The Pre-crisis Exchange Rate Management and External Balance in Selected East Asian Countries

Hiroyuki TAGUCHI*

I. Introduction

Exchange rate management is one of the central issues of macroeconomic policies. Since the postwar period, there has been a long-term debate over the merits of fixed versus floating exchange rates. The debate, which is typically framed in terms of the trade-off between credibility and flexibility, has gone through several swings of the pendulum. Recently, the debate on exchange rate regimes has become focused on whether or not the intermediate regimes such as target zones, crawling and basket pegs are vanishing, in other words, whether or not exchange rate regimes are moving to a corner solution with the “hard peg” or the “free float”. So far, no clear consensus has been reached.

The 1997-98 Asian crises have refocused attention on exchange rate management of East Asian countries. Most views expressed criticize the pre-crisis US dollar-pegged-rate regime as one of the causes of the crisis. It is said that this regime induced short-term external over- borrowing and caused the appreciation of real exchange rates with the loss of competitiveness. The question also arises as to whether, after the crisis, the East Asian countries are simply returning to the pre-crisis US dollar standard, or whether they have learned a lesson from the crisis and are finding another path to follow.

This article focuses on the exchange rate management of the selected East Asian countries, evaluates the pre-crisis dollar peg system from the viewpoint of such external balances as capital flow and trade, and examines the

* Director, Ministry of Land, Infrastructure and Transport, Taguchi-h2k9@mlit.go.jp, T0A7G1U0@aol.com.

post-crisis exchange rate management. The rest of this article is organized as follows. Chapter II reviews the debates on exchange rate regimes in both long and recent terms, and clarifies this article's position in the recent debates. Chapter III assesses the pre-crisis dollar peg system by examine its negative effects on both capital inflow and trade balance. Chapter IV examines whether, after the crisis, the East Asian countries have changes their exchange rate management. Chapter V presents concluding remarks.

II. Debates on Exchange Rate Regimes and This Article's Position

This chapter reviews the debates on exchange rate regimes. We first summarize the long-term history of debates over the merits of fixed versus floating exchange rates since the postwar period. We then focus on recent debates over the exchange rate regimes: the corner solutions hypothesis, the "Fear of Floating" hypothesis, and the regional cooperation in exchange rate policies. Based on the reviews, we clarify this article position in the debates on exchange rate regimes.

2.1 Long-term Debates: Fixed versus Floating Exchange Rates

We first review the long-term history of debates over the merits of fixed versus floating exchange rates since the postwar period. Frankel (1999) summarizes the advantage of each exchange rate regime as follows: the two big advantages of a fixed exchange rate are (1) that it reduces transactions costs and exchange-rate risk which can discourage trade and investment, and (2) that it provides a credible nominal anchor for monetary policy; the big advantage of a floating exchange rate is that it enables a country to pursue an independent monetary policy. In short, the adoption of a fixed regime automatically acquires all the credibility accumulated by the issuer of the anchor

currency, while floating rates maximize the flexibility with which the authorities can use monetary policy for economic stabilization. Therefore, the history of debates can be framed in terms of the trade-off between credibility and flexibility.

The debates have gone through several swings of the pendulum, meeting the demands of the times. Frankel et al. (2000) reviews the postwar history of the debates as follows. At the time of Bretton Woods, the architects of the postwar system favored fixed exchange rates, attributing the economic instability of the interwar period, in part, to flexible rates. During the 1960s, a growing number of economists came to favor floating rates, responding to the widening US balance-of-payments disequilibrium that led to the breakdown of the Bretton Woods system. During the 1980s, the accumulating experience with high inflation in many parts of the world brought the pendulum back. Setting a target for the exchange rate came to be viewed as one way for central banks to realize monetary stabilization. New theories of rational expectation and dynamic consistency concluded that a commitment to such a nominal anchor, if credible, would even allow disinflation without the usual costs of lost output and employment. In the late 1990s we faced the second complete swing of the pendulum out and back, as conventional wisdom blamed exchange rate targets. The trend toward increased preference for greater exchange rate flexibility reflects many instances in which countries faced balance of payment difficulties for crises in Mexico (1994-95), East Asia (1997-98), Russia (1998), and Brazil (1999). The debates over the exchange rate regime still seem to continue.

2.2 Recent Debates (1): Corner Solutions Hypothesis

We then focus on recent debates over the exchange rate regimes. The hypothesis of the “Corner Solutions” is one of the new propositions. As the latest study, Fischer (2001) discusses this hypothesis. This hypothesis involves

opting either, on the one hand, for full flexibility, or, on the other, for rigid institutional commitments to fixed exchanges in the form of currency boards or full monetary union with the dollar or euro. It is said that the intermediate exchange rate regimes such as the target zones, crawling and basket pegs, are no longer feasible and are going to disappear.

This hypothesis has the following analytical backgrounds. First, the principle of the Impossible Trinity explains the hypothesis. This principle says that a country has to give up one of three goals: exchange rate stability, monetary independence, and financial market integration. It cannot have all three simultaneously. Summers (1999) suspect this means that as capital market integration increases, countries will be forced increasingly to more pure floating or more purely fixed regimes.[1] ADB (2001) explained, from the practical viewpoint, that large and liquid international capital markets make it more difficult for national authorities to support a shaky currency peg, since the resources of the markets far outstrip the reserves of even the best-armed central banks and governments. Effective defense of exchange rates requires raising interest rates and restricting domestic credit, something that will have significant costs especially in emerging market economies with their fragile financial and political systems.

Second, Frankel et al. (2000) offered a theoretical rationale for the corners hypothesis by introducing the notion of “Verifiability” and suggested that a simple peg or a simple float may be more verifiable by market participants than a more complicated intermediate regime. They also offered some empirical evidence that intermediate regimes do in fact inspire less credibility than institutional arrangements such as dollarization.

2.3 Recent Debates (2): “Fear of Floating” Hypothesis

There are some counter-arguments against the hypothesis of the “Corner

Solutions". One of them argues from empirical studies that many countries that are categorized as having floating currencies are, in effect, holding the intermediate exchange rate regimes.[2] Calvo and Reinhart (2000) insisted that a careful reading of the evidence on exchange rate policy presents a strikingly different picture; countries that say they allow their exchange rate to float mostly do not – there seems to be an epidemic case of the "fear of floating", particularly among emerging market economies. They presented an analytical model that suggests that, even in the best of times, when countries retain voluntary access to international capital markets, lack of credibility will lead to the "fear of floating". They also found, in their empirical analyses across 154 exchange rate arrangements, a low variability of exchange rates and a high volatility of central bank reserves that suggest significant central bank intervention. [3]

When it comes to the issue of credibility, Frankel et al. (2000) argued that, since the 1990s was a period during which high inflation was no longer such a big problem as previously in most places, the focus is now more on establishing in the financial markets credibility that the local currency will not lose value against the dollar, than on credibility in the labor and goods markets that the currency will not lose value in terms of wages and prices. To be specific, the lack of credibility originates from incomplete domestic financial markets, as the "original sin" hypothesis tells us. Eichengreen and Hausmann (1999) explained that the "Original sin" is a situation in which the domestic currency cannot be used to borrow abroad or to borrow long term even domestically, and that the problem is that a country whose external liabilities are necessarily denominated in foreign exchange is by definition unable to hedge.[4]

Williamson (2000) also questioned the efficacy of the two-corner solution by stating that the currency boards have already been subjected to substantial speculative pressure both in Argentina and in Hong Kong, and that a county with a freely floating rate may suffer from excess volatility of the exchange rate.

He argued that the behavior of most of the emerging market countries is motivated not by an irrational, short-run “fear of floating”, but by legitimate concerns that floating will generate long-run misalignments. Williamson then recommends the BBC rules (basket, band, crawl) for emerging market economies.

Kawai (2002), recognizing that the two-corner solution approach does not to be realistic in many emerging East Asian economies because of the “fear of floating”, stated that a reasonable exchange rate policy for the region would be to stabilize rates to a basket of currencies consisting of the US dollar, the yen and the euro, given emerging East Asia’s diversified trade and FDI relationships with the United States, Japan, and the European Union and given the continued high exchange-rate volatility among the tri-polar currencies. French and Japanese staff (2002) also argued that a possible solution for many emerging market economies could be a managed floating exchange rate regime whereby the currency moves within a given band with its center targeted to a basket of currencies including the dollar, the yen and the euro.

2.4 Recent Debates (3): Regional Cooperation

The recent debates over the exchange rate regimes are going a step further, arguing that there must be coordination in selecting an exchange rate regime among countries in the region with similar trading structures and with high intra-regional trading shares. Ogawa and Ito (2000) argued that an optimal exchange rate regime of country A (say, Thailand) depends on the exchange rate regime of country B (say, Malaysia), with which country A has a high proportion of trade. Kawai (2002) also insisted that for intra-regional exchange rate stability, greater coordination on the currency basket policy would be desirable, and this needs to be supported by regional surveillance and financing mechanisms.[5]

As for the possibility of an optimal currency area in East Asia, Bayoumi, Eichengreen, and Mauro (2000) made an empirical analysis by using a structural VAR model. This paper analyzed the extent to which ASEAN may be suitable for a regional monetary arrangement. On the economic front, it reviewed evidence on patterns of trade, economic shocks, the extent of factor mobility, and the monetary transmission mechanism, and found that ASEAN today is less suitable for a regional monetary arrangement than the euro area was before the Maastricht Treaty. On the political front, it analyzed the prerequisites for monetary integration in light of 50 years of European experience. It concluded that a firm political commitment would be the key to ensuring the form of a regional monetary arrangement.

2.5 This Article's Position in the Debates on Exchange Rate Regimes

Ito (2001) stated that the debate over what would be desirable exchange rate regimes for Asian countries seems likely to continue, although the selection of an exchange rate regime will be crucial for Asian countries' further recovery and beyond. For the empirical analysis in the following Chapter, we here need to clarify this article position in the fore-mentioned debates on exchange rate regimes. First, among the recent debates of Section 2.2 to 2.4, we follow the "Fear of Floating" hypothesis, considering that the two-corner solution approach does not seem to be realistic in many emerging East Asian economies; we presume that emerging East Asian economies have adopted managed exchange rate policies, intermediate regime placed between free floating and such a rigid fixed system as currency board. This point will be examined in Section 4.2.2 of Chapter IV too. Second, we then concentrate on where is the benchmark, the choice of an appropriate reference rate, in the managed exchange rate; we will specifically assess the pre-crisis dollar peg regime, and examine alternative managements such as basket pegging and inflation sliding.

Third, we will not step further into the issue of regional coordination in exchange rate regime. We follow Bayoumi, Eichengreen, and Mauro (2000), and recognize that it is premature for emerging East Asian economies to form the optimum currency area.

Notes:

1. Frankel et al. (2000) makes a negative comment on the explanation by the principle of the Impossible Trinity such as Summers (1999), by stating that economists tend to believe in interior solutions for most problem, and that there is nothing that prevents the government from pursuing a managed float in which half of every fluctuation in demand for its currency is accommodated by intervention and half is allowed to be reflected in the exchange rate.
2. See Notes 4 in Chapter IV for the reason why we need empirical studies rather than rely simply on the IMF classification when examining the exchange rate regimes.
3. Masson (2000) also made a careful statistical examination of the way in which countries have changed their exchange rate regime over the years. He found that, although there has been some tendency for countries to polarize toward the extremes, it is far weaker than one would infer from the sort of summary of Latin American experience.
4. McKinnon (2001) also describes the emerging-market debtor economy with original sin in such a way that: the term structure of finance is short, and there is no history of central bank independence. Correspondingly, there is a potential lack of confidence in the long-term exchange rate unless the government can effectively restrain itself.
5. As a typical example of regional surveillance and financing mechanisms, the ASEAN+3 countries agreed to the Chiang Mai Initiative (CMI) of currency swaps and Surveillance at the Asian Development Bank meeting in Thailand in May 2000. However, the World Bank (2003) stated that it is too early to tell whether the CMI should be seen as a first step to establishing a collective system of common currency pegs, or as a mechanism

for multilateral support to countries experiencing financial difficulties.

References:

ADB (Asian Development Bank). 2001. Asia's Globalization Challenge. *Asian Development Outlook 2001*. 161-201. Manila.

Bayoumi, T., B. Eichengreen, and P. Mauro. 2000. "On regional monetary arrangements for ASEAN," *CEPR Discussion Paper*, No.2411.

Calvo, Guillermo A., and Carmen M. Reinhart. 2000. "Fear of Floating." *NBER Working Paper* No. 7993. Cambridge, Massachusetts: National Bureau of Economic Research.

Eichengreen, Barry, and Ricardo Hausmann. 1999. "Exchange Rates and Financial Fragility." *NBER Working Paper* No. 7418. Cambridge, Massachusetts: National Bureau of Economic Research.

Fischer, Stanley. 2001. Exchange Rate Regimes: "Is the Bipolar View Correct?" This paper was prepared for the 2001 American Economic Association meetings, Washington, D.C: International Monetary Fund.

Frankel, Jeffrey A. 1999. *No Single Currency Regime Is Right for All Countries or at All Times*, Princeton Essays in International Finance 215. Princeton, NJ: Princeton University Press.

Frankel, Jeffrey A., Sergio Schmukler, and Luis Serven. 2000. "Verifiability and the Vanishing Exchange Rate Regime." This paper was prepared for the Brookings Trade Forum 2000: Policy Challenges in the Next Millenium, April 27-28, 2000, Washington, D.C.

French and Japanese Staff. 2002. "Exchange Rate Regimes for Emerging Market Economies." *Discussion Paper prepared for ASEM meeting May 2002*.

Ito, Takatoshi. 2001. "Growth, Crisis, and the Future of Economic Recovery in East Asia," In Joseph E. Stiglitz and Shahid Yusuf, eds., *Rethinking the East Asian Miracle*, World Bank, pp. 55-94.

Kawai, Masahiro. 2002. "Exchange Rate Arrangements in East Asia: Lessons from the

1997-98 Currency Crisis," *IMES Discussion Paper Series* 2002-E-17, Institute for Monetary and Economic Studies, Bank of Japan, September.

Masson, Paul. 2000. *Exchange Rate Regime Transitions.* Washington: Brookings Institution.

Mckinnon, Ronald. 2001. "After the Crisis, the East Asian Dollar Standard Resurrected: an Interpretation of High-frequency Exchange Rate Pegging." In Joseph E. Stiglitz and Shahid Yusuf, eds., *Rethinking the East Asian Miracle (Chapter 5).* Washington, D.C: World Bank.

Ogawa, Eiji, and Takatoshi Ito. 2000. "On the Desirability of a Regional Basket Currency Arrangement." *NBER Working Paper* No. 8002. Cambridge, Massachusetts: National Bureau of Economic Research.

Summers, Lawrence. 1999. "Building an International Financial Architecture for the Twenty-First Century," *Cato Journal* 18 (Winter).

Williamson, John. 2000. *Exchange Rate Regimes for Emerging Markets: Reviving the Intermediate Option*. Washington, D.C.: Institute for International Economics.

World Bank. 2003. *Innovative East Asia: the Future of Growth.* Washington D.C: pp. 104-104.

III. Assessment of the East Asian Pre-crisis Dollar Peg System

The 1997-98 Asian crisis has refocused attention on exchange rate management of East Asian countries. Most views expressed are critical of the pre-crisis US dollar-pegged-rate regime, citing it as one cause of the crisis. It is said that this regime induced short-term external over-borrowing and caused the appreciation of real exchange rates and the subsequent loss of competitiveness.

This chapter focuses on the assessments of the pre-crisis exchange rate management in East Asian countries. The rest of the paper is organized as

follows. Section 3.1 reviews the analyses of the pre-crisis de facto exchange rate regime – the dollar peg system. Section 3.2 reviews the assessment of the pre-crisis dollar peg system in the context of the Asian crisis. Section 3.3 examines the dollar peg system in the selected East Asian countries from the viewpoint of capital inflows. Section 3.4 also examines it from the viewpoint of trade balance. Section 3.5 presents some concluding remarks.

3.1 Pre-crisis de facto Regime: the Dollar Peg System

We first review the analyses of the pre-crisis de facto exchange rate regime – the dollar peg system.

The IMF classification of exchange rate arrangements did not necessarily reflect actual exchange rate management, since it was based on member countries' formally announced regimes. For example, the pre-crisis exchange rate arrangements of Indonesia, Korea, and Malaysia were classified as "Managed Float," for the Philippines it was "Independent Float," and for Thailand the classification was "Pegged to Currency Composite," although all of them appeared to have adopted dollar peg regimes .

Frankel and Wei (1994) and Kawai (1997) presented their own analysis of the de facto exchange rate regimes. Frankel and Wei (1994) estimated the weights placed on major foreign currencies in their exchange rate policy during the period between 1979 and 1992, while Kawai (1997) estimated them during the period between 1990 and 1996, using the same method as Frankel and Wei. According to their estimations, for example, the weight on the US dollar is 0.91 (Frankel and Wei (1994)) and 0.789 (Kawai (1997)) for Thailand. The weight on the US dollar is nearly equal to one for Indonesia, Korea, and Philippines (Table 3.1). Thus, the estimation indicates that these countries have adopted the de facto dollar peg system. Researchers and policymakers seem to be in agreement over this analysis.

3.2 Criticism towards the Dollar Peg System

We next review the assessments of the pre-crisis dollar peg system in the context of the Asian crisis. We first summarize the comments of international organizations on the dollar peg regime, most of which blame the regime as one cause of the crisis.

The World Bank (1998) stated that in most of the ASEAN countries, informal pegs to the U.S. dollar—which make nominal rates predicable—encouraged unhedged short-term external borrowing due to large interest rate differentials. To further complicate matters, they also added that because the yen depreciated against the U.S. dollar throughout much of 1996, the pegged currencies lost competitiveness against the important yen market. Along these lines, the World Bank (2000) suggested that a flexible exchange rate absorbs shocks from capital inflows and outflows.

The IMF (1998) identified the excessively long maintenance of pegged exchange rate regimes as a factor in the Asian crisis. The pegged regimes complicated the response of monetary policy to overheating pressures, and came to be viewed as implicit guarantees of exchange value, encouraging short-term external borrowing and leading to excessive exposure to foreign exchange risk. The IMF (1998) also suggested that adjustable pegs have become increasingly difficult to maintain in the face of large-scale financial flows, and that for some economies the balance of costs and benefits may be shifting in favor of greater exchange rate flexibility, partly because of the advantages of avoiding the risk that a fixed rate may encourage excessive foreign currency exposure.

The ADB (1998) explained that the pegged exchange rate contributed to the current account deficits and rising real exchange rates, the combination of which provided a vital ingredient for the financial crisis. They attributed the

rising real rate to a combination of factors that included higher domestic inflation in relation to the world average; appreciation of the U.S. dollar, to which these currencies were pegged; depreciation of the Japanese yen; and devaluation of the PRC currency in 1994. They also pointed out that the high interest rates of the affected countries, along with pegged exchange rates, created a false sense of security among many investors that they could earn relatively high rates of return without any exchange rate risk.

Some academic articles also comment on the dollar peg regime as follows. Kawai (2002) puts forward as one of the problems of US dollar-based stabilization, that using the US dollar as the sole anchor is problematic given that the emerging East Asian economies have diverse economic relationships with the United States, Japan, and the European Union through trade, FDI inflows, and other forms of capital flows.

Ito (2001) picks up three types of problems which the de facto dollar peg gives rise to. First, when inflation at home is higher than in the United States, export sectors lose competitiveness in the long run. Where productivity growth compensates for the inflation differential, the real appreciation of the exchange rate can be absorbed. But, unfortunately, this was not the case for most Asian countries. Second, Asian countries have extensive trade relationships with Japan. For many Asian countries, one-quarter to one-third of their exports and imports are to and from Japan. Even though the exchange rate was fixed to the US dollar, the exchange rate relative to the yen fluctuated greatly. Therefore, the fixed exchange rate relative to the US dollar led to instability of the real, effective exchange rate – the trade-weighted, inflation-adjusted exchange rate. Third, a stable exchange rate diminished the perception of exchange rate risk in borrowing and lending short-term capital. Because of the credit risk premium and the inflation risk premium (plus possibly political risk premium and devaluation risk), the domestic interest rate in the local currency tended to be

higher than the world interest rate, namely the dollar interest rate. Under the apparent absence of exchange rate risk, it was regarded as a free lunch to borrow in the dollar and invest in the local currency. Thus, the de facto exchange rate regime led to a buildup of short-term external liabilities.

After all, most of the views criticize the pre-crisis dollar peg regime because of its moral hazard in inducing short-term external borrowing and its tendency to cause the appreciation of real exchange rates that deteriorate trade balance with the loss of competitiveness.

3.3 The Dollar Peg System and Capital Inflow[1]

This section examines the pre-crisis US dollar peg regime in the selected East Asian countries from the viewpoint of stability of capital flows. Specifically, the two main questions are these: whether the dollar peg system did in fact induce the external over-borrowings in the pre-crisis Asian countries, and if so what alternative exchange rate managements would have been preferable in stabilizing capital flows. The strategic implication of our findings is that the inflation slide, rather than the basket pegging, would have been more preferable than the simple dollar pegging in exchange rate management from the viewpoint of stabilizing capital flows.

The rest of this section is organized as follows. First, we review the recent studies that describe the relationship between exchange rate regime and capital inflows. Second, we show a theoretical framework on the relationship between exchange rate regime and short-term capital inflows. Third, following the theoretical framework, we conduct empirical analyses on the selected East Asian countries. Fourth, we compare the result of our empirical studies with that of the other recent study of Ogawa and Sun (2001). Finally, we summarize this section.

3.3.1 Previous Studies

We first review the recent studies that describe the relationship between exchange rate regime and capital inflows. We are specifically interested in whether the dollar peg regime had induced the external over-borrowings before the crisis.

Ogawa and Sun (2001) analyzed how the de facto dollar peg system influenced capital inflows in the Asian countries, in particular Thailand, Korea, and Indonesia, which faced severe crises in 1997. They first regressed capital inflows by explaining variables such as interest rates, foreign exchange risks, export growth rate, and rate of change in stock prices, then used an instrumental variable method to take into account how instrumental variables such as domestic interest rates, export growth rates, and rate of change in stock prices are influenced by other variables. From the regression analysis, they found that responsiveness of capital inflows to the foreign exchange risk against the US dollar is much larger than responsiveness of capital inflows to the foreign exchange risk against the yen in the case of Thailand and Korea.

They next conducted a simulation analysis of the capital inflows with the assumption that the monetary authorities of the sample countries had adopted a currency basket peg system instead of the de facto dollar peg system. They concluded that a currency basket peg system would have had a depressing effect on capital inflows to Thailand and Korea during the analyzed period (from 1985 to 1996), and that it would also have had a slightly depressing effect on capital inflows to Indonesia. They interpreted the result in such a way that the currency basket peg system would have increased foreign exchange risk against the US dollar, whereas it would have decreased foreign exchange risk against the yen, and that the asymmetry in the responsiveness between foreign exchange risks against the US dollar and the yen would have decreased capital inflows under the currency basket peg system. They then concluded that capital

inflows would have been more stable under the currency basket peg system.

McKinnon (2000 and 2001) showed an analytical framework that the super risk premium, which is composed of the currency risk premium and the probability of an exchange rate regime change, represents the margin of temptation for banks to over-borrow in foreign exchange beyond what they might do if forced to hedge. McKinnon (2001) found that in the pre-crisis period, the super risk premiums of the Asian crisis countries were large enough to contribute to the unhedged over-borrowing. The theoretical framework above, including the comment on the relationship between the super risk premium and the exchange rate regime will be described in detail in the following section.

3.3.2 Theoretical Framework for Empirical Studies

In this section we show a theoretical framework on the relationship between exchange rate regime and short-term capital inflows for the empirical studies in the following section. Our major concern is in what way the dollar peg regime had induced the external over-borrowings before the crisis. First, we simply summarize the framework presented by McKinnon (2000 and 2001), the one of the super risk premium representing the margin of temptation of the external over-borrowings. Then, we examine the relationship between exchange rate regime and the super risk premium.

3.3.2.a Super Risk Premium Presented by McKinnon

We here summarize the framework of the super risk premium presented by McKinnon (2000 and 2001). He defines the super risk premium, ρ_{super}, representing the margin of temptation for banks to over-borrow in foreign exchange in the following way.

$$\rho_{super} = \rho_{currency} + E\hat{e}_{regime\ change} = i - i^* - E\hat{e}_{predictable}$$

The super risk premium, $\rho_{super,}$ has two components: the currency risk premium, $\rho_{currency}$, as ordinarily defined, representing the extra return that investors require to hold domestic rather than foreign currency assets, and the possibility that the regime could change through a discrete devaluation, $E\hat{e}_{regime\ change}$. It can be rewritten into the interest rate differential (the domestic rate *i* minus the international rate *i**) minus the predictable depreciation of the domestic currency, $E\hat{e}_{predictable}$. This equation comes from the following equations for ordinary interest rate parity and decomposition of Eê, the expected depreciation of the domestic currency:

$$i = i^* + E\hat{e} + \rho_{currency},$$

$$E\hat{e} = E\hat{e}_{predictable} + E\hat{e}_{regime\ change}$$

McKinnon (2000 and 2001) explains the super risk premium defined above as follows: in the premature monetary markets in the emerging economies, the decision-making horizon of the bank with moral hazard is sufficiently short that it ignores unpredictable changes in the exchange rate. When borrowing unhedged in foreign currency, the domestic banks with deposit insurance and other government guarantees tend to ignore the risks of large devaluations whose timing is uncertain. They also ignore ongoing volatility in the exchange rate as measured by $\rho_{currency}$. They will only cover the predictable component of the expected depreciation within the existing currency regime. Therefore, the super risk premium, the interest rate differential discounted only by the predictable depreciation, represents the margin of temptation for banks to over-borrow in foreign exchange.

3.3.2.b Exchange Rate Regime and Super Risk Premium

Following the above framework, we then examine the relationship

between exchange rate regime and super risk premium. Our major concerns are whether the pre-crisis dollar peg regime in the Asian crisis countries had caused the larger super risk premium, the greater margin of temptation to over-borrow and, if so, which alternative regimes would have minimized the super risk premium.

The $\hat{Ee}_{\text{regime change}}$ component of the super risk premium would seem to be higher under a dollar peg regime than under other regimes with greater flexibility. The dollar pegging creates the pressure to probably cause a large discrete devaluation, by overvaluing the local exchange rates in real terms through misalignments from both basket peg rates and purchasing power parity rates. While the large $\hat{Ee}_{\text{regime change}}$ gives the upward pressure on the interest rate on assets denominated in the domestic currency, it does not lead to any changes in the $\hat{Ee}_{\text{predictable}}$ because the domestic banks with moral hazard ignore the risks of discrete devaluation and cover only the predictable change within the existing dollar peg regime. The dollar peg regime would, therefore, seem to enlarge super risk premium.

What kinds of the alternative regimes would have minimized the super risk premium? McKinnon (2001) argues that moving from a “good fix” to a floating exchange rate need not reduce the super risk premium and the margin of temptation for international over-borrowing because, under greater but uncertain exchange rate flexibility, ρ_{currency} will increase even if $\hat{Ee}_{\text{regime change}}$ declines. As for the “good fix,” McKinnon (2001) also posits that it will be rewarded with a lower ρ_{currency}, and a low $\hat{Ee}_{\text{regime change}}$, and that a more flexible but controlled exchange rate—perhaps a downward crawl—seems more likely to be the best way of coping with an unfortunate situation.[2] To be specific, the key for minimizing the super risk premium is to pursue the better exchange rate targeting, as opposed to simple dollar pegging. This paper discusses two kinds of the targeting—the basket pegging and the inflation slide—as candidates of

the better exchange rate targeting, and puts them into the simulation tests in the following section.

3.3.3 Empirical Studies on Selected East Asian Countries

We next turn to empirical analyses on the selected East Asian countries. Here we focus, as sample countries, on the hardest-hit crisis countries among the East Asian countries: Indonesia, Korea, the Philippines, Malaysia, and Thailand. We also select the United States and Japan as foreign influences for the sample countries because all of the countries mentioned above trade heavily with the United States and Japan.

We here take three steps in our analyses, following the theoretical framework in the previous section. First, we examine the trends of the super risk premium of the sample countries during the pre-crisis period, considering their relations with exchange rate regimes. Second, we conduct a regression analysis to verify the relationship between the super risk premium and capital inflows during the pre-crisis period. Third, we conduct a simulation analysis of capital inflows with the assumption that the sample countries had adopted the basket pegging and the inflation slide as exchange rate targeting instead of the de facto U.S. dollar peg system during the pre-crisis period.

All data used through the empirical studies come from the IFS and DTSY of IMF (IMF, 2000 and 2001). We use quarterly data in all of the analyses due to a constraint on data, the sample period of which is from the first quarter of 1987 to the first quarter of 2001.

3.3.3.a Trends of Super Risk Premium

We start by examining the trends of the super risk premiums in sample countries and determining whether the pre-crisis dollar peg system had enlarged the super risk premium, the margin of temptation to over-borrow. We

calculate two kinds of super risk premiums—those against the United States and Japan—in the following way (taking Indonesia as an example).

SPUI = ITI – ITU – RPU,

SPJI = ITI – ITJ – RPY

where SPUI and SPJI are the super risk premiums of Indonesia against the United States and Japan respectively, ITI, ITU and ITJ are short-term interest rates of Indonesia, the United States and Japan respectively, RPU and RPY are the predictable changes of Indonesian currency (rupiah) per U.S. dollar and Japanese yen. As for data on interest rates, we use money market rate in Indonesia, Korea, Malaysia, Thailand, and Japan, and the Treasury Bill rate in the Philippines and the United States. Because data on the predictable exchange rate change is unavailable, we use, as a proxy variable, the actual change from the previous quarter to the current quarter, keeping in mind that the banks with moral hazard only cover the short-term horizon within the existing currency regime.

Figures 3.3.3.a-i, ii and Table 3.3.3.a-i, ii indicate the pre-crisis trends against the United States and Japan respectively. We observed the following. During the pre-crisis period from 1990 to 1996, the super risk premiums against the United States almost keep positive positions, sometimes around 10 or 20 percent in all of the sample countries. The super risk premiums against Japan, on the other hand, do not show clear positions, except that they amount to clearly positive positions after the middle of 1995. We interpret the observations above in the following way. The pre-crisis positive positions of the super risk premium against the U.S. would be explained in such a way that the interest rate differentials could not be offset by the expected depreciation of local currencies because the banks only predict the rate on the short-term horizon

under the de facto dollar peg system. The positive positions of the super risk premium against Japan after the middle of 1995 could mainly be explained by the sharp depreciation of the yen (appreciation of local currencies) in that period.

Appendix 3.3.3.a Super Risk Premiums After the Asian Crisis

The super risk premiums changed their trends after the Asian crisis as shown in Figures 3.3.3.a-iii, iv and Table 3.3.3.a-iii, iv. During the post-crisis period from 1999 to 2001, the super risk premiums of sample countries do not indicate clear trends, but tend to be negative in those against the United States. There seem to be two reasons why the super risk premiums against the U.S. tend to be negative.

The first reason is that, unlike those in the pre-crisis period, the interest rate differentials are narrow and even negative because the post-crisis interest rates of the Asian countries are much lower than those of pre-crisis period. McKinnon (2001) called these dramatic falls in the short-term interest rates the “honeymoon” effect. He states that the proximate cause of these remarkable falls in short-term interest rates was the changes in the $E\hat{e}_{\text{regime change}}$ component of the interest differentials. The $E\hat{e}_{\text{regime change}}$ was repressed as confidence returned and the fear of another speculative attack became much more remote after the dramatic overshooting of the exchange rates of the devaluing countries. He finally commented, however, that the “honeymoon” will end like most honeymoons, by stating that *long-term* expectations of future devaluations and other risks did not change all that much.

The second reason is that the predictable currency depreciations in the Asian countries except Malaysia—which has adopted the U.S. dollar peg system since 1998—seem to become larger especially after 2000. This tendency has to be carefully examined by another detailed analyses because it

may accompany the consideration of the post-crisis exchange rate management of the Asian countries. This point will be mentioned in Chapter IV.

3.3.3.b Regression Analysis of Capital Inflows

The second step of our empirical studies is to conduct a regression analysis to prove that the large super risk premium, the margin of temptation to over-borrow, significantly accelerated short-term capital inflow to the Asian countries during the pre-crisis period. Malaysia, which has no quarterly data on capital flows, is excluded in this regression analysis. We specify the simple regression model in the following way (taking Indonesia as an example).

$$SCFI / GDPI = \alpha_1 SPUI + \alpha_2 SPJI$$

where SCFI is short-term capital inflow of Indonesia, GDPI is gross domestic products of Indonesia, SPUI and SPJI are the super risk premiums of Indonesia against the United States and Japan respectively. We use a ratio of short-term capital inflow in terms of GDP to eliminate an increasing trend in capital inflow. The regression model is multivariate ordinary least squares for each country. Regressions are estimated by correcting for first order serially correlated errors when necessary. We add any dummy variables that show a representative deregulation of international capital transactions that are statistically significant to explaining variables. As for data on short-term capital inflow, we use “Other investments” in the financial account of the balance of payments, because international bank loans prevail in capital inflows to the sample countries. We also use “Portfolio and other investments” in Korea, the Philippines and Thailand. Data on “Portfolio investments” for Indonesia is not available due to missing values in the data. When conducting regression analysis, seasonal adjustments are made for the data that requires it.

We first test the stationarity of all the data series for the regression by using the unit root tests of Augmented Dickey-Fuller (ADF) test and the Philips-Perron (PP) test (for the test methodology, see Matsuura and McKenzie 2001). Table 3.3.3.b-i reports that at the 5 percent significance level, all the data series are confirmed as stationary in either test, thereby suggesting that a regression analysis using all the data series is valid.

Table 3.3.3.b-ii reports the results of the regressions. We observed as follows: The coefficients of the super risk premiums against the U.S. are significantly positive in all the capital inflow functions (of both “Other investments” and “Portfolio and other investments”). The coefficients of the super risk premiums against Japan are significantly positive in the capital inflow functions of Korea and Thailand. The coefficients of the super risk premiums against the U.S. are larger than those against Japan in all the functions. From these observations, we could verify the correlation between the super risk premiums against the U.S. and short-term capital inflows in all the sample countries, and the correlation between the super risk premium against Japan and short-term capital inflows in Korea and Thailand. We could also see the dominant effects of the super risk premiums against the U.S. on the short-term capital inflows.

3.3.3.c Simulation Analysis of Capital Inflows

We finally turn to a simulation analysis to examine how such alternative exchange rate management tools as basket pegging and inflation slide would have affected the short-term capital inflows to the sample countries during the pre-crisis period. We then compare the capital inflows under the actual de facto dollar peg system with the results of the simulation. Here we set up two kinds of the simulation cases in the exchange rate management: case (1) of adopting the basket peg system, and case (2) of adopting the inflation slide.

As for case (1), we materialize the basket-pegged exchange rate as follows (taking the Indonesian rupiah as an example). We assume that a currency basket consists of only the U.S. dollar and the yen. We first calculate the basket-pegged rate on the Swiss franc (SWF) base.[3]

ES_{BP} (Rupiah/SWF) = ω × E (U.S. dollar/SWF) + (1- ω) × E (Yen/SWF)

where ES_{BP} is the percentage change of basket-pegged rate for simulation, E is the percentage change of actual exchange rate, and ω is the weight on the U.S. dollar in a currency basket, which is calculated as a share of Indonesia's trade with the U.S. relative to Indonesia's trade with the U.S. and Japan. We then converted the basket-pegged rate into those on the U.S. dollar base and the yen base as follows.

ES_{BP} (Rupiah/U.S. dollar) = ES_{BP} (Rupiah/SWF) + E (SWF/U.S. dollar)

ES_{BP}(Rupiah/Yen) = ES_{BP}(Rupiah/SWF) + E(SWF/Yen)

As for case (2), we describe the inflation-slid exchange rate as follows (again taking the rupiah as an example). We here assume that the monetary authorities care for only the differential of inflation rates between the U.S. and domestic currency. We first calculate the inflation-slid rate on the U.S. dollar base.

ES_{IF} (Rupiah/U.S. dollar) = $CPI_{Indonesia} - CPI_{U.S.}$

where ES_{IF} is the percentage change of inflation-slid rate for simulation, CPI is

the percentage change of consumer price index. We then calculate the inflation-slid rate on the yen base.

ES_{IF} (Rupiah/Yen) = ES_{IF} (Rupiah/U.S. dollar) + E (U.S. dollar/Yen)

The next step is to calculate the alternative super risk premiums against the U.S. and Japan, for example, by replacing RPU (in Section 3.3.3.a) with ES_{BP} (Rupiah/U.S. dollar) or ES_{IF} (Rupiah/U.S. dollar), and replacing RPY with ES_{BP} (Rupiah/Yen) or ES_{IF}(Rupiah/Yen). We then simulate short-term capital inflows by replacing SPUI and SPJI (in Section 3.3.3.b) with the alternative super risk premiums calculated above. In this simulation, we use the regression equation estimated in Section 3.3.3.b (Table 3.3.3.b-ii), because we assume that coefficients on the explaining variable in the regression equation are unchanged even if the monetary authorities change their exchange rate management.

Figure 3.3.3.c-i, ii and Table 3.3.3.c-i, ii reports the alternative super risk premiums against the U.S. and Japan, and Table 3.3.3.c-iiI reports the results of the simulation on short-term capital inflows under the alternative super risk premiums. The main observations are as follows. First, in the case (1) of adopting the basket peg system, the alternative super risk premiums against both the U.S. and Japan are larger than their actual trends on the average in all the sample countries. In accordance with these larger alternative super risk premiums, the simulated capital inflows (of both “Other investments” and “Portfolio and other investments”) are clearly larger than the estimated capital inflows under the dollar peg system. Second, in the case (2) of adopting the inflation slide, the alternative super risk premiums against both the U.S. and Japan are smaller than their actual trends on the average except for Korea. Accordingly, the simulated capital inflows are clearly smaller than the estimated

capital inflows under the dollar peg system except for Korea (1990Q1-96Q4).

We interpret the observation above in the following way. In the case (1) of adopting a currency basket, the local currencies would have been influenced by the yen appreciation toward 1995, which would have made the super risk premiums larger and induced more capital inflows than those of the dollar peg system. Therefore, the adoption of the basket peg system does not seem to contribute to the stabilization of capital flows. In the case (2) of adopting the inflation slide, the local currencies would have depreciated more during all the pre-crisis analytical period, which would have moderated the super risk premiums and have had a depressing effect on capital inflows. In this sense, the inflation slide in exchange rate management appears to have a stabilizing effect on capital flows compared with the dollar peg management. [4]

3.3.3.d Comparison with Ogawa and Sun (2001)

The above simulation concludes that the adoption of a currency basket would have induced more capital inflows than those of a dollar peg, which appears to be inconsistent with the outcomes of the simulation analysis by Ogawa and Sun (2001). Ogawa and Sun (2001) concluded that a currency basket peg system would have had a depressing effect on capital inflows, as was outlined in Section 3.3.1. The simulation results reported here seem to be more reliable than those of Ogawa and Sun (2001) for the following reasons.

The first reason is about the relevancy of the structure of the equations used for the simulations. Ogawa and Sun (2001) regressed capital inflows on explaining variables such as domestic interest rates, exchange rate adjusted foreign interest rates, foreign exchange risks, and so on. On the contrary, the estimated equations in this paper are specified in such a way that capital inflows are regressed by the super risk premiums, based on the theoretical framework of McKinnon (2000 and 2001). According to McKinnon (2000 and

2001), short-term capital inflows are induced not by individual factors as interest rates and foreign exchange risks, but by super risk premiums. The case is typically seen on those occasions when an increase in the domestic interest rate could simply be due to a rise in risk premium, which would not cause capital inflow (Lui 2001).

The second reason seems to be related to the validity of the equations for the simulations. The estimated equations in Ogawa and Sun (2001) have most of the coefficients on interest variables as not significant in view of the low t-values. It is questionable, therefore, whether we should proceed to discuss the simulation results that are based on these estimated coefficients (Lui 2001 and Tinakorn 2001). On the other hand, all the estimated equations in this paper have robust coefficients on the super risk premiums against the U.S., after all the data series for the regressions are proven to be stationary. That is why our simulation results deserve consideration.

3.3.4 Summary

In this Section 3.3, we set out to examine, using empirical studies, the pre-crisis US dollar peg system in selected East Asian countries from the viewpoint of stability of capital flows.

First, we found the significantly large super risk premiums against the U.S. in the pre-crisis Asian sample countries with de facto dollar peg regimes. Second, we verified the correlation between the super risk premium and short-term capital inflows in the regression analysis. Third, the simulation results indicate that as an alternative exchange rate management, the inflation-slid management would have had a depressing effect on capital inflows while the basket peg system would not have. Therefore, our studies in this section imply that the inflation slide, rather than the basket pegging, would have been more preferable than the simple dollar pegging in exchange rate

management from the viewpoint of stabilizing capital flows.

Other analytical issues remain. First, we may improve the simulation method by considering the “general impact” of the changes of exchange rate policies on macroeconomic variables. This paper considers only the “partial impact” on capital inflows. The change of exchange rate management, however, may simultaneously influence domestic interest rates and the coefficients on the super risk premium. Second, the post-crisis trends of the super risk premiums and short-tem capital inflows are an important frontier to be studied. The post-crisis period is, up to now, a little too short to acquire sufficient data for sophisticated analyses. We will, therefore, need to keep track of upcoming trends in the relevant economic indices and policies.

3.4 The Dollar Peg System and Trade balance

This section evaluates the pre-crisis US dollar peg regime in the selected East Asian countries by examining its effect on trade balance. Specifically, the two main questions are these: whether the dollar peg system did in fact cause appreciation of REER, thereby deteriorating trade balance in the pre-crisis Asian countries, and, if it did, what alternative exchange rate managements would have been preferable in keeping trade balance. The strategic implication of our findings is that the inflation slide, rather than the basket pegging, would have been more preferable than the simple dollar pegging in exchange rate management from the viewpoint of stabilizing REER and trade balance.

In the following section, we first review previous studies of the pre-crisis trend of the REER and of the relationship between the REER and trade balance. We second describe empirical studies, including regression and simulation analyses, carried out to clarify the relationships among the US dollar peg regimes, REER and trade balance. We then summarize this section.

3.4.1 Previous Studies

We first review recent studies of the pre-crisis trend of the REER and of the relationship between the REER and trade balance. In looking at the REER trend, several studies have examined the validity of the purchasing power parity (PPP) hypothesis, which is equivalent to the constancy of the REER. [5] Hataiseree (1995), through co-integration analysis, provided *no* evidence in support of a long-run equilibrium relationship between bilateral nominal exchange rates for the Thai baht and the currencies of Thailand's major trading partners, thereby rejecting PPP. This implied that considerable care should be taken in assessing the long-run implications for the real exchange rate. Khoon and Mithani (2000) presented an empirical test of PPP applied to the Malaysian ringgit for the pre-crisis period. It detected that real exchange rate follows a random walk, contrary to the expectations of PPP equilibrium.

Looking at the relationship between the REER and trade balance, the movement of REER, in general, has played a central role in empirical work on trade, where volumes of exports and imports are usually related to changes in REER and to changes in real activity, either at home (for imports) or abroad (for exports). Such equations have proven to be highly successful empirically, and they have consistently been used in policy work and in macroeconomic models.[6] Among these studies, we focus on the ones examining the direct relationship between the REER and the balance of trade. Although previous studies have attempted to address this important issue, no clear consequences have emerged from the empirical work regarding the effect of exchange rates on the trade balances. While providing a comprehensive summary of previous studies, Baharumshah (2001), in the most recent study of this issue, attempted to identify the major economic factors that influence the bilateral trade balances

of Malaysia and Thailand with the US and Japan. He indicated the existence of a stable long-running relationship between trade balance and three macro variables: exchange rate, domestic income and foreign income. His findings showed that the real effective exchange rate is an important variable in the trade balance equation and that devaluation improves the trade balances of both economies in the long-run. The model in Rose and Yellen (1989), and Krugman and Baldwin (1987) was applied to the analysis of the trade balances, and will be described in detail in the following section.

All though there has been plenty of literature on the issue of the REER and its connection with trade as shown above, there seem to be few studies which deal directly with the REER appreciation under the pre-crisis dollar peg system, and its negative impact on trade balance. This article will address this specific issue by applying the analytical framework of trade balance presented by Baharumshah (2001) to our simulation analysis.

3.4.2 Empirical Studies on Selected East Asian Countries

In this section, we conduct empirical analyses on the selected East Asian countries. Here we focus, as sample countries, on the hardest-hit countries among the East Asian countries: Indonesia, Korea, the Philippines, Malaysia, and Thailand.

We here take four steps in our analyses. First, we examine the trend of real effective exchange rates (REER) for the sample countries during the pre-crisis period, considering its relation with the US dollar peg regime. Second, we conduct a regression analysis to verify the relationship between REER and trade balance during the pre-crisis period. Third, we conduct a simulation analysis of trade balances with the assumption that the sample countries had adopted a policy to stabilize REER instead of the de facto US dollar peg system during the pre-crisis period. We can then examine the negative effect of REER

appreciation on trade balances. Fourth, we examine which kinds of exchange rate management, the basket pegging or the inflation slide, would significantly have contributed to stabilizing REER.

All data used throughout the empirical studies come from the IFS of the IMF (IMF 2002). We use IFS annual data for the regression and simulation analyses considering data availability, the sample period for which is from 1960 to 1996 (For Indonesia, the sample period is from 1971 to 1996 due to a constraint on data). We exclude the period after 1997 because of macroeconomic turbulence during the financial crisis.

3.4.2.a Real Effective Exchange Rate Trends

We start by looking at the REER trends in the sample countries and examining whether the pre-crisis dollar peg system caused appreciation of the REER.

The REER is an indicator of a country's international price competitiveness, specifically of a country's prices relative to those of other countries. Therefore, a country's REER levels off when an exchange rate is fully adjusted according to a country's prices relative to those of other countries (the country follows purchasing power parity). There are, in general, two kinds of REER: One is the prices of one country relative to those of competitors in the world export market, which are obtained by dividing the US dollar value of the price level of a country in question by the US dollar value of the world export unit value index. The other is the weighted average of bilateral real exchange rates with a trading partner wherein the weight is the share of the trade with the trading partner in the country's total trade, the typical example of which is the Morgan Guaranty indexes (JP Morgan (2002)). The former values the role of competitors in third markets, while the latter reflects the relative importance of a country's trading partners. We here use the former indices of REER by taking

the role of competitors in third markets into account and calculate it in the following way (taking Indonesia as an example).

$$REER_{Indonesia} = \{WPI_{Indonesia} / ER(Rupiah /U.S.\ dollar)\} / WEUVI$$

where WPI is wholesale price index on local currency base, ER(Rupiah /U.S. dollar) is actual exchange rate on the U.S. dollar base, and WEUPI is world export unit value index on the U.S. dollar base.

According to Figure 3.4.1.a-i and Table 3.4.1.a-i, the REER shows a clear trend of appreciation by 10 – 40 percent during the pre-crisis period of 1987-96. There seem to be at least two reasons for this significantly large appreciation of REER. First, when the sample countries peg their currencies to the US dollar in nominal terms, their higher domestic inflation than that of the US definitely creates appreciation of their currencies in real terms. Figure 3.4.1.a-ii and Table 3.4.1.a-ii describes higher trends of the consumer prices in the sample countries than that of the US. These inflation differentials under the US dollar peg regime may have entailed appreciation of REER. Second, the devaluation of the Chinese yuan in 1994 and the rapid depreciation of the Japanese yen in 1996, shown in Figure 3.4.1.a-iii and Table 3.4.1.a-iii, may have caused appreciation of REER in the sample countries. The sample countries' pegging to the single currency of the US dollar makes their currencies appreciate when there is devaluation or depreciation in the third countries. Thus, we identified the appreciation of REER of the pre-crisis East Asian countries accompanied inherently with their dollar peg regime.

3.4.2.b Regression Analysis of Trade Balance

The second step of our empirical studies is to conduct a regression analysis to prove the relationship between the REER and the trade balance

during the pre-crisis period.

We here follow the analytical framework of trade balance equation presented by Baharumshah (2001). We choose to work with the framework not only for its simplicity but also because of its ability to capture the net effects of the REER on the trade balance for the simulation analysis in the next section. The estimating model is derived from foreign and domestic supply and demand for imports and exports[7], and the final equation form is shown as follows.

$$\Delta \ln(TB) = \alpha_1 \Delta \ln(REER) + \alpha_2 \Delta \ln(REER_{-1}) + \beta \Delta \ln(YR) + \gamma \Delta \ln(WYR) + u$$

$$\alpha_1 < 0, \quad \alpha_2 < 0, \quad \beta > 0 \text{ or } < 0, \quad \gamma > 0,$$

where In shows natural logarithm, and *u* is assumed to be a white-noise process. TB, the trade balance, is expressed by the ratio of export value to import value (In Indonesia, oil export value is excluded). Using the ratio enables us to do without price index to express trade balance in real terms and to avoid the scale problem of time-series increase of value. REER, the real effective exchange rate, is the one defined in the previous section of 3.4.2.a. The reason for using both variables of REER and $REER_{-1}$ is that it is possible to take a certain time to improve trade balance because of the J-curve effect. Of particular importance are the signs and magnitude of the coefficient of REER, α_1 and α_2. They are expected to be negative if the Marshall-Lerner condition holds, that is, if the REER has meaningful impacts on trade balance. For YR, the domestic real income, we use GDP in real terms. The sign of β is ambiguous, depending on whether YR represents the level of domestic demands or the supply volume of exportables. For WYR, foreign real income, we use industrial production of industrial countries. The sign of γ is expected

to be positive because WYR is seen as the foreign demand for the country's export. The regression model is multivariate ordinary least squares for each country.

We first test the stationarity of all the data series for the regression by using the unit root tests of the Augmented Dickey-Fuller (ADF) test and the Philips-Perron (PP) test (for the test methodology, see Matsuura and McKenzie 2001). Due to a failure to reject the null of a unit root for each regression data, we specify the function above in the first-differenced data. Table 3.4.1.b-i reports that at the 5 percent significance level, all the first-differenced data series are confirmed as stationary in both tests, thereby suggesting that a regression analysis using all the first-differenced data series is valid.

Table 3.4.1.b-ii reports the results of the regressions. We observed as follows: The coefficients of REER are significantly negative in Korea and Philippines, and that of $REER_{-1}$ is significantly negative in Thailand. The coefficients of YR are negative except for Korea, but only significant in Philippines. The coefficients of WYR are positive in all the sample countries, but significant in Indonesia, Korea and Philippines. From these observations, we could at least verify the meaningful correlation between REER and trade balance during the pre-crisis period in Korea, Philippines and Thailand. As reasons why Indonesia and Malaysia do not show a significant relationship between REER and trade balance, we speculate that Indonesian exports, recording a large share of raw materials (even if crude oil is excluded) may have been highly influenced by the movements of world commodity prices, and that Malaysian exports, consisting largely of machinery components for the Asian industrial production network, may not have been so sensitive to price mechanisms.

3.4.2.c Simulation Analysis: Negative Impact of REER Appreciation

We next turn to a simulation analysis to examine how and to what extent the sample countries would have changed their trade balance trend if they had adopted a policy to stabilize their REER instead of the de facto US dollar peg system during the pre-crisis period. We here exclude Indonesia and Malaysia from the simulation analysis because we could not verify the relationship between its REER and trade balance in the regression analysis of the previous section.

We proceed to the simulation analysis in the following way. First, we materialize the policy to stabilize the REER in such a way that the REER levels off from 1987 to 1996. Second, we simulated the trade balance by replacing only the actual REER with the leveled-off REER in the regression equation estimated in the previous section. We here assume that the coefficients on the explaining variable in the regression equation are unchanged even if the monetary authorities change their exchange rate management. Third, we compare the simulated trade balance with the one estimated under the actual REER appreciation, and then calculate the gap for both values. The gap really shows the extent to which the sample countries would have improved their trade balance trend if they had adopted a policy to stabilize their REER instead of the de facto US dollar peg system during the pre-crisis period. This can also be understood as the negative effect of the pre-crisis REER appreciation under the dollar peg regime on trade balance.

Figure 3.4.1.c and Table 3.4.1.c report the results of the calculation above. The main observations are as follows. The cumulative negative impact of the REER appreciation on trade balance from 1987 until 1996 in three sample countries amounts to 0.1 – 0.2 points of the export – import ratio. During the same period, three countries' trade balances had deteriorated by 0.1 – 0.3 points of the export – import ratio. We can therefore conclude that the negative effect of the REER appreciation on external balance was large enough to be

considered as one of the causes of the currency crisis since 1997.

3.4.2.d Simulation Analysis: How to Stabilize REER?

The simulation analysis above clearly comes up with the importance of stabilizing the REER in exchange rate management as a policy implication. The US dollar peg system, as analyzed in Section 3.4.1.a, had inherently caused the REER appreciation. Then, what kinds of alternative system for exchange rate management can achieve a stable REER is the question. Since we pick up both inflation differentials and the depreciation of other currency than US dollar as the possible reasons for the REER appreciation in Section 3.4.1.a, we here set up two kinds of the simulation cases in the exchange rate management: case (1) of adopting the basket peg system, and case (2) of adopting the inflation slide. We then examine which kinds of exchange rate management, the basket peg system or the inflation slide, would significantly have contributed to stabilizing REER.

As for case (1), we materialize the basket-pegged exchange rate as follows (taking the Indonesian rupiah as an example). We assume that a currency basket consists of only the U.S. dollar and the yen. We first calculate the basket-pegged rate on the Swiss franc (SWF) base.[3]

$$ES_{BP}\ (\text{Rupiah/SWF}) = \omega \times E\ (\text{U.S. dollar/SWF}) + (1-\omega) \times E\ (\text{Yen/SWF})$$

where ES_{BP} is the percentage change of basket-pegged rate for simulation, E is the percentage change of actual exchange rate, and ω is the weight on the U.S. dollar in a currency basket, which is calculated as a share of Indonesia's trade with the U.S. relative to Indonesia's trade with the U.S. and Japan. We then converted the basket-pegged rate into those on the U.S. dollar base as

follows.

ES_{BP} (Rupiah/U.S. dollar) = ES_{BP} (Rupiah/SWF) + E (SWF/U.S. dollar)

As for case (2), we describe the inflation-slid exchange rate as follows (again taking the rupiah as an example). We here assume that the monetary authorities care for only the differential of inflation rates between the U.S. and domestic currency. We then calculate the inflation-slid rate on the U.S. dollar base as follows.

ES_{IF} (Rupiah/U.S. dollar) = $CPI_{Indonesia} - CPI_{U.S.}$

where ES_{IF} is the percentage change of inflation-slid rate for simulation, CPI is the percentage change of consumer price index.

The next step is to calculate the simulated real effective exchange rate (REER). We use the equation for the REER calculation in Section 3.4.1.a, and replace the actual exchange rate of ER(Rupiah /U.S. dollar) in that equation with the simulated exchange rate calculated by ES_{BP} (Rupiah/U.S. dollar) or ES_{IF} (Rupiah/U.S. dollar) with the year of 1987 being a bench mark year. By comparing the actual trend of REER with the simulated REER, we can find the degree of contributions to the REER stabilization of the basket peg system and the inflation slide respectively.

Figure 3.4.1.d and Table 3.4.1.d reports the results of the simulation on the REERs. The main observations and their interpretations are as follows: The simulated REER under the basket peg system would have been highly appreciated, even more than the actual trend of REER in all the sample countries. It seems to be because the simulated local currencies would have been heavily influenced by the yen appreciation toward 1995 under the basket

peg system. Therefore, the adoption of the basket peg system does not seem to contribute to the stabilization of REER. On the contrary, the simulated REER under the inflation slide would have been less appreciated and even more stable than the actual trend. We speculate that the simulated local currencies under the inflation slide would have been significantly depreciated through the adjustment by inflation differentials during all the pre-crisis analytical period. In this sense, the inflation slide in exchange rate management appears to have a stabilizing effect on the REER compared with the dollar peg management.

3.4.3 Summary

In this Section 3.4, we set out to examine, using empirical studies, the pre-crisis US dollar peg system in selected East Asian countries from the viewpoint of trade balance.

First, we found a significantly large appreciation of real effective exchange rate in the pre-crisis East Asian sample countries with de facto dollar peg regimes. Second, we verified the correlation between real effective exchange rate and trade balance by regression analysis. Third, the simulation results indicate that the appreciation of REER had a significant negative effect on trade balance. Fourth, another simulation shows that as an alternative exchange rate management, the inflation-slid management would have had a stabilizing effect on the REER while the basket peg system would not have. Therefore, our studies in this section imply that the inflation slide, rather than the basket pegging, would have been more preferable than the simple dollar pegging in exchange rate management from the viewpoint of stabilizing trade balance.

Other analytical issues remain. First, we may improve the simulation method by considering the “general impact” of the changes of exchange rate policies on macroeconomic variables. This paper considers only the “partial

impact" on trade balance. Change of exchange rate management, however, may simultaneously influence such domestic economic variables as GDP and coefficients on the REER. Second, the post-crisis trends of the REER and trade balance are an important frontier to be studied. The post-crisis period is, up to now, a little too short to provide sufficient data for sophisticated analyses. We will, therefore, need to keep track of upcoming trends in the relevant economic indices and policies.

Notes:

1. The descriptions in Section 3.3 mostly refer to Taguchi (2003).
2. Concerning the evaluation on the pre-crisis dollar peg system, McKinnon (2000) argued that it looked like good fixes with purchasing power parity, price level stability, and fiscal balance. This evaluation is different from the views of international organizations and the result of our simulation analysis.
3. We often use the Swiss franc as a numéraire because it is an independently floating currency of an advanced country, which carries little weight in Asian trade.
4. Ohno (1999) also conducted counterfactual simulations over the pre-crisis period that show that, to stabilize competitiveness, proper adjustments for inflation by individual economies are more important than the choice of currency weights. He concluded that adoption of a common currency basket in the region does not add much stability.
5. The relationship between the REER and PPP is shown from their definitions as REER = ER / PPP where ER means nominal exchange rate. If ER follows PPP, therefore, REER keeps constancy.
6. Much of trade theory, including the factor-proportions theory associated with Heckscher and Ohlin, focuses on the underlying reasons for international trade, with relatively limited discussion of the role of exchange rates either in determining or being determined by trade. In contrast to that, exchange rates have played a central role in estimated equations for trade volumes (See Ito, Isard, Symansky, and Bayoumi (1996).).

Taguchi (1998) focus on the estimation for trade – exchange rate relationship of selected East Asian countries. Kim and Lee (1996) dealt with the issue on the impact of exchange rate volatility on trade in the Korean case.

7. For details in theoretical background, see Baharumshah (2001).

References:

ADB (Asian Development Bank). 1998. *Asian Development Outlook 1998.* Manila: pp. 23-37.

Baharumshah, Ahmad Zubaidi. 2001. "The Effect of Exchange Rate on Bilateral Trade Balance: New Evidence from Malatsia and Thailand," *Asian Economic Journal*, Vol.15 No.3.

Davidson, R., and J. MacKinnon. 1993. *Estimation and Inference in Econometrics.* New York: Oxford University Press.

Frankel, Jeffrey A., and S. J. Wei. 1994. "Yen Bloc or Dollar Bloc? Exchange Rate Policies in the East Asian Economies," In Takatoshi Ito and Anne Krueger, eds., *Macroeconomic Linkage: Savings, Exchange Rates, and Capital Flow*, NBER-East Asia Seminar on Economics 3, University of Chicago Press, Chicago.

Hataiseree, Rungsun. 1995. "Cointegration Tests of Purchasing Power Parity: the Case of the Thai Baht," *Asian Economic Journal*, Vol.9 No.1.

IMF (International Monetary Fund). 1998. *World Economic Outlook: May 1998.* Washington D.C: pp. 3-7.

---. 2000. *Direction of Trade Statistics Yearbook (DTSY).* Washington D.C.

---. 2001. *International Financial Statistics (IFS).* July 2001, CD-ROM, Washington D.C.

Ito, Takatoshi. 2001. "Growth, Crisis, and the Future of Economic Recovery in East Asia," In Joseph E. Stiglitz and Shahid Yusuf, eds., *Rethinking the East Asian Miracle*, World Bank, pp. 55-94.

Ito, Takatoshi, Peter Isard, Steven Symansky, and Tamim Bayoumi. 1996. "Exchange Rate Movements and Their Impact on Trade and Investment in the APEC Region," *IMF*

Occasional Paper No.145.

JP Morgan. 2002. JP Morgan Real Broad Effective Exchange Rate Indices. [http://www.jpmorgan.com/MarketDataInd/Forex/currIndex.html]

Kawai, Masahiro. 1997. “East Asia currency turbulence: Implications of financial system fragility,” *A paper prepared for a seminar at the World Bank*.

---. 2002. “Exchange Rate Arrangements in East Asia: Lessons from the 1997-98 Currency Crisis,” *IMES Discussion Paper Series* 2002-E-17, Institute for Monetary and Economic Studies, Bank of Japan, September.

Khoon, Goh Soo, and Dawood M. Mithani. 2000. “Deviation from Purchasing Power Parity: Evidence from Malaysia, 1973-1997,” *Asian Economic Journal*, Vol.14 No.1.

Kim, Kiheung, and WooRhee lee. 1996. “The Impact of Korea’s Exchange Rate Volatility on Korean Trade,” *Asian Economic Journal*, Vol.10 No.1.

Krugman, P.R. and R. E. Baldwin. 1987. “The Persistence of the U.S. Trade Deficit,” *Brookings Papers on Economic Activity*, 1, pp. 1-55.

Lui, Francis T., 2001, Comments on “How were capital inflows stimulated under the dollar peg system?” by Eiji Ogawa and Lijian Sun, In Takatoshi Ito and Anne O. Krueger, eds., *Regional and Global Capital Flows: Macroeconomic Causes and Consequences*. University of Chicago Press, Chicago.

Matsuura, Katsumi, and Colin Mckenzie. 2001. *Eviews niyoru Keiryou Keizai Bunseki (Econometric Analysis by Eviews).* Tokyo: Toyo Keizai Shinpo Sha.

Mckinnon, Ronald. 2000. “The East Asian Dollar Standard, Life after Death?” *Economic Notes* 29 (1, February), pp. 31-82.

---. 2001. “After the Crisis, the East Asian Dollar Standard Resurrected: an Interpretation of High-frequency Exchange Rate Pegging.” In Joseph E. Stiglitz and Shahid Yusuf, eds., *Rethinking the East Asian Miracle (Chapter 5).* Washington, D.C: World Bank.

Ogawa, Eiji, and Lijian Sun. 2001. “How were capital inflows stimulated under the dollar peg system?” In Takatoshi Ito and Anne O. Krueger, eds., *Regional and Global Capital Flows: Macroeconomic Causes and Consequences*. Chicago: University of Chicago

Press.

Ohno, Kenichi. 1999. “Exchange Rate Management in Developing Asia: Reassessment of the Precrisis Soft Dollar Zone.” *ADBI Working Paper* 1 (January). Tokyo: Asian Development Bank Institute.

Rose, A.K. and J. L. Yellen. 1989. “Is There a J-curve?” *Journal of Monetary Economics,* 24, pp. 53-68.

Taguchi, Hiroyuki. 1998. “Exchange Rate Movements and Trade Balances in Selected ASEAN Countries,” *Scio-Science*, Waseda University.

---. 2003. “Exchange Rate Management and Capital Inflows in Selected East Asian Countries,” *Journal of International Development Society*, Volume 12, No.1.

Tinakorn, Pranee, 2001, Comments on “How were capital inflows stimulated under the dollar peg system?” by Eiji Ogawa and Lijian Sun, In Takatoshi Ito and Anne O. Krueger, eds., *Regional and Global Capital Flows: Macroeconomic Causes and Consequences*. University of Chicago Press, Chicago.

World Bank. 1998. *East Asia: The Road to Recovery.* Washington D.C: pp. 1-18.

---. 2000. *East Asia: Recovery and Beyond.* Washington D.C: pp. 19-43.

IV. Examining the East Asian Post-crisis Exchange Rate Management [1]

This chapter focuses on examining post-crisis exchange rate management in selected East Asian countries. In the previous Chapter, we found that the pre-crisis US dollar peg system had the defect of deteriorating external balances, namely inducing massive capital inflow and worsening trade balance. Then, the question arises as to whether, after the crisis, the East Asian countries are simply returning to the pre-crisis US dollar peg system, or whether they have learned a lesson from the crisis and are finding another path to follow.

The rest of this chapter is organized as follows: Section 4.1 reviews the

analyses of the post-crisis exchange rate management in East Asian countries. Section 4.2 conducts empirical studies on the post-crisis developments of the official and de facto exchange rate regimes in the sample countries, and on the factors determining the targeted reference rates in managing exchange rates. Section 4.3 presents concluding remarks.

4.1 Previous Studies on Post-crisis Exchange Rate Management

We first review the analyses of the post-crisis exchange rate management in East Asian countries. As shown in the previous chapter, the pre-crisis US dollar-pegged-rate regime has been criticized because of its moral hazard in inducing short-term external borrowing and its tendency to cause the appreciation of real exchange rates with the loss of competitiveness. Most of the views also have favored greater exchange rate flexibility. In spite of the suggestion of greater flexibility, after the Asian crisis, not all East Asian countries seem to prefer the same exchange rate arrangement and assessment does not always seem to reach clear-cut consensus. We pick up some previous studies as follows.

Calvo and Reinhart (2000), as shown in Chapter II, found that countries that say they allow their exchange rate to float mostly do not – there seems to be an epidemic case of “fear of floating.” They showed, as one of the key evidences of the “fear of floating”, that in the countries that say they allow their exchange rate to float, the foreign exchange reserve volatility is very high, contrary to what would be expected in a floating exchange rate regime, which suggests significant central bank intervention. Their analysis included the cases of Indonesia, Korea and Thailand in the post-crisis period, and the Philippines in the recent decade, where their foreign exchange reserve volatilities are higher than those of the United States and Japan, and surprisingly, even those of the countries that are classified in “limited Flexibility” according to the IMF

system. Their analysis, therefore, showed that some East Asian countries that are categorized as having floating currencies since the Asian crisis are, in effect, holding loose pegs.

Reinhart and Rogoff (2002) reclassified historical exchange rate regimes by employing newly compiled monthly data set on market–determined exchange rates that goes back to 1946 for 153 countries. Their classification leads to a stark reassessment of the post-war history of exchange rate arrangements. When the official categorization is a form of peg, roughly half the time our classification reveals the true underlying regime to be something radically different, often a variant of a float. Conversely, when official classification is floating, their scheme routinely suggests that the reality was a form of de facto peg. According to their reclassification, during the post-crisis period, the exchange rate regimes of the Philippines and Thailand are reclassified into managed floating, those of Indonesia and Korea into freely floating, and that of Malaysia into pegged arrangement.

Mckinnon (2001) analyzed how the post-crisis exchange rate regime has evolved since 1998. According to his analyses, dollar exchange rates, particularly when observed on a high-frequency (daily) basis, have become as stable as they were before the crisis. Therefore, he stated that the East Asian dollar standard, except for Indonesia, seems to be resurrecting itself, and that the “fear of floating” identified by Calvo and Reinhart (2000) is shown at higher frequencies to be a rational response to capital market conditions in emerging markets.

Kawai (2002) also examined the evolution of exchange rate arrangements in East Asia’s emerging market economies over the last ten years. According to his analyses, in the post crisis period the dollar has regained prominence in some countries (notably in Malaysia), while its dominance has been reduced and exchange rate flexibility has risen in others

(notably in Indonesia). Interesting is the observation that Korea and Thailand appear to have shifted to a de facto currency basket arrangement with significant weights on the US dollar and the yen, similar to Singapore's managed floating arrangement.

4.2 Empirical Studies on Selected East Asian Countries

In this section, we conducted an empirical analysis of the selected East Asian countries. We here focus, as sample countries, on the hardest-hit crisis countries among the East Asian countries: Indonesia, the Republic of Korea, the Philippines, Malaysia, and Thailand. First, we briefly review recent developments of exchange rate regimes in the sample countries according to the IMF classification. Second, we analyze the de facto exchange rate regimes by examining the volatilities of foreign exchange reserves in the sample countries. Third, we analyze the exchange rate targeting, namely the factors determining the targeted reference rates in managing exchange rates, both by investigating the real effective exchange rate movements and by conducting regression analysis.

4.2.1 Developments of Exchange Rate Regimes in IMF Classification

We first confirm the developments of exchange rate arrangements in the sample countries from the pre-crisis period to the post-crisis period from information obtained from the IMF (International Monetary Fund).

According to Table 4.2.1, we observed the following: First, Indonesia and Korea moved from Managed Float to Independent Float. Thailand moved from Pegged to Currency Composite through Managed Float to Independent Float. Second, Malaysia, on the contrary, shifted from Managed Float to Pegged to US dollar in 1998. Third, the Philippines showed no change, staying at Independent Float. Fourth, although the IMF has adopted the new exchange

rate classification system since 1999 [2], any significant changes in classification have not occurred in the sample countries.

From the observation above and considering that Hong Kong and China have adopted pegs, the East Asian arrangements seem apparently to go along with the hypothesis of corner solutions, “hard peg” or “free float”.[3] As we stated in the previous section, however, some economists argue that some countries that announced “free float” seem to be returning to “soft peg”, from their empirical studies. We will verify this point in the following section.

4.2.2 De facto Exchange Rate Regimes: Returning to “Soft Peg”

As shown in Section 4.1, Calvo and Reinhart (2000) showed, as one of the key evidences of the “fear of floating”, that the foreign exchange reserve volatility in the post-crisis East Asian countries that say they allow their exchange rate to float is very high compared with those of the United States and Japan.

We here verify the volatilities of foreign exchange reserves in the sample countries by examining the trends of their coefficients of variation from the pre-crisis period to the post-crisis period. We use the monthly data of the foreign exchange reserves in US Dollar base from January 1994 to December 2000, taken from the International Financial Statistics of the International Monetary Fund. Then we calculate the coefficients of variation year by year. If a country adopts the regime of “pure float”, the coefficients of variation should, in principle, be zero.

Table 4.2.2 reports the results of the calculations. The main observations are as follows. First, Indonesia, Korea and Thailand, which announced “Independent Float” after the crisis, showed no significant changes in the coefficients of variation of their foreign exchange reserves regardless of their changes of the announced regime. Second, Malaysia, which shifted

formally to “Pegged to US dollar”, similarly showed no noteworthy change in its coefficients. Third, the Philippines, which kept to the formally “Independent Float” during the period, has mostly the same degree of coefficients as those of the other sample countries.

From the observation above, we speculate that the sample countries, except for Malaysia, are holding to the “soft peg” even in the post-crisis period regardless of their announcement of the “free float”.

4.2.3 Exchange Rate Targeting

If we follow the hypothesis that the sample countries, except for Malaysia, are holding to the “soft peg”, the next step is to examine what factors determine targeted reference rates; in other words, whether or not the sample countries during the post-crisis period are simply returning to the pre-crisis US dollar-pegged-rate regime as Mckinnon (2001) suggested. We here present the hypothesis that the sample countries, not simply relying on the US dollar standard, have come to pay more attention to inflation rates in their exchange rate management during the post-crisis period. We speculate that they may have learned the lessons that the Asian crisis was partly caused by the simple US dollar-pegged-rate regime accompanied by a rising real exchange rate and the moral hazard in inducing external borrowing. We first examine the actual movements of the real effective exchange rates to see whether the exchange rates have been adjusted by inflation rates. We next conduct a regression analysis to identify the factor of inflation adjustment in managing exchange rates.

4.2.3.a Real Effective Exchange Rate

We first examine the actual movements of the real effective exchange rates (REER) in the sample countries. The REER is an indicator for a country’s

international price competitiveness. This indicator is obtained by unifying a bilateral real exchange rate that shows the prices of one country's output baskets relative to the others'. Therefore, when an exchange rate is fully adjusted according to a country's prices relative to the others' (the country follows the purchasing power parity), the country's REER levels off because the country's prices relative to the others' remains unchanged.

We here show two kinds of REER: One is the Morgan Guaranty indexes ($REER_{MGI}$), which are weighted averages of each real exchange rate of its trading partners wherein the weights are the share of the trading partner in the country's total exports and imports (JP Morgan (2001)). The other is the prices of one country relative to those of the competitors in the world export market ($REER_{EUP}$), which are obtained by dividing the US dollar value of the price level of a country in question by the US dollar value of the world export unit price index. The $REER_{MGI}$ clearly reflect the relative importance of a country's trading partners, while $REER_{EUP}$ value the role of competitors in third markets.[4]

The following are the main findings from Figure 4.2.3.a and Table 4.2.3.a. The $REER_{EUP}$, which shows a clear trend of appreciation during the pre-crisis period of 1990-96, indicates no significant trend of appreciation during the post-crisis period of 1999-2001. The $REER_{MGI}$, which does not necessarily show a trend of appreciation during the pre-crisis period, also reveals no clear trend of appreciation during the post-crisis period. Therefore, we verify no significant trend of appreciation in both indices during the post-crisis period, thereby high possibility that the post-crisis exchange rate has been adjusted by inflation rates. The reason why the $REER_{MGI}$ does not show a trend of appreciation during the pre-crisis period seems to be that it may not fully reflect the role of competitors in export markets, with the drastic devaluation of the Chinese Yuan in 1994 being the typical example.

4.2.3.b Regression Analysis

We next turn to a regression analysis to identify the factors determining the targeted reference rates including inflation rate in managing exchange rates. We follow the work of Frankel and Wei (1994)[5] and specify the regression model in the following way.

$$\Delta \log (\text{Local Currency/ SWF}) = \alpha_1 \Delta \log (\text{USD/ SWF}) + \alpha_2 \Delta \log (\text{JPY/ SWF}) + \alpha_3 \Delta \log (\text{DEM/ SWF}) + \alpha_4 \Delta \log ((\text{CPI}+\text{CPI}_{-1})/2) + \varepsilon$$

Where SWF is the Swiss franc, USD is the US dollar, JPY is the Japanese yen, DEM is the German mark and ε is assumed to be a well-behaved error term, following N(0, σ^2). CPI is the Consumer Price Index of the local country with a time lag to take the causality relationship between CPI and the value of local currency into account. The Swiss franc is chosen as an arbitrary *numéraire* for measuring variations in the exchange rate because it is an independently floating currency of an advanced country which nonetheless carries little weight in Asia's trade. Based on the first difference of logarithms (percentage changes), the simple regression model is multivariate ordinary least squares for each country and time period. All the sample data are monthly ones taken from the International Financial Statistics of the International Monetary Fund, for the sample countries – Indonesia, Korea, Malaysia, the Philippines and Thailand. The data are broken up into two periods – pre-crisis from January 1994 to December 1996, and post-crisis from January 1999 to December 2000. According to Frankel and Wei (1994), if the local currency is tightly fixed to some particular value of the US dollar, then the regression coefficient α_1 should be discernable and approximately unity, while the others are close to 0. Another crucial variable is the local CPI. If the coefficient of the local CPI is significantly positive, we assume that the domestic inflation rate can be one of the factors

determining the targeted reference rates in managing exchange rates.

Before the regression, we test the stationarity of all the data series by using the unit root tests of the Augmented Dickey-Fuller (ADF) test and the Philips-Perron (PP) test (for the test methodology, see Matsuura and McKenzie 2001). Table 4.2.3.b-i reports that at the 5 percent significance level, all the first-differenced data series are confirmed as stationary in both tests, thereby suggesting that a regression analysis using all the first-differenced data series is valid.

Table 4.2.3.b-ii reports the results of the regressions. The main observations and their interpretations are as follows. First, the coefficients of the US dollar in all local currencies are significantly positive throughout the pre- and post- periods. In particular, the Philippine Peso of both periods and the pre-crisis Indonesian Rupiah have an approximate unity as a coefficient of the US dollar and the post-crisis Malaysian Ringgit has a rigid unity. The sample countries, except for Malaysia, therefore, seem to be holding the “soft peg” to the US dollar, during not only the pre-crisis period but also the post-crisis period, regardless of its assigned weights. Malaysia, who has announced “Pegged to US dollar” since 1998 is econometrically verified to fix its currency to the US dollar in the post-crisis period. Second, the coefficients of the local CPI are significantly positive in the post-crisis of the Thai Baht, the Philippine Peso and the Korean Won. Korea, the Philippines and Thailand, therefore, may have come to take the domestic inflation rates into account as one of the factors determining the targeted reference rates during the post- crisis period. Third, most of the coefficients of the Japanese yen and the German mark are insignificant and do not have a noteworthy characteristic in the process from the pre-crisis to the post crisis. Thus, there seem to be no significant changes in the weights assigned to the Japanese yen and German mark. Lastly, the post-crisis Indonesia Rupiah shows a relatively worse performance in the adjusted

R-squared. Post-crisis Indonesia may have had its currency influenced by other factors such as political instability.

4.3 Summary

After the Asian crisis, Indonesia, Korea and Thailand officially announced the transition of their exchange rate regimes towards “free float” while Malaysia announced the transition towards the solid peg to the US dollar. It apparently looks as though the hypothesis of corner solution has taken hold in these post-crisis developments for the official regimes. When it comes to the de facto exchange rate regimes, however, Indonesia, Korea and Thailand as well as the Philippines, seem to be still holding to the “soft peg” regimes even in the post-crisis period. The post-crisis exchange rate targeting, however, appears to be somewhat different from the simple US dollar standard in the pre-crisis period. Our empirical evidence shows that Korea, the Philippines and Thailand have come to care about the factor of the inflation rate in addition to the US dollar linkage in their post-crisis exchange rate management.

The following issues still need analysis: First, the post-crisis period is a little too short to provide sufficient monthly data for analyses of the foreign exchange reserves, the REER, and the factors for exchange rate targeting. We will, therefore, need the re-analyses to get more consolidated outcomes by keeping track of the upcoming data. Second, it may be useful for our analysis to examine the exchange rate management of non-crisis countries and to compare them with the management of hardest-hit crisis countries. Third, we have to analyze more deeply the merits and demerits of inflation-adjusted management on exchange rates. Inflation adjustment under the “soft peg”, with an exchange rate less volatile than “free float”, may alleviate such risks as the rising real exchange rates (the loss of competitiveness) and the moral hazard inducing external borrowing. However, whether the “soft peg”, even though

inflation-adjusted, would still be the best regime consistent with growing international financial integration (whether “soft peg” would help alleviate pressures associated with large capital flows), is the question.

Notes:

1. The descriptions in Chapter IV mostly refer to Taguchi (2002).
2. IMF classification system has grouped IMF members’ exchange rate arrangements according to the degree of flexibility. The previous system, though it had been unchanged for over 14 years, has a number of shortcomings. In particular, there were sometimes important differences between the official classification, based on members’ formally announced regimes, and the actual, de facto, exchange rate arrangements. IMF (1999) describes that the new system is based on the members’ actual, de facto, regimes and it also presents members’ exchange rate regimes against alternative monetary policy frameworks. The new system, however, does not necessarily seem to reflect de facto regimes such as informal exchange rate targeting because it still depends on the information provided by country authorities.
3. The exchange rate arrangements can be classified into three categories in general: the “hard peg” where a currency is fixed using a currency board or where the currency of another country has been adopted, the “soft peg” where the currency is tied to another currency or a basket of currencies either through a peg, a crawling peg, or bands around a reference rate, and “free float” where the value of the currency is either allowed to fluctuate freely or where there is a managed float. For details see ADB (2001).
4. The IMF weighting scheme is based on trade data for manufactured goods and primary goods, with weights reflecting both the relative importance of a country’s trading partners in its direct bilateral trade relation, and that resulting from competition in a third market. However, the REER compiled by the IMF based on this weighting scheme is not available for the sample countries. The weights, which are derived from

MERM (Multilateral Exchange Rate Model), each represent the model's estimate of the effect on the trade balance of the country in question of a 1 percent change in the domestic currency price of each of the other currencies. A detail description of the IMF weighting scheme is contained in the IFS of IMF "Supplement on Exchange Rates, No.9 (1985)".

5. Some of the local currencies are de facto linked to a basket of major currencies and the weights assigned to various currencies are not announced. Frankel and Wei (1994) argue that it is important to infer policies by observing actual behavior, rather than relying on official pronouncements, and estimate the implicit weights econometrically.

References:

ADB (Asian Development Bank). 2001. Asia's Globalization Challenge. *Asian Development Outlook 2001*. 161-201. Manila.

Calvo, Guillermo A., and Carmen M. Reinhart. 2000. Fear of Floating. *NBER Working Paper* No. 7993. Cambridge, Massachusetts: National Bureau of Economic Research.

Davidson, R., and J. MacKinnon. 1993. *Estimation and Inference in Econometrics.* New York: Oxford University Press.

Frankel, Jeffrey A., and S. J. Wei. 1994. "Yen Bloc or Dollar Bloc? Exchange Rate Policies in the East Asian Economies." In Takatoshi Ito and Anne Krueger, eds., *Macroeconomic Linkage: Savings, Exchange Rates, and Capital Flow*. NBER-East Asia Seminar on Economics 3. Chicago: University of Chicago Press.

IMF (International Monetary Fund). 1999. Exchange Rate Arrangements and Currency Convertibility: Developments and Issues. *World Economic and Financial Surveys*. 23-46. Washington, D.C.

---. 2002. *International Financial Statistics*. February 2002, and previous issues. Washington, D.C.

JP Morgan. 2001. JP Morgan Real Broad Effective Exchange Rate Indices, July 2001.

[http://www.jpmorgan.com/MarketDataInd/Forex/currIndex.html]

Kawai, Masahiro. 2002. “Exchange Rate Arrangements in East Asia: Lessons from the 1997-98 Currency Crisis,” *IMES Discussion Paper Series* 2002-E-17, Institute for Monetary and Economic Studies, Bank of Japan, September.

Matsuura, Katsumi, and Colin Mckenzie. 2001. *Eviews niyoru Keiryou Keizai Bunseki (Econometric Analysis by Eviews).* Tokyo: Toyo Keizai Shinpo Sha.

Mckinnon, Ronald. 2001. After the Crisis, the East Asian Dollar Standard Resurrected: an Interpretation of High-frequency Exchange Rate Pegging. In Joseph E. Stiglitz and Shahid Yusuf, eds., *Rethinking the East Asian Miracle* (Chapter 5). 197-246. Washington, D.C: World Bank.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2002. The Modern History of Exchange Rate Arrangements: A Reinterpretation. *NBER Working Paper* No. 8963. Cambridge, Massachusetts: National Bureau of Economic Research.

Taguchi, Hiroyuki. 2002. “Exchange Rate Management in Selected East Asian Countries After the Financial Crisis,” *WASEDA Review of Socio-science*, Graduate School of Social Science of WASEDA University, Volume 8.

V. Concluding Remarks

In this article, we set out to examine, using empirical studies, the pre-crisis dollar peg system from the viewpoint of such external balances as capital flow and trade, and the post-crisis exchange rate management in the selected emerging East Asian economies.

Chapter II reviewed the debates on exchange rate regimes in both long and recent terms, and clarifies this article’s position in such a way that intermediate exchange rate regimes are still alive in emerging East Asian economies because of the “Fear of Floating.” Chapter III evaluated the pre-crisis exchange rate management in East Asian countries. It first identified

the pre-crisis de facto exchange rate regime as the US dollar peg system by reviewing several previous studies. It also reviewed the assessments of the US pre-crisis dollar peg system, most of which blame the regime as one cause of the Asian crisis. It then conducted empirical analyses to examine the pre-crisis US dollar peg system in the selected East Asian countries from the viewpoints of both capital inflow and trade balance. The main findings are: the dollar peg system had induced massive capital inflows through significantly large super risk premium against the US; the dollar peg system had deteriorated trade balances through significantly large appreciation of real effective exchange rate. The simulation analyses indicated that as an alternative exchange rate management, the inflation-slid management, rather than the basket pegging, had been more preferable than the simple dollar peg system from the viewpoints of stabilizing both capital inflow and trade balance. Chapter IV examined the post-crisis exchange rate management in the selected East Asian countries. The main findings are: in the post-crisis exchange rate management, some East Asian countries have come to care more about the factor of the inflation slide in addition to the US dollar linkage. We speculate that they may have learned the lessons that the Asian crisis was partly caused by the simple US dollar peg regime accompanied by massive capital inflows and worsening trade balance. The strategic implication of all the findings above is the importance of inflation slide in the exchange rate management in the emerging East Asian economies.

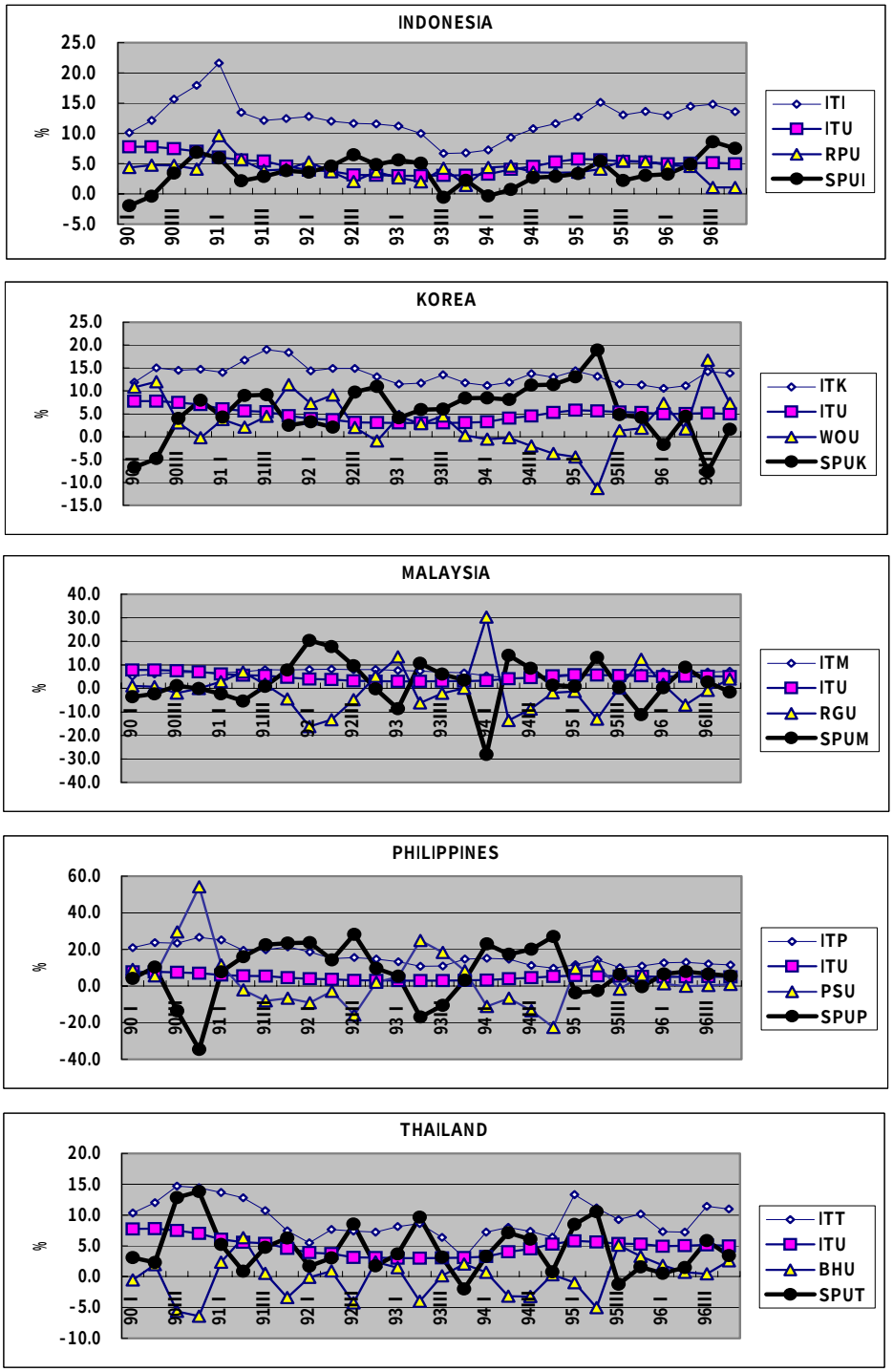
The following issues still need analysis: First, it may be useful for our analysis to examine the exchange rate management of non-crisis countries and to compare them with the management of hardest-hit crisis countries. Second, the post-crisis trends of the REER, capital inflow, and trade balance are an important frontier to be studied. The post-crisis period is, up to now, a little too short to acquire sufficient data for sophisticated analyses. We will, therefore,

need to keep track of upcoming trends in the relevant economic indices and policies.

Table 3.1 Weights on the Dollar and the Yen in Exchange Rate Policies of the Asian Countries

	Frankel and Wei (1994) Estimated period: 1979-92		Kawai (1997) Estimated period: 1990-96	
	Dollar	Yen	Dollar	Yen
Hong Kong	0.92	-0.00	1.002	-0.002
Indonesia	0.95	0.16	0.966	0.014
Korea	0.96	-0.10	0.941	0.088
Malaysia	0.78	0.07	0.589	0.044
Philippines	1.07	-0.01	1.087	-0.094
Singapore	0.75	0.13	0.420	0.021
Thailand	0.91	0.05	0.789	0.104

Figure 3.3.3.a-i Super Risk Premium against US in 1990-1996



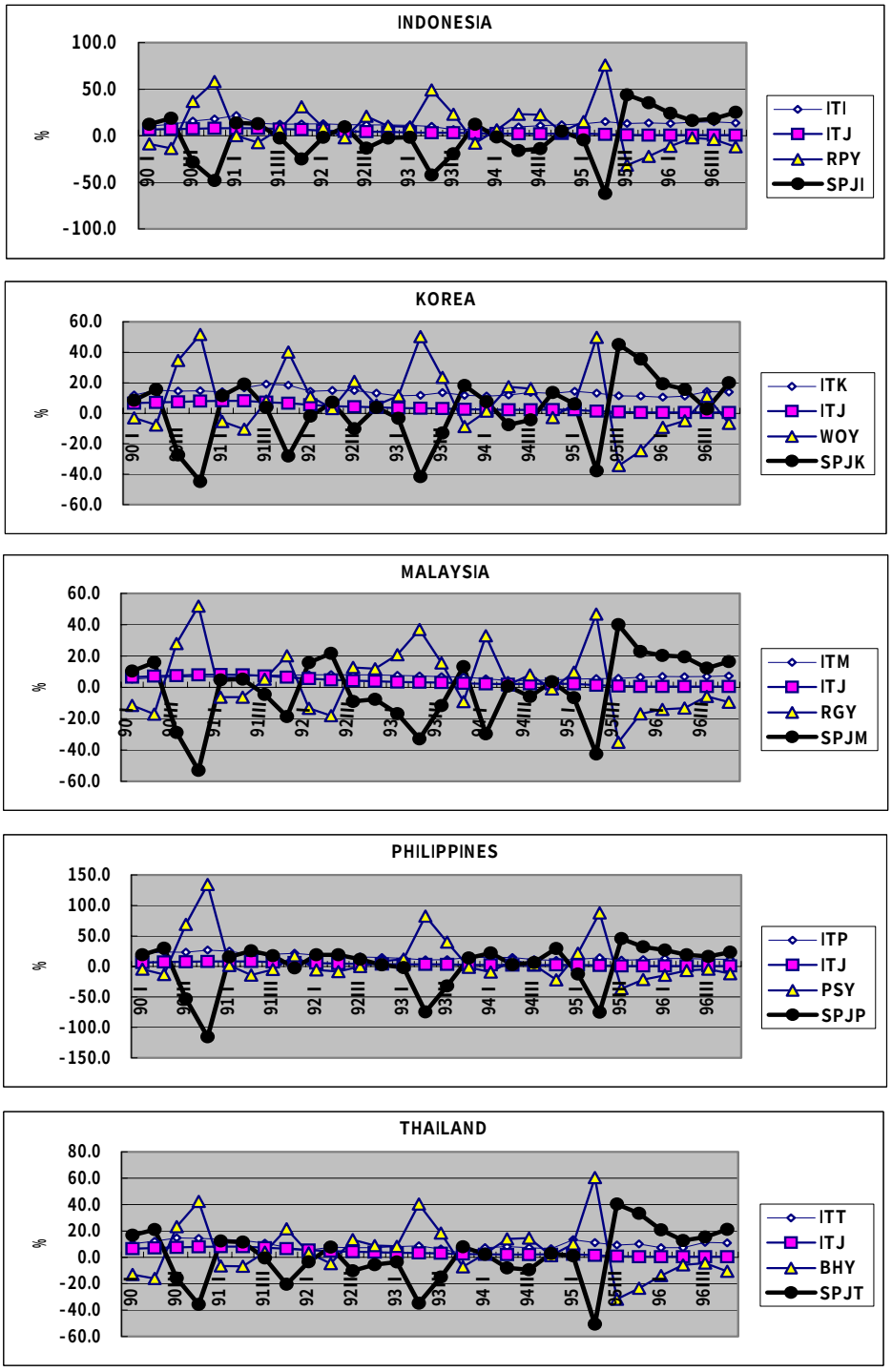
Note: IT: Interest Rate, SPU: Super Risk Premium against U.S., I: Indonesia, K: Korea, M: Malaysia, P: Philippines, T: Thailand, U: United States, RPU: Rupiah/$, WOU: Won/$, RGU: Ringgit/$, PSU: Peso/$, BHU: Baht/$.
Source: IFS(IMF).

Table 3.3.3.a-i Super Risk Premium against US in 1990-1996

	Indonesia				Korea				Malaysia			
	ITI	ITU	RPU	SPUI	ITK	ITU	WOU	SPUK	ITM	ITU	RGU	SPUM
90 I	10.1	7.8	4.4	-2.0	11.9	7.8	10.8	-6.7	5.2	7.8	1.0	-3.6
90 II	12.1	7.8	4.7	-0.4	15.0	7.8	12.0	-4.8	6.1	7.8	0.7	-2.4
90III	15.7	7.5	4.7	3.4	14.5	7.5	3.0	4.0	6.6	7.5	-2.0	1.2
90IV	17.9	7.0	4.1	6.8	14.7	7.0	-0.2	8.0	6.8	7.0	-0.1	-0.2
91 I	21.6	6.1	9.6	5.9	14.0	6.1	3.7	4.3	6.5	6.1	2.8	-2.4
91 II	13.4	5.6	5.7	2.2	16.7	5.6	2.1	9.0	7.0	5.6	6.9	-5.5
91III	12.1	5.4	3.9	2.9	19.0	5.4	4.5	9.2	7.9	5.4	1.7	0.7
91IV	12.4	4.6	4.0	3.8	18.4	4.6	11.3	2.5	7.8	4.6	-4.6	7.8
92 I	12.8	3.9	5.3	3.6	14.4	3.9	7.2	3.2	8.0	3.9	-16.2	20.3
92 II	12.0	3.7	3.7	4.6	14.9	3.7	9.1	2.1	8.1	3.7	-13.3	17.7
92III	11.7	3.1	2.0	6.5	14.9	3.1	2.0	9.7	7.9	3.1	-4.9	9.6
92IV	11.6	3.1	3.7	4.8	13.1	3.1	-1.0	10.9	8.0	3.1	5.1	-0.2
93 I	11.2	3.0	2.6	5.6	11.5	3.0	4.4	4.1	7.6	3.0	13.3	-8.7
93 II	10.0	3.0	2.0	5.0	11.7	3.0	2.8	5.9	7.3	3.0	-6.2	10.6
93III	6.7	3.0	4.2	-0.6	13.5	3.0	4.5	6.0	6.9	3.0	-2.2	6.0
93IV	6.8	3.1	1.4	2.3	11.8	3.1	0.3	8.4	6.5	3.1	0.0	3.5
94 I	7.3	3.3	4.4	-0.4	11.2	3.3	-0.6	8.5	5.4	3.3	30.3	-28.2
94 II	9.3	4.0	4.6	0.7	11.9	4.0	-0.3	8.1	4.4	4.0	-13.7	14.0
94III	10.8	4.5	3.6	2.7	13.7	4.5	-2.0	11.3	4.2	4.5	-8.8	8.5
94IV	11.6	5.3	3.5	2.9	13.0	5.3	-3.7	11.4	4.7	5.3	-1.9	1.4
95 I	12.7	5.8	3.6	3.4	14.4	5.8	-4.4	13.0	5.3	5.8	-1.3	0.8
95 II	15.1	5.6	4.1	5.4	13.2	5.6	-11.4	18.9	5.6	5.6	-13.1	13.1
95III	13.1	5.4	5.5	2.2	11.5	5.4	1.3	4.8	5.8	5.4	0.1	0.3
95IV	13.6	5.3	5.3	3.0	11.3	5.3	1.9	4.1	6.4	5.3	12.3	-11.2
96 I	13.0	5.0	4.8	3.3	10.5	5.0	7.3	-1.7	6.9	5.0	1.7	0.3
96 II	14.5	5.0	4.5	4.9	11.2	5.0	1.7	4.4	6.8	5.0	-7.1	8.9
96III	14.8	5.1	1.1	8.6	14.2	5.1	16.7	-7.6	6.9	5.1	-1.0	2.7
96IV	13.6	5.0	1.1	7.5	13.9	5.0	7.3	1.6	7.3	5.0	3.9	-1.6

	Philippines				Thailand			
	ITP	ITU	PSU	SPUP	ITT	ITU	BHU	SPUT
90 I	21.0	7.8	9.1	4.2	10.3	7.8	-0.5	3.1
90 II	23.7	7.8	5.5	10.4	12.0	7.8	2.0	2.3
90III	23.4	7.5	29.5	-13.6	14.7	7.5	-5.6	12.9
90IV	26.6	7.0	54.2	-34.6	14.4	7.0	-6.4	13.8
91 I	25.2	6.1	11.5	7.7	13.6	6.1	2.4	5.2
91 II	19.5	5.6	-2.2	16.0	12.8	5.6	6.3	0.9
91III	19.8	5.4	-8.1	22.5	10.7	5.4	0.5	4.8
91IV	21.4	4.6	-6.7	23.5	7.5	4.6	-3.4	6.3
92 I	18.6	3.9	-9.1	23.8	5.5	3.9	-0.1	1.7
92 II	15.1	3.7	-2.9	14.3	7.7	3.7	0.9	3.0
92III	15.6	3.1	-15.8	28.3	7.4	3.1	-4.3	8.5
92IV	14.8	3.1	2.1	9.6	7.2	3.1	2.4	1.7
93 I	13.3	3.0	5.0	5.4	8.1	3.0	1.4	3.7
93 II	10.9	3.0	24.9	-17.0	8.6	3.0	-4.0	9.6
93III	10.9	3.0	18.4	-10.5	6.3	3.0	0.2	3.2
93IV	14.7	3.1	8.3	3.3	3.1	3.1	2.0	-2.0
94 I	15.1	3.3	-11.1	23.0	7.2	3.3	0.7	3.3
94 II	14.8	4.0	-6.6	17.3	8.0	4.0	-3.2	7.1
94III	11.3	4.5	-13.4	20.1	7.4	4.5	-3.2	6.1
94IV	9.8	5.3	-22.6	27.1	6.4	5.3	0.3	0.8
95 I	11.7	5.8	9.6	-3.7	13.3	5.8	-1.0	8.5
95 II	14.2	5.6	11.1	-2.5	11.1	5.6	-5.0	10.6
95III	10.1	5.4	-1.7	6.5	9.2	5.4	5.1	-1.2
95IV	11.0	5.3	6.1	-0.3	10.2	5.3	3.3	1.6
96 I	12.8	5.0	1.2	6.6	7.3	5.0	1.8	0.5
96 II	12.9	5.0	0.0	7.9	7.2	5.0	0.7	1.5
96III	12.1	5.1	0.4	6.6	11.4	5.1	0.4	5.8
96IV	11.6	5.0	1.0	5.6	11.0	5.0	2.6	3.4

Figure 3.3.3.a-ii Super Risk Premium against Japan in 1990-1996



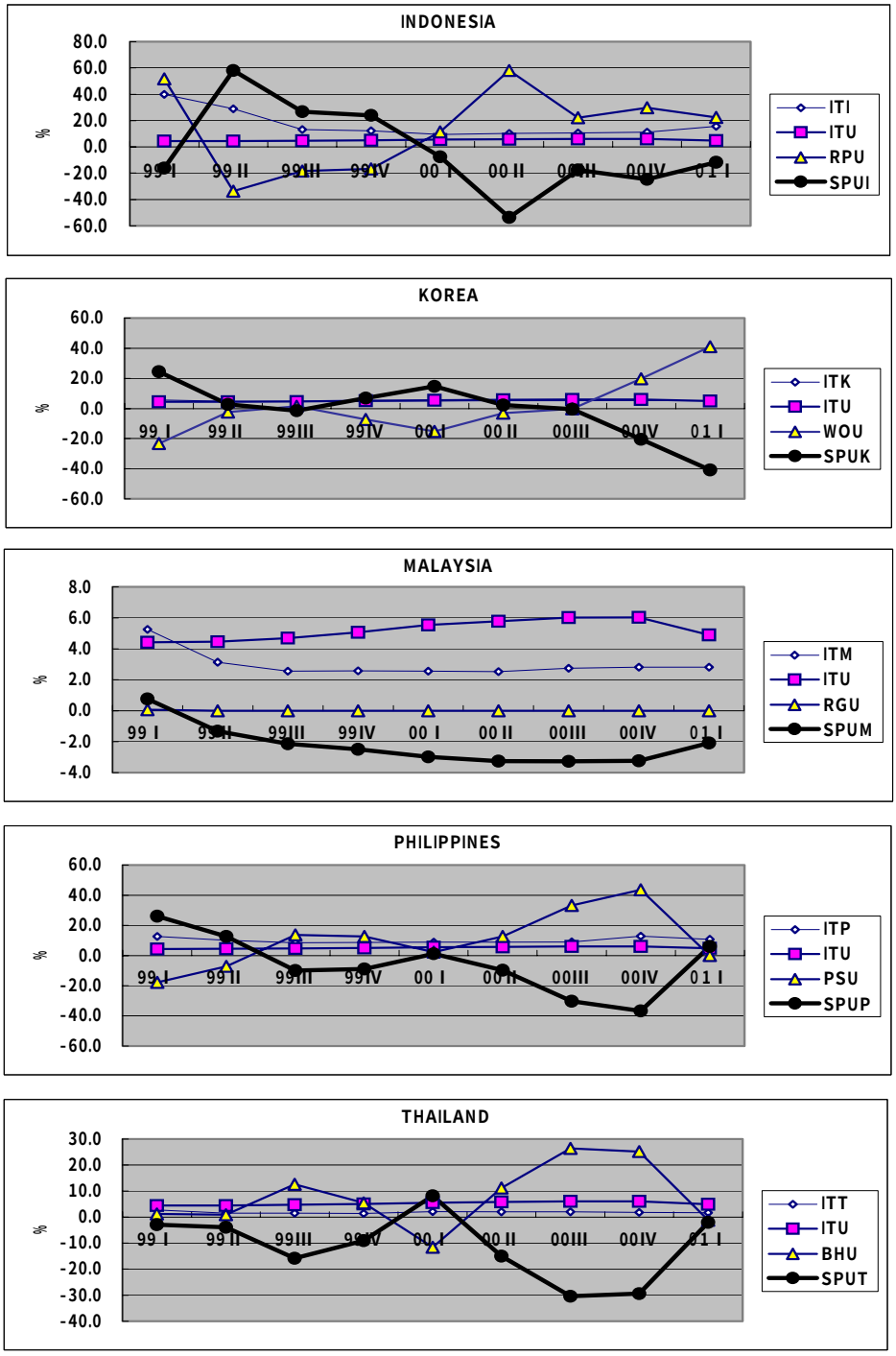
Note: IT: Interest Rate, SPU: Super Risk Premium againist Japan, I: Indonesia, K: Korea, M: Malaysia, P: Philippines, T: Thailand, J: Japan, RPY: Rupiah/\, WOY: Won/\, RGY: Ringgit/\, PSY: Peso/\, BHY: Baht/\.
Source: IFS(IMF).

Table 3.3.3.a-ii Super Risk Premium against Japan in 1990-1996

	Indonesia				Korea				Malaysia			
	ITI	ITJ	RPY	SPJI	ITK	ITJ	WOY	SPJK	ITM	ITJ	RGY	SPJM
90 I	10.1	6.5	-8.7	12.3	11.9	6.5	-3.1	8.4	5.2	6.5	-11.6	10.3
90 II	12.1	7.1	-13.7	18.7	15.0	7.1	-7.8	15.7	6.1	7.1	-17.0	16.0
90III	15.7	7.4	36.8	-28.5	14.5	7.4	34.5	-27.5	6.6	7.4	28.0	-28.8
90IV	17.9	7.9	58.2	-48.2	14.7	7.9	51.7	-44.8	6.8	7.9	51.9	-53.0
91 I	21.6	8.1	-0.1	13.6	14.0	8.1	-5.4	11.4	6.5	8.1	-6.2	4.7
91 II	13.4	8.0	-7.3	12.7	16.7	8.0	-10.5	19.1	7.0	8.0	-6.2	5.2
91III	12.1	7.3	7.4	-2.5	19.0	7.3	8.0	3.8	7.9	7.3	5.2	-4.6
91IV	12.4	6.5	30.9	-24.9	18.4	6.5	40.1	-28.2	7.8	6.5	20.1	-18.7
92 I	12.8	5.5	8.8	-1.6	14.4	5.5	10.9	-2.0	8.0	5.5	-13.4	15.8
92 II	12.0	4.7	-2.2	9.5	14.9	4.7	3.0	7.2	8.1	4.7	-18.2	21.6
92III	11.7	4.2	20.9	-13.5	14.9	4.2	20.9	-10.2	7.9	4.2	12.7	-9.0
92IV	11.6	3.9	10.3	-2.6	13.1	3.9	5.3	3.8	8.0	3.9	11.8	-7.7
93 I	11.2	3.5	9.5	-1.8	11.5	3.5	11.4	-3.4	7.6	3.5	20.9	-16.7
93 II	10.0	3.2	49.0	-42.2	11.7	3.2	50.3	-41.8	7.3	3.2	37.0	-32.9
93III	6.7	3.1	23.1	-19.5	13.5	3.1	23.4	-12.9	6.9	3.1	15.5	-11.8
93IV	6.8	2.5	-7.8	12.1	11.8	2.5	-8.9	18.2	6.5	2.5	-9.2	13.2
94 I	7.3	2.3	6.4	-1.4	11.2	2.3	1.4	7.5	5.4	2.3	32.8	-29.7
94 II	9.3	2.1	23.0	-15.8	11.9	2.1	17.4	-7.6	4.4	2.1	1.6	0.7
94III	10.8	2.1	22.6	-14.0	13.7	2.1	16.0	-4.4	4.2	2.1	8.0	-5.9
94IV	11.6	2.3	4.4	4.9	13.0	2.3	-2.8	13.5	4.7	2.3	-1.0	3.5
95 I	12.7	2.2	15.1	-4.6	14.4	2.2	6.2	6.0	5.3	2.2	9.6	-6.6
95 II	15.1	1.4	75.9	-62.2	13.2	1.4	49.8	-38.0	5.6	1.4	46.9	-42.6
95III	13.1	0.8	-31.6	43.9	11.5	0.8	-34.3	45.0	5.8	0.8	-35.1	40.1
95IV	13.6	0.5	-22.1	35.3	11.3	0.5	-24.7	35.5	6.4	0.5	-16.9	22.8
96 I	13.0	0.5	-11.4	23.9	10.5	0.5	-9.2	19.3	6.9	0.5	-14.0	20.4
96 II	14.5	0.5	-2.3	16.2	11.2	0.5	-5.0	15.6	6.8	0.5	-13.2	19.6
96III	14.8	0.5	-3.8	18.2	14.2	0.5	11.0	2.7	6.9	0.5	-5.8	12.2
96IV	13.6	0.5	-12.0	25.1	13.9	0.5	-6.6	20.0	7.3	0.5	-9.6	16.4

	Philippines				Thailand			
	ITP	ITJ	PSY	SPJP	ITT	ITJ	BHY	SPJT
90 I	21.0	6.5	-4.6	19.0	10.3	6.5	-13.0	16.8
90 II	23.7	7.1	-13.1	29.7	12.0	7.1	-16.0	20.9
90III	23.4	7.4	69.2	-53.2	14.7	7.4	23.2	-16.0
90IV	26.6	7.9	134.4	-115.7	14.4	7.9	42.2	-35.7
91 I	25.2	8.1	1.6	15.5	13.6	8.1	-6.7	12.2
91 II	19.5	8.0	-14.2	25.6	12.8	8.0	-6.7	11.5
91III	19.8	7.3	-4.9	17.5	10.7	7.3	3.9	-0.5
91IV	21.4	6.5	17.4	-2.5	7.5	6.5	21.6	-20.6
92 I	18.6	5.5	-6.0	19.1	5.5	5.5	3.2	-3.3
92 II	15.1	4.7	-8.4	18.7	7.7	4.7	-4.8	7.7
92III	15.6	4.2	-0.2	11.6	7.4	4.2	13.4	-10.2
92IV	14.8	3.9	8.6	2.3	7.2	3.9	8.9	-5.6
93 I	13.3	3.5	12.0	-2.1	8.1	3.5	8.2	-3.5
93 II	10.9	3.2	82.5	-74.8	8.6	3.2	40.3	-34.9
93III	10.9	3.1	39.8	-32.0	6.3	3.1	18.3	-15.0
93IV	14.7	2.5	-1.6	13.8	3.1	2.5	-7.3	7.9
94 I	15.1	2.3	-9.4	22.2	7.2	2.3	2.7	2.3
94 II	14.8	2.1	9.9	2.7	8.0	2.1	14.0	-8.1
94III	11.3	2.1	2.6	6.5	7.4	2.1	14.6	-9.4
94IV	9.8	2.3	-21.9	29.4	6.4	2.3	1.2	2.9
95 I	11.7	2.2	21.8	-12.3	13.3	2.2	10.0	1.0
95 II	14.2	1.4	87.8	-74.9	11.1	1.4	60.4	-50.7
95III	10.1	0.8	-36.3	45.6	9.2	0.8	-31.9	40.3
95IV	11.0	0.5	-21.5	32.1	10.2	0.5	-23.6	33.3
96 I	12.8	0.5	-14.4	26.7	7.3	0.5	-13.8	20.7
96 II	12.9	0.5	-6.6	19.0	7.2	0.5	-5.9	12.6
96III	12.1	0.5	-4.5	16.1	11.4	0.5	-4.5	15.4
96IV	11.6	0.5	-12.1	23.2	11.0	0.5	-10.7	21.2

Figure 3.3.3.a-iii Super Risk Premium against US in 1999-2001



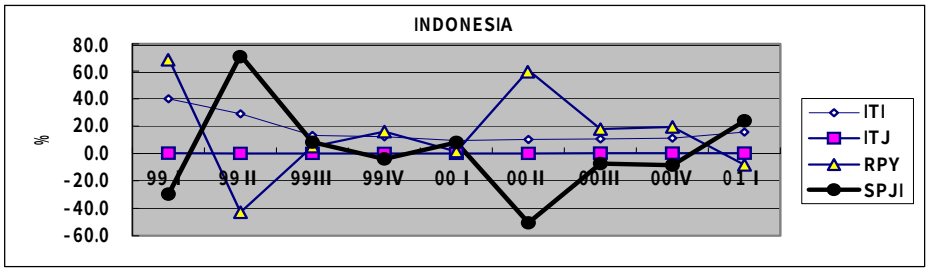
Note: IT: Interest Rate, SPU: Super Risk Premium againist U.S., I: Indonesia, K: Korea, M: Malaysia, P: Philippines, T: Thailand, U: United States, RPU: Rupiah/$, WOU: Won/$, RGU: Ringgit/$, PSU: Peso/$, BHU: Baht/$.
Source: IFS(IMF)

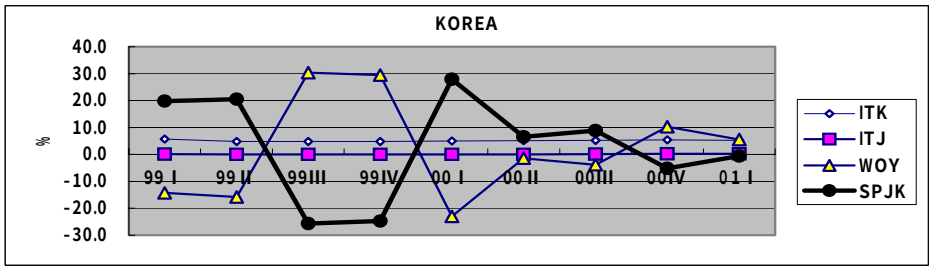
Table 3.3.3.a-iii Super Risk Premium against US in 1999-2001

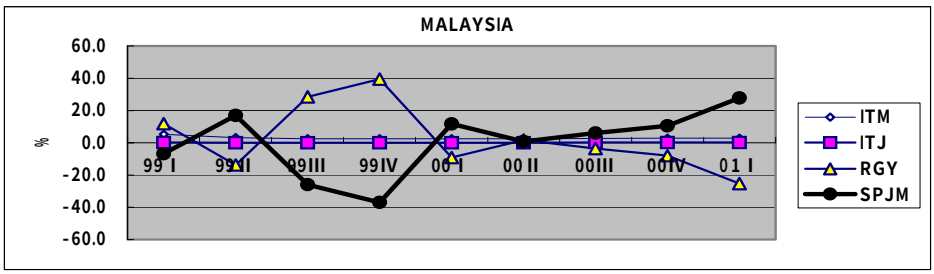
	Indonesia				Korea				Malaysia			
	ITI	ITU	RPU	SPUI	ITK	ITU	WOU	SPUK	ITM	ITU	RGU	SPUM
99 I	40.0	4.4	51.6	-16.1	5.7	4.4	-23.3	24.5	5.3	4.4	0.1	0.8
99 II	29.0	4.5	-33.6	58.1	4.8	4.5	-2.3	2.7	3.1	4.5	0.0	-1.3
99III	13.2	4.7	-18.3	26.8	4.8	4.7	1.5	-1.5	2.6	4.7	0.0	-2.1
99IV	12.2	5.1	-16.8	24.0	4.8	5.1	-7.2	6.9	2.6	5.1	0.0	-2.5
00 I	9.5	5.5	11.5	-7.6	5.0	5.5	-15.3	14.7	2.6	5.5	0.0	-3.0
00 II	10.2	5.8	58.0	-53.7	5.1	5.8	-3.1	2.4	2.5	5.8	0.0	-3.3
00III	10.6	6.0	22.1	-17.6	5.2	6.0	-0.3	-0.5	2.7	6.0	0.0	-3.3
00IV	11.1	6.0	29.7	-24.6	5.4	6.0	19.8	-20.5	2.8	6.0	0.0	-3.2
01 I	15.6	4.9	22.4	-11.8	5.2	4.9	41.1	-40.8	2.8	4.9	0.0	-2.1

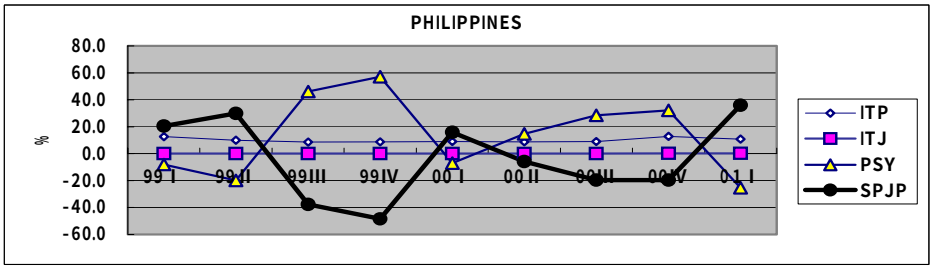
	Philippines				Thailand			
	ITP	ITU	PSU	SPUP	ITT	ITU	BHU	SPUT
99 I	12.7	4.4	-17.7	26.0	2.7	4.4	1.2	-2.9
99 II	10.0	4.5	-7.1	12.7	1.5	4.5	0.9	-3.9
99III	8.5	4.7	13.8	-10.0	1.5	4.7	12.6	-15.8
99IV	8.8	5.1	12.7	-9.0	1.4	5.1	5.4	-9.0
00 I	8.9	5.5	2.2	1.2	2.1	5.5	-11.6	8.1
00 II	8.8	5.8	12.7	-9.7	2.0	5.8	11.2	-15.0
00III	9.0	6.0	33.2	-30.2	2.0	6.0	26.4	-30.4
00IV	12.9	6.0	43.6	-36.7	1.8	6.0	25.2	-29.4
01 I	10.9	4.9	-0.1	6.0	1.7	4.9	-1.2	-2.0

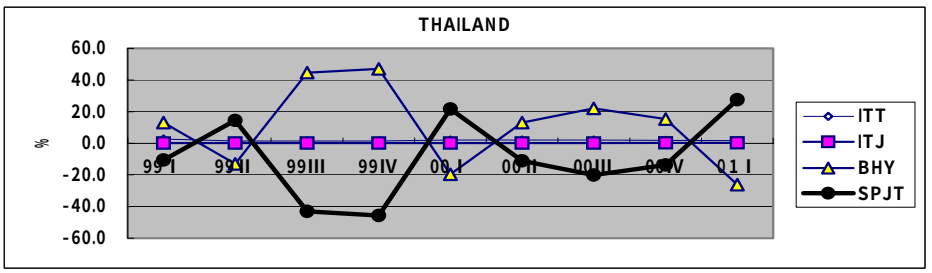
Figure 3.3.3.a-iv Super Risk Premium against Japan in 1999-2001











Note: IT: Interest Rate, SPU: Super Risk Premium againist Japan, I: Indonesia, K: Korea, M: Malaysia, P: Philippines, T: Thailand, J: Japan, RPY: Rupiah/\, WOY: Won/\, RGY: Ringgit/\, PSY: Peso/\, BHY: Baht/\.
Source: IFS(IMF)

Table 3.3.3.a-iii Super Risk Premium against Japan in 1999-2001

	Indonesia				Korea				Malaysia			
	ITI	ITJ	RPY	SPJI	ITK	ITJ	WOY	SPJK	ITM	ITJ	RGY	SPJM
99 I	40.0	0.2	69.5	-29.7	5.7	0.2	-14.3	19.8	5.3	0.2	11.9	-6.8
99 II	29.0	0.0	-42.8	71.7	4.8	0.0	-15.8	20.5	3.1	0.0	-13.8	16.9
99III	13.2	0.0	4.9	8.3	4.8	0.0	30.4	-25.7	2.6	0.0	28.4	-25.9
99IV	12.2	0.0	16.1	-3.9	4.8	0.0	29.4	-24.7	2.6	0.0	39.5	-36.9
00 I	9.5	0.0	1.4	8.1	5.0	0.0	-23.0	27.9	2.6	0.0	-9.1	11.6
00 II	10.2	0.0	60.7	-50.6	5.1	0.0	-1.4	6.5	2.5	0.0	1.7	0.8
00III	10.6	0.1	17.8	-7.4	5.2	0.1	-3.9	8.9	2.7	0.1	-3.5	6.1
00IV	11.1	0.3	19.4	-8.5	5.4	0.3	10.3	-5.2	2.8	0.3	-7.9	10.5
01 I	15.6	0.2	-8.4	23.8	5.2	0.2	5.5	-0.6	2.8	0.2	-25.2	27.8

	Philippines				Thailand			
	ITP	ITJ	PSY	SPJP	ITT	ITJ	BHY	SPJT
99 I	12.7	0.2	-8.1	20.6	2.7	0.2	13.1	-10.6
99 II	10.0	0.0	-19.9	29.9	1.5	0.0	-13.0	14.4
99III	8.5	0.0	46.1	-37.6	1.5	0.0	44.6	-43.1
99IV	8.8	0.0	57.2	-48.4	1.4	0.0	47.0	-45.6
00 I	8.9	0.0	-7.1	16.0	2.1	0.0	-19.6	21.7
00 II	8.8	0.0	14.6	-5.8	2.0	0.0	13.1	-11.1
00III	9.0	0.1	28.5	-19.6	2.0	0.1	21.9	-20.1
00IV	12.9	0.3	32.2	-19.5	1.8	0.3	15.2	-13.7
01 I	10.9	0.2	-25.3	35.9	1.7	0.2	-26.1	27.6

Table 3.3.3.b-i Unit Root Tests on Data for Regressions on Capital Inflows

Variables	ADF Statistic		PP Statistic	
	Intercept	Trend and intercept	Intercept	Trend and intercept
<Other Investments>				
SCFI/GDPI	-2.665*	-3.320*	-4.515***	-5.512***
SCFK/GDPK	-2.817*	-3.711**	-2.849*	-3.820**
SCFP/GDPP	-3.521**	-5.517***	-4.750***	-6.544***
SCFT/GDPT	-2.966**	-2.820	-3.922***	-4.418***
<Portfolio and Other Investments>				
SCFK/GDPK	-1.982	-3.845**	-2.040	-4.652***
SCFP/GDPP	-2.592	-5.898***	-3.555**	-6.672***
SCFT/GDPT	-2.933*	-3.128	-3.673***	-4.515***
<Super Risk Premium>				
SPUI	-3.362**	-3.178	-3.225**	-2.951
SPUK	-2.388	-2.533	-3.176**	-3.474*
SPUP	-3.769***	-3.746**	-3.682***	-3.642**
SPUT	-5.419***	-5.438***	-5.274***	-5.268***
SPJI	-4.762***	-4.762***	-5.355***	-5.375***
SPJK	-4.810***	-4.742***	-5.128***	-5.062***
SPJP	-5.086***	-5.088***	-4.868***	-4.868***
SPJT	-4.385***	-4.407***	-5.138***	-5.221***

Notes:
1) SCFI/GDPI, SCFK/GDPK, SCFP/GDPP and SCFT/GDPT are the ratio of short-term capital inflow relative to GDP in Indonesia, Korea, Philippines and Thailand. SPUI, SPUK SPUP and SPUT are the super risk premium against the U.S. of Indonesia, Korea Philippines and Thailand. SPJI, SPJK, SPJP and SPJT are the super risk premium against Japan of Indonesia, Korea, Philippines and Thailand.
2) The sample period is from the first quarter of 1987 to the forth quarter of 1996.
3) The lag truncation is one quarter in the ADF test, and three quarters in the PP test.
4) ***, **, and * indicate rejection of the null of nonstationarity at the 1 percent, 5 percent, and 10 percent significance levels with critical values taken from Davidson and MacKinnon (1993).

Source: IFS(IMF)

Table 3.3.3.b-ii Results of Regressions on Capital Inflow Functions

<Other Investments>

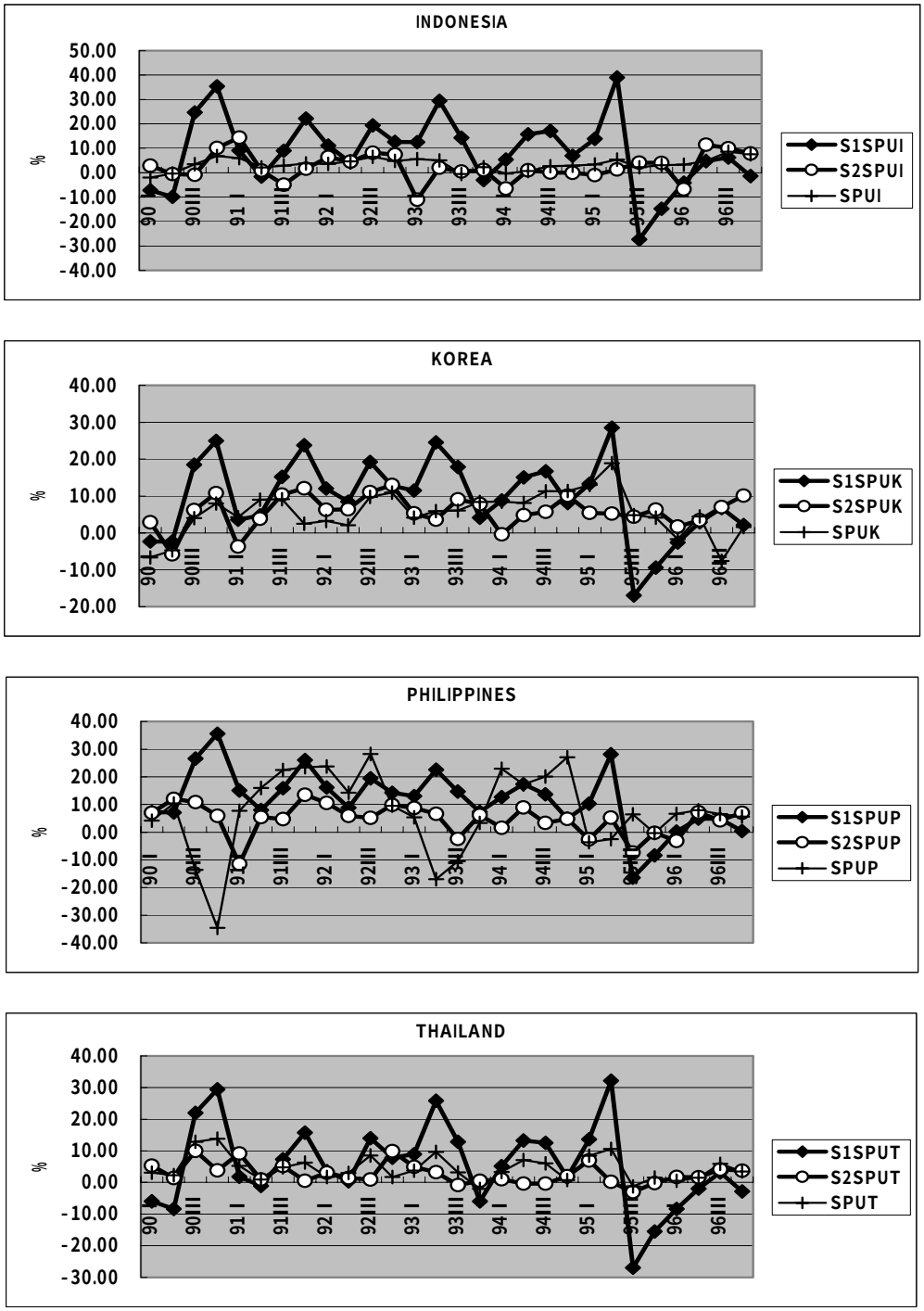
	SPU	SPJ	Adj R**2	AR(1)	D.W.
Indonasia	0.24 **	-0.00	0.24	YES	2.35
Korea	0.16 ***	0.03 **	0.69	YES	2.01
Philippines	0.25 ***	-0.00	0.16	YES	1.87
Thailand	0.97 ***	0.11 ***	0.33	NO	2.07

<Portfolio and Other Investments>

	SPU	SPJ	Adj R**2	AR(1)	D.W.
Korea	0.20 ***	0.05 ***	0.79	YES	2.14
Philippines	0.25 **	-0.00	0.27	YES	1.97
Thailand	1.53 ***	0.22 ***	0.31	NO	1.94

Notes:
1) SPU: Super risk premium of each currency against the U.S.
SPJ: Super risk premium of each currency against Japan
Adj R**2: Adjusted R-squared
AR(1): Adjusted for Autocorrelation by adopting Cochrane-Orcutt procedure
D.W.: Durbin-Watson Statistic
2) The sample period is from the first quarter of 1987 to the forth quarter of 1996.
3) *, **, *** indicate that the coefficient is significant at the 90, 95, and 99 percent level respectively.
Source: IFS(IMF)

Figure 3.3.3.c-i Alternative Super Risk Premiums against U.S.

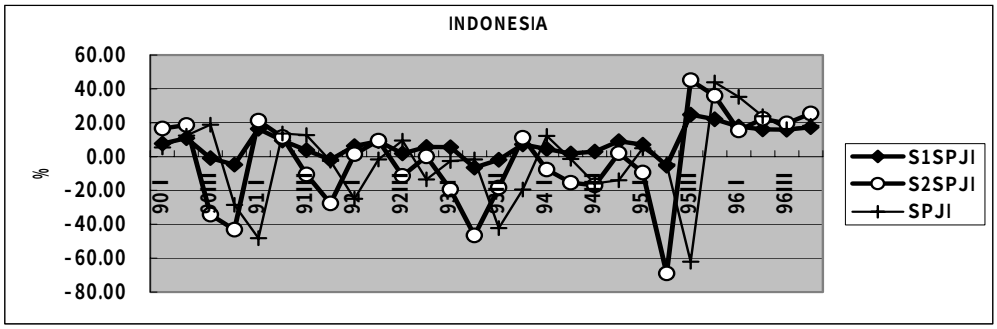


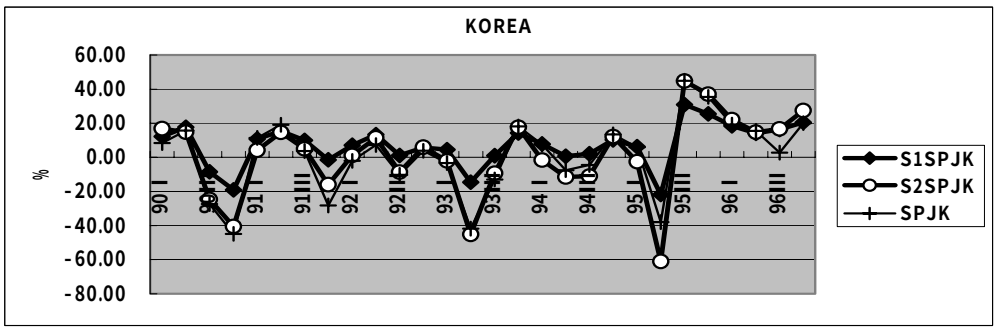
Note: See Figure 3.3.3.a-i.
S1 is the case of adopting the basket peg system.
S2 is the case of adopting the inflation slide.

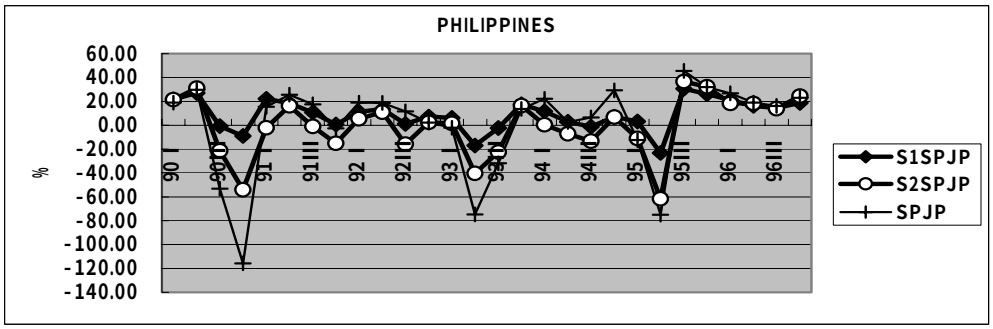
Table 3.3.3.c-i Alternative Super Risk Premiums against U.S.

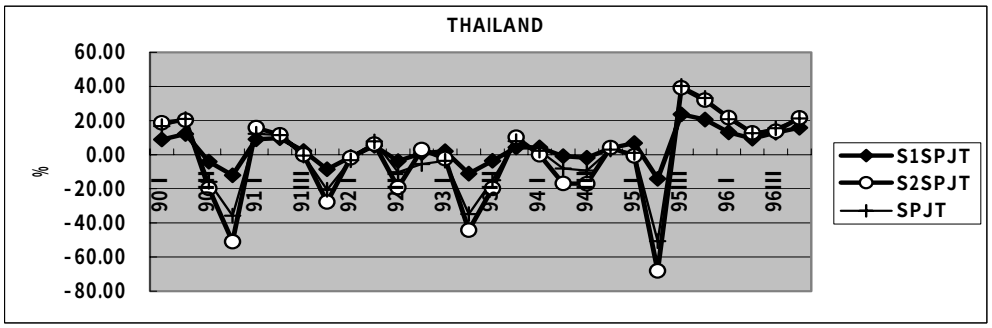
	Indonesia			Korea			Philippines			Thailand		
	S1SPUI	S2SPUI	SPUI	S1SPUK	S2SPUK	SPUK	S1SPUP	S2SPUP	SPUP	S1SPUT	S2SPUT	SPUT
90 I	-7.2	2.9	-2.0	-2.4	2.9	-6.7	7.2	7.0	4.2	-5.9	5.3	3.1
90 II	-9.9	-0.5	-0.4	-2.3	-5.8	-4.8	7.1	12.1	10.4	-8.4	1.4	2.3
90III	24.6	-0.9	3.4	18.5	6.2	4.0	26.6	10.9	-13.6	22.0	10.0	12.9
90IV	35.4	10.1	6.8	25.0	10.8	8.0	35.6	5.9	-34.6	29.4	3.8	13.8
91 I	9.1	14.4	5.9	3.6	-3.7	4.3	15.1	-11.5	7.7	1.8	9.2	5.2
91 II	-1.6	0.9	2.2	4.7	3.8	9.0	8.0	5.4	16.0	-1.1	0.9	0.9
91III	9.0	-4.9	2.9	15.2	10.4	9.2	15.9	4.7	22.5	7.3	5.1	4.8
91IV	22.2	1.7	3.8	23.8	12.1	2.5	26.1	13.5	23.5	15.8	0.5	6.3
92 I	11.1	6.4	3.6	12.0	6.2	3.2	16.1	10.6	23.8	3.6	3.1	1.7
92 II	4.2	4.5	4.6	8.4	6.4	2.1	8.8	5.9	14.3	0.4	1.4	3.0
92III	19.4	8.2	6.5	19.3	11.1	9.7	19.4	5.2	28.3	14.0	0.9	8.5
92IV	12.6	7.4	4.8	12.8	13.0	10.9	14.3	9.9	9.6	7.8	9.9	1.7
93 I	12.5	-11.0	5.6	11.4	5.3	4.1	13.1	8.8	5.4	9.0	4.9	3.7
93 II	29.5	2.1	5.0	24.5	3.6	5.9	22.6	6.6	-17.0	25.8	3.2	9.6
93III	14.3	0.4	-0.6	17.9	9.1	6.0	14.7	-2.5	-10.5	12.8	-0.8	3.2
93IV	-3.1	1.1	2.3	4.1	7.8	8.4	7.4	6.2	3.3	-6.0	0.5	-2.0
94 I	5.3	-6.5	-0.4	8.8	-0.4	8.5	12.7	1.6	23.0	5.2	1.0	3.3
94 II	15.7	1.0	0.7	15.1	4.8	8.1	17.4	8.9	17.3	13.3	-0.4	7.1
94III	17.1	0.1	2.7	16.7	5.7	11.3	13.7	3.3	20.1	12.5	-0.4	6.1
94IV	6.9	0.0	2.9	8.1	10.1	11.4	4.9	4.8	27.1	1.7	1.9	0.8
95 I	13.8	-1.0	3.4	13.3	5.4	13.0	10.3	-2.6	-3.7	13.7	6.9	8.5
95 II	39.0	1.3	5.4	28.5	5.3	18.9	28.1	5.3	-2.5	32.2	0.2	10.6
95III	-27.3	4.1	2.2	-17.0	4.4	4.8	-16.5	-7.4	6.5	-26.9	-3.0	-1.2
95IV	-14.7	4.0	3.0	-9.4	6.3	4.1	-8.4	-0.2	-0.3	-15.5	-0.2	1.6
96 I	-4.1	-6.8	3.3	-2.6	1.7	-1.7	0.3	-3.2	6.6	-8.4	1.7	0.5
96 II	4.7	11.4	4.9	2.9	3.4	4.4	4.9	7.2	7.9	-2.0	1.6	1.5
96III	6.2	10.0	8.6	6.7	7.0	-7.6	4.8	4.2	6.6	3.2	4.1	5.8
96IV	-1.4	7.8	7.5	2.1	10.1	1.6	0.4	7.0	5.6	-2.8	3.8	3.4
Average	8.7	2.4	3.5	9.6	5.8	5.5	11.8	4.6	7.4	5.5	2.7	4.5

Figure 3.3.3.c-ii Alternative Super Risk Premiums against Japan









Note: See Figure 3.3.3.a-ii.
S1 is the case of adopting the basket peg system.
S2 is the case of adopting the inflation slide.

Table 3.3.3.c-ii Alternative Super Risk Premiums against Japan

	Indonesia			Korea			Philippines			Thailand		
	S1SPJI	S2SPJI	SPJI	S1SPJK	S2SPJK	SPJK	S1SPJP	S2SPJP	SPJP	S1SPJT	S2SPJT	SPJT
90 I	7.7	16.6	12.3	12.2	16.8	8.4	21.7	21.5	19.0	8.9	18.7	16.8
90 II	10.9	18.6	18.7	17.7	14.8	15.7	26.9	31.0	29.7	12.2	20.2	20.9
90III	-0.9	-34.2	-28.5	-8.5	-24.6	-27.5	-0.7	-21.2	-53.2	-4.0	-19.7	-16.0
90IV	-4.8	-43.2	-48.2	-19.0	-40.6	-44.8	-8.9	-54.2	-115.7	-12.0	-51.0	-35.7
91 I	16.4	21.3	13.6	10.8	4.1	11.4	22.3	-2.0	15.5	9.1	15.8	12.2
91 II	9.5	11.6	12.7	15.4	14.6	19.1	18.6	16.3	25.6	9.8	11.6	11.5
91III	3.8	-10.5	-2.5	10.0	5.0	3.8	10.7	-0.9	17.5	2.1	-0.1	-0.5
91IV	-1.8	-27.6	-24.9	-1.4	-16.1	-28.2	0.7	-15.0	-2.5	-8.6	-27.8	-20.6
92 I	6.2	1.3	-1.6	7.1	1.1	-2.0	11.2	5.4	19.1	-1.4	-1.8	-3.3
92 II	9.1	9.4	9.5	13.3	11.3	7.2	13.6	10.9	18.7	5.2	6.2	7.7
92III	1.8	-11.4	-13.5	1.1	-8.6	-10.2	1.2	-15.7	11.6	-3.8	-19.3	-10.2
92IV	5.7	0.2	-2.6	5.8	6.0	3.8	7.3	2.6	2.3	0.8	3.0	-5.6
93 I	5.6	-19.5	-1.8	4.5	-2.1	-3.4	6.1	1.5	-2.1	2.1	-2.3	-3.5
93 II	-6.5	-46.5	-42.2	-14.6	-45.2	-41.8	-17.0	-40.3	-74.8	-11.2	-44.3	-34.9
93III	-1.9	-18.3	-19.5	1.1	-9.3	-12.9	-2.2	-22.5	-32.0	-3.6	-19.7	-15.0
93IV	7.3	11.1	12.1	14.3	17.6	18.2	17.5	16.4	13.8	4.3	10.2	7.9
94 I	4.4	-7.7	-1.4	7.9	-1.6	7.5	11.7	0.4	22.2	4.2	-0.1	2.3
94 II	1.8	-15.4	-15.8	0.6	-11.5	-7.6	2.8	-7.2	2.7	-0.8	-16.9	-8.1
94III	3.0	-17.1	-14.0	2.0	-11.0	-4.4	-1.1	-13.4	6.5	-1.8	-17.0	-9.4
94IV	9.1	2.0	4.9	10.3	12.2	13.5	7.0	6.9	29.4	3.8	4.0	2.9
95 I	7.0	-9.4	-4.6	6.3	-2.5	6.0	3.2	-11.1	-12.3	6.8	-0.7	1.0
95 II	-5.4	-69.1	-62.2	-21.7	-61.0	-38.0	-23.1	-61.7	-74.9	-14.2	-68.2	-50.7
95III	24.7	45.1	43.9	30.9	44.7	45.0	30.7	36.6	45.6	23.6	39.1	40.3
95IV	22.1	36.0	35.3	25.5	37.1	35.5	26.1	32.2	32.1	20.7	32.0	33.3
96 I	17.6	15.4	23.9	18.5	22.2	19.3	21.3	18.4	26.7	13.1	21.7	20.7
96 II	16.1	22.4	16.2	14.2	14.7	15.6	16.2	18.3	19.0	9.4	12.8	12.6
96III	15.9	19.6	18.2	16.4	16.7	2.7	14.4	13.9	16.1	12.9	13.8	15.4
96IV	17.4	25.4	25.1	20.5	27.4	20.0	18.7	24.4	23.2	15.8	21.5	21.2
Average	7.2	-2.6	-1.3	7.2	1.2	1.1	9.2	-0.3	1.0	3.7	-2.1	0.5

Table 3.3.3.c-iii Means of Estimated and Simulated Values of Capital Inflow

<Other Investments: % of GDP>

		Indonesia	Korea	Philippines	Thailand
1987Q1-96Q4	estimated	1.02	1.48	2.37	5.18
	simulated(1)	2.19	1.69	3.37	6.47
	simulated(2)	0.88	0.97	1.61	3.61
1990Q1-96Q4	estimated	1.03	1.08	2.81	6.62
	simulated(1)	2.25	1.93	3.85	7.93
	simulated(2)	0.78	1.14	2.11	4.60

<Portfolio and Other Investments: % of GDP>

		Indonesia	Korea	Philippines	Thailand
1987Q1-96Q4	estimated	-	1.84	2.27	6.51
	simulated(1)	-	2.13	3.28	8.68
	simulated(2)	-	1.18	1.51	3.96
1990Q1-96Q4	estimated	-	1.31	2.67	8.08
	simulated(1)	-	2.40	3.73	10.27
	simulated(2)	-	1.38	1.97	4.79

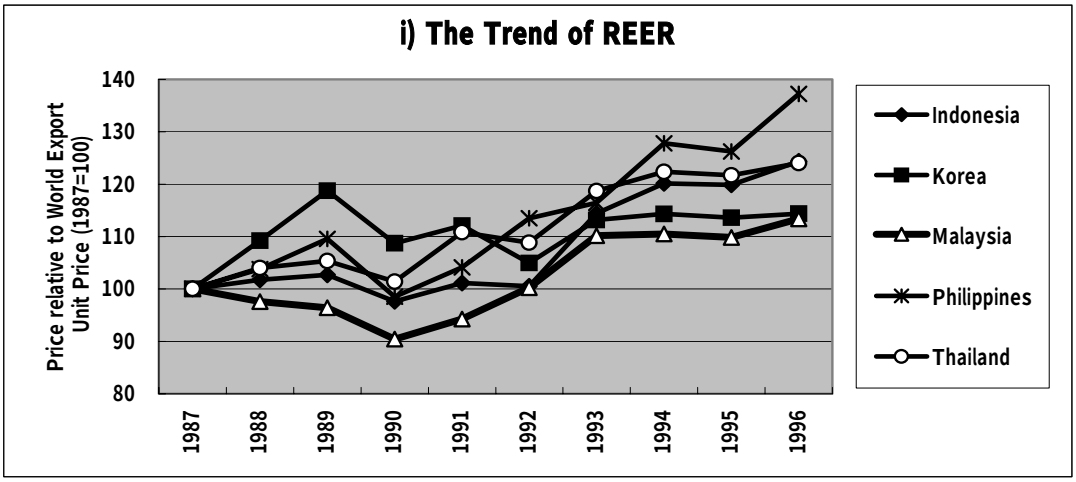
Notes:

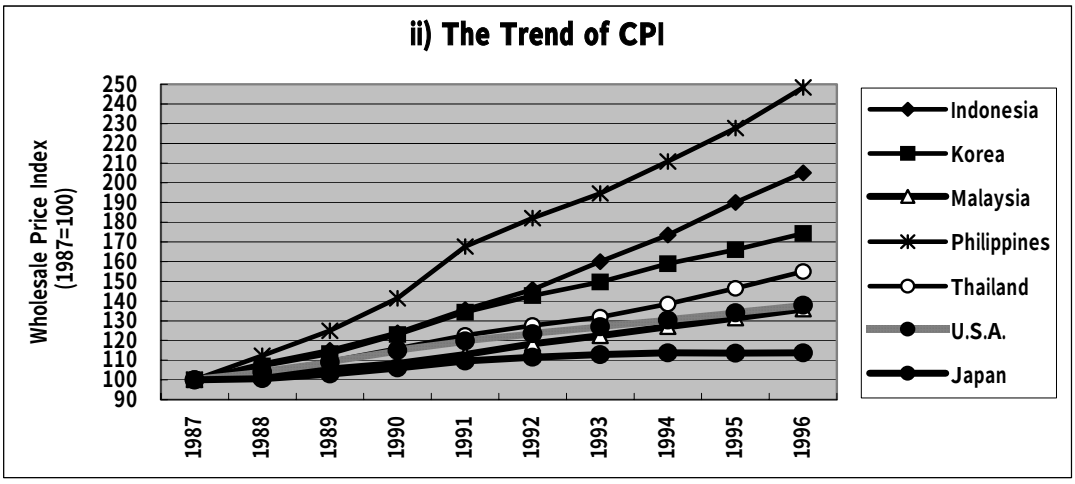
Simulated (1) is the case of adopting the basket pegging as exchange rate targeting.

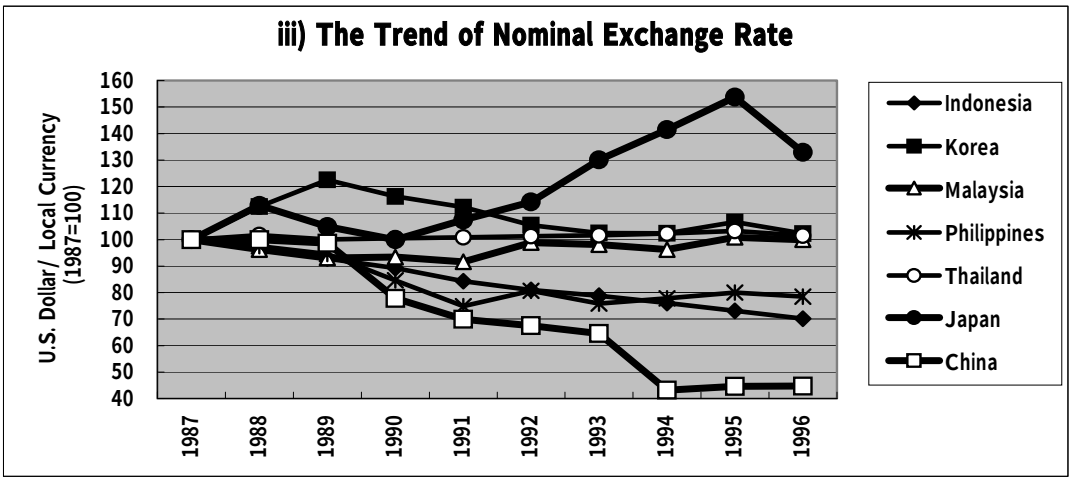
Simulated (2) is the case of adopting the inflation slide as exchange rate targeting.

source: IFS and DTSY (IMF).

Figure 3.4.1.a The Trends of REER, CPI, and Nominal Exchange Rate







Source: IFS (IMF)

Table 3.4.1.a The Trends of REER, CPI, and Nominal Exchange Rate

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
i) The Trend of REER (1987=100)										
Indonesia	100.0	101.7	102.7	97.6	101.1	100.5	114.4	120.1	119.8	124.4
Korea	100.0	109.2	118.8	108.7	112.1	105.0	113.2	114.3	113.6	114.4
Malaysia	100.0	97.6	96.4	90.4	94.2	100.2	110.2	110.5	109.8	113.4
Philippines	100.0	103.8	109.6	98.5	104.1	113.5	116.4	127.8	126.2	137.2
Thailand	100.0	104.0	105.4	101.4	110.8	108.9	118.7	122.3	121.7	124.0
ii) The Trend of CPI (1987=100)										
Indonesia	100.0	108.1	115.0	124.0	135.6	145.8	160.0	173.6	190.0	205.1
Korea	100.0	107.2	113.3	123.0	134.4	142.8	149.6	158.9	166.1	174.2
Malaysia	100.0	102.5	105.4	108.2	112.9	118.3	122.5	127.0	131.4	136.0
Philippines	100.0	112.2	125.0	141.5	167.7	182.1	194.6	210.8	227.8	248.3
Thailand	100.0	103.8	109.4	115.9	122.5	127.5	131.8	138.5	146.5	155.0
The United State	100.0	104.0	109.0	114.9	119.8	123.4	127.1	130.4	134.0	138.0
Japan	100.0	100.7	103.0	106.1	109.6	111.4	112.9	113.7	113.5	113.7
iii) The Trend of Nominal Exchange Rate (1987=100)										
Indonesia	100.0	97.5	92.9	89.2	84.3	81.0	78.8	76.1	73.1	70.2
Korea	100.0	112.5	122.5	116.2	112.2	105.4	102.5	102.4	106.7	102.3
Malaysia	100.0	96.2	93.0	93.3	91.6	98.8	98.1	96.2	100.8	100.0
Philippines	100.0	97.5	94.6	84.6	74.9	80.6	75.8	77.9	80.0	78.5
Thailand	100.0	101.7	100.1	100.5	100.8	101.3	101.6	102.3	103.2	101.5
Japan	100.0	112.9	104.8	99.9	107.4	114.2	130.1	141.5	153.8	133.0
China	100.0	100.0	98.7	77.8	69.9	67.5	64.6	43.2	44.6	44.8

Table 3.4.1.b-i The Unit Root Tests on Data for Regressions on Trade Balance

Variables	ADF Statistic		PP Statistic	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Indonesia (1973-1996)				
⊿ln(TB)	-4.39 ***	-4.27 **	-4.96 ***	-4.82 ***
⊿ln(REER)	-3.89 ***	-3.80 **	-3.75 ***	-3.65 **
⊿ln(YR)	-3.28 **	-3.17	-3.41 **	-3.26 *
⊿ln(WYR)	-5.00 ***	-4.91 ***	-4.45 ***	-4.27 **
Korea (1962-1996)				
⊿ln(TB)	-4.24 ***	-5.84 ***	-4.23 ***	-4.81 ***
⊿ln(REER)	-6.50 ***	-6.79 ***	-10.00 ***	-9.79 ***
⊿ln(YR)	-4.56 ***	-4.59 ***	-5.34 ***	-5.26 ***
⊿ln(WYR)	-4.35 ***	-5.55 ***	-4.29 ***	-5.02 ***
Malaysia (1962-1996)				
⊿ln(TB)	-5.18 ***	-5.15 ***	-5.95 ***	-5.87 ***
⊿ln(REER)	-4.10 ***	-4.14 **	-3.91 ***	-3.80 **
⊿ln(YR)	-3.92 ***	-4.07 **	-5.45 ***	-5.53 ***
⊿ln(WYR)	-4.35 ***	-5.55 ***	-4.29 ***	-5.02 ***
Philippines (1962-1996)				
⊿ln(TB)	-6.52 ***	-6.45 ***	-7.56 ***	-7.50 ***
⊿ln(REER)	-6.05 ***	-6.15 ***	-7.19 ***	-7.92 ***
⊿ln(YR)	-3.32 **	-3.53 *	-3.02 **	-3.07
⊿ln(WYR)	-4.35 ***	-5.55 ***	-4.29 ***	-5.02 ***
Thailand (1962-1996)				
⊿ln(TB)	-4.26 ***	-4.21 **	-6.75 ***	-6.79 ***
⊿ln(REER)	-4.90 ***	-4.97 ***	-4.79 ***	-4.74 ***
⊿ln(YR)	-3.38 **	-3.33 *	-3.85 ***	-3.74 **
⊿ln(WYR)	-4.35 ***	-5.55 ***	-4.29 ***	-5.02 ***

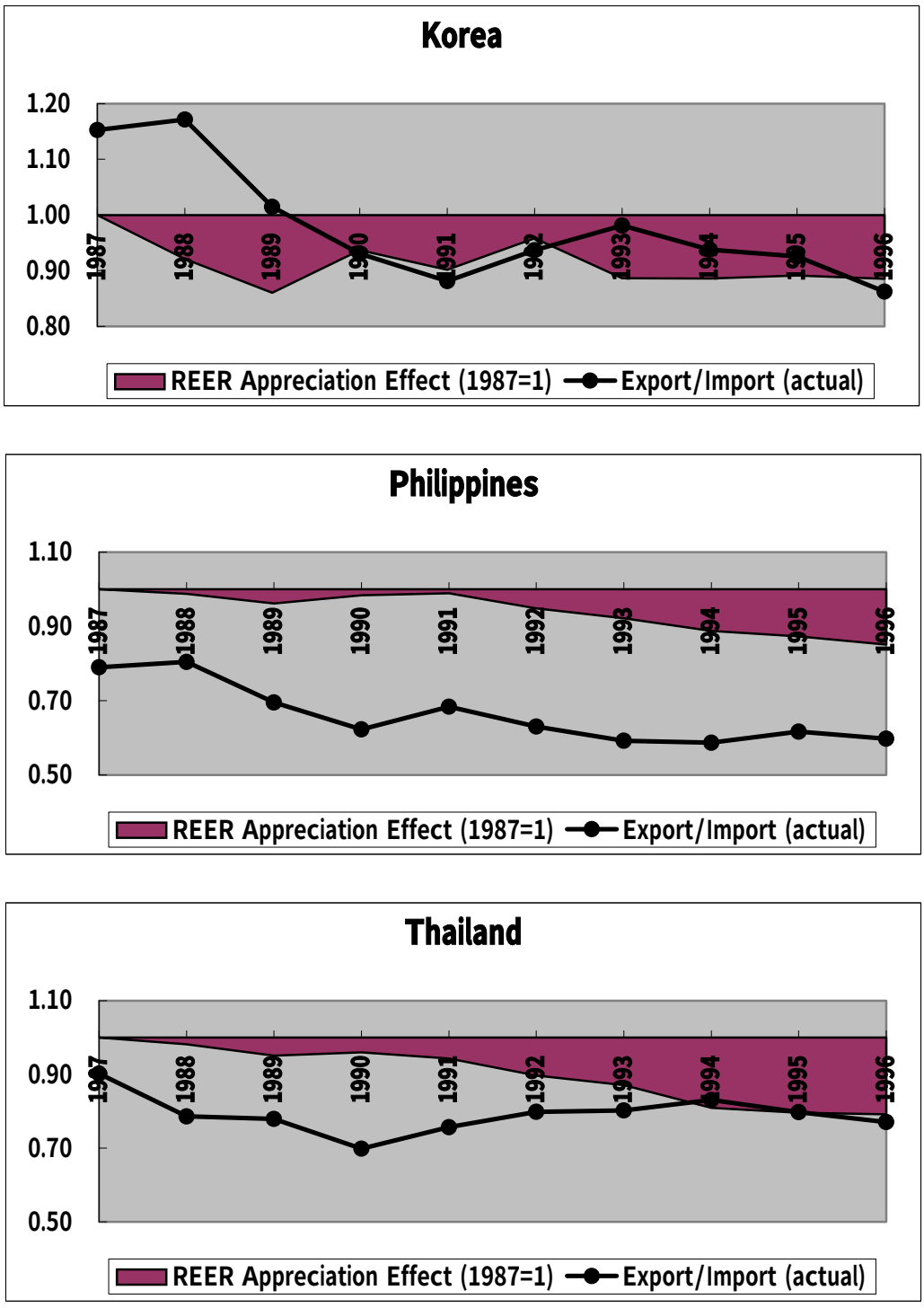
Notes:
1) The lag truncation is one quarter in the ADF test, and three quarters in the PP test.
2) ***, **, and * indicate rejection of the null of nonstationarity at the 1 percent, 5 percen and 10 percent significance levels with critical values taken from Davidson and MacKinnon (1993).
Source: IFS(IMF)

Table 3.4.1.b-i The Results of Regression on Trade Balance Functions

	Indonesia	Korea	Malaysia	Philippines	Thailand
Δln(REER)	-0.41	-0.90 ***	0.20	-0.33 **	-0.47
Δln($REER_{-1}$)	-0.07	0.11	0.27	-0.23	-0.64 *
Δln(YR)	-0.98	0.02	-0.28	-1.51 ***	-0.38
Δln(WYR)	4.11 ***	1.35 *	0.79	1.74 ***	0.48
Adj R^2	0.40	0.27	0.04	0.32	0.14
D.W.	1.98	1.37	2.04	2.65	2.48
Sample	1973-1996	1962-1996	1962-1996	1962-1996	1962-1996

Notes:
1) The specified Trade Balance Function is:
$\Delta\ln(TB) = \alpha_1\Delta\ln(REER) + \alpha_2\Delta\ln(REER_{-1}) + \beta\Delta\ln(YR) + \gamma\Delta\ln(WYR)$
TB: Trade Balance (Export/Import)
REER: Real Effective Exchange Rate
YR: Real GDP
WYR: Industiral Production (Industrial Countries)
2) *, **, *** indicate that the coefficient is significant at the 90, 95, and 99 percent level.

Figure 3.4.1.c The Effect of REER Appreciation on Trade Balance



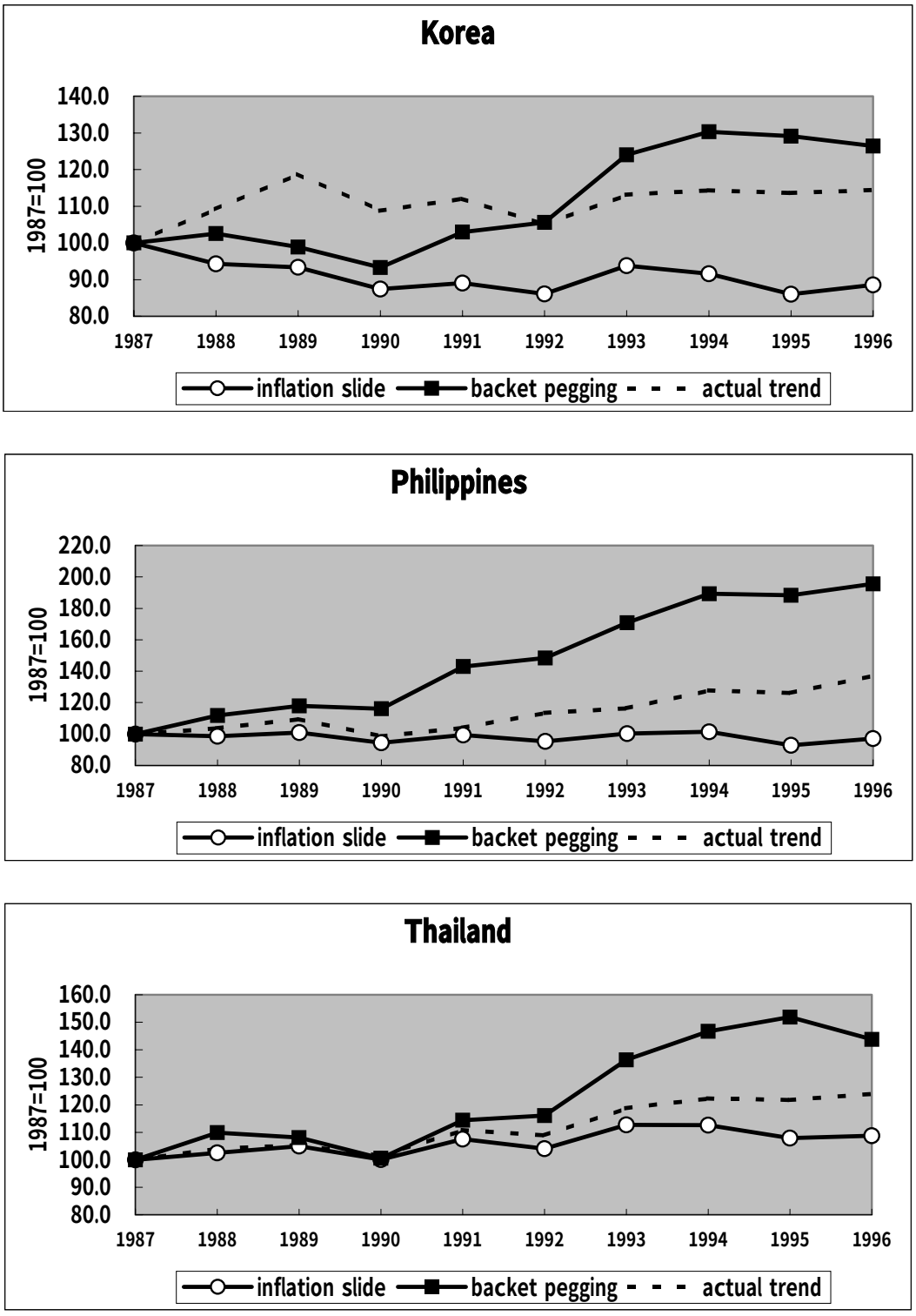
Source: IFS (IMF)

Table 3.4.1.c The Effect of REER Appreciation on Trade Balance

	Actual Trade Balance (Export/Import)			The cumulative Effect of REER Appreciation (1987=1.0)		
	Korea	Philippines	Thailand	Korea	Philippines	Thailand
1987	1.15	0.79	0.90	1.00	1.00	1.00
1988	1.17	0.80	0.79	0.92	0.99	0.98
1989	1.01	0.70	0.78	0.86	0.96	0.95
1990	0.93	0.62	0.70	0.94	0.98	0.96
1991	0.88	0.68	0.76	0.90	0.99	0.94
1992	0.94	0.63	0.80	0.96	0.95	0.90
1993	0.98	0.59	0.80	0.89	0.92	0.87
1994	0.94	0.59	0.83	0.89	0.89	0.81
1995	0.93	0.62	0.80	0.89	0.87	0.80
1996	0.86	0.60	0.77	0.89	0.85	0.79
1996-87	-0.29	-0.19	-0.13	-0.11	-0.15	-0.21

Source: IFS (IMF)

Figure 3.4.1.d Simulations on REER

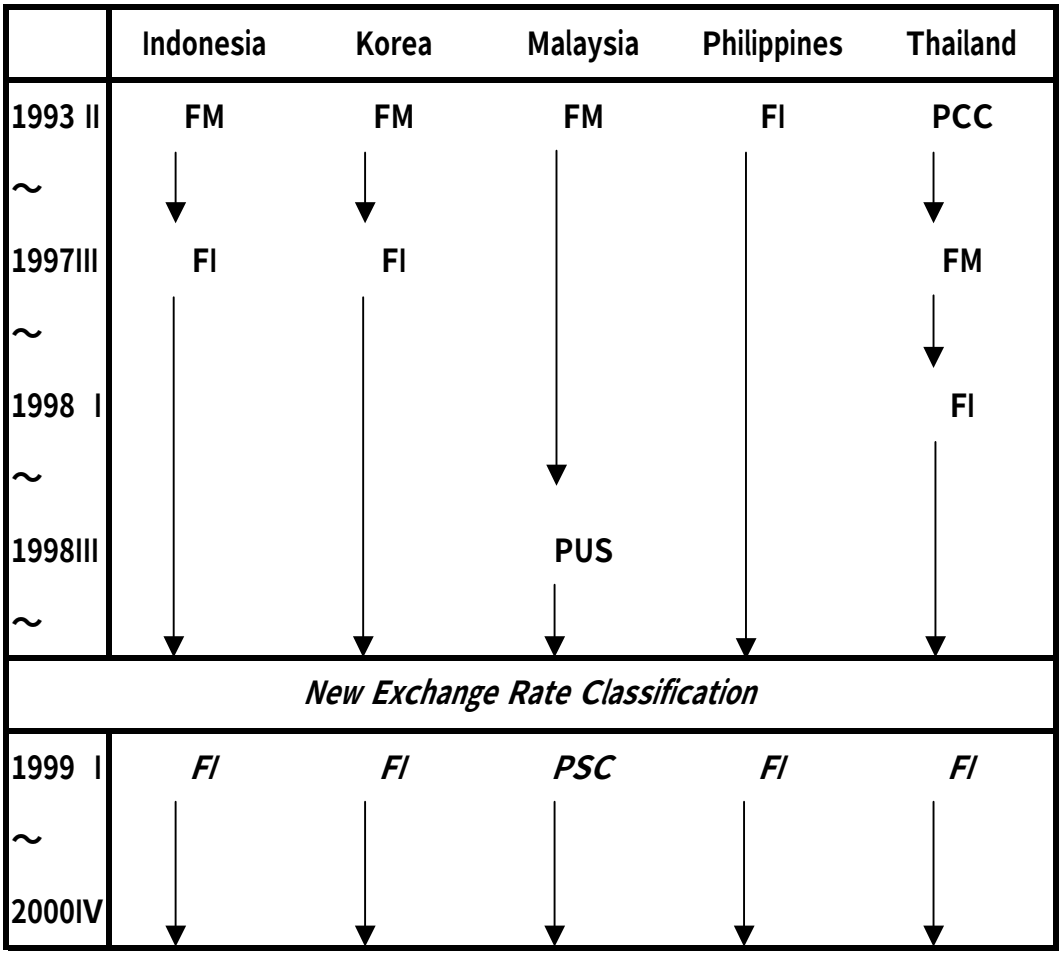


Source: IFS (IMF)

Table 3.4.1.d Simulations on REER

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Korea (1987=100)										
Actual Trend	100.0	109.2	118.8	108.7	112.1	105.0	113.2	114.3	113.6	114.4
Basket Pegging	100.0	102.5	98.9	93.3	103.0	105.6	124.0	130.3	129.1	126.4
Inflation Slide	100.0	94.3	93.3	87.4	89.1	86.1	93.8	91.6	86.0	88.6
Philippines (1987=100)										
Actual Trend	100.0	103.8	109.6	98.5	104.1	113.5	116.4	127.8	126.2	137.2
Basket Pegging	100.0	111.9	117.9	116.0	142.9	148.4	170.9	189.3	188.4	195.7
Inflation Slide	100.0	98.6	101.0	94.6	99.4	95.4	100.2	101.5	92.8	97.2
Thailand (1987=100)										
Actual Trend	100.0	104.0	105.4	101.4	110.8	108.9	118.7	122.3	121.7	124.0
Basket Pegging	100.0	109.9	108.1	100.6	114.4	116.1	136.3	146.7	151.9	143.8
Inflation Slide	100.0	102.5	104.9	100.1	107.5	104.0	112.7	112.6	107.9	108.8

Table 4.2.1 Developments of Exchange Rate Arrangements



Note: FM: Managed Float
FI: Independent Float
PUS: Pegged to U.S.dollar
PCC: Pegged to Currency Composite

FM: Managed Floating with no preannounced path for exchange rate
FI: Ondependently Floating
PSC: Conventional Fixed Peg Arrangements against a single currency

Source: IFS (IMF)

Table 4.2.2 Coefficient of Variation in Foreign Exchange Reserves

	Indonesia		Korea		Malaysia		Philippines		Thailand	
	C.V.	Regimes	C.V.	Regimes	C.V.	Regimes	C.V.	Regimes	C.V.	Regimes
1994	0.05		0.07		0.09		0.11		0.06	
1995	0.05	FM	0.09	FM	0.03	FM	0.08		0.08	PCC
1996	0.07		0.04		0.06		0.15		0.02	
1997	0.06	FM→FI	0.13	FM→FI	0.11		0.10	FI	0.15	PCC→FM
1998	0.12		0.24		0.09	FM→PUS	0.08		0.04	FM→FI
1999	0.04	FI	0.09	FI	0.06	PUS	0.08		0.06	FI
2000	0.07		0.07		0.05		0.04		0.01	

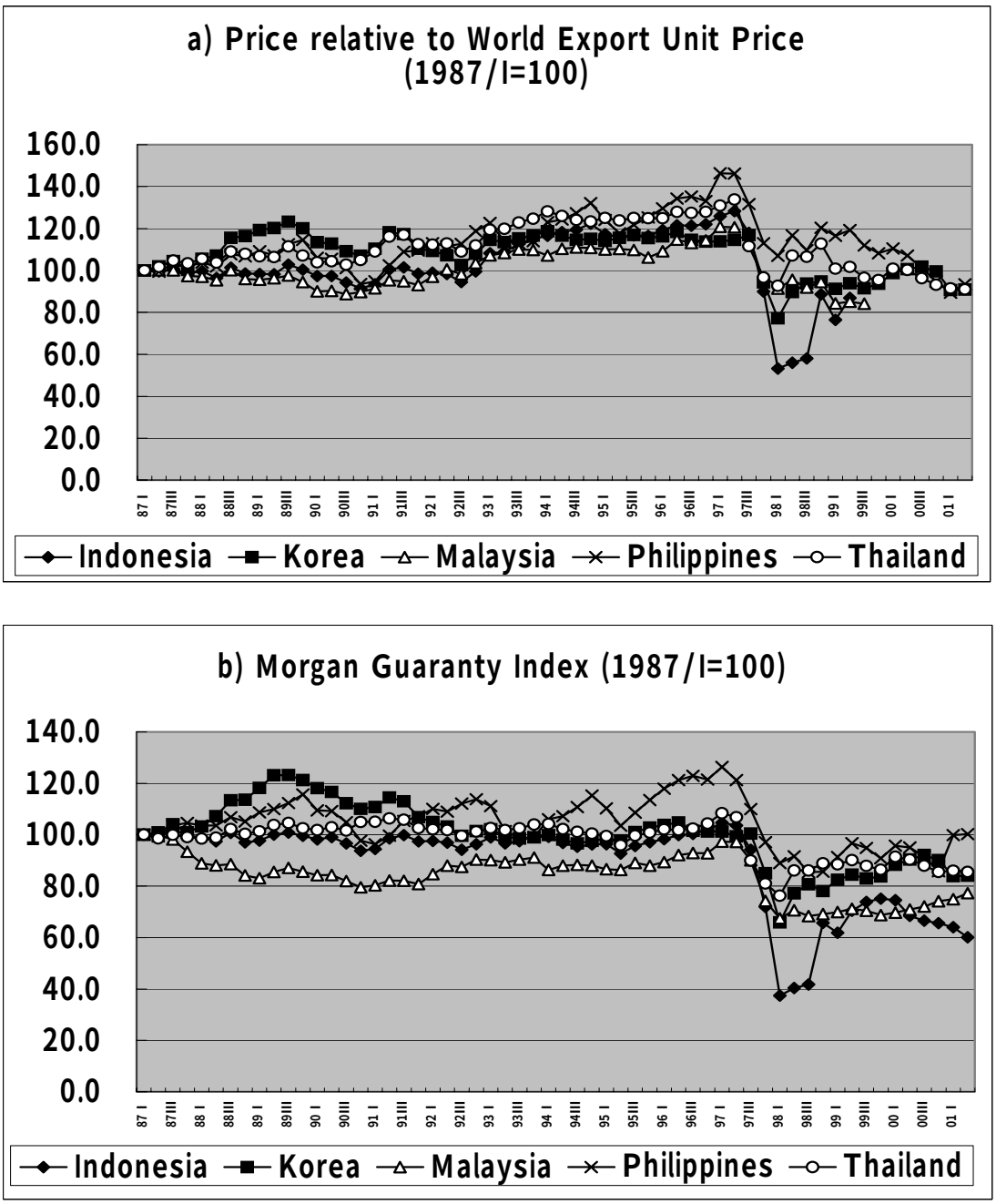
Notes:

1) C.V.: Coefficient of Variation in Foreign Exchange Reserves

2) The meanings of the simbols in Regimes are shown in Table 1.

Source: IFS (IMF)

Figure 4.2.3.a The Trend of Real Effective Exchange Rate



Notes:
1) All the indexes on exchange rates are expressed as the foreign currency price of a unit of domestic currency. Thus, an increase in the index means appreciation of the currency.
2) "Price relative to World Export Unit Price" is caluculated in case of Indonesia as follows. Exchange Rate (U.S. dollar/Rupiah) * Indonesian WPI (Rupiah base) / World Export Price Index (U.S. dollar base)

Source: JP Morgan (2002), IFS (IMF)

Table 4.2.3.a The Trend of Real Effective Exchange Rate

	Price relative to World Export Unit Price (87I=100)					Morgan Guarantee Index (87 I=100)				
	Indonesia	Korea	Malaysia	Philippines	Thailand	Indonesia	Korea	Malaysia	Philippines	Thailand
87 I	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
87 II	99.5	101.9	100.0	99.4	101.6	99.2	101.0	99.7	99.4	98.5
87III	100.2	104.5	100.0	103.2	104.7	102.1	104.1	98.2	103.7	99.9
87IV	98.5	100.3	97.3	101.9	103.3	99.7	100.9	93.4	104.6	99.0
88 I	99.6	105.6	97.0	103.7	105.5	98.8	103.2	88.9	103.5	98.4
88 II	96.4	107.1	95.3	101.8	103.7	97.4	107.2	88.0	103.6	98.8
88III	101.3	115.5	100.0	107.7	109.0	100.8	113.4	88.5	106.8	102.2
88IV	98.6	116.3	95.8	106.7	107.9	97.0	113.6	84.2	105.2	100.4
89 I	98.3	119.2	95.5	109.2	106.7	97.7	118.2	83.1	108.7	101.3
89 II	98.2	120.2	96.2	107.2	106.4	100.0	123.2	85.5	110.0	103.7
89III	102.8	123.1	97.6	112.5	111.4	100.8	123.2	87.1	112.3	104.5
89IV	100.3	120.0	94.4	114.5	107.1	99.5	121.3	85.6	115.7	102.5
90 I	97.3	113.4	89.9	105.9	103.8	98.2	118.1	84.2	109.5	101.8
90 II	97.3	112.7	90.3	105.5	104.3	99.0	116.6	84.4	109.2	102.8
90III	94.2	109.1	88.7	101.1	102.7	96.6	112.3	82.0	104.8	101.6
90IV	91.4	106.9	89.7	93.5	105.0	93.7	110.0	79.6	97.7	104.9
91 I	93.4	110.3	91.4	94.8	109.0	94.4	110.7	80.3	96.3	105.1
91 II	100.5	118.1	95.3	102.3	116.0	98.5	114.4	82.1	99.7	106.3
91III	101.4	117.3	94.8	108.8	116.9	99.9	113.0	82.1	105.4	105.9
91IV	98.3	110.3	93.0	109.5	112.4	97.4	106.9	80.8	107.2	102.6
92 I	98.9	109.2	97.0	112.9	112.3	97.5	105.0	84.7	110.0	102.1
92 II	98.3	107.2	100.5	111.5	112.9	96.9	103.2	88.0	109.0	101.8
92III	94.4	102.5	98.2	112.6	109.0	94.2	99.5	87.5	112.1	99.6
92IV	99.5	107.9	103.4	118.7	111.9	96.3	101.4	90.3	113.8	101.3
93 I	108.2	114.6	107.2	122.6	119.3	99.0	102.1	90.1	111.2	102.6
93 II	108.7	113.5	108.2	113.9	119.8	96.6	99.1	89.3	101.4	101.8
93III	112.6	115.2	110.0	112.9	122.8	97.5	98.6	90.3	98.5	102.5
93IV	115.0	116.5	109.7	113.9	124.6	99.4	99.0	91.1	99.0	104.0
94 I	116.4	118.6	107.0	122.9	128.1	99.2	99.8	86.3	106.0	104.2
94 II	118.3	116.6	110.3	124.3	126.0	96.8	98.1	88.0	107.2	102.2
94III	119.3	114.5	110.9	127.3	124.1	95.3	96.6	88.2	110.7	101.2
94IV	122.3	115.0	110.6	132.1	123.3	96.2	97.6	88.0	115.3	100.4
95 I	117.3	114.1	110.0	124.1	125.0	96.3	98.5	86.6	110.3	99.4
95 II	115.8	115.4	110.2	117.7	123.8	92.6	97.8	86.3	103.5	95.9
95III	116.7	116.8	109.8	121.7	125.0	95.6	101.1	89.0	108.6	99.6
95IV	116.5	115.4	106.1	125.3	124.9	97.1	102.8	88.0	113.4	100.8
96 I	119.2	116.2	109.1	129.5	124.9	98.3	103.8	89.4	117.9	102.1
96 II	121.5	118.3	114.6	134.3	127.9	99.8	104.7	92.1	121.2	101.8
96III	121.3	114.5	113.0	135.2	127.4	100.4	101.6	92.8	122.9	102.4
96IV	122.0	113.6	114.3	133.0	127.9	101.8	101.2	92.8	121.5	104.4
97 I	125.9	113.9	120.7	146.3	130.9	104.7	101.3	97.3	126.4	108.4
97 II	128.3	114.5	120.5	146.1	133.7	103.6	99.4	97.2	121.2	106.9
97III	117.9	116.8		131.6	111.5	94.2	100.4	90.0	109.9	89.9
97IV	89.9	94.2		112.9	96.6	71.8	85.0	74.2	97.1	81.0
98 I	53.1	77.2	91.3	106.9	92.7	37.4	65.9	67.5	88.9	76.3
98 II	56.0	89.6	95.5	116.7	107.1	40.3	77.2	70.6	91.6	86.1
98III	58.0	93.7	91.8	109.6	106.4	41.8	80.7	68.3	85.4	86.1
98IV	88.6	94.7	94.5	120.3	112.7	65.7	78.0	69.2	85.6	88.9
99 I	76.4	91.2	84.2	116.5	100.8	61.8	82.4	69.9	91.3	88.4
99 II	86.9	93.8	85.0	119.3	101.7	70.4	84.4	71.1	96.7	90.1
99III		91.4	84.1	111.9	96.4	73.8	82.9	70.4	94.8	87.8
99IV		93.6		108.2	95.4	75.1	83.7	68.7	90.8	86.4
00 I		98.6		110.5	100.8	74.5	88.3	69.7	95.7	91.4
00 II		100.6		107.0	100.2	68.4	90.4	70.9	95.1	90.3
00III		101.7		101.2	96.2	66.5	92.0	72.1	91.5	88.0
00IV		99.5		94.7	93.1	65.6	90.2	74.1	85.8	85.5
01 I		90.6		89.4	91.4	64.1	83.9	74.9	99.9	86.0
01 II		90.9		93.3	90.9	60.0	84.0	77.3	100.2	85.5

Table 4.2.3.b-i The Unit Root Tests on Data for Regression

Variables	ADF Statistic		PP Statistic	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis (Jan.1994-Dec.1996)				
⊿log(Baht)	-3.75 ***	-4.41 ***	-4.23 ***	-4.70 ***
⊿log(Peso)	-4.01 ***	-4.09 **	-3.89 ***	-3.97 **
⊿log(Won)	-4.15 ***	-4.40 ***	-4.51 ***	-4.72 ***
⊿log(Rupiah)	-3.87 ***	-4.64 ***	-4.24 ***	-4.81 ***
⊿log(Ringgit)	-4.57 ***	-5.35 ***	-4.31 ***	-4.83 ***
⊿log(USD)	-3.75 ***	-4.45 ***	-4.13 ***	-4.63 ***
⊿log(JPY)	-3.32 **	-3.27 *	-4.55 ***	-4.48 ***
⊿log(DEM)	-3.77 ***	-4.18 **	-4.73 ***	-5.01 ***
⊿log((CPI+CPI(-1))/2) Thailand	-5.76 ***	-5.41 ***	-3.72 ***	-3.74 **
⊿log((CPI+CPI(-1))/2) Philippines	-4.61 ***	-4.70 ***	-3.03 **	-3.14
⊿log((CPI+CPI(-1))/2) Korea	-6.15 ***	-6.58 ***	-3.07 **	-3.34 *
⊿log((CPI+CPI(-1))/2) Indonesia	-4.61 ***	-5.12 ***	-3.17 **	-3.40 *
⊿log((CPI+CPI(-1))/2) Malaysia	-4.64 ***	-4.81 ***	-3.65 ***	-3.68 **
Post-crisis (Jun.1998-Apr.2001)				
⊿log(Baht)	-5.57 ***	-5.83 ***	-4.99 ***	-5.00 ***
⊿log(Peso)	-4.01 ***	-3.99 **	-4.69 ***	-4.63 ***
⊿log(Won)	-4.67 ***	-5.04 ***	-4.36 ***	-4.51 ***
⊿log(Rupiah)	-5.79 ***	-6.04 ***	-4.03 ***	-4.13 **
⊿log(Ringgit)	-3.50 **	-3.47 *	-5.82 ***	-5.76 ***
⊿log(USD)	-4.08 ***	-4.03 **	-5.03 ***	-4.97 ***
⊿log(JPY)	-3.70 ***	-3.94 **	-4.80 ***	-5.02 ***
⊿log(DEM)	-4.15 ***	-4.28 ***	-6.02 ***	-6.13 ***
⊿log((CPI+CPI(-1))/2) Thailand	-3.71 ***	-3.63 **	-3.03 **	-3.00
⊿log((CPI+CPI(-1))/2) Philippines	-3.78 ***	-3.81 **	-2.88 *	-2.91
⊿log((CPI+CPI(-1))/2) Korea	-5.29 ***	-7.23 ***	-3.03 **	-3.51 *
⊿log((CPI+CPI(-1))/2) Indonesia	-3.25 **	-3.08	-1.79	-1.51
⊿log((CPI+CPI(-1))/2) Malaysia	-3.92 ***	-3.99 **	-3.09 **	-3.02

Notes:

1) The lag truncation is one quarter in the ADF test, and three quarters in the PP test.

2) ***, **, and * indicate rejection of the null of nonstationarity at the 1 percent, 5 percent, and 10 percent significance levels with critical values taken from Davidson and MacKinnon (1993).

Source: IFS(IMF)

Table 4.2.3.b-ii Results of Regressions on Functions Determining Changes in Value of Currencies

	Period	USD	JPY	DEM	(CPI+CPI(-1))/2	R**2	D.W.
Baht	pre-crisis	0.85 ***	0.10 ***	0.04	0.01	0.998	1.275
	post-crisis	0.66 ***	0.23	-0.02	4.17 **	0.481	1.488
Peso	pre-crisis	1.05 ***	0.05	0.37	-0.22	0.843	0.805
	post-crisis	1.15 ***	-0.18	0.08 ***	2.78 ***	0.825	1.820
Won	pre-crisis	0.82 ***	0.20 ***	-0.14	0.18	0.908	1.472
	post-crisis	1.06 ***	0.44 ***	0.01	2.15 **	0.750	1.731
Rupiah	pre-crisis	0.97 ***	0.01	0.06	0.20 ***	0.986	1.459
	post-crisis	2.13 **	-0.85	-0.04	1.31	0.273	2.034
Ringgit	pre-crisis	0.78 ***	0.10	0.64 **	0.23	0.780	1.367
	post-crisis	1.00 ***	0.00	-0.00	0.00	1.000	2.829

Notes:
1) All currencies are in terms of units of Swiss francs.
2) The pre-crisis period is from January 1994 to December 1996, and the post-crisis period is from January 1999 to December 2000, except for the Baht (from June 1998 to December 2000) and the Won (from June 1998 to April 2001).
3) *, **, *** indicate that the coefficient is significant at the 90, 95, and 99 percent levels, respectively.

Source: IFS (IMF)