Research Papers and Policy Recommendations

on

Toward Greater Financial Stability in the Asian Region: Measures for Possible Use of Regional Monetary Units for Surveillance and Transaction

Commissioned by ASEAN Secretariat

February 2008

Institute for International Monetary Affairs

Table of Contents

Executive Summary

This study focuses on the definition of RMU for surveillance, the way to utilize RMU in regional surveillance, and how to promote RMU denominated transactions.

(The definition of RMU for surveillance)

RMU and RMU deviation Indicators (DIs) as a monitoring device would be effective in avoiding misalignment and excess volatility of intra-regional exchange rates, thereby contributing to the economic and financial stability and the growth in the region. If and when the RMU is to be used for ASEAN+3 surveillance process, it should consist of the thirteen currencies. However, there is no consensus on what is the best weighting scheme. Here we calculate the weights based on the shares of two variables, GDP, and intra-regional trade. Regarding GDP, GDP measured in PPP-exchange rate and GDP measured in market-exchange rate are applied. In addition, capital market size is included as a third variable for calculating the weights. Thus, four types of RMU are constructed. The best one should most powerfully explain variables such as effective exchange rates, exports, and imports of regional countries. However, statistical analysis finds out that the levels of statistical significance and the estimated coefficients do not differ so much depending on the types of RMUs. Therefore, it would be recommended that we try to reach an agreement on selecting a certain experimental RMU and monitoring that RMU and RMU DIs for ASEAN+3 regional surveillance process.

The choice of benchmark year of RMU DI affects the present degree of deviation. The benchmark year should be selected when exchange rates are close to the equilibrium levels. However, estimated levels of equilibrium exchange rates will differ significantly depending on the estimating approaches. The IIMA propose 2000/2001 as a benchmark year citing the relatively small size in the current account balances in the year.

(Regional surveillance)

In parallel with the IMF surveillance, ERPD, an independent regional surveillance in East Asia, is expected to play an important role. Regional surveillance is expected to do: monitoring contagion, spill-over, or transmission of macro-economic conditions and risks in the region; solving coordination failure of exchange rate policy; or dealing with problems arising from the access limit to the IMF lending. Therefore, monitoring RMU and RMU DIs, in addition to the main economic and financial indicators and those used for early warning system such as the ratio of short-term external debt to foreign reserves, will make regional surveillance more effective. Also, European experience of

regional surveillance could be learned, which shows the importance of the existence of regional institutions and the personal trust among high ranking officials.

(RMU for transaction)

RMUs for transaction, which can be composed of selective convertible currencies, offer instruments for diversification of foreign exchange risk with the weighted average interest rates of their component currencies. They will work as a bridge between savings and investment within the region, leading to further deepening of the regional economic and financial integration.

It is effective to enhance the use of RMUs through expanding network externalities where people use the RMU because others are doing so. Network externalities can be better enhanced with official supports to the use of any RMU, such as in preferential treatment in foreign exchange laws and taxation, issuing RMU-denominated public debt securities, or defining and creating an official RMU in the region.

The increase in the use of RMUs will be supported by facilitating regional economic and financial integration, increasing the number of convertible currencies in the region, and dealing with technical issues on designing RMU-denominated financial instruments. Particularly, facilitating financial integration is an important challenge, as financial integration lags far behind economic integration in this region.

Stable value of the RMUs is also essential for enhancing the use of the RMUs. RMU-denominated transaction should be promoted, if such measures as monitoring the RMU for regional surveillance are taken to stabilize intra-regional exchange rates.

(Roadmap to RMU)

The roadmap to introduce RMUs has two paths. One path is for surveillance, which is different from the one for transaction. These two paths can converge into one, with sufficient economic and financial intra-regional integration in the longer-term.

An RMU for surveillance on exchange rate policy can be started immediately. It is recommended that the authorities would reach an agreement to define a certain kind of RMU for surveillance, announce the RMU value every day, and monitor RMU DIs in ASEAN+3 ERPD. As for enhancing the use of RMUs for transactions, official support would be effective, in addition to exploring the needs of RMUs for transactions in the private sector. In order to steadily take the actions mentioned above, it should be emphasized that establishing a permanent secretariat is indispensable.

CHAPTER 1

EXPLORE THE SPECIFIC MEASURES IN CALCULATING AND UTILIZING RMUs (REGIONAL MONETARY UNITS) FOR SURVEILLANCE AND TRANSACTAIAON

Chapter1 : Explore the specific measures in calculating and utilizing RMUs (Regional Monetary Units) for surveillance

1-1. Calculate RMUs for surveillance

The method of defining the basket weights for the RMU has been a controversial topic. In our last research report, purposes of creating RMUs were discussed and various arrangements of RMUs composed of some different groups of countries in East Asia were proposed. It is important to recognize that both the best composition of currencies and the most desirable basket weights depends on what the purpose of their usage.

In this chapter, the RMUs as a surveillance indicator are focused on. As for the surveillance indicator, RMUs can serve as a useful benchmark in monitoring overvaluation and undervaluation of a regional currency compared with a weighted average of regional currencies. Accordingly, the weights of RMU for surveillance might be most desirable when the RMU adequately represent the collective value of all composite currencies. In the previous research, the basket weights of RMUs for surveillance purpose were calculated based on the shares of GDP and intra-trade volumes. The intra-regional trade volumes were calculated as a sum of exports and imports within the region. Regarding the GDP, both PPP-exchange-rate GDP and market-exchange-rate GDP were applied. There are a large difference between the sizes of PPP-exchange-rate GDP and market-exchange-rate GDP. While PPP-exchange-rate GDP represents the size of the economy taking into account standard of living, in another word real values of consumption and investment, while market-exchange-rate GDP represents the best proxy for the size of economy. In the previous research, both of the PPP-exchange-rate GDP and the market-exchange-rate GDP were applied to create different RMUs. If the data of PPP-exchange-rate GDP were applied to calculate basket weights, the Chinese yuan had the highest share among the ASEAN+3 currencies. To the contrary, the Japanese yen had the highest share if the data of market-exchange-rate GDP were applied.

In addition to them, the size of capital market is considered to be another economic indicator to decide basket weights in response to the previous meeting discussion. There were some suggestions that some sort of economic indicators, which represent each country’s capital market size, should be considered. This time, a new economic indicator “capital market size” is included to calculate basket shares. It is a total volume of local currency bond market (Government, Corporate and Financial Institution) and domestic stock market capitalization. The former data are from BIS and the later are from World Federation of Exchanges. For Brunei, Cambodia, Lao, Myanmar and Vietnam, zero weight is applied since no local capital market data are available at the moment. Appendix 1 shows the size of local capital market in East Asia. It indicates that the size of Japanese capital market is

remarkably larger than other East Asian countries. Accordingly, the Japanese basket share becomes larger if the data of capital market size are included.

Then, four different types of RMUs composed of 13 East Asian currencies are tested as follows:

1. RMU1based on PPP-exchange-rate GDP + Intra-trade Share
2. RMU2 based on Market-exchange-rate GDP + Intra-trade Share
3. RMU3 based on RMU3: PPP-exchange-rate GDP + Intra-trade Share +Capital market size
4. RMU4 based on Market-exchange-rate GDP + Intra-trade Share + Capital market size

(In each case, basket shares are calculated as the arithmetic average of each economic data.[1])

Tables 1 to 4 show the basket shares and weights of RMU1, RMU2, RMU3, and RMU4, respectively. Among them, the basket share of the Chinese yuan is the highest in the case of RMU1 (37.85%). On the other hand, the basket share of the Japanese yen becomes higher if capital market size is included into the basket share. It is the highest in the case of RMU 4 (52.36%). Figure 1 shows the movement of four different types RMUs.[2] Among them, RMU4 looks most volatile since the Japanese yen's movement dominates it. To the contrary, RMU1 looks stable since its basket shares are well balanced.

We calculate RMU deviation indicators (DIs) corresponding to four different RMUs, too. Figures 2 to 5 show the movement of RMU1 DIs, RMU2 DIs, RMU3 DIs and RMU4 DIs, respectively. Comparing each RMU DI's positional relationship, there are not so much differences among four RMUs. However, their ranges of fluctuation are somewhat different. In the case of RMU1, their range of fluctuation is almost within +/- 30 percent. In the case of RMU4, it widens to +/- 35 percent.

1-2. The relationship between NEERs and RMU, RMU Deviation Indicators

At first, the differences of functional role for surveillance between RMUs and nominal effective exchange rates (NEERs) are investigated, from the viewpoint of intra-regional exchange rate stability or avoiding misalignment of the external value of Asian currencies as a whole. Monthly data of NEER are used for this research in order to meet monthly RMU and RMU deviation indicators in nominal term.[3] For the reference, Figure 6 shows the movement of NEER of East Asian countries.[4]

---

[1] We assign latest three years average of these economic data.

[2] The value of RMUs is quoted in terms of a weighted average of the US dollar and the euro because both the United States and EU countries are important trading partners for East Asia. The weighted average of the US dollar and the euro (hereafter, US$-euro) is based on the East Asian countries' trade shares with the United States and the euro area. The weights on the US dollar and the euro are set at 65% and 35%, respectively

[3] Monthly RMUs and RMU Deviation Indicators are calculated as the monthly average of daily-calculated RMUs and RMU Deviation Indicators, respectively.

Following the methodology of Ogawa and Shimizu (2007), which investigated how the movements of AMU and AMU Deviation Indicators could explain the movements of nominal effective exchange rates, the following equation is estimated for each country's NEER.[5]

$$diff\left(\log NEER_{i,k}\right) = \beta_0 + \beta_1 \cdot diff\left(\log RMU_{i,k}\right) + \beta_2 \cdot diff\left(RMU_{i,k} DI\right) \qquad (1)$$

where i represents sample countries and k represents 4 different types of RMUs.
The sample period is from Jan 2000 to Aug 2007.

Table 5 shows the results. It confirms that both RMUs and RMU DIs are significantly related with each NEER in all sampled countries. In all cases, the coefficients of RMU DIs are close to a unity and they are far larger than those of RMUs. It means that watching RMU DIs is very important for monetary authorities in order to monitor their NEER movement. The purpose of this estimation is to compare the difference of explanation power among four RMUs. Although there are some differences in the size of coefficients and adjusted R-squared among four RMUs, the best explained RMU differ with each country. Accordingly it is rather impossible to choose the best RMU. In other word, every RMU DIs can be a useful surveillance indicator from the standpoint of good relationship with NEER.

1-3. The relationship between International Trade and RMU, RMU Deviation Indicators

Second, the differences of functional role for surveillance between international trade and RMU, RMU DIs are investigated. In this section, RMU and RMU DIs are in real terms, not in nominal terms [6]. Figures 7 to 19 show graphic representation of each country's relationship between trade data and four kind of RMU DIs. From these figures, it seems that RMU DIs might have some

---

[4] The data of NEER are from IFS (IMF) for all sampled countries except for Korea, Singapore and Thailand whose data are from BIS.

[5] The data of NEER and RMUs are transposed into the difference of logarithm. The data of AMU Deviation Indicators are transposed into 1st difference since they are quoted in the percent of change.

[6] We calculate an RMU Deviation Indicator in real terms by taking into account inflation rate differentials. Given a Nominal RMU Deviation Indicator, we calculate the Real RMU Deviation Indicator according to the following equation:

$$\begin{aligned} &Rate\ of\ Change\ in\ Real\ AMU\ Deviation\ Indicator_i \\ &\quad = Rate\ of\ Change\ in\ Nominal\ AMU\ Deviation\ Indicator_i - \left(\dot{P}_{AMU} - \dot{P}_i\right) \\ &\text{where } \dot{P}_{AMU} \end{aligned} \qquad (2)$$

= inflation rate in the AMU area, and $\dot{P}_i$ = inflation rate in country i.

We use Consumer Price Index (CPI) data as the price index in calculating the Real RMU Deviation Indicator. Since the CPI data are available only on a monthly basis, we calculate the Real RMU Deviation Indicator monthly. As for the inflation rates in the RMU area, we calculate a weighted average of the CPI for the RMU area using the AMU shares, which is the combination of shares in intra-trades and GDP measured at PPP.

relationship with trade data. Then, we make a statistical analysis to investigate each effect both of RMUs and RMUDIs on exports and imports by using Polynomial Distributed Lag Model (Almon lag). This time, quarterly data of RMUs and RMU DIs are used since other control variables, such as GDP data, are available only in quarterly basis. Almon lag model, with 6 lags, 2nd-degree polynomial and far end constraints, is estimated in the case of imports and exports respectively. Sampled countries include Japan, China, Indonesia, South Korea, Malaysia, the Philippines, Singapore and Thailand.

In the estimation results, each sum of the estimated coefficients on the distributed lag is focused on. It has the interpretation of the long run effect of RMUs and RMU DIs on exports and imports. Since an increase in RMU DI_i implies appreciation of $currency_i$ vis-à-vis RMU, coefficients on RMU DI_i is expected to be positive for $country_i$'s imports while coefficients on RMU DI_i is expected to be negative for its exports.

- Effects on Imports

The following regression equation is estimated for each of the sample countries:

$$\log(WorldIIMPORT_i) = \alpha_0 + \alpha_1 \cdot \log(GDP_i) + \alpha_2 \cdot \log(GDP_i(-1)) + PDL_{(6,2)}(\log(RMU_{i,k}) + PDL_{(6,2)}(RMUDI_{i,k})$$

where i represents a sample country and k represents each of the four different types of RMUs. If k=1, the type of RMU represents currency basket composed of 13 East Asian currencies weighted by PPP-exchange-rate GDP and intra-trade share. If k=2, RMU is weighted by market-exchange-rate GDP and intra-trade share. If k=3, RMU is weighted by. PPP-exchange-rate GDP, intra-trade share and capital market size. If k=4, RMU is weighted by market-exchange-rate GDP, intra-trade share and capital market size. Table1 to Table4 show their weights in detail. $PDL_{(6,2)}$ represent s a Polynomial Distributed Lag Model with 6 lags and 2nd-degree polynomial with end constraints. $WorldIMPORT_i$ is country i's total import from rest of the world. GDP_i is country i's GDP calculated at market rate. Both of the data on imports and GDP are seasonally adjusted.

Signs of coefficients on RMU and RMU DI_i are expected to be positive for $country_i$'s imports. Tables 9 to 16 show the analytical results of effects of RMU and RMU DI_i on imports of each of the sample countries. The tables report not only coefficients on the RMU and the RMU DI_i with each time lag but also a sum of the coefficients on the RMU and the RMU DI_i with time lags at the bottom line. In addition, they report coefficients on the current GDP and the GDP with time lag.

(1) Japan

In the case of Japan, the sums of estimated coefficients on all of the RMU DIs except for RMUDI1 are significant and positive, where the positive sign is consistent with the sign to be expected.. In the long- run, most of the RMU DIs have positive effects on imports. In the short-run, most coefficients of RMU DIs with the second and the third time lags are positive and statistically significant. The results indicate that the RMU DIs themselves can explain imports in Japan both in the long-run and the short-run.

(2) China

In the case of China, the sums of estimated coefficients on RMU1 are positive but statistically insignificant. In the long-run, both the RMUs and the RMU DIs have insignificant effects. In the short-run, all of the coefficients on current RMUs are significant and positive The results indicate that current RMUs can explain Chinese imports in the short-run.

(3) Indonesia

In the case of Indonesia, the sums of estimated coefficients on all of the RMUs and the RMU DIs except for RMUDI2 are significant and positive where the positive sign is consistent with the sign to be expected. In the long-run, all of the RMUs and most of the RMU DIs have significantly positive effects on imports. In the short-run, most coefficients of current and lagged values of RMUs and RMU DIs are significantly positive. The results indicate that RMUs and RMU DIs themselves can explain Indonesian imports very well both in both the long-run and the short-run.

(4) Korea

In the case of Korea, the sums of estimated coefficients on all of the RMUs except for RMU1 are significant and positive, which is consistent with sign to be expected. Moreover, all of the RMU DIs are positive although they are statistically insignificant. In the long-run, these RMUs have significantly positive effects on imports. In the short-run, coefficients on the current and some lagged values of RMUs and RMU DIs are significantly positive. The results indicate that the RMUs and the RMU DIs can explain Korean imports very well both in the long-run and the short-run.

(5) Malaysia

In the case of Malaysia, the sums of estimated coefficients on all of the RMU DIs are positive but statistically insignificant. In the long-run, all of the RMU DIs have positive effects on imports although they are statistically insignificant. In the short-run, all of the coefficients on current and the first lagged RMUs and RMU DIs except for RMU DI1 are significant and positive. The results indicate that the RMUs and the RMU DIs themselves can explain imports in Malaysia very well in the short-run.

(6) Philippines

In the case of the Philippines, the sums of estimated coefficients on most of the RMUs and the RMU DIs are positive but insignificant. In the long-run, most of the RMUs and the RMU DIs have positive effects on imports but statistically insignificant. In the short-run, all of the coefficients on the current value and most of first lagged values of RMUs are significant and positive. The results indicate that the RMUs themselves can explain imports in the Philippines very well in the short-run.

(7) Singapore

In the case of Singapore, the sums of estimated coefficients on all of the RMUs and the RMU DIs except for RMUDI1 are negative, which is opposite in sign to expected. In the short-run, all of the coefficients on the current and lagged RMUs and RMU DIs are insignificant or significantly negative. The results indicate that RMUs and RMU DIs themselves cannot explain imports in Singapore both in the long-run and the short-run.

(8) Thailand

In the case of Thailand, the sums of estimated coefficients on all of the RMUs except for RMU1 are significant and positive. In the long-run, most of the RMUs have significantly positive effects on imports. In the short-run, most coefficients on current and first to second lagged values of RMUs are significant and positive. The results indicate that RMUs themselves can explain imports in Thailand very well both in the long-run and the short-run.

The signs on coefficients on RMU and RMU DI_i are expected to be positive for $country_i$'s imports. Tables 6 to 13 show the analytical results of effects of RMU and RMU DI_i on imports for each of the sample countrires. Table 7 summarizes the analytical results for all of the sample countries. RMU2 and RMU3 are the best measurement for showing effects on imports for the long-run effect while all of the RMU have the same performances for the short-run effect when we compare performances of showing significantly expected positive effects on exports among RMU1, RMU2, RMU3, and RMU4. On one hand, RMU1DI, RMU3DI, and RMU4DI are better than RMU2DI for the long-run effect while RMU2DI, RMU3DI, and RMU4DI are better than RMU1DI for the short-run effect when we compare performances of showing significantly expected negative effects on imports among RMU1DI, RMU2DI, RMU3DI, and RMU4DI. After comparing the performances of RMU and RMUDI for both the long-run and short-run effects on imports, both RMU3 and RMU3DI seem relatively better than other RMUs and RMUDIs.

- Effects on Exports

The following regression equation is estimated for each of the sample countries:

$$\log(WorldEXPORT_i) = \beta_0 + \beta_1 \cdot \log(OECDGDP_{real}) + \beta_2 \cdot \log(OECDGDP_{real}(-1)) + PDL_{(6,2)}(\log(RMU_{i,k})) + PDL_{(6,2)}(RMUDI_{i,k})$$

where i represents a sample country and k represents each of the four different types of RMUs. $PDL_{(6,2)}$ represents a Polynomial Distributed Lag Model with 6 lags and 2nd-degree polynomial with end constraints. $WorldEXPORT_i$ is country i's total export to rest of the world. $OECDGDP_{real}$ is a total real GDP of OECD countries. Both of the data on exports and GDP are seasonally adjusted.

Signs of coefficients on RMU and RMU DI_i are expected to be negative for $country_i$'s export in both the long run and the short run. Tables 17 to 24 show the results of each of the sample countries. The tables report not only coefficients on the RMU and the RMU DI_i with each time lag but also a sum of the coefficients on the RMU and the RMU DI_i with time lags at the bottom line. In addition, they report coefficients on the current GDP and the GDP with time lag.

(1) Japan

In the case of Japan, the sums of estimated coefficients on all of the RMUs are negative but statistically insignificant. In the long-run, all of the RMUs have negative effects on exports but they are statistically insignificant. In the short-run, most coefficients on current and 3rd to 6th lagged values of RMUs and RMU DIs are significant and negative. The results indicate that RMUs and RMU DIs themselves can explain exports in Japan very well especially in the short-run.

(2) China

In the case of China, the sums of estimated coefficients on all of the RMU DIs are significant and negative, which is consistent in sign to be expected. In the long-run, all of the RMU DIs have significantly negative effects on exports. In the short-run, most coefficients on current and 1st to 2nd lagged values of RMU DIs are significant and negative The results indicate that RMU DIs themselves can explain exports in China very well both in the long-run and the short-run.

(3) Indonesia

In the case of Indonesia, the sum of estimated coefficients on RMU DI1 is negative but insignificant. In the long-run, all of the RMUs and the RMU DIs cannot explain exports in Indonesia. Also, in the short-run, all the coefficients on 4th to 6th lagged values of RMU DIs are negative and significantly estimated. The results indicate that RMU DIs themselves can explain exports in Indonesia very well both in the short-run.

(4) Korea

In the case of Korea, the sums of estimated coefficients on all of the RMUs except for RMU4 and the RMU DIs except for RMU DI1 are significant and negative, which is consistent in sign to be

expected. In the long-run, most of the RMUs and the RMU DIs have significantly negative effects on exports in Korea. In the short-run, many coefficients on lagged values of RMUs and RMU DIs are negative and significantly estimated. The results indicate that the RMUs and the RMU DIs themselves can explain exports in Korea very well both in the long-run and the short-run.

(5) Malaysia

In the case of Malaysia, the sums of estimated coefficients on all of the RMUs and the RMU DIs except for RMU DI1 are significant and negative, which is consistent in sign to be expected. In the long-run, all of the RMUs and most of the RMU DIs have significantly negative effects on exports. In the short-run, most coefficients on lagged values of RMUs and RMU DIs are negative and significantly estimated. The results indicate that RMU DIs themselves can explain Malaysian exports very well both in the long-run and the short-run.

(6) Philippines

In the case of the Philippines, the sums of estimated coefficients on all of the RMUs are negative but statistically insignificant. In the long-run, all of the RMUs and the RMU DIs cannot explain exports. In the short-run, some coefficients on current and lagged values of RMU1 and RMU2 are negatively and significantly estimated. The results indicate that RMU1 and RMU2 can explain exports in the Philippines at least in the short-run.

(7) Singapore

In the case of Singapore, the sums of estimated coefficients on all of the RMUs and the RMU DIs are significant and negative, which is consistent in sign to be expected. In the long-run, all of the RMUs and the RMU DIs have significantly negative effects on exports. In the short-run, most coefficients of the current and 1^{st} to 2^{nd} lagged values of RMUs and 2^{nd} to 4^{th} lagged values of RMU DIs are significant and negative. The results indicate that the RMUs and the RMU DIs themselves can explain exports in Singapore very well both in the long-run and the short-run.

(8) Thailand

In the case of Thailand, the sum of estimated coefficients on RMU1 is significant and negative. In the long-run, RMU1 can explain exports. In the short-run, the coefficient on 2^{nd} lagged value of RMU1 is negatively and significantly estimated. The results indicate that at least RMU1 can explain exports in Thailand very well both in the long-run and the short-run.

The signs of coefficients on RMU and RMU DI_i are expected to be negative for $country_i$'s exports. Tables 17 to 24 show the analytical results of effects of RMU and RMU DI_i on exports of each of the sample countrires. Table 8 summarizes the analytical results for all of the sample countries. RMU1 is

the best measurement for showing effects on exports both for the long-run and short-run effects when we compare performances of showing significantly expected negative effects on exports among RMU1, RMU2, RMU3, and RMU4. On one hand, RMU2DI, RMU3DI, and RMU4DI are better than RMU1DI for the long-run effect while RMU2DI and RMU3DI are the best for the short-run effect when we compare performances of showing significantly expected negative effects on exports among RMU1DI, RMU2DI, RMU3DI, and RMU4DI. After comparing the performances of RMU and RMUDI for both the long-run and short-run effects on exports, RMU1 seems relatively better than other RMUs in terms of the effects of RMU on exports while both RMU2DI and RMU3DI seem relatively better than other RMUDIs in terms of the effects of RMUDI on exports.

The findings are summarized as follows: firstly, both RMU3 and RMU3DI seem relatively better than other RMUs and RMUDIs when we compare performances of showing effects of RMUs and RMUDIs on imports. Secondly, performances of showing effects of RMUs and RMUDIs on exports are a little mixture. RMU1 seems relatively better than other RMUs in terms of the effects of RMU on exports while both RMU2DI and RMU3DI seem relatively better than other RMUDIs in terms of the effects of RMUDI on exports. Thirdly, it is possible for us to conclude that a RMU and a RMU DI should consistently explain effects on both imports and exports among East Asian countries. It is partly because trade structure of the East Asian countries has been so complicated due to its expanding production base or production network in the region in recent years, and partly because export competitions in many sectors have increased within Asian countries. These movements seem to make complicate to figure out the effects of exchange rates on exports and imports.

We can point out one more important issue related with the above empirical analysis. Statistical improvements of economic data, which include GDP, are desirable. It is usual that both real exchange rate data and real GDP data are required to conduct the empirical analysis related with effects of RMU and RMU DI on exports and imports. However, not all of ASEAN+3 countries have reliable price data set to convert nominal RMU DIs and nominal GDP into real terms. In the daily surveillance over nominal position of each currency among East Asian currencies, RMU DIs in nominal terms is enough benchmark in monitoring overvaluation or undervaluation of the currency in the region. However, RMU DIs in real terms should be needed for macro economic surveillance in the longer run.

1-4. Conclusion

We find that all types of RMUs combined with RMU DIs have statistically significant and positive relationships with NEERs (nominal effective exchange rates) in all the sampled countries. In addition, they have statistically significant effects on exports in the countries whose basket weights are rather high. These results suggest that it is meaningful to use RMUs and RMU DIs for regional

surveillance. We also find that levels of statistical significance and the estimated coefficients do not differ so much depending on the types of RMUs. This implies that the four RMU candidates are indifferent in terms of their effects on NEERs, exports, and imports and that trying to find other desirable ways of calculating the weights in RMUs could be an ongoing discussion.

Other aspects of basket weights also should be discussed. For example, although there are crucial difference between the basket shares calculated by PPP-exchange-rate GDP and those by market-exchange-rate GDP, there is not much difference between RMU1 and RMU2 from their explanation power of NEERs or trade data. However, from the standpoint of basket weight revision, using PPP-exchange-rate GDP will be better than using market-exchange-rate GDP in the long run. It is because the fluctuations of market-exchange-rate GDP caused by fluctuations of market exchange rates are basically larger than those of PPP-exchange-rate GDP, so the basket shares will be changed a lot at every revision time if market-exchange-rate GDP is used as a basket share.

Regarding RMU Deviation indicators (RMU DIs), they show the deviation of the value of regional currencies against the RMU from their values in a benchmark period, which are useful as indicators for gauging the development of intra-regional value of these currencies. The value of RMU DIs depends on the benchmark year as shown in Appendix3. There seems to be tendency that the more flexible the exchange rate system is, the more easily the value changes depending the selection of benchmark year. Furthermore, although the benchmark year should be selected when exchange rates are close to the equilibrium levels, estimated levels of equilibrium exchange rates will differ significantly depending on the estimating approaches, data availability, definition and measurement, estimation and filtering techniques. Even after considering such drawbacks of RMU DIs, monitoring RMU DIs should play an important role in regional surveillance.

It is meaningful to continue studying the most desirable way to calculate RMUs. However, it would be rather important to try to reach an agreement on selecting a certain kind of RMU and using the RMU and the RMU DIs for regional surveillance in ASEAN+3 ERPD, in an attempt to facilitate the intra-regional exchange rate stability without giving rise to the misalignments of exchange rates.

References

Ogawa, Eiji and Junko Shimizu (2006), "AMU Deviation Indicator for Coordinated Exchange Rate Policies in East Asia and its Relation with Effective Exchange Rates," *The World Economy*, issue 29:12, p1691-1708.

Tables and Charts

Table 1.

RMU 1's Basket Shares and Weights of East Asian Currencies

(Benchmark year=2000/2001)

	Intra-Trade share* %	GDP measured at PPP** %	Arithmetic average shares % (a)	Benchmark exchange rate*** (b)	AMU weights (a)/(b)
Brunei	0.33	0.33	0.33	0.589114	0.0056
Cambodia	0.19	0.23	0.21	0.000270	7.6219
China	23.99	51.70	37.85	0.125109	3.0251
Indonesia	6.47	5.31	5.89	0.000113	522.9228
Japan	24.79	25.28	25.04	0.009065	27.6235
South Korea	13.01	6.66	9.83	0.000859	114.4362
Laos	0.08	0.08	0.08	0.000136	5.7474
Malaysia	8.10	1.72	4.91	0.272534	0.1801
Myanmar	0.32	0.32	0.32	0.159215	0.0202
Philippines	2.66	2.56	2.61	0.021903	1.1926
Singapore	11.71	0.81	6.26	0.589160	0.1063
Thailand	6.36	3.46	4.91	0.024543	2.0005
Vietnam	1.98	1.55	1.76	0.000072	246.5203

Calculated by authors.

* : Intra-Trade share is calculated as the average of total export and import volumes in 2003, 2004 and 2005 taken from DOTS (IMF).

**: GDP measured at PPP is the average of GDP measured at PPP in 2003, 2004 and 2005 taken from the World Development Report, World Bank. For Brunei and Myanmar, we again use the same share of trade volume since no GDP data are available for these countries.

*** : The Benchmark exchange rate ($-euro/Currency) is the average of the daily exchange rate in terms of US$-euro in 2000 and 2001.

Table 2.

RMU 2's Basket Shares and Weights of East Asian Currencies

(Benchmark year=2000/2001)

	Intra-Trade share* %	Nominal GDP ** %	Arithmetic average shares % (a)	Benchmark exchange rate*** (b)	AMU weights (a)/(b)
Brunei	0.33	0.07	0.20	0.589114	0.0034
Cambodia	0.19	0.06	0.12	0.000270	4.6059
China	23.99	24.43	24.21	0.125109	1.9351
Indonesia	6.47	3.25	4.86	0.000113	431.4425
Japan	24.79	56.78	40.78	0.009065	44.9939
South Korea	13.01	8.78	10.89	0.000859	126.7796
Laos	0.08	0.03	0.05	0.000136	4.0133
Malaysia	8.10	1.49	4.79	0.272534	0.1759
Myanmar	0.32	0.09	0.21	0.159215	0.0129
Philippines	2.66	1.11	1.89	0.021903	0.8610
Singapore	11.71	1.34	6.53	0.589160	0.1108
Thailand	6.36	2.00	4.18	0.024543	1.7038
Vietnam	1.98	0.57	1.28	0.000072	178.3679

Calculated by authors.

* : Intra-Trade share is calculated as the average of total export and import volumes in 2003, 2004 and 2005 taken from DOTS (IMF).

**: Nominal GDP is the average of Nominal GDP in 2003, 2004 and 2005 taken from IFS (IMF).

*** : The Benchmark exchange rate ($-euro/Currency) is the average of the daily exchange rate in terms of US$-euro in 2000 and 2001.

Table 3.

RMU 3's Basket Shares and Weights of East Asian Currencies

(Benchmark year=2000/2001)

	Intra-Trade share* %	GDP measured at PPP** %	Size of Capital Market***, %	Arithmetic average shares % (a)	Benchmark exchange rate**** (b)	AMU weights (a)/(b)
Brunei	0.33	0.33	0.00	0.22	0.589114	0.0037
Cambodia	0.19	0.23	0.00	0.14	0.000270	5.0813
China	23.99	51.70	9.06	28.25	0.125109	2.2582
Indonesia	6.47	5.31	0.93	4.24	0.000113	376.2514
Japan	24.79	25.28	75.51	41.86	0.009065	46.1845
South Korea	13.01	6.66	8.77	9.48	0.000859	110.3034
Laos	0.08	0.08	0.00	0.05	0.000136	3.8316
Malaysia	8.10	1.72	1.89	3.90	0.272534	0.1431
Myanmar	0.32	0.32	0.00	0.21	0.159215	0.0135
Philippines	2.66	2.56	0.50	1.91	0.021903	0.8707
Singapore	11.71	0.81	2.11	4.88	0.589160	0.0828
Thailand	6.36	3.46	1.23	3.68	0.024543	1.5010
Vietnam	1.98	1.55	0.00	1.18	0.000072	164.3469

Calculated by authors.

* : Intra-Trade share is calculated as the average of total export and import volumes in 2003, 2004 and 2005 taken from DOTS (IMF).

**: GDP measured at PPP is the average of GDP measured at PPP in 2003, 2004 and 2005 taken from the World Development Report, World Bank. For Brunei and Myanmar, we again use the same share of trade volume since no GDP data are available for these countries.

*** : Size of Capital Market is calculated as the average of total volume of local currency bond market (Government, Corporate and Financial Institution) and domestic market capitalization in end of Dec 2004, 2005 and 2006. The former data are from BIS and the later are from World Federation of Exchanges. For Brunei, Cambodia, Lao, Myanmar and Vietnam, we assign zero share since no capital market data are available.

**** : The Benchmark exchange rate ($-euro/Currency) is the average of the daily exchange rate in terms of US$-euro in 2000 and 2001.

Table 4.

RMU 4's Basket Shares and Weights of East Asian Currencies

(Benchmark year=2000/2001)

	Intra-Trade share* %	Nominal GDP ** %	Size of Capital Market***, %	Arithmetic average shares % (a)	Benchmark exchange rate*** (b)	AMU weights (a)/(b)
Brunei	0.33	0.07	0.00	0.13	0.589114	0.0023
Cambodia	0.19	0.06	0.00	0.08	0.000270	3.0706
China	23.99	24.43	9.06	19.16	0.125109	1.5315
Indonesia	6.47	3.25	0.93	3.55	0.000113	315.2645
Japan	24.79	56.78	75.51	52.36	0.009065	57.7647
South Korea	13.01	8.78	8.77	10.19	0.000859	118.5323
Laos	0.08	0.03	0.00	0.04	0.000136	2.6755
Malaysia	8.10	1.49	1.89	3.82	0.272534	0.1403
Myanmar	0.32	0.09	0.00	0.14	0.159215	0.0086
Philippines	2.66	1.11	0.50	1.42	0.021903	0.6496
Singapore	11.71	1.34	2.11	5.05	0.589160	0.0858
Thailand	6.36	2.00	1.23	3.20	0.024543	1.3032
Vietnam	1.98	0.57	0.00	0.85	0.000072	118.9119

Calculated by authors.

* : Intra-Trade share is calculated as the average of total export and import volumes in 2003, 2004 and 2005 taken from DOTS (IMF).

**: Nominal GDP is the average of Nominal GDP in 2003, 2004 and 2005 taken from IFS (IMF).

*** : Size of Capital Market is calculated as the average of total volume of local currency bond market (Government, Corporate and Financial Institution) and domestic market capitalization in end of Dec 2004, 2005 and 2006. The former data are from BIS and the later are from World Federation of Exchanges. For Brunei, Cambodia, Lao, Myanmar and Vietnam, we assign zero share since no capital market data are available.

**** : The Benchmark exchange rate ($-euro/Currency) is the average of the daily exchange rate in terms of US$-euro in 2000 and 2001.

Table 5. The Relationship between NEERs and RMU, RMU Deviation Indicators

	RMU1			RMU2			RMU3			RMU4		
	Cofficient		Std.Dev.	Cofficient		Std.Dev.	Cofficient		Std.Dev.	Cofficient		Std.Dev.
China												
Intercept	0.0251		(0.1049)	-0.0088		(0.0640)	0.0177		(0.0573)	0.0113		(0.0570)
DLOG(RMUi)*100	0.2602	**	(0.1026)	0.2835	***	(0.0716)	0.4660	***	(0.0770)	0.5161	***	(0.0706)
D(RMUDI China)	1.1007	***	(0.0750)	1.0084	***	(0.0487)	1.0612	***	(0.0451)	1.0366	***	(0.0443)
AR(1)				-0.5119	***	(0.0950)	-0.5307	***	(0.0935)	-0.5324	***	(0.0933)
Adj. R2	0.7158			0.7665			0.8108			0.8127		
Indonesia												
Intercept	-0.1114		(0.0918)	-0.1156		(0.0860)	-0.1338		(0.1183)	-0.1389		(0.1302)
DLOG(RMUi)*100	0.0791		(0.0477)	0.0692	*	(0.0408)	0.3449	***	(0.0367)	0.4198	***	(0.0315)
D(RMUDI Indonesia)	0.7973	***	(0.0558)	0.7460	***	(0.0546)	0.8734	***	(0.0411)	0.8766	***	(0.0379)
AR(1)	0.4193	***	(0.1031)	0.3536	***	(0.1075)	0.6611	***	(0.0857)	0.7080	***	(0.0812)
Adj. R2	0.7697			0.7499			0.8695			0.8826		
Japan												
Intercept	-0.0267		(0.0420)	-0.0328		(0.0515)	-0.0227		(0.0282)	-0.0216		(0.0310)
DLOG(RMUi)*100	0.2123	***	(0.0429)	0.1285	***	(0.0340)	0.4738	***	(0.0397)	0.4861	***	(0.0406)
D(RMUDI Japan)	0.9887	***	(0.0491)	0.7243	***	(0.0402)	0.9928	***	(0.0354)	0.9191	***	(0.0358)
AR(1)				0.1630		(0.1219)	-0.0571		(0.1602)	0.0360		(0.1562)
Adj. R2	0.8242			0.8122			0.9116			0.9109		
South Korea												
Intercept	-0.0147		(0.0683)	-0.0412		(0.0721)	-0.0029		(0.0483)	-0.0062		(0.0460)
DLOG(RMUi)*100	0.1629	**	(0.0692)	0.1852	***	(0.0574)	0.5360	***	(0.0480)	0.5899	***	(0.0393)
D(RMUDI South Korea)	1.0417	***	(0.0228)	1.0214	***	(0.0236)	1.0263	***	(0.0153)	1.0209	***	(0.0144)
AR(1)				0.0000	***	(0.0000)	0.0000	***	(0.0000)	0.0000	***	(0.0000)
Adj. R2	0.9632			0.9589			0.9817			0.9834		
Malaysia												
Intercept	-0.0391		(0.0443)	-0.0673		(0.0565)	-0.0110		(0.0247)	-0.0072		(0.0242)
DLOG(RMUi)*100	0.2202	***	(0.0449)	0.2182	***	(0.0442)	0.5474	***	(0.0250)	0.6130	***	(0.0203)
D(RMUDI Malaysia)	1.0484	***	(0.0348)	1.0604	***	(0.0453)	0.9648	***	(0.0196)	0.9487	***	(0.0184)
AR(1)												
Adj. R2	0.9280			0.8841			0.9781			0.9788		
Philippines												
Intercept	-0.0381		(0.0581)	-0.0246		(0.0624)	-0.0143		(0.0307)	-0.0071		(0.0301)
DLOG(RMUi)*100	0.1519	***	(0.0575)	0.1126	**	(0.0497)	0.6431	***	(0.0400)	0.6621	***	(0.0368)
D(RMUDI Philippines)	1.2560	***	(0.0429)	1.6068	***	(0.0611)	1.2403	***	(0.0383)	1.3685	***	(0.0514)
AR(1)												
Adj. R2	0.9117			0.8979			0.9753			0.9763		
Singapore												
Intercept	-0.0290		(0.0520)	-0.0388		(0.0516)	-0.0253		(0.0357)	-0.0252		(0.0355)
DLOG(RMUi)*100	0.2803	***	(0.0530)	0.1896	***	(0.0429)	0.5817	***	(0.0505)	0.5862	***	(0.0499)
D(RMUDI Singapore)	1.1799	***	(0.0615)	0.8993	***	(0.0468)	1.2098	***	(0.0441)	1.1147	***	(0.0429)
AR(1)												
Adj. R2	0.8100			0.8124			0.9108			0.9117		
Thailand												
Intercept	-0.0095		(0.0384)	-0.0046		(0.0460)	-0.0060		(0.0215)	-0.0019		(0.0227)
DLOG(RMUi)*100	0.1696	***	(0.0385)	0.1402	***	(0.0374)	0.4812	***	(0.0259)	0.5290	***	(0.0268)
D(RMUDI Thailand)	0.8774	***	(0.0624)	0.6589	***	(0.0618)	0.9427	***	(0.0330)	0.8984	***	(0.0333)
AR(1)												
Adj. R2	0.6972			0.5658			0.9052			0.8943		

1. 4types RMU and RMUDI are calculated by authors. The data of NEERs(Nominal Effective Exchange Rates) of China, Indonesia, Japan, Malaysia, Philippine are from IFS(IMF), and South Korea, Singapore and Thailand from BIS.

2. * , ** and *** show significance levels of 1%, 5% and 10%, respectively.

Table 6. Long-term Relationship among Real RMU, Real RMUDI, and Imports / Exports

		RMU1			RMU2			RMU3			RMU4		
		Coefficient		Std.Dev.	Coefficient		Std.Dev.	Coefficient		Std.Dev.	Coefficient		Std.Dev.
China													
Imports	LOG(RMU)	0.1715		(0.6836)	-0.5754		(0.5593)	-0.5439		(0.6191)	-0.6429		(0.5547)
	RMUDI	-0.0233	***	(0.0078)	-0.0079	**	(0.0034)	-0.0072	*	(0.0037)	-0.0051		(0.0032)
	Adj. R2	0.9843			0.9849			0.9836			0.9847		
Exports	LOG(RMU)	-0.0200		(0.4929)	0.0517		(0.5168)	0.0550		(0.5495)	0.0623		(0.5504)
	RMUDI	-0.0147	**	(0.0054)	-0.0084	***	(0.0023)	-0.0082	***	(0.0025)	-0.0063	***	(0.0022)
	Adj. R2	0.9930			0.9927			0.9928			0.9926		
Indonesia													
Imports	LOG(RMU)	7.2536	***	(1.5018)	9.9301	***	(1.7847)	11.2414	***	(1.9119)	12.9683	***	(2.1715)
	RMUDI	0.0079		(0.0046)	0.0069		(0.0047)	0.0089	*	(0.0046)	0.0133	**	(0.0052)
	Adj. R2	0.9778						0.9807			0.9809		
Exports	LOG(RMU)	1.0824		(0.9583)	2.0840	*	(1.1119)	2.1833	*	(1.2091)	2.9459	**	(1.2569)
	RMUDI	-0.0010		(0.0027)	0.0010		(0.0027)	0.0009		(0.0027)	0.0028		(0.0029)
	Adj. R2	0.9829			0.9850			0.9848			0.9865		
Japan													
Imports	LOG(RMU)	-1.5493	**	(0.6341)	-1.4143	**	(0.6480)	-1.4954	**	(0.6826)	-1.3286	*	(0.6978)
	RMUDI	0.0017		(0.0024)	0.0061	*	(0.0031)	0.0060	*	(0.0031)	0.0100	**	(0.0047)
	Adj. R2	0.9819			0.9812			0.9817			0.9814		
Exports	LOG(RMU)	-0.2601		(0.4389)	-0.2108		(0.4145)	-0.2051		(0.4686)	-0.1911		(0.4623)
	RMUDI	0.0038	***	(0.0013)	0.0059	***	(0.0015)	0.0059	***	(0.0017)	0.0078	***	(0.0027)
	Adj. R2	0.9935			0.9937			0.9929			0.9929		
South Korea													
Imports	LOG(RMU)	-2.2505	***	(0.6561)	1.4333	*	(0.8012)	1.5419	*	(0.8069)	2.6268	***	(0.6458)
	RMUDI	0.0245	***	(0.0058)	0.0029		(0.0094)	0.0073		(0.0091)	0.0028		(0.0052)
	Adj. R2	0.9900			0.9823			0.9834			0.9891		
Exports	LOG(RMU)	-2.5176	***	(0.4452)	-1.2918	***	(0.4207)	-1.1940	**	(0.4574)	-0.6998		(0.5005)
	RMUDI	0.0006		(0.0060)	-0.0111	***	(0.0032)	-0.0103	***	(0.0033)	-0.0097	***	(0.0029)
	Adj. R2	0.9966			0.9955			0.9957			0.9960		
Malaysia													
Imports	LOG(RMU)	-0.1740		(0.8820)	-0.7147		(0.8275)	-0.3223		(0.9207)	-0.5892		(0.8886)
	RMUDI	0.0034		(0.0042)	0.0008		(0.0025)	0.0019		(0.0027)	0.0006		(0.0030)
	Adj. R2	0.9868			0.9889			0.9868			0.9880		
Exports	LOG(RMU)	-1.9208	***	(0.5725)	-2.1548	***	(0.5506)	-1.9757	***	(0.6014)	-2.0657	***	(0.5900)
	RMUDI	0.0000		(0.0025)	-0.0058	***	(0.0014)	-0.0055	***	(0.0016)	-0.0081	***	(0.0018)
	Adj. R2	0.9957			0.9960			0.9954			0.9955		
Philippines													
Imports	LOG(RMU)	-1.0254		(1.0678)	0.3895		(0.9549)	0.4224		(1.0341)	0.7094		(1.0223)
	RMUDI	0.0061		(0.0052)	0.0054		(0.0037)	0.0055		(0.0039)	0.0064		(0.0042)
	Adj. R2	0.9182			0.9254			0.9211			0.9201		
Exports	LOG(RMU)	-1.0063		(1.3105)	-0.2650		(1.1414)	-0.2896		(1.2253)	-0.2801		(1.1865)
	RMUDI	0.0136	**	(0.0056)	0.0102	***	(0.0032)	0.0103	***	(0.0034)	0.0089	**	(0.0036)
	Adj. R2	0.8939			0.8978			0.8946			0.8948		
Singapore													
Imports	LOG(RMU)	-1.7837	***	(0.5196)	-3.0663	***	(0.7196)	-2.9734	***	(0.7004)	-2.9616	***	(0.8895)
	RMUDI	-0.0333		(0.0242)	-0.0275	***	(0.0083)	-0.0281	***	(0.0088)	-0.0283	***	(0.0087)
	Adj. R2	0.9931			0.9898			0.9896			0.9876		
Exports	LOG(RMU)	-2.1270	***	(0.5424)	-3.6387	***	(0.8576)	-3.4820	***	(0.8484)	-3.3837	***	(0.9443)
	RMUDI	-0.0358	*	(0.0172)	-0.0271	***	(0.0058)	-0.0276	***	(0.0061)	-0.0283	***	(0.0061)
	Adj. R2	0.9928			0.9930			0.9928			0.9923		
Thailand													
Imports	LOG(RMU)	1.6630	**	(0.7911)	3.3263	***	(0.8192)	3.5764	***	(0.8760)	3.0401	***	(0.8827)
	RMUDI	-0.0124		(0.0124)	-0.0175	**	(0.0066)	-0.0161	**	(0.0067)	-0.0113	*	(0.0058)
	Adj. R2	0.9748			0.9818			0.9815			0.9806		
Exports	LOG(RMU)	-0.8987	**	(0.3783)	-0.4370		(0.5535)	-0.4994		(0.5887)	-0.2304		(0.5633)
	RMUDI	0.0049		(0.0073)	0.0044		(0.0049)	0.0044		(0.0050)	0.0031		(0.0043)
	Adj. R2	0.9915			0.9915			0.9915			0.9916		

1. 4types RMU and RMUDI are calculated by authors. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
2. * , ** and *** show significance levels of 1%, 5% and 10% respectively.
3. Intercept, log of real GDP of each country (only for import cases) and log of real GDP of OECD countries (only for export cases) are included a variables but not reported.
4. Reported numbers are sum of coefficients on current and lagged value of RMU and RMUDI and standard deviations in parentheses.

Table 7. Relationship among Real RMU, Real RMUDI, and Imports

Long-term	**RMU1**		**RMU2**		**RMU3**		**RMU4**	
	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI
Japan	×	△	×	○	×	○	×	○
China	△	×	×	×	×	×	×	×
Indonesia	○	○	○	△	○	○	○	○
South Korea	×	○	○	△	○	△	○	△
Malaysia	×	△	×	△	×	△	×	△
Philippines	×	△	△	△	△	△	×	△
Singapore	×	×	×	×	×	×	×	×
Thailand	△	×	○	×	○	×	○	×

Short-term	**RMU1**		**RMU2**		**RMU3**		**RMU4**	
	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI
Japan	none	none	none	2-3	none	2-3	none	2-5
China	0-1	none	0	none	0	none	0	none
Indonesia	0-2	2-3	0-3	0-1	0-3	0-2	0-3	0-2
South Korea	0-1	1-6	2	none	1-2	none	0-2	none
Malaysia	0-1	none	0-1	0-1	0-1	0-1	0-1	0-1
Philippines	0	none	0-1	none	0-1	none	0-1	none
Singapore	none	none	none	none	none	none	none	none
Thailand	1-2	none	0-2	none	0-2	none	0-3	none

1. 4types RMU and RMUDI are calculated by authors.
2. ○, △ and × in upper table indicates that estimated coefficient is positive and statistically significant at 10% level (○), positive but statistically insignificant (△) and negative (×).
3. Lower table shows lags that are positively estimated and statistically significant at 10% level.

Table 8. Relationship among Real RMU, Real RMUDI, and Exports

Long-term	**RMU1**		**RMU2**		**RMU3**		**RMU4**	
	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI
Japan	△	×	△	×	△	×	△	×
China	△	○	×	○	×	○	△	○
Indonesia	×	△	×	×	×	×	×	×
South Korea	○	×	○	○	○	○	△	○
Malaysia	○	×	○	○	○	○	○	○
Philippines	△	×	△	×	△	×	△	×
Singapore	○	○	○	○	○	○	○	○
Thailand	○	×	△	×	△	×	△	×

Short-term	**RMU1**		**RMU2**		**RMU3**		**RMU4**	
	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI	RMU	RMUDI
Japan	3-6	3-6	3-6	5-6	3-6	5-6	3-6	none
China	none	0-3	none	0-2	none	0-2	none	0-2
Indonesia	none	4-6	none	4-6	none	4-6	none	4-6
South Korea	2-6	none	2-5	0-4	2-5	0-3	3-6	0-3
Malaysia	2-6	3-6	2-6	2-6	2-6	2-6	2-6	2-6
Philippines	3-6	none	4-5	none	none	none	none	none
Singapore	0-2	2-4	0-3	2-5	0-2	2-3	0-2	2
Thailand	2	none	none	none	none	none	none	none

1. 4types RMU and RMUDI are calculated by authors.
2. ○, △ and × in upper table indicates that estimated coefficient is negative and statistically significant at 10% level (○), negative but statistically insignificant (△) and positive (×).
3. Lower table shows lags that are negatively estimated and statistically significant at 10% level.

Table 9. Relationship among Real RMU, Real RMUDI, and Imports in Japan

Japan

RMU1

Variable	Coefficient		P-value
C	-15.1513	***	(0.0002)
LOG(GDP_JAPAN)	1.3613		(0.3570)
LOG(GDP_JAPAN(-1))	4.3673	***	(0.0025)
Adjusted R-squared	0.9819		
Durbin-Watson stat	1.4703		
Akaike info criterion	-3.9541		
F-statistic	199.9932		

Lag Distribution of LOG(RMU1)

Lag	Coefficient	P-value
0	-0.4577	(0.4301)
1	-0.3622	(0.2160)
2	-0.2767	(0.0240)
3	-0.2012	(0.1991)
4	-0.1358	(0.5292)
5	-0.0805	(0.7077)
6	-0.0352	(0.8061)
Sum of Lags	-1.5493	(0.0240)

Lag Distribution of RMUDI1_JAPAN

Lag	Coefficient	P-value
0	-0.0015	(0.3714)
1	-0.0005	(0.5823)
2	0.0003	(0.4693)
3	0.0008	(0.1808)
4	0.0010	(0.1812)
5	0.0010	(0.1903)
6	0.0006	(0.1974)
Sum of Lags	0.0017	(0.4693)

RMU2

Variable	Coefficient		P-value
C	-15.1521	***	(0.0001)
LOG(GDP_JAPAN)	1.2809		(0.3874)
LOG(GDP_JAPAN(-1))	4.4533	***	(0.0026)
Adjusted R-squared	0.9812		
Durbin-Watson stat	1.4327		
Akaike info criterion	-3.9152		
F-statistic	192.2657		

Lag Distribution of LOG(RMU2)

Lag	Coefficient	P-value
0	-0.2046	(0.7005)
1	-0.2392	(0.3857)
2	-0.2525	(0.0412)
3	-0.2446	(0.0869)
4	-0.2154	(0.2624)
5	-0.1649	(0.3874)
6	-0.0931	(0.4653)
Sum of Lags	-1.4143	(0.0412)

Lag Distribution of RMUDI2_JAPAN

Lag	Coefficient	P-value
0	-0.0012	(0.5904)
1	0.0002	(0.8761)
2	0.0011	(0.0608)
3	0.0016	(0.0761)
4	0.0018	(0.1167)
5	0.0016	(0.1437)
6	0.0010	(0.1617)
Sum of Lags	0.0061	(0.0608)

RMU3

Variable	Coefficient		P-value
C	-14.7893	***	(0.0001)
LOG(GDP_JAPAN)	1.2216		(0.4082)
LOG(GDP_JAPAN(-1))	4.4339	***	(0.0024)
Adjusted R-squared	0.9817		
Durbin-Watson stat	1.4666		
Akaike info criterion	-3.9412		
F-statistic	197.4051		

Lag Distribution of LOG(RMU3)

Lag	Coefficient	P-value
0	-0.2382	(0.7026)
1	-0.2623	(0.4132)
2	-0.2670	(0.0405)
3	-0.2524	(0.0946)
4	-0.2184	(0.3075)
5	-0.1649	(0.4451)
6	-0.0922	(0.5264)
Sum of Lags	-1.4954	(0.0405)

Lag Distribution of RMUDI3_JAPAN

Lag	Coefficient	P-value
0	-0.0012	(0.5746)
1	0.0001	(0.9055)
2	0.0011	(0.0681)
3	0.0016	(0.0673)
4	0.0018	(0.1039)
5	0.0016	(0.1295)
6	0.0010	(0.1469)
Sum of Lags	0.0060	(0.0681)

RMU4

Variable	Coefficient		P-value
C	-14.9851	***	(5.79E-05)
LOG(GDP_JAPAN)	1.1803		(0.423584019)
LOG(GDP_JAPAN(-1))	4.5224	***	(0.002219892)
Adjusted R-squared	0.9814		
Durbin-Watson stat	1.4423		
Akaike info criterion	-3.9281		
F-statistic	194.7978		

Lag Distribution of LOG(RMU4)

Lag	Coefficient	P-value
0	-0.0484	(0.9359)
1	-0.1631	(0.6050)
2	-0.2373	(0.0714)
3	-0.2709	(0.0489)
4	-0.2640	(0.1764)
5	-0.2165	(0.2753)
6	-0.1285	(0.3384)
Sum of Lags	-1.3286	(0.0714)

Lag Distribution of RMUDI4_JAPAN

Lag	Coefficient	P-value
0	-0.0019	(0.5715)
1	0.0003	(0.8701)
2	0.0018	(0.0467)
3	0.0027	(0.0409)
4	0.0030	(0.0716)
5	0.0026	(0.0950)
6	0.0016	(0.1116)
Sum of Lags	0.0100	(0.0467)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 10. Relationship among Real RMU, Real RMUDI, and Imports in China

China

RMU1

Variable	Coefficient		P-value
C	10.4729	***	(0.0000)
LOG(GDP_CHINA)	0.1443		(0.2924)
LOG(GDP_CHINA(-1)	0.2863	**	(0.0427)
Adjusted R-squared	0.9843		
Durbin-Watson stat	1.3449		
Akaike info criterion	-4.2976		
F-statistic	231.1079		

Lag Distribution of LOG(RMU1)

Lag	Coefficient	P-value
0	1.1522	(0.0211)
1	0.5122	(0.0540)
2	0.0306	(0.8044)
3	-0.2925	(0.0241)
4	-0.4571	(0.0077)
5	-0.4632	(0.0066)
6	-0.3108	(0.0065)
Sum of Lags	0.1715	(0.8044)

Lag Distribution of RMUDI1_CHINA

Lag	Coefficient	P-value
0	-0.0081	(0.0378)
1	-0.0060	(0.0179)
2	-0.0042	(0.0070)
3	-0.0027	(0.0095)
4	-0.0015	(0.0919)
5	-0.0007	(0.3964)
6	-0.0002	(0.7333)
Sum of Lags	-0.0233	(0.0070)

RMU2

Variable	Coefficient		P-value
C	10.3405	***	(0.0000)
LOG(GDP_CHINA)	0.1681		(0.2092)
LOG(GDP_CHINA(-1	0.3384	**	(0.0193)
Adjusted R-squared	0.9849		
Durbin-Watson stat	1.4851		
Akaike info criterion	-4.3376		
F-statistic	240.6617		

Lag Distribution of LOG(RMU2)

Lag	Coefficient	P-value
0	0.9767	(0.0218)
1	0.3569	(0.1001)
2	-0.1027	(0.3159)
3	-0.4024	(0.0017)
4	-0.5419	(0.0012)
5	-0.5213	(0.0015)
6	-0.3407	(0.0017)
Sum of Lags	-0.5754	(0.3159)

Lag Distribution of RMUDI2_CHINA

Lag	Coefficient	P-value
0	0.0000	(0.9943)
1	-0.0009	(0.5038)
2	-0.0014	(0.0306)
3	-0.0017	(0.0126)
4	-0.0017	(0.0474)
5	-0.0014	(0.0905)
6	-0.0008	(0.1265)
Sum of Lags	-0.0079	(0.0306)

RMU3

Variable	Coefficient		P-value
C	10.3499	***	(0.0000)
LOG(GDP_CHINA)	0.1723		(0.2179)
LOG(GDP_CHINA(-1)	0.3327	**	(0.0258)
Adjusted R-squared	0.9836		
Durbin-Watson stat	1.4444		
Akaike info criterion	-4.2557		
F-statistic	221.5101		

Lag Distribution of LOG(RMU3)

Lag	Coefficient	P-value
0	1.0550	(0.0370)
1	0.3939	(0.1253)
2	-0.0971	(0.3901)
3	-0.4180	(0.0031)
4	-0.5687	(0.0028)
5	-0.5493	(0.0036)
6	-0.3597	(0.0042)
Sum of Lags	-0.5439	(0.3901)

Lag Distribution of RMUDI3_CHINA

Lag	Coefficient	P-value
0	0.0003	(0.9128)
1	-0.0006	(0.6482)
2	-0.0013	(0.0681)
3	-0.0016	(0.0249)
4	-0.0017	(0.0716)
5	-0.0014	(0.1210)
6	-0.0009	(0.1588)
Sum of Lags	-0.0072	(0.0681)

RMU4

Variable	Coefficient		P-value
C	10.3392	***	(0.0000)
LOG(GDP_CHINA)	0.1730		(0.2022)
LOG(GDP_CHINA(-1	0.3362	**	(0.0226)
Adjusted R-squared	0.9847		
Durbin-Watson stat	1.5770		
Akaike info criterion	-4.3225		
F-statistic	237.0111		

Lag Distribution of LOG(RMU4)

Lag	Coefficient	P-value
0	1.0436	(0.0268)
1	0.3784	(0.1097)
2	-0.1148	(0.2601)
3	-0.4359	(0.0011)
4	-0.5850	(0.0012)
5	-0.5620	(0.0017)
6	-0.3670	(0.0021)
Sum of Lags	-0.6429	(0.2601)

Lag Distribution of RMUDI4_CHINA

Lag	Coefficient	P-value
0	0.0025	(0.2961)
1	0.0005	(0.6623)
2	-0.0009	(0.1307)
3	-0.0018	(0.0132)
4	-0.0022	(0.0223)
5	-0.0020	(0.0320)
6	-0.0013	(0.0395)
Sum of Lags	-0.0051	(0.1307)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 11. Relationship among Real RMU, Real RMUDI, and Imports in Indonesia

Indonesia

RMU1

Variable	Coefficient		P-value
C	-10.3887	***	0.0009
LOG(GDP_INDONESIA)	3.3567	*	0.0959
LOG(GDP_INDONESIA(-1)	0.9131		0.6430
Adjusted R-squared	0.9778		
Durbin-Watson stat	1.6784		
Akaike info criterion	-2.3712		
F-statistic	162.3293		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	5.4655	0.0002
. *	1	3.1195	0.0001
. *	2	1.2953	0.0001
*	3	-0.0072	0.9808
* .	4	-0.7880	0.0668
* .	5	-1.0471	0.0182
* .	6	-0.7844	0.0095
	Sum of Lags	7.2536	0.0001

Lag Distribution of RMUDI1_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0003	0.8374
. *	1	0.0010	0.2687
. *	2	0.0014	0.0989
. *	3	0.0016	0.0951
. *	4	0.0016	0.1113
. *	5	0.0013	0.1274
. *	6	0.0008	0.1408
	Sum of Lags	0.0079	0.0989

RMU2

Variable	Coefficient		P-value
C	-18.6835	***	0.0000
LOG(GDP_INDONESIA)	3.9433	**	0.0433
LOG(GDP_INDONESIA(-1)	2.1501		0.2503
Adjusted R-squared	0.9801		
Durbin-Watson stat	1.5796		
Akaike info criterion	-2.4801		
F-statistic	181.3214		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	5.1298	0.0001
. *	1	3.2624	0.0000
. *	2	1.7732	0.0000
. *	3	0.6622	0.0278
*	4	-0.0706	0.8333
* .	5	-0.4252	0.2022
* .	6	-0.4017	0.0767
	Sum of Lags	9.9301	0.0000

Lag Distribution of RMUDI2_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0041	0.0076
. *	1	0.0025	0.0182
. *	2	0.0012	0.1519
. *	3	0.0003	0.7001
* .	4	-0.0003	0.7579
* .	5	-0.0005	0.4727
* .	6	-0.0004	0.3315
	Sum of Lags	0.0069	0.1519

RMU3

Variable	Coefficient		P-value
C	-18.8848	***	0.0000
LOG(GDP_INDONESIA)	4.5495	**	0.0205
LOG(GDP_INDONESIA(-1)	1.6001		0.3804
Adjusted R-squared	0.9807		
Durbin-Watson stat	1.6889		
Akaike info criterion	-2.5132		
F-statistic	187.5051		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	6.0045	0.0001
. *	1	3.7778	0.0000
. *	2	2.0074	0.0000
. *	3	0.6933	0.0175
*	4	-0.1645	0.6287
* .	5	-0.5660	0.1100
* .	6	-0.5111	0.0381
	Sum of Lags	11.2414	0.0000

Lag Distribution of RMUDI3_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0045	0.0037
. *	1	0.0029	0.0071
. *	2	0.0016	0.0666
. *	3	0.0006	0.4667
*	4	0.0000	0.9540
* .	5	-0.0004	0.5934
* .	6	-0.0003	0.4063
	Sum of Lags	0.0089	0.0666

RMU4

Variable	Coefficient		P-value
C	-23.2324	***	0.0000
LOG(GDP_INDONESIA)	4.7999	**	0.0150
LOG(GDP_INDONESIA(-1)	2.2936		0.2097
Adjusted R-squared	0.9809		
Durbin-Watson stat	1.6583		
Akaike info criterion	-2.5242		
F-statistic	189.6080		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	5.5470	0.0001
. *	1	3.7667	0.0000
. *	2	2.3158	0.0000
. *	3	1.1941	0.0004
. *	4	0.4017	0.1849
*	5	-0.0615	0.8298
*.	6	-0.1954	0.3164
	Sum of Lags	12.9683	0.0000

Lag Distribution of RMUDI4_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0092	0.0001
. *	1	0.0054	0.0003
. *	2	0.0024	0.0182
*	3	0.0002	0.7908
* .	4	-0.0011	0.2061
* .	5	-0.0016	0.0409
* .	6	-0.0012	0.0140
	Sum of Lags	0.0133	0.0182

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 12. Relationship among Real RMU, Real RMUDI, and Imports in Korea

Korea

RMU1

Variable	Coefficient		P-value	
C	14.2961	**	(0.0134	)
LOG(GDP_KOREA)	-2.1190	*	(0.0609	)
LOG(GDP_KOREA(-1))	1.3148		(0.1702	)
Adjusted R-squared	0.9900			
Durbin-Watson stat	1.8993			
Akaike info criterion	-3.9175			
F-statistic	363.7681			

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	2.3478	(0.0021)
. *	1	0.7651	(0.0098)
* .	2	-0.4019	(0.0027)
* .	3	-1.1530	(0.0004)
* .	4	-1.4884	(0.0005)
* .	5	-1.4081	(0.0006)
* .	6	-0.9119	(0.0006)
	Sum of Lags	-2.2505	(0.0027)

Lag Distribution of RMUDI1_KOREA

	Lag	Coefficient	P-value
. *	0	0.0028	(0.1037)
. *	1	0.0038	(0.0044)
. *	2	0.0044	(0.0004)
. *	3	0.0045	(0.0003)
. *	4	0.0040	(0.0004)
. *	5	0.0032	(0.0008)
. *	6	0.0018	(0.0013)
	Sum of Lags	0.0245	(0.0004)

RMU2

Variable	Coefficient		P-value	
C	-6.9581		(0.3974	)
LOG(GDP_KOREA)	0.9556		(0.4477	)
LOG(GDP_KOREA(-1))	2.8201	*	(0.0860	)
Adjusted R-squared	0.9823			
Durbin-Watson stat	0.8546			
Akaike info criterion	-3.3483			
F-statistic	204.7304			

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	1.2626	(0.2428)
. *	1	0.6947	(0.1527)
. *	2	0.2559	(0.0888)
*.	3	-0.0536	(0.8718)
* .	4	-0.2340	(0.6185)
* .	5	-0.2852	(0.5388)
* .	6	-0.2072	(0.5009)
	Sum of Lags	1.4333	(0.0888)

Lag Distribution of RMUDI2_KOREA

	Lag	Coefficient	P-value
* .	0	-0.0007	(0.8129)
*	1	0.0000	(0.9957)
. *	2	0.0005	(0.7645)
. *	3	0.0008	(0.5791)
. *	4	0.0009	(0.4753)
. *	5	0.0008	(0.4260)
. *	6	0.0005	(0.4033)
	Sum of Lags	0.0029	(0.7645)

RMU3

Variable	Coefficient		P-value	
C	-3.2287		(0.6864	)
LOG(GDP_KOREA)	0.7486		(0.5340	)
LOG(GDP_KOREA(-1))	2.2394		(0.1631	)
Adjusted R-squared	0.9834			
Durbin-Watson stat	0.8821			
Akaike info criterion	-3.4087			
F-statistic	217.6512			

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	1.9938	(0.1014)
. *	1	1.0197	(0.0662)
. *	2	0.2753	(0.0705)
* .	3	-0.2392	(0.4851)
* .	4	-0.5240	(0.2948)
* .	5	-0.5791	(0.2460)
* .	6	-0.4044	(0.2245)
	Sum of Lags	1.5419	(0.0705)

Lag Distribution of RMUDI3_KOREA

	Lag	Coefficient	P-value
. *	0	0.0002	(0.9505)
. *	1	0.0009	(0.6749)
. *	2	0.0013	(0.4357)
. *	3	0.0015	(0.3058)
. *	4	0.0015	(0.2544)
. *	5	0.0012	(0.2379)
. *	6	0.0007	(0.2351)
	Sum of Lags	0.0073	(0.4357)

RMU4

Variable	Coefficient		P-value	
C	-9.7723	**	(0.0269	)
LOG(GDP_KOREA)	1.5452	*	(0.0963	)
LOG(GDP_KOREA(-1))	2.8551	**	(0.0189	)
Adjusted R-squared	0.9891			
Durbin-Watson stat	1.2034			
Akaike info criterion	-3.8345			
F-statistic	334.6054			

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	1.5230	(0.0339)
. *	1	0.9342	(0.0120)
. *	2	0.4691	(0.0006)
. *	3	0.1277	(0.3650)
*.	4	-0.0898	(0.6808)
* .	5	-0.1836	(0.4194)
* .	6	-0.1537	(0.3226)
	Sum of Lags	2.6268	(0.0006)

Lag Distribution of RMUDI4_KOREA

	Lag	Coefficient	P-value
* .	0	-0.0011	(0.5665)
* .	1	-0.0002	(0.8899)
. *	2	0.0005	(0.6002)
. *	3	0.0009	(0.2702)
. *	4	0.0011	(0.1721)
. *	5	0.0010	(0.1472)
. *	6	0.0006	(0.1415)
	Sum of Lags	0.0028	(0.6002)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 13. Relationship among Real RMU, Real RMUDI, and Imports in Malaysia

Malaysia

RMU1

Variable	Coefficient		P-value
C	2.3283	**	0.0440
LOG(GDP_MALAY)	1.5667	*	0.0623
LOG(GDP_MALAY(-1))	0.0747		0.9217
Adjusted R-squared	0.9868		
Durbin-Watson stat	1.7369		
Akaike info criterion	-4.1939		
F-statistic	275.9809		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	1.9869	0.0004
. *	1	0.8329	0.0029
*	2	-0.0311	0.8456
* .	3	-0.6050	0.0057
* .	4	-0.8888	0.0010
* .	5	-0.8826	0.0005
* .	6	-0.5863	0.0004
	Sum of Lags	-0.1740	0.8456

Lag Distribution of RMUDI1_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0048	0.1862
. *	1	0.0024	0.2002
. *	2	0.0006	0.4281
* .	3	-0.0007	0.4189
* .	4	-0.0013	0.2541
* .	5	-0.0015	0.2240
* .	6	-0.0010	0.2129
	Sum of Lags	0.0034	0.4281

RMU2

Variable	Coefficient		P-value
C	3.2702	**	0.0301
LOG(GDP_MALAY)	1.5307	*	0.0552
LOG(GDP_MALAY(-1)	-0.0986		0.8857
Adjusted R-squared	0.9889		
Durbin-Watson stat	1.8522		
Akaike info criterion	-4.3655		
F-statistic	328.1415		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	2.0514	0.0001
. *	1	0.8026	0.0011
*.	2	-0.1276	0.3980
* .	3	-0.7393	0.0014
* .	4	-1.0323	0.0003
* .	5	-1.0068	0.0001
* .	6	-0.6627	0.0001
	Sum of Lags	-0.7147	0.3980

Lag Distribution of RMUDI2_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0101	0.0004
. *	1	0.0044	0.0004
.*	2	0.0001	0.7560
* .	3	-0.0027	0.0058
* .	4	-0.0042	0.0020
* .	5	-0.0042	0.0014
* .	6	-0.0028	0.0012
	Sum of Lags	0.0008	0.7560

RMU3

Variable	Coefficient		P-value
C	2.9984	*	0.0733
LOG(GDP_MALAY)	1.4221		0.1002
LOG(GDP_MALAY(-1))	0.0787		0.9159
Adjusted R-squared	0.9868		
Durbin-Watson stat	1.5176		
Akaike info criterion	-4.1926		
F-statistic	275.6263		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	2.2774	0.0003
. *	1	0.9415	0.0019
*	2	-0.0576	0.7299
* .	3	-0.7198	0.0045
* .	4	-1.0451	0.0010
* .	5	-1.0336	0.0006
* .	6	-0.6852	0.0005
	Sum of Lags	-0.3223	0.7299

Lag Distribution of RMUDI3_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0099	0.0015
. *	1	0.0044	0.0013
.*	2	0.0003	0.4868
* .	3	-0.0024	0.0223
* .	4	-0.0038	0.0081
* .	5	-0.0039	0.0058
* .	6	-0.0026	0.0049
	Sum of Lags	0.0019	0.4868

RMU4

Variable	Coefficient		P-value
C	3.6387	*	0.0528
LOG(GDP_MALAY)	1.3216		0.1159
LOG(GDP_MALAY(-1)	0.0393		0.9557
Adjusted R-squared	0.9880		
Durbin-Watson stat	1.5446		
Akaike info criterion	-4.2830		
F-statistic	301.9573		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	2.3643	0.0002
. *	1	0.9501	0.0009
*.	2	-0.1052	0.5148
* .	3	-0.8018	0.0022
* .	4	-1.1395	0.0005
* .	5	-1.1185	0.0003
* .	6	-0.7386	0.0002
	Sum of Lags	-0.5892	0.5148

Lag Distribution of RMUDI4_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0127	0.0001
. *	1	0.0055	0.0001
*	2	0.0001	0.8413
* .	3	-0.0035	0.0050
* .	4	-0.0053	0.0015
* .	5	-0.0054	0.0010
* .	6	-0.0036	0.0008
	Sum of Lags	0.0006	0.8413

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 14. Relationship among Real RMU, Real RMUDI, and Imports in Philippines

Philippines

RMU1

Variable	Coefficient		P-value	
C	4.8178	*	0.0569	
LOG(GDP_PHILI)	1.7900		0.1968	
LOG(GDP_PHILI(-1))	-0.8762		0.5091	
Adjusted R-squared	0.9182			
Durbin-Watson stat	2.2379			
Akaike info criterion	-2.9914			
F-statistic	38.3971			

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	1.9962	0.0458
. *	1	0.7457	0.1186
*.	2	-0.1831	0.3484
* .	3	-0.7901	0.0104
* .	4	-1.0753	0.0104
* .	5	-1.0386	0.0117
* .	6	-0.6802	0.0127
	Sum of Lags	-1.0254	0.3484

Lag Distribution of RMUDI1_PHILIPPINES

	Lag	Coefficient	P-value
* .	0	-0.0012	0.6451
.*	1	0.0002	0.9107
. *	2	0.0011	0.2503
. *	3	0.0017	0.1695
. *	4	0.0018	0.1885
. *	5	0.0016	0.2079
. *	6	0.0010	0.2222
	Sum of Lags	0.0061	0.2503

RMU2

Variable	Coefficient		P-value	
C	2.7748		0.1417	
LOG(GDP_PHILI)	2.1251		0.1062	
LOG(GDP_PHILI(-1))	-0.7520		0.5548	
Adjusted R-squared	0.9254			
Durbin-Watson stat	2.3766			
Akaike info criterion	-3.0841			
F-statistic	42.3576			

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	1.9805	0.0216
. *	1	0.8905	0.0468
*	2	0.0696	0.6877
* .	3	-0.4824	0.0077
* .	4	-0.7653	0.0046
* .	5	-0.7792	0.0051
* .	6	-0.5241	0.0056
	Sum of Lags	0.3895	0.6877

Lag Distribution of RMUDI2_PHILIPPINES

	Lag	Coefficient	P-value
. *	0	0.0009	0.6194
. *	1	0.0010	0.3007
. *	2	0.0010	0.1614
. *	3	0.0009	0.3395
. *	4	0.0008	0.4853
. *	5	0.0006	0.5713
. *	6	0.0003	0.6250
	Sum of Lags	0.0054	0.1614

RMU3

Variable	Coefficient		P-value	
C	3.0123		0.1281	
LOG(GDP_PHILI)	2.0117		0.1367	
LOG(GDP_PHILI(-1))	-0.6863		0.6004	
Adjusted R-squared	0.9211			
Durbin-Watson stat	2.4989			
Akaike info criterion	-3.0277			
F-statistic	39.9058			

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	2.1220	0.0356
. *	1	0.9547	0.0668
*	2	0.0754	0.6873
* .	3	-0.5158	0.0089
* .	4	-0.8189	0.0080
* .	5	-0.8340	0.0096
* .	6	-0.5610	0.0107
	Sum of Lags	0.4224	0.6873

Lag Distribution of RMUDI3_PHILIPPINES

	Lag	Coefficient	P-value
. *	0	0.0010	0.6005
. *	1	0.0010	0.2968
. *	2	0.0010	0.1763
. *	3	0.0009	0.3590
. *	4	0.0007	0.5058
. *	5	0.0006	0.5924
. *	6	0.0003	0.6463
	Sum of Lags	0.0055	0.1763

RMU4

Variable	Coefficient		P-value	
C	2.3215		0.2109	
LOG(GDP_PHILI)	2.1822		0.1082	
LOG(GDP_PHILI(-1))	-0.7064		0.5926	
Adjusted R-squared	0.9201			
Durbin-Watson stat	2.4943			
Akaike info criterion	-3.0158			
F-statistic	39.4043			

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	1.8787	0.0391
. *	1	0.8812	0.0688
.*	2	0.1267	0.4957
* .	3	-0.3848	0.0140
* .	4	-0.6531	0.0090
* .	5	-0.6785	0.0106
* .	6	-0.4608	0.0119
	Sum of Lags	-0.5892	0.5148

Lag Distribution of RMUDI4_PHILIPPINES

	Lag	Coefficient	P-value
. *	0	0.0023	0.2292
. *	1	0.0017	0.1114
. *	2	0.0011	0.1484
. *	3	0.0007	0.4696
. *	4	0.0004	0.7378
.*	5	0.0001	0.8904
*	6	0.0000	0.9811
	Sum of Lags	0.0064	0.1484

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 15. Relationship among Real RMU, Real RMUDI, and Imports in Singapore

Singapore

RMU1

Variable	Coefficient		P-value
C	0.4768	(	0.6811)
LOG(GDP_SING)	1.5703	*** (	0.0001)
LOG(GDP_SING(-1))	0.5345	(	0.1215)
Adjusted R-squared	0.9931		
Durbin-Watson stat	2.2794		
Akaike info criterion	-4.4573		
F-statistic	479.3180		

Lag Distribution of LOG(RMU1)

Lag	Coefficient	P-value
0	-1.0041	(0.0643)
1	-0.6214	(0.0171)
2	-0.3185	(0.0026)
3	-0.0953	(0.5632)
4	0.0481	(0.8308)
5	0.1118	(0.6134)
6	0.0958	(0.5141)
Sum of Lags	-1.7837	(0.0026)

Lag Distribution of RMUDI1_SINGAPORE

Lag	Coefficient	P-value
0	0.0076	(0.2974)
1	-0.0003	(0.9549)
2	-0.0060	(0.1841)
3	-0.0093	(0.0267)
4	-0.0104	(0.0079)
5	-0.0092	(0.0042)
6	-0.0057	(0.0031)
Sum of Lags	-0.0333	(0.1841)

RMU2

Variable	Coefficient		P-value
C	3.0640	** (	0.0356)
LOG(GDP_SING)	1.1051	*** (	0.0045)
LOG(GDP_SING(-1))	0.4256	(	0.3071)
Adjusted R-squared	0.9898		
Durbin-Watson stat	1.9199		
Akaike info criterion	-4.0718		
F-statistic	325.2250		

Lag Distribution of LOG(RMU2)

Lag	Coefficient	P-value
0	-0.3698	(0.4610)
1	-0.4870	(0.0556)
2	-0.5476	(0.0004)
3	-0.5514	(0.0073)
4	-0.4986	(0.0446)
5	-0.3891	(0.0948)
6	-0.2229	(0.1397)
Sum of Lags	-3.0663	(0.0004)

Lag Distribution of RMUDI2_SINGAPORE

Lag	Coefficient	P-value
0	0.0110	(0.1002)
1	0.0018	(0.5506)
2	-0.0049	(0.0036)
3	-0.0090	(0.0017)
4	-0.0106	(0.0035)
5	-0.0096	(0.0051)
6	-0.0061	(0.0064)
Sum of Lags	-0.0275	(0.0036)

RMU3

Variable	Coefficient		P-value
C	3.1012	** (	0.0491)
LOG(GDP_SING)	1.1380	*** (	0.0041)
LOG(GDP_SING(-1))	0.3877	(	0.3984)
Adjusted R-squared	0.9896		
Durbin-Watson stat	1.9352		
Akaike info criterion	-4.0535		
F-statistic	319.2770		

Lag Distribution of LOG(RMU3)

Lag	Coefficient	P-value
0	-0.4032	(0.5236)
1	-0.4914	(0.1100)
2	-0.5310	(0.0004)
3	-0.5220	(0.0178)
4	-0.4644	(0.1027)
5	-0.3582	(0.1912)
6	-0.2034	(0.2584)
Sum of Lags	-2.9734	(0.0004)

Lag Distribution of RMUDI3_SINGAPORE

Lag	Coefficient	P-value
0	0.0113	(0.1252)
1	0.0018	(0.5784)
2	-0.0050	(0.0046)
3	-0.0093	(0.0025)
4	-0.0109	(0.0052)
5	-0.0099	(0.0075)
6	-0.0062	(0.0094)
Sum of Lags	-0.0281	(0.0046)

RMU4

Variable	Coefficient		P-value
C	3.7498	(	0.0720)
LOG(GDP_SING)	1.0109	** (	0.0176)
LOG(GDP_SING(-1))	0.3793	(	0.4640)
Adjusted R-squared	0.9876		
Durbin-Watson stat	1.6811		
Akaike info criterion	-3.8774		
F-statistic	267.3555		

Lag Distribution of LOG(RMU4)

Lag	Coefficient	P-value
0	-0.0078	(0.9903)
1	-0.3207	(0.2944)
2	-0.5288	(0.0033)
3	-0.6324	(0.0195)
4	-0.6313	(0.0591)
5	-0.5255	(0.0956)
6	-0.3151	(0.1234)
Sum of Lags	-2.9616	(0.0033)

Lag Distribution of RMUDI4_SINGAPORE

Lag	Coefficient	P-value
0	0.0099	(0.2069)
1	0.0012	(0.7036)
2	-0.0051	(0.0039)
3	-0.0089	(0.0108)
4	-0.0103	(0.0207)
5	-0.0093	(0.0276)
6	-0.0059	(0.0324)
Sum of Lags	-0.0283	(0.0039)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 16. Relationship among Real RMU, Real RMUDI, and Imports in Thailand

Thailand

RMU1

Variable	Coefficient		P-value
C	-6.0396	**	(0.0495)
LOG(GDP_THAI)	1.5138		(0.2694)
LOG(GDP_THAI(-1))	1.9044		(0.1864)
Adjusted R-squared	0.9748		
Durbin-Watson stat	1.6499		
Akaike info criterion	-3.0808		
F-statistic	142.8226		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	2.0040	(0.0178)
. *	1	1.0370	(0.0086)
. *	2	0.2970	(0.0484)
* .	3	-0.2162	(0.4098)
* .	4	-0.5025	(0.1648)
* .	5	-0.5619	(0.1141)
* .	6	-0.3944	(0.0942)
	Sum of Lags	1.6630	(0.0484)

Lag Distribution of RMUDI1_THAILAND

	Lag	Coefficient	P-value
* .	0	-0.0091	(0.0020)
* .	1	-0.0053	(0.0062)
* .	2	-0.0022	(0.3260)
* .	3	-0.0001	(0.9839)
. *	4	0.0012	(0.6687)
. *	5	0.0017	(0.5015)
. *	6	0.0013	(0.4103)
	Sum of Lags	-0.0124	(0.3260)

RMU2

Variable	Coefficient		P-value
C	-9.6407	***	(0.0000)
LOG(GDP_THAI)	2.2987	*	(0.0644)
LOG(GDP_THAI(-1))	1.9218		(0.1008)
Adjusted R-squared	0.9818		
Durbin-Watson stat	1.7860		
Akaike info criterion	-3.4036		
F-statistic	198.2543		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	1.7669	(0.0085)
. *	1	1.1136	(0.0031)
. *	2	0.5940	(0.0006)
. *	3	0.2079	(0.1071)
*	4	-0.0445	(0.7994)
*.	5	-0.1633	(0.3708)
*.	6	-0.1485	(0.2375)
	Sum of Lags	3.3263	(0.0006)

Lag Distribution of RMUDI2_THAILAND

	Lag	Coefficient	P-value
* .	0	-0.0034	(0.0863)
* .	1	-0.0033	(0.0009)
* .	2	-0.0031	(0.0153)
* .	3	-0.0028	(0.1160)
* .	4	-0.0023	(0.2350)
* .	5	-0.0017	(0.3267)
* .	6	-0.0009	(0.3937)
	Sum of Lags	-0.0175	(0.0153)

RMU3

Variable	Coefficient		P-value
C	-9.5490	***	(0.0000)
LOG(GDP_THAI)	2.2719	*	(0.0689)
LOG(GDP_THAI(-1))	1.9318		(0.1022)
Adjusted R-squared	0.9815		
Durbin-Watson stat	1.7218		
Akaike info criterion	-3.3883		
F-statistic	195.2158		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	2.0471	(0.0081)
. *	1	1.2605	(0.0032)
. *	2	0.6386	(0.0006)
.*	3	0.1815	(0.1744)
*.	4	-0.1110	(0.5704)
*.	5	-0.2387	(0.2511)
*.	6	-0.2017	(0.1620)
	Sum of Lags	3.5764	(0.0006)

Lag Distribution of RMUDI3_THAILAND

	Lag	Coefficient	P-value
* .	0	-0.0032	(0.1077)
* .	1	-0.0031	(0.0019)
* .	2	-0.0029	(0.0258)
* .	3	-0.0025	(0.1534)
* .	4	-0.0021	(0.2846)
* .	5	-0.0015	(0.3799)
* .	6	-0.0008	(0.4474)
	Sum of Lags	-0.0161	(0.0258)

RMU4

Variable	Coefficient		P-value
C	-9.1023	***	(0.0000)
LOG(GDP_THAI)	2.2827	*	(0.0748)
LOG(GDP_THAI(-1))	1.8161		(0.1293)
Adjusted R-squared	0.9806		
Durbin-Watson stat	1.5671		
Akaike info criterion	-3.3406		
F-statistic	186.0014		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	1.4466	(0.0229)
. *	1	0.9457	(0.0100)
. *	2	0.5429	(0.0026)
. *	3	0.2381	(0.0504)
*	4	0.0315	(0.8371)
*.	5	-0.0771	(0.6282)
*.	6	-0.0876	(0.4266)
	Sum of Lags	3.0401	(0.0026)

Lag Distribution of RMUDI4_THAILAND

	Lag	Coefficient	P-value
*.	0	-0.0001	(0.9795)
* .	1	-0.0012	(0.1710)
* .	2	-0.0020	(0.0649)
* .	3	-0.0024	(0.1338)
* .	4	-0.0024	(0.1840)
* .	5	-0.0020	(0.2164)
* .	6	-0.0012	(0.2383)
	Sum of Lags	-0.0113	(0.0649)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 17. Relationship among Real RMU, Real RMUDI, and Exports in Japan

Japan

RMU1

Variable	Coefficient		P-value
C	-58.2577	***	(0.0000)
LOG(OECDGDP)	1.3603		(0.4219)
LOG(OECDGDP(-1))	2.7153	*	(0.0894)
Adjusted R-squared	0.9935		
Durbin-Watson stat	1.9394		
Akaike info criterion	-5.2554		
F-statistic	558.5809		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	0.5937	(0.0539)
. *	1	0.2266	(0.1432)
*.	2	-0.0464	(0.5602)
* .	3	-0.2253	(0.0335)
* .	4	-0.3102	(0.0210)
* .	5	-0.3009	(0.0198)
* .	6	-0.1975	(0.0198)
	Sum of Lags	-0.2601	(0.5602)

Lag Distribution of RMUDI1_JAPAN

	Lag	Coefficient	P-value
. *	0	0.0053	(0.0001)
. *	1	0.0027	(0.0001)
.*	2	0.0007	(0.0090)
*.	3	-0.0007	(0.0330)
* .	4	-0.0014	(0.0023)
* .	5	-0.0016	(0.0010)
* .	6	-0.0011	(0.0007)
	Sum of Lags	0.0038	(0.0090)

RMU2

Variable	Coefficient		P-value
C	-60.4870	***	(0.0000)
LOG(OECDGDP)	1.6299		(0.3167)
LOG(OECDGDP(-1))	2.5757	*	(0.0994)
Adjusted R-squared	0.9937		
Durbin-Watson stat	1.9369		
Akaike info criterion	-5.2995		
F-statistic	583.8982		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	0.5566	(0.0461)
. *	1	0.2160	(0.1370)
*.	2	-0.0376	(0.6166)
* .	3	-0.2042	(0.0238)
* .	4	-0.2837	(0.0126)
* .	5	-0.2762	(0.0117)
* .	6	-0.1816	(0.0119)
	Sum of Lags	-0.2108	(0.6166)

Lag Distribution of RMUDI2_JAPAN

	Lag	Coefficient	P-value
. *	0	0.0053	(0.0006)
. *	1	0.0029	(0.0001)
. *	2	0.0011	(0.0010)
*.	3	-0.0002	(0.6252)
* .	4	-0.0010	(0.1396)
* .	5	-0.0012	(0.0667)
* .	6	-0.0009	(0.0442)
	Sum of Lags	0.0059	(0.0010)

RMU3

Variable	Coefficient		P-value
C	-60.7898	***	(0.0000)
LOG(OECDGDP)	1.6683		(0.3352)
LOG(OECDGDP(-1))	2.5551		(0.1220)
Adjusted R-squared	0.9929		
Durbin-Watson stat	1.9769		
Akaike info criterion	-5.1756		
F-statistic	515.5264		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	0.5193	(0.1292)
. *	1	0.2006	(0.2607)
*.	2	-0.0366	(0.6663)
* .	3	-0.1923	(0.0508)
* .	4	-0.2665	(0.0381)
* .	5	-0.2592	(0.0398)
* .	6	-0.1703	(0.0421)
	Sum of Lags	-0.2051	(0.6663)

Lag Distribution of RMUDI3_JAPAN

	Lag	Coefficient	P-value
. *	0	0.0054	(0.0010)
. *	1	0.0029	(0.0002)
. *	2	0.0010	(0.0021)
*.	3	-0.0003	(0.5918)
* .	4	-0.0011	(0.1371)
* .	5	-0.0013	(0.0680)
* .	6	-0.0009	(0.0462)
	Sum of Lags	0.0059	(0.0021)

RMU4

Variable	Coefficient		P-value
C	-62.5967	***	(0.0000)
LOG(OECDGDP)	1.7725		(0.3009)
LOG(OECDGDP(-1))	2.5562		(0.1240)
Adjusted R-squared	0.9929		
Durbin-Watson stat	1.9698		
Akaike info criterion	-5.1692		
F-statistic	512.2085		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	0.4605	(0.1658)
. *	1	0.1769	(0.3187)
*.	2	-0.0341	(0.6837)
* .	3	-0.1725	(0.0472)
* .	4	-0.2383	(0.0369)
* .	5	-0.2315	(0.0411)
* .	6	-0.1520	(0.0451)
	Sum of Lags	-0.1911	(0.6837)

Lag Distribution of RMUDI4_JAPAN

	Lag	Coefficient	P-value
. *	0	0.0058	(0.0076)
. *	1	0.0033	(0.0015)
. *	2	0.0014	(0.0087)
*	3	0.0000	(0.9881)
* .	4	-0.0008	(0.4144)
* .	5	-0.0011	(0.2546)
* .	6	-0.0008	(0.1916)
	Sum of Lags	0.0078	(0.0087)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 18. Relationship among Real RMU, Real RMUDI, and Exports in China

China

RMU1

Variable	Coefficient		P-value	
C	-49.2825	***	(0.0000)	
LOG(OECDGDP)	-0.2295		(0.8852)	
LOG(OECDGDP(-1))	3.7365	**	(0.0308)	
Adjusted R-squared	0.9930			
Durbin-Watson stat	2.1225			
Akaike info criterion	-5.1380			
F-statistic	521.5958			

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	0.3351	(0.3074)
. *	1	0.1415	(0.4211)
*	2	-0.0036	(0.9680)
* .	3	-0.1000	(0.2975)
* .	4	-0.1479	(0.2227)
* .	5	-0.1472	(0.2130)
* .	6	-0.0979	(0.2119)
	Sum of Lags	-0.0200	(0.9680)

Lag Distribution of RMUDI1_CHINA

	Lag	Coefficient	P-value
* .	0	-0.0065	(0.0161)
* .	1	-0.0044	(0.0123)
* .	2	-0.0026	(0.0131)
* .	3	-0.0013	(0.0626)
*.	4	-0.0004	(0.5553)
*	5	0.0002	(0.7530)
.*	6	0.0003	(0.4303)
	Sum of Lags	-0.0147	(0.0131)

RMU2

Variable	Coefficient		P-value	
C	-59.4013	***	(0.0000)	
LOG(OECDGDP)	0.6029		(0.7306)	
LOG(OECDGDP(-1))	3.4943	**	(0.0446)	
Adjusted R-squared	0.9927			
Durbin-Watson stat	2.0921			
Akaike info criterion	-5.0944			
F-statistic	499.1904			

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	0.1089	(0.6948)
. *	1	0.0522	(0.7267)
.*	2	0.0092	(0.9213)
* .	3	-0.0200	(0.8560)
* .	4	-0.0356	(0.7830)
* .	5	-0.0374	(0.7561)
* .	6	-0.0256	(0.7431)
	Sum of Lags	0.0517	(0.9213)

Lag Distribution of RMUDI2_CHINA

	Lag	Coefficient	P-value
* .	0	-0.0046	(0.0259)
* .	1	-0.0029	(0.0085)
* .	2	-0.0015	(0.0018)
* .	3	-0.0005	(0.3301)
.*	4	0.0002	(0.8004)
. *	5	0.0005	(0.4916)
. *	6	0.0004	(0.3701)
	Sum of Lags	-0.0084	(0.0018)

RMU3

Variable	Coefficient		P-value	
C	-59.5037	***	(0.0000)	
LOG(OECDGDP)	0.5387		(0.7595)	
LOG(OECDGDP(-1))	3.5644	**	(0.0403)	
Adjusted R-squared	0.9928			
Durbin-Watson stat	2.1341			
Akaike info criterion	-5.1065			
F-statistic	505.3387			

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	0.1452	(0.6489)
. *	1	0.0681	(0.6887)
.*	2	0.0098	(0.9213)
* .	3	-0.0297	(0.7992)
* .	4	-0.0504	(0.7183)
* .	5	-0.0524	(0.6915)
* .	6	-0.0356	(0.6793)
	Sum of Lags	0.0550	(0.9213)

Lag Distribution of RMUDI3_CHINA

	Lag	Coefficient	P-value
* .	0	-0.0045	(0.0402)
* .	1	-0.0028	(0.0152)
* .	2	-0.0015	(0.0033)
* .	3	-0.0005	(0.3715)
.*	4	0.0002	(0.7992)
. *	5	0.0005	(0.5142)
. *	6	0.0004	(0.3998)
	Sum of Lags	-0.0082	(0.0033)

RMU4

Variable	Coefficient		P-value	
C	-62.8305	***	(0.0000)	
LOG(OECDGDP)	0.8062		(0.6604)	
LOG(OECDGDP(-1))	3.4909	**	(0.0452)	
Adjusted R-squared	0.9926			
Durbin-Watson stat	2.1121			
Akaike info criterion	-5.0857			
F-statistic	494.8790			

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	0.0451	(0.8819)
. *	1	0.0260	(0.8715)
. *	2	0.0111	(0.9110)
*	3	0.0005	(0.9969)
* .	4	-0.0060	(0.9667)
* .	5	-0.0082	(0.9512)
* .	6	-0.0062	(0.9430)
	Sum of Lags	-0.6429	(0.2601)

Lag Distribution of RMUDI4_CHINA

	Lag	Coefficient	P-value
* .	0	-0.0040	(0.0612)
* .	1	-0.0024	(0.0227)
* .	2	-0.0011	(0.0108)
*	3	-0.0002	(0.7478)
. *	4	0.0004	(0.6676)
. *	5	0.0006	(0.4832)
. *	6	0.0005	(0.4027)
	Sum of Lags	-0.0063	(0.0108)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 19. Relationship among Real RMU, Real RMUDI, and Exports in Indonesia

Indonesia

RMU1

Variable	Coefficient		P-value
C	-111.9886	***	(0.0000)
LOG(OECDGDP)	-2.3208		(0.5253)
LOG(OECDGDP(-1))	9.4142	**	(0.0182)
Adjusted R-squared	0.9829		
Durbin-Watson stat	1.8883		
Akaike info criterion	-3.4918		
F-statistic	211.1719		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	0.5362	(0.5008)
. *	1	0.3458	(0.4064)
. *	2	0.1933	(0.2720)
. *	3	0.0788	(0.6751)
*	4	0.0022	(0.9934)
* .	5	-0.0365	(0.8912)
* .	6	-0.0372	(0.8362)
	Sum of Lags	7.2536	(0.0001)

Lag Distribution of RMUDI1_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0020	(0.0150)
. *	1	0.0007	(0.1431)
*.	2	-0.0002	(0.7224)
* .	3	-0.0008	(0.1828)
* .	4	-0.0010	(0.0836)
* .	5	-0.0010	(0.0546)
* .	6	-0.0007	(0.0423)
	Sum of Lags	-0.0010	(0.7224)

RMU2

Variable	Coefficient		P-value
C	-114.9216	***	(0.0000)
LOG(OECDGDP)	-1.0859		(0.7522)
LOG(OECDGDP(-1))	8.3539	**	(0.0244)
Adjusted R-squared	0.9850		
Durbin-Watson stat	1.7901		
Akaike info criterion	-3.6277		
F-statistic	242.2889		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	0.8742	(0.1658)
. *	1	0.5979	(0.1083)
. *	2	0.3721	(0.0756)
. *	3	0.1968	(0.2503)
.*	4	0.0719	(0.7074)
*	5	-0.0025	(0.9892)
*.	6	-0.0265	(0.8294)
	Sum of Lags	2.0840	(0.0756)

Lag Distribution of RMUDI2_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0029	(0.0012)
. *	1	0.0014	(0.0231)
.*	2	0.0002	(0.7185)
* .	3	-0.0006	(0.2071)
* .	4	-0.0010	(0.0370)
* .	5	-0.0011	(0.0125)
* .	6	-0.0007	(0.0064)
	Sum of Lags	0.0010	(0.7185)

RMU3

Variable	Coefficient		P-value
C	-115.3017	***	(0.0000)
LOG(OECDGDP)	-1.1497		(0.7406)
LOG(OECDGDP(-1))	8.4404	**	(0.0242)
Adjusted R-squared	0.9848		
Durbin-Watson stat	1.7795		
Akaike info criterion	-3.6123		
F-statistic	238.5560		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	1.0135	(0.1757)
. *	1	0.6683	(0.1256)
. *	2	0.3899	(0.0860)
. *	3	0.1783	(0.2882)
.*	4	0.0335	(0.8660)
*	5	-0.0445	(0.8233)
*.	6	-0.0556	(0.6814)
	Sum of Lags	2.1833	(0.0860)

Lag Distribution of RMUDI3_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0029	(0.0016)
. *	1	0.0014	(0.0263)
.*	2	0.0002	(0.7357)
* .	3	-0.0006	(0.1963)
* .	4	-0.0011	(0.0340)
* .	5	-0.0011	(0.0115)
* .	6	-0.0007	(0.0059)
	Sum of Lags	0.0009	(0.7357)

RMU4

Variable	Coefficient		P-value
C	-119.9187576	***	(0.0000)
LOG(OECDGDP)	-0.563479644		(0.8629)
LOG(OECDGDP(-1))	8.125817311	**	(0.0199)
Adjusted R-squared	0.986458727		
Durbin-Watson stat	1.77048236		
Akaike info criterion	-3.727920947		
F-statistic	268.1104346		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	1.2058	(0.0629)
. *	1	0.8324	(0.0404)
. *	2	0.5261	(0.0295)
. *	3	0.2868	(0.0947)
. *	4	0.1145	(0.4919)
*	5	0.0093	(0.9525)
*.	6	-0.0289	(0.7811)
	Sum of Lags	2.9459	(0.0295)

Lag Distribution of RMUDI4_INDONESIA

	Lag	Coefficient	P-value
. *	0	0.0042	(0.0007)
. *	1	0.0021	(0.0072)
.*	2	0.0005	(0.3490)
* .	3	-0.0006	(0.2190)
* .	4	-0.0012	(0.0155)
* .	5	-0.0013	(0.0032)
* .	6	-0.0009	(0.0013)
	Sum of Lags	0.0028	(0.3490)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 20. Relationship among Real RMU, Real RMUDI, and Exports in Korea

Korea

RMU1

Variable	Coefficient		P-value
C	-73.8296	**	0.0269
LOG(OECDGDP)	-2.0163		0.4159
LOG(OECDGDP(-1))	6.9356	***	0.0005
Adjusted R-squared	0.9966		
Durbin-Watson stat	1.6436		
Akaike info criterion	-4.9722		
F-statistic	1076.9107		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	0.5812	0.3001
*	1	-0.0207	0.9226
* .	2	-0.4496	0.0000
* .	3	-0.7055	0.0053
* .	4	-0.7885	0.0160
* .	5	-0.6986	0.0247
* .	6	-0.4358	0.0310
	Sum of Lags	-2.5176	0.0000

Lag Distribution of RMUDI1_KOREA

	Lag	Coefficient	P-value
* .	0	-0.0019	0.0733
* .	1	-0.0007	0.4625
*	2	0.0001	0.9162
. *	3	0.0007	0.5626
. *	4	0.0009	0.3955
. *	5	0.0009	0.3089
. *	6	0.0006	0.2586
	Sum of Lags	0.0006	0.9162

RMU2

Variable	Coefficient		P-value
C	-132.5738	***	0.0000
LOG(OECDGDP)	2.2929		0.2564
LOG(OECDGDP(-1))	6.0558	***	0.0070
Adjusted R-squared	0.9955		
Durbin-Watson stat	1.2644		
Akaike info criterion	-4.6935		
F-statistic	814.3096		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	0.0679	0.8795
* .	1	-0.1093	0.6336
* .	2	-0.2307	0.0060
* .	3	-0.2962	0.0016
* .	4	-0.3059	0.0330
* .	5	-0.2598	0.0791
* .	6	-0.1578	0.1166
	Sum of Lags	-1.2918	0.0060

Lag Distribution of RMUDI2_KOREA

	Lag	Coefficient	P-value
* .	0	-0.0030	0.0064
* .	1	-0.0025	0.0015
* .	2	-0.0020	0.0024
* .	3	-0.0015	0.0171
* .	4	-0.0011	0.0765
* .	5	-0.0007	0.1825
* .	6	-0.0003	0.3027
	Sum of Lags	-0.0111	0.0024

RMU3

Variable	Coefficient		P-value
C	-129.4447	***	0.0000
LOG(OECDGDP)	2.2995		0.2466
LOG(OECDGDP(-1))	5.8676	***	0.0082
Adjusted R-squared	0.9957		
Durbin-Watson stat	1.2893		
Akaike info criterion	-4.7268		
F-statistic	841.9317		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	0.2017	0.6980
*.	1	-0.0415	0.8752
* .	2	-0.2132	0.0167
* .	3	-0.3135	0.0021
* .	4	-0.3423	0.0356
* .	5	-0.2996	0.0775
* .	6	-0.1855	0.1091
	Sum of Lags	-1.1940	0.0167

Lag Distribution of RMUDI3_KOREA

	Lag	Coefficient	P-value
* .	0	-0.0031	0.0046
* .	1	-0.0024	0.0017
* .	2	-0.0018	0.0053
* .	3	-0.0013	0.0406
* .	4	-0.0009	0.1548
* .	5	-0.0005	0.3207
* .	6	-0.0002	0.4838
	Sum of Lags	-0.0103	0.0053

RMU4

Variable	Coefficient		P-value
C	-131.8889	***	0.0000
LOG(OECDGDP)	3.2758	*	0.0884
LOG(OECDGDP(-1))	5.0365	**	0.0189
Adjusted R-squared	0.9960		
Durbin-Watson stat	1.2889		
Akaike info criterion	-3.8345		
F-statistic	334.6054		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	0.3494	0.4054
. *	1	0.0748	0.7444
* .	2	-0.1250	0.1774
* .	3	-0.2498	0.0000
* .	4	-0.2997	0.0033
* .	5	-0.2747	0.0135
* .	6	-0.1748	0.0246
	Sum of Lags	-0.6998	0.1774

Lag Distribution of RMUDI4_KOREA

	Lag	Coefficient	P-value
* .	0	-0.0029	0.0062
* .	1	-0.0023	0.0019
* .	2	-0.0017	0.0032
* .	3	-0.0013	0.0239
* .	4	-0.0008	0.1130
* .	5	-0.0005	0.2694
* .	6	-0.0002	0.4375
	Sum of Lags	-0.0097	0.0032

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 21. Relationship among Real RMU, Real RMUDI, and Exports in Malaysia

Malaysia

RMU1

Variable	Coefficient		P-value
C	-58.3496	***	0.0000
LOG(OECDGDP)	-1.0802		0.5173
LOG(OECDGDP(-1))	5.0634	***	0.0042
Adjusted R-squared	0.9957		
Durbin-Watson stat	2.0765		
Akaike info criterion	-5.3117		
F-statistic	851.8617		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
. *	0	0.0513	0.8509
* .	1	-0.1838	0.2251
* .	2	-0.3430	0.0032
* .	3	-0.4263	0.0024
* .	4	-0.4336	0.0056
* .	5	-0.3650	0.0099
* .	6	-0.2205	0.0143
	Sum of Lags	-1.9208	0.0032

Lag Distribution of RMUDI1_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0034	0.1623
. *	1	0.0015	0.2407
*	2	0.0000	0.9899
* .	3	-0.0010	0.0566
* .	4	-0.0014	0.0612
* .	5	-0.0014	0.0698
* .	6	-0.0010	0.0755
	Sum of Lags	0.0000	0.9899

RMU2

Variable	Coefficient		P-value
C	-49.3448	***	0.0000
LOG(OECDGDP)	-1.5057		0.3690
LOG(OECDGDP(-1))	4.9628	***	0.0032
Adjusted R-squared	0.9960		
Durbin-Watson stat	2.1308		
Akaike info criterion	-5.3728		
F-statistic	905.6899		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
. *	0	0.0483	0.8507
* .	1	-0.2102	0.1267
* .	2	-0.3848	0.0009
* .	3	-0.4755	0.0014
* .	4	-0.4825	0.0037
* .	5	-0.4055	0.0067
* .	6	-0.2447	0.0097
	Sum of Lags	-2.1548	0.0009

Lag Distribution of RMUDI2_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0029	0.0971
. *	1	0.0006	0.3988
* .	2	-0.0010	0.0006
* .	3	-0.0021	0.0019
* .	4	-0.0025	0.0052
* .	5	-0.0023	0.0079
* .	6	-0.0015	0.0099
	Sum of Lags	-0.0058	0.0006

RMU3

Variable	Coefficient		P-value
C	-50.6272	***	0.0000
LOG(OECDGDP)	-1.1521		0.5175
LOG(OECDGDP(-1))	4.6852	***	0.0073
Adjusted R-squared	0.9954		
Durbin-Watson stat	1.9507		
Akaike info criterion	-5.2442		
F-statistic	796.0760		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
. *	0	0.0727	0.8199
* .	1	-0.1805	0.2790
* .	2	-0.3528	0.0037
* .	3	-0.4441	0.0046
* .	4	-0.4545	0.0118
* .	5	-0.3839	0.0202
* .	6	-0.2324	0.0279
	Sum of Lags	-1.9757	0.0037

Lag Distribution of RMUDI3_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0026	0.1696
. *	1	0.0005	0.5124
* .	2	-0.0010	0.0021
* .	3	-0.0019	0.0061
* .	4	-0.0023	0.0147
* .	5	-0.0021	0.0211
* .	6	-0.0013	0.0256
	Sum of Lags	-0.0055	0.0021

RMU4

Variable	Coefficient		P-value
C	-46.0579	***	0.0001
LOG(OECDGDP)	-1.3772		0.4432
LOG(OECDGDP(-1))	4.6436	***	0.0067
Adjusted R-squared	0.9955		
Durbin-Watson stat	1.9579		
Akaike info criterion	-5.2638		
F-statistic	811.8391		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	0.0956	0.7622
* .	1	-0.1804	0.2602
* .	2	-0.3689	0.0023
* .	3	-0.4700	0.0039
* .	4	-0.4836	0.0102
* .	5	-0.4099	0.0174
* .	6	-0.2486	0.0239
	Sum of Lags	-2.0657	0.0023

Lag Distribution of RMUDI4_MALAYSIA

	Lag	Coefficient	P-value
. *	0	0.0026	0.1737
. *	1	0.0003	0.7408
* .	2	-0.0014	0.0003
* .	3	-0.0025	0.0033
* .	4	-0.0028	0.0086
* .	5	-0.0026	0.0129
* .	6	-0.0016	0.0161
	Sum of Lags	-0.0081	0.0003

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 22. Relationship among Real RMU, Real RMUDI, and Exports in Philippines

Philippines

RMU1

Variable	Coefficient		P-value	
C	-13.3367	(	0.5163	)
LOG(OECDGDP)	0.5704	(	0.9135	)
LOG(OECDGDP(-1))	0.7349	(	0.8790	)
Adjusted R-squared	0.8939			
Durbin-Watson stat	2.1589			
Akaike info criterion	-2.9131			
F-statistic	31.8988			

Lag Distribution of LOG(RMU1)

	Lag	Coefficient		P-value	
. *	0	1.4624	(	0.1572	)
. *	1	0.5189	(	0.2926	)
*.	2	-0.1797	(	0.4515	)
* .	3	-0.6335	(	0.0838	)
* .	4	-0.8424	(	0.0762	)
* .	5	-0.8064	(	0.0780	)
* .	6	-0.5256	(	0.0801	)
	Sum of Lags	-1.0063	(	0.4515	)

Lag Distribution of RMUDI1_PHILIPPINES

	Lag	Coefficient		P-value	
.*	0	0.0002	(	0.9369	)
. *	1	0.0015	(	0.3366	)
. *	2	0.0024	(	0.0261	)
. *	3	0.0028	(	0.0136	)
. *	4	0.0028	(	0.0267	)
. *	5	0.0023	(	0.0445	)
. *	6	0.0014	(	0.0614	)
	Sum of Lags	0.0136	(	0.0261	)

RMU2

Variable	Coefficient		P-value	
C	-23.6194	(	0.1310	)
LOG(OECDGDP)	1.1837	(	0.8175	)
LOG(OECDGDP(-1))	0.7225	(	0.8815	)
Adjusted R-squared	0.8978			
Durbin-Watson stat	2.2097			
Akaike info criterion	-2.9502			
F-statistic	33.2059			

Lag Distribution of LOG(RMU2)

	Lag	Coefficient		P-value	
. *	0	1.0091	(	0.2417	)
. *	1	0.4041	(	0.3771	)
*	2	-0.0473	(	0.8188	)
* .	3	-0.3451	(	0.1051	)
* .	4	-0.4893	(	0.0890	)
* .	5	-0.4798	(	0.0962	)
* .	6	-0.3167	(	0.1026	)
	Sum of Lags	-0.2650	(	0.8188	)

Lag Distribution of RMUDI2_PHILIPPINES

	Lag	Coefficient		P-value	
. *	0	0.0019	(	0.3943	)
. *	1	0.0019	(	0.0980	)
. *	2	0.0018	(	0.0046	)
. *	3	0.0016	(	0.0447	)
. *	4	0.0014	(	0.1743	)
. *	5	0.0010	(	0.2947	)
. *	6	0.0005	(	0.3818	)
	Sum of Lags	0.0102	(	0.0046	)

RMU3

Variable	Coefficient		P-value	
C	-23.3817	(	0.1462	)
LOG(OECDGDP)	1.1924	(	0.8187	)
LOG(OECDGDP(-1))	0.7001	(	0.8869	)
Adjusted R-squared	0.8946			
Durbin-Watson stat	2.1616			
Akaike info criterion	-2.9198			
F-statistic	32.1310			

Lag Distribution of LOG(RMU3)

	Lag	Coefficient		P-value	
. *	0	1.0083	(	0.3237	)
. *	1	0.4011	(	0.4556	)
*	2	-0.0517	(	0.8156	)
* .	3	-0.3501	(	0.1167	)
* .	4	-0.4942	(	0.1240	)
* .	5	-0.4838	(	0.1412	)
* .	6	-0.3191	(	0.1528	)
	Sum of Lags	-0.2896	(	0.8156	)

Lag Distribution of RMUDI3_PHILIPPINES

	Lag	Coefficient		P-value	
. *	0	0.0019	(	0.4054	)
. *	1	0.0019	(	0.1038	)
. *	2	0.0018	(	0.0066	)
. *	3	0.0017	(	0.0497	)
. *	4	0.0014	(	0.1755	)
. *	5	0.0010	(	0.2909	)
. *	6	0.0006	(	0.3746	)
	Sum of Lags	0.0103	(	0.0066	)

RMU4

Variable	Coefficient			P-value	
C	-25.8477	*	(	0.0878	)
LOG(OECDGDP)	0.9174		(	0.8608	)
LOG(OECDGDP(-1))	1.1177		(	0.8219	)
Adjusted R-squared	0.8948				
Durbin-Watson stat	2.1348				
Akaike info criterion	-2.9215				
F-statistic	32.1922				

Lag Distribution of LOG(RMU4)

	Lag	Coefficient		P-value	
. *	0	0.6871	(	0.4487	)
. *	1	0.2644	(	0.5921	)
*.	2	-0.0500	(	0.8158	)
* .	3	-0.2563	(	0.1543	)
* .	4	-0.3545	(	0.1668	)
* .	5	-0.3445	(	0.1953	)
* .	6	-0.2263	(	0.2140	)
	Sum of Lags	-0.2801	(	0.8158	)

Lag Distribution of RMUDI4_PHILIPPINES

	Lag	Coefficient		P-value	
. *	0	0.0024	(	0.2890	)
. *	1	0.0020	(	0.0906	)
. *	2	0.0016	(	0.0208	)
. *	3	0.0012	(	0.1505	)
. *	4	0.0009	(	0.3865	)
. *	5	0.0006	(	0.5539	)
. *	6	0.0003	(	0.6606	)
	Sum of Lags	0.0089	(	0.0208	)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 23. Relationship among Real RMU, Real RMUDI, and Exports in Singapore

Singapore

RMU1

Variable	Coefficient		P-value
C	-91.4501	***	(0.0000)
LOG(OECDGDP)	0.4388		(0.8823)
LOG(OECDGDP(-1))	5.4898		(0.1023)
Adjusted R-squared	0.9928		
Durbin-Watson stat	2.7390		
Akaike info criterion	-4.1570		
F-statistic	504.3687		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
* .	0	-1.2226	(0.0238)
* .	1	-0.7519	(0.0032)
* .	2	-0.3798	(0.0009)
* .	3	-0.1065	(0.5603)
. *	4	0.0682	(0.7781)
. *	5	0.1442	(0.5393)
. *	6	0.1214	(0.4325)
	Sum of Lags	-2.1270	(0.0009)

Lag Distribution of RMUDI1_SINGAPORE

	Lag	Coefficient	P-value
* .	0	-0.0031	(0.6611)
* .	1	-0.0052	(0.2244)
* .	2	-0.0064	(0.0505)
* .	3	-0.0068	(0.0579)
* .	4	-0.0063	(0.0967)
* .	5	-0.0051	(0.1363)
* .	6	-0.0029	(0.1692)
	Sum of Lags	-0.0358	(0.0505)

RMU2

Variable	Coefficient		P-value
C	-72.7717	***	(0.0001)
LOG(OECDGDP)	-1.5729		(0.5522)
LOG(OECDGDP(-1))	6.4066	**	(0.0408)
Adjusted R-squared	0.9930		
Durbin-Watson stat	2.9267		
Akaike info criterion	-4.1851		
F-statistic	518.7805		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
* .	0	-1.1197	(0.0209)
* .	1	-0.8697	(0.0013)
* .	2	-0.6498	(0.0004)
* .	3	-0.4598	(0.0297)
* .	4	-0.2998	(0.2082)
* .	5	-0.1699	(0.4362)
*.	6	-0.0699	(0.6172)
	Sum of Lags	-3.6387	(0.0004)

Lag Distribution of RMUDI2_SINGAPORE

	Lag	Coefficient	P-value
. *	0	0.0022	(0.7332)
* .	1	-0.0020	(0.4730)
* .	2	-0.0048	(0.0001)
* .	3	-0.0064	(0.0157)
* .	4	-0.0068	(0.0519)
* .	5	-0.0058	(0.0814)
* .	6	-0.0035	(0.1026)
	Sum of Lags	-0.0271	(0.0001)

RMU3

Variable	Coefficient		P-value
C	-77.6035	***	(0.0001)
LOG(OECDGDP)	-1.8494		(0.5007)
LOG(OECDGDP(-1))	6.9652	**	(0.0363)
Adjusted R-squared	0.9928		
Durbin-Watson stat	2.8461		
Akaike info criterion	-4.1626		
F-statistic	507.2029		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
* .	0	-1.3687	(0.0204)
* .	1	-0.9596	(0.0020)
* .	2	-0.6218	(0.0006)
* .	3	-0.3551	(0.1014)
* .	4	-0.1596	(0.5406)
*.	5	-0.0352	(0.8863)
*	6	0.0180	(0.9110)
	Sum of Lags	-3.4820	(0.0006)

Lag Distribution of RMUDI3_SINGAPORE

	Lag	Coefficient	P-value
*.	0	-0.0002	(0.9801)
* .	1	-0.0030	(0.3043)
* .	2	-0.0049	(0.0002)
* .	3	-0.0059	(0.0370)
* .	4	-0.0058	(0.1130)
* .	5	-0.0049	(0.1690)
* .	6	-0.0029	(0.2071)
	Sum of Lags	-0.0276	(0.0002)

RMU4

Variable	Coefficient		P-value
C	-75.9567	***	(0.0006)
LOG(OECDGDP)	-2.8870		(0.3112)
LOG(OECDGDP(-1))	7.9079	**	(0.0197)
Adjusted R-squared	0.9923		
Durbin-Watson stat	2.6708		
Akaike info criterion	-4.0923		
F-statistic	472.5735		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
* .	0	-1.1617	(0.0412)
* .	1	-0.8604	(0.0037)
* .	2	-0.6042	(0.0019)
* .	3	-0.3932	(0.1105)
* .	4	-0.2272	(0.4314)
*.	5	-0.1064	(0.6913)
*.	6	-0.0306	(0.8592)
	Sum of Lags	-3.3837	(0.0019)

Lag Distribution of RMUDI4_SINGAPORE

	Lag	Coefficient	P-value
* .	0	-0.0030	(0.6517)
* .	1	-0.0043	(0.1089)
* .	2	-0.0051	(0.0002)
* .	3	-0.0052	(0.0718)
* .	4	-0.0048	(0.2006)
* .	5	-0.0038	(0.2886)
* .	6	-0.0022	(0.3462)
	Sum of Lags	-0.0283	(0.0002)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Table 24. Relationship among Real RMU, Real RMUDI, and Exports in Thailand

Thailand

RMU1

Variable	Coefficient		P-value
C	-84.9045	***	(0.0000)
LOG(OECDGDP)	0.8329		(0.7606)
LOG(OECDGDP(-1))	4.6834		(0.1219)
Adjusted R-squared	0.9915		
Durbin-Watson stat	2.9722		
Akaike info criterion	-4.3389		
F-statistic	428.3868		

Lag Distribution of LOG(RMU1)

	Lag	Coefficient	P-value
* .	0	-0.4704	(0.3445)
* .	1	-0.2979	(0.2116)
* .	2	-0.1605	(0.0277)
* .	3	-0.0582	(0.6373)
. *	4	0.0090	(0.9611)
. *	5	0.0411	(0.8260)
. *	6	0.0381	(0.7618)
	Sum of Lags	-0.8987	(0.0277)

Lag Distribution of RMUDI1_THAILAND

	Lag	Coefficient	P-value
. *	0	0.0001	(0.9282)
. *	1	0.0006	(0.5369)
. *	2	0.0009	(0.5147)
. *	3	0.0010	(0.5644)
. *	4	0.0010	(0.5946)
. *	5	0.0008	(0.6132)
. *	6	0.0005	(0.6256)
	Sum of Lags	0.0049	(0.5147)

RMU2

Variable	Coefficient		P-value
C	-85.3760	***	(0.0000)
LOG(OECDGDP)	2.1067		(0.4590)
LOG(OECDGDP(-1))	3.4396		(0.2362)
Adjusted R-squared	0.9915		
Durbin-Watson stat	2.8681		
Akaike info criterion	-4.3353		
F-statistic	426.8651		

Lag Distribution of LOG(RMU2)

	Lag	Coefficient	P-value
* .	0	-0.0215	(0.9564)
* .	1	-0.0560	(0.7974)
* .	2	-0.0780	(0.4391)
* .	3	-0.0875	(0.2791)
* .	4	-0.0844	(0.4401)
* .	5	-0.0688	(0.5409)
* .	6	-0.0407	(0.5972)
	Sum of Lags	-0.4370	(0.4391)

Lag Distribution of RMUDI2_THAILAND

	Lag	Coefficient	P-value
* .	0	-0.0019	(0.1891)
* .	1	-0.0003	(0.5852)
. *	2	0.0008	(0.3776)
. *	3	0.0015	(0.2561)
. *	4	0.0017	(0.2278)
. *	5	0.0016	(0.2161)
. *	6	0.0010	(0.2099)
	Sum of Lags	0.0044	(0.3776)

RMU3

Variable	Coefficient		P-value
C	-84.8293	***	(0.0000)
LOG(OECDGDP)	2.0071		(0.4822)
LOG(OECDGDP(-1))	3.5072		(0.2309)
Adjusted R-squared	0.9915		
Durbin-Watson stat	2.8771		
Akaike info criterion	-4.3364		
F-statistic	427.3333		

Lag Distribution of LOG(RMU3)

	Lag	Coefficient	P-value
* .	0	-0.0490	(0.9141)
* .	1	-0.0745	(0.7652)
* .	2	-0.0892	(0.4063)
* .	3	-0.0930	(0.2505)
* .	4	-0.0860	(0.4698)
* .	5	-0.0682	(0.5877)
* .	6	-0.0395	(0.6493)
	Sum of Lags	-0.4994	(0.4063)

Lag Distribution of RMUDI3_THAILAND

	Lag	Coefficient	P-value
* .	0	-0.0018	(0.2089)
* .	1	-0.0003	(0.6318)
. *	2	0.0008	(0.3852)
. *	3	0.0015	(0.2689)
. *	4	0.0017	(0.2413)
. *	5	0.0016	(0.2299)
. *	6	0.0010	(0.2239)
	Sum of Lags	0.0044	(0.3852)

RMU4

Variable	Coefficient		P-value
C	-88.5404	***	(0.0000)
LOG(OECDGDP)	2.4331		(0.3823)
LOG(OECDGDP(-1))	3.2988		(0.2389)
Adjusted R-squared	0.9916		
Durbin-Watson stat	2.8834		
Akaike info criterion	-4.3552		
F-statistic	435.4919		

Lag Distribution of LOG(RMU4)

	Lag	Coefficient	P-value
. *	0	0.0286	(0.9359)
* .	1	-0.0124	(0.9513)
* .	2	-0.0411	(0.6869)
* .	3	-0.0575	(0.4640)
* .	4	-0.0616	(0.5273)
* .	5	-0.0534	(0.5879)
* .	6	-0.0329	(0.6243)
	Sum of Lags	-0.2304	(0.6869)

Lag Distribution of RMUDI4_THAILAND

	Lag	Coefficient	P-value
* .	0	-0.0020	(0.1455)
* .	1	-0.0005	(0.3570)
. *	2	0.0006	(0.4704)
. *	3	0.0013	(0.2780)
. *	4	0.0015	(0.2348)
. *	5	0.0014	(0.2173)
. *	6	0.0009	(0.2080)
	Sum of Lags	0.0031	(0.4704)

1. RMU and RMUDI are calculated by Authors.
2. ALL GDP data are seasonally adjusted. Data are from IFS (IMF).
3. Dots (".") in the graph indicate zero.

Figure 1. Various RMUs

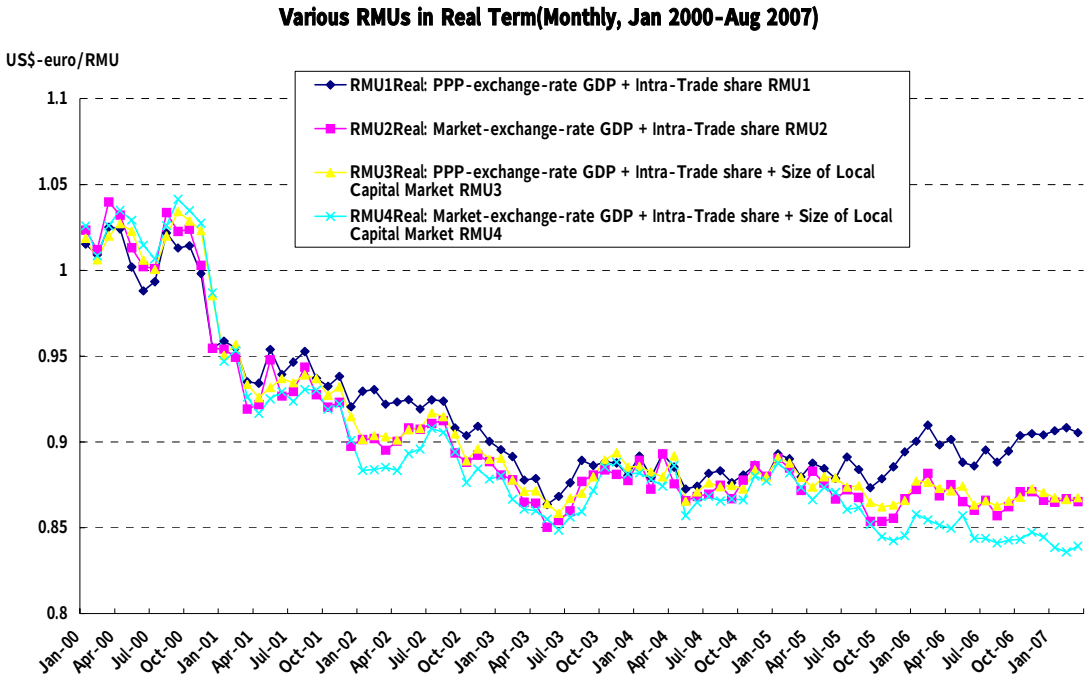


Figure 2. The RMU1 Deviation Indicators

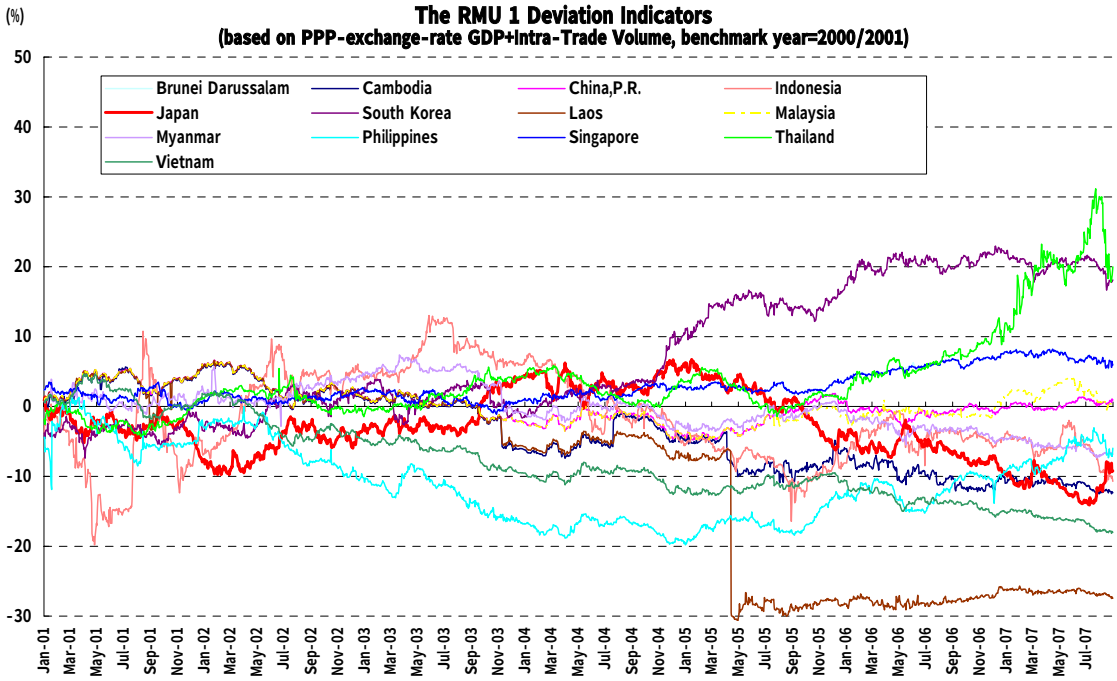


Figure 3. The RMU2 Deviation Indicators

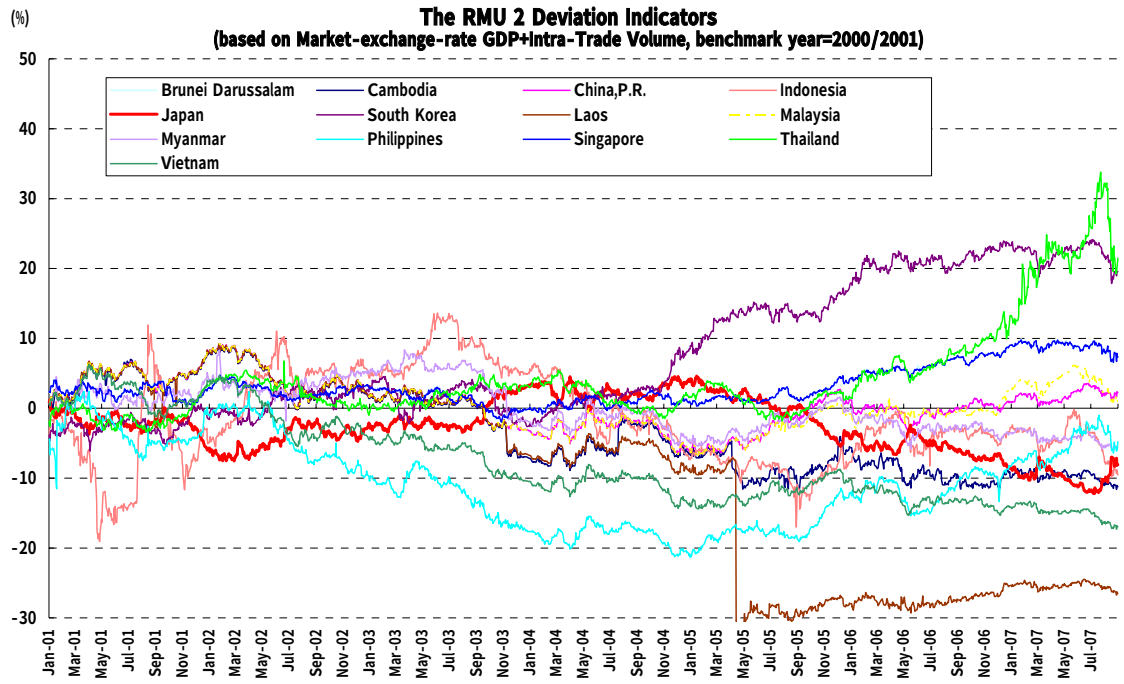


Figure 4. The RMU3 Deviation Indicators

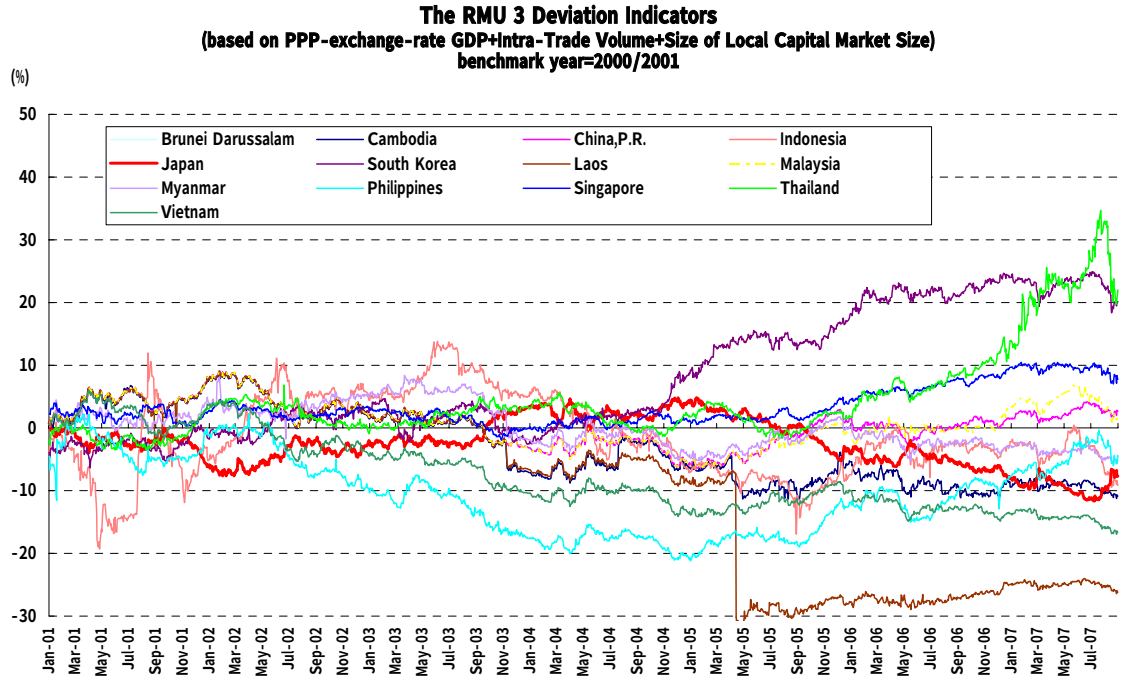


Figure 5. The RMU4 Deviation Indicators

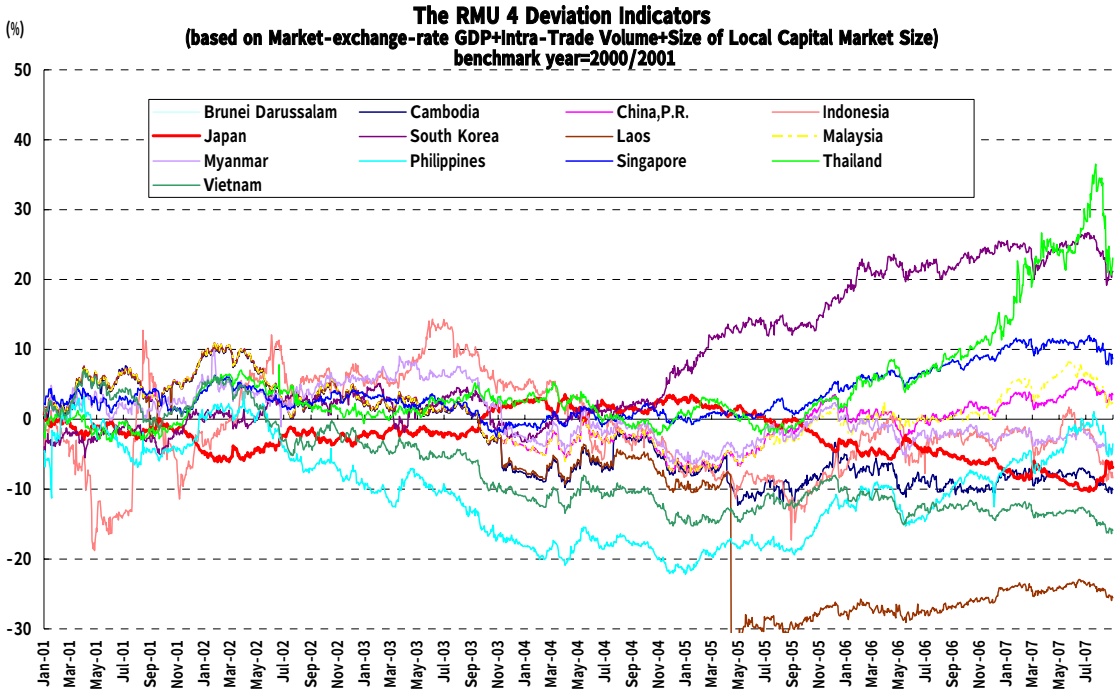


Figure 6. The movement of NEER in East Asia

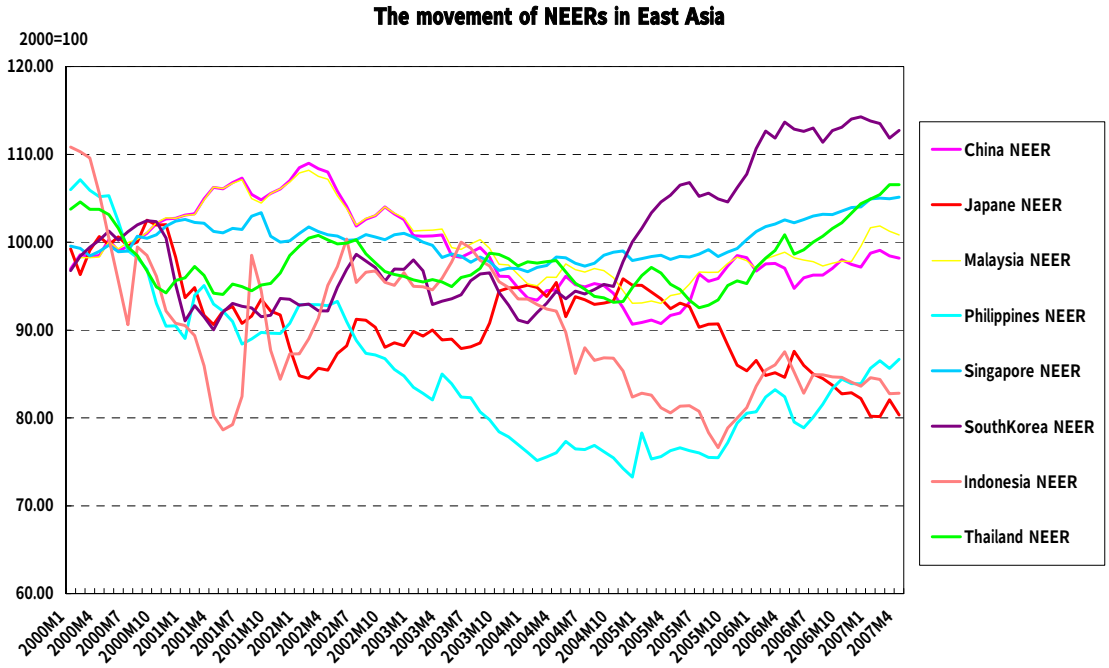


Figure 7 The Relationship between Trade data and RMUDI-Brunei

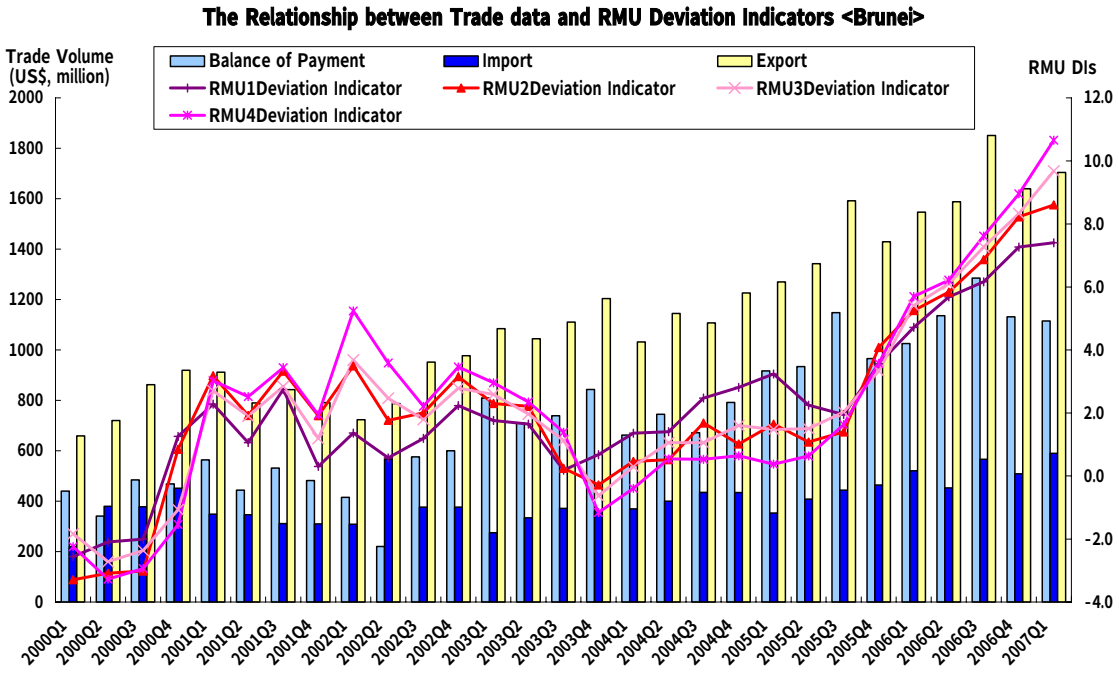


Figure 8 The Relationship between Trade data and RMUDI-Cambodia

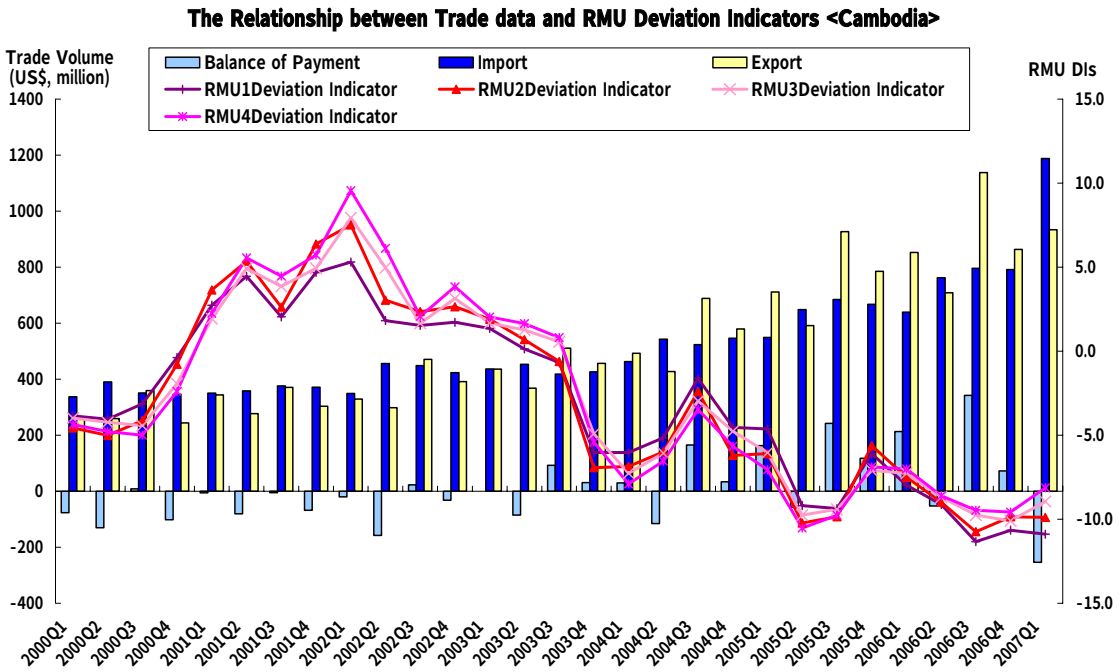


Figure 9 The Relationship between Trade data and RMUDI-China

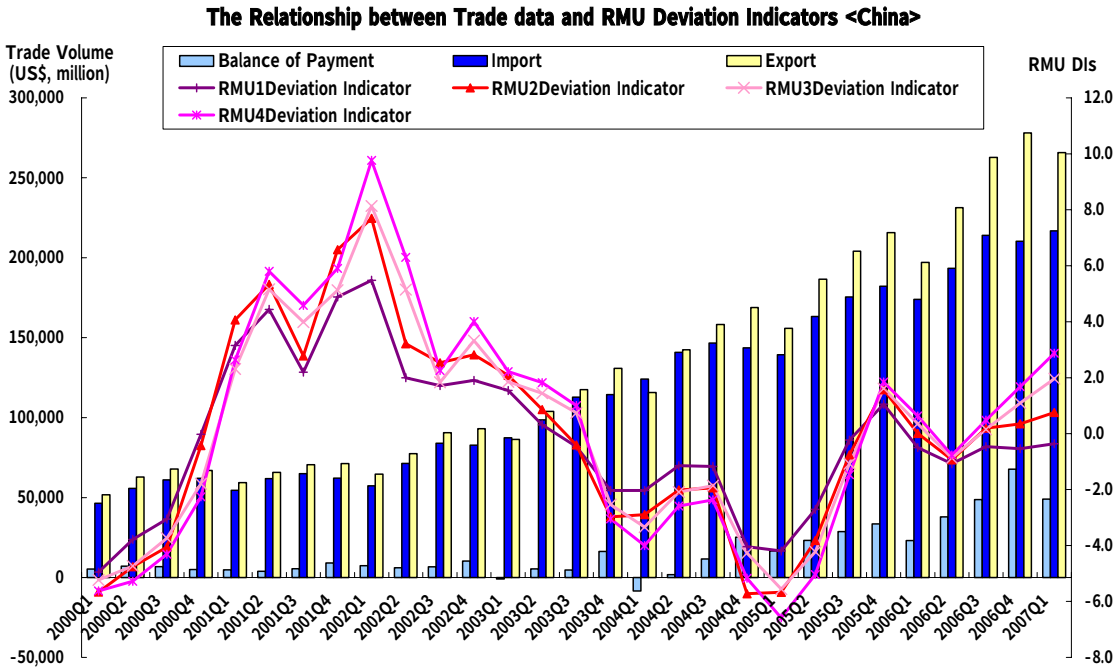


Figure 10 The Relationship between Trade data and RMUDI-Indonesia

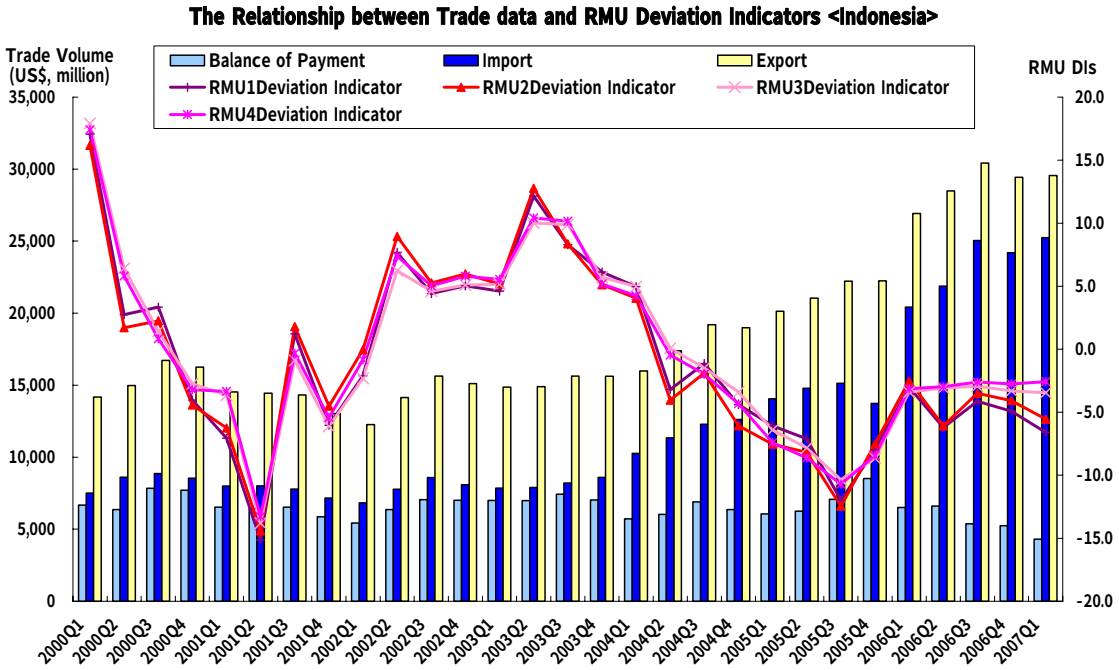


Figure 11 The Relationship between Trade data and RMUDI-Japan

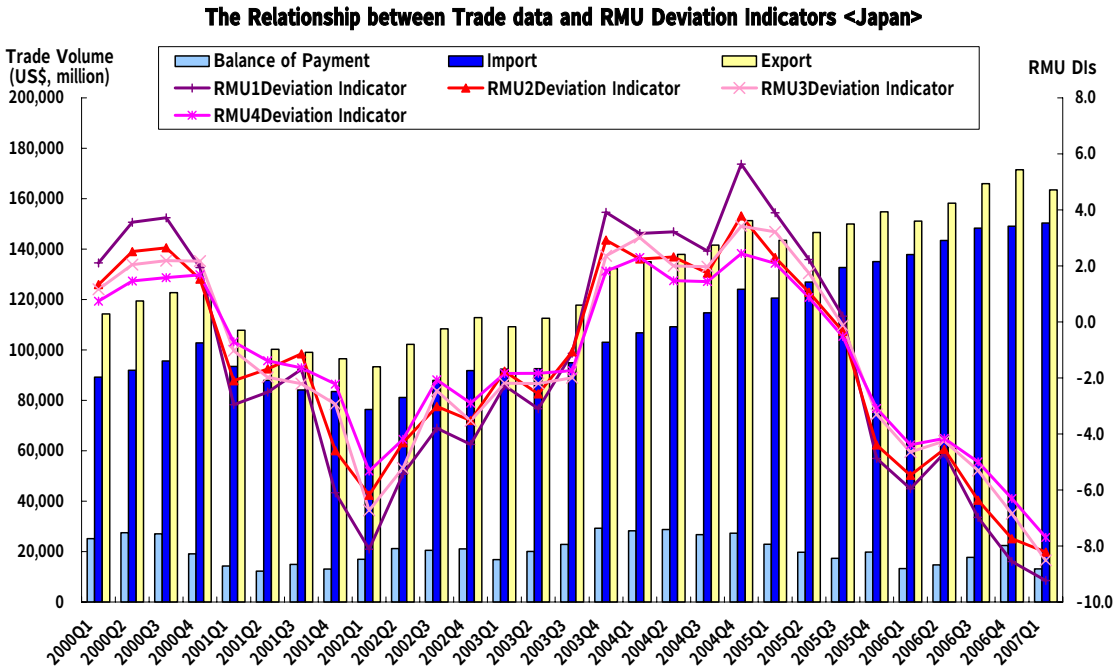


Figure 12 The Relationship between Trade data and RMUDI-South Korea

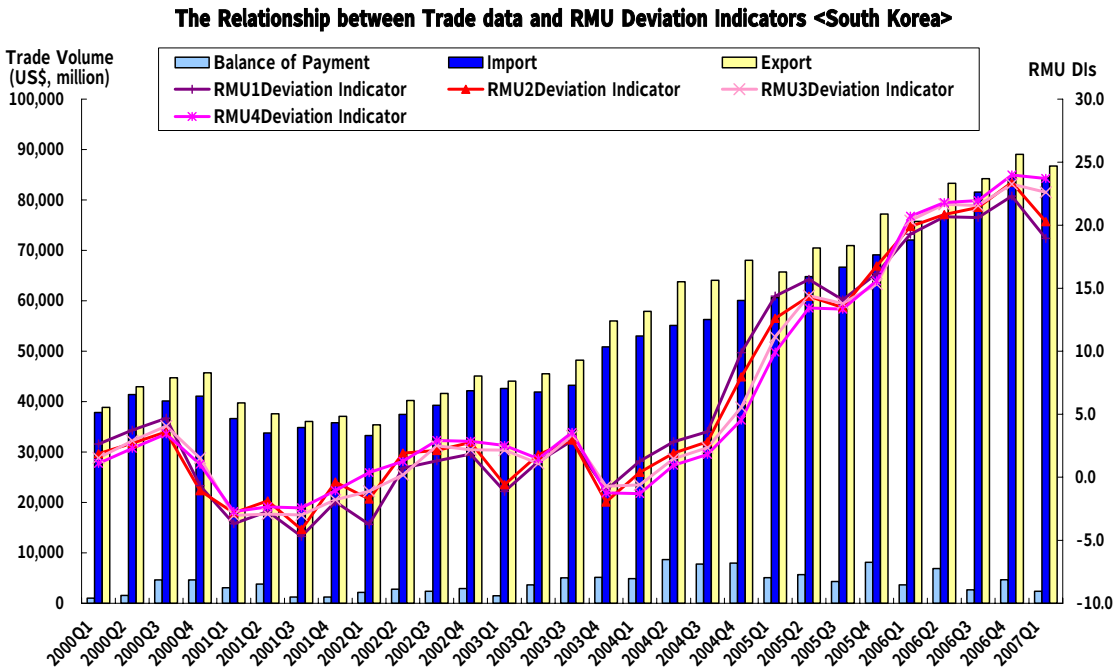


Figure 13 The Relationship between Trade data and RMUDI-Lao

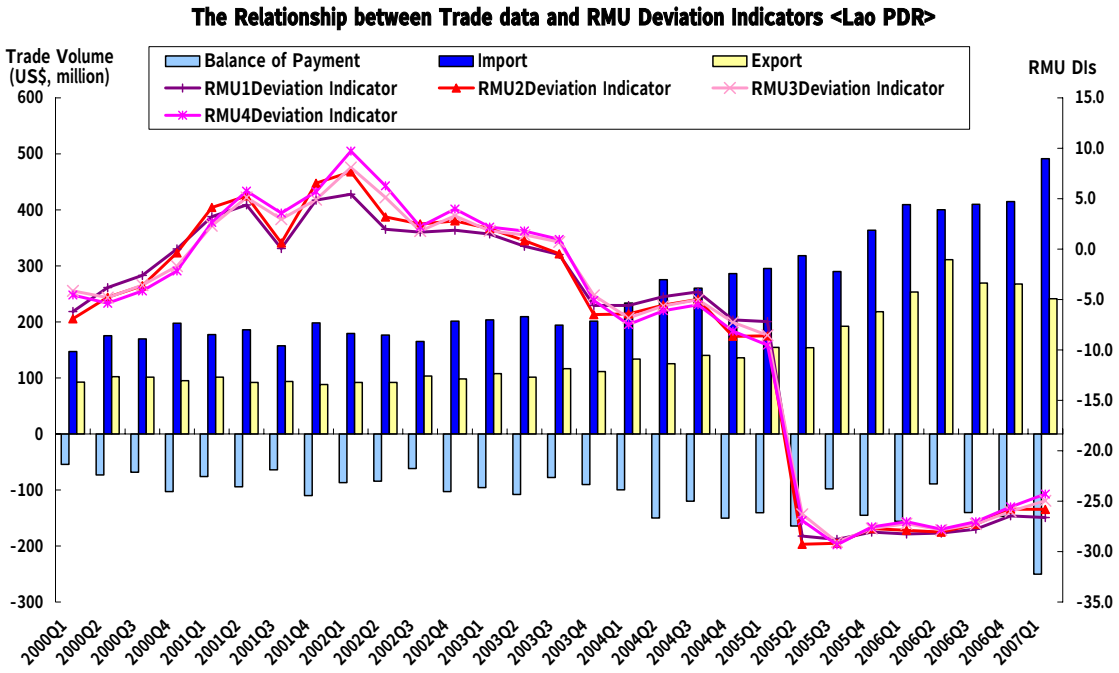


Figure 14 The Relationship between Trade data and RMUDI-Malaysia

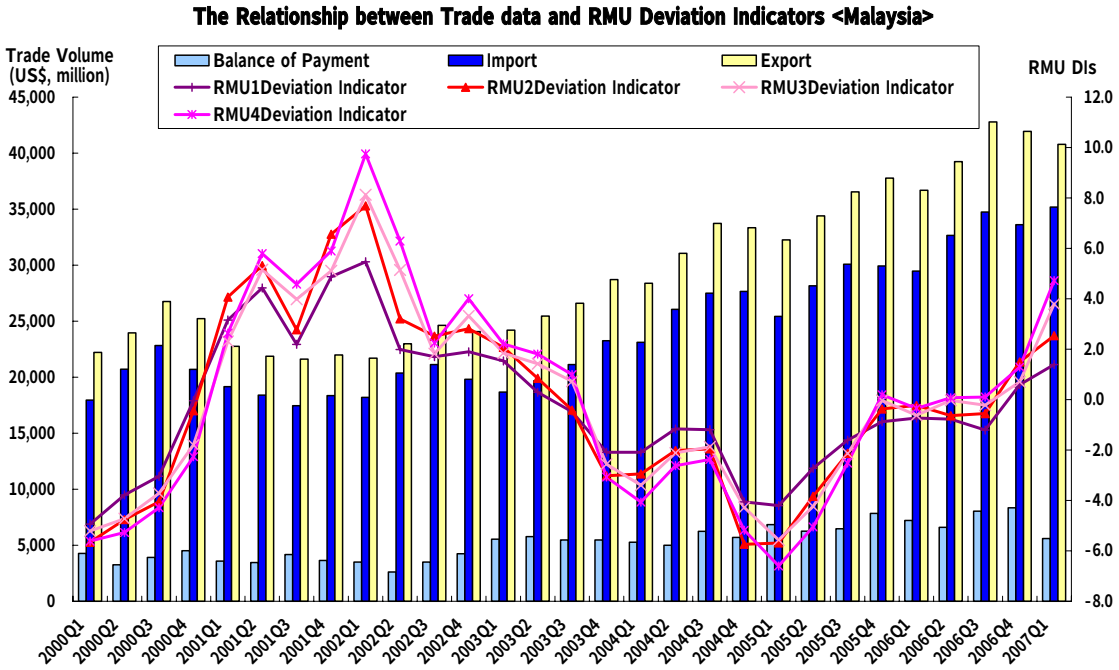


Figure 15 The Relationship between Trade data and RMUDI-Myanmar

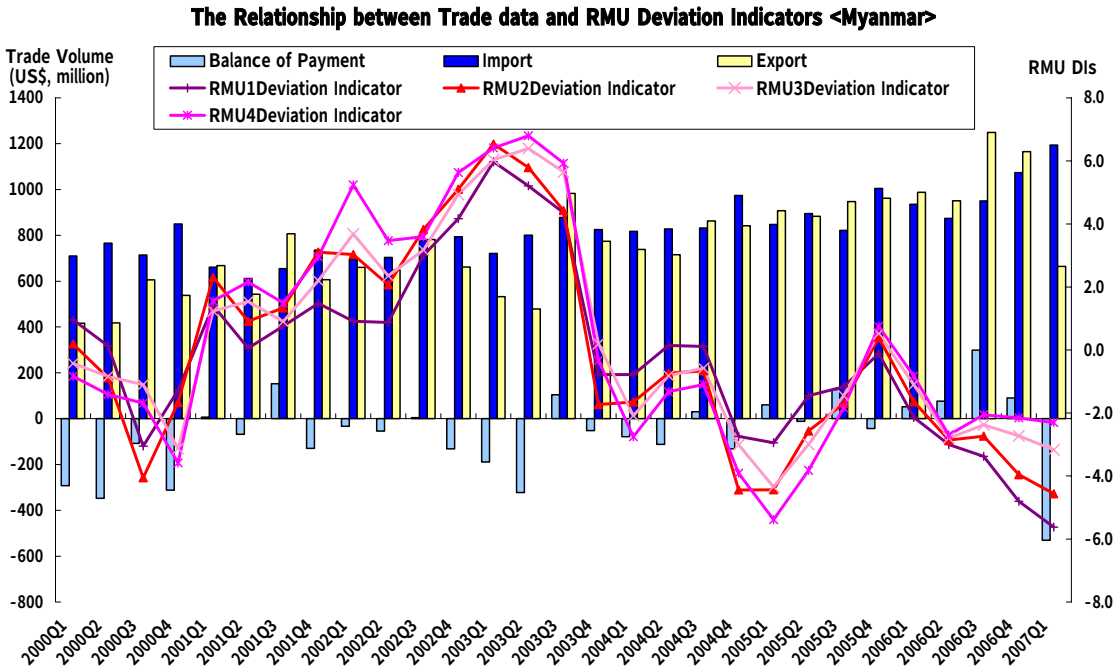


Figure 16 The Relationship between Trade data and RMUDI-Philippines

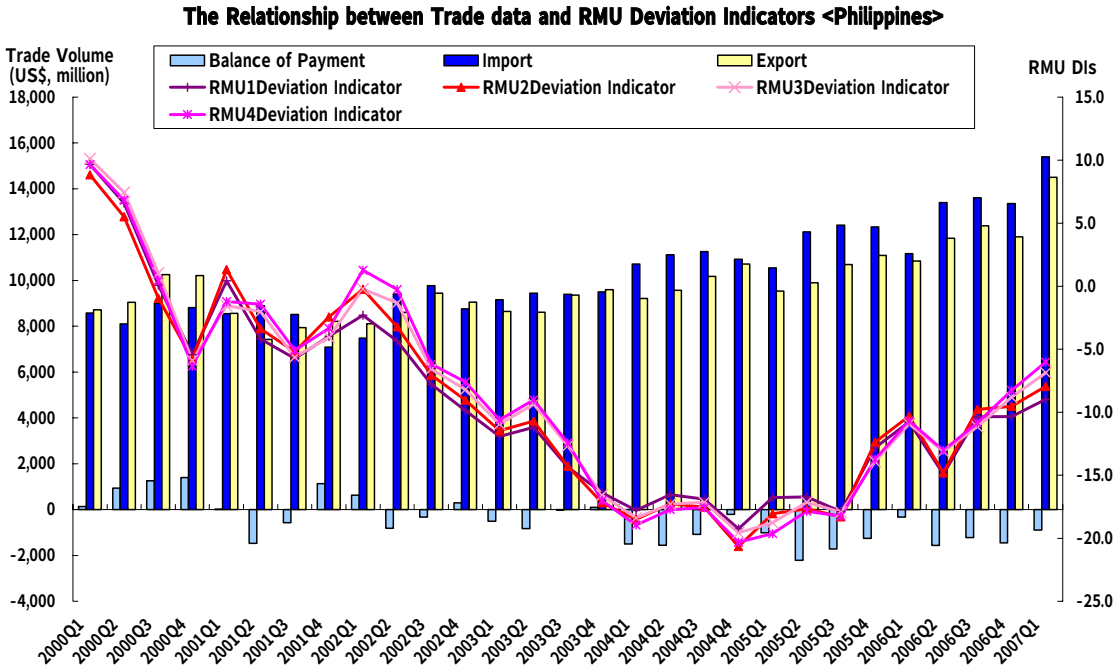


Figure 17 The Relationship between Trade data and RMUDI-Singapore

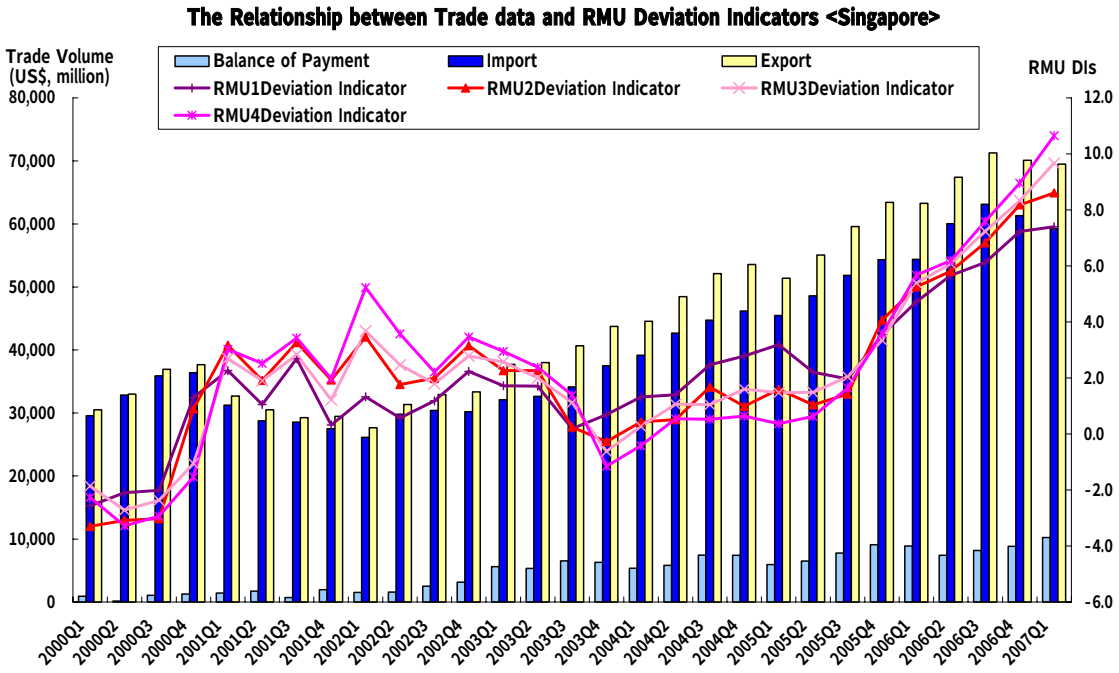


Figure 18 The Relationship between Trade data and RMUDI-Thailand

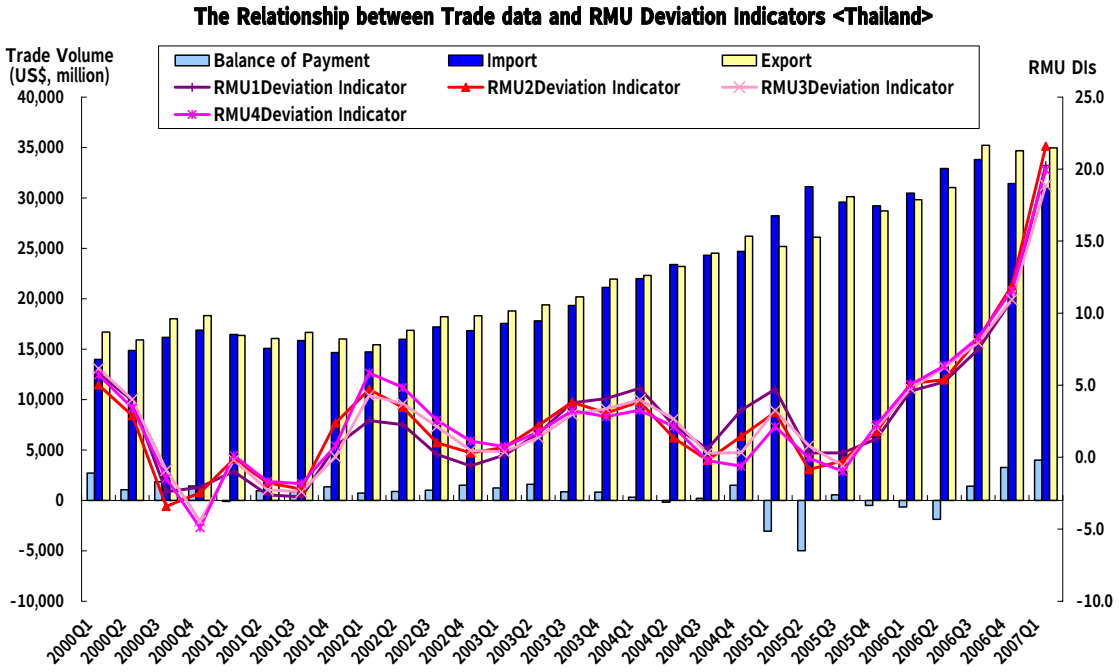
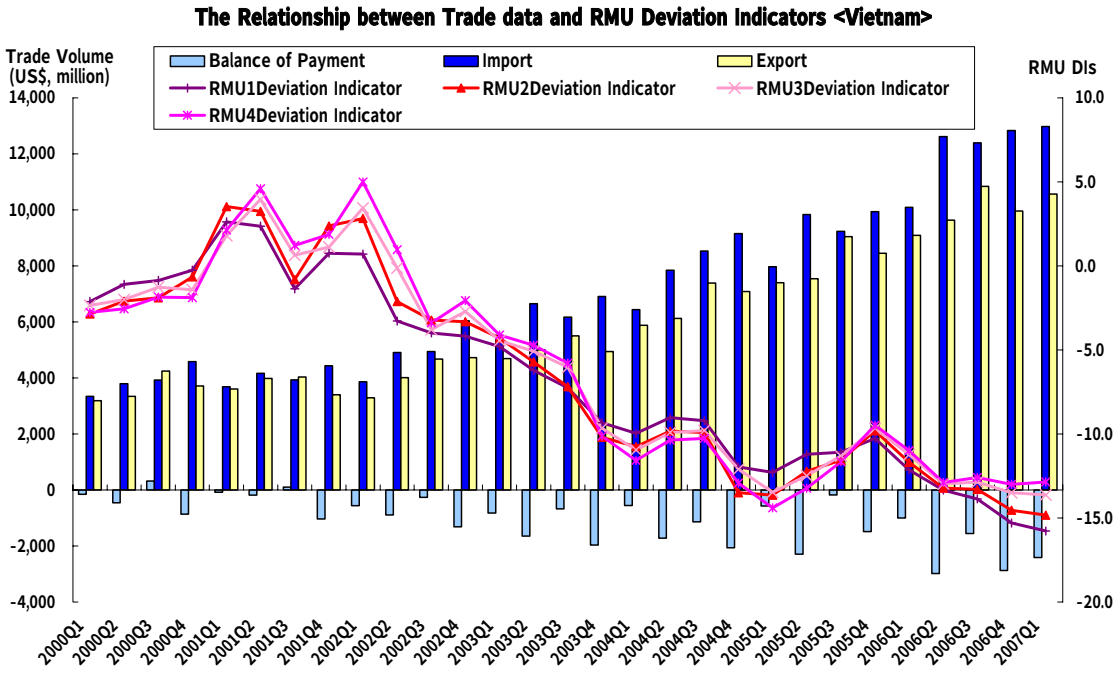
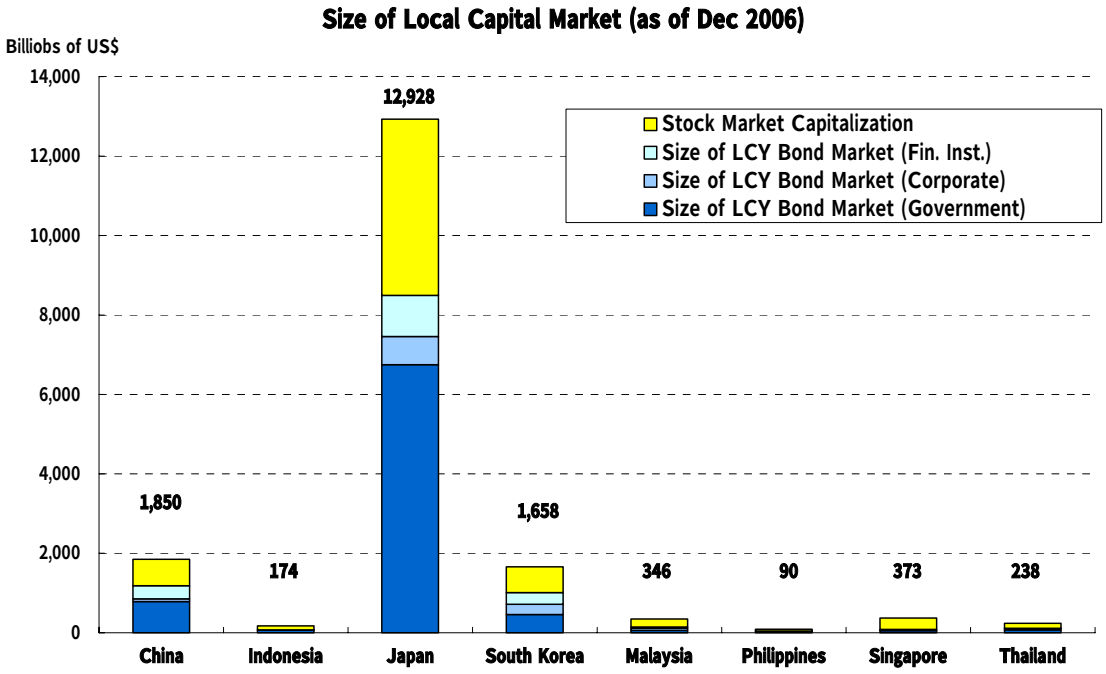


Figure 19 The Relationship between Trade data and RMUDI-Vietnam



Appendix 1:



Appendix 2:

Figure1. The Relationship between Capital flow and RMUDI- Cambodia

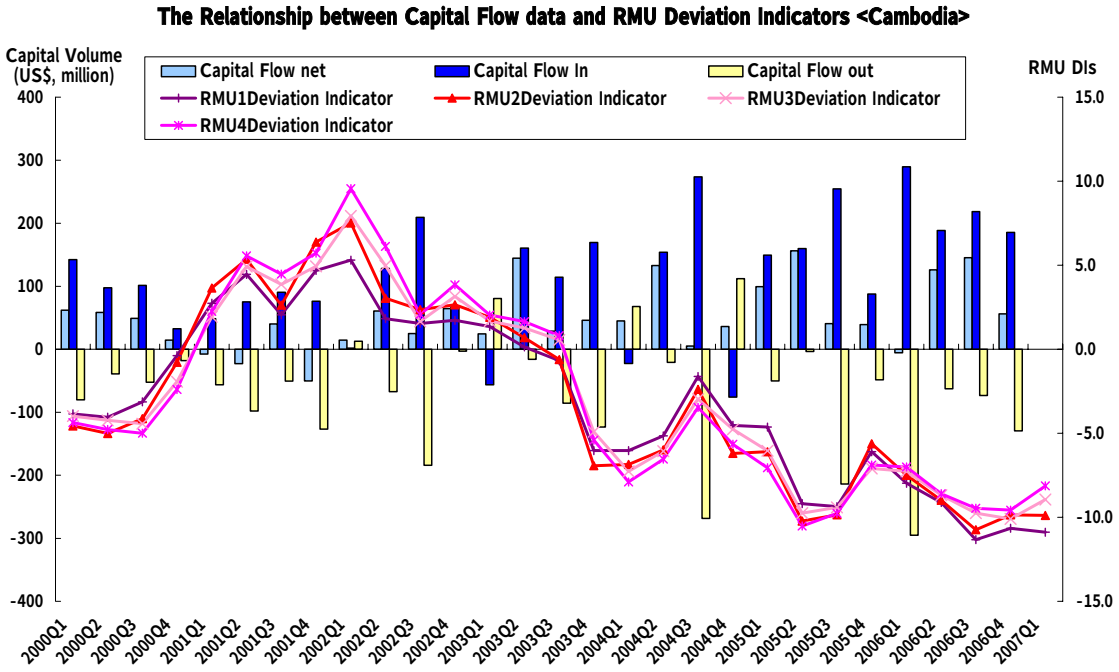


Figure 2. The Relationship between Capital flow and RMUDI-Indonesia

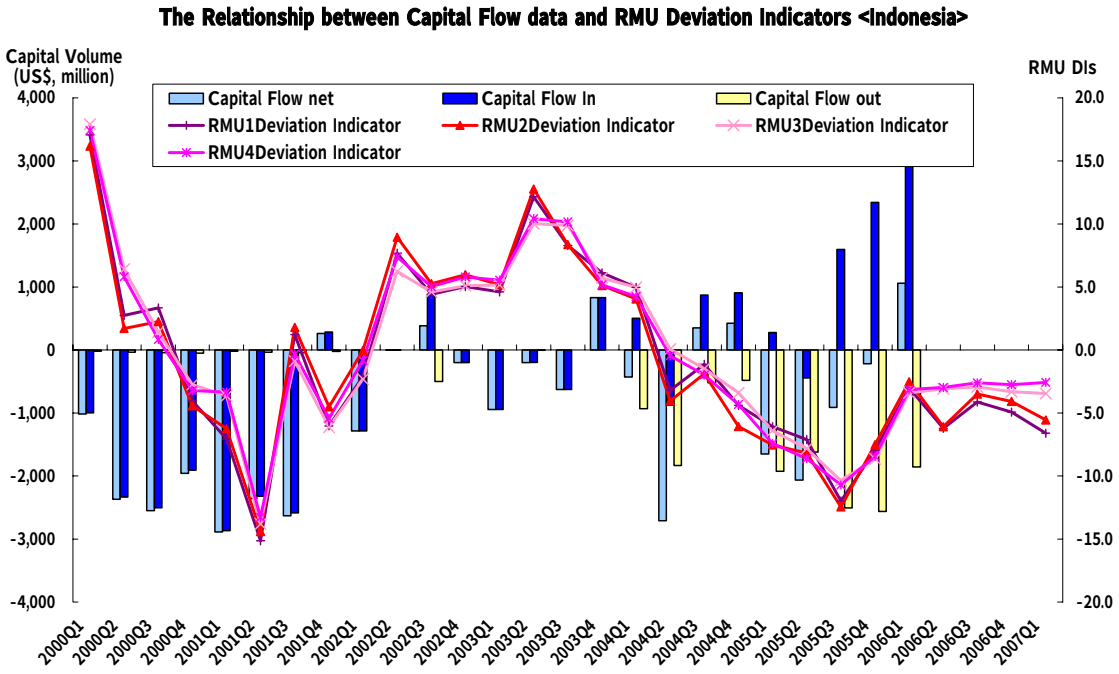


Figure 3. The Relationship between Capital flow and RMUDI-Japan

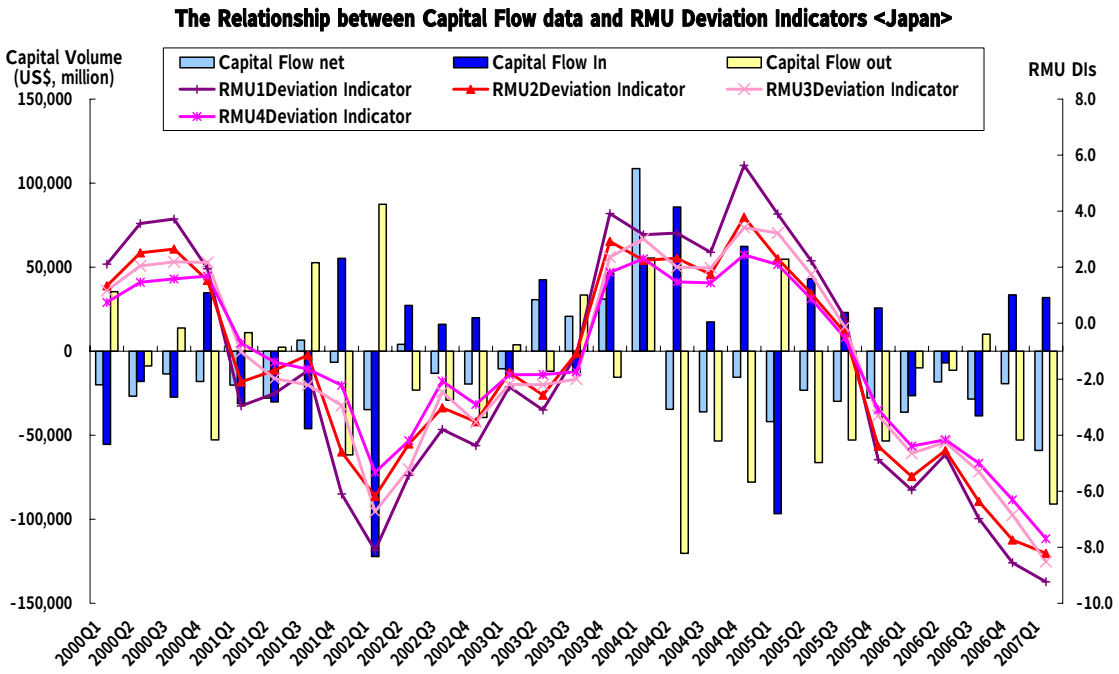


Figure 4. The Relationship between Capital flow and RMUDI-South Korea

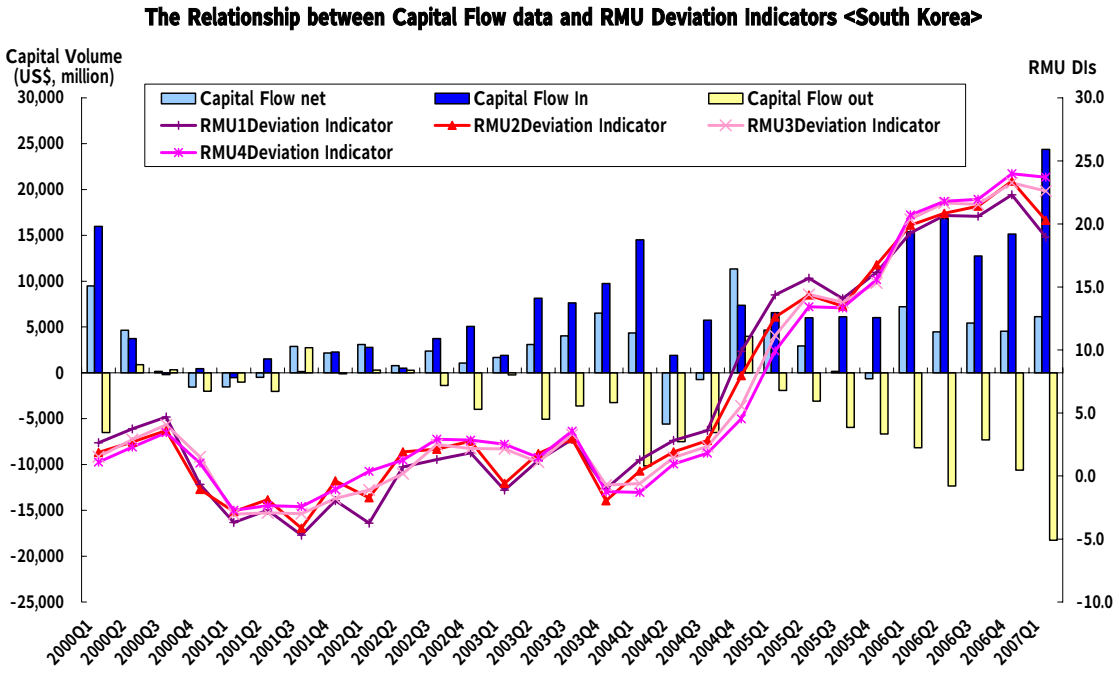


Figure 5 The Relationship between Capital flow and RMUDI-Philippines

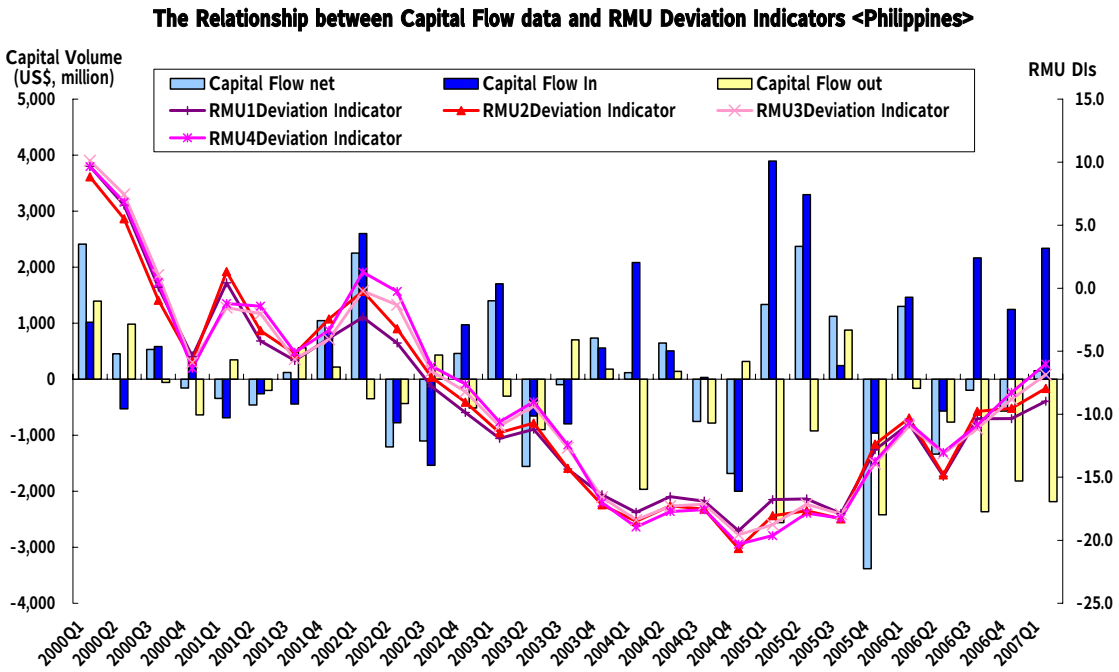


Figure 6 The Relationship between Capital flow and RMUDI-Singapore

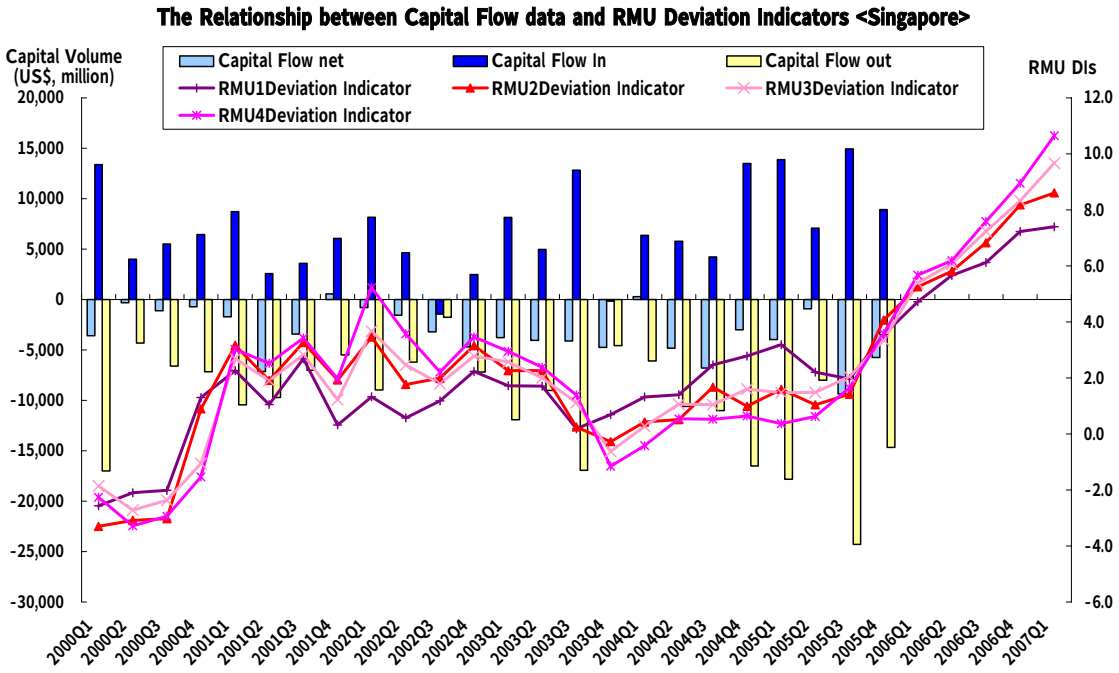


Figure 7 The Relationship between Capital flow and RMUDI-Thailand

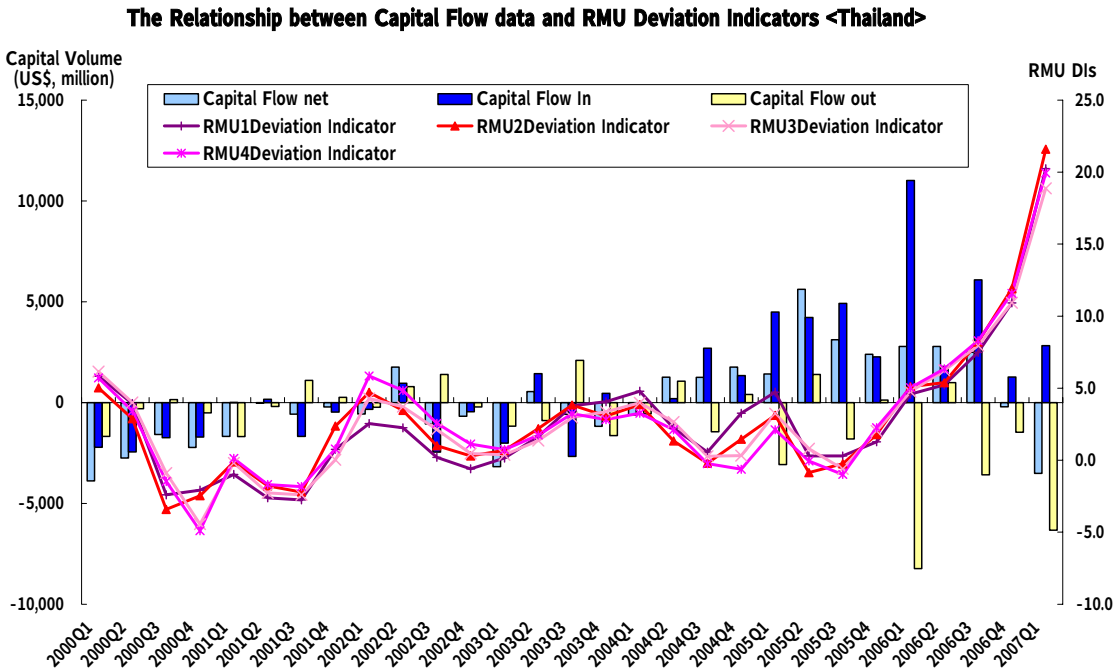
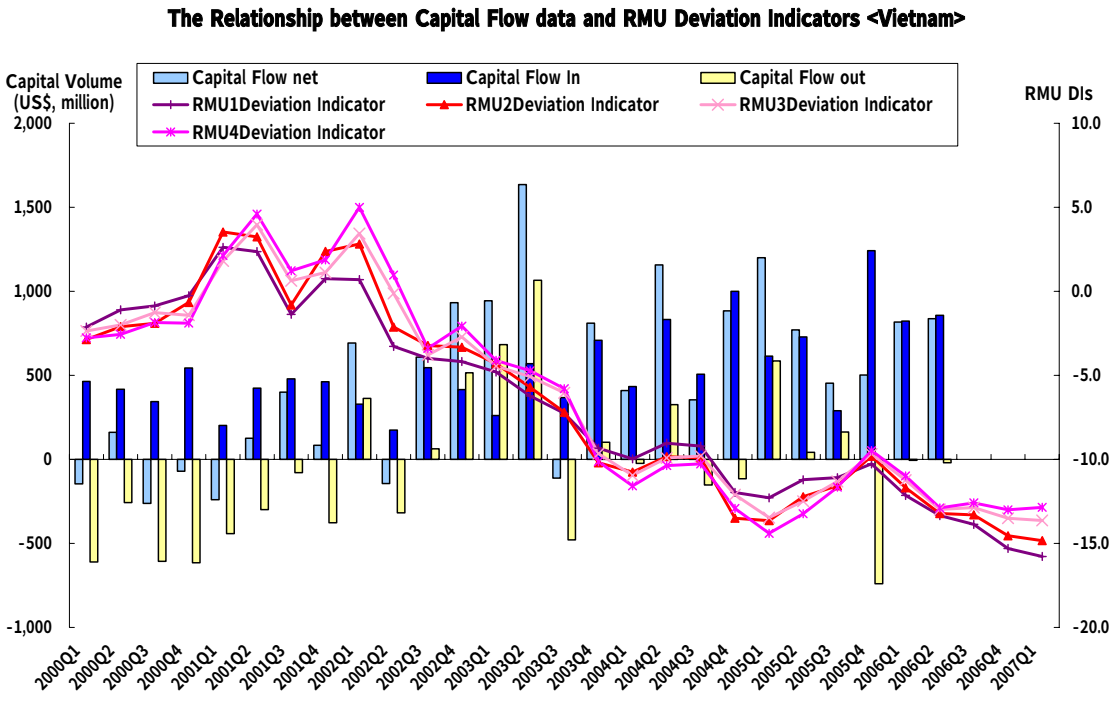


Figure 8 The Relationship between Capital flow and RMUDI-Vietnam



Appendix 3: Selection of benchmark year.

Table 1.

How does the value of RMU DIs change depending on the selection of benchmark year?

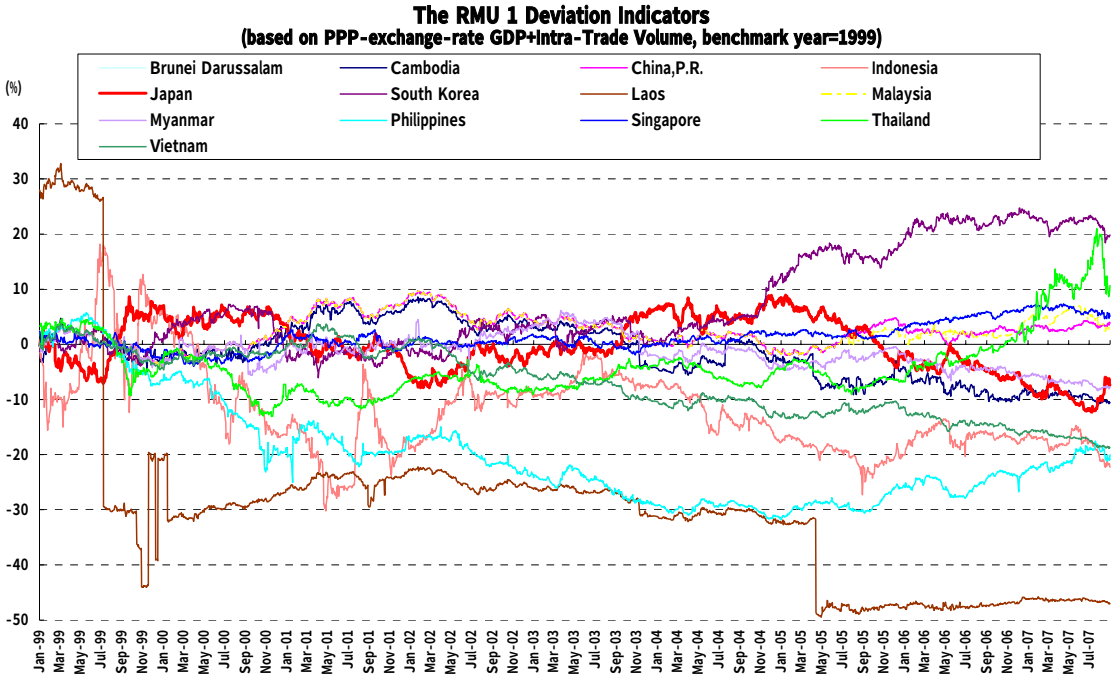
(%)

Benchmark year	1999	2000-2001	2002	2003	2004	2005
Brunei Darussal	6.3	7.2	5.8	6.2	5.2	4.4
Cambodia	-9.3	-11.1	-13.7	-10.5	-7.0	-3.8
China, P.R.	3.2	0.3	-2.8	0.2	2.4	2.1
Indonesia	-18.0	-5.8	-7.7	-12.3	-6.6	2.2
Japan	-9.4	-11.2	-5.8	-10.1	-14.3	-12.0
Korea, R.	22.0	20.3	20.7	18.9	16.6	5.2
Laos	-46.4	-26.5	-28.8	-26.2	-22.4	-5.2
Malaysia	5.1	2.1	-1.1	2.0	4.2	4.7
Myanmar	-6.8	-5.7	-7.7	-9.6	-5.0	-4.2
Philippines	-20.8	-6.9	-1.6	6.5	12.7	11.5
Singapore	6.3	7.2	5.8	6.1	5.2	4.4
Thailand	11.0	20.3	18.8	18.2	17.1	18.0
Vietnam	-17.0	-16.2	-14.4	-10.3	-7.0	-5.6

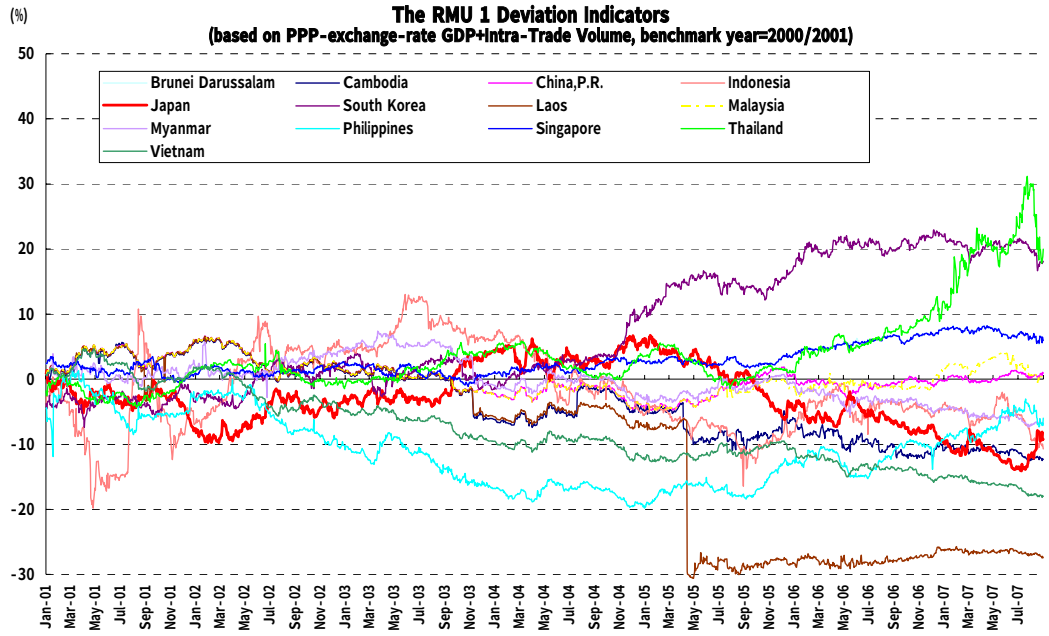
Remarks: All the figures are RMU deviation indicators during Jan. to Aug. in 2007 based on RMU1

Deviation Indicator (RMU1) in various benchmark periods

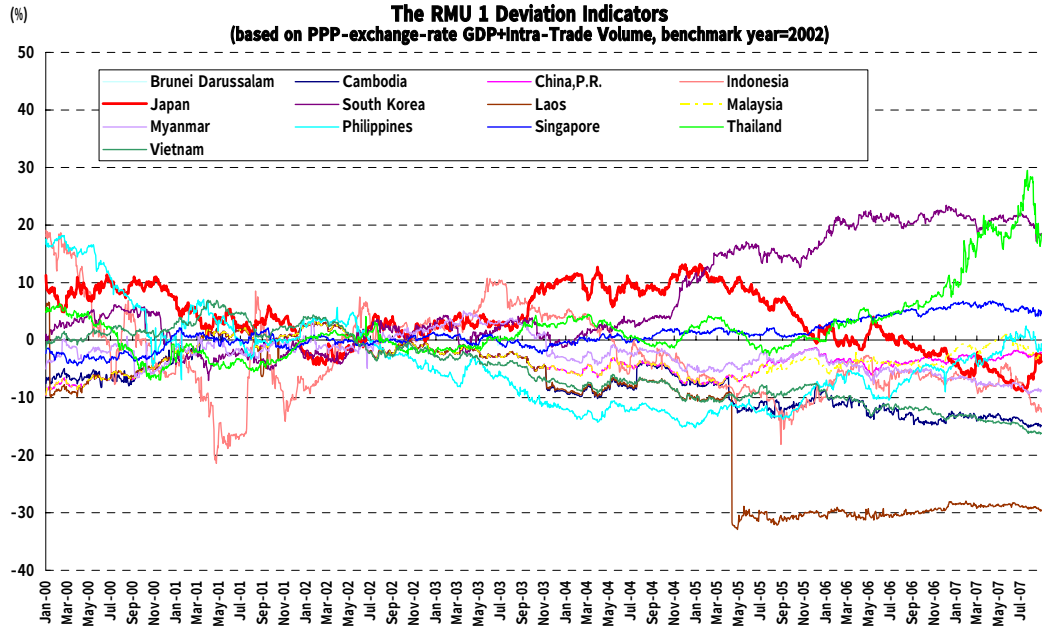
Benchmark year: 1999



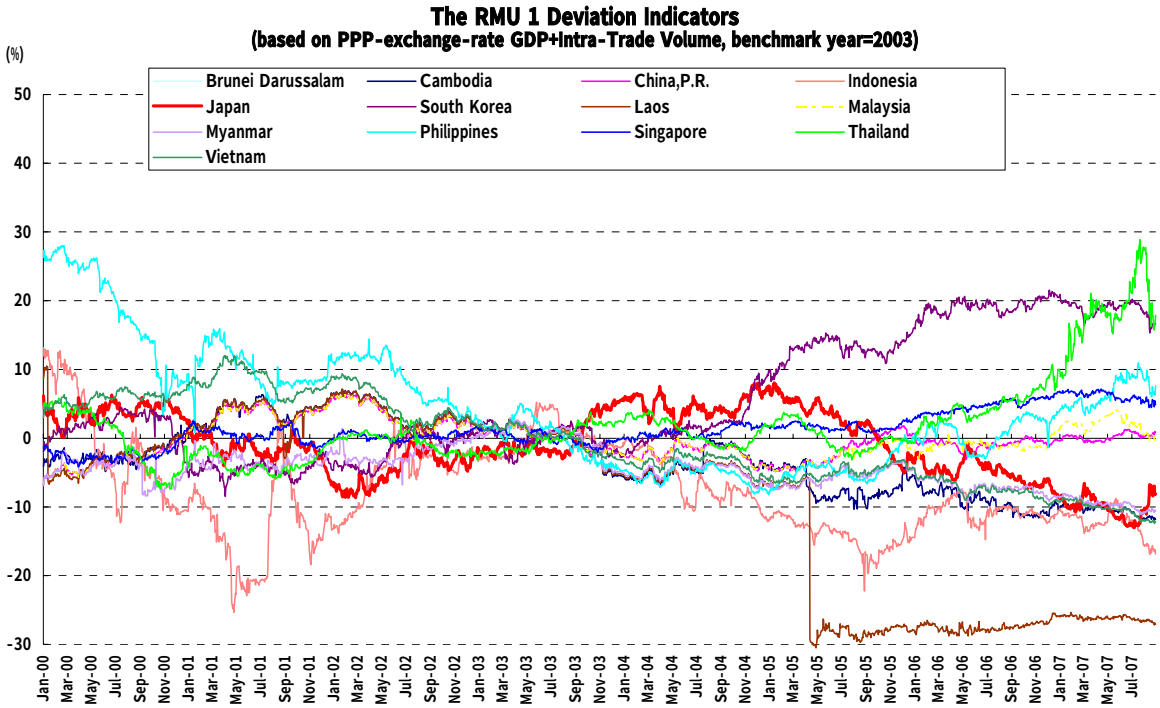
Benchmark year: 2000-2001



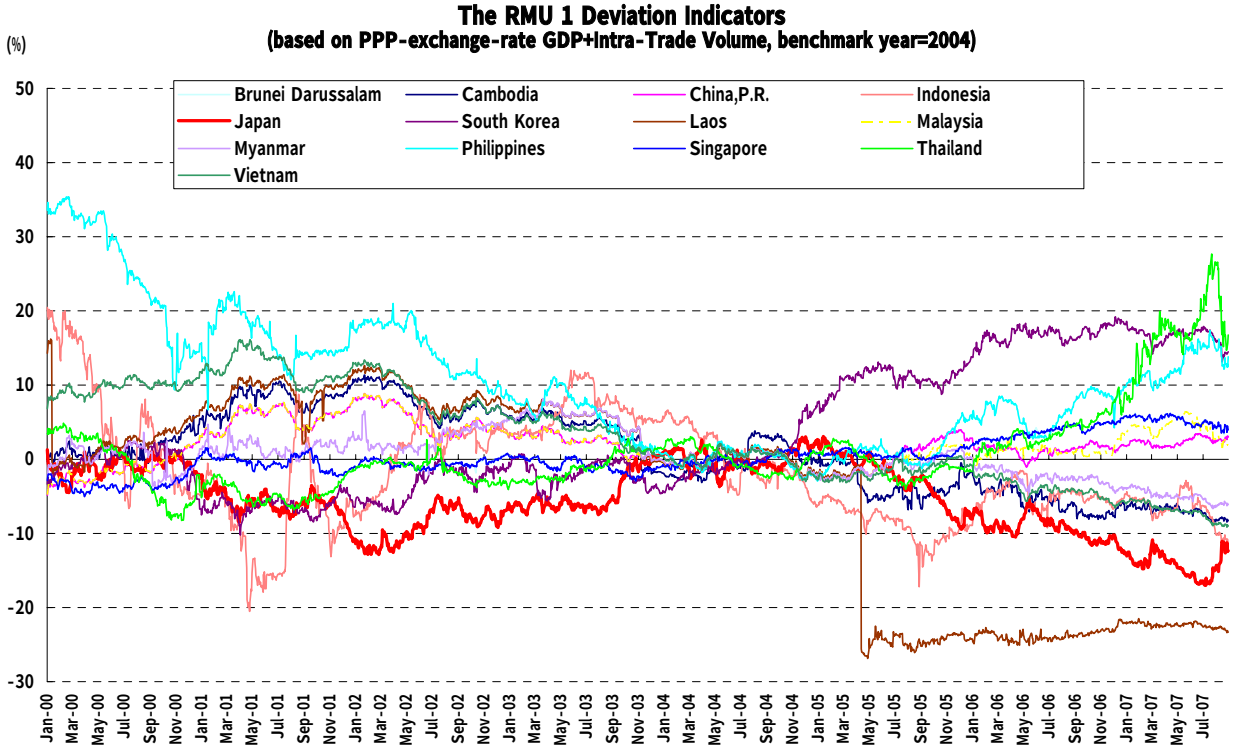
Benchmark year: 2002



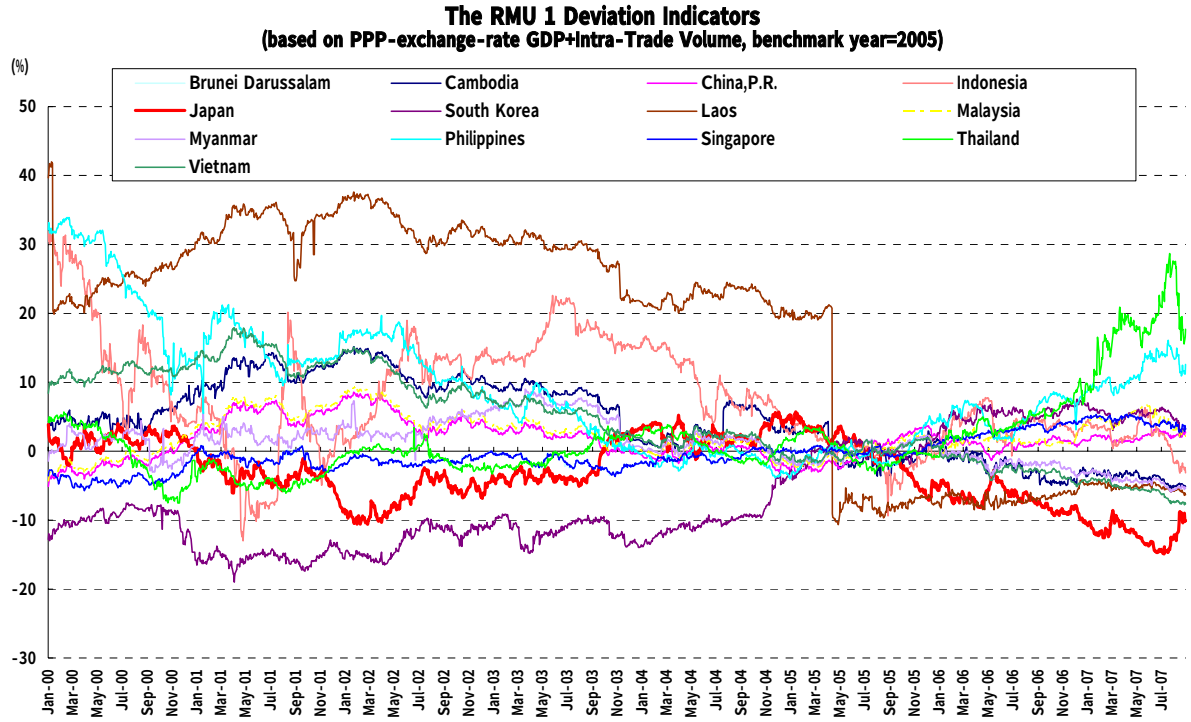
Benchmark year: 2003



Benchmark year: 2004



Benchmark year: 2005



CHPTER 2

STRENGTHEN REGIONAL SURVEILLANCE UTILIZING VARIOUS ECONOMIC AND FINANCIAL INDICATORS INCLUDING RMUs

Chapter 2 : Strengthen regional surveillance utilizing various economic and financial indicators including RMUs

Introduction

As economic conditions and policies of a country may more easily spill over to affect many other countries and regions with the globalization of the world economy, regional surveillance mechanisms that have the functions of information exchange, peer review and pressure, and due diligence have become increasingly important.

The IMF conducts a three-tier surveillance; bilateral, regional and multilateral on the global economy. As regards bilateral surveillance, the "1977 Executive Board Decision on Surveillance over Exchange Rate Policies", which had been applied for 30 years was reviewed and "the Decision on Bilateral Surveillance over Members' Policies" was adopted in June 2007.

Under the ASEAN + 3 framework, a meeting focusing on policy dialogue concerning economic situations and policy issues of member countries has been held twice annually since 2002 among the deputies of the Finance Ministers and Central Bank governors with the understanding that it is critical to accurately grasp the regional economic situation to activate the swap arrangements. This is in addition to the annual ASEAN + 3 Finance Ministers' dialogue on economic situations and policy issues. The regional economic surveillance framework is called the Economic Review and Policy Dialogue (ERPD). In May 2005, an agreement was reached on the integration of the ASEAN+3 economic surveillance into the CMI framework and to enhance regional surveillance, and the Group of Experts (GOE) and Technical Working Group of Economic Financial Monitoring (ETWG) were established to examine the regional economic situation.

This chapter will study the pending issues in utilizing a RMU for regional surveillance based on the current situation of the surveillance mechanism in Asia. Then the relationship between the ERPD, which is a regional framework, and the IMF's surveillance system, which is global in nature, and their respective roles will be reviewed.

2-1. Regional surveillance for crisis prevention and intra-regional exchange rate stability

2-1-1. Information sharing, peer review/peer pressure, and due diligence

Regional surveillance plays the function of mutually monitoring the economic situation of the regional countries and is indispensable for avoiding currency crises. It is also expected to contribute to the regional economic and financial stability.

Regional surveillance can be categorized into the following three based on their functions.
The first is information sharing. This means sharing of information on the economic conditions, policy options, constraints, and objectives of the countries in the region. It provides opportunities for improving data and statistical system of member countries. Information on neighboring countries' economic conditions and policies would be useful for policymaking. Frequent contacts and meetings for information sharing would nurture a sense of trust and human networks among member countries.

The second is peer review and peer pressure. Moving one step further from just information sharing, discussions would be held on economic issues that affect the region and the member countries, and would lead to recommendations, soft persuasion, and pressure on members' economic policies. There would, of course, be no means of enforcement or penalties.

The third is due diligence. It involves assessment of the ability of a potential borrowing country to pay from the lens of a potential lending country. Based on the assessments, loan details, such as amount, duration, and interest rate, and supplementary conditions that the borrowing country must adhere to would be determined in loan agreements as part of financial support.

Information sharing, peer review/ peer pressure, and due diligence are mutually complementary. Information sharing provides the foundation for peer review and peer pressure, and due diligence. In economic surveillance, it is possible to strengthen both peer review/peer pressure and due diligence. Both are mutually complementary.

2-1-2. Enhancing the function of ASEAN+3 ERPD

2-1-2-1. Crisis prevention

Surveillance is essential for lenders to invoke emergency loans such as the CMI with confidence.
Under the Bilateral Swap Agreement (BSA) of the CMI, the size of swaps that could be withdrawn without the IMF-supported program had been 10% but was increased to 20% in May 2005 when the ERPD, the surveillance mechanism created under the ASEAN + 3 Finance Ministers process, was

developed to some extent.

It is understood that under the ERPD scheme, the Asian Development Bank (ADB) is reporting on the economic conditions and structural issues of the individual countries and the region, and individual members are explaining and conducting Q&A sessions on the economic conditions, economic policies and structural issues of their countries. It seems that the ERPD is currently closest to the information sharing category among those shown in 2-1-1. If the function of peer review and peer pressure should be added to the information sharing, the ERPD should be able to greatly contribute to preventing currency crises in the future.

In addition to peer review and peer pressure, the functions of the ERPD should develop so that it could provide due diligence which is necessary for the ERPD to activate the BSA in the CMI. This would be discussed in the integration process of the ERPD into the CMI. In activating the BSA in the CMI, a collective decision making procedure is adopted, such as "to seek support only from a pre-delegated coordinating country when a country needs assistance in a crisis" and "the country that would be delegated to coordinate must hold a meeting within a set period and conclude the decision making process." In the process of collectively deciding the context and supplementary conditions for activating the BSA, the ERPD should play a more assertive role in due diligence.

2-1-2-2. Intra-regional exchange rate stability

From a longer perspective, the goal of regional surveillance could include facilitating regional exchange rate stability in addition to preventing currency crises. In the final report of the East Asia Study Group (EASG) in 2002, to "pursue a more closely coordinated regional exchange rate mechanism" was included as one of the nine medium and long-term measures along with to "establish a regional financing facility."

The first reason why regional exchange rate stability could be an objective of regional surveillance is the deepening of economic integration. Regional economic integration is deepening through the increase of foreign trade and foreign direct investment. Regional trade ratio has increased from below 40% in 1985 to 58.5% in 2005 (ref: Asian Regional Integration Center website). Under such a circumstance, the benefit to reduce excessive volatility of regional foreign exchange rate is increasing. It is of course necessary to remember that the equilibrium exchange rate could change drastically in view of the dynamic economic growth in Asia. Therefore, to try reduce the excessive volatility does not mean to stick to a certain level of exchange rate or postpone a necessary adjustment, which could exacerbate the exchange rate misalignment (deviation from the equilibrium exchange rate).

The second reason is global imbalances. On one hand, the United States runs a huge current account deficit (5-6% of the GDP), while Asian countries and oil exporting countries have a huge current account surplus. If a hard landing scenario of the global imbalance accompanied by a sharp decline of the US dollar rate is realized, it could bring about turmoil in the foreign exchange market of the Asian currencies against the US dollar which could destabilize also the exchange rates among Asian currencies. If such a shock changes the exchange rates among Asian currencies very disproportionately, it could result in destabilizing the regional economy as a whole. This is where it becomes worthwhile to cooperate so as to facilitate regional exchange rate stability.

The third reason is that possible capital account liberalization in Asian countries can exacerbate the exchange rate volatility in the future.. Before the 1997-98 currency crisis, many Asian countries were moving toward liberalization of cross-border financial and capital transactions. Such a move was reversed after the crisis. Recently, most of the Asian countries have a current account surplus and there is a continued capital inflows from abroad. This has increased the amount of foreign reserves in these countries, making them less aware of the risk of currency crisis. Therefore, in the future, these countries could return to the move before the crisis and could progress capital account liberalization, which would increase the exchange rate volatility.

2-1-2-3. Establishing a permanent secretariat

Establishing a high-quality, permanent secretariat is an important factor in order to meet the various goals mentioned above. Currently, the joint-chairs of the ASEAN+3 take turns in preparing for the Finance Ministers' meetings, and the ADB and the ASEAN secretariat are assisting in the process. It would become increasingly important to have a permanent secretariat as financial cooperation deepens so that experience and knowledge would accumulate in one place and there would be continuity in various efforts.

2-2. Useful economic and financial indicators for surveillance

What are the indicators that should be examined in economic surveillance?

2-2-1. Main economic and financial indicators

It would first be necessary to monitor the main economic indicators that measure the health of the basic macro-economy as part of economic surveillance. The main economic indicators are economic growth rate, inflation rate, budget balance, balance of payments, external debt, foreign currency reserve, etc.

As seen in the currency and financial crises of the past, importance of the financial sector is increasing, and basic variables for financial supervision, such as capital adequacy ratio and ratio of non-performing loans are useful indicators to be monitored.

Though some of them overlap with the main economic and financial indicators, the following indicators are useful for an early warning system as well as RMUs and would play an important role in regional surveillance.

2-2-2. Indicators useful for an early warning system (EWS)

Indicators that are useful for an early warning system could play an important role in economic surveillance. An EWS is a model that aims to predict a currency crisis from economic and financial indicators and is useful in the following ways: to develop an economic structure that could best avoid economic crises, to detect a crisis and prevent it from happening, and if a crisis should occur, to analyze whether it is caused by fundamentals or by transmission or contagion.

It has been pointed out that the model that takes the various types of crises into account performs better as an EWS than the basic model that does not distinguish among the developing countries (Ito and Orii (2006)). This implies that the type of crises that occur in various regions differs, though to different degrees, so that the indicators that are useful for an EWS are valuable for regional surveillance.

In relation to RMUs that will be touched on in the following section, it is necessary to minimize the possible economic and financial turbulence of the RMU component countries so that the RMUs for surveillance (Chapter 1) and the RMUs for transaction (Chapter 4) would function effectively. This is another reason why the indicators that are useful for an early warning system should be monitored as part of regional surveillance.

There is a criticism that if an EWS begins to predict crises accurately, then the authorities would take that into account with the result that the EWS would lose the ability to predict accurately. In other words, there would be more incidents when the EWS would signal an alert but there would not be a crisis because the authorities would deal with the situation accordingly. Accuracy of an EWS is certainly important but such a situation would actually be desirable since the ultimate objective is to prevent a crisis.

According to the ADB (2005), the indicators that are useful for an early warning system are the following:

Deviation of the real exchange rate against the US dollar from its trend, ratio of short-term external debt to foreign reserves, ratio of deposits in Bank for International Settlements (BIS) banks to foreign reserves,ratio of broad money (M2) to foreign reserves, and ratio of current account balance to gross domestic investment (GDI).

2-2-3. RMUs versus parity grid

As regional economic and financial integration deepens, regional exchange rate stability would bring more benefit to the region. If regional countries are competing severely to export to a third country's market, then the volatility in the regional exchange rate would bring a huge impact on those regional countries. Stabilizing the regional exchange rates would be beneficial for the region as a whole in such a case. Monitoring the RMU and RMU DI as indicators to measure stability would be effective in promoting the regional foreign exchange rate stability. (refer to Chapter 1)

If, in the future, the situation should move on from monitoring the RMU and RMU DI as part of regional surveillance to aiming for regional exchange rate stability by determining a fluctuation limit, there would be two ways of doing so. The first is to confine the exchange rate of the regional currencies against the RMU within a certain fluctuation band. This means confining the RMU DI within determined upper and lower limits. The second is to set the upper and lower limits of the foreign exchange rates between member currencies. In the case of the EMS in Europe, the table of the upper and lower limits of the exchange rates between member currencies was called the parity grid. The EMS adopted the second way rather than the first, except in its early stage.

If there were a close foreign exchange rate policy coordination that would involve coordination of domestic macro-economic policies such as monetary and fiscal policies in order to stabilize the regional foreign exchange rates, then foreign exchange rate coordination by using RMUs as depicted in the first of the two choices would have a tendency to promote convergence toward some average level of monetary and price development in the region. This is because a RMU is the weighted average value of the component currencies of the region.

On the other hand, the exchange rate coordination using a parity grid would have a tendency to promote convergence toward the level of monetary and price development of the core country in the regional coordination. This is because the target of the coordination is the stability of the value of individual currencies against other currencies within the region, rather than the stability of individual currencies against the RMU (refer to Chapter 3).

Such a difference between a RMU and a parity grid would not be an issue, as long as monitoring of

the RMU DI is under the framework of regional surveillance. This is because the concept of a fluctuation limit of member currencies would not arise , as long as the RMU DI is monitored through regional surveillance. However, the difference would become significant, once there were close policy coordination and fluctuation limit of regional currencies were bound informally or formally.

The current debate is still at a stage of considering the ERPD monitoring the RMU DI regularly. It would also take a number of years before foreign exchange rate coordination with fluctuation limit were realized in Asia, because of the significantly divergent levels of economic development of the countries in the region. Though this means that the difference between a RMU and a parity grid would not be an issue for the time being, it should nevertheless be noted.

2-3. IMF surveillance

The following is a brief description of IMF surveillance, extracted from the releases and documents of the IMF.

IMF surveillance takes three forms: bilateral, regional, and multilateral. Bilateral surveillance traditionally has been and will be the core surveillance activity. In addition, regional and multilateral surveillance have assumed greater importance in recent years, as the need for more systematic treatment of contagion and cross-country themes in bilateral surveillance became obvious.

2-3-1. Bilateral surveillance

Bilateral surveillance under Article IV is mandatory for all member countries of the IMF. The 1977 Decision on Surveillance over Exchange Rate Policies are designed to implement bilateral surveillance. The Decision was replaced by 2007 Decision on Bilateral Surveillance over Members' Policies.

Such updating was needed because the 1977 Decision did not address the developments that have most challenged the stability of the international financial system in the past thirty years. Most exchange rate-related problems since 1977 have been, for the domestic reasons, the maintenance of overvalued or undervalued exchange rate pegs and, more recently, capital account vulnerabilities often arising form balance sheet imbalances. The 2007 Decision gives clear guidance on how member countries should run their exchange rate policies, what is acceptable to the international community, and what is not.

The most striking change is the introduction of the concept of "external stability." The Decision

clarifies that country surveillance should be focused on assessing whether countries' policies promote external stability. That means that surveillance should mainly focus on exchange rate, monetary, fiscal, financial policies and on the assessment of risks and vulnerabilities. The external stability requires both (i) an underlying current account broadly in equilibrium situation in which the country's net external asset position is evolving consistently with the economy's structure and fundamentals; and (ii) a capital and financial account that does not create risks of abrupt shifts in capital flows, whether through the presence of financing constraints or the build up of maintenance of vulnerable external balance sheet structures.

Fundamental exchange rate misalignment, an important indicator of external instability under the 2007 Decision, is a deviation of the real effective exchange rate from its equilibrium level-that is, the level consistent with a current account in line with economic fundamentals. While the concept of misalignment is clear, it is subject to significant measurement uncertainties. Accordingly, the IMF will exercise appropriate caution in reaching conclusions about misalignments. Moreover, an exchange rate would only be judged to be fundamentally misaligned if the misalignment was significant.

According to Faulkner-MacDonagh (2007), there are four broad approaches to estimate equilibrium exchange rate: the reduced-form equilibrium real exchange rate (ERER) approach, the macroeconomic balance (MB) approach, the external sustainability (ES) approach, and the global general equilibrium model approach (GGEM). Estimates of the value vary widely depending on the approach used, due to the inherent "conceptual" differences of these approaches and other factors such as data availability, definition and measurement, as well as estimation and filtering techniques.

2-3-2. Regional surveillance

Regional surveillance, which complements bilateral ones, takes regional developments and policies pursued by supra-national authorities into account. Formal procedure exists for conducting regional surveillance over the monetary and exchange rate policies of the Euro area, the West African Economic and Monetary Union (WAEMU), the Central African Economic and Monetary Community (CEMAC), and the East Caribbean Currency Union (ECCU).

In Asia, in addition to the regional office in Tokyo, the IMF had been designated as the technical secretariat of the Manila Framework Group (MFG) that was established specifically to undertake macroeconomic surveillance. However, MFG halted its activity in 2005. The IMF also maintains dialogues with the ASEAN and the Gulf Cooperation Council (GCC). However, a formal procedure does not exist for conducting regional surveillance over the policies of the ASEAN+3.

2-3-3. Multilateral surveillance

Multilateral surveillance plays an important role in the IMF's effort to strengthen surveillance. Multilateral consultations, the *World Economic Outlook* (WEO) report, the *Regional Economic Outlook* (REO) report, the *Global Financial Stability Report* (GFSR), and the *Annual Review of Exchange Arrangement and Exchange Restrictions* (AREAER) are key instruments for multilateral surveillance.

The first multilateral consultation was launched in 2006, and particularly focused in a comprehensive and collective way on the issue of global imbalances, and involved members important to the issue —China, the Euro Area, Japan, Saudi Arabia, and the United States. The five participants reported their policy plans in considerable detail to the semi-annual meeting of the IMF members in April 2007, and their reports were well received.

2-3-4. Strengthening surveillance

A number of initiatives have been taken to enhance the effectiveness of bilateral surveillance and crisis prevention. These initiatives include external vulnerability assessments, strengthening financial sector surveillance (including the Financial Sector Assessment Program (FSAP), combating money laundering and terrorism financing, and offshore financial center assessments), improving data provision to the IMF, re-examining surveillance in program countries, and strengthening international standards and codes.

As regards strengthening international standard and codes, these standards consist of two tiers: the General Data Dissemination System (GDDS), which is a voluntary general standard that applies to all IMF members and focuses on improving statistical systems; and a more demanding standard, the Special Data Dissemination Standard (SDDS), that applies to those member countries having and seeking access to international capital markets.

2-4. Complementary relationship between IMF surveillance and regional surveillance in East Asia

2-4-1. IMF surveillance tools are useful for regional surveillance as well .

Unique exchange rate systems are adopted by some countries:(de facto multiple foreign exchange rate system (Myanmar), dollarization, where the ratio of the dollar-denominated deposits and loans are high (Cambodia, Laos, Vietnam), etc. Having de facto multiple exchange rates must be problematic in managing a foreign exchange rate policy. Dollarization limits the scope of autonomy and in turn limits the effectiveness of monetary policy on the domestic

economy. For these countries, correcting their exchange rate systems is the first step to utilize the RMU for surveillance effectively in their economic policy management. “A home currency with a single exchange rate being used extensively in the country” is a condition for having a shared basis of discussing exchange rate systems, exchange rate policies, and monetary and fiscal policies with other countries that are participating in regional surveillance. Having such a shared basis of discussion would be the condition for allowing regional surveillance to function effectively.

The framework and results of the IMF surveillance, which is bilateral, regional, and multilateral, can be used in regional surveillance of East Asia as they are. In the case of the EMS in Europe, the IMF’s surveillance framework and outcomes were utilized effectively where there were shortage of personnel that could conduct regional surveillance.

In order to make an effective use of the framework and results of the IMF surveillance, the following conditions must be met: (i) Meeting the data disclosure standards of the IMF (SDDS, GDDS); (ii) Participating in FSAP(Fiscal Sector Assessment Program and ROSC(Report on the Observance of Standards and Codes) of the IMF; (iii) Having accepted the Article VIII of the Agreement of the IMF; and (iv) Having accepted the disclosure obligations of the Public Information Notice (PIN) regarding the Article IV consultation of the IMF. The current situation is as follows and the countries that have not met the conditions must make efforts to do so.

ASEAN+3 countries and the IMF

	GDDS Participating Contrries (as of 31/12/07)	SDDS Subscribing Country (as of 31/12/07)	Acceptance of Article VIII (as of 31/12/07)	Economies with Published ROSCs (as of 30/09/07)
Burunei Darussalam	x		x	
Cambodia	x		x	x
China	x		x	
Hong Kong		x	x	x
Indonesia		x	x	x
Japan		x	x	x
Korea		x	x	x
Lao P. D. Rep				
Malaysia		x	x	x
Myanmar				
Philippines		x	x	x
Singapore		x	x	x
Thailand		x	x	x
Vietnam	x		x	x

(Notes)
x denotes that the country is applicable.
SDDS is more demanding standard than GDDS.

(Abbreviations)
GDDS: General Data Dissemination System
SDDS: Special Data Dissemination Standards
ROSC: Report on Observance of Standards and Codes

Soueces: IMF

2-4-2. What the region can and the IMF can not do for regional surveillance

2-4-2-1. Raison d'etre of regional surveillance

There is often an argument that surveillance should be left only to the IMF. It is true that the IMF with its bilateral, regional and multilateral three-tier surveillance system has accumulated experience and conducts surveillance in a well-organized way. Hence, surveillance by the IMF is valuable for regional surveillance and can be utilized as it is.

However, that does not mean that independent surveillance by a region is unnecessary. For the following reasons, independent regional surveillance framework is necessary in East Asia.

First, globalization is not intensifying at the same speed around the world. The economic and financial links within East Asia is stronger than their extra-regional links, which means that the economic conditions and policies of a country in East Asia affect the regional members more quickly and strongly than countries outside the region. Consequently, the benefits of a regional surveillance are larger for intra-regional countries than for extra-regional countries. The regional surveillance would promote regional integration, which would be a shared benefit for the region, improving the economic performance of the individual countries through policy coordination and cooperation. Therefore, serious and achievable efforts to establish and improve regional surveillance with a sense of ownership would materialize only through regional efforts and not

through a global framework.

The second is that the IMF is not fully cognizant of Asia's unique circumstances. If there had been a regional surveillance framework at the time of the Asian currency crisis, the prescriptions included in the conditionalities for IMF-supported program might have been adjusted to more adequately reflect the situations in Asia. If that had been possible, the price paid to calm and to recover from the crisis could have been much smaller. Still now, the IMF does not always have the expertise or experience necessary to cover all issues that may at times be critical to a country's or a region's macroeconomic stability. The number of resident representatives that the IMF can send is up to a few economists, quite often borrowing an office in the central bank, and they are not necessarily the specialists of that country.

The limitations that a huge global organization like the IMF face most powerfully justify the establishment of a regional surveillance framework in East Asia. It is true that the Article IV consultation of the IMF is seen as helpful to many of the applicable countries in the region. The IMF has been attending the ASEAN + 3 deputies meetings since 2005 and has contributed in the areas that it specializes on. This type of cooperation should be maintained in the future. However, the IMF should not have such rights that could have a serious impact on policy management for a region or for a country in a region, such as making it a condition to accept an IMF program in order to be provided liquidity during a crisis. Such a decision should be left to the due diligence process of regional surveillance and not to an IMF program.

2-4-2-2. The role of regional surveillance

What can an independent regional surveillance do that the IMF cannot do?

The first is to conduct regional surveillance by being fully aware of the contagion, spill-over and cross-country issues in the region and among the countries in the region. The IMF conducts regional surveillance on currency unions but lacks a regional surveillance mechanism for Asia. Independent regional surveillance would also be able to make use of the many specialists who have deep understanding of the unique aspects of the region.

The second is that a regional framework would be able to cope better with coordination failures in the region than the IMF framework. As mentioned in 2-1-2. and 2-2-3., there are countries in East Asia which are competing for third country markets with each other. For example, such a

competitive relationship exists between Japan and South Korea, and China and the ASEAN members, which could lead to coordination failures on exchange rate policies in the region.

When there are countries that peg their home currency to the dollar, and if one of them moves to another exchange rate system, then this country could lose its competitiveness. So even if an exchange rate system that could be superior in stabilizing real effective exchange rates, such as pegging to a currency basket, were to be developed, it would be difficult for those countries to adopt the system. This is another form of regional coordination failure. A regional framework would be able to cope better with such a situation than the IMF framework.

The third is to supplement the lending extended by the IMF. The IMF has various lending systems, but access is limited by quotas. Looking at the experience of the Asian currency crisis, independent regional loan systems in East Asia, which is currently the CMI, should supplement the IMF system. Independent East Asian loan system would require an independent due diligence process and the role is expected to be played by a regional surveillance framework.

2-4-2-3. Challenges for regional surveillance at the moment

Looking at the global economy and the economic situation in Asia, the importance of regional surveillance in Asia could become acute quite rapidly.

Asian economy deteriorated temporarily because of the currency crisis during 1997-98. However, it has recovered and returned to a strong growth path since then. Though there are differences among the regional economies, the region as a whole enjoys current account surpluses and increase in foreign currency reserves, and there seems to be a very low concern for the resurgence of another currency crisis. Foreign currency reserves increased because the authorities intervened in the foreign exchange market by buying foreign currencies and selling home currencies in order to suppress the upward pressure on the value of the home currency created by the capital flows into Asia. Such interventions in the foreign exchange markets are bringing about an increase in the domestic liquidity. Sterilized intervention is being used to suppress the increase of domestic liquidity. The effect, however, is not as adequate as hoped for, because the financial markets and financial system are not fully developed.

As a result, exchange rates of Asian currencies to the dollar and asset values, such as stock values, have been rising in the past years. Since last August, the sub-prime problem has been affecting

the foreign exchange markets and equity values. Notwithstanding, some countries have not been affected much. In such an environment, whether the increase of stock values is due to fundamentals or how far it is a bubble, whether there would be something akin to a collapse of the bubble in the near future, are economic questions that are critical to the whole Asian region. If a bubble should burst in one country, the effect could be spread to other countries. This would be a significant issue that should be dealt with through regional surveillance.

Regional surveillance would also have a major role to play in avoiding the risk of the regional exchange rates destabilizing in Asia because of currency adjustments due to global imbalances as mentioned in 2-1-2, and to deal with the situation if the risk should materialize.

Different kinds of risks from those during the 1997-78 currency crisis seem to be accumulating now in Asia. The IMF surveillance should be utilized effectively to deal with them. In parallel to it, regional surveillance should contribute to solving the issues by sharing information and applying peer review/peer pressure among the regional countries. Regional surveillance is invaluable for analyzing the problems unique to the region and to coordinate cooperation and adjust interests among the countries in the region. The current Asian economic conditions can be seen as providing an invaluable opportunity to prove the value and effectiveness of regional surveillance.

The ERPD, which is the regional surveillance mechanism that has been conducted until now, should be strengthened in order to avoid the risks that Asian economies are subject to from materializing and to deal with them competently if they should materialize. Improving its effectiveness by including RMUs and RMU DIs as indicators to be monitored in regional surveillance would be a means of strengthening the ERPD.

References

ADB (2005), *Early Warning Systems for Financial Crises*, Palgrave Macmillan.

Berg, Andrew, Eduardo Borensztein, and Catherine Pattillo (2004), Assessing Early Warning Systems: How Have They Worked in Practice?" *IMF Working Paper* WP/04/52.

Faulkner-MacDonagh, Christopher, Papa N'Diaye, Yougesh Khatri, Sumiko Ogawa, Michael Keen, Elena Loukoianova, and Shinobu Nakagawa (2007) "Japan: Selected Issues," *IMF Country Report* No. 07/281

Fritz-Krockow, Bernhard and Parmeshwar Ramlogan (eds) (2007), *International Monetary Fund Handbook; its Functions, Policies, and Operations*, IMF, Secretary's Dpt.

Ito, Takatoshi and Keisuke Orii (2006) "Tsuka Kiki no Yochi to Yobo (in Japanese)," *Financial Review*, April, pp. 177-200

Ito, Takatoshi (2007) "Asian Currency and the International Monetary Fund. 10 Years Later: Overview," Asian Economic Policy Review, Vol. 2, No. 1, pp. 16-49

Masahiro, Kawai and Cindy Houser (2007) "Evolving ASEAN+3 ERPD: Towards Peer Reviews or Due Diligence?" *ADB Institute Discussion Paper* No. 79 September.

Murase, Tetsuji (2007) *The Regional Monetary and Financial Cooperation in East Asia (in Japanese)*, Keisou Shobou

Shirono, Kazuko (2007) Real Effects of Common Currencies in East Asia, *IMF Working Paper* WP/07/166.

CHPTER 3

EC’s ECONOMIC SURVEILLANCE DURING THE EMS PERIOD

Chapter 3 : EC's Economic Surveillance during the EMS Period

Introduction

The economic surveillance and policy coordination form an integral part of overall economic policies in the European Union. There are few academics, if any, who raise doubts about the importance of economic surveillance in the Economic and Monetary Union (hereafter EMU), especially in the euro area today.

The picture looks quite different when the subject of economic surveillance and policy coordination is discussed for the period of the European Monetary System (EMS) that preceded the EMU for twenty years from 1979 to 98. Was economic surveillance carried out at all among EC member states that participated in the EMS and its Exchange Rate Mechanism (ERM)? Was the economic policy coordinated among member states and how far was it done? What were the major objectives and contents of economic surveillance? Who (what institutions) were in charge, and how effective was such a surveillance process?

The ECU (European Currency Unit) was supposed to play a central role in the EMS as a currency basket against which central rates were defined. As a divergence indicator, the ECU was expected to play the role of an early warning system that would trigger prompt economic policy responses for the maintenance of stable exchange rates within the ERM. However, "the divergence indicator never played the role for which its proponents had hoped, and after some time, it was virtually abandoned as a tool of policy and analysis" (Ungerer [1997] page 163). How was the divergence indicator structured, and why did it not function as had been hoped for?

This chapter tries to comment on, and answer, these issues in order to draw lessons in promoting monetary and financial cooperation, and when the time matures, in designing and implementing a regional exchange rate coordination arrangement in East Asia. The author would like to express sincere appreciation to Dr. Günter Grosche, Special Advisor to the President of the Eurogroup and former Secretary of the Economic and Financial Committee and Economic Policy Committee, for an interview to discuss the captioned subject in detail and valuable comments to draft papers.

3-1. EEC as a basis of cooperation

It should not be overlooked that the creation and existence of the European Economic Community (EEC) itself fostered the economic cooperation among its member states from two perspectives; the real economy and the framework of the Treaty of Rome.

From the perspective of the real economy, the completion of the customs union (a common market) and further efforts towards the single market intensified mutual economic dependence within the Community, which required the stability of exchange rates as much as possible. For nearly a decade after the creation of the EEC, the Bretton Woods fixed exchange rate regime was a matter of course in economic activities in the Community, but when it started to demise around the turn of the 1970s, the issue of maintaining exchange rate stability among member states became a matter of high priority. This held true in particular for the Common Agricultural Policy, another pillar of the EEC, which had to maintain common agricultural prices and could function well only on the basis of stable exchange rates, as evidenced by the complicated and unsatisfactory replacement system called "green rates" when EC currencies floated or adjusted their parities frequently. Was the Treaty of Rome of any help? It stipulated the necessity of economic policy coordination, but in practice the member states were left at their will as to the scope and kinds of policies to be implemented.

Article 6 (the original treaty unless otherwise indicated hereafter):

1. *Member states shall, in close cooperation with the institutions of the Community (author's note: e.g. the Council and Commission),* ***coordinate their respective policies to the extent necessary to attain the objectives of this Treaty****.*
2. *The institutions of the Community shall take care not to prejudice the internal and external financial stability of the Member States.*

In the Title II Economic Policy of the Treaty, important clauses were incorporated to foster cooperation and coordination of economic policies regarding business cycles and balance of payments. Especially worth taking note is the establishment of the Monetary Committee, which is to be described in detail later.

Article 103

1. *Member States shall* ***regard their conjunctural policies as a matter of common concern****. They shall consult each other and the Commission on the measures to be taken in the light of the prevailing circumstances.*
2. *……the Council may, acting unanimously on a proposal from the Commission, decide upon the measures appropriate to the situation.……*

Article 104

Each Member State shall pursue the economic policy needed to ensure the equilibrium of its overall balance of payments and to maintain confidence in its currency, while taking care to ensure a high level of employment and a stable level of prices.

Article 105

1. *In order to facilitate attainment of the objectives set out in Article 104,* ***Member States shall coordinate their economic policies****. They shall for this purpose provide for cooperation between their appropriate administrative departments and between central banks.*

The Commission shall submit to the Council recommendations on how to achieve such cooperation.

2. *In order to promote coordination of the policies of Member States in the monetary field to the full extent needed for the functioning of the common market,* ***a Monetary Committee with advisory status is hereby set up****. It shall have the following tasks:*
   - *to keep under review the monetary and financial situation of the Member States and of the Community and the general payment system of the Member States and to report regularly thereon to the Council and to the Commission;*
   - *to deliver opinions at the request of the Council or the Commission or on its own initiative, for submission to these institutions.*

   The Member States and the Commission shall each appoint two members of the Monetary Committee.

Article 107

1. *Each Member State shall* ***treat its policy with regard to rates of exchange as a matter of common concern.***
2. *If a Member State makes an alternation in its rate of exchange which is inconsistent with the objectives set out in Article 104 and which seriously distorts conditions of competition, the Commission may,* ***after consulting the Monetary Committee****, authorize other Member States to take for a strictly limited period the necessary measures, the conditions and details of which it shall determine, in order to counter the consequences of such alteration*.

Article 108

1. Where a Member State is in difficulties or seriously threatened with difficulties as regards its balance of payments……the Commission, ***after consulting the Monetary Committee,*** *recommend to the Council* ***the granting of mutual assistance*** *and appropriate methods therefore* (bold types by the author).

3-2. Failure of policy coordination in the 1970s

During the last days of the tumbling Bretton Woods System, European political leaders attempted to retain as much exchange rate stability as possible by establishing an exchange rate mechanism called the “Snake” (the joint floating of EC currencies against the dollar). But faced by challenges of higher energy prices and turbulences in the internationalized financial markets in the post Bretton Woods monetary order, many EC member states were too preoccupied with their own national economic problems to give sufficient heed to the common concern of the Community, with the result that many currencies came under market pressure and had to leave the “Snake” mechanism which shrank to a ”mini-Snake” of DM bloc currencies in the latter half of the 70s.

Robert Marjolin deplored in 1975 “the national economic and monetary policies have never been more disharmonized nor more diverging than today…The coordination of national policies is a sincere wish, which can hardly ever be realized in the practice” (Tietmeyer [2005] page 66).

To help correct this situation, a more detailed framework for policy coordination was set up[7]. In 1974 the so-called “Convergence Decision” was adopted, together with other decisions to supplement it[8], with the aim to “establish quite a sophisticated system, with quantitative objectives and formal procedures to coordinate national economic policies through a process centralized at the Commission, and as a first step toward the transference of sovereignty in the macroeconomic sphere” (Ghymers [2003] page 39). An “Annual Economic Report” on the Community economy was introduced to be prepared by the Commission (Directorate-General for Economic and Financial Affairs: DG ECFIN).
These centralistic attempts of coordination failed because not sufficient consensus emerged among member states as to the philosophy and contents of economic policies. “No centralized policy-coordinating procedure can work among a group of sovereign countries if national options regarding their concrete content are divergent…content prevails over procedure; what is important is not so much the institutional aspect, the establishment of obligatory formal procedures, but the ability to narrow down the differences in economic analyses and choices through the development of appropriate incentives tending to interest the national authorities in an exchange of opinions and information” (Ghymers ditto).

3-3. Economic surveillance during the EMS (1979-93)

3-3-1. Overview

Faced with a limitedly functioning “mini-Snake” and a lack of international monetary guidance provided by a weak dollar, German Chancellor Helmut Schmidt and French President Giscard d’Estang in the late 1970s took a political initiative to create a “zone of monetary stability in Europe”, leading to the creation of a European Monetary System (EMS) and its Exchange Rate Mechanism (ERM). “The ideas of both initiators aimed obviously at more exchange rate stability and common

[7] 41971Y0327(01) Resolution of the Council and of the Representatives of the Governments of the Member States of 22 march 1971 on the attainment by stages of economic and monetary union in the Community (OJ C 028, 27/03/1971, pp. 0001-0004)

[8] 74/120/EEC Council Decision of 18 February 1974 on the attainment of a high degree of convergence of the economic policies of the Member States of the European Economic Community (OJ L 063, 05/03/1974, p. 0016)
74/121/EEC Council Directive of 18 February 1974 on stability, growth and full employment in the Community (OJ L 063, 05/03/1974, p. 0019)
74/122/EEC Council Decision of 18 February 1974 setting up an Economic Policy Committee (OJ L 063, 05/03/1974, pp. 0021-0022)

holding of foreign reserves in order to reduce intra-European tensions, and to make Europe more independent from the American monetary policy" (Tietmeyer p. 70).

There was no **formal** surveillance procedure within the EMS until the start of the first stage of the EMU in 1990, when the so-called "new Convergence Decision" was adopted[9]. Throughout the whole period of EMS, however, substantive surveillance was conducted **de facto** at the Monetary Committee as an advisory organ to both the Ecofin Council and Commission, and within the network of central banks.

At the initial stage from 1979 to 1983, and under the external shock of the second oil crisis, central rates had to be realigned seven times because of continuing divergent economic policies of participating countries. The period of "trials and errors" was over with the 7th realignment, when the French government turned its basic economic policy 180 degrees around by subordinating domestic economic policies to the overriding objective of exchange rate stability by adopting a package of restrictive measures in budgetary, monetary, and foreign exchange fields.

For the smooth functioning of the EMS and stability of exchange rates from 1983 onwards, the role of the DM as an anchor currency and the dissemination of stability-oriented monetary policy and the credibility of the Deutsche Bundesbank were of crucial importance. The confidential exercise of regional surveillance at the Monetary Committee and the Ecofin Council, supported by the Commission, and the regular concertations (daily telephone conferences) and consultations among central banks worked relatively well during the "good times," that is, when the DM as the key currency firmly anchored the EMS. It became increasingly clear among EMS participants that the exchange rate stability depended mainly on domestic policies of each member country.

These good times were interrupted in 1992-93 as an aftermath to the fall of Berlin Wall in November 1989. This event can be characterized as an external economic shock for EC member states. German reunification in October 1990 with the need to rebuild Eastern Germany left the German government no other choice than an expansionary budgetary policy, with the Bundesbank responding to mounting inflationary pressures by raising the policy interest rate to historically high levels. This combination of German economic policies effectively called into question the deutschmark's role as an anchor

[9] 90/141/EEC Council Decision of 12 March 1990 on the attainment of progressive convergence of economic policies and performance during stage one of economic and monetary union (OJ L 078, 24/03/1990, p. 0023-0024)
90/142/EEC Council Decision of 12 March 1990 amending Council Decision 64/300/EEC on cooperation between the central banks of the Member States of the European Economic Community (OJ L 078, 24/03/1990, p. 0025-0026)

currency because other members had difficulty to follow its interest rate policy, which led to the European currency crises in 1992/93. This situation reminds of the dollar's declining role as an anchor currency in the late 1960s which led to the demise of the Bretton Woods System, but that time it was because of the overvaluation of the leading currency (as a result of the Vietnam war and subsequent inflation). One can observe that the economic surveillance in the EMS, both formal and de facto, had to acknowledge its limitations, when the basic presumption of the system was overturned.

3-3-2. Objectives of economic surveillance at the Monetary Committee

The confidential de facto economic surveillance was practiced at the Monetary Committee (hereafter MC) consisting of two representatives of each EC member state; a vice finance minister and a central bank deputy governor. The major emphasis of discussions at the MC was placed on fostering a smooth functioning of the EMS in changing economic circumstances, by preventing currency crises and maintaining stable, but if necessary adjustable, exchange rates of participating currencies. The basic approach of the MC was to leave it to individual member states to take the policies and measures necessary to secure the currency stability. However, it should be noted that the fact of being a member of the EMS forced member states, through its rules and market disciplines, to align their monetary and, to a lesser degree, other economic policies.

"The EMS, with its accent on exchange rate performance and its determining factors, made it possible for there to be an authentic internalization of the external effects of the national policies: any divergence in monetary and/or fiscal policy had increased consequences in terms of the exchange rates, and the institutional commitment regarding the parities increased the visibility and political cost of non-compliance. This internalization helped to solve the fundamental issue of coordination, which is how to impose a common discipline, because by 'tying their hands,' each political authority was more motivated to adjust its own behavior. Thus, coordination became progressively the automatic result of an optimized combination of national policies under compulsory rules and vis-à-vis some markets that could seriously sanction the national authorities" (Ghymers [2003] p.40).

3-3-3. Contents of discussions at the Monetary Committee

(i) Regular surveillance

The MC normally began its monthly (except in August) routine meetings with discussing the "Recent economic development and outlook," on the basis of a brief report prepared by the Commission (DG ECFIN) for the MC. The report covered mainly the macroeconomic and monetary situation (e.g. growth rate, inflation prospects, currency movements and interest rate developments) in the Community, focusing on some current issues of common interests for discussion. The fiscal policy was not much brought to a fore in those days. There was no formal surveillance template to be

provided by national authorities, but issues of individual member states such as their balance of payments and monetary policy were an agenda item as deemed necessary.

The monthly discussion offered an opportunity to detect irregularities and risks in the economy of individual countries and the Community (to report that something may be going wrong), or as a mechanism of Early Warning. In preparing papers for the MC, the economists at the DG ECFIN utilized fully their intense network of information with national governments, central banks, private research institutes etc. Members representing central banks reported latest movements in foreign exchange and other markets.

The chairman of the MC summed up the discussion and reported orally to the Ecofin Council. In ordinary monthly meetings, the MC closed discussions without policy recommendations to any particular member state, but in exceptional country cases the chairman wrote a confidential letter with recommendations addressed to the economic and finance ministers of the countries concerned (normally drafted by the Secretary).

Since mid-1970s an "Annual Economic Report" was produced by the DG ECFIN, and it was published from the beginning of the EMS period in the *European Economy* series (the Annual Economic Report was renamed the EU Economic Review in 1999). Moreover, comprehensive country reports were prepared informally at an interval of 2-3 years for the Monetary Committee by country experts at the DG ECFIN. Country reports ceased to be produced, when the multilateral surveillance started (the new "Convergence Decision") in 1990 at the first stage of the EMU.

In September 1987 the Ecofin Council and governors of central banks agreed on measures to strengthen the EMS (the Basel-Nyborg Agreement). The MC was requested to exercise a six-monthly surveillance and monthly examinations of exchange and interest rate development[10]. This has been

[10] Excerpt from a press communiqué dated September 12, 1987
"A. Measures designed to increase convergence and avoid conflicting policies which would threaten the cohesion of the System:
-A six-monthly Monetary Committee surveillance procedure using economic indicators and projections (in line with the G-7 framework) will be carried out, designed to highlight any policy inconsistencies between EMS countries and incompatible approaches to third currencies.
-A Monetary Committee monthly examination of the latest exchange and interest rate developments has been set up to consider what conclusions can be drawn.
-a Committee of Governors monthly monitoring procedure will take place, focusing on simultaneous consideration of intervention, exchange rate and interest rate policies to discuss appropriate policy responses regarding not only EMS currencies but also third currencies and the ECU." (Source: Occasional Paper 73 The European Monetary System: Development and Perspectives, IMF, November 1990)

carried out in a round at its monthly meetings.

(ii) Central rate realignments

When EMS member states changed their central rates in the Exchange Rate Mechanism, they had to consult the MC first before governments and central banks participating in the System took a decision[11]. The MC held a meeting physically over a weekend, only in exceptional cases agreements among MC members were reached over telephone as was the case of the devaluation of the Irish pound in August 1986. At the time of central rate realignments, the MC discussed usually economic measures that the relevant member states were advised to take in connection with realignments, and such recommended measures were made public in the official communiqué.

EMS: Economic Measures in Connection with Realignments before 1990

Realignment date	Changes in central rate	Major economic measures in official communique
Sep 24, 1979	DK-3.0, DM+2.0	-
Nov 30, 1979	DK-4.8	DK: Short-term price and wage freeze. Increase in direct personal wealth and corporate taxes etc.
Mar 23, 1981	ITL-6.0	ITL: Discount rate +2.5%, Government spending cut plans
Oct 5, 1981	DM+5.5, FF-3.0, ITL-3.0, NLF+5.5	FF: Temporary price and profit freeze. F10.15 bio government expenditure in suspense
Feb 22, 1982	BF-8.5, DK-3.0	BF: Temporary wage and price freeze etc.
Jun 14, 1982	DM+4.25, FF-5.75, ITL-2.75, NLF+4.25	FF: Freeze of wage. Revision of 1983 budget etc. ITL: Budgetary austerity measures.
Mar 21, 1983	BF+1.5, DK+2.5, DM+5.5, FF-2.5, IRP-3.5, ITL-2.5, NLF+3.5	FF: Package of restrictive measures in budgetary, monetary and foreign exchange fields
Jul 20, 1985	BF+2.0, DK+2.0, DM+2.0, FF+2.0, IRP+2.0, ITL-6.0, NLF+2.0	ITL: Package of revenue raising measures. Modification of wage indexation mechanism.
Apr 6, 1986	BF+1.0, DK+1.0, DM+3.0, FF-3.0, NLF+3.0	FF: Steps to slow nominal wage growth and to reduce government budget deficit etc.
Aug 2, 1986	IRP-8.0	-
Jan 12, 1987	BF+2.0, DM3.0, NLF+3.0	-
Jan 8, 1990	ITL-3.7	ITL: Pledge to maintain budget deficit within forecast limit. Swifter reduction in inflation.

(Source: IMF Occasional Paper 73, 1990, Ungerer et al. "The European Monetary System: Development and Perspectives," Ungerer, H. [1997] Table 15.1)

(iii) Due diligence for medium-term credits

If "a member state is in difficulties or seriously threatened with difficulties as regards its balance of

[11] So far as central rate realignments were concerned, the Ecofin Council was not involved in the decision-making process. The EMS/ERM existed outside the Treaty framework; therefore the Ecofin Council had no decision-making authority.

payments (Article 108)," the Ecofin Council could grant financial assistance to a member state. The financial assistance was extended in the form of the "Medium-term Financial Assistance (MTFA)" established in 1971, and later "Medium-term Financial Support (MTFS)" that combined the MTFA with the Community Loan Mechanism in 1988. The MC played an important role in advising the Commission in the design of these credit facilities, and was in charge of surveying policy recommendations linked to the grant of such loans to individual member states in collaboration with the Commission (DG ECFIC).

The Council Decision[12] establishing the MTFA in 1971 stipulates:

Article 1

1. *Member States shall make available…medium-term credits granted in the form of mutual assistance by directive or decision taken by a qualified majority by the Council on a recommendation of the Commission which shall for this purpose* ***consult the Monetary Committee*** *pursuant to Article 108.*
2. *Where a Member State in difficulties or seriously threatened with difficulties as regards its balance of payments proposes to call upon sources of medium-term credit outside the Community, it shall first consult the Commission and the other Member States in order to examine, among other things, the possibilities of financial assistance from within the European Economic Community.* ***Such consultation shall be held within the Monetary Committee.***

The Council Regulation[13] establishing the MTFS in 1988 stipulates:

Article 1

1. *A Community facility providing medium-term financial support shall be established…*
2. *To this end, in accordance with a decision adopted by the Council…and* ***after consulting the Monetary Committee****, the Commission shall be empowered, on behalf of the European Economic Community, to contract loans on the capital markets or with financial institutions.*

Article 2 Where a Member State proposes to call upon sources of financing, outside the Community, which are subject to economic policy requirements[14], it shall first consult the Commission and the other Member States in order to examine, among other things, the possibilities available under the Community facility for medium-term financial support. ***Such consultation shall be held within the Monetary Committee*** (bold type and underline by the author).

---

[12] 71/143/EEC: Council Decision of 22 March 1971 setting up machinery for medium-term financial assistance (OJ L 073, 27/03/1971 p. 0015-0017)

[13] Council Regulation (EEC) No 1968/88 of 24 June 1988 establishing a single facility providing medium-term financial assistance for Member States' balances of payments (OJ L 178, 08/07/1988 p. 0001-0004)

[14] One can interpret the intention of the Article 2 being to exclude credit contracts with conditionality by member states with a third party such as the IMF.

(iv) Relations with the IMF surveillance

An IMF occasional paper questioned in 1983 "whether the Fund's and the EMS's approaches to the same problems might differ and whether conflicts might arise. These doubts concentrated on three areas: surveillance over exchange rate policies, conditionality in credit operations, and the creation of the international liquidity (Ungerer et al. [1983] page 19)."

There was no clear incompatibility of goals or of general policy orientation between the IMF and EC. There were no serious doubts as to the appropriateness of exchange rate decisions taken by the EMS member countries. As to the conditionality in credit operations, differences in the nature of adjustment policies could arise, but such differences would be considered consistent with the IMF's policy of paying due regards with members' particular circumstances (Ibid., page 20). The EMS did not create international liquidity, except in a statistical sense (creation of the ECU against the market price of gold vs. its book value at national monetary authorities).

The Commission maintained friendly relationship with the IMF. There were close personal connections (staff were seconded to each other. Dr. Günter Grosche had been Executive Director representing Germany at the IMF before taking the position as Secretary of the MC). The IMF was strongly interested in the EC approach, and vice versa. Cross reading of papers was done extensively. As the Commission (DG ECFIN) was understaffed in doing full research work related to country papers and due diligence for member states, it relied often on materials the IMF produced in Article IV consultations (there was no IMF regional surveillance prior to the establishment of the EMU).

There was no division of labor or friction between the Commission and IMF. As to the economic outlook of member states, the Commission competed in a healthy way with the IMF and OECD as to their accuracy and likeliness of hitting the forecast.

3-3-4. Monetary Committee pulls policy strings[15]

(i) The Monetary Committee's official roles and its informal power

The MC can be described as a place where politicians' concepts and intentions, be it the EMS or the rescue of a member state in difficulties, were discussed and worked out in detail into programs for implementation. The homepage of the European Union (European Dialogue) featured the MC in 1997, and described its informal power as follows:

[15] European Dialogue: Jul-Aug 1997 issue 4: EU at work

"The Monetary Committee is unique. It was set up by the Treaty of Rome to advise both the Commission and the Council on monetary policy. It groups together senior civil servants from finance ministries and central banks. The committee has become synonymous with extraordinary and mystical economic power.

The committee advises the Commission and prepares meetings of the Economic and Finance Council (known as Ecofin), and any decisions reached by it are usually adopted by the ministers[16]. This is because the members are close advisers to ministers. Due to the participation of central bankers, they also have more in-depth expertise in monetary economics than do the politicians responsible.

The secretariat, headed by Günter Grosche from 1993 onwards, included only two secretaries and three experts. It was based on the fourth floor of the Commission's Beaulieu building in Brussels. The committee's meetings were usually confidential, although its work had become widely known, mainly as a result of crunch meetings on exchange-rate realignments which culminated in 1992-93 in crisis meetings to save the old-style exchange rate mechanism (ERM) of the European Monetary System (EMS) which eventually led to enlarging the margins around the central rates…
Under the Treaty on European Union, which came into force in November 1993, the committee was given extra powers to prepare meetings of Ecofin, although this was "without prejudice" to the powers of EU ambassadors (grouped together in Coreper[17]). This had led to turf battles between the ambassadors and the committee members who report directly to their ministers and often by-pass the Brussels-based mission…
The committee helped to draft the Union's broad economic guidelines, which are meant to guide economic policy for all member states over a thee-year time frame. It played also a key role in the excessive deficit procedure…
The committee played a central role in multilateral surveillance and multi-annual programmes 'to ensure closer co-ordination of economic policies and sustained convergence of the economic performance' of member states. Every year the committee also examines the situation on the movement of capital and freedom of payments.

[16] The European Dialogue mentions an exceptional case: "Only once, in August 1993, did the committee have to call the ministers in together with the central bank governors. This was the seminal occasion when the ERM bands, which had allowed most currencies to fluctuate only 2.25% either side of a central rate against ECU, were widened to 15%. This was done to cope with massive speculative attack on the system. The Monetary Committee had been incapable of reaching such a highly charged political decision."
[17] French acronym of a committee consisting of the Permanent Representatives of the Member States. Article 207 of the Treaty on European Union stipulates the Coreper "shall be responsible for preparing the work of the Council and for carrying out the tasks assigned to it by the Council."

At the start of the third stage of EMU an Economic and Financial Committee will be set up and the Monetary Committee dissolved…" (the underline and bold types by the author). It is worth noting, however, that the successor EFC took on the same assignments, roles and procedures as the Monetary Committee had (the main reason for the name change having been to reserve the term "monetary" to the activities of the newly created European Central Bank).

Regarding to the above sentence with an underline, the MC was assigned by the Treaty on European Union (Article 114, which corresponds to the aforementioned Article 105 of the original Treaty of Rome)[18] to prepare the work of the Ecofin Council referred in following articles (major ones only, explanatory remark by the author):

Article 59 Drafting safeguard measures against movements of capital

Article 60 Drafting urgent measures on the movement of capital and on payments

Article 99 Formulation of a broad guideline of economic policies of Member States and the Community

Article 100 Granting of Community financial assistance

Article 104 Formulation of opinion on excessive government deficits

Article 116 Assessment of economic and monetary convergence in the second stage of EMU

Article 121 Assessing whether Member States fulfill the necessary conditions for the adoption of the single currency

(ii) How the Monetary Committee worked

Up to the EC accession of Austria, Finland and Sweden in 1995, the MC consisted of a comfortable size of total 28 members (two representatives each from 12 member states, chairman, Director General and his deputy of the Commission DG ECFIN and Secretary), who used to sit around a round table without country name plates so to underline their role as "experts" who act in their personal capacity in the interest of the European common goal (cf. the present Economic and Financial Committee of total 60 members out of 27 member states, the Commission, ECB and secretary). Each member had one vote regardless the size of his home country (but normally the Committee acted by consensus).

The vice finance minister and deputy central bank governor that were chosen from each member state (as was usually the case) reported directly to the minister in charge/the central bank governor at the home country, unlike other committees in the EC, which had to channel information through the Coreper. In case of central rate realignments, for example, once the MC reached a tentative conclusion,

[18] Article 114 European Union consolidated version of the Treaty on European Union and of the Treaty establishing the European Community (OJ C 321E of 29 December 2006)

the MC took a brief recess, during which members consulted with their ministers/governors over the telephone. When the MC reconvened, members took the formal decision and issued a communique on behalf of their governments and central banks. The MC was a group of experts in economic and monetary fields, who were trusted advisors to ministers/governors at home, thus able to think and act in political categories albeit in full knowledge of the technicalities.

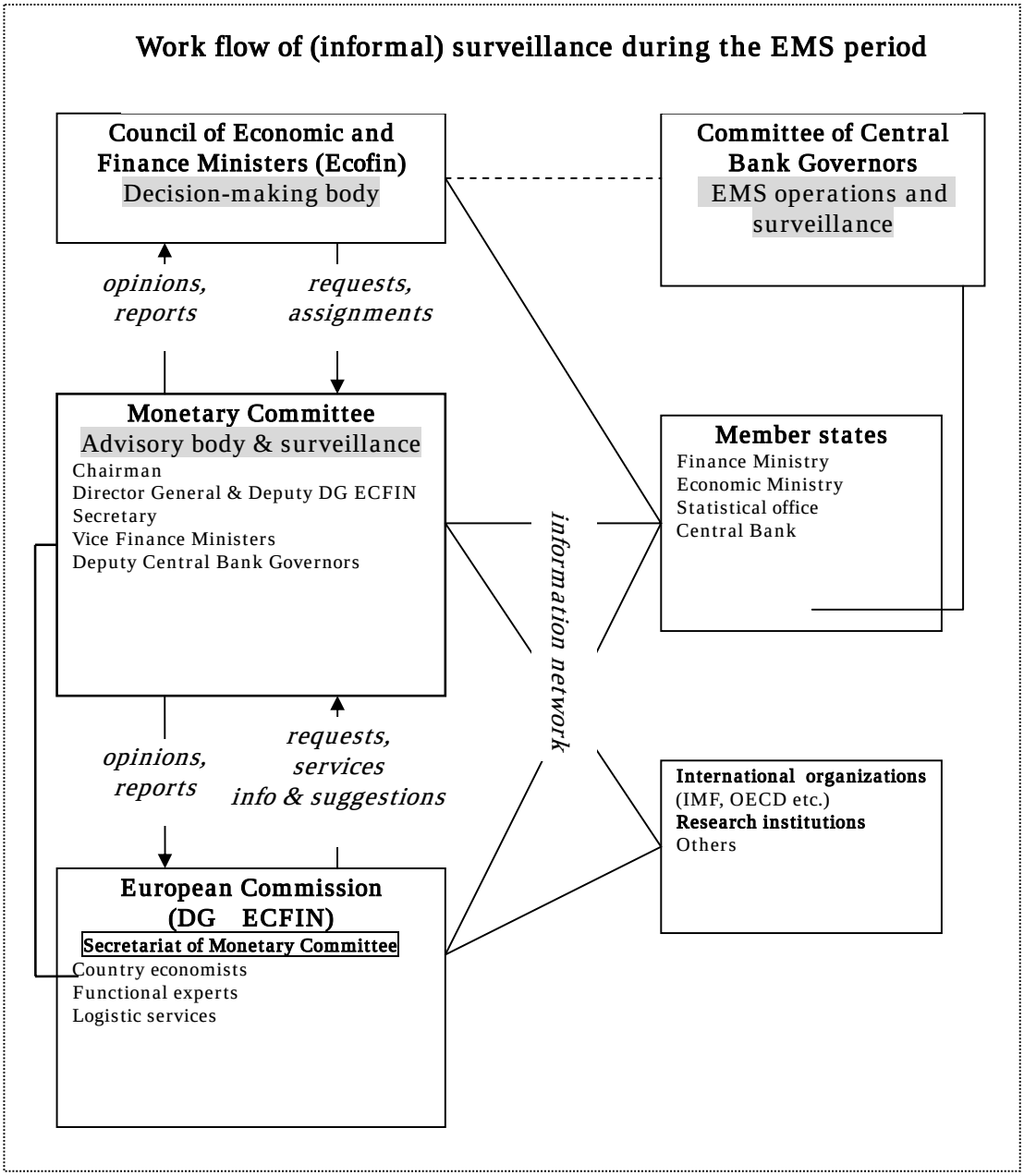
Members served for long periods (normally as long as they kept office at home) that nurtured friendship and trust among each other (personality mattered and words were honored). Papers and discussions were kept confidential with no press contacts. The minutes were kept short and factual. Access to the meeting room was restricted. In such circumstances members could discuss frankly, and could also be adventurous in developing ideas.

In preparing the EMU related issues of the Maastricht Treaty and designing details for the implementation of the EMU, the MC could contribute substantially and efficiently, not least because its members were mostly identical with the members of the Inter-Governmental Conference to prepare a treaty draft, or with the group of central bankers that drafted the statute of the European System of Central Banks.

The chairman of the MC served usually for two years, and sometimes longer (e.g. Sir Nigel Wicks (UK) 1993-98), unlike other committees in the EC, whose chairmen rotate every six months in principle in the pattern of EC chairmanship. The chairperson was elected among the peers, and had three important powers: he set the agenda, summed up the discussion and reported back to ministers on his own responsibility. “When he goes to meetings of the Ecofin, he makes short recommendations to the meeting, which sets the tone for the political discussions (European Dialogue).” Among the chairmen in recent years, such names can be found as Jean-Claude Trichet (present ECB President), Hans Tietmeyer (former Bundesbank President) and Horst Köhler (former IMF Managing Director and present German President).

The secretariat played a crucial role in promoting the informal power the MC. Unlike secretariats of other Council committees, which belong to the fairly big Council Secretariat machinery under the guidance of Coreper, the MC’s secretariat belonged to the Commission (Directorate- General for Economic and Financial Affairs or DG ECFIN). The chief secretary’s post was equivalent to the level of a director next to the Director General. DG ECFIN made available all information and logistic services to the Committee through the secretariat. The staff (a few secretaries and experts), recruited within DG ECFIN or seconded from member states, was highly qualified mostly with the background of economics, and with their own personal information network. The last (chief) secretary served for

11 years. His main tasks were to make sure that the meetings were well prepared and proceeded smoothly, and to support the chairman in every respect.



Rules governing the Monetary Committee

(31958Q1006 OJ B 017, 06/10/1958 p. 0390-0392)

Article 1 The Committee shall keep under review the monetary and financial situation of Member States and of the Community and also the general payments system of Member States, and shall report regularly to the Council and to the Commission thereon.

Article 2 When examining the monetary and financial situation of Member States, the Committee shall endeavour in particular to foresee any difficulties which may affect their balance of payments. It shall address to the Council and to the Commission any suggestions designed to avert these difficulties while at the same time preserving the internal and external financial stability of each Member State.

Article 3 In respect to the general payments system of Member States, the Committee shall, in particular, keep under review the implementation of Article 106…

Article 4 The opinion of the Monetary Committee must be obtained either by the Council or, in the cases provided for in Article 69…by the Commission.

The opinion of the Committee may also be obtained in other cases by the Council or the Commission. In any event, the Committee has the power and the obligation to draw up opinions on its own initiative whenever it considers it necessary for the proper fulfillment of its task.

Article 5 Member States and the Commission shall each appoint two members of the Committee. The members of the Committee and the alternates must be selected from among experts possessing outstanding competence in the monetary field. As a general rule, each Member State shall select one member from among senior officials of the administration and the other member on the proposal of the central bank; the alternates may be selected in the same way.

Members of the Committee and alternates shall be appointed in their personal capacity and shall, in the general interests of the Community, be completely independent in the performance of their duties.

The term of the office of the members of the Committee and of the alternates shall be two years. It shall be renewable. It shall end on death, voluntary resignation, or compulsory retirement. In such cases the new member of alternate shall be appointed for the remainder of the term of office. A member of the Committee or an alternate may be compulsorily retired against his wishes only by the authority which appointed him and then only if the member or alternate no longer fulfils the conditions required for the performance of his duties.

Article 6 Each member of the Committee shall have one vote.

Article 7 The Committee shall appoint from among its members a chairman and two vice-chairmen to be elected by a majority of eight votes for a period of two years. If a chairman or vice-chairman ceases to hold office before his full term has expired, the vacancy thus caused shall be filled for the

remainder of the term of the office.

The term of office of a chairman or vice-chairman is only renewable once.

Article 8 Unless the Committee decides otherwise, alternates may attend meetings of the Committee. They shall not take part in the discussions and shall not vote.

A member who is unable to attend a meeting of the Committee may delegate his functions to one of the alternates; he may also delegate them to another member.

Article 9 The Committee shall meet not less than six times a year.

It shall be convened by the chairman on his own initiative or at the request of the Council or of the Commission or of two members of the Committee.

Article 10 Opinions of the Committee, within the meaning of Article 4, shall be adopted by a majority of eight votes. The minority may set out its views in a document attached to the opinion of the Committee.

Where a majority within the meaning of the preceding subparagraph is not obtained, and in the case of any other decision, suggestion or communication intended for the Council or the Commission, the Committee shall submit a report setting out either the unanimous opinion of its members or the various opinions expressed in the course of the discussion.

Article 11 The Committee may propose to the Council or to the Commission that one or more of its members be attached to these institutions in order to comment orally on any document which may be addressed to them by the Committee.

Article 12 The Committee may entrust the study of specific questions to working parties composed of members of the Committee or alternates. The Committee and the working parties may call upon experts to assist them.

Article 13 In important cases the Committee may, before drawing up a report or delivering an opinion on a specific country, request all necessary information.

Article 14 …..…

Article 15 Discussion of the Committee and of the working parties shall be confidential.

Article 16 The Committee shall be assisted by a secretariat. The staff needed for this shall be supplied by the Commission.

The expenses of the Committee shall be included in the estimates of the Commission.

Article 17 The Committee shall adopt its own rules of procedure.

Done at Strasbourg, 18 March 1958

For the Council the President

(5) Effectiveness of surveillance in the EC and its limitations

(i) Success during the 1980s

There was basically no change in the institutional framework of surveillance and policy

coordination between the “Snake period” and the EMS period up to the first stage of EMU. However, in contrast to the 1970s when there was effectively no surveillance, the surveillance, carried out mostly informally by the Monetary Committee and the network of central banks, was successful during the 1980s in the sense that the EMS was stabilized with less frequent central rate realignments.

A study in the late 1980s by the IMF staff describes “The evidence…indicates effectiveness on the part of EMS toward the achievement of greater stability in exchange rates. Of particular importance is the absence of indications of fundamental misalignments within the ERM…the weight of evidence points to the significant progress made in the coordination of monetary policies among countries in the ERM…The record is substantially less clear with regard to developments in the fiscal sector (Guitian et al. [1988] pp11-13).”

This relative success of surveillance and policy coordination can be attributed to following factors:

1. “Consensus regarding the content of economic policies is a necessary condition to ensure the success of coordination. It involves the countries having a similar vision regarding the working of the economy, i.e. a minimum consensus regarding the so-called underlying economic model.
2. Institutional or practical modalities of coordination play two leading roles: the first is to build progressively a collegial culture and a climate of trust through personal contacts between the technical decision-makers in order to encourage emulation between the national authorities. The second is to establish, through rules and procedures, some visible signals serving to transmit the quality of the policies to public opinion and to the markets. This makes it possible to accelerate the rewards to or sanctions upon the national authorities (Ghymers [2003] page 41)”.

The first factor is clearly displayed by the performance of the EMS, after the French government decided to follow the stability-oriented policy of “franc fort”. The second factor is illustrated well in the way the Monetary Committee functioned, monitoring macro-economic and market developments.

(ii) The 1992-93 crisis and the limitations of surveillance

The question arises that if the surveillance had been effective, the European currency crisis might have been anticipated and averted. Maybe yes, but practically unlikely in the author’s opinion.

A report that reviewed the 1992-93 crises pointed out, together with the importance of analysis and assessment of underlying macro-economic development in each ERM country and the credibility of national policies (the track record of individual governments and central banks), the importance of surveillance of exchange rate relationships to function as an Early Warning System. At the same time, the report admitted **the difficulty of assessment of ERM parities**.

From 1983 to 1998 the ERM functioned well with the DM as an anchor, the Bundesbank being the leader of monetary policy, which was followed closely by other ERM central banks. The surveillance and policy coordination, especially in monetary policy, were carried out with such a basic consensus and presumption. However, once such a presumption was no longer valid because of the unexpected external economic shock of the German reunification with its economic consequences of a boom period in Germany and the tightening of the monetary policy of the anchor currency's central bank, other participating currencies had difficulties in following with their interest rate policies and tensions emerged. Once the markets realized those tensions, they reacted with massive forces.

It would have been extremely difficult for monetary authorities to foresee such unexpected developments of ERM currencies and to agree in time to a different exchange rate structure (parity grid), which could have prevented the tensions in the system. Markets were content with rates before the shock and it would have been extremely difficult to fix new equilibrium central rates "against the markets". It is doubtful if any regional exchange rate regime could have mastered such a situation without letting the market fathom new levels at least temporarily, before a new regime could be reconstructed. In the ERM, the broadening of fluctuations margins around the central rates in 1993 served this purpose well, assisted, obviously, by the prospect of Monetary Union and the need for prospective participants to adjust their domestic economic policies in such a way as to fulfill the entrance criteria, among them exchange rate stability.

3-4. ECU as a divergence indicator

3-4-1. ECU as an "early warning system"

One of the important roles that EMS initiators had expected of the ECU was as an indicator (DI: divergence indicator) that shows the divergence of a currency from the average of other currencies, and at the same time signals the tension among currencies as in an "early warning system," which should induce policy measures and interventions by countries concerned (BMF [1979] page 43).

The Council Resolution of December 5, 1978 stipulated following provisions:

> *"An ECU basket formula will be used as an indicator to detect divergences between Community currencies. A 'threshold of divergence' will be fixed at 75% of the maximum spread of divergence for each currency. It will be calculated in such a way as to eliminate the influence of weight on the probability to reach the threshold (Section 3.5)*

> *When a currency crosses its 'threshold of divergence,' this results in a presumption that the authorities concerned will correct this situation by adequate measures, namely:*

(a) Diversified intervention;

(b) Measures of domestic monetary policy;

(c) Changes in central rates;

(d) Other measures of economic policy.

In case such measures, on account of special circumstances, are not taken, the reasons for this shall be given to the other authorities, especially in the 'concertation between Central Banks.' Consultations will, if necessary, then take place in the appropriate Community bodies, including the Council of Ministers (Section 3.6)".

3-4-2. How the DI worked[19]

The DI was calculated so that the differing weights of ECU composite currencies do not influence the probability of a currency in reaching the threshold at the 75% of the maximum spread of divergence. The spread is measured by the percentage between the ECU market rate and ECU central rate of a currency. The maximum divergence spread is calculated:+/－2.25×(1－p), where p is the weight of the currency, for which the divergence spread is calculated.

Taking Belgian franc (Luxemburg franc) as an example, the weight of BFR is 9.63% (3.80/39.46×100=9.63%: refer Table 2). The maximum divergence spread is +/－2.03 (+/－2.25×(1－0.0963)＝＋/－2.03: refer Table 2 & 3). The threshold of divergence is +/－1.52 (+/－2.03×0.75＝＋/－1.52: refer Table 4). Suppose the ECU market rate of BFR on the 27th March 1979 is 39.8226, the divergence spread (D) can be calculated: D= (39.8226 － 39.4582)/39.4582×100=0.92%. The divergence indicator (DI) is: DI= 0.92/2.03×100=45.

Table1. EMS currencies: ECU central rates and central rates against BFR/LFR

Currency (1)	Central rate 1ECU=	Bilateral central rate against BFR (1unit of (1) = BFR)
BFR/LFR	39.4582	1.0
HFL	2.72077	14.5026
DKR	7.08592	5.56852
DM	2.51064	15.7164
LIT	1148.15	0.0343668
FF	5.79831	6.80512
UKL	(0.663247)	(59.4925)
IRL	0.662638	59.5471

[19] The information source of this subsection is Kommission der Europäischen Gemeinden/Generaldirektion Wirtschaft und Finanzen: Europäische Wirtschaft-Seiten 88-94, Nr. 3 Juli 1979 „Das Europäische Währungssytem."

Table2. Central rate and limit rate of ECU in BFR/LFR

ECU composition		Value of ECU components in BFR, when	
		Every currency remains at central rate against BFR	Every currency drops by 2.25% against BFR
		BFR	BFR
BFR/LFR	3.80	3.80	3.80
HFL	0.286	4.15	4.0544
DKR	0.217	1.21	1.1812
DM	0.828	13.01	12.7204
LIT	109.0	3.74	3.6617
FF	1.15	7.83	7.6498
UKL	0.0885	5.27	5.1514
IRL	0.00759	0.45	0.4418
1 ECU =		39.46	38.66
Depreciation in %: 2.03			

Table3. Percentage effect that other EMS currencies give to the ECU rate in BFR, when they depreciate by 2.25%

(1) currency	(2) depreciation	(3) weight (%) of currencies (1) in ECU	(4) effect in % (2)×(3)/100
BFR/LFR	-	-	-
HFL	−2.25	10.51	−0.24
DKR	−2.25	3.06	−0.07
DM	−2.25	32.98	−0.74
LIT	−2.25	9.50	−0.21
FF	−2.25	19.83	−0.44
UKL	−2.25	13.34	−0.30
IRL	−2.25	1.15	−0.03
Total	−2.25	90.37	− 2.03 = depreciation of ECU in BFR

Table4. Maximum divergence spread and threshold of divergence

(1) currency	(2) maximum divergence spread (%)	(3) threshold of divergence, 75% of (2)
BFR/LFR	+/−2.03	+/−1.52
HFL	+/−2.01	+/−1.51
DKR	+/−2.18	+/−1.64
DM	+/−1.51	+/−1.13
LIT	+/−5.43*	+/−4.07*
FF	+/−1.80	+/−1.35
UKL	-*	-*
IRL	+/−2.22	+/−1.67

*Please note that for LIT and UKL the real spread margin is applied, although for the calculation of other currencies the hypothetical margin of 2.25% is used also for LIT and UKL.

3-4-3. Problems with the DI and failure as a policy instrument

One must keep in mind the basic reason why the EMS was based upon the parity grid of ERM participating currencies and the ECU-based DI became only a supplementary early warning device. It was the ECUs built-in tendency to promote convergence not necessarily toward monetary stability but rather toward some average level of monetary and price development (Ungerer et al. [1983] p.15)[20]. The DI, therefore, was not given the legal enforcement power to trigger actions automatically, but only to attempt to induce actions mentioned in the Council Resolution above.

The DI had a technical flaw in its design. When only one currency diverged clearly from the average of other currencies, the threshold of divergence gave signals as an early warning. But when two currencies moved strongly in opposite directions, the margin limit of ±2.25% was reached without the DI giving an early warning signal. Suppose that (i)DKR appreciates to its ceiling of +2.25% against BFR and (ii)BFR depreciates to its floor of －2.25％ against DKR, while other currencies remain in the middle (±1.125%), in such a case the DIs of neither DKR nor BFR reach its threshold as shown below (source same as (2) above):

(i) The ECU rate in BFR drops: (2.25×3.06/100) + (1.125×87.31/100)= 1.05%
DI of BFR: 1.05/2.03×100= 52 (－) <75%

(ii) The ECU rate in DKR rises: (2.25×9.63/100) + (1.125×87.31/100)= 1.20%
DI of DKR: 1.20/2.18×100=55 (+) <75%

In addition, the inclusion of the pound sterling, which did not join the ERM, and the Italian lira, which moved in a wider band of 6%, resulted in distortions in calculating DIs despite adjustments made. Due to such technical problems, the DI diminished its importance as an early warning system, and was abandoned as a policy instrument.

3-5. Implications for East Asia

3-5-1. Existence of regional institutions with a clear objective

The European surveillance during the EMS period took place within the institutional framework of the European Communities to achieve the objective of the European zone of monetary stability, for which the EMS was created. Its legal provisions provided with institutions (the Council of Ministers, the European Commission, the Monetary Committee, the Committee of central bank governors and etc.)

[20] The controversy in designing the EMS between the French, who insisted on the balance of burden of both deficit and surplus countries by making the ECU a reference criterion for parity, and the Germans, who insisted to use the ECU simply as a numerair (unit of account) and to adopt a parity grid of bilateral central rates, related to the characteristic of the ECU itself as a currency basket (for details, refer Tietmeyer [2005] chapter 7).

that were indispensable for effective surveillance.

The surveillance evolved over the years with trials and errors, sometimes facing critical moments like March 1983, when France had to choose virtually to leave or remain in the ERM, and the European currency crises of 1992-93. The surveillance, mostly informal ones at the Commission and MC, helped the EC not only to overcome difficult times, but to make Member States realize the importance of economic convergence to maintain monetary stability.

Unlike in Europe, the regional integration in East Asia has been driven mostly by private market forces. The institutional framework is still in the process of shaping in a relatively loose form without a legal binding instrument like a treaty. For the ASEAN+3 it may not be appropriate for the moment to have a rigid regional framework, but a minimum level of institutional infrastructure (the equivalent of the Commission and others) needs to be created. When the ASEAN+3 decides in future to deepen the present monetary and financial cooperation (crisis prevention and management) further in "pursuit of a more closely coordinated exchange rate mechanism" (East Asian Study Group Final Report) in future, a standing secretariat will be indispensable for an effective surveillance with substance.

3-5-2. Personal trust among experts with technical expertise

Despite its status as an advisory organ to the Ecofin Council and Commission, the Monetary Committee played a crucial role in monetary and financial affairs, and increasingly in economic surveillance in the EC. The source of its influential power lay in its composition of highly qualified experts, tightly tied by personal trust, not formally representing their national governments, but acting as individuals for the common interests of the Community in a discussion forum shielded from outside pressures. The MC was supported by its small but capable secretariat and the Commission experts.

In Latin America, the project of Macroeconomic Dialogue Network (REDIMA I: acronym in Spanish) was implemented in 2000 through 03, supported by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) with the technical contribution and financial sponsorship of the European Union. The purpose of the REDIMA I project was to create an instrument of communication and dialogue between high-level macroeconomists from ministry of finance and central banks in three sub-regions of Latin America: the Andean Community, the Southern Common Market (Mercosur) and the Central-American Common Market (CACM). An expert of the European Commission DG ECFIN (Christian Ghymers) was on secondment at the ECLAC for this project. The second phase REDIMA II was carried out in 2005 and 06 supported by the ECLAC and EU[21]. The

[21] http://www.eclac.cl (Refer the page RED DE DIALOGO MACROECOMICO (REDIMA))

project is a trial to transfer the European experience and know-how collected mainly through the MC to Latin America for better communication among member countries in sub-regions.

It is worth considering for East Asia to review the existing ASEAN+3 Finance Deputies Meeting (AFDM+3), consisting of deputy finance ministers and deputy central bank governors, from the viewpoint of lessons drawn from the European experience. Here again, it will be essential to establish a permanent secretariat to support the activities of ADFM+3.

3-5-3. Failure of ECU as a Divergence Indicator

The reason why the ECU failed to function as a divergence indicator (DI) can be traced to the compromise reached prior to the start of the EMS. The controversy whether the Exchange Rate Mechanism should be based upon the parity grid, or use the ECU as a reference point of exchange rates for intervention was settled politically in Aachen, as announced by the Council Resolution of December 1978. It was, however, not compatible to give the ECU the role of DI, while bilateral exchange rates had to be kept within an agreed margin of the parity grid. The policy proponents must have been aware of the problem, and, therefore, the "threshold of divergence" did not trigger corrective actions automatically, but it resulted simply in a presumption that authorities would take actions.

When East Asia draws a blue print for its regional monetary system in future, it needs to weigh cautiously the pro and con of two exchange rate mechanisms: the parity grid formula as in the EMS, or the hub and spokes as in the present ERM II (in case of East Asia a Regional Monetary Unit (RMU) is supposed to become the hub). The RMU will function as a DI only in the hub and spokes formula, but such a formula will have a drawback that exchange rates are referred to a currency basket that is an average value of composite currencies, not the most stable currency of the monetary system. When the parity grid formula is to be chosen with an RMU simply as a unit of account, but not as a DI, the European experience of the EMS will be relevant straightforwardly in designing such a system in East Asia.

References

Bundesministerium des Finanzen (1979) „Das Europäische Währungssystem Reihe: Bürger-Informationen"

Ghymers, C. (2003) "Fostering economic policy coordination in Latin America: lessons from the REDIMA Phase I (2000-2003) How to get out of the prisoner's dilemma in Latin America"

Guitian M. et al (1988) "Policy coordination in the European Monetary System," Occasional Paper 61,

IMF

Kommission der Europäischen Gemeinschften/Generaldirektion Wirtschaft und Finazen (1979) *Das Europäische Währungssystem*, „Europäische Wirtschaft Nr. 3“

Tietmeyer, H. (2005) “Herauforderung Euro,” Carl Hanser Verlag

Ungerer, H. et al. (1983) „The European Monetary System: the experience, 1979-82,“ Occasional Paper 19, IMF

Ungerer, H. (1997) “A Concise history of European monetary integration- from EPU to EMU,” Quorum Books

CHAPTER 4

THE DESIRED ROLE OF PUBLIC AND PRIVATE SECTORS TO PROMOTE RMU DENOMINATED TRANSACTIONS

Chapter 4 : The Desired Roles of Public and Private Sectors to Promote RMU (Regional Monetary Unit) Denominated Transactions

Introduction

RMUs for transaction can be used as a unit of account in contracts and transactions. They can be utilized as a unit of account in both the public and private sectors for international transactions, in other words, in current account and capital transactions. This chapter will review what role the public and private sectors can play in promoting the use of RMUs in the Asian region.

Based on last year's report (IIMA(2006-2007)), the characteristics, utilities, and effects of RMUs will be reviewed and the conditions to promote the use of RMUs will be presented. Then two options, one stemming from their use in the private sector and the other involving the public sector, will be laid out. Then possible measures for enhancing the use of RMUs will be considered. Discussions on the means of promoting the use of RMUs tend to focus on the technical aspects, such as the designing of the RMU denominated financial products, but in this chapter, a more comprehensive approach will be taken to explore how RMU utilization could be expanded based on economic rationale and various aspects will be considered including the economic environment.

The RMUs for transaction that are discussed in this chapter consist of convertible Asian currencies whose component ratio is determined by using the weights calculated on the basis of fixed criteria and have a different concept from the RMUs for surveillance discussed in Chapter 1. The RMUs for transaction are the equivalent of the Core-RMUs introduced in last year's report. (for details of Core-RMUs, please refer to Chapter 1 of IIMA (2006-2007))

4-1. The characteristics, utilities and effects of RMU for transaction

Let us review the characteristics, utilities and effects of RMU for transaction.

4-1-1. The characteristics

RMUs have the following two important characteristics.

The first is foreign exchange risk diversification. This is evident from the fact that a RMU is a composite of a range of Asian currencies.

The second is that it offers the weighted average interest rate of the component currencies. As long as foreign exchange risks are within acceptable bounds, the countries with relatively low interest rates among the Asian economies can conduct their fund management in the RMU denominated financial

instruments, thereby being able to benefit from higher interest rates than if management operations were conducted in their own currencies. On the other hand, by raising funds through RMU denominated financial instruments, those with relatively high interest rates can raise funds with lower interest rates than through financial instruments in home currency denominations. Because of such features, RMU denominated financial products can be the bridge between the abundant savings and high investment demand in the region.

4-1-2. Utilities

There are public and private means of utility.

4-1-2-1. Utilization in the public sector

The following are the possible means of official use. Table 1 shows the conceptual categorization.

(1) RMUs can be used as the accounting unit for public sector or multilateral institutions, or as the denomination for asset and liabilities contracts among governments in the region. In more concrete terms, a RMU can be used as a unit of account by the ADB or for ASEAN + 3 activities. The upper limit for swap agreements in the Chiang Mai Initiative could also be denominated in a RMU.

(2) RMUs could be used for payments among governments or between governments and multilateral institutions in the region, as the denomination for account transfers.

(3) RMUs could be used as foreign currency reserves. European countries used to hold the ECU (European Currency Unit) as part of their foreign currency reserves, with their central banks paying in 20% of their gold reserve and 20% of their dollar reserve to the European Monetary Cooperation Fund.

4-1-2-2. Utilization in the private sector

RMUs could be used in the following ways in the private sector.

(1) They could be used as the denominating currency for current account and capital account transactions.

(2) They could be used as the vehicle, transaction and settlement currency in current and capital account transactions. (This would, however, be difficult to realize unless there was a RMU denominated fund settlement system)

(3) They could be used in asset denomination. Assets could include deposits, loans, securities and derivatives.

Table1: Conceptual categorization of private and official use of RMUs

	For private use	For oficial use
Unit of account	Denomination currency in current and capital transactions	Accounting unit of pulic sector and multilateral institutions, Denomination for financial claims and obligations among governments
Medium of Exchnage	Vehicle, transaction, and setllement currency in current and capital transactions	Payment among governments and multilateral institutions
Store of value	Issuance of or investment in assets (deposits, loans, securities, derivatives, and so on)	Foreign reserves

4-1-3. Effects

4-1-3-1. Serving as a bridge between savings and investment in the region and contributing to the development of the financial and capital markets.

The Asian currency crisis of 1997-98 brought an acute awareness that Asian financial and capital markets had not been serving adequately as the intermediary between savings and investment.

Before the Asian currency crisis, savings from Asia took a roundabout route – first to the financial institutions and markets in the developed countries, then from the financial institutions and investors of the developed countries to the governments, financial institutions and corporations in Asia. Such capital flows tended to be short-term, denominated in extra-regional currencies, such as the US dollar, which were invested in tangible and financial assets in Asia. The investments were denominated in the home currencies and were medium to long-term. As a result, the recipients of the investment ended up being exposed to both foreign exchange and interest rate risks. Unfortunately, they did not fully appreciate the risks and neglected to manage them.

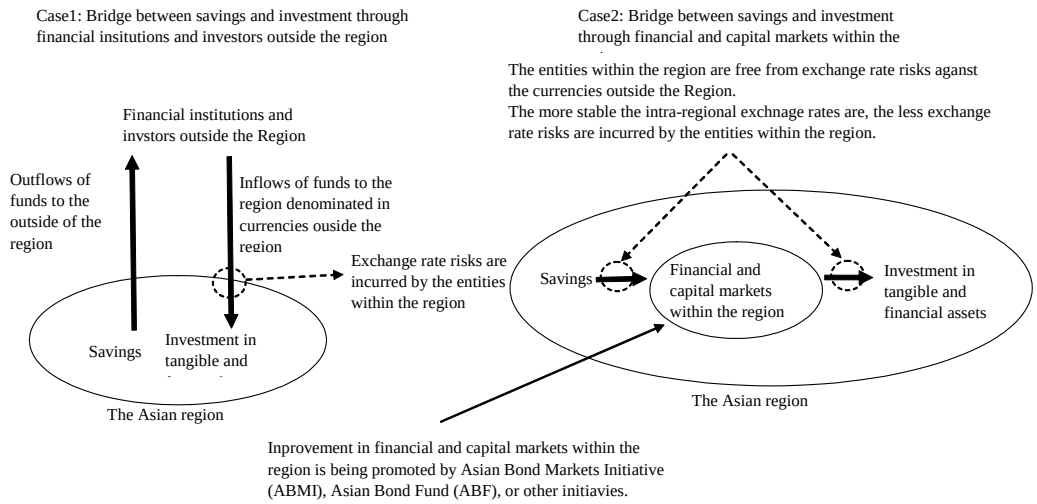
This was due to the fact that some of the Asian economies had adopted the policy of applying an exchange rate system akin to a dollar-peg system, while liberalizing cross-border flow of capital and pursuing an autonomous monetary policy at the same time. Such a policy is contrary to the "Impossible Trinity" thesis of international finance, which states that it is possible to meet two of the three conditions but not all three simultaneously: exchange rate stability, free cross-border movement of capital, and autonomy of monetary policy.

The contradiction was exposed by the precipitous withdrawal of funds from Asia in the 1997-98 period, the risks materialized as real losses and the situation developed into the Asian currency crisis.

The fundamental cause of the crisis was the application of policies that were contrary to "the

Impossible Trinity." However, if the savings in regional currencies had been bridged to investment in regional currencies in Asia, the risks would not have been so significant and even if they had materialized, they could have been manageable (see Figure 1).

Figure 1 : Bridging between Savings and Investment within the Asian region



Because a RMU diversifies foreign exchange risks and offers the weighted average interest rate of the component currencies, RMU denominated financial products would promote bridging between Asian savings and investment and contribute to the development of regional financial and capital markets. Looking back at the experience of the Asian currency crisis, such a contribution would be highly significant. The promotion of RMU use has the possibility of providing added support to the development of Asian Bond Market Initiative (ABMI) and Asian Bond Fund (ABF), which are endorsed to better organize the Asian financial and capital markets.

4-1-3-2. The increase of the extra-regional transactions denominated in RMU would contribute to the lowering of foreign exchange risks which the region is exposed to

RMU denominated financial products would provide the weighted average value of the component Asian currencies and interest rates. This would well suit foreign investors who want to invest not in individual countries but in Asia as a whole. If the RMU denominated financial products are recognized by non-regional investors as highly convenient for investment in Asia and if the extra-regional governments, financial institutions and investors begin to deal in these products, then funds would flow through the borders of Asia without the Asian fund raisers being exposed to foreign exchange risks. For example, when Japanese investors bought the ECU bonds in the 80s and 90s, they regarded the investment as "purchasing Europe by purchasing ECU bonds with the added benefit of the higher interest rate than the German mark bonds."

If the proportion of RMU denominated transactions should increase in the flow of capital between Asia and other regions, then the foreign exchange risk that Asia as a region would be exposed to would decrease and non-Asian regions would carry more of the burden.

4-2. Conditions to promote the use of RMUs

What are the conditions for promoting the use of RMUs? To put it in another way, what are the conditions for expanding the use of RMUs as a result of actions that are rational from the economic perspective when there is nothing to enforce their use? The answer to "what conditions does a currency have to meet to be chosen as a key currency from among a wide range of choices?" should lie in the stability of the value of the currency and its low transaction cost. Similarly, the condition for promoting the use of RMUs should lie in the stability of their value and their low transaction cost. Unless the value is stable, it is not suitable as an accounting unit or a means for storing value, and unless the transaction cost is low, it would not be logical to adopt it as a payment method.

In order to secure the stability of the value and the low transaction cost, network externalities, economies of scale, and intra-regional economic and financial integration would play important roles.

4-2-1. Stability of the RMU value

What does the stability of RMU value mean? The RMU has an extra-regional (external) and an intra-regional (internal) value.

Of the two, it is not realistic to aim for the stability of its external value. It is hardly possible to try to stabilize the value of an Asian RMU against the dollar and the Euro, which are extra-regional currencies. On the other hand, the stability of the RMU's internal value could be achieved by close cooperation within the region.

The stability of the RMU value, which is the key to promoting the use of RMUs, translates into the stability of internal value, as the discussions presuppose the use of the RMU in the region. It is clear that the stability of the internal value of a RMU is the same as the stability of the intra-regional foreign exchange rates. As discussed in Chapter 1, monitoring the value of regional currencies against the RMU for surveillance under the framework of regional surveillance in Asia is the most effective method to stabilize the intra-regional foreign exchange rates. Although it would be difficult to coordinate the foreign exchange rate policies in the region, discussions towards coordination should begin.

The history of the use of the ECU in Europe also makes it clear that stability of the value is critical to the use of a RMU. For example, the use of the ECU dropped precipitously when the foreign exchange rate within Europe became volatile due to the European currency crisis in 1992-1993. The use of the ECU recovered once the prospect of the ECU becoming the single currency, the Euro, became evident, but if it had not been for such a prospect, the use of the ECU might not have recovered.

4-2-2. Low transaction cost of the RMU

The transaction cost of the RMU is the cost that is incurred when trading RMU denominated financial products. This includes the cost that is incurred when hedging the foreign exchange and interest rate risks that are associated with buying or selling RMU denominated financial products.

Apparently, a low transaction cost is important in promoting the use of RMUs. In addition to the transaction cost, there is also the information cost associated with collecting information related to any transaction. In the following section, the term “transaction cost” includes such information cost.
The following two conditions must be met to lower the transaction cost and for the low transaction cost to promote the use of RMUs.

4-2-2-1. Transaction cost of the composite currencies of the RMU must be reasonably low

A market participant who has RMU short position in his balance sheet can hedge his foreign exchange risk by buying RMU denominated financial assets or RMU forward contracts at the equal amount with his short position in the market. However, if it should be difficult to buy RMU in the market as a shortage of liquidity of RMU, it would be necessary to purchase the composite currencies of the RMU at the ratio equivalent to the weight of the currencies within the RMU. This is called as bundling of the RMU composite currencies. The opposite operation is called unbundling of the RMU composite currencies.

This means that the cost of bundling and unbundling the RMU must be low enough for the RMU transaction cost to be reasonably low. Since bundling and unbundling are purchasing and selling of composite currencies, it would be critical for the transaction cost of the RMU composite currencies to be low.

4-2-2-2. RMU transaction cost must be lower than the transaction cost of unbundling and unbundling of the RMU.

It is important to note that the RMU transaction cost must be lower than the transaction cost of the RMU composite currencies to promote the use of the RMU.

If the latter is lower, then it would be logical to break up the RMU denominated financial product into financial products denominated in RMU composite currencies according to their weighted ratio and to trade those products rather than to trade RMU denominated financial products.

In the case of the SDR, which was composed of five major currencies, US dollar, Japanese yen, West German mark, French franc and British pound, there was no difference in the costs between transactions in the SDR and transactions in individual currencies, so the market participants lost interest in SDR denominated transactions. This was because the transaction cost of bundling and unbundling of the SDR was low enough and management and fund raising in each currency could be conducted freely. The transaction cost of the SDR was not low enough compared to the transaction cost of its component currencies.

In Asia, with only a few exceptions, currencies do not have adequate convertibility. Financial and capital markets have not developed enough, making the transaction cost for most currencies quite dear. So the transaction cost of the possible composite currencies of an Asian RMU would be much higher than those of SDR composite currencies.

In retail transactions, it may be possible for RMU transaction cost to be adequately lower than the transaction cost of the RMU composite currencies, as it may be costly for retail customers to put together RMU financial products out of the RMU composite currencies. However, as the size of transactions increases, the difference between the two could easily shrink, and some serious thinking is necessary to assure that “the RMU transaction cost is lower than the transaction cost of bundling and unbundling of the RMU composite currencies.” Such a condition would be met if the effect of “network externalities”, laid out in the next section, should spread sufficiently.

4-2-3. Network externalities

Externalities arising from network-effect are critical to lowering transaction costs. It is the case for circulation of money.

The same applies for RMUs. In order to promote the use of a RMU, a mechanism must be created whereby “people use the RMU because others are doing so.” If such a mechanism should be developed, RMU denominated transactions would increase and the economies of scale would kick in to decrease the transaction cost. Currently most of the cross-border transactions in Asia are denominated in the US dollar and one would instinctively think that it is much more convenient to use the dollar than RMUs. Hence some creative thinking is necessary to introduce the mechanism where

“a RMU is used because others are using it.”

How can network externalities be realized? One way could be through activities solely in the private sector. The other is to enhance the benefits by involving the public sector. These possibilities will be touched on in section “4-3., Sequencing to promote the use of RMUs.”

4-2-3. Economies of scale

Economies of scale are an important factor in lowering transaction costs. Due partly to the ABMI and ABF, the size of the regional bond market is continuing to increase and conditions should be favorable for the economies of scale to take effect and for transaction cost to decrease (see Table 2). Even then, the transaction cost for bonds denominated in regional currencies, which is one of the costs, cannot be said to be low. The data on bid-ask-spread for the bonds proves the point (see Table 3). If not only the bond issuing balance but also the volume of transactions grow, then the economies of scale should take effect, and the transaction cost and information cost should further decrease. Investors in Asian bond market tend to buy and hold, and it is important to develop the secondary market as well as the primary market.

Table 2: Outstandings of Bonds Issued in Local Currencies in East Asia

(Issued by governments, corporate business, and financial institutions)

	End of December 1997		End of December 2006	
	Percent of GDP	in billion US$	Percent of GDP	in billion US$
China	12.2	116.4	52.9	1,350.6
Hong Kong	26.4	45.8	51.0	96.2
Indonesia	1.9	4.6	15.2	53.4
Korea	25.1	130.4	109.3	959.0
Malaysia	56.4	57.0	82.5	121.3
Philippines	20.5	16.9	37.5	43.9
Singapore	24.8	23.8	74.3	99.2
Thailand	6.7	10.5	57.6	112.0
Vietnam	-	-	8.9	4.9
Total	17.3	405.3	61.5	2,840.4

(Issued by govenments)

	End of December 1997		End of December 2006	
	Percent of GDP	in billion US$	Percent of GDP	in billion US$
China	7.1	67.4	34.4	877.9
Hong Kong	7.6	13.1	9.0	16.9
Indonesia	0.4	0.9	13.3	46.6
Korea	4.2	21.6	53.5	469.1
Malaysia	19.2	19.4	41.4	60.9
Philippines	20.1	16.6	37.2	43.5
Singapore	13.6	13.1	41.9	55.9
Thailand	0.2	0.3	38.3	74.6
Vietnam	-	-	8.2	4.5
Total	6.5	152.4	35.7	1,649.9

(Issued by corporate business and financial institutions)

	End of December 1997		End of December 2006	
	Percent of GDP	in billion US$	Percent of GDP	in billion US$
China	5.1	49.0	18.5	472.7
Hong Kong	18.8	32.7	42.0	79.3
Indonesia	1.6	3.7	2.0	6.8
Korea	20.9	108.8	55.8	489.8
Malaysia	37.2	37.6	41.1	60.4
Philippines	0.4	0.3	0.3	0.4
Singapore	11.2	10.7	32.4	43.3
Thailand	6.5	10.2	19.2	37.4
Vietnam	-	-	0.8	0.4
Total	9.0	253.0	25.8	1,190.5

Source: Asian Bond Online（http://asianbondsonline.adb.org/regional/regional.php）

Table 3: Bid-ask-spread in secondary bond markets in East Asia

	Issued by corporate business and financial institutions (basis points)		Issued by governments (basis points)	
	2000	2006	2000	2006
China	-	10.8	15.0	7.6
Hong Kong	8.0	6.3	3.5	3.0
Indonesia	100.0	68.8	100.0	16.9
Korea	5.0	3.0	1.8	1.4
Malaysia	15.0	18.8	4.9	2.3
Phillipines	40.0	30.0	47.5	25.3
Singapore	10.5	5.5	1.6	2.7
Thailand	10.0	10.8	2.8	3.0
Vietnam	-	14.9	N/A	N/A
Japan	9.3	6.0	0.6	0.6

Source: Asian Bond Online (http://asianbondsonline.adb.org/regional/regional.php)

4-2-4. Enhancing economic and financial integration

As the regional economic and financial integration deepens, in other words, as interdependence in the regional transaction of goods and services as well as in financial and capital transaction grows, the mechanism of "I will use the RMU because the others are" should work better.

It would be easier for the economies of scale to take effect as regional economic and financial integration deepens, as that would lead to the increase in the volume of regional goods and services transactions and the expansion of regional financial and capital markets.

At the same time, the benefit of stable regional foreign exchange rates should also increase as regional economic and financial integration deepens. This means that as integration deepens, it is possible that cooperation towards regional foreign exchange stability would strengthen. If such cooperation should materialize, that would enhance the stability of the RMU value.

Regional economic and financial integration would not only lead to the lowering of transaction costs but also contribute to the stability of the RMU value.

4-3. Sequencing of the use of RMUs

In view of the conditions for promoting the use of RMUs as shown in 4-2., there are two routes in which the use of RMUs could be promoted. One is to start by using RMUs solely in the private sector and the other is to involve the public sector.

4-3-1. Starting by using RMUs solely in the private sector

An agreement within the region would, of course, be necessary to realize an official RMU, which does

not seem likely at this point. If the promotion of the use of RMUs must begin in the private sector, the following conditions are presupposed.

- Since there is no single official or private RMU in existence, the component currencies and their weight would have to be defined by those involved in creating the RMUs. The RMUs would be “made-to-order” and contracts and transactions would be based on the agreed definition, which means that there would be multiple RMUs.
- Since it would be difficult to limit to one RMU, it would not be easy to establish a RMU denominated fund settlement system like the ECU Clearing System which exited in Europe in the 1980-90s. The settlement of RMU denominated transactions would have to be conducted by exchanging the amount of existing currencies equivalent to the RMU settlement amount.

If a RMU denominated fund settlement system could not be established because there could not be one RMU, it would be difficult to benefit from “network externalities,” which is “I will use the RMU because the others are.”
However, if there were a private financial institution that would systematically deal with RMU denominated transactions for some reason and function as a RMU fund settlement system, and user-friendly RMU services were offered by the institution, then “network externalities” whereby “I will use that private financial institution because others are” cycle could be created.

The following things become clear by studying the use of the ECU in the private sector in Europe.

- The use of a RMU begins with long-term financial products and moves to short-term products. This is because without the establishment of the RMU denominated fund settlement system, it is difficult to promote the use of RMUs for short-term financial products.
- While a RMU denominated fund settlement system is not available, the promotion of RMU denominated bonds, loans, deposits, investment funds and index transactions could be promoted by settling transactions in the equivalent amount of existing currencies.
- Although it is possible to promote the use of RMUs in financial (capital) transactions, their promotion would be limited in commercial (current account) transactions. Diversifying foreign exchange risks and providing weighted average interest rates, which are the characteristics of RMUs, are attractive in financial transactions, however, could only bring about complications in commercial transactions because companies aim to maximize profits in the home currency.

Although it may be difficult to establish a RMU denominated fund settlement system for the time being, it is necessary to try to establish one at an early stage in the process of increasing the use of RMU for transaction.

4-3-2. Involving the public sector in the private use of RMUs

In considering the involvement of the public sector in the private use of RMUs, the following choices can be studied.

(i) Official support to the private use of RMUs

There could be an official support of RMU denominated transactions in the private sector even if there is no official RMU. Drawing from the experience of the ECU in Europe (IIMA (200-2007), Chapter 3), the following means of official support are possible; excluding RMU denominated transactions from the list of products regulated under the Foreign Exchange Law, providing favorable tax treatment such as concerning the withholding tax, issuance of RMU denominated public debt securities by governments and multilateral institutions, and supporting the establishment of a RMU denominated settlement system. These measures would have the effect of promoting RMU denominated transactions.

(ii) Definition of an official RMU and its creation

As seen in 4-1-3., it is possible to define a single official RMU with the agreement of the regional authorities and use it for ASEAN + 3 activities, accounting unit for the ADB, unit of quotation for asset and liabilities among the regional authorities, and as an unit to indicate the swap size under the Chiang Mai Initiative.

In Europe, the member central banks paid in 20% of their gold holdings and 20% of their dollar foreign reserve to the European Monetary Co-operation Fund and held the equivalent of the two as foreign currency reserve in the ECU. However, a RMU denominated foreign currency reserve could be created in Asia in the same way, only if the RMU gains enough credibility among the regional governments.

Once the definition of an official RMU is clarified and its use prevails in the private sector, it would make it easier to establish a RMU fund settlement system, leading to the expansion of private and official use of the RMU.

(iii) Using the official RMU for transactions between the official and the private sectors

The official ECU was used in Europe only for transactions within the public sector – among governments and between governments and multilateral institutions – but not for payments to the private sector. Transactions between the official and the private ECU were prohibited.

Revoking this ban would encourage the involvement of the public sector in RMUs. The official ECU

could be used for payment to the private sector and the private RMU that the public sector receives from the private sector could be used as an official RMU for payments among governments. This would mean supplying RMU denominated liquidity from the public to the private sector as well as withdrawal of liquidity, possibly influencing liquidity in the financial markets and interest rates of the member countries. To allow transactions between the official and private RMUs, the government authorities in the region must be able to demonstrate that they can adequately control liquidity and interest rates.

(iv) Accepting the official RMU as another legal tender

There is a possibility of accepting an official RMU as another legal tender along with the legal currency. However, when there are two legal tenders in a country, funds could shift from one to the other based on interest rate and foreign exchange rate fluctuations or expectations of such fluctuations, and could destabilize the financial system. Such side-effects should be taken into account and weighed carefully when considering the possibility of accepting an official RMU as another legal tender.

The significance of public sector involvement is in promoting the use of RMUs in the private sector through the "network externalities" effect. However, (iv) and (iii) were not applied in the case of the ECU in Europe, and side effects to the regional financial markets and monetary policies could not be small. This means that the realistic approach is to start a dialogue among the regional authorities on (i) and (ii). It is crucial to expand the market size for RMU transaction large enough in the initial stage, so that the use of the RMU prevails in the region. In other words, exceeding critical mass is important. Public sector involvement would be able to play an important role in it, through the effects of network externalities and economies of scale.

4-4. Measures to promote the use of RMUs

The key factor when considering the means to promote the use of RMUs is how to create the situation under which the demand for RMU denominated financial products would grow. It is also important to develop an environment where the RMU denominated transactions would increase based on the economic rationale of low RMU transaction cost and price stability.

4-4-1. Promoting regional economic and financial integration

Regional economic and financial integration is a significant factor in furthering the attraction of RMUs, and the two complement each other. It is especially important to encourage regional financial integration, which is far behind economic integration. Here, lessons will be drawn from the process under which the German mark became the key currency in Europe in the 1980s. The importance of the

link among various financial and capital markets in the process of financial integration will also be made clear.

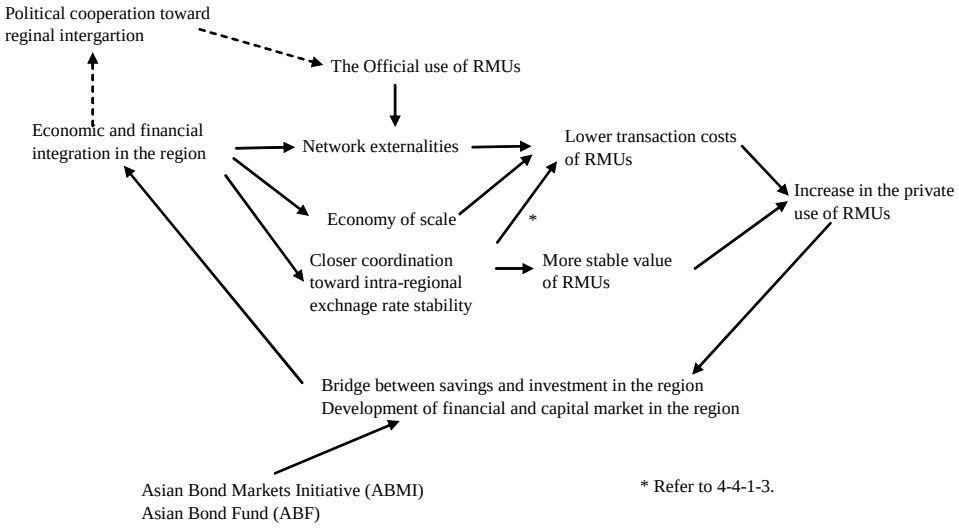
4-4-1-1. Promotion of regional economic and financial integration and expanding the use of RMUs are mutually complementary

Why is it important to enhance regional economic and financial integration to increase the attraction of using RMUs? This is because a positive cycle could start whereby regional economic and financial integration deepens, which would promote the utilization of RMUs, which would further deepen regional economic and financial integration.

As mentioned above, promotion of regional integration would strengthen interdependence in the region, and when regional transactions increase, RMU transaction costs should decline through network externalities and the effects of the economies of scale. Also, when regional integration deepens, regional foreign exchange rate stability becomes more important, and because the regional authorities could strengthen their cooperation to realize that stability, the value of RMUs could also stabilize. If the attraction of RMUs should increase for the private sector, RMU transactions would increase. This would enhance the bridging of savings and investment in the region, contribute to the development of financial and capital markets in the region and further contribute to the promotion of regional economic and financial integration.

If the deepening of regional economic and financial integration should influence the policies of the regional governments concerning political cooperation towards regional integration and if it should become possible to achieve an agreement among regional governments concerning RMU's official use, then the RMU transaction cost would further lower through network externalities, which would promote the use of the RMU. Figure 2 shows this mechanism. As is clear, the promotion of Asian regional economic and financial integration is indispensable to the promotion of RMU utilization, and the two are mutually complementary.

Figure 2: Virtuous Circle of the Use of RMU for Transaction and Regional Integration in Asia



4-4-1-2. The importance of promoting regional financial integration

Until now, Asian economic integration has been market-led, not policy-led. Production networks were established through direct investment by foreign-affiliated companies and that contributed to the expansion of regional trade. More recently, since the beginning of this millennium, the number of free trade agreements (FTA) signed among the regional economies has multiplied, and there is likely to be a network of FTAs in Asia in the near future. This means that now, economic integration in Asia is supported both by policy and markets.

Here, it must be emphasized that financial integration is still far behind economic integration. The regional trade ratio, which indicates the extent of economic integration, was 59% for imports and 50% for exports on average in 2005 (see Table 4). But financial integration is nowhere near the economic integration. Statistics that help to grasp the regional flow of funds comprehensively is still lacking. However, looking at cross-border portfolio investment, outflows from East Asia to the intra-regional countries as a percentage of the outflows to the world is 6.5%, and inflows from the intra-regional countries to the East Asia as a percentage of the inflows to the world is 9.4% (see Table 5).

Table 4: Trade Flows

2005	From	(In billions of US dollars)					(Percentage of sub total)				
		NAFTA	EU25	East Asia	Rest of the World	World Total	NAFTA	EU25	East Asia	Rest of the World	World Total
In	NAFTA	805	364	564	372	2,105	38.3	17.3	26.8	17.7	100.0
	EU25	216	2,642	415	727	3,999	5.4	66.1	10.4	18.2	100.0
	East Asia	234	239	1,371	476	2,320	10.1	10.3	59.1	20.5	100.0
	Rest of the World	205	741	397	628	1,970	10.4	37.6	20.1	31.9	100.0
	World Total	1,461	3,984	2,747	2,202	10,394	14.1	38.3	26.4	21.2	100.0
		(Percentage of sub total)					(Percentage of World Total)				
	NAFTA	55.1	9.1	20.5	16.9	20.3	7.7	3.5	5.4	3.6	20.3
	EU25	14.8	66.3	15.1	33.0	38.5	2.1	25.4	4.0	7.0	38.5
	East Asia	16.0	6.0	49.9	21.6	22.3	2.3	2.3	13.2	4.6	22.3
	Rest of the World	14.0	18.6	14.4	28.5	19.0	2.0	7.1	3.8	6.0	19.0
	World Total	100.0	100.0	100.0	100.0	100.0	14.1	38.3	26.4	21.2	100.0

2001	From	(In billions of US dollars)					(Percentage of sub total)				
		NAFTA	EU25	East Asia	Rest of the World	World Total	NAFTA	EU25	East Asia	Rest of the World	World Total
In	NAFTA	639	254	376	189	1,458	43.8	17.4	25.8	12.9	100.0
	EU25	180	1,623	234	361	2,398	7.5	67.7	9.8	15.1	100.0
	East Asia	187	151	693	217	1,248	15.0	12.1	55.5	17.4	100.0
	Rest of the World	145	407	193	294	1,039	14.0	39.1	18.6	28.3	100.0
	World Total	1,151	2,436	1,496	1,061	6,144	18.7	39.6	24.4	17.3	100.0
		(Percentage of sub total)					(Percentage of World Total)				
	NAFTA	55.5	10.4	25.2	17.8	23.7	10.4	4.1	6.1	3.1	23.7
	EU25	15.6	66.7	15.6	34.0	39.0	2.9	26.4	3.8	5.9	39.0
	East Asia	16.2	6.2	46.3	20.4	20.3	3.0	2.5	11.3	3.5	20.3
	Rest of the World	12.6	16.7	12.9	27.7	16.9	2.4	6.6	3.1	4.8	16.9
	World Total	100.0	100.0	100.0	100.0	100.0	18.7	39.6	24.4	17.3	100.0

Note: East Asia = Japan, China, Hong Kong, Singapore Indonesia, Malaysia, Philippines, and Thailand
Source: IMF, Direction of Trade Statistics

Table 5: Cross-Border Portfolio Invetment Flows

2005	From	(in billions of US dollars)					(Pecentage of sub total)				
		NAFTA	EU15	East Asia	Rest of the World	World Total	NAFTA	EU15	East Asia	Rest of the World	World Total
In	NAFTA	767	2,309	911	2,076	6,063	12.7	38.1	15.0	34.2	100.0
	EU15	2,086	8,146	960	1,789	12,981	16.1	62.8	7.4	13.8	100.0
	East Asia	834	755	184	185	1,958	42.6	38.5	9.4	9.5	100.0
	Rest of the World	1,383	1,951	755	770	4,859	28.5	40.2	15.5	15.9	100.0
	World Total	5,070	13,161	2,810	4,820	25,860	19.6	50.9	10.9	18.6	100.0
		(Pecentage of sub total)					(Pecentage of World Total)				
	NAFTA	15.1	17.5	32.4	43.1	23.4	3.0	8.9	3.5	8.0	23.4
	EU15	41.1	61.9	34.2	37.1	50.2	8.1	31.5	3.7	6.9	50.2
	East Asia	16.5	5.7	6.5	3.8	7.6	3.2	2.9	0.7	0.7	7.6
	Rest of the World	27.3	14.8	26.9	16.0	18.8	5.3	7.5	2.9	3.0	18.8
	World Total	100.0	100.0	100.0	100.0	100.0	19.6	50.9	10.9	18.6	100.0

2001	From	(in billions of US dollars)					(Percentage of sub total)				
		NAFTA	EU15	East Asia	Rest of the World	World Total	NAFTA	EU15	East Asia	Rest of the World	World Total
In	NAFTA	415	1,300	585	1,206	3,506	11.8	37.1	16.7	34.4	100.0
	EU15	1,264	3,603	585	857	6,309	20.0	57.1	9.3	13.6	100.0
	East Asia	325	303	86	126	840	38.7	36.0	10.2	15.0	100.0
	Rest of the World	560	799	359	338	2,056	27.3	38.8	17.5	16.4	100.0
	World Total	2,565	6,005	1,615	2,526	12,711	20.2	47.2	12.7	19.9	100.0
		(Percentage of sub total)					(Percentage of World Total)				
	NAFTA	16.2	21.6	36.2	47.7	27.6	3.3	10.2	4.6	9.5	27.6
	EU15	49.3	60.0	36.2	33.9	49.6	9.9	28.3	4.6	6.7	49.6
	East Asia	12.7	5.0	5.3	5.0	6.6	2.6	2.4	0.7	1.0	6.6
	Rest of the World	21.8	13.3	22.2	13.4	16.2	4.4	6.3	2.8	2.7	16.2
	World Total	100.0	100.0	100.0	100.0	100.0	20.2	47.2	12.7	19.9	100.0

Note: East Asia = Japan, China, Hong Kong, Singapore Indonesia, Malaysia, Philippines, and Thailand
Source: IMF, Coordinated Portfolio Inverment Survey

However, promotion of financial integration is especially important for the promotion of RMUs because the kind of transaction where the dual RMU attraction of providing foreign exchange risk

diversification and weighted average interest rate of the regional currencies can be utilized is a financial transaction rather than trade related transaction. The fact that the ECU was used for financial and capital transactions rather than in trade transactions supports this assertion. The demand for RMUs would only increase with the expansion of the regional capital flow through financial integration.

What are the factors that encourage financial integration? On this, the work by Cowen, Salgado, Shah, Teo, and Zanello (2006) gives a detailed analysis. The index of their work is as follows:

- Strengthening Capital Markets
  - Developing institutional investors
  - Strengthening corporate governance
  - Improving transparency
- Building Market Infrastructures
  - Enhancing market depth and liquidity
  - Linking clearing and settlement systems
  - Regional credit rating and benchmarks
- Minimizing Risks
  - Moving towards risk-based supervision
  - Addressing cross-sectoral and cross-boarder issues
- Removing Impediments
  - Further capital account liberalization
  - Liberalization of financial services and prudential regulation
- Harmonizing Rules and Practices
  - Strengthening implementation of global standards and best practices
  - Regional efforts at harmonization
- Improving International and Regional Cooperation

4-4-1-3. Lessons from the process in which the German mark became the key currency in the 1980s.

The process in which the German mark became the key and the intermediary currency of Europe in the 1980s indicates how RMU utilization could be increased when regional financial integration lowers the transaction cost of the RMU (refer to Soko (1996) for details).

The US dollar had been the key currency in Europe, but the German mark strengthened its role as the key currency in the 1980s. The background to this development was the fact that as regional financial

integration deepened, the foreign exchange trading spread among the regional currencies shrunk significantly, and it became cheaper to use the German mark as the intermediary of regional currency trading than to use the US dollar. This enhanced the mark's role as the key currency. The buying and selling of European currencies were necessary for the bundling and unbundling of the ECU and as the German mark increased its role as the key currency, the process would also have lowered the trading cost of European currencies and the transaction cost of the ECU denominated products.

The above process could have encouraged the use of the private ECU in Europe. Although it is not an easy task to provide a point by point evidence of the effects, it is safe to say that the way in which the German mark became the key currency in Europe provides an invaluable indication of how the use of RMUs could be promoted in Asia today.

<The European experience>

Generally speaking, foreign exchange bid-ask spread shrinks as the volume of foreign exchange trading increases and foreign exchange rate fluctuation becomes smaller. The spread for foreign exchange trading between regional currencies would become smaller as economic and financial integration deepens, the volume of foreign exchange trading of the currency increases and regional foreign exchange policy coordination strengthens.

Economic and financial integration was continuing in the 1980s in Europe, but the important development was the increase of capital flow in the region, which deepened financial integration. The increase was due to the rise in the amount of European currency denominated bonds issued in the Euro market, the increased flow of household savings to institutional investors, the increase of foreign portfolio in the investment made by institutional investors, etc. This led to the rise in cross-border portfolio investment in the region where an investor from a member country would buy securities from another member country, and expanded the volume of foreign exchange trading among the regional currencies.

It should be emphasized that a dramatic increase in the foreign exchange trading of regional currencies was possible with the expansion of cross-border portfolio investment, which is the deepening of financial integration, and would have been very difficult to achieve merely from the deepening of economic integration such as an increase in intra-regional trade.

At the same time, the volatility of regional currencies' exchange rates dropped sharply due to the European Monetary System (EMS), and became far less than the volatility of the foreign exchange rate of the European currencies against the dollar. This helped to shrink the foreign exchange bid-ask spread among the European currencies.

As a result, the foreign exchange bid-ask spread became smaller when the German mark was the intermediary than when using the US dollar in foreign exchange transactions among European currencies. By the end of the 80s, foreign exchange trading with the German mark as the vehicle currency (as the intermediary) had increased markedly even though the dollar had been used for foreign exchange transactions in Europe until then. The German mark had come to play the role of the vehicle currency (the intermediary) and the key currency.
Until the change had actually happened, it was thought, especially among the foreign exchange market participants, that the German mark would not be able to play the role of a key currency. The development was indeed phenomenal.

<Implications for Asia>

The European experience has implications for Asia today. The vehicle and key currency in the foreign exchange market in Asia is the dollar. This is because the foreign exchange bid-ask spread is the smallest when using the dollar as the intermediary in foreign exchange trading among regional currencies.

There is no Asian currency that plays the role that the German mark did in Europe, and there is no knowing whether such a currency would emerge. It is still worthwhile to remember that there is a possibility of lowering the foreign exchange bid-ask spread in trading among the regional currencies by using a regional currency as intermediary if the volume of foreign exchange trading among regional currencies should increase and if their foreign exchange rates stabilize.

Foreign exchange trading of Asian currencies has been expanding rapidly in recent years and its share in the global turnover has increased (see Table 6). There is a limit to how much the foreign exchange trading can grow in the future only through trade and direct investment. It is the cross-border financial and capital transactions in the region that have the potential to increase the foreign exchange trading of regional currencies markedly.

If, for example, pension funds or investment trust funds in the region should increase their investment in public bonds issued in the region, then the foreign exchange dealings among the regional currencies would increase. As we have seen, such intra-regional cross-border portfolio investment increased in Europe in the 1980s. There is yet no indication that such an increase would occur in Asia. However, with the increase of per capita income, the accumulation of financial assets, and aging population, there will be higher demand for financial services and significant increase in intra-regional cross-border portfolio investment is bound to occur in the future.

Table 6: Currency and geographical distribution of foreign exchange market turnover

Currency Distribution (Percent)

	1992	1995	1998	2001	2004	2007
Japanese Yen	23.4	24.1	20.2	22.7	20.3	16.5
Hong Kong Dollar	1.1	0.9	1.3	2.3	1.9	2.8
Singapore Dollar	0.3	0.3	1.2	1.1	1.0	1.2
Korean Won	-	-	0.2	0.8	1.2	1.1
Chinese Renminbi	-	-	0.0	0.0	0.1	0.5
Taiwan Dollar	-	-	0.1	0.3	0.4	0.4
Malaysian Ringgit	-	-	0.0	0.1	0.1	0.1
Philippine Peso	-	-	0.0	0.0	0.0	0.1
Indonesian Rupiah	-	-	0.1	0.0	0.1	0.1
total			23.1	27.3	25.1	22.8
total (excluding Japan)			2.9	4.6	4.8	6.3
All currencies(*)	200	200	200	200	200	200

*: Total of all currencies is 200% instead of 100%, as each currency appears twice, as a buying currency and selling currency.

Geographical distribution (in billions of US dollars)

	1992	1995	1998	2001	2004	2007
China		-	0	0	2	9
Hong Kong		90	79	67	102	175
Indonesia			2	4	2	3
Japan		161	136	147	199	238
Korea			4	10	20	33
Malaysia			1	1	2	3
Philippines			1	1	1	2
Singpore		105	139	101	125	231
Taiwan, China			5	4	8	15
Thailand			3	2	3	6
Sub Total			370	337	464	715
as a percentage of total			18.8	20.9	19.3	17.9
Sub Total(excluding Japan)			234	190	265	477
as a percentage of total			11.9	11.8	11.0	12.0
World total		1,572	1,969	1,616	2,408	3,989

Note: All the figures are daily average of April of the years.
Source: BIS

If regional cross-border financial and capital transactions should increase, which would mean the deepening of financial integration, then the bid-ask spread of foreign exchange among regional

currencies would be reduced due to the increase in foreign exchange turnover. This would lower the cost of trading among Asian currencies, which is necessary for RMU bundling and unbundling, and lower the transaction cost of using RMUs. The European experience implies that the deepening of financial integration combined with the intra-regional exchange rate stability due to the EMS is critical for the promotion of RMU utilization.

4-4-1-4. The importance of the linkage among the financial and capital markets

Arbitrary transactions are conducted among the foreign exchange, money, bond and securities markets through the mechanisms of foreign exchange swap spread, yield curve, return on equity investment and interest rates. Since these markets are linked, their development is mutually complementary.

For example, nurturing of the repo market, which is a short-term financial market, is indispensable for the nurturing of a bond market, especially its secondary market. In order to develop a bond market, especially its secondary market, it is necessary for the bond-holding investors to be able to trade bonds flexibly and to use the portfolio to raise or manage funds with ease. For this, the investors must be able to conduct bond repurchasing transactions with ease. This means that the nurturing of the secondary market for bonds and the nurturing of the bond repo market are complementary and in close relation to each other.

Efforts are being made to develop the regional bond markets through the ABMI and ABF. However, it is also important to nurture and maintain markets besides the bond market, since their development is all mutually complementary.

The institutions that issue RMU denominated financial products or those holding such products would need to manage foreign exchange and interest rate risks or to hedge such risks flexibly. In order to meet such needs, the foreign exchange markets of the component currencies, money markets and bond markets need to be developed adequately.

4-4-2. Convertibility of component currencies: capital account liberalization vs stability of regional foreign exchange rates

Convertibility of the component currencies of a RMU is an indispensable condition for the bundling and unbundling of the RMU and for risk-hedging associated with asset and liabilities holdings in RMU denomination. To put it in other way, it is a condition for adequately lowering the transaction cost of the RMU. Convertibility means that not only the residents but also non-residents are able to directly or indirectly, through the financial institutions of the country, have access to the foreign exchange market of the currency of that country and be able to trade that currency.

Convertibility of the RMU component currencies is also important in order to maintain a market mechanism where the value of an official RMU and private RMU would converge through arbitrary transaction, if an official RMU is created and if the RMU with the same definition should be used in the private sector.

It would, of course, be putting the horse before the cart, if capital account liberalization should be advanced in order to promote the use of RMUs. Capital account liberalization should move in tandem with economic and financial development, and the home currency should become convertible at a suitable timing within that process. This is one of the lessons to be learned from the Asian currency crisis.

If a country still needs some regulations to limit the convertibility of its home currency, it may be able to promote the use of RMUs by permitting its home currency to be convertible only when the currency is traded in transactions related to RMUs. Such a policy was seen in several countries in Europe in the 1980s.

There is an important aspect to be emphasized at this point. That is the contradiction between capital account deregulation and stability of intra-regional foreign exchange rates. There are two scenarios (A) and (B).

Capital account deregulation → full convertibility of RMU's component currencies → increase the foreign exchange trading of the component currencies
→ (A) Increase the liquidity of trading → lowering of the foreign exchange bid-ask spread → lowering of the transaction cost associated with the bundling and unbundling of RMUs
→ (B) increase the volatility of the foreign exchange rates

The outcome of (A) is desirable while (B) is not. As the "Impossible Trinity" shows, this is because if the autonomy of national monetary policies is assumed, then it is not possible to achieve both progress in the convertibility of component currencies, which is part of capital account liberalization, and stability of the intra-regional foreign exchange rates.

Looking at the situation in Europe in the 1980s, financial globalization was much less advanced compared to what it is now and the amount of funds that moved over borders freely was not so large. So it was less difficult to stabilize the intra-regional foreign exchange rates while accepting the free movement of capital, and the contradiction between (A) and (B) was not significant. However, with

the massive development in financial globalization, the problems emerging from the contradiction must be seriously taken into account.

That is why the measures to reduce the volatility of the regional foreign exchange rates discussed under the RMU for surveillance has an important connotation for RMU for transaction. If a member country joins RMU for transaction as a composite currency by achieving full convertibility of the currency, it is inevitable to step forward more close intra-regional coordination of macro-economic policies in order to avoid an excessive volatility of the currency.

In the future, there could be a framework for intra-regional coordination of macro-economic economic policies including exchange rate policy. The most binding measure for intra-regional exchange rate stability would be the construction of regional exchange rate regime like the EMS. There could be discussions on the kind of regional exchange rate regime to be established in the era of financial globalization. Some regional exchange rate regime would be necessary to make the value of RMUs stable enough so that the use of RMU for transaction would be significantly increased.

4-4-3. Features to take into account when designing RMU denominated financial products so as to attract demand

4-4-3-1. Characteristics of a RMU as a pre-packaged product

RMU denominated financial instruments would be used for fund management and raising by financial institutions, institutional investors, and large companies. They would be also used by retail customers such as small and medium-sized companies and individuals. Retails investors can avoid the hassle of buying individual currencies by purchasing a RMU denominated product in which multiple Asian currencies have been packaged. For example, recently in Japan, more retail investors are interested in diversified international investment. Therefore, RMU denominated investment instruments could become attractive as a pre-packaged product among them, if the liquidity of the market is sufficient.

4-4-3-2. Possibilities of products that have the same or similar economic effect as RMUs

In the course of promoting the use of RMUs, the possibility of the following financial products is worth considering.

- Define a RMU in the private sector and design RMU denominated financial products based on that definition.

  (Example) RMU denominated bonds and loans, RMU denominated index trading:

  If there is a possibility that the composition and weighting scheme of the RMU product could change before maturity, it would be necessary to clearly define whether the product would be

applied a closed basket method, where the value of the RMU would be calculated using the initial definition even after the change of the composition and weighting scheme, or an open basket method, where the value would be adjusted according to the new definition. For developing RMU market, open basket method would be better than closed basket method. This is because single RMU would prevail in the market with open basket method, while there can be several kinds of RMUs in the market with closed basket method such as RMU based on the definition in year X or the one in year Y. Several kinds of RMUs in the same market seem complicated for the market participants.

- Products that could have a similar economic effect even though it is not defined as a RMU product.

  It is possible to design a financial product that has the similar economic effect as a RMU denominated financial product by mixing financial products denominated in multiple regional currencies in the asset-backed securities method or investment trust fund method.

4-4-3-3. Transparency of data necessary for calculating RMUs

It is necessary to clearly define not only the means of calculating a RMU and the weight of component currencies but also the data which is used to calculate the RMU such as the foreign exchange rates of the component currencies and interest rates. Foreign exchange rates and interest rates could be very different depending on the market maker, so highly transparent data must be provided to enhance the efficiency of markets.

When the official RMU is defined and created, information on the official RMU must be provided just as the IMF publicizes the SDR rate everyday. This could be done by establishing an ASEAN + 3 Secretariat and disseminating the information from there or any other institution commissioned by it could provide the information.

4-4-4. Financial regulations and supervisions

As is pointed out in the previous sections, enlargement of the use of RMU is desirable for the development of financial and capital market in the region as well as regional financial integration. However, as there is a exchange rate risk between a home currency and a RMU, RMU denominated financial products must be under regulations and supervisions which are applied to foreign currency denominated financial product in each country in the region.

4-5. Policy implications for East Asia

The studies in this chapter can be summarized as follows.

The RMU for transaction, which is composed of multiple convertible currencies, has the function of diversifying foreign exchange risks and providing a weighted average interest rate of the component currencies. It can be used as a unit of account, medium of exchange and store of value in the private and public sectors. The increase of RMU denominated transactions would contribute to the development of regional financial and capital markets by bridging the savings and investment in the region. If the extra-regional RMU denominated transactions should increase, that would contribute to reducing the foreign exchange risk contained in the region.

Stability of the value (same as the stability of intra-regional foreign exchange rates) and low transaction cost are necessary to promote the use of RMUs. In order to meet these conditions, network externality, which is "I will use the RMU because the others are", economies of scale, and regional economic and financial integration would play important roles. Public sector involvement is especially important in initiating the usefulness of network externality. There are a number of ways in which the public sector could be involved such as preferential treatment under the foreign exchange law or tax laws, issuance of RMU denominated public bonds, and creation of official RMUs. All the possibilities could be discussed among governments in the region. It is also important to note that bridging the savings and investment in the region would have the effect of further promoting the regional economic and financial integration.

The experience in Europe leads one to believe that the stability of the EMS and financial integration played an important role in promoting the use of a RMU. In East Asia, however, the intra-regional trade ratio is high, while the intra-regional cross-border portfolio investment ratio is low. Therefore, in order to facilitate financial integration, markets should be strengthened, financial infrastructure should be more developed, capital account liberalization should be orderly enhanced, and more harmonization should be created in legal system and practices of countries in the region.

It is important to remember that there is an inherently contradictory aspect in going ahead with capital account liberalization aimed at enhancing the convertibility of regional currencies. On one hand it has the effect of lowering transaction costs, on the other it has the danger of increasing the volatility of foreign exchange rates. Therefore, taking measures to stabilize the intra-regional foreign exchange rates is indispensable for the promotion of RMU utilization. In order to achieve foreign exchange rate stability in the region, there must be a keen awareness that RMU for surveillance, which aims for regional foreign exchange stability, and RMU for transaction, which helps promote regional economic and financial integration, are mutually complementary.

It is necessary to continue studying the product designs in order to increase the demand for RMU denominated financial products.

Following are the policy implications based on the above analysis.

(I) The promotion of regional economic and financial integration and promotion of RMU utilization have the effect of promoting each other and are mutually complementary. Even if the efforts towards regional economic and financial integration do not have the direct effect on promoting the use of RMUs, they do have indirect effects on RMU promotion. Economic integration has progressed but financial integration has come only half way. Financial transaction rather than commercial transaction seems attractive for RMU utilization. This leads to the conclusion that the promotion of financial integration is especially important for the promotion of RMU utilization.

(II) In order to lower the transaction cost of using RMUs and to increase the utility of RMUs, the mechanism of "I will use the RMU because the others are" is important. In this regard, the involvement of the public sector is important and the following measures would be effective.

(1) Denomination of bond issuance by the government; (2) Denomination of swap arrangements under CMI; (3) Preferential treatment of Core-RMU related operations in foreign exchange regulations (If an outright liberalization of capital control is difficult, the authorities could exempt capital market transactions related to the RMU products.); (4) Acknowledgment of the private Core-RMU legally or de facto as a "foreign currency"; (5) Harmonizing accounting and tax treatment including RMU products; (6) Daily announcement of RMU value; (7) the use of RMU in budget by ADB (and ADBI) or a permanent ASEAN+3 Secretariat when it is established; and (8) supporting the establishment of a RMU fund settlement system.

(III) Capital account liberalization to provide convertibility for currencies, which is a condition for a currency to become a component currency in the RMU for transaction, has the effect of lowering the RMU transaction cost, while at the same time it could increase volatility of foreign exchange rates, making the RMU value less stable. It is important to note that the efforts to stabilize the foreign exchange rates through RMU for surveillance and promoting the use of RMUs for transaction are mutually complementary, and this fact should be reflected on the CMI, ERPD and ABMI, all of which will be expanded in the future. For the stability of the RMU value, which is the pre-requisite for the expansion of the use of RMU for transaction, some regional exchange rate regime would be necessary.

References:

Cowen, David, Ranil Salgado, Hemant Shah, Leslie Teo, and Alessandro Zanello (2006) “Financial Integration in Asia: Recent Developments and Next Steps,” *IMF Working Paper* WP/06/196.

EMEAP Working Group on Financial Markets (2006) “Review of the Asian Bond Fund 2 Initiative,” No. 79 June.

Institute for International Monetary Affairs (IIMA) (2006-2007), Toward Greater Financial Stability in the Asian Region: Exploring Steps to Create Regional Monetary Units (RMUs), *ASEAN+3 Research Group Studies.*

Kawai, Masahiro (2007) “Toward a Regional Exchange Rate Regime in East Asia,” *ADB Institute Discussion Paper* No.68.

Matsuyama, Kiminori, Nobuhiro Kiyotaki, and Akihiko Matsui (1993) “Toward a Theory of International Currency,” *Review of Economic Studies* 60, 283-307.

Tanaka, Soko (1996) *European Monetary System* (in Japanese), Yuhikaku

Wragg, L. de V. Cowen (ed.) (1984) *Composite Currencies: SDRs, ECUs and other instruments*, Euromoney Publications.

CHPTER 5

ROADMAP to RMU

Chapter 5 : Roadmap to RMU

This chapter will summarize the implications from Chapter 1 to Chapter4. Then the roadmap to RMU and policy recommendations will be presented.

5-1. Imprecations from the previous chapters

Implications from the previous chapters are summarized in the following five points.

5-1-1. The use of RMU as a monitoring device for regional surveillance

An RMU and the value of regional currencies against the RMU should be used in regional surveillance. The RMU as a monitoring device would be effective in avoiding misalignment and excess volatility of intra-regional exchange rates, thereby contributing to the economic and financial stability and growth in the region. There are various ways to define the structures of RMUs, depending on the component currencies and the weighting scheme. However, estimating the relationship between RMU combined with RMU DIs and various variables such as NEERs (nominal effective exchange rates), exports and imports of individual countries finds out that the levels of statistical significance and the estimated coefficients do not differ so much depending on the types of RMUs. Although it is meaningful to continue studying the most desirable way of calculating the structure of RMUs, it would be recommended that we try to reach an agreement on selecting a certain experimental RMU and monitoring that RMU for regional surveillance in ASEAN+3 ERPD(Economic Review and Policy Dialogue), in an attempt to help facilitate intra-regional stability of exchange rates while avoiding the misalignment.

RMU Deviation indicators (RMU DIs), which show the deviation of the value of regional currencies against the RMU from their values in benchmark period, are useful as indicators for gauging the development of value of these currencies. The value of RMU DIs depends on the benchmark year. Although the benchmark year should be selected when exchange rates are close to the equilibrium levels, estimated levels of equilibrium exchange rates will differ significantly depending on the estimating approaches, data availability, definition and measurement, estimation and filtering techniques. Even after considering such drawbacks of RMU DIs, monitoring RMU DIs should play an important role in regional surveillance.

5-1-2. RMU as a center of independent regional surveillance in East Asia

In parallel with the IMF surveillance, ERPD (Economic Review and Policy Dialogue), an independent regional surveillance in East Asia, is expected to play an important role. Regional surveillance that covers countries in the region and the region as a whole, is assuming greater importance in the era of

globalization. For these countries, serious cooperation toward regional surveillance will be possible, as they share common interest coming from regional integration facilitated by regional surveillance. Intra-regional countries are more cognizant of the region's unique circumstances than the extra-regional countries are. Due diligence for the provision of liquidity in the region, such as CMI, should be done by regional surveillance, rather than IMF.

Regional surveillance by ASEAN+3 is expected to do: monitoring contagion, spill-over, or transmission of macro-economic conditions and risks in the region; solving problems coming from coordination failure of macro-economic policy including exchange rate policy; or dealing with problems arising from the access limit to the IMF lending.

Monitoring RMU and RMU DIs, in addition to the main economic and financial indicators and those used for early warning system such as the ratio of short-term external debt to foreign reserves, will make regional surveillance more effective.

Monitoring RMU will assume greater importance also in dealing with concerns that intra-regional exchange rate stability could be undermined by the global imbalances, as well as risks accumulated by such macro-economic imbalances in some countries in the region as large current account surplus, excessive liquidity, and sharp rise in asset prices.

5-1-3. Learning from EC's Economic Surveillance during the EMS Period

In Europe, there was no formal surveillance procedure within the EMS until the start of the first stage of the EMU (European Monetary Union) in September 1990. Substantive de facto surveillance was conducted informally at the Monetary Committee (MC), an advisory organ to both the Ecofin Council (the Economic and Finance Ministers' Council) and the European Commission. The MC consisted effectively of two representatives of each member state; a vice finance minister and a central bank deputy governor, which is similar to the ASEAN+3 Finance and Central Bank Deputies' Meetings (AFDM+3). The MC played an important role in the surveillance for information sharing, peer review/peer pressure, and due diligence. The surveillance worked well, as it had a clear objective of fostering smooth functioning of the EMS by preventing currency crises and maintaining stable, and if necessary, adjustable exchange rates of member currencies. The important factor of its success was the personal trust among high-ranking officials with technical expertise within the MC.

In Europe, the parity grid scheme, instead of the relationship to the ECU, was used as a reference point of exchange rates for intervention for the intra-regional exchange rate stability. This was mainly because the ECU had a built-in tendency to promote convergence not toward the most stable currency,

but rather toward an average level of monetary and price development in the region. The experience in Europe as noted above should give us a lesson when East Asia discusses the introduction of an RMU and RMU DIs for a regional surveillance and possible exchange rate policy coordination.

5-1-4. Promotion of RMU denominated transaction and facilitating regional economic and financial integration are mutually complementary.

RMUs for transaction, which can be composed of selective convertible currencies, offer instruments for diversification of foreign exchange risk with the weighted average interest rates of their component currencies. They are expected to be used in both the private sector and the public sector, as a unit of account, as a medium of exchange, and as a means of storing value. Increased use of RMUs is expected to facilitate the development of financial and capital markets and work as a bridge between savings and investment within the region, leading to further deepening of the regional economic and financial integration.

Low transaction costs are essential for enhancing the use of RMUs in transactions. It is effective to reduce the costs through expanding network externalities where people use the RMU because others are doing so. Network externalities can be better enhanced with official supports to the use of RMU, such as in preferential treatment in foreign exchange laws and taxation, issuing RMU-denominated public debt securities, or defining and creating an official RMU in the region. The increase in the use of RMUs will also be supported by facilitating regional economic and financial integration, increasing the number of convertible currencies in the region, and dealing with technical issues on designing RMU-denominated financial instruments. Particularly, facilitating financial integration is an important challenge, as financial integration lags far behind economic integration in this region.

Thus, promotion of RMU denominated transaction and facilitating regional economic and financial integration are mutually complementary.

5-1-5. RMU-denominated transaction should be promoted by the measures to stabilize intra-regional exchange rates such as monitoring of RMU in regional surveillance.

Stable value of RMU, which is essential for enhancing the use of RMUs in transactions, translates into intra-regional exchange rate stability. Although capital account liberalization reduces the transaction costs of RMUs, it also could increase the intra-regional exchange volatility leading to the instability in the value of RMUs, which in turn might discourage their use. Therefore, monitoring RMU is important in promoting the use of RMUs for transaction through facilitating intra-regional exchange stability. Establishing regional framework for coordination of macro-economic policies including exchange rate policy for intra-regional exchange rate stability, or regional exchange rate system like

EMS should be discussed as an challenge for the future.

5-2. Roadmap to RMU

The implications stipulated so far show that the roadmap to RMU presented in the previous project has been and will be appropriate in enhancing the use of RMUs.

5-2-1. Two paths and regional integration

The roadmap to introduce RMUs has two paths. One path is for surveillance, which is different from the other one for transaction. First, RMUs for surveillance are to be used for macro-economic surveillance. All the currencies of member countries should be included in that surveillance. Second, RMUs for transaction can serve as a composite currency for financial products. Only currencies that meet several specified criteria, including convertibility, should be included in this composite.

These two paths can converge into one, with sufficient regional economic and financial integration achieved in the longer-term. Eventually the differences between developed high income countries---Japan, Korea, and Singapore⁻and middle-income developing countries---China, Thailand, Malaysia, Indonesia, and the Philippines---will become less and less in every respect of the economies, particularly in the maturity levels of their financial and capital markets.

These two paths would facilitate regional economic and financial integration as well. RMUs for surveillance would contribute, with strengthened mechanism of regional surveillance, to avoiding intra-regional exchange rate misalignments and excess volatility, thereby facilitating regional economic integration. RMUs for transaction would promote financial intermediation (bridging between savings and investment) within the region, through offering financial products for diversification of foreign exchange risk with weighted average interest rates of their component currencies, thereby facilitating regional financial integration.

Thus, two paths for RMUs and regional economic and financial integration are mutually complementary.

5-2-2. Path 1. Surveillance path

RMUs for surveillance on exchange rate policy can be started immediately, and it will be an appropriate tool in identifying misalignment and excess volatility of intra-regional exchange rates. It is recommended that the authorities (would) reach an agreement to define a certain kind of RMU for

surveillance, announce the RMU value every day, and monitor RMU DIs in ASEAN+3 ERPD.
From a longer perspective, several stages of surveillance path to monetary integration are proposed:

- Stage 1: one tool in macroeconomic surveillance: deviation may be benign or malicious
- Stage 2: Use as an Early Warning signal
- Stage 3: policy coordination and joint intervention to keep the deviation within the band
- Stage 4: narrow the band (cf. ERM, stage I)
- Stage 5: fix the exchange rates (cf. ERM, stage II)
- Stage 6: Single currency (cf. Euro)

Details are described in the report of IIMA under the ASEAN+3 project (2006-2008) on "Toward Greater Financial Stability in the Asian Region: Exploring Steps to Create Regional Monetary Units" (hereafter termed as the previous project).

5-2-3. Path 2. Private-sector transaction path

The first stage of the transaction path is to create a financial product that has basket currency denomination and to have the product sold and traded in some markets.
At present, all transactions are free from controls in the following currencies (vis-a-vis major globally traded currencies): Japanese yen, Korean Won, Hong Kong dollar, and Singaporean Dollar (recall Chapter 1). Therefore RMU for transaction, named Core-RMU-hard, should be composed of those four currencies. Two additional currencies, Thai baht and Chinese RMB are almost free from controls in current account transactions. Capital account transactions of these currencies still have substantial controls, but for current account transactions they are relatively free from controls. The Core-RMU-soft should include these two currencies.
Therefore, the following arrangement is possible for stage 1,:
Core-RMU-hard: Japan, South Korea, Hong Kong, and Singapore;
Core RMU-soft: Japan, South Korea, Hong Kong, Singapore, China, and Thailand

A sequence of stages toward full integration in terms of private-sector use of RMUs is not as clear as that of the surveillance path, since the sequence is basically up to the private sector. However, the following stages may be a natural sequence, if the past trends of the income and structural reforms continue into the future:

- Stage 1: Current status
- Core-RMU hard: Japan, Hong Kong, SAR, South Korea and Singapore

- Core-RMU soft: Core-RMU hard + China and Thailand, with expectations that they will remove all controls on current account transactions, and so perceived by the market, in the matter of months.
- Stage 2: Malaysia, the Philippines and Indonesia join the soft group, removing the remaining exchange controls related to current account transactions.

** the following stages are projections only, and exact progression depends on efforts of respective governments:

- Stage 3: China and Thailand join the hard group. The two countries completely remove the restrictions on capital account transactions, domestic restrictions discriminating foreigners in asset and stock ownership.
- Stage 4: Brunei joins the soft group
- Stage 5: Cambodia, Viet Nam, Lao, and Myanmar join the soft group, unifying the exchange rates; establishing credibility around domestic currencies; removing foreign exchange controls related to all current account transactions.
- Stage 6: Brunei, Malaysia, the Philippines and Indonesia join the hard group
- Stage 7: Cambodia, Viet Nam, Lao, and Myanmar join the hard group. The ASEAN10+3+Hong Kong join the Core-RMU-hard group, so that the differentiation of "core" will disappear.

Details are described in the report of IIMA under the previous project.

5-3. Policy Recommendations

How could we carry out the plan stipulated in the roadmap to RMU? Measures to implement it should be considered from multifaceted angles. There are various kinds of measures to directly or indirectly encourage utilizing RMUs for surveillance and transaction, to improve the circumstance surrounding the use of RMUs, and to increase the benefit given by the use of RMUs.

5-3-1. Short-term Measures

Short-term measures to encourage and enhance using RMU directly are as follows.

RMU for surveillance:

(1) define an RMU for surveillance purpose;

(2) announce RMU value every day; and

(3) Monitor RMU and RMU deviation indicators for regional surveillance.

RMU for private sector transaction:

(1) Issuance of RMU denominated bonds by governments or multilateral institutions;

(2) Preferential treatment of Core-RMU related operations in foreign exchange regulations (If an outright liberalization of capital control is difficult, the authorities could exempt capital market transactions related to the RMU products.);

(3) Legal or de facto acknowledgment of the private Core-RMU as a “foreign currency”;

(4) Harmonizing accounting and tax treatment on RMU-included products; and

(5) Supporting the establishment of an RMU fund settlement system.

5-3-2. Medium-term and Long-term Measures

Medium-to-long-term measures that are expected to require political consensus through negotiations in the medium-to-long term, those for improving the circumstance and environment surrounding the use of RMUs, or those to increase the benefits given by the use of RMUs are summarized in the following.

Official involvement in RMUs

・Create and define an official RMU for transaction (Core-RMU) and daily announce its value.

・Use RMU for official transaction such as:

(1) Denomination of swap arrangements under CMI;

(2) In the budget of ADB (and ADBI) or a permanent ASEAN+3 Secretariat when it is established.

Intra-regional exchange rate stability

・Explore the regional framework to enhance intra-regional exchange rate stability while avoiding exchange rate misalignments through coordination of economic policies including exchange rate policy

Currency convertibility of member countries in the region

・Encourage member countries to promote capital account liberalization in tandem with economic development and sophistication of financial infrastructure

Facilitate economic integration

・Promote FTA/EPA in the region

Facilitate financial integration

・Develop further CMI and ABMI

・Strengthen surveillance mechanism, enhance domestic financial systems and facilitate the development and orderly integration of financial markets in the region

Establish Permanent Secretariat

In order to smoothly and steadily take the actions mentioned above, it should be emphasized that establishing a permanent secretariat is indispensable.

List of Authors

Takatoshi Ito, Project Leader
Professor, Graduate School of Economics, The University of Tokyo

Eiji Ogawa, Co-leader
Professor, Graduate School of Commerce and Management, Hitotsubashi University

Tetsuji Murase
Professor, The International Center, Kyoto University

Junko Shimizu
Associate Professor, Faculty of Economics, Meikai University

Taiyo Yoshimi
Graduate School of Commerce and Management, Hitotsubashi University

Hajime Shinohara
Managing Director, Institute for International Monetary Affairs

Masaharu Takenaka
Director & Chief Economist, Institute for International Monetary Affairs

Yozo Nishimura
Senior Economist, Institute for International Monetary Affairs

Sumino Kamei
Lead Economist, Institute for International Monetary Affairs