Towards De Facto Optimum Currency Areas in East Asia?

Chen-Jui Huang*

ABSTRACT

This paper proposes an alternative methodology to empirically assess the feasibility of creating optimum currency areas (OCAs) driven by dynamic market forces in East Asia. Both contemporaneous and lagged intra-regional dynamics of exchange rates since the late 1990s are captured to investigate bilateral currency cohesion between thirteen East Asian countries. Main findings include the emergence of a premature market-driven OCA composed of eight Asian countries, stronger contemporaneous connection between currencies vis-à-vis their lagged relationship, and regional crowding-out effect that may lead to two distinct types of de facto OCAs in the long run.

JEL Classification: F15; F31; F33

Keywords: Exchange Rate; Optimum Currency Area; East Asia

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1. Introduction

Despite much debate about the creation of the euro *ex ante* as well as *ex post*, and in literature as well as in practice, the concept of optimum currency areas (OCAs) as defined by Mundell (1961) and McKinnon (1963) in their seminal contributions has also inspired discussion on the feasibility of establishing in East Asia a currency union analogous to the euro area. Driven by intense international trade with the rest of the world, most East Asian countries have, in parallel with globalization and regionalization over the past two decades, experienced relatively high economic growth. Together with the US and the EU, the region constitutes one of the most dynamic ones in the contemporary world economy.

There exists, however, a major difference as regards the process of enhancing regional cohesion between the European case and the East Asian case. The former has historically been driven by well-established institutions, whereas the latter has essentially been led by market forces with the exception of one formal regional organization, i.e. the ASEAN. Created in 1967 by five founding member countries (Indonesia, Malaysia, Philippines, Singapore, and Thailand), the ASEAN expands today to a regional economic community composed of ten member countries, adding on Brunei, Cambodia, Laos, Myanmar, and Vietnam. Furthermore, it has created, through the Agreement on the Common Effective Preferential Tariff (CEPT) scheme initiated in 1992 and gradually implemented to date, the ASEAN free trade area (AFTA) that moves towards a complete regional custom union. For the time being, the ASEAN also collaborates with other regional partners, not least Japan, South Korea, and China, which has during the previous years been quickly emerging as a key player in both regional and global economy. The undergoing dialogue between the ASEAN and the three mentioned countries is labeled as the “ASEAN+3” Cooperation with a view to concluding bilateral free trade agreements (FTAs) between the former and each of the three economies. FTAs consented between individual Asian countries have also been launched or are under progress, among others, the accord ratified by Singapore and Japan in 2002, along with negotiations between Taiwan and Japan, Taiwan and Philippines, South Korea and Singapore, and South Korea and Japan. In other words, Asian governments now act more vigorously to strengthen regional trade cohesion beyond the existing trade intensity that has been historically driven by the dynamic private sector in the region. The activism of the ASEAN in the form of explicit coalition with regional partners undoubtedly marks a new era of regionalization. For instance, the First East Asia Summit held in December 2005 connects the ASEAN+3 with three new allies (India, Australia, and New Zealand), without inviting the US for participation.

With continual growth in regional trade and recent proliferation of FTAs, trade patterns in East Asia have been dramatically metamorphosed over the past two decades. Table 1 below demonstrates such striking changes in regional trade flows. Three observations are worth pointing out. Firstly, the intra-regional trade among the core NIC8 countries has, both for exports and for imports, significantly increased at the expense of reduction in trade with the US and the rest of the world. Secondly, China is now becoming a major trade partner for East
Asian countries since it started to open its economy, which, in turn, results in a relative decline in the role played by Japan as the regional trade leader. Thirdly, the average of exports and imports of intra-EA10 nature, i.e. trade between NIC8, China, and Japan, approximates, by 2002, one half of their total trade activities. Gradual economic integration in East Asia on the one side results from the prompt response by the local market in the face of new regional geopolitical relations, and on the other side develops from the increasingly active cooperation among regional governments in trade and other areas.

Table 1. Changes in Trade Patterns in East Asia, 1980 – 2002

<table>
<thead>
<tr>
<th></th>
<th>EXPORTS TO</th>
<th>Imports FROM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NIC8</td>
<td>China</td>
</tr>
<tr>
<td>1980</td>
<td>18.9</td>
<td>1.5</td>
</tr>
<tr>
<td>1990</td>
<td>22.3</td>
<td>6.4</td>
</tr>
<tr>
<td>2002</td>
<td>29.0</td>
<td>13.8</td>
</tr>
</tbody>
</table>

EA10

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>32.0</th>
<th>22.6</th>
<th>45.4</th>
<th></th>
<th></th>
<th>31.8</th>
<th>17.4</th>
<th>50.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>39.6</td>
<td>26.2</td>
<td>34.2</td>
<td></td>
<td></td>
<td></td>
<td>42.9</td>
<td>18.1</td>
<td>39.0</td>
</tr>
<tr>
<td>2002</td>
<td>46.9</td>
<td>23.7</td>
<td>29.4</td>
<td></td>
<td></td>
<td></td>
<td>56.3</td>
<td>13.5</td>
<td>30.2</td>
</tr>
</tbody>
</table>

Source: Adapted from Tables 2.1 and 2.2 by Direction-of-Trade Statistics of IMF, in McKinnon (2005).
Note: NIC8 = Four Tigers (South Korea, Taiwan, Hong Kong, and Singapore) + Thailand + Philippines + Indonesia + Malaysia. EA10 = NIC8 + China + Japan. ROW = Rest of the World.

The regionalism represented by the proliferation of FTAs in East Asia contradicts in reality the ultimate objective of the WTO (World Trade Organization), which aims to achieve global free trade on a multilateral basis. Created in 1995 as a successor to the GATT (General Agreement on Tariffs and Trade) signed in 1947, the WTO has been, to many advocates, the promising institution that serves to accelerate the process towards global multilateralism in the domain of trade. Nevertheless, after the Doha trade round held in 2001, there have emerged bilateral and regional trade negotiations between various trade partners not only in East Asia but also in other regions. The obvious failure of the “Cancún trade talks” in September 2003, as well as the rising unilateralism of the US in many fields of international affairs, seemingly have further signaled the malfunctioning of the WTO as an effective forum for multilateral discussion since the turn of the new century. Even though the renegotiation in global trade liberalization has been partially achieved in the latest “Hong Kong trade talks” held in December 2005, regionalism is to continue to prevail as a long-term trend. This paper emphasizes its impact by studying dynamics of exchange rates under deeper regional economic integration and proposing to shed light on the feasibility of creating one or more OCAs driven by dynamic regional market forces in East Asia.

Relevant studies, as identified by Tavlas (1994) and further elucidated by Huang (2003), can be regrouped in two classes, each of which respectively highlights one of the two distinct but complementary approaches serving to analyzing monetary integration. On one side, the
“criterion approach” develops on the basis of the concept of OCAs. The approach is also incorporated into the Maastricht Treaty as the juristic foundation for the present euro area. On the other side, cost-and-benefit analysis (CBA) provides an alternative framework for evaluating the feasibility of forming a currency union. The commonly cited report by the Commission of the European Communities (1990) is as a matter of fact developed on this “income-statement approach”. Both approaches have their proper methodological pros and cons as regards analysis of a monetary integration process.

The OCA theory proposes criteria that guarantee macroeconomic stability within an OCA and hence justify its “optimality”. Each criterion is a kind of vaccination against the illness of regional macroeconomic instability. Since total immunity does not exist, the list of such vaccinations is never complete. Accordingly, the OCA theory is of enumerative nature and difficult to be modeled. Furthermore, as OCA criteria are mostly derived from a regional and macroeconomic vision, they are often interdependent and rarely concomitant in the economy. This limits their empirical applicability and generates the problem of arbitrariness linked with the choice of the weight assigned to each criterion.

The CBA paradigm partially eliminates methodological drawbacks inherent to the OCA theory and permits global and balanced analysis of a monetary integration process. One of its advantages resides in its applicability at both country-specific (net benefit for one country to join a currency union) and region-wide (overall net benefit for the union) levels. Another relates to the fact that the optimality for a monetary union in the CBA framework concerns both microeconomics and macroeconomics, while the optimality for the opposing approach is mainly macroeconomic. However, the CBA framework adopted from the regional perspective does not explicitly treat issues on redistribution of costs and benefits among countries. In contrast, they are stressed by the OCA theory with its convergence criteria. Recent works reviewing foundations for analyzing monetary integration include De Grauwe (2005).

The direct application of the two approaches above to the discussion on the feasibility of creating in Asia a currency union analogous to the euro area has surged in literature since the late 1990s. One reason relates to the imperative call for establishing a new and stable regional monetary system after the end of the Asian Crisis in 1998. Another links with new Asian geopolitics metamorphosed by rising China, which challenges the position of Japan as a traditional regional leader. Recent works that explicitly extend existing research on European monetary integration can be recapitulated according to the two approaches as highlighted before. Under the OCA framework, analysis of aggregate demand and supply shocks is conducted, inter alia, by Bayoumi, Eichengreen, and Mauro (2000), Chow and Kim (2003), Kwack (2004), and Zhang, Sato, and McAleer (2004). The authors apply the methodology developed by Bayoumi and Eichengreen (1993) for assessing the degree of shock symmetry among European economies to the Asian case, and unanimously confirm that it is too premature to consider the whole region as an OCA. Rather, it is currently more realistic to reflect on the option of establishing, in particular among smaller economies as the ASEAN countries, a transition process to achieve a more complete integration in the long run.
The CBA paradigm complements the OCA theory with additional emphasis on benefits of microeconomic nature for a currency union, where reduced or eliminated exchange-rate fluctuations lower \textit{ex post} cross-currency transaction costs and improve efficiency in regional goods and financial markets. In terms of trade, the process of monetary integration favors in turn more synchronized business cycles and thus dynamically decreases the degree of shock asymmetry as a major cost of macroeconomic nature for the union. Nevertheless, trade patterns, as suggested by McKinnon (1963), constitute \textit{per se} an OCA criterion \textit{ex ante}. The ambiguity concerning the role of trade cohesion in determining an OCA is embodied by Frankel and Rose (1998). Opinions on the endogeneity for trade openness remain divergent. Bayoumi and Eichengreen (1997) empirically analyze the European data and conclude a two-way symbiotic relationship between trade integration and currency integration. Frankel and Wei (1998) and Glick and Rose (2002) find that currency unions exert in principle a positive effect on trade, of which the phenomenon is further examined by Rose (2004) through his “meta-analysis”. Hughes-Hallett and Piscitelli (2002) theoretically derive a model that suggests instead easy violation of the endogenous convergence hypothesis. As to the Asian case, Pomfret (2005a) is doubtful about the trade effect. Hefeker and Nabor (2005) instead anticipate that monetary cooperation in Asia will generate significant benefits for promoting regional trade and capital flows, and the benefits will exceed costs linked with shock asymmetry and inflation differentials in the long run.

Current studies in literature affirm the fact that formation of an immediate OCA in Asia is quixotic. Searching for an appropriate preparatory regional monetary system that favors closer linkage among Asian currencies seems more realistic. Hurley and Santos (2001) find all ASEAN currencies except the Malaysian ringgit become less susceptible to instability after the switch to the de facto dollar-peg. Yoshino, Kaji, and Suzuki (2004) show, however, that a basket-peg may be more advantageous for small open economies as the Asian ones with a three-country model. McKinnon (2005) advocates the desirability of setting an East Asian dollar standard, which he calls the “conflicted virtue” that is in contrast with the “original sin”, a term proposed by Eichengreen and Hausmann (1999) for studying the problem of currency mismatch. The role for the Chinese yuan is also considered. Hefeker and Nabor (2005) are in favor of an Asian ERM (Exchange Rate Mechanism) analogous to the ERM that functioned in the former EMS (European Monetary System). The authors suggest that the transition regime become a more symmetric system than the European counterpart as the Chinese yuan assumes through an evolutionary process the role of a co-leader with the Japanese yen. Their view echoes Vaubal (1990) and Dowd and Greenaway (1993), who emphasize the role played by market forces in the process of currency integration even for an explicitly institutionalized process of integration in Europe. It is in this spirit that this paper proposes an alternative methodology to evaluate how the interaction between regional market forces and authorities can contribute to the development of de facto OCAs in East Asia. Section 2 presents the sample data adopted as well as the methodology suggested for the subsequent empirical analysis. Section 3 discusses the main results. Section 4 concludes and proposes possible application of our methodology to advanced studies.
2. Data and Methodology

Thirteen East Asian countries are considered in our investigation: Japan, the four tigers that include South Korea, Taiwan, Hong Kong, and Singapore, together with other eight ASEAN member countries, i.e. Thailand, Philippines, Indonesia, Vietnam, Cambodia, Laos, Myanmar, and Brunei. Malaysia as the remaining ASEAN country is excluded from our study. The reason lies in its adoption of the fixed exchange rate since the Asian Crisis occurred, which is incompatible with our methodology. Another key country in East Asia, China, is also absent from our sample for the same reason concerning its exchange regime. The following analysis, however, focuses on twelve currencies only. Brunei’s currency board, in fact, sets a par value equal to one for its currency against the Singapore dollar. Examination of the latter yields thus the same implications for both currencies.

The RF (monthly average) bilateral exchange rate series against the US dollar by the International Financial Statistics of the IMF are used as the basis for analyzing the exchange-rate dynamics of the twelve countries to be studied. These series are more relevant to our research than the AF (end-of-month) series of the same dataset, because the former seems to better capture the medium-run trend of exchange-rate dynamics over the period we focus on, from December 1998 to October 2005. This period follows the ending of the Asian Crisis in 1997-1998 and marks a new era of advanced regionalization in East Asia.

The log return series are then derived from the level series and present the volatility of exchange rates for the sample period from January 1999 to October 2005. The preliminary ADF and PP tests are employed concerning their stationarity. The null hypothesis of a unit root is rejected for all the twelve log series. Each volatility series is then regressed, respectively, on a common volatility series, which is the log return series derived from the IMF monthly average euro exchange rate against the US dollar. Each of the twelve regressions is, according to the resultant F-statistic, AIC, and SIC, specified with certain lags of the dependent variable (Asian currency volatility) as additional explanatory variables. The serial correlation and ARCH effect of the residuals are then tested with a view to selecting the final regression model that produces white noise residuals. Main results from the twelve specified regressions are summarized in Table 2 below.

Our rationale for conducting the preliminary regressions described above consists in capturing East Asian exchange-rate dynamics that are unrelated to European ones and presented by the residuals obtained from these regressions. Today’s international monetary system is centered on the US dollar, with which the Fed adopts for long a noninterventionist approach in the foreign exchange market. Moreover, the US, the EU, and East Asia are considered to be the three major actors in the global economy, where the US plays the role of vehicle linking the EU and East Asia. It is therefore sensible to presume that the dollar exchange-rate dynamics for East Asian currencies are essentially affected by two determinants: either extra-regional factors that influence both them and the euro, or intra-regional shocks that concern the Asian currencies only. The former are explained by the dollar exchange-rate volatility for the euro as
the independent variable in our preliminary regressions, while the latter are extracted through their residuals, which represent hence the core of the following analysis.

Table 2. Summary of Preliminary Regressions

<table>
<thead>
<tr>
<th>Currency (ISO)</th>
<th>Explanatory Variables</th>
<th>GARCH Variance Equation</th>
<th>Regression Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>EUR Y(-1) Y(-2) Y(-3) Y(-4)</td>
<td>Constant CV(-1) Ret(-1)</td>
</tr>
<tr>
<td>JPY</td>
<td>0.001 0.415</td>
<td></td>
<td>0.000 0.295</td>
</tr>
<tr>
<td></td>
<td>0.767 0.000</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>KRW</td>
<td>-0.001 0.119 0.261</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td></td>
<td>0.677 0.147 0.017</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>TWD</td>
<td>0.000 0.151 0.449</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td></td>
<td>0.694 0.000</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>HKD</td>
<td>-0.000 0.001 0.571</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td></td>
<td>0.974 0.705 0.000</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>SGD</td>
<td>0.000 0.260</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td></td>
<td>0.710 0.000</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>THB</td>
<td>0.002 0.312 0.301</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td></td>
<td>0.285 0.000 0.001</td>
<td></td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>PHP</td>
<td>0.005 0.079 0.244</td>
<td>-0.176</td>
<td>0.000 0.107</td>
</tr>
<tr>
<td></td>
<td>0.013 0.252 0.030</td>
<td>0.111</td>
<td>0.000 0.107</td>
</tr>
<tr>
<td>IDR</td>
<td>0.004 0.219 0.239 -0.197</td>
<td></td>
<td>0.000 1.370</td>
</tr>
<tr>
<td></td>
<td>0.047 0.016 0.003 0.000</td>
<td></td>
<td>0.000 0.000</td>
</tr>
<tr>
<td>VND</td>
<td>0.001 -0.012 -0.317 -0.167</td>
<td></td>
<td>0.000 3.377</td>
</tr>
<tr>
<td></td>
<td>0.000 0.002 0.000 0.000</td>
<td></td>
<td>0.038 0.000</td>
</tr>
<tr>
<td>KHR</td>
<td>0.001 0.002</td>
<td></td>
<td>0.000 0.743</td>
</tr>
<tr>
<td></td>
<td>0.000 0.900</td>
<td></td>
<td>0.000 0.003</td>
</tr>
<tr>
<td>LAK</td>
<td>0.001 -0.055 0.745 0.216 -0.320</td>
<td></td>
<td>0.000 1.861</td>
</tr>
<tr>
<td></td>
<td>0.378 0.362 0.000 0.025 0.000</td>
<td></td>
<td>0.023 0.012</td>
</tr>
<tr>
<td>MMK</td>
<td>0.000 0.511</td>
<td></td>
<td>0.000 1.838</td>
</tr>
<tr>
<td></td>
<td>0.277 0.000</td>
<td></td>
<td>0.275 0.142 0.000</td>
</tr>
</tbody>
</table>

Notes: 1. All currencies are abbreviated in their ISO code. 2. The estimated value of the coefficient for each independent variable is presented above, while the p-value of the corresponding t-statistic or z-statistic is presented below. 3. With CV for the conditional variance and Re for the residuals obtained from the mean equation, the GARCH(1, 1) model is specified for MMK, while the ARCH(1) model is selected for the other currencies except KRW, TWD, SGD, and PHP. 4. When the adjusted R² is negative, only the value of the log likelihood (Log LLD) function is reported. 5. The regression model for IDR appears to be the best specification against alternative models despite its insignificance at the 5% level.

The twelve residual series are again examined with the ADF and PP tests. The null hypothesis of a unit root is, as expected, rejected for all series. For the eight ARCH-class regressions, standardized residuals are taken so that all series in our sample are a white noise process on the basis of the Ljung-Box Q-statistic at the 5% level of significance. The ARCH effect also disappears in the twelve residual series, with the exception of the South Korean case where there exhibits an ARCH(1) effect. As a matter of fact, the (G)ARCH model seems far from an appropriate option to conduct an overall significant regression for the South Korean won. We therefore maintain the specification as shown in Table 2. The graphs in Figure 1 below present the residual series, marked with the respective currency ISO code.
Figure 1. Specified Residual Series

The statistical relationships among the twelve residual series are to be inferred at two levels. Firstly, we examine their contemporaneous bilateral relationship with a correlation matrix. Secondly, we resort to the Granger causality test in order to analyze their lagged bilateral relationship. The sample is also split into two sub-samples, ranging from January 1999 to December 2002 for the one and ranging from January 2003 to October 2005 for the other. Because of the difference in model specification for each preliminary regression, the number of free observations for each currency varies in the first sub-sample. The comparison between the two sub-periods serves to perceive whether there exist significant changes in the East Asian dynamics of exchange rates over the whole sample period. It is worth noting that the two sub-periods are divided unevenly, with more observations left for the former. As long as the latter exhibits a more significant outcome than the former, it is sensible to argue that there does exist substantial and positive evolution in Asian exchange-rate dynamics that favor the emergence of de facto regional OCAs over time.

3. Empirical Results

As highlighted in the previous section, we aim to investigate the degree of bilateral cohesion between East Asian currencies in terms of intra-regional volatility of exchange rates, from both the contemporaneous dimension and the lagged dimension. The two dimensions jointly serve to provide a complete picture of current connection between Asian currencies under ongoing regionalization, and suggest the prospect for East Asian economies to evolve towards market-driven regional OCAs in the years to come.
Three conventional correlation matrices are derived to illustrate the contemporaneous bilateral relationship between each pair of the twelve Asian currencies examined. The first matrix covers the whole sample period, i.e. from January 1999 to October 2005. The second and third ones respectively involve the sub-period from January 1999 to December 2002 and the sub-period from January 2003 to October 2005. In order to better perceive the trend over the whole sample period, the three matrices are consolidated in one, as shown in Table 3 below. All the figures below the diagonal of the consolidated matrix represent contemporaneous correlation coefficients. For each pair of currencies, the three figures from top to bottom respectively correspond to the whole sample period, the first sub-period, and the second sub-period. The positive correlation coefficients underlying a regression fit at the 5% level of significance are either remarked in italics for the first sub-period or highlighted in bold type for the second sub-period. The former signals a fall in the degree of cohesion between the two currencies to a less significant or even insignificant extent over the whole sample period. In contrast, the latter indicates a rise in the degree of cohesion.

Table 3 clearly shows that contemporaneous intra-regional exchange-rate dynamics remain heterogeneous after the Asian Crisis. However, all the correlation coefficients with a negative sign are either close to zero or insignificant in terms of the regression they underlie. In other words, intra-regional shocks that affect these residual series of exchange-rate volatility appear to be, at least, comparatively far from being asynchronous and asymmetric among the twelve East Asian countries, which therefore leaves great room for their future coordination in exchange-rate policy and harmonization in exchange-rate regimes. Out of the sixty-six currency pairs under investigation, one-third exhibit strong and growing linkage since the late 1990s, whereas eight show signs of weaker or disappearing connection as regional economic cooperation moves forward. The remaining thirty-six pairs fail to suggest any significant cohesion between currencies.

With a closer look at the cases of growing contemporaneous correlation, we can perceive that they have clustered around certain countries. Both Japan and Taiwan have seven closely linked regional partners. Besides each of the two and common associates including Singapore, Thailand, Laos, and Myanmar, the former also relates to Hong Kong and Cambodia whereas the latter connects to South Korea and Indonesia. Thailand establishes six strong relationships with Japan, South Korea, Taiwan, Singapore, Laos, and Myanmar. South Korea, Singapore, Laos, and Myanmar have in turn five important regional partners which overlap certain ones for each of the four countries. In sum, Japan, three out of the four tigers except Hong Kong that has one close partner only, plus four ASEAN countries, i.e. Thailand, Laos, Myanmar, and Brunei of which the currency is pegged at a one-to-one trade ratio to the Singapore dollar, are composed of the core group that seems to have constituted de facto an emerging market-driven OCA following stronger currency cohesion over the past years.
The cases of diminishing contemporaneous correlation have also exhibited the clustering phenomenon. Two key ASEAN member countries, Indonesia and Philippines, appear to have being detached over the whole sample period from some of their regional partners. The former has only one significant currency cohesion with Taiwan, and its relationship with Singapore has been weakened. The latter exhibits no obviously growing linkage with the other eleven economies and even experiences a worsening currency relationship with three regional partners, i.e. South Korea, Singapore, and Thailand. A third “degenerating” case concerns the relationship between Cambodia and Thailand.
Hong Kong also appears to gradually become an outsider in the regional group. The economy has strong currency cohesion with Japan only and little enhanced relationship with Taiwan and Singapore in the second sub-period. The magnetic effect generated from its increasingly closer economic linkage with China certainly counts. As to the declining degree of the connection between Japan and South Korea, there seem to be two opposing viewpoints to interpret the phenomenon. On the one hand, as the two countries are geographically and historically close to each other, it is natural that their currencies are bound to each other in the medium and long runs. The fall in the correlation coefficient appears thus considered to be of temporary nature. Moreover, the correlation coefficient in the second sub-period keeps being high compared to those for most of the other currency pairs. On the other hand, the fall in their currency cohesion may naturally result from a growingly enhanced economic relationship, in particular trade, with other regional partners. As long as the ASEAN+3 (Japan, South Korea, and China) agenda continues to progress, the crowding-out effect will keep reducing the bilateral currency cohesion between Japan and South Korea.

From the lagged dimension, Granger causality tests are applied with the number of lags from one to three, allowing the currency cohesion over a longer time span to be captured. All the figures appearing above the diagonal of the consolidated matrix in Table 3 present the specified number of lags that underlie Granger causality at the 5% level of significance. Similar to the contemporaneous correlation coefficients, the figures for each currency pair concern, from top to bottom, each of the three sample periods we set. Blank boxes imply absence of Granger causality. In each of the boxes filled with figures, those before the slash show that the causality runs from the currency in the first column to the currency in the first row, and vice versa for those after the slash.

Two main observations come into sight from our Granger causality analysis. Firstly, only about one-sixth of the currency pairs exhibiting one-way or two-way Granger causality are involved with the second sub-period. Accordingly, there seems no direct evidence for growing lagged cohesion between Asian currencies over the whole sample period. An alternative interpretation resides in that the stronger intra-regional currency linkage in East Asia is hitherto apparent in the medium run or on a monthly basis only. Synchronized exchange-rate volatility in the longer run is to this point far imperceptible.

Secondly, the eight core countries (Japan, South Korea, Taiwan, Singapore, Thailand, Laos, Myanmar, and Brunei) highlighted from the contemporaneous analysis above do not consistently exhibit significant Granger causality, in both directions, with their privileged partners suggested by the first approach. For example, Both Japan and Myanmar seem to play the role of affecting the Vietnamese Dong after certain months, while the Laotian Kip follows the movement of the Hong Kong dollar and Myanmarese kyat. One notable finding lies in the close lagged linkage between Singapore (and Brunei) and Indonesia, of which currency cohesion is absent from the contemporaneous view. Similarly, Philippines as another outsider according to the previous analysis, also shows various degrees of lagged currency cohesion with five Asian partners including South Korea, Taiwan, Indonesia, Laos, and Myanmar.
The results from Granger causality analysis should, nevertheless, be treated with caution. Two underlying problems may affect our interpretation above. The first concerns the sample size, in particular for the second sub-period. The second concerns the sign of the effect of one currency on the other, which is beyond the extent of the Granger Causality test. A more detailed estimation of bivariate VAR is thus called for but is left for future research.

4. Conclusion

This paper proposes an alternative methodology to empirically assess the feasibility of creating de facto optimum currency areas (OCAs) among East Asian countries in the context of growing economic cohesion in the region since the late 1990s. Because of prevalence of the dynamic private sector in the regional economy, relevant literature, extended from studies in European monetary integration that emphasize the institutional approach to determining OCAs on the basis of the theory developed since Mundell (1961), also takes into account the market approach to capturing the role played by regional market forces in the process of currency integration. However, opinions on the causality concerning currency integration and one of the most visible forms of regionalization in East Asia, i.e. trade integration, seem to have diverged till now. Under a perceptible long-term trend in the reinforcement of regional trade collaboration, this paper examines concurrent regional dynamics of exchange rates and clarifies the plausibility for market-driven OCAs in East Asia.

By preliminarily regressing the monthly dollar exchange-rate volatility of each of the twelve examined East Asian countries on that of the euro, the paper analyzes both contemporaneous correlation and lagged Granger causality between the resultant time series of residuals, which we reasonably interpret as exchange-rate volatility affected by intra-regional shocks. The whole sample period ranging from January 1999 to October 2005 is also split into two sub-periods, with a view to dynamically understanding the trend towards de facto OCAs in East Asia. Main econometric results can be summarized in three points as follows.

Firstly, despite overall heterogeneity across the region in terms of bilateral connection between currencies, a core group representing more than one half of the countries included in our sample, i.e. Japan, three out of the four tigers except Hong Kong, and Thailand, Laos, Myanmar, and Brunei, appear to have constituted de facto an emerging market-driven OCA. The rationale lies in the finding by which the intra-regional volatility of their currencies is contemporaneously linked and the degree of linkage grows from the first sub-period to the second sub-period. On this point, there is emerging in East Asia a premature market-led bilateral nominal peg that functions analogously to the institution-imposed band for exchange-rate fluctuations as the “Snake” in the 1970s and the ERM (exchange rate mechanism) for the EMS (European Monetary System) in the 1980s. This type of peg not only favors regional policy coordination, but can be regarded as the prelude to a possibly government-driven OCA to be launched in the future.
Secondly, bilateral currency cohesion is less convincingly visible when we take into consideration the lagged time dimension, in particular for the eight core countries discussed above. In contrast, the countries that exhibit the lowest degree of contemporaneous currency cohesion with others, in particular Indonesia and Philippines, establish a certain lagged link, which is relatively diverse in form, with some of their privileged regional partners. This seems to imply that market-driven currency cohesion in nominal terms is best observable in the medium run, e.g. on a monthly basis, while the lagged connection is more likely to be significant in the longer run and measurable in real terms only.

Finally, a fall in the degree of contemporaneous currency cohesion between Japan and South Korea provides important implications for the future Asian “geography of money”, a terminology by Cohen (1998). It has been argued in Section 3 that continual growth in the trade of Japan and South Korea respectively with the rest of East Asia, along with the long-run impact created by the ongoing ASEAN+3 agenda, risk a substantial crowing-out effect that gradually degenerates the traditional link between the two countries in trade as well as in currency. The same dynamics undoubtedly apply to other historically close or geographically proximate countries in East Asia. As long as intra-regional trade becomes predominant at the expense of extra-regional trade, dynamics of trade patterns in East Asia will be decisive in determination of the form of regional OCAs. More specifically, an asymmetric intra-regional trade pattern dominated by Japan or China, or a relatively symmetric one with the approximately equal weight for each regional economy, will lead to two distinct types of trade-driven OCAs in the long run in East Asia. For example, the former may be in the form of an effective “yen bloc” or “yuan bloc”, while the latter may be analogous to a variant of “East Asian dollar standard” as advocated by McKinnon (2005).

The main findings and their relevant policy implications are nevertheless confronted with some problems underlying the methodology innovated and employed in this paper. The major shortcoming involves fixed exchange rates prevailing over most of our sample period for Malaysia and China, two important East Asian economies excluded from our study. However, the two countries start to adopt a limited floating system since the RMB revaluation in July 2005. Our methodology will therefore soon be applicable as the number of observations becomes sufficient for empirical analysis. An alternative solution consists in adoption of real exchange-rate series instead of nominal ones to examine regional currency cohesion at the purchasing power parity.
References


