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## Yen Bloc or Yuan Bloc: An Analysis of Currency Arrangements in East Asia

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**Abstract**

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This paper examines the role of Japan against that of China in the exchange rate regime in East Asia in light of growing interest in forming a currency union in the region. The analysis suggests that currency unions with China tend to generate higher average welfare gains for East Asian countries than currency unions with Japan or the United States. Overall, Japan does not appear to be a dominant player in forming a currency union in East Asia, and this trend is likely to continue if China's relative presence continues to rise in the regional trade.

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## Contents

I. Introduction.....	3
II. Economic Trend in East Asia: 1990-2003.....	5
III. Gravity Model.....	8
A. Theory.....	8
B. Empirical Specification.....	10
IV. The Effects of Common Currencies.....	11
A. Data.....	11
B. Estimation Results.....	13
V. Yen Zone and Dollar Zone Revisited.....	16
A. Japan's Regional Economic Cooperation.....	16
B. Bilateral and Multilateral Currency Unions.....	17
VI. Yen Bloc or Yuan Bloc.....	21
A. Common Currency Arrangements in East Asia.....	21
B. Sub-Regional Currency Unions.....	23
C. Impact on the United States.....	26
VII. Conclusion.....	27
References.....	29
Tables	
1. The Growth Rate of Per Capita Income, 1990-2003 Average.....	5
2. Japan's Trade Partners.....	7
3. Gravity Model Estimation Results.....	13
4. Robustness Check.....	14
5. Bilateral Arrangements vs. Regional Arrangements.....	23
6. Common Currency Arrangements in East Asia – Trade Effects.....	24
7. Common Currency Arrangements in East Asia – Welfare Effects.....	24
8. Common Currency Arrangements with Australia and New Zealand—Trade Effects.....	25
9. Common Currency Arrangements with Australia and New Zealand—Welfare Effects.....	25
10. Impact on the United States.....	26
Figures	
11. Share of Regional Trade.....	6
12. Trade Share of Japan and the U.S.....	6
13. Trade Effects of Common Currency.....	19
14. Welfare Effects of Common Currency.....	19
15. Trade Effects of Currency Unions.....	21
16. Welfare Effects of Currency Unions.....	22
Appendix Figures	
A1. Imports from Germany to France.....	32
A2. Imports from Netherlands to Austria.....	32

## I. INTRODUCTION

Japan has close economic ties with East Asia through trade, foreign direct investment (FDI), and official development assistance (ODA). However, the Japanese yen has played a relatively minor role in the exchange rate policy of the region. East Asia was known as a loose dollar zone in which countries linked their currencies to the U.S. dollar before the Asian crisis of 1997-98 (Frankel (1993) and Frankel and Wei (1994)). Various studies have suggested that this *de facto* dollar peg was one of the main causes of the crisis. Subsequently, researchers have proposed alternative exchange rate policies to stabilize currencies in East Asia.<sup>2</sup> Among the various proposals, one of the most ambitious is to form a currency union in East Asia, and many countries in the region, including Japan, have expressed interest in the idea.<sup>3</sup>

The exchange rate regime of East Asian countries has important economic implications for Japan. The de fact dollar peg of East Asia meant that the exchange rate between yen and East Asian currencies would also swing as the yen/dollar exchange rate fluctuated. For example, a large yen appreciation at times caused the “hollowing out” of industry in Japan while generating FDI and export booms in East Asian economies.<sup>4</sup>

In part to mitigate the impact of exchange rate fluctuations, Japan has long engaged in the “internationalization of yen,” namely to promote the use of yen in East Asia, and more generally in international transactions.<sup>5</sup> Particularly since the Asian crisis, a series of studies have been conducted to identify bottlenecks that prevent a wider use of yen. These studies made a number of recommendations to facilitate the internationalization of yen, including vitalizing the Japanese economy to improve the confidence in the currency, updating domestic financial and capital markets to enhance the versatility of yen, and maintaining cooperation and dialog with East Asian countries to increase the role of yen in the region. Notwithstanding various policy initiatives, however, the progress in the internationalization of yen has been rather slow, and the role of yen continues to be limited in the exchange rate policy in East Asia.<sup>6</sup>

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<sup>2</sup> For example, Williamson (1999) proposes a common basket peg among East Asian economies. Ogawa and Ito (2002) also advocate a basket peg to keep the real effective exchange rate stable. Kwan (1998) makes a proposal for a formation of a yen bloc in East Asia.

<sup>3</sup> For example, finance ministers from China, Japan, and Korea have announced tentative measures to coordinate their currencies in manners that can ultimately lead to a formation of a common regional currency. See “Asian Finance Ministers Seek Common Currency,” New York Times, May 5, 2006, <http://www.nytimes.com>.

<sup>4</sup> See Kwan (1995).

<sup>5</sup> See, for example, a webpage entirely dedicated for the internationalization of yen on the Ministry of Finance website: <http://www.mof.go.jp/yen-itiran.htm>.

<sup>6</sup> Indeed, McKinnon (2000) reports that East Asian countries restored the East Asian “dollar standard” after the 1997/98 crisis. More recently, Chow, Kim, and Sun (2007) find that the role of the U.S. dollar declined in East Asia after the crisis while that of the yen and other currencies remains mostly the same.

In the meantime, the economic situation of East Asian countries has changed significantly over the past decade. While the Japanese economy has long stagnated (“lost decade”) and its real income has even declined at times, East Asian economies have grown quite impressively. Despite the 1997 currency crisis, East Asia continues to be the fastest growing region in the world. Most notably, China has been growing at an outstanding rate. Indeed, China has emerged as an important player in the regional and global economy, and the Chinese yuan has become a key subject of debate. While it is undeniable that Japan is still a dominant economy in East Asia, the economic footing of Japan relative to its neighbor countries, particularly China, has shifted over the last decade. This naturally raises a question whether there is any room for Japan to play a significant role in the exchange rate policy in East Asia, especially in terms of forming a currency union among East Asian economies.

Shirono (2008) estimates trade-creating effects and welfare effects of various common currency arrangements in East Asia using a gravity model with bilateral trade data for 1980 and 1990. The study finds that a single currency in East Asia will stimulate regional trade substantially, and regional currency arrangements that include Japan will generate economically significant welfare gains for the region. This paper re-examines single currency arrangements in East Asia using more recent bilateral trade data and evaluates how those changes in the economic environment in East Asia have affected prospects for the role of Japan in forming a regional currency union.

In order to assess the role of Japan in the East Asian currency regime, this paper provides estimates of trade-creating effects and accompanying welfare gains of various single currency arrangements in the region, focusing on Japan, China, the United States, and the seven East Asian economies: Hong Kong S.A.R., Singapore, Korea, Indonesia, Malaysia, Thailand, and the Philippines. I will estimate a micro-founded gravity equation that emerges from a general equilibrium trade model, adopting the theoretical approach of Anderson and van Wincoop (2001). An advantage of this framework is that once parameters are estimated, one can use the general equilibrium model to conduct comparative statics exercises. In particular, the model allows for counterfactual experiments such as asking what the effects on trade and welfare are of a hypothetical currency union.

Comparative statics exercises of the general equilibrium model suggest that currency unions with China tend to generate higher average welfare gains for East Asian countries than currency unions with Japan or the United States. In comparing the effects of including Japan or the United States in currency unions, the analysis shows that welfare gains will be larger for currency unions that include Japan rather than the United States. This result is consistent with the earlier findings of Shirono (2008) who reports that currency unions with Japan tend to generate larger welfare gains for East Asian economies than currency unions with the United States.

However, in comparing the role of Japan and China, the analysis suggests that currency unions with China in general tend to yield larger welfare gains than currency unions with Japan, both in bilateral and multilateral setups. This result is also robust to sub-regional grouping as well as extending membership to other regional trade partners such as Australia and New Zealand. Moreover, the analysis also suggests that China’s participation in a

regional currency union can potentially have a larger impact on the United States, a non-member third country, than Japan's participation even though the magnitude of such effects is quite small. The evidence thus seems to indicate that China may play a more significant role in regional currency arrangements if China's relative importance in regional trade continues to rise.

The rest of the paper is organized as follows. The next section overviews the economic trend of East Asia in the 1990-2003 period. Section 3 presents a gravity model and its implications for empirical exercises. Section 4 discusses the data and reports estimation results of gravity equations. Section 5 revisits the debate on the role of the U.S. dollar and the Japanese yen in East Asia. Section 6 conducts counter-factual experiments to assess the relative importance of Japan and China in forming currency unions in East Asia. Section 7 concludes.

## II. ECONOMIC TREND IN EAST ASIA: 1990-2003

To motivate the analysis, this section overviews the economic trend in East Asia for 1990-2003, focusing on the growth rate of per capita real income and regional trade. As will be discussed in the next section, the degree of regional trade integration plays an important role in determining the size of welfare gains from a currency union. Thus the information on the trade pattern presented in this section will be useful in interpreting the results of the subsequent analysis.

Table 1: The Growth Rate of Per Capita Income, 1990-2003 Average

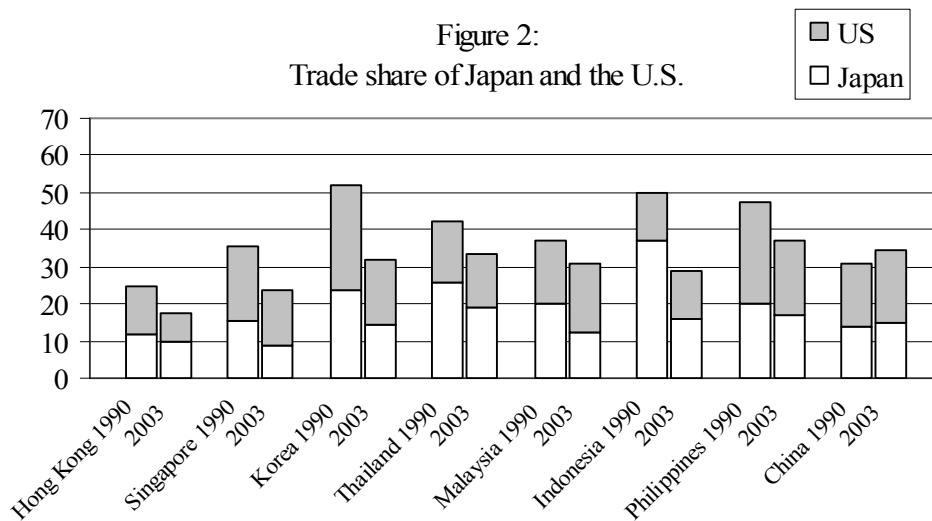
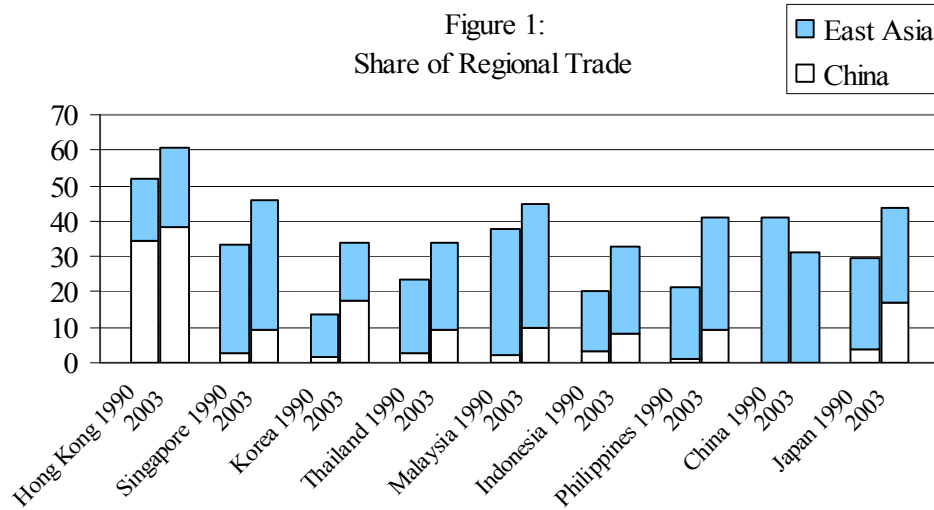
Unit: Percent	
	Growth rate
Hong Kong	2.5
Singapore	4.0
Korea	5.3
Thailand	4.0
Malaysia	4.1
Indonesia	2.9
Philippines	1.2
China	8.4
Japan	0.9
United States	1.8

Notes: The average annual growth rate of per capita GDP for 1990-2003.

Author's calculation using the data from the International Financial Statistics.

Table 1 reports the economic performance of Japan and East Asian countries. The United States is also included for comparison purposes. The average annual growth rate of per capita

income of Japan was only 0.9 percent in the 1990-2003 period.<sup>7</sup> On the other hand, all the East Asian economies outperformed Japan despite the fact that many of them struggled in recovering from the currency crisis of 1997-98. China has grown at the highest rate of 8.4 percent among the all countries. In short, the growth data suggest that the income gap between Japan and other East Asian economies have narrowed over the past 13 years, and especially China is growing quite rapidly.<sup>8</sup>



<sup>7</sup> Note, however, that the Japanese economy began to recover in 2002. See International Monetary Fund (2007).

<sup>8</sup> Broda and Weinstein (2007), however, show that Japan's growth is likely to be underestimated due to the overstatement in its CPI. For example, the average growth rate of Japanese real household consumption per capita over the 1999-2006 period was 1.2 percent after correcting for the biases in the Japanese CPI while the official data suggest that the growth rate of consumption was only 0.4 percent during the same time period. Thus the growth figure in Table 1 may also understate Japan's actual growth rate, but the overall conclusion of this subsection does not change.



There was also a notable change in the trade pattern of East Asia over the past decade. In particular, China has emerged as an important trade partner for East Asian countries. Figure 1 shows the share of intra-regional trade (exports plus imports) in total trade of East Asian economies for 1990 and 2003. Japan is also included for comparison purposes. Except for China, the share of intra-regional trade has grown substantially. In particular, the share of China in total trade has more than tripled for most of the East Asian economies and also for Japan. On the other hand, the share of Japan in the East Asian trade has declined over the past 13 years, except for China, whose trade share with Japan has increased slightly (Figure 2). The trade share of the United States also has declined for many East Asian countries. Even though Japan and the United States are still two equally important trade partners for East Asia, the presence of China has increased significantly in the regional trade.

Table 2: Japan's Trade Partners

Unit: Percent		
	1990	2003
EA + China	29	44
EA	26	27
China	4	17
US	28	20

Table 2 further reports the share of Japan's main trade partners. The share of East Asia has increased from 29 percent in 1990 to 44 percent in 2003, but the most of this change comes from the increase in the trade share with China (4 percent in 1990 to 17 percent in 2003, also shown in Figure 1). In the meantime, the share of the United States in Japan's total trade has declined from 28 percent in 1990 to 20 percent in 2003.

In sum, there are five observations that emerge from the growth and trade data:

1. Per capita income of East Asian economies, especially China, has increased substantially compared with that of Japan over the last decade.
2. Intra-regional trade among East Asian economies has increased significantly in the period of 1990-2003, suggesting that East Asia is more integrated in terms of goods trade than before.
3. In particular, the share of China in total trade for East Asian economies has increased substantially.
4. On the other hand, the relative importance of Japan and the United States for East Asia in terms of trade has declined over the past 13 years.
5. While East Asian countries have become less dependent on trade with Japan, Japan has become more dependent on trade with East Asia, particularly with China.

A casual observation of the data suggests that Japan's relative economic importance in East Asia seems to have declined as far as trade is concerned.<sup>9</sup> On the other hand, China is rising as a key player in the region. Of course, Japan is still a dominant economy in East Asia, but the economic position of Japan relative to its neighbor countries, particularly China, has changed over the last decade. The rest of the paper analyzes how these changes have affected prospects for the role of Japan in forming a currency union in East Asia.

### III. GRAVITY MODEL

#### A. Theory

This paper uses a micro-founded gravity model that emerges from a general equilibrium trade model to analyze the impacts of various common currency arrangements in East Asia. In particular, this paper adopts the theoretical approach developed by Anderson and van Wincoop (2003). The framework has at least three advantages. First, once parameters are estimated, one can conduct comparative statics exercises by solving the general equilibrium model before and after change in trade barriers. In particular, the model allows for counterfactual experiments of hypothetical scenarios about trade costs. Second, one can measure the welfare effects of removing trade barriers because the model generates an explicit welfare metric. Finally, since the model is exactly specified, specification errors will be limited.

In the Anderson and van Wincoop framework, output is given as an endowment, and all goods are differentiated by place of production. Preferences are expressed as an identical constant elasticity of substitution (CES) utility function. In this setup, a gravity equation can be derived as follows:

$$x_{ij} = \frac{y_i y_j}{y^w} \left( \frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (1)$$

where  $x_{ij}$  is nominal demand of country  $j$  for goods from country  $i$ ,  $t_{ij}$  is the bilateral trade costs,  $y_j$  is the nominal income of country  $j$ , and  $y^w$  is the nominal value of the world output.  $P_j$  and  $P_i$  are CES price indices given by

$$P_j = \left[ \sum_i (\beta_i p_i t_{ij})^{1-\sigma} \right]^{1/(1-\sigma)} \quad (2)$$

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<sup>9</sup> A similar trend seems to hold for FDI flows. Callen and McKibbin (2003) report that, while Japanese FDI flows to East Asia increased, the relative importance of Japanese investment in East Asian countries declined during the 1996-2001 period. See also Nakagawa and Faulkner-MacDonagh (2007) for recent developments for Japan's capital flows, including FDI.

where  $p_i$  is the exporter's price,  $\sigma$  is the elasticity of substitution between goods, and  $\beta_i$  is a positive parameter in the CES utility function. After imposing market clearing conditions, these price indices are subject to

$$P_j^{1-\sigma} = \sum_i \frac{y_i}{y^w} \left( \frac{t_{ij}}{P_i} \right)^{1-\sigma} \quad \forall j \quad (3)$$

$P_j$  is also called “multilateral trade resistance” because it summarizes the trade costs between country  $j$  and *all* of its trading partners. The above gravity equation thus implies that, after controlling for size, bilateral trade depends on the trade barrier between  $j$  and  $i$ , relative to the product of the multilateral trade resistance terms.

The model also provides a welfare metric. The indirect utility function is expressed as

$$U_j = \frac{y_j}{P_j} \quad (4)$$

The equation (3) shows that welfare is inversely related to the multilateral resistance term. In other words, welfare increases as the price index declines. The intuition of this result is quite straightforward: The price index becomes smaller as trade barriers are removed. Savings on trade costs will generate welfare gains because fewer resources are wasted for transportation.

There are two theoretical predictions that will be useful later to interpret empirical findings. First, the model suggests that the rise in trade among the members of a currency union is smaller the larger the size of the union. On the other hand, the increase in welfare is larger the bigger the size of the union. The multilateral trade resistance term for the members of a currency union will drop more the larger the size of the union. As a result, relative trade barriers between members will decline less the larger the size of the union, thereby generating a smaller increase in trade. The larger drop in the multilateral resistance term will yield a larger increase in welfare because the welfare is inversely related to the multilateral resistance term.

Second, an increase in trade among the members of a currency union will be smaller the higher the initial level of trade among the members before forming the union. On the other hand, the welfare effect will be larger the higher the level of pre-union trade. The multilateral trade resistance term will drop more the higher the initial level of intra-regional trade, thus generating a smaller increase in trade and a larger increase in welfare for the members of the currency union.<sup>10</sup>

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<sup>10</sup> See also Anderson and van Wincoop (2001) for more discussions on the theoretical implications of the model.

The theory thus suggests that East Asia is likely to gain more from a regional currency union in 2003 than in 1990, holding other things constant, given the deepening of the regional integration through trade over the past decade. However, the role of Japan in such an arrangement is not entirely clear as Japan has increased its dependency on East Asia while East Asia has become less dependent on Japan than before. How these changes will work out needs to be estimated.

## B. Empirical Specification

To derive the estimation equation, I divide the equation (1) by  $y_i y_j$  and take logs to obtain:

$$\ln\left(\frac{x_{ij}}{y_i y_j}\right) = -\ln y^w + (1-\sigma)\ln t_{ij} - (1-\sigma)\ln P_i - (1-\sigma)\ln P_j \quad (5)$$

The gravity model itself is silent about specifications of bilateral trade barriers  $t_{ij}$ . I assume that trade barriers are expressed as a linear combination of various trade cost variables.<sup>11</sup> In particular, assuming that

$$t_{ij} = (d_{ij})^\rho m^{(1-\delta_{ij})} \prod_{k=1}^K \gamma_k^{z_{ij}^k} \quad (6)$$

and taking logs of the above expression yield

$$\ln t_{ij} = \rho \ln d_{ij} + (1-\delta_{ij}) \ln m + \sum_{k=1}^K z_{ij}^k \ln \gamma_k + v_{ij} \quad (7)$$

where  $d_{ij}$  is bilateral distance,  $m$  is the cost associated with national currencies, and  $\delta_{ij}$  is a currency union dummy variable that equals one if country  $i$  and  $j$  belong to a currency union and zero otherwise.  $z_{ij}^k$  is a control variable that captures other trade costs.  $v_{ij}$  is the error term. Substituting equation (7) into equation (5), adding time subscripts, and letting  $q_{ijt} \equiv x_{ijt}/y_i y_j$ ,  $\mu_i \equiv -(1-\sigma)\ln P_i$ , and  $\mu_j \equiv -(1-\sigma)\ln P_j$ , the estimation equation (5) can be rewritten as

$$\ln q_{ijt} = \beta_0 + \beta_1 \ln d_{ijt} + \beta_2 \delta_{ijt} + \sum_{k=1}^K \lambda_k z_{ijt}^k + \mu_{it} + \mu_{jt} + \varepsilon_{ijt} \quad (8)$$

where  $\beta_0 = (1-\sigma)\ln m - \ln y^w$ ,  $\beta_1 = (1-\sigma)\rho$ ,  $\beta_2 = (1-\sigma)\ln m$ , and  $\lambda_k = (1-\sigma)\ln \gamma_k$ .

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<sup>11</sup> This is a standard assumption in the literature. See, for example, Anderson and van Wincoop (2003) and Noguer and Siscart (2004), among others.

The coefficient of interest is  $\beta_2$ . Multilateral trade resistance terms will be captured by time specific country dummies ( $\mu_{it}$  and  $\mu_{jt}$ ) in the regression.

There are at least two factors that can bias the estimate of currency union effects. First, price indices  $P_i$  and  $P_j$  depend on trade costs, so ignoring these terms will cause an omitted variable problem. Thus it is important to include country specific dummies in the regression to control for price index terms as shown above. Second, even after correcting for omitted variable biases, one still needs to solve a general equilibrium model before and after forming a currency union in order to obtain correct estimates of the effects of a common currency on bilateral trade. This paper thus estimates equation (8) to obtain parameters of the model and solves the general equilibrium model to compute the effects of common currencies under various hypothetical currency arrangements among East Asian economies.

Since Rose (2000), who first estimated the impact of currency unions on trade, a number of studies have been conducted to re-examine his results.<sup>12</sup> Economists are yet to agree on the size of the impact of currency unions on trade. Indeed, many believe that the estimated currency union effects are too large.<sup>13</sup> Given the controversy surrounding the estimate of currency union effects, quantitative results of this paper need to be interpreted with caution. Nevertheless, qualitative results of this paper provide an interesting insight into evaluating the role of Japan in common currency arrangements in East Asia.

#### IV. THE EFFECTS OF COMMON CURRENCIES

This section estimates the gravity equation (8) to obtain the parameters of the general equilibrium model. The estimated parameters will be used to conduct counterfactual experiments under various hypothetical scenarios about common currency arrangements in East Asia.

##### A. Data

Bilateral trade data are constructed using import data from the United Nations' Comtrade database. All the exports are inferred from partner country's imports. Bilateral trade is measured as the sum of nominal exports and imports deflated by the U.S. price index. The dataset covers 166 countries for the 1999-2003 period. Distance is calculated as great-circle distance using the information on the latitude and longitude of capital cities obtained from the CIA's World Factbook. The basic data on currency unions are taken from Glick and Rose (2002) but updated to reflect new developments in recent years, particularly the introduction of euro. Real GDP data are taken from the World Bank's World Development Indicators.

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<sup>12</sup> See Rose (2004).

<sup>13</sup> Baldwin (2006) provides a critical literature review. See also Baldwin and Taglioni (2006) for detailed discussions on the methodology for estimating currency union effects.

Control variables of other trade barriers include (i) a common language dummy, which is unity if a pair of countries uses the same languages and zero otherwise; (ii) a border dummy, which is unity if a pair of countries shares a border and zero otherwise; (iii) a political union dummy, which is unity if a pair of countries belongs to a political union and zero otherwise; (iv) a colony-colonizer dummy, which is unity if a pair of countries historically had a colony-colonizer relationship and zero otherwise; (v) a common colonizer dummy, which is unity if a pair of countries had a common colonizer and zero otherwise; and (vi) a FTA dummy, which is unity if a pair of countries belong to the same regional trade agreement. The information on these variables, except the FTA variable, are all taken from the CIA's World Factbook. The FTA indicator was created using data on regional trade agreements from Baier and Bergstrand (2007) and the World Trade Organization website.

The sample period of the data used in this paper is more recent, and therefore currency union observations include euro countries. This raises a few issues in the estimation. First, the euro area is not only a currency union, but also a subset of the European Union, which implements various regional policies (e.g. single market policy). I will include an EU dummy that is unity if a pair of trading countries belongs to the European Union to control for EU policies that may affect bilateral trade.<sup>14</sup>

Another important issue is the continuity of the EU trade data after the introduction of Euro in 1999. Recent studies that estimate the effects of Euro on trade, such as Micco and others (2003) and Baldwin and Taglioni (2006), have used bilateral trade data from the IMF's Direction of Trade (DOT) Statistics for the 1990-2003 period. It can be problematic to use the DOT data for EU countries trade because the series is not comparable before and after 1999 (the year of introduction of euro) due to a change in the data source: Before 1999, trade data for EU countries in the DOT were collected from individual countries, but after 1999, the trade data for EU countries in the DOT are taken from the Eurostat database. Trade data from individual countries and those reported to Eurostat can differ substantially due to the differences in definitions and data collection methods (Eurostat (2006)).

On the other hand, there was no change in the data source of the Comtrade database before and after 1999: EU trade data in Comtrade are collected from individual countries both before and after the introduction of euro.<sup>15</sup> The change in the data source appears to have created large discrepancies between DOT and Comtrade data as far as trade data for some of the EU countries are concerned. See, for example, Figure A-1 and A-2, which plot import data from DOT (dotted line) and Comtrade (solid line) for Austria and France. This paper uses the Comtrade data to maintain continuity and comparability of the trade data for EU countries in the sample period.

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<sup>14</sup> Studies that estimate the impact of Euro on trade also include the EU dummy in their regressions. See, for example, Micco and others (2003) and Baldwin and Taglioni (2006).

<sup>15</sup> I would like to thank Mr. Matthias Reister of the United Nations Statistics Division for clarifying the data source of Comtrade database after 1999.

## B. Estimation Results

Table 3 reports estimation results of the gravity equation. Specification (1) is a basic specification without the EU dummy variable. Under this specification, the currency union variable is positive and highly significant with a coefficient of 0.54 and a standard error of 0.08. This estimate is slightly smaller than the estimates reported elsewhere. For example, Glick and Rose (2002) conduct various robustness checks for the estimates of currency union effects and find that their fixed effects estimates lie in the range of (.59, .80). The estimates of other variables in Table 3 are comparable to other studies. If the EU dummy is included (specification (2)), however, the estimate of currency union effects increases to 0.71 with a standard error of 0.08.<sup>16</sup> The EU dummy is *negative* and statistically significant. At the same time, the coefficient of the FTA variable jumps to 0.92 while other variables remain more or less the same. This result suggests that if one does not control for EU membership, the effects of currency unions and FTA on bilateral trade are biased downward.

Table 3: Gravity Model Estimation Results

Variable	Regressions	
	(1)	(2)
Currency Union	0.54 (0.08)***	0.71 (0.08)***
Log Distance	-1.30 (0.01)***	-1.30 (0.01)***
Common Language	0.69 (0.03)***	0.66 (0.03)***
Border	0.59 (0.06)***	0.58 (0.06)***
FTA	0.66 (0.04)***	0.92 (0.04)***
Ex-Colony/Colonizer	1.35 (0.06)***	1.35 (0.06)***
Common Colonizer	0.59 (0.03)***	0.57 (0.03)***
Political Union	3.03 (0.08)***	3.04 (0.08)***
EU		-1.33 (0.06)***
Year-country dummy	Yes	Yes
R2	0.34	0.34
No. Observations	52091	52091

Notes: \*\*\* indicates that estimates are statistically significant at 1 % level. Robust standard errors are in parentheses.

<sup>16</sup> Recent studies that estimate the impact of *euro* on trade report much smaller currency union effects but the size of estimated euro effects vary across studies. For example, Bun and Klaassen (2007) report the estimate of euro effects to be 0.032 while Flam and Nordstrom (2007) report the estimated coefficient to be 0.248. Note that these studies include only industrialized countries or EU members in the sample.

The impact of EU membership can be calculated, using the coefficients of the FTA variable and EU dummy variable, as  $-0.41 (=0.92 + (-1.33))$ . In other words, countries that belong to EU tend to trade *less* with each other than otherwise. This finding may seem puzzling given that the single market policy in EU is meant to facilitate regional integration, including trade. In light of theory, however, it is not entirely clear whether the single market policy itself will increase bilateral trade: The fundamental pillars of the single market policy are known as “four freedoms,” which include the free movement of people, goods, services, and capital. While removing trade barriers such as import tariffs is likely to increase trade, allowing factor mobility across borders may not necessarily increase trade. For example, Mundell (1957) shows that factor mobility is a perfect substitute for trade in the standard Heckscher-Ohlin setup. In this case, EU membership, or the single market policy in particular, may not necessarily boost bilateral trade among member countries.<sup>17</sup> I will revisit this issue later in the section.

Table 4: Robustness Check

	(1) Without EU Variable		(2) With EU Variable			Obs.
	CU	FTA	CU	FTA	EU	
1999 only	0.20 (0.17)	0.77 (0.10)***	0.57 (0.16)***	1.13 (0.11)***	-1.67 (0.17)***	10234
2000 only	0.34 (0.16)**	0.67 (0.09)***	0.74 (0.16)***	0.97 (0.10)***	-1.70 (0.16)***	10876
2001 only	0.19 (0.15)	0.64 (0.09)***	0.67 (0.15)***	0.88 (0.10)***	-1.58 (0.16)***	10764
2002 only	0.05 (0.17)	0.65 (0.08)***	0.46 (0.18)**	0.84 (0.09)***	-1.32 (0.17)***	10595
2003 only	0.06 (0.17)	0.69 (0.09)***	0.46 (0.19)**	0.87 (0.09)***	-1.21 (0.18)***	9622
Similar size	0.51 (0.09)***	0.43 (0.06)***	0.76 (0.10)***	0.60 (0.06)***	-0.98 (0.09)***	16988
No Australia, France, New Zealand, UK, and the US	0.23 (0.08)***	0.77 (0.04)***	0.61 (0.08)***	0.95 (0.04)***	-1.40 (0.09)***	47952
No North-North trade	0.73 (0.09)***	1.00 (0.04)***	-	-	-	50936
Fixed Effects with time dummy	0.12 (0.13)	0.22 (0.10)**	-	-	-	52091
Fixed Effects with time-country dummy	0.21 (0.13)	0.23 (0.10)**	-	-	-	52091

Notes: \*\*\*, \*\*, and \* indicate that estimates are statistically significant at 1 %, 5 %, and 10 % levels, respectively. Robust standard errors are in parentheses. All specifications include control variables as in Table 3.

<sup>17</sup> For example, Flam and Nordstrom (2007) estimate the effects of single market policy on trade and FDI. They find a large impact of single market policy on FDI but no impact on trade.



To test the robustness of the above results, Table 4 reports estimation results using different samples as well as a panel technique. The first eight rows are the results by OLS with different sample splits. The currency union variable is not always statistically significant in the specification without the EU dummy. Once the EU dummy is included, however, the currency union variable becomes significant in all cases, ranging from 0.46 to 0.74. The coefficient of the FTA variable becomes larger in the specification with the EU dummy. The EU dummy is always negative and statistically significant.

The last two rows report the results from fixed effects estimation. The EU dummy is time-invariant in the sample and therefore cannot be identified in fixed effects estimations: The data cover from 1999 to 2003, and there was no accession to EU during that time period. The estimated coefficient of the currency union variable becomes much smaller and also turns statistically insignificant in fixed effects estimations. However, it remains to be positive. In the last specification, which closely follows the theory by including time-country dummies, the estimated coefficient is 0.21 with a standard error of 0.13. It is not statistically significant, but the sign of the coefficient is positive. The FTA variable remains statistically significant in all specifications.

Now I re-examine the negative effects of EU. One may argue that the negative coefficient on the EU variable is due to a selection bias. For example, error term  $\varepsilon_{ij}$  in equation (8) may reflect unobservable policy-related barriers which tend to reduce trade between two countries. Those barriers may be correlated with the decision to participate in EU. Two countries may select into EU expecting large welfare gains from potential bilateral trade creation since EU is meant to seek deeper integration beyond tariff liberalization. In this case, the EU variable and unobservable barriers are positively correlated, and unobservable barriers and the error term are negatively correlated. This suggests that the EU variable and the error term are negatively correlated, and the EU coefficient will be underestimated.

A standard treatment to take account of unobservable time-invariant heterogeneity is to use panel estimation techniques. In particular, in this context, it seems more appropriate to use fixed effects estimation since the unobserved time-invariant variable is likely to be correlated with the EU variable. However, the standard fixed effects estimation cannot be applied to the current data set because the EU dummy is time-invariant in the sample as noted earlier.

Alternatively, I add three years (1993, 1995, and 1997) and take three years from the current sample (1999, 2001, and 2003) to conduct a quick check for the possibility of a selection bias. Adding earlier years introduces some variation in the EU variable and thus allows for fixed effects estimation. The estimation results (not reported here) is that the fixed effects estimation with time-country dummies still gives a negative estimate of the EU variable, but it is not statistically significant. The magnitude of the EU effect becomes much smaller, but the negative sign is surprisingly robust to different specifications. Thus the EU effect on trade seems to be indeed negative even after controlling for the possible selection bias.

I will use the estimate from specification (2) with the EU dummy in Table 3 for the rest of the analysis. However, it is quite important to keep in mind that quantitative results from the analysis below need to be interpreted with caution because the estimate of currency union

effects can vary depending on the specification of the regression as shown in Table 4. Nevertheless, the qualitative analysis below offers an interesting insight into the role of Japan in the currency arrangement in East Asia.

The estimate of the currency union effect in Table 3 suggests that a currency union will increase trade by about 100 percent ( $=e^{0.71}(\approx 2.03)-1$ ), holding other things constant. This result, however, does not directly translate into the trade effects of various currency arrangements in East Asia because the estimate does not take account of general equilibrium effects and therefore contains computational biases. In order to obtain correct estimates of the currency union effects, the general equilibrium model needs to be solved.

Using the estimates obtained from the regression, the rest of the paper conducts counterfactual experiments to estimate the trade creating effects and welfare effects of common currency arrangements in East Asia and evaluates the role of Japan in such arrangements.

## V. YEN ZONE AND DOLLAR ZONE REVISITED

The role of yen and dollar in East Asia has long been one of the important policy issues in the region. Before evaluating the role of Japan against that of China, this section revisits the debate and examines the importance of Japan against the United States in common currency arrangements in East Asia.

### A. Japan's Regional Economic Cooperation

East Asia was known as a loose dollar zone in which countries peg their currencies to the U.S. dollar before the Asian Crisis of 1997-98 (Frankel (1993) and Frankel and Wei (1994)). The Japanese yen played a very limited role in the exchange rate policy in East Asia despite the close economic linkages between Japan and the region through trade, foreign direct investment, and official development assistance.

The exchange rate regime of East Asian economies has important economic implications for Japan. The de fact dollar peg of East Asia meant that the exchange rate between yen and East Asian currencies would also swing as the yen/dollar exchange rate fluctuated. The appreciation of yen against dollar would often cause a recession in Japan (“*endaka fukyo*”, or high yen recession) while generating export booms in East Asia and large FDI flows from Japan to the region.<sup>18</sup>

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<sup>18</sup> On the other hand, the depreciation of yen would erode the external competitiveness of East Asian economies. For example, Ramaswamy and Samiei (2003) argue that the loss of competitiveness due to the dollar peg coupled with the sustained depreciation of yen against dollar was one of the triggers for the Asian Crisis in 1997.

Against this background, Japan has long engaged in the “internationalization of yen,” namely to increase the role of yen in East Asia, and more generally in international transactions. There have been extensive discussions on this issue among Japanese scholars, policy makers, and business leaders. For example, a series of reports have been prepared to identify the factors that hinder a wider use of yen. One of the recommendations made by these studies is to facilitate economic cooperation and dialog with East Asian economies to increase the role of yen in the exchange rate policy in the region.<sup>19</sup>

Indeed, since the early 2000s, Japan has engaged in a series of policy initiatives for regional cooperation and integration. For example, various FTAs have been proposed and negotiated in East Asia. In the area of financial cooperation, the creation of an Asian Bond market has been considered among policy makers in the region.<sup>20</sup> Japan has also taken the initiative in creating a study group on various financial sector issues, including regional currency coordination in East Asia.<sup>21</sup> Despite these policy efforts, however, the progress in the internationalization of yen has been rather slow, and the role of yen continues to be limited in the exchange rate policy in East Asia.<sup>22</sup>

Shirono (2008) estimates trade and welfare effects of currency unions in East Asia and finds that a regional currency union that involves Japan can generate economically significant welfare gains using the data for 1980 and 1990. As shown in section II, however, the economic position of Japan in the region has shifted and the regional trade structure has also changed for the last decade. This section thus re-evaluates the role of Japan against the U.S. in light of the new developments that took place in East Asia.

## **B. Bilateral and Multilateral Currency Unions**

To assess the role of Japan against that of the United States in forming a currency union in East Asia, this subsection estimates the average percentage increases in trade flows and welfare for East Asian countries under different common currency arrangements. In particular, this subsection focuses on bilateral currency unions and multilateral currency

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<sup>19</sup> See Study Group of the Promotion of the Internationalization of the Yen (2001).

<sup>20</sup> See Ito (2004) for an overview of these movements toward regional economic integration in East Asia. See also the Ministry of Finance’s website on regional financial cooperation at [www.mof.go.jp/english/if/regional\\_financial\\_cooperation.htm](http://www.mof.go.jp/english/if/regional_financial_cooperation.htm).

<sup>21</sup> The study group was created at the Informal ASEAN+3 Finance and Central Bank Deputies’ Meeting in November 2002. The study group has conducted various studies on financial cooperation. For instance, one of the most recent studies examines steps to create regional monetary units in East Asia. See the ASEAN’s website at <http://www.aseansec.org/17880.htm> for all the reports prepared by the study group.

<sup>22</sup> As for the use of yen in other areas, Lopez and Spiegel (2006), for example, show that foreign financial market participation in the international yen-denominated bond underwriting activity increased over the last decade partly due to the interest rate differential between Japan and the United States and also the financial difficulties faced by domestic competitors in Japan.

unions with Japan or the United States. A bilateral currency union here means that a country forms a currency union either with Japan or the United States unilaterally while the rest of the countries in East Asia maintain the current exchange rate regime. A multilateral currency union means that East Asian economies form a currency union as a whole through policy coordination.

For the rest of the paper, I will use the following grouping of East Asian economies:

NIES3: Hong Kong, Singapore, and Korea

ASEAN4: Thailand, Malaysia, Indonesia, and Philippines

ASEAN 5: ASEAN4 and Singapore

East Asia (EA): NIES3 and ASEAN4

All the estimates are obtained by solving the general equilibrium model before and after introducing a common currency among a certain group of countries, using parameters estimated from the previous section. More specifically, average percentage changes in trade are calculated by comparing the bilateral trade of country-pairs that do not share a common currency with the bilateral trade of the same country-pairs in the counter-factual environment where they share a common currency. Similarly, average percentage increases in welfare are calculated by comparing the welfare of a country before and after forming a currency union.

To solve the model, two additional assumptions are made. First, a parameter value for  $\sigma$  is needed to solve the general equilibrium model. However,  $\sigma$  cannot be estimated from equation (10). Thus I assume that  $\sigma = 5$  according to recent studies that estimate the elasticity of substitution.<sup>23</sup> Anderson and van Wincoop (2003) show that different values of  $\sigma$  affect the general equilibrium solutions very little. Second, I incorporate the border effect estimated in Anderson and van Wincoop (2003) in addition to the various trade cost factors considered in the regression. In other words, Anderson and van Wincoop's estimate of the border effect is included in the calculation of total trade costs.<sup>24</sup>

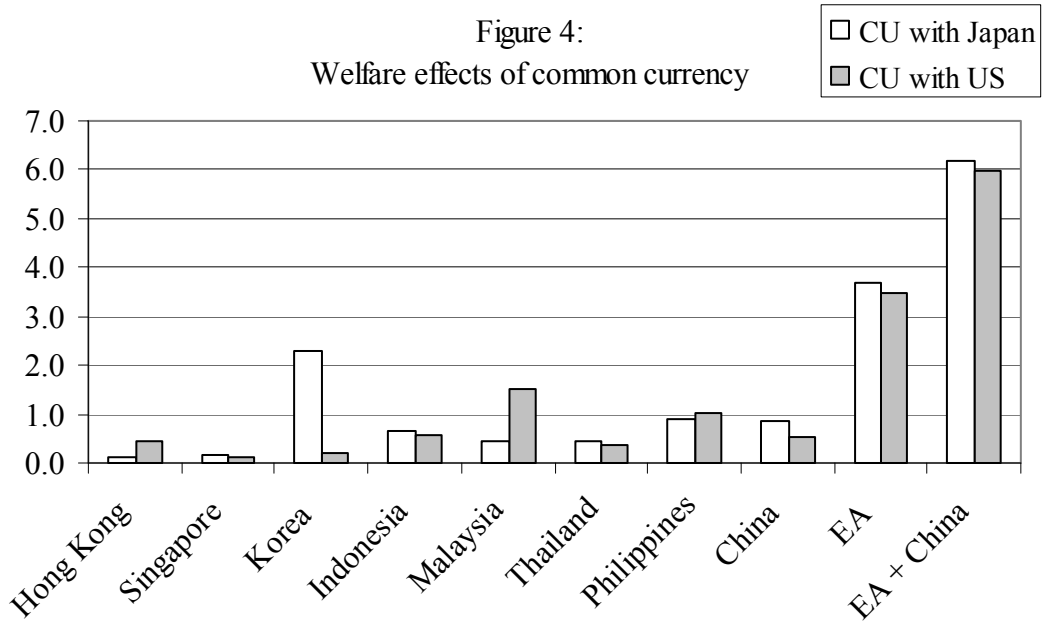
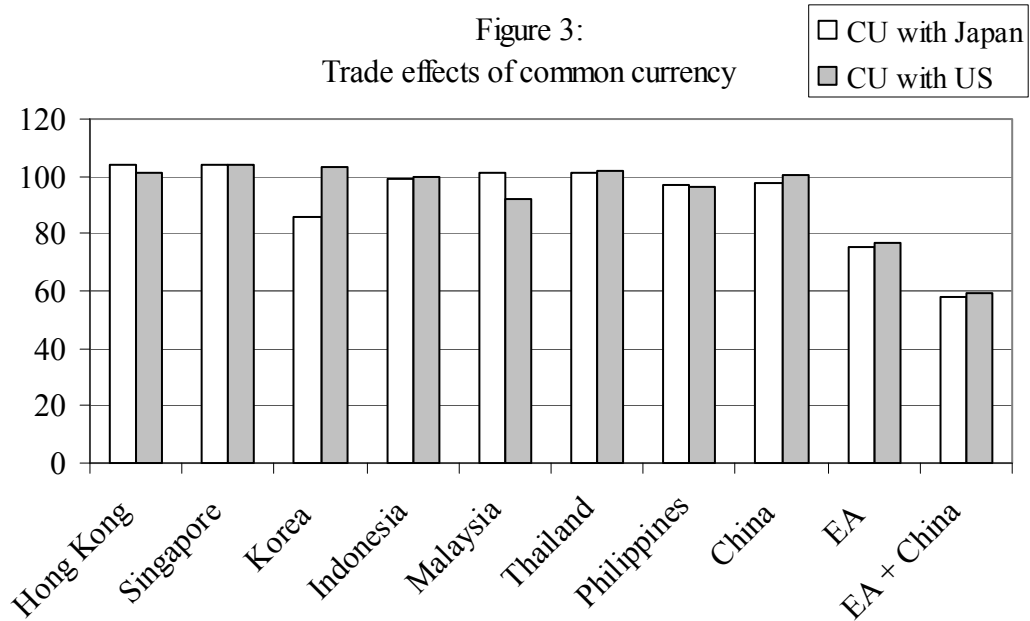
As discussed earlier, the theory suggests that the higher the trade levels before a currency union and the larger the size of the union, the smaller its effect on trade and the larger its effect on welfare. Thus the smallest trade effects but the largest welfare effects are expected from a common currency involving all East Asian countries, holding other things constant.

Figure 3 summarizes the trade effects of bilateral and multilateral currency arrangements either with Japan or the United States. White bars in the figure indicate trade effects from a currency union with Japan while colored bars indicated trade effects from a currency union with the United States. Similarly, Figure 4 summarizes the welfare effects of bilateral and multilateral currency arrangements.

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<sup>23</sup> For example, Hummels (2001).

<sup>24</sup> Rose and van Wincoop (2001) adopt the same approach.



In Figure 3, for most bilateral arrangements, trade effects are more or less the same across countries regardless of the currency union partner. Average percentage increases from bilateral currency unions range from 86 percent to 104 percent. Indeed, these differences in trade effects are not statistically significant.

On the other hand, in Figure 4, welfare gains from a bilateral currency union with Japan, rather than a union with the United States, tend to be higher for five out of eight East Asian countries while for Hong Kong, Malaysia, and the Philippines, currency unions with the

United States tend to generate higher welfare gains. However, these differences in welfare effects are statistically significant only for Hong Kong, Korea, and Malaysia. Moreover, the magnitude of welfare effects from bilateral currency arrangements tends to be small. In most cases, bilateral currency unions, regardless with Japan or the United States, will increase welfare by less than one percent.

As far as bilateral currency arrangements are concerned, a currency union with Japan seems to generate larger welfare gains for most East Asian economies. A more interesting scenario, however, is a regional (multilateral) currency union in which East Asian countries collectively form a currency union with either Japan or the United States. The last two sets of bars in Figure 4 report this scenario.

Figure 4 suggests that a regional currency union with Japan will generate slightly larger welfare gains for its member countries than a regional currency union with the United States: An East Asian currency union (not including China) with Japan will increase welfare by 3.6 percent on average while a currency union with the United States will increase welfare by 3.4 percent. However, the difference in the welfare effects is not statistically significant.

If China is included in the regional currency arrangement, welfare gains become more substantial. An East Asian currency union including Japan will increase welfare by 6.2 percent while a currency union with the United States will raise welfare by 5.9 percent. However, including China does not affect the basic finding: a regional currency union with Japan will generate larger welfare increases, but the difference in welfare effects is not statistically significant.

The above results can be better understood in light of earlier findings in Shirono (2008). In short, Japan does not seem to have advanced its position significantly against the United States in the currency arrangement in East Asia over the past years. On one hand, there seems to be a slight improvement as for as bilateral currency unions are concerned: In Figure 4, five out of eight economies tend to have higher average welfare gains from a currency union with Japan while Shirono (2008) reports that four out of eight countries would have higher welfare gains from such an arrangement. This difference comes from the results for Singapore. However, as shown in Figure 4, the magnitude of the welfare effects from bilateral arrangements for Singapore is almost negligible regardless of the partners. Moreover, the gap in the welfare effects from the two different bilateral arrangements is not statistically significant.

As for regional (multilateral) currency unions, the above analysis yields the same results as Shirono (2008): Regional currency unions with Japan tend to generate higher welfare gains than currency unions with the United States, but the difference in the welfare effects is not statistically significant. Thus on a statistical basis, a region-wide currency union with Japan is as good as the one with the United States. The comparison with earlier findings therefore suggests that Japan does not seem to have gained much ground in regional common currency arrangements against the United States over the past decade.

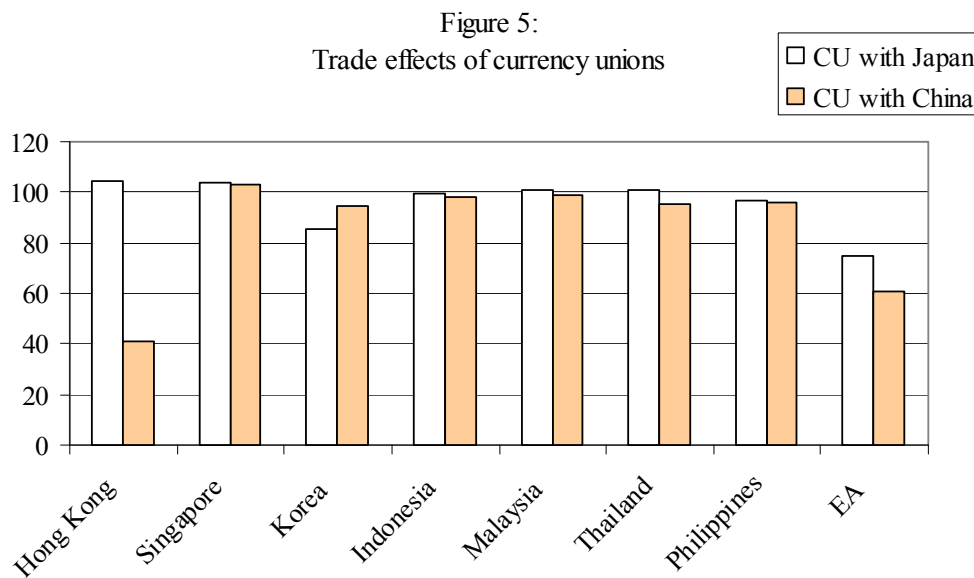
The result above also suggests that China appears to play an important role in common currency arrangements in East Asia, as welfare gains become more substantial once China is included in the regional currency arrangements. Of course, these findings are based on a narrow metric which focuses only on one aspect of currency unions. However, these are interesting findings because they are in line with the observations made in Section II that, measured by growth rates and trade shares, the relative position of Japan in East Asia has declined over the past years while China has emerged as a key player in the region. The next analysis focuses on this point and evaluates the relative importance of Japan against China in currency arrangements of East Asia.

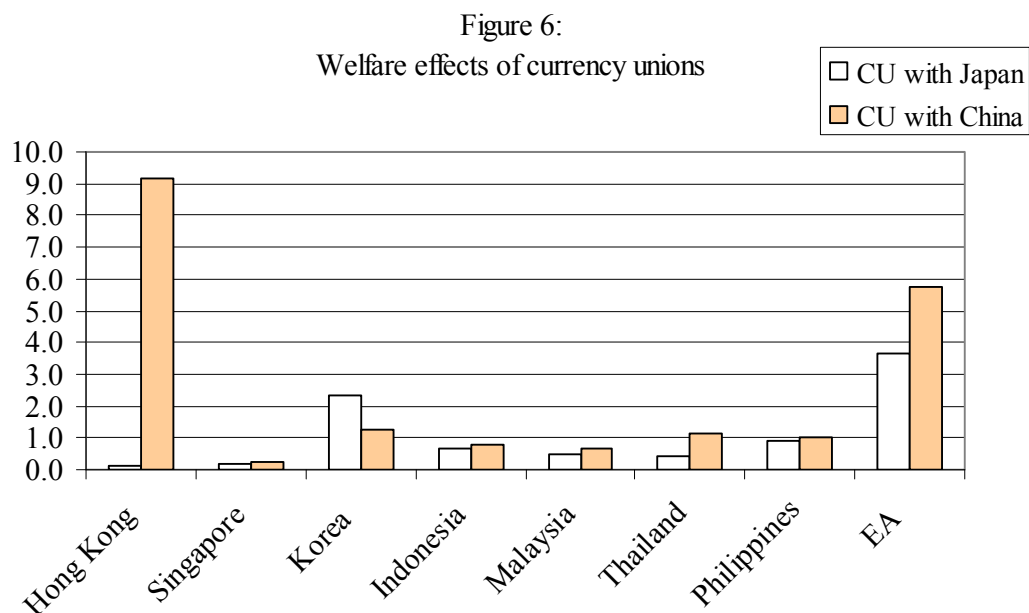
## VI. YEN BLOC OR YUAN BLOC

### A. Common Currency Arrangements in East Asia

There has been heated debate on the Chinese currency in recent years. While it is unlikely that China will form a currency union with East Asian countries at this point, there is also some interest in the regional monetary and financial cooperation on the Chinese side as mentioned earlier. Moreover, the growing share of Chinese trade in East Asian economies suggests that the importance of China might have increased relative to Japan and have changed prospects for a creation of a currency union in the region. This section evaluates the role of Japan against that of China in forming a currency union in East Asia.

Figure 5 summarizes the results for trade effects. As in the analysis in the previous section, Figure 5 reports trade effects of bilateral and multilateral currency unions with either Japan or China. White bars in the figure indicate trade effects from a currency union with Japan while colored bars indicate trade effects from a currency union with China. Similarly, Figure 6 summarizes the welfare effects of bilateral and multilateral currency arrangements.





In Figure 5, bilateral currency unions, regardless of the partners, tend to increase bilateral trade substantially, ranging from by 41 to 104 percent. However, the difference in the trade effects from different currency unions is not statistically significant with an exception of Hong Kong. Since China's share in Hong Kong's trade is already large, the trade effect of the bilateral currency union between Hong Kong and China tends to be smaller than in other cases.

Turning to the welfare effects, Figure 6 suggests that a bilateral currency union with China will generate higher welfare gains than a union with Japan for all East Asian countries except Korea. The difference in welfare effects is statistically significant for Hong Kong, Korea and Thailand. Interestingly, as for a regional currency union, a multilateral currency union with China will also deliver a higher welfare gain than a currency union with Japan. However, the difference in welfare effects slightly falls short of statistical significance at the conventional level. This result thus suggests that, while a regional currency union with Japan is as good as one with China for East Asia according to a statistical significance, China may gain even more ground in regional common currency arrangements if its importance in the regional trade continues to increase.

Table 5 summarizes all the results so far. The table shows that trade effects are more or less similar across different currency union arrangements, but the average welfare increase tends to be the largest in currency unions with China. While the differences in welfare effects from different currency unions are not always statistically significant, this is an interesting result because it suggests that it may be of the interest for some of the East Asian economies to form a currency union with China – at least on a bilateral basis – rather than with Japan or the United States.



Table 5: Bilateral arrangements vs. regional arrangements

Unit: Percentage

	Trade Effects			Welfare Effects		
	CU with Japan	CU with US	CU with China	CU with Japan	CU with US	CU with China
Hong Kong	104 (17.6)	101 (16.8)	41 (5.4)	0.11 (0.02)	0.46 (0.08)	9.15 (1.60)
Singapore	104 (17.5)	104 (17.6)	103 (17.4)	0.17 (0.03)	0.13 (0.02)	0.23 (0.04)
Korea	86 (13.1)	103 (17.4)	94 (15.1)	2.31 (0.40)	0.22 (0.03)	1.24 (0.23)
Indonesia	99 (16.4)	100 (16.5)	98 (16.1)	0.65 (0.11)	0.59 (0.10)	0.79 (0.13)
Malaysia	101 (16.8)	92 (14.6)	99 (16.4)	0.47 (0.08)	1.53 (0.28)	0.69 (0.11)
Thailand	101 (16.9)	102 (17.0)	95 (15.4)	0.43 (0.07)	0.38 (0.06)	1.15 (0.19)
Philippines	97 (15.8)	96 (15.6)	96 (15.6)	0.92 (0.16)	1.02 (0.18)	1.02 (0.17)
China	97 (16.0)	100 (16.7)		0.87 (0.15)	0.53 (0.09)	
EA	75 (11.0)	77 (11.3)	61 (8.1)	3.67 (0.60)	3.47 (0.57)	5.77 (0.94)
EA+China	58 (7.6)	59 (7.9)		6.20 (1.00)	5.99 (0.97)	

Note: This table reports average percentage increases in trade and welfare under various currency union arrangements. Standard errors are in parentheses.

Moreover, the above analysis suggests that welfare gains from a region-side currency union with China can become more significant in the future if regional trade deepens further and China's trade share in the region continues to increase. This in turn suggests that it may become less attractive for East Asian economies to form a currency union with Japan if the current declining trend of Japan's trade share continues.

## B. Sub-Regional Currency Unions

As a robustness check of the above result, this subsection examines the trade effects and welfare effects of various sub-regional currency unions among East Asian countries. Table 6 and Table 7 summarize trade effects and welfare effects, respectively. The first column in Table 6 (Table 7) reports the average trade (welfare) increase from various sub-regional currency unions which exclude both Japan and China. The second column reports the average trade (welfare) increase from a sub-regional union that includes Japan. The third column reports the average trade (welfare) increase from a sub-regions union that includes China.

Table 6 : Common Currency Arrangements in East Asia - Trade Effects

	Percentage changes in trade		
		Plus Japan	Plus China
NIES3	105 (17.8)	94 (15.0)	65 (9.2)
ASEAN4	73 (10.5)	72 (10.2)	69 (10.1)
ASEAN5	75 (11.1)	74 (10.7)	71 (10.2)
EA	81 (12.4)	75 (11.0)	61 (8.1)

Note: Standard errors are in parentheses.

In Table 6, trade effects from sub-regional currency unions with Japan tend to be smaller than without Japan. Sub-regional currency unions with China tend to generate even smaller trade effects. This reflects the fact that East Asia is more integrated with China than with Japan in terms of trade. However, the difference in trade effects are not statistically significant.

Table 7 : Common Currency Arrangements in East Asia - Welfare Effects

	Percentage changes in welfare		
		Plus Japan	Plus China
NIES3	0.05 (0.01)	1.33 (0.23)	5.20 (0.89)
ASEAN4	3.98 (0.67)	4.04 (0.66)	4.45 (0.73)
ASEAN5	3.67 (0.60)	3.81 (0.62)	4.17 (0.68)
EA	2.89 (0.48)	3.67 (0.60)	5.77 (0.94)

Note: Standard errors are in parentheses.

As for the welfare effects, Table 7 shows that welfare effects vary somewhat across different sub-groups. A sub-regional currency union among ASEAN4 (without Japan and China) tends to generate higher welfare (3.98 percent) than any other sub-regional currency unions.<sup>25</sup> On the other hand, the welfare effect is very small for a sub-regional currency union among NIES3 (0.05 percent). Including Japan or China in sub-regional currency unions increases welfare effects substantially. However, Chinese membership seems to increase welfare gains more than Japanese membership. For example, a currency union among NIES3 with Japan will increase welfare of the member countries by 1.33 percent on average, while a currency

<sup>25</sup> This result is consistent with a view that ASEAN has been the driving force of the regional trade process in East Asia. Some observers therefore argue that ASEAN, rather than China or Japan, should be the main player for the regional integration in East Asia. See Bergsten (2007) who discusses the political economy of the regional integration in East Asia.

union with China will increase welfare by 5.20 percent. This difference is also statistically significant. However, the differences in welfare effects are not statistically significant for other cases.

Table 8 and Table 9 further extend the analysis to incorporate Australia and New Zealand, important trade partners for some of the East Asian economies. Table 8 suggests that trade effects are similar in magnitude across different sub-regional arrangements. In Table 9, welfare effects become more sizable than in Table 7 where Australia and New Zealand are not included. Nevertheless, including Australia and New Zealand does not affect the key results so far: Currency unions with China tend to generate higher average welfare effects than currency unions with Japan, and the difference in welfare effects is statistically significant for a currency union among NIES3, Australia, and New Zealand.

Table 8: Common Currency Arrangements Including Australia and New Zealand - Trade Effects

	Percentage changes in trade		
		Plus Japan	Plus China
NIES3+Australia+New Zealand	82 (12.6)	78 (11.6)	60 (8.2)
ASEAN4 + Australia + New Zealand	61 (8.3)	62 (8.4)	60 (8.0)
ASEAN5 + Australia + New Zealand	64 (8.9)	64 (8.8)	62 (8.4)
EA + Australia + New Zealand	71 (10.1)	67 (9.3)	56 (7.2)

Note: Standard errors are in parentheses.

Table 9: Common Currency Arrangements Including Australia and New Zealand - Welfare Effects

	Percentage changes in welfare		
		Plus Japan	Plus China
NIES3+Australia+New Zealand	2.78 (0.45)	3.32 (0.54)	5.87 (0.96)
ASEAN4 + Australia + New Zealand	5.59 (0.90)	5.51 (0.88)	5.81 (0.93)
ASEAN5 + Australia + New Zealand	5.19 (0.83)	5.21 (0.83)	5.48 (0.87)
EA + Australia + New Zealand	4.32 (0.69)	4.88 (0.78)	6.53 (1.04)

Note: Standard errors are in parentheses.

In sum, even at the sub-regional level, currency unions with China tend to generate higher welfare gains than currency unions with Japan. While the difference in welfare effects from different currency unions is not always statistically significant, the above analysis confirms the earlier result that it may be less attractive for East Asian economies to form a currency union with Japan than with China as far as the welfare metric used in this paper is concerned.

This result also suggests that Japan's footing in regional currency arrangements can weaken even more if Japan's relative importance in regional trade continues to decline.

### C. Impact on the United States

Lastly, this subsection examines the impact of regional currency unions in East Asia on the United States, a major trade partner for both Japan and East Asian economies. The focus here is somewhat different from the above analysis: Instead of assessing the benefit of currency unions for member countries, this subsection considers the cost of currency unions for the non-member third country to evaluate the relative importance of Japan and China in the regional currency arrangement.

Table 10: Impact on the United States

	Trade effect	Welfare effect
EA	-6.04 (0.90)	-0.004 (0.001)
EA+ Japan	-7.57 (1.17)	-0.007 (0.001)
EA+China	-11.45 (1.67)	-0.011 (0.001)

Note: This table reports percentage changes in the average bilateral trade between the United States and the members of the hypothetical currency unions (trade effect) and percentage changes in the welfare of the United States under those currency arrangements in East Asia (welfare effect).

Table 10 summarizes the results. The first column of the table reports percentage changes in the average bilateral trade between the United States and the member countries of the hypothetical regional currency unions. The second column reports percentage changes in the welfare of the United States assuming common currency arrangements are in place in East Asia.

In Table 10, trade effects are negative, suggesting that regional currency unions in East Asia will divert trade away from the United States. However, those effects are small, particularly compared to the trade generating effects for member countries (see Table 5). Welfare effects are also negative but very small, ranging from -0.004 percent to -0.011 percent. Thus the welfare loss for the United States due to regional currency unions in East Asia is likely to be very limited.

However, note that both trade diversion and welfare loss for the United States are higher under a regional currency union which includes China. The difference in trade losses from different regional currency unions (i.e. the difference between the second and the third rows in Table 10) is not statistically significant, but the difference in welfare losses is statistically significant. This result suggests that the Chinese membership to a regional currency union

can potentially have a larger impact on the United States than the Japanese membership while the magnitude of such effects is very small.

## VII. CONCLUSION

This paper has evaluated the standing of Japan in forming a currency union in East Asia in light of the evolving economic environment of the region. Trade and growth data clearly suggest that Japan's economic position in East Asia has changed over the last decade: While Japanese economy has stagnated for a long time, East Asian economies, particularly China, have achieved high growth performance. At the same time, East Asia has become less dependent on Japan in terms of trade while regional trade among East Asian economies and the trade share of China have increased substantially.

These changes have important implications for the prospect of forming a currency union among East Asian economies. Consistent with what is observed in the trade data, the analysis of this paper suggests that China, rather than Japan, may play a more important role in common currency arrangements in East Asia if they are to form a currency union in the future. This result will be further strengthened if China's trade share in the region continue to increase while Japan's trade share continue to decline.<sup>26</sup>

This paper also has revisited the debate on the role of Japan and the United States in East Asia, by extending the analysis of Shirono (2008). The above analysis shows that currency unions with Japan will tend to generate larger welfare gains than currency unions with the United States, but the comparison with the earlier results suggests that Japan does not seem to have gained much ground in regional common currency arrangements against the United States over the past decade.

These results are somewhat puzzling, especially given Japan's various policy initiatives, including the efforts to promote the internationalization of yen and more recently the engagement in regional financial cooperation and free trade arrangements. Admittedly, one can argue that it will need more time for these policy initiatives to take effects and that the sample period of this paper may not fully capture these effects. A number of other factors can also affect the above result. For example, if Japan's economic expansion, which started in 2002, continues, Japan may resurge as a key economic player in East Asia.<sup>27</sup> If Japan successfully concludes more regional free trade agreements, this may boost Japan's presence in the regional trade. In addition, there is a lot of uncertainty about China's exchange rate policy.

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<sup>26</sup> On the other hand, Ogawa and Kawasaki (2007), examining common currency basket arrangements in East Asia, report that a common exchange rate policy with reference to a common currency basket among ASEAN plus Japan became feasible in the post crisis period. However, their focus is mainly on the Japanese yen, not necessarily the comparison between yen and yuan.

<sup>27</sup> Such a prospect is becoming increasingly uncertain in light of the ongoing global financial crisis, however.

Nevertheless, the analysis of this paper suggests that Japan will not be a dominant player in forming a currency union in East Asia, and this trend is likely to continue if China's relative presence continues to rise in the region.

## REFERENCES

- Anderson, James E., and Eric van Wincoop, "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review*, Vol.93, No.1, 170-192, March 2003.
- Anderson, James E., and Eric van Wincoop, "Borders, Trade, and Welfare," *Brookings Trade Forum*, 207-230, 2001.
- Baier, L. Scott, and Jeffrey H. Bergstrand, "Do Free Trade Agreements Actually Increase Members' International Trade?" *Journal of International Economics*, 71, 72-95, 2007.
- Baldwin, Richard, "The Euro's Trade Effects," Working Paper Series, No. 594, European Central Bank, March 2006.
- Baldwin, Richard, and Daria Taglioni, "Gravity for Dummies and Dummies for Gravity Equations," NBER Working Paper, September 2006.
- Bergsten, C. Fred, "China and Economic Integration in East Asia: Implications for the United States," Policy Briefs in International Economics, PB07-3, Peterson Institute for International Economics, March 2007.
- Broda, Christian, and David E. Weinstein, "Defining Price Stability in Japan: A View from America," NBER Working Paper, No.13255, July 2007.
- Bun, Maurice J.G., and Franc J.G.M. Klaassen, "The Euro Effect on Trade is Not as Large as Commonly Thought," *Oxford Bulletin of Economics and Statistics*, 2007.
- Callen, Tim, and Warwick McKibbin, "The Impact of Japanese Economic Policies on the Asia Region," in T. Callen and J. Ostry eds., *Japan's Lost Decade*, 251-271, 2003.
- Chow, Hwee Kwan, Yoonbai Kim, and Wei Sun, "Characterizing Exchange Rate Policy in East Asia: A Reconsideration," *Journal of Asian Economics*, 18, 448-465, 2007.
- Eurostat, *Statistics on the Trading of Goods – User Guide*, 2006, available at [http://epp.eurostat.cec.eu.int/cache/ITY\\_OFFPUB/KS-BM-06-001/EN/KS-BM-06-001-EN.PDF](http://epp.eurostat.cec.eu.int/cache/ITY_OFFPUB/KS-BM-06-001/EN/KS-BM-06-001-EN.PDF).
- Flam, Harry, and Hakan Nordstrom, "The Euro and Single Market Impact on Trade and FDI," mimeo, 2007.
- Frankel, Jeffrey A., "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" Frankel, J., Kahler, M., eds., *Regionalism and Rivalry: Japan and the US in Pacific Asia*, University of Chicago Press, Chicago, 1993.

- Frankel, Jeffrey A., and Andrew K. Rose, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol. 108, No. 449, 1009-1025, July 1998.
- Frankel, Jeffrey A., and Shang-Jin Wei, "Yen Bloc or Dollar Bloc? Exchange Rate Policies of East Asian Economies," Ito, T., Kruger, A.O., eds., *Macroeconomic Linkages: Savings, Exchange Rates, and Capital Flows*, University of Chicago Press, Chicago, 1994.
- Glick, Reuven, and Andrew K. Rose, "Does a Currency Union Affect Trade? The Time Series Evidence," *European Economic Review*, 2002.
- International Monetary Fund, "*Japan: Staff Report*," IMF Country Report No.07/280, August 2007.
- Ito, Takatoshi, "East Asian Economic Cooperation and Integration: Japan's Perspective," a paper presented in the AEA session on East Asian Economic Cooperation and Integration, January 2004.
- Kwan, C.H., "The Theory of Optimum Currency Areas and the Possibility of Forming a Yen Bloc in Asia," *Journal of Asian Economics*, Vol. 9, No.4, 555-580, 1998.
- , *The Economics of a Yen Bloc*, Nihon-Keizai Shinbunsha, 1995.
- Lee, Jong-Wha, and Robert J. Barro, "East Asian Currency Union," October 2006.
- Lopez, Jose A. and Mark M. Spiegel, "Foreign Bank Lending and Bond Underwriting in Japan during the Lost Decade," Federal Reserve Bank of San Francisco Working Paper Series 2006-45, November 2006.
- McKinnon, Ronald I., "The East Asian Dollar Standard, Life After Death?" *Economic Notes*, Vol.29, No.1, 31-82, 2000
- Micco, Alejandro, Ernesto Stein, and Guillermo Ordóñez, "The Currency Union Effect on Trade: Early Evidence from EMU," *Economic Policy*, 315-356, October 2003.
- Mundell, Rober A., "International Trade and Factor Mobility," *American Economic Review*, vol.47, No.3, 321-335, June, 1957.
- Nakagawa, Shinobu, and Chris Faulkner-MacDonagh, "Recent Developments and Outlook for Japan's Capital Flows," *Japan: Selected Issues*, IMF Country Report No.07/281, August 2007.
- Ogawa, Eiji, and Takatoshi Ito, "On the Desirability of a Regional Basket Currency Arrangement," *Journal of the Japanese and International Economies*, vol. 16, September, 2002, 317-334.



- Ogawa, Eiji, and Kentaro Kawasaki, "Adopting a Common Currency Basket Arrangement into the ASEAN Plus Three," May 2007.
- Ramaswamy, Ramana, and Hossein Samiei, "The Yen-Dollar Rate: Have Interventions Mattered?" in T. Callen and J. Ostry eds., *Japan's Lost Decade*, 224-248, 2003.
- Rose, Andrew K., "One Money, One Market: Estimating the Effect of Common Currencies on Trade," *Economic Policy*, 2000.
- , "The Effect of Common Currencies on International Trade: A Meta-Analysis," in Alexander, Méltiz, and von Furstenberg, eds., *Monetary Unions and Hard Pegs: Effects on Trade, Financial Development, and Stability*, Oxford, 2004.
- Rose, Andrew K., and Eric van Wincoop, "National Money as a Barrier to International Trade: The Real Case for Currency Union," *American Economic Review*, Vol.91, No.2, 386-390, May 2001.
- Shirono, Kazuko, "Real Effects of Common Currencies in East Asia," *Journal of Asian Economics*, vol. 19 (3), June 2008, 199-212.
- Study Group for the Promotion of the Internationalization of the Yen, *Report*, available at <http://www.mof.go.jp/english/if/if043b.htm>, June 2001.
- Williamson, John, "The Case for a Common Basket Peg for East Asian Currencies," Exchange Rate Policies in Emerging Asian Countries, S. Collignon, J. Pisani-Ferry, and Y. Park, eds., 327-343, 1999.

APPENDIX

Figure A-1:  
Imports from Germany to France

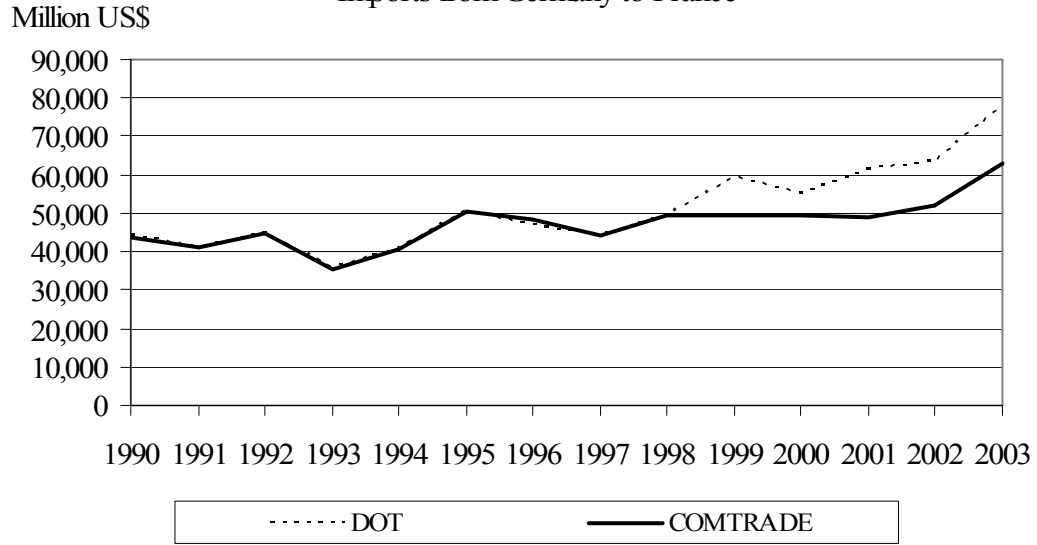


Figure A-2:  
Imports from Netherlands to Austria

