# Exchange Rate Arrangements in East Asia: Lessons from the 1997–98 Currency Crisis

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*This paper examines the evolution of exchange rate arrangements in East Asia's emerging market economies over the last 10 years. It considers both "official" and "observed" exchange rate arrangements in these economies from an international comparative perspective. By focusing on the roles of the dollar, the yen, and the euro as anchor currencies for exchange rate stabilization, the paper claims that the dollar played a dominant role as a* de jure *or* de facto *anchor for emerging East Asia until the 1997–98 currency crisis. During the crisis, the dollar's dominance naturally declined in affected East Asia as a result of a general shift to more flexible exchange rate arrangements. In the post-crisis period, the dollar has regained prominence in some countries (notably in Malaysia), while its dominance has been reduced and exchange rate flexibility has risen in others (notably in Indonesia). Interesting is the observation that Korea and Thailand appear to have shifted to a* de facto *currency basket arrangement with significant weights on the dollar and the yen, similar to Singapore's managed floating arrangement. This paper also considers what may be a desirable currency system for the region. Given the high volatility of yen/dollar exchange rates and partner diversity of trade and foreign direct investment (FDI) relationships, it claims that the emerging East Asian economies would be better off stabilizing their currencies to a balanced currency basket in which the dollar, the yen, and the euro play equally important roles. For intra-regional exchange rate stability, greater coordination on the currency basket policy would be desirable, and this needs to be supported by regional policy dialogue and financing mechanisms.*

Key words: East Asian currency crisis; Exchange rate arrangements; Two-corner solution approach; Fear of floating; Currency basket system

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## I. Introduction

Reflecting on the East Asian currency crisis in 1997–98, this paper examines how the East Asian exchange rate arrangements have evolved over the last decade. For this purpose, it examines exchange rate arrangements of other developing countries and evaluates the East Asian practice from an international comparative perspective. It also explores what may be a resilient regional exchange rate arrangement for East Asia's financial stability, economic development, and sustained growth.

The East Asian currency crisis forced many economies in the region to shift away from *de facto* dollar-pegged regimes to more flexible exchange rate regimes. The dollar had played a dominant role as an international anchor currency until the outbreak of the crisis in the summer of 1997. During the crisis, the anchor currency role of the dollar was substantially reduced, due to a general shift to more flexible rate arrangements. As the currency crisis subsided in the second half of 1998, however, the East Asian economies generally restored exchange rate stability—with the exception of Indonesia. This restoration of rate stability was accompanied by a greater role of the dollar in some countries—notably in Malaysia—and a greater role of the yen in others—notably in Singapore, Korea, and Thailand.

Emerging market economies, including those in East Asia,[1] face a trade-off between the virtue of exchange rate stability to promote trade, investment, and growth and the need for flexibility, particularly during a time of crisis, to maintain international price-competitiveness and facilitate adjustment. The "two-corner solution" approach of choosing either a pure float—often accompanied by inflation targeting—or a hard peg—an institutionally binding fixed rate regime like monetary union, unilateral "dollarization" or "yenization," or a currency board—does not appear to be realistic in many emerging East Asian economies. The reason is that they appear to have a "fear of floating" or a preference toward exchange rate stability, though not necessarily rigidity. Given emerging East Asia's diversified trade and FDI relationships with the United States, Japan, and the European Union (EU) and given the continued high exchange rate volatility among the tripolar currencies, a reasonable exchange rate policy for the region would be to stabilize rates to a basket of currencies consisting of the dollar, the yen, and the euro.

The organization of the paper is as follows: Section II examines the nature of "official" and "observed" exchange rate arrangements for developing economies in the world. This section finds that many authorities in the developing world exhibit a "fear of floating" or a preference for stable exchange rates vis-à-vis an international currency or a basket of such currencies. Section III analyzes the changing importance of the dollar, the yen, and the euro as international anchor currencies for the exchange rate behavior of the emerging East Asian economies before, during, and after the currency crisis. It finds that the dollar played a dominant role as an anchor currency for exchange rate stabilization in emerging East Asia in the pre-crisis period, but that its dominant role naturally declined during the crisis. It also finds that,

1. In this paper, emerging East Asian economies include China, Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand.

in the post-crisis period, some economies have reverted to a pre-crisis type of dollar-based exchange rate regime, while others have allowed greater exchange rate flexibility. Several countries have shifted to a *de facto* currency basket arrangement with larger weights on the yen. Section IV proposes a region-wide currency basket system where the dollar, the yen, and the euro would play more balanced roles. How tightly or loosely the exchange rate should be stabilized is left to each economy's specific conditions and preferences, at least initially. It also argues that a currency basket system needs to be accompanied by closer regional coordination through financing and policy dialogue mechanisms, in a manner commensurate with real sector integration. Section V summarizes the paper.

## II. Trends in Exchange Rate Arrangements in the Developing World

### A. "Official" Exchange Rate Arrangements

The International Monetary Fund (IMF) regularly publishes exchange rate arrangements formally reported by its member countries according to its own classification scheme. In 1999, the IMF started to pay greater attention to the *de facto* exchange rate arrangement practices of its members rather than using only formally reported arrangements. Table 1 summarizes such "official" arrangements for developing countries during 1980–2001.[2] In this table, exchange rate arrangements are classified broadly into three categories; a fixed exchange rate arrangement, limited exchange rate flexibility, and a more flexible exchange rate arrangement.[3]

While the number of IMF members in the developing world has increased over time (from 118 in 1980 to 163 in 2001), the number of countries under fixed exchange rate arrangements has decreased (from 90 to 76), and the number of countries under more flexible exchange rate arrangements has increased (from about 25 to 83). As far as "official" exchange rate arrangements are concerned, many countries have shifted from fixed to more flexible arrangements over the last 20 years. Nonetheless, quite a few countries still attempt to stabilize their exchange rates. Indeed, 80 countries (49 percent of the total) were on "fixed exchange rate arrangements" and "limited exchange rate flexibility" in 2001. In addition, some countries under "more flexible arrangements" are known to have stabilized their exchange rates vis-à-vis a certain currency or a basket of currencies.

2. See International Monetary Fund (1997), and Mussa *et al.* (2000) for discussions of exchange rate arrangements in developing countries. Table 1 is compiled from the IMF's *International Financial Statistics* (various issues) by removing industrialized countries.

3. Beginning in January 1999, the IMF introduced a new classification of categories that includes (1) exchange arrangements with no separate legal tender; (2) currency board arrangements; (3) other conventional fixed-peg arrangements (including *de facto* peg arrangements under managed floating); (4) pegged exchange rates within horizontal bands; (5) crawling pegs; (6) exchange rates within crawling bands; (7) managed floating with no preannounced path for exchange rate; and (8) independently floating. As the new classification is not strictly comparable to earlier classifications, I have decided to compile Table 1 according to the earlier classification, assuming that (1), (2), and (3) belong to a "fixed rate arrangement," (4) is "limited exchange rate flexibility," (5), (6), and (7) belong to "managed floating," and (8) is "independently floating." The last two combined represent a "more flexible rate arrangement."

## Table 1 Summary of Official Exchange Rate Arrangements of IMF-Member Developing Countries, 1980–2001

Number of countries

| | Dec. 1980 | Dec. 85 | Dec. 90 | Dec. 91 | Dec. 92 | Dec. 93 | Dec. 94 | Dec. 95 | Dec. 96 | Dec. 97 | Sept. 98 | Jan. 99 | Dec. 99 | Dec. 2000 | Dec. 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fixed exchange rate arrangement** | **90** | **89** | **81** | **75** | **82** | **71** | **70** | **65** | **65** | **65** | **63** | **73** | **79** | **79** | **76** |
| Pegged to the dollar | 39 | 31 | 25 | 24 | 24 | 21 | 23 | 22 | 21 | 20 | 20 | 31 | 38 | 37 | 38 |
| Pegged to the euro | 15 | 14 | 15 | 15 | 15 | 16 | 16 | 17 | 17 | 19 | 20 | 21 | 21 | 22 | 21 |
| Pegged to the French franc | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | — |
| Pegged to the deutschemark | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | — |
| Pegged to other EMU currency | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | — |
| Pegged to the U.K. pound sterling | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pegged to the Russian ruble | 0 | 0 | 0 | 0 | 6 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pegged to other currency | 2 | 4 | 5 | 3 | 5 | 5 | 6 | 5 | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Pegged to SDR | 15 | 11 | 6 | 6 | 5 | 4 | 4 | 3 | 2 | 3 | 4 | 2 | 2 | 2 | 1 |
| Pegged to other currency composite | 18 | 28 | 30 | 27 | 27 | 24 | 20 | 18 | 19 | 16 | 12 | 12 | 11 | 11 | 9 |
| **Limited exchange rate flexibility** | **a** | **5** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **4** | **9** | **3** | **4** | **4** |
| **More flexible exchange rate arrangement** | **3+b+c** | **32** | **46** | **54** | **58** | **77** | **81** | **88** | **89** | **89** | **92** | **80** | **80** | **80** | **83** |
| Adjusted according to a set of indicators | 3 | 4 | 5 | 5 | 3 | 4 | 3 | 2 | 2 | — | — | — | — | — | — |
| Other managed floating | b | 17 | 21 | 25 | 22 | 28 | 30 | 42 | 43 | 44 | 55 | 41 | 37 | 42 | 52 |
| Independently floating | c | 11 | 20 | 24 | 33 | 45 | 48 | 44 | 44 | 45 | 37 | 39 | 43 | 38 | 31 |
| Unclassified | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **118** | **127** | **132** | **134** | **144** | **152** | **155** | **157** | **158** | **158** | **159** | **162** | **162** | **163** | **163** |

Notes: 1. Though a new classification of exchange rate arrangements was introduced on January 1, 1999, the table summarizes official exchange rate arrangements on the basis of earlier classification methods. To try to maintain consistency with the earlier classification, several assumptions are made: a **"fixed exchange rate arrangement"** includes "exchange arrangements with no separate legal tender," "currency board arrangements," and "other conventional fixed-peg arrangements (including *de facto* peg arrangements under managed floating)"; **"limited exchange rate flexibility"** corresponds to "pegged exchange rates within horizontal bands"; **"managed floating"** includes "crawling pegs," "exchange rates within crawling bands," and "managed floating with no preannounced path for exchange rate"; and **"independently floating"** in the table corresponds to "independently floating" under the new classification.

2. The number of countries under "fixed exchange rate arrangement" jumped upward in January 1999 because nine countries began to be reclassified as "other conventional fixed-peg arrangements (including *de facto* peg arrangements under managed floating)" rather than as managed or independently floating, and three economies (Aruba, Hong Kong, and Netherlands Antilles) were added to the list.

3. Given that the euro was introduced in January 1999, the row for "pegged to the euro" is created to indicate the number of developing countries that had pegged their currencies to EMU-12 currencies—mainly the French franc, the deutschemark, the Spanish peseta, and the Portuguese escudo—until the end of 1998.

4. Several IMF-member and non-member developing economies are not always included in this table, e.g., Hong Kong (1980–98), Taiwan, and Cambodia (1980 and 1992).

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

Source: International Monetary Fund, *International Financial Statistics* (various issues).

Focusing on the fixed rate arrangements in the developing world, as of December 2001, the dollar is the most popular target currency (for 42 developing countries including four countries under "flexibility limited in terms of a single currency"), followed by the euro (formerly the French franc for 15 countries, the deutschemark for four countries and the Portuguese escudo and the Italian lira for one country each after January 1999), non-special drawing right (SDR) currency baskets (for nine countries), and the SDR (for one country).[4] It is noteworthy to observe that no developing country pegs its exchange rate any longer to the U.K. pound sterling, particularly since 1986, or to the yen throughout the period.

**B. "Observed" Exchange Rate Arrangements: Quantitative Analyses**

The "official" exchange rate arrangements provide information about the nature of the arrangements as reported by individual countries and, where appropriate, reclassified by the IMF when formally reported arrangements differ from the actual practices. However, these official arrangements still do not accurately 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 *de facto* exchange rate stabilization. To understand which exchange rate arrangements are actually in place, one must statistically examine the observed behavior of relevant variables, particularly exchange rates.[5]

One way to do this is through a regression analysis technique used by Frankel and Wei (1993, 1994, 1995) and to identify which major currency or currency basket is chosen as an anchor for a particular country's exchange rate stabilization and how closely such a relationship can be observed. In this subsection, we estimate the following type of regression equation:[6]

$$\Delta e^{j}_{t} = \alpha + \beta_1 \Delta e^{USD}{}_{t} + \beta_2 \Delta e^{DM}{}_{t} + \beta_3 \Delta e^{JY}{}_{t} + \beta_4 \Delta e^{FF}{}_{t} + \beta_5 \Delta e^{UKP}{}_{t} + u_t,$$

where $\Delta e^{j}_{t}$ is the monthly change in the log exchange rate of currency $j$ in month $t$, $\alpha$ is a constant term, $\beta_k$ ($k$ = 1, 2, . . .) is the coefficient on the monthly change in the log exchange rate of currency $k$, and $u_t$ is the residual term. The superscripts *USD*, *DM*, *JY*, *FF*, and *UKP* refer to the dollar, the deutschemark, the yen, the French franc, and the U.K. pound sterling, respectively. The estimated standard error of regression residuals can be interpreted as a measure of exchange rate volatility. A monthly change in the exchange rate is defined by the first difference of the natural logarithm of the nominal exchange rate. For some countries, we use as right-hand side variables the exchange rates of the SDR, European Currency Unit (ECU), and other relevant minor, regional currencies, reflecting country-specific characteristics. Following Frankel and Wei (1994), we express all the exchange rates in terms of a

4. Other target currencies for single-currency pegs include the South African rand (for three countries in December 2001), the Indian rupee (for two countries), the Australian dollar, and the Singapore dollar (for one country each). In the past, the U.K. pound sterling, the Spanish peseta, and the Russian ruble were also targets for single-currency pegs.
5. A more detailed study would require analysis of changes in foreign exchange reserves, foreign exchange market pressure, and interest rates.
6. This exercise is an extension of the studies conducted by the author for an earlier sample period (see Kawai and Akiyama [1998]).

numeraire currency, the Swiss franc.[7] In this exercise, we have decided to remove data observations with values of log first differences greater than 0.1 to minimize the impacts of discrete devaluations or revaluations.[8]

This exercise provides useful information on "observed" exchange rate arrangements for developing countries. The underlying hypothesis is that every country attempts to stabilize the exchange rate to a basket of multiple currencies. First, it can identify specific currencies that comprise a basket in each developing country's exchange rate stabilization policy in terms of the estimated coefficients in the regression equation. 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 coefficient, while other currencies' coefficients are small and statistically insignificant. Second, it can identify the degree to which the authorities allow or limit exchange rate flexibility depending on the size of exchange rate volatility as measured by the estimated standard error of regression. A large size of the estimated standard error of regression implies that the authorities allow relatively large exchange rate flexibility, while a small size indicates that they attempt to stabilize their exchange rates.

Based on the regression analysis, developing economies can be classified 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. Specifically, countries are classified to be under the "pegged" arrangement when volatility is less than 0.0075, "intermediate" when volatility is between 0.0075 and 0.015, and "flexible" when volatility exceeds 0.015.[9] Table 2 summarizes this information for the period 1980–99 by dividing the whole sample into five-year sub-samples.[10] Table 3 summarizes observed exchange rate arrangements of emerging market economies over the same sample periods.[11]

Table 2 reveals several interesting points. First, the number of developing countries under the "pegged" rate arrangement has declined as a trend, though there was some reversal in this trend in the second half of the 1990s. On the other hand, the number of countries under the "flexible" rate arrangement has risen as a trend. The number of countries under the "intermediate" rate arrangement has risen slightly. In the second half of the 1990s where 157 developing country currencies are examined, 75 countries (48 percent of the total) are under the "pegged" arrangement, 29 countries (18 percent) under the "intermediate" arrangement, and 53 countries (34 percent) under the "flexible" arrangement. Second, regardless of the extent of exchange rate flexibility, almost all developing countries appear to have their own preferred anchor in

7. In other papers, Frankel and Wei (1993, 1995) use the SDR as a numeraire currency, but we do not follow this procedure because our study regards the SDR as a potential candidate for a nominal anchor.
8. We have done so because countries often change their parities or central rates to accommodate persistent differences in inflation rates or productivities vis-à-vis their nominal anchor-currency country. Without eliminating the effects of such discrete devaluations or revaluations, it would be difficult to conclude the presence or absence of a nominal anchor currency for certain countries.
9. The value 0.0100 is approximately a 1 percent change in monthly exchange rates.
10. Table 2 in the working paper version of this paper also provides the size of exchange rate volatility, the number of excluded observations due to large, discrete exchange rate changes, and other information. The working paper is downloadable from http://www.imes.boj.or.jp/english/publication/edps/2002/02-E-17.pdf.
11. Emerging market economies include those in East Asia (see Footnote 1) as well as Argentina, Brazil, Chile, Colombia, the Czech Republic, Hungary, India, Israel, Mexico, Peru, Poland, the Russian Federation, South Africa, Turkey, and Venezuela.

**Table 2 Summary of Observed Exchange Rate Arrangements of Developing Countries (Classified by Monthly Data)**

Number of countries; number of emerging market economies in parentheses

| | Sample period | Dollar | Other single currency | Basket of currencies | Total |
|---|---|---|---|---|---|
| [1] Pegged: 0 ≤ volatility < 0.0075 | Jan. 1980–Dec. 1984 | 39 (3) | 23 (0) | 21 (4) | 83 (7) |
| | Jan. 1985–Dec. 1989 | 32 (1) | 22 (0) | 15 (3) | 69 (4) |
| | Jan. 1990–Dec. 1994 | 31 (2) | 22 (0) | 14 (4) | 67 (6) |
| | Jan. 1995–Dec. 1999 | 37 (3) | 24 (0) | 14 (0) | 75 (3) |
| [2] Intermediate: 0.0075 ≤ volatility < 0.015 | Jan. 1980–Dec. 1984 | 10 (3) | 0 (0) | 15 (4) | 25 (7) |
| | Jan. 1985–Dec. 1989 | 14 (7) | 1 (0) | 14 (2) | 29 (9) |
| | Jan. 1990–Dec. 1994 | 10 (5) | 1 (0) | 23 (7) | 34 (12) |
| | Jan. 1995–Dec. 1999 | 16 (4) | 1 (1) | 12 (3) | 29 (8) |
| [3] Flexible: volatility ≥ 0.015 | Jan. 1980–Dec. 1984 | 12 (7) | 1 (0) | 10 (2) | 24 (9) |
| | Jan. 1985–Dec. 1989 | 24 (6) | 2 (0) | 10 (4) | 36 (10) |
| | Jan. 1990–Dec. 1994 | 29 (5) | 7 (1) | 17 (1) | 53 (7) |
| | Jan. 1995–Dec. 1999 | 31 (6) | 6 (3) | 15 (5) | 53 (14) |

Notes: 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 standard error of regression. Countries are classified as "pegged" when the volatility is less than 0.0075, "intermediate" when the volatility is between 0.0075 and 0.015, and "flexible" when the volatility is equal to or greater than 0.015. 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. The "dollar" group includes those for which the dollar appears as the only significant currency in the regression equation. The "other single currency" group includes those for which another single currency appears as the only significant currency in the regression equation. The "basket of currencies" group includes those for which multiple currencies appear as significant in the regression equation.

2. Emerging market economies include Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong, Hungary, India, Indonesia, Israel, Korea (Republic of), Malaysia, Mexico, Pakistan, Peru, the Philippines, Poland, the Russian Federation, Singapore, South Africa, Taiwan, Thailand, Turkey, and Venezuela.

3. There is one country each for the periods January 1980–December 1984 (Lebanon) and January 1995–December 1999 (Congo, Democratic Rep.), whose volatility exceeds 0.03 without any identified currency weight.

terms of a single currency or a basket of currencies. The dollar is the most preferred anchor currency (for 84 countries or 54 percent of all developing countries in the second half of the 1990s), followed by a basket of currencies (for 41 countries or 26 percent) and other single currencies (for 31 countries or 20 percent). There were very few countries where anchor currencies could not be identified. Third, as can be seen in Table 3, until the mid-1990s, a majority of non-East Asian emerging

**Table 3 Emerging Market Economies under Alternative, Observed Exchange Rate Arrangements (Classified by Monthly Data)**

| | Sample period | Dollar | Other single currency | Basket of currencies |
|---|---|---|---|---|
| [1] Pegged | Jan. 1980–Dec. 1984 | Venezuela, Colombia, *Taiwan* | | *Indonesia*, *Singapore*, India, *Malaysia* |
| | Jan. 1985–Dec. 1989 | *Indonesia* | | *Hong Kong*, *Thailand*, Pakistan |
| | Jan. 1990–Dec. 1994 | *Hong Kong*, *Korea* | | Czech Republic, *Thailand*, *Indonesia*, *Singapore* |
| | Jan. 1995–Dec. 1999 | Argentina, *Hong Kong*, *China* | | |
| [2] Intermediate | Jan. 1980–Dec. 1984 | *Korea*, Mexico, *Philippines* | | *Thailand*, Pakistan, *China*, Israel |
| | Jan. 1985–Dec. 1989 | Colombia, *China*, *Korea*, *Singapore*, *Philippines*, *Taiwan*, Venezuela | | India, *Malaysia* |
| | Jan. 1990–Dec. 1994 | India, Colombia, Mexico, Chile, *China* | | *Taiwan*, Pakistan, South Africa, *Malaysia*, Israel, Hungary, Argentina |
| | Jan. 1995–Dec. 1999 | Venezuela, Peru, Brazil, Turkey | Czech Republic | Hungary, *Taiwan*, India |
| [3] Flexible | Jan. 1980–Dec. 1984 | Hungary, *Hong Kong*, Brazil, Peru, Chile, Poland, Argentina | | Turkey, South Africa |
| | Jan. 1985–Dec. 1989 | Turkey, Hungary, Israel, Poland, Mexico, Brazil | | Chile, Peru, Argentina, South Africa |
| | Jan. 1990–Dec. 1994 | Poland, *Philippines*, Venezuela, Peru, Russian Federation | Brazil | Turkey |
| | Jan. 1995–Dec. 1999 | Pakistan, Israel, South Africa, Russian Federation, Mexico, Colombia | *Thailand*, *Malaysia*, *Indonesia* | Chile, *Singapore*, Poland, *Korea*, *Philippines* |

Notes: 1. Emerging East Asian economies include China, Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand. They are shown in italics.
2. Non-East Asian emerging market economies include Argentina, Brazil, Chile, Colombia, the Czech Republic, Hungary, India, Israel, Mexico, Pakistan, Peru, Poland, the Russian Federation, South Africa, Turkey, and Venezuela.

economies were under the "flexible" or "intermediate" arrangements, while most of the East Asian emerging economies were under the "pegged" or "intermediate" arrangements. That is, emerging economies in East Asia showed stronger preferences for exchange rate stability—or a stronger "fear of floating"—than those in non-East Asia. However, crisis-affected countries and Singapore shifted to the "flexible" arrangement due to the outbreak of currency crisis in the second half of the 1990s.[12]

12. Table 3 reports that while Thailand, Malaysia, and Indonesia adopted a "flexible" rate arrangement in the second half of the 1990s, they used a non-U.S. dollar currency as a target for exchange rate stabilization. This currency

While an increasing number of developing countries shifted away from fixed toward more flexible exchange rate arrangements on an "official" basis by the 1990s, almost all countries attempted to stabilize their exchange rates against a single currency or a currency basket, though the degree of rate stabilization varied considerably across countries. Many countries regard the dollar as their anchor currency despite the absence of a formal commitment to a dollar peg. Notable is the fact that quite a few economies are using currency baskets as their anchor without officially announcing it.

**C. Formation of Tripolar Currency Areas**

Using the results in the preceding subsection, we can estimate the size of tripolar currency areas, that is, currency areas formed by the dollar, the new European single currency (euro), and the yen. The objective here is to gain insight into the current state and evolution of the international monetary system by quantitatively gauging the size of major currency areas. Particularly interesting is to evaluate the impact of the creation of the European Economic and Monetary Union (EMU) and introduction of the euro on the international monetary system. The main question is whether the newly introduced euro is strong enough to seriously challenge the dollar's dominance and to convert the dollar-dominated international monetary system into a regime centered on both the dollar and the euro. Another important question is what role the yen can play.[13]

**1. Defining currency areas**

In this subsection, we calculate the economic size of a currency area in terms of GDP and trade flows (exports plus imports), expressed as current dollar values, using data for the period 1990–99. By using different economic variables as the basis for measuring the size of currency areas, we can further our understanding of the importance of the major currencies as nominal anchors for the rest of the world.

In this calculation, we undertake the following four steps: first, we start by focusing on the currencies of the G-5 countries (i.e., the United States, Germany, France, the United Kingdom, and Japan) in addition to the SDR and the ECU. Each of these G-5 currencies is assumed to form a currency area of its own. If any country rigidly pegs its exchange rate to a particular G-5 currency, its entire economy, measured by GDP or trade flows, is classified as belonging to the currency area formed by this particular currency. If a country stabilizes its exchange rate to a basket of multiple currencies, its economy is divided into fractions of major currency areas according to the weights assigned to these major currencies in a basket. The coefficients that were estimated in the previous section as statistically significant, at least at the 5 percent level, are interpreted as the weights assigned to the corresponding currencies. If a country does not stabilize its exchange rate against any single currency or currency basket, its

turns out to be the Singapore dollar despite the fact that these countries did not pursue conscious policies to use the Singapore dollar as their official target. Since Singapore was under a currency basket system during this period, these three countries are considered to have been under a similar currency basket arrangement. At any rate, this result appears to reflect statistical relationships observed on the average during the sample period that includes the currency crisis episode.

13. See Alogoskoufis and Portes (1997) and Bergsten (1997), who argue that the introduction of the euro will challenge the dollar's dominance and convert the international monetary system into a bipolar system centered on both the dollar and the euro. They do not see much potential for the yen to grow into another dominant international currency.

economy is considered not to belong to any currency area; it adopts flexible exchange rates vis-à-vis the major currencies. In essence, we divide each individual country into different fractions of currency areas and then calculate the size of a currency area for the world as a whole by summing the corresponding fractions over all countries.[14]

Second, the weights assigned to anchor currencies are obtained from the estimated coefficients of a regression equation that are positive and statistically significant at the 5 percent level or above. If the sum of the estimated coefficients is equal to or less than one, their values are used as weights. If the sum exceeds unity, all the coefficients are proportionally rescaled downward to make the sum equal to one and the rescaled coefficients are used as weights.

Third, using procedures similar to the first step, we also calculate the size of the currency area formed by the currency of a minor, regional country—such as Australia, India, New Zealand, Portugal, Singapore, South Africa, and Spain. We next distribute the currency area formed by such a minor, regional currency to the larger currency areas formed by the G-5 currencies, the SDR, and the ECU, by using the estimated regression coefficients for each minor, regional currency. We also distribute the currency areas formed by the SDR and the ECU to G-5 currency areas, by using the estimated regression coefficients for these composite currencies. In this way, a country that stabilizes its currency to a minor, regional currency, the SDR, or the ECU can be divided into fractions of G-5 currency areas.

**2. Currency areas formed by the euro, the dollar, and the yen**

Finally, we calculate the global size of the euro area, by adding the size of EMU members and the currency areas formed by the French franc (FF) and the deutschemark (DM)—and by the U.K. pound sterling depending on the definition of the euro area—for non-EMU countries.[15] A sample of 99 countries is used for such calculations. We consider two cases with regard to the scope of the euro area, depending on which countries form the EMU: the current case of the EU-12 (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain) forming the EMU, and the prospective case of the EU-15 (the EU-12 plus Denmark, Sweden, and the United Kingdom) forming a Greater EMU. The latter case defines the maximum possible size of the EMU in the conceivable future, because it also assumes that the transition economies in Central and Eastern Europe and the Baltic states also stabilize their currencies to the euro.[16] If EMU membership is expanded to include all EU countries, the size of the euro area will be correspondingly larger while the size of the dollar area will probably become smaller. The size of the yen area will probably not be affected much by the scale of EMU membership.

14. We use annual data for the period from 1990 through 1999. Most data series are taken from the IMF's *International Financial Statistics* and, if necessary, are supplemented by national sources. Data for GDP and trade flows are converted into dollars at the annual average exchange rate. We have selected only those countries where data series for GDP and trade flows are available. Transition countries in Central and Eastern Europe and in the former Soviet bloc are under-represented in our sample due to the lack of data over the entire sample period. Many African countries are also absent in the sample. In terms of economic size, however, our sample of 99 countries covers a substantial amount of global economic activity and trade flows.
15. For this purpose, similar regressions have also been run for non-EMU developed countries. These countries have been divided into fractions of G-5 currency areas.
16. Honohan and Lane (1999) claim that the Central and Eastern European countries and former Soviet Union countries willing to be EU members are expected to stabilize their currencies vis-à-vis the euro if they have not done so already.

**Table 4 Estimated Size of the Currency Areas for the Dollar, the Yen, and the Euro (Percentage Averages Based on 1990–99 Data)**

[1] Measured by Gross Domestic Product (GDP) in Current Dollars

Percent; US$ billions in parentheses

| | Case of EMU | | | | | Case of Greater EMU | | | | | Regional total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dollar area | Yen area | Euro area | U.K. pound area | Other | Dollar area | Yen area | Euro area | U.K. pound area | Other | |
| Industrial countries | 29.8 | 15.8 | 26.4 | 4.9 | 0.1 | 29.6 | 15.8 | 31.5 | 0.0 | 0.0 | 76.9 (20,182) |
| European Union-15 | 0.2 | 0.0 | 24.8 | 4.4 | 0.1 | 0.0 | 0.0 | 29.5 | 0.0 | 0.0 | 29.5 (7,727) |
| EU-12 | 0.0 | 0.0 | 23.7 | 0.0 | 0.0 | 0.0 | 0.0 | 23.7 | 0.0 | 0.0 | 23.7 (6,214) |
| Three other EU members | 0.2 | 0.0 | 1.1 | 4.4 | 0.1 | 0.0 | 0.0 | 5.8 | 0.0 | 0.0 | 5.8 (1,513) |
| United States | 26.5 | 0.0 | 0.0 | 0.0 | 0.0 | 26.5 | 0.0 | 0.0 | 0.0 | 0.0 | 26.5 (6,962) |
| Japan | 0.0 | 15.7 | 0.0 | 0.0 | 0.0 | 0.0 | 15.7 | 0.0 | 0.0 | 0.0 | 15.7 (4,117) |
| Other | 3.0 | 0.1 | 1.6 | 0.4 | 0.0 | 3.0 | 0.1 | 2.1 | 0.0 | 0.0 | 5.2 (1,377) |
| Developing countries | 18.2 | 0.9 | 2.3 | 0.5 | 1.2 | 15.6 | 0.8 | 5.4 | 0.0 | 1.2 | 23.1 (6,050) |
| Africa | 0.9 | 0.0 | 0.4 | 0.1 | 0.1 | 0.9 | 0.0 | 0.5 | 0.0 | 0.1 | 1.5 (405) |
| Asia | 7.3 | 0.8 | 0.9 | 0.3 | 0.3 | 7.3 | 0.8 | 1.1 | 0.0 | 0.3 | 9.5 (2,492) |
| Europe | 2.8 | 0.0 | 0.7 | 0.1 | 0.4 | 0.3 | 0.0 | 3.4 | 0.0 | 0.4 | 4.0 (1,059) |
| Middle East | 1.6 | 0.0 | 0.0 | 0.1 | 0.1 | 1.6 | 0.0 | 0.1 | 0.0 | 0.1 | 1.9 (491) |
| Western hemisphere | 5.5 | 0.1 | 0.3 | 0.0 | 0.3 | 5.5 | 0.1 | 0.3 | 0.0 | 0.3 | 6.1 (1,603) |
| World total | 47.9 (12,570) | 16.7 (4,376) | 28.7 (7,523) | 5.4 (1,413) | 1.3 (351) | 45.2 (11,859) | 16.7 (4,374) | 36.9 (9,691) | 0.0 (0) | 1.2 (309) | 100.0 (26,233) (26,233) |

Notes: 1. The EU-12 includes Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain.
2. Three other EU members are Denmark, Sweden, and the United Kingdom.
3. Greater EMU includes all 15 EU member countries and assumes that Central and European countries in transition (e.g., Hungary, Poland, and Romania) and the Baltic states stabilize exchange rates to the euro.

(Continued on next page)

**Table 4 (continued)**

[2] Measured by Total Trade Flows (Exports Plus Imports) in Current Dollars

Percent; US$ billions in parentheses

| | Case of EMU | | | | | Case of Greater EMU | | | | | Regional total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dollar area | Yen area | Euro area | U.K. pound area | Other | Dollar area | Yen area | Euro area | U.K. pound area | Other | | |
| Industrial countries | 18.5 | 7.3 | 35.9 | 6.1 | 0.1 | 18.3 | 7.3 | 42.4 | 0.0 | 0.5 | 68.0 | (6,267) |
| European Union-15 | 0.3 | 0.0 | 33.6 | 4.5 | 0.1 | 0.0 | 0.0 | 39.4 | 0.0 | 0.0 | 39.4 | (3,634) |
| EU-12 | 0.0 | 0.0 | 31.9 | 0.0 | 0.0 | 0.0 | 0.0 | 31.9 | 0.0 | 0.0 | 31.9 | (2,939) |
| Three other EU members | 0.3 | 0.0 | 1.7 | 4.5 | 0.1 | 0.0 | 0.0 | 7.5 | 0.0 | 0.0 | 7.5 | (695) |
| United States | 14.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.0 | (1,289) |
| Japan | 0.0 | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 | 7.2 | 0.0 | 0.0 | 0.0 | 7.2 | (662) |
| Other | 4.3 | 0.1 | 2.3 | 0.7 | 0.0 | 4.3 | 0.1 | 3.0 | 0.0 | 0.0 | 7.4 | (681) |
| Developing countries | 24.2 | 1.8 | 3.9 | 0.8 | 1.3 | 21.6 | 1.7 | 7.5 | 0.0 | 1.2 | 32.0 | (2,950) |
| Africa | 1.1 | 0.0 | 0.5 | 0.2 | 0.2 | 1.1 | 0.0 | 0.7 | 0.0 | 0.2 | 2.0 | (185) |
| Asia | 12.9 | 1.6 | 1.7 | 0.4 | 0.4 | 12.9 | 1.6 | 2.1 | 0.0 | 0.4 | 17.0 | (1,569) |
| Europe | 2.9 | 0.0 | 1.5 | 0.1 | 0.4 | 0.3 | 0.0 | 4.3 | 0.0 | 0.3 | 4.9 | (454) |
| Middle East | 2.8 | 0.1 | 0.1 | 0.1 | 0.2 | 2.8 | 0.1 | 0.2 | 0.0 | 0.2 | 3.3 | (302) |
| Western hemisphere | 4.5 | 0.0 | 0.1 | 0.0 | 0.1 | 4.5 | 0.0 | 0.1 | 0.0 | 0.1 | 4.8 | (440) |
| World total | 42.8 (3,942) | 9.1 (835) | 39.8 (3,670) | 6.9 (634) | 1.5 (135) | 39.9 (3,674) | 9.1 (835) | 49.9 (4,596) | 0.0 (0) | 1.2 (112) | 100.0 (9,216) | (9,216) |

Notes: 1. The EU-12 includes Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain.
2. Three other EU members are Denmark, Sweden, and the United Kingdom.
3. Greater EMU includes all 15 EU member countries and assumes that Central and European countries in transition (e.g., Hungary, Poland, and Romania) and the Baltic states stabilize exchange rates to the euro.

Table 4 summarizes the results of these calculations. The table reports the relative economic shares for each of the three major currency areas, based on GDP and total trade flows, for developing as well as developed countries. It shows that choice of measurement—GDP or trade flows—influences the size of the dollar and euro areas. Taking the case of Greater EMU, the GDP measure indicates that the dollar area is still larger than the euro area. For example, 45 percent of the world economy is covered by the dollar area, 37 percent by the euro area, and 17 percent by the yen area. The dollar area is large because many developing countries, particularly those in Asia and Latin America, regard the dollar as the most important nominal anchor. The size of the dollar area outside the United States is about 19 percent of the world's GDP, of which the developing world accounts for 16 percent. In contrast, the size of the euro area outside the EU-15 members is 7.5 percent of the world's GDP, of which the developing world accounts for 5 percent. The yen area's share (17 percent) is only slightly bigger than the weight of the Japanese economy in the world (16 percent).[17] The yen area outside Japan is small and accounts for only 1 percent of the world's GDP, which underlines the fact that the yen is not a full-fledged, global nominal anchor currency.

The trade flow measure indicates that the euro area will be larger than the dollar area. The euro area accounts for 50 percent of the world total trade flows, the dollar area 40 percent and the yen area a meager 9 percent. Interpretation of trade-based economic size requires caution because the underlying trade flows do not net out intra-EU trade flows, and the predominance of the euro area measured by trade activity may be exaggerated. Essentially, the relative economic size of the euro area depends on which economic activity is considered more important to the world as a whole, real economic activity or trade activity.

**D. Preference for Exchange Rate Stability in Emerging Market Economies**

The results described above reveal that the "observed" exchange rate arrangements are largely consistent with the "official" exchange rate policies, with some exceptions. The results also provide several stylized facts and general conclusions about the individual developing economies' exchange rate arrangements.

First, many developing countries—including emerging market economies—have shifted their "official" exchange rate arrangements from "fixed" to "more flexible" rate regimes. However, they 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 were those in the early stage of economic transition in Eastern Europe or the former Soviet Union or economies subject to chronically high inflation.

Second, non-East Asian emerging market economies tend to have a "flexible" or "intermediate" arrangement, while the East Asian emerging economies tend to choose a "pegged" or "intermediate" arrangement. The East Asian economies appear to exhibit greater preference for exchange rate stability or a greater fear of floating than their non-East Asian counterparts.

17. These relative share numbers correspond to the figures estimated by other authors such as Bergsten (1997) and Masson and Turtleboom (1997).

Third, the dollar is the most favored anchor currency for exchange rate stabilization in the developing world. However, significant diversity exists across regions globally in exchange rate arrangements. For African countries, their major exchange rate stabilization anchors are the euro (formerly the French franc), the dollar, and the SDR. Asian economies generally attempt to stabilize their exchange rates vis-à-vis the dollar, the SDR, and a few regional currencies. The yen has not played a major anchor currency role even in East Asia. The transition economies in Central and Eastern Europe and the former Soviet Union have not experienced stable exchange rates or stable arrangements in general, but many of them are expected to eventually stabilize their currencies to the euro. The Middle East includes countries that have successfully stabilized exchange rates vis-à-vis the dollar and/or the SDR. The whole of Latin America is a *de facto* dollar area, and even countries not officially pegging exchange rates to the dollar do assign significantly positive, and close to unitary, weights to the dollar.

Fourth, a developing country's choice of anchor currency for exchange rate stabilization depends largely on which currency areas the country tends to trade with, as well as on the country's geographical location and its past colonial ties.[18] For example, a country that trades heavily with the dollar area tends to choose the dollar as an exchange rate stabilization anchor. 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 anchor for exchange rate stabilization.

## III. The East Asian Exchange Rate Arrangements

In this section, we attempt to identify the exchange rate arrangements that have prevailed in East Asia, particularly in former crisis countries and the neighboring emerging economies, before and after the 1997–98 currency crisis. An important task is to identify factors behind the choice of exchange rate arrangements in the pre-crisis as well as post-crisis periods.

### A. Changes in the Official Exchange Rate Arrangements in East Asia

To identify the exchange rate arrangements in emerging East Asia in the pre-crisis and post-crisis periods, it is useful first to take a look at the official exchange rate arrangements as published by the IMF. Table 5 summarizes changes in exchange rate arrangements in not only the former crisis countries—Indonesia, Korea, Malaysia, the Philippines, and Thailand—but also Japan, China, Hong Kong, Taiwan, and other ASEAN countries.

Table 5 indicates several facts. First, emerging East Asia has exhibited a variety of exchange rate arrangements, ranging from a currency board system (Hong Kong) to independently floating (Philippines). In between these two polar cases, there are conventional fixed pegs to a single currency (China and post-crisis Malaysia) or a currency basket (Singapore and pre-crisis Thailand) as well as managed floating

18. See Kawai and Akiyama (2000) for such empirical evidence.

**Table 5 Official Exchange Rate Arrangements in the East Asian Economies**

| Country | Article VIII (date accepted) | Pre-crisis and mid-crisis exchange rate arrangements (dates of change) | Post-crisis exchange rate arrangement (Dec. 2001) |
|---|---|---|---|
| Japan | Apr. 1, 1964 | Independently floating (July 1982–present) | Independently floating |
| Korea | Nov. 1, 1988 | Managed floating (June 1982–Nov. 1997); independently floating (Nov. 1997–present) | Independently floating |
| China | Dec. 1, 1996 | Managed floating (Oct. 1986–Sep. 1998); conventional fixed peg to the dollar (Jan. 1999–present) | Conventional fixed peg to the dollar |
| Hong Kong | Feb. 15, 1961 | Currency board arrangement with a peg to the dollar (Oct. 1983–present) | Currency board arrangement with a peg to the dollar |
| Taiwan | — | Managed floating (Apr. 1989–present) | Managed floating |
| Indonesia | May 7, 1988 | Managed floating (Dec. 1983–July 1997); independently floating (Aug. 1997–Sep. 2001) | Managed floating with no preannounced path for exchange rate (Sep. 2001–present) |
| Malaysia | Nov. 11, 1968 | Peg to other currency composite (Sep. 1975–June 1993); managed floating (June 1993–Sep. 1998); peg to the dollar (Sep. 1998–present) | Conventional fixed peg to the dollar |
| Philippines | Sep. 8, 1995 | Independently floating (Nov. 1984–present) | Independently floating |
| Singapore | Nov. 9, 1968 | Managed floating (Dec. 1987–present) | Managed floating with no preannounced path for exchange rate |
| Thailand | May 4, 1990 | Peg to other currency composite (Nov. 1984–June 1997); independently floating (July 1997–Sep. 2001) | Managed floating with no preannounced path for exchange rate (Sep. 2001–present) |
| Brunei Darussalam | Oct. 10, 1995 | Currency board arrangement with a peg to the Singapore dollar (Mar. 1996–present) | Currency board arrangement with a peg to the Singapore dollar |
| Cambodia | Jan. 1, 2002 | Managed floating (June 1993–present) | Managed floating with no preannounced path for exchange rate |
| Laos | Article XIV | Managed floating (Mar. 1989–Sep. 1995); independently floating (Sep. 1995–June 1997); managed floating (June 1997–present) | Managed floating with no preannounced path for exchange rate |
| Myanmar | Article XIV | Peg to the SDR (Feb. 1975–Dec. 2001) | Managed floating with no preannounced path for exchange rate (Dec. 2001–present) |
| Vietnam | Article XIV | Peg to the dollar (Mar. 1989–Mar. 1990); managed floating (Mar. 1993–Sep. 1998) | Pegged exchange rate within horizontal bands (Jan. 1999–Dec. 2001); managed floating with no preannounced path for exchange rate (Dec. 2001–present) |

Note: Information on Taiwan is based on Fischer (2001).

Sources: International Monetary Fund, *International Financial Statistics* (various issues); *Annual Report on Exchange Arrangements and Exchange Restrictions 2001.*

(pre-crisis Korea, Indonesia, and Singapore).[19] Second, three (Korea, Indonesia, and Thailand) out of the five former crisis countries saw a change in their official exchange rate arrangements in the direction of greater exchange rate flexibility, while Malaysia moved in the opposite direction. Hong Kong, Singapore, Taiwan, and the Philippines have maintained identical exchange rate arrangements in the pre- and post-crisis periods.

However, "official" exchange rate arrangements may not describe the accurate state and evolution of the exchange rate policies in emerging East Asia, particularly those in the former crisis countries. First, countries under managed floating (Korea, Indonesia, and Malaysia) or independently floating (the Philippines) in the pre-crisis period may have had a regime more akin to pegged arrangements, because otherwise they would not have been subjected to currency speculation. Second, one may wonder whether economies, particularly former crisis countries that adopted independent floating in the post-crisis period, have really been floating their exchange rates. The "fear of floating" argument hypothesizes that despite the officially declared arrangement, the actual practice of exchange rate management is close to managed or pegged arrangements. Indeed McKinnon (2001) and others claim that the former crisis countries have reverted to pre-crisis, dollar-based exchange rate arrangements.

It is thus important to examine the actual behavior of the exchange rates for emerging economies in East Asia, particularly for former crisis countries, and empirically identify their pre-crisis arrangements and changes in such arrangements in the post-crisis period by looking at the data in a more detailed way.

**B. The Changing Roles of the Dollar, the Yen, and the Euro in East Asia**

The hypothesis here is that the roles of the dollar, the yen, and the euro (or its predecessor) as anchors for exchange rate stabilization have changed since the outbreak of the East Asian currency crisis. A Frankel-Wei type of regression of daily movements in each economy's exchange rate on the movements of the three major international currencies facilitates a convenient comparison of the roles of the tripolar currencies across major emerging East Asian economies as well as over time.

Similarly to the previous case, the daily—rather than monthly—change in the log exchange rate of each East Asian currency is regressed on the daily changes in the log exchange rates of the dollar, the yen, and the euro—or the ECU before the introduction of the euro on January 1, 1999. All exchange rates are again expressed vis-à-vis the Swiss franc. More specifically, we estimate the following regression equation:

$$\Delta e^{j}_{t} = \alpha + \beta_1 \Delta e^{USD}{}_{t} + \beta_2 \Delta e^{JY}{}_{t} + \beta_3 \Delta e^{EURO}{}_{t} + v_t,$$

where $\Delta e^{j}_{t}$ is the daily change in the log exchange rate of currency $j$ on day $t$, $\alpha$ is a constant term, $\beta_k$ ($k$ = 1, 2, . . .) is the coefficient on the daily change in the log exchange rate of currency $k$, and $v_t$ is the residual term. The superscripts *USD*, *JY*, and *EURO*, respectively, refer to the dollar, the yen, and the euro. As in the

19. Though not indicated in the table, it is well known that Singapore has been under a currency basket-based managed floating arrangement since 1985.

previous case, the estimated coefficients are interpreted as the weights assigned by the authorities to the corresponding currencies in their exchange rate policies. Similarly, the estimated standard error of regression residuals can be interpreted as a measure of exchange rate volatility.

Table 6 summarizes the regression results for each emerging economy in East Asia over the sample period January 1990 through June 2002. The sample is divided into 18-month sub-samples. The mid-crisis period (July 1997–December 1998) is indicated by the shaded areas.

**1. Pre-crisis period**

Table 6 confirms that in the pre-crisis period (January 1990–June 1997), the estimated coefficients of the dollar were statistically significant and close to unity, the adjusted $R^2$ was close to one, and the estimated standard error of regression was small for almost all economies—particularly Hong Kong, Korea, Indonesia, and Thailand (for the first half of the 1990s). In the case of Singapore and Malaysia, the dollar coefficients were somewhat lower, though generally greater than 0.75 and highly significant, due to their formal or informal currency basket arrangements. In the case of Taiwan, the Philippines, Thailand (for the 18 months prior to the baht crisis) and China (the first half of the 1990s), the adjusted $R^2$ was somewhat lower and the estimated standard error of regression somewhat higher. In Thailand, speculative activity that had begun in 1996 and mounted in February and May 1997 had already affected the currency movement prior to the outbreak of the baht crisis.

These results support the proposition that many emerging East Asian economies were on *de jure* or *de facto* dollar-stabilization arrangements until the time of the crisis. Nonetheless, the estimated coefficients of the yen were also significant, for some sub-sample periods, in Singapore, Thailand, Korea, and Malaysia, though the size of its coefficients rarely exceeded 0.1. In this sense, the yen played a limited role as part of a currency basket in the pre-crisis period. The euro—more accurately, its predecessor, the ECU—also played some role in Singapore, Malaysia, and Thailand due to the nature of their currency basket arrangements, though it was relatively insignificant in other countries.[20]

**2. Mid-crisis period**

Not surprisingly, many former crisis countries in East Asia experienced noticeable declines in dollar weights and in the adjusted $R^2$ in the mid-crisis period (July 1997–December 1998). This was particularly pronounced in Indonesia and Thailand. In the case of Korea, Malaysia, and the Philippines, the estimated coefficients on the dollar did not decline noticeably, but the adjusted $R^2$ declined sharply and the estimated standard error of regression rose sharply.[21] Even economies

20. The observed role of the yen and the euro—or the ECU—in a currency basket for some countries such as Singapore, however, may reflect the fact that the authorities chose the SDR as a target in their exchange rate management. The yen and the European currencies—making up a major part of the ECU—were important components of the SDR.
21. The less noticeable decline in the dollar coefficient in Malaysia may be explained by the authorities' move to fix the Malaysian ringgit to the dollar on September 2, 1998. If the mid-crisis sample period were shortened to, say, July 1997–August 1998, the decline in dollar coefficients would be more pronounced. A series of three-month rolling regressions strongly indicates this tendency (see details in the Appendix Table of the working paper version, downloadable from http://www.imes.boj.or.jp/english/publication/edps/2002/02-E-17.pdf). The rolling regression procedure allows us to analyze the mid-crisis period more carefully because of regional contagion, delayed currency attacks (Indonesia and Korea), and large exchange rate depreciations at times of political uncertainty (Indonesia).

**Table 6 Regression Results of Exchange Rate Movements for Major Emerging East Asian Economies: Pre-Crisis, Mid-Crisis, and Post-Crisis Periods (Daily Data)**

[1] Hong Kong Dollar

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | –0.014 | 0.993** | –0.001 | 0.007 | 0.9973 | 1.566 | 0.000425 | 389 |
| July 1991–Dec. 1992 | –0.008 | 0.998** | –0.011 | 0.006 | 0.9956 | 2.579 | 0.000597 | 394 |
| Jan. 1993–June 1994 | –0.004 | 0.995** | 0.000 | 0.003 | 0.9975 | 2.147 | 0.000358 | 390 |
| July 1994–Dec. 1995 | 0.002 | 0.997** | 0.000 | 0.002 | 0.9994 | 2.018 | 0.000204 | 391 |
| Jan. 1996–June 1997 | 0.004 | 0.997** | 0.009** | –0.007 | 0.9977 | 2.598 | 0.000277 | 391 |
| July 1997–Dec. 1998 | 0.000 | 1.001** | 0.006* | 0.000 | 0.9938 | 2.773 | 0.000528 | 393 |
| Jan. 1999–June 2000 | 0.016** | 0.993** | 0.001 | 0.003 | 0.9998 | 2.116 | 0.000087 | 390 |
| July 2000–Dec. 2001 | 0.000 | 1.004** | 0.000 | –0.002 | 0.9999 | 2.054 | 0.000061 | 392 |
| Jan. 2002–June 2002 | 0.002 | 0.998** | 0.000 | 0.001 | 0.9999 | 2.124 | 0.000024 | 124 |

[2] Korean Won

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.172 | 1.004** | –0.013 | –0.011 | 0.9336 | 1.968 | 0.002149 | 389 |
| July 1991–Dec. 1992 | 0.210 | 1.026** | –0.016 | –0.006 | 0.8098 | 2.005 | 0.004458 | 394 |
| Jan. 1993–June 1994 | 0.045 | 1.014** | –0.021* | –0.002 | 0.9720 | 2.255 | 0.001208 | 390 |
| July 1994–Dec. 1995 | –0.127 | 0.983** | 0.081** | –0.045* | 0.9329 | 2.008 | 0.002205 | 391 |
| Jan. 1996–June 1997 | 0.354** | 0.960** | 0.065** | 0.020 | 0.8583 | 1.804 | 0.002378 | 391 |
| July 1997–Dec. 1998 | 0.758 | 1.149** | 0.039 | 0.084 | 0.0921 | 1.607 | 0.024301 | 393 |
| Jan. 1999–June 2000 | –0.172 | 1.044** | 0.063* | –0.036 | 0.7220 | 1.645 | 0.004023 | 390 |
| July 2000–Dec. 2001 | 0.256 | 0.982** | 0.284** | –0.056 | 0.7550 | 2.107 | 0.004476 | 392 |
| Jan. 2002–June 2002 | –0.510* | 0.654* | 0.175** | 0.101 | 0.7504 | 2.092 | 0.002783 | 124 |

[3] Singapore Dollar

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | –0.212 | 0.739** | 0.065** | 0.199** | 0.9167 | 2.309 | 0.002188 | 389 |
| July 1991–Dec. 1992 | –0.140 | 0.758** | 0.077** | 0.185** | 0.9482 | 2.309 | 0.001857 | 394 |
| Jan. 1993–June 1994 | –0.160 | 0.865** | 0.049** | 0.098** | 0.9199 | 2.131 | 0.001960 | 390 |
| July 1994–Dec. 1995 | –0.189 | 0.789** | 0.098** | 0.117** | 0.9383 | 2.052 | 0.001915 | 391 |
| Jan. 1996–June 1997 | –0.019 | 0.798** | 0.096** | 0.144** | 0.9294 | 2.167 | 0.001503 | 391 |
| July 1997–Dec. 1998 | 0.381 | 0.635** | 0.342** | 0.190* | 0.4851 | 2.181 | 0.006911 | 393 |
| Jan. 1999–June 2000 | 0.103 | 1.219** | 0.123** | –0.194** | 0.8505 | 1.925 | 0.002547 | 390 |
| July 2000–Dec. 2001 | 0.035 | 0.948** | 0.197** | –0.089* | 0.8975 | 1.942 | 0.002236 | 392 |
| Jan. 2002–June 2002 | –0.170 | 0.610** | 0.223** | 0.064 | 0.8731 | 2.019 | 0.000346 | 124 |

Notes: 1. Daily exchange rate data, obtained from Datastream, are used for regression analysis.
2. Double asterisks and a single asterisk indicate that the estimated coefficients are statistically significant at the 1 percent and 5 percent levels, respectively.

**Table 6 (continued)**

[4] New Taiwan Dollar

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.040 | 0.840** | –0.017 | 0.240** | 0.4605 | 2.849 | 0.008475 | 389 |
| July 1991–Dec. 1992 | –0.154 | 0.967** | 0.033 | –0.003 | 0.6336 | 2.913 | 0.006803 | 394 |
| Jan. 1993–June 1994 | 0.193 | 1.012** | 0.055 | –0.019 | 0.6664 | 2.875 | 0.005199 | 390 |
| July 1994–Dec. 1995 | 0.023 | 0.948** | 0.060* | 0.028 | 0.8956 | 2.022 | 0.002807 | 391 |
| Jan. 1996–June 1997 | 0.024 | 0.946** | 0.036 | –0.001 | 0.8264 | 2.734 | 0.002573 | 391 |
| July 1997–Dec. 1998 | 0.382 | 0.867** | 0.090** | 0.068 | 0.5698 | 1.702 | 0.005472 | 393 |
| Jan. 1999–June 2000 | –0.131 | 0.999** | –0.007 | –0.012 | 0.8920 | 2.289 | 0.002128 | 390 |
| July 2000–Dec. 2001 | 0.322** | 1.019** | 0.000 | –0.017 | 0.9030 | 1.799 | 0.002248 | 392 |
| Jan. 2002–June 2002 | –0.200 | 0.990** | 0.109** | –0.053 | 0.9320 | 2.475 | 0.001307 | 124 |

[5] Indonesian Rupiah

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.227 | 0.962** | 0.029 | 0.030 | 0.9094 | 2.084 | 0.002555 | 389 |
| July 1991–Dec. 1992 | 0.145** | 0.997** | –0.006 | 0.016 | 0.9903 | 2.292 | 0.000900 | 394 |
| Jan. 1993–June 1994 | 0.131* | 0.995** | 0.010 | –0.002 | 0.9739 | 2.044 | 0.001161 | 390 |
| July 1994–Dec. 1995 | 0.153* | 0.994** | –0.015 | 0.011 | 0.9710 | 2.004 | 0.001438 | 391 |
| Jan. 1996–June 1997 | 0.156* | 1.009** | 0.001 | 0.002 | 0.9372 | 2.165 | 0.001528 | 391 |
| July 1997–Dec. 1998 | 2.982 | 0.512 | 0.692* | –0.067 | 0.0167 | 1.961 | 0.053151 | 393 |
| Jan. 1999–June 2000 | 0.290 | 2.147* | 0.270** | –0.643 | 0.1880 | 1.689 | 0.015509 | 390 |
| July 2000–Dec. 2001 | 0.354 | 1.423** | 0.140 | –0.138 | 0.3370 | 1.719 | 0.012363 | 392 |
| Jan. 2002–June 2002 | –1.410* | 0.289 | 0.012 | 0.300 | 0.2870 | 1.752 | 0.006755 | 124 |

[6] Malaysian Ringgit

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.072 | 0.892** | 0.027** | 0.096** | 0.9739 | 2.207 | 0.001279 | 389 |
| July 1991–Dec. 1992 | –0.138 | 0.874** | 0.025 | 0.090** | 0.9487 | 2.006 | 0.001944 | 394 |
| Jan. 1993–June 1994 | 0.004 | 0.906** | 0.001 | 0.020 | 0.8170 | 1.507 | 0.003072 | 390 |
| July 1994–Dec. 1995 | –0.062 | 0.869** | 0.059** | 0.084** | 0.9532 | 1.970 | 0.001738 | 391 |
| Jan. 1996–June 1997 | –0.049 | 0.885** | 0.034* | 0.086** | 0.9226 | 2.018 | 0.001611 | 391 |
| July 1997–Dec. 1998 | 1.032 | 0.883** | 0.300** | –0.035 | 0.1862 | 1.742 | 0.014911 | 393 |
| Jan. 1999–June 2000 | 0.000 | 1.043** | 0.000 | –0.019** | 0.9980 | 2.943 | 0.000265 | 390 |
| July 2000–Dec. 2001 | 0.000 | 1.000** | 0.000 | 0.000 | 1.0000 | 3.040 | 0.000000 | 392 |
| Jan. 2002–June 2002 | 0.000 | 1.000** | 0.000 | 0.000 | 1.0000 | 2.919 | 0.000000 | 124 |

(Continued on next page)

**Table 6 (continued)**

[7] Philippines Peso

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.571 | 1.054** | 0.043 | –0.048 | 0.6891 | 2.011 | 0.005762 | 389 |
| July 1991–Dec. 1992 | –0.363 | 1.048** | –0.110 | 0.101 | 0.6700 | 1.991 | 0.006458 | 394 |
| Jan. 1993–June 1994 | 0.309 | 0.973** | –0.006 | –0.026 | 0.6154 | 2.013 | 0.005375 | 390 |
| July 1994–Dec. 1995 | –0.045 | 0.986** | 0.062 | –0.059 | 0.7805 | 2.221 | 0.004306 | 391 |
| Jan. 1996–June 1997 | 0.020 | 1.004** | –0.005 | –0.002 | 0.9936 | 2.202 | 0.000469 | 391 |
| July 1997–Dec. 1998 | 0.998 | 0.876** | 0.285** | –0.022 | 0.1924 | 1.716 | 0.014420 | 393 |
| Jan. 1999–June 2000 | 0.268 | 1.410** | 0.085** | –0.243* | 0.7190 | 1.968 | 0.006247 | 390 |
| July 2000–Dec. 2001 | 0.406 | 0.779* | 0.116 | 0.093 | 0.4460 | 2.067 | 0.008187 | 392 |
| Jan. 2002–June 2002 | –0.150 | 0.628* | 0.031 | 0.150 | 0.7460 | 1.947 | 0.002744 | 124 |

[8] Thai Baht

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.014 | 0.961** | 0.031* | 0.023 | 0.9543 | 2.034 | 0.001766 | 389 |
| July 1991–Dec. 1992 | –0.017 | 0.957** | 0.019 | 0.043** | 0.9782 | 2.007 | 0.001334 | 394 |
| Jan. 1993–June 1994 | –0.037 | 0.972** | 0.012 | 0.006 | 0.9778 | 2.040 | 0.001049 | 390 |
| July 1994–Dec. 1995 | 0.017 | 0.877** | 0.069** | 0.049** | 0.9882 | 2.410 | 0.000848 | 391 |
| Jan. 1996–June 1997 | –0.053 | 0.823** | 0.178** | 0.154 | 0.4746 | 1.978 | 0.006179 | 391 |
| July 1997–Dec. 1998 | 1.014 | 0.608** | 0.311** | 0.099 | 0.1046 | 1.877 | 0.017221 | 393 |
| Jan. 1999–June 2000 | 0.178 | 1.432** | 0.130** | –0.297* | 0.6291 | 1.933 | 0.008783 | 390 |
| July 2000–Dec. 2001 | 0.189 | 0.971** | 0.197** | –0.069 | 0.7902 | 1.980 | 0.003625 | 392 |
| Jan. 2002–June 2002 | –0.310* | 0.697** | 0.176** | 0.070 | 0.9030 | 1.861 | 0.001558 | 124 |

[9] Chinese Renminbi

| Period | Const. | U.S. dollar | Yen | Euro | Adj. $R^2$ | D.W. | Std-res | No. obs. |
|---|---|---|---|---|---|---|---|---|
| Jan. 1990–June 1991 | 0.317 | 1.025** | –0.036 | 0.007 | 0.7145 | 2.007 | 0.005179 | 389 |
| July 1991–Dec. 1992 | 0.211 | 1.037** | –0.041 | –0.032 | 0.8889 | 2.042 | 0.003212 | 394 |
| Jan. 1993–June 1994 | 1.037 | 0.969** | 0.082 | 0.064 | 0.1159 | 2.007 | 0.019926 | 390 |
| July 1994–Dec. 1995 | –0.113* | 1.030** | –0.001 | –0.030** | 0.9829 | 2.082 | 0.001116 | 391 |
| Jan. 1996–June 1997 | 0.000 | 1.018** | –0.010 | –0.012 | 0.9335 | 2.832 | 0.001569 | 391 |
| July 1997–Dec. 1998 | –0.008 | 0.996** | 0.001 | –0.002 | 0.9919 | 2.471 | 0.000597 | 393 |
| Jan. 1999–June 2000 | 0.000 | 1.002** | 0.000 | –0.001 | 0.9999 | 2.019 | 0.000033 | 390 |
| July 2000–Dec. 2001 | 0.000 | 0.998** | 0.000 | 0.001 | 1.0000 | 2.326 | 0.000043 | 392 |
| Jan. 2002–June 2002 | 0.000 | 1.001** | –0.001* | 0.000 | 1.0000 | 2.121 | 0.000018 | 124 |

Notes: 1. Daily exchange rate data, obtained from Datastream, are used for regression analysis.
2. Double asterisks and a single asterisk indicate that the estimated coefficients are statistically significant at the 1 percent and 5 percent levels, respectively.

not directly affected by the crisis, such as Singapore and Taiwan, also saw declines in the dollar coefficients and in the adjusted $R^2$. In the case of Singapore, the central rates were changed a few times to weather the currency crisis occurring in the neighboring countries. But these changes were much less pronounced than those for the former crisis country currencies. Hong Kong and China were relatively immune to currency speculation as far as the observed movements of spot exchange rates are concerned.[22]

As the dollar weights declined in the mid-crisis period, the weights of the yen rose in a significant way in some countries, particularly in Indonesia, Singapore, Thailand, and Malaysia. The size of the yen coefficients jumped upward to 0.7 in Indonesia and to 0.3 in other countries. Only in Korea and China were the yen coefficients statistically insignificant. The euro coefficients were relatively unaffected by the crisis. Generally speaking, the importance of the yen in the currency baskets of many countries rose during the crisis, while the euro's importance did not.

**3. Post-crisis period**

The results for the post-crisis period (January 1999–June 2002) indicate a greater diversity in exchange rate arrangements than in the pre-crisis period. A few countries have returned to the pre-crisis pattern of dollar-based exchange rate arrangement, while others have departed from the pre-crisis arrangement. At one extreme, economies under a stable dollar peg throughout the period, such as China and Hong Kong, have maintained dollar coefficients at levels close to unity, the adjusted $R^2$ close to one, and an estimated standard error of regression even smaller than in the pre-crisis period. Malaysia returned to a formal dollar-peg arrangement, and the regression result indeed confirms it. Taiwan has been stabilizing the currency to the dollar in a way tighter than in the pre-crisis period, as judged from a larger size of the adjusted $R^2$ and a smaller size of the estimated standard error of regression.

Indonesia is at the other extreme where, despite large coefficients on the dollar in some post-crisis sub-sample periods, the adjusted $R^2$ is much lower and the estimated standard error of regression much higher than in the pre-crisis period. In this sense, Indonesia has been maintaining an exchange rate arrangement that is most akin to freely floating among the emerging East Asian economies, despite the fact that Bank Indonesia has often intervened in the foreign exchange market to smooth the rupiah/dollar exchange rate. Essentially, Indonesia has not been able to restore exchange rate stability despite interventions, because of the country's difficult economic—and social and political—problems.

In between these two groups, there are countries that exhibit statistically significant dollar coefficients but with a lower value (the Philippines) or with a lower adjusted $R^2$

22. Though the spot exchange rate data do not reveal it, the Hong Kong dollar was under serious attack in August 1998. The authorities resorted to unorthodox measures to contain speculative pressures, by intervening in the stock market and purchasing HK$118 billion of domestic equities in a period of about two weeks. They intervened in the stock market because speculators shorted the currency and stock markets simultaneously, hoping to profit from the lower stock prices that could result from high interest rates needed to support the exchange rate under the pressure of short selling the Hong Kong dollar. This intervention was also accompanied by a variety of regulatory measures, including increases in the cost of speculation in financial markets—tighter enforcement of rules on short selling and settlement of trades, and higher margin requirements in the futures markets. Aided by an improvement in the external environment, the intervention eventually succeeded in calming the markets.

(Korea, Singapore, Thailand, and the Philippines). What is interesting for these countries is that the yen coefficients take values of 0.2–0.3 and are statistically significant, except for the Philippines, and the dollar coefficients in the most recent sub-sample periods are lower than in the pre-crisis period. For these economies, one cannot conclude that they have reverted to pre-crisis dollar-based exchange rate stabilization policies or that they have shifted to freely floating exchange rate arrangements. Their exchange rates are more flexible than in the pre-crisis period, but more stable than those of a typical free-floating industrial country. Korea and Thailand, in particular, appear to have shifted to *de facto* managed floating with a currency basket arrangement with a relatively large weight on the dollar (on the order of 0.6–0.7) and a smaller, but significant, weight on the yen (on the order of 0.2–0.3). The observed pattern of these countries' *de facto* basket arrangements is very similar to that of Singapore, which is known to have maintained a managed float with a currency basket system. It remains to be seen whether this shift reflects a permanent change in these countries' exchange rate policies or a temporary adjustment of their exchange rates to the recent rapid yen/dollar rate movements.[23]

### C. Rationale for and Problems of Dollar-Based Stabilization Policy

Despite post-crisis diversity in exchange rate arrangements, the fact is that the dollar continues to play a dominant anchor currency role in emerging economies in East Asia.[24] The East Asian currencies with a large weight on the dollar in their currency baskets in the pre-crisis period became overvalued on a real, effective basis due to both higher domestic inflation than in the United States and the dollar's appreciation since mid-1995 vis-à-vis the major industrialized currencies, particularly the yen and the deutschemark. The emergence of real, effective overvaluation of the currencies was an important factor behind the mounting speculative pressure that developed in the foreign exchange market in 1997.[25] Hence, the *de facto* dollar-peg system was one of the underlying triggers of the currency crisis. The issue is whether the continued importance of the dollar, including the post-crisis resurrection of the dollar standard (McKinnon [2001]) in some countries, is a desirable and sustainable arrangement for East Asia. We must discuss the issues of the "peg" and the "dollar" separately.

#### 1. *De facto* currency stabilization

The first question is why many emerging East Asian economies have chosen *de jure* or *de facto* currency stabilization rather than "pure floating." First, emerging economies in East Asia preferred exchange rate stability, reflecting their desire to

23. Kawai and Akiyama (2000) and McKinnon (2000, 2001) have observed a reversion of the post-crisis exchange rate arrangement of emerging East Asia to an arrangement akin to the pre-crisis *de facto* dollar-based stabilization policies. Their analyses were based on data until 1999 or early 2000. But, as shown in the text, with longer time-series data available, one can observe a variety of exchange rate arrangements in post-crisis East Asia, ranging from a dollar hard peg (Hong Kong) and a soft peg (China and Malaysia) to a managed float with currency basket arrangements (Singapore, Korea, and Thailand), and to freely floating (Indonesia).
24. The relatively high dollar weights observed in the post-crisis regressions, with the exception of Indonesia, may indicate that the monetary authorities continue to regard the dollar as the most relevant anchor currency for their exchange rate policies despite their stated objective of free floating (with the notable exception of Malaysia), or that the market is simply driving each country's exchange rate in parallel with the dollar. Whatever the interpretation, the dollar continues to play a dominant, reference currency role in the region.
25. This was compounded with weaknesses of the domestic financial institutions, particularly in Thailand, which triggered the twin crises in the domestic financial system and the external capital account.

promote trade and FDI for economic growth. Excessive exchange rate movements under free floating have been considered inappropriate for outward-oriented economies, because of the harmful impacts on trade, investment, and economic growth. Small, open, and highly trade-dependent economies, like those in East Asia, benefit from exchange rate stability through creating predictable environments for trade- and FDI-driven economic development and growth, and avoiding regional beggar-thy-neighbor policies of competitive depreciation. McKinnon (2000) claims that 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.

Second, the emerging economies in East Asia needed to establish a nominal anchor due to the lack of credible monetary policy, to rely on foreign currency for external financing due to the so-called "original-sin" hypothesis (Eichengreen and Hausmann [1999] and Hausmann [2001]), or simply to overcome their "fear of floating" (Calvo and Reinhart [2002]). "Original sin" is a situation where emerging economy residents cannot borrow abroad in domestic currency nor borrow long term, even domestically. Hence domestic banks and corporations tend to face a currency mismatch or a maturity mismatch or both, thus creating balance-sheet vulnerabilities to sharp exchange rate changes. Given that hedging instruments—currency futures and options—are not fully available in these markets due to the lack of well-functioning domestic bond markets (McKinnon and Schnabl [2002]), the government tends to stabilize exchange rates to mitigate the potential foreign exchange risk.[26]

**2. *De facto* dollar-based stabilization**

Rapid economic development and growth in the emerging East Asian economies in the 10 years prior to the outbreak of the crisis had been stimulated by their stabilization to the dollar. In the face of steep yen rate appreciation that began in the mid-1980s, the *de facto* dollar-pegged system allowed these economies to receive FDI from Japan and to integrate themselves into the regional and global trading system. As Japan had already been gradually losing its international price-competitiveness in low- to mid-tech manufacturing products, yen rate appreciation accelerated this process by forcing Japanese multinational corporations to move their production facilities to emerging East Asia. From the latter's perspectives, their exchange rate depreciation vis-à-vis the yen helped transform them into attractive production bases and platforms, for Japanese multinationals, to export products to the U.S. 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 early 1995, when the yen rate started to depreciate rapidly.

Thus, there is no doubt that the emerging East Asian economies enjoyed large benefits, for a long time until the mid-1990s, by choosing the dollar as an anchor for exchange rate stabilization. But it is hard to argue that these economies adopted a *de facto* dollar peg, expecting such developmental benefits arising from the yen's

26. In economies like the United States, Japan, or Western Europe, free floating is less harmful, because the financial markets are deeper and economic systems are more resilient. But emerging market economies with shallow financial and currency markets have limited ability to absorb large exchange rate fluctuations. For these reasons, the authorities in the emerging market economies have preferred some degree of exchange rate stability.

appreciation. So the next question is why the East Asian economies have chosen the dollar as an anchor currency for exchange rate stabilization. Several reasons can be given.

First, the dollar has been chosen because it has been used extensively as an invoicing currency for international trade and as a vehicle currency for foreign exchange transactions in East Asia and in other parts of the world.[27] For each East Asian economy, stabilizing the value of its trade and transactions in terms of the dollar was a reasonable policy given that its neighbors and many other countries in the world willingly used the dollar for trade invoicing and foreign exchange market transactions.

Second, because the bond and forward exchange markets have not been developed adequately in emerging East Asia, governments have been induced to provide an informal hedge by stabilizing the exchange rate against the dollar. Considering the risk of exchange rate fluctuations, the reliance on the dollar made sense, because forward transactions were more active—though still limited—in the dollar markets than in markets for other currencies.

Third, a dollar-based system was an arrangement that implicitly guaranteed intra-regional exchange rate stability for the East Asian economies. Several authors have noted that the *de facto* dollar-based system has helped promote intra-regional exchange rate stability, an important policy objective for a highly interdependent region such as East Asia (Bayoumi *et al.* [2000] and McKinnon [2000]). The arrangement essentially prevented, at least until the 1997–98 crisis, harmful beggar-thy-neighbor exchange rate competition, thereby ensuring environments conducive to outward-oriented economic growth for the region as a whole.

**3. Problems of dollar-based stabilization**

Even though some degree of exchange rate stability is desirable for the emerging East Asian economies, there are several problems associated with choosing the dollar as the sole nominal anchor currency in these economies.

First, using the dollar as the sole anchor is problematic given that the emerging East Asian economies have diverse economic relationships with the United States, Japan, and the EU through trade (exports and imports), FDI inflows, and other forms of capital flows. For emerging East Asia, the United States is no longer the most dominant economic partner and the relative importance of Japan and the EU is as large as, and in some cases much larger than, that of the United States. The United States accounts for 18 percent, while Japan and the EU respectively account for 17 percent and 14 percent, of emerging East Asia's trade (Table 7). Japan and the United States are comparable partners as an FDI source country (Table 8).

Second, against the benefit of intra-regional exchange rate stability guaranteed by the informal dollar-based arrangements, there is a cost in terms of excessive movements in effective exchange rates induced by yen/dollar rate fluctuations. When the yen began to depreciate vis-à-vis the dollar in the spring of 1995, emerging East Asian economies saw their international price-competitiveness deteriorate. Growth driven by Japanese FDI inflows began to lose its momentum. In addition, yen depreciation dampened real

27. Commodities and primary products exported by many developing countries tend to be priced in the dollar in the global markets.

**Table 7 Regional Breakdown of East Asian Trade, Average for 1990–98 (Percentage Share of Total)**

[1] Exports

Percent

| Exporters/ Exports to | ASEAN | Other East Asia | EA-14 | Japan | EA-14 and Japan | United States | European Union | Rest of the world | World total |
|---|---|---|---|---|---|---|---|---|---|
| Brunei Darussalam | 21.1 | 16.3 | 37.4 | 55.6 | 93.0 | 2.7 | 2.2 | 2.1 | 100.0 |
| Cambodia | 56.8 | 5.5 | 62.3 | 6.7 | 69.0 | 6.0 | 18.6 | 6.4 | 100.0 |
| Indonesia | 14.2 | 16.6 | 30.8 | 29.3 | 60.1 | 13.8 | 14.5 | 11.5 | 100.0 |
| Laos | 46.5 | 5.3 | 51.9 | 10.7 | 62.6 | 2.6 | 18.0 | 16.8 | 100.0 |
| Malaysia | 28.2 | 13.6 | 41.7 | 13.2 | 54.9 | 19.2 | 14.8 | 11.0 | 100.0 |
| Myanmar | 22.2 | 20.4 | 42.6 | 7.4 | 50.0 | 7.2 | 8.4 | 34.4 | 100.0 |
| Philippines | 10.1 | 11.4 | 21.5 | 17.0 | 38.5 | 36.5 | 18.2 | 6.7 | 100.0 |
| Singapore | 26.1 | 17.2 | 43.2 | 7.7 | 50.9 | 19.6 | 14.4 | 15.1 | 100.0 |
| Thailand | 17.3 | 11.0 | 28.3 | 16.5 | 44.8 | 20.7 | 18.2 | 16.3 | 100.0 |
| Vietnam | 20.3 | 18.1 | 38.4 | 24.4 | 62.8 | 2.0 | 12.2 | 23.0 | 100.0 |
| China | 6.3 | 35.4 | 41.7 | 16.7 | 58.4 | 15.1 | 12.2 | 14.2 | 100.0 |
| Hong Kong | 6.6 | 36.2 | 42.8 | 5.7 | 48.5 | 22.7 | 16.1 | 12.7 | 100.0 |
| Korea | 12.4 | 16.4 | 28.8 | 14.0 | 42.8 | 21.4 | 12.8 | 23.0 | 100.0 |
| Taiwan | 11.7 | 22.6 | 34.3 | 11.0 | 45.2 | 27.0 | 15.0 | 12.8 | 100.0 |
| ASEAN | 22.1 | 14.9 | 37.0 | 15.4 | 52.4 | 19.1 | 15.2 | 13.3 | 100.0 |
| EA-14 | 13.6 | 23.7 | 37.2 | 12.9 | 50.1 | 20.7 | 14.5 | 14.6 | 100.0 |
| EA-14 and Japan | 13.8 | 23.2 | 37.0 | 8.3 | 45.4 | 23.7 | 15.6 | 15.3 | 100.0 |

[2] Imports

Percent

| Importers/ Imports from | ASEAN | Other East Asia | EA-14 | Japan | EA-14 and Japan | United States | European Union | Rest of the world | World total |
|---|---|---|---|---|---|---|---|---|---|
| Brunei Darussalam | 41.5 | 6.3 | 47.8 | 10.8 | 58.6 | 14.0 | 21.4 | 6.0 | 100.0 |
| Cambodia | 57.5 | 13.6 | 71.2 | 9.9 | 81.1 | 1.6 | 9.7 | 7.6 | 100.0 |
| Indonesia | 11.5 | 15.6 | 27.2 | 22.1 | 49.2 | 11.8 | 20.2 | 18.7 | 100.0 |
| Laos | 61.8 | 8.8 | 70.6 | 9.4 | 80.0 | 0.5 | 3.7 | 15.8 | 100.0 |
| Malaysia | 19.9 | 13.7 | 33.7 | 24.9 | 58.5 | 16.6 | 14.2 | 10.6 | 100.0 |
| Myanmar | 41.7 | 31.6 | 73.2 | 9.5 | 82.7 | 1.4 | 9.0 | 7.0 | 100.0 |
| Philippines | 11.3 | 17.6 | 28.9 | 21.2 | 50.1 | 19.5 | 11.0 | 19.4 | 100.0 |
| Singapore | 21.2 | 13.9 | 35.2 | 20.0 | 55.2 | 16.3 | 13.4 | 15.1 | 100.0 |
| Thailand | 13.1 | 13.0 | 26.1 | 28.4 | 54.6 | 12.1 | 15.2 | 18.2 | 100.0 |
| Vietnam | 28.4 | 26.4 | 54.8 | 9.9 | 64.7 | 1.0 | 10.2 | 24.0 | 100.0 |
| China | 7.0 | 29.2 | 36.1 | 19.5 | 55.6 | 11.7 | 15.0 | 17.7 | 100.0 |
| Hong Kong | 9.1 | 50.7 | 59.9 | 15.2 | 75.1 | 7.6 | 10.3 | 7.0 | 100.0 |
| Korea | 8.0 | 7.5 | 15.5 | 23.0 | 38.5 | 22.2 | 13.1 | 26.2 | 100.0 |
| Taiwan | 9.9 | 7.9 | 17.7 | 28.5 | 46.2 | 21.0 | 14.9 | 17.8 | 100.0 |
| ASEAN | 18.0 | 14.6 | 32.7 | 22.6 | 55.2 | 14.8 | 14.5 | 15.5 | 100.0 |
| EA-14 | 12.1 | 22.5 | 34.6 | 21.4 | 56.0 | 14.6 | 13.5 | 15.8 | 100.0 |
| EA-14 and Japan | 12.7 | 21.5 | 34.2 | 15.3 | 49.4 | 17.0 | 13.8 | 19.8 | 100.0 |

Note: Other East Asia includes China, Hong Kong, Korea, and Taiwan. The EA-14 includes ASEAN and Other East Asia.

Source: Kawai and Takagi (2000). Constructed from International Monetary Fund, *Direction of Trade Statistics*.

(Continued on next page)

**Table 7 (continued)**

[3] Total Trade (Exports Plus Imports)

Percent

| Trading economies/ Trade with | ASEAN | Other East Asia | EA-14 | Japan | EA-14 and Japan | United States | European Union | Rest of the world | World total |
|---|---|---|---|---|---|---|---|---|---|
| Brunei Darussalam | 30.2 | 11.8 | 42.0 | 36.4 | 78.4 | 7.3 | 10.4 | 3.9 | 100.0 |
| Cambodia | 58.8 | 10.6 | 69.4 | 9.0 | 78.4 | 3.5 | 11.6 | 6.5 | 100.0 |
| Indonesia | 12.9 | 16.2 | 29.1 | 26.0 | 55.1 | 13.0 | 17.1 | 14.8 | 100.0 |
| Laos | 55.3 | 7.6 | 62.9 | 11.1 | 74.0 | 1.2 | 8.5 | 16.3 | 100.0 |
| Malaysia | 24.0 | 13.6 | 37.7 | 19.0 | 56.6 | 17.9 | 14.6 | 10.8 | 100.0 |
| Myanmar | 34.8 | 27.8 | 62.6 | 8.7 | 71.3 | 3.3 | 8.7 | 16.6 | 100.0 |
| Philippines | 10.8 | 15.1 | 25.9 | 19.5 | 45.4 | 26.3 | 13.9 | 14.3 | 100.0 |
| Singapore | 23.5 | 15.5 | 39.1 | 14.1 | 53.1 | 17.9 | 13.9 | 15.1 | 100.0 |
| Thailand | 15.1 | 12.1 | 27.2 | 23.0 | 50.2 | 16.0 | 16.6 | 17.3 | 100.0 |
| Vietnam | 24.8 | 23.0 | 47.8 | 16.3 | 64.1 | 1.4 | 11.0 | 23.5 | 100.0 |
| China | 6.6 | 32.4 | 39.0 | 18.1 | 57.1 | 13.5 | 13.5 | 15.9 | 100.0 |
| Hong Kong | 7.9 | 43.7 | 51.6 | 10.6 | 62.1 | 15.0 | 13.1 | 9.8 | 100.0 |
| Korea | 10.1 | 11.9 | 22.0 | 18.6 | 40.6 | 21.7 | 13.0 | 24.6 | 100.0 |
| Taiwan | 10.8 | 15.6 | 26.5 | 19.2 | 45.7 | 24.2 | 15.0 | 15.1 | 100.0 |
| ASEAN | 19.9 | 14.7 | 34.7 | 19.1 | 53.8 | 16.9 | 14.8 | 14.5 | 100.0 |
| EA-14 | 12.8 | 23.1 | 35.9 | 17.2 | 53.0 | 17.7 | 14.1 | 15.2 | 100.0 |
| EA-14 and Japan | 13.3 | 22.4 | 35.6 | 11.7 | 47.3 | 20.5 | 14.8 | 17.5 | 100.0 |

Note: Other East Asia includes China, Hong Kong, Korea, and Taiwan. The EA-14 includes ASEAN and Other East Asia.

Source: Kawai and Takagi (2000). Constructed from International Monetary Fund, *Direction of Trade Statistics.*

**Table 8 FDI Inflows to East Asia, 1990–98**

US$ millions, percentage of total

| Recipients / Investors | ASEAN[1] | China | Korea | Taiwan | Total |
|---|---|---|---|---|---|
| Japan | 57,693 (19.2) | 29,715 (5.5) | 2,769 (10.5) | 4,935 (22.7) | 95,112 (10.7) |
| United States | 35,082 (11.7) | 42,658 (7.9) | 9,331 (35.3) | 3,885 (17.8) | 90,956 (10.3) |
| Europe[2] | 40,375 (13.4) | 27,311 (5.1) | 8,935 (33.8) | 2,484 (11.4) | 79,105 (8.9) |
| ASEAN | 27,493 (9.1) | 33,421 (6.2) | 3,271 (12.4) | 1,108 (5.1) | 65,293 (7.4) |
| Other East Asia[3] | 46,731 (15.5) | 336,132 (62.4) | 551 (2.1) | 1,571 (7.2) | 384,985 (43.4) |
| Total, including others | 301,074 (100.0) | 538,477 (100.0) | 26,422 (100.0) | 21,778 (100.0) | 887,751 (100.0) |

Notes: 1. 1991–98 for Brunei and Vietnam, 1992–98 for the Philippines, and 1994–98 for Cambodia.
2. These figures underestimate the actual volumes, because some countries with small volumes are not included.
3. Hong Kong, Korea, and Taiwan only.

Source: Kawai and Takagi (2000). Constructed from ASEAN Secretariat, *ASEAN Investment Report 1999: Trends and Developments in Foreign Direct Investment,* Jakarta, 1999; Japan External Trade Organization.

economic activity in relatively advanced emerging East Asian economies (such as Korea, Taiwan, and Malaysia) that competed against Japan in third markets in the United States and Europe. If the yen had continued to experience the "ever higher yen syndrome" (McKinnon and Ohno [1997]), then exchange rate stabilization vis-à-vis the dollar would have been attractive to emerging East Asia. Once the yen/dollar exchange rate became volatile, however, 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 the real economic activity of some emerging East Asian economies (Kwan [2001]) is that they not only trade with Japan, but also compete with Japan in third markets in certain products.

The diverse economic linkages of emerging East Asia with the rest of the world suggest that exchange rate stabilization vis-à-vis the dollar alone is not the best policy. Rate stabilization vis-à-vis a well-balanced currency basket comprising the dollar, the yen, and the euro is a more reasonable option. The reason is that exchange rate stabilization against a currency of one major trading partner means the lack of exchange rate stability against currencies of other major trading partners as long as the exchange rates of these major countries fluctuate in a volatile way. A currency basket arrangement ensures relative stability of a country's effective exchange rates vis-à-vis major trading partners.[28] This approach offers a better buffer to an economy's exposure to yen/dollar and dollar/euro exchange rate volatility.[29]

## IV. Future of East Asian Exchange Rate Arrangements

### A. Options for Possible Arrangements

While the popular "two-corner solution" view gives exclusive attention to the objective of crisis prevention, emerging market economies can pursue other legitimate objectives such as growth, trade, and investment promotion through their use of exchange rate policy.[30] A desirable option for many emerging market economies, including those in East Asia, would be neither a pure float because of the potential for excessive volatility and misalignment and the pervasive "fear of floating," nor a hard peg except in a very small open economy like Hong Kong.

In view of the impossibility of any country achieving a trinity of simultaneous exchange rate stability, monetary policy autonomy, and free mobility of capital, the authorities must make a desirable trade-off. Given the open capital account in most of emerging East Asia (except in China), a desirable trade-off would be to ensure a certain degree of monetary policy autonomy and a certain degree of exchange rate

28. As discussed in Kawai and Akiyama (2000), an economy that has diversified trade and FDI relationships with the major currency areas has strong potential for choosing a well-balanced currency basket.
29. A basket system would have preserved more stable effective exchange rates at the time when the dollar began to appreciate in the spring of 1995, without resulting in a loss of international price-competitiveness or an overvaluation of currencies in emerging East Asia.
30. Adoption of the "two-corner solution" approach (Eichengreen [1994], Obstfeld and Rogoff [1995], and Fischer [2001]) would be unrealistic, with a few exceptions for truly small, open economies—e.g., Hong Kong and Brunei in the case of East Asia. As has been claimed by Frankel (1999), no single-currency regime is suitable for all countries at all times.

stability. In China, where capital account transactions are still limited, the authorities can pursue both stable exchange rates and relatively autonomous monetary policy.

Numerous proposals have been made on the choice of exchange rate arrangements for East Asia, including the dollar standard (McKinnon [2001], McKinnon and Schnabl [2002], and Mundell [2001]), a G-3 currency basket system (Williamson [1999a, b, 2000, 2001], Kawai and Akiyama [2000], Kawai and Takagi [2000], Ogawa and Ito [2000], French and Japanese Staff, Ministries of Finance [2001], and Ito [2001]), and regional monetary union (Wyplosz [2001]).

A proposal for the dollar standard emphasizes the advantage for the emerging East Asian economies to use the existing, most dominant international currency in the region, i.e., the dollar, while minimizing the yen/dollar exchange rate fluctuations. The dollar standard is a formalization of the long-standing *de facto* arrangement, is simple and transparent, and involves no additional cost in ensuring both inter-regional and intra-regional exchange rate stability. However, the dollar standard would result in undesirable fluctuations in effective exchange rates as long as yen/dollar exchange rate fluctuations continue.

The G-3 currency basket system proposal claims that linking the central rate of a country's national currency to a basket of major G-3 currencies, i.e., the dollar, the yen, and the euro, rather than the dollar alone, is more desirable. The tightness of the link and the currency weights may initially be left to each country's choice, with the possibility for closer coordination as the authorities increasingly realize the importance of intra-regional exchange rate stability. The virtue of this system is that it would prevent excessive fluctuations in effective exchange rates in the face of volatile yen/dollar or euro/dollar rate movements, while allowing their currency some flexibility to move within a certain range.

Opponents of a G-3 currency basket system claim that it treats the yen asymmetrically relative to other East Asian currencies, thus providing the Bank of Japan with the ability to pursue an independent monetary policy, without paying formal attention to the need for a stable value of the yen. To the extent that this special position of Japan may jeopardize the goal of intra-regional exchange rate stability, Japan may also be encouraged to stabilize the external value of the yen.

In the spirit of regional cooperation, a more symmetric approach may be taken, e.g., an Asian Monetary System (patterned after the European Monetary System [EMS]) or even East Asia's own Economic and Monetary Union in the more distant future. Advocates of regional monetary union would claim that in the long run, one of the corner solutions of the "two-corner solution" approach—that is, introducing a common currency through coordinated regional integration—may be feasible and even desirable from optimal currency area criteria.[31]

Such an approach makes sense, but only in the long run. The region may eventually develop a common currency arrangement, like the euro in Europe.

31. For example, Bayoumi and Eichengreen (1994) found that Northeast Asia (Japan, Korea, and Taiwan) and Southeast Asia (Hong Kong, Indonesia, Malaysia, Singapore, and perhaps Thailand), in addition to Northern Europe (but not the entirety of Western Europe), were respectively plausible candidates for monetary union. Bayoumi *et al.* (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 to medium term.

A common currency arrangement, however, cannot be expected to emerge in the near future, because of the absence of political commitment within the region, of formal region-wide trade arrangements, and of convergence in macroeconomic and structural underpinnings. A common currency would require a substantially closer coordination of economic policies and a much greater and sufficiently sustained buildup of institutional infrastructure.

**B. A Currency Basket System for Emerging East Asia**

Though formation of regional monetary union may be desirable in the long run, a more realistic approach for emerging East Asia would be to shift to a currency basket system now, thereby absorbing the impact of yen/dollar volatility on their economies, and then to start institution building, strive for deeper economic interdependence, and achieve the convergence needed for future monetary integration.

Under a currency basket arrangement, a reasonable choice of anchor for exchange rate stabilization is a currency basket that includes the dollar, the yen, and the euro in a more balanced way than in the pre-crisis period. Actual currency weights in the basket will depend on the relative importance of the United States, Japan, and the EU as trade partners and FDI sources for each East Asian economy, future expectations of trend movements of the yen/dollar exchange rate, and the success of the newly introduced euro. The extent of exchange rate stability also depends on each economy's specific conditions and preferences.

**1. Intra-regional exchange rate stability**

The East Asian region has long enjoyed a market-driven integration process through international trade and FDI within the frameworks of the General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO) and the Asia-Pacific Economic Cooperation (APEC). The rising intra-regional interdependence through trade and investment suggests that economies in the region can benefit from avoiding large fluctuations in intra-regional exchange rates. This is particularly the case for the members of the Association of Southeast Asian Nations (ASEAN), which began to implement the ASEAN Free Trade Agreement (AFTA) in January 2002 by lowering tariffs on manufactured products below 5 percent.

Essentially, large swings in exchange rates among closely interdependent economies 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 within East Asia is to adopt similar currency baskets consisting of the 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 members have only to choose similar baskets. 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 on a formal basis, or even adoption of a common currency unit, may become desirable.[32]

32. See Williamson (1999a, b, 2000).

**2. Consistency with inflation targeting**

Monetary authorities in general 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 EU and if nominal exchange rate targeting is defined as a policy of stabilizing the nominal exchange rate vis-à-vis a basket of the dollar, the yen, and the euro, then these two policies are in fact one and the same as long as the same weights are chosen for inflation and exchange rate targeting, at least in the long run when purchasing power parity (PPP) tends to hold.[33]

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 manner 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 tends to reflect international price movements. In essence, a loose peg to a basket of the tripolar currencies can ensure stabilization of intra-regional exchange rates, while maintaining a targeted range of inflation rates.

**3. A coordinated move to a currency basket system**

Even when a currency basket system is desirable, it is not easy for any single emerging East Asian economy to move away unilaterally from the existing dollar-based arrangement to a new arrangement in which the relative weight of the dollar is smaller and those of the yen and euro larger.[34] The reason is that when neighboring countries stabilize their exchange rates primarily against the dollar, each economy may not have sufficient incentive to unilaterally alter its own exchange rate policy. Essentially, the situation is one of a less desirable equilibrium due to a coordination failure.[35] This demonstrates the potential importance of collective action on the part of emerging East Asia. A coordinated simultaneous move to a currency basket system will result in a more desirable equilibrium situation (Ogawa and Ito [2000]).

At least initially, exchange rate policy coordination would simply require emerging economies in the region to adopt a similar currency basket as an anchor. The operation of the regional currency basket arrangement requires less formality and greater flexibility than the EMS of 1979–98 did in Europe, because the proposed currency basket arrangement including currencies that are external to the region—in contrast to internal currencies in the case of Europe's ECU—does not immediately demand a formal structure of monetary policy and exchange rate coordination. This consideration is important, given the current lack of a commitment to full-fledged regional financial cooperation in East Asia, the diversity in the level of economic and financial developments across countries, the dynamic nature of East Asian

33. See Kawai and Takagi (2000).
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. Williamson (1999a) has characterized this informal dollar-based arrangement as a classic collective action problem, whereby each country is compelled to stay close to the dollar because of fears that appreciation vis-à-vis the dollar would weaken its competitiveness against its regional competitors.

economies with rapid structural changes, and possibly differing inflationary tendencies. Economies with different rates of inflation and productivity growth can (and are expected to) adjust the central rates with respect to the basket differently over the medium term. In the absence of sufficient convergence, adjustment for inflation and productivity growth differentials may be just as important as the choice of the basket itself.

On a deeper level, as the region becomes more integrated and hence more prepared, in terms of both economic criteria and political climate, for a more permanent commitment to economic and monetary union, greater efforts should be made to build institutions capable of supporting such a commitment. Given the possible endogeneity of the optimum currency area criteria (Frankel and Rose [1998]), the process can be self-promoting.

### C. Regional Financial Cooperation

Given deepening interdependence of the East Asian economies through trade and investment, intra-regional exchange rate stability, possibly supported by a regional currency basket arrangement, calls for a stronger form of financial cooperation among the authorities in the region. One country's exchange rate adjustment can have serious, competitive implications for its neighboring countries—hence a need for cooperative behavior. Another good reason for regional cooperation is the fact that crisis contagion tends to be concentrated within a region, as evidenced during the 1997–98 crisis.

Initiatives to strengthen regional financial cooperation in East Asia can be broken down into two broad categories: financing arrangements and policy dialogue.[36]

#### 1. Financing arrangements

The experience of the 1997–98 crisis has convinced many economies in East Asia that the role of the IMF as an international lender of last resort is limited and that a regional financing facility can play a useful, complementary role for crisis prevention and management, through timely and adequate provision of international liquidity in the face of currency attack, contagion, and crisis.

Inspired by the successful financial support package for Thailand in August 1997, Japan, with support from Korea and the ASEAN countries that participated in the Thai package, proposed to establish an Asian Monetary Fund (AMF) to supplement IMF resources for crisis prevention, management, and resolution. However, the United States and the IMF opposed this proposition on the grounds of moral hazard and duplication. They argued that an East Asian country hit by a currency crisis might bypass the tough conditionality of the IMF and receive easy money from the AMF, thereby creating potential for moral hazard, and that an AMF would be redundant in the presence of an effective global crisis manager, the IMF.

Although an AMF was not created, the East Asian economies agreed on the Chiang Mai Initiative (CMI) in May 2001. The CMI has two components: strengthening the long-standing ASEAN Swap Arrangement by extending its membership to all ASEAN members and increasing the size of swap arrangements; and creating a new network of

36. See Kuroda and Kawai (2002).

bilateral swap and repurchase arrangements for the ASEAN+3 members, including China, Japan, and Korea. The initiative is currently in progress; several bilateral swap agreements have been concluded and several negotiations are underway (Table 9).

The basic framework and main principles of bilateral swap arrangements (BSAs) under the CMI include linkages to the IMF, maturity, and interest. For example, countries can borrow liquidity collateralized by domestic currencies with government guarantees, rather than offering U.S. Treasury bonds as collateral. Members requesting liquidity support can immediately obtain short-term financial assistance for the first 10 percent of the BSA facility without IMF programs, while the remaining 90 percent is provided to the requesting member under an IMF program or an activated contingent credit line. The linkage to IMF conditionality is designed to address the concern that the problems leading to balance of payments difficulties may be fundamental in nature and that the potential moral hazard problem could be non-negligible.[37] These main principles, including the issue of IMF linkages, will be reviewed in May 2004.

**Table 9 Progress on the Chiang Mai Initiative (As of June 2002)**

| Bilateral swap arrangement | Currencies | Conclusion date | Size |
|---|---|---|---|
| Japan–Korea | Dollar/won | July 4, 2001 | US$7 billion† |
| Japan–Thailand | Dollar/baht | July 30, 2001 | US$3 billion |
| Japan–Philippines | Dollar/peso | Aug. 27, 2001 | US$3 billion |
| Japan–Malaysia | Dollar/ringgit | Oct. 5, 2001 | US$3.5 billion† |
| China–Thailand | Dollar/baht | Dec. 6, 2001 | US$2 billion |
| Japan–China | Yen/renminbi | Mar. 28, 2002 | US$3 billion equivalent |
| China–Korea | Renminbi/won | June 24, 2002 | US$2 billion equivalent |
| Korea–Thailand | Dollar/won or Dollar/baht | June 25, 2002 | US$1 billion |
| Korea–Malaysia | Under negotiation | | |
| Korea–Philippines | Under negotiation | | |
| Japan–Singapore | Under negotiation | | |
| Japan–Indonesia | Under negotiation | | |
| China–Philippines | Under negotiation | | |
| China–Malaysia | To be negotiated in the near future | | |

Note: The daggers indicate that the dollar amounts include the amounts committed under the New Miyazawa Initiative, US$5 billion for Korea, and US$2.5 billion for Malaysia.

Source: Kuroda and Kawai (2002).

## 2. Policy dialogue processes

Regional policy dialogue processes are instrumental to the effective functioning of regional financing arrangements. Several forums have been developed for regional policy dialogue and economic surveillance. Three major initiatives include the ASEAN+3 Framework, the Manila Framework, and the Executive's Meeting of East Asia-Pacific Central Banks (EMEAP). In addition to these, there are other forums, including those for trans-regional policy dialogue under APEC and the Asia-Europe Meeting (ASEM).

37. The swap is for a period of 90 days, renewable up to seven times, at an interest rate equivalent to the London interbank offered rate (LIBOR) plus 150 basis points for the first drawing and first renewal. Thereafter, the premium rises by 50 basis points every two renewals, subject to a maximum of 300 basis points.

The common objective of these processes is to strengthen policymaking capacity through information exchanges, peer reviews, and recommendations for action at the regional and national levels. For this purpose, each group monitors global economic conditions, regional economic developments, capital flows, exchange rates, financial-sector conditions, and macroeconomic structural and social policies. Monitoring and analysis of the regional macroeconomic and structural conditions are indispensable both for crisis prevention, because of the need to implement corrective policies, and for crisis financing, because of the need to identify causes of a crisis and formulate appropriate policy responses.

The ASEAN+3 Economic Review and Policy Dialogue (ERPD) process is the most important among these, particularly given the introduction of the CMI. Its purpose is to strengthen policy dialogue, coordination, and collaboration on the financial and macroeconomic issues of common interest, focusing initially on issues related to macroeconomic risk management, monitoring of regional capital flows, strengthening of the banking and financial systems, better corporate governance, reform of the international financial architecture, and enhancing self-help and support mechanisms in East Asia. Steps have been taken for cooperation in monitoring short-term capital flows and developing a regional early warning system to assess regional financial vulnerabilities, with a view to preventing financial crises in the future.

**D. Internationalization of the Yen**

For the successful functioning of a currency basket system, and more broadly for regional financial stability, the role of the yen must be increased. For greater international use of the yen, sufficient incentives must be provided to the private sector in using the yen for international trade, investment, finance, and foreign exchange transactions. A greater role of the yen can in turn induce regional central banks to adopt a currency basket system.

Ideally, the yen would improve its international status and play a regional key currency role in a tripolar international monetary system. In reality, as has been discussed in Section II, the international role of the yen has been quite limited. The dollar continues to play a dominant role as the key global currency, reflecting not only the robust economic performance of the U.S. economy in the 1990s but also the dollar's historical role and inertia. The euro is emerging as the No. 2 international currency.

The dollar accounts for close to 50 percent of international bonds issued, more than 40 percent of commercial banks' external assets, almost 90 percent of foreign exchange transactions in the global market, and 66 percent of foreign exchange reserves held. The euro accounts for about 30 percent of international bonds issued, 27 percent of commercial banks' external assets, almost 40 percent of foreign exchange transactions, and only 12 percent of foreign exchange reserves. In contrast, the yen accounts for less than 10 percent of international bonds issued and commercial banks' external assets, 23 percent of foreign exchange transactions, and 5 percent of foreign exchange reserves. While the yen's invoicing share of Japanese trade with Asia has risen in the second half of the 1990s, the international status of the yen is still too low to allow a tripolar monetary system to emerge.

Several steps can be taken to increase the attractiveness of the yen for international use. The first is to resume strong economic growth in Japan and regain market confidence in its economy, which has been undermined during the past 10 years of economic stagnation and price deflation. Priorities should be given to restoring the soundness of the financial system through acceleration of the disposal of non-performing loans, enhancing total factor productivity growth through structural reform—in particular, deregulation—and ensuring sustainability of the nation's public finance through fiscal consolidation.

Second, further opening and liberalization of the Japanese economy that contributes to larger volumes of its trade with the rest of the world would naturally increase the trade-invoicing role of the yen. Japan's trade as a share of GDP, which is currently one of the lowest among the OECD countries, needs to be increased substantially. In addition, further integration of the Japanese economy with emerging East Asia would further encourage intra-industry trade and the associated use of the yen. In manufacturing products, currently 50 percent of Japan's exports to, and 28 percent of its imports from, Asia are invoiced in the yen, and the yen invoicing ratios are also high for trade with Europe. These shares, though still low compared with those of the United States and Germany, are much higher than those for Japan's overall trade denominated in the yen. Greater manufacturing trade with Asia and Europe will lead to greater use of the yen as a trade-invoicing currency.

Third, deeper foreign exchange and capital markets can induce the yen to serve as an attractive investment currency. In the Tokyo foreign exchange market, for instance, direct yen/euro trade comprises only one-fifth of euro/dollar trades in terms of volume. Development of direct transactions between the yen and non-dollar currencies, particularly the euro and East Asian currencies, can increase the role of the yen in the foreign exchange market. The recent approval of the Korean authority to allow Japanese banks to trade yen/won in Japan is a step in this direction. In addition, liquid and deep capital markets can encourage yen-denominated investment and financing, where risks are easily diversified. A number of measures have been taken in Japan to improve the efficiency of the capital market in recent years, following the "financial Big Bang." These attempts include rationalization of stock exchanges, corporatization and listing of the Tokyo Stock Exchange, introduction of withholding tax exemption for Japanese government bond (JGB) interest payments on non-residents, a review of the syndicate underwriting system for JGBs, and an attempt to shorten the JGB settlement period to T+1.

In the foreseeable future, the role of the dollar will continue to be significant, because of the effects of inertia and history. Nonetheless, there still is room for the yen to play a more important role as an international nominal anchor currency in East Asia. The yen may come to share the nominal anchor role with the dollar in East Asia, in the sense of receiving greater weights assigned by the East Asian authorities in their currency basket policies.[38]

38. Hence, the yen's role in East Asia will not be as distinct as the one that was played by the deutschemark in the EMS. Even in Western Europe, however, the nominal role of the deutschemark appears to have been shared by the French franc and the ECU during the EMS period (Kawai and Akiyama [1998]).

## V. Concluding Remarks

The recent currency crisis in East Asia created a common trend toward more flexible exchange rates, at least as an "official" regime in the affected countries (except for Malaysia). During the crisis, the role of the dollar as an anchor currency clearly declined in the affected countries. As the crisis subsided, emerging East Asia's exchange rate arrangements began to diverge in comparison to the pre-crisis pattern of assigning a considerable weight to the dollar. Malaysia has restored a dollar-peg arrangement after a short period of crisis-driven floating, while Indonesia has allowed large fluctuations of the currency. In between these two polar cases, most countries have adopted managed floating. Korea and Thailand particularly appear to have shifted to a *de facto* managed-float, currency-basket arrangement with larger weights on the yen, an arrangement akin to that of Singapore.

The rest of the paper has proposed that emerging economies in East Asia, in the short to medium term, achieve real effective exchange rate stabilization by loosely tying their central rates to a currency basket, supported by consistent and sustainable macroeconomic policy. It has argued that (1) a system which ensures intra-regional exchange rate stability will be beneficial for emerging East Asia to promote trade, FDI, and economic growth; (2) given the high degree of intra-regional trade and the rising similarity of trade composition in East Asia, each economy's exchange rate policy should be directed toward maintaining intra-regional exchange rate stability; and (3) in view of the sub-optimality of the *de facto* dollar peg policy as an informal and uncoordinated mechanism of ensuring intra-regional stability, a coordinated action can be profitably employed to shift the target of nominal exchange rate stability to a similar currency basket, consisting of the dollar, the yen, and the euro, which is broadly representative of the partner composition of the region's trade and FDI.

At least initially, regional currency stabilization to the basket does not have to be rigid. Each economy may choose its own formal exchange rate arrangement, provided that a currency basket serves as the reference numeraire in the conduct of exchange rate policy, be it a currency board, a soft peg, or a managed float with wide margins. After the initial phase, the East Asian economies may agree on a common basket and adopt policies that ensure tighter exchange rate stability against the basket. Such an arrangement is likely to contribute to the simultaneous stabilization of intra-regional exchange rates as well as individual economies' effective exchange rates. It is a pragmatic policy option until greater political and institutional developments create an environment conducive to a more robust framework of monetary and exchange rate policy coordination that is commensurate with trade and investment integration in the region. To that end, the regional economies are advised to strengthen financial cooperation through various regional forums, such as ASEAN+3, the Manila Framework Group and EMEAP, and trans-regional forums, such as APEC and ASEM, with a view to enhanced financing and policy dialogue mechanisms, which will help foster such a framework.

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# Comment

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## I. Introduction

Masahiro Kawai's paper takes a stylized and practical approach in characterizing the observed exchange rate arrangements in East Asia. In particular, the paper focuses on the role played by the U.S. dollar as an international anchor currency for the exchange rate behavior of the East Asian economies before, during, and after the currency crisis. It concludes that the dollar continues to play a dominant anchor currency role for many economies in the region. A key proposal in this paper is for these economies—given their diversified trade patterns—to loosely tie their central rates to a balanced currency basket, comprising the G-3 currencies, i.e., the euro, dollar, and yen, to achieve stable real effective exchange rates.

In this discussion, we will first highlight the approaches concerning the choice of exchange rate regimes facing East Asian economies, and provide some empirical evidence from a paper by my colleagues at the Monetary Authority of Singapore (MAS) on the move toward somewhat more flexible arrangements after the crisis, as observed in Kawai's paper. Singapore's exchange rate framework might also serve as a useful case-study of how a small, open economy has tried to implement the currency basket framework proposed in Kawai's paper. Finally, as alluded to in the paper, the choice of the exchange rate *per se* is not the only consideration in the conduct of exchange rate policy. Policymakers need to take a multi-dimensional approach, thinking hard about the macro- and microeconomic polices as well as supporting institutions of the chosen exchange rate framework.

## II. Approaches in Choosing Exchange Rate Regimes

Corden (2001) identifies in essence three approaches in choosing an exchange rate regime:

(1) Exchange rate stability—an implication of this approach is that the floating rate creates undue instability or misalignment that is adverse for international trade and capital movements.
(2) Real targets—this approach uses the nominal exchange rate as a policy instrument to adjust the real exchange rate to attain, together with fiscal policy, the targets of internal and external balance.
(3) A nominal anchor—in this approach, an anchor to a country's inflation rate is provided by fixing the exchange rate or the rate of crawl.

39. I am grateful to Edward Robinson for useful input and discussion.

A history of relatively low inflation for most East Asian countries leads us to rule out the pressing need for a nominal anchor in this region. We also note that in the continuum of exchange rate regimes, the corner solution of a fixed system accords the advantages of exchange rate stability but not that of achieving real targets. Meanwhile, the reverse is true for the other corner solution of a flexible system. The open economy trilemma is also a particularly relevant consideration for the East Asian economies, since most are integrated in the world capital market. Given the trade-offs involved, it seems unnecessary to go to the extremes of rigid fixity or free float; instead, adherence to some interior solution appears plausible (see Frankel [1999]).

## III. Flexible Exchange Rates Enhanced Monetary Autonomy in East Asia

To confirm Kawai's observation of East Asia's move toward more flexible exchange rate arrangements, we draw on the results of a past study on monetary policy in four East Asian economies—namely, Indonesia, Korea, Thailand, and Malaysia after the currency crisis (see MAS [2000]). The empirical evidence suggests that the first three countries have transited from the pre-crisis quasi-dollar-peg regime to a more flexible post-crisis exchange rate regime. In particular, the standard deviations of the daily percentage change in the rupiah, baht, and won (the Indonesian, Thai, and Korean currencies, respectively) against the dollar for the post-crisis period from January 2, 1999 to September 22, 2000, are compared against the daily volatility during the pre-crisis period from January 2, 1995 to January 2, 1997 (Table 1). There has been an increase in the standard deviation of the daily movements of the three currencies from the pre- to post-crisis sample period, with the largest increase in volatility being recorded for the rupiah. Indeed, the *de jure* regime classification after the crisis for all three economies is a free float, within the inflation targeting framework that employs interest rates as the key operating instrument. Meanwhile, Malaysia has pegged its currency, the ringgit, to the dollar.

**Table 1 Daily Exchange Rate Volatility**

| | Period | Indonesia | Korea | Thailand |
|---|---|---|---|---|
| Standard deviation of daily percentage change | Jan. 2, 1995–Jan. 2, 1997 | 0.2061 | 0.2528 | 0.2223 |
| | Jan. 2, 1999–Sep. 22, 2000 | 1.8791 | 0.4016 | 0.5474 |

Source: MAS (2000).

The new frameworks adopted are presumably aimed at securing greater autonomy in monetary policy management, while retaining the anchor on price stability. To evaluate the degree of monetary independence the authorities of these countries could exercise, the MAS study also examined the relationship between exchange rate flexibility and interest rate differentials. A short-term interest rate dynamic model for the differential between the domestic and dollar interbank interest rates was estimated using pre- and post-crisis observations from the four countries. The

following discrete time approximation to a continuous-time short-term interest rate adjustment model formulated in Chan *et al.* (1992) was used:

$$r_t - r_{t-1} = \alpha + \beta r_{t-1} + \varepsilon_t, \quad (1)$$
$$\sigma^2_t = a_0 + a_1 \varepsilon^2_{t-1} + b_1 \sigma^2_{t-1}, \quad (2)$$

where $E(\varepsilon_t/\Omega_{t-1}) = 0$, $E(\varepsilon^2_t/\Omega_{t-1}) = \sigma^2_t$, $\Omega_{t-1}$ is the information set at time $t - 1$, and $\sigma^2_t$ is the conditional variance of interest rate change. The parameter of interest is $\beta$, which captures the speed of mean reversion toward the long-run mean following a given shock.

Estimates from the model (Table 2) indicate that the spread between the domestic and the U.S. interest rates exhibited slower mean-reversion for Indonesia and Thailand after the crisis, as evidenced by the large fall in the respective estimates for $\beta$. In the case of Korea, the post-crisis coefficient was not statistically significant. The results indicate that the domestic interest rate tends to adjust much more slowly or not at all to movements in the U.S. rate, in which case the money market equilibrium is restored under the more flexible exchange rate regime through a more significant adjustment in the nominal exchange rate. The relatively small estimated value and the non-significance of the estimate for $\beta$ in the case of Malaysia indicate that the presence of capital flow restrictions has effectively severed the linkage between domestic and foreign interest rates, despite the fact that the exchange rate was fixed against the dollar.

**Table 2 Mean Reversion in Interest Rate Differential**

| | | Indonesia | Korea | Malaysia | Thailand |
|---|---|---|---|---|---|
| Mean reversion parameter ($\beta$) | Pre-crisis (Jan. 1995–Jan. 1997) | –0.0107 (–1.957) | –0.0090 (–1.945) | –0.0065 (–1.804) | –0.0363 (–2.947) |
| | Post-crisis (Jan. 1999–Sep. 2000) | –0.0038 (–4.022) | –0.0206 (–1.469) | –0.00045 (–0.039) | –0.0088 (–2.474) |

Note: Figures in parentheses are the Bollerslev and Wooldridge *t*-values.
Source: MAS (2000).

## IV. Singapore's Experiences with the Basket Peg

We would like to share how Singapore operationalizes the basket peg framework proposed in Kawai's paper.[40] Since 1981, monetary policy in Singapore has been centered on management of the exchange rate.[41] The primary objective has been to promote price stability as a sound basis for sustainable economic growth (see Robinson [2001]).

40. The experience of Singapore may not apply to other East Asian economies, because of differing circumstances.
41. The choice of the exchange rate as the intermediate target of monetary policy is predicated on the openness of the Singapore economy to trade and capital flows, and implies that MAS cedes control over domestic interest rates. In the context of free movement of capital, interest rates in Singapore are largely determined by foreign interest rates and investor expectations of future movements in the Singapore dollar.

A key feature of our exchange rate system is the basket peg. The Singapore dollar is managed against a basket of currencies of 10–15 major trading partners. The various currencies are weighted geometrically, with the weights varying with the extent of Singapore's trade dependence with that particular country. Reflecting MAS' targeting of the nominal effective exchange rate (NEER), Singapore's trade-weighted exchange rate has remained fairly stable.[42] Volatility as measured by the standard deviation of the NEER was significantly lower for the Singapore dollar compared to that of the U.S. dollar and of the yen.[43] The standard deviation of the Singapore dollar NEER was 1.46 percent between 1981/I and 2001/I, compared to 3.45 percent for the U.S. dollar and 4.82 percent for the yen.

The movements of the Singapore dollar against major currencies, especially the U.S. dollar, have been less volatile than the movements among the major currencies. Indeed, the Singapore dollar has been less volatile with respect to the other currencies than if it had been pegged to any of the main currencies. For example, if the Singapore dollar were pegged against the U.S. dollar, the monthly standard deviation against the yen and deutschemark would have been 3.42 percent and 3.27 percent, respectively, instead of 2.99 percent and 2.92 percent. The "basket" characteristic of the managed float system has therefore also helped to mitigate some volatility as compared to if the Singapore dollar were on a bilateral peg.

## V. Coping with Short-Term Volatility as Well as Currency Misalignments

While Kawai has recommended a loose peg to the currency basket for East Asian economies, the Singapore exchange rate framework contains elements of the BBC system, i.e., basket, band, and crawl regime (see Williamson [2000]). The MAS operates a managed float for the Singapore dollar, allowing the trade-weighted exchange rate to fluctuate within an undisclosed policy band. In the short term, managing the Singapore dollar within a band provides the flexibility to prevent volatility in the financial markets from adversely affecting the real economy, as evidenced for example by the Asian crisis. During that period, MAS was able to widen policy bands as volatility increased in foreign exchange markets and subsequently narrow them when some degree of calm had returned to the regional markets. The flexibility accorded by the band is pertinent in view of Singapore's vulnerability to disturbances in the international financial system (strong fundamentals notwithstanding), given our small, open economy as well as our role as a financial center in Asia.

Another key feature of Singapore's exchange rate system is the crawl. The exchange rate policy band is periodically reviewed to ensure that it remains consistent with the underlying fundamentals of the economy. Over the longer term, the managed float has provided the flexibility for MAS to prevent currency misalignments by allowing

42. In relation to the endogeneity of a currency regime, the stability in the Singapore dollar could very well reflect the strong fundamentals underlying the Singapore economy.
43. The NEER series for the U.S. dollar and yen are based on the quarterly series published by the International Monetary Fund.

the equilibrium (real) value of the exchange rate to reflect changes in underlying fundamentals, such as the trend increase in the savings rate and higher productivity in the export sector. Notably, the trade-weighted Singapore dollar has been on a secularly appreciating trend since 1981 in both nominal and real terms. This uptrend has helped to keep inflationary pressures in check. Between 1981 and 1987, domestic inflation averaged 2.3 percent, markedly less than external inflation (as proxied by a trade-weighted average of foreign composite consumer price index [CPI]), which averaged 4.6 percent over the same period.

In addition, we have a semiannual exchange rate policy cycle. In January and July each year, we release our *Monetary Policy Statement* and publish the *Macroeconomic Review*. The latter is aimed at providing information on the background economic analysis and assessment of GDP growth and inflation developments in the Singapore economy, thereby sharing the basis for policy decisions articulated in the *Monetary Policy Statement*.

## VI. A Multi-Dimensional Approach to Exchange Rate Management

It is generally recognized and can be inferred from Kawai's paper that the challenges posed by the global financial markets cannot be met by the choice of exchange rate regime alone. Exchange rate policy management has moved beyond the confines of the traditional parameters of instruments, targets, transmission mechanisms, and inflation-output trade-off issues, and needs to be supported by a framework of consistent macroeconomic and microeconomic policies, and by strong institutions. The exchange rate system may therefore be viewed as a "monetary overlay" on the real economy foundations.

We have identified the following five aspects of an exchange rate support structure (see Robinson [2001]):

(1) Sound and credible macroeconomic policies are essential to avoid the buildup of major macro imbalances in the economy. This will reduce the vulnerability to speculative attacks by preventing misalignments in the value of the currency.

(2) The flexibility of the product and factor markets is essential to cope with and adjust to shocks arising from the volatility of currency markets and swings in the terms of trade in world product markets. This is particularly true for small, open economies, which are dependent on exports of goods and services.

(3) It is crucial to develop and strengthen financial systems to enhance robustness to shocks. A sound and efficient banking system, together with deep and liquid capital markets, contributes to the efficient intermediation of financial flows. This will help prevent the emergence of vulnerabilities in the financial system by minimizing unsound lending practices that could lead to the buildup of excessive leveraging in the corporate sector and exposure to foreign borrowings.

(4) Countries need to build up their regulatory and supervisory capabilities to keep pace with financial innovations and the growing complexity of financial institutions' activities, as well as new products and services.

(5) Policymakers should promote greater disclosure and transparency. This will help to foster market discipline, as well as reduce the likelihood of markets over-reacting due to lack of information or information asymmetries.

## VII. Monetary Integration in East Asia

We conclude with a brief comment on Kawai's suggestion for a move toward a common basket peg for East Asia. First, we agree with him that East Asia is not yet ready for a monetary union. This is especially so given the relatively wide divergences in economic characteristics such as GDP per capita, business cycle synchronization, and price and wage flexibility in this region. Empirical evidence revealing asymmetric shocks also suggests that this region currently does not meet the necessary prerequisites for monetary integration (see, e.g., Chow and Kim [2003]).

Asian countries should focus their efforts instead on deepening the integration of their markets. This would include developing greater intra-regional trade linkages, integrating financial markets, and establishing regional production networks. Underpinning this should be an evolution of common codes of conduct and standards of corporate governance, as well as greater regulatory cooperation and harmonization. Perhaps in the longer term, when Asia has achieved a certain degree of integration in its factor and capital markets, some form of closer monetary cooperation and integration can be an effective means of securing the benefits of the economic linkages.

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# Comment

**EIJI HIRANO**
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Masahiro Kawai's paper tackles challenging topics, and I really appreciate his devoted efforts to map this uncharted territory. Before commenting on his paper, I would like to summarize its principal line of thought.

First, the paper claims that the dollar remains the *de facto* anchor currency even in the post-crisis period, in spite of the shortcomings of the dollar-peg regime that prevailed before the crisis.

Second, such *de facto* predominance of the dollar does not reflect the underlying trade patterns and foreign direct investment flows in the region, and is therefore sub-optimal.

Third, the emerging East Asian economies should adopt the "soft-peg" regime to the currency basket, where the dollar, the yen, and the euro play equally important roles.

Fourth, given the above, greater coordination on the currency basket policy, an enhanced surveillance mechanism, and the internationalization of the yen are desirable.

In my comments on the paper, first I would like to pose a question as to the interpretation of the existing trade patterns, focusing especially on the expansion of intra-regional trade in East Asia. The interpretation is of essential importance in the paper. For example, if the intra-regional trade expansion is driven by region-specific or autonomous factors, excessive dependence on the dollar may be irrelevant. Conversely, if such expansion is mainly driven by the U.S. economy, then predominance of the dollar may be inevitable.

Recently, economists at the Bank of Japan conducted joint research with economists from the European Central Bank on the intra- and inter-regional trade patterns in East Asia (Isogai *et al.* [2002]). Their key finding was that intra-regional trade expansion in East Asia is mainly induced by the U.S. economy. This result is in line with the intuition that East Asia has become an important production center for IT-related goods. If so, intra-regional trade expansion in East Asia may not be independent in nature.

This leads to the second question, of sub-optimality of the present regime. The paper claims that the present system is sub-optimal, because it does not reflect the underlying trade patterns in the region. However, one may argue that the present system does in fact broadly reflect the reality of the real trade patterns. Given this reservation, I wonder how confidently one could argue for an intentional and collective shift to a currency basket regime.

Third, I would like to call attention to financial factors in the choice of an exchange rate regime. The role of the dollar is much larger in the context of financial transactions than in the area of trade. The emerging East Asian economies borrow money mainly in dollars for a number of reasons. We may assume this is one of the reasons why they are particularly sensitive to the stability of their currencies vis-à-vis the dollar. We should not underestimate such financial factors, particularly in the wake of the currency crisis.

Fourth, and last, I would like to argue that a peg is a peg. A currency basket regime cannot be completely immune from the well-known deficiencies of the peg system. Problems include how to define an optimal basket, how to design the adjustment mechanism of the weights assigned to basket currencies, how to make it consistent with monetary policy and capital controls, and so on. Starting with a mechanism that is not too rigid may be one idea. However, I wonder from a practical viewpoint if such a soft and somewhat elusive regime is a meaningful departure from the present mechanism.

Let us suppose that Japan can create an autonomous and independent business cycle, and suppose further that Japan's economic influence on the rest of the region becomes dominant. In this case, a greater role played by the yen is conceivable. Should we initiate such a shift of paradigm as public policy, or should we leave the work to market forces in a broad sense? This may be the fundamental question.

In any event, designing an optimal currency regime requires a long process of trial and error, and continued effort. Here in East Asia, momentum is clearly building in pursuit of a better currency regime and improved monetary cooperation, and policymakers should take advantage of such momentum. In this respect, the paper provides us with a good reference point, as a catalyst for further discussion.

### Reference

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## General Discussion

Responding to the comments of the discussants, Masahiro Kawai, while acknowledging the importance of the removal of trade barriers, emphasized the need to develop an exchange rate regime that would be conducive to intra-regional exchange rate stability. Responding to the comment that the region is heavily affected by the U.S. economy as the source of final demand, he asserted that, given the rapid growth of intra-regional trade, a dollar peg would give rise to problems in the event of large fluctuations in the yen-dollar rate. While acknowledging the importance of financial transactions, Kawai argued that, given the very high dependence of Asian countries on trade and foreign direct investment (FDI), it was important to discuss desirable exchange rate regimes from the perspective of international trade and investment.

In the general discussion that followed, Asian participants generally expressed views in support of currency basket arrangements and agreed with Kawai's analysis. Jeong-Ho Hahm (The Bank of Korea) and Amara Sriphayak (Bank of Thailand) acknowledged the usefulness of currency basket arrangements in simultaneously achieving exchange rate stability and price stability. Han Ming Zhi noted his support for currency basket arrangements, subject to the appropriate choice of currency

composition in such baskets. Robert W. Rankin commented that Kawai's empirical results for the first half of 2002 suggest that Korea and Thailand, like Singapore, were already operating under a currency basket during this period.

Various criticisms of currency basket arrangements were also voiced. Gabriele Galati, Chow Hwee Kwan, and Ismail Alowi agreed with the statement of Eiji Hirano that the importance of the dollar in current account and capital transactions should be taken into consideration. Alowi and Reuven Glick noted that currency basket arrangements lacked transparency because information regarding the relative weights of the currencies in a basket and determination of the fluctuation bands often were not disclosed. Vittorio Corbo noted that during the past two years, there were no cases of successful intermediate exchange rate regimes outside of Asia. He then argued that to pursue real exchange rate stability from the perspective of international competitiveness alone would not be consistent with the goal of price stability.

The following comments were made concerning the empirical analysis of the presentation. Robert H. Rasche (Federal Reserve Bank of St. Louis) noted that the reduced-form equations used in the estimation were subject to simultaneous bias, so that due caution needed to be exercised in applying the results based on such equations to policy recommendations concerning the choice of exchange rate regimes. Corbo argued that countries with capital-flow controls should be excluded from the analysis and emerging market economies should be the study's focus. Hiroshi Fujiki commented that, given the fact that certain aspects of the "original-sin hypothesis" are applicable to the Asian countries, it is necessary to include both exchange rates and foreign reserves in the analysis.

Commenting on Kawai's assertion that Singapore represented an almost ideal form of currency basket arrangement, Corbo, Glick, and Alowi stated that Singapore's success was based on its favorable fundamentals, and that it was doubtful whether the arrangement would work in other countries. Chow responded that, notwithstanding favorable fundamentals, a small and open economy was prone to be affected by currency crises in other countries. Kawai responded that, although pre-crisis fundamentals were believed to be strong, there were currency crises, which suggested the need to adopt an exchange rate regime that is less prone to a crisis. Also, such a regime should be supported by consistent monetary policy, sound fiscal policy, and a resilient financial sector, as in the case of Singapore. The Asian region experienced a currency crisis and contagion effects. Rankin commented that, although the impact of the East Asian crisis on Singapore was reduced by the depreciation of its currency, if all countries of the region were to depreciate their currencies in the event of another crisis, foreign exchange adjustment would be impossible in Asia as a whole.

Comments were also made from a more long-term perspective. Allan H. Meltzer emphasized the importance of the Chinese economy in considering the future of East Asian exchange rate regimes. Jerry L. Jordan (Federal Reserve Bank of Cleveland) stated that the elimination of the causes of currency crises requires governments to improve governance. Jordan also commented that Kawai's paper failed to present a theoretical model to explain how a specific currency comes to be widely accepted as a regional currency. Jorge A. Braga de Macedo pointed out that Kawai's paper did not

clearly identify the process by which currency basket systems can be established in East Asia. He also emphasized that an institutional framework must be developed to avoid future financial crises and to promote regional cooperation. Kawai responded that while a recent attempt to create the Chiang Mai Initiative was a significant step forward, East Asian regional frameworks for exchanges of information, policy dialogue, and economic surveillance were relatively underdeveloped given the degree of regional economic integration, and it was important to start a dialogue process on exchange rate movements and policies.

Given the important bearing of foreign exchange fluctuations on the discussions of this session, Meltzer asked Hirano to explain why the Bank of Japan undertakes sterilization when intervening in the foreign exchange market. Hirano responded that there was no effective difference between sterilization and non-sterilization because the Bank of Japan, under the so-called quantitative easing framework, was targeting outstanding current account balances of banks with the Bank of Japan, which effectively created the zero interest rate environment.