

**RESERVE POOLING AND SINGLE CURRENCY IN ASEAN:
EVIDENCE FROM PANEL ANALYSIS**

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Abstract

Regional economic integration in ASEAN, ASEAN Free Trade Area (AFTA) is expected to produce positive outcome on economic growth in ASEAN especially through its impact on trade and investment. This idea can be strengthened if regional monetary integration is followed. Therefore, focusing on the reserve pooling, which is one of the proxy for OCA variables, this study intends to examine the feasibility of common currency in ASEAN. In addition, this study also investigates this idea in the presence of external shock.

Keywords: Single currency; International reserve; Terms of trade shock; AFTA.

JEL Classification Codes: F31; F32.

1. Introduction

Following the breakdown of the Bretton Woods system in the early 1970s, the ASEAN economies are generally adopted a fixed but adjustable (crawling peg) exchange regime. Although such exchange rate regimes are expected to be relatively stable, they do encounter volatility (Hurley and Santos, 2001). Table 1, which is extracted from Lee and Tan (2004), shows currency depreciation of ASEAN-4 around the 1997 economic crisis, which tells us that how volatile are ASEAN currencies to sudden shocks. This view is also supported by Jason and McAleer (2002). Subsequently, we could also see lower or even negative growth of external sector (or trade) in ASEAN-4.

Table 1: Economic growth and depreciation

	Growth 1998	Depreciation^a	Trade growth 1998
Indonesia	- 14 %	85 %	-34.04 %
Malaysia	- 6.5 %	45 %	2.14 %
Singapore	1.5 %	20 %	-7.62 %
Thailand	- 8.0 %	60 %	- 3.64 %

Note: ^a Refers to the worst currency value lost since the currency turmoil.

Source: Lee and Tan (2004) and authors' own calculation.

Generally, most of the emerging economies, particularly ASEAN economies, pegged their currencies gradually to the US dollar before the 1997 economic crisis. The advantage of (adjustable) pegging to USD is that it provides macro-economic discipline by maintaining prices of tradable goods in line with foreign prices. This exchange rate policy contributed to the relative stability of the exchange rate in East Asian countries until 1995, and subsequently promoted export-led high economic growth in each country (Aminian, 2005). At the meantime, the appreciation of Japanese Yen has added additional advantages of fixing the currency to USD – i.e. attraction for Japanese investors to invest in the region as well as the expansion of intra-regional trade (Sazanami and Yoshimura, 1999). In other words, the fix rate has granted the ASEAN with competitiveness. But, this “ad-hoc” competitiveness started to decline when USD started to appreciate in 1995. Therefore, the 1997 economic crisis triggered wide-ranging and extensive research on the optimal choice of exchange rate regimes in emerging markets (Mussa et al, 2000; Williamson,

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2000). The Asian currency crisis of 1997 hit most of the economies in the region with strong shocks to their trade, capital inflows and incomes. Despite rapid recovery in some of the affected countries, the crisis may have long-lasting negative effects on economic development in the region. This phenomenon is best explained by the tremendous growth in global trade as well as greater mobility of capital.

This is one of the reasons why East Asian countries, particularly ASEAN, have shown growing interest in economic and monetary cooperation (Aminian, 2005). With the recent experience of economic crisis and the onset of economic recovery in the region, ASEAN is shifting its focus towards implementing measures that would limit the susceptibility of their economies to another such crisis while strengthening the region's economic solidarity. Concerns about exchange rate volatility have prompted central banks to actively intervene in foreign currency markets from time to time and among policies under consideration by the ASEAN policymakers towards this end include measures to reduce exchange rate fluctuations via such as the adoption of a common currency similar to the Euro (Madhur, 2002)¹.

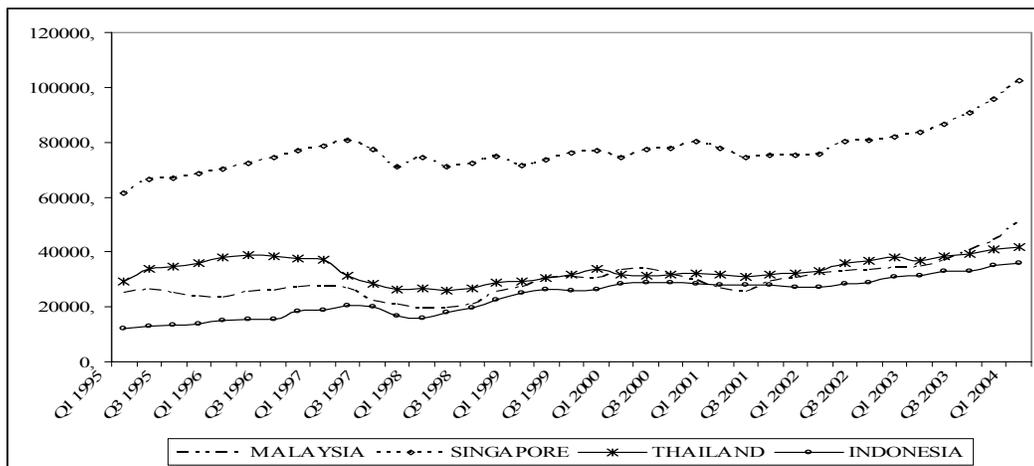


Figure 1: Net international reserves (in Billion US dollar) -Indonesia, Malaysia, Singapore and Thailand

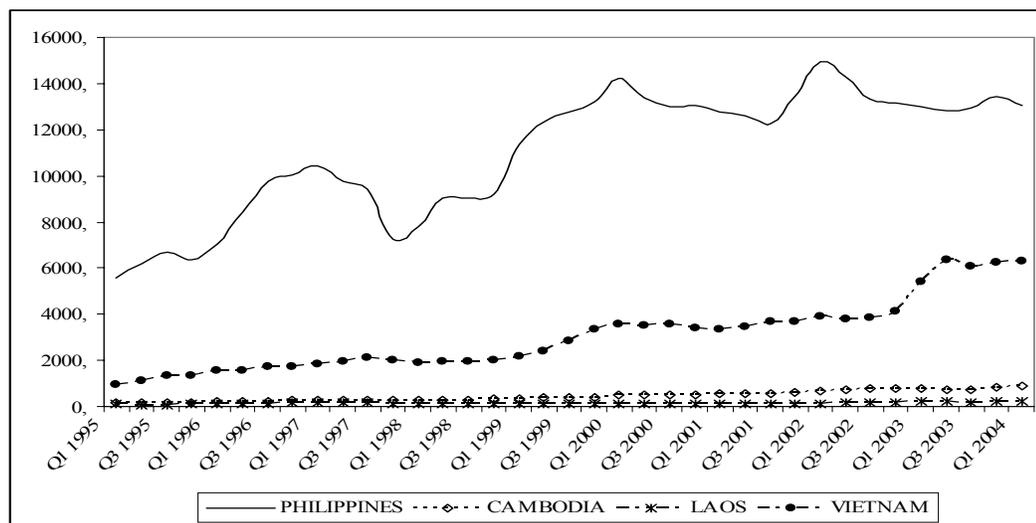


Figure 2: Net international reserves (in Billion US dollar) -Cambodia, Laos, The Philippines and Vietnam

Source: International Financial Statistics (IMF, 2007)

¹ Another related issue is on the revisions to the basket of currencies against which regional currencies are pegged. See also for detail discussion in Dieter and Higgot (2003) and Bird and Rajan (2003).

In conjunction with the increased in exchange rate volatility, from Figure 1 and 2, we could see that the level of net international reserve of all ASEAN-8 economies is recording an increasing or upward trend. Theoretically, one of the reason of why reserve holding rise is because the movement towards fixed exchange rate regime (Aizenman and Marion, 2003)². In other words, a country's tolerance for greater exchange rate flexibility should reduce its demand for reserves, because its central bank would not need a large reserve stockpile to manage a fixed exchange rate. Therefore, reserve holdings are likely to be lower, the more variable the country's exchange rate is. In addition, Eichengreen (2006) also argued that one way of more effectively mobilizing reserves would be through pooling them via an organization (i.e. regional organization) and using them for co-insurance. The reserve pool can be used for emergency lending in response to sudden stops (or shocks). Therefore, whether there is association between reserve pooling and exchange rate volatility, and thus validating optimum currency area (OCA) in ASEAN, is the main issue that this study attempts to address.

The organization of this paper is as follows. The next section provides literature review on the related studies. The third section discusses the empirical model specification, and the estimation procedure will be presented in the forth section. Results and discussion available in the fifth section, and concluding remarks in the sixth section will end up this paper.

2. Literature review

The feasibility of optimum currency area (OCA) theory, which postulates that lower transaction costs, reduced need for reserve holdings, reduction in regional price discrimination, elimination of costs due to interregional exchange rate uncertainty must outweigh the costs of the loss of monetary policy autonomy (Mundell, 1961). The successful formation of OCA in the region will subsequently anticipated to resulted in reduction in transactions and information costs. The reason is that a single currency is expected to promote intra-regional trade and financial activities amongst members. There are few evidences suggesting this proposition. Rose and Engel (2002) as well as Frankel and Rose (2002), among others, argued that a common currency area significantly increases international business cycle correlations, and thus tend to be trade-stimulating. Consequently, they concluded that countries that are mainly involved in trade will tend to benefit from entering into a currency union with their principal trading partner(s). However, the potential trade gains due to common currency may be gone and a peg may lead to difficulties if the country's business cycle is not synchronized with the cycle of the trading partner (against whose currency the exchange rate has been fixed). Thus, the degree of cyclical synchronicity may be important in determining the efficacy of a peg (Husain, 2006).

Hviding et al. (2004) provides various possible explanatory variables based on previous studies. They classified them into four categories. Firstly, macroeconomic variables such as growth, inflation, and fiscal balance to gross domestic product (GDP) ratio. These variables capture confidence³ factors that may affect market sentiment and were used in the Canales-Kriljenko and Habermeier (1999) and Christofides et al. (2003) studies, among others. Secondly, volatility of fundamentals, such as terms of trade and money supply. The first variable was employed in the Canales-Kriljenko and Habermeier (1999) study. The monetary volatility variable captures any influence from frequent changes in monetary stance, which according to the monetary theory of the exchange rate could be an important factor influencing the volatility in the nominal exchange rate (Dornbusch, 1976). Monetary volatility was constructed similarly to exchange rate volatility. Thirdly, variables related to the choice of exchange rate regime such as a dummy was used for the choice of exchange rate regime, based on a de facto classification of Reinhart and Rogoff (2002), trade openness, domestic financial deepening, external financial exposure, economic size and level of economic development (Devereux and Lane, 2003), as well as foreign exchange market intervention (Hviding et al., 2004).

² Other reasons, highlighted in Aizenman and Marion (2003), are increases in: (2) size of population or level of standard of living; (3) volatility in a country's export receipt as well as import payment; and (4) vulnerability to external shock.

³ 1 for purely floating, managed floating, and "freely falling" exchange rate regime, and 0 for de facto fixed exchange rate or crawling peg.

Devereux and Lane (2003) presented a theoretical model where the choice of exchange rate flexibility is based on optimal currency area considerations with credit constraints and tested by using large cross-section of industrial and developing countries' data from January 1995 to September 2000. The variables employed to reflect the optimal currency area are bilateral trade, growth rate differentials, and GDP. In addition, they included financial variables. They found that all of these variables play a significant role in determining the bilateral volatility of the exchange rate. Bayoumi and Eichengreen (1998) also argued that the variables pointed to by the theory of optimum currency areas help to explain the behavior of the bilateral exchange rates on the grounds that the same factors that inform the decision of whether to form a currency union should also influence exchange rate behavior across countries. The evidence turns out to be strongly supportive of this hypothesis. Variables suggested by OCA theory such as asymmetric disturbances to output and the intensity of trade links have considerable explanatory power.

Canales-Kriljenko and Habermeier (1999) tested for the determinants of nominal exchange rate volatility on a cross-section of 85 developing and transition economies. They use of cross-section regression in their study permitted the inclusion of a very large set of structural variables. On the basis of a model selection algorithm, they found that the most important macroeconomic determinants of nominal exchange rate volatility were inflation, real GDP growth, fiscal deficit (as percent of GDP), and trade openness.

In relating the choice of exchange rate regime and reserves, there are two main approaches discussed in the literature. The first approach looks at the role of intervention (Calvo and Reinhart, 2002) while the second approach focuses on the role of reserve pooling (Dodsworth, 1992; Williams et al., 2001; Eichengreen, 2006). Of course the literature on this issue is relatively scarce and more research is required. On one hand, on the intervention approach, Calvo and Reinhart (2002) argued that as shocks to money demand and expectations when the exchange rate is fixed are accommodated through purchases and sales of foreign exchange reserves, the opposite pattern should prevail for changes in foreign exchange reserves. Thus, the probability that changes in reserves fall within a relatively narrow band is a decreasing function of the degree of exchange rate rigidity, as money demand shocks and changes in expectations are accommodated to prevent a change in the exchange rate. On the other hand, few studies can be found in the literature focusing on the role of reserve pooling such as and Dodsworth (1992), and Williams et al. (2001). Motivated by this scarce literature, Williams et al. (2001) explored the gains from pooling reserve in the case of Eastern Caribbean Currency Union (ECCU) as well as Communauté Financière Africaine in the Central African Economic and Monetary Community and Cooperation Financière Africaine in the West African Economic and Monetary Union (CFA) franc zone. In summary, they found that all members of ECCU and CFA franc zone benefited significantly from the monetary union via the pooling reserve, especially those with low levels of own reserves. At the same time, however, they also found that unanticipated changes in terms of trade had exerted a strong negative impact on reserves, especially in the case of CFA franc zone. In addition, Eichengreen (2006) stated that the amount of reserve holding will be higher if the precautionary measures were included in facing unexpected external shocks or sudden stops. During this difficult period of economic slump, as what ASEAN had experienced in 1997 crisis, country may have limited access to international capital market and thus necessitate holding a higher level of reserve. The possibility of utilizing reserve pooling as a mean to build stronger national and regional financial systems and encouraging the introduction of contingent claims might limit the susceptibility of emerging markets to financial crises.

3. Empirical model

In conjunction with the idea of OCA, there are few related issues need to be addressed before the benefit of OCA can be grasped by the members, namely: (1) the choice of exchange rate regime; (2) exposure to external shocks, and (3) the criteria for establishment of common currency area. As it is difficult and beyond the scope of the study to address the first issue, we focus only on the second and third issues. In short, we will focus on investigating the feasibility of single currency in ASEAN. Subsequently, this validity will further be tested under the presence of external shocks.

In general, we specify our empirical model similar to Devereux and Lane (2003) but without the inclusion of financial factors. In other words, in the studies by Bayoumi and Eichengreen (1998) and Devereux and Lane (2003), they assumed that OCA variables are among the most important factors in determining level of exchange rate volatility. Given our limited sample size (1995 to 2004), we examine solely the role of

OCA with a slight modification, particularly in terms of proxy that being utilized in this study. Three main OCA variables used in Deveraux and Lane (2003) are bilateral trade, asymmetric shock and size. In this study, we use international reserve as a proxy for size. Hence, our empirical model will be as follow:

$$ERV_t = \theta_0 + \theta_1 \ln IT_2 + \theta_2 CYCLE_t + \theta_3 \ln SIZE_t + \varepsilon_t^1 \quad (1)$$

where ERV stands for nominal exchange rate volatility, $\ln IT$ denotes intra-trade between Singapore and other ASEAN members (in the log form), $CYCLE$ is an absolute growth differential between Singapore and other ASEAN members, $\ln SIZE$ refers to pool of international reserve between Singapore and other ASEAN members (in the log form). International openness, namely the level at which an economy is open to its counterparts, is the research core of McKinnon (1963) in his study of the theory of the optimum currency area. McKinnon proclaimed that, fundamentally, if two countries were open to each other, it would be suitable for them to arrange trade freely and correspondingly fix their exchange rate. The principal logic behind McKinnon's statement suggests that firstly, that bilateral exchange of two nations is purely voluntary, and secondly, more importantly, the flows of trade imply the interaction of economic activities through which changes occurring in one nation will most likely pass over into another. Countries that naturally trade a lot would particularly be benefited a lot from using a common currency by assuming that the underlying tradable goods are relatively close substitutes. In this case, Frankel and Rose (2002) predicted that countries with more bilateral trade are more likely to form currency unions⁴. In a similar argument, Calderón (2004) also shows theoretically that trade (openness) and exchange rate volatility has a negative association. Calculation of nominal exchange rate volatility is based on the standard deviation of monthly data of the nominal exchange rate, or:

$$ERV = std(ER^{month}) \quad (2)$$

The measurement of $CYCLE$ is similar to the measurement of ERV . $CYCLE$ is proxy by correlation of two ASEAN economies' GDP, or:

$$CYCLE = corr(GDP^k, GDP^j) \quad (3)$$

where the subscripts k and j stand for country k and j. The OCA literature has stressed that if participating countries of a monetary union face similar shocks, the costs of forgoing the exchange rate as a shock absorbing mechanism are likely to be reduced. 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). Therefore, we postulate that the relationship between asymmetric shock and exchange rate volatility would be positive.

Variables suggested by the theory of optimum currency areas can be useful in explaining patterns of foreign exchange market intervention. Market intervention depends primarily on the benefits of an optimum currency area (i.e. on variables like country size). We can analyze exchange market pressure analogously, by using international reserve as a measure of the degree to which countries use to neutralize incipient exchange-rate movements. We use international reserve to measure the reduction in the transactions value of the national currency due to floating rates; the costs of a common currency, in terms of macroeconomic policy independence foregone, should be balanced against the benefits, which will be greatest for small economies where there is least scope for utilizing a separate national currency in transactions (Bayoumi and Eichengreen, 1998). Frankel and Rose (2002) also theoretically showed that the effect of country size on the incentive to join a currency union. They found that a smaller country would be more motivated to incur costs to enter into a currency union. On the empirical side, Masron and Yusop (2006) justified that country size has been affecting the choice of exchange rate regime in the ASEAN

⁴ Of course, we are not going to say whether common currency can be formed or not. We just borrowed the idea that having common currency is simply means that less volatile. Therefore, if two countries are involved in bilateral trade heavily, we could expect that they will prefer to have a fix exchange rate in order to magnify the benefit from trade.

region by using county's GDP as a proxy. Therefore, again we assumed that reserve pooling as having a positive association with exchange rate volatility. Reserve pooling variable, which is utilized as a proxy for *SIZE*, is calculated as follows:

$$SIZE_i = RSV_i^k + RSV_i^j \quad (4)$$

As mentioned before, subscripts k stands for Singapore and j denotes either Malaysia or Thailand. In the related development, as each ASEAN or region as a whole, is still relatively small developing economy or area, they are very much vulnerable to external shock. For this reason, we attempt to verify the feasibility of OCA in the presence of external shock in our second empirical model. World shock (*ES*) will be proxy by capital flight (*CP*). A more widely accepted method of estimating capital flight concentrates on capital flight as a residual (see World Bank, 1985; Bank for International Settlements [BIS], 1989; Erbe, 1985; and Gunter, 1996)⁵. As shown in Equation (5), the current account balance, changes in international reserves, and the amount of net foreign direct investment determine the necessary international borrowing for a nation. If actual foreign borrowing during a period exceeds this necessary amount, then it is assumed that the difference or residual represents additional borrowing to offset capital flight.

$$Capital\ Flight = CAB + FDI + \Delta ForDebt - \Delta InterRes \quad (5)$$

where CAB stands for current account balance, FDI is gross foreign direct investment and $\Delta ForDebt$ denotes change in foreign debt, and $\Delta InterRes$ refers to change in international reserves.

4. Estimation procedures and data collection

Due to data constraint, particularly international reserve data for Vietnam, we decided to pool the information to get longer observation. This idea will also allow us to add more variable which will be included in each specification. Therefore, the simplest way to estimate is by using panel cross-fixed effect procedure. We do believe that heterogeneity issue is more prevalent in our study, considering the diverse background, particularly economic background of ASEAN members in the study. The model is estimated using annual data from 1995 to 2004, which covers only ASEAN-8 economies⁶. The choice of countries is dictated by the availability of data mainly international reserve data which are only available from 1994 onwards in the case of Vietnam. Data are taken from various issues of the International Financial Statistics (IMF), Key Economic Indicators (ADB, 2008) and World Development Indicator (World Bank, 2008).

5. Results

The results of fixed-effect analysis are presented at Table 2. We start with the most basic equation, looking at the implication of OCA criteria on the exchange rate stability. We found that although $\ln IT$ and reserve pooling (*RSV*) are significant at least at 10 percent significant level but the role of asymmetric shock is remained ambiguous. This might be explained by the fact that there is large diversity among the members of ASEAN that could lead to this outcome. Nevertheless, the sign of each proxy is also as expected.

Table 2: Estimated results based on cross-fixed effect procedure

EQUATION 1:

$$ERV = - 609.6214 - 718.3876\ln IT^{***} + 0.3019CYCLE + 2639.50\ln RSV^{**}$$

[- 84.3511] [58.2377] [596.0603]

EQUATION 2:

$$ERV = - 789.5342 - 3.1586\ln IT^{**} + 2.5278CYCLE + 2.9426\ln RSV + 30.8474\ln ES^{***}$$

[- 57.8602] [27.9494] [0.6535] [4.3783]

Note: Figure in [] denotes standard error of regression.

⁵ Sometimes also called as BIS-Erbe-WB measure.

⁶ Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

Next, we examine the feasibility of single currency in ASEAN in the present of external shock. As a proxy we include shock in capital flow, which we believe as having big implication on ASEAN economies due to their high reliance on external capital for economic development. With the inclusion of *ES*, we found that *RSV* is no longer significantly affecting *ERV*. This phenomenon might be explained by the fact that although ASEAN would be successfully accumulated all the resources, but the amount is relatively remained too small. As a result it may not be able to offer sufficient protection to the members, in case if there were a shock. In connection to the 1997 economic crisis, we could observe that each ASEAN members started to negotiate with large countries such as US, China and Australia, with most probably due to this reason.

6. Conclusion

The main objective of this study is to investigate the feasibility of OCA in ASEAN by examining the experience of three ASEAN core economies, namely Singapore, Malaysia and Thailand for the period spanning from 1995 to 2004. The results support the objective that all OCA variables are significantly affecting the exchange rate volatility. More importantly, the significant impact of reserve pooling demonstrates the capability of ASEAN region to have fix exchange rate within the region. Pooling will allow the same reserves to support larger volume of emergency lending (Eichengreen, 2006) and thus strengthen the idea of common currency. However, after the inclusion of world terms of trade shocks, the impact remain significant but became negative, suggesting that ASEAN region is very much sensitive to external shocks and forming ASEAN regional common currency may not be well sustained in the presence of large external shock. This finding may provide an evidence on why there is proliferation of bilateral trade agreement between individual ASEAN economy with non-ASEAN economy, especially with US or other economically powerful economies as well as an attempt to include more economies – i.e. ASEAN+3 (ASEAN + Japan, Korea, China). On the other hand, this type of analysis is relatively static in nature. Without incorporating other nations as mentioned above, ASEAN may able to form single currency, provided that this single currency will produce positive spillover effect on economic variables such as bilateral trade and bilateral investment. In the nutshell, very less attention given on the impact of reserve pooling in a dynamic form that could be the future research direction, as far as optimum currency area is concerned.

The implication of this study is not without limitation. Several assumptions have been made in order to ensure the workability of this framework. First of all, theoretically it is assumed that there is labor mobility within the region (Glavan, 2004). Unfortunately, ASEAN with the idea of ASEAN Economic Community has just proposed the idea of allowing skilled worker to flow freely within the region. Secondly, with the bulk inflow of foreign capital into and out from the region, it is very unlikely that focusing on trade openness will provide clear-cut answer on the issue of abating the adverse impact of external shocks. This is because foreign capital can also be the transmission mechanism for the external shocks, particularly short term capital (Calvo and Reinhart, 2002; Masron and Yusop, 2006). Thirdly, on the choice of currency peg, although the 1997 economic crisis demonstrated the deficiencies of developing countries and emerging economies pegging the values of their currencies to a single currency such as the US dollar, Bird and Rajan (2002)⁷ also argued that pegging against the US dollar was sub-optimal, whereas pegging against a more diversified composite basket of currencies would have enabled the Southeast Asian countries to better deal with the third currency phenomenon which contributed to the crisis⁸. Hence, searching for type of single currency to be a regional currency is still an on-going process and non conclusive⁹. Finally, the conclusion should be treated cautiously as this study only focuses on ASEAN-3 core members. Therefore raises a question how about if we include the remaining members of ASEAN.

⁷ See also Aminian (2005).

⁸ Calvo et al. (2004) and Levy Yeyati (2004) also warned that more dollarized countries have a higher incidence of sudden stops or banking crises.

⁹ Although Singapore dollar is utilized as a benchmark and likely the suggestion of the study to use it as a single currency denominated other ASEAN currencies, actually this study does not meant that. In fact, the decision on what currency to be chosen is goes beyond the scope of the study.

References

- Aizenman, J. and Marion, N. (2003) Exchange reserves in East Asia: Why the high demand? *FRBSF Economic Letter No. 11*, San Francisco.
- Aminian, N. (2005) Economic integration and prospects for regional monetary cooperation in East Asia. *Structural Change and Economic Dynamics*, 16, 91-110.
- Bayoumi, T. and Eichengreen, B. (1998) Exchange rate volatility and intervention: Implications of the theory of optimum currency areas. *Journal of International Economics*, 45, 191-209.
- Bird, G. and Rajan R.S. (2002) Optimal currency baskets and the third currency phenomenon: Exchange rate policy in Southeast Asia. *Journal of International Development*, 14, 1053-1073.
- Bird, G. and Rajan, R.S. (2003) Too much of a good thing? The adequacy of international reserves in the aftermath of crises. *World Economy*, 26, 873-891.
- Dieter, H. and Higgott, R. (2003) Exploring alternative theories of economic regionalism: From trade to finance in Asian co-operation? *Review of International Political Economy*, 10, 3, 430-454.
- Calderón, C. (2004) Trade openness and real exchange rate volatility: Panel data evidence. *Central Bank of Chile Working Papers No. 294*.
- Calvo, G. A. and Reinhart, C.M. (2002) Fear of floating. *The Quarterly Journal of Economics*, CXVII, 2, 379-408.
- Calvo, G.A., Izquierdo A., and Mejia, L.F. (2004) On the empirics of sudden stops: The relevance of balance-sheet effects. *NBER Working Paper no. 10520*. Cambridge MA.
- Canales-Kriljenko, J. and Habermeier, K. (1999) Factors affecting exchange rate volatility. In IMF (1999) world economic and financial surveys. *Exchange Arrangements and Foreign Exchange Markets; Developments and Issues*.
- Christofides, C., Mulder, C. and Tiffin, A. (2003) The link between adherence to international standards of good practice, foreign exchange spreads, and ratings. *IMF Working Paper 03/74* (Washington: IMF).
- Devereux, M.B. and Lane, P.R. (2003) Understanding bilateral exchange rate volatility. *Journal of International Economics*, 60, 109-132.
- Dodsworth, J. R. (1992) Reserve pooling an application of the theory of clubs. *Economia Internazionale*, 40, 209-222.
- Dornbusch, R. (1976) Expectations and Exchange Rate Dynamics. *Journal of Political Economy*, 84, 6, 1161-76.
- Eichengreen, B. (2006) Insurance underwriter or financial development fund: What role for reserve pooling in Latin America? *NBER Working Paper Series No 12451*, Cambridge MA.
- Frankel, J. and Rose, A. (2002) An estimates of the effect of common currencies on trade and income. *The Quarterly Journal of Economics*, 117, 437-466.
- Glavan, B. (2004) The failure of OCA analysis. *The Quarterly Journal of Austrian Economics*, 7, 2, 29-46.
- Hurley, D. T. and Santos, R.A. (2001). Exchange rate volatility and the role of regional currency linkages: the ASEAN case. *Applied Economics*, 33, 1991-1999.
- Husain, A.M. (2006) Choosing the Right Exchange Rate Regime for Pakistan. *SBP-Research Bulletin*, 2, 91-111.
- Hviding, K., Nowak, M. and Ricci, L.A. (2004) Can higher reserves help reduce exchange rate volatility? *IMF Working Paper No. WP/04/189*, Washington, D.C.
- International Monetary Fund (IMF) *International Financial Statistics*. Various issues.
- Jason, C.W.N. and McAleer, M. (2002) Monetary integration and contagion. *Working Paper*, Department of Economics, University of Western Australia, 2002. [Online available at <http://www.e.u-tokyo.ac.jp/cirje/research/papers/mcaleer/mcaleer6.pdf>, accessed Mei 2004].
- Kim, Y. and Chow, H.K. (2003) Optimum currency area in Europe: An alternative assessment. *Economics Letters*, 81, 297-304.
- Lee, C.F. and Tan, K.G. (2004) The determination of flows of funds for ASEAN. *CREFS Working Paper Series No. 99-15*, Nanyang University, Singapore.
- Levy Yeyati, E. (2004) Financial dollarization: Evaluating the consequences. *Universidad Torcuato Di Tella Working Paper*. Buenos Aires, Argentina.
- Ling, H. Y.P. (2001) Optimum currency areas in East Asia: A structural VAR approach. *ASEAN Economic Bulletin*, 18, 2, 206-217.
- Madhur, S. (2002) Costs and benefits of a common currency for ASEAN. *Economics and Research Department (ERD) Working Paper No. 12*. Asian Development Bank, Manila, the Philippines.

- Masron, T.A. and Yusop, Z. (2006) Optimum currency area and volatility in ASEAN. *Asian Academy of Management Journal of Accounting and Finance*, 2, 2, 1-12.
- McKinnon, R. (1963) Optimum currency areas. *American Economic Review*, 53, 717-725.
- Mussa, M., Masson, P., Swoboda, A., Jadresic, E., Mauro, P. and Berg, A. (2000) Exchange rate regimes in an increasingly integrated world economy. *IMF Occasional Paper No. 193*. Washington, D.C.: IMF.
- Mundell, R. A. (1961) A theory of optimum currency areas. *The American Economic Review*, 51, 657-665.
- Reinhart, C.M. and Rogoff, K.S. (2002) The modern history of exchange rate arrangements: A reinterpretation. *NBER Working Paper No. 8963*, Cambridge MA.
- Rose, A. and Engel, C. (2002) Currency Unions and International Integration. *Journal of Money, Credit and Banking*, 34, 1067-1089.
- Sazanami, Y. and Yoshimura, S. (1999) Restructuring East Asian exchange rate regimes. *Journal of Asian Economies*, 10, 509-523.
- Williams, O., Polius, T. and Hazel, S. (2001) Reserve pooling in the Eastern Caribbean Currency Union and the CFA Franc Zone: A comparative analysis. *IMF Working Paper No. WP/01/04*, Washington, D.C.
- Williamson, J. (2000) Exchange rate regimes for emerging markets: Reviving the intermediate option. *Policy Analyses in International Economics No. 60*, Washington, D.C.: Institute for International Economics.
- World Bank (2008). *World Development Indicator*. Washington D. C.