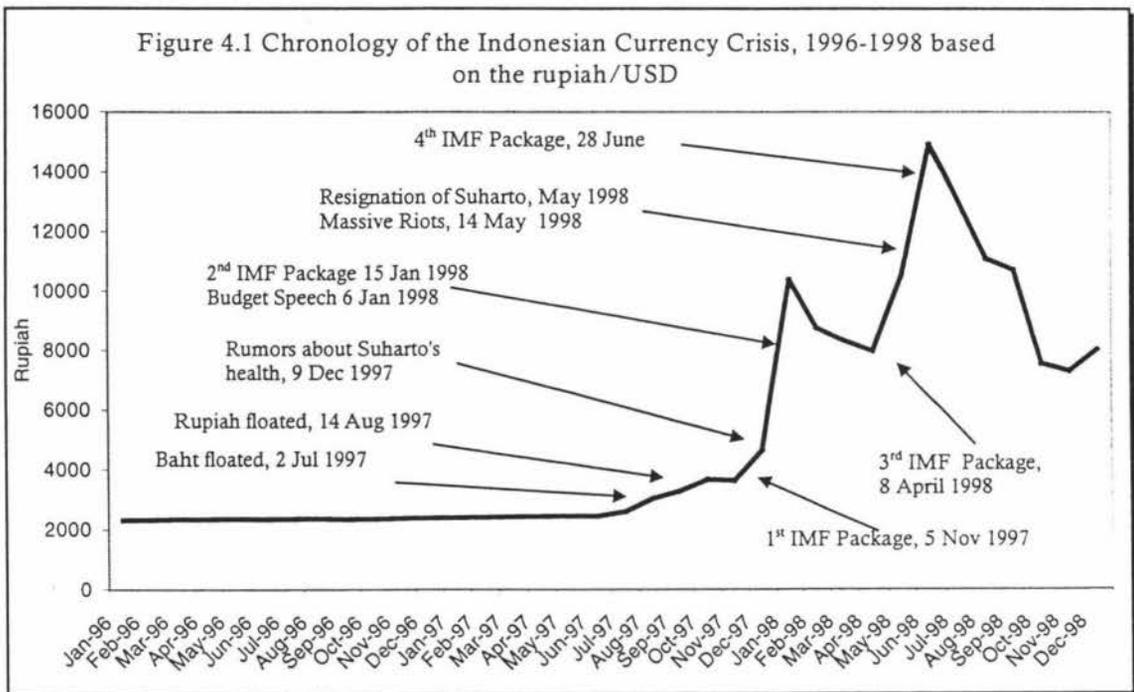
4.2 The Chronology of the Currency Crisis: A Narrative Story

Following the large depreciation of the Thai baht in May 1997, the Indonesian currency, rupiah, was under the speculative attack, which firstly took place in July 1997. The rupiah exchange rate to the US dollar then depreciated from Rp 2,396/USD, in January 1997, to Rp 2,599/USD in July 1997. By the end of 1997 the rupiah value stood at Rp 3,845/USD (Figure 4.1). In response to this early depreciation, the government of Indonesia tried to defend its currency by at least three main policies. The first policy was set by widening the upper limit of the foreign exchange rate intervention band on 13 August 1997, and then in the next few days, Bank Indonesia let the rupiah exchange rate to float freely. The second was a tight monetary policy through raising domestic interest rates and contracting the government spending. Following the crisis, the interest rate of the official certificate of Bank Indonesia (SBI) for one week maturity raised from 8.67% in July 1997 to 16% in December, 1997. As a result, the overnight interest rate of interbank call money jumped from 15.87% to 40.67%. The contraction of the government spending was carried out by cancelling projects worth around 39 trillion rupiah (Bullard *et. al.*, 1998). The third policy was done by asking a rescue package from IMF. The first IMF agreement was signed in November 1998.

The tight monetary policy that raised the domestic interest rate also had a negative impact on the banking sector. As the interest rate raised, depositors suspected that most banks were in trouble, producing bank panics in terms of a sudden withdrawal of deposits, particularly, in private banks. In response to this situation, Bank Indonesia announced on 27 January 1998 that all deposits and liabilities of national banks would be guaranteed. The announcement of this guarantee policy and the second IMF agreement that was signed also in January 1998 played a virtual role in a return of confidence in the rupiah from February to April 1998. Thus, while the rupiah exchange rate reached Rp 10,375/USD in January 1998, it then appreciated gradually to Rp 7,970/USD in April 1998.

However, such policies failed in restoring the long-term confidence in rupiah. McLeod (1998) argues two factors why such a policy failed to encourage a reverting flow of capital. The first factor was the absence of the former president Suharto at the ASEAN meeting in

Kuala Lumpur on December 1997 that raised the rumour of Suharto's health. This factor then contributed to the political uncertainty in Indonesia. The second factor was the announcement of a new budget for 1998 in the early January of 1998/1999, which was based on the unrealistic assumption of the exchange rate at Rp 4,000/USD. The currency already stood at Rp 7,500/USD in the Singapore foreign exchange market when the budget was issued. Consequently, these put market agents in confusion and created deep pessimism towards economic and political situations, then, pressured the rupiah exchange rate to fall more deeply. In January 1998 the rupiah exchange rate to the US dollar then fell at Rp 10,375/USD.



Source: Bank Indonesia, *the Indonesian Financial Statistics*, September 1997 and April 1999.

The fear of the decrease in food supplies resulting from the El Nino drought and the high prices of basic commodities contributed to the depreciation of rupiah in the period of May to June 1998 through social and political unrest that produced conflicts between the Chinese minority and Indigenous majority. The Chinese minority who had controlled most economic activities in every corner of this country was accused of increasing prices of basic commodities and creating shortages. Consequently, the massive riots occurred during May

1998, destroying hundreds of shops and homes of the Chinese minority (Bullard *et.al.*, 1998). The culminating impact of the social and political upheaval was the resignation of the former president, Suharto, who had controlled the government for 32 years. On 14 May 1998, the occupation of the High Representative Assembly (MPR) building by hundred thousands of students forced the former president to step down. Even though, the third IMF rescue took place in April 1998, the rise in social and political instability resulted in the massive depreciation of rupiah during May to June 1998. In June 1998 the rupiah stood at Rp 14,900/USD. Not surprisingly, some argue that the political and social instability played a crucial factor in exacerbating the Indonesia currency crisis (Sadli, 1998, McCyntyre, 1998, and Cole and Slade, 1998).

Since the third IMF package was neutralised by social and political upheaval, the fourth IMF rescue package was immediately signed in the late of June 1998. This agreement was mainly to reinforce the social safety net and the bank restructuring programme. Following this agreement, the Asian Development Bank (ADB) and the World Bank quickly committed themselves to providing a large loan to Indonesia. The ADB provided a US\$ 1.5 billion loan and the World Bank approved US\$ 1 billion. The IMF also committed a US\$ 1 billion loan. The most important factor in restoring the lost confidence in rupiah after a massive depreciation in June 1998, was probably an announcement that IMF had been able to provide over US\$ 6 billion from the international financial community to fund the budget deficit of 1998/1999 (Johnson, 1998). The fourth IMF package accompanied by such an announcement gave rise to the confidence in rupiah. As a result, the rupiah exchange rate appreciated significantly from Rp 14,900/USD in June to Rp 10,700/USD in September 1998. By November 1998 the rupiah stood at Rp 7,300/USD.

4.3 Data Analysis: the Proximate Cause of the Indonesian Financial Vulnerability

Following the Indonesian currency crisis of 1997, most studies argue that the main cause of the crisis was a loss of confidence among investors toward rupiah, producing the successful speculative attacks on the currency (McLeod, 1998 and Sadli 1998). According to these authors, the lost confidence was mainly triggered by the contagion effect of the depreciation of the Thai baht. In terms of economic fundamentals, many discussions on

the cause of the successful speculative attack on the rupiah are based on five factors: the sustainability of current account deficit, the decrease in the growth of exports, inflation rates, economic growth, and the large-unhedged foreign debts of private and banking sectors. By examining the first four factors, their conclusions are different. For instance, McLeod (1998) and Sadli (1998) conclude that these factors were less important in driving the lost confidence in rupiah. Basically, their findings are based on the facts that prior to the crisis the Indonesian economic fundamentals were relatively sound in terms of stable inflation, high economic growth and small budget deficit. The current account deficit was also in a safe condition. In contrast, Henderson (1998) arrives at a conclusion that, although, Indonesia had achieved the high economic growth of 8.0% in 1996, its current account deficit was quite large. This factor accompanied by fiscal deficit, high M2 growth and the large fall in export growth gave rise to symptoms of a currency crisis, producing the successful attacks on the rupiah.

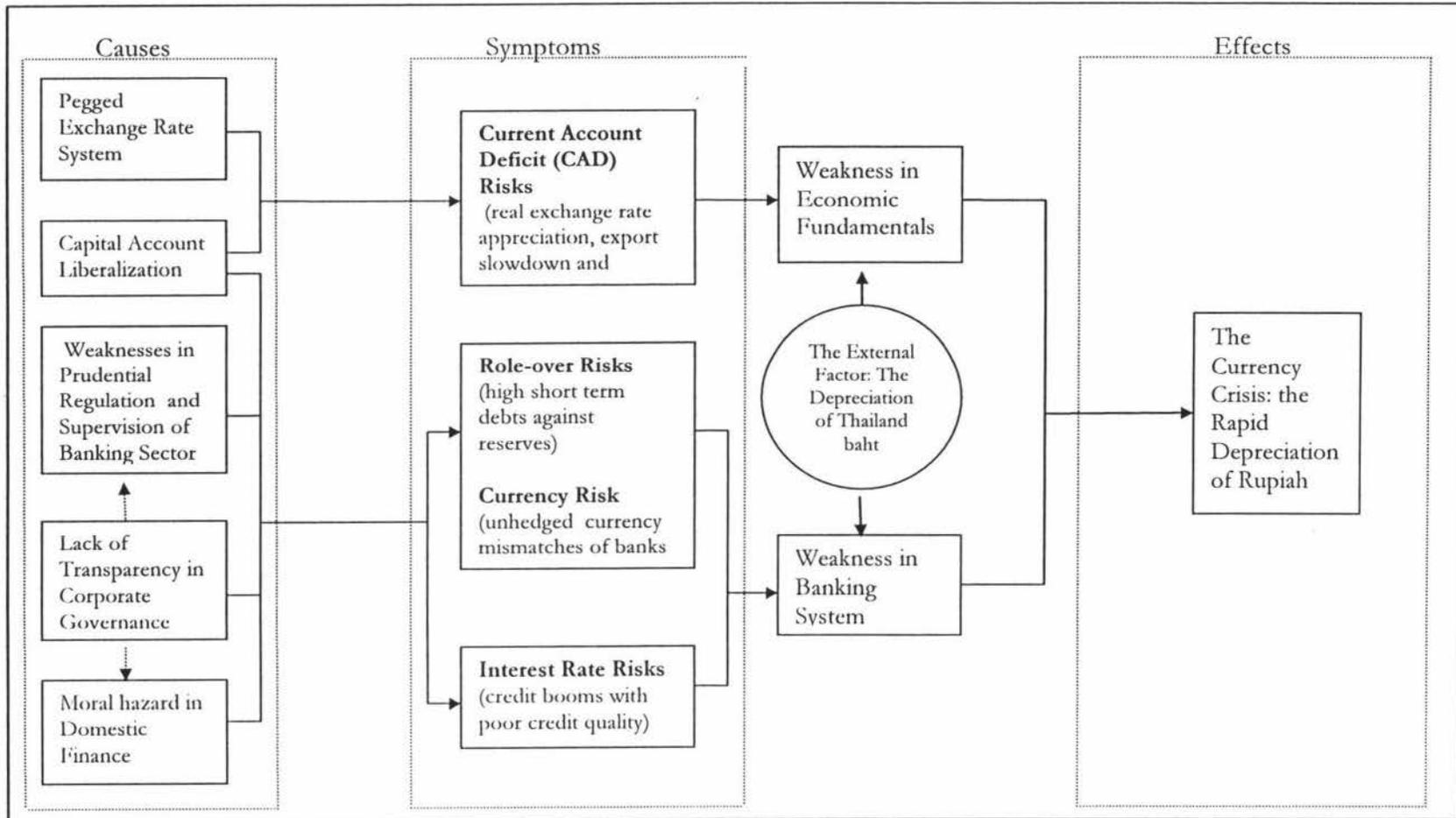
This study argues that the opposite findings cited above occur because such conclusions are based on different approaches in examining the onset of the Indonesian currency crisis. The first conclusion is primarily based on a view that the crisis was mainly as a result of financial panics, regardless of the fundamental soundness. In a broad sense, this view follows the self-fulfilling currency crisis approach, in which, the financial panic was fully an exogenous factor, which resulted from the contagion effect of the depreciation of the Thai baht (see also Radelet and Sachs (1998) on the cross-country study on the currency crisis of Asian crisis countries).

The second conclusion seems to follow the fundamental-based approach (Krugman, 1998). This approach mainly argues that the crisis resulted from the rise in vulnerability toward financial panics, which arose from the weakness in economic fundamentals, or at least the Indonesian economic fundamentals were less than investors were inform of. Additionally, regarding the political instability, some also argue, however, that the cause of the crisis was the weakness in "political" rather than the economic fundamentals (Sadli, 1998 and McCyntyre, 1998)

From a different view, Soesastro and Basri (1998) point out that it is implausible to argue the contagion of the depreciation of the Thai baht as the only factor of the Indonesian currency crisis. The domestic factors shall be taken into account for the crisis. According to these authors, the domestic factors at least include two factors. Firstly, the pegged exchange rate system, which led to the rise in foreign debts of banking and corporate sectors. The second factor was the imprudent supervision and regulations of the banking sector, corresponding to the poor quality of bank loan portfolios.

Considering the opposite conclusion cited above, this study follows the model of Perry and Lederman (1998), in which it is likely to accommodate these two different approaches in analysing the proximate cause of the Indonesian currency crisis. There are at least two important points of this model. Firstly, the model distinguishes the cause and the symptom of financial vulnerability. According to these authors, the symptom of financial vulnerability is defined as a high probability that currency speculators will make successful attacks on the domestic currency. Therefore, the increase in the financial vulnerability of Indonesia means an increase in the probability of successful currency speculator against rupiah, producing the rapid depreciation of the rupiah. Secondly, the model divides the symptoms of the currency crisis into four types of risks: current account deficit; roll-over; currency; and interest rate risks, which make the role of weaknesses in the Indonesian economic fundamentals and the banking sector on the rise in the financial vulnerability clearer (Figure 4.2)

Figure 4.2 Causes, Symptoms and Effects of Financial Vulnerability



Sources: Perry and Lederman, 1998 p 6.

Furthermore, the sustainable risk of a current account deficit leading to the symptoms of the rise in the Indonesian financial vulnerability is indicated by following factors: the real exchange rate appreciation, the decrease in export growth, and the rise in current account deficit. These factors play a central role in deteriorating the Indonesian economic fundamentals. The rise in role-over risk results from the massive increase in short-term foreign debts of banking and private sectors. The currency-mismatch risks lead to the large unhedged foreign currency exposures. The high risk of domestic bank and private sectors lead to the high rise in domestic interest rate. These last three factors then result in weakening the banking and corporate sector. Finally, following the depreciation of the Thai baht, these four factors of the rise in the financial vulnerability together or interactively created an environment for the successful currency speculator to attack the rupiah, leading to the Indonesian currency crisis.

Following Perry and Lederman (1998), this study assumes five causes of the rise in the Indonesian financial vulnerability: the pegged exchange rate regime, capital account liberalisation, moral hazard problems in domestic finance, imprudent regulations and supervision of the banking sector, and the lack of transparency in corporate governance (Figure 4.2). The first two factors lead to the weakness in the Indonesian economic fundamentals, and the last three factors lead to the weakness in the Indonesian banking and corporate sectors. It is important to note that the factors of moral hazard problems in domestic finance, weaknesses in prudential regulation and supervision of banking sectors lead to the lack of transparency in the corporate governance in which, then, these factors interactively result in the rise in the Indonesian financial vulnerability.

4.3.1 Symptoms of the Weakness in Banking Sector

4.3.1.1 The Rise in Vulnerability Resulting from Roll-over Risks

Most argue that the weakness in the banking sector raised the vulnerability of the Indonesian financial sector toward the contagion effect of the depreciation of the Thai baht in July 1997, resulting in a loss of confidence in the rupiah. A number of indicators have been used to indicate the weakness in the banking sector. According to Goldstein (1998), the weakness in the banking sector was due to inadequate banking supervision

and regulations. It is important to note, however, that the weakness in the Indonesian banking sector was not in the scope of the banking supervision and regulations. The weak banking supervision and regulations relied heavily on the presence of moral hazard problems in the form of implicit guarantee for insolvent banks (Chapter 3). Such an implicit guarantee was mainly because political involvement in the banking sector which protected insolvent banks as well as distrustful bank debtors from the prudent supervision of Bank Indonesia (see also Cole and Slade, 1998). As a result, the external debts of the banking sector as well as other corporate institutions increased substantially. Since the bulk of foreign debts was unprotected, it then raised the fragility of the Indonesian banking sector in the pre-crisis period. Sadli (1998) and Soesastro and Basri (1998) point out that the fragility of the Indonesian banking sector was also reinforced by a fact that the huge amount of foreign debts of the banking sector had been undertaken at short-term maturity and denominated in the US dollar.

The substantial increase in short-term foreign debts of the banking and non-bank during the pre-crisis period is presented in Table 4.1. By the end of 1995 to 1996, the Indonesian short-term foreign debts increased from US\$ 27.6 billion to US\$ 34.2 billion. Then, it slightly increased to US\$ 34.7 billion in the middle of 1997. This trend was similar to what happened in Thailand and Korea. Similarly, in the period of 1990 to 1998, the foreign liabilities of banks indicated an upward trend (Figure 4.3 on page 77). The increase in the amount of foreign liabilities of the Indonesian banks can be argued as being the reflection of the weakness in the Indonesian banking sector because it is likely to indicate the high risk of banks toward the fluctuation of the rupiah exchange rate. Therefore, when there was a shock causing the depreciation of the rupiah exchange rate, such as the contagion effect of the depreciation of the Thai baht in 1997, banks were in a state of panic in purchasing foreign currency to avoid capital losses. This then raised the demand for foreign currency, pressuring the rupiah to depreciate further. For this reason, it is reasonable to argue that the huge amount of foreign liabilities of banks was one of the main causes of the Indonesian financial fragility, leading to the Indonesian currency crisis in 1997-1998.

Table 4.1
Foreign Debts and Foreign Reserves of Indonesia, 1995-1997
(Billion of US Dollar)

Year And Country	Sector				Short-term Debt	Reserves	Short-term Debt-to Reserves Ratio
	Banks	Public	Non-bank Private	Total			
<i>End 1995</i>							
Indonesia	8.9 (20.0)	6.7 (15.1)	28.8 (64.9)	44.4 (100)	27.6	14.7	1.9
Thailand	25.8 (41.1)	2.3 (3.7)	34.7 (55.2)	62.8 (100)	43.6	37	1.2
Korea	50 (64.4)	6.2 (8.0)	21.4 (27.6)	77.6 (100)	54.3	32.7	1.7
<i>End 1996</i>							
Indonesia	11.7 (21.1)	6.9 (12.5)	36.8 (66.4)	55.4 (100)	34.2	19.3	1.8
Thailand	25.9 (36.9)	2.3 (3.3)	41.9 (59.8)	70.1 (100)	45.7	38.7	1.2
Korea	65.9 (66.0)	5.7 (5.7)	28.3 (28.3)	99.9 (100)	67.5	34.1	2.0
<i>Mid 1997</i>							
Indonesia	12.4 (21.2)	6.5 (11.1)	39.7 (67.7)	58.6 (100)	34.7	20.3	1.7
Thailand	26.1 (37.8)	2.0 (2.9)	41.0 (59.3)	69.1 (100)	45.6	31.4	1.5
Korea	67.3 (65.1)	4.4 (4.3)	31.7 (30.6)	103.4 (100)	70.2	34.1	2.1

Source: Radelet and Sachs, 1998.

Another indicator of the rise in the Indonesian financial vulnerability is the ratio of the Indonesian short-term foreign debts to foreign reserves. Even though, this ratio tended to reduce slightly from 1.9 in the end of 1995 to 1.8 in the end of 1996 and, 1.7 in mid 1997, this ratio remained in the warning level in the sense that it was more than one. The ratio that larger than one might not be enough to trigger the currency crisis as long as these debts was hedged and foreign creditors of the Indonesian banking and private sectors were ready to roll over their loans (Radelet and Sachs, 1998). However, it gave rise to the financial vulnerability, since foreign creditors had incentives to withdraw their loans. A crucial question is, however, how we know that there was a sudden withdrawal

of the Indonesian foreign debts, following the fall of the Thai baht in 1997.

The data that can instantly be used to reveal the sudden withdrawal of the Indonesian foreign debts is lacking. However, the rapid depreciation of the rupiah reasonably reflected that foreign creditors withdrew their loans as a response to the depreciation of the Thai baht. Thus, as foreign creditors were reluctant to roll over the existing loans, instead of withdrawing their loans, there was a large sudden demand for the US dollar, leading to the massive depreciation of the rupiah exchange rate. This sudden demand for the US dollar was mainly because domestic debtors rushed to purchase foreign exchange to service their foreign debts due at least to factors. The first factor was the lacked incentives of foreign creditors to roll over their loans. The second factor was because the large share of foreign debts of domestic debtors was denominated in the US dollar and unhedged. For this reason, it is plausible to argue that the large proportion of foreign debts of the Indonesian private sector was unhedged, which then raised financial vulnerability, enabling currency speculators to successfully attack the rupiah following the depreciation of the Thai baht.

Overborrowing and foreign debts by the Indonesian bank and other corporate institutions mainly resulted from four factors: the pegged exchange rate system under the capital account liberalisation, the lack of prudent supervision and regulations in the banking system, the moral hazard problem in domestic finance, and the weakness in corporate governance. When the rupiah was pegged to the US dollar, the monetary liberalisation of the Indonesian economy increased large capital inflows. Even though, most capital inflows were channeled in the form of foreign direct investments, the short-term portfolio of foreign investments and the foreign debts of domestic banking and other private institutions increased substantially. In the pre-crisis period, the Indonesian private and banking sectors had approximately borrowed US\$ 80 billions from overseas, mostly in foreign currency and unprotected (Sadli, 1998). Such a careless behaviour occurred mainly because under the long surviving-pegged system, domestic debtors gained benefits from lower foreign interest rates than domestic rates without need to protect themselves against risks of foreign exchange fluctuations. Similarly, foreign creditors gained foreign interest rate differentials without exchange rate risks.

According to Perry and Lederman (1998), the inattentive decision of foreign creditors in channeling their loans was also reinforced by a belief that the government would bailout domestic debtors whenever they were default. Another reason was probably in regard to the Mexican rescue of 1995, in which this raised the expectation of foreign creditors that the troubled government would always be supported by international monetary institutions.

The large amount of unhedged foreign debts of the Indonesian banking sector led to lack of prudent supervision and regulations, and moral hazard in domestic finance. In this case, the weakness in supervision and regulations in banking sector did not, however, lead to the scope of banking supervision and regulation.¹⁴ The dual role of Bank Indonesia as the lender of last resort of domestic banks and as banking supervisor and regulator were suspected to be responsible for the weakness in the Indonesian banking supervision and regulations. As banking supervisor and regulator, Bank Indonesia had to improve the prudent banking sector operation, continuously. As the lender of last resort, it had to rescue banks whenever they faced liquidity problems.

Considering the role as lender of last resort, however, Bank Indonesia had no incentive to liquidate insolvent banks in the pre-crisis period¹⁵. In spite of this, Bank Indonesia continuously provided liquidity supports for insolvent banks. Although, the unwillingness of bank Indonesia to let insolvent banks fail because it would be able to produce bank panics. This more likely reflected that the role of Bank Indonesia as a banking supervisor and regulator was carried out by an imprudent manner. This fact suggests that the dual role of Bank Indonesia created moral hazard problems in the banking sector in the sense that there was a conflicting goal of these dual functions of Bank Indonesia. Accordingly, since banking supervision and regulation were weak, this gave rise to the vulnerability of the Indonesian financial sector.

¹⁴ The scope of banking supervision and regulation in Indonesia has mostly adopted the world standards of banking supervision and regulation (see Chapter 4 for the detailed explanation).

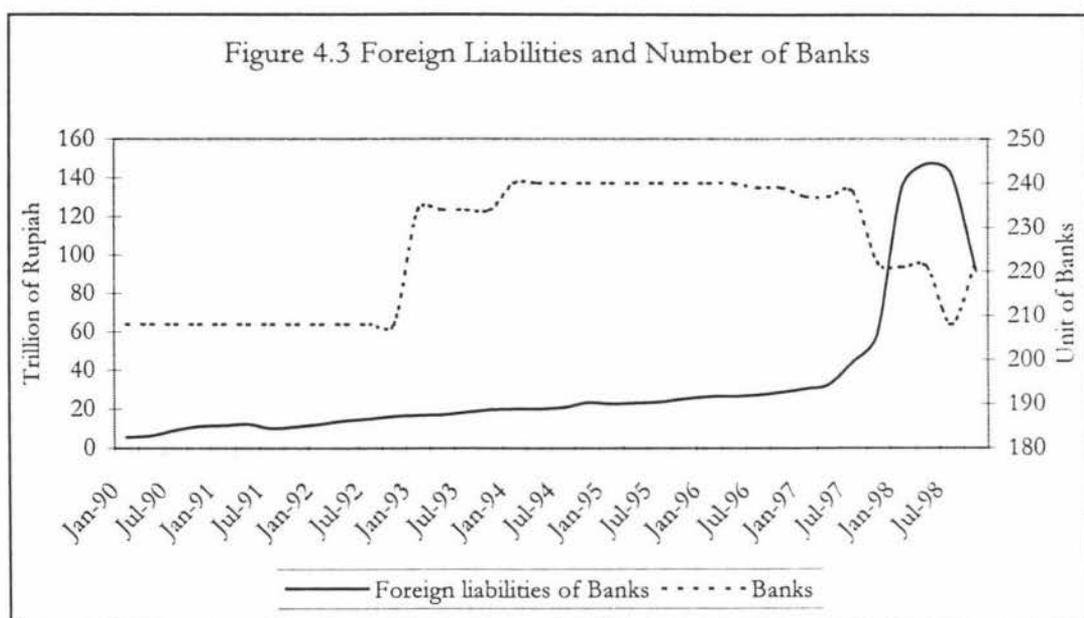
¹⁵ Take for example in 1990, Bank Indonesia rescued the large private bank, Bank Duta that faced a massive loss from speculation in foreign exchange market. In the beginning of 1991, then, Bank Indonesia also gave rescue for three small banks that faced the liquidity problems (Suwandi, 1995).

4.3.1.2 The Rise in Vulnerability Resulting from Interest Rate Risks

The interest rate risks corresponding to the rise in the vulnerability of the Indonesian financial sectors, particularly, led to three main factors: a number of banks, a large accumulation of banking credit, and the poor quality of bank credit portfolio in the pre-crisis period. Figure 4.3 shows that while from 1990 to 1993 the number of banks were 208, it then increased to 240 in 1995. Following the currency crisis in 1997-1998, the number of banks then dropped to 222 in the end of 1998. Even though, in terms of theoretical explanation as well as empirical evidence, the link between the number of banks and the currency depreciation is lacking, in the case of Indonesia, however, the linkage may exist because of, at least, two reasons. Firstly, as a result of the rapid increase in the number of banks, following the banking deregulation of 1988 also meant that every private bank was closely related to the Indonesian conglomerates through ownership or management structures (Nasution, 1999). Consequently, bank credits were mostly channelled into firms within their own groups by poor credit assessment. This could be the case because prudent banking regulations, such as, a legal-lending-limit regulation of bank credits for firms within a group was effortlessly broken down due to a presence of collusion, corruption and nepotism within the government.

Secondly, an increased number of banks from 1990 to 1995 (Figure 4.3) was also associated with the weaknesses in the banking supervision and regulations, particularly in the form of moral hazard problems, leading to an implicit insurance for insolvent banks. In this case, this was mainly because Bank Indonesia had no incentive to liquidate insolvent banks in the pre-crisis period in which it then accommodated a number of insolvent banks. Obviously, Bank Indonesia should not have provided liquidity supports for insolvent banks because by letting insolvent banks fail, it would have given a warning signal for other banks to consistently increase their prudent banking operations. However, since Bank Indonesia provided an implicit guarantee for insolvent banks, this then weakened the exercise of prudent principles in its role as banking supervisor and regulator. Accordingly, the fair number of the existing banks were unsound. For instance, the World Bank (1996) cited in Nasution (1999) reports

that in 1995 twenty two banks had a capital adequacy ratio of less than the minimum requirement of 8%, and bank credits of 65 banks were beyond the legal lending limit regulations. Similarly, state-owned banks which captured over 30% of total bank assets had historically been undercapitalised because of weaknesses in banking management and credit assessment due to political involvement on credit allocations. Under these circumstances, the Indonesian domestic finance was vulnerable toward the high rise in domestic interest rates. Hence, not surprisingly, as a result of the high domestic interest rates, some banks failed during 1997-1998 (Figure 4.3) and a number of banks faced financial difficulties.



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

The weakness in the Indonesian banking sector also led to credit booms during the pre-crisis period, which was indicated by the massive increase in bank credits. According to Figure 4.4 on page 79, in the period of 1994 to 1997, bank credits to private sectors, the central government and other financial institutions tended to increase substantially. Such a credit boom alone might not indicate the rise in the vulnerability of banking sector, but it was accompanied by the poor quality of banking credits, giving rise to the vulnerability of domestic finance, particularly when there was the high increase in domestic interest rate. Considering Table 4.2, it is not naïve to say that in terms of

nonperforming loans-to-assets ratio the quality of bank credits were inferior. During the period of 1990 to 1996, for instance, the ratio of nonperforming loans to assets for every type of bank tended to increase significantly. The nonperforming-loan-to-asset ratio of state-owned banks increased from 1.2% in 1990 to 5.9% in 1994. Though, this ratio gradually decreased from 1994 to 1995, it remained relatively high.

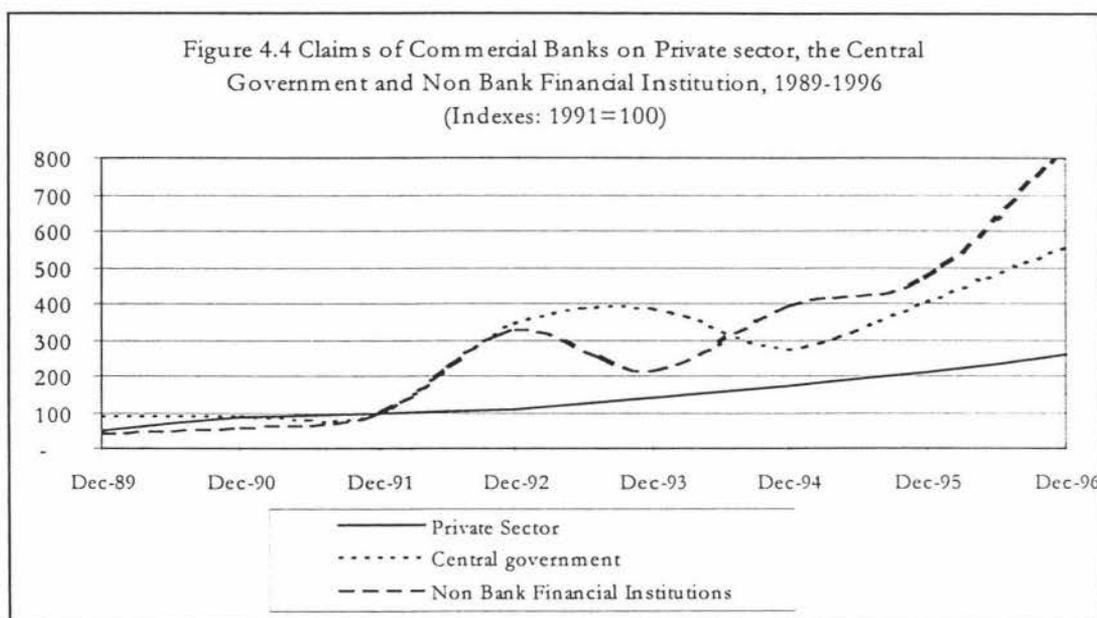
Table 4.2
Ratio of Nonperforming Loans to Assets
by Types of Banks, 1990-1998 (%)

Types of banks	1990	1991	1992	1993	1994	1995	1996	1997	1998
State Banks	1.2	1.8	1.9	2.2	5.9	5.2	4.5	3.2	14.5
Private Banks	0.1	0.8	1.1	1.0	1.4	1.0	1.1	0.6	19.6
Regional Dev. Banks	0.9	0.8	3.2	3.0	5.2	4.9	4.4	3.9	6.6
Foreign and Joint Venture Banks	0.4	0.3	0.3	0.6	1.8	1.6	1.4	0.8	11.4
Total Banks	0.7	1.2	1.5	1.6	3.5	2.8	2.4	1.7	16.3

Source: Author's calculation based on Bank Indonesia, 1999.

The poor quality of banking credits led to moral hazard problems that mainly resulted from two factors: the political involvement in bank credit assessments and the weak corporate governance. For instance, local newspapers recently stated that the former president, Suharto was suspiciously involved in allocating US\$ 660 million of nonperforming loans from the largest state bank, BNI, to Texmaco Group. According to the senior deputy of BI, Anwar Nasution, this credit allocation was beyond the regulation of legal lending limits. Some of the largest conglomerates were also suspected of breaking down the regulation of legal lending limits, including the largest Indonesian conglomerates: the Salim group, the Gajah Tunggal group, bank Danamon, and BHS bank (Jawa Post, 6/12/1999). This suggested that the Indonesian banking sector was infected by moral hazard problems in banking supervision and regulations as well as the exercise of prudent principles.

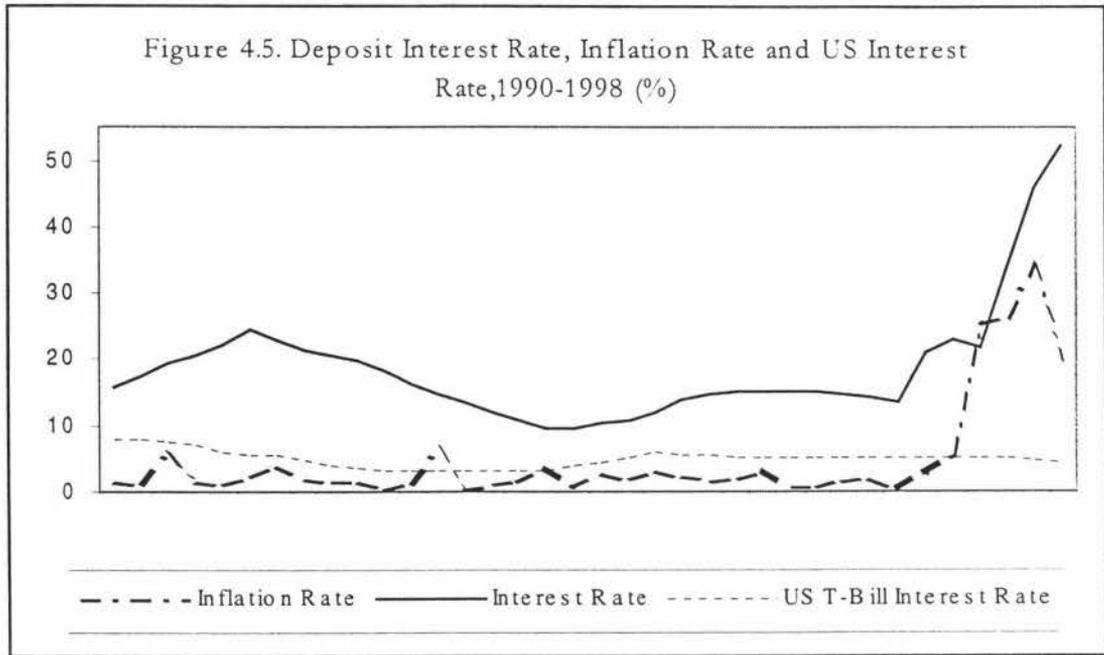
The weak corporate governance mainly resulted from the fact that most of the Indonesian conglomerates had their own banks. Thus, most bank credits were channeled into firms under their own groups with poor credit assessment. Even though, there were legal-lending-limit regulations of bank credits for firms under one group, such regulations were easily broken down by government corrupt practices referred to by the media (locally speaking) as “Kolusi, Korupsi and Nepotisme or KKN” (collusion, corruption and nepotism).



Source: IMF, *the International Financial Statistics*, December, 1998.

The credit boom and poor quality of bank loans, consequently, put Bank Indonesia in a dilemma situation, particularly when the government tried to restore the lost confidence in the rupiah by setting high interest rates (Figure 4.5). The tight monetary policy might have been able to protect the rupiah from continuous depreciation because, theoretically, this policy raised the domestic and foreign interest rate differential, making a rupiah holding look attractive. However, this policy failed to restore the confidence in the rupiah because high interest rates revealed the weakness in the Indonesian banking institution. Thus, when economic agents were well aware of the rise in domestic interest rates that made domestic banks and other corporations fall into serious default, they began to panic and suddenly withdrew their deposits, which resulted in liquidity

problems for banks. Soesastro and Basri (1998) state that up to August 1997 Bank Indonesia had supplied around US\$ 500 million to rescue banks that faced liquidity problems. Consequently, the collapse in the banking system became inevitable. It is important to note, however, that the impact of interest rate risks did not occur during pre-crisis period. Despite, this impact contributed in exacerbating the Indonesian currency crisis, once the government had set a high domestic interest rate.



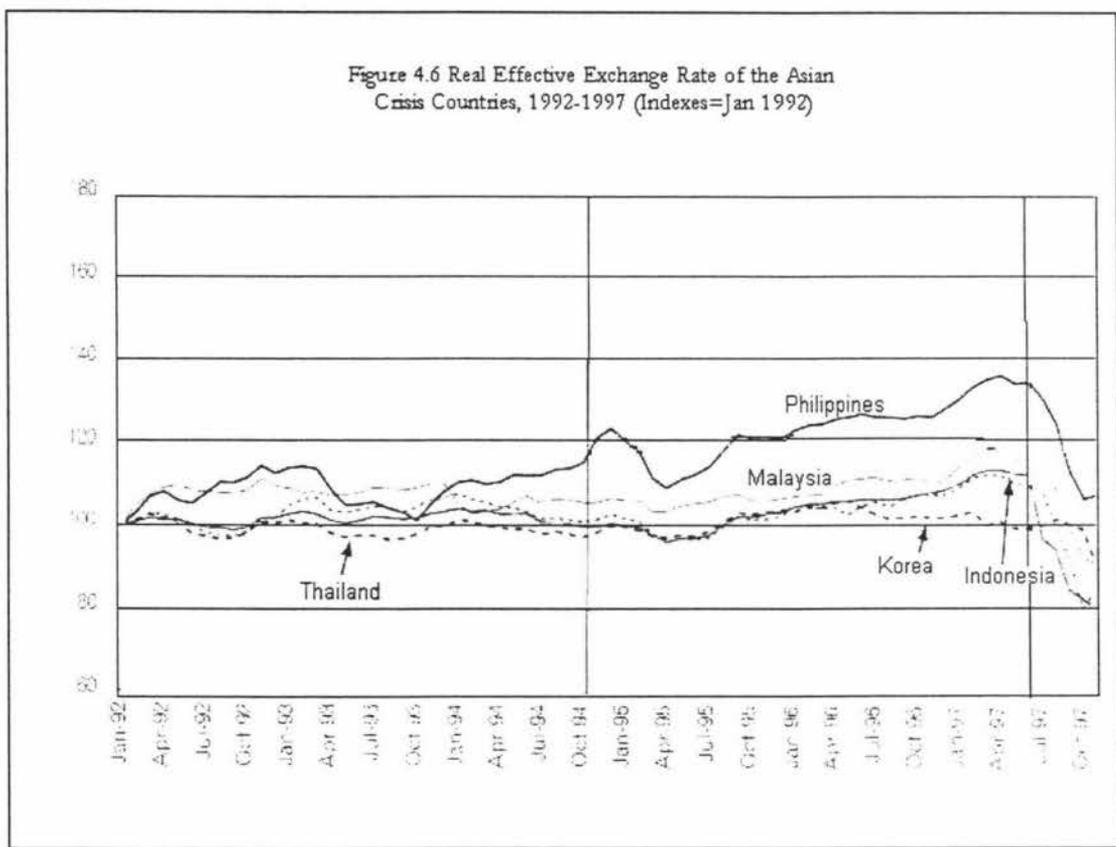
Sources: Bank Indonesia, *the Indonesian Financial Statistics* and IMF, *the International Financial Statistics* (various issues).

4.3.2 Symptoms of Deteriorating the Economic Fundamentals

4.3.2.1 The Sustainability of Current Account Deficit and the Slow Growth of Exports

There are a number of indicators that have been used to indicate the soundness in the Indonesian economic fundamentals, such as trade deficit-to-reserves ratio, the size of reserves, reserves-to-GDP ratio, fiscal deficit, the growth of GDP, inflation rates, slow growth of import and current account deficit-to-GDP ratio. In terms of fiscal deficit, the growth of GDP and inflation rate, one may argue that prior to the currency crisis of

1997, the Indonesian economic fundamentals were relatively sound (McLeod, 1998 and Sadli, 1998). Table 4.3 on page 83 shows that the GDP growth in the last three years of the pre-crisis period (1994, 1995 and 1996) were still larger than the average growth of GDP from 1990 to 1996. The inflation rate, which had never been low reduced from 9.3% per annum in 1995 to 6.5% per annum in 1996. The trade deficit, however, indicated a different view. Although, the trade deficit as percentage of GDP was stable at 4.4% in 1995 and 1996, the average figure from 1990 to 1996 was 5.4% which was slightly larger than 5% regarded as a danger level by international standards. The export growth reduced from 13.4% in 1995 to 10.4% in 1996. The growth rate of exports in 1996 was also smaller than the average growth from 1990 to 1996, that was 12.4%. In contrast, the import growth remained high at 11.1% in 1996, though, it was smaller than those in 1995.



Source: Perry and Lederman, 1998.

The Indonesian slowdown in the growth of exports and the widening the trade deficit during the pre-crisis period mainly resulted from the decrease in the competitiveness of the Indonesian exports in the world market. This competitiveness problem was partly because of the real appreciation of the rupiah and partly due to the devaluation of Chinese currency in January 1994. Figure 4.6, for instance, shows that the real effective exchange rate of the rupiah tended to increase from 1994 to 1997. The real appreciation of the rupiah particularly led to the pegged exchange regime. Since the rupiah had been pegged vis-à-vis to the US dollar, the appreciation of the dollar to the Japanese Yen contributed to the real appreciation of the rupiah (Perry and Lederman, 1998).

The ratio of trade deficit to GDP is an important indicator of the fundamental weaknesses because, as some studies argue, this ratio tended to increase in the pre-crisis period, making the Indonesian economy vulnerable to the contagion effect of the depreciation of the Thai baht and therefore, the currency crisis in 1997-1998. Figure 4.7 reveals that the ratio of trade deficit to GDP rose during 1991 to 1993, and then it was stable from 1993 to 1996. This ratio then jumped in 1997 to 1998. The sustainable rise in the ratio of trade deficit to GDP resulted in the currency crisis because the gap between output and domestic absorption was financed by capital inflows. Then when the capital inflow became an outflow as a response to the contagion effect of the depreciation of the Thai baht, it produced the currency crisis of 1997-1998.

This study also shows that the ratio of foreign reserves to imports led to the change in the rupiah exchange rate. Moreover, as Berg and Pattillo (1999) state, the stock of foreign reserves of less than three months of imports is often used as an indicator of the warning zone of currency crises. In the case of Indonesia, however, the stock of the Indonesian foreign reserves in the pre-crisis was relatively safe in the sense that it was enough to finance more than three months of imports (Table 4.3). The average of the Indonesian reserves as months of import from 1990 to 1996 was 6.5. Similarly, except Korea, the average foreign reserves as months of imports from 1990 to 1995 for Thailand was 6.9. Malaysia was 5.2. Singapore was 6.8, and the Philippines, was 3.7 (McLeod and Garnaut, 1998). This ratio indicates the ability of the Indonesian economy to finance the imports, in which a higher ratio means that the government is in a

stronger position to protect the economy against currency speculators. Similarly, regarding Figure 4.7, the ratio of foreign reserves to import increased gradually in the period of 1990-1998. Theoretically, based only on the stable increase in the ratio, one may argue that the Indonesian economic fundamentals in the pre-crisis period were relatively sound, which should have protected the economy against a rapid depreciation of the rupiah. Even though, there was a sustainable increase in the ratio of foreign reserves to imports, the next question is why the depreciation of the rupiah exchange rate was unavoidable, following the rapid depreciation of the Thai baht in July 1997.

Table 4.3
Indicators of the Indonesian Economic Fundamentals, 1990-1996.

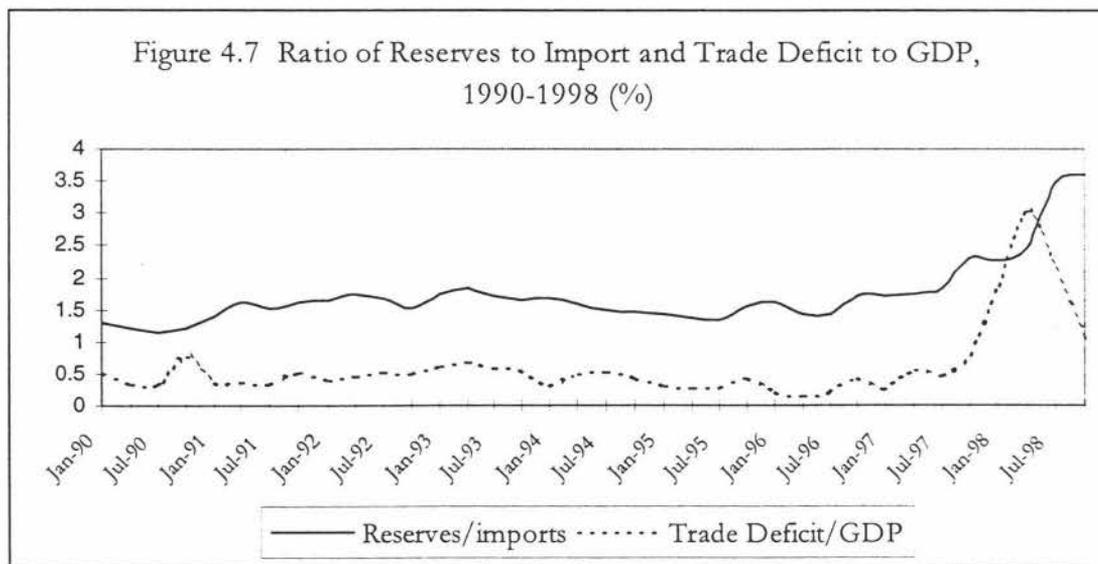
Indicators	1990	1991	1992	1993	1994	1995	1996	1990-96 avg.
1. Trade Deficit (mil of US\$)	5352	4801	7022	8231	7901	5710	5948	6423.6
As % of GDP	3.1	4.2	6.0	6.8	6.3	4.4	4.4	5.4
2. Export Growth (% p.a.)	15.8	13.4	16.6	8.4	8.8	13.4	10.4	12.4
3. Import Growth (% p.a.)	32.9	18.8	5.4	3.8	12.9	27.9	11.1	16.1
4. GDP Growth	7.8	7.5	6.0	8.2	7.6	7.9	8.2	7.6
6. Foreign Reserves*	8661	9868	11611	12352	13158	14674	19125	
As months of Import	5.3	5.0	5.4	5.4	5.0	4.3	5.2	5.1
As % of GDP	8.4	8.7	10.0	10.2	10.5	11.4	14.2	10.8
7. Inflation (% p.a.)	7.8	9	8.3	9.3	8.5	9.3	6.5	8.3
8. Interest Rate (% p.a.)	18.12	20.96	20.9	15.73	12.13	13.94	16.03	16.8
9. US Interest Rate (% p.a.)	7.51	5.41	3.46	3.02	4.27	5.51	5.04	4.8
10. Interest Rate Differentials	10.61	15.55	17.44	12.71	7.86	8.43	10.99	11.9
11. Government Deficit (as % of GDP)	1.1	0.6	0.4	0.6	0.2	0.3	0.0	0.5

Sources: Bank Indonesia, *the Indonesia Financial Statistics*; IMF, *the International Financial Statistics* (various issues), and Garnaut in McLeod and Garnaut (eds.), 1998.

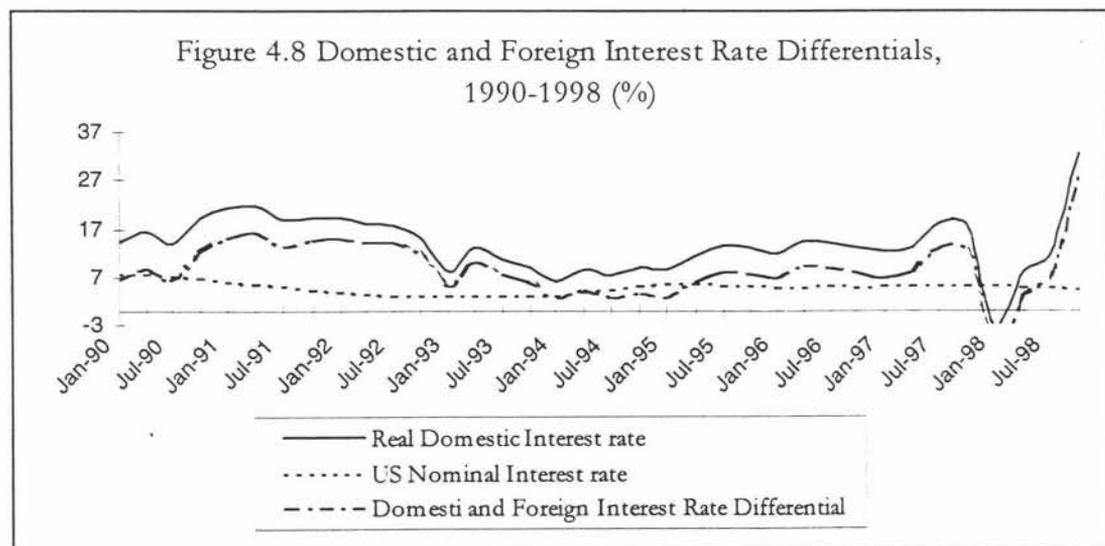
Note : *) Million of USD.

There were a number of factor why this could be the case. Radelet and Sachs (1998), for instance, argue that this was because of the contagion effect in the sense that when the Thailand baht had depreciated rapidly, this would soon be followed by its neighbours.

Another reason was because of the sudden withdrawal of foreign loans by foreign investors, arising because they were reluctant to roll over the existing loans; instead of withdrawing their loans, domestic debtors panic purchased the US dollar, to service their loans. As a result of the sudden-massive demand for the US dollar, the rapid depreciation of the rupiah exchange rate was inescapable.



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



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

The most important factor, however, was the policy of the Indonesian government that abandoned the pegged exchange rate system in response to the rapid depreciation of the Thai baht. Since this policy implied that the Government of Indonesia was reluctant to use its foreign reserves to defend the rupiah, the rise in stocks of foreign reserves then had no effect on an increased confidence in holding the rupiah. Instead, the abandonment of the pegged exchange rate system resulted in the lost confidence in the rupiah, leading to the rise in the expected depreciation of the rupiah. Consequently, there was a massive demand for foreign currency thus producing a rapid depreciation of the rupiah exchange rate.

Figure 4.8 shows that the foreign and domestic interest rate differentials tended to increase in the period from January 1994 to July 1997. Theoretically, this should have led to the appreciation of the rupiah because holding rupiah was more attractive than foreign currency. However, this could not result in an appreciation; instead of depreciation of the rupiah as there was a sudden fall of foreign and domestic interest rate differentials, particularly in the ongoing crisis from 1997 to 1998. The massive drop in the foreign and domestic interest rate differentials was because the increase in the nominal domestic interest rate was lagged behind domestic inflation. Consequently, as the real domestic and foreign interest rate differentials fell, holding rupiah, became less attractive (Figure 4.8). This fact also suggests that the government policy of raising the domestic interest rate to defend the rupiah exchange rate against a rapid depreciation was ineffective. This policy failed to defend the value of the rupiah, particularly, since the rise in nominal domestic interest rate was then followed by an increase in domestic inflation rate, and therefore, the rupiah depreciated continuously (Johnson, 1998).

4.5 Concluding Discussion

Four conclusions can be made from this chapter. Firstly, in the pre-crisis period the Indonesian economy experienced a rise in the vulnerability of financial system in terms of deteriorating economic fundamentals and banking sector. The deterioration in economic fundamentals were indicated by at least two factors: the rise in the current account deficit and the slow growth of exports. These factors mainly resulted from an

accelerated real appreciation of the rupiah, reducing the competitiveness of the Indonesian product exports in the world market. Under the liberalisation of the capital account, the widening current account deficits raised the capital inflow in terms of foreign debts. The large foreign debts made the Indonesian economy highly susceptible to a reversal in capital outflows.

Secondly, in the banking sector, the rise in the Indonesian financial vulnerability was indicated by two symptoms: the rise in short-term foreign debts of banking and non-bank private sectors, and the high risk of banking sector toward the high rise in domestic interest rate. The large short-term foreign debts relative to the Indonesian foreign reserves increased the financial vulnerability toward the speculative attacks, particularly when foreign investors had incentives to withdraw their loans and were reluctant to roll over the loans. The large short-term foreign debts of the Indonesian banking and corporate sectors mainly resulted from the monetary liberalisation with the pegged exchange rate system, the lack of prudent regulations and supervision of the banking sector, and the weakness in corporate governance.

Since the pegged exchange rate system protected the Indonesian banking and corporate debtors from the risks of foreign exchange fluctuation, they became careless in managing their foreign debts. As a result, most foreign debts of the Indonesian banking and corporate sector were in foreign currency and unhedged. It is important to note that the incautious behaviour was also reinforced by a lacked prudence in banking supervision and regulation, and moral hazard problems in domestic finance. Consequently, the Indonesian financial and corporate sectors were largely vulnerable toward external shocks, particularly when financial panics resulted from the contagion effect of the Thai baht crisis.

Thirdly, the rise in the vulnerability of the Indonesian banking sector towards risks of high domestic interest rate resulted from the lending booms in those banking sectors with poor quality of banking credit. Credit boom was indicated by the rapid increase in bank credit to private sectors. The increase in the ratio of nonperforming loans to bank assets revealed that bank credit was channeled with poor credit assessments. The credit

boom and poor credit quality of the banking system mainly resulted from the conflicting role of the central bank, Bank Indonesia, as the lender of last resort and banking supervisors and regulators. The weak corporate governance, occurred with the widespread corruption, collusion and nepotism in banking supervision and regulation, and the deterioration of the prudent principles of the Indonesian banking system.

Fourthly, the credit boom with poor credit quality then placed the banking sector as well as private institutions in serious financial problems, particularly when the government set a tight monetary policy by raising the domestic interest rates to defend the value of the rupiah. Consequently, this policy failed to defend the rupiah because it was neutralised by bank panics in which depositors converted their rupiah-denominated deposits into the US dollar. Such panic emerged, at least, because high interest rates revealed the weakness in banking and corporate sectors. Furthermore, as depositors were well informed about the large number of insolvent banks as well as corporate sectors, they also panicked. Another consequence was that the large number of insolvent banks and other financial institutions simultaneously decreased the credibility of the government to defend the rupiah exchange rate. As a result, depositors believed that the government would not have enough reserves to bailout a number of insolvent banks and corporations, leading to financial panic.

CHAPTER 5

ECONOMETRIC ANALYSIS

Econometric models of currency crises have developed progressively. Even though the emergence of currency speculators seems to be unpredictable, many of the models, based on both fundamental and self-fulfilling approaches, have claimed that they can systematically predict, either which countries may largely face currency crises or when the crises would be more likely to occur¹⁶. The important point of the models is that a currency crisis is mostly defined as being characterised by the large depreciation of currency exchange rates. For example, Frankel and Rose (1996) define a currency crisis as being the value of a currency drops of more than 25% a year and the depreciation is at least 10% higher than the depreciation in the previous year (see also Montiel, 1989 and Santaela, 1993). Note, however, that such a measurement is just an arbitrary number without any argument supporting their determination.

Other studies identify a currency crisis using a crisis index, which is calculated by a weighted average of a currency depreciation and the drop in the foreign reserves of countries (Kaminsky and Reinhart, 1999 and Sachs, Tornell and Velasco, 1996). Even though these two studies use similar indicators to indicate the currency crisis, the calculation of the crisis index is based on a different measure. According to Kaminsky and Reinhart (1999), a currency crisis takes place when a weighted average of monthly change in depreciation of the exchange rate and monthly decline in foreign reserves are more than three standard deviations. On a different approach, Sachs, Tornell and Velasco (1996) calculate a crisis index as being the weighted sum of the rate of decrease in foreign reserves and the rate of depreciation of the Mexican peso exchange rate from November 1994 to April 1995 in which a currency crisis occurred in Mexico during this period. Furthermore, each of these two indicators is weighted by its

¹⁶ The model based on fundamental approach, for instance, can be reviewed in Frankel and Rose (1996), and Sachs, Velasco and Tornell (1996) for cross-country studies. The models based on self-fulfilling approach can be seen in Calvo and Mendoza (1996) for the Mexico crisis of 1994, and Jeanne (1997) for the France crisis of 1993.

precision over the total of precision. Precision is defined as being a benchmark level of stable Mexican peso exchange rate in which it is computed using ten years of monthly data, which clearly has an arbitrary element (Sachs, Tornell and Velasco, 1996).

Considering that currency crises are mostly defined as being the rapid depreciation of currency and there is no certain indicator of the crisis that has been accepted widely, the econometric model of this study focuses on the estimation of the role of the proximate variables in causing the change in the rupiah exchange rate during 1990 to 1998. The chosen period of observation from 1990 to 1998 is basically to capture the pre- and ongoing crisis periods. The focus is on the estimation of the proximate variables that affect the change in the rupiah exchange rate is preferred because this study does not try to predict the timing of the Indonesian currency crisis. Another reason is to insulate the model from the arbitrariness of the definition of the currency crisis. This study argues that the arbitrariness of the models cited above arises because they define a currency crisis as being a particular event in an economy and they construct a specific tool to indicate this event. Then an arbitrary element results from the construction of the tool.

5.1 The Model Specification

5.1.1 A Simple Model

Following Sachs, Tornell and Velasco (1996), suppose that a country adopts the managed float exchange rate system with nominal exchange rate E_t at time t . The real exchange rate is then E_t/P , where P is a relative price defined as the ratio of the domestic price level to the world price level. For convenience, P is assumed to be a predetermined variable in the short run, and it is equal to one. The assumption of purchasing-power parity (PPP) holds and therefore, foreign interest rate is equal to domestic rate.

Between two periods, then the size of changes in the exchange rate D_t can be measured as $(E_t/E_{t-1}) - 1$. The value of D_t will be zero, positive or negative number. A positive

or negative sign of D_t will indicate an appreciation or depreciation of the exchange rate, depending on the definition of the exchange rate. In this model, we define the Indonesian exchange rate as the number of the US dollar per unit of the rupiah (i.e USD/Rp). This implies that if the Indonesian exchange rate at time t is larger than the last period of the exchange rate ($E_t > E_{t-1}$), the value of D_t will be a positive number, which means that there will be an appreciation of the rupiah exchange rate. In Contrast, if ($E_t < E_{t-1}$) there will be a depreciation of the rupiah. However, if ($E_t = E_{t-1}$), there will be no depreciation or appreciation of the rupiah exchange rate ($D_t = 0$).

It has been well documented that the size of changes in the exchange rate D_t should observe the soundness of a country's economic fundamentals. Krugman (1979 and 1996), for instance, points out that if a country's economic fundamentals are weak, the depreciation of the exchange rate will be large. According to Sachs, Tornell and Velasco (1996), the changes in the exchange rate D_t also lead to the soundness of a country's banking sector. This means that if the banking sector is sound, the size of D_t will approach to zero because the exchange rate E_t is close to the long-run exchange rate, e . Note that under the pegged exchange rate system e will approach to the last period of the exchange rate E_{t-1} , since the government is able to maintain the parity of the exchange rate. Whereas, when the banking sector is weak, D_t will be a negative figure which means the depreciation of the exchange rate.

For convenience, denote that the soundness of a country's economic fundamentals and banking sector at time t , reflected by the following variables: foreign liabilities of banks X_{1p} and the number of banks X_{2p} , trade deficit-to-GDP ratio X_{3p} and the ratio of foreign reserves to imports X_{4p} . The first two variables reflect the soundness of banking sector, and the last two variables represent the soundness of economic fundamentals. The size of D_t is assumed as being a linear function of these variables. Now define R_t as a country's foreign reserves and K_t as net capital outflow at time t . Furthermore, the potential size of D_t can be illustrated as:

$$\text{if } K_t > R_t \rightarrow D_t = \Psi(X_{1t}, X_{2t}, X_{3t}, X_{4t}) \dots \dots \dots (1).$$

$$\text{if } K_t \leq R_t \rightarrow D_t = 0$$

Equation (1) implies that when a net capital outflow is larger than a country's international reserves, the value of D_t indicates the depreciation of currency. Then the size of depreciation depends on two conditions. First, the size of depreciation will be large if the government does not use its foreign reserves to defend the currency exchange rate. In this case, the exchange rate E_t will relatively be much smaller larger than the long-run exchange rate e . Second, the size of currency depreciation also depends on the soundness of a country's economic fundamentals and banking sector.

Concerning the soundness in economic fundamentals and banking sector, there will be two conditions, which are likely to occur. First, if a country's economic fundamentals and banking sector are sound, any depreciation of currency will approach to zero, and so that there will be no capital outflow. A second possible condition occurs when the country's economic fundamentals and banking sector are weak. In this case, the depreciation of the currency takes place because capital outflows may be larger than foreign reserves. But if capital outflow is smaller than foreign reserves, there may not be a depreciation of currency because under the pegged exchange rate regime, the government may be able to defend its currency.

In order to test possible factors causing the changes in currency exchange rate: the soundness in a country's banking sector and economic fundamentals, the econometric model of this study can be formed by rewriting Equation (1).

$$D_t = \phi_0 + \phi_1 X_{1t} + \phi_2 X_{2t} + \phi_3 X_{3t} + \phi_4 X_{4t} + \varepsilon_t \dots \dots \dots (2).$$

Equation (2) shows that the change in the rupiah exchange rates is a linear function of the soundness in the Indonesian banking sector and economic fundamentals. The banking sector soundness is indicated by the foreign liabilities of banks X_{1t} and the number of banks X_{2t} . The soundness in the Indonesian economic fundamentals is

indicated by the ratio of trade deficit to GDP X_{3t} and the ratio of foreign reserves to imports X_{4t}

Now suppose that the impact of foreign reserves-to-imports ratio on the change in the rupiah exchange rate and the intercept of Equation (2) are affected by the variable of domestic and foreign interest differential X_{5t} over time. This assumption allows us to rewrite Equation (2) as:

$$D_t = \phi_{0t} + \phi_1 X_{1t} + \phi_2 X_{2t} + \phi_3 X_{3t} + \phi_{4t} X_{4t} + \varepsilon_t \dots \dots \dots (3).$$

The only difference in Equation (3) from (2) is subscript “t” to the parameter ϕ_t and ϕ_0 . Parameter ϕ_{4t} then indicates the impact of the foreign reserves-to-imports ratio X_{4t} on the change in the rupiah exchange rate changes over time, depending on the domestic and foreign interest rate differentials X_{5t} (Equation 4). Similarly, parameter ϕ_{0t} indicates the impact of X_{5t} on the intercept of Equation (2) which is presented by Equation (5).

$$\phi_{4t} = \gamma + \delta_2 X_{5t} \dots \dots \dots (4).$$

$$\phi_{0t} = \xi + \delta_1 X_{5t} \dots \dots \dots (5).$$

Parameter δ_2 and δ_1 reflect the impact of changes in domestic and foreign interest rate differential on the coefficient of the variable of reserves-to-imports ratio and the intercept of Equation (2). Substituting Equation (4) and (5) into (3) results in the equation below.

$$D_t = \xi + \phi_1 X_{1t} + \phi_2 X_{2t} + \phi_3 X_{3t} + \gamma X_{4t} + \delta_1 X_{5t} + \delta_2 (X_{4t} * X_{5t}) + \varepsilon_t \dots \dots \dots (6).$$

Equation (6) indicates that there is an interaction variable between the variables of reserves-to-imports ratio and domestic and foreign interest rate differential. Following Griffith, Hill and Judge (1993), taking the partial derivative of Equation (6) with respect to the variable of reserves-to-imports ratio results in the equation below.

$$\partial D_t / \partial X_{4t} = \gamma + \delta_2 X_{5t} \dots \dots \dots (7).$$

In this case, the parameter δ_2 measures the effect of domestic interest rate differential on the effect of reserves-to- import ratio on the change in the rupiah exchange rate. The expected sign of these parameters (γ and δ_2) are positive which means if the domestic and foreign interest rate differential increases, the appreciation of the rupiah exchange rate resulting from the rise in the ratio of foreign reserves to imports also increases. According to Griffith, Hill and Judge (1993), if δ_2 is statistically significant, this means that the interaction variable is acceptable in which it implies that the impact of the foreign reserves-to-imports ratio on the change in the exchange rate is affected by the variable of domestic and foreign interest rate differential.

Similarly, taking the partial derivative of Equation (6) with respect to the variable of domestic and foreign interest rate differential X_{5t} results in the following equation.

$$\partial D_t / \partial X_{5t} = \delta_1 + \delta_2 X_{4t} \dots \dots \dots (8).$$

In this case, parameter δ_2 indicates the effect of domestic and foreign interest rate differential on the change in the rupiah exchange rate depends also on the ratio of foreign reserves to imports. The expected sign of these parameter (δ_1 and δ_2) are positive which means if the ratio of foreign reserves to imports increases, the appreciation of the rupiah exchange rate resulting from the rise in the domestic and foreign interest differential also increases.

It has widely been accepted that the rapid depreciation of the rupiah exchange rate led to the abandonment of the pegged exchange rate system (Soesastro and Basri, 1998 and McLeod, 1998). Recalling Figure 4.1 on Chapter 4, once the Indonesian government moved from the pegged to free-floated exchange rate system in August 1997, the rupiah exchange rate depreciated accordingly. Furthermore, the impact of this policy on the depreciation of the rupiah exchange rate can be tested by involving a dummy variable in Equation (6). The dummy variable, (DV) is constructed by taking a value of zero

during the period of observation before the abandonment of the pegged system (the first quarter of 1990 to the second quarter of 1997) and the value of one during the third quarter of 1997 to the last quarter of 1998, that is, after the abandonment of the pegged exchange rate system. Therefore, by involving the dummy variable, Equation (6) can then be written as:

$$D_t = \xi + \phi_1 X_{1t} + \phi_2 X_{2t} + \phi_3 X_{3t} + \gamma X_{4t} + \delta_1 X_{5t} + \delta_2 (X_{4t} * X_{5t}) + \chi DV + \varepsilon_t \dots (9).$$

The expected sign of parameter χ is negative which means that the change in the policy from the pegged to the free-floated exchange rate system results in the depreciation of rupiah exchange rate.

Furthermore, Equation (9) is estimated by a semilog model, in which, the regressand of the equation is logarithmic and the regressors are linear. This model is often named as the constant growth model which means that the effects of the chosen variables on the change in the rupiah exchange rate during the period of observations are assumed as being constant (Gujarati, 1995). The dependant variable D_t of the equation is the rupiah exchange rate, in which, it is measured by the number of the US dollar per unit rupiah (i.e. USD/Rp). Then, by taking the logarithmic values of this nominal exchange rate, it indicates the relative change in the rupiah exchange rate (depreciation or appreciation). Furthermore, the time series data used to estimate the model is quarterly data from 1990 to 1998.

The choice of the semilog model for the regression estimation is based on the following reasons. This model will instantly indicate the impact of absolute changes in explanatory variables on the relative change in the regressand by multiplying coefficients of explanatory variables with 100. In this case, then, the slope of coefficients directly measure the constant proportional depreciation of the rupiah exchange rate D_t for given absolute changes in the value of the regressors. For instance, if the regression estimation results in the negative sign of the coefficient of the number of banks, this means that a decrease in one unit of banks leads to the appreciation of the rupiah.

5.1.2 Explanatory Variables and Hypothesis

Regarding Equation (9), the banking sector soundness is indicated by variables of foreign liabilities of banks X_1 and the number of Banks X_2 . The impact of the variable of foreign liabilities of banks on the change in the rupiah exchange rate is negative (Table 5.1), which means that the rise in foreign liabilities of banks result in the depreciation of rupiah. This is reasonable since an increase in foreign liabilities of banks implies the high risk of banks toward the volatility of the rupiah exchange rate. For instance, when the contagion effect of the Thai baht crisis in 1997 damped the rupiah exchange rate, banks rushed to purchase foreign currency to avoid capital losses. This then led to the rapid depreciation of the rupiah. Similarly, the expected sign of the variable of the number of banks is negative, which implies that a decrease in the number of banks may result in the appreciation of the rupiah exchange rate. Figure 3.3 on Chapter 3, for instance, shows that the liquidation of some insolvent banks in November 1997 contributed to the appreciation of the rupiah exchange rate during the period of November to December 1997. Another reason is that the establishment of the Indonesian bank restructuring programme in January 1998 which allows insolvent banks close down also played an important role in the appreciation of the rupiah from January to May 1998.

Table 5.1
The Expected Sign of Explanatory Variables

Explanatory Variables	Expected Signs
Foreign Liabilities of banks, X_1	-
Number of Banks, X_2	-
Trade Deficit-to-GDP Ratio, X_3	-
Reserves-to-import Ratio, X_4	+
Domestic and Foreign Interest rate Differential, X_5	+/-
Interaction variable, $(X_4 * X_5)$	+/-
Dummy, DV	-

The soundness in the Indonesian economic fundamentals is indicated by the variables of trade deficit-to-GDP ratio X_3 , reserves-to-import ratio X_4 and domestic and foreign interest rate differentials X_5 . As it has been noted earlier, the variable of trade-deficit-to-GDP ratio has a negative correlation with the change in the rupiah exchange rate, which means that the increase in this ratio is expected to depreciate the rupiah exchange rate during the period of observation. This is mainly because the gap between output and domestic absorption during the pre-crisis period was financed by capital inflows.

The ratio of foreign reserves to imports indicates the ability of the Indonesian government to finance its imports, in which, a higher the ratio means that the government is in a stronger position to protect the economy against currency speculators (Krugman, 1979 and 1996). Note, however, that the impact of this ratio to the changes in the rupiah exchange rate is associated with the variable of domestic and foreign interest rate differential. This interaction is based on a fact that the increase in the ratio of foreign reserves to import ratio during the period of observation should have resulted in the appreciation of the rupiah exchange rate. In reality, the depreciation of rupiah, however, was unavoidable because there was an increase demand for foreign currency due to the fall of the domestic and foreign interest rate differential. The reason is that as the domestic and foreign interest rate differential decreased, holding the rupiah became less attractive.

Lastly, the dummy variable DV is expected to have a negative correlation with the changes in the rupiah exchange rate. As the classical approach to the currency crisis points out (Krugman, 1979), when currency speculators emerge and the government is unwilling to use its foreign reserves to defend the currency, instead of abandoning the pegged exchange rate system, there will more likely be a currency crisis.

5.2 Empirical Results

The regression results of Equation (9) is presented in Table 5.2. The F-value of 1255.167 is statistically significant at 1% level of significance. This implies that the

selected variables jointly contribute to the change in the rupiah exchange rate during the period of observation. Considering the t-value of each variable, all of the coefficients of the variables are statistically significant and have the expected signs. In other words, the model specification is statistically acceptable. The Durbin Watson value of 2.1854 indicates that there is no positive or negative autocorrelation, which means that this model is methodologically unbiased. The R-square of 0.9969 means that 99.69% of the variation in the rupiah exchange rate during the period of 1990 to 1998 can be explained by the chosen variables.

Table 5.2
The Estimate of the Model

Explanatory Variables	Estimated Coefficient	T-Ratio
Constant	-7.6948	-68.81
Foreign Liabilities of Banks, X_1	-0.0130	-19.09
Number of Banks, X_2	-0.0009	-2.847
Trade Deficit-to-GDP Ratio, X_3	-0.0123	-4.961
Reserves-to-import Ratio, X_4	0.0038	7.299
Domestic and Foreign Interest Rate Differential, X_5	0.0374	4.979
Interaction Variable, $(X_1 * X_2)$	-0.0003	-6.474
Dummy, DV	-0.2191	-4.724
F-value : 1255.167		
R ² : 0.9969		
R ² adjusted: 0.9961		
DW-value : 2.1854		

Concerning individual regressors, it will be noticed that the coefficient of the foreign liability variable X_1 is -0.0130. This implies that an increase of 1 trillion rupiah in the foreign liabilities of banks leads to about 1.3% depreciation of the rupiah exchange rate. This is reasonable since the large amount of foreign liabilities of banks increased substantially during the period of 1990 to 1998. As a result, the Indonesian banking

sector was vulnerable to the large fluctuation of the rupiah exchange rate. Therefore, when there was an external shock such as the depreciation of the Thai baht in 1997, banks were in a state of panic in purchasing foreign currency, particularly the US dollar to avoid capital losses.

The number of banks is also associated with the change in the rupiah exchange rate during the period of observation. The negative sign of the coefficient should, however, be interpreted cautiously. A negative sign should not lead one to conclude that an increase in the number of banks lead to the depreciation of the rupiah exchange rate or the onset of the crisis. The plausible interpretation is probably that the decrease in the number of banks results in the appreciation of the rupiah only when the Indonesian government tried to raise its credibility by the liquidation of some insolvent banks during the ongoing crisis. It is also important to note that the coefficient of this variable is 0.0009, in which, multiplying this coefficient by 100 indicates that the liquidating ten insolvent banks lead to about 1% appreciation of the rupiah exchange rate.

It is now widely accepted that the higher ratio of trade deficit to GDP results in the depreciation of the rupiah exchange rate. The estimated coefficient is -0.123 and statistically significant. This suggests that an increase of a unit in the ratio leads to about 1.23% depreciation of the rupiah exchange rate. This seems plausible, since the average of that ratio during the period of observation is larger than 5, which is argued as being the warning level (Berg and Pattillo, 1999). This also indicates that the trade deficit during the pre-crisis period was financed by capital inflows which made the Indonesian economy vulnerable to the currency crisis.

The variable of foreign reserves-to-import ratio is statistically significant. The coefficient of this variable, which is 0.0038, implies that an increase of a unit in this ratio may contribute to the appreciation of the rupiah exchange rate by about 0.4 %. Similarly, the coefficient of domestic and foreign interest rate differential is 0.0374, indicating that a unit increase in the domestic and foreign interest rate differentials may result in about 3.7% appreciation of the rupiah exchange rate. Note, however, that the interaction variable between the ratio of foreign reserves to imports and domestic-and-foreign-

interest rate differential is statistically significant. This implies that the impact of these two variables on the change in the rupiah exchange rate cannot be interpreted individually, but rather should be done jointly. This interaction can be illustrated by taking the partial derivative of the dependant variable in the regression equation with respect to the ratio of foreign reserves to imports (X_{4t}). The result is as follows:

$$\partial D_{it} / \partial X_{4t} = 0.0038 - 0.0003 X_{5t} \dots \dots \dots (10).$$

Equation (10) shows that the rise in the foreign-reserves-to-imports ratio results in the appreciation of the rupiah exchange rate during the period of observation. However, the appreciation of the rupiah resulting from a unit increase in this ratio is not 0.38%, but it should be reduced by 0.03% of the level of the domestic and foreign interest rate differential (X_{5t}). Theoretically, the appreciation of the rupiah exchange resulting from the rise in the ratio of foreign reserves to imports should be amplified by the rise in the domestic and foreign interest rate differential. In contrast, Equation (10), however, indicates that the appreciation of the rupiah resulting from the rise in the ratio of foreign reserves to imports is moderated by 0.03% of the current value of the interest rate differential. For instance, at the mean value of X_{5t} of 8.88, the net impact of X_{4t} on the appreciation of the rupiah exchange rate is just 0.0011. This implies that the appreciation of the rupiah exchange rate resulting from a unit increase in this ratio is just 0.11%, which is much smaller than 0.38%. This arises because the increase in the domestic and foreign interest rate differential, particularly during the ongoing crisis could not elicit a return of confidence in the rupiah, but rather it led to an increased demand for the US dollar. This is not surprising because during the ongoing crisis the expected depreciation of the rupiah by economic agents was large. As a consequence, they were reluctant to hold rupiah-denominated deposits because holding such deposits would have resulted in capital losses at a time when the value of rupiah fell sharply against the US dollar.

Similarly, considering Equation (9), taking the partial derivative with respect to the domestic and foreign interest rate differential variable results in the following equation:

$$\partial D_t / \partial X_{5t} = 0.00374 - 0.0003 X_{4t} \dots \dots \dots (11).$$

Equation (11) implies that the rise of a unit in the domestic and foreign interest rate differential will result in the appreciation of the rupiah exchange rate by 0.37% less 0.03% of the level of the ratio of foreign reserves to import. At the mean value of X_{4t} of 1.72, the net impact X_{5t} on the appreciation of the rupiah exchange rate would be 0.0032. This means that a unit increase in the real domestic and foreign interest rate differential would result in 0.32% appreciation of the rupiah exchange rate. Theoretically, the rise in foreign reserves-to-imports ratio should lead to an appreciation of the rupiah exchange rate resulting from the rise in the domestic and foreign interest rate differentials. In this case, however, the increase in foreign reserves-to-import ratio reduces the impact of the rise in the domestic and foreign interest rate differential on the appreciation of the rupiah exchange rate. There are two reasons of why this could be the case. Firstly, this occurred because during the ongoing currency crisis, economic agents believed that the policy of high domestic interest rate would have been no impact on the return of confidence in the rupiah. Secondly, economic agents expected with almost complete certainty that the Indonesian government would abandon the pegged exchange rate system. This meant that foreign reserves would not be used to defend the value of the rupiah.

As expected, the dummy variable was statistically significant. The negative sign of the coefficient means that the abandonment of the pegged exchange rate system in August 1997 resulted in the depreciation of the rupiah exchange rate. This is not surprising, as it has theoretically been established, the abandonment of the pegged system largely contributed to the successful attacks of currency speculators on the rupiah, leading to the massive depreciation of the rupiah exchange rate. The magnitude of the coefficient of -0.2191 means that when actual values of the variables are substituted in the regression equation to solve for the dependant variable, we must add -0.2191 to the estimated value of the intercept if the period being considered comes after the abandonment of the pegged exchange rate regime.

5.3 Concluding Discussion

This chapter concludes that a higher level of foreign liabilities of banks and the large number of banks contributed to the depreciation of the rupiah exchange rate. However, the number of banks variable should be interpreted cautiously. The plausible interpretation of the regression coefficient variable is that a decrease in the number of banks would result in the appreciation of the rupiah as the Indonesian government tried to raise its credibility by the liquidation of some insolvent banks.

The ratio of trade deficit to GDP, foreign reserves-to-import ratio, and the real domestic and foreign interest rate differential are important explanatory variables of the changes in the rupiah exchange rate during the period of observation. Somewhat surprisingly, the interaction between the variables of foreign reserves-to-import ratio, and the real domestic and foreign interest rate differentials these two variables are also significant. However, there are two interpretations in regard to the interaction variable.

Firstly, the appreciation of the rupiah exchange rate resulting from the rise in the ratio of foreign reserves to imports would be reduced as the real domestic and foreign interest rate differentials increase. This is probably because the behaviour of whether economic agents hold the rupiah or foreign currency was not based on interest benefits but on risks of the exchange rate fluctuation. Thus, as the fluctuation of the rupiah exchange rate was large during the crisis period, there was an increased demand for the US dollar because interest benefits resulting from holding rupiah would be much smaller than capital losses of holding rupiah particularly when there was the massive depreciation of rupiah against the US dollar.

Secondly, the appreciation of the rupiah exchange rate resulting from the rise in the domestic and foreign interest rate differential would also be reduced as the ratio of foreign reserves to imports increases. This is reasonable, since economic agents believed that the policy of high domestic interest rate had no credibility and the rise in the amount of foreign reserves would not be used to defend the value of the rupiah,

particularly as the Indonesian government abandoned the pegged exchange rate system. Consequently, even though, the government's foreign reserves rose, there was the increased demand for the US dollar, reducing the impact of the rise in the real domestic and interest rate differentials on the appreciation of the rupiah exchange rate. Not surprisingly, the abandonment of the pegged exchange rate system resulted in the massive depreciation of the rupiah exchange rate.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

- 6.1.1 The occurrence of the Indonesian currency crisis in 1997-1998 was ascribed to the contagion effect of the depreciation of the Thai baht and the weaknesses in, both the Indonesian banking sector and economic fundamentals. The weakness in the banking sector, however, was not due to an absence of a regulatory framework but rather it was due to poor implementation of prudent banking supervision and regulation leading to an implicit protection of insolvent banks. The plausible cause of the implicit guarantee was because of moral hazard problems resulting from the lack of transparency and the dual role of the central bank, associated with widespread corruption collusion and nepotism in the Indonesian banking supervision and regulations. Another factor was political involvement in the form of a "Suharto connection" insuring most of the insolvent banks in the 1990s. As a result, the number of risky and non-performing loans increased substantially, leading to the rise in the Indonesian financial vulnerability. This implies that under this circumstance, the government created an environment for a currency crisis to occur in response to the contagion effect of the Thai baht crisis. In other words, the 1988 banking deregulation sowed the seeds of the Indonesian currency crisis of 1997-1998.
- 6.1.2 The deterioration in economic fundamentals prior to the currency crisis of 1997-1998 was indicated by at least two factors: the rise in the current account deficit and the slow growth of exports. These factors mainly resulted from the rise in real appreciation, reducing the competitiveness of the Indonesian product exports in the world market. Under the liberalisation of capital account, the widening current account deficits raised the capital inflow in terms of

foreign debts. The large foreign debts made the Indonesian economy highly susceptible to sudden capital outflows.

- 6.1.3 The weaknesses in the Indonesian banking sector and economic fundamentals also led to the long-surviving pegged exchange rate system under globalised capital markets. The pegged system, accompanied by the implicit guarantee in the banking system, then gave rise to the massive increase in unhedged foreign debts of banks and the poor quality of bank credits. Furthermore, the massive unhedged foreign debts made the banking system vulnerable to roll-over and currency-mismatch risks, and credit booms with poor credit quality led to the risks of high domestic interest rates. These factors together reduced the ability of the central bank to defend the rupiah exchange rate because setting high domestic interest rates resulted in the number of insolvent banks, producing a bank panic. Since such a panic led to withdrawals of deposits into foreign currency, then it put a large pressure on the rupiah exchange rate to depreciate further.
- 6.1.4 Moreover, the currency crisis resulted in the collapse of the banking sector in 1998-1999, which was indicated by two major undesired events in the banking system: a number of bank closures and insolvent banks which have been taken over by the government. For this reason, it is plausible to argue that two different theories of the linkage between banking and currency problems can be accommodated in the case of the Indonesian banking and currency crisis of 1997-1998. The weakness in the Indonesian banking sector gave rise to the currency crisis, and simultaneously, the currency crisis then resulted in the banking crisis.
- 6.1.5 Using a simple model, this study concludes that the variables of foreign liabilities of banks, the number of banks, the variables of trade deficit to GDP ratio, and foreign reserves to import ratio, the domestic and foreign interest rate differential and the interaction variable between foreign reserves to imports ratio and the domestic and foreign interest rate differential explain a large proportion

of the changes in the rupiah exchange rate during 1990-1998. For this reason, it is reasonable to argue that the weaknesses in the Indonesian banking sector and economic fundamentals played a crucial role in the depreciation of the rupiah exchange rate during 1997-1998. Similarly, the abandonment of the pegged exchange rate system had a large impact on the presence of the currency crisis in 1997-1998.

6.2 Recommendation

6.2.1 Since the weakness in the Indonesian banking sector is due largely to moral hazard problems in the Indonesian banking supervision and regulations, enforcement of prudent banking supervision and regulations need to be improved. For this reason, the following aspects should be strengthened: the implementation of bankruptcy laws, prudent supervision of bank offshore loans, off-balance sheet liabilities, and legal lending limits and the like. Since the problems of moral hazard led to the presence of an implicit guarantee for insolvent banks, it is therefore important to avoid such an implicit guarantee in the banking sector by letting insolvent banks close down. Most importantly, however, these attempts to strengthen the banking sector will not result in optimal goals without removing the government involvement in collusion, corruption and nepotism in the banking supervision and regulations.

6.2.2 Regarding the currency crisis of 1997-1998 that led to the weaknesses in the Indonesian economic fundamentals, it is important to keep maintaining prudent fiscal and monetary policies. The policy of a high economic growth target in the past is still applicable, but it should be monitored cautiously, especially, in regard to a presence of the rapid growth of banking credit and foreign capital inflows, in particular, short-term foreign debts of banks, as well as corporate sectors. Furthermore, large current account deficits, and rapid currency appreciation leading to the downfall in exports should also be watched carefully.

6.2.3 In the future, studies on the relationship between the weakness in banking sector and the occurrence of the Indonesian currency crisis in 1997-1998 should pay close attention to the development of formal models. Interesting subjects such as the relationship between the presence of moral hazard problems, the weak credibility of the government and the currency crisis will provide a substantial portrait of the linkages between the banking sector and the Indonesian currency crisis of 1997-1998. The econometric analysis using a simultaneous model will also be an interesting subject to analyse the causal linkage between the Indonesian currency and banking crises.

6.2.4 Finally, please note that the chosen variables of the number of banks in this study has not been based on a strong theoretical foundation. Future analysis could focus on providing a convincing foundation of this variable in examining the linkages between the banking sector and the Indonesian currency crises. A further development of the model of Calvo and Mendoza (1996) for the case of Mexico in 1994-1995 would probably be a good start.

References

- Asiamoney (1998). Recapital Punishment for Crony Banks, (November 1998), pp. 15-27.
- Agénor, P., Bhandari, J. and Flood, R.P. (1992) "Speculative Attacks and Models of Balance of Payments Crises", *Staff Papers, IMF, Vol. 39*, pp. 357-394.
- Atkeson, A. and Ríos-Rull, J. (1996) "The Balance of Payments and Borrowing Constraints: An Alternative View of the Mexican", *Journal of International Economics, Vol. 41*, pp. 331-349.
- Bank Indonesia, *Monthly Financial Statistics 1999*, Various Issues, Jakarta: Bank Indonesia.
- _____, (1999) *Report for the Financial Year of 1996/97 and 1997/1998*. Jakarta: Bank Indonesia.
- Bascom, W.O. (1997). *Bank Management and Supervision in Developing Financial Market*, London: Macmillan Press LTD.
- Berg, A. and Pattillo, C. (1999) "Are Currency Crises Predictable? A Test.", *International Monetary Fund Staff Paper, Vol. 40, No.2* pp. 107-138.
- Bernanke, B. (1983) Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression, *The American Economic Review, Vol. 73, No.3*, pp. 257-76.
- Binhadi (1995), *Financial Sector Deregulation, Banking Development and Monetary Policy: The Indonesian Experience, 1983-1993*, Jakarta: Institute Bankir Indonesia.
- Blanco, H. and Garber, P.M. (1986) "Recurrent Devaluation and Speculative Attacks on the Mexico's Peso," *Journal of Political Economy, Vol. 94*, pp. 148-166.
- Bullard, N. et.al (1998) Taming the Tigers: the IMF and the Asian Crisis. *Third World Quarterly, Vol. 19 No.3*, pp. 505-555.
- Calomoris, C.W. and Mason, J.R. "Contagion and Bank Failures During the Great Depression: The June 1932 Chicago Banking Panic", *The American Economic Review December 1997*, pp. 863-883.
- Calomoris, C.W. and Khan, C. (1991) "The Role of Demandable Debt in Structuring Optimal Banking Arrangement", *The American Economic Review, Vol 81*, pp. 863-883.
- Calvo, G.A. (1995) "Varieties of Capital Market Crises," *Center for International Economics Working Paper No. 15*, College Park: University of Maryland.

- Calvo, G.A. and Mendoza, E.G. (1996) "Mexico's Balance of Payment Crisis: A Chronicle of a Death Foretold", *Journal of International Economics Vol. 41*, pp. 235-264.
- Caprio, G. and Klingebiel, D. (1996) "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking ?", Paper presented to Annual World Bank Conference on Development Economics. Washington: the World Bank.
- Cartens, A. and Schwartz, M.J. (1998). "Capital Flows and the Financial Crisis in Mexico", *Journal of Asian Economics, Vol. 9 No. 2*, pp. 207-226.
- Cole, H.L. and Kehoe, T.J. (1996) "A Self-fulfilling Model of Mexico's 1994-1995 Debt Crisis" *Journal of International Economics, Vol. 41*, pp. 309-330.
- Cole, D.C. and Slade, B.F. (1996) *Building a Modern Financial System: The Indonesian Experience*, Cambridge: Cambridge University Press.
- _____,(1998) "Why has Indonesia's Financial Crisis been so Bad?". *Bulletin of Indonesian Economic Studies (BIES), Vol. 34 No.2*, pp. 61-66.
- Corbett, J. and Vines, D. (1999) "Asian Currency and Financial Crises: Lessons from Vulnerability, Crisis, and Collapse," *The World Economy, Vol. 22 No. 2*, pp. 155-177.
- Corsetti, Pesenti and Roubini (1998) "What Caused the Asian Financial crisis ?" Mimeo, New York University.
- Cumby, R. and Wijnbergen, S. (1989) "Financial Policy and Speculative Runs with a Crawling Peg: Argentina 1979-1981," *Journal of International Economics, Vol. 17*, pp. 111-127.
- De Bonis, R., Giustiniani, A. and Gomel, G. (1999) "Crisis and Bailout of Banks and Countries: Linkages, Analogies, and Differences", *The World Economy, Vol. 2 No. 1*, pp. 55-86.
- Delhaise, P. (1999) *Asia in Crisis: the Implosion of the Banking and Financial Systems*, Singapore: John Wiley & Sons (Asia) Pte Ltd.
- Demirgüç-Kunt, A and Detragiache, E. (1998) "The Determinant of Banking Crises in Developing and Developed Countries", *Staff Paper, IMF, Vol.45 No.1*, pp. 81-109.
- Dewatripont, M. and Tirole, J (1994). *The Prudential Regulation of Banks*, Massachusetts: The MIT Press.
- Diamond, D.W. and Dybvig, P.H. (1983) "Bank Runs, Deposit Insurance, and Liquidity", *Journal of Political Economy, Vol. 91*, pp.401-419.

- Dornbusch, R. and Werner, A. (1994) "Mexico: Stabilisation, Reform, and No Growth," *Brooking Paper on Economic Activity: 1, Brooking Institution*, pp. 253-291.
- Dornbusch, R., Golfajn, I. and Valdes, R.O, (1995) "Currency Crises and collapses," *Brooking Paper on Economic Activity: 2, Brooking Institution*, pp. 219-293.
- Edin, P. and Vredin, A. (1993) "Devaluation Risk in Target Zone: Evidence from the Nordic Countries," *Economic Journal*, Vol. 103, pp.161-175.
- Edward, S. (1989) *Real Exchange Rates, Devaluation, and Adjustment: Exchange Rate Policy in Developing Countries*, MIT Press.
- _____, (1998) "The Mexican Peso Crisis; How Much Did We Know? When Did We Know It?" *The World Economy*, Vol. 21 No. 1, pp. 1-30.
- Edward, S and Julio A. Santaela (1993) "Devaluation Controversies in the Developing Countries: Lessons from the Bretton Woods Era," in Michael D. Bordo and Barry Eichengreen (eds.) *A Retrospective on the Bretton Woods System: Lessons for International Monetary Reform*, Chicago: University of Chichago Press, pp. 405-55.
- Edward, S. and Montiel, P.J. (1989) "Devaluation Crises and Macroeconomic Consequences of Postponed Adjustment in Developing Countries," *Staff Papers, IMF*, Vol. 36, pp. 875-903.
- Elek, A. and Wilson, D. (1999) "The East Asian Crisis and International Capital Markets," *Asian-Pacific Economic Literature*, Vol. 13, No. 1, pp. 1-21.
- Eichengreen, B. and Wyplosz, C. (1993) "The Unstable EMS," *Brooking Paper on Economic Activity: 1, Brooking Institution*, pp. 51-124.
- Espinosa, M. and Russell, S. (1996) "The Mexican Economic Crisis: Alternative Views," *Economic Review*, Vol. 81 No. 1, pp. 1-13, Federal Reserve Bank of Atlanta.
- Far East Economic Review, (1997/98) Various issues.
- Flood, R. and Garber, P. (1984) "Collapsing Exchange-rate Regime: Some Linear Examples," *Journal of International Economics*, Vol. 17, pp. 1-13.
- Frankel, J.A. and Rose, A.K. (1996) "Currency Crashes in Emerging Markets: An Empirical Treatment," *Journal of International Economics*, Vol. 41, pp. 351-366.
- Furman, J and Stiglitz, J.E. (1998) "Economic Crisis: Evidence and Insights from East Asia", *Brooking Paper on Economic Activity: 2, Brooking Institution* , pp. 1-135.

- Garcia, V.F. (1997) "Roundtable Discussion: Systemic Banking Crises" in S.K. Bery, V.F. Garcia (eds.) *Preventing Banking Distress and Crises in Latin America, Proceeding of a Conference held in Washington, D.C., April 15-16, 1996*, Washington, D.C.: The World Bank.
- Gavito, J. Silva, A. and Zamarripa, G. (1997). "Mexico's Banking Crisis: Origin and Consequences, and Countermeasures". in George M. von Furstenberg (eds.), *Regulation and Supervision of Financial Institutions in the NAFTA Countries and Beyond* (pp. 228-245). Washington: International Monetary Fund (IMF).
- Gavin, M. Hausmann, R. (1996) "The Roots of Banking Crises: The Macroeconomic Context," in Hausmann and Rojas-Suarez (eds.) *Banking crises in Latin America*, Washington, D.C.: Inter-American development Bank and John Hopkins University.
- Goldfajn, I. and Valdes, R.O. (1998) "Current Account Sustainability: Are Currency Crises Predictable?," *European Economic Review, Vol. 42*, pp. 873-885.
- Goldstein, M. (1998). *The Asian Financial Crisis: Causes, Cures, and Systemic Implication*, Washington: Institute for International Economics.
- Goldstein, M. and Turner, P. (1996) "Banking crises in Emerging Economies: Origins and Policy Options", *BIS Economic Papers No. 46, October 1996*, Basle: Monetary and Economic Department, Bank for International Settlements.
- González-Hermosillo, B., Pazarbaşıoğlu, C. and Billings, R. (1997). "Determinant of Banking System Fragility: A Case Study of Mexico", *Staff Paper, IMF, Vol.44 No. 3*, pp. 295-315.
- Gorton, G. (1988) "Banking Panics and Business Cycles" *Oxford Economic Papers Vol. 40*, pp. 751-81.
- Griffiths, W.E., Hill, R.C. and Judge, G.G. (1993). *Learning and Practicing Econometrics*, Canada: John-wiley and Sons, Inc.
- Gujarati, D.N. (1995). *Basic Econometrics*, Singapore: McGraw-Hill International Editions.
- Hadad, M.D. (1999) "Financial Market Development in Indonesia". Paper presented at *the Financial Worksop on the Financial Market Reform*, Department of Foreign Affairs and Trade of Australia and the Australia National University. Canberra, February 20 – March 5, 1999.
- Hall, M.J.B. (1993). *Banking Regulation and supervision: A Comparative Study of the UK, USA and Japan*, England: Edward Elgar.

- Henderson, C (1998). *Asia Faling?: Making Sense of the Asian Currency Crisis and its Aftermath*, Singapore: McGraw-Hill Co.
- Hendrobudiyono (1994) "Bank Soundness Requirements: a Central Bank Perspective," in Ross H. McCleod (ed.) *Indonesia Assessment 1994: Finance as a Key Sector in Indonesia's Development*, Singapore, and Canberra: Institute of Southeast Asian Studies and Australia National University.
- Hofer, B. and Furstenberg, G.M. (1997) Regional Financial Integration in Europe: A Blueprint for North America? in George M. von Furstenberg (ed.), *Regulation and Supervision of Financial Institutions in the NAFTA Countries and Beyond*. Massachusetts: Kluwer Academic Publishers.
- International Monetary Fund (IMF), *the International Financial Statistics*, Various Issues.
- Jawa Post (6/12/1999) the Indonesian Newspaper
- Jeanne, O. (1997) "Are Currency Crises Self-fulfilling? A Test," *Journal of International Economics*, Vol. 43, pp. 263-286.
- Johnson, C (1998). "Survey of Recent Development". *Bulletin of Indonesian Economic Studies (BIES)*, Vol. 34 No. 2, pp. 3-60.
- Kaminsky, G.L. and Reinhart, C.M. (1996). "The Twin Crisis: The Cause of Banking and Balance of Payments Problems." *Board of Governors of the Federal Reserve, International Discussion Paper 544*, March, Washington, D.C.
- _____,(1999). "The Twin Crisis: The Cause of Banking and Balance-of-Payments Problems." *The American Economic Review*, Vol. 89, No. 3, pp. 473-500.
- Kaminsky, G.L. and Leiderman, L. (1998). "High Real Interest Rates in the Aftermath of Disinflation: Credit Crunch or Credibility Crisis?," *Journal of Development Economics*,
- Kaminsky, G.,Lizondo, S. and Reinhart, C.M. (1998) "Leading Indicator of Currency Crises", *Staff Paper, IMF, Vol.45 No. 1, pp. 1-48*.
- Kaminsky, G.L. and Pereira, A. (1996) "The Debt Crisis; Lessons of the 1980s for the 1990s", *Journal of Development Economics*, Vol. 50, pp. 1-24.
- Kindelberger, C. (1996) *Manias, Panics, and Crashes*, New York: Basic Books Inc.
- Kompas*, 1998, (the Indonesian Newspaper) Various Issue.
- Krugman, P. (1979) "A Model of Balance of Payments Crises," *Journal of Money, Credit and Banking*, Vol. 11, pp. 311-325.

- _____,(1996) "Are Currency Crises Self-fulfilling?" *NBER Macroeconomics Annual* 344-378.
- _____,(1998) "What Happened to Asia?" Mimeo-graphed, Department of Economics, MIT, Cambridge, [<http://web.mit.edu/krugman>].
- Lethiche, J.M. (1998) "Cause of the Financial and Economic Crisis in Southeast Asia and the Need for National, Regional, and IMF Structural Reforms", *Journal of Asian Economics*, Vol. 9 No. 2, pp. 181-191.
- Loretan, M. (1997). Systemic Risk in Banking: Concept and Models in George M. von Furstenberg (ed.), *Regulation and Supervision of Financial Institutions in the NAFTA Countries and Beyond* (pp. 36-45). Massachusetts: Kluwer Academic Publishers.
- MacIntyre, A. (1998) "Political Institutions and the Economic Crisis in Thailand and Indonesia" in Hal Hill and H.W. Arndt (eds.) *Southeast Asia's Economic Crisis: Origin, Lesson and the Way Forward*. Singapore: Institute of Southeast Asian Studies (ISEAS).
- Maehara, Y. (1998) "Financial Stability in Southeast Asia", *Journal of Asian Economics*, Vol 9 No. 2, pp. 227-235.
- McLeod, R.H. (1998) "Crisis to Cataclysm? The Mismanagement of Indonesia's Economic Ailments", *The World Economy*, pp. 913-30.
- _____,(1998) "Case Studies: the Troubled Economies, Indonesia" in Ross H. McLeod and Ross Garnaut (eds.) *East Asia in Crisis From being a Miracle to Needing One?*. London: Routledge.
- Meltzer, A.H. (1997) Roundtable Discussion: Systemic Banking crises in S.K. Bery, V.F. Garcia (eds.) *Preventing Banking Distress and Crises in Latin America, Proceeding of a Conference held in Washington, D.C., April 15-16, 1996*, Washington, D.C.: The World Bank.
- Montes, M.F. (1998) *The Currency Crisis in Southeast Asia*, Singapore: Institute of Southeast Asian Studies (ISEAS).
- Musch, F.C. (1997). Applying Basle Standards in Developing and transition Economies. in Charles Enoch and John H. Green (eds.), *Banking Soundness and Monetary Policy; Issue and Experiences in the Global Economy* (pp. 130-39). Washington: International Monetary Fund (IMF).
- Nasution, A. (1992) "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, Seoul, Korea, August 20-1*.

- _____(1999) "The Financial Crisis in Indonesia" in Seiichi Masuyama, Donna Vandenbrink and Chia Siow Yue (eds.) *East Asia's Financial Systems: Evolution and Crisis*. Tokyo: Nomura Research Institute (NRI) and Institute of Southeast Asian Studies (ISEAS).
- Obstfeld, M. (1986) "Rational and Self-fulfilling Balance of Payment Crisis," *American Economic Review*, Vol.76, (march), pp. 72-81.
- _____(1996) "Models of Currency crises with Self-fulfilling Features," *European Economic Review*, Vol.40, pp. 1037-1047.
- Obstfeld, M. and Roggoff, K. (1995) "The Mirage of Fixed Exchange Rates," *Journal of Economic Perspective*, Vol.9, pp. 73-96.
- Padoa-Schioppa, T. (1997). Evolving Supervisory Standards in Advanced Market Economies. in Charles Enoch and John H. Green (eds.), *Banking Soundness and Monetary Policy; Issue and Experiences in the Global Economy* (pp. 115-24), Washington: International Monetary Fund (IMF).
- Park, S. (1991) "Bank Failures Contagion in Historical Perspective", *Journal of Monetary Economics*, Vol. 28, pp. 271-286.
- Perry, G.E and Lederman, D. (1998) *Financial Vulnerability, Spillover Effect, and Contagion: Lessons from the Asian Crises for Latin America*, World Bank Latin American and Caribbean Studies, Washington DC: The World Bank.
- Radelet, S. and Sachs, J.D. (1998) "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects", *Brooking Paper on Economic Activity: 1, Brooking Institution*, pp. 1-90.
- Rojas-Suárez, L. and Weisbrod, S.T. (1995) *Financial Fragility in Latin America the 1980s and 1990s*, Washington, D.C.: International Monetary Fund.
- Sachs, J.D. Tornell, and Velasco (1996) "Financial Crisis in Emerging Markets: The Lessons from 1995", *Brooking Paper on Economic Activity: 1, Brooking Institution*, pp. 147-215.
- Sachs, J.D., Tornell, A. and Velasco, A.(1996) "The Mexican Peso Crisis: Sudden Death or Death Foretold?", *Journal of International Economics*, Vol. 41, pp. 265-283.
- Sadli, M. (1999) "The Indonesian Crisis" in Hal Hill and H.W. Arndt (eds.) *Southeast Asia's Economic Crisis: Origin, Lesson and the Way Forward*. Singapore: Institute of Southeast Asian Studies (ISEAS).
- Saunders, A. and Wilson, B. (1996) "Contagious Bank Runs: Evidence from the 1929-1933 Period", *Journal of Financial Intermediation*, No. 5, pp. 409-423.

- Soesastro, H. and Basri, M.C. (1998) "Survey of Recent Developments" *Bulletin of Indonesian Economic Studies* Vol. 34 No. 1, pp 3-54.
- Suwandi, T. (1995) "Indonesian Banking Post-deregulation: Moral Hazard and High Real Interest Rates", *Economic Division Working Papers 95/4*, Canberra: Research School of Pacific and Asian Studies, Australia National University.
- Stocker, J. (1994) "Intermediation and the Business Cycle Under a Specie Standard: The Role of the Gold Standard in English Financial Crises, 1790-1850." Mimeo, University of Chicago.
- Velasco, A. (1987) "Financial and Balance of payment Crises: A Simple Model of the Southern Cone Experience", *Journal of Developing Economics*, Vol. 27, pp. 263-283.
- Waldo, D.G. (1985) "Bank Runs, the Deposit-currency Ratio and the Interest Rate", *Journal of Monetary Economics*, No.15, pp. 269-277.
- Yamazawa, I. (1998) "The Asian Economic Crisis and Japan", *The Developing Economies*, Vol. 36 No.3, pp. 332-351.

Appendices

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|_READ (C:\AGUSDAT.TXT)EXCHRATE EXCHLAG TRADEDEF RESVS G DPRUP CPIINF DINTREST
FINTREST &
| FORLIABS CAPITAL TOTASSET BANKS USINT USCPI USINF IMPORT DV1 DV2
UNIT 88 IS NOW ASSIGNED TO: C:\AGUSDAT.TXT

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...SAMPLE RANGE IS NOW SET TO:          1          36
|_SAMPLE 1 36

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|_GENR EXVALUE=1/EXCHRATE
|_GENR LEXVALUE=LOG(EXVALUE)
|_GENR DFINTDEF=DINTREST-USINT
|_GENR GDPD=(GDPMIL/EXCHRATE)
|_GENR TDEFGDPD=(TRADEDEF/GDPD)*100
|_GENR RESIM=(RESVS/IMPORT)*100
|_GENR RILDINT=DINTREST-CPIINF
|_GENR DFINDEF=RILDINT-USINT
|_GENR FLB=(FORLIABS/1000)
|_GENR RESIMDEF=RESIM*DFINDEF
|_PRINT EXVALUE LEXVALUE RESIM DFINDEF

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EXVALUE	LEXVALUE	RESIM	DFINDEF (%)
0.5509642E-03	-7.503841	131.2455	6.440000
0.5422993E-03	-7.519692	120.8474	8.790000
0.5364807E-03	-7.530480	113.5724	6.470000
0.5260389E-03	-7.550135	121.0185	12.06000
0.5175983E-03	-7.566311	141.4773	15.14000
0.5117707E-03	-7.577634	160.4869	16.35000
0.5081301E-03	-7.584773	153.2955	13.52000
0.5020080E-03	-7.596894	160.0970	14.79000
0.4975124E-03	-7.605890	163.9037	15.22000
0.4933399E-03	-7.614312	173.2185	14.47000
0.4897160E-03	-7.621685	168.4796	14.35000
0.4861449E-03	-7.629004	152.6574	11.93000
0.4835590E-03	-7.634337	174.0813	5.260000
0.4789272E-03	-7.643962	183.8102	10.02000
0.4743833E-03	-7.653495	171.4529	7.660000
0.4739336E-03	-7.654443	162.8412	5.950000
0.4666356E-03	-7.669962	167.9841	2.650000
0.4629630E-03	-7.677864	156.9118	4.500000
0.4597701E-03	-7.684784	149.9759	2.950000
0.4559964E-03	-7.693026	146.5419	3.530000
0.4506534E-03	-7.704812	142.2744	2.960000
0.4452360E-03	-7.716906	135.2076	5.870000
0.4395604E-03	-7.729735	133.4677	7.960000
0.4332756E-03	-7.744137	154.8707	7.760000
0.4278990E-03	-7.756623	160.6173	6.750000
0.4269855E-03	-7.758761	141.8747	9.270000
0.4273504E-03	-7.757906	143.0750	8.850000
0.4196391E-03	-7.776115	170.7132	8.210000
0.4133940E-03	-7.791110	172.4338	7.080000
0.4081633E-03	-7.803843	172.9898	8.000000
0.3053435E-03	-8.094073	182.3545	12.92000
0.2150538E-03	-8.444622	229.6028	12.20000
0.1201201E-03	-9.027018	226.0277	-8.430000
0.6711409E-04	-9.609116	245.4339	3.060000
0.9345794E-04	-9.277999	346.4859	7.150000
0.1246106E-03	-8.990317	358.6735	28.06000

FLB	GDPD	DV
(Trill. of Rp)	(Bill. Of \$US)	
5.638000	25041.38	0.0000000
6.333000	26165.78	0.0000000
9.180300	26407.99	0.0000000
11.15230	27963.65	0.0000000
11.58800	28410.04	0.0000000
12.23500	27836.69	0.0000000
10.23300	30211.18	0.0000000
11.06200	29330.37	0.0000000
12.32500	30260.25	0.0000000
14.03130	30668.23	0.0000000
15.06970	32661.07	0.0000000
16.33430	31965.19	0.0000000
16.88530	34534.67	0.0000000
17.13600	35788.22	0.0000000
18.48230	37168.45	0.0000000
19.79970	36740.85	0.0000000
20.10400	40689.78	0.0000000
20.20000	42542.96	0.0000000
20.90400	45216.00	0.0000000
23.46500	46409.48	0.0000000
22.73170	47443.94	0.0000000
23.22000	48356.06	0.0000000
23.81600	50377.01	0.0000000
25.44300	50902.69	0.0000000
26.54570	52770.00	0.0000000
26.64300	54990.65	0.0000000
27.31500	58730.38	0.0000000
28.90670	60046.24	0.0000000
30.68400	59093.80	0.0000000
33.03200	60767.06	0.0000000
44.74500	48257.56	0.0000000
59.17530	37771.01	1.0000000
135.3787	26007.65	1.0000000
147.2840	16348.48	1.0000000
141.7810	24011.13	1.0000000
91.93900	33962.37	1.0000000

RESIMDEF	TRADEDEF	TDEFGDPD	BANKS
	(Mill of \$US)	(%)	
845.2211	1326.000	5.295236	168.0000
1062.249	923.0000	3.527508	168.0000
734.8136	924.0000	3.498941	168.0000
1459.483	2179.000	7.792259	168.0000
2141.966	1089.000	3.833152	199.0000
2623.961	997.0000	3.581603	199.0000
2072.556	1059.000	3.505325	199.0000
2367.834	1522.000	5.189160	199.0000
2494.614	1199.000	3.962294	208.0000
2506.472	1473.000	4.803016	208.0000
2417.682	1780.000	5.449914	208.0000
1821.203	1622.000	5.074270	208.0000
915.6677	2163.000	6.263271	234.0000
1841.778	2458.000	6.868182	234.0000
1313.329	2168.000	5.832903	234.0000
968.9053	2021.000	5.500689	234.0000
445.1580	1309.000	3.217024	240.0000
706.1029	2075.000	4.877422	240.0000
442.4289	2449.000	5.416224	240.0000
517.2930	1971.000	4.246977	240.0000
421.1323	1447.000	3.049915	240.0000

793.6684	1418.000	2.932415	240.0000
1062.403	1414.000	2.806836	240.0000
1201.797	2254.000	4.428057	240.0000
1084.167	1166.000	2.209589	240.0000
1315.178	910.0000	1.654827	240.0000
1266.214	1343.000	2.286721	239.0000
1401.555	2529.000	4.211754	239.0000
1220.832	1437.000	2.431727	237.0000
1383.919	3482.000	5.730078	237.0000
2356.020	2176.000	4.509138	238.0000
2801.154	2979.000	7.887001	222.0000
-1905.414	4821.000	18.53685	221.0000
751.0277	4971.000	30.40650	221.0000
2477.374	5100.000	21.24015	208.0000
10064.38	3537.000	10.41447	222.0000

NAME	N	MEAN	ST. DEV	VARIANCE	MINIMUM	MAXIMUM
RESIM	36	171.94	52.597	2766.4	113.57	358.67
TDEFGDPD	36	6.1798	5.7491	33.052	1.6548	30.407
DFINDEF	36	8.8811	5.8975	34.781	-8.4300	28.060
RESIMDEF	36	1594.3	1710.4	0.29254E+07	-1905.4	10064.
FLB	36	32.800	36.798	1354.1	5.6380	147.28
BANKS	36	220.00	23.735	563.37	168.00	240.00
DV1	36	0.13889	0.35074	0.12302	0.00000	1.0000

CORRELATION MATRIX OF VARIABLES - 36 OBSERVATIONS

RESIM	1.0000						
TDEFGDPD	0.67796	1.0000					
DFINDEF	0.22291	-0.23405	1.0000				
RESIMDEF	0.57473	0.01069	0.88303	1.0000			
FLB	0.81004	0.89760	-0.22813	0.10435	1.0000		
BANKS	0.13646	-0.08424	-0.28414	-0.10904	0.13718	1.0000	
DV1	0.84641	0.81597	-0.03267	0.29611	0.91108	-0.0205	1.0000
	RESIM	TDEFGDPD	DFINDEF	RESIMDEF	FLB	BANKS	DV1

OLS LEXVALUE FLB BANKS RESIM TDEFGDPD DFINDEF RESIMDEF DV1 / RSTAT BEG=1
END=35 COEF=AGS1

REQUIRED MEMORY IS PAR= 21 CURRENT PAR= 500
OLS ESTIMATION
35 OBSERVATIONS DEPENDENT VARIABLE = LEXVALUE
...NOTE..SAMPLE RANGE SET TO: 1, 35

R-SQUARE = 0.9969 R-SQUARE ADJUSTED = 0.9961
VARIANCE OF THE ESTIMATE-SIGMA**2 = 0.93391E-03
STANDARD ERROR OF THE ESTIMATE-SIGMA = 0.30560E-01
SUM OF SQUARED ERRORS-SSE= 0.25215E-01
MEAN OF DEPENDENT VARIABLE = -7.8344
LOG OF THE LIKELIHOOD FUNCTION = 76.9609

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO	27 DF	P-VALUE	PARTIAL CORR.	STANDARDIZED COEFFICIENT	ELASTICITY AT MEANS
FLB	-0.12957E-01	0.6787E-03	-19.09		0.000	-0.965	-0.9452	0.0515
BANKS	-0.91186E-03	0.3203E-03	-2.847		0.008	-0.480	-0.0446	0.0256
RESIM	0.37585E-02	0.5149E-03	7.299		0.000	0.815	0.3235	-0.0799
TDEFGDPD	-0.12299E-01	0.2479E-02	-4.961		0.000	-0.691	-0.1446	0.0095
DFINDEF	0.37403E-01	0.7512E-02	4.979		0.000	0.692	0.3776	-0.0398
RESIMDEF	-0.27679E-03	0.4275E-04	-6.474		0.000	-0.780	-0.5159	0.0478
DV1	-0.21911	0.4638E-01	-4.724		0.000	-0.673	-0.1438	0.0032
CONSTANT	-7.6948	0.1118	-68.81		0.000	-0.997	0.0000	0.9822

DURBIN-WATSON = 2.1854 VON NEUMANN RATIO = 2.2496 RHO = -0.13943
RESIDUAL SUM = -0.79034E-14 RESIDUAL VARIANCE = 0.93391E-03
SUM OF ABSOLUTE ERRORS= 0.76166

R-SQUARE BETWEEN OBSERVED AND PREDICTED = 0.9969
RUNS TEST: 18 RUNS, 21 POS, 0 ZERO, 14 NEG NORMAL STATISTIC = 0.0716

Note:

EXVALUE : 1/ rupiah exchange rate against the US dollar
LEXVALUE : Log of the EXVALUE
RESIM : Ratio of Foreign reserves to import
DFINDEF : Domestic and foreign interest rate differentials, calculated
from the real domestic interest rates minus the US T-bill
interest rates.
RESIMDEF : Interaction variables (RESIM times DFINDEF)
FLB : Foreign liabilities of banks
GDPD : GDP in the US dollar
TRADEDEF : Trade deficit in the US dollar
TDEFGDPD : Ratio of trade deficit to GDP
DV : Dummy variable
BANKS : Number of banks