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**Exchange Rate Policy Coordination
Among
China, Japan, and Korea**

**by
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Abstract

In this paper we argue that the three countries in East Asia should make joint efforts to achieve a long-term goal of currency union. We also argue that in order to achieve this long-term goal, the three countries should conduct exchange rate policy coordination based on the medium-term exchange rate target range of each country. Exchange rate policy within a country is closely related to its inflation targeting, and the government authorities should make sure that these two policies be consistent with each other. In each country it is the ministry of finance that conducts exchange rate policy whereas it is the central bank that strives to attain the inflation target. Therefore, we argue that the ministry of finance and the central bank should coordinate these two policies for the nation before the three countries coordinate their exchange rate policies for the region.

JEL classification: F31, F36, F41, and F42

Key words: the exchange rate target range, inflation targeting, the real effective exchange rate, and the Asian Currency Unit.

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I. Introduction

During the period of the fixed exchange rates (1944-1971), the exchange rate was one of the most important policy instruments for developing countries, and a large volume of research work was made on the effects of exchange rate policy. During the floating exchange rate period, however, scholars and practitioners turned their attention to the issues of exchange rate volatility.

In the 1990s, they focused on the issues of nominal income targeting or inflation targeting. Taylor (1993) proposes a rule that the central bank adjusts the real interest rate in response to deviations in the rate of inflation and the level of real output from their targeted levels. Svensson (1997) argues that it is optimal for a central bank to target the inflation rate if price stability is the main goal of monetary policy. In Ball (1997), policy makers face a loss function involving the variances of inflation and output. Ball argues that nominal income targeting is a disastrous strategy of monetary policy. Guender (1998) finds that the alleged instability of nominal income targeting in the backward-looking model disappears if the policymaker chooses to adopt a hybrid nominal income target. Jensen (1999) argues based on the forward-looking behavior of private agents that if society does not have the inflation-output gap trade-off, inflation targeting is preferable.

While focusing on inflation targeting, researchers began to examine the relationship between the exchange rate regime and inflation targeting. Petursson (2000) finds that when monetary policy is based on an inflation target, no formal intermediate target such as a fixed exchange rate or specified growth in money supply is used. Orr, Scott, and White (2001) discuss aspects of the role of the exchange rate in the case of New Zealand's inflation targeting regime.

In this paper we focus on exchange rate targeting in the regional context. We attempt to derive a theoretical relationship between exchange rate targeting and inflation targeting, and argue that because of real shocks, range targeting is desirable instead of point targeting. Furthermore, we analyze medium-term exchange policy coordination among China, Japan, and Korea. Also we argue that this exchange rate policy coordination must be consistent or compatible with their long-term goal of currency union.¹

II. The Model of Exchange Rate Range Target

In this section we develop a model of exchange rate range targeting by using money market equilibrium and purchasing power parity condition. Equation (1) is money market equilibrium.

$$M = KPy, \quad \text{----- (1)}$$

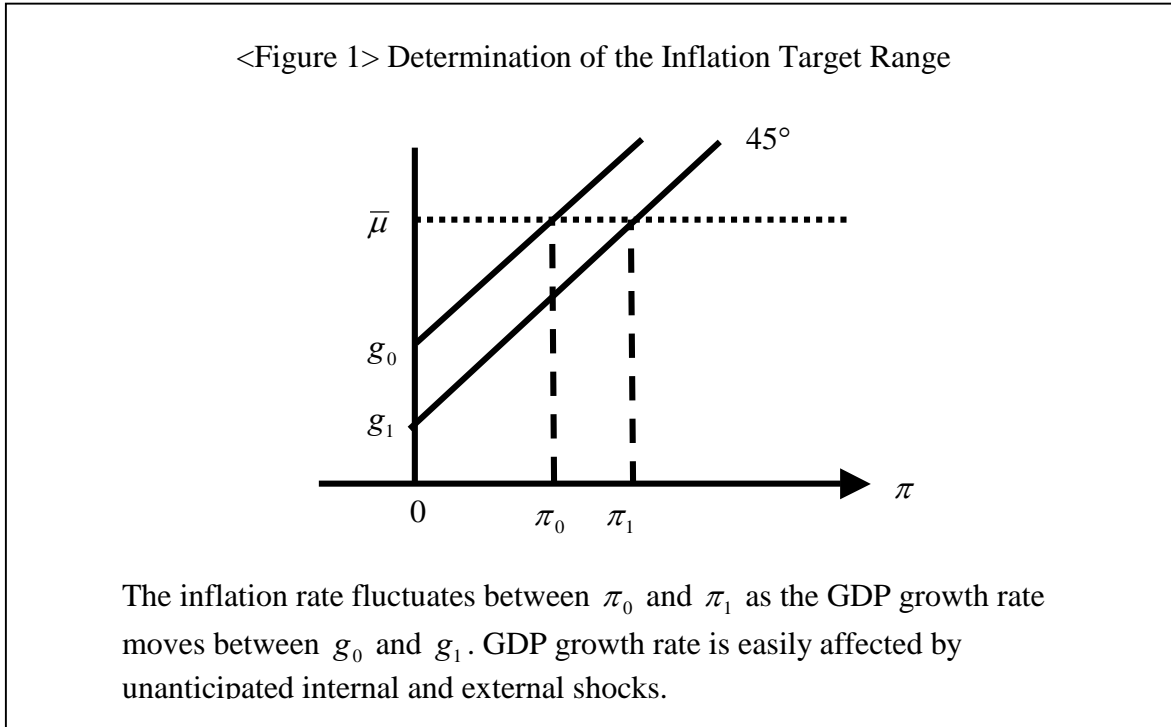
where M, K, P, y refer to the nominal money supply, an institutional factor including the velocity of money, the price level and circulation real income. If we take the percentage change of each variable, Equation (1) turns into Equation (2).

$$\mu = \pi + g \quad \text{----- (2)}$$

If the time horizon we consider is a short-term or mid-term, the percentage change in ‘K’ is zero. Then inflation rate can be expressed as the sum of money growth rate minus income growth rate.

¹ Allan Meltzer (2002) and Mourice Obstfeld (2002) argue that small and open economies should adopt fixed rate regimes or join a currency union.

Equation (2) implies that the target inflation rate is determined by money growth rate and income growth rate.



Based on Equations (1) and (2), we can find the target range for inflation. Figure 1 illustrates this. The horizontal axis measures inflation whereas the vertical axis the money supply growth rate. If the central bank fixes the money supply growth rate, the real GDP growth rate determines the inflation rate. Real GDP growth is affected by internal and external shocks such as political instability, climate change, and drastic changes in the price of oil. These shocks make real GDP fluctuate. Therefore, the central bank needs to have the range target for inflation. As shown in Figure 1, once money supply growth is set at $\bar{\mu}$, then real GDP growth ' g_0 ' determines ' π_0 '. If ' g_0 ' falls to ' g_1 ', inflation increases to ' π_1 '. If the central bank raises money supply growth, the scale of the inflation range increases.

Now let us consider how the change in the exchange rate is related to money supply and real GDP. For this task, we use the money market equilibrium condition for the foreign country as in (3) and the purchasing power parity which links up the price levels of the two countries as in (4).

$$\mu^* = \pi^* + g^* \quad \text{----- (3)}$$

$$P = SP^* \quad \text{----- (4)}$$

$$\pi = e + \pi^* \quad \text{----- (5)}$$

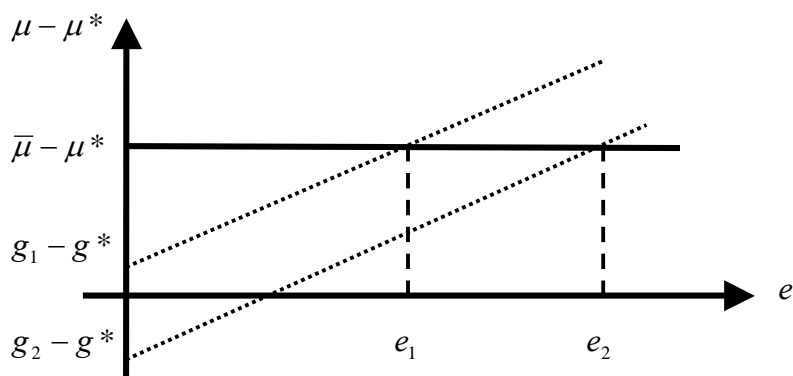
If we take the percentage change of each variable in (4), we get (5), where π , e , and π^* refer to domestic inflation, percentage change of the exchange rate, and foreign inflation respectively. Using (2), (3), and (5), we can derive (6)

$$(\mu - \mu^*) = e + (g - g^*) \quad \text{----- (6)}$$

$$e = \pi - \pi^* = (\mu - g) - (\mu^* - g^*) \quad \text{----- (7)}$$

Figure 2 indicates that both relative money supply and relative GDP growth in the two countries affect the medium-term exchange rate target. Domestic central bank can seldom control foreign money supply and foreign real growth but can control domestic money supply. Given foreign money supply and foreign GDP growth, the domestic central bank can forecast the future exchange rate based on its monetary policy. If domestic real GDP fluctuates due to shocks, the exchange rate is also moving up and down.

Figure 2. Money Growth Targeting, Inflation Targeting, and Exchange Rate Targeting



Given foreign money supply growth (μ^*) and foreign GDP growth (g^*), domestic money supply ($\bar{\mu}$) and domestic GDP growth determine the equilibrium exchange rate change. Fluctuations of GDP growth between g_1 and g_2 yield the range of e_1 and e_2 for the exchange rate change.

III. Analysis of an East Asian Currency Union

After the 1997 Asian currency crisis, many countries have been accumulating foreign reserves to prevent occurrence of another currency crisis. Still, most of them are worried about reoccurrence of currency crises. Mundell (2002), a Nobel laureate endorses a currency union for East Asia. Other scholars and practitioners suggest that small and open economies should join a currency union. This was one of the conclusions drawn at an international conference organized by the Bank of Japan in July 2002. The participants focused on the exchange rate regimes of developing countries. Advocates of a currency union argued that in order to maintain stable export earnings, developing and emerging

countries need exchange rate stability, and that regional currency integration will make it possible.

There are two major sources of exchange rate stability. One stems from the instability of the numeraire currency, currently de facto, the U.S. dollar. The other comes from each country's competitive devaluation policy. In spite of its potential and actual instability, the U.S. dollar plays a role of anchor currency. A lion's share of the world's business contracts is drawn in U.S. dollars. Whether they like it or not, most developing countries peg their currency to the dollar. Therefore, when the dollar value changes, it affects many other countries in the world. A small change in the dollar value may not affect the countries in the euro zone. However, it may have a critical impact on a small developing country. This is why small and open economies need to form a currency union.

The exchange rates of developing countries can be much more volatile than large countries because of competitive exchange rate policies within a region. In order to increase their share in the export markets, their government has strong incentive to implement trade protection policy including exchange rate devaluation. If member countries establish a regional currency union, they will have a built-in exchange rate stabilizer and with group floating, they can maintain the same degree of competitiveness among member countries.

The 1997 Asian currency crisis teaches us many lessons. A currency crisis is very contagious and neighboring countries are affected quickly and critically. Countries with a

high short-term debt ratio and large external debts, and open economies with less developed capital markets easily become the targets of currency speculation. So these economies need to join a regional currency union. They are often advised to adopt flexible exchange rates to prevent currency crises. While admitting the merits of flexible exchange rates, they cannot adopt it right away because they do not want to give up on stable export earnings. Instead of flexible exchange rates, they have made currency swap arrangements with neighboring countries and have been accumulating large amounts of foreign reserves.

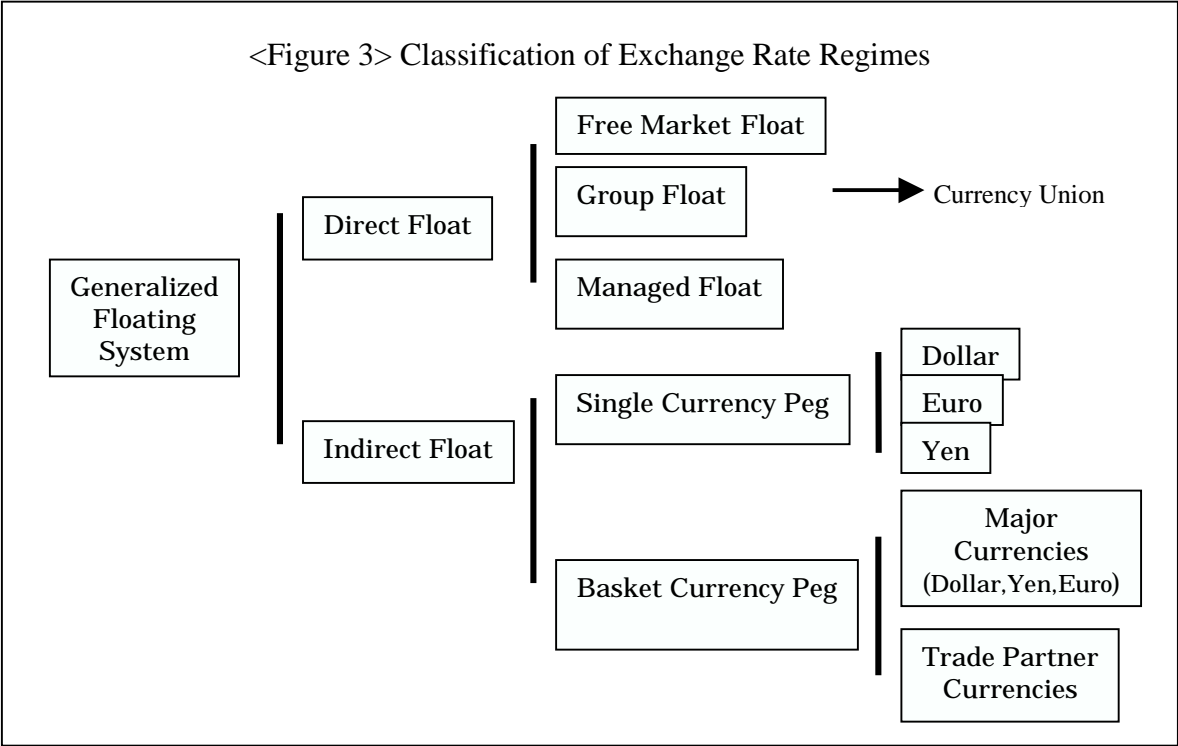


Figure 3 shows the options of exchange regimes for both developed and developing countries. Eichengreen (2000) discusses the appropriate exchange rate regimes for emerging countries.

Large economies such as the U.S. and Japan adopted the freely floating system. European countries had adopted the group float regime before they reached a single currency. Some countries adopted managed floating and others adopted either a single currency peg or a basket-currency peg. Last July 2005, China switched from its de facto the dollar peg to a basket-peg system. Korea's exchange rate regime can be classified as the market-based floating system but the market is limited in scale. Korean currency is traded in the foreign exchange markets only inside the country.

To form a currency union for any region requires extensive amounts of preparation. It took European nations more than a few decades to reach the stage of single currency. They went through several transitional steps before they establish a full-fledged integration of their currencies, including the European Monetary System, European Currency Unit, and European Exchange Rate Mechanism. East Asia can follow the European experience of currency union but cannot, and, perhaps, should not copy it exactly due to differences in economic, political, and social systems.

Before reaching the stage of single currency, East Asia may create an Asia Currency Unit or establish an Asian Exchange Rate Mechanism at which the currencies of member countries are pegged to the anchor currency. According to Kawai (2005), it is desirable for East Asia to seek currency stability by way of adopting a "G3 currency basket system" composed of the yen, the dollar, and the euro – excluding the yuan due to its lack of convertibility. In establishing an East Asian currency union, three countries of China, Japan, and Korea should jointly take the initiative step. This task requires a long-term preparation work. The three countries need to set up a three lateral preparation committee and its secretariat office. They should make plans to establish regional financial organizations including the Asia Monetary Fund and regional development banks.

IV. Analysis of Regional Exchange Rate Policy Coordination

While taking steps towards a long-term goal of currency union, three countries need to conduct exchange rate policy coordination. First of all, they must make sure that the currencies of member countries be resilient from external currency shocks. They should prepare measures to prevent speculative currency attack and extend swap agreements. They will continue to develop bond markets in East Asia. Secondly, they must maintain exchange rate stability with the region. They should coordinate the policies of the three countries in such a way that they may maintain the same parity with their common anchor currency. The policies include not only exchange rate policy but also other policies including monetary policy.

As a guide for exchange rate policy coordination, we use Equation (7) again.

$$e = \pi - \pi^* = (\mu - g) - (\mu^* - g^*) \quad \text{----- (7)}$$

From Equation (7), we know that inflation directly affects the change of the exchange rate whereas monetary and growth policies indirectly affect the exchange rates. In conducting exchange rate coordination, we must consider monetary and fiscal policies. In particular, we must consider how inflation targeting is related to exchange rate coordination. For a small and open economy, the price level may be expressed as in (8).

$$P = P_T^\alpha P_N^\beta, \quad \text{----- (8)}$$

If we take the percentage change of each variable in (8), we get (9)

$$\% \Delta P = \alpha \% \Delta P_T + \beta \% \Delta P_N$$

where P, P_T, P_N , refer to the price level, the prices of traded goods, and the prices of non traded goods, and α and β may represent weights for the price index of the traded goods and for the price index of the non traded goods. Unlike other equations in this paper, Equation (8) is a measurement definition. This means that the price - level index is based on the prices of traded goods and the prices of non-traded goods.

In order to relate the exchange rate to the domestic price level, we use Equation (10)

$$P_T = SP_T^* \quad \text{----- (10)}$$

If we take the percentage change of each variable in (10), we get (11)

$$\% P_T = \% \Delta S + \% \Delta P_T^* \quad \text{----- (11)}$$

Combining (9) and (11) will give us a new inflation equation, (12)

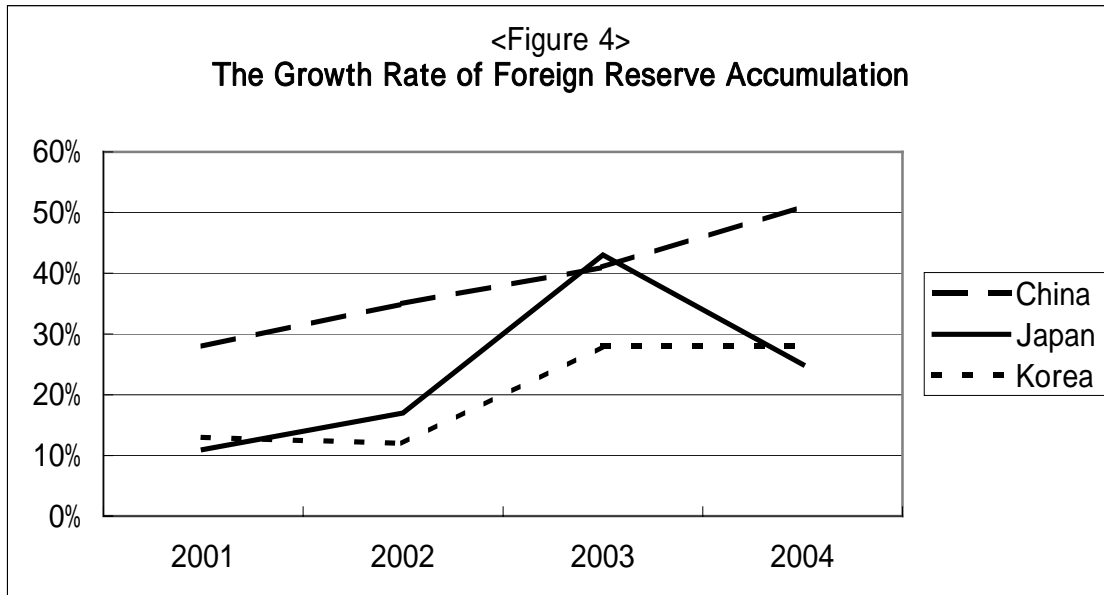
$$\Pi = \alpha [\% \Delta S + \% \Delta P_T^*] + \beta \% \Delta P_N \quad \text{----- (12)}$$

Based on Equation (12), we can state that a change in the exchange rate will affect the domestic price level or inflation through the change in the price of traded goods. Also, a change in the

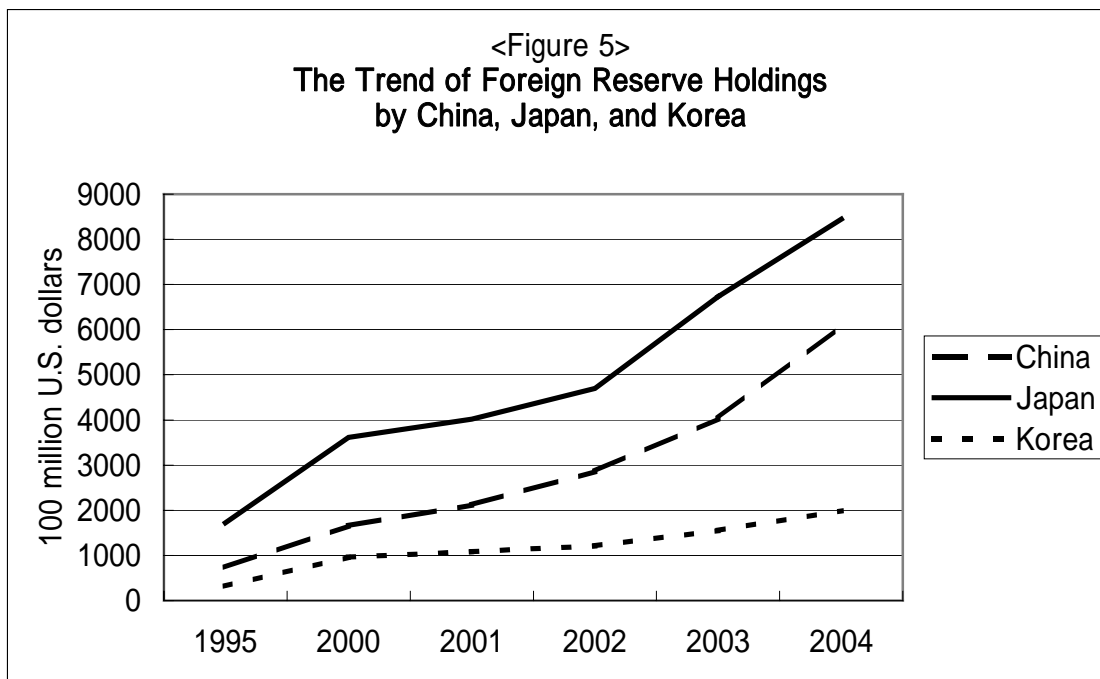
prices of foreign goods will affect inflation. In addition, a change in the exchange rate affects the prices of the non-traded goods including the prices of services, which will, in turn, affect inflation.

V. Analysis of Why Three Countries

There are more than 20 countries in East Asia, and one may ask a question why three countries, in particular, should take the lead in achieving the goal of currency union. First of all, the formation of a regional currency union is a long-time taking process and requires enormous amounts of resources. Therefore, all countries in East Asia do not have incentive to join the task force. By contrast China, Japan, and Korea are three strongest economic powers in East Asia and they have resources and manpower to plan for the future of East Asia. See major indicators for three countries contained in the Appendix A. Secondly, the economic size of each of the three countries is substantially large and if East Asia should encounter another currency crisis, they will be a big loser. So they need to take preventive measures for their own sake. Thirdly, these three countries have been accumulating so much of foreign reserves. Their foreign reserve holdings are excessive by any conventional standard. For Example, the foreign reserve to import ratio for each country has been rapidly rising since 1999. During the period 1999-2003, the ratio kept on increasing: 95%, 75%, 89%, 99%, and 99% for China; 83%, 99%, 128%, 131%, and 160 for Japan; 62%, 60%, 73%, 80%, 87%, and 89% for Korea. (Appendix 1, 2, and 3) If three countries become successful in mid-term exchange rate coordination and in the formation of a currency union, they can reduce much of foreign reserve holdings.



Fourthly, there is much more uncertainty in the beginning stage. If too many member countries get involved in the decision-making process, no decisive actions can be undertaken. It will be much easier for countries to agree on any decision. Other countries can join the group later, when things become more certain and they have a better prospect of their common goal. Last but equally important, while seeking their common goal, they can gain huge benefits by cooperating for the promotion of their production and exports. Using the basis of differing distributions of income, each can expand its exports and can increase complementary production relationships among the three countries.



VI. Criteria for Exchange Rate Policy Coordination

In conducting exchange rate policy coordination, the three countries need to have common guidelines. First of all, each country should adopt range targeting rather than point targeting for exchange rate policy. This point was discussed in V. It is partly because unexpected real shocks make GDP growth rates shift and it is partly because exchange rate policy is constrained by other monetary policies including inflation targeting.

Next question is what is the target exchange rate. Williamson (2003) suggested that each country may use the concept of fundamental equilibrium exchange rate (FEER) in finding the target exchange rate. He defines it as the value of the real exchange rate consistent with macroeconomic

equilibrium. The empirical measurement of FEER can vary with the country. The three countries need to have a consensus on the exchange rate target of each country.

The real effective exchange rate (REER) can be accepted as a useful guide for the exchange rate target. The REER is a composite exchange rate index and can measure the overall value of a currency. It is a weighted average of changes in the basket currencies. The basket currencies may include major currencies that are easily convertible in the international foreign exchange markets such as the dollar, the euro, and the yen. Changes in REER reflect how far a member currency deviates from its initial equilibrium position and this can be the foundation over which three countries discuss the future course of their exchange rate policy.

In discussing future exchange rate policy for each country, maintenance of harmonized exchange rates must be the common ground. They wish to keep their currency value at a level at which they maintain the same currency competitiveness against the non-member countries. Furthermore, comparing to the exchange rate in the base period, they want to maintain the same exchange rate with the anchor currency – the U.S. dollar or the euro.

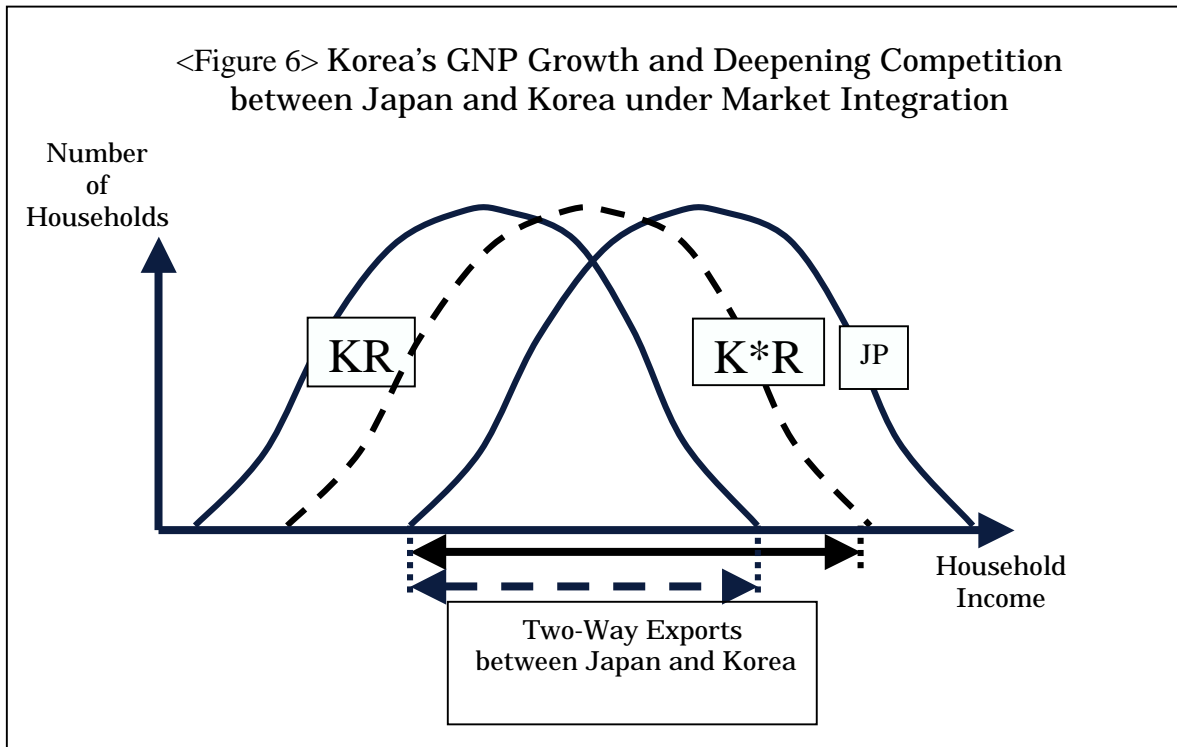
To attain the mid-term or long-term harmony in the exchange rate, member countries need to keep balance between current account and capital account transactions. While the three countries coordinate their medium-term exchange rate policy, they must share the long-term goal of a common currency and of a currency union, and should make concerted efforts in taking step-wise measures towards their long-term goal.

VII. Analysis of Goods Market Integration Among Three Countries

While three countries make joint efforts to achieve currency union and coordinate mid-term exchange rate policy, they should try to integrate goods markets in East Asia. Without freer trade within a region, regional currency union does not mean very much. Yu (2005) argues that if there is no will in the region for the creation of an East Asian Economic Community, any cooperation will be piecemeal and half-hearted, and the endeavor of regional financial cooperation will lose steam easily. Kuroda (2004) introduces five steps towards an East Asian single currency: the first step is already on place by way of the Chiang Mai Initiative; the second step taken is the Asian Bond Markets Initiative; the third step is the free trade agreements; the fourth step is to establish intra-regional exchange rate stability, and the last step is to create a common currency.

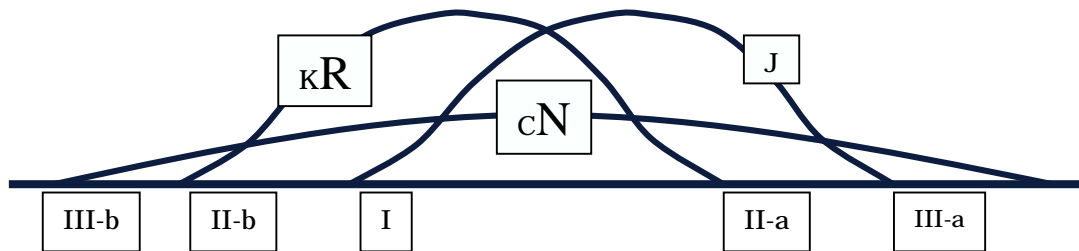
The rationale for the common currency and free trade is well understood among member countries. In order to realize these tasks, member countries need to be persuaded about the benefits they will gain. In this section, we analyze the potential benefits that accrue to member countries when they form a regional trade bloc and integrate the region's product markets. Negotiations of free trade agreements (FTA) have been under way among member countries and not much progress has been made. The leaders of smaller countries are afraid that their products may be driven out of market by the products of large countries.

This is not necessarily true if one takes into account the merits of differing distributions of national income. Grubel (1970) explained intra-industry trade based on the theory of differing distributions in the context of two countries. However, we apply this theory in the context of three countries – China, Japan, and Korea. Through this framework, we point out that an FTA or any market integration not only increases intra-regional as well as inter-regional trade for the region as a whole but also it provides ample opportunities for smaller economies.



We assume that each country has a distribution of national income where high-income, middle-income, and low-income groups exist. Figure 6 shows two income distribution curves for Korea and Japan. The two curves overlap with each other and yield a common range of household income. The consumers falling into this range of income, whether they are Koreans or Japanese, are assumed to have a similar consumption pattern. So producers of two countries make efforts to cater to these customers. At this moment, competition between the Japanese and Korean producers increases but it occurs in the extended market. When Korea's GNP increases, its income distribution curve shifts to the right and the overlapping range extends. This means that the producers of the two countries will have more opportunities to sell and that the consumers of the two countries will enjoy greater benefits. Both consumers and producers in the two countries can gain from market integration.

<Figure 7> Coexistence of Competition and Complementary Production Relationships among China, Japan, and Korea



- I: competition among China, Japan, and Korea
- II-a: competition between Japan and China
- II-b: competition between China and Japan
- III-a: competition between China and non-member countries
(Intra-regional complementary increases)
- III-b: China can allow potential partner countries to compete with China.

Up to this point, it is not clear why a smaller country can gain with a high probability. Let us now consider a third country, China. In Figure 7, China's income distribution curve is drawn. We have made the curve look much flatter than the other two in order to reflect a wider distribution of income in China. Range I is the competitive market for three countries. Range II-a is the competitive market for China and Japan. Range II-b is the competitive market for China and Korea. Range III-a indicates the competitive market for China and other higher-income countries. Range III-b is the competitive market for China and other lower-income countries. Through this example, we can show that even a smaller country can have ample opportunities if it considers the differing distributions of national income. Furthermore, if these three countries create regional joint ventures by utilizing the merits of location, labor cost, and technology, they can well compete with non-member countries.

VIII. Conclusion

We analyzed the rationale of the East Asia's long-term goal of currency union and medium-term exchange rate policy coordination. An individual currency in East Asia is subject to enormous impacts from external shocks. So they need to form a currency bloc to lessen the impact. They also need to maintain exchange rate stability by creating a regional currency unit to which every member country's currency is pegged. While making joint efforts to reach the final stage of currency union, China, Japan, and Korea need to jointly conduct mid-term exchange rate policy coordination. Through exchange rate range targeting, three countries can maintain the exchange rate at a level consistent with one another. When conducting exchange rate targeting, it may conflict with inflation targeting.

To keep inflation at the target band, proper monetary policy is to be implemented. If the central bank wants to lower inflation, it must tighten up its money supply. Then it will lead to an appreciation of the domestic currency, which may jeopardize exchange rate targeting. Potentially there is an objective conflict between the ministry of finance and the central bank. This is because the ministry is responsible for keeping the exchange rate at the target range whereas the central bank is responsible for keeping inflation at a low level. Therefore, each country should coordinate domestic policies between different agencies of the government while trying to coordinate exchange rate policy among the three countries.

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Appendix 1: The Trends of China's Major Indicators

	1999	2000	2001	2002	2003	2004	2005 7.22
GDP (bill. yuan)	8,267.3	8,934.1	9,859.3	10,789.8	12,151.1		
Exchange Rate	8.2795	8.2774	8.2768	8.2773	8.2767	8.2765	8.11
GDP (mill. US Dollar)	998,466. 2	1,078,997	1,190,736	1,303,115	1,467,512		
Exports (mill. US Dollar)	194,931	249,203	266,098	325,591	437,899		
Imports (mill. US Dollar)	165,699	225,094	243,553	295,171	413,062		
Foreign Reserves (mill. US Dollar)	157,728	168,278	215,605	291,128	408,151		
FR/GDP	15.8%	15.6%	18.1%	22.3%	27.8%		
FR/IMP	95.2%	74.8%	88.5%	98.6%	98.8%		

Appendix 2: The Trends of Japan's Major Indicators

	1999	2000	2001	2002	2003	2004
GDP (bill. yen)	507,724	511,462	505,847	498,276	497,821	
Exchange Rate	102.20	114.90	131.80	119.90	107.10	104.12
GDP (mill. US Dollar)	4,967,945	4,451,366	3,837,989	4,155,763	4,648,188	
Exports (mill. US Dollar)	465,254	449,513	371,851	434,604	509,328	587,639
Imports (mill. US Dollar)	345,108	356,092	321,715	351,768	413,810	472,023
Foreign Reserves (mill. US Dollar)	286,916	354,092	395,155	461,186	663,289	833,891
FR/GDP	5.8%	7.95%	10.3%	11.1%	14.3%	
FR/IMP	83.1%	99.4%	127.8%	131.1%	160.3%	167.7%

Appendix 3: The Trends of Korea's Major Indicators

	1999	2000	2001	2002	2003	2004
GDP (bill. won)	529,500	578,665	622,123	684,263	724,675	
Exchange Rate	1,138.0	1,264.50	1,313.50	1,186.20	1,192.60	1,035.10
GDP (mill. US Dollar)	465,290	457,623.6	473,637.6	576,853	607,643	
Exports (mill. US Dollar)	143,686	172,268	150,439	162,471	193,817	253,845
Imports (mill. US Dollar)	119,725	160,481	141,098	152,126	178,827	224,463
Foreign Reserves (mill. US Dollar)	73,987.3	96,130.5	102,753.3	121,345.2	155,284.2	198,996.6
FR/GDP	15.9%	21.0%	21.7%	21.0%	25.6%	
FR/IMP	61.8%	59.9%	72.8%	79.8%	86.8%	88.7%