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Is Economic Development Promoting Monetary Integration in East Asia?

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Is Economic Development Promoting Monetary Integration in East Asia?[1]

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Abstract

This paper aims to investigate whether there exist international integrated markets among East Asian economies by employing the generalized purchasing power parity (G-PPP) model, which then would help to suggest whether or not the East Asian region is an optimum currency area (OCA). The empirical results in this paper suggest that holding the G-PPP among nine Asian countries (China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, and Vietnam) is more applicable in 2000-2013 than in 1984-1997. In the period of "globalization," which is characterized by the expansion of world trade, an increase of international capital flows, and development of information and communications technologies, Asian economic development has been promoting not only economic integrations but also constructing the stable linkages of real exchange rates. Therefore, it would be helpful to adopt regional coordination for monetary policies to assure the feasibility of a possible monetary union.

Key words: OCA, Exchange rate, M-TAR, Cointegration with thresholds adjustment
JEL classification: F31, F33, F36

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1. Introduction

It is well known that the each of the East Asian countries considered here experienced rapid economic growth across two separate periods of development. The first period of rapid growth was called “The East Asian miracle.” There were eight high-performing Asian economies (HPAEs): three ASEAN countries, four newly-industrializing countries (NIEs), and Japan, whose economy grew faster than almost all other economies from the mid 1960’s until the early 1990’s. Most of their economic achievements, in particular a rapid increase in GDP per capita, were based on maintaining macroeconomic stability with sound financial markets and providing government-backed supports for key industries, and maintaining sound fiscal and public policies. Although each country promoted to develop “internationalized” industries by expanding exports of the manufacturing, the “localized” monetary environment played important roles in supporting the rapid growth of local infant industries.

The second period of growth has been experienced in the twenty-first century. It can be described as a century of “globalization,” which is characterized by the expansion of world trade, the increase of international capital flows, and the development of information-communication technologies. These new growth factors led to spillover effects on developing countries in East Asia. Hence, this recent economic growth promoted an economic integration across the East Asian countries. Therefore, the question arises as to whether economic growth also promotes the monetary integration by moving away from monetary “localization” to monetary “regionalization.”

This paper investigates this issue by employing the Generalized Purchasing Power Parity (G-PPP) model, which considers that countries that satisfy the criterion for the

OCA should share a common stochastic trend in their real exchange rates, which can be defined as the function of the national income process. Our empirical results suggest the existence of integrated markets among the region's economies. It allows us to consider whether the region represents an Optimum Currency Area (OCA). By adopting the non-linear cointegration method into Enders and Hurn's (1994) original and well-known G-PPP model, our empirical analysis suggests that a consideration of G-PPP among nine Asian countries is more relevant in 2000–2013 than in the previous period of 1984–1997. This means that Asian economic development has been promoting not only the economic integration but also the monetary integration, where the stability of real exchange rates among regional currencies also enhances the efficiency of market transactions. Therefore, further economic integration potentially contributes to the coordination of regional monetary/financial policies, thus assuring the feasibility of a monetary union.

The rest of this paper is organized as follows. Section 2 provides the brief reviews of earlier studies on the necessity of monetary cooperation and on the OCA in East Asia. Section 3 gives the details of the G-PPP model. Section 4 provides explanations of the empirical strategy and its results. Section 5 is saved for the concluding remarks.

2. Monetary Cooperation in East Asia

The economic growth in East Asian area stood out as far back as 50 years ago. Since the 1960s, East Asia had been in a period of high growth; this led to Korea, Taiwan, Hong Kong, and Singapore being billed "The Four Tigers." In the 1980s, the Southeast Asian area—including Malaysia, Indonesia, and Thailand—achieved a high growth rate. The excellent performance of the East Asian economy was considered "The

East Asian Miracle" by the World Bank. The myth of economic growth there, however, was broken by the unexpected incident that has since come to be known as the Asian currency crisis.

In the aftermath of the 1997 Asian currency crises, some policymakers and academics proposed surveillance over the intra-regional exchange rates of East Asian currencies, to prevent future crises. In accordance with these proposals, the Chiang Mai Initiative (CMI) was established as a safety net for a liquidity crisis by the members of the Association of Southeast Asian Nations (ASEAN), Japan, China, and Korea (ASEAN+3) in 2000. Concurrently, the finance deputy ministers of the ASEAN+3 countries executed the Economic Review and Policy Dialogue (ERPD) to oversee the macroeconomic performance of each member country.

The objective of entering into a currency swap arrangement is to manage crises; therefore, the CMI exerts its effect only in cases of an actual currency crisis. On the other hand, the ERPD is simply a surveillance system that focuses on the performance of each country's macroeconomic variables (e.g., GDP and inflation rate), as well as the soundness of its financial sector. Therefore, it is necessary to incorporate intra-regional exchange rates into the surveillance process, in order to enhance foreign exchange surveillance of the ASEAN+3 countries, which may result in lowering the probability of a future crisis. The monetary authorities are expected to establish a surveillance system to monitor fluctuations and misalignments of each ASEAN+3 currency. The exchange rates to monitor include intra-regional exchange rates as well as the one vis-à-vis the US dollar.

In line with the need to establish a system for monitoring fluctuations in intra-regional exchange rates, Williamson (2000), Ogawa, Eiji and Takatoshi Ito, (2002),

"On the desirability of a Regional Basket Currency Arrangement" ***Journal of the Japanese and International Economies,*** vol. 16, No. 3, September, 2002: 317-334, Kuroda and Kawai (2003), and Ogawa (2004) have suggested the introduction in the East Asian area of a common basket system. Given that a common currency basket system could inhibit foreign exchange volatility and contribute to stabilizing trade balance within East Asian area, the monetary authority of East Asian countries are expected to adopt a common currency basket system. Furthermore, some positive results have been achieved in terms of CMI Multilateralization (CMIM) and the ASEAN+3 Macroeconomic Research Office (AMRO), after the commencement of regional monetary cooperation in East Asia.

Within the context mentioned above, Kawasaki (2012) employed the G-PPP model to conclude that a common currency basket would be a desirable step toward creating a common currency area in East Asia. With respect to the economic integration in East Asia, this paper investigates whether East Asian countries have been more or less integrated in the first decade of the twenty-first century than the period before Asian currency crisis. Furthermore, recognizing the importance of intra-regional foreign exchange stabilization, this paper also extends Kawasaki (2012) to identify which ASEAN member countries are suitable to form a common currency area with Japan, China, and Korea.

3. The Generalized Purchasing Power Parity Model

The G-PPP model was developed by Enders and Hurn (1994), which extends from a simple Purchasing Power Parity (PPP) model. Enders and Hurn argue that changes in a bilateral exchange rate depend not only on changes in the relative prices

between the related two countries but also on those in relative prices among other countries such as trade partners. As Mundell (1961) pointed out, countries that have close economic relationships with each other can share factor mobility in their national income processes. The real exchange rates can be defined as a function of countries' income process, hence, the real exchange rates among countries which share factor mobility will be also highly correlated. Therefore, Enders and Hurn (1994) considered that countries that share factor mobility should exhibit a common stochastic trend in their real exchange rates, which can satisfy the criterion for the OCA. Kawasaki (2012) shows the theoretical background of G-PPP model by extending the two-country and two-commodity model proposed in Obstfeld and Rogoff (1996). As domestic labor mobility equalizes the productivity growth in tradables with that of nontradables, international factor mobility between two countries would equalize the productivity growth in both two countries. Therefore, the nominal exchange rate between two countries would be equal to the relative PPP. The real exchange rates are constants over time, hence, the nominal exchange rate can be fixed between two countries. In consequence, the condition for the PPP to hold between the two countries is regarded as a sufficient condition for the OCA.

Here, following the theoretical background of the G-PPP model proposed by Kawasaki (2012), we assume that m countries $(1,2,\cdots,j,\cdots,m)$ are expected to compose a common currency area. Country j has a trade relationship with n countries, and a strong trade relationship with $m-1$ countries that are expected to compose the common currency area. The real effective exchange rate of country j can be expressed as follows:

$$\begin{aligned} ree_j &= \zeta_j \cdot \left(\beta_{j,1} re_{j,1} + \beta_{j,2} re_{j,2} + \cdots + \beta_{j,m} re_{j,m}\right) \\ &+ \left(1-\zeta_j\right) \cdot \left(\beta_{j,m+1} re_{j,m+1} + \beta_{j,m+2} re_{j,m+2} + \cdots + \beta_{j,n} re_{j,n}\right) \end{aligned} \tag{3.1}$$

where $re_{j,i}$ is real exchange rate between country i and country j in logarithm. Then, ζ_j is the trade weight of the group countries that are expected to compose a common currency area. And $\beta_{j,i}$ is the trade weight of country j with country $\left(\sum_{i=1,i\neq j}^{m} \beta_{j,i} = 1, \sum_{i=m+1}^{n} \beta_{j,i} = 1\right)$.

For simplicity, we focus on the group of countries that is expected to adopt a common currency and the country $m+1$ that is not expected to share a common currency with the other countries. Then the real effective exchange rate of country j can be rewritten as follows:

$$ree_j = \omega_{j,1} re_{j,1} + \omega_{j,2} re_{j,2} + \cdots + \omega_{j,m} re_{j,m} + \omega_{j,m+1} re_{j,m+1} \tag{3.2}$$

where $\omega_{j,i}$ is the trade weight of country j with country $\left(\sum_{i=1,i\neq j}^{m+1} \omega_{j,i} = 1\right)$.

Since $\omega_{j,m+1} = 1 - \omega_{j,1} - \omega_{j,2} - \omega_{j,3} - \cdots - \omega_{j,m}$, the real effective exchange rate of country j can be expressed as follows:

$$\begin{aligned} ree_j &= \omega_{j,1}\left(re_{j,1} - re_{j,m+1}\right) + \omega_{j,2}\left(re_{j,2} - re_{j,m+1}\right) + \cdots \\ &+ \omega_{j,m-1}\left(re_{j,m-1} - re_{j,m+1}\right) + \omega_{j,m}\left(re_{j,m} - re_{j,m+1}\right) + re_{j,m+1} \end{aligned} \tag{3.3}$$

Given $re_{j,k} = re_{j,n} - re_{k,n}$,[1], then we can express the real effective exchange rate of country j as below:

$$ree_j = \omega_{j,1} re_{m+1,1,t} + \cdots + \omega_{j,m} re_{m+1,m,t} - re_{m+1,j,t} \tag{3.4}$$

Therefore, the real effective exchange rate of other countries country 1, country 2, $\cdots$, and country $m+1$ can be expressed as follows:

[1] The real exchange rate between country j and country k can also be expressed as follows: $re_{j,k} = -re_{n,j} + re_{n,k}$.

$$
\begin{aligned}
ree_{1,t} &= -re_{m+1,1,t} + \omega_{1,2} re_{m+1,2,t} + \cdots + \omega_{1,m} re_{m+1,m,t} \\
ree_{2,t} &= \omega_{2,1} re_{m+1,1,t} - re_{m+1,2,t} \cdots + \omega_{2,m} re_{m+1,m,t} \\
&\vdots \\
ree_{m,t} &= \omega_{m,1} re_{m+1,1,t} + \cdots + \omega_{m,m-1} re_{m+1,m-1,t} - re_{m+1,m,t} \\
ree_{m+1,t} &= \omega_{m+1,1} re_{m+1,1,t} + \cdots + \omega_{m+1,m-1} re_{m+1,m-1,t} + \omega_{m+1,m} re_{m+1,m,t}
\end{aligned}
$$

The real effective exchange rate of $m+1$ countries can be expressed in a vector as follow:

$$
\mathbf{ree}_t = \Omega \cdot \mathbf{re}_t \tag{3.5}
$$

where $\mathbf{\Omega}$ is a matrix, which defines the trade weights, and $\mathbf{re}$ is the real exchange rate of country j vis-à-vis its trading partners (m countries).

$$
\underset{(m+1)\times m}{\Omega} = \begin{bmatrix}
-1 & \omega_{1,2} & \cdots & \omega_{1,m-1} & \omega_{1,m} \\
\omega_{2,1} & -1 & \cdots & \omega_{2,m-1} & \omega_{2,m} \\
\vdots & \vdots & \ddots & \vdots & \vdots \\
\omega_{m,1} & \omega_{m,2} & \cdots & \omega_{m,m-1} & -1 \\
\omega_{m+1,1} & \omega_{m+1,2} & \cdots & \omega_{m+1,m-1} & \omega_{m+1,m}
\end{bmatrix} \quad \text{and}
$$

$$
\mathbf{re} = \left(re_{m+1,1}, re_{m+1,2}, re_{m+1,3}, \cdots, re_{m+1,m-1}, re_{m+1,m} \right)'
$$

As Enders and Hurn (1994) discussed, within a common currency area the fundamental macroeconomic variables share common trends, and a G-PPP based on real macroeconomic variables suggests that certain groupings of real exchange rates share the same stochastic trends. Therefore, the real effective exchange rates within a currency area will share a common stochastic trend because the fundamental variables are sufficiently interrelated. Using the common trends representation developed in Stock and Watson (1988), the real effective exchange rates can be expressed by the sum of a stationary component and a nonstationary component. That is,

$$\mathbf{ree}_t = \mathbf{r\bar{e}e}_t + \mathbf{r\tilde{e}e}_t \tag{3.6}$$

where $\mathbf{r\bar{e}e}$ represents a stationary component and $\mathbf{r\tilde{e}e}$ represents a non-stationary component.

Since the stationary component $\mathbf{r\bar{e}e}$, which represents the logarithm of the real effective exchange rate, can be expected to converge toward zero over the long run, the real effective exchange rate then can be described as the non-stationary component $\mathbf{r\tilde{e}e}$ only.[2] As described in Stock and Watson (1988), in terms of the common trends representation, $m+1$ non-stationary variables can be described as $m+1$ stochastic trends. We can rewrite the real effective exchange rates as follows:

$$\mathbf{ree} = \mathbf{r\tilde{e}e} = \mathbf{\Phi} \cdot \mathbf{w} \tag{3.7}$$

where $\mathbf{\Phi}$ is a $(m+1) \times (m+1)$ matrix, and $\mathbf{w}$ is a $(m+1)$ vector of which the vector is characterized by a random walk with non-stationary stochastic trends.

Based on Eq. (3.5) and Eq. (3.7), we can obtain,

$$\Phi \cdot \mathbf{w}_t = \Omega \cdot \mathbf{re}_t . \tag{3.8}$$

Here, we define a nonzero matrix $\mathbf{\Psi}$ which is given by $(m+1) \times (m+1)$ components, and then by substituting it into Eq. (3.8), we can rewrite Eq. (3.8) as follows,

$$\Psi \cdot \Phi \cdot \mathbf{w}_t = \Psi \cdot \Omega \cdot \mathbf{re}_t . \tag{3.9}$$

If $\mathbf{\Psi} \cdot \mathbf{\Phi} \cdot \mathbf{w}$ is expected to be equal to zero over the long run, then $\mathbf{\Psi} \cdot \mathbf{\Phi}$ should not be a full rank because $\mathbf{w}$ that defined as a random walk with non-stationary stochastic trends is a nonzero vector. The rank condition of $\mathbf{\Psi} \cdot \mathbf{\Phi}$ will be expected as follows:

[2] The stationary component $\mathbf{r\bar{e}e}$ can be given by $E(\mathbf{r\bar{e}e}) = \mathbf{0}$ over the long run.

$$\text{rank}(\Psi \cdot \Phi) = \text{rank}(\Phi) < m\,.$$

As long as the rank condition to be held, there exists a nonzero matrix $\boldsymbol{\Psi}$ with which we can obtain the following equation:

$$\Psi \cdot \Phi = 0 \tag{3.10}$$

Under the circumstance given by $\boldsymbol{\Psi} \cdot \boldsymbol{\Phi} \cdot \mathbf{w} = \mathbf{0}$, we can rewrite Eq. (3.9) as follows,

$$\boldsymbol{\Psi} \cdot \boldsymbol{\Omega} \cdot \mathbf{re} = \mathbf{Z} \cdot \mathbf{re} = 0 \tag{3.11}$$

where $\mathbf{Z}$ is defined as $\mathbf{Z} = \boldsymbol{\Psi} \cdot \boldsymbol{\Omega}$.

If we can find a matrix $\mathbf{Z}$ for which the rank condition satisfies $\text{rank}(\mathbf{Z}) < \text{m}$, then we can obtain $\mathbf{Z} \cdot \mathbf{re} = \mathbf{0}$ that there exists at least one linear combination of the real exchange rate cointegrating over the long run.

4. Empirical Analysis of a Common Currency AreaEquation Chapter 4 Section 1

4.1 Empirical Methodology

As mentioned above, the G-PPP model assumes that there are common factors among the bilateral real exchange rates of these countries exhibiting strong economic relationships. Therefore, if we can detect an equilibrium relationship among the real exchange rates over the long run, these countries (with real exchange rates that share common trends), might be defined as representing a common currency area.

Ogawa and Kawasaki (2003) employed the methodology of the Johansen test as elaborated by Johansen and Juselius (1990) to identify whether there exists cointegration relationships among the real exchange rates of East Asian currencies over the long run. As is well known, the Johansen approach is designed to identify a cointegration relationship under the assumption of linear composition. In other words, the short-term instability converges to the long-term equilibrium level linearly.

Therefore, when we identify whether combinations satisfy the condition of stationarity over the long run, some of them will be rejected due to the assumption of linear convergence. Here, we employ the momentum threshold autoregressive (M-TAR) model developed by Enders and Granger (1998) to investigate the property of real exchange rates.

It is well known that many macroeconomic variables display an asymmetric adjustment process. The TAR model suggested by Enders and Granger (1998) allows for asymmetric adjustment processes and can capture the key aspects of any "sharp" or "deep" movements in a series. The TAR model with high order processes can be expressed as below,

$$\Delta X_t = I_t \rho_1 \left(X_{t-1} - \tau \right) + \left(1 - I_t\right) \rho_2 \left(X_{t-1} - \tau \right) + \sum_{i=1}^{p} \alpha_i \Delta X_{t-1} + \varepsilon_t \tag{4.1}$$

$$\rho_1 < 0, \rho_2 < 0, \quad I_t = \begin{cases} 1 & if \quad X_{t-1} \geq \tau \\ 0 & if \quad X_{t-1} < \tau \end{cases},$$

where ρ_1 and ρ_2 indicate adjustment process respectively, $I_t \rho_1$ is regarded as the appreciation correcting coefficient, $(1 - I_t)\rho_2$ is regarded as the depreciation correcting coefficient, and the nonzero value τ is a threshold.

From Eq. (4.1) we could detect whether there exists a long-term equilibrium relationship among the real exchange rate as far as the threshold value τ is given. It is also clear that autoregressive decay depends on the level value of X_{t-1}. As another alternative adjustment specification, Enders and Granger (1998) indicated that it is useful to allow the autoregressive decay depending on the previous period's change in X_{t-1} instead of on the level value. Therefore, the M-TAR model can also be given as follows:

$$\Delta X_t = I_t \rho_1 X_{t-1} + (1 - I_t)\rho_2 X_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta X_{t-1} + \varepsilon_t \tag{4.2}$$

$$\rho_1 < 0, \rho_2 < 0 \; I_t = \begin{cases} 1 & if \quad \Delta X_{t-1} \geq 0 \\ 0 & if \quad \Delta X_{t-1} < 0 \end{cases}.$$

The M-TAR model suggests that there exists little autoregressive decay for positive ΔX_{t-1}, but a significant decay for negative ΔX_{t-1} as far as the prior condition $|\rho_1| < |\rho_2|$, and vice versa.

Based on the theoretical model of G-PPP, we can express the cointegration relationship of $\mathbf{Z} \cdot \mathbf{re} = \mathbf{0}$ with the $m + 1$ real exchange rates as follows,

$$re_{USD,EUR,t} = \beta_1 \cdot re_{USD,1,t} + \beta_2 \cdot re_{USD,2,t} + \cdots + \beta_m \cdot re_{USD,m,t} + \nu_t \tag{4.3}$$

where $re_{USD,EUR,t}$ is the anchor exchange rate, $re_{USD,i,t}$ for which i is given by $i = 1, 2, 3, \cdots, m$ is the individual $I(1)$ components of real exchange rate, β_i for which i is given by $i = 1, 2, 3, \cdots, m$ is estimated parameters and ν_t is the disturbance term which is considered serially correlated.

As the two-step methodology entails using OLS to estimate a long-term equilibrium relationship, we also focus on the disturbance term to conduct a cointegration test. However, the error correction model to identify adjustment process is not symmetric but asymmetric.[3]

4.2 Data

The real exchange rate used in our empirical analysis is based on the nominal exchange rate and the consumer price index (CPI) from the *International Financial*

[3] For more detail, see Enders and Siklos (2001).

Statistics of IMF.[4] The sample periods are from January 1984 to June 1997 and from January 2000 to June 2013. The possible candidates for a common currency area include six ASEAN countries (Singapore, Indonesia, Thailand, Malaysia, the Philippines, and Vietnam) and Japan, China, and Korea (ASEAN6+3). However, Vietnam is excluded from the first sample period (January 1984 to June 1997) and the inclusion of China begins in January 1987 due to data constraints. Since the United States and the euro area are important trading partners of ASEAN6+3, we employ the real exchange rate of the euro vis-à-vis the US dollar as an anchor exchange rate in our empirical analysis.[5] The nominal exchange rates of the US dollar and the euro are also based on the *International Financial Statistics* of IMF. The CPI of the euro area from January 1984 to June 1997 is calculated based the member of European Currency Unit (ECU), and that of the second sample period (January 2000 to June 2013) is from DataStream.

4.3 Analytical Results

For estimating the cointegration relationship over the long run, the estimation results of OLS coefficients for asymmetric cointegration and M-TAR unit root test were summarized in Tables 1 to 4.[6] Tables 1 and 3 which show the results of the OLS estimation only include the combinations which all independent variables indicate

[4] The CPI data of China is based on the *International Financial Statistics* of IMF, as well as the AMU database in the Research Institute of Economy, Trade and Industry (RIETI).

[5] In a strict sense, the anchor exchange rate in this empirical analysis should be a currency basket, which includes all the trading partners of ASEAN6+3. Here for simplicity, we use the exchange rate of euro to the US dollar instead of the currency basket. In our future research, we intend to calculate the currency basket along with data accumulation.

[6] With respect to the property of real exchange rate of each currency, the M-TAR unit root test revealed that the PPP does not hold over the long run in both sample periods. The estimation results of OLS coefficients and M-TAR unit root test are not reported completely because of space limitations but are available upon request. Lag orders are based on the Akaike information criteria (AIC) and the Schwartz Bayes information criteria (SBIC).

significant at 5% significance level. In Tables 2 and 4, which show the results of the M-TAR unit root test, the color filled columns suggests that two coefficients of adjustment process in the error correction model indicate significant at 2.5% significance level.

In the sample period from January 2000 to June 2013, there exist 502 possible candidates that contain 9, 8, 7, 6 5, 4, 3, or 2 countries in the common currency area, and that selected from 9 Asian currencies. 78 combinations were found that all coefficients for independent variables are statistically significant (Table 1). Out of the 78 combinations, 27 combinations were found that both coefficients for the M-TAR unit root test indicate statistically significant at 2.5% significance level (Table 2).

On the other hand, in the sample period from January 1984 to June 1997, of the 247 combinations of 8 currencies, 38 combinations were found that all OLS coefficient estimators indicate statistically significant (Table 3). For 6 of 38 combinations, adjustment coefficients the M-TAR unit root test are statistically significant (Table 4) .The empirical results of this paper are summarized in Table 5.

Our empirical study suggests three features. First, in recent years, the ASEAN6+3 countries might come closer to OCA than before. Because that there exist 28 cointegration relationships among currencies of ASEAN6+3 countries in the period from January 2000 to June 2013, while only 6 combinations were found as a possible currency union in the period from January 1984 to June 1997. Even if we ignore the VND as a candidate for the member states of currency union, we could find 16 combinations contain cointegration relationship among the currencies of the original ASEAN5 +3 countries in the period from January 2000 to June 2013. [7]

[7] Since the sample period in the recent years includes nine currencies and covers larger sample

Second, in the case that the common currency union contains more than 4 countries, the possible currency union should include the Japanese yen as a key currency when the samples from January 1984 to June 1997 were applied. On the other hand, the ASEAN6 countries could form a common currency union with Japan, China, and/or Korea, in the sample period from January 2000 to June 2013. Therefore, not only Japan but also "the plus three" countries might affect significant impacts on the possible common currency union.

Third, our empirical results suggest the combination of Singapore, Indonesia, Philippines, and Vietnam (94117) and the combination of Singapore, Indonesia, Thailand, and Vietnam (94113) could form a currency union without "the plus three" countries. This might reflect the recent economic integration which is deepening with the intra-industrial trade or the horizontal trade, the regional integration might not be only dominated by the large economies such as Japan or China or by the developed economies such as Japan or Korea. This might suggest that the possible currency union might be deepening not as "vertical integration" but as "horizontal integration."

4.4 Discussion

The results can be explained by the recent developments of economic integration in ASEAN6+3. Since the beginning of 2000, on the basis of high economic growth in the East Asian area, intra-regional trade and investment has become more vigorous than ever before, and real economic integration within the area is in progress. Foreign direct investment via intra-regional multinational firms has also given rise to a manufacturing network within the East Asian area. The intra-regional trade volumes of

currencies than in the sample period from 1984 to 1997, we cannot compare the two sample periods without careful consideration and further conclude that the currencies of the recent sample period are more cointegrated.

ASEAN6+3 have been increasing steadily since the early 2000s and reached approximately one-half of its total trade volume in recent years. Through this manufacturing network, advanced economies such as Japan and Korea have tended to export their low-added-value products to developing countries, and process these products while incurring low labor costs. In contrast, most of the developing countries in East Asia—such as China and Thailand—act as the "workshops" of developed economies by taking on low-added-value work and re-exporting the end products to advanced and other developing economies in the East Asian area. The added-profit trade—which includes processing and assembly—has been a typical economic growth model among most developing East Asian countries, and it is obvious that each country's economic growth is deeply involved in the manufacturing network. Through the integration of real economies, multinational firms have been optimizing their supply chains, information technologies, and capital flows. Based on our empirical analysis and our conclusions on economic integration, East Asia is now closer than ever exhibiting the conditions for a common currency.

5. Conclusion

Since the 1960s, economic integration within the East Asia area has been implemented through the use of corporate initiatives, in what has been referred to as "functioning integration." East Asian multi-national production networks have been established through the expansion of Japanese enterprises—as well as those of newly industrialized economies—into ASEAN and China. The trade volumes within East Asian area are one-half its total trade volumes worldwide. FTAs among the East Asian countries have been enacted since the 2000s, and internal trade among them will

increase as more FTAs are formulated. However, the exchange rate—one of the key factors affecting trade volume—might be a destabilizing factor in intra-regional trade transactions. In line with the need to stabilize foreign exchange rate within East Asian area, the monetary authorities of East Asian countries need to cooperate with each other on their foreign exchange policy. As a measurement to stabilize foreign exchange rate, the monetary authorities of East Asian countries need to create a common currency basket. Some of previous studies argued that a common currency basket can rectify currency overvaluation or undervaluation, and is more suitable for East Asian countries to create a common currency area.

In this paper, we investigate whether East Asian countries are suitable candidates for forming a common currency area by employing the G-PPP model and by testing for cointegration with asymmetric error correction. Comparing the pre- and post-period of the Asian currency crisis, some East Asian countries tend to converge. In particular, after the crisis the member countries of ASEAN are converging either around themselves or around the three largest economies of Japan, China, and Korea.

The results of our empirical analysis suggest that East Asian countries are more suitable today for creating a common currency area based on the G-PPP model in the first decade of the twenty-first century than before the Asian currency crisis. It implies that East Asian economic development has been promoting trade transactions and monetary regionalization. In the next decade, a stable real exchange rate among East Asian countries is expected to promote the efficiency of market transactions and economic integration.

Furthermore, to evaluate which East Asian countries are more applicable for creating a common currency area appropriately, in future research, we need to improve

the anchor exchange rate by reference to a currency basket calculated by including all the trading partners of ASEAN6+3.

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Table 1-1. OLS Estimation for Asymmetric Integration (2000.01-2013.06)

No.	Combination	D.F. / D.W.	Explanatories																	
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY		KRW	
97031	CNY KRW SGD IDR	155	-0.994	****	0.275	****	1.224	****	—		-1.231	****	0.644	****	—		0.708	***	0.404	****
	THB VND PHP	0.470	(0.198)		(0.069)		(0.213)		—		(0.116)		(0.162)		—		(0.282)		(0.074)	
97009	JPY CNY KRW SGD	155	-0.873	****	—		1.821	****	—		-1.523	****	0.603	****	-0.092		0.729	**	0.411	****
	THB VND PHP	0.500	(0.248)		—		(0.170)		—		(0.088)		(0.168)		(0.060)		(0.343)		(0.096)	
96065	CNY KRW SGD	156	-1.089	****	—		1.783	****	—		-1.578	****	0.598	****	—		1.028	****	0.509	****
	THB VND PHP	0.536	(0.206)		—		(0.169)		—		(0.081)		(0.169)		—		(0.284)		(0.072)	
96061	CNY KRW SGD	156	-1.090	****	0.642	****	—		-0.668	****	-0.447	****	—		—		1.876	****	0.621	****
	IDR MYR PHP	0.443	(0.218)		(0.062)		—		(0.252)		(0.061)		—		—		(0.223)		(0.084)	
96059	CNY KRW SGD	156	-1.371	****	0.256	****	1.503	****	—		-1.224	****	—		—		1.572	****	0.437	****
	IDR THB PHP	0.504	(0.182)		(0.072)		(0.210)		—		(0.121)		—		—		(0.189)		(0.077)	
96058	CNY KRW SGD	156	-1.308	****	0.817	****	-0.675	****	—		—		0.618	****	—		0.906	***	0.544	****
	IDR THB VND	0.363	(0.256)		(0.060)		(0.151)		—		—		(0.212)		—		(0.369)		(0.095)	
96057	CNY KRW SGD	156	-1.427	****	0.843	****	-0.418	****	-0.734	***	—		—		—		1.933	****	0.607	****
	IDR THB MYR	0.445	(0.244)		(0.063)		(0.118)		(0.282)		—		—		—		(0.249)		(0.096)	
96056	JPY IDR THB	156	—		0.307	****	1.616	****	-0.639	****	-1.210	****	0.444	****	-0.263	****	—		—	
	MYR VND PHP	0.398	—		(0.076)		(0.208)		(0.155)		(0.125)		(0.092)		(0.048)		—		—	
96050	JPY KRW THB	156	—		—		1.866	****	-0.330	**	-1.520	****	0.662	****	-0.235	****	—		0.246	****
	MYR VND PHP	0.401	—		—		(0.186)		(0.153)		(0.091)		(0.116)		(0.054)		—		(0.079)	
96044	JPY KRW SGD	156	-0.408	****	—		1.847	****	—		-1.541	****	0.837	****	-0.165	****	—		0.282	****
	THB VND PHP	0.448	(0.119)		—		(0.171)		—		(0.089)		(0.128)		(0.050)		—		(0.075)	

Table 1-2. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories																	
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY		KRW	
96037	JPY KRW SGD	156	-0.693	****	0.790	****	-0.547	****	—		—		0.816	****	-0.158	***	—		0.337	****
	IDR THB VND	0.297	(0.152)		(0.067)		(0.184)		—		—		(0.160)		(0.066)		—		(0.094)	
96032	JPY CNY IDR	156	—		0.316	****	1.802	****	-0.953	****	-1.166	****	—		-0.311	****	0.481	****	—	
	THB MYR PHP	0.399	—		(0.078)		(0.208)		(0.215)		(0.128)		—		(0.048)		(0.130)		—	
96030	JPY CNY SGD	156	0.699	**	—		—		1.838	****	-1.039	****	2.527	****	-0.293	****	-2.884	****	—	
	MYR VND PHP	0.290	(0.340)		—		—		(0.414)		(0.123)		(0.250)		(0.088)		(0.396)		—	
96023	JPY CNY SGD	156	-0.761	****	0.280	****	1.905	****	—		-1.256	****	—		-0.193	****	0.636	****	—	
	IDR THB PHP	0.402	(0.200)		(0.078)		(0.213)		—		(0.128)		—		(0.052)		(0.176)		—	
96012	JPY CNY KRW	156	—		0.776	****	-0.599	****	—		—		0.910	****	-0.254	****	-0.693	****	0.219	**
	IDR THB VND	0.252	—		(0.070)		(0.189)		—		—		(0.200)		(0.066)		(0.218)		(0.105)	
96002	JPY CNY KRW	156	-0.789	***	0.763	****	—		-1.083	****	—		—		-0.260	****	1.269	****	0.354	****
	SGD IDR MYR	0.369	(0.321)		(0.064)		—		(0.293)		—		—		(0.060)		(0.283)		(0.097)	
95125	SGD THB MYR	157	-0.928	****	—		2.383	****	0.653	****	-1.893	****	0.808	****	—		—		—	
	VND PHP	0.500	(0.183)		—		(0.137)		(0.220)		(0.071)		(0.107)		—		—		—	
95119	KRW IDR MYR	157	—		0.547	****	—		-0.388	***	-0.784	****	0.964	****	—		—		0.456	****
	VND PHP	0.295	—		(0.064)		—		(0.168)		(0.061)		(0.105)		—		—		(0.070)	
95116	KRW IDR THB	157	—		0.951	****	-1.030	****	-0.686	****	—		0.838	****	—		—		0.455	****
	MYR VND	0.302	—		(0.062)		(0.133)		(0.201)		—		(0.136)		—		—		(0.090)	
95115	KRW SGD MYR	157	-0.776	****	—		—		1.028	****	-1.020	****	1.627	****	—		—		0.839	****
	VND PHP	0.290	(0.208)		—		—		(0.244)		(0.060)		(0.111)		—		—		(0.059)	

Table 1-3. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories																	
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY		KRW	
95111	KRW SGD IDR	157	-0.538	****	0.549	****	—		—		-0.708	****	1.112	****	—		—		0.448	****
	VND PHP	0.346	(0.124)		(0.056)		—		—		(0.062)		(0.109)		—		—		(0.066)	
95107	KRW SGD IDR	157	-0.791	****	0.890	****	-0.848	****	—		—		1.017	****	—		—		0.434	****
	THB VND	0.329	(0.149)		(0.053)		(0.135)		—		—		(0.137)		—		—		(0.085)	
95082	CNY KRW IDR	157	—		0.924	****	-1.154	****	—		—		1.138	****	—		-0.639	****	0.400	****
	THB VND	0.285	—		(0.061)		(0.127)		—		—		(0.200)		—		(0.227)		(0.098)	
95081	CNY KRW IDR	157	—		0.992	****	-0.732	****	-1.362	****	—		—		—		1.073	****	0.492	****
	THB MYR	0.314	—		(0.063)		(0.115)		(0.288)		—		—		—		(0.221)		(0.103)	
95077	CNY KRW SGD	157	-1.435	****	—		2.006	****	—		-1.548	****	—		—		1.814	****	0.533	****
	THB PHP	0.573	(0.188)		—		(0.162)		—		(0.084)		—		—		(0.183)		(0.075)	
95074	CNY KRW SGD	157	-1.293	****	0.599	****	—		—		-0.447	****	—		—		1.697	****	0.595	****
	IDR PHP	0.381	(0.208)		(0.061)		—		—		(0.062)		—		—		(0.216)		(0.085)	
95072	CNY KRW SGD	157	-1.823	****	0.839	****	—		-0.669	***	—		—		—		1.884	****	0.505	****
	IDR MYR	0.424	(0.225)		(0.065)		—		(0.292)		—		—		—		(0.258)		(0.095)	
95071	CNY KRW SGD	157	-1.668	****	0.795	****	-0.398	****	—		—		—		—		1.734	****	0.575	****
	IDR THB	0.384	(0.230)		(0.061)		(0.120)		—		—		—		—		(0.241)		(0.097)	
95070	JPY THB MYR	157	—		—		2.289	****	-0.435	****	-1.578	****	0.449	****	-0.322	****	—		—	
	VND PHP	0.448	—		—		0.131		(0.154)		(0.091)		(0.096)		(0.047)		—		—	
95069	JPY IDR MYR	157	—		0.778	****	—		-0.690	****	-0.415	****	0.605	****	-0.200	****	—		—	
	VND PHP	0.312	—		(0.053)		—		0.182		(0.085)		(0.105)		(0.055)		—		—	

Table 1-4. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories																	
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY		KRW	
95067	JPY IDR THB	157	—		0.312	****	1.842	****	-0.382	***	-1.147	****	—		-0.311	****	—		—	
	MYR PHP	0.308	—		(0.081)		(0.216)		(0.155)		(0.133)		—		(0.050)		—		—	
95064	JPY SGD THB	157	-0.410	****	—		2.294	****	—		-1.609	****	0.566	****	-0.254	****	—		—	
	VND PHP	0.478	(0.124)		—		(0.128)		—		(0.091)		(0.110)		(0.046)		—		—	
95047	JPY KRW IDR	157	—		0.711	****	-0.666	****	—		—		0.470	****	-0.240	****	—		0.353	****
	THB VND	0.213	—		(0.069)		(0.193)		—		—		(0.149)		(0.068)		—		(0.099)	
95034	JPY CNY THB	157	—		—		2.139	****	—		-1.595	****	0.762	****	-0.282	****	-0.497	****	—	
	VND PHP	0.434	—		—		(0.120)		—		(0.091)		(0.160)		(0.045)		(0.160)		—	
95033	JPY CNY THB	157	—		—		2.497	****	-0.733	****	-1.543	****	—		-0.373	****	0.474	****	—	
	MYR PHP	0.444	—		—		(0.124)		(0.218)		(0.093)		—		(0.047)		(0.137)		—	
95031	JPY CNY IDR	157	—		0.706	****	—		—		-0.561	****	1.157	****	-0.148	****	-0.878	****	—	
	VND PHP	0.311	—		(0.046)		—		—		(0.077)		(0.168)		(0.053)		(0.176)		—	
95030	JPY CNY IDR	157	—		0.870	****	—		-0.973	****	-0.210	****	—		-0.258	****	0.540	****	—	
	MYR PHP	0.303	—		(0.054)		—		(0.261)		(0.079)		—		(0.057)		(0.158)		—	
95022	JPY CNY SGD	157	-0.635	****	—		2.526	****	—		-1.583	****	—		-0.271	****	0.623	****	—	
	THB PHP	0.458	(0.205)		—		(0.130)		—		(0.094)		—		(0.049)		(0.182)		—	
95019	JPY CNY SGD	157	-0.554	***	0.842	****	—		—		-0.264	****	—		-0.159	***	0.533	***	—	
	IDR PHP	0.261	(0.244)		(0.056)		—		—		(0.079)		—		(0.064)		(0.215)		—	
95009	JPY CNY KRW	157	—		0.611	****	—		—		-0.479	****	—		-0.144	***	0.481	****	0.346	****
	IDR PHP	0.193	—		(0.067)		—		—		(0.087)		—		(0.060)		(0.147)		(0.093)	

Table 1-5. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories								
			SGD	IDR	THB	MYR	PHP	VND	JPY	CNY	KRW
95001	JPY CNY KRW	157	-1.373 ****	0.721 ****	—	—	—	—	-0.187 ****	1.182 ****	0.360 ****
	SGD IDR	0.311	(0.291)	(0.066)	—	—	—	—	(0.059)	(0.293)	(0.100)
94125	IDR MYR VND	158	—	0.834 ****	—	-0.580 ****	-0.631 ****	0.674 ****	—	—	—
	PHP	0.292	—	(0.053)	—	(0.186)	(0.064)	(0.107)	—	—	—
94122	IDR THB MYR	158	—	1.158 ****	-0.700 ****	-0.884 ****	—	0.498 ****	—	—	—
	VND	0.301	—	(0.050)	(0.125)	(0.212)	—	(0.127)	—	—	—
94117	SGD IDR VND	158	-0.642 ****	0.813 ****	—	—	-0.557 ****	0.832 ****	—	—	—
	PHP	0.330	(0.140)	(0.045)	—	—	(0.066)	(0.114)	—	—	—
94113	SGD IDR THB	158	-0.926 ****	1.067 ****	-0.517 ****	—	—	0.710 ****	—	—	—
	VND	0.323	(0.157)	(0.043)	(0.127)	—	—	(0.133)	—	—	—
94107	KRW IDR VND	158	—	0.468 ****	—	—	-0.839 ****	0.898 ****	—	—	0.484 ****
	PHP	0.258	—	(0.056)	—	—	(0.057)	(0.103)	—	—	(0.069)
94103	KRW IDR THB	158	—	0.857 ****	-1.188 ****	—	—	0.719 ****	—	—	0.515 ****
	VND	0.252	—	(0.057)	(0.129)	—	—	(0.136)	—	—	(0.091)
94087	CNY IDR VND	158	—	0.762 ****	—	—	-0.712 ****	1.251 ****	—	-0.910 ****	—
	PHP	0.314	—	(0.042)	—	—	(0.057)	(0.168)	—	(0.179)	—
94086	CNY IDR MYR	158	—	0.961 ****	—	-0.766 ****	-0.461 ****	—	—	0.536 ****	—
	PHP	0.266	—	(0.053)	—	(0.272)	(0.060)	—	—	(0.167)	—
94083	CNY IDR THB	158	—	1.099 ****	-0.918 ****	—	—	1.109 ****	—	-1.024 ****	—
	VND	0.292	—	(0.045)	(0.118)	—	—	(0.209)	—	(0.216)	—

Table 1-6. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories																	
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY		KRW	
94082	CNY IDR THB	158	—		1.185	****	-0.484	****	-1.047	****	—		—		—		0.421	***	—	
	MYR	0.285	—		(0.051)		(0.109)		(0.298)		—		—		—		(0.185)		—	
94078	CNY SGD THB	158	-1.056	****	—		2.873	****	—		-1.969	****	—		—		1.093	****	—	
	PHP	0.519	(0.206)		—		(0.123)		—		(0.068)		—		—		(0.175)		—	
94075	CNY SGD IDR	158	-0.809	****	0.926	****	—		—		-0.364	****	—		—		0.770	****	—	
	PHP	0.284	(0.225)		(0.045)		—		—		(0.069)		—		—		(0.196)		—	
94057	CNY KRW SGD	158	-2.027	****	0.795	****	—		—		—		—		—		1.704	****	0.480	****
	IDR	0.372	(0.209)		(0.063)		—		—		—		—		—		(0.249)		(0.096)	
94055	JPY THB VND	158	—		—		2.148	****	—		-1.583	****	0.349	****	-0.284	****	—		—	
	PHP	0.378	—		—		(0.123)		—		(0.093)		(0.091)		(0.046)		—		—	
94052	JPY IDR VND	158	—		0.680	****	—		—		-0.534	****	0.468	****	-0.165	****	—		—	
	PHP	0.225	—		(0.049)		—		—		(0.083)		(0.103)		(0.056)		—		—	
94039	JPY SGD IDR	158	-0.735	****	0.801	****	—		—		—		0.428	****	-0.296	****	—		—	
	VND	0.277	(0.156)		(0.056)		—		—		—		(0.120)		(0.050)		—		—	
94030	JPY KRW IDR	158	—		0.780	****	—		—		-0.265	****	—		-0.213	****	—		0.143	**
	PHP	0.202	—		(0.044)		—		—		(0.060)		—		(0.058)		—		(0.072)	
94026	JPY KRW SGD	158	1.238	****	—		—		—		-0.449	****	—		-0.534	****	—		0.606	****
	PHP	0.085	(0.129)		—		—		—		(0.111)		—		(0.071)		—		(0.091)	
94013	JPY CNY IDR	158	—		0.877	****	—		-1.206	****	—		—		-0.365	****	0.469	****	—	
	MYR	0.314	—		(0.055)		—		(0.250)		—		—		(0.042)		(0.158)		—	

Table 1-7. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories															
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY		KRW	
94007	JPY CNY SGD	158	-0.759	****	0.846	****	—		—		—		—		-0.267	****	0.459	**	—	
	IDR	0.266	(0.244)		(0.058)		—		—		—		—		(0.057)		(0.221)		—	
93076	IDR THB VND	159	—		1.067	****	-0.854	****	—		—		0.280	***	—		—		—	
		0.221	—		(0.047)		(0.125)		—		—		(0.122)		—		—		—	
93075	IDR THB MYR	159	—		1.173	****	-0.423	****	-0.542	****	—		—		—		—		—	
		0.246	—		(0.052)		(0.107)		(0.202)		—		—		—		—		—	
93067	SGD IDR VND	159	-1.213	****	1.037	****	—		—		—		0.526	****	—		—		—	
		0.280	(0.147)		(0.044)		—		—		—		(0.131)		—		—		—	
93065	SGD IDR THB	159	-0.461	****	1.128	****	-0.285	**	—		—		—		—		—		—	
		0.236	(0.142)		(0.045)		(0.130)		—		—		—		—		—		—	
93063	KRW MYR PHP	159	—		—		—		2.262	****	-0.821	****	—		—		—		0.801	****
		0.130	—		—		—		(0.154)		(0.075)		—		—		—		(0.091)	
93059	KRW THB MYR	159	—		—		-0.599	****	1.908	****	—		—		—		—		1.065	****
		0.089	—		—		(0.185)		(0.289)		—		—		—		—		(0.119)	
93046	CNY THB PHP	159	—		—		2.670	****	—		-2.049	****	—		—		0.342	****	—	
		0.347	—		—		(0.126)		—		(0.072)		—		—		(0.103)		—	
93035	CNY SGD IDR	159	-1.509	****	1.039	****	—		—		—		—		—		0.929	****	—	
		0.317	(0.196)		(0.043)		—		—		—		—		—		(0.209)		—	
93025	JPY THB PHP	159	—		—		2.439	****	—		-1.528	****	—		-0.350	****	—		—	
		0.346	—		—		(0.101)		—		(0.096)		—		(0.045)		—		—	

Table 1-8. OLS Estimation for Asymmetric Integration (2000.01-2013.06) (cont'd)

No.	Combination	D.F. / D.W.	Explanatories															
			SGD		IDR		THB		MYR		PHP		VND		JPY		CNY	KRW
93022	JPY IDR PHP	159	—		0.814	****	—		—		-0.260	****	—		-0.231	****	—	—
		0.208	—		(0.041)		—		—		(0.060)		—		(0.058)		—	—
93020	JPY IDR MYR	159	—		0.884	****	—		-0.585	****	—		—		-0.343	****	—	—
		0.251	—		(0.056)		—		(0.140)		—		—		(0.042)		—	—
92036	VND PHP	160	—		—		—		—		-1.212	****	1.918	****	—		—	—
		0.160	—		—		—		—		(0.086)		(0.096)		—		—	—
92033	THB PHP	160	—		—		2.984	****	—		-2.098	****	—		—		—	—
		0.351	—		—		(0.085)		—		(0.072)		—		—		—	—
92030	IDR PHP	160	—		0.938	****	—		—		-0.444	****	—		—		—	—
		0.206	—		(0.028)		—		—		(0.041)		—		—		—	—
92028	IDR MYR	160	—		1.152	****	—		-1.101	****	—		—		—		—	—
		0.233	—		(0.054)		—		(0.149)		—		—		—		—	—
92027	IDR THB	160	—		1.101	****	-0.626	****	—		—		—		—		—	—
		0.211	—		(0.045)		(0.078)		—		—		—		—		—	—
92022	SGD IDR	160	-0.715	****	1.099	****	—		—		—		—		—		—	—
		0.228	(0.084)		(0.043)		—		—		—		—		—		—	—

Note: SGD denotes the Singapore dollar, IDR denotes the Indonesian rupiah, THB denotes the Thai baht, MYR denotes the Malaysian ringgit, VND denotes the Vietnamese dong, PHP denotes the Philippine peso, JPY denotes the Japanese yen, CNY denotes the Chinese yuan and KRW denotes the Korean won.

****, ***, **, and * indicate significance at the1%, 2.5%, 5% and 10% levels in two-tailed test, respectively. Standard error is in parentheses.

Table 2-1. M-TAR Unit Root Test for Residuals from Cointegration Estimation (2000.01-2013.06)

No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)			No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)		
97031	CNY KRW SGD IDR THB VND PHP	159	0	-0.288 -0.163	(0.068) (0.077)	**** **	96037	JPY KRW SGD IDR THB VND	159	0	-0.139 -0.153	(0.061) (0.057)	*** ****
97009	JPY CNY KRW SGD THB VND PHP	149	5	-0.265 -0.210	(0.088) (0.092)	**** ***	96032	JPY CNY IDR THB MYR PHP	159	0	-0.247 -0.137	(0.069) (0.068)	**** **
96065	CNY KRW SGD THB VND PHP	149	5	-0.285 -0.201	(0.087) (0.098)	**** **	96030	JPY CNY SGD MYR VND PHP	159	0	-0.167 -0.114	(0.055) (0.062)	**** *
96061	CNY KRW SGD IDR MYR PHP	159	0	-0.237 -0.203	(0.075) (0.067)	**** ****	96023	JPY CNY SGD IDR THB PHP	159	0	-0.254 -0.123	(0.063) (0.073)	**** *
96059	CNY KRW SGD IDR THB PHP	151	4	-0.236 -0.200	(0.081) (0.088)	**** ***	96012	JPY CNY KRW IDR THB VND	159	0	-0.108 -0.136	(0.057) (0.053)	* ***
96058	CNY KRW SGD IDR THB VND	159	0	-0.150 -0.204	(0.069) (0.061)	** ****	96002	JPY CNY KRW SGD IDR MYR	159	0	-0.150 -0.204	(0.068) (0.064)	** ****
96057	CNY KRW SGD IDR THB MYR	159	0	-0.239 -0.209	(0.080) (0.064)	**** ****	95125	SGD THB MYR VND PHP	159	0	-0.367 -0.123	(0.072) (0.074)	**** *
96056	JPY IDR THB MYR VND PHP	159	0	-0.263 -0.128	(0.069) (0.066)	**** *	95119	KRW IDR MYR VND PHP	159	0	-0.202 -0.101	(0.063) (0.055)	**** *
96050	JPY KRW THB MYR VND PHP	159	0	-0.280 -0.119	(0.070) (0.066)	**** *	95116	KRW IDR THB MYR VND	159	0	-0.158 -0.140	(0.059) (0.060)	**** ***
96044	JPY KRW SGD THB VND PHP	159	0	-0.318 -0.133	(0.072) (0.069)	**** *	95115	KRW SGD MYR VND PHP	159	0	-0.128 -0.162	(0.056) (0.061)	*** ****

Table 2-2. M-TAR Unit Root Test for Residuals from Cointegration Estimation (2000.01-2013.06) (cont'd)

No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)		
95111	KRW SGD IDR	159	0	-0.221	(0.067)	****
	VND PHP			-0.131	(0.060)	**
95107	KRW SGD IDR	159	0	-0.174	(0.063)	****
	THB VND			-0.155	(0.060)	***
95082	CNY KRW IDR	159	0	-0.147	(0.058)	***
	THB VND			-0.136	(0.057)	***
95081	CNY KRW IDR	159	0	-0.135	(0.061)	**
	THB MYR			-0.173	(0.060)	****
95077	CNY KRW SGD	151	4	-0.249	(0.089)	****
	THB PHP			-0.249	(0.094)	****
95074	CNY KRW SGD	159	0	-0.184	(0.071)	***
	IDR PHP			-0.193	(0.062)	****
95072	CNY KRW SGD	159	0	-0.237	(0.079)	****
	IDR MYR			-0.195	(0.062)	****
95071	CNY KRW SGD	159	0	-0.172	(0.074)	***
	IDR THB			-0.205	(0.060)	****
95070	JPY THB MYR	159	0	-0.290	(0.074)	****
	VND PHP			-0.154	(0.069)	**
95069	JPY IDR MYR	159	0	-0.173	(0.066)	****
	VND PHP			-0.134	(0.057)	***
95067	JPY IDR THB	159	0	-0.194	(0.063)	****
	MYR PHP			-0.112	(0.058)	*
95064	JPY SGD THB	159	0	-0.292	(0.074)	****
	VND PHP			-0.181	(0.073)	***
95047	JPY KRW IDR	159	0	-0.108	(0.051)	**
	THB VND			-0.097	(0.051)	*
95034	JPY CNY THB	159	0	-0.307	(0.073)	****
	VND PHP			-0.133	(0.067)	**
95033	JPY CNY THB	159	0	-0.258	(0.077)	****
	MYR PHP			-0.181	(0.067)	****
95031	JPY CNY IDR	159	0	-0.182	(0.063)	****
	VND PHP			-0.129	(0.058)	**
95030	JPY CNY IDR	159	0	-0.131	(0.062)	**
	MYR PHP			-0.159	(0.058)	****
95022	JPY CNY SGD	159	0	-0.242	(0.074)	****
	THB PHP			-0.211	(0.070)	****
95019	JPY CNY SGD	159	0	-0.129	(0.056)	***
	IDR PHP			-0.128	(0.055)	***
95009	JPY CNY KRW	159	0	-0.081	(0.048)	*
	IDR PHP			-0.106	(0.049)	**

Table 2-3. M-TAR Unit Root Test for Residuals from Cointegration Estimation (2000.01-2013.06) (cont'd)

No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)		
95001	JPY CNY KRW	159	0	-0.121	(0.066)	*
	SGD IDR			-0.176	(0.055)	****
94125	IDR MYR VND	159	0	-0.185	(0.060)	****
	PHP			-0.105	(0.057)	*
94122	IDR THB MYR	159	0	-0.191	(0.062)	****
	VND			-0.114	(0.057)	**
94117	SGD IDR VND	159	0	-0.186	(0.062)	****
	PHP			-0.142	(0.061)	***
94113	SGD IDR THB	159	0	-0.156	(0.063)	***
	VND			-0.166	(0.059)	****
94107	KRW IDR VND	159	0	-0.147	(0.055)	****
	PHP			-0.105	(0.056)	*
94103	KRW IDR THB	159	0	-0.117	(0.054)	**
	VND			-0.132	(0.055)	***
94087	CNY IDR VND	159	0	-0.209	(0.060)	****
	PHP			-0.104	(0.060)	*
94086	CNY IDR MYR	159	0	-0.127	(0.055)	***
	PHP			-0.137	(0.058)	***
94083	CNY IDR THB	159	0	-0.134	(0.062)	**
	VND			-0.156	(0.055)	****
94082	CNY IDR THB	159	0	-0.140	(0.060)	***
	MYR			-0.143	(0.056)	***
94078	CNY SGD THB	159	0	-0.370	(0.079)	****
	PHP			-0.170	(0.071)	***
94075	CNY SGD IDR	159	0	-0.163	(0.056)	****
	PHP			-0.117	(0.059)	**
94057	CNY KRW SGD	159	0	-0.198	(0.074)	****
	IDR			-0.178	(0.059)	****
94055	JPY THB VND	159	0	-0.221	(0.068)	****
	PHP			-0.149	(0.065)	***
94052	JPY IDR VND	159	0	-0.120	(0.052)	***
	PHP			-0.096	(0.052)	*
94039	JPY SGD IDR	159	0	-0.106	(0.061)	*
	VND			-0.159	(0.054)	****
94030	JPY KRW IDR	159	0	-0.086	(0.051)	*
	PHP			-0.111	(0.048)	***
94026	JPY KRW SGD	135	12	-0.087	(0.035)	***
	PHP			-0.056	(0.032)	*
94013	JPY CNY IDR	159	0	-0.136	(0.067)	**
	MYR			-0.161	(0.056)	****

Table 2-4. M-TAR Unit Root Test for Residuals from Cointegration Estimation (2000.01-2013.06) (cont'd)

No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)			No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)		
94007	JPY CNY SGD IDR	159	0	-0.097	(0.057)	*	93025	JPY THB PHP	159	0	-0.197	(0.065)	****
				-0.161	(0.055)	****					-0.143	(0.062)	***
93076	IDR THB VND	159	0	-0.120	(0.051)	***	93022	JPY IDR PHP	159	0	-0.090	(0.053)	*
				-0.100	(0.051)	*					-0.112	(0.048)	***
93075	IDR THB MYR	159	0	-0.126	(0.056)	**	93020	JPY IDR MYR	159	0	-0.132	(0.058)	***
				-0.119	(0.052)	***					-0.114	(0.052)	**
93067	SGD IDR VND	159	0	-0.117	(0.062)	*	92036	VND PHP	159	0	-0.074	(0.043)	*
				-0.158	(0.054)	****					-0.081	(0.045)	*
93065	SGD IDR THB	159	0	-0.138	(0.055)	***	92033	THB PHP	159	0	-0.264	(0.068)	****
				-0.101	(0.051)	**					-0.108	(0.059)	*
93063	KRW MYR PHP	141	9	-0.078	(0.043)	*	92030	IDR PHP	159	0	-0.119	(0.050)	***
				-0.091	(0.041)	**					-0.087	(0.049)	*
93059	KRW THB MYR	135	12	-0.065	(0.038)	*	92028	IDR MYR	159	0	-0.172	(0.063)	****
				-0.067	(0.039)	*					-0.087	(0.046)	*
93046	CNY THB PHP	159	0	-0.256	(0.065)	****	92027	IDR THB	159	0	-0.120	(0.052)	***
				-0.102	(0.060)	*					-0.093	(0.049)	*
93035	CNY SGD IDR	159	0	-0.183	(0.068)	****	92022	SGD IDR	159	0	-0.116	(0.058)	**
				-0.143	(0.055)	***					-0.112	(0.048)	***

Note: ****, ***, **, and * indicate significance at the1%, 2.5%, 5% and 10% levels in single-tailed test, respectively. Standard error is in parentheses.

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Table 3-1. OLS Estimation for Asymmetric Integration (1984.01-1997.06)

No.	Combination	D.F. D.W.	SGD	IDR	THB	MYR	PHP	JPY	CNY	KRW
8705	JPY CNY KRW IDR	119	—	0.946 ****	-1.556 ****	-1.092 ****	0.664 ****	0.188 ****	0.192 ****	-0.879 ****
(97012)	THB MYR PHP	0.407	—	(0.305)	(0.323)	(0.264)	(0.121)	(0.071)	(0.057)	(0.160)
8626	CNY KRW IDR	120	—	1.346 ****	-1.651 ****	-0.723 ****	0.508 ****	—	0.104 **	-0.603 ****
(96068)	THB MYR PHP	0.314	—	(0.271)	(0.329)	(0.230)	(0.108)	—	(0.048)	(0.124)
8610	JPY CNY KRW	120	—	—	-1.165 ****	-1.137 ****	0.747 ****	0.299 ****	0.290 ****	-1.032 ****
(96018)	THB MYR PHP	0.441	—	—	(0.308)	(0.273)	(0.122)	(0.064)	(0.049)	(0.157)
8606	JPY CNY KRW	120	-0.710 ****	—	—	-1.194 ****	0.802 ****	0.302 ****	0.166 ***	-0.935 ****
(96009)	SGD MYR PHP	0.467	(0.164)	—	—	(0.263)	(0.124)	(0.063)	(0.064)	(0.161)
8551	KRW SGD IDR	157	-0.483 ****	0.973 ****	-0.791 ****	0.751 ****	—	—	—	0.250 **
(95106)	THB MYR	0.352	(0.088)	(0.077)	(0.196)	(0.192)	—	—	—	(0.123)
8547	CNY SGD IDR	121	-0.809 ****	1.306 ****	-1.173 **	—	0.472 ****	—	-0.133 ****	—
(95093)	THB PHP	0.224	(0.216)	(0.292)	(0.563)	—	(0.111)	—	(0.047)	—
8544	CNY KRW IDR	121	—	0.818 ****	—	-1.055 ****	0.240 ***	—	0.245 ****	-0.902 ****
(95085)	MYR PHP	0.334	—	(0.273)	—	(0.241)	(0.103)	—	(0.042)	(0.119)
8531	JPY SGD IDR	157	-0.200 ***	0.679 ****	-0.595 ****	0.503 ****	—	-0.269 ****	—	—
(95056)	THB MYR	0.285	(0.085)	(0.083)	(0.131)	(0.132)	—	(0.043)	—	—
8525	JPY KRW SGD	157	-0.490 ***	—	0.687 ****	—	0.316 ****	-0.578 ****	—	-0.619 ****
(95042)	THB PHP	0.124	(0.191)	—	(0.136)	—	(0.120)	(0.044)	—	(0.094)
8510	JPY CNY KRW	121	—	—	—	-1.452 ****	0.511 ****	0.273 ****	0.368 ****	-1.245 ****
(95014)	MYR PHP	0.491	—	—	—	(0.274)	(0.111)	(0.067)	(0.047)	(0.155)

Table 3-2. OLS Estimation for Asymmetric Integration (1984.01-1997.06) (cont'd)

No.	Combination	D.F. D.W.	SGD	IDR	THB	MYR	PHP	JPY	CNY	KRW
8509	JPY CNY KRW	121	—	—	-1.556 ****	—	0.456 ****	0.144 ***	0.167 ****	-0.391 ****
(95012)	THB PHP	0.262	—	—	(0.312)	—	(0.107)	(0.056)	(0.042)	(0.035)
8470	IDR THB MYR	158	—	0.981 ****	-0.928 ****	0.694 ****	-0.202 ****	—	—	—
(94123)	PHP	0.356	—	(0.082)	(0.109)	(0.149)	(0.060)	—	—	—
8460	KRW SGD THB	158	-1.476 ****	—	2.054 ****	—	0.486 ****	—	—	-1.156 ****
(94098)	PHP	0.138	(0.254)	—	(0.126)	—	(0.173)	—	—	(0.122)
8445	CNY KRW MYR	122	—	—	—	-0.730 ****	0.301 ****	—	0.269 ****	-0.806 ****
(94070)	PHP	0.296	—	—	—	(0.222)	(0.104)	—	(0.043)	(0.118)
8444	CNY KRW THB	122	—	—	-1.263 ****	—	0.406 ****	—	0.154 ****	-0.369 ****
(94068)	PHP	0.227	—	—	(0.298)	—	(0.108)	—	(0.043)	(0.035)
8441	CNY KRW IDR	122	—	0.943 ****	—	-0.679 ****	—	—	0.198 ****	-0.673 ****
(94063)	MYR	0.306	—	(0.273)	—	(0.182)	—	—	(0.038)	(0.068)
8432	JPY IDR THB	158	—	0.668 ****	-0.810 ****	0.568 ****	—	-0.314 ****	—	—
(94047)	MYR	0.289	—	(0.084)	(0.094)	(0.131)	—	(0.040)	—	—
8431	JPY SGD MYR	158	-0.651 ****	—	—	0.919 ****	0.241 ***	-0.459 ****	—	—
(94045)	PHP	0.137	(0.112)	—	—	(0.086)	(0.100)	(0.045)	—	—
8428	JPY SGD IDR	158	-0.729 ****	0.805 ****	—	—	0.323 ****	-0.259 ****	—	—
(94040)	PHP	0.274	(0.094)	(0.052)	—	—	(0.083)	(0.044)	—	—
8420	JPY KRW IDR	158	—	0.808 ****	-0.414 ****	—	—	-0.324 ****	—	-0.198 ***
(94027)	THB	0.267	—	(0.079)	(0.112)	—	—	(0.041)	—	(0.084)

Table 3-3. OLS Estimation for Asymmetric Integration (1984.01-1997.06) (cont'd)

No.	Combination	D.F. D.W.	SGD	IDR	THB	MYR	PHP	JPY	CNY	KRW
8418	JPY KRW SGD	158	-0.268 ***	—	—	0.787 ****	—	-0.461 ****	—	-0.246 ***
(94024)	MYR	0.140	(0.104)	—	—	(0.104)	—	(0.045)	—	(0.101)
8353	IDR THB MYR	159	—	1.060 ****	-1.070 ****	0.668 ****	—	—	—	—
(93075)		0.344	—	(0.081)	(0.104)	(0.154)	—	—	—	—
8346	KRW MYR PHP	159	—	—	—	1.472 ****	-0.417 ****	—	—	-0.551 ****
(93063)		0.171	—	—	—	(0.070)	(0.089)	—	—	(0.107)
8345	KRW THB PHP	159	—	—	1.558 ****	—	-0.331 ****	—	—	-1.669 ****
(93061)		0.134	—	—	(0.102)	—	(0.111)	—	—	(0.093)
8343	KRW IDR PHP	159	—	0.969 ****	—	—	-0.226 ****	—	—	-0.445 ****
(93058)		0.277	—	(0.032)	—	—	(0.066)	—	—	(0.080)
8341	KRW IDR THB	159	—	1.236 ****	-0.602 ****	—	—	—	—	-0.242 ***
(93055)		0.329	—	(0.068)	(0.129)	—	—	—	—	(0.098)
8338	KRW SGD THB	159	-0.896 ****	—	1.896 ****	—	—	—	—	-1.279 ****
(93051)		0.133	(0.151)	—	(0.116)	—	—	—	—	(0.116)
8332	CNY IDR MYR	123	—	-1.173 ****	—	1.031 ****	—	—	0.306 ****	—
(93041)		0.237	—	(0.228)	—	(0.078)	—	—	(0.049)	—
8319	JPY THB MYR	159	—	—	-0.797 ****	1.287 ****	—	-0.497 ****	—	—
(93023)		0.184	—	—	(0.111)	(0.111)	—	(0.038)	—	—
8316	JPY IDR THB	159	—	0.921 ****	-0.594 ****	—	—	-0.331 ****	—	—
(93019)		0.287	—	(0.064)	(0.084)	—	—	(0.042)	—	—

Table 3-4. OLS Estimation for Asymmetric Integration (1984.01-1997.06) (cont'd)

No.	Combination	D.F. D.W.	SGD	IDR	THB	MYR	PHP	JPY	CNY	KRW
8311	JPY KRW PHP	159	—	—	—	—	0.213 ****	-0.760 ****	—	-0.596 ****
(93013)		0.099	—	—	—	—	(0.073)	(0.029)	—	(0.086)
8309	JPY KRW THB	159	—	—	0.482 ****	—	—	-0.609 ****	—	-0.713 ****
(93010)		0.115	—	—	(0.090)	—	—	(0.038)	—	(0.086)
8308	JPY KRW IDR	159	—	0.579 ****	—	—	—	-0.356 ****	—	-0.407 ****
(93009)		0.208	—	(0.051)	—	—	—	(0.042)	—	(0.064)
8305	JPY CNY MYR	123	—	—	—	0.749 ****	—	-0.301 ****	0.217 ****	—
(93005)		0.162	—	—	—	(0.079)	—	(0.053)	(0.053)	—
8223	IDR THB	160	—	1.386 ****	-0.828 ****	—	—	—	—	—
(92027)		0.361	—	(0.032)	(0.092)	—	—	—	—	—
8217	KRW MYR	160	—	—	—	1.386 ****	—	—	—	-0.812 ****
(92019)		0.130	—	—	—	(0.072)	—	—	—	(0.097)
8212	CNY MYR	124	—	—	—	0.915 ****	—	—	0.350 ****	—
(92013)		0.200	—	—	—	(0.083)	—	—	(0.053)	—
8208	CNY KRW	124	—	—	—	—	—	—	0.223 ****	-0.431 ****
(92009)		0.275	—	—	—	—	—	—	(0.039)	(0.023)

Note: SGD denotes the Singapore dollar, IDR denotes the Indonesian rupiah, THB denotes the Thai baht, MYR denotes the Malaysian ringgit, PHP denotes the Philippine peso, JPY denotes the Japanese yen, CNY denotes the Chinese yuan and KRW denotes the Korean won.

****, ***, **, and * indicate significance at the1%, 2.5%, 5% and 10% levels in two-tailed test, respectively. Standard error is in parentheses.

Table 4-1. M-TAR Unit Root Test for Residuals from Cointegration Estimation (1984.01-1997.06)

No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)			No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)		
8705	JPY CNY KRW IDR	121	1	-0.227	(0.077)	****	8509	JPY CNY KRW	121	1	-0.103	(0.058)	*
(97012)	THB MYR PHP			-0.262	(0.081)	****	(95012)	THB PHP			-0.228	(0.072)	****
8610	JPY CNY KRW	123	0	-0.189	(0.076)	***	8470	IDR THB MYR	159	0	-0.209	(0.059)	****
(96018)	THB MYR PHP			-0.257	(0.084)	****	(94123)	PHP			-0.122	(0.072)	*
8606	JPY CNY KRW	123	0	-0.165	(0.078)	**	8460	KRW SGD THB	157	1	-0.080	(0.037)	**
(96009)	SGD MYR PHP			-0.314	(0.085)	****	(94098)	PHP			-0.079	(0.047)	*
8551	KRW SGD IDR	159	0	-0.206	(0.059)	****	8445	CNY KRW MYR	121	1	-0.130	(0.063)	**
(95106)	THB MYR			-0.121	(0.070)	*	(94070)	PHP			-0.236	(0.072)	****
8547	CNY SGD IDR	121	1	-0.115	(0.057)	**	8444	CNY KRW THB	121	1	-0.093	(0.052)	*
(95093)	THB PHP			-0.132	(0.065)	**	(94068)	PHP			-0.211	(0.071)	****
8544	CNY KRW IDR	121	1	-0.155	(0.070)	**	8441	CNY KRW IDR	121	1	-0.122	(0.066)	*
(95085)	MYR PHP			-0.255	(0.072)	****	(94063)	MYR			-0.260	(0.069)	****
8531	JPY SGD IDR	159	0	-0.144	(0.054)	****	8432	JPY IDR THB	159	0	-0.133	(0.054)	***
(95056)	THB MYR			-0.134	(0.063)	**	(94047)	MYR			-0.155	(0.064)	***
8526	JPY KRW SGD	145	7	-0.076	(0.044)	*	8431	JPY SGD MYR	145	7	-0.080	(0.041)	*
(95044)	MYR PHP			-0.190	(0.044)	****	(94045)	PHP			-0.193	(0.045)	****
8525	JPY KRW SGD	145	7	-0.093	(0.039)	***	8428	JPY SGD IDR	159	0	-0.149	(0.053)	****
(95042)	THB PHP			-0.120	(0.044)	****	(94040)	PHP			-0.118	(0.062)	*
8510	JPY CNY KRW	121	1	-0.205	(0.080)	***	8420	JPY KRW IDR	159	0	-0.149	(0.051)	****
(95014)	MYR PHP			-0.401	(0.090)	****	(94027)	THB			-0.108	(0.062)	*

Table 4-2. M-TAR Unit Root Test for Residuals from Cointegration Estimation (1984.01-1997.06) (cont'd)

No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)			No.	Combination	D.F.	Lag(s)	Coefficient (with S.E.) (Upper: Z-Plus) (Lower: Z-Minus)		
8418	JPY KRW SGD	145	7	-0.086	(0.044)	*	8316	JPY IDR THB	159	0	-0.156	(0.053)	****
(94024)	MYR			-0.176	(0.046)	****	(93019)				-0.119	(0.065)	*
8353	IDR THB MYR	159	0	-0.191	(0.057)	****	8311	JPY KRW PHP	145	7	-0.087	(0.035)	***
(93075)				-0.138	(0.071)	*	(93013)				-0.082	(0.041)	**
8346	KRW MYR PHP	155	2	-0.088	(0.043)	**	8309	JPY KRW THB	131	14	-0.083	(0.041)	**
(93063)				-0.127	(0.049)	***	(93010)				-0.125	(0.049)	***
8345	KRW THB PHP	131	14	-0.145	(0.043)	****	8308	JPY KRW IDR	157	1	-0.124	(0.047)	****
(93061)				-0.120	(0.053)	**	(93009)				-0.106	(0.053)	**
8343	KRW IDR PHP	157	1	-0.192	(0.053)	****	8305	JPY CNY MYR	121	1	-0.074	(0.044)	*
(93058)				-0.106	(0.063)	*	(93005)				-0.142	(0.061)	***
8341	KRW IDR THB	157	1	-0.211	(0.054)	****	8223	IDR THB	157	1	-0.226	(0.056)	****
(93055)				-0.125	(0.075)	*	(92027)				-0.135	(0.081)	*
8338	KRW SGD THB	131	14	-0.129	(0.041)	****	8217	KRW MYR	155	2	-0.073	(0.038)	*
(93051)				-0.145	(0.053)	****	(92019)				-0.093	(0.042)	**
8332	CNY IDR MYR	121	1	-0.096	(0.052)	*	8212	CNY MYR	121	1	-0.090	(0.051)	*
(93041)				-0.235	(0.072)	****	(92013)				-0.156	(0.063)	***
8319	JPY THB MYR	145	7	-0.108	(0.049)	**	8208	CNY KRW	121	1	-0.118	(0.059)	**
(93023)				-0.254	(0.055)	****	(92009)				-0.237	(0.072)	****

Note: SGD denotes the Singapore dollar, IDR denotes the Indonesian rupiah, THB denotes the Thai baht, MYR denotes the Malaysian ringgit, PHP denotes the Philippine peso, JPY denotes the Japanese yen, CNY denotes the Chinese yuan and KRW denotes the Korean won. ****, ***, **, and * indicate significance at the1%, 2.5%, 5% and 10% levels in two-tailed test, respectively. Standard error is in parentheses. parentheses. parentheses. parentheses. parentheses. parentheses. parentheses.parentheses.parentheses.

Table 5. Summary of Empirical Results (Candidates for member states of the Common Currency Union)

The Number of Countries		No.	SGD	IDR	THB	MYR	PHP	VND	JPY	CNY	KRW
(2000.01-2013.06)											
7		97009	X	-	X	-	X	X	X	X	X
6		96061	X	X	-	X	X	-	-	X	X
		96059	X	X	X	-	X	-	-	X	X
		96057	X	X	X	X	-	-	-	X	X
		96037	X	X	X	-	-	X	X	-	X
5		95116	-	X	X	X	-	X	-	-	X
		95115	X	-	-	X	X	X	-	-	X
		95107	X	X	X	-	-	X	-	-	X
		95082	-	X	X	-	-	X	-	X	X
		95077	X	-	X	-	X	-	-	X	X
		95074	X	X	-	-	X	-	-	X	X
		95072	X	X	-	X	-	-	-	X	X
		95071	X	X	X	-	-	-	-	X	X
		95069	-	X	-	X	X	X	X	-	-
		95064	X	-	X	-	X	X	X	-	-
		95033	-	-	X	X	X	-	X	X	-
		95022	X	-	X	-	X	-	X	X	-
		95019	X	X	-	-	X	-	X	X	-
4		94117	X	X	-	-	X	X	-	-	-
		94113	X	X	X	-	-	X	-	-	-
		94086	-	X	-	X	X	-	-	X	-
		94082	-	X	X	X	-	-	-	X	-
		94078	X	-	X	-	X	-	-	X	-
		94057	X	X	-	-	-	-	-	X	X
		94055	-	-	X	-	X	X	X	-	-
3		93035	X	X	-	-	-	-	-	-	X
		93025	-	-	X	-	X	-	X	-	-
(1984.01-1997.06)											
7	8705	(97012)	-	X	X	X	X	-	X	X	X
6	8610	(96018)	-	-	X	X	X	-	X	X	X
5	8525	(95042)	X	-	X	-	X	-	X	-	X
	8510	(95014)	-	-	-	X	X	-	X	X	X
4	8432	(94047)	-	X	X	X	-	-	X	-	-
3	8338	(93051)	X	-	X	-	-	-	-	-	X