OPTIMUM CURRENCY AREA CRITERIA AND VOLATILITY IN ASEAN

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ABSTRACT

The goal of regional integration is to promote greater macroeconomic coordination, and reduce the degree of macroeconomic volatility, in particular exchange rate fluctuations. This paper investigates how well optimum currency area (OCA) variables will work in the context of the ASEAN region when the Singapore Dollar, given its relative stability, is used as an anchor currency. The results indicate that OCA variables play an important role in explaining bilateral exchange rate volatility. In addition, exchange rate volatility exerts a negative impact on bilateral trade and gross domestic product (GDP). It is also a source of divergence among ASEAN members.

Keywords: optimum currency area, bilateral trade, exchange rate volatility, asymmetric shock, size

1.INTRODUCTION

Macroeconomic coordination is an important policy objective, in the context of greater regional integration as envisaged by the Association of Southeast Asian Nations' (ASEAN) Free Trade Area (AFTA). The purpose of regional integration is to promote greater macroeconomic coordination by facilitating monetary cooperation and foreign exchange arrangements among ASEAN members with the ultimate goal of reducing the extent of macroeconomic volatility brought about by factors such as exchange rate volatility (Frankel & Wei, 1993). The European Union (EU) is a successful model of economic integration, under which exchange rate uncertainty and misalignment is avoided and trade and investment between members is promoted (Ariccia, 1999). Exchange rate stability is vital in any effort to ensure macroeconomic stability. Economic theory suggests that misalignments in the real exchange rate of nations, as well as their departure from long-run equilibrium rates, negatively affect economic growth. These conditions create relative price uncertainty, trigger increased adjustment costs and decrease the efficiency of resource allocation in domestic markets (Kemme & Teng, 2000). Hence, any effort to stabilize exchange rates allows for the creation of a more conducive business environment and can potentially increase economic growth rates. Given the importance of the above issues in promoting prosperity among ASEAN nations, the question of how exchange rate volatility (ERV) can be reduced becomes vital. The regional financial crisis in 1997 to 1998 eroded the credibility of unilateral fixed exchange rates, and renewed calls for greater monetary integration and regional exchange rate stability in East Asia (EA). The success of the Euro also raised interest in the viability of a common currency for both ASEAN and the developed economies of East Asia (Zhang, Sato, & McAleer, 2004). This issue was addressed extensively in the November 1999 ASEAN meeting, where the grouping's 10 members were urged to work harder to achieve the target of a common market and a single currency (Asia Now, November 29, 1999; Hurley & Santos, 2001). However, a formal institutional framework appears to be lacking in the drive to achieve monetary integration. In addition, economic and financial conditions differ greatly among the ASEAN nations. Nevertheless, it should be noted that the economies in ASEAN have experienced a rapid, seemingly spontaneous period of regional integration in the last decade. This integration arose as a result of the unilateral liberalization of the goods and capital markets. Despite the fact that quantifying the costs and benefits and applying the guidelines of an optimum currency area (OCA) is difficult, the literature shows that ASEAN has several characteristics that suggest that the benefits of implementing a common currency may be significant, even relative to the costs (Madhur, 2002). Overall, the composite OCA indices for the region are similar to those for the EU (Bayoumi & Eichengreen, 1998). These indices take into account intraregional trade, wage-price flexibility, labor mobility, and shock symmetry. By using a variety of such indicators from the OCA literature, Bayoumi and Eichengreen (1998) conclude that, from a purely economic perspective, ASEAN is as suitable for an OCA as Europe was prior to the Maastricht Treaty.

Table 1: Economic growth and depreciation2 around the 1997 economic crisis

	Growth 1998 (%)	Depreciation (%)
Indonesia	–1.4	85
Malaysia	–6.5	45
Philippines	–0.5	40
Singapore	1.5	20
Thailand	– 8.0	60

Source: Lee and Tan (2004)

During the post-Bretton Woods period, the ASEAN-5 nations experienced substantial ERV despite adopting a crawling peg exchange rate regime. Between 1974 and 1999, the Indonesian Rupiah was the most volatile of the ASEAN currencies, followed by the Philippine Peso, while the Singapore Dollar was the least volatile (Hurley & Santos, 2001). Other evidence documenting the volatility of ASEAN currencies can be found in studies done by Nam and McAleer (2002) and Lee and Tan (2004). Table 1 depicts the data from Lee and Tan (2004). From Table 1, generally ASEAN currencies appear to be too volatile and sensitive to sudden shocks. The order of volatility, however is in contrast to Hurley and Santos (2001). Despite this difference, it is apparent that the two countries most affected by problems of volatility, Thailand and Indonesia, also suffered the largest negative economic growth. Singapore was the least volatile of the ASEAN states, and was least affected by the economic crisis. The island's economic growth was indeed low, but it remained positive during this period.A popular view among economists and policy makers since the Asian crisis is that developing countries with open capital accounts have a bipolar solution to the exchange rate dilemma: either a free float or a hard peg. The hard peg solution refers specifically to the use of a common currency or the formation of a monetary union. Hochreiter and Winckler (1995) outlined the costs and benefits of giving up a national currency and joining a monetary union. Among the effects described in relation to the Euro was a boost in economic growth that occurred via increased trade (Rose, 2000; Frankel & Rose, 2002). Joining a monetary union also facilitated greater microeconomic efficiency by eliminating ERV, hence lowering interest rates and promoting international use of the currency. Given relative stability of Singapore's currency, we examine the bilateral exchange rate between the four major ASEAN economies, namely Malaysia, Thailand, the Philippines and Indonesia,5 and the Singapore Dollar. It is our intention in this paper to first find an explanation for the volatility in the exchange rate,6 and thus determine the

feasibility of a single currency in ASEAN region. By definition, if the OCA variables shown in this study significantly explain the variation in exchange rate, the ASEAN common currency would be deemed viable and likely strengthen the argument for the AFTA.7 It is also our intention to examine if there is reverse (Granger) causality in the relationship; in other words, whether ERV had an impact on OCA criteria. Should the empirical model validate the formation of an OCA in ASEAN, our final motivation would be to identify the difficulties that ASEAN nations have to face even before they start on the road towards a common currency. The paper is organized as follows. The section that follows presents a review of the existing literature, and includes definitions of the OCA variables. The third section specifies the empirical model along with its estimation procedures. This is followed by an empirical assessment of the model with the results being interpreted in the forth section. In addition, as part of the answer for the third objective, we raise the possible difficulty faced by ASEAN in successfully forming AFTA and thus become the agenda for ASEAN to work through before the aim of forming AFTA can be realized. The paper concludes in section five by proposing direction for future research.

2. FRAMEWORK – OCA THEORY AND HYPOTHESES

Mundell (1961), in his seminal paper entitled A theory of optimal currency areas, was one of the first economists to argue against the "system of national currencies connected by flexible exchange rates". The alternative he came up with was a system where currencies are not defined by national borders, but by geographic areas within which factor mobility is high. Mundell's basic premise was that "the choice between fixed and flexible exchange rates should not be independent of the economic characteristics of the countries or areas in questions" (Tower & Willett, 1976).8 Mundell was convinced from the onset, however that his theory was politically unfeasible because sovereign nations would never abandon their national legal tender for a shared currency. Largely triggered by Mundell's idea, and despite his reservations, the Euro became Europe's uniting currency in January 2002, effectively replacing eleven national currencies. Therefore, this study utilizes the OCA criteria as part of the possible explanation to the idea of creating a single currency in ASEAN. According to the OCA theory, the wisdom of joining a monetary union can be decided using three major factors. These are the extent of trade intensity between the countries in the proposed area, the symmetry of economic activity, and country-specific characteristics (Ling, 2001). McKinnon (1963) argued that highly open economies qualify for OCA since a common currency is very important for their stability and prosperity. The key benefit of monetary unification is that it reduces uncertainty related to exchange rates and reduces the cost of doing business across borders, and thus induces great impact on regions that trade extensively (Glavan, 2004). The higher the level of intra-trade between two countries and the greater the intensity of trade within a region, the higher the possibility of forming an OCA will be. Given this assumption, we hypothesize that there will be a negative association between ERV and (bilateral) trade.9 Asymmetric shocks are another important element of OCA theory, as they tend to undermine the case for a common currency. Asymmetric shocks occur when an unexpected disturbance affects one country's national output differently from another (Frankel & Mussa, 1980). The OCA literature stresses that similar shocks across a monetary union's participating countries are likely to reduce the costs of forgoing the exchange rate as a shock absorbing mechanism. On the other hand, the retention of the exchange rate as an independent policy instrument is crucial if a country faces mainly asymmetric shocks (Ling, 2001).In Mundell's paradigm, policy makers have to balance the transactions cost savings derived from the creation of a single currency against the consequences of diminished policy autonomy. This diminution of autonomy follows from the loss of an independent monetary policy that commonly serves as an instrument of adjustment. Such a loss of autonomy will be more costly when:

(a) macroeconomic shocks are more "asymmetric" (for present purposes, more region- or country-specific).

(b) monetary policy is a powerful instrument for offsetting such shocks.

(c) other adjustment mechanisms, such as relative wages and labor mobility, are less effective (Eichengreen, 1997).

In the face of these concerns, Mundell suggested that a common currency is able to mitigate asymmetric shock because it involves a pooling of the members' reserves and a more diverse investment portfolio. In a monetary union, a country that suffers from an adverse shock effectively "shares" the loss with its trading partners, because the partner hold a claim on each other's output through the common currency. Under a flexible exchange rate however, no such portfolio diversification exists and a country facing an adverse shock may suffer devaluation. The domestic currency and its assets would buy less on world markets and the cost of the shock would be confined largely to the country within which the shock originated. In short, we hypothesize that there is a positive association between asymmetric shock and ERV. Existing OCA theories are primarily related to the choice of exchange rate regime. They also tend to focus on country-specific variables that do not change very much over time. Devereux and Lane (2003) proposed the use of relative size of the gross domestic products (GDPs) of two countries as a proxy for size. Size, measured as the log of the product of the GDPs of countries i and j, can be considered a proxy for the microeconomic benefits of exchange rate stability. In other word, smaller countries are expected to be less willing to tolerate fluctuations in their nominal exchange rate. Hence, we expect a positive relationship between ERV and a country's GDP.

3. EMPIRICAL MODEL AND ESTIMATION PROCEDURE

It is the purpose of the authors to investigate the relationship between ERV and the OCA variables, i.e. intra-trade, asymmetric shocks, and size. Our aim is to justify the feasibility of the OCA idea within ASEAN. Our empirical model is specified as follows:

$$\mathrm{ERV}_t = \beta_0 + \beta_1 \mathrm{OCA}_t + \varepsilon_t^1 \qquad (1)$$

$$\mathrm{ERV}_t = \beta_0 + \beta_{11} \ln \bar{\mathrm{IT}}_t + \beta_{12} \overset{+}{\mathrm{AS}}_t + \beta_{13} \ln \overset{+}{\mathrm{SIZE}}_t + \varepsilon_t^2 \qquad (2)$$

IT refers to bilateral (or intra-) trade between Singapore and other ASEAN members. It is entered in the log form and is expected to have a negative sign, since higher levels of trade will lead to a greater desire for lower ERV. This takes place to reduce the extent of losses suffered as a result of poor currency exchange and to reduce uncertainty in the pursuit of profit. AS stands for asymmetric shocks, and a positive relationship is expected between this factor and ERV. The higher the level of the AS between two countries, the more profound is the more-adversely affected country's desire to have a flexible adjustment mechanism (a flexible exchange rate) to absorb the impact of the shocks. Size here represents the interaction between Singapore's GDP and that of corresponding ASEAN countries. As mentioned in Devereux and Lane (2003), this variable is a proxy for country-specific characteristics and captures the notion that the smaller country will not be able to tolerate variations in the exchange rate. Hence, we expect the sign to be positive. ERV is measured as a moving average of first-differenced nominal exchange rate, with an order of three (m = 3), as follows:

$$\mathrm{ERV}_t = \left[\left(\frac{1}{m} \right) \sum_{i=1}^{m} \mathrm{ER}_{t-1-i} - \mathrm{ER}_{t-i} \right] \quad (3)$$

$$\mathrm{AS}_t = \left[\left(\mathrm{growth}_{k,t} - \mathrm{growth}_{j,t} \right)^2 \right]^{1/2} \quad (4)$$

where the subscripts k and j stand for country k and j, respectively. Many forms of economic time series data exhibit common features such as periods of stationarity. However, it is only recently that time series econometricians have formalized the concept of common co-movements at particular frequencies in econometric models, together with the idea that common factors may influence the trend component of some macroeconomic variables. Nevertheless, the statistical underpinnings of time series analysis require that the data be stationary. This will require a first-difference for most macroeconomic series before estimating the economic model. Hence, the significance of detecting and rectifying the trend component in macroeconomic data is sufficiently indicated. If two or more variables have a common trend, then causality must exist in at least one direction. Many series, even those which are non-stationary, when examined separately, will display a long-term equilibrium relationship if they are joined linearly (Engle & Granger, 1987). Hence, both series are said to be cointegrated. Cointegration tests are concerned with the long-term behavior of the components of partially non-stationary time series elements – this is an indication of a common trend component. In other words, cointegration is the statistical approach that tests for the existence of a long-run equilibrium relationship among non-stationary variables integrated in the same order. Two non-stationary series are said to be integrated if there exists a linear combination of the two series. For this purpose, Johansen and Juselius (1990) have introduced two likelihood ratio tests to determine the number of cointegrating vectors, namely the maximum eigenvalue and trace tests. However, given the endogenous nature of OCA variables, it is also very important to analyze the dynamic short run relationship among the variables in the study. The cointegration between two or more variables is sufficient to indicate causality in at least one direction (Granger, 1988). The causality between predetermined and dependent variables can be examined by conducting the Wald test, that is, by calculating the F-statistic based on the null hypothesis that a set of coefficients on the lagged values of independent variables are equal to zero. If the null hypothesis is accepted, it can be concluded that the independent variables do not cause the dependent variable. The long-run relationship between ERV and OCA variables is tested using cointegration procedures. Three types of exchange rates10 were chosen, namely RM/SD, Baht/SD, and Peso/SD, where SD stands for the Singapore Dollar, RM for the Malaysian Ringgit, and Peso for the Philippines' Peso. These rates were tracked over the 1967 to 2002 period, along with data on each country's GDP per capita by using data compiled in International Financial Statistics, a publication of the International Monetary Fund (IMF). Data on the bilateral trade between Singapore and its ASEAN trading partners were collected from Direction of International Trade, another publication of the IMF for the period of 1970 to 2002.

4. RESULTS AND DISCUSSIONS

The results of unit root tests based on Philips-Perron (1988) are presented in Table 2. It appears, in general, that all variables are non-stationary at level in each country. The use of the vector error correction procedure is appropriate, given the evidence that all variables are integrated of order of 1 or I(1). Table 2 provides the results of the cointegration test, as well as the trace and maximum eigenvalue tests. From the results of the Johansen cointegration test, the null hypothesis of no cointegration is rejected at the 0.01 significance level for all three economies. We can conclude then, that all variables are cointegrated and there is a long run equilibrium. A summary of the overall result is presented in Table 3.

Table 2 : Unit Root Test – Philips-Perron (1988) Test

	Level		First difference	
	C	C & T	C	C & T
Rupiah/SD				
ERV	1.6680	0.5567	−4.1442***	−4.7963***
lnIT	−2.0284	−1.9192	−3.6538**	−3.6911**
AS	−3.2568*	−3.1597	−6.5204***	−6.7486***
lnSIZE	−2.5317	−1.8751	−3.9724***	−4.1886**
RM/SD				
ERV	−2.9005	−3.1626	−4.0999***	−3.6127***
lnIT	−1.1986	−3.4731**	−3.1548 ***	−2.8170**
AS	−1.7690	−1.7115	−4.9106 ***	−5.0415***
lnSIZE	−0.5584	−2.4549	−3.3998 ***	−3.3078***
Peso/SD				
ERV	−0.4636	−2.1189	−5.5124***	−5.6507***
lnIT	−1.5787	−2.8424	−6.3346***	−6.4809***
AS	−3.1059**	−3.1040	−5.4277***	−5.2853***
lnSIZE	−1.9793	−2.4963	−3.074525***	−3.0798
Baht/SD				
ERV	−2.8642	−3.0334	−4.8765***	−4.7169***
lnIT	−2.4765	−1.3856	−3.5134**	−4.0735**
AS	−3.1360**	−3.1903	−4.8964***	−4.7511***
lnSIZE	−1.7983	−2.0008	−3.3801**	−3.4784*

Notes: *, ** and *** are MacKinnon 90, 95 and 99% critical values for rejection of hypothesis of a unit root, respectively.

Table 3: Cointegration Tests – Trace and Maximum Eigenvalue Tests

H_0	Trace test					Maximum eigenvalue test				
	IS	MS	PS	TS	1%	IS	MS	PS	TS	1%
$r = 0$	74.1*	69.9*	58.7*	55.1*	54.4	49.4*	38.8*	41.3*	22.5	32.2
$r \leq 1$	24.6	31.0	17.4	32.6	35.6	14.3	22.6	12.4	13.8	25.5
$r \leq 2$	10.2	8.4	5.1	18.7	20.0	8.5	8.2	4.8	11.1	18.6
$r \leq 3$	1.7	0.3	0.2	6.6	6.6	1.7	0.3	0.2	6.6	6.6

Notes: IS = [Rupiah/SD], MS =[RM/SD], PS = [Peso/SD], and TS = [Baht/SD]. * denotes significant at 1%.

The estimated error correction model (ECM) for each equation is presented in Panel I of Table 4. From the ECM, it appears that the lagged period of the error correction term (ECT) in each equation enters significantly with a correct sign and magnitude. This provides further evidence that there exists a long-run equilibrium among variables. The ECT reflects the adjustment process on the path towards this long-run equilibrium. From Panel II in Table 4, it is apparent that the standard error of regression for each model is generally low. The robustness of the model is affirmed by diagnostic tests, including the LM test (Breusch-Godfrey serial correlation test), the ARCH test (heterogeneity test), the Jacque-Bera test (normality test) and the CUSUM test (stability test) under 1% critical value. Table 5 provides the results of the long run equations. These estimated equations show that all the OCA variables satisfy their expected sign: negative for IT and positive for AS and SIZE. All variables are significant, except SIZE in relation to the Baht/SD equation (see Table 5). Bilateral trade between Singapore and other ASEAN economies can be considered to be the most significant determinant for ERV. The negative sign implies that in order to reduce the extent of the variation in the exchange rate, ASEAN economies should make an effort to increase the level of intra-ASEAN trade. The current level of intra-ASEAN trade only comprises 20% of total ASEAN trade. A low level of intra-ASEAN trade may retard the effort to promote the AFTA, along with the stability of the region. The positive association between bilateral trade and ERV also suggests that the higher the level of bilateral trade, the greater the desire for a relatively stable, if not fixed, exchange rate regime. In other words, large bilateral trade volumes act as an incentive for the maintenance of a stable or fixed exchange rate.

Table 4: ECM Model and Its Diagnostic Tests

Panel I: ECM model

$$\Delta ERV_{IS} = -0.28ECT_{MS}(-1)^{***} + 0.13\Delta ERV(-1) - 0.95\Delta lnIT(-1) + 0.72\Delta AS(-1) - 0.05\Delta lnSIZE(-1)$$

$$\Delta ERV_{MS} = -0.44ECT_{MS}(-1)^{***} + 0.29\Delta ERV(-1) - 0.29\Delta lnIT(-1) + 0.02\Delta AS(-1) - 0.45\Delta lnSIZE(-1)$$

$$\Delta ERV_{PS} = -0.45ECT_{PS}(-1)^{***} + 0.24\Delta ERV(-1) + 0.32\Delta ERV(-2) + 0.07\Delta lnIT(-1) - 0.17\Delta lnIT(-2) + 0.29\Delta AS(-1) + 0.47\Delta AS(-2)^{**} + 1.17\Delta lnSIZE(-1) - 1.85\Delta lnSIZE(-2)$$

$$\Delta ERV_{TS} = -0.82ECT_{TS}(-1)^{***} + 0.34\Delta ERV(-1) + 0.41\Delta ERV(-2) - 1.38\Delta lnIT(-1) + 2.18\Delta lnIT(-2) + 0.29\Delta AS(-1) + 0.08\Delta AS(-2) - 12.58\Delta lnSIZE(-1) - 2.59\Delta lnSIZE(-2)$$

Panel II: Model criteria and diagnostic tests

	IS	MS	PS	TS
R^2	0.3569	0.4966	0.5087	0.5197
S.E. of regression	2.2356	0.1381	1.2778	2.1150
Autocorrelation	0.5243 (0.5112)	0.2514 (0.6160)	0.7034 (0.4087)	0.6453 (0.5220)
Heterogeneity	0.1384 (0.2659)	0.0458 (0.8322)	0.0772 (0.7833)	0.3698 (0.5430)
Normality	2.5598 (0.2946)	2.6421 (0.2670)	1.3660 (0.8501)	1.7612 (0.8112)

Notes: Figure in ( ) denote p-value and the test is based on F- test. Stability is based on CUSUM test and available upon request. IS = [Rupiah/SD]; MS = [RM/SD]; PS = [Peso/SD]; TS = [Baht/SD]. *, ** and *** denote significant at 90, 95 and 99% critical values, respectively.

Table 5 : Long Run Equation

1. Rupiah/SD			
ERV =	$-0.1594lnIT^{*}$	$+ 0.7383AS^{*}$	$+ 0.0024lnSIZE^{***}$
	[–1.8687]	[2.0021]	[3.6942]
2. RM/SD			
ERV =	$- 0.1594lnIT^{**}$	$+ 0.1383AS^{**}$	$+ 0.1220lnSIZE^{*}$
	[–3.6374]	[3.6521]	[2.6942]
3. Peso/SD			
ERV =	$- 1.5101lnIT^{***}$	$+ 1.6962AS^{***}$	$+ 0.1341lnSIZE^{**}$
	[– 7.2291]	[6.2876]	[4.6009]

Notes: Figure in [ ] denotes t-value. *, ** and *** denote significant at 10, 5 and 1% critical values, respectively.

Turning to the impact of AS, it appears that its contribution to volatility is relatively low, since Malaysia's and Thailand's economic performance is becoming similar to that of Singapore's, at least in terms of GDP per capita growth. The contribution of AS to ERV is relatively low for Malaysia (or RM/SD) and Thailand (or Baht/SD), but much higher for the Philippines (or Peso/SD) and Indonesia (or Rupiah/SD). This development may be explained by the similarities in the production structure of ASEAN economies, as well as by the parallel movement towards greater openness, for example, in the form of a more export-focused orientation and the liberalization of capital accounts. In general, the level of AS suffered by the ASEAN economies is not very high. What exists instead is a high degree of shock symmetry (Madhur, 2002). In short, the significant and positive impact of AS on ERV suggests the existence of slight differences between Singapore and its ASEAN trading partners. This observation also implies the need for adjustments when the economic condition of a trading partner changes unexpectedly. Another important finding from this study relates to the relative contributions of AS and IT to ERV. Although the relative impact of IT is larger than AS in Malaysia and Thailand, the reverse is observed in the Philippines. IT does not always have a bigger role in determining the choice of exchange rate regime, and this conclusion is consistent with the contradictory results already apparent in the literature. For example, some authors argue that trade (commonly used as a proxy for openness) may provide countries with an incentive to maintain fixed rates, while others point out that foreign shocks are more important in countries that are more open, making floating rates more appealing as a method of shock absorption. In all cases, SIZE plays only a minor role in explaining real ERV. Its effects appear to be insignificant in the case of the Baht in relation to the SD. Although small, the SIZE element is positive, implying that the

economies are not big enough to absorb any shocks. Given the relatively small value of their coefficients, we can say that there is a growing trend for ASEAN economies to develop their own capability in handling the shocks as well as a tendency to have stable (if not fix) exchange rate regime. The results of the short-run Granger causality tests are presented in Table 6. Short-run Granger causality appears to run mainly from the ERV to each of the OCA criterion, although the short-run impact on IT and AS is insignificant in the case of Baht/SD. Meanwhile, the short-run Granger causality running from each of the OCA criterion to ERV or other OCA criterion is less apparent. Therefore, the disequilibrium in the short-run may be due to the shock of the ERV.

Table 6: Granger Causality Based on VECM

	ΔERV [F-stat]	ΔlnIT [F-stat]	ΔAS [F-stat]	ΔlnSIZE [F-stat]	ECM [t-stat]
Panel I: Rupiah/SD					
ΔERV	–	1.6594 [0.1734]	0.6744 [0.4245]	1.2303 [0.1932]	–0.2819*** [0.0051]
ΔlnIT	(–) 7.6512*** [0.0035]	–	0.1464 [0.6311]	4.1641* [0.0857]	3.1275*** [0.0621]
ΔAS	(+) 4.0114* [0.0837]	0.1423 [0.6925]	–	3.2208* [0.0524]	–2.1458*** [0.0014]
ΔlnSIZE	(–) 6.2532** [0.0389]	4.2358* [0.0627]	2.2169 [0.2518]	–	1.5314 [0.1640]
Panel II: RM/SD					
ΔERV	–	1.8594 [0.1727]	0.5743 [0.4485]	1.9403 [0.1636]	–4.6019*** [0.0001]
ΔlnIT	(–) 9.0192*** [0.0027]	–	0.0412 [0.8391]	24.1641*** [0.0000]	3.1275*** [0.0046]
ΔAS	(+) 6.0804** [0.0137]	0.1584 [0.6906]	–	3.8908** [0.0485]	–3.6073*** [0.0014]
ΔlnSIZE	(–) 5.7032** [0.0169]	3.2326* [0.0722]	1.2129 [0.2708]	–	1.3777 [0.1810]
Panel III: Peso/SD					
ΔERV	–	0.0311 [0.9845]	5.7757* [0.0557]	0.0908 [0.9556]	–3.4595*** [0.0026]
ΔlnIT	(–) 5.1544* [0.0760]	–	0.6648 [0.7172]	24.9817*** [0.0000]	0.1519 [0.8808]
ΔAS	(+) 8.3919** [0.0151]	1.2949 [0.5234]	–	3.3661 [0.1858]	–4.2073*** [0.0005]
ΔlnSIZE	(–) 15.586*** [0.0004]	4.2222 [0.1211]	8.1366** [0.0171]	–	2.0329* [0.0563]
Panel IV: Baht/SD					
ΔERV	–	0.6227 [0.7324]	0.8142 [0.6656]	4.3651 [0.1128]	–2.7569** [0.0125]
ΔlnIT	(–) 3.8256 [0.1477]	–	0.9761 [0.6138]	3.2802 [0.1940]	–1.0273 [0.3172]
ΔAS	(+) 4.0498* [0.0976]	0.9326 [0.6273]	–	1.1956 [0.5500]	–1.9263* [0.0692]
ΔlnSIZE	(–) 22.648*** [0.0000]	1.6137 [0.4462]	2.9259 [0.2315]	–	–1.5528 [0.1369]

Notes: Sign in ( ) denote the sign of impact and value in [ ] refers to p-value. *, ** and *** denote significant at 10, 5 and 1% critical value, respectively.

We attempted to examine the severity of the ERV impact on real economic activities more closely. Focusing on the second column of Table 5, the short-run Granger causality from ERV into each of the OCA criterion becomes clear. The sign in the bracket stands for the direction of the impact of the ERV on each of OCA criterion. Although many studies that utilize the VAR model (i.e. VECM) investigate the direction of impact by using impulse response functions (IRFs), we chose not to focus on the IRFs and instead simply sum up the coefficients of the short-run impact of the ERV. This method of quantifying the short run effect by summing up the coefficients is commonly carried out as part of ARDL procedures. When there is more than one lag of the VAR model, the short-run coefficient (or impact) is estimated by the summation of first-differenced ERV coefficient, while the significance of the impact is tested by an F-test based on Wald-test procedure. While the short-run impacts of ERV on IT and SIZE are negative, its impact on AS is positive for all three equations. This negative impact of ERV on trade is justified in many studies, such as Poon, Chong, and Habibullah (2005) who examined Malaysian experiences and found that volatility tends to exert a negative impact on Malaysian export. The negative impact of ERV on SIZE can be considered as a justification of Table 1 in which highly volatile exchange rates led to a low growth rate. Finally, the positive impact of ERV on AS means that ERV, which is used as a proxy for miscoordination,11 can contribute to greater divergence, instead of convergence, among ASEAN members. In short, we found that ERV has in general contributed negatively to the level of real economic activity. Both generally and empirically, we found that all OCA variables play an important role in explaining the ERV, and thus in the choice of an exchange rate regime. The question then arises as to why the idea of a common or single currency has not been even remotely realized. From the empirical results, possible explanations include smallness, coordination, the choice of currency, as well as labor immobility. Although increasing bilateral trade will increase a desire to forge a common currency, the current level of intra-ASEAN trade intensification is still low.12 In other words, ASEAN has relied more heavily on trade with non-ASEAN nations, than among themselves. This fact combined with the large foreign capital inflows means that ASEAN in general is very sensitive to external shocks13 (Ravenhill, 2000; Rajan & Siregar, 2002) at least via foreign capital flow.14 On the other hand, large differences exist among the members especially in relation to their level of economic development. Exacerbating the situation is the fact that ASEAN lacks coordination in the form of a legal body that could supervise, monitor and enforce regulations. The immobility of labor across the region makes it

very difficult to reduce the use of monetary policy (by fixing the currency) as a means for adjustment. Finally, perhaps the biggest issue that has to be tackled both politically and economically would be the choice of a common currency.

5. CONCLUDING REMARKS

The formation of the AFTA, like any regional economic arrangement, serves largely to help foster stability across the region. The formation of AFTA can be further strengthened by the idea of a single currency. The feasibility of AFTA and single currency is the main focus of this study. We investigated whether there is room for OCA variables in explaining ERV in the case of ASEAN-5 for the period of 1970 to 2002.

As mentioned in the previous section, although OCA variables might play a significant role, they may not fully account for the variance in exchange rates. As suggested in previous studies (i.e. Bayoumi & Eichengreen, 1998; Calvo & Reinhart, 2002; Madhur, 2002; Devereux & Lane, 2003; Devereux, Lane, & Xu, 2004), attention should also be focused on areas beyond the OCA criteria, such as the financial sector, to better understand the choice of an exchange rate regime.

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