

POLICY RESEARCH WORKING PAPER

wps 2502
2502

Implications of the Currency Crisis for Exchange Rate Arrangements in Emerging East Asia

Masahiro Kawai
Shigeru Akiyama

More effort should be made to develop a framework for international monetary coordination, not only to maintain stable exchange rates among the U.S. dollar, the Japanese yen, and the euro, but to minimize the risk of currency and financial crises in emerging economies in East Asia and elsewhere.

The World Bank
East Asia and Pacific Region
Office of the Chief Economist
December 2000



Summary findings

Kawai and Akiyama examine the implications of the East Asian currency crisis for exchange rate arrangements in the region's emerging market economies. They focus on the roles of the U.S. dollar, the Japanese yen, and the euro in the emerging East Asian economies' exchange rate policies.

They claim that these economies are particularly susceptible to large exchange rate fluctuations because they have been pursuing financial deregulation, opening markets, and liberalizing capital accounts, and because they face increased risk of sudden capital flow reversals, with attendant instability in their financial system and foreign exchange market.

Kawai and Akiyama find that the dollar's role as the dominant anchor currency in East Asia was reduced during the recent currency crisis but has become

prominent again since late 1998. It is too early for conclusions, but the economies seem likely to maintain more flexible exchange rate arrangements, at least officially.

At the same time, these economies presumably will continue to prefer to maintain exchange rate stability without fixed rate commitments. They are better off choosing a balanced currency basket system in which the yen and the euro play a more important role than before.

The ASEAN countries have a special incentive to avoid harmful fluctuations in exchange rates within the region, which could suddenly alter their international price competitiveness and make prospective free trade agreements unsustainable. So they may stabilize their exchange rates against similar currency baskets, to ensure intraregional exchange rate stability.

This paper—a product of the Office of the Chief Economist, East Asia and Pacific Region—is part of a larger effort in the region to study financial market development, capital flows, and exchange rate arrangements in East Asia. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Athena Azarcon, room MC9-142, telephone 202-473-6049, fax 202-477-0169, email address aazarcon@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. The authors may be contacted at mkawai@worldbank.org or sakiyama@worldbank.org. December 2000. (65 pages)

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

**IMPLICATIONS OF THE CURRENCY CRISIS
FOR EXCHANGE RATE ARRANGEMENTS
IN EMERGING EAST ASIA**

By

Masahiro Kawai* and Shigeru Akiyama**

* Chief Economist, East Asia and the Pacific Region, World Bank, 1818 H Street, N.W., Washington, D.C., USA.

**Consultant, East Asia and the Pacific Region, World Bank, 1818 H Street, N.W., Washington, D.C., USA.

Earlier versions of this paper were presented to several conferences: the "Seminar on Exchange Rate Issues in an Environment of Volatile Capital Flows," which was co-hosted by the Japanese Ministry of Finance and the SEACEN Centre, and held in Kuala Lumpur on May 30-June 1, 2000; the International Symposium, "International Monetary and Financial System and East Asia," which was organized by the Japan Research Center, Nankai University, and held in Tianjin on September 9-11, 1999; and the NYU Technical Symposium, "International Finance and Financial Institutions: Analysis of the Asian Crises," which was organized by the Center for Japan-US Business and Economic Studies, Stern School of Business, New York University, and held in New York on March 26, 1999. The authors are grateful to Patrick Honohan, Yusuke Horiguchi, Richard Levich, Paolo Mauro, Paul Samuelson, Alexander Swoboda, several other IMF economists, and many participants at the conferences above for constructive comments, to Naoko Kojo for her earlier contribution and to David Bisbee for editorial assistance.

IMPLICATIONS OF THE CURRENCY CRISIS FOR EXCHANGE RATE ARRANGEMENTS IN EMERGING EAST ASIA

Masahiro Kawai and Shigeru Akiyama

I. INTRODUCTION

This paper examines implications of the East Asian currency crisis for the exchange rate arrangements in the region's emerging market economies. In particular, it focuses on the international roles of the US dollar, the Japanese yen, and the euro in the emerging East Asian economies' exchange rate policies.

The East Asian currency crisis forced many economies in the region to shift away from *de facto* US dollar-pegged regimes to flexible exchange rate regimes. The US dollar had played a dominant role as an international anchor (reference) currency in East Asia until the outbreak of the currency crisis in July 1997. During the crisis, the anchor currency role of the US dollar was substantially reduced, at least temporarily. As the currency crisis subsided in the second half of 1998, however, the East Asian economies largely returned, in practice, to arrangements akin to the pre-crisis, dollar-based exchange rate stabilization regimes. The question is whether or not this apparent reversion to US dollar-based regimes is a long-term trend. This question is important because it is often claimed that one of the causes of the East Asian currency crisis was the *de facto* US dollar-pegged regimes of the pre-crisis period.

This paper argues that any emerging market economy, including those in East Asia, faces a trade-off between the virtue of exchange rate stability and the need for flexibility, particularly during a time of a crisis, to maintain international price competitiveness. The "two-corner solution" approach of choosing either a free floating or a fully committed fixed rate regime (a

common currency, dollarization, or a currency board) does not appear to be realistic in many emerging market economies, including East Asia, because these economies have strong preferences towards exchange rate stability, though not necessarily rigidity. Given East Asia's diversified trade and FDI relationships with the United States, Japan, and the European Union and given the continued large exchange-rate volatility among the tripolar currencies, a reasonable exchange rate policy for many East Asian economies would be to stabilize rates to a basket of currencies consisting of the US dollar, the Japanese yen, and the euro. This paper proposes that the East Asian economies should achieve real effective exchange rate stability by loosely tying their rates to currency baskets during normal times, while allowing enough room for flexibility during a crisis.

The organization of the paper is as follows. Section II summarizes the nature of "reported" and "observed" exchange rate arrangements for developing economies. By econometrically identifying major currencies and their weights in a currency basket for almost all developing countries, this section demonstrates that many authorities in these economies exhibit a preference to stabilize their exchange rates vis-à-vis an international currency or a basket of such currencies. Using further regression analyses, the observed weights in a currency basket are explained by the country's share of trade with the relevant anchor countries or the currency areas formed by such anchor countries. Section III briefly describes the process of the East Asian currency crisis and contagion. It then empirically analyzes the importance of the US dollar, the Japanese yen and the euro as an international anchor currency for the exchange rate behavior of 12 East Asian economies before, during, and after the currency crisis using daily exchange rate data. It examines the changing roles of the tri-polar currencies in the 1990s and the changing

patterns of cross-country exchange rate co-movements. Section IV presents the argument that the *de facto* US dollar-pegged exchange rate regimes were indeed one of the factors behind the crisis and develops a scope for future exchange rate arrangements in emerging East Asia. It proposes a “soft” currency basket system where the US dollar, the Japanese yen and the euro play more balanced roles than in the pre-crisis period. Section V summarizes the paper and offers an agenda for future research.

II. EXCHANGE RATE ARRANGEMENTS OF THE LDC’S IN THE 1990S

This section reviews the exchange rate arrangements of almost all developing countries in the world for the 1990s and obtains some stylized facts and general conclusions.¹ It focuses particularly on the role played by the world’s major currencies, such as the US dollar, the Deutsche mark, and the Japanese yen, as international anchor currencies for other countries’ exchange rate stabilization.

1. “Reported” Exchange Rate Arrangements

The International Monetary Fund (IMF) regularly publishes exchange rate arrangements reported by its member countries according to its own classification scheme. Table 1 presents the overview of the developing world’s exchange rate arrangements reported by LDC members, for the period December 1980 through September 1998.² Exchange rate arrangements are classified broadly into three categories: (a) a fixed rate arrangement; (b) limited exchange rate flexibility; and (c) a more flexible rate arrangement.³

¹ See International Monetary Fund [1997] for discussions of exchange rate arrangements in developing countries.

² This table is compiled from the IMF’s International Financial Statistics (various issues) by removing industrialized countries.

³ Beginning January 1999, the IMF introduced a new classification of categories that include: exchange rate

First, the fixed rate arrangement includes a “peg to a single currency” and a “peg to a basket of currencies.” As target currencies for single-currency pegs, the IMF lists the US dollar, the French franc, the Deutsche mark, the Australian dollar, the Indian rupee, the South African rand, the Italian lira, and the Singapore dollar at end-September 1998.⁴ A peg to a basket of currencies is further divided into a “peg to the Special Drawing Rights (SDR)” and a “peg to a currency composite other than the SDR.” While currency compositions of the SDR and their weights are clearly defined by the IMF, those of other currency composites are specific to the respective country and are in most cases not made publicly available. To find such information, one must statistically analyze the observed exchange rate movements and estimate the basket composition and currency weights.

Next, limited exchange rate flexibility refers to “flexibility limited in terms of a single currency.” Though not officially part of a “fixed rate arrangement,” it is in reality a peg to the US dollar.

Finally, the more flexible rate arrangement includes “other managed floating” and “independently floating.” The sub-category “other managed floating” suggests that the authorities intervene frequently in the foreign exchange market to influence the level and/or volatility of the exchange rate. The sub-category “independently floating” is supposed to represent a textbook-style flexible exchange rate regime. Both of these sub-categories may

arrangements with no separate legal tender; currency board arrangements; other conventional fixed peg arrangements (including *de facto* peg arrangements under managed floating); pegged exchange rates within horizontal bands; crawling pegs; exchange rates within crawling bands; managed floating with no preannounced path for exchange rate; and independently floating. The new classification, however, is not strictly comparable to earlier classifications. For the sake of data continuity, this paper uses classification reported until September 1998, the last period for which comparable information is available.

⁴ In the past, the IMF used to list also the UK pound, the Spanish peseta, the Portuguese escudo (for their respective former colonies), and the Russian ruble (for the newly independent, former Soviet republics soon after the collapse

possibly contain heavily managed, or even *de facto* fixed, exchange rate regimes.

While the number of IMF members in the developing world has increased over time (from 118 in 1980 to 159 in 1998), the number of developing countries under fixed exchange rate arrangements has decreased (from 90 to 63), and the number of countries under more flexible exchange rate arrangements has increased (from 25 to 92). As far as “reported” exchange rate arrangements are concerned, developing countries have shifted from fixed to more flexible arrangements since 1980.

Though the number of developing countries on “more flexible rate arrangements” reached 92 (58% of the total) in September 1998, quite a few developing countries still attempt to stabilize their exchange rates. Indeed, 67 developing countries (42% of the total) were on “fixed exchange rate arrangements,” including “limited exchange rate flexibility.” It is also possible that some countries under “more flexible arrangements” have actually stabilized their exchange rates vis-à-vis a certain currency or a basket of currencies.

Focusing on the fixed rate arrangements, as of September 1998, the US dollar is the most popular target currency (for 24 developing countries including 4 countries under “flexibility limited in terms of a single currency”), followed by the French franc (for 15 countries), non-SDR currency baskets (for 12 countries), the SDR (for 4 countries), and the Deutsche mark (for 3 countries).⁵ It is noteworthy to observe that no country any longer pegs its exchange rate to the UK pound sterling, particularly since 1986, or the Japanese yen throughout the period.

of the Soviet Union) as target anchors for single-currency pegs.

⁵ Other target currencies for single-currency pegs include the South African rand (for 3 countries), the Indian rupee (for 2 countries), the Australian dollar, the Portuguese escudo and the Singapore dollar (for 1 country each).

2. “Observed” Exchange Rate Arrangements: Regression Analyses

The “reported” exchange rate arrangements provide useful information about the nature of the arrangements as reported by individual developing countries. However, these reported arrangements do not always describe the actual practice of exchange rate policies, nor do they offer sufficient information as to which currency or basket of currencies is chosen as a target for exchange rate stabilization. To understand what exchange rate arrangements are actually in place, one must statistically examine the behavior of observed exchange rates.⁶

Regression analyses. One way to do this is to find, through regression analyses, which major currency or currency basket is chosen as a target for a particular country’s exchange rate stabilization and how closely such a relationship can be observed. Extending the studies by Frankel and Wei [1993, 1994, 1995], Kawai and Akiyama [1998] conducted regression analyses to identify specific currencies that comprise a basket used as a target for a particular country’s exchange rate stabilization and to find their weights in the basket. Exchange rate stabilization to a single currency can be interpreted as a special case in which only one currency is identified with a significant and large positive weight, while other currencies’ weights are negligible.

Specifically, Kawai and Akiyama [1998] estimated the following type of regression equation:

$$\Delta e_t^j = \alpha + \beta_1 \Delta e_t^{\text{USD}} + \beta_2 \Delta e_t^{\text{DM}} + \beta_3 \Delta e_t^{\text{JY}} + \beta_4 \Delta e_t^{\text{FF}} + \beta_5 \Delta e_t^{\text{UKP}} + u_t \quad (1)$$

where Δe_t^j is the monthly change in the log exchange rate of currency j in month t , α is a constant term, β_k ($k = 1, 2, \dots$) is the coefficient on the monthly change in the log exchange rate of currency k , and u_t is the residual term. The estimated standard error of residuals is interpreted as

⁶ A more detailed study would require analysis of changes in foreign exchange reserves.

a measure of exchange rate volatility. Though the G-5 currencies (the US dollar, the Deutsche mark, the Japanese yen, the French franc, and the UK pound) were mainly used as candidates for potential targets for exchange rate stabilization, the SDR, ECU, and other relevant minor, regional currencies were also tried as potential targets, depending on a country's economic as well as non-economic (i.e., colonial, historical, cultural, and geographical) relationships. Using information from the "reported" exchange rate arrangements, the Australian dollar, the Indian rupee, the New Zealand dollar, the Portuguese escudo, the Singapore dollar, the South African rand, and the Spanish peseta were included in the list of potential target currencies for certain countries.⁷ Data used were monthly average exchange rates for the sample period of January 1990 through December 1996.⁸ Following Frankel and Wei [1994], all the exchange rates were expressed in terms of a numeraire currency, the Swiss franc.⁹

The underlying hypothesis is that every country attempts to stabilize its exchange rate to a basket of multiple currencies. The coefficients on the right-hand side exchange rates, β_k , are interpreted as the weights in a currency basket assigned by the country's authorities. A single currency peg is a special case, where the coefficient on the target currency for exchange rate pegging should be unity, the coefficients on other currencies should all be zero, and the value of

⁷ The Russian ruble was not tried as a potential nominal anchor currency due to the lack of a sufficient number of exchange rate data for the former Soviet republic countries.

⁸ The monthly average series of the exchange rates of G-5 currencies, a few regional currencies, SDR and ECU vis-à-vis the US dollar were obtained from the IFS data base (line code rf). Exchange rate data for Taiwan Province of China (POC) were obtained from the Central Bank of China, Taiwan District, Financial Statistics, various issues. To obtain meaningful regression results, data observations with values of log first differences greater than 0.1 (approximately a 10.5 percent change in both directions) were removed. This procedure was taken because countries often devalue their currencies to accommodate persistent differences in inflation rates vis-à-vis their reference-currency country. Without eliminating the effects of such discrete currency devaluations (or revaluations), the regression results could be too unstable to conclude the presence or absence of target/reference currency.

⁹ In other papers, Frankel and Wei [1993, 1995] use the SDR as a numeraire currency, but Kawai and Akiyama [1998] did not follow this procedure because the SDR was regarded as a potential candidate for a reference currency.

the standard error of regression residuals should be zero. If one country's currency is not pegged rigidly, but is only loosely stabilized to another currency, the estimated coefficient for this target currency should be statistically significant and close to unity. Also, the standard error of residuals should take a sufficiently small value. If a currency is pegged or stabilized to a basket of multiple currencies, several coefficients should be statistically significant and should approximately add to unity. On the other hand, if a currency is on a purely flexible exchange rate regime, no coefficient should be statistically significant, and the estimated standard error of the regression residuals should be large.¹⁰

“Observed” exchange rate arrangements. Estimation results are summarized in Table 2.¹¹ The table classifies developing economies into three broad categories according to their “observed” exchange rate arrangements, that is, pegged, intermediate, and flexible, depending on the size of exchange rate volatility as measured by the estimated standard error of regression. Countries are classified to be under the “pegged” arrangement when volatility is less than 0.005, “intermediate” when volatility is between 0.005 and 0.015, and “flexible” when volatility exceeds 0.015; where the value 0.01 is approximately a 1 percent change in monthly exchange rates. The size of exchange rate volatility is shown next to each country's name. In each category, the table further classifies countries into three groups, depending on what currency or

¹⁰ Interpretation of regression results, however, requires caution. The reason is that the exchange rate of a country whose shocks are highly correlated with those of the anchor country and whose inflation objective is similar to that of the anchor country authorities may appear to be stabilized vis-à-vis the anchor currency, even in the absence of any conscious effort of exchange rate stabilization. Such examples for industrialized countries in the 1990s include the Swiss franc vs. the Deutsche mark and the New Zealand dollar vs. the Australian dollar.

¹¹ The results in the table are obtained after extensive trial and error using many different combinations of the G-5 currencies, the SDR, the ECU, and relevant regional currencies as explanatory variables in each currency's regression. For each country (or economy), a regression equation with the highest explanatory power, measured by the R²-adjusted and with reasonable coefficient estimates was chosen and its results reported.

currency basket is assigned a significant weight in the regression equation.¹² Countries in the “USD” group are those for which the US dollar appears as the only significant currency in the regression equation. Countries in the “other single currency” group are those for which any other single currency appears as the only significant currency in the regression equation, with the name of the currency shown in parenthesis. Countries in the “basket of currencies” group are those for which multiple currencies appear as significant in the regression equation, with the names of currencies shown in parenthesis. The pound sign “#” is attached to a currency’s name in parenthesis if its estimated coefficient exceeds 0.80 on an adjusted basis. When the sum of the estimated coefficients on multiple currencies is greater than unity, adjustments are made by proportionally re-scaling the estimated coefficients downward so as to make the sum of the adjusted coefficients equal to one.

The table provides interesting information on "observed" exchange rate arrangements adopted by developing countries. While Table 1 indicates that an increasing number of developing countries have shifted away from fixed towards more flexible exchange rate arrangements, Table 2 reveals that almost all countries attempt to stabilize their exchange rates against one currency or a currency basket, though the degree of rate stabilization varies considerably across countries. Many countries regard the US dollar as the target currency even though they do not formally peg their currencies to the US dollar. Indeed, some countries under formal, flexible exchange rate arrangements do assign a large weight to the US dollar. Many other countries are using currency baskets as their anchor without officially announcing it. In addition to the French franc zone countries, there are other isolated cases where regionally

¹² The statistical significance level is 5 percent.

influential currencies such as the Australian dollar and the South African rand are used as target currencies.

Exchange rate volatility and domestic price inflation. Cross-country data reveal that developing economies that allow large exchange rate volatilities are those with relatively high inflation rates. This is depicted in Figure 1 where exchange rate volatility (measured by the standard error of regression reported in Table 2) is plotted against the inflation rate (average of the log differences of monthly CPI series during January 1990 - December 1996). Since both exchange rate volatility and CPI data are needed to draw this figure, the number of developing countries is limited to 124. These economies are grouped into 6 regions: Africa, East Asia, South Asia, Europe, the Middle East, and Latin America.

Figure 1 clearly demonstrates that developing countries with high inflation rates tend to have high volatility of exchange rates. Many developing countries in Africa, Europe, and Latin America exhibit high inflation rates as well as large exchange rate volatility, although there are several exceptions. Developing countries in the Middle East tend to have both low inflation rates and small exchange rate volatility. Inflation rates of the East Asian emerging market economies are generally low, thus enabling them to achieve relatively stable exchange rates.

3. Explaining the Estimated Currency Weights

Trade with the anchor country or the anchor currency area. What determines the estimated G-5 currency weights in each developing country's currency basket? The hypothesis tested here is that the estimated currency weights are explained either by (a) the country's share of trade with the respective anchor country (direct-trade based share), or (b) the country's share of trade with the currency area formed by the respective anchor country (currency-area based

share). In addition, it is also postulated that non-economic factors, such as geographical location and former colonial relationship, may explain the currency weights.

The size of the currency area formed by an anchor country is calculated by assuming that a G-5 country constitutes its own currency area; by decomposing every non-G-5 country into G-5 currency areas, based on the country's estimated G-5 currency weights; and by aggregating over all decomposed G-5 currency areas. For each developing country, the volume of trade with each G-5 currency area is computed according to this principle, and using bilateral trade data (average exports plus imports for the 1990-96 period) obtained from IMF, Direction of Trade Statistics.¹³

In explaining the estimated G-5 currency weights, we have used a set of dummy variables that represent the country's geographical location and the past (or present) colonial status. First, 5 regional dummies are introduced: Africa, East Asia, Europe, the Middle East, and Latin America. South Asia is the remaining regional dummy that is excluded to avoid linear dependence in regressor variables. Second, 3 colonial dummies are introduced: the French colony, the UK colony, and the former Soviet Union Republic dummy. Only when a country was a French or UK colony in year 1950 or was part of the former Soviet Union at the time of its breakup, is the colonial dummy used.¹⁴

¹³ For example, the estimated G-5 currency weights in the basket for the Thai baht are 0.82 for the US dollar (USD), 0.11 for the Japanese yen (JY), 0.05 for the Deutsche mark (DM), and 0.02 for the UK pound sterling (UKP). This means that 82 percent of Thailand belongs to the USD area, 11 percent to the JY area, 5 percent to the DM area, and 2 percent to the UKP area. Hence, any country that trades with Thailand is considered to trade with the USD, JY, DM and UKP areas according to these proportions. A country's total volume of trade with each G-5 currency area was obtained by summing up over all its trading partners' decomposed fractions of the G-5 currency area. See Kawai and Akiyama [1998] for a detailed explanation of this computation procedure. When there were non-G-5 currencies in a currency basket, the currency area formed by each non-G-5 currency was recursively decomposed into G-5 currency areas based on the latter's regression estimates.

¹⁴ It turns out that there were many countries that had colonial ties with France or the UK in 1950, but none with the US, Germany or Japan. The data source is an electronic text version of the US Central Intelligence Agency (CIA), The World Factbook, 1998.

Estimation results. In the regression analysis, all possible combinations of the above-mentioned 13 regressors are tried as the right-hand side variables and, after excluding non-sensical combinations of regressors, the regression results that are considered to be the best according to explanatory power, as judged by R^2 -adjusted, are chosen. Table 3 summarizes these results using direct trade-based and currency area-based trade shares for a sample of 146 developing economies. Generally speaking, use of currency-area based trade shares seems to explain G-5 currency weights better than does the use of direct-trade based variables: the more a developing economy trades with one of the G-5 currency areas (rather than the G-5 countries), the larger the weight of this anchor currency in the economy's exchange rate stabilization policy. One notable exception is the case of the DM weight, where use of direct-trade based shares produces better results, although there is no qualitative difference in the estimation results. Another exception is the case of the UKP weight where use of currency-area based trade shares does not yield an expected positive coefficient.

For the USD weight equation, use of currency-area data produces reasonable results with an expected positive coefficient on the USD area. While the coefficient on the French colony dummy is negative as expected, the model for the USD weight may not be completely satisfactory because of the negative coefficients of East Asia regional dummies. For the DM weight equation, the choice of direct-trade based or currency-area based trade share is not important: a country's share of trade with Germany or with the DM area has the expected positive sign in explaining the DM weight in a currency basket. For the JY weight equation, the results are relatively weak: the coefficient on the JY area or Japan variable is statistically insignificant, and explanatory power is the lowest among the 5 equations. Trading with the JY

area or with Japan does not necessarily increase the relative weight of the yen in a country's exchange rate policy.¹⁵ For the FF weight equation, the estimation result is satisfactory because the coefficient on the FF area or France variable is positive and statistically significant, even after the relevant dummies are included. Finally, for the UKP weight equation, the results are difficult to interpret: the UKP weight is not adequately explained by the share of trade with the UKP area or with the United Kingdom. Numerous specifications failed to produce meaningful results in explaining the UKP weight.

4. Summary of Exchange Rate Arrangements

The results discussed above reveal that the “observed” exchange rate arrangements are largely consistent with the “reported” exchange rate policies, with some exceptions. The discussions in this section provide several stylized facts and general conclusions about the individual developing countries' exchange rate arrangements.

First, many developing countries have shifted their formal exchange rate arrangements from “fixed” to “more flexible” rate regimes. However, countries often exhibit preferences toward stable exchange rates vis-à-vis a single currency or a currency basket. Countries facing large exchange rate fluctuations against major international currencies are those in economic transition in Eastern Europe or the former Soviet Union or those subject to chronically high inflation.

Second, the US dollar is the most favored target currency for exchange rate stabilization in the developing world (see Kawai and Akiyama [1998] for numerical estimation of the size of the US dollar area). However, significant diversity exists across regions in exchange rate

¹⁵ Thus, the limited use of the Japanese yen as a reference/target currency for exchange rate stabilization is reflected

arrangements. Africa includes rigid exchange-rate peggers as well as free exchange-rate floaters, and its major anchor currencies are the French franc, the US dollar, and the SDR. Asian economies generally attempt to stabilize their exchange rates vis-à-vis the US dollar, the SDR and a few regional currencies. The Japanese yen does not play a major role as an anchor currency even in East Asia. Developing Europe has not experienced stable exchange rates in general, while the US dollar, major Western European currencies, or a basket of these serve as loose anchor currencies.¹⁶ The Middle East includes countries that successfully stabilize exchange rates vis-à-vis the US dollar and the SDR. It is one of the most stable regions in the world in terms of exchange rate movements. The whole of Latin America is a *de facto* US dollar area, and even countries not officially pegging exchange rates to the US dollar do assign significantly positive, and close to unitary, weights to the dollar.

Third, a developing country's choice of reference/target currencies for exchange rate stabilization depends largely on which currency areas the country tends to trade with (excepting the UKP area), as well as on the country's geographical location and its past colonial ties. That is, a country that trades heavily with a particular currency area tends to choose this particular currency as an anchor for exchange rate stabilization. By implication, a country that trades with several currency areas with more or less equal shares is expected to choose a well-balanced currency basket as its target for exchange rate stabilization.

III. THE EAST ASIAN CURRENCY CRISIS AND EXCHANGE RATE MOVEMENTS

1. Thai Baht Devaluation, Crisis Contagion, and Restoration of Stability

in the weak sensitivity of currency use to trade shares.

¹⁶ However, Eastern European countries willing to be EU members are expected to stabilize their currencies vis-à-vis the euro if they have not done so already (Honohan and Lane [1999]).

The Thai baht came under serious attack in February 1997. To support the peg, the Bank of Thailand intervened heavily and issued some US\$23 billion in forward foreign exchange contracts at a time when foreign exchange reserves were hovering around US\$25 billion. As investor perceptions began to worsen, finance companies, whose loan portfolios had been deteriorating in quality due to the bursting of real-estate and economic bubbles, came under pressure, and the government continued to pump a large volume of liquidity to support them. This led to further capital outflows and a decline in foreign exchange reserves. In mid-May, Thailand announced capital controls, after facing selling pressure and massive intervention in the forward markets.¹⁷ Finally, on July 2, 1997, the government yielded to market forces and abandoned the currency basket peg in which the weight of the US dollar was considered to be dominant. The crisis that was to drive the rest of East Asia, as well as global financial markets, into turmoil had begun.

The Thai baht devaluation triggered withdrawal of capital from the ASEAN region and several other economies in East Asia as financial panic progressively set in. Developments in Thailand caused investors to look more critically at vulnerabilities they had previously ignored elsewhere. In the process, they discovered new information—especially about the problems of the financial system and the magnitude of short-term external debt—that amplified their concerns. Market doubts were compounded by the lack of transparency in the financial and corporate sectors, and hence, about the magnitude of non-performing loans in the banking sector. Once investors lost confidence that foreign exchange reserves would cover short-term external debt, both domestic and foreign investors scrambled to get out. The lack of a mechanism for

¹⁷ This capital control was eliminated in early 1998.

orderly workouts of private external debt undoubtedly contributed to the full-scale financial panic that swept Thailand, Indonesia, Korea, and Malaysia.

A quick review of its chronology illustrates the dynamics of the crisis, along with its spillover effects. After Thailand devalued the baht, the Philippines allowed the peso to freely float on July 11, and Malaysia abandoned the defense of the ringgit peg on July 14.¹⁸ When an IMF package was signed with Thailand on August 14, Indonesia allowed the rupiah to float. Under exchange market pressure, Taiwan Province of China (POC) floated the new Taiwan dollar on October 17, letting the currency depreciate. When the Hong Kong dollar was tested in late October, the Hong Kong Monetary Authority jacked up the interest rate in order to defend its currency board, leading to a sharp fall in the Hang Seng index. This produced a shock wave felt throughout the global financial markets, causing stock price declines in both Europe and on Wall Street on October 27 and, then again, returning to East Asian markets.

Although an IMF rescue package for Indonesia was signed on November 4, 1997, it could not stop the rupiah's depreciation. Korea was forced to widen its exchange rate band in mid-November and both stock prices and the won fell sharply. Following the signing of the IMF financial package on December 4, Korea finally abandoned the band and moved to a floating system in mid-December. The Korean crisis situation was contained by mid-January 1998, when an agreement was reached between Korea and international creditor banks to restructure Korean banks' short-term external debt. Between February and May of 1998, the most significant events took place in Indonesia, with riots, looting and the resignation of President Suharto. The rupiah fluctuated wildly during these political episodes.

¹⁸ In response to the increasing volatility, in early September 1997, the Malaysian authorities introduced restrictions

When the Japanese yen came under pressure in June 1998, exchange market tensions developed in East Asia. Downward pressure on the Thai baht, the Chinese renminbi (RMB) and other regional currencies mounted. However, cuts in US interest rates eased this pressure and restored foreign exchange market stability in the region.

The financial market turmoil intensified again when Russia decided to devalue the ruble and to impose a forced rescheduling of government debt on August 17, 1998. Russia's devaluation and unilateral rescheduling led investors to reassess emerging market risks, generating strong spillover effects on international financial markets. In response to this turmoil, Malaysia decided to restore its US dollar peg policy by imposing selective capital controls and prohibiting offshore ringgit trading on September 1, 1998. Its objectives were to isolate the domestic financial market from the international financial turbulence and to prevent capital outflows and speculation against the Malaysian ringgit.¹⁹ In the fall of 1998, a US hedge fund, Long-term Capital Management (LTCM), went into serious difficulties and posed a risk of systemic crisis, but the problem was carefully managed and effectively contained by the US authorities.

The series of events described above demonstrate how the crisis spread from one country to another, and how the crisis and contagion swamped the entire East Asian region. Contagion produced simultaneous falls in exchange rates in the region (see Figure 2) reflecting massive and simultaneous capital outflows. Within the space of the last six months of 1997, capital outflows from the region erased the inflows of the first semester, and turned the net flow negative by

on short sales of equities and forward sales of the ringgit. Shortly thereafter, some of the restrictions were removed in response to a negative market reaction.

¹⁹ The quantity-based capital controls were later modified through the introduction of a graduated capital gains tax in February 1999, and were virtually eliminated in September 1999. The exit tax and the continued closure of the

US\$20 billion for the East Asia-5 affected countries. Between 1996 and 1997, net capital flows had reversed by more than US\$100 billion for the ASEAN-4 (US\$71 billion) and Korea (US\$33 billion). Only after the Russian and LTCM's crisis subsided in late 1998, did the East Asian exchange rates begin to stabilize.

2. The Currency Crisis and the Roles of the US Dollar, the Yen and the Euro

Let us examine the anchor currency roles of the US dollar, the Japanese yen, and the euro during the East Asian currency crisis. To do so, we have decided to run the following simple regression equation by using daily exchange rates:

$$\Delta e_t^j = \alpha + \beta_1 \Delta e_t^{\text{USD}} + \beta_2 \Delta e_t^{\text{JY}} + \beta_3 \Delta e_t^{\text{EURO}} + u_t, \quad (2)$$

where Δe_t^j is now the daily change in the log exchange rate of currency j on date t . Similar to equation (1) discussed earlier in the previous section, this regression equation attempts to determine how daily movements in each country's exchange rate are explained by the movements of three major international currencies of the world, i.e., the US dollar, the Japanese yen, and the euro.²⁰ All exchange rates are expressed vis-à-vis the Swiss franc. This simpler specification, rather than country-specific regression form, has been chosen because of the need to compare the roles of the tripolar currencies across economies in East Asia as well as over time for each economy. As in the previous monthly regression, the estimated coefficients are interpreted as the weights assigned by the authorities to the corresponding currencies in their exchange rate policies.²¹ Similarly, the estimated standard error of residuals can be interpreted as a measure of exchange rate volatility.

offshore ringgit market are the only effective form of control that remained after September 1999.

²⁰ For the sample period prior to the introduction of the euro on January 1, 1999, the European Currency Unit (ECU), the predecessor of the euro, is used for the euro rate.

²¹ Again, this interpretation requires caution because the market, without conscious efforts on the part of the

Pre-crisis, mid-crisis, and post-crisis estimations. In order to examine possible shifts in the “observed” role of the tri-polar currencies before and after the currency crisis, we have run exchange-rate regressions (2) for twelve emerging East Asian economies, including the Asian NIEs (Hong Kong SAR, Korea, Singapore, and Taiwan POC), the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), the smaller ASEAN-3 (Cambodia, Laos, and Vietnam), and China. In particular, to examine shifts in exchange rate arrangements, we consider the period before, during, and after the Thai baht devaluation. Using daily exchange rate data up to December 1999, we have chosen to divide the sample into the pre-crisis period of January 1996 - June 1997, the mid-crisis period of July 1997 - December 1998, and the post-crisis period of January 1999 - December 1999.

Regression results are summarized in Table 4. Results for earlier 18-month periods are also reported, to compare with later periods. The table confirms that in the pre-crisis period (January 1990 - June 1997), the estimated coefficients of the US dollar were statistically significant and close to unity for all the economies studied (except for the smaller Indochina countries). This again supports the proposition that many East Asian economies were on *de facto* US dollar-pegged systems until the time of the crisis. Nonetheless, the estimated coefficients of the Japanese yen were significant, for some sub-sample periods, in Thailand (a maximum value of 0.18 during January 1996-June 1997), Singapore (a maximum value of 0.10 during July 1994-December 1995), Korea (0.08 during July 1994-December 1995), Taiwan POC (0.06 during July 1994-December 1995), Malaysia (0.06 during July 1994-December 1995), Hong Kong SAR (0.01 during January 1996-June 1997), but were much smaller than the coefficients for the US

authorities, may have chosen the estimated coefficients.

dollar. In this sense, the Japanese yen played some role as part of a currency basket in the pre-crisis period.²² The euro also played an important role in Vietnam and some role in Singapore, Malaysia, and Thailand though it was relatively insignificant in other countries.

Not surprisingly, many affected economies experienced noticeable declines in US dollar weights in the mid-crisis period (July 1997-December 1998). This was particularly pronounced in Indonesia (where the US dollar weight declined to a statistically insignificant level of 0.51), Thailand (0.61), and Singapore (0.64). As the US dollar weights declined, the weights of the Japanese yen rose in a significant way in some countries, particularly in Indonesia (0.69), Singapore (0.34), Thailand (0.31), and Malaysia (0.30).²³ The weights of the euro were relatively unaffected except for Vietnam where its role was relatively prominent in the pre-crisis period. The overall implication is that the importance of the Japanese yen in the exchange rate policies of several ASEAN countries rose during the crisis, while the euro's importance did not.²⁴

The regression results for the post-crisis period (January-December 1999) indicate a return to the pre-crisis pattern of exchange rate arrangements. That is, the coefficients on the US dollar have become greater and significant again, and the R²-adjusted level has become substantially larger than in the mid-crisis period.²⁵ The exception is Indonesia where the US

²² The observed role of the Japanese yen in a currency basket for some countries such as Singapore, however, may reflect the fact that the authorities chose the SDR as a target for exchange rate management policy. The Japanese yen is an important component currency of the SDR.

²³ If the mid-crisis sample period is shortened to, say July 1997-August 1998, the decline in US dollar weights and the rise in yen weights are much more pronounced.

²⁴ Whether the greater importance of the yen in the mid-crisis period truly reflects a conscious policy on the part of some ASEAN countries to target the yen remains debatable. This may simply reflect correlations between shocks and news affecting ASEAN's foreign exchange markets and those affecting Japan's, thus creating the observed statistical results.

²⁵ The higher US dollar weights observed in the post-crisis regressions may indicate that the East Asian monetary authorities have reverted to the pre-crisis pattern of US dollar-based exchange rate stabilization regimes despite their stated objective of free floating (with the notable exception of Malaysia). Alternatively, the post-crisis pattern may simply reflect either the decline in exchange rate volatility in the post-crisis period (January-December 1999), rather

dollar coefficient is still lower than the pre-crisis level (though it has become larger in size and statistically significant in comparison to the mid-crisis period). Interestingly, the weight of the Japanese yen continues to be significant in Indonesia (0.31), Thailand (0.12), and the Philippines (0.10), even though the yen was never important in pre-crisis Indonesia or the Philippines.²⁶

Rolling regressions. Using 18-month period data for July 1997-December 1998 as a mid-crisis sample may be problematic because exchange market developments were quite volatile, erratic, and dynamic during the crisis. Regional contagion, delayed currency attacks (Korea) and large exchange rate depreciations at times of political uncertainty (Indonesia) may have altered patterns of exchange rate movements over the course of events. Therefore, we next examine mid-crisis exchange rate movements in more detail by dividing the sample into a series of 3-month periods.²⁷

Figure 3 reports the results of such rolling regressions for the period January 1990 - December 1999. The 10-year period is divided into a series of 3-month sub-samples, by rolling over the sample by one month each. More concretely, a total of 118 regressions are run, using the first sub-sample period as January-March 1990, the second as February-April 1990, and so on—all up to the final sub-sample period of October-December 1999 (see the Appendix Table for a summary of the regression results).²⁸ Estimated regression coefficients of the US dollar, the Japanese yen, and the euro are plotted against time: a thick solid line for the dollar; a fine solid

than a conscious policy shift to exchange rate stabilization, or the authorities' concern about too rapid an appreciation of the currency when growth momentum was about to pick up. Whatever the interpretation, it appears that the authorities continue to regard the US dollar as the most relevant reference currency for their exchange rate policies.

²⁶ Again, the observed post-crisis importance of the yen may be the result of common shocks and news affecting Indonesia and the Philippines on the one hand and Japan on the other.

²⁷ Our preliminary experiment indicated that one month (with about 20 observations) was too short to produce statistically significant results for coefficients other than the USD.

²⁸ No observations have been removed in this regression analysis.

line for the yen; and a dotted line for the euro.²⁹

The figure clearly reveals that countries under a stable peg throughout the period, such as Hong Kong SAR and China, have maintained US dollar weights at levels close to unity. The R^2 -adjusted is close to 1 and the estimated standard errors of regression are small and consistently below 0.001, which is close to a 0.1 percent change in daily exchange rates.³⁰

In contrast, other affected economies exhibit different exchange rate behavior over time. In these economies, particularly the affected East Asia-5, the weights of the US dollar were all close to unity and significant in the pre-crisis period. But in the mid-crisis period, the dollar weights began to fall and became insignificant for 8 to 13 months depending on countries. As the US dollar weights began to decline during the crisis, the weights of the Japanese yen and, to a lesser extent, the euro began to rise and even became statistically significant in some countries. Striking changes are observed in the R^2 -adjusted; they were all high, with some close to unity, in the pre-crisis period but became low in the mid-crisis period.

Singapore and Taiwan POC were less affected by the East Asian currency turmoil as judged from the high US dollar weights maintained throughout the entire sample period. In the mid-crisis period, however, the US dollar weights declined more significantly for the Singapore dollar than for the new Taiwan dollar. An interesting observation is that the weights of the Japanese yen for these two currencies became significant in 1998 (Singapore) or in the last few months of 1998 (Taiwan POC). Furthermore, declines in R^2 -adjusted in the mid-crisis period for these two currencies were much less pronounced than those for the East Asia-5 affected

²⁹ Since all estimated coefficients are shown in the figures irrespective of their statistical significance, some plotted lines show erratic behavior; the euro reveals this tendency. The US dollar plots also include some non-significant coefficient values in the mid-crisis period.

³⁰ This volatility is not directly comparable in size to the volatility reported in Table 2 where monthly exchange rates

currencies.

3. Co-movements and Contagion

Figure 2 suggests the presence of strong co-movements among the East Asian currencies, particularly among the currencies of the crisis-affected economies, even under the newly introduced flexible exchange rate arrangements. What is the source of such cross-currency co-movements? Is it a result of a conscious attempt on the part of the monetary authorities to stabilize their exchange rates vis-à-vis other regional currencies, or is it a result of simultaneous shocks hitting the foreign exchange markets and spontaneous market reaction to adjust to the shocks?

The first panel of Figure 4 depicts correlation coefficients between the exchange rate movements (the log first differences in the rate) for a crisis-affected currency and those for the rest of the currencies in the region. They are calculated for each 3-month period in a rolling fashion. The pre-crisis correlation coefficients were large, often exceeding 0.9, because of their *de facto* US dollar-pegged exchange rate arrangements. The correlations naturally declined in the mid-crisis period due to a shift to more flexible exchange rate arrangements. It is interesting to note that, towards the end of 1998, some of the correlations began to return to the pre-crisis levels, with the exception of the Indonesian rupiah whose correlations with other exchange rates have remained low.

What are the forces that determine patterns of correlation coefficients? To examine this, exchange rate movements are divided into predicted and unpredicted components. Predicted movements are the fitted values of regression equation (2), and unpredicted movements are the

were used.

estimated residuals of regression. It is interesting to see which factor is more important in determining the cross-country co-movements of exchange rates.

The second panel of Figure 4 depicts correlation coefficients between the predicted exchange-rate movements of a crisis-affected currency and those of other regional currencies. These cross-currency correlations of the predicted exchange-rate movements were all close to unity before the crisis. During the crisis, correlations of the predicted movements suddenly fell, with large fluctuations during the period. Towards the end of 1998, correlation coefficients for some currencies began to return to their pre-crisis levels. This is a sign of the restoration of more stable exchange rate arrangements in East Asia.

The third panel of Figure 4 depicts correlation coefficients between the unpredicted movements of exchange rate pairs. These correlation coefficients are distributed around zero before the crisis: essentially, systematic cross-currency correlations were absent in the pre-crisis period as far as unpredicted movements of exchange rates are concerned. During the crisis, the correlation coefficients tended to be distributed around some positive values, suggesting the presence of systematic cross-currency correlations due to some common or causal shocks to the system. The implication is that the perceived co-movements of exchange rates during the crisis, implied by Figure 2 and observed in the first panel of Figure 4, may well be the result of unexplained common or causal shocks, such as contagion, to the system.

IV. A PROPOSAL FOR EXCHANGE RATE ARRANGEMENTS IN EAST ASIA

1. The Role of the *De-facto* Dollar Peg as a Crisis Trigger

With free mobility of capital, exchange rate movements are susceptible to market

psychology and herding behavior, particularly in emerging market economies. Once investors are convinced that the exchange rate is out of a perceived “equilibrium” level, massive, one-way speculation can take place.

As discussed in the previous sections, many affected East Asian economies had attempted to maintain relatively stable exchange rates vis-à-vis the US dollar. For example, Thailand had been on a basket peg system until July 1, 1997, which required the Bank of Thailand to stabilize the baht with respect to a basket of foreign currencies where the weight of the US dollar was dominant. Similarly, other countries *de facto* stabilized their exchange rates against the US dollar.

The East Asian currencies with a large weight on the US dollar in their currency baskets, became overvalued on a real, effective basis due to both higher domestic inflation than in the United States and the US dollar’s appreciation since mid-1995 vis-à-vis the major industrialized currencies, particularly the Japanese yen and the Deutsche mark. The emergence of real, effective overvaluation of the currency was an important factor behind the mounting speculative pressure that developed in the foreign exchange market in 1997. Hence, the *de facto* US dollar-peg system was one of the underlying triggers of the currency crisis. We must discuss the “peg” part and the “US dollar” part separately.

Pros and cons of a currency “peg” policy. The first issue is whether the affected East Asian economies made a mistake by pursuing the *de facto* “peg” system, rather than a flexible rate system, in the pre-crisis period. Exchange rate stability clearly benefited the East Asian economies, by ensuring nominal anchor and price stability, creating stable environments for trade- and FDI-driven economic development and growth, and avoiding regional beggar-thy-

neighbor policies of competitive depreciation. In fact, exchange rate stability was an important factor behind the remarkable economic performance during the East Asian Miracle period of the mid-1960s through the mid-1990s (McKinnon [2000]).

However, an argument can be made that adopting greater exchange rate flexibility in the mid-1990s, for example in 1995 or the first half of 1996 in the case of Thailand, might have reduced the volume of capital inflows because of the probable exchange rate appreciation. Exchange rate appreciation would have raised the risk of undertaking continued foreign borrowing, because of the increased probability of currency depreciation, thus limiting further accumulation of short-term external debt. Instead, *de-facto* fixed exchange rate arrangements provided a perception that foreign currency-denominated inflows posed little risks for both domestic borrowers and foreign lenders. With high nominal interest rates at home relative to foreign countries, large volumes of foreign capital continued to pour into Thailand (and other economies). In addition, defending a pegged exchange rate at the time of severe speculative attacks and massive capital outflows is a difficult and potentially counterproductive task. An early adoption of exchange rate flexibility would have relieved such speculative pressure without imposing large costs on the economy. In sum, even if countries may benefit from stable exchange rates at normal times, maintaining an overvalued exchange rate at a time of speculative attack would be difficult and potentially costly.

Pros and cons of de facto US dollar-based exchange rate stabilization. The next issue is whether the affected East Asian economies made a mistake by *de facto* pegging the exchange rates to the wrong currency, the US dollar. There is no doubt that the East Asian economies had enjoyed large benefits, for a long time until the mid-1990s, by choosing the US dollar as an

anchor for exchange rate stabilization.

First, the US dollar was used extensively as a trade invoicing currency for international trade in East Asia and in other parts of the world.³¹ For each East Asian economy, stabilizing the value of its trade in terms of the US dollar was a reasonable policy given that its neighbors and many other countries in the world were using the dollar for trade invoicing.

Second, rapid economic development and growth in the Asian NIEs, the ASEAN countries, and China in the fifteen years until the outbreak of the crisis had been stimulated by their stabilization to the US dollar. In the face of rapid yen rate appreciation that began in the mid-1980s, the *de facto* US dollar-pegged system allowed these economies to receive foreign direct investment from Japan and to integrate themselves with the regional and global trading system. As Japan had already been gradually losing its international price competitiveness in the low- to mid-tech manufacturing products, yen rate appreciation accelerated this process by forcing Japanese firms to move their production sites to East Asia. From East Asian economies' perspectives, their exchange rate depreciation vis-à-vis the Japanese yen helped transform these economies into attractive production bases and platforms, for Japanese multinationals, to export products to the US and European markets. This process promoted international division of labor in the manufacturing sector within the region and helped these economies industrialize and grow, at least until 1995 when the yen rate rapidly depreciated.

When the yen began to depreciate vis-à-vis the US dollar in the Spring of 1995, however, the emerging East Asian economies started to see deterioration of their international price competitiveness. Growth driven by Japanese FDI inflows began to lose its momentum. In

³¹ Commodities and primary products exported by many developing countries tend to be priced in the US dollar in

addition, yen depreciation began to dampen real economic activity in relatively advanced East Asian economies (such as Korea, Taiwan POC, and Malaysia) that compete against Japan in third markets (such as the United States and Europe). If the Japanese yen were to continue to experience the “ever higher yen syndrome” (McKinnon and Ohno [1997]), then continued exchange rate stabilization vis-à-vis the US dollar would have been attractive to emerging East Asia. However, once the yen/dollar exchange rate began to go up and down and became volatile, US dollar-based exchange rate regimes began to produce wide fluctuations of economic activity, severely limiting its benefits. The reason for the close association between yen/dollar exchange rate movements and East Asian economies’ real activity is that these economies not only trade with Japan, but also compete with Japan in third markets in certain products.

Table 5 summarizes the emerging East Asian economies’ relationship with the United States, Japan, the European Union, and the region itself in trade (exports and imports), FDI inflows, and total stocks of inward bank loans in the pre-crisis year of 1996. The table shows that for many East Asian economies, the United States is no longer the most dominant economic partner and that the relative importance provided by Japan and the European Union is as large as, and in some cases much larger than, that of the United States. Striking is the fact that the share provided by emerging East Asia is the largest for exports, imports and FDI. Following emerging East Asia, the United States is the most dominant as an export market, Japan is the most dominant as an import and FDI source country, and the European Union is the largest bank lender to East Asia.

The fact that the emerging East Asian economies have diverse linkages with the rest of

the global markets.

the world in trade and FDI suggests that exchange rate stabilization vis-à-vis the US dollar alone is not the best choice. Indeed, when the US dollar began to appreciate in the Spring of 1995, this system resulted in a loss of international price competitiveness and an overvaluation of the currencies on a real, effective basis.

2. Viable Exchange Rate Arrangements Reflecting Diverse Economic Linkages

The recent currency crisis in East Asia created a common trend towards more flexible exchange rates at least as a “formal” regime in the affected countries (except for Malaysia). During the crisis, the role of the US dollar as an anchor currency clearly declined in the affected East Asia-5 (Korea and the ASEAN-4). As the crisis subsided, East Asia’s exchange rate behavior began to revert to the pre-crisis pattern of assigning a considerable weight to the US dollar. This trend implies that the role for the US dollar continues to be important in the post-crisis period, despite increased flexibility in the exchange rates vis-à-vis the dollar. If these economies are to stabilize their exchange rates vis-à-vis some international currency or a basket, at least in normal times, the issue is what currency or currency basket should be targeted.

For many emerging market economies in East Asia, a return to a “formal” fixed exchange rate regime is unlikely, except for Malaysia, at least in the medium run. These economies have learned the hard lesson that a pegged exchange rate regime can be vulnerable to currency speculation unless they close the capital account vis-à-vis the rest of the world or choose to institutionalize a more permanent fixed rate commitment such as a currency board system or dollarization (or yenization). They are not likely to close the capital account or set up a permanent fixed rate institution; they are likely to maintain “formal” flexible exchange rate arrangements under open capital accounts. On the other hand, these economies are reluctant to

float freely (Calvo and Reinhart's [2000] "fear of floating") and have a greater tendency to intervene in the foreign exchange market. The implication is that the East Asian economies are likely to manage exchange rates so as to ensure reasonable rate stability. Essentially, the immediate adoption of the "two-corner solution" approach (Eichengreen [1994] and Obstfeld and Rogoff [1995]) would be unrealistic.³²

Under this scenario, given a well-balanced diversification of East Asia's economic transactions, a reasonable choice of target for exchange rate stabilization is a currency basket that includes the US dollar, the yen and the euro in a more balanced way than in the pre-crisis period.³³ Actual currency weights in the new basket will depend on: the relative importance of the United States, Japan and the European Union as trade partners and FDI sources for each East Asian economy; future expectations of trend movements of the yen/US dollar exchange rate; and the perceived success of the newly introduced euro.

In general, monetary authorities cannot pursue simultaneously both nominal exchange rate and inflation targets, when the capital account is open. However, if inflation targeting is defined as a policy of achieving a weighted average of inflation rates of the United States, Japan and the European Union and if nominal exchange rate targeting is defined as a policy of stabilizing the nominal exchange rate vis-à-vis a basket of the US dollar, the Japanese yen and the euro, then these two policies are in fact one and the same, at least in the long run when

³² In the longer run, however, one of the corner solutions, that is, introducing a common currency through coordinated regional integration may be feasible and even desirable from optimum currency area criteria. For example, Bayoumi and Eichengreen [1994] found that Northeast Asia (Japan, Korea, and Taiwan POC) and Southeast Asia (Hong Kong SAR, Indonesia, Malaysia, Singapore, and perhaps Thailand), in addition to Northern Europe (not entire Western Europe), were respectively plausible candidates for monetary union. Bayoumi, Eichengreen and Mauro [2000] concluded that in terms of preparedness for monetary union, Asia in 1995 was not much different from continental Europe in 1987. But the lack of political commitment and institutional capacity would make such a move difficult in the short run.

³³ As the earlier finding in Section II-3 indicated, an economy that has diversified trade and FDI relationships with

purchasing power parity (PPP) tends to hold. Nominal exchange rate targeting has one added advantage over inflation targeting cum free floating: By removing the problems associated with a floating rate regime (short-run volatility and medium-run misalignment of exchange rates), a policy of nominal exchange rate targeting (with some bands) can better ensure exchange rate stability in a way consistent with inflation targeting (with some bands). This is particularly the case for East Asia where the economies are small and relatively open so that domestic price inflation reflects international price movements. In essence, a “soft” peg to a basket of the tri-polar currencies can stabilize intra-regional exchange rates, while maintaining a targeted range of inflation rates.

It is not easy, however, for any East Asian economy to move unilaterally away from the current exchange rate arrangement in which the US dollar has a dominant weight to a new arrangement in which the relative weight of the dollar is smaller and those of the yen and euro larger.³⁴ Given other countries’ arrangements, each economy may not have sufficient incentive to unilaterally alter its own exchange rate policy; a large share of trade with US dollar areas can increase the country’s US-dollar weight. When neighboring countries stabilize their exchange rates primarily against the US dollar, there may be no good reason for any one country to unilaterally alter its exchange rate policy. This demonstrates the potential importance of coordinated action on the part of the East Asian economies.

The rising degree of intra-regional trade and investment interdependence in East Asia means that, economies in the region are expected to benefit from avoiding large fluctuations in intra-regional exchange rates. This is particularly the case for the ASEAN members, which are

the major currency areas has strong potential for choosing a well-balanced currency basket.

expected to complete the ASEAN Free Trade Agreement (AFTA) by the year 2003 through lowering tariffs on manufactured products below 5 percent. Essentially, large swings in exchange rates among the ASEAN countries would be counterproductive because they would alter international price competitiveness suddenly and make the prospective free trade agreement unsustainable. One way to maintain stable currencies with one another is for the ASEAN countries to adopt similar currency baskets consisting of the US dollar, the yen and the euro and to loosely stabilize their exchange rates to such baskets. This does not require formal agreements on common baskets or frequent, concerted joint actions in the foreign exchange markets. Instead, the countries have only to choose similar baskets.³⁵

To summarize, emerging East Asia is sufficiently integrated with Japan and Europe, as well as with the United States, in the area of trade and FDI. The region would be better off by adopting officially flexible arrangements, while in normal times actually stabilizing the rates vis-à-vis a basket consisting of the tripolar currencies. The desired weight to be assigned to the US dollar would be lower and those to the yen and the euro higher than the pre-crisis levels.

3. Impact of the Euro on East Asia's Exchange Rate Arrangements

Although the above discussion suggests that the weights of the euro in East Asia's future exchange rate policy could be higher, the newly introduced single currency is unlikely to rise to the status of a dominant key currency. The geographical distance between Europe and East Asia, and the continued structural rigidity of the EU economy are other important reasons why the euro

³⁴ Honohan and Lane [1999] emphasized the existence of strategic interdependence in the choice of exchange rate regimes for neighboring countries that compete for exports in third markets and for FDI inflows.

³⁵ As the degree of intra-regional integration becomes deeper, however, more concerted actions in the area of exchange rate, monetary and fiscal policies may be called for. And the choice of a common currency basket, or even adoption of a common currency, may become desirable. See Williamson [1999a, b].

may not serve as a dominant key currency in emerging East Asia.³⁶

The introduction of the euro will bring several benefits and costs to East Asia. In terms of benefits, the emergence of the euro will give private traders and investors a wider menu of dominant international currencies and financial instruments from which to choose. This does great service to everyone in the world, including East Asia. East Asian traders and investors will be able to hedge exchange risks using a larger, more efficient, and more liquid money market in a unified Europe. Investors will be able to diversify their portfolios across an increasing variety of international financial instruments, particularly those offered in the broader, deeper, and more liquid European capital market.³⁷

In terms of costs, the emergence of the euro is expected to increase currency substitution, thus creating greater fluctuations in the exchange rates among the euro, the US dollar, and the Japanese yen. Given that East Asia trades with the US, Japan and the EU, exchange rate fluctuations among the tripolar currencies could pose a large strain on many East Asian economies. Furthermore, a unified, larger Europe would begin to exert greater financial and macroeconomic influence on the rest of the world, including East Asia. The East Asian authorities will have to take into account shocks emanating from Europe, in addition to those from the US and Japan. East Asia's deepening financial interdependence with the rest of the

³⁶ Once East Asia resumes its export expansion based on sustained economic growth, Europe is expected to face renewed trade competition from East Asian exporters. East Asia's targeting of its exchange rates to the euro would reinforce this trend to levels that might be politically unsustainable. Under exchange rate stabilization vis-à-vis the euro, the East Asian economies probably would have to realign exchange rates frequently. This suggests that, while its international role may rise in East Asia, the euro is not a realistic candidate for the region's major reference currency.

³⁷ Another global impact is that the emergence of the euro might place considerable limits on the policy autonomy of the United States (Bergsten [1997]). The United States might be forced to pursue macroeconomic policies consistent with sustainable current accounts and stable exchange rates. This would be a welcome consequence because it would ensure stable purchasing power and increased attractiveness for the US dollar, the most dominant international currency in the world.

world, including Europe, implies that they will face even greater risks of sudden capital flow reversals, increased pressure on the exchange rates, and undesirable effects on its local financial institutions, as illustrated by the recent currency crisis. This would require prudent macroeconomic policy management on the part of the East Asian authorities, as well as more frequent consultation with the EU (as well as the US and Japan) on the latter's macroeconomic policy.

As the exchange rates of the tripolar currencies are expected to remain volatile, the East Asian economies have the incentive to increase the euro's weight (and the yen's weight) in their exchange rate management.

4. Possibilities for an Increased Role of the Yen

As in the case of the euro, the Japanese yen is unlikely to be the sole anchor currency, due to Japan's limited size as an export market for East Asia, the continued perception of an "ever higher yen," and its still shallow money and capital markets.³⁸ Whether the weight of the yen in East Asian exchange rate arrangements rises or not depends on how soon and strongly the Japanese economy recovers from the long financial crisis of the 1990s, and how attractive an international currency the yen becomes. There are reasons to believe that potential exists for a greater international use of the yen.

First, Japan's economic interdependence with emerging East Asia has deepened over time. This process is expected to continue as the East Asian economies resume their sustained growth path, and as they become more similar to Japan, both in terms of economic and industrial structure and in terms of output and trade composition. In addition, Japan's trade structure has

³⁸ See Hamada and Horiuchi [1987], Tavlas and Ozeki [1992], Garber [1996], and Kawai [1996] for explanations of

changed since the mid-1980s, mainly due to its overseas FDI activity. With diversified trading partners and increased intra-industry trade, Japan has been expanding imports of manufactured products, particularly from East Asia. If this trend continues, and if Japan offers larger markets for foreign products, the international use of the yen as a trade invoicing currency is likely to rise. In fact, in manufacturing products, 48 percent of Japan's exports to, and 29 percent of its imports from, East Asia are invoiced in yen. Though still low compared with those of the United States and Germany, these shares are much higher than those for Japan's overall trade that is denominated in yen. A rapid expansion of Japanese markets for foreign products has potential for the yen's greater attractiveness.

Second, the expectations of trend appreciation of the Japanese yen may be reversed in the process of financial sector consolidation, economic recovery, and rapid aging of the population, which would render use of the yen attractive in the exchange rate policies of East Asia. The trend appreciation of the yen gave strong incentive for the emerging East Asian economies to stabilize their exchange rates to the US dollar, because they could gain international price competitiveness against Japan by doing so. Japan's current account surplus is expected to be smaller due to its eventual economic recovery (greater absorption) in the short run and its population aging (lower savings rates) in the medium term, which would restrain the expectations of an "ever higher yen."

Third, the on-going deregulation and liberalization of the Japanese money and capital markets is expected to make some progress to transform Tokyo into a more user-friendly international financial center. This process would be accelerated by the Tokyo financial "Big

the limited use of the Japanese yen as an international currency, even in emerging East Asia.

Bang” policy on the one hand and, on the other, by the Japanese government’s response to the introduction of the euro and the unification of money and capital markets in Europe. If it is successful in reconstructing as a healthy financial system, the Tokyo market could grow into one of the top three international financial centers in the world. This would promote the international use of the yen.³⁹

Room exists for the yen to play a more prominent role as one of the international anchor currencies in East Asia. At the same time, however, the role of the US dollar will continue to be dominant because of the effects of inertia and history. To the extent that the yen’s attractiveness rises, it may come to share the anchor currency role with the US dollar, in the sense of receiving greater weights assigned by the East Asian authorities in their currency basket policies.⁴⁰

V. CONCLUDING REMARKS

This paper has found that the role of the US dollar as the dominant anchor currency in East Asia was reduced during the recent currency crisis period, but its prominence has recently been restored, particularly since late-1998. Although it is too early to conclude anything definitely at this point, the crisis experience suggests that the East Asian economies are likely to maintain more flexible exchange rate arrangements, at least officially. At the same time, these economies would presumably continue to prefer to maintain exchange rate stability without fixed rate commitments. A case can be made that they are likely to choose a balanced currency basket system in which the yen and the euro play a more important role than before.

³⁹ Another point to be considered is the fact that the yen is being widely used to denominate long-term debt in East Asia; since the 1980s, the East Asian economies have shifted the currency composition of their external debt away from the US dollar and towards the yen.

⁴⁰ Hence, the yen's role in East Asia will not be as distinct as the one that was played by the Deutsche mark in the European Monetary System. Even in Western Europe, the French franc and the ECU before the introduction of the

Given the strong degree of intra-regional trade and investment interdependence, each economy in East Asia has an incentive to avoid harmful large fluctuations in exchange rates within the region. This is particularly the case for ASEAN countries: large swings in exchange rates among the ASEAN members would be counterproductive because they could suddenly alter international price competitiveness and make the prospective free trade agreement unsustainable. This implies that the ASEAN countries might find it useful to choose similar currency baskets and stabilize their exchange rates against these baskets, ensuring intra-regional exchange rate stability.

From a global perspective, the avoidance of large exchange rate fluctuations among the major currencies will continue to be an important policy objective not only for Japan, the United States, and Europe, but also for emerging market economies such as those in East Asia, which benefit from global exchange rate stability among the tripolar currencies. These economies are particularly susceptible because (a) they have been pursuing financial deregulation, market opening, and capital account liberalization, and (b) they are facing increased risks of sudden capital flow reversals, as well as the consequent instability in their financial system and foreign exchange market caused by these flows. A greater effort is required to develop a framework for international monetary coordination, not only to maintain stable exchange rates among the tripolar currencies, but also to minimize the risk of currency and financial crises in emerging economies. In choosing exchange rate arrangements, the emerging market economies, particularly those of East Asia, should focus on maintaining stable macroeconomic environments, minimizing currency risks, and promoting trade, investment and growth.

euro shared the anchor currency role of the Deutsche mark (see Kawai and Akiyama [1998]).

REFERENCES

- Bayoumi, Tamim and Barry Eichengreen. "One Money or Many? Analyzing the Prospects for Monetary unification in Various Parts of the World." Princeton Studies in International Finance, 76 (1994), International finance Section, Princeton University.
- Bayoumi, Tamim, Barry Eichengreen and Paolo Mauro. "On Regional Monetary Arrangements for ASEAN." Journal of the Japanese and International Economies, 14 (June 2000), 121-148.
- Bergsten, C. Fred. "The Impact of the Euro on Exchange Rates and International Policy Cooperation." Paul R. Masson, Thomas H. Krueger, and Bart G. Turtleboom, eds., EMU and the International Monetary System (Washington, D.C.: International Monetary Fund, 1997), pp. 17-48.
- Calvo, Guillermo A. and Carmen M. Reinhart. "Fear of Floating." Mimeographed (May 2000). University of Maryland, College Park.
- Eichengreen, Barry. International Monetary Arrangements for the 21st Century (Washington, DC: Brookings Institution, 1994).
- Eichengreen, Barry. "The Euro as a Reserve Currency." Journal of the Japanese and International Economies (December 1998), pp. 483-506.
- Frankel, Jeffrey A. and Shang-Jin Wei. "Is There a Currency Bloc in the Pacific?" Adrian Blundell-Wingnall and Stephen Grenville, eds., Exchange Rates, International Trade and Monetary Policy (Sydney: Reserve Bank of Australia, 1993), pp. 275-307.
- Frankel, Jeffrey A. and Shang-Jin Wei. "Yen Bloc or Dollar Bloc?: Exchange Rate Policies of the East Asian Economies." Takatoshi Ito and Anne Krueger, eds., Macroeconomic

- Linkage: Savings, Exchange Rates, and Capital Flows (Chicago: University of Chicago Press, 1994), pp. 295-329.
- Frankel, Jeffrey A. and Shang-Jin Wei. "Emerging Currency Blocks." Hans Genberg, ed., The International Monetary System, Spring 1995, pp.111-170.
- Garber, Peter. "The Use of the Yen as a Reserve Currency." Monetary and Economic Studies, Bank of Japan, 14 (December 1996), pp. 1-21.
- Hamada, Koichi and Akiyoshi Horiuchi. "Monetary, Financial and Real Effects of Yen Internationalization." S. W. Arndt and J. D. Richardson, eds., Real-Financial Linkages among Open Economies (Cambridge: MIT Press, 1987), pp. 167-191.
- Hausmann, Ricardo, Ugo Panizza and Ernesto Stein. "Why Do Countries Float the Way They Float?" Mimeographed (November 1999). Inter-American Development Bank, Washington, D.C..
- Honohan, Patrick and Philip R. Lane. "Pegging to the Dollar and the Euro." International Finance, 2:3 (1999), pp. 379-410.
- Ito, Takatoshi, Eiji Ogawa, Yuri Nagataki-Sasaki. "How Did the Dollar Peg Fail in Asia?" Journal of the Japanese and International Economies, 12 (December 1998), pp. 256-304.
- Kawai, Masahiro. "The Japanese Yen as an International Currency: Performance and Prospects." Ryuzo Sato, Rama V. Ramachandran, and Hajime Hori, eds., Organization, Performance and Equity: Perspectives on the Japanese Economy (Kluwer Academic Publishers, 1996), pp. 305-355.
- Kawai, Masahiro. "Japan's Trade and Investment in East Asia." David Robertson, ed., East Asian Trade after the Uruguay Round (Cambridge: Cambridge University Press, 1997),

pp. 209-226.

Kawai, Masahiro and Shigeru Akiyama. "Roles of the World's Major Currencies in Exchange Rate Arrangements." Journal of the Japanese and International Economies, 12 (December 1998), pp. 334-387.

Kusukawa, Toru. "Asian Currency Reform: The Option of a Common Basket Peg." Fuji Research Paper 13 (March 1999), Fuji Research Institute Corporation, Tokyo.

Masson, Paul R. and Bart Turtleboom. "Characteristics of the Euro, the Demand for Reserves, and Policy Coordination under EMU." Paul R. Masson, Thomas H. Krueger, and Bart G. Turtleboom, eds., EMU and the International Monetary System (Washington, D.C.: International Monetary Fund, 1997), pp. 194-224.

Mussa, Michael, Paul Masson, Alexander Swoboda, Esteban Jadresic, Paolo Mauro, and Andy Berg. "Exchange Rate Regimes in an Increasingly Integrated World Economy." Occasional Paper, 193 (August 2000), International Monetary Fund, Washington, D.C..

McKinnon, Ronald I.. "The East Asian Dollar Standard: Life after Death?" Economic Notes, 29 (February 2000), pp. 31-82.

McKinnon, Ronald I. and Kenichi Ohno. Dollar and Yen: Resolving Economic Conflict between the United States and Japan (Cambridge, MA: MIT Press, 1997).

Obstfeld, Maurice and Kenneth Rogoff. "The Mirage of Fixed Exchange Rates." Journal of Economic Perspectives, 9 (Fall 1995), pp. 73-96.

Ohno, Kenichi. "Exchange Rate Management in Developing Asia: Reassessment of the Pre-crisis Soft Dollar Zone." ADBI Working Paper 1 (January 1999), Asian Development Bank Institute, Tokyo.

- Tavlas, George S. and Yuzuru Ozeki. The Internationalization of Currencies: An Appraisal of the Japanese Yen, Occasional Paper, 90 (January 1992), International Monetary Fund.
- Williamson, John. "The Case for a Common Basket Peg for East Asian Currencies." Stefan Collignon, Jean Pisani-Ferry and Yung Chul Park, eds., Exchange Rate Policies in Emerging Asian Countries (London and New York: Routledge, 1999a), pp. 327-343.
- Williamson, John. "Future Exchange rate regimes for Developing East Asia: Exploring the Policy Options." Mimeographed (May 1999b). South Asia Region, World Bank, Washington, D.C..

**Table 1. Summary of Reported Exchange Rate Arrangements of IMF-member Developing Countries
1980-1998**

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998
Fixed exchange rate arrangement	90	89	81	75	82	71	70	65	65	65	63
Pegged to the US dollar	39	31	25	24	24	21	23	22	21	20	20
Pegged to the French franc	14	14	14	14	14	14	14	14	14	15	15
Pegged to the UK pound sterling	1	1	0	0	0	0	0	0	0	0	0
Pegged to the deutsche mark	0	0	1	1	1	1	1	2	2	3	3
Pegged to the Russian ruble	0	0	0	0	6	1	1	0	0	0	0
Pegged to other currency	3	4	5	3	5	6	7	6	7	8	9
Pegged to SDR	15	11	6	6	5	4	4	3	2	3	4
Pegged to other currency composite	18	28	30	27	27	24	20	18	19	16	12
Limited exchange rate flexibility	a	5	4	4	4	4	4	4	4	4	4
Flexibility limited vis-a-vis a single currency	a	5	4	4	4	4	4	4	4	4	4
Cooperative arrangements	0	0	0	0	0	0	0	0	0	0	0
More flexible exchange rate arrangement	3+b+c	32	46	54	58	77	81	88	89	89	92
Adjusted according to a set of indicators	3	4	5	5	3	4	3	2	2	0	0
Other managed floating	b	17	21	25	22	28	30	42	43	44	55
Independently floating	c	11	20	24	33	45	48	44	44	45	37
Unclassified	0	1	1	1	0	0	0	0	0	0	0
Total	118	127	132	134	144	152	155	157	158	158	159

Notes: 1) There are several IMF-member and non-member developing economies that are not included in this table, such as Hong Kong SAR, Taiwan Province of China, and Cambodia (1980 and 1992).

2) The last date of this sample is September 1998.

3) The sum of a, b, and c in the table in 1980 is 25.

Sources: IMF, International Financial Statistics, various issues.

Table 2. Summary of Observed Exchange Rate Arrangements of Developing Countries, 1990-1996

(a) Pegged: Volatility < 0.005

USD	No. Obs.		Other Single Currency	No. Obs.		Basket of Currencies	No. Obs.	
	Volatility	Excl/Incl		Volatility	Excl/Incl		Volatility	Excl/Incl
Afghanistan, I. S. of #	0.0000	0/84	Benin (FF#)	0.0000	1/83	Thailand (USD#, JY, DM, UKP)	0.0009	0/84
Antigua & Barbuda #	0.0000	0/84	Burkina Faso (FF#)	0.0000	1/83	Fiji (USD, AD, JY, UKP, NZD)	0.0027	0/84
Aruba #	0.0000	0/84	Cameroon (FF#)	0.0000	1/83	Czech Republic (DM, USD)	0.0042	0/47
Bahamas, The #	0.0000	0/84	Central African Rep (FF#)	0.0000	1/83	Jordan (USD, SDR)	0.0043	0/84
Bahrain #	0.0000	0/84	Chad (FF#)	0.0000	1/83	Tonga (AD, USD, NZD)	0.0048	0/84
Barbados #	0.0000	0/84	Comoros (FF#)	0.0000	1/83	Singapore (SDR, USD)	0.0050	0/84
Belize #	0.0000	0/84	Congo (FF#)	0.0000	1/83			
Djibouti #	0.0000	0/84	Cote d'Ivoire (FF#)	0.0000	1/83			
Dominica #	0.0000	0/84	Equatorial Guinea (FF#)	0.0000	1/83			
Grenada #	0.0000	0/84	Gabon (FF#)	0.0000	1/83			
Iraq #	0.0000	0/84	Mali (FF#)	0.0000	1/83			
Liberia #	0.0000	0/84	Niger (FF#)	0.0000	1/83			
Micronesia, Fed Sts #	0.0000	0/84	Senegal (FF#)	0.0000	1/83			
Netherlands Antilles #	0.0000	0/84	Togo (FF#)	0.0000	1/83			
Oman #	0.0000	0/84	Kiribati (AD#)	0.0000	0/84			
Panama #	0.0000	0/84	Lesotho (SAR#)	0.0000	0/84			
Qatar #	0.0000	0/84	Namibia (SAR#)	0.0000	0/84			
St. Vincent & Grenadines #	0.0000	0/84	Swaziland (SAR#)	0.0000	0/84			
Saudi Arabia #	0.0000	0/84	Bhutan (IR#)	0.0002	2/82			
St. Kitts and Nevis #	0.0000	0/84	Brunei Darussalam (SID#)	0.0033	0/30			
St. Lucia #	0.0000	0/84	Estonia (DM#)	0.0037	0/54			
Syrian Arab Republic #	0.0000	0/84						
United Arab Emirates #	0.0000	0/84						
Yemen, Republic of #	0.0000	2/77						
Hong Kong SAR#	0.0011	0/84						
Indonesia #	0.0027	0/84						
Egypt #	0.0035	2/82						
Bolivia #	0.0036	0/83						
Trinidad & Tobago #	0.0047	1/83						

(b) Intermediate: 0.005 < Volatility < 0.015

USD	No. Obs.		Other Single Currency	No. Obs.		Basket of Currencies	No. Obs.	
	Volatility	Excl/Incl		Volatility	Excl/Incl		Volatility	Excl/Incl
Bangladesh #	0.0066	0/84	Croatia (DM#)	0.0064	0/24	Mauritius (ECU, FF, USD)	0.0056	0/84
Lao People's Dem. #	0.0068	1/83	Vanuatu (AD)	0.0122	0/84	Cyprus (ECU, USD, UKP)	0.0056	0/84
Moldova #	0.0073	0/31	Western Samoa (AD)	0.0146	0/84	Korea (USD#, JY)	0.0062	0/84
Azerbaijan #	0.0076	1/18	Macedonia (DM#)	0.0148	0/36	Cape Verde (FF, PE)	0.0069	1/83
China, People's Rep. #	0.0093	2/82				El Salvador (USD#, UKP)	0.0069	2/82
Costa Rica #	0.0107	0/84				Tunisia (ECU#, USD)	0.0070	0/84
Suriname #	0.0118	5/79				Kuwait (USD, JY)	0.0073	0/75
Paraguay #	0.0119	0/84				Seychelles (USD, JY, UKP)	0.0075	0/84
Guinea #	0.0124	0/83				Libya (USD, FF, JY, UKP)	0.0079	1/83
Ethiopia #	0.0125	1/83				Botswana (SAR, USD)	0.0085	2/82
Solomon Islands #	0.0127	0/84				Taiwan POC (USD, FF, JY)	0.0087	0/84
Israel	0.0127	0/84				Myanmar (SDR#)	0.0089	0/84
Pakistan #	0.0128	0/84				Malta (ECU#, USD)	0.0096	0/84
India #	0.0130	2/82				Slovak Republic (FF#, USD)	0.0103	0/47
Maldives #	0.0134	0/84				Iran, I.R. of (USD, DM, UKP)	0.0106	2/82
Sri Lanka #	0.0140	0/84				Malaysia (SID, USD)	0.0106	0/84
Nicaragua	0.0143	16/68				Morocco (FF, DM, USD)	0.0108	0/84
						Colombia (USD, SDR)	0.0114	1/83
						Argentina (USD, DM)	0.0124	6/78
						Guyana (USD, DM)	0.0130	4/80
						Hungary (USD, FF)	0.0133	1/83
						South Africa (USD, UKP)	0.0135	0/84
						Mauritania (USD, UKP)	0.0139	1/83
						Gambia, The (FF, USD, UKP)	0.0146	0/83
						Nepal (IR, USD)	0.0148	0/84

(c) Flexible: Volatility > 0.015

USD	No. Obs.		Other Single Currency	No. Obs.		Basket of Currencies	No. Obs.	
	Volatility	Excl/Incl		Volatility	Excl/Incl		Volatility	Excl/Incl
Poland	0.0152	3/81	Malawi (UKP)	0.0166	7/74	Latvia (USD, JY)	0.0150	5/53
Somalia #	0.0156	0/5	Slovenia (DM#)	0.0202	1/60	Chile (USD#, JY)	0.0151	0/84
Dominican Republic #	0.0158	3/81	Tajikistan (UKP#)	0.0346	21/18	Burundi (SDR#)	0.0152	1/79
Algeria	0.0159	6/78				Papua New Guinea (USD, AD)	0.0166	1/83
Mexico #	0.0163	4/80				Zimbabwe (USD, UKP)	0.0187	3/81
Honduras #	0.0165	4/80				Madagascar (SDR#)	0.0191	3/81
Uruguay #	0.0166	0/84				Ghana (USD, FF)	0.0192	0/84
Philippines #	0.0168	0/84				Kenya (USD, UKP)	0.0204	5/79
Vietnam #	0.0169	2/89				Guatemala (USD#, JY)	0.0220	2/82
Mongolia #	0.0175	6/71				Mozambique (FF, USD)	0.0254	7/77
Ecuador #	0.0180	1/83				Sao Tome & Principe (SDR#)	0.0276	9/73
Venezuela #	0.0180	6/78				Angola (ECU#)	0.0395	40/28
Turkey	0.0183	4/80						
Lebanon #	0.0203	18/68						
Rwanda	0.0203	8/70						
Peru #	0.0214	16/68						
Turkmenistan #	0.0239	18/23						
Sierra Leone #	0.0242	7/77						
Armenia #	0.0244	21/35						
Guinea-Bissau	0.0249	6/78						
Tanzania #	0.0250	2/82						
Cambodia #	0.0250	13/46						
Albania	0.0251	2/57						
Lithuania #	0.0260	3/45						
Russian Federation, #	0.0261	11/25						
Nigeria #	0.0267	3/79						
Ukraine #	0.0274	16/32						
Kazakhstan #	0.0281	7/30						
Uganda #	0.0283	2/82						
Haiti #	0.0284	5/79						
Bulgaria #	0.0294	14/58						
Sudan #	0.0295	9/71						
Romania	0.0303	13/71						
Jamaica #	0.0316	3/81						
Zambia #	0.0335	19/65						
Brazil #	0.0380	46/38						
Zaire #	0.0453	53/21						

Note: 1) Countries are classified into three categories of exchange rate arrangements (pegged, intermediate, and flexible), depending on the size of exchange rate volatility as measured by the estimated standard error of regression. Countries are classified as "pegged" when the volatility is less than 0.005, "intermediate" when the volatility is between 0.005 and 0.015, and "flexible" when the volatility is greater than 0.015. The size of exchange rate volatility is shown next to each country's name. In each category, countries are further classified into three groups, depending on what currency or basket of currencies is assigned a significant weight in the regression equation. Countries in the "USD" group are those for which the US dollar appears as the only significant currency in the regression equation. Countries in the "other single currency" group are those for which other single currency appears as the only significant currency in the regression equation, with the name of the currency shown in each parenthesis. Countries in the "basket of currencies" group are those for which multiple currencies appear as significant in the regression equation, with the names of currencies shown in each parenthesis. The pound sign "#" is attached to a currency if its estimated coefficient exceeds 0.80 on an adjusted basis; when the sum of the estimated coefficients on multiple currencies is greater than unity, adjustment is made by proportionally re-scaling the estimated coefficients downward so as to make the sum of the adjusted coefficients equal to one.

2) Data observations with values of log first differences greater than 0.1 have been excluded. The column, excl/incl, shows the number of observations excluded and included in the regression equation.

3) The currency names are abbreviated as: USD = US dollar, FF = French franc, SAR = South African rand, SID = Singapore dollar, DM = Deutsche mark, AD = Australian dollar, JY = Japanese yen, UKP = UK pound, NZD = New Zealand dollar, SDR = Special drawing rights, ECU = European currency unit.

4) Croatia refers to the 1995-96 period. Only Belarus (the size of volatility being 0.0336) exhibited no significant currency in the regression equation. However, the number of observations for Belarus was only eight.

Data Source: Kawai and Akiyama (1998), Appendix Table.

Table 3. Determinants of G-5 Currency Weights in Developing Countries' Exchange Rate Arrangements

Direct-Trade based Regression Results				Currency-Area based Regression Results			
Major Currency Weight	Coefficient	Std. Error	R2-adj.	Major Currency Weight	Coefficient	Std. Error	R2-adj.
US dollar (USD) Weight 0.451				US dollar (USD) Weight 0.515			
Constant	1.001 **	0.080		Constant	0.029	0.084	
US's Trade Share	-0.020	0.208		USD Area's Trade Share	1.247 **	0.146	
France's Trade Share	-1.977 **	0.328		---	---	---	
---	---	---		JY Area's Trade Share	1.072 **	0.364	
Germany's Trade Share	-0.682	0.671		---	---	---	
Regional: Africa	-0.271 **	0.079		---	---	---	
Regional: East Asia	-0.322 **	0.082		Regional: East Asia	-0.344 **	0.091	
Regional: Europe	-0.393 **	0.129		---	---	---	
---	---	---		Regional: Middle East	0.114	0.083	
---	---	---		Colonial: France	-0.267 **	0.076	
Colonial: Former USSR	0.213	0.148		---	---	---	
Deutsche mark (DM) Weight 0.153				Deutsche mark (DM) Weight 0.129			
Constant	-0.029	0.019		Constant	-0.034	0.024	
Germany's Trade Share	0.829 **	0.267		DM Area's Trade Share	0.403 *	0.173	
Regional: Europe	0.068	0.040		Regional: Europe	0.078	0.042	
Japanese yen (JY) Weight 0.025				Japanese yen (JY) Weight 0.046			
Constant	-0.001	0.009		Constant	-0.229	0.144	
Japan's Trade Share	-0.047	0.070		JY Area's Trade Share	0.176	0.153	
Germany's Trade Share	0.161 *	0.079		DM Area's Trade Share	0.412 *	0.171	
---	---	---		UKP Area's Trade Share	0.369 *	0.176	
---	---	---		FF Area's Trade Share	0.230	0.149	
---	---	---		USD Area's Trade Share	0.212	0.147	
---	---	---		Regional: Africa	-0.016	0.015	
Regional: East Asia	0.025	0.016		Regional: East Asia	0.021	0.016	
---	---	---		Regional: Europe	-0.035	0.023	
Regional: Middle East	0.017	0.015		---	---	---	
Colonial: Former USSR	0.025	0.017		Colonial: Former USSR	0.070 *	0.028	
French franc (FF) Weight 0.536				French franc (FF) Weight 0.572			
Constant	0.053	0.048		Constant	-0.004	0.047	
France's Trade Share	1.270 **	0.356		FF Area's Trade Share	1.092 **	0.189	
Germany's Trade Share	-0.811	0.483		---	---	---	
---	---	---		UKP Area's Trade Share	-0.798 *	0.376	
Japan's Trade Share	-0.250	0.247		JY Area's Trade Share	-0.242	0.211	
Regional: Africa	0.113 *	0.053		---	---	---	
Regional: Europe	0.146	0.093		---	---	---	
Colonial: France	0.207 *	0.097		Colonial: France	0.241 **	0.078	
Colonial: UK	-0.063	0.044		Colonial: UK	0.052	0.048	
Colonial: Former USSR	-0.161	0.107		---	---	---	
UK pound sterling (UKP) Weight 0.090				UK pound sterling (UKP) Weight 0.159			
Constant	-0.025	0.017		Constant	0.857 **	0.259	
UK's Trade Share	0.442 **	0.155		UKP Area's Trade Share	-0.665	0.343	
---	---	---		FF Area's Trade Share	-1.044 **	0.291	
---	---	---		USD Area's Trade Share	-0.943 **	0.263	
Japan's Trade Share	0.106	0.103		JY Area's Trade Share	-0.800 **	0.266	
---	---	---		DM Area's Trade Share	-0.664 *	0.306	
Regional: Africa	0.031	0.018		---	---	---	
---	---	---		Regional: Europe	-0.074	0.038	
---	---	---		Colonial: France	0.052	0.037	
---	---	---		Colonial: UK	0.023	0.023	
Colonial: Former USSR	0.110 **	0.033		Colonial: Former USSR	0.076	0.051	

Note: 1) Double asterisks (**) and a single asterisk (*) indicate that the estimated coefficients are statistically significant at the 1% and 5% levels, respectively.

2) The number of observations is 146.

**Table 4. Regression Results of Exchange Rate Movements:
Pre-crisis, Mid-crisis, and Post-crisis Periods**

Hong Kong Dollar

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	-0.014	0.993 **	-0.001	0.007	0.9973	1.566	0.000425	389
91/07-92/12	-0.008	0.998 **	-0.011	0.006	0.9956	2.579	0.000597	394
93/01-94/06	-0.004	0.995 **	0.000	0.003	0.9975	2.147	0.000358	390
94/07-95/12	0.002	0.997 **	0.000	0.002	0.9994	2.018	0.000204	391
96/01-97/06	0.004	0.997 **	0.009 **	-0.007	0.9977	2.598	0.000277	391
97/07-98/12	0.000	1.001 **	0.006 *	0.000	0.9938	2.773	0.000528	393
99/01-99/12	0.014 *	0.999 **	0.001	0.000	0.9998	2.402	0.000108	261

Korean Won

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.172	1.004 **	-0.013	-0.011	0.9336	1.968	0.002149	389
91/07-92/12	0.210	1.026 **	-0.016	-0.006	0.8098	2.005	0.004458	394
93/01-94/06	0.045	1.014 **	-0.021 *	-0.002	0.9720	2.255	0.001208	390
94/07-95/12	-0.127	0.983 **	0.081 **	-0.045 *	0.9329	2.008	0.002205	391
96/01-97/06	0.354 **	0.960 **	0.065 **	0.020	0.8583	1.804	0.002378	391
97/07-98/12	0.758	1.149 **	0.039	0.084	0.0921	1.607	0.024301	393
99/01-99/12	-0.203	0.922 **	0.061	0.001	0.7152	1.585	0.004190	261

Singapore Dollar

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	-0.212	0.739 **	0.065 **	0.199 **	0.9167	2.309	0.002188	389
91/07-92/12	-0.140	0.758 **	0.077 **	0.185 **	0.9482	2.309	0.001857	394
93/01-94/06	-0.160	0.865 **	0.049 **	0.098 **	0.9199	2.131	0.001960	390
94/07-95/12	-0.189	0.789 **	0.098 **	0.117 **	0.9383	2.052	0.001915	391
96/01-97/06	-0.019	0.798 **	0.096 **	0.144 **	0.9294	2.167	0.001503	391
97/07-98/12	0.381	0.635 **	0.342 **	0.190 *	0.4851	2.181	0.006911	393
99/01-99/12	0.035	0.874 **	0.087 **	0.119 **	0.8463	2.177	0.002927	261

New Taiwan Dollar

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.040	0.840 **	-0.017	0.240 **	0.4605	2.849	0.008475	389
91/07-92/12	-0.154	0.967 **	0.033	-0.003	0.6336	2.913	0.006803	394
93/01-94/06	0.193	1.012 **	0.055	-0.019	0.6664	2.875	0.005199	390
94/07-95/12	0.023	0.948 **	0.060 *	0.028	0.8956	2.022	0.002807	391
96/01-97/06	0.024	0.946 **	0.036	-0.001	0.8264	2.734	0.002573	391
97/07-98/12	0.382	0.867 **	0.090 **	0.068	0.5698	1.702	0.005472	393
99/01-99/12	-0.106	0.957 **	0.023	0.045	0.9495	1.765	0.001578	261

Indonesian Rupiah

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.227	0.962 **	0.029	0.030	0.9094	2.084	0.002555	389
91/07-92/12	0.145 **	0.997 **	-0.006	0.016	0.9903	2.292	0.000900	394
93/01-94/06	0.131 *	0.995 **	0.010	-0.002	0.9739	2.044	0.001161	390
94/07-95/12	0.153 *	0.994 **	-0.015	0.011	0.9710	2.004	0.001438	391
96/01-97/06	0.156 *	1.009 **	0.001	0.002	0.9372	2.165	0.001528	391
97/07-98/12	2.982	0.512	0.692 *	-0.067	0.0167	1.961	0.053151	393
99/01-99/12	-0.313	0.769 **	0.313 *	0.207	0.1501	1.773	0.018294	261

Malaysian Ringgit

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.072	0.892 **	0.027 **	0.096 **	0.9739	2.207	0.001279	389
91/07-92/12	-0.138	0.874 **	0.025	0.090 **	0.9487	2.006	0.001944	394
93/01-94/06	0.004	0.906 **	0.001	0.020	0.8170	1.507	0.003072	390
94/07-95/12	-0.062	0.869 **	0.059 **	0.084 **	0.9532	1.970	0.001738	391
96/01-97/06	-0.049	0.885 **	0.034 *	0.086 **	0.9226	2.018	0.001611	391
97/07-98/12	1.032	0.883 **	0.300 **	-0.035	0.1862	1.742	0.014911	393
99/01-99/12	0.000	1.001 **	0.000	0.004	0.9984	2.658	0.000280	261

Table 4. (Continued)

Philippines Peso

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.571	1.054 **	0.043	-0.048	0.6891	2.011	0.005762	389
91/07-92/12	-0.363	1.048 **	-0.110	0.101	0.6700	1.991	0.006458	394
93/01-94/06	0.309	0.973 **	-0.006	-0.026	0.6154	2.013	0.005375	390
94/07-95/12	-0.045	0.986 **	0.062	-0.059	0.7805	2.221	0.004306	391
96/01-97/06	0.020	1.004 **	-0.005	-0.002	0.9936	2.202	0.000469	391
97/07-98/12	0.998	0.876 **	0.285 **	-0.022	0.1924	1.716	0.014420	393
99/01-99/12	0.131	0.876 **	0.096 **	0.043	0.6997	1.998	0.004362	261

Thai Baht

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.014	0.961 **	0.031 *	0.023	0.9543	2.034	0.001766	389
91/07-92/12	-0.017	0.957 **	0.019	0.043 **	0.9782	2.007	0.001334	394
93/01-94/06	-0.037	0.972 **	0.012	0.006	0.9778	2.040	0.001049	390
94/07-95/12	0.017	0.877 **	0.069 **	0.049 **	0.9882	2.410	0.000848	391
96/01-97/06	-0.053	0.823 **	0.178 **	0.154	0.4746	1.978	0.006179	391
97/07-98/12	1.014	0.608 **	0.311 **	0.099	0.1046	1.877	0.017221	393
99/01-99/12	0.093	0.775 **	0.119 **	0.139	0.5348	2.197	0.005990	261

Chinese Renminbi

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.317	1.025 **	-0.036	0.007	0.7145	2.007	0.005179	389
91/07-92/12	0.211	1.037 **	-0.041	-0.032	0.8889	2.042	0.003212	394
93/01-94/06	1.037	0.969 **	0.082	0.064	0.1159	2.007	0.019926	390
94/07-95/12	-0.113 *	1.030 **	-0.001	-0.030 **	0.9829	2.082	0.001116	391
96/01-97/06	0.000	1.018 **	-0.010	-0.012	0.9335	2.832	0.001569	391
97/07-98/12	-0.008	0.996 **	0.001	-0.002	0.9919	2.471	0.000597	393
99/01-99/12	0.000	0.995 **	0.004	0.011	0.9939	2.966	0.000541	261

Vietnamese Don

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	1.431 *	0.419 **	-0.243 *	0.653 **	0.1748	2.118	0.013246	389
91/07-92/12	0.751	0.561 **	-0.013	0.263	0.1121	2.083	0.016349	394
93/01-94/06	-0.027	0.351 **	-0.109	0.725 **	0.2816	1.959	0.008682	390
94/07-95/12	0.088	0.607 **	-0.048	0.403 **	0.6055	2.163	0.005797	391
96/01-97/06	0.070	0.699 **	-0.036	0.415 **	0.5700	2.190	0.004833	391
97/07-98/12	0.440	1.014 **	0.037	-0.024	0.6258	2.271	0.005244	393
99/01-99/12	0.036 **	0.998 **	0.000	-0.001	0.9994	2.403	0.000166	261

Cambodia Riel

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	3.464	0.375	-0.433	0.172	-0.0025	2.007	0.045834	389
91/07-92/12	3.234	0.280	0.448	-0.179	0.0060	2.039	0.042950	394
93/01-94/06	1.591	0.158	0.290	0.523	0.0130	2.023	0.033773	390
94/07-95/12	-1.048	0.885 **	0.145	-0.302	0.0969	2.037	0.019219	391
96/01-97/06	0.402	1.142 **	-0.150	-0.358	0.1189	2.083	0.013866	391
97/07-98/12	0.816	1.333 **	0.120	-0.807 **	0.1295	2.291	0.019151	393
99/01-99/12	-0.137	1.127 **	-0.117 **	-0.320 **	0.6119	2.506	0.005043	261

Laos Kip

Period	Const	USD	JY	EURO	R2-adj	D.W.	Std-res	No. obs.
90/01-91/06	0.441	0.343 **	0.111	0.195	0.0912	2.144	0.013244	389
91/07-92/12	0.214	0.243 *	0.175	0.124	0.1187	2.167	0.009874	394
93/01-94/06	0.100	0.284 **	0.026	0.309 **	0.1366	2.063	0.008243	390
94/07-95/12	0.673	0.794 **	0.122	-0.183	0.1754	2.068	0.013119	391
96/01-97/06	-0.044	0.704 **	-0.023	0.112	0.4029	2.121	0.005386	391
97/07-98/12	3.794 *	0.757 *	-0.240	-0.168	0.0119	2.139	0.032036	393
99/01-99/12	1.891	1.687 **	-0.388	-1.447 *	0.0175	1.954	0.049340	261

Note: Double asterisks (**) and a single asterisk (*) indicate that the estimated coefficients are statistically significant at the 1% and 5% levels, respectively.

Table 5. Shares of the United States, the European Union, Japan, and East Asia in the Total International Transactions of the Individual East Asian Economies, 1996

(Percentage)

	Exports					Imports				
	United States	European Union	Japan	East Asia	Total	United States	European Union	Japan	East Asia	Total
Singapore	18.4	13.0	8.2	46.8	100.0	16.4	14.5	18.2	37.9	100.0
Hong Kong SAR	21.3	14.9	6.6	45.1	100.0	7.9	11.1	13.6	60.4	100.0
Taiwan POC	26.8	13.6	12.9	45.0	100.0	18.2	15.3	25.7	23.0	100.0
Korea	16.7	10.8	12.3	35.9	100.0	22.1	14.1	20.9	15.9	100.0
Malaysia	18.2	13.7	13.4	43.2	100.0	15.6	14.5	24.7	32.6	100.0
Thailand	18.0	16.0	16.8	32.7	100.0	12.6	14.5	27.8	24.3	100.0
Philippines	33.9	15.9	17.9	25.3	100.0	19.7	9.4	21.8	28.3	100.0
Indonesia	16.4	16.6	28.5	29.7	100.0	10.2	22.2	23.2	29.4	100.0
China	17.7	13.1	20.4	35.0	100.0	11.7	14.3	21.0	34.0	100.0
Vietnam	4.5	24.3	26.4	24.1	100.0	5.0	13.0	9.2	57.1	100.0
East Asia	19.8	13.7	13.5	40.0	100.0	14.3	14.0	20.3	35.1	100.0

	Foreign Direct Investment Inflows					Outstanding Loans from BIS-Reporting Banks (Year End)				
	United States	European Union	Japan	East Asia	Total	United States	European Union	Japan	East Asia	Total
Singapore	39.6	23.1	34.3	n.a.	100.0	3.0	54.3	31.1	n.a.	100.0
Hong Kong SAR	9.8	18.1	45.4	22.7	100.0	4.2	41.6	42.2	n.a.	100.0
Taiwan POC	19.3	5.0	22.2	18.6	100.0	12.4	56.6	12.0	n.a.	100.0
Korea	27.4	27.9	7.9	29.9	100.0	9.4	33.8	24.3	n.a.	100.0
Malaysia	17.0	5.1	27.0	36.8	100.0	10.5	41.4	36.9	n.a.	100.0
Thailand	21.1	16.3	47.2	44.3	100.0	7.2	27.3	53.5	n.a.	100.0
Philippines	3.4	17.5	6.0	41.0	100.0	29.4	47.6	11.7	n.a.	100.0
Indonesia	2.1	16.8	25.6	30.2	100.0	9.5	37.8	39.7	n.a.	100.0
China	8.3	6.6	8.8	68.7	100.0	4.9	47.4	32.3	n.a.	100.0
Vietnam	8.1	16.8	17.3	35.3	100.0	12.0	62.7	16.3	n.a.	100.0
East Asia	10.7	12.1	21.2	46.7	100.0	6.2	43.2	35.4	n.a.	100.0

Source: International Monetary Fund, Direction of Trade Yearbook 1997.

Japan External Trade Organization, Jetro White Papers on Foreign Direct Investment (1998).

Bank for International Settlement, The Maturity, Sectoral and Nationality Distribution of International Bank Lending, First Half 1997 (Basle, January 1998).

Figure 1. Inflation Rate and Volatility of Exchange Rates (OLS residuals)

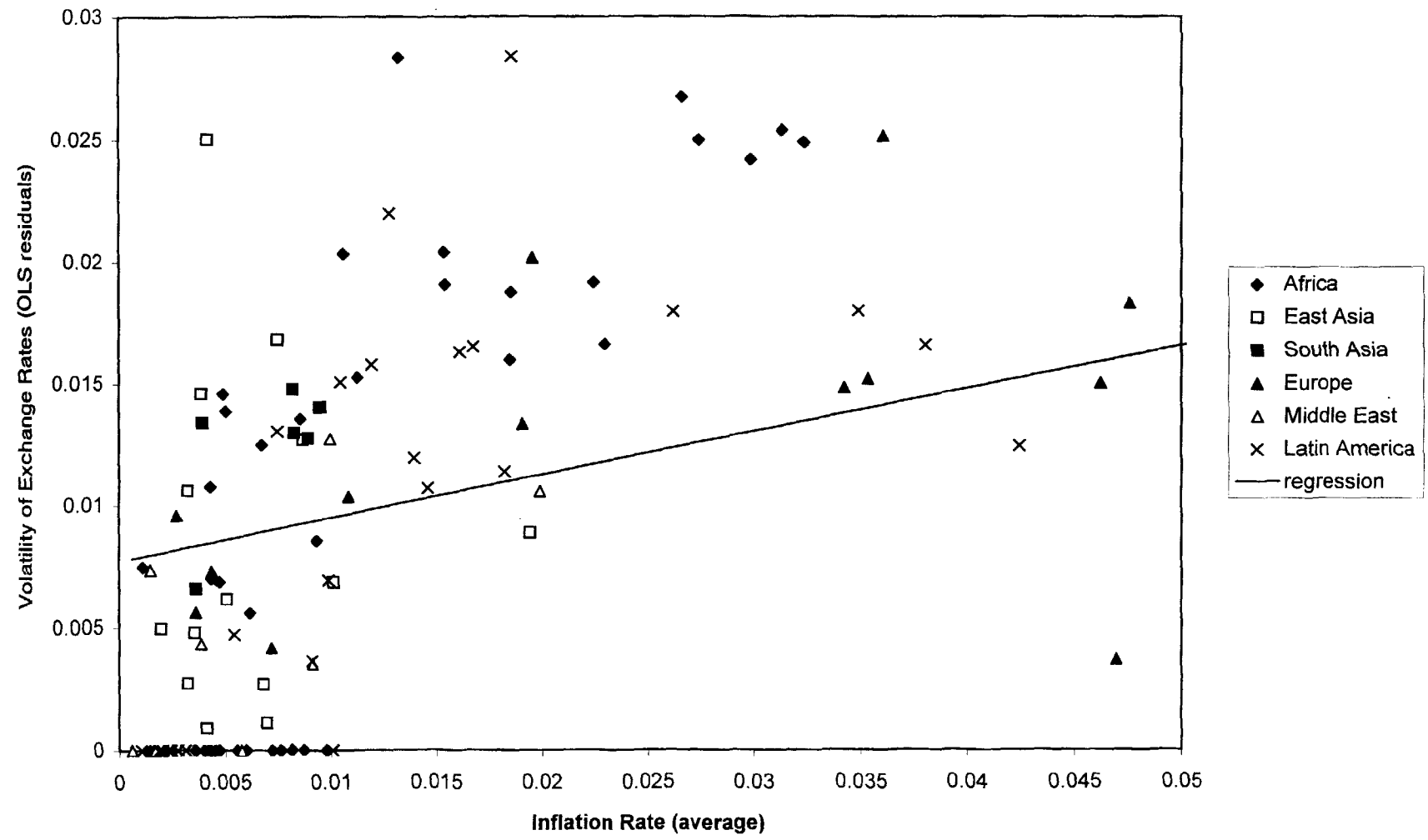
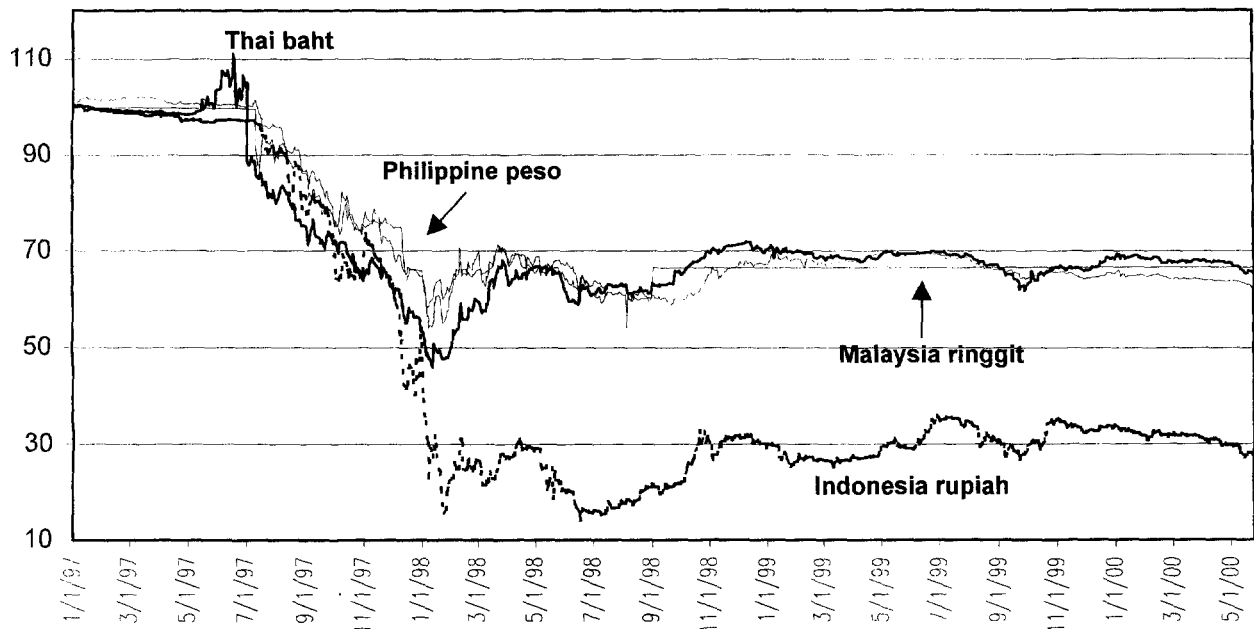
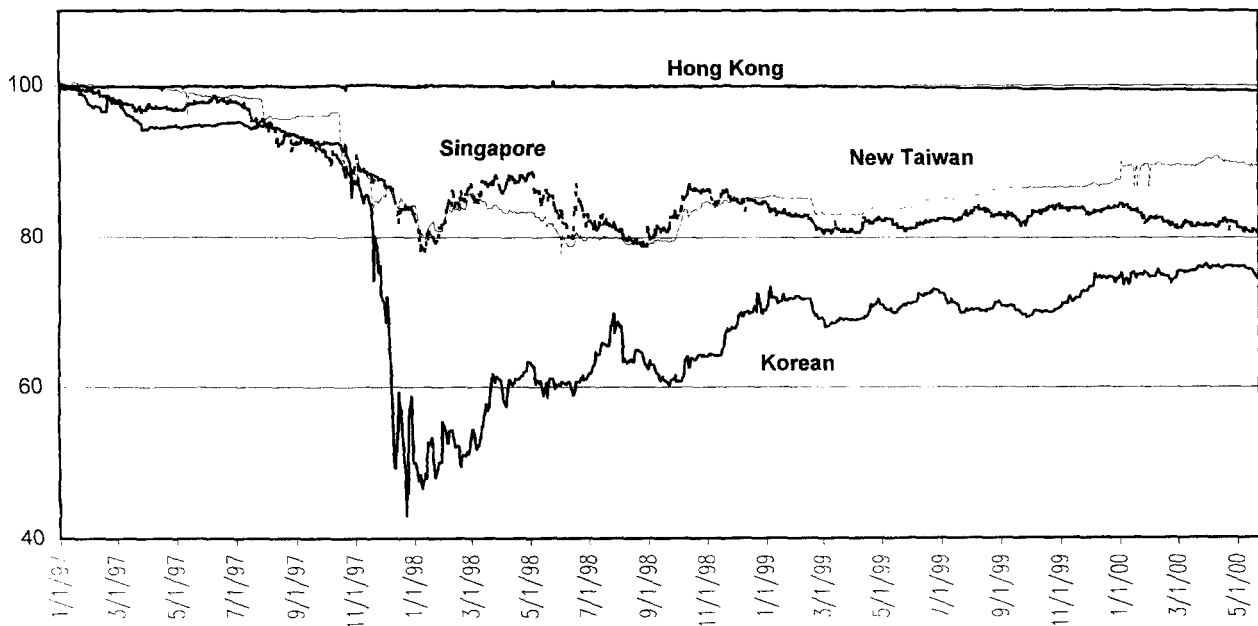


Figure 2. The East Asian Economies' Exchange Rate Movements

(a) ASEAN Countries' Exchange Rate Indices, Offshore Rates (January 1997 = 100)



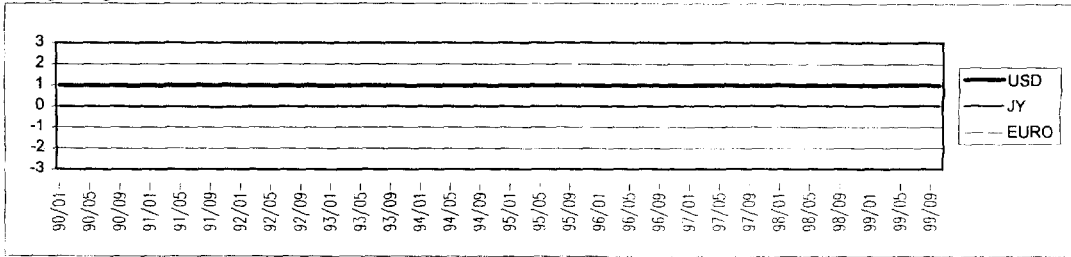
(b) The Asian NIEs' Exchange Rate Indices (January 1997 = 100)



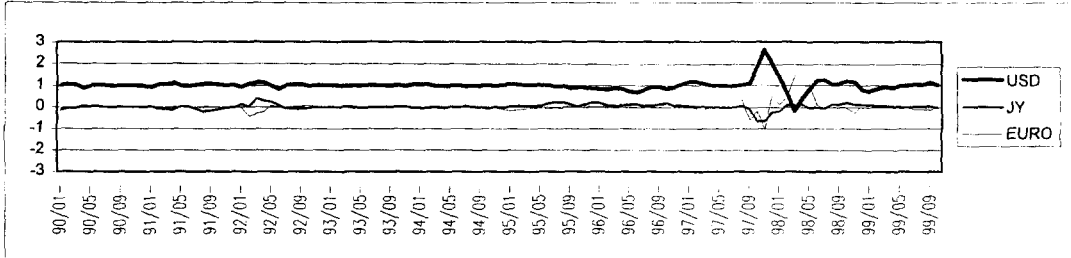
Source: Datastream.

Figure 3. Estimated Coefficients on the US Dollar, Japanese Yen, and Euro

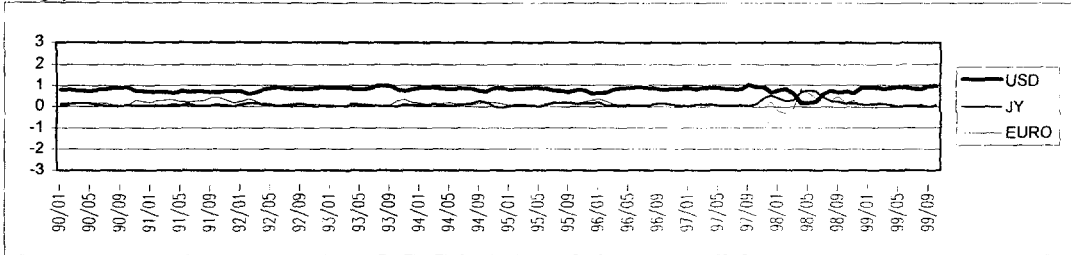
Hong Kong Dollar



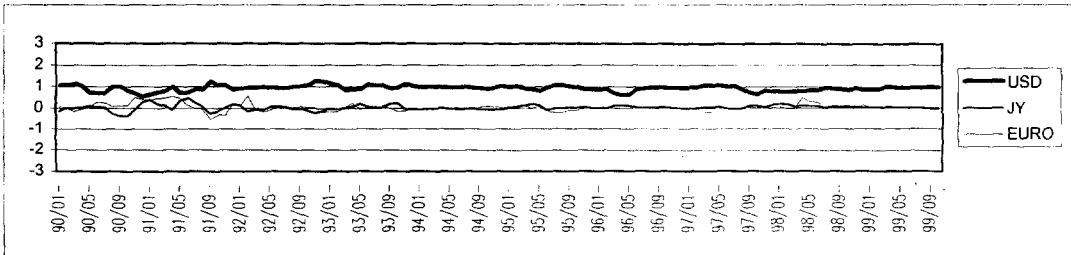
Korean Won



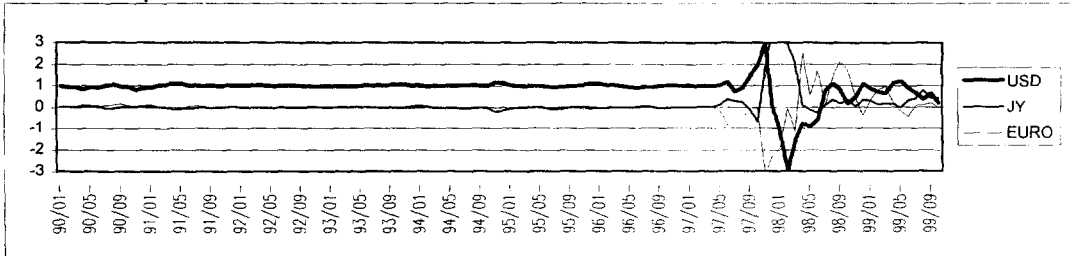
Singapore Dollar



New Taiwan Dollar



Indonesian Rupiah



Malaysian Ringgit

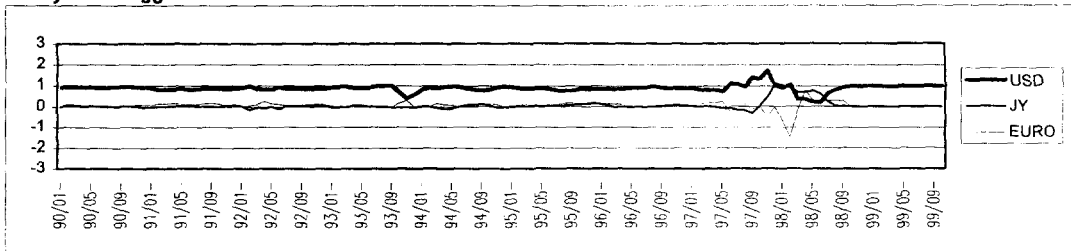
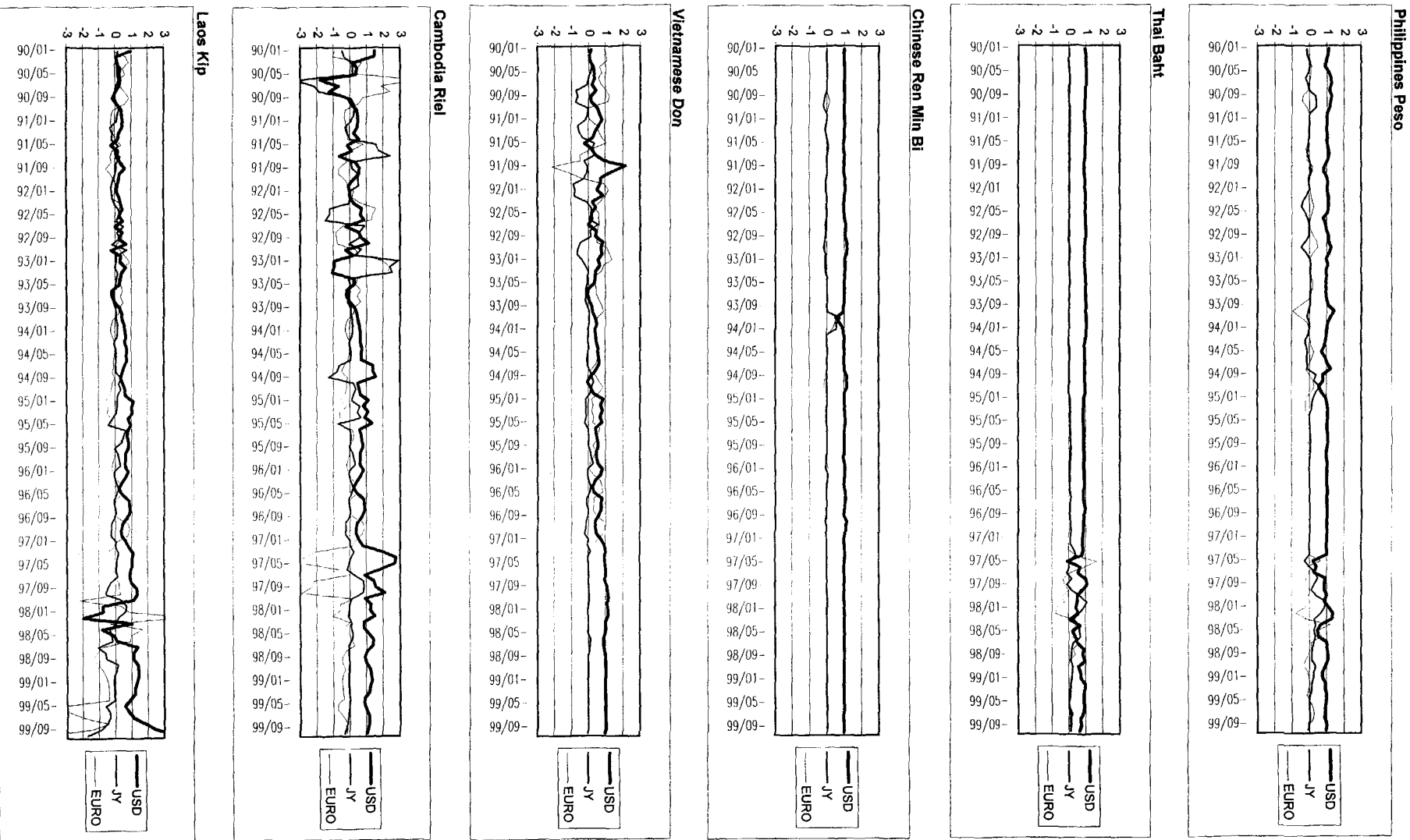
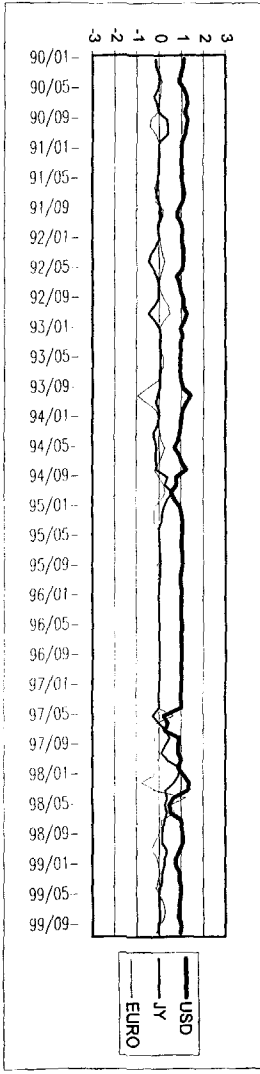


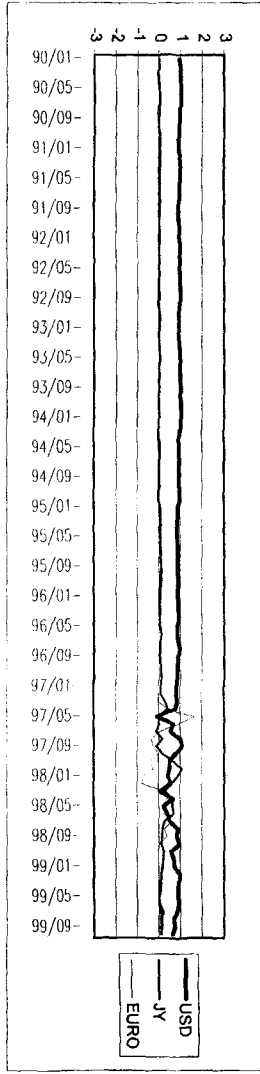
Figure 3. (Continued)



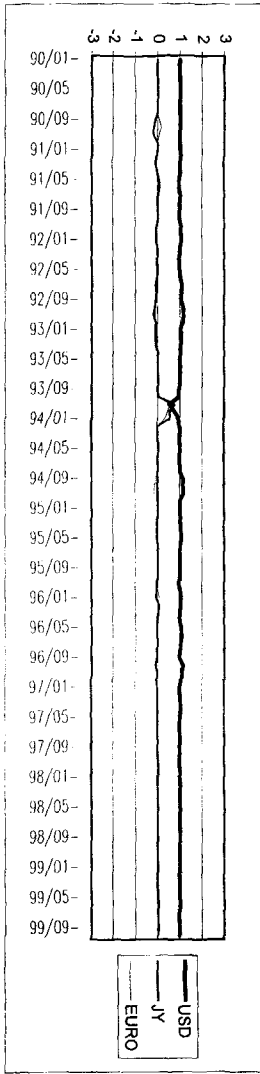
Philippines Peso



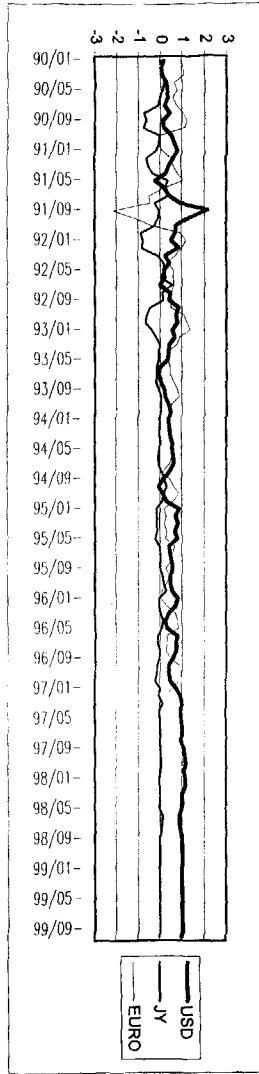
Thai Baht



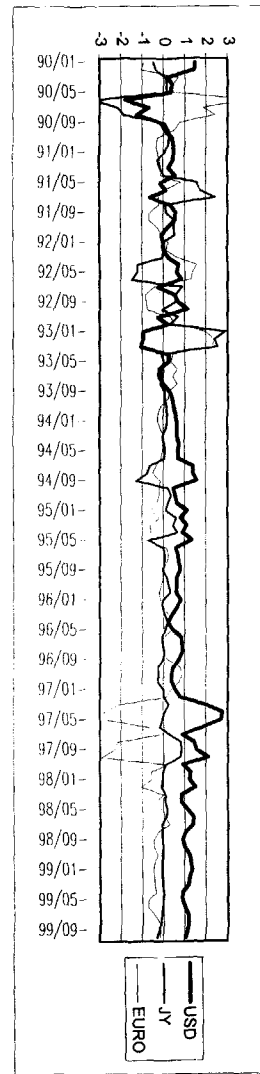
Chinese Ren Min Bi



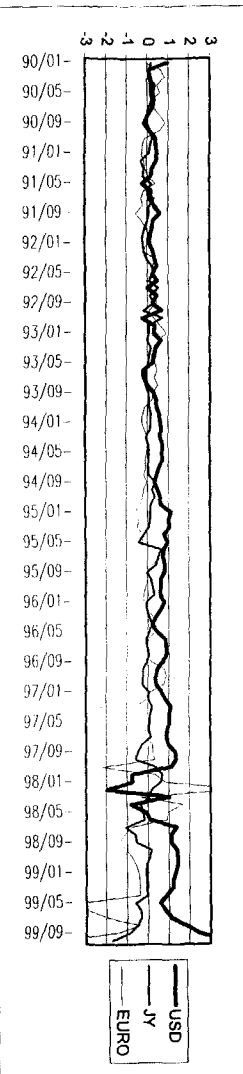
Vietnamese Dong



Cambodia Riel

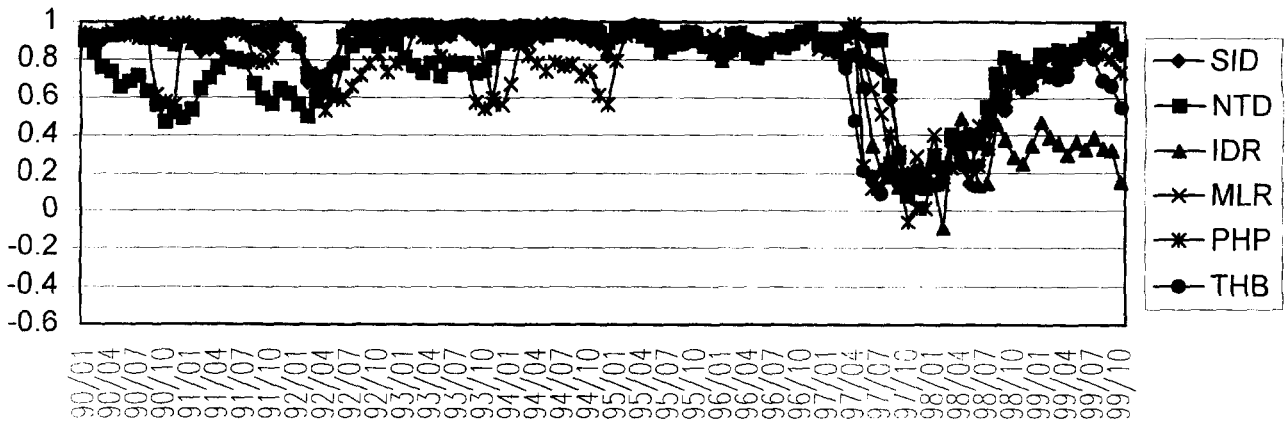


Laos Kip

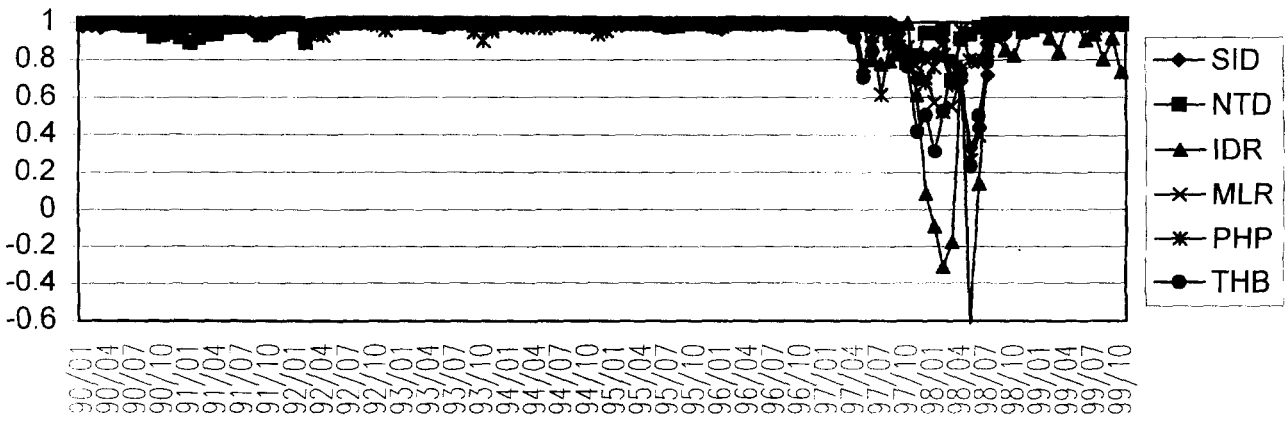


**Figure 4. Correlation Coefficients of Exchange Rate Changes
(a) Korean Won versus Other Currencies**

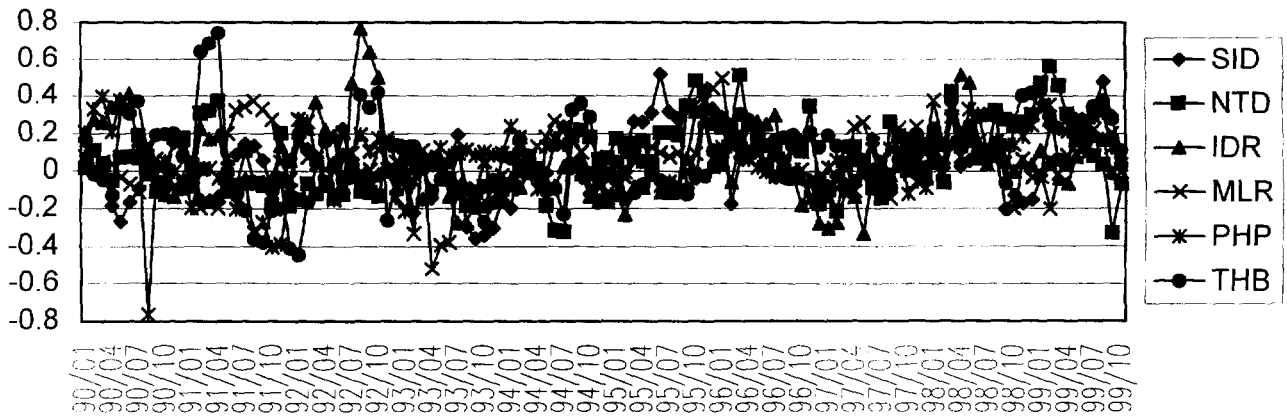
Actual



Predicted

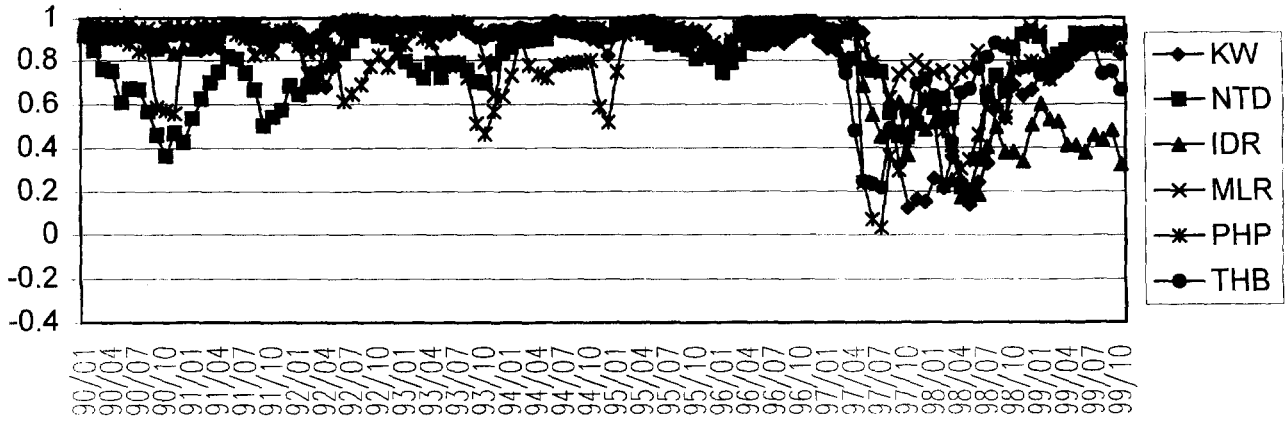


Residual

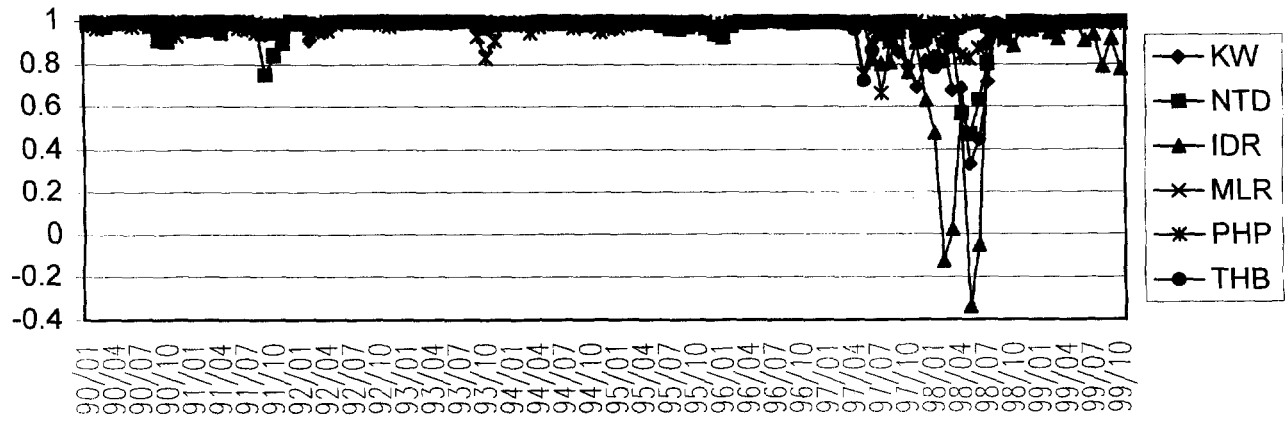


**Figure 4. Correlation Coefficients of Exchange Rate Changes
(b) Singapore Dollar versus Other Currencies**

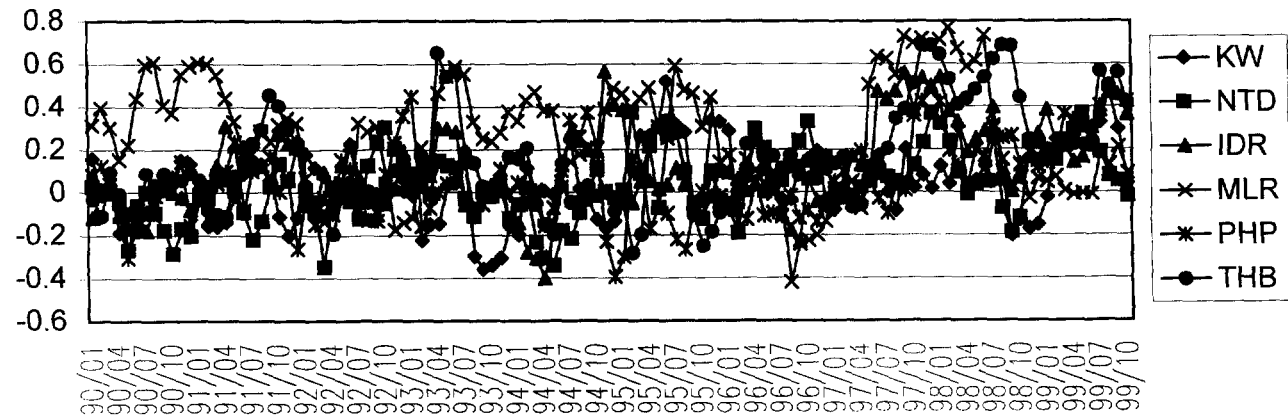
Actual



Predicted

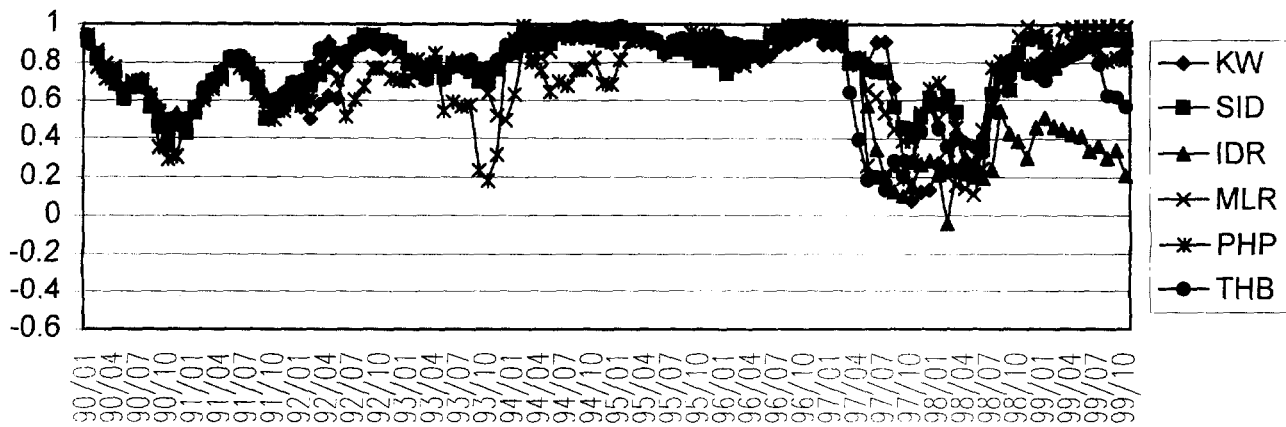


Residual

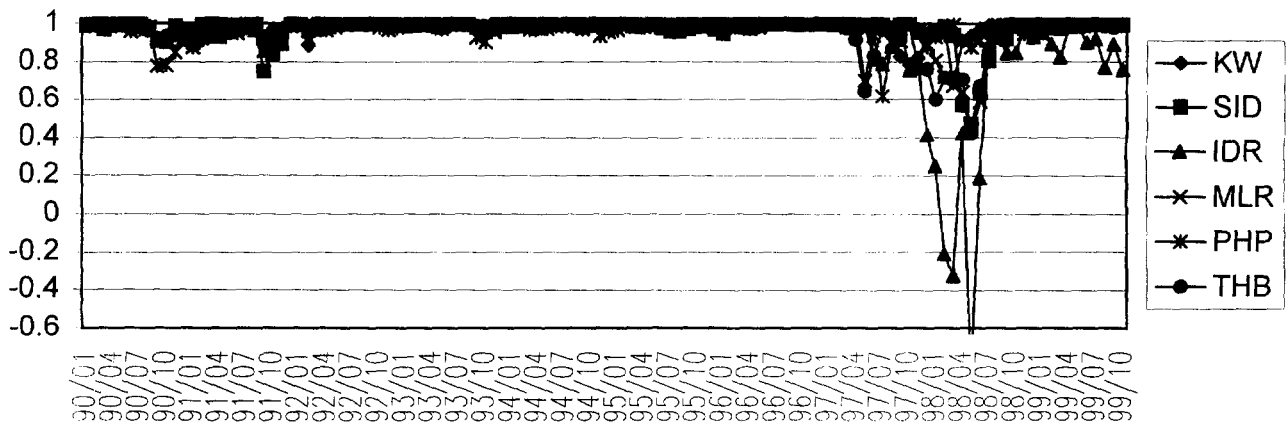


**Figure 4. Correlation Coefficients of Exchange Rate Changes
(c) New Taiwan Dollar versus Other Currencies**

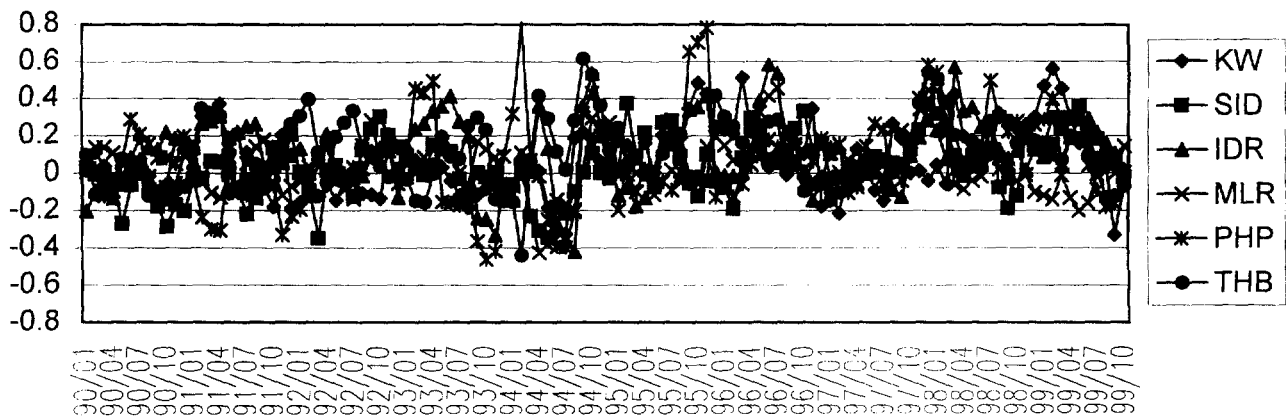
Actual



Predicted

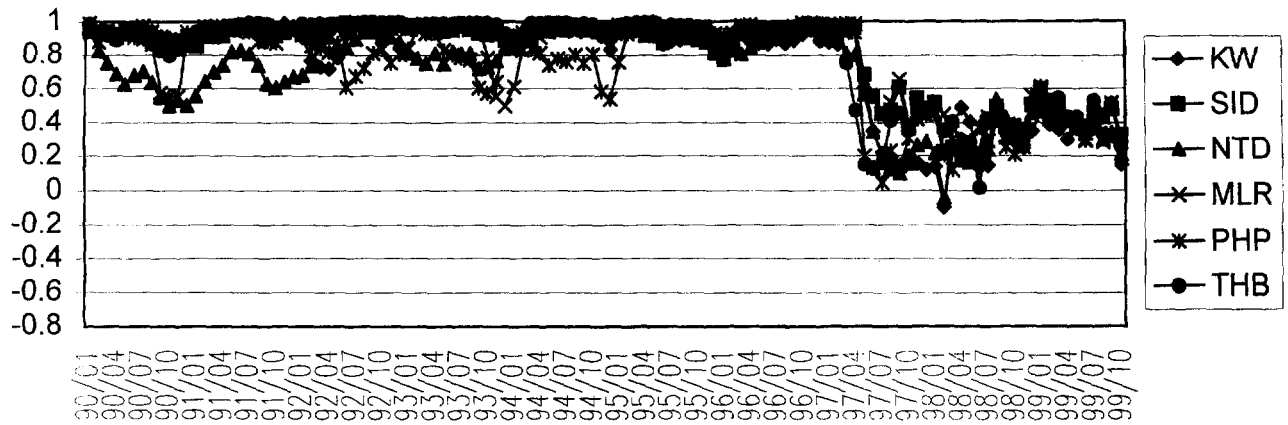


Residual

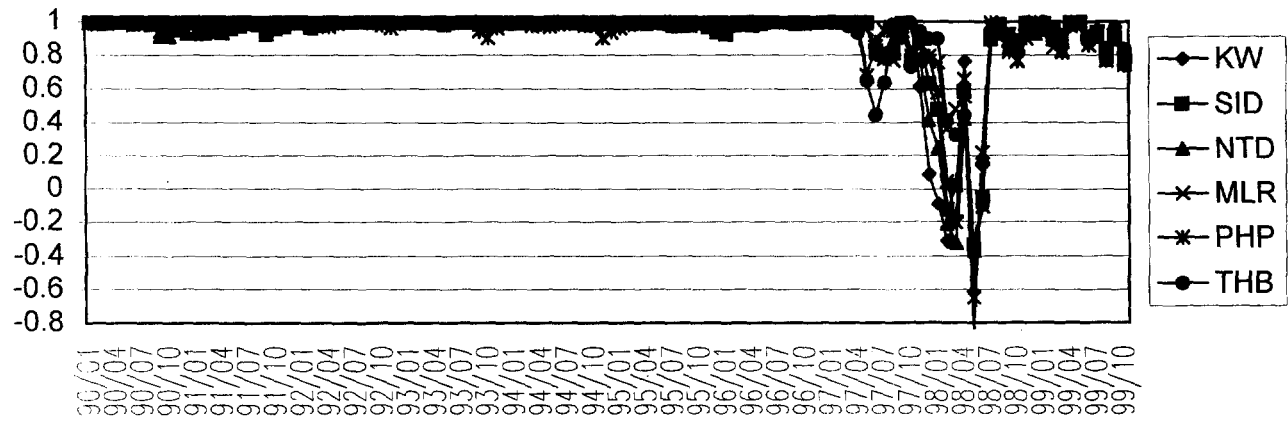


**Figure 4. Correlation Coefficients of Exchange Rate Changes
(d) Indonesian Rupiah versus Other Currencies**

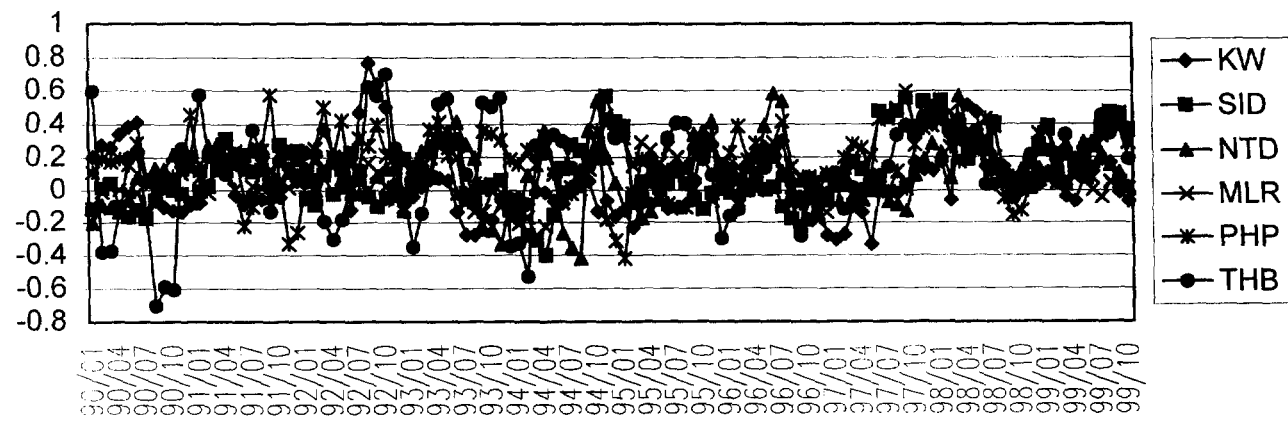
Actual



Predicted

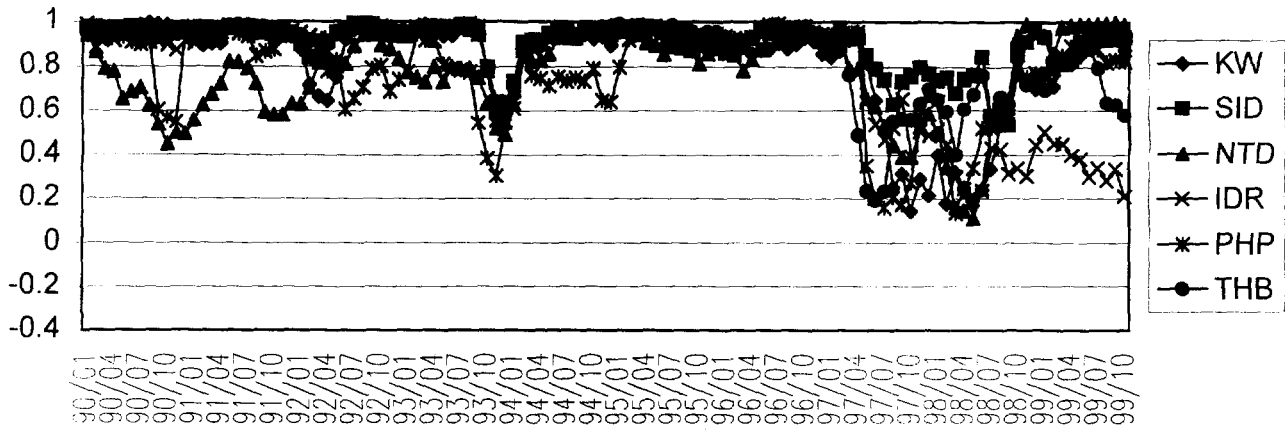


Residual

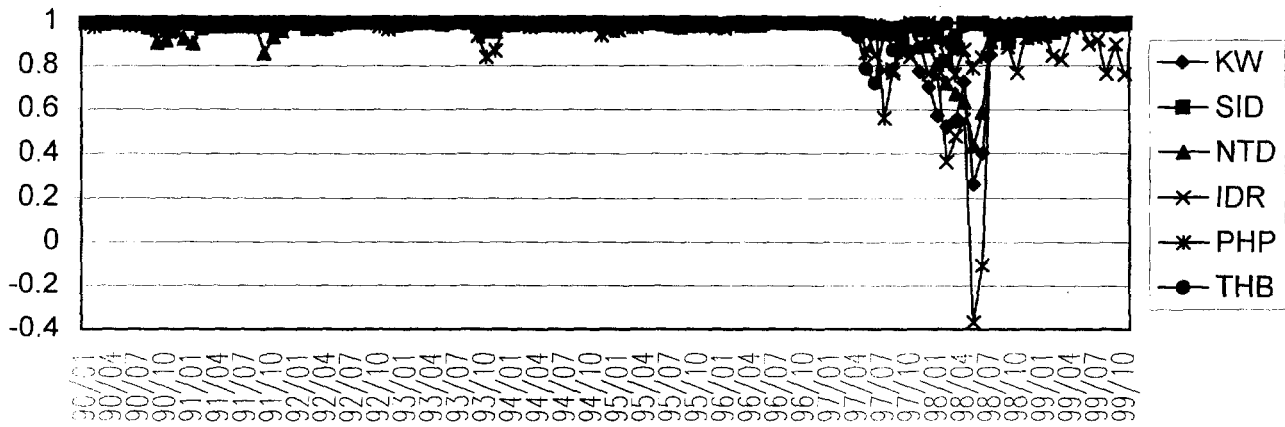


**Figure 4. Correlation Coefficients of Exchange Rate Changes
(e) Malaysian Ringgit versus Other Currencies**

Actual



Predicted



Residual

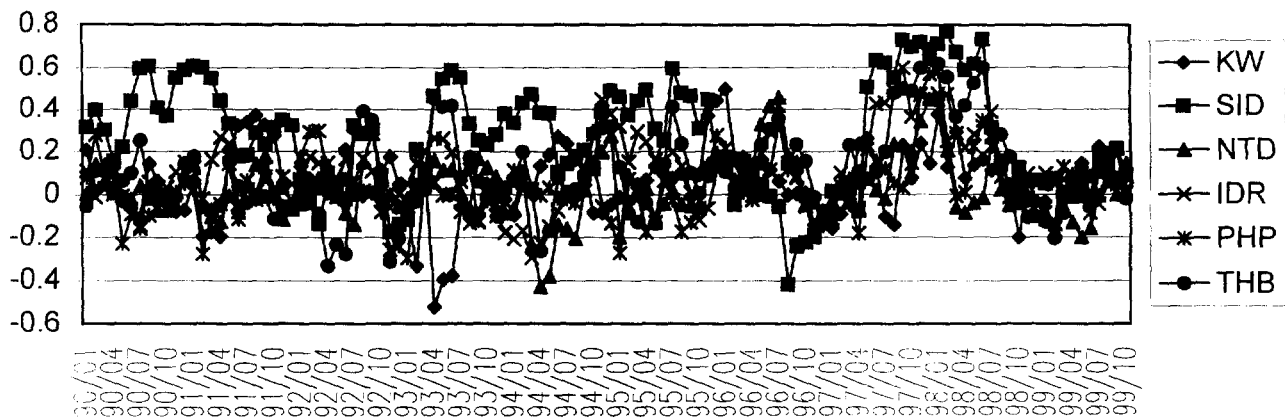


Figure 4. Correlation Coefficients of Exchange Rate Changes
(f) Thai Baht versus Other Currencies

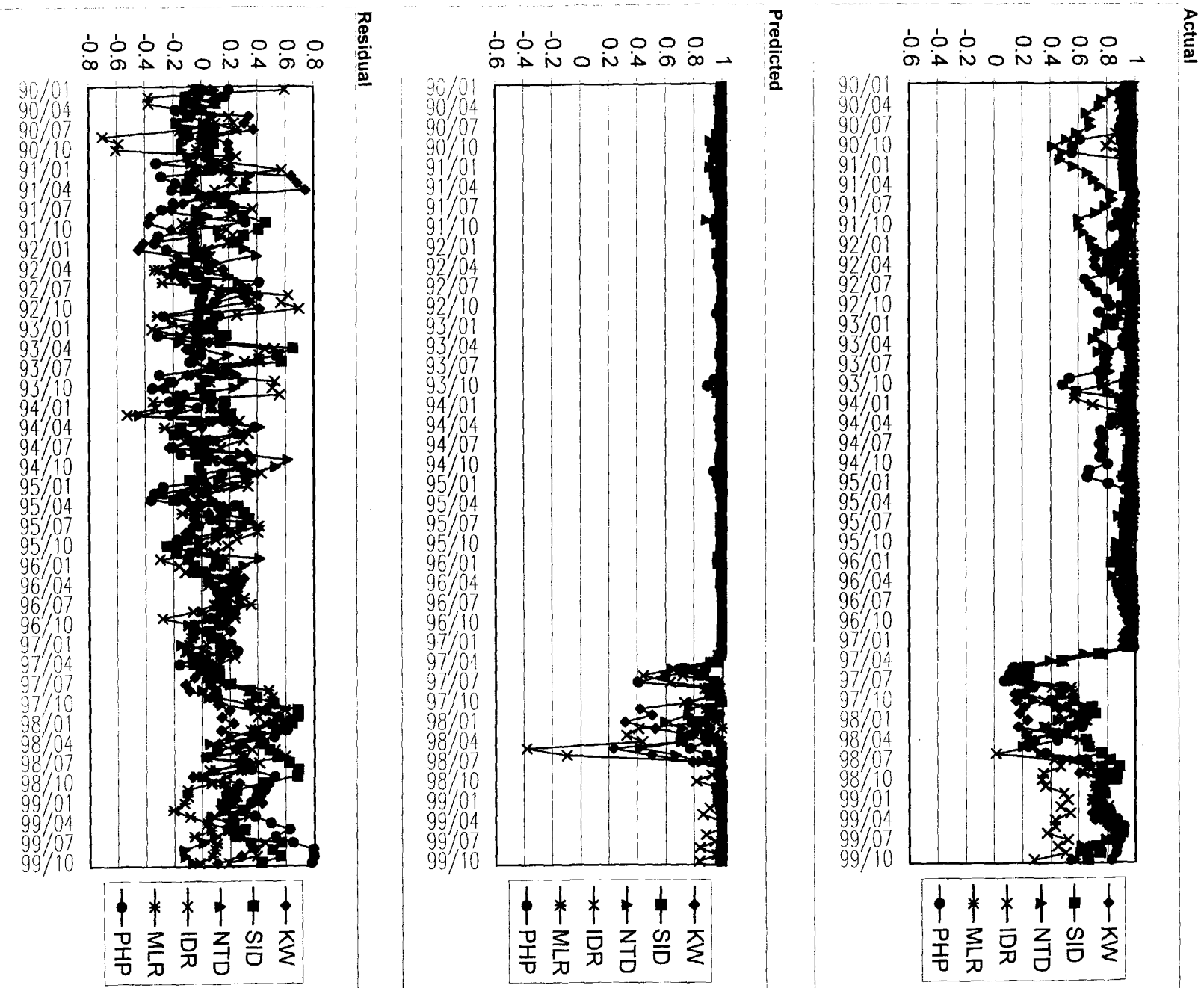
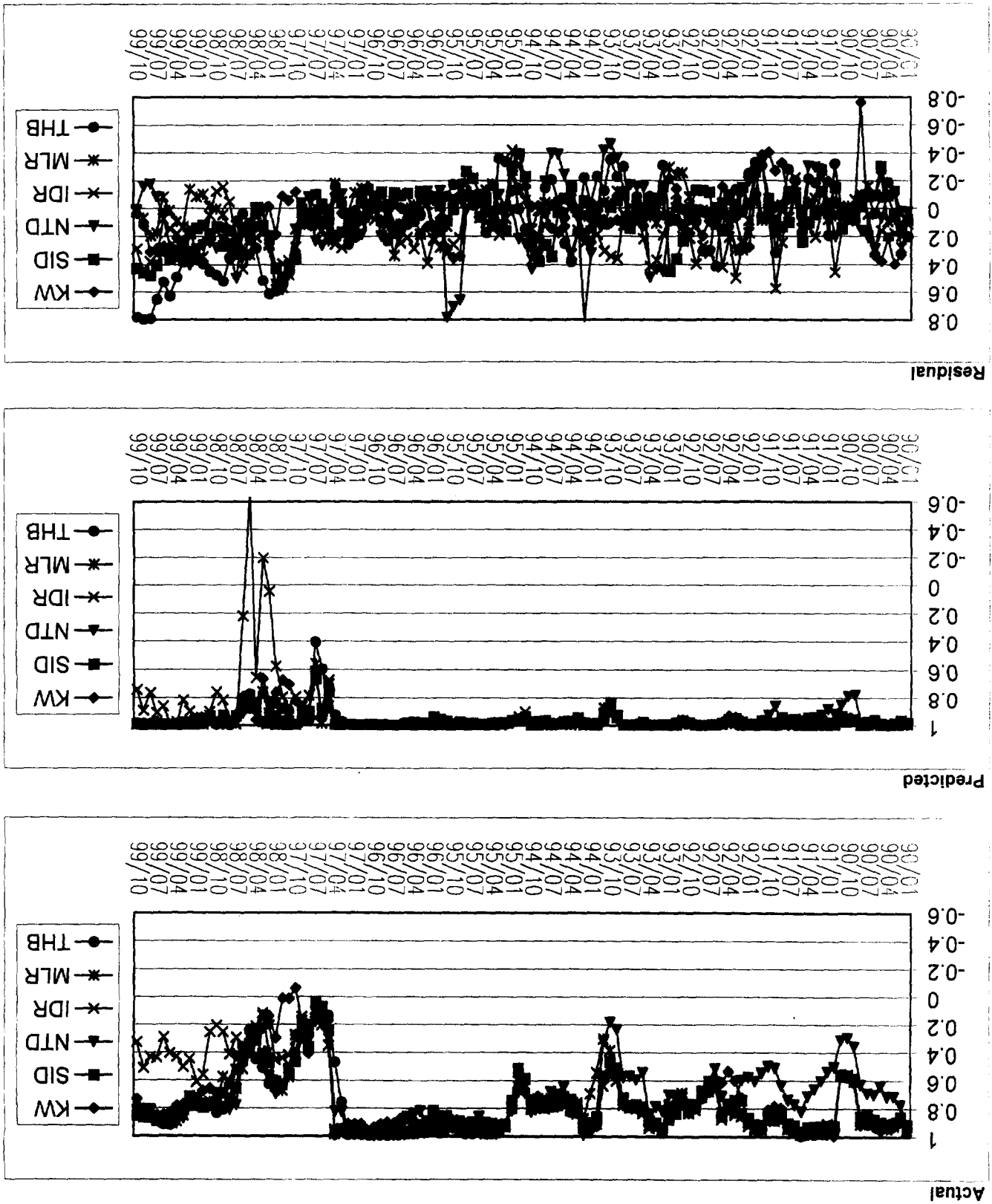
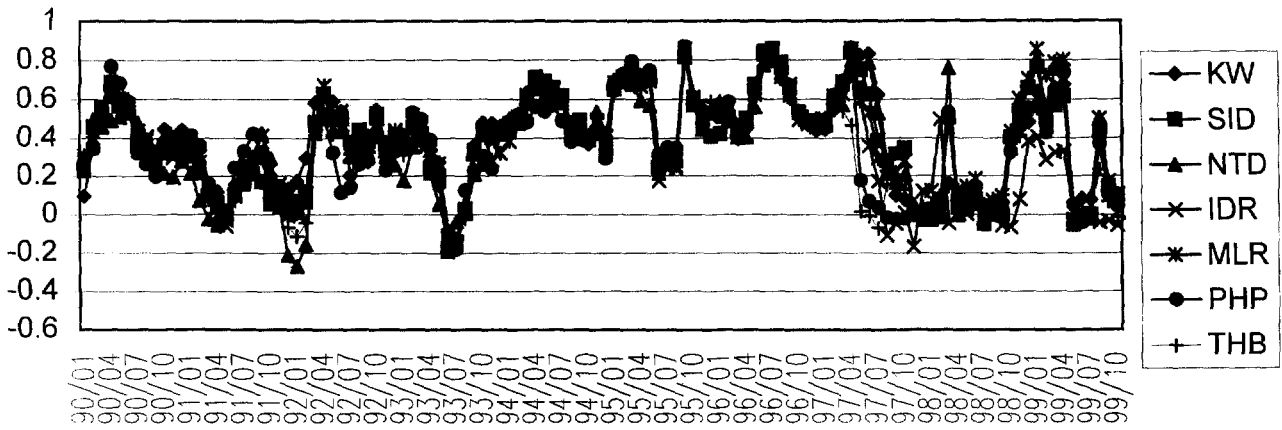


Figure 4. Correlation Coefficients of Exchange Rate Changes
(g) Philippines Peso versus Other Currencies

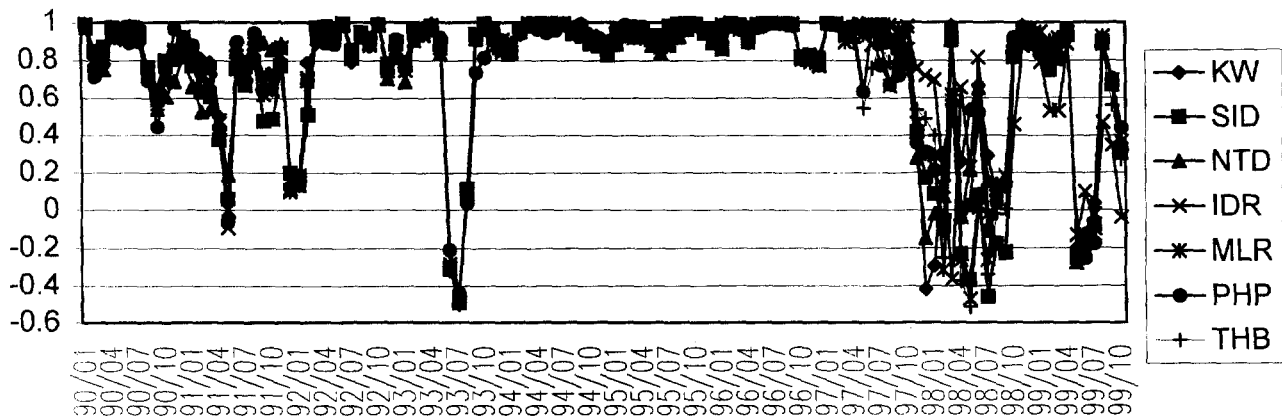


**Figure 4. Correlation Coefficients of Exchange Rate Changes
(h) Laos Kip versus Other Currencies**

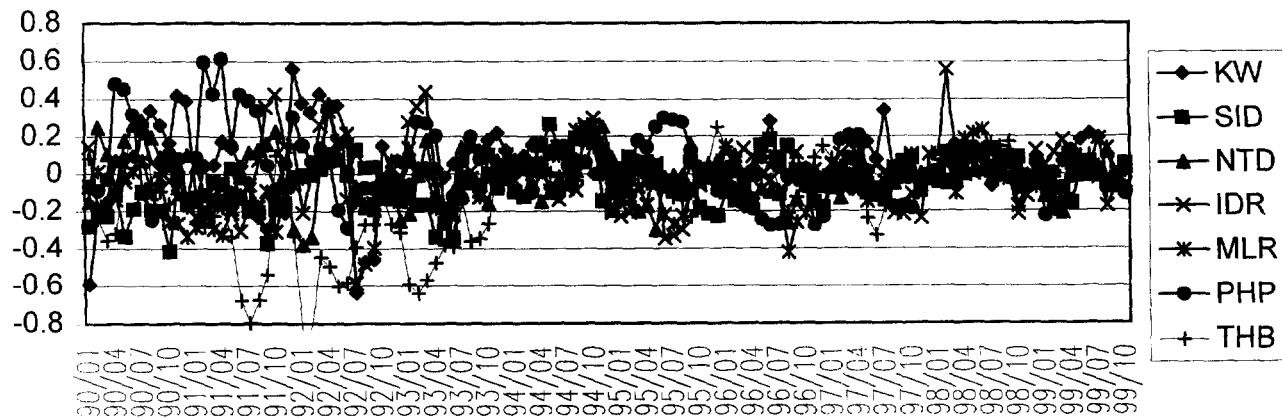
Actual



Predicted



Residual



Appendix Table. (Continued)

Table with columns: Country, USD, JY, EURO, PZ-adj, DW, SDR, No. obs. It lists economic indicators for Chinese Ren Min Bi and Vietnamese Dong across various years and indicators.

Note: Double asterisks (**), a single asterisk (*) and a pound (#) indicate that the estimated coefficients are statistically significant at the 1%, 5%, and 10% levels, respectively.

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS2480	Productivity Growth and Resource Degradation in Pakistan's Punjab: A Decomposition Analysis	Mubarik Ali Derek Byerlee	November 2000	D. Byerlee 87287
WPS2481	Foreign Direct Investment in Africa: Policies Also Matter	Jacques Morisset	November 2000	N. Busjeet 33997
WPS2482	Can Institutions Resolve Ethnic Conflict?	William Easterly	November 2000	K. Labrie 31001
WPS2483	The Credit Crunch in East Asia: What Can Bank Excess Liquid Assets Tell Us?	Pierre-Richard Agénor Joshua Aizenman Alexander Hoffmaister	November 2000	M. Gosiengfiao 33363
WPS2484	Banking Crises in Transition Economies: Fiscal Costs and Related Issues	Helena Tang Edda Zoli Irina Klytchnikova	November 2000	A. Carcani 30241
WPS2485	Are Corruption and Taxation Really Harmful to Growth? Firm-Level Evidence	Raymond Fisman Jakob Svensson	November 2000	R. Bonfield 31248
WPS2486	Who Must Pay Bribes and How Much? Evidence from a Cross-Section of Firms	Jakob Svensson	November 2000	R. Bonfield 31248
WPS2487	Finance and Macroeconomic Volatility	Cevdet Denizer Murat F. Iyigun Ann L. Owen	November 2000	I. Partola 35759
WPS2488	Revisiting the Link between Poverty and Child Labor: The Ghanaian Experience	Niels-Hugo Blunch Dorte Verner	November 2000	H. Vargas 37871
WPS2489	Banking Crises and Exchange Rate Regimes: Is There a Link?	Ilker Domaç Maria Soledad Martinez Peria	November 2000	A. Carcani 30241
WPS2490	Contractual Savings, Stock, and Asset Markets	Gregorio Impavido Alberto R. Musalem	November 2000	P. Braxton 32720
WPS2491	Labor Demand and Trade Reform in Latin America	Pablo Fajnzylber William F. Maloney	November 2000	T. Gomez 32127
WPS2492	Health Insurance Reform in Four Latin American Countries: Theory and Practice	William Jack	November 2000	H. Sladovich 37698

Policy Research Working Paper Series

Title	Author	Date	Contact for paper
WPS2493 Annuity Markets in Comparative Perspective: Do Consumers Get Their Money's Worth?	Estelle James Dimitri Vittas	November 2000	A. Yaptenco 31823
WPS2494 The Relevance of Index Funds for Pension Investment in Equities	Ajay Shah Kshama Fernandes	November 2000	A. Yaptenco 31823
WPS2495 The Australian Annuity Market	David M. Knox	November 2000	A. Yaptenco 31823
WPS2496 Perspectives on the Sources of Heterogeneity in Indian Industry	Somik V. Lall G. Chris Rodrigo	November 2000	R. Yazigi 37176
WPS2497 State Policies and Women's Autonomy in China, India, and the Republic of Korea, 1950–2000: Lessons from Contrasting Experiences	Monica Das Gupta Sunhwa Lee Patricia Uberoi Danning Wang Lihong Wang Xiaodan Zhang	November 2000	M. Das Gupta 31983
WPS2498 Sustaining Economic Welfare: Estimating Changes in Per Capita Wealth	Kirk Hamilton	November 2000	L. Rivera 82819
WPS2499 The Treatment of Non-Essential Inputs in a Cobb-Douglas Technology: An Application to Mexican Rural Household-Level Data	Isidro Soloaga	December 2000	L. Tabada 36896
WPS2500 Investigating Corruption	Canice Prendergast	December 2000	H. Sladovich 37698
WPS2501 Anti-Corruption Policies and Programs: A Framework for Evaluation	Jeff Huther Anwar Shah	December 2000	A. Santos 31675