Very preliminary

Economic interdependence and international coordination in East Asia*

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1. Introduction

We learnt some lessons from the Asian currency crisis that occurred in 1997. When we focus on exchange rate systems, the monetary authorities in many East Asian countries adopted a *de facto* dollar peg system before the currency crisis. Appreciation of the US dollar under the *de facto* dollar peg system from 1995 to 1997 led to appreciation of effective exchange rates of their home currencies because they trade with diversified countries including Japan and the EU countries as well as the United States. Accordingly, one of the lessons is that the *de facto* dollar peg system was dangerous for East Asian countries (Williamson (2000)).

However, linkages of East Asian currencies with the US dollar have returned to the pre-crisis situation for some of East Asian countries in recent years as McKinnon (2000) pointed out. Ogawa (2002b) estimated weights on the US dollar in a possible currency basket for some East Asian countries according to a method of Frankel and Wei (1994). An analytical result shows that some of the countries have increased the linkages of their home currencies with the US dollar in recent years.

It is important to consider what factors increased the linkage of East Asian currencies with the US dollar again. We can point out some factors, which include inertia of the US dollar as a key currency in the world economy, the US dollar as a nominal anchor, appreciation of the Japanese yen against the US dollar, and coordination failure in choosing exchange rate system under intra-regional trade competition. Among them, we focus on coordination failure in choosing exchange rate system in this paper.

We use a two-country model in Ogawa and Ito (2002) to analyze theoretically why the monetary authorities keep to adopt the dollar peg system instead of adopting other

exchange rate regimes which include their optimal exchange rate regimes. It is shown that coordination failure in exchange rate policies among the monetary authorities contribute to their keeping the dollar peg system. Moreover, we make an empirical analysis to investigate whether the monetary authorities in fact meet with coordination failure in choosing an optimal exchange rate system among ASEAN5 countries, China, and Korea.

2. Recent return to *de facto* dollar pegs

This section shows that East Asian currencies have increased linkages with the US dollar in the recent years. When we compare recent movements of exchange rates of their currencies vis-à-vis the US dollar with those vis-à-vis the Japanese yen, exchange rates of their currencies vis-à-vis the US dollar fluctuated more widely during the currency crisis period from July 1997 to the end of 1998. Moreover, some of the countries (Thailand, Indonesia, Malaysian, and Korea) experienced overshooting of their exchange rates during the currency crisis. We can find the same movements in their exchange rates vis-à-vis the Japanese yen during the currency crisis.

Movements of the exchange rates tended to be stabilized in 1999 and 2000. However, we can find differences in fluctuations between exchange rates vis-à-vis the US dollar and the Japanese yen. Their exchange rates vis-à-vis the Japanese yen have fluctuated more widely than those vis-à-vis the US dollar. It seems that some of East Asian countries are returning to such a *de facto* dollar peg system as they adopted before the currency crisis even though they experienced the currency crisis under the *de facto* dollar peg system.

Ogawa (2002b) empirically analyzed how much weight the monetary authorities

placed on the US dollar when they conducted exchange rate policy. McKinnon (2000) and Kawai and Akiyama (2000) used a method of Frankel and Wei (1994) to conduct the similar analysis about the weight on the US dollar. They obtained a common result that East Asian countries have returned to the *de facto* dollar peg system. I divided a sample period into sub-sample periods of a half-year in estimating the weights on the US dollar.

I estimated the weights placed on major foreign currencies (the US dollar, the Japanese yen, the Deutsche mark, and British pound) in their possible currency basket during the period between January 1997 and September 2000. East Asian currencies (in terms of the Swiss franc) were regressed on the major currency (in terms of the Swiss franc), for various sub-periods in 1997-2000, with such high frequency data as daily data. A source of the data was *Datastream*.

I regressed log differences of exchange rates of a local currency vis-à-vis the Swiss franc on log differences on exchange rates of the major currencies vis-à-vis the Swiss franc.

$$\Delta \log e^{home/SF} = a_0 + a_1 \Delta \log e^{USD/SF} + a_2 \Delta \log e^{JPY/SF} + a_3 \Delta \log e^{DM/SF} + a_4 \Delta \log e^{BP/SF} + e_t \quad (2.1)$$

I omitted variables that were significantly negative when I made regression exchange rates of a local currency on those of all of the major currencies.

Table 1 shows results of estimation of weights in a possible currency basket with log differences by using daily data. In the case of Thailand, the weight on the US dollar was 0.990 during January to June 1997 before the currency crisis. The weight decreased during the currency crisis from July 1997 to June 1998. However, it has increased since July 1998. We can find the similar movements in the cases of Indonesia, Malaysia, the Philippines, Singapore, and Korea. Thus, from the empirical analysis, we obtained the results that linkages of East Asian currencies with the US dollar have returned to 1. In

other word, we found that the weights on the US dollar has increased or has been increasing toward 1 in most of the East Asian countries.

Next, we should consider why the monetary authorities have returned to such a *de facto* dollar peg system if it is true that they intended to intervene in foreign exchange markets in order to target (or peg) their home currency to the US dollar. We can point out some factors, which include the US dollar as inertia of the US dollar as a key currency (Ogawa (2002a)), a nominal anchor, appreciation of the Japanese yen against the US dollar, and coordination failure in choosing exchange rate system under intra-regional trade competition. Among them, I focus on coordination failure in exchange rate policy through this paper.

3. Effects of neighboring country currency on trade balances

East Asian countries have close trade relationship with each other. Moreover, they are trade competitors with each other in US and Japanese markets. In this sense, they have economic interdependences in a field of international trade. Not only exchange rates of the home currency but also exchange rates of the neighboring country currencies might have effects on exports of home country in a situation of economic interdependence.

We estimate elasticities of exports with respect of exchange rates of home currency and the neighboring country currencies. We regress exports on both of the exchange rates according to the following regression equations:

$$\hat{X}_t^A = a\hat{E}_t^{A/\$} + b\hat{E}_t^{A/Y} + c\hat{E}_t^{B/\$} + d\hat{E}_t^{B/Y} \qquad (3.1)$$

where X^A: exports of country A, $E^{A/\$}$: exchange rate of home currency vis-à-vis the US dollar, $E^{A/Y}$: exchange rate of home currency vis-à-vis the Japanese yen, $E^{B/\$}$:

exchange rate of neighboring country currencies vis-à-vis the US dollar, $E^{A/Y}$: exchange rate of neighboring country currencies vis-à-vis the Japanese yen. Variables with a hut represent a rate of change in the relevant variable ($\hat{x} = \Delta x / x$). Coefficients (a and b) on exchange rates of home currency are expected to be positive while coefficients (c and d) on exchange rate of neighboring country currencies are expected to be negative.

Exchange rates of a currency vis-à-vis the Japanese yen are determined by arbitrage between the yen/dollar exchange rates and exchange rates of the country vis-à-vis the US dollar. Accordingly, we can rewrite equation (3.1) as the following equations:

$$\begin{aligned} \hat{X}_t &= a\hat{E}_t^{A/\$} + b(\hat{E}_t^{A/\$} - \hat{E}_t^{Y/\$}) + c\hat{E}_t^{B/\$} + d(\hat{E}_t^{B/\$} - \hat{E}_t^{Y/\$}) \\ &= (a+b)\hat{E}_t^{A/\$} + (c+d)\hat{E}_t^{B/\$} - (b+d)\hat{E}_t^{Y/\$} \end{aligned} \tag{3.2}$$

We estimate a polynomial distributed lag model for equation (3.2):

$$\hat{X}_t = \sum_{k=0}^{8}(a_k + b_k)\hat{E}_{t-k}^{A/\$} + \sum_{k=0}^{8}(c_k + d_k)\hat{E}_{t-k}^{B/\$} - \sum_{k=0}^{8}(b_k + d_k)\hat{E}_{t-k}^{Y/\$} \tag{3.3}$$

We use third-degree polynomial distributed lags that are extended back for eight periods with far constraint for our regression. We use Maximum Likelihood Method to correct for serially correlated errors.

We use quarterly data for ASEAN5 countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand), China, and Korea. We make two groups for the estimation; one group consists of the ASEAN5 countries and the other group consists of the ASEAN5 countries, China, and Korea. At first, we regard the other ASEAN5 countries as neighboring countries. Next, we regard the other countries of ASEAN5+China+Korea as neighboring countries. We use trade-based weighted average of exchange rates for exchange rates of the neighboring country currencies. We use data set in *International Financial Statistics* CD-ROM (IMF). The data are seasonally adjusted with ESMOOTH

instruction in RATS version 4.30. We use real exchange rates as exchange rates in equations (3.3). We use WPI to calculate real exchange rates.

As for the group of the ASEAN5 countries, we set two sample periods during 1980:Q1 to 1997:Q2 and during 1980:Q1 to 2000:Q1 because we have to take into account of effects of the Asian currency crisis that started in July 1997. We estimate export equations during a sample period from 1980:Q1 to 1997:Q2. When we estimate them during a sample period from 1980:Q1 to 2000:Q1, we place both a crisis dummy for the Asian currency crisis period and a post-crisis dummy for a period after the Asian currency crisis in the exports equations in order to get rid of effects of the currency crisis on export equations. The crisis dummy is set to be 1 from 1997:Q2 to 1998:Q4 and the post-crisis dummy is set to be 1 from 1999:Q1 to 2000:Q1.

As for the group of ASEAN5+China+Korea, we set two sample periods during 1981:Q1 to 1997:Q2 and during 1981:Q1 to 2000:Q1 because of constraints of Chinese trade data. Also, we place both the crisis dummy and the post-crisis dummy in the export equations in order to get rid of effects of the currency crisis on export equations when we estimate them during a sample period from 1981:Q1 to 2000:Q1.

Tables 2a, 2b, 2c, and 2d show results of the estimation. Coefficients of $E^{B/\$}(c+d)$ mean effects of the neighboring country currencies (the other ASEAN5 country currencies or the other countries of ASEAN5+China+Korea) on exports. Tables 2a and 2b show results in the case when we regard the other AESAN5 countries as neighboring countries. Table 2c and 2d show results in the case when we regard the other countries of ASEAN5+China+Korea as neighboring countries.

When the other AESAN5 countries are regarded as neighboring countries, the other ASEAN5 country currencies significantly had negative effects on their exports in the

case of Indonesia during both of the two analytical periods. In the case of Singapore and the Philippines, the other ASEAN5 country currencies had negative effects on their exports although they were statistically insignificant during either of the periods. In contrast, the other ASEAN5 country currencies significantly had positive effects on exports of Malaysia during both of the two analytical periods.

When the other countries of AESAN5+China+Korea are regarded as neighboring countries, the neighboring country currencies had negative effects on their exports in the case of Indonesia, Thailand, and China during 1981 to 1997 and in the case of Indonesia and Singapore during 1981 to 2000 though they were statistically insignificant. In contrast, the other ASEAN5 country currencies significantly had positive effects on exports of Malaysia during both of the two analytical periods. The neighboring country currencies insignificantly had positive effects on exports of the other countries.

4. Coordination failure in choosing an optimal exchange rate system

The monetary authorities might meet with a situation where they are forced to keep the current exchange rate system instead of adopting an optimal exchange rate system. The situation is related with a kind of coordination failure. Suppose that all of East Asian countries have been adopting the *de facto* dollar peg system at the present time and that each of them knows that is should adopt an optimal currency basket system in order to stabilize fluctuations of its trade balances. Moreover, firms of these countries are competitive in both Japanese and US markets.

If one country switches to a currency basket system while the others keep the dollar peg system in such a situation, the country with a currency basket system might face in

increases in fluctuations in trade balances. If the US dollar depreciates against the Japanese yen, the related appreciation of its home currency against the other currencies worsens its price competitiveness of firms in the country. On one hand, if the US dollar appreciates against the Japanese yen, the related depreciation of its home currency against the other currencies improves its price competitiveness of firms in the country. Thus, the country, that adopted a currency basket system by itself, faces in increases in fluctuations of trade balances. The monetary authorities of the country have to keep the dollar peg system. Therefore, all of the monetary authorities are enforced to keep the dollar peg system if they have the same thinking.

Ogawa and Ito (2002) used a game-theoretic framework of two-country model to analyze theoretically the coordination failure in choosing an optimal exchange rate system. We theoretically analyzed possibilities of coordination failures by comparing losses for the monetary authorities between two situations:[1] one situation where both of the monetary authorities adopt the dollar peg at the same time and the other situation where the monetary authorities of one country adopt an optimal currency basket peg while the monetary authorities of the other country adopt the dollar peg.

We express the above effects of exchange rates on the trade balances of countries A and B in terms of rates of changes as follows:

$$\hat{T}_A = A^{A/Y}\hat{E}^{A/Y} + A^{A/\$}\hat{E}^{A/\$} + A^{B/Y}\hat{E}^{B/Y} + A^{B/\$}\hat{E}^{B/\$} \tag{4.1}$$

$$\hat{T}_B = B^{B/Y}\hat{E}^{B/Y} + B^{B/\$}\hat{E}^{B/\$} + B^{A/Y}\hat{E}^{A/Y} + B^{A/\$}\hat{E}^{A/\$} \tag{4.2}$$

where T_i: trade balances of country i, $A^{i/j}$: elasticity of trade balances of country A in

[1] Bénassy-Quéré (1999) and Ohno (1999) analyzed pegging the US dollar as a coordination failure.

terms of the exchange rate of currency i vis-à-vis currency j, $B^{i/j}$: elasticity of trade balances of country B in terms of the exchange rate of currency i vis-à-vis currency j.

The volume effects of exchange rates should dominate in equations (4.1) and (4.2) by the assumption of the Marshall-Lerner condition. For the qualitative analysis, we regard signs of A and B coefficients in equations (4.1) and (4.2) as the signs of coefficients in the volume effects of exchange rates.

Coefficients ($A^{A/Y}$, $A^{A/\$}$, $B^{B/Y}$, and $B^{B/\$}$) on the exchange rates of the home currency vis-à-vis the Japanese yen and the US dollar should be positive under the Marshall-Lerner condition. Coefficients ($A^{B/Y}$, $A^{B/\$}$, $B^{A/Y}$, and $B^{A/\$}$) on the exchange rates of the neighboring country's currency vis-à-vis the Japanese yen and the US dollar are unambiguously negative in our model. The appreciation of the neighboring country's currency has positive effects on the trade volume, as the competitiveness of home products would increase compared with the neighboring country's products.

Both of the monetary authorities are assumed to choose weights on the US dollar and the Japanese yen in a currency basket in order to stabilize the fluctuation of their own trade balances that is caused by changes in the exchange rates. Our optimality of the exchange rate policy is to stabilize fluctuations in trade balances in terms of the US dollar under a currency basket peg system. We suppose that the monetary authorities of each country control weights in a currency basket to minimize the squared rate of change in trade balances in terms of the US dollar subject to the following equations:

$$w_A \hat{E}^{A/\$} + (1 - w_A)\hat{E}^{A/Y} = 0 \tag{4.3}$$

$$w_B \hat{E}^{B/\$} + (1 - w_B)\hat{E}^{B/Y} = 0 \tag{4.4}$$

where w_i (for $i = A, B$): a weight on the US dollar in a currency basket for country i. We

suppose a realistic case where $0 \le w_i \le 1$.

We can derive the first order conditions for minimizing their objective functions to obtain the following linear reaction functions:

$$(A^{A/Y} + A^{A/\$})w_A + (A^{B/Y} + A^{B/\$})w_B = A^{A/\$} + A^{B/\$} \tag{4.5}$$

$$(B^{B/Y} + B^{B/\$})w_B + (B^{A/Y} + B^{A/\$})w_A = B^{B/\$} + B^{A/\$} \tag{4.6}$$

There is a unique equilibrium pair of optimal weights for countries A and B because both of the policy reaction functions are linear functions. From equations (4.5) and (4.6), we derive a pair of optimal weights (w_A^*, w_B^*) on the US dollar in a currency basket to stabilize their trade balances for both of the countries A and B at the same time. If both of the monetary authorities of countries A and B could, at the same time, set w_A^* and w_B^*, respectively, trade balances would be stabilized in both of the countries. However, it is not always guaranteed that the optimal weights for the both countries are a stable equilibrium.

The condition for a stable equilibrium is

$$-\frac{A^{A/Y} + A^{A/\$}}{A^{B/Y} + A^{B/\$}} > -\frac{B^{A/Y} + B^{A/\$}}{B^{B/Y} + B^{B/\$}} \tag{4.7}$$

In this case, a pair of the weights proceeds along a converging process toward an equilibrium point implied by the optimal weights (w_A^*, w_B^*) as shown in Figure 1. The weights for both of the countries should converge to their optimal equilibrium ones.

On the other hand, if

$$-\frac{A^{A/Y} + A^{A/\$}}{A^{B/Y} + A^{B/\$}} < -\frac{B^{A/Y} + B^{A/\$}}{B^{B/Y} + B^{B/\$}} \tag{4.8}$$

a pair of the optimal weights (w_A^*, w_B^*) is an unstable equilibrium. In this case, weights diverge out of the optimal weights once they are off the equilibrium point (w_A^*, w_B^*) as shown in Figure 2.

Suppose that each of the monetary authorities of countries A and B chooses its own weight in order to stabilize its own trade balances, given the weights chosen by the other monetary authorities. The weights chosen by the monetary authorities should diverge out of the optimal weights (w_A^*, w_B^*). Thus, the weights on the US dollar increase and reach to a unity for both the countries, provided that the weight is realistically constrained between 0 and 1. Both of the monetary authorities eventually adopt a full dollar peg system rather than the optimal currency basket peg system although they have been choosing their weights in order to stabilize their own trade balances. Thus, if inequality (4.8) is satisfied, an optimal weight point is unstable. Then, it is difficult for the monetary authorities to change their exchange rate policy to an optimal exchange rate policy.

Next, we analyze whether the monetary authorities of countries A and B can directly shift their exchange rate system from the dollar peg system to an optimal currency basket peg system. The shift to optimal currency basket peg system depends on whether each of the monetary authorities can decrease fluctuations in trade balances under the optimal currency basket peg system in comparison with those under the dollar peg system. Especially, each of the monetary authorities should care about fluctuations in trade balances in a case where it shifts to the optimal currency basket peg system while the other keep the dollar peg system.

If both of the monetary authorities adopt the dollar peg ($w_A = w_B = 1$) at the same time, fluctuations in trade balances for country A are calculated as follows:

$$\hat{T}_A^{2}{}_{(w_A=w_B=1)} = \left(A_1 - A_3\right)^2 \hat{E}^{Y/\$2} \tag{4.9}$$

On one hand, suppose that the monetary authorities of country A adopt the above optimal currency basket peg ($w_A = w_A^*$) while the monetary authorities of country B

adopt the dollar peg ($w_B = 1$). Fluctuations in trade balances for country A are obtained in this case as follows:

$$\hat{T}_A^{\,2}{}_{(w_A=w_A^*,\,w_B=1)} = \left\{ \frac{(A_1+A_2)(B_1+B_4)-(A_1+A_4)(B_3+B_4)}{(A_1+A_2)(B_1+B_2)-(A_3+A_4)(B_3+B_4)}(A_3+A_4) \right\}^2 \hat{E}^{Y/\$2} \qquad (4.10)$$

When the monetary authorities of country A have options to adopt the dollar peg ($w_A = 1$) or the optimal currency basket peg ($w_A = w_A^*$), given that the monetary authorities of country B adopt the dollar peg ($w_B = 1$), the monetary authorities of country A compare fluctuations in trade balances between the two options. The monetary authorities of country A compare equation (4.10) with equation (4.9). If fluctuations in trade balance in the case of adopting the dollar peg (equation (4.9)) are less than those in the case of adopting the optimal currency basket peg (equation (4.10)), the monetary authorities of country A prefer the dollar peg to the optimal currency basket peg.

Also, the monetary authorities of country B should behave in a same way with those of country A because we supposed symmetry of two-country economies. Thus, both of the monetary authorities should keep pegging their home currencies to the dollar if their trade balances fluctuate more widely in the case of the optimal currency basket peg than in the case of the dollar peg. At this time, they meet with a coordination failure that they are forced to adopt the dollar peg even though the optimal currency basket peg is to minimize the fluctuations in trade balances if they adopt the optimal currency basket peg at the same time. Only if both of the monetary authorities coordinated to adopt the optimal currency basket peg at the same time, they peg their home currencies to the optimal currency basket.

5. Empirical analysis on coordination failure

(1) Methodology

We empirically analyze whether the ASEAN5 countries have stable equilibrium or unstable equilibrium in choosing an optimal exchange rate system and whether they have possibilities of meeting with coordination failure.

We use the results of estimating export equation (3.3) for each of the ASEAN5 countries. We need to estimate an import equation for each country and export and import equations for neighboring countries.

We regress imports on both the exchange rates of home currency and neighboring currency according to the following regression equations:

$$\hat{M}_t = e\hat{E}_t^{A/\$} + f\hat{E}_t^{A/Y} \tag{5.1}$$

where M : imports. Parameter e and f are expected to be negative.

Exchange rates of a currency vis-à-vis the Japanese yen are determined by arbitrage between the yen/dollar exchange rates and exchange rates of the currency vis-à-vis the US dollar. Accordingly, we can rewrite equation (5.1) as the following equations:

$$\hat{M}_t = e\hat{E}_t^{A/\$} + f(\hat{E}_t^{A/\$} - \hat{E}_t^{Y/\$}) = (e+f)\hat{E}_t^{A/\$} - f\hat{E}_t^{Y/\$} \tag{5.2}$$

We estimate a polynomial distributed lag model for equation (5.2) in the same way as estimation of export equation (3.3):

$$\hat{M}_t = \sum_{k=0}^{8}(e_k + f_k)\hat{E}_{t-k}^{A/\$} - \sum_{k=0}^{8} f_k \hat{E}_{t-k}^{Y/\$} \tag{5.3}$$

We estimate both export and import equations for neighboring countries. We use an arithmetic average of counties in the other ASEAN5 countries for the neighboring countries.

Elasticities of trade balances in terms of exchange rates of home currency vis-à-vis the US dollar or the Japanese yen is calculated as weighted sum of elasticities of exports and imports. We can regard the elasticity in equation (4.1) as weighted average of coefficients in equations (3.1) and (5.1):

$$A^{A/\$} = \frac{\bar{X}}{\bar{X}+\bar{M}}a - \frac{\bar{M}}{\bar{X}+\bar{M}}e \tag{5.4a}$$

$$A^{A/Y} = \frac{\bar{X}}{\bar{X}+\bar{M}}b - \frac{\bar{M}}{\bar{X}+\bar{M}}f \tag{5.4b}$$

where $\bar{X}$: average of exports during a sample period, $\bar{M}$: average of imports during a sample period.

However, we cannot identify each of coefficients (a, b, e, f) in estimation of equations (3.3) and (5.3). For the reason, we calculate slopes of reaction functions of home country and neighboring country, AA and BB, according to the following equations:

$$\frac{A^{A/Y}+A^{A/\$}}{A^{B/Y}+A^{B/\$}} = \frac{\frac{\bar{X}}{\bar{X}+\bar{M}}(a+b) - \frac{\bar{M}}{\bar{X}+\bar{M}}(e+f)}{(c+d)} \tag{5.5a}$$

$$\frac{B^{A/Y}+B^{A/\$}}{B^{B/Y}+B^{B/\$}} = \frac{(c+d)}{\frac{\bar{X}}{\bar{X}+\bar{M}}(a+b) - \frac{\bar{M}}{\bar{X}+\bar{M}}(e+f)} \tag{5.5b}$$

Thus, we use estimated coefficients in both export equation (3.3) and import equations (5.3) to calculate slopes of reaction functions of home county and neighboring countries, respectively.

(2) ASEAN5

At first, we estimate a case of ASEAN5. We use quarterly data for ASEAN5 countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand). We regard the

other ASEAN5 countries as neighboring countries for an ASEAN country. We use trade-based weighted average of exchange rates for exchange rates of the neighboring country currencies. We take into account effects of the Asian currency crisis to set two analytical periods. An analytical period is from 1980:Q1 to 1997:Q2 and the other is from 1980:Q1 to 2000:Q1. When we estimate them during the latter analytical period, we place both the crisis dummy and the post-crisis dummy as explained in Section 3.

Tables 3a and 3b show sums of coefficients for the listed variables with lags in export and import equations for a home country and neighboring countries. Some of the coefficients significantly have their expected sign. Especially as for coefficients for the neighboring countries, they significantly had expected signs in the case of Thailand and Malaysia. However, a few coefficients significantly have a wrong sign for the neighboring countries.

Tables 4a and 4b show slopes of policy reaction functions for both home country and neighboring countries. According to inequalities (4.7) and (4.8), we can judge whether an equilibrium of their policy reaction functions is stable or unstable. There is an unstable equilibrium in policy reaction functions of the home and neighboring countries only in the case of Indonesia during an analytical period from 1980:Q1 to 1997:Q2. We can find an unstable equilibrium in the cases of Indonesia, Thailand, and Malaysia during an analytical period from 1980:Q1 to 2000:Q1. In the other cases, there is a stable equilibrium in their policy reaction functions.

Next, we investigate whether the monetary authorities of the ASEAN5 countries directly shift from the dollar peg system to an optimal exchange rate system, which is related with coordination failure in choosing exchange rate system. For the purpose we calculate fluctuations of trade balances in both the cases where both home and

neighboring countries adopt the dollar peg system and where home country adopts its optimal exchange rate system while neighboring countries adopt the dollar peg system. It is possible to compare the fluctuations of the trade balances in both the cases. Tables 4a and 4b show results of the calculations.

The fluctuations of trade balances in the case of the dollar peg system adopted by all of the countries are smaller than those in the case of adopting an optimal exchange rate system given the neighboring countries' dollar peg system only in Malaysia among the four countries with a stable equilibrium during the analytical period from 1980:Q1 to 1997:Q2. The fluctuations of trade balances in the case of the dollar peg system adopted by all of the countries are larger in both of the two countries (Singapore and the Philippines) with a stable equilibrium during the analytical period from 1980:Q1 to 2000:Q1. They have no possibilities to face in coordination failure in choosing exchange rate system in the case where we limit neighboring countries to ASEAN5.

The analytical results imply that the monetary authorities in Indonesia, Thailand, and Malaysia cannot shift from the dollar peg system to its optimal exchange rate system. They have possibilities that they meet with in coordination failure in choosing an optimal exchange rate system.

(3) AESAN5+China+Korea

Next, we added China and Korea to ASEAN5 countries to conduct the same empirical analysis on both stability of equilibrium and coordination failure in exchange rate policy. We regard the other countries of ASEAN5+China+Korea as neighboring countries for one country of them. We use trade-based weighted average of exchange rates for exchange rates of the neighboring country currencies. We could estimate

export and import equations during a period from 1981:Q1 to 2000:Q1 because of constraints of Chinese trade data. We take into account effects of the Asian currency crisis to set both the crisis dummy and the post-crisis dummy when we estimate both export and import equations.

Table 5a shows sums of coefficients for the listed variables with lags in export and import equations for a home country and neighboring countries during the analytical period from 1981:Q1 to 1997:Q2. Table 5b shows sums of coefficients for the listed variables with lags in export and import equations for a home country and neighboring countries during the analytical period from 1981:Q1 to 2000:Q1. Some of the coefficients significantly have their expected sign. However, some coefficients significantly have a wrong sign for the neighboring countries.

Table 6a and 6b show slopes of policy reaction functions for both home country and neighboring countries during the two analytical periods. According to inequalities (4.7) and (4.8), we can judge whether an equilibrium of their policy reaction functions is stable or unstable. There is an unstable equilibrium in policy reaction functions of the home and neighboring countries in the cases of Singapore, Malaysia, and China during the analytical period from 1981:Q1 to 1997:Q2 and in the cases of Indonesia, Singapore, Malaysia, the Philippines, and China during the analytical period from 1981:Q1 to 2000:Q1. In the cases of Thailand and Korea, there is a stable equilibrium in their policy reaction functions. After we added China and Korea to neighboring countries of the ASEAN5 countries, equilibrium change from stable to unstable in the cases of Singapore and the Philippines.

We investigate coordination failure in choosing exchange rate system, that is, whether the monetary authorities of the ASEAN5 countries, China, and Korea directly

shift from the dollar peg system to an optimal exchange rate system when the other countries of the ASEAN5+China+Korea are regarded as neighboring countries. Table 6 shows comparisons between the fluctuations of trade balances in the case of all of the countries' adopting the dollar peg system and those in the case of one country's adopting an optimal exchange rate system given the neighboring countries' dollar peg system.

In the cases of Thailand that has a stable equilibrium in policy reaction functions, they have coordination failure in choosing exchange rate system during the analytical period from 1981:Q1 to 1997:Q2. In contrast, we can find no coordination failure in the case of Korea with a stable equilibrium.

The analytical result implies that the ASEAN countries and China are enforced to adopt the dollar peg system because they have an unstable equilibrium or coordination failure in choosing exchange rate system. Only the monetary authorities of Korea can directly shift from the dollar peg system to its optimal exchange rate system among ASEAN5 countries, China, and Korea.

6. Conclusion

It is often pointed out that the *de facto* dollar peg system is dangerous for the East Asian countries with diversified trade with Japan, the EU countries, and the intra-region as well as the United States. Under the *de facto* dollar peg system, the movements of exchange rate of the US dollar against the Japanese yen worsened trade balances. Moreover, the *de facto* dollar peg system stimulated capital inflows to the crisis countries before the crisis. When we look at movements of the exchange rates of some East Asian currency during a post-crisis period from 1999 to present day, we can find that the exchange rates against the US dollar have been stabilized while the

exchange rates against the Japanese yen have been fluctuating during the post-crisis. It seems that the monetary authorities of some countries have been returning to the *de facto* dollar peg system that they adopted before the currency crisis.

One factor is regarded to be coordination failure in exchange rate policies among the countries. Suppose that a currency basket system is optimal for the East Asian countries in order to prevent another currency crisis in the future. However, the monetary authorities might face in a coordination failure in choosing an optimal currency basket system. It is necessary for them to make arrangements of international coordination in their exchange rate policies for achieving optimal currency basket systems that are crisis-proof if the coordination failure prevents them from adopting their optimal currency basket system

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Table 1: Estimation of weights in a currency basket (daily data; log differences)

Currency	period	US dollar	yen	DM	B pound
Thailand	Jan-Jun 1997	0.990***	0.049***	-	-0.001
	Jul-Dec 1997	0.932**	0.020	0.550	-0.268
	Jan-Jun 1998	0.471	0.148	0.727	0.311
	Jul-Dec 1998	1.004***	0.082	0.146	-0.039
	Jan-Jun 1999	0.998***	0.043	-0.079	-0.088
	Jul-Dec 1999	1.145***	-0.040	0.032	-0.147
	Jan-Jun 2000	0.908***	0.027	-0.116	0.090
	Jan-Sep 2000	0.896***	0.035	-0.121	0.119**
Indonesia	Jan-Jun 1997	0.999***	0.014	0.024	0.025
	Jul-Dec 1997	0.843	-0.152	-0.390	0.458
	Jan-Jun 1998	-0.203	1.974**	2.071	-0.890
	Jul-Dec 1998	0.841*	0.277	0.244	0.063
	Jan-Jun 1999	1.159***	0.298*	-0.144	-
	Jul-Dec 1999	0.477	0.411**	0.660	-
	Jan-Jun 2000	0.942***	0.129	0.266	-0.009
	Jan-Sep 2000	1.012***	0.118	0.890***	0.165
Philippines	Jan-Jun 1997	0.999***	-0.001	-0.002	0.000
	Jul-Dec 1997	1.232***	-0.137	0.094	-0.08
	Jan-Jun 1998	0.656**	0.082	-0.346	0.403
	Jul-Dec 1998	1.127***	-0.026	-0.001	-0.040
	Jan-Jun 1999	0.996***	-0.027	-0.030	0.060
	Jul-Dec 1999	1.046***	-0.073	-0.244	-0.166
	Jan-Jun 2000	0.938***	-0.043	-0.096	0.064
	Jan-Sep 2000	0.872***	-0.005	-0.100	0.055
Malaysia	Jan-Jun 1997	1.030***	0.023	-0.070	-0.071
	Jul-Dec 1997	0.650**	0.303*	0.602*	-0.026
	Jan-Jun 1998	0.867*	0.341	-0.654	0.976
	Jul-Dec 1998	1.027***	0.050	0.136	-0.078
	Jan-Jun 1999	1.000***	0.000	0.000	0.000
	Jul-Dec 1999	1.000***	0.000	0.000	0.000
	Jan-Jun 2000	1.000***	0.000	0.000	0.000
	Jan-Sep 2000	1.000***	0.000	0.000	0.000

Singapore	Jan-Jun 1997	0.902***	0.095***	-0.030	0.015
	Jul-Dec 1997	0.833***	0.050	-0.040	0.145*
	Jan-Jun 1998	0.747***	0.209**	0.318	0.115
	Jul-Dec 1998	0.903***	0.232***	-0.088	0.012
	Jan-Jun 1999	0.915***	0.072***	0.303***	-0.091
	Jul-Dec 1999	0.997***	0.021	-0.049	-0.052
	Jan-Jun 2000	0.929***	0.005	-0.108	0.052
	Jan-Sep 2000	0.948***	0.001	-0.038	0.051
Korea	Jan-Jun 1997	1.009***	0.049*	-0.042	0.012
	Jul-Dec 1997	0.590	1.104**	0.256	0.391
	Jan-Jun 1998	0.536	0.045	1.228	0.122
	Jul-Dec 1998	1.015***	0.063	0.083	-
	Jan-Jun 1999	1.008***	-0.012	-0.250	0.043
	Jul-Dec 1999	0.951***	0.043	-0.146	-0.002
	Jan-Jun 2000	1.027***	-0.061	-0.061	0.016
	Jan-Sep 2000	0.975***	-	-0.009	0.015
Taiwan	Jan-Jun 1997	0.990***	0.013	-0.037	-0.000
	Jul-Dec 1997	1.020***	-0.026	0.178	-0.084
	Jan-Jun 1998	0.895***	0.082	0.087	-0.001
	Jul-Dec 1998	0.957***	0.099***	-0.060	-0.008
	Jan-Jun 1999	0.974***	0.021	0.095	-
	Jul-Dec 1999	1.000***	0.008	0.041	-0.015
	Jan-Jun 2000	0.971***	-	0.038	-0.006
	Jan-Sep 2000	0.981***	-	0.022	-0.013

Source: Ogawa(2002b)
***: significant level of 1%, **: significant level of 5%, *: significant level of 10%
Period [Jan-Jun 1997]: 01:02:1997 To 06:30:1997
Period [Jul-Dec 1997]: 07:02:1997 To 12:31:1997
Period [Jan-Jun 1998]: 01:02:1998 To 06:30:1998
Period [Jul-Dec 1998]: 07:02:1998 To 12:31:1998
Period [Jan-Jun 1999]: 01:04:1999 To 06:30:1999
Period [Jul-Dec 1999]: 07:02:1999 To 12:31:1999
Period [Jan-Jun 2000]: 01:04:2000 To 06:30:2000
Period [Jan-Sep 2000]: 01:04:2000 To 09:15:2000

Table 2a: Estimation of export equations (1980:Q1 to 1997:Q2)

ASEAN5

	Indonesia		Thailand		Singapore	
		t value		t value		t value
$E^{A/\$}(a+b)$	0.277	1.924 *	-0.111	-0.113	0.309	0.917
$E^{B/\$}(c+d)$	-2.356	-5.432 ***	0.056	0.081	0.344	1.391
$E^{¥/\$}(-(b+d))$	-0.400	-2.953 ***	0.965	3.516 ***	0.251	2.029 ***
	Malaysia		Philippines			
Export		t value		t value		
$E^{A/\$}(a+b)$	-0.498	-1.923 *	-0.023	-0.579		
$E^{B/\$}(c+d)$	0.361	2.008 *	-0.038	-0.186		
$E^{¥/\$}(-(b+d))$	0.088	1.158	-0.009	-0.146		

Table 2b: Estimation of export equations (1980:Q1 to 2000:Q1)

ASEAN5

	Indonesia		Thailand		Singapore	
		t value		t value		t value
$E^{A/\$}(a+b)$	0.281	2.931 ***	0.028	0.063	0.282	0.928
$E^{B/\$}(c+d)$	-2.303	-5.487 ***	0.316	0.712	-0.101	-1.137
$E^{¥/\$}(-(b+d))$	-0.375	-2.922 ***	0.935	3.715 ***	0.227	2.119 **
	Malaysia		Philippines			
		t value		t value		
$E^{A/\$}(a+b)$	-0.551	-3.843 ***	-0.021	-0.335		
$E^{B/\$}(c+d)$	0.293	2.800 ***	0.005	0.059		
$E^{¥/\$}(-(b+d))$	0.102	1.507	-0.053	-0.624		

Table 2c: Estimation of export equations (1981:Q1 to 1997:Q2)

ASEAN5+China+Korea

	Indonesia		Thailand		Singapore	
		t value		t value		t value
$E^{A/\$}(a+b)$	0.562	1.992*	0.308	1.077	0.944	1.929*
$E^{B/\$}(c+d)$	-0.028	-0.046	-0.245	-0.820	0.528	1.394
$E^{¥/\$}(-(b+d))$	-0.237	-0.868	-0.061	-0.641	0.361	2.013**
	Malaysia		Philippines			
		t value		t value		
$E^{A/\$}(a+b)$	-1.446	-3.040***	0.010	0.070		
$E^{B/\$}(c+d)$	0.716	1.994*	0.546	0.911		
$E^{¥/\$}(-(b+d))$	0.308	2.350**	0.154	0.688		
	Korea		China			
		t value		t value		
$E^{A/\$}(a+b)$	0.022	1.037	-0.026	-1.078		
$E^{B/\$}(c+d)$	0.002	0.089	-0.113	-0.848		
$E^{¥/\$}(-(b+d))$	-0.003	-0.227	-0.024	-0.702		

Table 2d: Estimation of export equations (1981:Q1 to 2000:Q1)

ASEAN5+China+Korea

	Indonesia		Thailand		Singapore	
		t value		t value		t value
$E^{A/\$}(a+b)$	0.008	0.073	-0.047	-0.640	0.596	1.207
$E^{B/\$}(c+d)$	-0.798	-1.409	0.130	1.069	-0.268	-1.216
$E^{¥/\$}(-(b+d))$	-0.034	-0.135	0.109	2.719***	0.380	1.999**
	Malaysia		Philippines			
		t value		t value		
$E^{A/\$}(a+b)$	-0.850	-2.206**	-0.038	-0.222		
$E^{B/\$}(c+d)$	0.617	1.704*	0.186	0.527		
$E^{¥/\$}(-(b+d))$	0.331	2.249**	0.001	0.004		
	Korea		China			
		t value		t value		
$E^{A/\$}(a+b)$	-0.013	-0.768	-0.051	-0.890		
$E^{B/\$}(c+d)$	0.002	0.082	0.093	1.086		
$E^{¥/\$}(-(b+d))$	0.018	1.333	-0.061	-0.774		

Table 3a-1: Estimation of export and import equations (1980:Q1 to 1997:Q2)

ASEAN5

	Indonesia		Thailand		Singapore	
Home country (Country A)						
Exports		t value		t value		t value
$E^{A/\$}(a+b)$	0.277	1.924*	-0.111	-0.113	0.309	0.917
$E^{B/\$}(c+d)$	-2.356	-5.432***	0.056	0.081	0.344	1.391
$E^{¥/\$}(-(b+d))$	-0.400	-2.953***	0.965	3.516***	0.251	2.029***
Imports						
$E^{A/\$}(e+f)$	-0.303	-1.630	-1.511	-1.801*	-0.385	-1.864*
$E^{¥/\$}(-f)$	0.525	2.210**	0.215	0.632	-0.162	-2.058**
Neighboring Countries (Country B)						
Exports						
$E^{B/\$}(a+b)$	-0.233	-0.469	0.701	1.528	0.445	1.640
$E^{A/\$}(c+d)$	0.335	3.004***	-0.437	-0.728	0.062	0.167
$E^{¥/\$}(-(b+d))$	0.187	1.436	0.160	1.054	0.122	0.867
Imports						
$E^{B/\$}(e+f)$	-0.949	-4.332***	-0.703	-2.772***	-0.467	-1.610
$E^{¥/\$}(-f)$	-0.067	-0.844	0.265	2.233**	0.428	2.318**

Table 3a-2: Estimation of export and import equations (1980:Q1 to 1997:Q2)

ASEAN5

	Malaysia		Philippines	
Home country (Country A)				
Exports		t value		t value
$E^{A/\$}(a+b)$	-0.498	-1.923*	-0.023	-0.579
$E^{B/\$}(c+d)$	0.361	2.008*	-0.038	-0.186
$E^{¥/\$}(-(b+d))$	0.088	1.158	-0.009	-0.146
Imports				
$E^{A/\$}(e+f)$	0.437	0.542	-0.147	-2.177**
$E^{¥/\$}(-f)$	0.122	0.519	-0.102	-0.931
Neighboring Countries (Country B)				
Exports				
$E^{B/\$}(a+b)$	0.348	1.276	-0.128	-1.127
$E^{A/\$}(c+d)$	-0.556	-1.410	-0.014	-0.159
$E^{¥/\$}(-(b+d))$	0.205	1.766*	0.152	1.303
Imports				
$E^{B/\$}(e+f)$	-0.669	-2.515**	-0.377	-2.883***
$E^{¥/\$}(-f)$	0.321	2.343**	0.268	1.864*

Table 3b-1: Estimation of export and import equations (1980:Q1 to 2000:Q1)

ASEAN5

	Indonesia		Thailand		Singapore	
Home country (County A)						
Exports		t-value		t-value		t-value
$E^{A/\$}(a+b)$	0.281	2.931***	0.028	0.063	0.282	0.928
$E^{B/\$}(c+d)$	-2.303	-5.487***	0.316	0.712	-0.101	-1.137
$E^{¥/\$}(-(b+d))$	-0.375	-2.922***	0.935	3.715***	0.227	2.119**
Imports						
$E^{A/\$}(e+f)$	-0.195	-2.271**	-0.686	-2.402**	-0.661	-3.922***
$E^{¥/\$}(-f)$	0.445	2.338**	0.250	0.792	-0.230	-3.443***
Neighboring Countries (Country B)						
Exports						
$E^{B/\$}(a+b)$	-0.853	-2.337**	0.520	2.327**	0.035	0.340
$E^{A/\$}(c+d)$	0.151	2.194**	-0.696	-3.169***	-0.027	-0.086
$E^{¥/\$}(-(b+d))$	0.116	0.899	0.086	0.642	0.146	1.176
Imports						
$E^{B/\$}(e+f)$	-0.865	-4.400***	-0.606	-3.870***	-0.377	-2.619***
$E^{¥/\$}(-f)$	-0.033	-0.348	0.278	2.507**	0.365	2.237**

Table 3b-2: Estimation of export and import equations (1980:Q1 to 2000:Q1)

	ASEAN5			
	Malaysia		Philippines	
Home country (Country A)				
Exports		t value		t value
$E^{A/\$}(a+b)$	-0.551	-3.843***	-0.021	-0.335
$E^{B/\$}(c+d)$	0.293	2.800***	0.005	0.059
$E^{¥/\$}(-(b+d))$	0.102	1.507	-0.053	-0.624
Imports				
$E^{A/\$}(e+f)$	-0.384	-1.248	-0.150	-2.271**
$E^{¥/\$}(-f)$	0.350	1.628	-0.088	-0.861
Neighboring Countries (Country B)				
Exports				
$E^{B/\$}(a+b)$	0.343	2.076**	-0.061	-0.460
$E^{A/\$}(c+d)$	-0.678	-2.986***	-0.055	-0.619
$E^{¥/\$}(-(b+d))$	0.159	1.496	0.190	1.533
Imports				
$E^{B/\$}(e+f)$	-0.609	-3.399***	-0.355	-2.176**
$E^{¥/\$}(-f)$	0.354	2.477**	0.266	1.782*

Table 4a: Stability of equilibrium and coordination failure (1980:Q1 to 1997:Q2)

	ASEAN5				
	Indonesia	Thailand	Singapore	Malaysia	Philippines
Stability Condition					
Slope of AA	0.122	-13.474	-1.012	1.301	1.948
Slope of BB	-0.887	0.622	-0.136	1.087	0.111
Stable or unstable	unstable	stable	stable	stable	stable
Optimal Weight					
w_A^*	0.823	0.507	-0.623	6.241	0.809
w_B^*	0.367	1.075	1.530	7.372	1.493
Fluctuation in trade balance					
$\hat{T}^2_{A\,(w_A=w_A^*,w_b=1)}$	2.220	0.00002	0.033	5.276	0.0003
$\hat{T}^2_{A\,(w_A=w_b=1)}$	2.071	0.134	0.147	0.026	0.001
Coordination failure	Yes	None	None	Yes	None

Table 4b: Stability of equilibrium and coordination failure (1980:Q1 to 2000:Q1)

	ASEAN5				
	Indonesia	Thailand	Singapore	Malaysia	Philippines
Stability Condition					
Slope of AA	0.106	-1.197	4.754	0.351	-15.520
Slope of BB	-4.356	1.237	0.125	1.416	0.378
Stable or unstable	unstable	unstable	stable	unstable	stable
Optimal Weight					
w_A^*	0.156	0.065	0.763	0.041	0.595
w_B^*	0.316	0.624	1.629	0.577	1.283
Fluctuation in trade balance					
$\hat{T}^2_{A\,(w_A=w_A^*,w_b=1)}$	2.483	0.014	0.004	0.015	0.000002
$\hat{T}^2_{A\,(w_A=w_b=1)}$	1.874	0.223	0.031	0.001	0.001
Coordination failure	Yes	None	None	Yes	None

Table 5a-1: Estimation of export and import equations (1981:Q1 to 1997:Q2)

ASEAN5+China+Korea

	Indonesia		Thailand		Singapore	
Home Country (Country A)						
Exports		t value		t value		t value
$E^{A/\$}(a+b)$	0.562	1.992*	0.308	1.077	0.944	1.929*
$E^{B/\$}(c+d)$	-0.028	-0.046	-0.245	-0.820	0.528	1.394
$E^{¥/\$}(-(b+d))$	-0.237	-0.868	-0.061	-0.641	0.361	2.013**
Imports						
$E^{A/\$}(e+f)$	0.115	1.545	-0.894	-1.090	-0.221	-1.355
$E^{¥/\$}(-f)$	-0.100	-1.379	0.050	0.154	-0.102	-1.565
Neighboring Countries (Country B)						
Exports						
$E^{B/\$}(a+b)$	0.542	1.970*	1.410	3.284***	0.761	2.190**
$E^{A/\$}(c+d)$	0.353	2.838***	-0.862	-1.463	0.758	1.544
$E^{¥/\$}(-(b+d))$	0.183	1.582	0.204	1.162	0.363	2.009*
Imports						
$E^{B/\$}(e+f)$	-0.098	-0.937	0.001	0.010	0.060	0.731
$E^{¥/\$}(-f)$	-0.064	-1.259	-0.036	-0.762	-0.050	-1.059

Table 5a-2: Estimation of export and import equations (1981:Q1 to 1997:Q2)

ASEAN5+China+Korea

	Malaysia		Philippines	
Home Country (Country A)				
Exports		t value		t value
$E^{A/\$}(a+b)$	-1.446	-3.040***	0.010	0.070
$E^{B/\$}(c+d)$	0.716	1.994*	0.546	0.911
$E^{¥/\$}(-(b+d))$	0.308	2.350**	0.154	0.688
Imports				
$E^{A/\$}(e+f)$	0.557	1.015	-0.193	-2.654**
$E^{¥/\$}(-f)$	-0.048	-0.308	-0.187	-1.707*
Neighboring Countries (Country B)				
Exports				
$E^{B/\$}(a+b)$	0.996	2.975***	1.190	3.075***
$E^{A/\$}(c+d)$	-0.744	-1.217	-0.068	-0.670
$E^{¥/\$}(-(b+d))$	0.367	2.385**	0.266	1.658
Imports				
$E^{B/\$}(e+f)$	-0.015	-0.166	-0.019	-0.190
$E^{¥/\$}(-f)$	-0.042	-0.973	-0.051	-1.189

Table 5a-3: Estimation of export and import equations (1981:Q1 to 1997:Q2)

ASEAN5+China+Korea

	Korea		China	
Home Country (Country A)				
Exports		t-value		t-value
$E^{A/\$}(a+b)$	0.022	1.037	-0.026	-1.078
$E^{B/\$}(c+d)$	0.002	0.089	-0.113	-0.848
$E^{¥/\$}(-(b+d))$	-0.003	-0.227	-0.024	-0.702
Imports				
$E^{A/\$}(e+f)$	-0.263	-2.310**	-0.045	-0.419
$E^{¥/\$}(-f)$	-2.310	-2.310**	-0.109	-0.687
Neighboring Countries (Country B)				
Exports				
$E^{B/\$}(a+b)$	0.863	2.568**	0.790	1.397
$E^{A/\$}(c+d)$	-0.213	-0.555	0.206	1.984*
$E^{¥/\$}(-(b+d))$	0.179	0.752	0.500	2.764***
Imports				
$E^{B/\$}(e+f)$	-0.289	-1.570	-0.957	-6.739***
$E^{¥/\$}(-f)$	-0.024	-0.628	0.008	0.105

Table 5b-1: Estimation of export and import equations (1981:Q1 to 2000:Q1)

ASEAN5+China+Korea

	Indonesia		Thailand		Singapore	
Home Country (Country A)						
Exports		t value		t value		t value
$E^{A/\$}(a+b)$	0.008	0.073	-0.047	-0.640	0.596	1.207
$E^{B/\$}(c+d)$	-0.798	-1.409	0.130	1.069	-0.268	-1.216
$E^{¥/\$}(-(b+d))$	-0.034	-0.135	0.109	2.719***	0.380	1.999**
Imports						
$E^{A/\$}(e+f)$	-0.082	-1.986*	-0.624	-2.094**	-0.483	-2.452**
$E^{¥/\$}(-f)$	0.043	0.376	0.347	0.904	-0.143	-1.736*
Neighboring Countries (Country B)						
Exports						
$E^{B/\$}(a+b)$	0.252	0.957	-0.016	-3.509***	0.157	0.994
$E^{A/\$}(c+d)$	-0.082	-1.261	-0.970	-3.250***	-0.668	-1.834*
$E^{¥/\$}(-(b+d))$	0.396	3.112***	0.313	1.932**	0.418	2.594**
Imports						
$E^{B/\$}(e+f)$	-0.608	-3.450***	-0.303	-4.198***	-0.281	-3.949***
$E^{¥/\$}(-f)$	-0.053	-0.436	-0.016	-0.288	-0.029	-0.413

Table 5b-2: Estimation of export and import equations (1981:Q1 to 2000:Q1)

ASEAN5+China+Korea

	Malaysia		Philippines	
Home Country (Country A)				
Exports		t value		t value
$E^{A/\$}(a+b)$	-0.850	-2.206**	-0.038	-0.222
$E^{B/\$}(c+d)$	0.617	1.704*	0.186	0.527
$E^{¥/\$}(-(b+d))$	0.331	2.249**	0.001	0.004
Imports				
$E^{A/\$}(e+f)$	-0.356	-1.300	-0.008	-1.382
$E^{¥/\$}(-f)$	0.120	0.615	-0.025	-2.722***
Neighboring Countries (Country B)				
Exports				
$E^{B/\$}(a+b)$	1.069	4.130***	0.099	0.376
$E^{A/\$}(c+d)$	-1.308	-3.843***	-0.222	-1.922*
$E^{¥/\$}(-(b+d))$	0.514	3.823***	0.416	2.545**
Imports				
$E^{B/\$}(e+f)$	-0.432	-4.391***	-0.514	-4.840***
$E^{¥/\$}(-f)$	-0.007	-0.087	-0.018	-0.232

Table 5b-3: Estimation of export and import equations (1981:Q1 to 2000:Q1)

ASEAN5+China+Korea

	Korea		China	
Home Country (Country A)				
Exports		t-value		t-value
$E^{A/\$}(a+b)$	-0.013	-0.768	-0.051	-0.890
$E^{B/\$}(c+d)$	0.002	0.082	0.093	1.086
$E^{¥/\$}(-(b+d))$	0.018	1.333	-0.061	-0.774
Imports				
$E^{A/\$}(e+f)$	-0.307	-6.661***	-0.111	-1.330
$E^{¥/\$}(-f)$	-0.176	-3.215***	-0.124	-1.093
Neighboring Countries (Country B)				
Exports				
$E^{B/\$}(a+b)$	0.705	2.634**	-0.104	-0.527
$E^{A/\$}(c+d)$	-0.616	-2.733***	0.229	2.572**
$E^{¥/\$}(-(b+d))$	0.337	1.963*	0.564	3.364***
Imports				
$E^{B/\$}(e+f)$	-0.300	-4.451***	-0.852	-5.946***
$E^{¥/\$}(-f)$	-0.005	-0.154	0.066	0.610

Table 6a: Stability of equilibrium and coordination failure (1981:Q1 to 1997:Q2)

ASEAN5+China+Korea

	Indonesia	Thailand	Singapore	Malaysia	Philippines	Korea	China
Stability Condition							
Slope of AA	9.792	2.526	-1.078	1.423	-0.208	-71.233	0.069
Slope of BB	-1.096	1.105	-2.117	1.466	0.111	0.368	-0.236
Stable or unstable	stable	stable	unstable	unstable	stable	stable	unstable
Optimal Weight							
w_A^*	1.263	1.764	0.350	-23.920	-1.112	-7.057	0.119
w_B^*	-0.216	2.172	0.752	-35.198	0.558	-1.959	0.808
Fluctuation in trade balance							
$\hat{T}^2_{A\,(w_A=w_A^*,w_b=1)}$	0.0012	0.083	0.0171	672.3859	0.0582	0.00003	0.0005
$\hat{T}^2_{A\,(w_A=w_b=1)}$	0.0116	0.034	0.2507	0.2774	0.2315	1.323	0.0002
Coordination failure	None	Yes	None	Yes	None	None	Yes

Table 6b: Stability of equilibrium and coordination failure (1981:Q1 to 2000:Q1)

ASEAN5+China+Korea

	Indonesia	Thailand	Singapore	Malaysia	Philippines	Korea	China
Stability Condition							
Slope of AA	0.049	-2.382	2.004	0.440	0.064	-72.635	-0.285
Slope of BB	0.192	1.140	3.070	1.739	0.732	1.220	-0.612
Stable or unstable	unstable	stable	unstable	unstable	unstable	stable	unstable
Optimal Weight							
w_A^*	0.762	1.056	0.981	0.089	0.584	0.342	0.395
w_B^*	0.522	1.361	1.403	-0.065	0.331	0.458	0.400
Fluctuation in trade balance							
$\hat{T}^2_{A\,(w_A=w_A^*,w_b=1)}$	0.1454	0.002	0.0117	0.4319	0.0155	0.000001	0.003
$\hat{T}^2_{A\,(w_A=w_b=1)}$	0.1384	0.004	0.0140	0.1683	0.0143	0.010	0.005
Coordination failure	Yes	None	None	Yes	Yes	None	None

Figure **1**

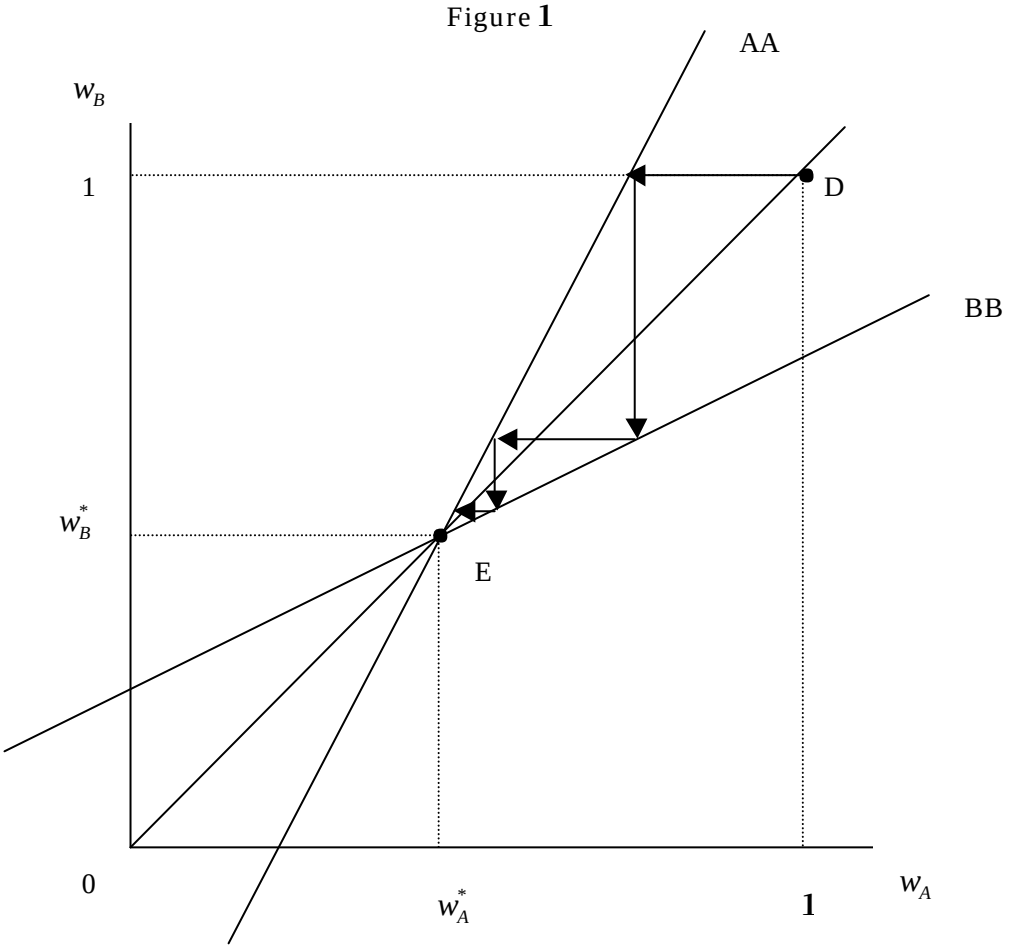

Figure 2