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Essays on an ASEAN Optimal Currency Area

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Essays on an ASEAN Optimal Currency Area

A Dissertation

Submitted to the Graduate Faculty of the University of New Orleans
in partial requirement of the
requirements for the degree of

Doctor of Philosophy
in
Financial Economics

by

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Abstract

Many regions of the world would like to replicate the financial and monetary integration of the European Monetary Union (EMU). Member countries of the Association of Southeast Asian Nations (ASEAN) have shown an interest in such an arrangement. ASEAN is a political, cultural, and economic association that includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Many of these nations are experiencing rapid economic development while others are still relatively poor and under developed. As such, they appear to be an unlikely group for currency unification. Older studies suggest that multiple currency union groupings may be possible in the short run that could be unified into a whole at an unspecified time in the future. The issue has been studied for some time and appeared defunct with the onset of the Asian Financial Crisis. More than a decade has passed and another more global financial crisis has ensued leaving many Asian countries in better shape than their highly developed trading partners in the west. This leads to the need for further examination of the possible unification of some or all ASEAN members into a Regional Currency Arrangement.

This dissertation evaluates the readiness of the ASEAN nations for monetary union using data from the post Asian Financial Crisis period. Results of a formal G-PPP test show the area is an optimum currency area. Analysis of other criteria shows incredible diversity across the countries in the region that would make unification a challenge. Coordination of monetary policy would be most difficult given the variety of inflation rates and differences in depth of financial system development as explored in chapter 2. Trade has increased in the region leading to better linkages among economies but the data shows that reaching full integration of all countries by the 2020 deadline without disruptions in some economies may still be difficult.

Optimum Currency Areas, ASEAN, currency union, financial integration, G-PPP, trade, foreign direct investment, monetary integration, monetary policy coordination

G-PPP Tests and Qualitative Approaches

Introduction

ASEAN is the acronym for the Association of Southeast Asian Nations. It is a political, cultural and economic organization representing nations in Southeast Asia. ASEAN members include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. As a grouping of somewhat similar yet dissimilar countries, ASEAN encourages social and cultural development and promotes the economic interests of associated nations. The organization has become strategic in representing the region's trade interests. Its primary goals are regional stability and development.

ASEAN was originally formed in 1967 from five nations as a successor to the Association of Southeast Asia which was originally set up to be an offset to the growth of Marxism in the region. The nations of ASEAN have different systems of government and varying levels of social, political and economic development. Government systems range from sultanates to military dictatorships to nascent democracies. Two are single party socialist states. A few nations have been experiencing rapid economic advancement while others still struggle at the bottom tier of the lowest of lows for GDP per capita. There is no one dominant shared industrial sector. Brunei Darussalam is oil-rich. Singapore is a services oriented economy. Laos, Myanmar, Vietnam, the Philippines and Indonesia still have dominant agriculture sectors as well extensive traditional economies. These less industrialized nations also seek development through providing labor and resources via horizontal trade channels and have turned into major recipients of outsourced manufacturing value.

Still, the position of East Asia to challenge North America and Western Europe as the leading economic zone has never been stronger since the latter two regions are emerging weakened from the global financial crisis of 2008-2009. The world economy is becoming increasingly tri-polarized. Many East Asian countries—most notably China—have embraced export-driven development policies. This has led to increasing trade flows both inside and outside the region. ASEAN members are part of an increasingly influential economic zone that includes the economies of China, South Korean and Japan; the three Asian tigers of the 'plus three'. This region is now generally referred to as ASEAN+3. Examination of direction of trade data elucidates increasing financial and economic openness between the ASEAN members, its plus three neighbors, and nations outside the geographic region.

Recent studies and literature have focused on the period directly following the Asian Financial Crisis of 1997. The events of the period brought into question the predominant currency regimes. Many countries experienced severe hardship from unilaterally fixed exchange rates. Movement to a floating exchange rate regime has helped in terms of the major global currencies (yen, dollar, Euro) but led to other issues in an environment where intra-regional trade is expanding. These developments have brought renewed interest for a shared currency to facilitate trade. Coordination of other goals associated with unification is more elusive.

There exists increased political will for cooperation since the 1997 financial crisis. The ASEAN+3 efforts were launched in 1999 with the establishment of a larger ASEAN Free Trade Area (AFTA). The ASEAN+3 members include ASEAN members plus the regions' powerhouse economies of Japan, China, and South Korea. The primary purpose of this agreement is to reduce tariff obligations and attract more foreign direct investment (FDI). The Chiang Mai Initiative was introduced in 2001 to promote exchange rate stability among members. The ASEAN Economic Community (AEC) was set up in 2003 with a 2015 deadline for completion of key free trade and integration goals that move the region towards homogeneity of trade laws, capital flows, development goals, and per capita incomes. Complete economic integration—including a common currency and shared central bank—of ASEAN is scheduled for 2020. The three Asian tigers are expected to continue their independent currencies and status while participating in the Free Trade Area. Other countries have and are expected to join the regional Free Trade Agreement. Both New Zealand and Australia are participants.

Plans are in place to move to financial and monetary integration and union for some countries in the region. Rapid development and a global financial crisis that has destabilized the major currencies have changed the region. Have these conditions created a better chance that the region represents an Optimum Currency Area (OCA)? Are the countries involved with the AEC initiative moving to a position where successful monetary union is possible? Which cluster of countries seems to have the best shot at merging? Is dollarization more likely to occur with smaller countries and the three Asian Tigers or will the smaller countries continue to seek a single identity implied by the original ASEAN charter? These are all important research questions that are researched research in the three chapters of this dissertation.

Chapter 1 begins by establishing the background and motivation of the entire dissertation. A general literature review of OCA criteria and empirical studies immediately follows the introduction. The empirical research of the chapter is divided into three parts. The first part explains and motivates the G-PPP model which is a formal test for the presence of an Optimal Currency Area. This is followed by a brief review of recent literature followed by analysis and results from tests for nonstationarity and

cointegration. Next, a review of qualitative factors identified as important to successful integration highlights trends in the macroeconomic variables—or forcing variables—that are important to the G-PPP analysis as well as serve as general OCA criteria. These variables include measurements of financial and economic openness. The last section of the chapter provides conclusions.

Background and Motivation of the Study

Early OCA theory provides essential insight into potential costs and benefits of financial integration of politically independent countries. Although it has been nearly 40 years since its inception, the earliest works still provide major insight into an idea that has gained prominence and support in an era of global trade. Adoption of single currencies by countries within a region is generally thought to lead to greater economic integration, lower transaction costs, and higher levels of both trade and investment within the region. Unification eliminates issues involved with exchange rate instability especially for regions with limited hedging and risk management opportunities. A shared, single currency, central bank, and monetary policy are usually the penultimate goal of financial integration. It has also been determined that this step eliminates harmful monetary policy spillovers and competitive devaluations. Unification is thought to pave the way for beneficial institutional changes and can eliminate the route to relaxed monetary policy for political purposes that usually create inflation.

Mongelli (2002) provides a classification scheme of the primary benefits and costs of participating in an OCA. He considers the first set of benefits to be improvements in ‘microeconomic efficiency’. Many of the ones just mentioned can be attributed to the shared currency’s ability to better function as money. There also exist benefits that reduce transaction costs and riskiness because of increased circulation of the single currency. A shared currency provides large and diverse markets with heightened price transparency. This is thought to foster more competitive markets and increase the size and diversity of the economy. Mongelli (2002) also finds that many studies fall into a grouping that find increased macroeconomic stability as well as economic growth with shared currency adoption. Again, price stability and a large populace of users eventually leads to more sophisticated financial markets and increased ability to react and weather exogenous shocks. This means that small countries can access financial innovations and markets more quickly than they could alone.

Beetsma and Giuliodori (2010) focus on studies that elucidate the macroeconomic costs and benefits of monetary union with focus on the results from the EMU. Fiscal coordination is an area ripe for political pitfalls. A recent issue of interest is fiscal free-riding as well as enforcement of monetary and

fiscal policy commitments. The study speculated that the cost-benefit trade-off of unification of developed nations may differ substantially than those of less-developed countries and implied that further study was required.

Formation of an OCA has costs as well as the aforementioned benefits. Corden (1972) showed that perhaps the biggest cost of integration is that member countries forgo control of their national monetary policy. This creates fewer policy options and limits the set of feasible economic allocations. However, it adds credibility to countries that have had trouble with their financial or banking systems or with inflation in the past or those known to use currency manipulations for export growth. This outcome is especially important for countries with governments that have misused inflation or taxation policies or have been known for weak monetary and financial markets. However, this still represents removal of important stabilization tools frequently required during tough economic times. It also removes any potential benefits to the government from inflation taxes. This includes 'tax bracket creep' and 'inflating away the national debt'.

The importance of integration of financial markets and institutions as well as the potential for problems aligning political interests of member countries cannot be understated. Each country must rely more on fiscal policy for business cycle stabilization and coordinate with others through their representation to the central monetary authority for interest rate level changes. Countries must share many economic characteristics in order to not destabilize themselves or their neighbors upon experiencing an exogenous shock. Countries with poor fiscal policy measures are apt to disturb the arrangement. The recent situation in the EU with Greece has amply demonstrated that one member with poor fiscal policy can impact the currency as well as the overall perceived riskiness of countries within the monetary union due to close and intense linkages.

Of course, there are some transactions costs to be considered. This would include administrative, legal and production costs of re-denomination of contracts, vending machines, and just simply getting the populace adjusted to the new currency. The actual costliness to countries of the loss of direct control is still being debated in the literature.

Alesina et al (2002) find that as long as countries experience co-movements of both output and prices, there will be little cost. Calvo and Reinhart (2002) argue that costs will be minimal for a country that has improperly used monetary policy in the past. The benefits of a credible monetary policy and a respected currency bring more rewards to weaker countries than punishment. Corsetti (2008) uses a stylized micro-founded model of costs involved with adopting common currency and finds these costs are of the "same magnitude as the costs of the business cycle". He further determines that common

monetary policies can be efficient even when “shocks are strongly asymmetric provided that the composition of aggregate spending tends to be symmetric at union-wide level”.

Much of the work on the ASEAN monetary union has compared statistics prior to or directly after the Asian Financial Crisis. Since then, many of the ASEAN countries have successfully developed intensive export strategies and attempted to move closer to an ASEAN version of the Maastricht criteria. Additionally, the global financial crisis of 2008-2009 has provided further opportunities and challenges for countries in the region. Since the 2015 deadline looms, it is pertinent to reexamine the issues surrounding readiness for proposed unification among the members of ASEAN for CU using both formal and informal criteria.

General Literature Review and Research Questions

Successful economic and financial market integration among European Union nations has led to interest in other regions for similar arrangements. Monetary integration includes several phases that may ultimately progress to complete monetary unification. Typically, countries with some kind of mutual economic, political, or cultural interest will meet to determine the feasibility of coordinating exchange rates, factor movement, and capital markets. These countries will assess their current situation and plan ways to move their economies and financial markets closer together over time. The penultimate state of monetary union can include a common central bank and currency but there are many intermediate stages that can be achieved which usually result in enhanced trade and investment performance for the participating countries. Easing the transition to union is essential so that acute exchange rate adjustments do not disrupt the economies of participating countries.

A body of literature has established theoretical criteria that promote successful integration and union. Harmony in readiness factors is considered essential to assessing the potential OCA. Inherent problems of adjustment when instituting monetary unification were first discussed in Friedman (1953) who argued that such a transition was only possible with near complete nominal price and wage flexibility within and between countries. If wage and price rigidity are present, resultant exchange rate adjustments can cause sustained unemployment in one country and/or acute inflation in the other. Kawai (1987) contributed to this line of work by showing that wage and price flexibility significantly aid the short run adjustment that follows an exogenous shock.

The seminal work on the possibilities of monetary unions was written by Robert A. Mundell in 1961 elucidating what are now known as Optimum Currency Areas (OCA). This paper introduced what is

now known as the Mundell criteria for OCA as well as the definition of an OCA. Mundell defines an OCA as “an area within which exchange rates are fixed”. As an OCA, the area can share a single currency or have currencies pegged in unison to a shared target. OCAs usually have a single monetary authority and a single, shared currency as the final goal as mentioned previously.

Mundell (1961) argued that regions or countries with a high degree of factor mobility are ideal candidates for an optimum currency area. This is because factor income and output prices have already experienced a high degree of integration due to the law of one price. Specifically, he believed countries should have a high degree of internal factor mobility, but a lower degree of external factor mobility. This lessens the impact of the reconciliation of nominal price differences between countries. Achieving a high degree of factor mobility in the relevant countries can be politically challenging. Mundell argued that factor flexibility can decrease the chance that union will result in disruptive exchange rate adjustments.

Ingram (1962) claimed that enhanced financial integration eases the transition to a single currency or pegged union and reduces potential disruptions from capital inflows to interest rates or other factor prices. McKinnon (1963) suggested that the degree of economic openness was an additional factor. He believed that countries that are open to trade or are already heavily trading can successfully form an OCA because of their high degree of product market interrelatedness. McKinnon determined that a high degree of goods market integration and analogous production structures provides an economic environment with symmetric shocks. Symmetry of shocks has become a meta-property used to assess the extent of possibly damaging exchange rate adjustments.

Kenen (1969) argued that countries with widely diverse exports and production but similar structure were the best candidates for OCA. Similar structure provides the mega-property of symmetrical shocks so that wage and price adjustments to disturbances occur similarly across countries. Kenen argued that highly diversified products and services provide further insulation from major disturbances. This characteristic is generally referred to as fiscal integration.

Corsetti (2008) suggests that convergence in consumption and spending patterns may be a more important criterion for checking country suitability for OCA than the narrower Kenen (1969) criteria. Other works during the seventies suggested that there had to be a level of political will that would generate cooperation on country-level laws promoting institutional linkages, joint commitments to compliance, and shared macroeconomic goals. Mintz (1970), Haberler (1970), and Tower and Willett (1976) focused on the various dimensions of political alignment required for successful monetary union.

Kenen's thesis was later opposed by Krugman (1993) who suggested the opposite was true. Krugman determined that monetary union causes greater industrial specialization, less diversification, and therefore less protection from shocks. Kenen also contended that countries that are more politically integrated will be more likely to risk share with member countries so that any members adversely impacted by monetary union will be helped by other members. This would be akin to cross border fiscal policy between members.

Fleming (1971) claimed that external imbalances frequently stem from persistent differences in national inflation rates. He maintained that the terms of trade remain stable when inflation rates between countries are low and similar over time. This relationship reduces the need for nominal exchange rate adjustment. Monetary union is more easy and feasible under these conditions.

McKinnon (2001) and Mundell (1973) assert that financial integration may also help with an economic monetary union. This argument is based on members' ability to adjust wealth portfolios, manage foreign exchange reserves, and hold assets across borders. This argument considers financial integration as a form of risk management or insurance that can ease transition. It also is a sign of the degree of capital mobility which feeds into the earlier Mundell criteria. This brings variables like interest rates and cross-country direct investment flows into possibly signals of readiness.

Empirical studies of OCA readiness find proxies or direct measures of the various criteria set out in the theoretical works. The most traditional empirical measurements used to assess OCA readiness are based on the Mundell criteria which look for openness, factor mobility and symmetry of shocks. Structural VAR methodology that employs the AD-AS models of Bayoumi and Eichengreen (1994) are the preferred method for evaluating symmetry of shocks. There are also formal tests for General Purchasing Power Parity (G-PPP) that employ co-integration tests first posited in Enders and Hurn (1994). The last method used for empirical studies is cluster analysis. Most of the empirical studies of the last ten years assess the performance of the EU and closely examine the criteria or search for additional regions that may represent an OCA. Most of this research validates and clarifies the theoretical characteristics proposed over 40 years ago.

Many empirical studies are based on estimations of the Maastricht Criteria. These are the five criteria set out in the Treaty of Maastricht (1992) that must be met by European countries seeking to adopt the Euro. The criteria are also based on the early theoretical works as well as the early experience of the EU. The Maastricht Criteria specify a rate of inflation, a level of budget deficit as a percentage of GDP, a level of national public debt as a percentage of GDP, a level of long term interest rates that compares favorably to other EU member countries, and the adoption of an Exchange Rate Mechanism

for the country's national currency. These criteria have been established so that the new member and current members are less likely to experience disruptive adjustments in prices that could destabilize the currency and the financial markets. These criteria were considered the most germane to determining business cycle synchronization at the time of the treaty. They still serve as the benchmarks of the readiness factors.

Much of the empirical literature for ASEAN and its potential for financial and monetary union stems from the immediate post-Asian financial crisis period dating from July, 1997 to roughly mid-1999. Conclusions generally determined that—at best—the ASEAN nations could find several tiers or groupings of countries that could possibly consolidate in the near term. Since then, there have been some attempts at coordination between countries on laws and standards as well as increased intra-region trade. An additional consideration is the global financial shock in 2008. These events suggest that it may be time to recheck the regional alignment. It is possible that rapid development and joint use of exports has led to a greater synchronization of business cycles regionally.

Bayoumi and Mauro (1999) examine the potential costs and benefits of a regional currency arrangement for ASEAN just after the Asian financial crisis. The authors found that members of ASEAN seemed less suited for integration than members in the EU prior to signing of the Maastricht treaty. At the time, the researchers found little political commitment to achieve the blending of financial and economic intuitions required for success. They argued that differences in development levels would create political pressure for differing policy agendas.

Yuen (2000) uses discriminant analysis to find various clusters of economies in the ASEAN region that might be suitable for integration into smaller subsets. She uses the technique to study a set of typical macroeconomic variables to determine the possibility of a progression to full integration by integrating small regions first.

Moon, Yoon, and Rhea (2000) compare ASEAN to the EU and find that there exists no reason to believe that the EU is any superior position to a potential ASEAN Economic Community. Wilson (2002) looks at the political efforts made up to date as well as the economic states of the ASEAN nations' post-Asian financial crisis. Wilson (2002) found that the Asian financial crisis had increase the differences between the nations however it had increased the political will to unify. The study focused on the lack of 'well-developed supranational institutions' in the area that could coordinate responses to problems associated with financial and economic shocks. The investigators were unable to find any sophisticated level of monetary cooperation in any key variables and found insufficient symmetry in nearly every combination of nation group in response to shocks.

Zhang et al (2004) use a three variable structural VAR model to study the symmetry of shocks across a series of East Asian economies. The estimates are used to study the responses to the shocks as well as the speed of adjustments to shocks. This study also suggested that the overall region appears ill-suited for integration but there are some countries that might be an OCA so that subsets could potentially move into a currency union. The overall region could then prepare to move closer to a more complete union at an unspecified date in the future.

Park & Sohn (2005) use a “regionalization coefficient” and an “intra-regional trade propensity” index to study trade flows in the area. They found increasing regional trade flows after the Asian Financial crisis and estimated that by 2003, the East Asian region had reached a level of trade comparable to that of the EU observable in the late 1970s. The investigators found this to be extraordinary considering most of this had happened outside a formal trade organization and concluded that it was the result of the incredible amount of economic growth. If this is the case, then the dynamics suggest that data and analysis of the region has a short shelf life. It also suggests an increasing level of economic interdependence in the region that could create better dynamics for monetary integration.

Tang (2006) studies twelve Asian countries using the S-VAR technique to identify response and speed of adjustments to both demand and supply shocks. Again, using the mega-property of symmetry of shocks only, it appears that only sub-groupings within the region are prepared for unification into some currency arrangement.

Azai et al (2007) uses the Maastricht Criteria to check for long-run real convergence in GDP per capita Growth among the ASEAN-5; a subset of ASEAN. The study uses data from 1978-2004 for Malaysia, Thailand, Singapore, Indonesia, and the Philippines. Once GDP per capita at first differences was confirmed stationary, an Auto-Regression Distributed Lag model was used to check for the long run relationship between the countries using the five Maastricht variables. The authors found that this subgroup of ASEAN had basically met the criteria and may have the potential to form a currency union.

Ibrahim (2008) uses cluster analysis and finds that the ASEAN+3 are too heterogeneous to be considered an OCA. The study concludes that potential unification would be costly. The conclusion is based on analysis of the differing impact of the Asian Financial crisis on the economies of these countries. The OCA criteria selected were volatility in real GDP, real exchange rates, and interest rates, openness to trade, and convergence of Inflation. ASEAN 5 members were included in the study as well as the Republic of South Korea and People’s Republic of China.

Given the progress noted in empirical literature in interregional trade and political will, there should be improvement in measurements connected to successful monetary integration as these

nations move further away from the Asian Financial Crisis and implement initiatives to prepare for integration. This leads to important research questions. Has the region made any significant progress in binding institutions and legal structures closer together? Has increased interregional trade patterns led to a level of increased financial and economic openness to suggest an expansion of possible subsets that form an OCA? What impact has the latest global financial crisis had on key variables in the region? What steps should ASEAN take if it does have the political will to move forward to monetary union along the lines of the EU? Are some clusters of countries more ready for integration or would pursuing dollarization with an Asian tiger be a better strategy? This dissertation provides a basis to examine and answer these important questions.

There have been many attempts to rank or prioritize suggested OCA properties. Each of the various readiness factors has gone through periods of evaluation and imminence. Many have been tested and discussed several times over. Ishiyama (1975) was the first to suggest that more than one criterion should be evaluated and that each criterion should be weighted based on the interests and welfare of each individual country. Analysis of conflicting results in properties should be considered in context of the preferences, priorities, and weakness that investigators observe in each member. One member's weakness could possibly be diluted by another member's strength, even though on the surface, the formal results may suggest an unlikely union. This is why it is suggested that a variety of measurements—as opposed to a more limited analysis of singular criterion—be undertaken. The Ishiyama (1975) approach is taken in this dissertation. Studies in all chapters weigh both formal and informal readiness factors when considering complete unification and potential unification clusters.

This chapter approaches unification readiness using Generalized Purchasing Power Parity Theory (G-PPP) and provides additional insight into some of the fundamental macroeconomic variables that force nonstationarity of real exchange rates in the proposed OCA. These variables also stand as important qualitative measures of monetary and financial integration readiness because increased linkages between countries creates a better chance that the G-PPP will hold and therefore the countries represent an OCA. Additionally, the qualitative variables show characteristics that are considered determinants of successful integration readiness.

The Generalized Purchasing Power Parity Approach

Enders and Hurn (1994) developed a theory of G-PPP using Engle Granger methodology (1987) of cointegration analysis. Purchasing Power Parity (PPP) is a theory of exchange rate determination that

links national price levels and exchange rates in a way that shows that the rate of currency appreciation or depreciation is equal to the difference between foreign and domestic inflation rates. In reality, there can be many deviations from PPP. There is a way to statistically test the viability of long run PPP, however. This involves determining if the deviations from PPP are stationary or nonstationary. If the deviations are nonstationary, then the PPP theory is rejected. This is because they are not transitory and rooted in things like demand or supply shocks. They are permanent. Persistent deviations are acceptable but permanent ones are not. Long run PPP holds if the sequence of deviations is stationary.¹

G-PPP posits that real exchange rates are generally nonstationary. This is because of the fundamental macroeconomic variables that determine these rates. They are nonstationary and follow different growth paths. The theory implies that OCA candidate countries should share common stochastic trends if they experience symmetric shocks in their fundamental macro variables. In other words, their economies should converge. Finding this variable behavior for a set of countries means that set of countries is an OCA.

The theory follows from the idea that the forcing variables—or the behavior of real macroeconomic shocks—will affect real exchange rates similarly even when domestic economies differ if sufficient linkages exist between countries. The obvious linkage is trade but more subtle linkages like technology transfer and flows of labor and capital exist also. Macroeconomic fundamentals should move together and be sufficiently interrelated so that the real exchange rates will display common stochastic trends. OCA theory suggests that the real exchange rates within a currency area should be co-integrated. This means that the bilateral real and/or multilateral exchange rates of countries in the currency area should have at least one co-integrating vector of real exchange rates.

One formalized G-PPP test uses the methodology of Enders and Hurn (1994) to determine if there are co-integrated vectors in bilateral exchange rates of countries in the proposed OCA. The methodology used in this paper is Johansen-Juselius (1990) multivariate co-integration. This test checks for equilibrium relationship between multilateral real exchange rates such that:

$$RER_{12t} = \alpha_{13t} RER_{13t} + \dots + \alpha_{1m} RER_{1mt} + \epsilon_t \quad (1.1)$$

RER is the real exchange rate between the country m and country 1 in period t and α_{1m} are the parameters of the co-integrating vector representing linkages among economies in the proposed

¹ Enders, Walter, *Applied Econometric Time Series*, Second Edition, John Wiley and Sons, 2004, page 186

currency area. The stationary stochastic disturbance term is ϵ_t is considered white noise present at the appropriate time period.

This study uses the multilateral Johansen-Juselius technique on RERs for ASEAN+3 countries during the period of 2000-2010. This period is after the Asian currency crisis of 1997-1998 but includes the recent 2007-2008 global financial crises and the Thai Political Crisis of 2008-2010. (See Table 13 in Appendix A for other dates and events relevant to ASEAN+3.) There are good reasons for choosing this period. First, most of the studies in current literature concentrate on the Asian financial crisis period and the recovery period directly following the crisis so that this period is well-studied.

Second, the ASEAN cluster of nations has signed a variety of agreements that attempt to move each country's laws, regulations, and economies closer together since the crisis period so looking for signs of progress in coordination attempts is appealing from a policy assessment viewpoint. Liberalization of financial institutions has occurred along with a period of increased trade and investment flows (Kawai, 2009). As an example, the 2000-2001 "Chiang Mai Initiative" was undertaken to boost monetary cooperation. If these initiatives have been successful, a marked improvement in results should be noticeable when compared with prior literature.

Third, many ASEAN economies used a de facto US Dollar peg prior to the pre-Asian financial crisis period. This regime choice for so many nations undoubtedly produced correlations that confuse analysis for that period. Removing this data should provide clearer results.

There are several papers of interest that specifically study the post Asian Financial crisis using a G-PPP approach. Taguchi (2010) tests for possible OCAs using the entire Asian region instead of countries specific to the ASEAN block. The motivation for using 17 Asian countries is the large number of free trade agreements that exist and will expand trade throughout in the region. Taguchi argues that the ASEAN bloc is important but also notes that large numbers of free trade agreements also exist among other members. There is the possibility of a more generalized South Asian Custom Union (SACU) prior to any complete integration by ASEAN. Taguchi found that ASEAN and south Asia passed the G-PPP condition. Additionally, co-integrating relations between specific members implied a strategy of subgrouping certain countries prior to complete unification. Japan, China, and South Korea were determined to not to be candidates for any ASIAN OCA. The research supported the idea of "strategic implementation" where smaller subgroups could possibly unify prior to the long run goal of complete ASEAN unification.

Ahn, Kim and Chang (2006) found two subsets of countries that could comprise an OCA. The first group subgroup included the ASEAN countries of Indonesia, Malaysia, Singapore, and Thailand. The

second subgroup included Hong Kong SAR, Japan, Republic of South Korea and Taiwan. This studied not only applied the G-PPP tests but also included an S-VAR model to test for symmetry in response to macroeconomic shocks which relates to the underpinning relationships of G-PPP theory. The authors used data from Jan 1970-Sept. 2003 so their data includes periods when many Asian nations were using pegs to the USD as well as the data from the Asian Financial Crisis.

Choudry (2005) uses data from 1990-2002 to compare changes in co-integrating relationships in ASEAN 5 exchange rates before and after the Asian currency crisis. The countries of interest include Thailand, Malaysia, Indonesia, the Philippines, and South Korea. These countries are frequently considered a potential cluster for standalone unification. Currencies were checked vis-à-vis the Thai Baht (THB), United States Dollar (USD) and the Japanese Yen (JPY). Choudry found substantial differences in these relationships between the post and pre Asian financial crisis period.

Ogawa and Kuawaski (2003) apply the G-PPP test to the currencies of the ASEAN 5 vis-à-vis a common currency basket. Their analysis includes the People's Republic of China. The authors found that the ASEAN 5 countries of Indonesia, Malaysia, the Philippines, Singapore, and Thailand could form an OCA using a common currency basket if People's Republic of China was added to the group.

Methodology and Hypotheses

Equation (1.1)—stated in the previous section—provides the stylized format of the G-PPP model. For empirical study, the equation for the real exchange rate (r) for country i at time t is calculated as:

$$r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{base,t}) \quad (1.2)$$

$S_{i,t}$ is the nominal exchange rate for country i in period t

$P_{i,t}$ is the price level for country i in period as measured by each country's CPI, and

$P_{base,i,t}$ is the base currency price level in period t

This means the nominal exchange rate is stated as the number of home currency units it takes to buy one unit of the currency of the base country. The G-PPP model assumes a group of $m+1$ countries represent an OCA in a world with n number of countries. This provides a reduced form solution with a vector limited to m number of real exchange rates. RERs are expected to be stationary in PPP theory but this is unlikely in the real world because of macroeconomic shocks and overshooting

(Dornbusch, 1976). Co-integration provides an alternative way to check this theory given the issues with real world, persistent deviations. G-PPP theory states that PPP will hold if all macroeconomic forcing factors are non-stationary. The vector of macroeconomic forcing factors subject to shock is assumed nonstationary. RERs will have common stochastic trends if these macroeconomic fundamentals are related to some degree through various linkages like trade, technology transfers or capital and labor flows. OCA theory states that they will be interrelated if the countries form an OCA. This means there will be at least one linear combination of bilateral or multilateral real exchange rates that will be stationary if the countries form an OCA. If analysis shows at least one linear combination, the RERs are co-integrated.

Several other concepts are important since the co-integration tests reveal underlying relationships between economies. First, the coefficients of RERs are functions of the parameters. These parameters represent fundamentals achieved in an AS-AD style equilibrium economy. Second, switching base currencies in the model causes the parameters in the co-integrating vector to renormalize. Third, the model provides RERs for the countries of interest that can be expressed as weighted averages of the other RERs in the currency area. These weights are dependent on the underlying trade linkages between countries within the OCA and reflect that relationship. The weights also reflect the broader linkages between the economies.

Data was obtained from the Asian Development bank and the International Financial Statistics database of the International Monetary Fund. All ten ASEAN (Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Singapore and Vietnam) members plus the three Asian Tigers (China, South Korea, and Japan) were included in the analysis. The real exchange rates for these countries were calculated using equation (2). Monthly data came from the period 2000-2101. Most researchers consider the post-crisis period start as April 1999 so the series clearly represents the post-crisis period.

G-PPP methodology can test for bilateral or multilateral co-integration relationship between the countries in question vis-à-vis a base currency of choice. Co-integration tests for this study follow the method developed by Johansen (1988) and Johansen and Juselius (1990). The presence of cointegrating vectors in nonstationary time series is determined using the maximum likelihood procedure. Two or more nonstationary time series are considered cointegrated if at least one linear combination of the series is stationary. The technique identifies the number of cointegrating vectors that are then analyzed using the Trace and the Maximum Eigenvalue Tests. The null hypothesis for the

trace test is that r or fewer cointegrating vectors exist. Large values demonstrate evidence against the null hypothesis.

A specific stochastic structure is required to appropriately use the cointegration technique. The time series must be examined to see if the variables are stationary or nonstationary in levels. Formal tests must show the presence of a unit root in the real exchange rates. Cointegration is a test appropriate for checking equilibrium between nonstationary time series. These tests must confirm that the RERs are nonstationary in levels but stationary after first difference.

Table 1.1 shows the results of unit root tests for all ASEAN+3 RERs using USD as the base currency. P-values of the Weighted Symmetric (WS) and Dickey-Fuller (DF) tests are shown at the 5% and 10% level of significance. The WS test has higher statistical power when compared to the Dickey-Fuller test (Pantula et al, 1994). Both tests confirm a unit root. Cointegration techniques are appropriate under the null of a unit root. The more traditional tests assume stationary variables and are inappropriate under the hypothesis that real rates are nonstationary.

Table 1.1: Unit root tests for real exchange rates

This table shows p-values from the Weighted Symmetric (WS) test for unit root. The WS test has higher statistical power than the Dickey and Fuller test (see Pantula, Gonzalez-Farias, and Fuller, 1994). Optimal lag length was chosen using the Akaike Information Criterion and is shown in parenthesis. Real exchange rate for country i is calculated: $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{US,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period, and $P_{US,t}$ is the United States price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000.

	Weighted Symmetric			Dickey-Fuller		
	Statistic	P-value	Lags	Statistic	P-value	Lags
ASEAN						
Brunei Dollar	-2.69	0.19	5	-3.47	0.04	5
Cambodia Riel	-1.74	0.80	3	-2.23	0.47	3
Indonesia Rupiah	-2.58	0.25	3	-3.31	0.07	3
Lao Kip	0.32	1.00	6	-1.69	0.75	7
Malaysia Ringgit	-3.01	0.08	7	-2.90	0.16	7
Myanmar Kyat	-1.68	0.83	3	-2.41	0.38	5
Philippines Peso	-1.35	0.93	5	-2.99	0.13	2
Singapore Dollar	-2.44	0.33	5	-3.07	0.11	5

(Table 1.1 continued)

	Weighted Symmetric			Dickey-Fuller		
	Statistic	P-value	Lags	Statistic	P-value	Lags
Thailand Baht	-1.94	0.69	3	-4.12	0.01	3
Vietnam Dong	0.17	1.00	3	-0.65	0.98	3
Plus 3						
China (Renminbi Yuan/USD)	-2.32	0.42	3	-2.31	0.43	3
Korea (Won/USD)	-2.48	0.31	5	-2.34	0.41	5
Japan (Yens/USD)	-2.04	0.62	2	-2.61	0.28	2

The maximum likelihood estimation procedure is used to determine the presence and number of co-integrating vectors. Optimal lag length was chosen using the Akaike Information Criterion. The logs of RERs are normalized to zero (0) in January 2000. A stationary long-run relationship between variables is identified when a nonzero vector is indicated these tests. The constant term is important because it helps indicate the trend. There is evidence that RERs may be subject to seasonal trend. Dummies representing months were used to control for seasonality. The first test uses the RERs of all ASEAN+3 nations vis-à-vis the United States Dollar (USD). A second test uses the RERs of a subset of ASEAN nations plus the three Tigers using the USD as the base currency. Final tests use the subset of ASEAN nations with and without the three Tigers vis-à-vis the Republic of South Korean Won (KRW).

Results and Conclusions for G-PPP tests

Figure 1.1 shows a graph of the estimated RERs from ASEAN+3 countries during the period using USD as the base currency. Both the price level and RERs are normalized to 100 percent in January 2000. Brunei Darussalam, Myanmar and Singapore have been marked for reference. Clearly, Brunei and Singapore move together. These currencies become almost 50 percent cheaper (in real terms) over time in respect to January 2000. Myanmar trends the opposite direction—it appreciates substantially—and goes off on its own. There is something unique going on with Myanmar that makes it an unlikely candidate for financial and monetary integration.

Figure 1.1: Real exchange rates for ASEAN + 3 (2000 - 2010)

This graph shows the real exchange for ASEAN+3 countries versus the U.S. dollar. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{US,t})$. Where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period, and $P_{US,t}$ is the United States price level in period t . Both price level and real exchange rates are normalized to 100 percent in January 2000. Only Brunei, Myanmar and Singapore have markers in order to highlight them.

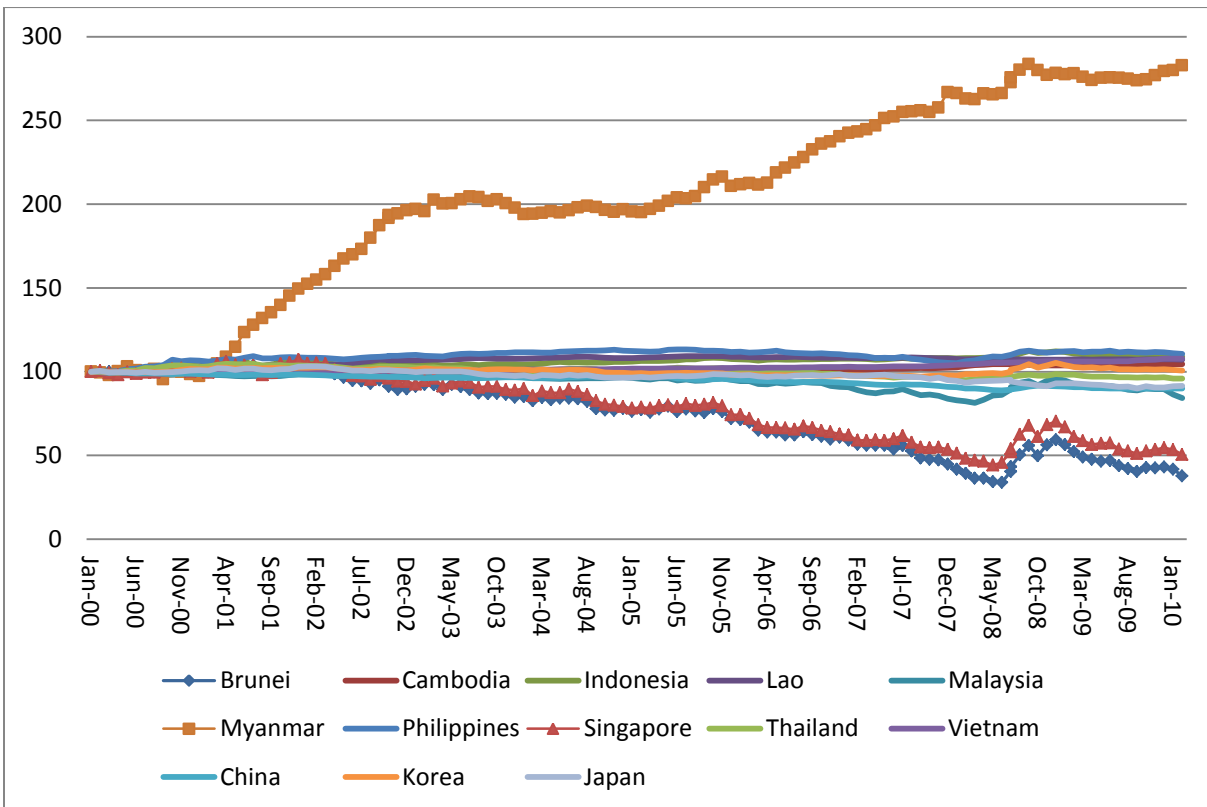
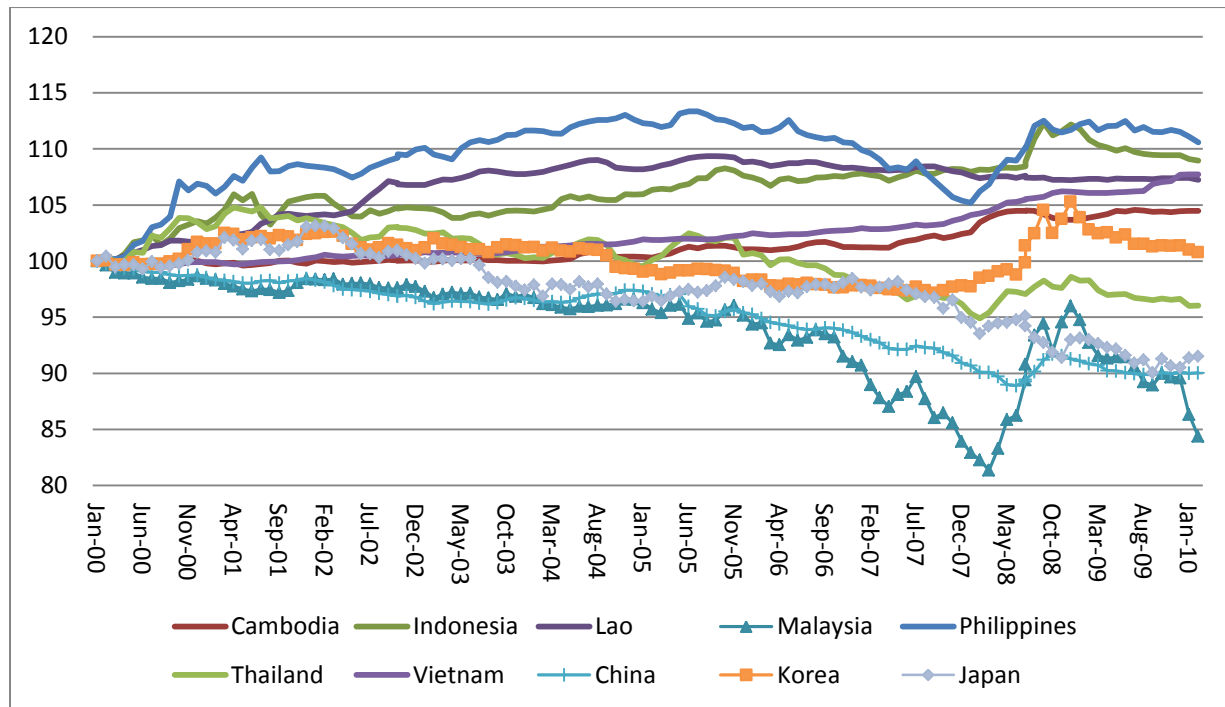


Figure 1.2 removes Brunei Darussalam, Myanmar and Singapore from the previous graph. China, Korea, Japan and Malaysia are highlighted. Korean is centrally located in the series whereas the Chinese Yuan Renminbi (CNY), the Malaysian Ringgit (MYR) and the Japanese Yen (JPY) are located in the bottom tier of the series. One distinct pattern can be seen during the global financial crisis. There is a decline in nearly all series in the 2007-2008 time period followed by an increase in the 2008-2009 time period.

Figure 1.2: Real exchange rate for Select ASEAN + 3 (2000-2010)

This graph shows the real exchange for ASEAN+3 countries versus the U.S. dollar. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{US,t})$. Where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period, and $P_{US,t}$ is the United States price level in period t . Both price level and real exchange rates are normalized to 100 percent in January 2000. Brunei, Myanmar and Singapore are not considered in this graph. China, Korea, Japan and Malaysia are marked in order to highlight them.



Tables 1.2 through 1.7 show the results of the Johansen-Julius cointegration tests. These tests look for multilateral co-integration in ASEAN, ASEAN+3, and an ASEAN subgroup with and without the three Asian Tigers. One set of test statistics applies to the January 2000 to October 2010 period. A second period of January 2006 to April 2010 is also evaluated separately to see if increased linkages are occurring post-Asian financial crisis given policy changes. The latter, isolated period also contains data from directly surrounding and during the Global Financial Crisis and hence the data reflects this macro shock.

Asterisks (** and * denote 1% and 5% significance levels, respectively) indicate significance. Table 1.2 shows the results of the test for the ASEAN+3 countries vis-à-vis USD. Trace and eigenvalue tests show four and three significant vectors—respectively—at the 5% or above significance level using

USD as the base currency for the period January 2000 to October 2010. The trace test indicates five significant vectors while the eigenvalue test indicates one for the latter period of January 2006 to April 2010. The trace test is a conventional likelihood ratio test. All eigenvalues are less than one. More than one stationary long-run relationship exists between variables when tests indicate more than one nonzero vector. Johansen and Juselius (1990) emphasize that more than one nonzero vector indicates a strong and robust relationship. These results indicate evidence of an OCA. Results indicate shocks to the economies will transmit from one set of RERS to others and imply an OCA.

Table 1.2: Johansen-Juselius cointegration tests for ASEAN + 3 countries
(Real exchange rates vis-à-vis USD)

Optimal lag length was chosen using the Akaike Information Criterion. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{US,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period t , and $P_{US,t}$ is the United States price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000. ** and * denote 1% and 5% significant level, respectively.

Period: 2000:01 - 2010:10				Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic
$H_0: r = 0$	0.64	558.6	118.4	0.88	522.2	109.5
$H_0: r \leq 1$	0.55	440.3**	92.3**	0.80	412.7**	82.9*
$H_0: r \leq 2$	0.48	347.9**	76.9*	0.70	329.8**	62.7
$H_0: r \leq 3$	0.43	271.0**	65.4*	0.65	267.1**	54.6
$H_0: r \leq 4$	0.35	205.6*	50.3	0.61	212.6**	49.3
$H_0: r \leq 5$	0.30	155.3	41.9	0.58	163.3*	44.9
$H_0: r \leq 6$	0.27	113.4	36.2	0.47	118.4	33.1
$H_0: r \leq 7$	0.20	77.2	26.2	0.42	85.3	28.2
$H_0: r \leq 8$	0.15	51.0	19.0	0.31	57.1	19.0
$H_0: r \leq 9$	0.11	32.0	13.8	0.30	38.0	18.3

Table 1.2 (continued)

Period: 2000:01 - 2010:10				Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic
$H_0: r \leq 11$	0.05	7.2	5.8	0.09	5.1	5.0
$H_0: r \leq 12$	0.01	1.4	1.4	0.00	0.1	0.1
Optimal Lags = 6 N = 117 AIC= -6,033.6				Optimal Lags = 0 N = 52 AIC= -2,049.1		

Performing additional tests on a subset of ASEAN+3 seemed prudent since Figure 1 showed three distinct patterns. Myanmar showed a unique and strong increasing pattern of RERs. The Kip appreciated at a very high rate—almost exponential rate—during the time period indicating some unique circumstance. Brunei Darussalam and Singapore shared a decreasing pattern of RERs that moved away from the rest of the series. These currencies depreciated almost 50 percent (in real terms) over time in respect to January 2000.

These three countries were removed from the subset for the second test to elucidate the underlying patterns in those countries whose RERs were closer together. Table 1.3 shows results from the Johansen and Juselius (1990) cointegration tests for the subset of ASEAN+3 vis-à-vis USD and normalized equations. This analysis was done without Brunei Darussalam, Myanmar and Singapore in the data set.

Table 1.3: Johansen-Juselius cointegration tests for subset of ASEAN + 3
(real exchange rates vis-à-vis USD)

This table shows Johansen-Juselius cointegration tests for ASEAN + 3 countries removing Brunei Darussalam, Myanmar and Singapore. Optimal lag length was chosen using the Akaike Information Criterion. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{US,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period, and $P_{US,t}$ is the United States price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000. ** and * denote 1% and 5% significant level, respectively.

Panel A. Cointegration tests for ASEAN +3 without Brunei, Myanmar or Singapore

	Period: 2000:01 - 2010:10			Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic
H0: r=0	0.60	321.5**	104.4**	0.81	380.1**	87.2**
H0: r<=1	0.44	217.1**	66.3**	0.78	292.9**	77.7**
H0: r<=2	0.38	150.8	54.7*	0.67	215.2**	57.6*
H0: r<=3	0.20	96.1	26.2	0.57	157.6**	44.2
H0: r<=4	0.18	69.9	23.1	0.53	113.4**	38.9
H0: r<=5	0.12	46.8	15.1	0.45	74.5*	31.5
H0: r<=6	0.11	31.7	13.7	0.31	43.0	19.3
H0: r<=7	0.09	18.0	11.4	0.23	23.8	13.8
H0: r<=8	0.05	6.6	6.3	0.17	10.0	9.5
H0: r<=9	0.00	0.3	0.3	0.01	0.5	0.5
Optimal Lags=8 N=115 AIC= -4,494.5			Optimal Lags=1 N=52 AIC= -1,537.1			

Table 1.3 (continued)

Panel B. Normalized equation to $\$/\$$ (KHR/USD)

	Period: 2000:01 - 2010:10	Period: 2006:01 - 2010:04
Cambodia Riel	1.000	1.000
Indonesia Rupiah	1.062**	-0.436**
Lao Kip	0.669*	-0.556*
Malaysia Ringgit	-4.644**	-1.162**
Philippines Peso	-1.562	-0.394**
Thailand Baht	-0.102	-0.228
Vietnam Dong	-0.997	-0.441**
China Yuan Renminbi	5.395**	3.352**
Korea Won	-0.031	0.646**
Japan Yen	-1.227*	-0.019

Panel B shows the normalized equations based on the first significant vector. Normalizing on the real exchange rate provides an intuitive economic interpretation for the estimated cointegrating vector(s). Normalized vectors reveal the relationship between the RERs in the data set. The vector is considered to show long run elasticities. The vectors are normalized using the Cambodian Riel (KHR) vis-à-vis USD. The KHR was chosen simply because Cambodia came first in the alphabetic list of countries in this subset of ASEAN.

The multivariate cointegration test revealed at least two vectors at the 5% or above significance level for the subset for the entire period of January 2000 to October 2010. The trace test showed six significant vectors while the Eigenvalue Statistic showed three significant vectors for the period January 2006 - April 2010 with at least 5% significance. All eigenvalues were less than one.

Normalized equations show significant coefficients that are less than one for the Indonesian Rupiah (IDR), the Laotian Kip (LAK), the Malaysian Ringgit (MYR), the Philippine Peso (PHP), and the Vietnamese Dong (VND) for the period January 2006 to April 2010. The Thai Baht's (THB) coefficient was less than one but did not test significant. The SKW tested significant with a less than one coefficient. The Chinese Yuan Renminbi (CNY) tested significant but with a positive coefficient that was greater than one. The Japanese yen (JPY) also had a less than one coefficient but did not test significant. This first test—based on the USD—showed 5 RERs with significance of at least 5% level for the overall period. The latter period showed seven RERs with significance over the 5% level for the overall period. The IDR, the LAK, the MYR and the CNY maintained their previous levels of significance having tested at the 1%,

the 5%, the 1% and the 1% levels of significance respectively. In this latter period, the Philippines Peso (PHP), the VND, and the KRW became significant at the 1% level. The JPY continued to be insignificant as did the THB. The KRW and the CNY impose opposite effects from the other significant currencies.

The implications of the long run elasticities are interpreted thusly using the results of the latter period. A 1% fall (rise) in the Malaysian-United States real exchange rate will induce a 1.162% rise (fall) in the real exchange rate of Cambodia-United States. Something in either a trade or investment linkage between Malaysia and Cambodia causes the two countries to have an inverse relationship in their real exchange rates. The relationship between the KHR and KRW are direct and close to one to one.

One of the interesting things to see when comparing the overall period to the latter period is that many of the signs in the normalized equations switched indicating some basic change in the underlying forcing variables between the countries. The IDR switched from a positive relationship over the entire period to an inverse one in the latter period while still maintaining its 1% significance level. Again, this indicates some fundamental change in either trade or investment relations between the Cambodia and Indonesia that transmits through the exchange rate. The LAK changes signs from positive to negative also. The MYR kept its negative sign as did the THB, the VND and the JPY. The CNY remained positive for both test periods. The KRW went from an inverse relationship to a positive one.

These results suggested further testing using this subset of ASEAN without the three Tigers. The results are shown in Table 1.4 with normalized equations shown in panel C.1. Normalized equations still use KHR/USD. The Trace and Max-Eigenvalue Statistic identify only one cointegrated vector at the 1% significance level for this configuration for the entire period. The Trace Statistic identifies two additional cointegrated vectors for the last period at the 5% significance level while the Max-Eigenvalue Statistic still identifies one at the 1% level. All Eigenvalues are less than one. Normalized equations use a KHR/USD basis. Only one significant currency was identified for the entire period. It was the MYR at the 1% level. The latter period indicated five significant relationships all at the 1% level. These currencies were the IDR, the LAK, the MYR, the PHP, and the THB. The VND was the sole currency not testing significant.

Table 1.4: Johansen-Juselius cointegration tests for a subset of ASEAN
(Real Exchange Rates vis-à-vis USD)

This table shows Johansen-Juselius cointegration tests for a sub set of ASEAN countries. Brunei, Myanmar and Singapore are excluded from the analysis. Optimal lags length was chosen using the Akaike Information Criterion. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{US,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period, and $P_{US,t}$ is the United States price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000. ** and * denote 1% and 5% significant level, respectively.

Panel A. Cointegration tests for a sub set of ASEAN (see panel B for countries included in the sample)

	Period: 2000:01 - 2010:10			Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic
H ₀ : r=0	0.41	144.6**	58.6**	0.65	156.4**	54.4**
H ₀ : r<=1	0.29	86.0	37.6	0.46	102.0*	31.9
H ₀ : r<=2	0.15	48.4	18.0	0.42	70.1*	28.1
H ₀ : r<=3	0.14	30.3	16.7	0.32	42.0	20.0
H ₀ : r<=4	0.07	13.7	8.4	0.21	22.0	12.5
H ₀ : r<=5	0.04	5.3	4.3	0.15	9.4	8.6
H ₀ : r<=6	0.01	1.0	1.0	0.02	0.9	0.9
Optimal Lags=12 N=115 AIC=-3,317.8			Optimal Lags=3 N=52 AIC= -1376.6			

Panel B.1. Normalized equation to \$/\$ (KHR/USD)

	Period: 2000:01 - 2010:10	Period: 2006:01 - 2010:04
Cambodia Riel	1.000	1.000
Indonesia Rupiah	0.462	-0.949**
Lao Kip	-0.333	-1.640**
Malaysia Ringgit	5.528**	2.082**
Philippines Peso	-0.167	-1.599**
Thailand Baht	-1.151	1.120**
Vietnam Dong	-0.693	-0.076

Additional tests for ASEAN +3 were accomplished using the KRW as base the currency. The entire group—including Brunei Darussalam, Myanmar, and Singapore—were included in the Cointegration test shown in Table 1.5. Normalized equations used the Brunei Darussalam dollar (BND) vis-à-vis KRW. The results are reported in Table 1.5, Panel B. As with the other tests, there is an increase in the number of cointegrating vectors in the second period observations. The Trace Test shows nine cointegrating vectors in the later period with eight of them testing at the 1% significance level and the remaining one at the 5% significant level. The Trace Test for the entire period identified 4 significant vectors at the 1% significance level. The Eigenvalue Statistic also identified four vectors. Two vectors were identified at the 1% significance level and two at the 5% level. Panel B shows the normalized equations based on the Brunei Darussalam Dollar (BND) to KRW. All countries tested significant at the 1% level during the period January 2006 to April 2010. The IND and LAK tested significant at the 1% level during the entire period of January 2000 to October 2010. The JPY, MYR, the Singapore Dollar (SGD) and the KHR tested significant at the 1% level for the entire period. China had a nearly a one-to-one, direct relationship with BND.

Table 1.5, Panel B also indicates those currencies that switched and maintained their direct or inverse relationships when normalized equations were set BND/KRW. The KHR maintained its positive relationship with the BND as did the CNY. The PHP, SNG and JPY maintained their inverse relationship. The other currencies switched signs. The IND went from positive to negative as did the LAK. The MYR the THB, the VND, and the Myanmar Kip (MAK) went from negative to positive. Again, something fundamental underlying the trade or investment relations in the countries switching signs changed. It is impossible to identify the cause from this analysis. The size of the coefficients changes slightly. In absolute value, their sizes are similar and less than one. A comparison of the sizes of the absolute value of the coefficients between periods provides some insight into volatility for the period. There is movement but not exceedingly large change.

Table 1.5: Johansen-Juselius cointegration tests for ASEAN +3 (real exchange rates vis-à-vis KRW)

This table shows Johansen-Juselius cointegration tests. Optimal lag length was chosen using the Akaike Information Criterion. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{KOREA,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period, and $P_{KOREA,t}$ is the Korean price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000. ** and * denote 1% and 5% significant level, respectively.

Panel A. Cointegration tests for ASEAN + 3

Period: 2000:01 - 2010:10				Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic
H ₀ : r = 0	0.61	472.2**	108.7**	0.87	547.3**	104.6**
H ₀ : r<=1	0.49	363.4**	78.5**	0.82	442.7**	89.2**
H ₀ : r<=2	0.44	284.9**	67.4*	0.77	353.5**	75.9**
H ₀ : r<=3	0.40	217.5**	59.2*	0.71	277.7**	63.6*
H ₀ : r<=4	0.28	158.4	38.6	0.60	214.1**	48.3
H ₀ : r<=5	0.26	119.8	34.5	0.58	165.8**	45.6
H ₀ : r<=6	0.21	85.3	27.7	0.48	120.1**	34.1
H ₀ : r<=7	0.18	57.6	23.2	0.47	86.1**	32.9
H ₀ : r<=8	0.11	34.4	13.2	0.37	53.2*	24.1
H ₀ : r<=9	0.10	21.2	12.0	0.27	29.0	16.5
H ₀ : r<=10	0.07	9.2	8.4	0.16	12.5	8.9
H ₀ : r<=11	0.01	0.8	0.8	0.07	3.6	3.6
Optimal Lags = 6 N = 117 AIC= -4,891.0			Optimal Lags = 1 N = 52 AIC= -2,244.2			

Table 1.5 (continued)

Panel B. Normalized equation to $BD\$/\text{¥}$

	Period: 2000:01 - 2010:10	Period: 2006:01 - 2010:04
Brunei	1.000	1.000
Cambodia	0.439**	0.263**
Indonesia	0.102*	-0.284**
Lao	0.201*	-0.511**
Malaysia	-0.703**	0.142**
Myanmar	-0.080	0.209**
Philippines	-0.207*	-0.247**
Singapore	-0.632**	-0.801**
Thailand	-0.284	0.401**
Vietnam	-0.175	0.107**
China	0.305	0.899**
Japan	-0.235**	-0.142**

Table 1.6 shows the Johansen-Juselius cointegration test without Brunei Darussalam, Myanmar and Singapore. The Trace Statistic identified 2 significant vectors. One was identified at the 5% and the other at 1% level while the Max Eigenvalue Statistic identified one at the 1% level for the entire period. The Trace Statistic identified the same 2 vectors at the 1% level of significance for the latter period and an additional sector at the 5% significance level. The Max Eigenvalue identified three significant vectors for the latter period. One was identified at the 1% level and the remaining two at the 5% level. Normalized equations were set KHR to RKW. The overall period had 4 RERS identified as significant. The MYR and the JPY were identified as significant at the 1% level while the INDR and VND were identified as significant at the 5% level. The cointegration test for the latter period identified five currencies as significant at the 1% level. These were the INDR, the LAK, the PHP, the THB, and the CNY.

Table 1.6: Johansen-Juselius cointegration tests for subset of ASEAN+ 3
(Real exchange rates vis-à-vis KRW)

This table shows Johansen-Juselius cointegration test dropping Brunei, Myanmar and Singapore from the sample. Optimal lags length was chosen using the Akaike Information Criterion. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{KOREA,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period t , and $P_{KOREA,t}$ is the Korean price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000. ** and * denote 1% and 5% significant level, respectively.

Panel A. ASEAN +3- (Brunei, Myanmar and Singapore)

	Period: 2000:01 - 2010:10			Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic	Eigenvalue	Trace Statistic	Max- Eigenvalue Statistic
H0: r=0	0.52	252.3**	84.7**	0.72	251.4**	65.8**
H0: r<=1	0.37	167.6*	51.8	0.66	185.6**	56.5*
H0: r<=2	0.27	115.8	36.6	0.59	129.1*	46.4*
H0: r<=3	0.21	79.2	26.8	0.42	82.7	28.7
H0: r<=4	0.18	52.4	22.0	0.35	54.0	22.2
H0: r<=5	0.12	30.4	14.4	0.28	31.8	16.8
H0: r<=6	0.09	16.0	11.2	0.20	15.0	11.7
H0: r<=7	0.04	4.8	4.2	0.06	3.4	3.3
H0: r<=8	0.01	0.6	0.6	0.00	0.1	0.1
Optimal Lags=12 N=111 AIC= -3,335.2			Optimal Lags=3 N=52 AIC= -1,283.4			

(Table 1.6 Continued)

Panel B. Normalized equation to $\$/\text{₩}$ (KHR/RKW)

	Period: 2000:01 - 2010:10	Period: 2006:01 - 2010:04
Cambodia Riel	1.000	1.000
Indonesia Rupiah	0.780*	-0.705**
Lao Kip	0.422	-3.313**
Malaysia Ringgit	-5.342**	0.657
Philippines Peso	-1.178	-1.525**
Thailand Baht	0.480	1.058**
Vietnam Dong	-1.870*	0.186
China Renminbi Yuan	3.242	4.512**
Japan Yen	-1.620**	-0.216

Table 1.7 presents the final multivariate cointegration tests for just the subset of ASEAN with the RERs vis-à-vis the KRW. At least one vector was identified for the entire period at the 1% level of significance. Three significant vectors were identified for the latter period for both the Trace and Max-Eigenvalue tests for at the 5% or above level of significance.

Table 1.7: Johansen-Juselius cointegration tests for subset of ASEAN**(Real exchange rates vis-à-vis KRW)**

This table shows Johansen-Julius cointegration tests, but dropping from the sample Brunei, Myanmar and Singapore. Optimal lags length was chosen using the Akaike Information Criterion. Real exchange rate for country i is calculated as $r_{i,t} = \log(S_{i,t}) + \log(P_{i,t}) - \log(P_{KOREA,t})$ where $S_{i,t}$ is the nominal exchange rate for country i in period t , $P_{i,t}$ is the price level for country i in period t , and $P_{KOREA,t}$ is the Korean price level in period t . Log of real exchange rates are normalized to zero (0) in January 2000. ** and * denote 1% and 5% significant level, respectively.

Panel A. Cointegration test for a sub set of ASEAN (see panel B for countries included in the sample)

Period: 2000:01 - 2010:10				Period: 2006:01 - 2010:04		
Hypothesis	Eigenvalue	Trace	Max-	Eigenvalue	Trace	Max-
		Statistic	Eigenvalue		Statistic	Eigenvalue
			Statistic			Statistic
H ₀ : r=0	0.39	167.5**	59.2**	0.68	169.8**	59.1**
H ₀ : r<=1	0.31	108.3**	44.2*	0.46	110.6**	32.4
H ₀ : r<=2	0.19	64.1	25.3	0.45	78.2**	31.3
H ₀ : r<=3	0.14	38.8	17.4	0.34	46.9	21.6
H ₀ : r<=4	0.13	21.4	16.6	0.26	25.3	15.9
H ₀ : r<=5	0.04	4.8	4.4	0.15	9.3	8.7
H ₀ : r<=6	0.00	0.4	0.4	0.01	0.6	0.6
Optimal Lags=3 N=120		AIC=-2,209.0		Optimal Lags=3 N=52		AIC= -1,283.4

Panel B. Normalized equation to (₪/\$ (KHR/USD))

	Period: 2000:01 - 2010:10	Period: 2006:01 - 2010:04
Cambodia Riel	1.000	1.000
Indonesia Rupiah	0.462	-0.949**
Lao Kip	-0.333	-1.640**
Malaysia Ringgit	5.528**	2.082**
Philippines Peso	-0.167	-1.599**
Thailand Baht	-1.151	1.120**
Vietnam Dong	-0.693	-0.076

The normalized equations set KHR/RKW identified the MYR and the JPY at the 1% level for the overall period. The IDR and VND were identified as significant for the overall period at the 5% level. There was a change in the identified significant currencies in the latter period. The LAK, the PHP, the THB and the CNY became significant at the 1% level in addition to the IDR. The JPY and the VND lost their significance. There were multiple sign changes too indicating changes in the basic relationships underlying many of the currencies.

The strengthening of the cointegration test results over time is confirmed with tests vis-à-vis USD and the KRW. This indicates that the relationships in exchange rates in the group are likely becoming stronger as intraregional trade increases, as coordination and implementation of integration strategies proceed, and as the countries move farther away from both the Asian currency crisis period and dollar pegs. The long run elasticities of the normalized equations signal other changes in the basic trade and investment relationships between the countries that are transmitted through exchange rates.

Our results reinforce the findings of Choudhry (2005) who concluded that the post Asian currency crisis showed signs of being an OCA while the pre-Asian currency crisis period did not. Our results compliment this study since our evidence indicates there are stronger linkages moving farther in time away from the currency crisis period. The Choudhry study generally found one cointegrating vector for most tests. A few of the tests showed two cointegrating vectors. Our results should many more cointegrating vectors. This was especially true for latest time period.

Calculation of speed of adjustment to disequilibrium is assessed as suggested by Engle and Granger (1987) following the results of cointegration tests that reject the null hypothesis that the number of multilateral cointegrating vectors is zero. These coefficients are presented in Table 1.8 for the subset of ASEAN+3 and the subset of ASEAN vis-à-vis the USD (Panel A) and for ASEAN+3 and the two subsets vis-à-vis the KRW (Panel B). Panel A does not include all of ASEAN+3 vis-à-vis USD because there is no evidence of cointegrating vectors in the sample.

Enders and Hurn (1994) argue that countries with similar demand parameters will have small parameters in the co-integrating vector. This is because the size of the coefficients in the vector depends on the forcing variables and the models that show a high degree of cointegration will have many channels to transmit the information to speed the adjustment to the long-run relationship. The coefficients shown in Table 1.8 represent the speed of adjustment to the long run cointegration relationship in the ASEAN+3 for the period of interest. They indicate how quickly a change in an RER away from the G-PPP equilibrium will take to correct. The expected sign of these parameters should be

opposite of those in the co-integrating vector of RER. The table shows the results of the overall period and of the latter period.

Table 1.8: Speed of Adjustment

This table shows speed of adjustment (alphas) from the Johansen-Julius cointegration tests. Panel A presents the coefficients using the USD as reference. Panel B presents the coefficients using the KRW as reference. Panel A does not include ASEAN + 3 because there is no evidence of cointegrating vectors in the sample.

Panel A. Speed of adjustment coefficients vis-à-vis USD

	Subset of ASEAN + 3		Subset of ASEAN	
	2000 - 2010	2006-2010	2000 - 2010	2006-2010
Brunei Dollar				
Cambodia Riel	0.023**	0.028	-0.027**	0.002
Indonesia Rupiah	-0.020	-0.003	-0.002	0.513**
Lao Kip	-0.028**	-0.074	0.017**	-0.045
Malaysia Ringgit	-0.007	0.204*	-0.003	0.145**
Myanmar Kyat				
Philippines Peso	-0.010	0.132	-0.003	0.245**
Singapore Dollar				
Thailand Baht	0.002	0.235**	0.002	0.011
Vietnam Dong	0.019**	0.130	-0.019**	-0.019
China (Yuan/\$)	-0.008**	-0.103**		
Korea (Won/\$)	-0.001	0.242		
Japan (Yens/\$)	0.003	0.033		

Table 1.8 (continued)

Panel B. Speed of adjustment coefficients vis-à-vis KRW

	ASEAN + 3		Subset of ASEAN + 3		Subset of ASEAN	
	2000-10	2006-10	2000-10	2006-10	2000-10	2006-10
Brunei Dollar	-0.055	0.696				
Cambodia Riel	0.118**	-0.866*	0.028**	0.157**	0.026*	-0.069
Indonesia Rupiah	0.052	2.721**	0.002	0.379**	0.014	0.676**
Lao Kip	-0.192**	0.031	-0.017*	0.034	-0.038**	-0.089*
Malaysia Ringgit	-0.029	0.196	0.003	0.171**	0.018	0.172**
Myanmar Kyat	-0.140*	-0.395				
Philippines Peso	0.023	1.420**	0.007	0.301**	-0.015	0.280**
Singapore Dollar	-0.001	0.905				
Thailand Baht	0.088	-0.199	0.014*	0.096	-0.013	0.044
Vietnam Dong	0.153**	-0.525	0.021**	0.084	0.037**	-0.018
China (Yuan/\$)	-0.030*	0.292*	-0.003	-0.014		
Korea (Won/\$)	0.128	0.017	0.011	-0.009		
Japan (Yens/\$)	-0.055	0.696	0.014*	0.096		

Size of the coefficients is important since high coefficients represent quick return to the long run cointegrating relationship, test significant, and are not considered weakly exogenous. The results for the subset of ASEAN+3 vis-à-vis the USD for the overall period show consistently minute coefficients. Most did not register as significant. Extremely small and insignificant coefficients mean that some of the RERs are weakly exogenous (Harris, 1995). Weak exogeneity means the equations for these variables have no information on the long-run relationship. This is because the cointegration relationship does not enter into the equation. Therefore, the variable can be omitted from the left hand side of the VAR.

The largest coefficients for the Panel A data for the subset of ASEAN+3 for the later period were for the MYR/USD at 0.204 which showed significant at the 5 % level, the THB/USD which showed significant at the 1% level with a value of 0.2345 and the KRW/USD which had a coefficient of 0.242 that tested significant at the 1% level. These results imply that these three currencies adjust at the speed of about 20 to 24% per month.

Panel B which shows the speed of adjustment coefficients vis-à-vis the KRW for the three groupings and two time periods provided more interesting results. These results also suggest that the RERs of these countries have a much stronger relationship with the KRW than with the USD. All the

variables in all three groupings were less than 1 with the exception of the PHP/KRW. Its coefficient was significant at the 1% level with a value of 1.420 when PHP/KRW when grouped with the entire ASEAN+3 and calculated only for the later time period.

Coefficients for the KHR/KRW, the LAK/KRW and the VND/KRW tested significant at the 1% level in the ASEAN+3 set for the entire period. The MAK/KRW and the CNY/KRW were significant at the 5% level. The significant coefficients ranged—in absolute value—from 0.30 for the CNY/KRW coefficient and 0.192 for the LAK/KRW. The latter period sample for the subset of ASEAN+3 which used the KRW as base currency showed four significant coefficients at the 1% level. The KHR/KRW showed a 15.7% monthly adjustment. The IND/KRW showed a 37.9 monthly adjustment. The MYR/KRW showed a 17.1% speed of monthly adjustment. The PHP/KRW coefficient suggested a 30.1% monthly speed of adjustment.

This represents the rate at which the currency will appreciate when domestic inflation rates or the foreign nominal interest change. Many coefficients did not test significant. This means that there are mostly likely undeveloped interest rate channels among other things in many of these countries. This could be due to the differences in development, institutions, and market which are known to exist in many of these developing nations.

In general terms, the ASEAN+3 VAR identified one additional significant relationship when using the KRW as the base currency. This is consistent with the general findings of the full G-PPP model which identifies the KRW as the most suitable base currency. Changing the base currency changed the results. The coefficients of some countries often became significant or lost their significance from one time period to the next. The majority of coefficients show weak exogeneity in all of the subset models.

The multivariate cointegration tests indicate that the area is most likely an OCA and has increasing numbers of linkages between the region's economies over time. There is evidence that shocks will transmit among countries. There is a long-run stationary relationship between the RERs during the period. High speed of adjustment coefficients implies quick adjustment. The model did not indicate a large number of large coefficients which means that many of the countries may not be developed enough to have sophisticated linkages.

Qualitative Factors

Economic and Financial Openness and Factor Mobility

A small open country is more likely to be ready to enter a currency union if its economy is heavily reliant on international trade. This is because its economy is more likely to be impacted by exchange rate fluctuations and exogenous shocks. McKinnon (1963) argued that in small open economies, the exchange rate cannot be useful to correct balance of payment issues because it is strongly linked to the prevailing price level. Any change in the international price of goods being traded will transmit quickly to the domestic cost of living. McKinnon concludes that a devaluation of currency would not achieve the desired result because of the rapid transmission of the change through the price of trade goods to domestic prices. Prices become less rigid or sticky as the economy becomes more open which makes it more likely that the Friedman thesis holds.

Economic openness is multidimensional. The ratio of trade to GDP is considered one such measure. The traditional formulation is $(X+M)/GDP$ where X is total exports, M is total imports, and GDP is Gross Domestic Product. The result is frequently referred to as trade openness. It is also standard to use either exports (X) or imports (M) over GDP (X/GDP or M/GDP). These represent the marginal propensity to import and the marginal propensity to export. Foreign direct investment as a percentage of GDP, and the degree of trade integration measured as the ratio of reciprocal exports plus imports over GDP. Another measurement is the percentage of tradeables vs. nontradeables in terms of production and/or consumption.

Financial openness is also of interest. The newly developed Chinn-Ito index called KAOPEN measures a country's degree of capital account openness. The index was introduced in Chinn and Ito (2006) and is based on "the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported" to the IMF.

A quick glance at recent annual data shows that the majority of the ASEAN economies are relatively open with the exception of Lao PDR and Myanmar. Lao PDR is a single party socialist republic. Myanmar is governed by a military junta. What trade occurs with these two countries tends to be regional and associated with bordering nations. Cambodia, Vietnam and Thailand show an increasing rate of openness while Indonesia and the Philippines have kept a more consistent level of trade. Malaysia, Brunei Darussalam and Singapore are definitely export driven economies. There is a good deal of intraregional trade that occurs within the region because of the diverse nature of exports.

Table 1.9 shows the marginal propensity to export (mpx) from 1995-2009. The mpx is a traditional measure of economic openness. Three countries depend on exports. Singapore had an mpx of 199.3 for 2009 and has had levels as high as 235.1 in 2006. The small city-state nation is clearly export-dependent. Malaysia's MPX for 2009 is 96.4. This number is down from a high of 117.5 in 2005. Brunei Darussalam's 2008 MPX is 78.3 and shows a clear upward trend over the period of 1995-2009. Myanmar's exports represent less than 1% of the country's GDP and show a downward trend. Lao PDR's export numbers are not available in the same format as the other countries but looking its export numbers is US dollars and compared to its GDP which is stated in terms of Kips indicates a very low percentage also. Thailand (68.4 in 2009) and Vietnam (68.3 in 2009) are also relatively dependent on exports. Indonesia (24.1 in 2009 with a falling trend) and the Philippines (31.7 in 2009 with a falling trend) are less dependent on exports.

Table 1.9: Economic Openness (Exports/GDP)

Export of Goods and Services as a Percent of GDP at current market prices (Marginal propensity to Export)

	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Brunei	50.5	55.8	67.4	69.5	67.1	69.3	68.8	70.2	71.7	67.9	78.3
Cambodia	37.2	49.9	52.7	55.4	56.5	63.6	64.1	68.6	65.3	52.7	n/a
Indonesia	35.5	41.0	39.0	32.7	30.5	32.2	34.1	31.0	29.4	29.8	24.1
Lao PDR	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Malaysia	121.3	119.8	110.4	108.3	106.9	115.4	117.5	116.5	110.5	103.6	96.4
Myanmar	0.3	0.5	0.5	0.4	0.2	0.2	0.2	0.2	0.1	n/a	n/a
Philippines	51.5	55.4	49.2	50.2	49.6	50.9	47.6	47.3	42.5	36.9	31.7
Singapore	183.9	195.6	191.6	192.3	212.5	224.4	230.0	235.1	219.1	228.9	199.3
Thailand	58.3	66.8	65.9	64.2	65.7	70.7	73.6	73.6	73.4	76.5	68.4
Vietnam	50.0	55.0	54.6	56.8	59.3	65.7	69.4	73.6	76.9	77.9	68.3

Source: Key Indicators for Asia and the Pacific, 2009 & 2010, Asian Development Bank

There are more sophisticated measures of openness than measuring the percentage of GDP represented by exports. Some empirical studies use global measures. Others focus on more regional measures of trade and financial market interaction. Finding better proxies for both economic and financial openness is an active line of research. Using several distinct proxies showing depth of trade within the region as compared to more globally can provide more robust results. This is especially true when considering monetary union.

Mundell (1961) discussed how the need to change real factor prices and the nominal exchange rate between countries is lessened with high factor market integration. This is a long held tenet of basic trade theory. This basically encourages factors to reallocate across markets so that higher efficiency is achieved as well as better allocation. Unless there is a high degree of control of capital outflows and inflows by law, developing economies may experience a high degree of capital mobility. Physical capital is not generally mobile. The mobility of the labor factor depends on many factors. This includes geography, language, cultural and religion, laws, and political considerations. Labor mobility is usually low in the short run.

Some regions—like the proposed currency arrangement in the Gulf—are more likely to achieve labor mobility because of the homogeneity of the populace and because their forms of government are more agreeable to such arrangements. The extent of joint ventures, agreements between countries and the occurrence of liberal regulations and institutions usually serve proxy for degree of factor mobility. FDI patterns are quantitatively analyzed in the third essay.

Financial Openness is usually associated with the extent and intensity of capital account controls. There are four groupings of binary variables considered to represent the presence or absence of financial openness. Unfortunately, these measures do not reflect intensity of openness and there are other ongoing attempts to quantify the strength of the controls. Such effort is reflected in Chinn and Ito (2007) where an index captures the extent of openness in cross-border financial transactions.

The binary variables include absence or presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and a final group that looks at any requirements on surrender of export proceeds. The problem with any laws seeking to either liberalize or restrict financial transactions is their actual effectiveness. Capital restrictions with increasing trade flows usually lead to black markets. Additionally, many regimes are de jure but not de facto.

Besides using the traditional binary variables, an interesting test of robustness uses various indexes like the KAOPEN index introduced in Chinn and Ito (2006). The index measures the presence of controls and the effectiveness of the controls in place. It is based a formulation of variables k1-k4 that indicate the presence or absence of the generally accepted groupings of controls that limit financial openness.

(k1): presence of multiple exchange rates

(k2): use of restrictions on current account transactions

(k3): use of restrictions on capital account transactions

(k4): requirement of the surrender of export proceeds

From the variable (k3), Chinn and Ito construct a new variable SHARE that uses a five-year window to provide a weighting representing that it takes time for controls to become effective. This seems a more reasonable approach than using strict binary variables.

$$SHARE_{3,t} = \left(\frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \right) \quad (1.3)$$

The index of countries is maintained and updated by Chinn and Ito and is available for use by researchers. This variable as a test of robustness will evaluate the usefulness of the index as well as add a proxy that is new to analysis of readiness factors in proposed monetary unions. This index is used in the third essay analyzing FDI and DOT patterns. Table 1.10 shows the 2009 values for the Chinn-Ito Index for the ASEAN+3 nations.

Table 1.10: Financial Openness (Chinn Ito Index)

	<u>2009</u>
Brunei Darussalam	n/a
Cambodia	1.232162
Indonesia	1.147968
Lao PDR	-1.148165
Malaysia	-0.0974876
Myanmar	-1.84374
Philippines	0.0972913
Singapore	2.477618
Thailand	-1.148165
Vietnam	-0.0974876
Japan	2.477618
Hong Kong, China	2.477618
South Korea	-0.0974876

Source: website of Drs. Chinn and Ito

Degree of Commodity Diversification: consumption and production patterns

Differences in consumption and production patterns correspond to the ability of countries within the OCA to respond to macroeconomic shocks. Kenen (1969) argued that diversification in either consumed goods or produced goods keeps a country more insulated from shock. Under these circumstances, it will be less necessary to use exchange rate manipulation to ameliorate the impact of the shock. Countries that are diversified that join OCAs that are diversified will be in better positions to ride out shocks and less like to pass contagion from shocks to specific sectors to other countries.

Patterns of exports and imports as well as patterns of consumption and production can show the interrelatedness of the ASEAN+3 countries and their degree of difference or similarity. These statistics are useful because they break out the direction of trade by sector and industry. This data can help when studying the mega property of symmetry of business cycles. Timing of entry into recessions or degree of impact by sector of recessionary forces can create problems within the OCA if countries experience different timing of cycles or different degrees of response to exogenous shocks. This makes monetary and fiscal policy coordination difficult and could require cross-country fiscal policy support if one or more countries experiences a more extreme shock and monetary policy prescriptions would negatively impact other countries. Chapter 3 in this dissertation focuses on both FDI and DOT patterns in the region.

Table 1.11 provides a quick look at GDP broken down by three sectors: agriculture, industry and service. This table provides some insight into why specific clusters may have been identified through the G-PPP approach. Both Singapore and Brunei Darussalam have nearly nonexistent agriculture sectors. Both countries receive less than 1% of their GDP from agriculture. The next lowest country is Malaysia at 9.3% followed Thailand at 11.6%. Myanmar has the largest agriculture sector at 38.2% of GDP produced. Both Cambodia and Lao PDR have agriculture sectors that represent about 1/3 of GDP produced. Brunei Darussalam has the highest source of its GDP from Industry at 74.1%. This sultanate is a producer of oil. The next highest is Indonesia with 47.6%. It is intuitive that countries that deal in similar goods in similar regions have closer parity of prices since they trade in the same markets. The ASEAN nations have a good deal of diversity in the production of goods and services. This is an interesting juxtaposition to the proposed currency union for the GCC countries that are almost all exclusively oil-producing. Diversity can help countries in that various sectors respond to macroeconomic shocks in various ways. However, this could prove challenging to unified fiscal and monetary policy coordination since it is likely that countries may have different policy requirements as a result of different shocks. Shocks coming from agriculture or oil sectors will definitely have varying impact on the

economies of the region. However, the region meets the Kenen criterion in that ASEAN nations have diversified production patterns.

Table 1.11: Structure of Output (2009)

(% of GDP at current market prices)

	<u>Agriculture</u>	<u>Industry</u>	<u>Services</u>
Brunei Darussalam	0.6	74.1	25.4
Cambodia	32.5	22.4	45.1
Indonesia	15.3	47.6	37.1
Lao PDR	32.8	25.2	42.0
Malaysia	9.3	43.4	47.3
Myanmar	38.2	24.4	37.4
Philippines	14.8	30.2	55.0
Singapore	0.0	26.3	73.7
Thailand	11.6	43.3	45.1
Vietnam	20.9	40.2	38.8

Source: Key Indicators for Asia and the Pacific, 2009 & 2010, ADB

Similarity in inflation rates across countries

Table 1.12 shows that percentage change in the implicit GDP deflator for the period 2005-2009 for countries in the ASEAN region. The Fleming criteria suggest that low and stable inflation improve chances of successful union. A quick glance at annual data for the last 14 years suggests the region has a long way to go to meeting the criteria. Singapore is a world financial center. Its rates provide evidence of fairly disciplined monetary policy while Myanmar's rate is consistent with poor governance. Lao PDR has shown marked improvement. There are distinct differences in national inflation rates.

Table 1.12: Implicit GDP Deflator

(annual change in percent)

	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Brunei Darussalam	1.1	0.2	1.0	2.1	1.1
Cambodia	6.1	4.6	6.5	19.1	n/a
Indonesia	14.3	14.1	11.3	18.2	8.4
Lao PDR	7.8	14.4	4.3	6.0	-4.3
Malaysia	4.6	3.9	4.9	10.3	-6.7
Myanmar	19.2	21.3	23.7	13.6	4.6
Philippines	6.5	5.2	2.9	7.5	2.6
Singapore	2.1	1.6	6.5	0.9	-1.8
Thailand	4.5	5.3	3.6	3.8	2.0
Vietnam	8.2	7.3	8.2	22.1	6.0

*Source: Key Indicators for Asia and the Pacific, 2009 & 2010, ADB**Institutional, policy and regulation consistency, and political factors*

Table 1.13 in Appendix A shows a chronicle of dates and actions taken by the ASEAN and other nations to bring the region closer together. The Chiang Mai Initiative (CMI) of 2000-2001 was a significant step towards bringing financial and economic institutions and regulations in the region closer for the purposes of expanding a more functional free trade zone. The CMI included a multilateral currency swap arrangement among ASEAN+3 drawing on a foreign exchange reserves pool to help stabilize exchange rates in the region post-Asian Currency Crisis that was initiated in 2010. This action was treated cynically at the time. Side-by-side comparison of results from later time frames in the G-PPP model to the overall period indicate that the further ASEAN moves away from the instigation of the CMI, the more noticeable the interconnectedness in the tests for cointegration. While, the second essay will demonstrate that there are many institutional and development factors that make this integration complex, recent Free Trade Agreement activity and strategic plans for legal, institutional, and regulatory change have been negotiated and agreed upon. What remains is continued will over the next decade to implement these changes.

Conclusions

There is evidence that the ASEAN nations form the basis of an OCA and that steps are moving the economies of these nations closer together. Complete financial integration is planned by 2020. An economic community is planned for 2015. Both formal and informal criteria show overall progress albeit uneven progress from country to country.

A Formal G-PPP test was used to verify unit roots before proceeding to multilateral co-integration analysis. These tests verified that all variables contain a unit root and confirmed that all RERs are nonstationary. The first round of multivariate cointegration tests applied the RER of currencies for all ASEAN+3 nations vis-à-vis the United States Dollar (USD). This means that the USD was used as the foreign currency. A second test applied the RER of currencies of select other ASEAN nations plus the three Asian Tigers vis-à-vis the USD. This test was performed due to results from the first test. Estimates of Myanmar's real interest rates showed a distinct and strong upward trending pattern that was unlike any of the other ASEAN+3 countries. Estimates for Brunei Darussalam and Singapore showed that these two countries' RERs clearly move together and appear to form a subset distinct from the others. They have a strongly downward trending pattern and show similar patterned reaction to the Global Financial Crisis. A third set of tests was performed using the subset of ASEAN nations using the KRW as the base currency since it showed the clearest relationship between the other currencies. Changing the base currency of the RERs changed the long-term relationships among several countries. These findings are distinct from other studies.

Based on these findings, a fifth set of tests was applied to ASEAN+3 vis-à-vis the KRW. This achieved the strongest results. Follow-up tests were performed on the subset of ASEAN+3 and the subset of ASEAN; each vis-à-vis the KRW. Each set of tests was also performed on the entire data period as well as the back half of the data period to determine if the relationships were strengthening over time. The relationships were shown stronger at the end of the decade when compared to the entire period. Tests showed a larger number of cointegrated vectors and more significant relationships in the later period. Given the prior history of USD pegs, the pattern of similarity to the KRW, and a large number of integrated vectors for the later period than the entire period, the results indicate a growing impact from likely stemming from cooperative changes in policies. This could be a result of changes in the de facto currency regimes in the post Asian currency crisis period. Results could also undoubtedly reflect growing linkages coming from increased trade resulting from the increased number of Free Trade Agreements entered into by ASEAN+3 from 2008 to 2010. Isolating later years from the total period

clearly shows increased linkages. This adds credence to the findings of Choudry (2005) who compared post and pre-Asian financial crisis data using the same methodology.

Speed of adjustment analysis was possible since more than one co-integrating vector was found (Engle and Granger, 1987). Speed of adjustment parameters measure how quickly a deviations in real exchange rates from G-PPP tend to correct and are reported vis-à-vis the USD and vis-à-vis the KRW. The parameters were generally small—with a few exceptions that were not consistent from subgrouping to subgrouping—indicating quick speeds of adjustment. This also demonstrates close linkages between economies since deviations in exchanges are shown to adjust to equilibrium quickly. This indicates that exchange rates in the area are not sticky. Overall, G-PPP holds for ASEAN+3 which implying the existence of an OCA.

While the formalized G-PPP approach showed that the area likely represents an OCA, the informal tests suggested that there is still variability in some of the underlying, forcing macro variables. There are distinct differences in inflation rates and financial and economic openness. There are definitely differences in development. Later essays in this dissertation will explore these issues. A review of ASEAN history shows the organization is systematically addressing major issues and has the structures in place to encourage but not coerce change. ASEAN is long standing organization so many of these countries have had long term, strong relationships. However, this does not mean that the political will or shared economic goals exist to make some of the most difficult institutional changes domestically. Some of these countries have severe governance and political issues as witnessed in the recently experienced in the Thai Political crisis of 2008-2010. The most noticeable may have come from the Trade Arrangements that do not necessarily require integration. The institutional changes required from each country may be harder to achieve.

Potential Monetary Policy Coordination Issues

Introduction and Literature Review

Economic and financial market integration among European Union nations has led to interest in other regions for similar arrangements. Monetary integration includes several phases that may ultimately progress to complete monetary unification. Typically, countries with some kind of mutual economic, political, or cultural interest will meet to determine the feasibility of coordinating exchange rates, factor movement, and capital markets. These countries will assess their current situation and plan ways to move their economies and financial markets closer together over time. The penultimate state of monetary union can include a common central bank and currency but there are many intermediate stages that can be achieved which usually result in enhanced trade and investment performance for the participating countries. Easing the transition to union is essential so that acute exchange rate adjustments do not disrupt the economies of participating countries.

One of the biggest issues surrounding the act of monetary integration is that member countries forgo control of their national monetary policy. This raises the issue of importance of integration of financial markets and institutions as well as the potential for alignment of political interests of member countries. Each country must rely on fiscal policy for business cycle stabilization and coordinate with the others through their representation to the central monetary authority. The actual costliness to the country of loss of direct control is still being determined in the literature. Alesina et al (2002) find that as long as countries experience co-movements of both output and prices, there will be little cost. Calvo and Reinhart (2002) argue that costs will be minimal for a country that has improperly used monetary policy in the past. A helpful overview of the research in costs and benefits is provided in Beetsma and Giuliodori (2010).

Chapter 2 examines issues surrounding Monetary Policy readiness for the proposed unification of ASEAN. ASEAN is the acronym for the Association of Southeast Asian Nations. It is a political, cultural and economic organization representing nations in Southeast Asia. ASEAN members include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. As a grouping of somewhat similar yet dissimilar countries, ASEAN encourages social and cultural development as well as promotes the economic interests of associated nations. The organization has become very important in representing the region's trade interests. Its primary goals are regional stability and development.

ASEAN members are part of an increasingly influential economic zone that includes the economies of China, South Korean and Japan. These nations are called the Asian tigers and are grouped under the heading 'plus three'. This region is now generally referred to as ASEAN+3. Additionally, there is a subgroup of interest called the ASEAN 5 that includes the Philippines, Indonesia, Malaysia, Singapore and Thailand. These five are considered as having the most developed economies and political systems in ASEAN. Examination of direction of trade data shows increasing financial and economic openness between the ASEAN members, its plus three neighbors, and nations outside the geographic region.

Recent studies and literature have focused on the period directly following the Asian Financial Crisis of 1997. The events of the period brought into question the predominant financial architecture. Many countries also experienced severe hardship from currency regime choices. Movement to floating exchange rate regime has helped in terms of the major global currencies (yen, dollar, Euro) but led to other issues in an environment where intra-regional trade is expanding. These developments have brought renewed interest in the region for a shared currency primarily for the purposes of facilitating trade. Coordination of other goals associated with unification is proving more elusive despite financial architecture blueprints, annual meetings and agreements.

Despite much coordination, significant differences exist in both qualitative and quantitative factors that will influence a regional, unitary monetary policy. Unification of ASEAN nations is planned for 2020. One of the most important qualitative measures contributing to effective monetary policy is central bank autonomy (CBA). It is considered essential for strong macroeconomic performance. Ability to politically influence monetary policy is lessened in integration which is a boon for countries with histories of problematic central banks. Many of the ASEAN+3 countries have long-standing systems similar to the EUCB or the US FED. Interestingly enough, Brunei Darussalam does not have a central bank. Monetary policy is done through the Ministry of Finance and the Ministry's Currency Board.

A 2008 IMF study of CBA (Arnone et al, 2008) for select countries shows that there is varying degrees of autonomy for ASEAN central banks. Banks in the study were rated for both political and economic autonomy and placed into separate and joint indexes. Comparisons of ranks were made of two time periods. Indexes were calculated for the late 1980s then compared with those at the end of 2003. Overall progress is apparent but unity in purpose still appears elusive.

Three countries of interest were placed in the category of advanced economies. Japan scored a 0.13 political, a 0.75 economic, and an overall CBA index of 0.44 for the end of 2003. Korea was given a 0.25 political, a 0.88 economic, and an overall CBA index of 0.56 for the same period. Singapore was rated 0.38 in each of the three CBA measures. Four of the ASEAN+3 countries were categorized as

emerging markets. China's CBA score was 0.38 for political, 0.75 for economic and 0.56 overall. Indonesia scored high with indexes of 0.63, 0.75, and 0.69 respectively. Malaysia's indexes were 0.25 for political, 0.75 for economic, and 0.50 for overall autonomy. Thailand is also in this category. Its indexes were 0.50, 0.38, and 0.44.

Developing countries include Cambodia which scored 0.38, 0.75, and an overall of 0.56. Lao PDR's indexes were 0.13, 0.63, and 0.38. Myanmar also scored low with indexes given at 0.25, 0.50 and 0.38. Vietnam came in with slightly higher rankings of 0.38 political, 0.50 economic, and 0.44.² ASEAN finance ministers and central bankers meet annually to coordinate integration strategies and steps.

Member states vary on availability of monetary instruments and effective controls on their domestic banking industry (Mai, 2009). Monetary integration will relieve the states of some of these considerations. It will be stabilizing for financial markets and institutions but makes political commitment to a shared and independent central bank challenging. The sophistication and depth of the banking and financial systems in the region is quite varied. There has been a move towards liberalization since the Asian Financial Crisis of 1997-1998. Fewer states have dominant state banks but many still exist.

The ASEAN Economic Community Blueprint provides guidance for financial system architecture as the region moves towards integration. The availability of financial services and institutions has increased but there remain distinct differences in some countries. Myanmar has large state banks as well as commercial banks, investment banks, development banks, finance companies and credit societies. It has had an organized capital market since 1996. Brunei Darussalam has licensed nine banks—six that are foreign—that conduct business within the country. There is one banking institution that provides Islamic banking services. As previously mentioned, Brunei Darussalam does not have a central bank but leaves monetary policy to the Ministry of Finance. There has been significant growth and deepening of financial markets in this country's financial services industry. The country has one of the region's more healthy banking systems and it has well-diversified non-bank financial institutions. Brunei Darussalam has joined a number of nations that license off-shore companies to attract multinational corporations. This includes financial institutions.

Vietnam has an extremely weak banking system. The country has some distinct financial institutions. There is a Development bank and a Social Policy Bank. There are Joint Venture banks, urban and rural joint stock commercial banks and State-owned Commercial banks. Nonbank institutions include a Peoples' Credit Fund System and finance and leasing companies. Vietnam's banks have

² All figures are from Table A1 of Appendix I of Amone, et al 2008.

numerous problems. They have been non-compliant with Basel capital standards. There is an absence of international auditing, a high level of non-performing loans, and general weakness in regulators and managers. As a result, there is very low public confidence in Vietnamese banking institutions. Vietnam has accomplished some technical upgrades that include ATMS and debit cards but because of many issues, the country still has a strong attachment to cash. Like many of its contiguous neighbors, IT infrastructure is lacking throughout the country which makes payment systems difficult.

Thailand has had a modern banking system since the World War 2 era. There are commercial banks, retail banks, finance companies and asset management companies. They are both foreign- and domestic-owned banks. There are three state-owned commercial banks and five state-owned specialized banks. Historically, Thai banks have had a high level of nonperforming assets which were particularly problematic after the Asian financial crisis. The government has instituted a number of reforms and the number of troubled assets and institutions has been reduced. It is still high, however, when compared to other nations and BASEL criteria.

Differences in public financial instruments and financial institutions are important since this impacts the relationship between money demand, interest rates, and availability of credit. In addition to Brunei Darussalam, Malaysia and Indonesia have also developed Islamic banking laws and institutions in addition to their traditional finance sector. The Islamic banking sector in Malaysia represents about 40 percent of the market. Islamic financial institutions have prohibitions against usury and therefore treat interest rates differently. This potentially creates a different relationship between money demand and interest rates in these countries.

Indonesia has significantly restructured its banking system since recovering from the Asian Financial Crisis. It has changed from a system with central bank and government control of credit through state-owned banks to a much more diverse financial architecture based on market mechanisms. There are now tighter capital requirements and stronger regulation of bank lending practices more in line with BASEL requirements. The central bank performs the usual functions as regulator of financial institutions. It also issues the state currency called the rupiah. Banks are classified into commercial and rural banks and operate in the traditional role of financial intermediaries. Commercial banks are not involved directly in the payment systems and have restricted operating zones. Banks are further categorized as Sharia'h and non-Sharia'h-based. While the number of state-owned banks has shrunk, the government of Indonesia still maintains two state banks at this writing. Continued modernization and liberalization is expected in keeping with the ASEAN blueprint.

Malaysia has worked hard to develop an improved system of commercial banks, investment banks and Islamic banking institutions since the Asian Financial Crisis. They have both liberalized and diversified their financial architecture. Malaysia's banking sector has been considered fully liberalized since early 1991. (Yee 2009) Commercial banks freely set their base lending rates. Malaysia has equity, money, foreign exchange, and bond markets. There are also derivative markets that offer commodity and KLIBOR futures. A full range of banking and nonbank financial institutions offer a range of savings, checking, and credit services. Malaysia has significantly enhanced its regulation of banks since the financial crisis. Foreign as well as domestic financial institutions exist in the country. Malaysia is much more advanced in its progress towards the accepted ASEAN financial architecture than many of its counterparts.

Lao PDR has more than 20 banks. Its State Bank has divided into a separate commercial bank and Central Bank with each providing the usual services. There are also joint state-private commercial banks that are local and foreign-owned. The government has also created several specialized banks that include a Joint Business bank with Vietnam and a bank that specifically services Lao's agriculture sector. Lack of laws governing banking activities has generally discouraged foreign banks from possible ventures. The small size of the Lao PDR economy is also a factor. The country has tried to pass legislation to create a better environment for foreign commercial banks but a clear regulatory framework is still lacking. This country has a long way to go to develop a modern banking and financial market infrastructure.

Cambodia is in the process of implementing its Financial Sector Blueprint with comprehensive economic and structural reforms. The country has increased both its legal and regulatory framework for banking and financial systems. As a result, the number of financial instruments in the country has increased. One of the biggest problems in Cambodia is its large number of unbanked people and organizations. Rural areas lack basic bank infrastructure and services. Cash is still the preferred method of payment throughout the country. There is no wholesale electronic payment system in the country and no interbank market exists. Implementation of Basel regulations has been minimal and supervision is weak. There are foreign banks in the market but most are confined to the few large urban areas. Microfinance institutions are more available but still rare in rural areas. The banking sector is primarily privately owned and there are electronic banking services where large foreign bank branches are located.

Singapore has a high degree of financial stability, bank efficiency, and commercial access to capital. Its institutional laws and regulations, corporate governance, and contract enforcement are

considered some of the best in the world. As a result, Singapore has highly developed banking institutions and financial services and markets. The country serves as an offshore haven for many multinationals. Singapore does have issues with high public debt that carries risk of both sovereign and private debt crises. Like much of ASEAN, the city-state has underdeveloped bond markets. The one area of concern in terms of BASEL standards is relatively weak financial disclosure. It also heavily relies on centralized economic policy making.

Increased exchange rate flexibility and labor and capital mobility is currently being implemented in the ASEAN region. Theoretical unification criteria consider these positive steps. The ASEAN Finance Ministers meeting (AFMM) held in Manila in 2003 endorsed a Roadmap for Monetary and Financial Integration of ASEAN (RIA-Fin). This agreement lists steps, timelines and indicators of activities to enhance capital market development, liberalization of financial services and capital accounts and cooperation for a shared ASEAN currency. Unification is planned for the year 2015. Evidence shows—ASEAN produces annual scorecards—that there is varying degree of success among countries in meeting the shared vision for modern banking and financial markets and institutions. Qualitative descriptions of the region show that while much progress has been made, more progress is needed to successfully integrate by 2015.

Quantitative measures can provide further insight into the possible disruptions that could occur in money and financial markets if the ASEAN region goes forward with its planned 2015 unification. The empirical analysis part of this paper is divided into five sections. Basic trends in money supply are examined in section 2. Section 3 explores money multiplier estimates while Section 4 investigates the variation of velocity of circulation in member states. Section 5 includes an estimate for the demand for money as well as demand elasticity with respect to relevant independent variables like domestic and international interest rates. The last section concludes the paper with a summary of major findings.

This paper studies the period of 1992-2009 which means data set covers the period of the Asian crisis (1997-1998) and the recent global financial crisis (2007-2008). Data comes from the Asian Development Bank, the World Bank, and the IMF databases.

Trends in Money Supply

Table 2.1 shows select financial indicators for the member states of ASEAN+3. The ratio of checking to M1 has generally increased for most member nations from the 1992 -2009 period. This development stresses the diminishing role of money in the economies of many of these countries and

the deepening of their respective commercial banking system. Nations can basically be sorted into two sets. The ones with the most developed banking system from the 2007-2009 time frame are Brunei (77.32), Indonesia (56.54), Malaysia (78.28), the Philippines (61.05), Singapore (75.74) and Vietnam (81.27). The ratio of quasi money to M2 presented in Panel B is much lower in Myanmar and Vietnam than all other members. This may be due to the nature of return on quasi money and the continued presence of State-owned banks.

Table 2.1: Selected Average Financial Indicators for the ASEAN + 3 (%)

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel A. Demand Deposit/M1							
<i>ASEAN countries</i>							
Brunei	82.18	83.65	80.68	72.16	70.23	77.49	77.32
Cambodia	20.74	8.72	8.73	7.52	4.72	3.30	3.73
Indonesia	62.87	60.03	62.79	57.10	57.59	55.51	56.54
Lao	27.99	36.16	38.00	69.04	68.88	44.21	38.60
Malaysia	58.72	64.47	67.03	68.09	73.50	75.68	78.28
Myanmar	8.78	8.60	9.83	19.81	20.37	10.25	15.82
Philippines	30.99	35.98	43.01	47.66	53.88	57.33	61.05
Singapore	53.23	58.66	61.31	64.15	66.49	69.36	75.74
Thailand	31.27	29.20	25.71	22.80	25.77	28.52	27.96
Vietnam	48.81	43.78	56.70	63.98	68.31	75.42	81.27
<i>Plus 3</i>							
China	n/a	n/a	n/a	70.32	75.25	77.82	80.90
Japan	n/a	n/a	n/a	n/a	85.95	84.28	84.05
Korea	23.44	23.41	19.79	15.76	14.85	16.04	19.15

(Table 2.1 Continued)

Panel B. Quasi Money/M2

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
ASEAN countries							
Brunei	49.43	48.10	57.81	68.82	76.14	75.57	72.41
Cambodia	1.32	41.77	61.60	63.16	72.01	74.39	80.80
Indonesia	69.95	74.80	77.29	81.17	77.94	76.19	74.85
Lao	42.43	58.52	71.57	83.74	84.99	74.79	68.32
Malaysia	75.66	71.53	75.59	79.33	76.92	79.75	79.41
Myanmar	26.85	24.04	30.48	36.82	31.22	26.52	31.18
Philippines	71.21	72.44	75.21	73.02	74.57	73.13	70.20
Singapore	75.01	74.26	76.23	81.92	80.10	79.26	76.88
Thailand	87.40	88.05	89.01	89.47	88.66	89.01	89.16
Vietnam	36.78	25.12	21.42	27.06	27.92	23.00	19.99
Plus 3							
China	50.91	53.67	60.67	59.86	59.62	62.08	63.64
Japan	83.80	83.67	80.14	76.44	62.85	53.11	52.73
Korea	75.48	74.72	78.45	87.13	88.19	86.48	86.12

Panel C. Bank reserves/M2

ASEAN countries							
Brunei	n/a	n/a	n/a	n/a	5.74	6.98	6.25
Cambodia	n/a	n/a	n/a	n/a	39.50	29.91	32.47
Indonesia	n/a	n/a	n/a	n/a	9.05	12.34	10.63
Lao	5.24	21.00	22.06	27.05	26.87	18.11	21.26
Malaysia	n/a	n/a	n/a	n/a	3.98	3.05	1.83
Myanmar	47.50	-0.59	-3.37	9.74	7.55	7.05	6.13
Philippines	n/a	n/a	n/a	n/a	6.66	8.87	18.03
Singapore	6.80	6.86	6.98	4.66	4.26	3.98	4.22
Thailand	n/a	n/a	n/a	n/a	0.76	0.71	0.57
Vietnam	n/a	13.52	15.49	11.10	7.53	7.16	7.81
Plus 3							
China	n/a	n/a	n/a	13.31	11.16	14.26	18.16
Japan	n/a	n/a	n/a	n/a	2.93	3.43	1.89
Korea	5.03	4.26	2.49	1.28	2.06	2.13	2.50

The behavior of the ratio of bank reserves to M2 differed substantially for ASEAN members over the period 1992-2009. Cambodia (32.47), Lao PDR (21.26) and the Philippines (18.03) have extremely high ratios in line with the People's Republic of China (18.16). China has recently used bank reserve requirements to tighten liquidity as a means to control inflation. Thailand has an extremely low ratio (0.57) but it also was the sole country experiencing deflation in 2009. Its annual percentage change in its CPI index was -.9%. The three countries with relatively mild inflation in 2009 as measured by the annual percentage change in their CPI index were Vietnam (5.9%), Indonesia (4.8%) and the Philippines (3.2%). All other ASEAN nations experienced inflation rates of 0% to 1.5% given the same measure of inflation. This may indicate that central bank policy over reserves may have little to do with the level of bank reserves. The differences in the levels of inflation in some countries also indicate potential conflict in monetary policy goals.

Data in Table 2.2 indicates that the latest ratio of claims on the private sector to GDP is much higher for Singapore (96.19), Thailand (93.99) and Vietnam (98.75) than any of the other ASEAN countries. Still, their ratios are below that of China (112.84), Japan (102.36), or Korea 105.33). This ratio frequently proxies as a measure of the effectiveness of the credit channel. This implies that monetary policy would have a more powerful impact on economic activities in these three high-ratio members and be less effective for those with low ratios.

Table 2.2 Panel B show the ratio of claims on the public sector to GDP for the region. Nearly all of the countries have negative numbers or slightly positive indication low reliance on domestic economic activities to finance their governments. This is consistent with countries heavily reliant on export economies. The public sector dominates the credit market in Japan. The Philippines is the one country in the ASEAN region where public sector claims are positive and relatively large at 15.22. Indonesia is the other country that registers a positive and somewhat large number of 10.96. Both of these countries are modernizing their infrastructure.

Table 2.2: Average Ratios of Domestic Claims for ASEAN + 3 (%)

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel A. Claims on Private Sector/GDP							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	52.72	40.50	37.18
Cambodia	n/a	2.85	4.83	5.89	6.51	10.00	22.04
Indonesia	36.48	39.89	58.63	34.89	21.51	25.81	25.70
Lao	1.66	6.84	10.36	9.99	8.09	6.49	10.96
Malaysia	n/a	n/a	n/a	n/a	9.13	8.46	7.71
Myanmar	4.67	6.69	9.14	9.57	8.99	4.72	n/a
Philippines	18.24	24.91	46.86	42.48	37.35	31.35	30.23
Singapore	83.56	84.67	96.75	106.36	112.41	92.56	96.19
Thailand	67.45	83.47	109.92	106.70	99.98	99.28	93.99
Vietnam	1.41	12.48	19.00	27.86	43.60	65.26	98.75
<i>Plus 3</i>							
China	84.80	90.58	90.95	109.99	119.09	114.70	112.84
Japan	n/a	n/a	n/a	n/a	107.23	99.75	102.36
Korea	53.68	53.53	57.86	73.83	86.88	89.07	105.33
Panel B. Claims on Government Sector/GDP							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	-18.61	-25.21	-19.32
Cambodia	n/a	2.29	1.22	0.77	-0.58	-2.05	-6.05
Indonesia	-5.56	-4.82	-5.07	23.55	30.13	19.20	10.92
Lao	3.61	0.31	0.52	1.23	2.46	1.02	-0.11
Malaysia	4.79	0.86	-3.20	-5.44	2.97	0.44	3.71
Myanmar	35.81	27.91	22.46	19.16	19.13	20.04	n/a
Philippines	3.47	11.64	18.08	17.44	19.77	18.16	15.22
Singapore	-21.04	-25.18	-29.97	-21.75	-27.93	-26.15	-17.28
Thailand	-1.33	-6.51	-9.51	1.34	11.36	7.60	6.31
Vietnam	7.38	3.51	1.48	0.83	1.84	4.25	5.82
<i>Plus 3</i>							
China	2.13	3.29	2.62	6.07	10.28	8.36	9.84
Japan	n/a	n/a	n/a	n/a	58.29	67.11	72.72
Korea	0.62	0.84	0.32	2.80	1.58	3.84	3.51

Table 2.2 (continued)

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel C. Claims on Government Sector/Total claims							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	-55.71	-178.80	-144.68
Cambodia	n/a	n/a	n/a	n/a	-9.76	-25.16	-38.41
Indonesia	n/a	n/a	n/a	n/a	57.76	41.72	28.75
Lao	65.95	1.46	1.39	9.33	22.97	13.20	4.95
Malaysia	n/a	n/a	n/a	n/a	2.81	0.44	3.54
Myanmar	88.66	77.30	69.52	66.00	68.80	80.78	83.38
Philippines	n/a	n/a	n/a	n/a	33.80	34.79	30.35
Singapore	-33.66	-42.39	-45.17	-25.70	-33.45	-39.67	-22.59
Thailand	n/a	n/a	n/a	n/a	8.81	6.40	5.89
Vietnam	n/a	19.75	7.23	3.55	3.80	6.08	5.30
<i>Plus 3</i>							
China	2.42	3.51	2.81	5.17	7.43	6.13	7.54
Japan	n/a	n/a	n/a	n/a	24.46	29.45	32.32
Korea	1.13	1.55	0.49	3.70	1.80	4.09	3.19

The significant factor in the series is the amount of variation in these ratios which has strong implications for the formation of a monetary union. These differences suggest that some countries will have an easier time financing government borrowing than others under unification. Additionally, the extent to which the credit channel effectively transmits monetary policy will also vary from country to country. A central monetary authority will not be as concerned with the plight of an individual country and will be more concerned with the well-being of the overall region. This might require a higher degree of political cooperation among the nations should cross border fiscal policy become necessary to help weaker members. This political challenge is currently working itself out in the Eurozone and has shown to be a major source of friction and volatility in markets.

Money Multipliers

The money supply multiplier for a country determines the stability of the relationship between the supply of money and the monetary base. Even though the effectiveness of monetary policy can be

discounted in the long term, the economy will respond as monetary policy funnels into the economy through its transmission channels on a regional basis in the short run. The level of growth resulting from policy will differ if each member state is affected in a significantly asymmetric way. Uneven economic outcomes can cast serious doubts on the benefits of each member and their commitment to the common monetary policy and strategy.

The performance of the monetary sector among ASEAN members may be evaluated through the money multiplier. The following definitions are given to examine money multipliers for the ASEAN+3 countries.

C = currency in circulation

D1 = demand deposits

D2 = time and saving deposits

R = bank reserves

The following ratios are defined for each ASEAN member over the period 1992-2009:

$$\alpha = C / D1 \quad (2.1)$$

$$\beta = D2 / D1 \quad (2.2)$$

$$\gamma = R / (D1 + D2) \quad (2.3)$$

The money multiplier k is defined as:

$$k = M / B \quad (2.4)$$

Where

M = stock of money (M1 or M2)

B = monetary base or C + R

Substituting the above ratios in the definition of the multiplier provides the following equations:

$$k = M / B = M / (C + R) = (C + D1) / (C + R)$$

$$k = (1 + \alpha) / [\gamma (1 + \beta) + \alpha] \quad (2.5)$$

Resultant values for the above equations are reported in Table 2.3. The results for α in Panel A suggest that people in Myanmar (5.33) and Thailand (2.52) have very high preferences for currency in comparison with other ASEAN nations. Lao PDR, Vietnam, and Cambodia also have relatively high

preferences for currency. This is most likely related to weak financial institutions that have not developed enough to provide coverage to the more traditional and rural parts of their economies.

Table 2.3: Money ratios and money multiplier for ASEAN+3

This shows 3-year averages of money ratios and 3-year averages of money multiplier for the ASEAN+3 countries. Alpha (α) is the ratio of currency in circulation to demand deposit, beta (β) is the ratio of time and saving deposit to demand deposit, gamma (γ) is the ratio bank reserves to total deposits (demand plus time and saving deposits), and the kappa (k) is the money multiplier defined as the ratio stock of money to base money.

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel A. Alpha (α)							
<i>ASEAN countries</i>							
Brunei	0.22	0.20	0.25	0.39	0.23	0.20	0.20
Cambodia	4.03	11.07	10.60	12.50	21.94	0.73	1.05
Indonesia	0.59	0.67	0.59	0.76	0.51	0.54	0.55
Lao	2.64	1.78	1.66	0.47	0.66	1.47	1.60
Malaysia	0.70	0.56	0.49	0.47	0.05	0.05	0.05
Myanmar	14.47	10.63	9.21	3.95	5.98	8.20	5.33
Philippines	2.23	1.78	1.33	1.10	0.84	0.73	0.62
Singapore	0.88	0.71	0.63	0.56	0.50	0.44	0.32
Thailand	2.21	2.43	2.93	3.53	2.99	2.44	2.52
Vietnam	1.05	2.29	2.25	1.45	1.42	1.20	1.10
<i>Plus 3</i>							
China	0.70	0.61	0.47	0.41	0.33	0.28	0.24
Japan	n/a	n/a	n/a	n/a	0.23	0.18	0.18
Korea	0.68	0.63	0.69	0.67	0.48	0.40	0.40
Panel B. Beta (β)							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	1.97	1.85	1.72
Cambodia	n/a	0.69	0.30	0.78	58.52	1.19	3.60
Indonesia	3.16	3.82	4.05	5.79	3.87	3.56	3.47
Lao	2.77	3.97	7.48	7.67	8.18	6.83	5.37
Malaysia	3.36	3.35	3.82	4.90	0.02	0.00	0.03

Table 2.3 (continued)

	2007-09	2007-09	2007-09	2007-09	2007-09	2007-09	2007-09
Myanmar	6.10	3.80	4.73	3.04	2.87	3.45	2.89
Philippines	7.64	7.34	7.08	5.71	8.05	6.80	5.08
Singapore	5.65	4.96	5.25	7.11	6.06	5.51	4.43
Thailand	23.25	24.47	21.12	39.28	36.25	28.52	28.13
Vietnam	1.28	1.18	1.22	1.22	1.61	2.43	3.50
Plus 3							
China	1.88	1.79	2.13	2.02	1.95	2.21	2.16
Japan	n/a	n/a	n/a	n/a	2.18	1.34	1.34
Korea	5.14	4.79	6.44	11.40	11.06	9.05	8.92
	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel C. Gamma (γ)							
ASEAN countries							
Brunei	n/a	n/a	n/a	n/a	0.06	0.07	0.07
Cambodia	n/a	n/a	n/a	n/a	0.54	0.40	0.40
Indonesia	n/a	n/a	n/a	n/a	0.10	0.14	0.12
Lao	0.09	0.29	0.27	0.28	0.29	0.22	0.26
Malaysia	n/a	n/a	n/a	n/a	0.03	0.03	0.02
Myanmar	1.43	-0.01	-0.09	0.19	0.17	0.20	0.15
Philippines	n/a	n/a	n/a	n/a	0.05	0.06	0.13
Singapore	0.08	0.08	0.08	0.05	0.05	0.04	0.04
Thailand	n/a	n/a	n/a	n/a	0.01	0.01	0.01
Vietnam	n/a	0.45	0.39	0.25	0.16	0.12	0.12
Plus 3							
China	0.23	0.21	0.22	0.16	0.13	0.16	0.20
Japan	n/a	n/a	n/a	n/a	0.02	0.02	0.01
Korea	0.11	0.10	0.07	0.03	0.04	0.04	0.05

Table 2.3 (continued)

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel D. kappa (κ) (money multiplier)							
ASEAN countries							
Brunei	n/a	n/a	n/a	n/a	2.99	2.93	3.18
Cambodia	n/a	n/a	n/a	n/a	0.42	1.09	0.72
Indonesia	n/a	n/a	n/a	n/a	1.51	1.32	1.44
Lao	1.23	0.87	0.71	0.51	0.50	0.78	0.79
Malaysia	n/a	n/a	n/a	n/a	12.56	12.22	14.20
Myanmar	0.67	1.11	1.18	1.06	1.13	1.01	1.07
Philippines	n/a	n/a	n/a	n/a	1.44	1.45	1.17
Singapore	1.35	1.47	1.47	1.63	1.82	2.01	2.36
Thailand	n/a	n/a	n/a	n/a	1.21	1.29	1.30
Vietnam	n/a	1.05	1.05	1.22	1.32	1.36	1.29
Plus 3							
China	1.24	1.34	1.26	1.57	1.85	1.64	1.45
Japan	n/a	n/a	n/a	n/a	4.21	4.98	5.45
Korea	1.23	1.32	1.48	1.66	1.64	1.74	1.49

Strong differences are evident even while the ratio of currency to demand deposits has decreased over time for many ASEAN member countries. This has a number of implications for monetary policy. If a small number of a country's transactions or investments are financed at local interest rates then changes to policy rates are unlikely to have much of an impact on the economies of those countries. Monetary policy will be highly constrained in these countries compared to the others. There will also be differences in the credit channel. This is significant because constrained lending means slower growth in businesses.

Another important implication can be seen in the ratio of time deposits to demand deposits (β). This ratio is extremely high in Thailand (28.13). Malaysia's ratio is practically zero which may have something to do with the strong presence of Islamic Financial Institutions with their prohibition on usury. Brunei Darussalam is the other nation with a low ratio (1.72). Ratios have generally fluctuated in all countries over the time period. Ratios generally increased during and after the Asian Financial Crisis and have mostly declined since then. The β ratio depends—among other things—on the interest rates paid on saving accounts and time deposits (in both domestic and foreign currencies). It is also related to the

interest paid on other competitive alternatives (Friedman, 1970). Saving and time deposits have been losing ground recently as interest rates on quasi money declined. Varying ratios imply differences in interest elasticity of demand.

Cambodia (0.40) and Lao PDR (0.26) have much higher ratios of reserves to total deposits (γ) compared with other ASEAN members. Lao PDR's ratio is most similar to the People's Republic of China (.20). Thailand's ratio (0.01) is extremely low and matches that of Japan. The other countries' ratios are scattered between those numbers. The ratio of reserves to total deposits depends on the reserve requirements for demand and time deposits for countries with private commercial banks as they are likely to expand their loans to the maximum level permitted by their reserve assets.

These very different results suggest that much work must be done to bring standardization to the commercial banking industry within the proposed monetary union. These structural differences could cause capital to flow inefficiently between nations. The flows may be more based on the banking law and structure early on in the union rather than the actual demands by a country's economy for investment. It is evidence of the uneven financial market development and inconsistent central bank policies that were outlined in the qualitative description of this paper.

Model results shown in Panel D indicate large differences in money multipliers (κ) of the ASEAN+3 countries during the period. Malaysia shows evidence of an extremely large money multiplier (14.20) that has been increasing. Brunei Darussalam (3.18) and Singapore (2.36) also have larger money multipliers—although nowhere near the size of Japan (5.45)—when compared to the other countries. This undoubtedly reflects their more developed banking and finance markets. Cambodia (0.72) and Lao PDR (.79) have the smallest money multipliers. Most of the other countries have multipliers in line with those of the Republic of Korea and China. This extreme variation suggests that application of a unified monetary policy for an integrated union would present difficulties.

Domestic liquidity is another important aspect to consider when looking at differences in monetary policies of countries. Table 2.4 shows how domestic liquidity is different across member states. Net foreign assets can have a diverse and heterogeneous influence on domestic liquidity. Net foreign assets have been more stable and have induced an increase in money supply in Singapore (99.10), Brunei Darussalam (43.98), and Thailand (46.05.) This item has been a less stable source of funds in the other members. This is especially true of Myanmar which has a negative number. The Domestic Credit numbers may reveal an underlying difference in degree of sensitivity of the money supply to capital inflow and preferences by banks. The presence of sharia'h compliant banking and finance institutions can also affect this measure since there is a prohibition against usury. A central

monetary authority must consider these variations in net foreign assets when employing various monetary policy strategies since policies feed into the money multiplier.

Table 2.4: Factors affecting domestic liquidity (% of GDP) for ASEAN+3

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel A. Net Foreign Assets/GDP							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	52.30	51.84	43.98
Cambodia	n/a	n/a	n/a	n/a	20.74	22.39	29.13
Indonesia	n/a	n/a	n/a	n/a	12.96	11.17	12.35
Lao	2.10	4.82	7.20	10.69	10.49	12.15	16.82
Malaysia	n/a	n/a	n/a	n/a	19.71	20.84	22.31
Myanmar	-8.01	-3.23	-1.41	-0.48	-0.20	-0.12	
Philippines	n/a	n/a	n/a	n/a	16.96	20.48	27.96
Singapore	73.89	80.41	68.81	85.42	87.69	94.49	99.10
Thailand	n/a	n/a	n/a	n/a	28.26	34.52	46.05
Vietnam	n/a	7.26	5.31	14.94	22.36	23.62	26.52
<i>Plus 3</i>							
China	8.68	9.01	13.54	19.00	26.07	40.71	55.41
Japan	n/a	n/a	n/a	n/a	7.40	9.83	12.60
Korea	4.98	5.59	4.58	15.83	20.95	21.86	16.20
Panel B. Domestic credit/GDP							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	34.26	15.75	18.52
Cambodia	n/a	n/a	n/a	n/a	5.93	8.02	16.06
Indonesia	n/a	n/a	n/a	n/a	52.02	45.83	37.64
Lao	5.27	7.15	10.87	11.22	10.55	7.52	8.49
Malaysia	n/a	n/a	n/a	n/a	104.97	97.23	99.12
Myanmar	40.60	36.14	32.27	29.01	28.26	24.84	n/a
Philippines	n/a	n/a	n/a	n/a	58.54	52.06	50.16
Singapore	62.53	59.50	66.79	84.61	84.49	66.41	78.91
Thailand	n/a	n/a	n/a	n/a	129.03	117.53	106.75
Vietnam	n/a	19.09	20.48	28.68	45.44	69.51	104.57
<i>Plus 3</i>							
China	86.93	93.87	93.92	117.37	139.44	136.05	131.28
Japan	n/a	n/a	n/a	n/a	238.34	227.92	224.20
Korea	54.30	54.37	58.18	76.64	88.46	92.90	108.84

Trends in Velocity

The behavior of velocity interests financial economists. This is because of the relationship between money supply and the level of economic activities as expressed by the Equation of Exchange ($MV=PY$). If velocity is constant, money supply connects directly to economic activities. Conversely, if velocity fluctuates in an unpredictable manner, monetary authorities find it difficult to influence or predict the change in GDP as money supply changes. The predictability of the value of velocity contributes to the effectiveness of monetary policy for inflation targeting and stimulus. The predictability of velocity also influences the effectiveness of fiscal policy. Fiscal policy will be an effective policy tool if velocity increases whenever government expenditures increase and decreases as expenditures decline.

The essential aspect of the monetarists' view is the assumption that velocity—rather than the multiplier—is the key to understanding microeconomic development in the economy (Bomberger, 1993). The Quantity Theory of Money (QTM) has been suggested as the most applicable hypothesis for analyzing monetary problems in less developed economies. QTM relies on stability of income and velocity when using its straightforward accounting identity. Practical considerations make this simplicity desirable since monetary authorities can base their decisions on a clear-cut hypothesis like the constant velocity of money (Friedman, 1970). It can be assumed that changes in the money supply and velocity are important transmitters of both policies since economists have found that money neutrality (the competing hypothesis to the *quantity theory of money* which says changes in the money supply do not cause changes in income) does not hold in the short run. This has important ramifications that can apply to short run business cycle management.

Large values for V are conceptually a characteristic of an economy with an efficient financial sector because V can depend on how quickly a bank can turn a deposit into a loan. Velocity also reflects how quickly banks can shift deposits and loans between themselves. In this sense, it is akin to a turnover ratio in the monetary sector. Many rural areas in developing countries are not covered by sophisticated banking systems and therefore maybe outside the reach of the benefits of a modern financial system. Any sustained increased in V reflects positive technology changes and functioning in banking and financial markets which can mean that more of the economy and its businesses are being brought into the modern sector.

Velocity may also depend on confidence in the banking system and between banks. Confidence and trust must exist between banks in and outside the country's borders when systems are integrated in a monetary union. Velocity also relates to existence of the fractional reserve system and is positively related to the money multiplier. A common behavior of velocity is important when consolidating the ASEAN region into a single economic block heading toward a unified monetary policy. It is important for a change in money supply to have a similar impact on economic activity in each member state. Systemic decreases in velocity can reflect problems within the banking system or with confidence surrounding the banking system. Velocity instability or weakness can result in limited influence of economic policies on countries with disadvantaged banking systems.

There are different measures of income velocity that depend on how money is defined and what concept of income is used. The three measures used are:

V1 = income velocity of currency outside banks

V2 = income velocity of M1

V3 = income velocity of M2

where:

$$V1 = (Y/C)$$

$$V2 = (Y/M1)$$

$$V3 = (Y/M2)$$

and

Y = nominal GDP or GNI

C = currency outside banks

M1 = demand deposits plus currency outside banks

M2 = M1 plus quasi money

The variability of V1, V2, and V3 is calculated by the degree of dispersion of each velocity value around its mean value. To measure this concept, the coefficient of variation for each V1, V2, and V3 is computed using data covering the period 1992-2009 and is based on the availability of published data for some variables. Note that gross national income, GNI, or GDP were used depending on data availability. Results are given in Table 2.5 and show that the coefficients of variation of velocity differ substantially among ASEAN+3 according to this definition.

Table 2.5: Income velocity for ASEAN + 3

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel A. Income velocity of currency outside banks ($V_1=Y/C$)							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	n/a	18.67	25.98	26.54
Cambodia	n/a	n/a	n/a	n/a	22.97	19.20	16.71
Indonesia	n/a	n/a	n/a	n/a	21.82	21.87	23.35
Lao	31.76	30.89	38.43	133.72	91.97	33.16	21.96
Malaysia	n/a	n/a	n/a	n/a	16.12	17.03	17.23
Myanmar	5.46	5.09	5.41	7.41	7.33	6.74	n/a
Philippines	n/a	n/a	n/a	n/a	19.20	19.81	17.68
Singapore	9.41	10.58	12.68	13.38	12.79	14.31	14.50
Thailand	n/a	n/a	n/a	n/a	11.59	11.92	12.13
Vietnam	n/a	10.16	12.11	10.51	7.08	6.36	5.70
<i>Plus 3</i>							
China	7.06	6.32	7.85	6.99	6.94	7.77	8.94
Japan	n/a	n/a	n/a	n/a	7.08	6.73	6.48
Korea	26.80	26.64	29.10	32.27	36.42	39.45	38.44
Panel B. Income velocity of narrow money ($V_2=Y/M1$)							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	3.27	3.45	4.27	4.81
Cambodia	n/a	34.33	28.21	24.27	21.88	18.72	17.23
Indonesia	8.96	9.45	9.20	9.52	9.69	9.74	9.81
Lao	22.19	19.75	23.83	37.28	33.53	19.50	13.16
Malaysia	4.77	3.77	3.47	4.50	4.33	4.21	4.04
Myanmar	5.04	4.65	4.87	5.85	5.71	6.10	n/a
Philippines	11.52	10.78	9.41	8.48	8.62	8.39	7.55
Singapore	4.40	4.36	4.90	4.79	4.29	4.38	3.54
Thailand	11.35	11.35	11.74	9.94	8.63	8.40	8.94
Vietnam	n/a	7.49	8.30	6.23	4.15	3.47	3.03
<i>Plus 3</i>							
China	2.67	2.34	2.49	1.97	1.70	1.70	1.72
Japan	3.24	3.10	2.36	1.77	1.33	1.03	1.03
Korea	10.98	10.32	11.87	12.79	11.77	11.29	10.82

Table 2.5 (continued)

	1992-94	1993-95	1996-98	1999-01	2001-03	2004-06	2007-09
Panel C. Income velocity of broad money ($V_3=Y/M_2$)							
<i>ASEAN countries</i>							
Brunei	n/a	n/a	n/a	1.23	1.33	1.69	1.85
Cambodia	n/a	18.07	10.88	8.83	6.14	4.82	3.32
Indonesia	2.67	2.28	1.91	1.75	2.06	2.32	2.51
Lao	12.67	8.26	6.60	5.87	5.56	5.15	4.18
Malaysia	1.28	0.92	0.83	0.79	0.76	0.81	0.83
Myanmar	3.63	3.51	3.32	3.60	3.87	4.36	n/a
Philippines	2.95	2.41	1.77	1.60	1.71	1.83	1.84
Singapore	1.10	1.12	1.16	0.87	0.85	0.91	0.81
Thailand	1.33	1.20	1.12	0.88	0.86	0.91	0.99
Vietnam	n/a	4.71	4.79	3.04	1.81	1.30	1.04
<i>Plus 3</i>							
China	1.31	1.09	0.98	0.79	0.69	0.65	0.63
Japan	0.52	0.51	0.47	0.42	0.48	0.48	0.49
Korea	2.69	2.61	2.51	1.65	1.39	1.52	1.50

Myanmar (6.74) and Vietnam (5.70) had the lowest coefficients of variation for V_1 . Their coefficients are similar to those of China (8.94) and Japan (6.48). The countries with the highest coefficients of variation for V_1 were Brunei Darussalam (26.54), Indonesia (23.35), Lao PDR (21.96) and the Philippines (17.23). These measurements were still not as high as those of the Republic of South Korea (38.44). The majority of countries showed upward historical trends with the exceptions of Vietnam, Lao PDR and Cambodia. These differences likely reflect variations in the relative growth of currency, demand deposits, and quasi-money in various member countries. A major finding is that all measures of velocity have shown a relatively large degree of instability.

The high coefficients of variation in velocity among some of the ASEAN countries may be attributed to a number of factors. First, many members of ASEAN are dependent on agricultural, mining and manufacturing exports which makes their income vulnerable to fluctuations that are difficult for policy makers to combat. Countries reliant on agriculture and mineral extraction see volatility in prices. Manufacturing is more subject to business downturns. Also, all countries have experienced substantial, overall increases in GNI over time. Velocity, therefore, will change as income changes and money supply

will not follow with the same magnitude. Some of the ASEAN countries have better smoothed the impact of fluctuations in income than others by relying on reserves and public borrowing. This is one potentially successful strategy.

Second, ASEAN countries may be subject to greater discrepancies between current and permanent income as a result of fluctuations and overall increases in income. This implies greater variability in velocity in some countries than others. Velocity tends to rise in periods when measured income is above permanent income. The opposite is also true (Park, 1973).

Third, the variability in velocity may also be due in part to variability in the lag in the adjustment of income money. This variability may be due to the source of exchange in money (e.g. the government's borrowing from the central bank, the supply of bank loans, etc.). Shifts in confidence and expectations can come from largely non-quantifiable factors related to psychological, sociological and political attributes. These items may also account for observed variations in velocity. Changes in these expectations may have been triggered by the Asian Financial Crisis or abrupt changes in regimes like those in Myanmar.

Fourth, there may be a host of other miscellaneous factors affecting the behavior of velocity in ASEAN+3 countries. Traditionally, variables that impact demand for real balances include things like changes in expected rates of inflation, nominal interest rates, or real income and its structure. In addition, the introduction of financial innovations like the availability of new money substitutes or new methods of payments can contribute to the variability of velocity (Palivos and Wange, 1995; Duca, 1995; Feinman and Porter, 1992; Chowdhury and Wheeler, 1999). Some countries have been quicker to adapt to modern financial systems than others.

These results suggest that basing monetary policy on TQM or even the Taylor Rule may not be advantageous for the time being. This is because circumstances in the region may not permit reliance on the crude QTM or a time trend analysis of velocity. Such analysis would likely be subject to substantial error.

Trends in the Demand for Money

Performance of the monetary sectors of ASEAN+3 countries may also be assessed by examining the demand for money function and estimating elasticity. Money demand stability is a vital prerequisite

to implementing effective monetary policy for either a single economy or an economic block in with coordinated monetary policy. The literature on money demand is extensive because of this reason.³

Theory states that the demand for real cash balances (M/p) will be positively related to real income (Y) and negatively related to yield on alternative assets (financial and/or real). Real interest rates may be used to represent the yield on financial assets (Arango and Nadiri, 1981; Baba et al., 1992). The equation of money demand should capture opportunity costs of holding money balances in alternative currencies whether locally or internationally (Campbell, 1996; Ericsson et al., 1998) since ASEAN+3 members are open economies and are characterized by an increasing degree of international capital mobility. This requirement should particularly be true for members lacking adequate domestic financial assets where wealth maybe held. Thus, it can be assumed that the demand for money in these countries would be influenced by international monetary development reflected in movements of foreign interest rates.

In this analysis, the demand for money function takes the conventional form of:

$$M/p = f(Y, i, r)$$

Where:

$$\partial(M/p) / \partial Y > 0$$

$$\partial(M/p) / \partial i < 0$$

$$\partial(M/p) / \partial r < 0$$

Three equations are tested for each member⁴:

$$\text{Model (1): } (M1/P)_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 i_t + \alpha_3 r_t + u_t \quad (2.6)$$

$$\text{Model (2): } (M2/P)_t = \beta_0 + \beta_1 Y_t + \beta_2 i_t + \beta_3 r_t + u_t \quad (2.7)$$

$$\text{Model (3): } (C/P)_t = \lambda_0 + \lambda_1 Y_t + \lambda_2 i_t + \lambda_3 r_t + u_t \quad (2.8)$$

where:

$(M1/P)_t$ = volume of real money (M1) in period t

$(M2/P)_t$ = volume of real money (M2) in period t

$(C/P)_t$ = volume of real money (M2) in period t

Y_t = real GDP in period t

³ For a survey on money demand, see Sriram (2001).

⁴ A log-linear model was tested but proved to be inferior in terms of AIC criterion. Also partial adjustment mechanism was tested but did not give better results. Also, due to lack of data (only 19 annual observations were used), it was not possible to use cointegration analysis (Patterson, 2000)

i_t = real domestic interest rate in period t

r_t = one-year London inter-bank offer rate on US dollar deposits in period t

These equations were estimated using data from the *International Financial Statistics* of the International Monetary Fund and the Asian Development Bank. The models were estimated using the method of ordinary least-squares. Some models were re-estimated using a variant of generalized least squares in cases where there were apparent problems in serial correlation in the spirit of Greene (2000).

The coefficients for the real GDP, $(\partial(M/p) / \partial Y)$ are significant and positive for all countries—as expected—with the exception of Brunei Darussalam which had a negative but not significant relationship. Coefficients for domestic interest rates were positive and significant for all countries but Brunei Darussalam which had a negative but not significant relationship. Coefficients for international interest rates (r_t) showed a mixture of positive and negative signs with varying levels of significance ($\partial(M/p)/\partial r < 0$). Cambodia, People's Republic of China, Korea, Malaysia, Myanmar, the Philippines, Singapore and Thailand had coefficients with negative signs. China, Singapore and Thailand had negative significant relationships. Negative signs imply that the demand for money in these countries is influenced by international monetary development while the others are not influenced by international monetary developments.

The values of R^2 suggest that the model is a good fit for all countries but Brunei Darussalam. The values of DW statistics clear the fit from any serious problem of serial correlation. The regression results in Table 2.6-A suggest that real income—as expected—is a major determinant of the demand for narrow money all ASEAN+3 countries but Brunei Darussalam. The t value of the coefficient α_1 is significant at the 1 percent level of significance in all cases except Japan and Brunei Darussalam. Japan is significant at the 10 percent level.

Table 2.6A Regression results for narrow money (M1) for ASEAN+3

Table shows the statistics for the AR1 regression: $(M1/P)_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 i_t + \alpha_3 r_t + \rho(M1/P)_{t-1} + u_t$, where $(M1/p)$ = logarithm of narrow money (M1) in period t, Y_t = logarithm of real GDP in period t, i_t = real domestic interest rate in period t, and r_t = one-year London inter-bank offer rate on US dollar deposits in period t. ***, **, and * denotes significant level of 1%, 5%, and 10% respectively. Coefficient standard errors are in parenthesis.

	α_0	α_1	α_2	α_3	ρ	Adj. R2	DW	Obs.
Brunei Darussalam	23.408*** (4.7000)	-0.074 (.2020)	-0.007 (.0058)	0.016 (.0335)	0.283 (.2530)	0.02	1.89	18
Cambodia	-20.951*** (3.3000)	1.588*** (.1070)	0.001 (.0061)	-0.026 (.0166)	0.208 (.2870)	0.97	1.75	16
China	-7.085*** (1.3100)	1.215*** (.0431)	0.007* (.0038)	-0.019* (.0103)	0.610*** (.1610)	0.99	1.62	24
Indonesia	-0.542 (2.5600)	0.950*** (.0717)	0.003** (.0015)	0.015 (.0103)	0.467** (.2160)	0.96	1.72	20
Japan	-171.630 (105.0000)	6.020* (3.1000)	0.113 (.2400)	0.134 (.1100)	0.483* (.2650)	0.09	1.24	25
Korea	2.650 (2.3100)	0.857*** (.0671)	-0.014* (.0081)	-0.011 (.0126)	0.482** (.1950)	0.96	1.57	24
Lao	-19.802 (12.4000)	1.541*** (.4010)	0.005* (.0030)	0.004 (.0321)	0.815*** (.1200)	0.85	1.44	19
Malaysia	-7.170*** (1.5000)	1.214*** (.0549)	0.011*** (.0038)	-0.004 (.0100)	0.205 (.2240)	0.98	1.86	20
Myanmar	5.756 (3.7500)	0.750*** (.1250)	0.000 (.0027)	-0.001 (.0174)	0.172 (.2590)	0.86	1.71	15
Philippines	-20.655*** (3.4500)	1.636*** (.1180)	-0.003 (.0073)	-0.009 (.0117)	0.461** (.2120)	0.97	1.81	20
Singapore	-1.559 (2.7700)	1.013*** (.1080)	0.003 (.0045)	-0.036*** (.0110)	0.861*** (.1070)	0.98	1.20	25
Thailand	-6.483 (8.8400)	1.144*** (.3010)	0.016*** (.0050)	-0.018* (.0102)	0.869*** (.1660)	0.96	1.19	20
Vietnam	-55.960*** (2.2000)	2.616*** (.0636)	-0.005 (.0033)	0.004 (.0128)	0.082 (.3000)	0.99	1.86	15

Table 2.6B reports the regression results for broad money. The values of R^2 suggest a better fit than that of narrow money in the previous case in all cases except Japan. The values of DW statistics suggest no serious problems of serial correlation. All countries now show a positive relationship with real GDP for a broad definition of money. Countries with the expected coefficient sign whose Domestic interest rates significantly impact money demand are Brunei Darussalam, Cambodia, People's Republic of China, and Malaysia. Singapore has a significant relationship but the coefficient has a positive sign. This is a surprising result.

The statistical results of Table 2.6B suggest that demand for broad money in ASEAN members is strongly influenced—as expected—by real income. Financial markets offering substitutability between money and other financial assets are developing rapidly in only a few ASEAN member countries. This conclusion can be drawn by comparing these results with those for narrow money. International interest rates exert a significant influence on the demand for broad money in a few members. This suggests that international opportunity costs of holding money balances are as important as the domestic counterpart in those countries. The significant influence of international interest rates on the demand for broad money (M2) in the economies of these ASEAN countries may also be attributed to the fact that international capital flows are not subject to major governmental control.

Table 2.6B: Regression results for broad money (M2) in the ASEAN+3

Table shows the statistics for the AR1 regression: $(M2/P)_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 i_t + \alpha_3 r_t + \rho(M2/P)_{t-1} + u_t$, where $(M2/P)$ = logarithm of narrow money (M2) in period t , Y_t = logarithm of real GDP in period t , i_t = real domestic interest rate in period t , and r_t = one-year London inter-bank offer rate on US dollar deposits in period t . ***, **, and * denotes significant level of 1%, 5%, and 10% respectively. Coefficient standard errors are in parenthesis.

	α_0	α_1	α_2	α_3	ρ	Adj. R2	DW	Obs.
Brunei Darussalam	13.171* (7.3400)	0.418 (.3210)	-0.004** (.0022)	0.008 (.0199)	0.915*** (.1420)	0.79	1.19	18
Cambodia	-48.204*** (3.8000)	2.520*** (.1230)	-0.014** (.0064)	-0.033* (.0184)	0.335 (.2670)	0.98	1.86	16
China	-12.358*** (1.8400)	1.417*** (.0614)	0.011*** (.0027)	-0.011 (.0072)	0.892*** (.0906)	1.00	1.40	24
Indonesia	3.312 (4.4000)	0.882*** (.1250)	-0.001 (.0010)	-0.002 (.0085)	0.930*** (.0624)	0.97	0.84	20
Japan	-119.994* (67.6000)	4.521** (1.9900)	0.220 (.1980)	0.158* (.0848)	0.069 (.4660)	0.10	1.24	25
Korea	-11.881** (4.7900)	1.333*** (.1410)	0.012* (.0074)	-0.006 (.0122)	0.827*** (.1280)	0.99	0.95	24
Lao	-28.892*** (5.3100)	1.883*** (.1710)	-0.002 (.0042)	-0.019 (.0242)	0.455 (.3980)	0.94	1.73	19
Malaysia	-14.964*** (1.1900)	1.559*** (.0438)	0.013*** (.0022)	0.009 (.0072)	0.441** (.2140)	0.99	1.62	20
Myanmar	-3.519 (4.7500)	1.070*** (.1580)	-0.002 (.0034)	0.039* (.0225)	0.184 (.2750)	0.85	1.68	15
Philippines	-18.335*** (5.1000)	1.600*** (.1750)	-0.001 (.0051)	-0.010 (.0091)	0.833*** (.1130)	0.98	1.52	20
Singapore	-6.801*** (1.8400)	1.267*** (.0706)	0.014*** (.0050)	-0.016 (.0119)	0.626*** (.1590)	0.98	1.54	25
Thailand	-7.041 (8.7400)	1.241*** (.2980)	-0.003 (.0050)	-0.018* (.0104)	0.840*** (.1850)	0.96	1.43	20
Vietnam	-54.721*** (3.6300)	2.587*** (.1050)	-0.002 (.0032)	0.010 (.0179)	0.479** (.2370)	0.99	1.55	15

The statistical results of Table 2.6C suggest that income plays a significant important role for the demand for currency in all ASEAN+3 countries except Brunei Darussalam. Its coefficients are positive but not significant. Domestic interest rates surprisingly showed positive and significant coefficients for Malaysia, Myanmar, Singapore and Thailand. It is negative and significant only in Japan. Finally, international interest rates play a major role in determining the demand for cash balances in Japan, Cambodia, Myanmar and Singapore where negative and significant coefficients were found. Using currency (C) as money gives weak support for monetary policy impact through channels of income and domestic interest rates in the ASEAN region.

Table 2.6C: Regression results for currency (C) for ASEAN+3

Table shows the statistics for the AR1 regression: $(C/P)_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 i_t + \alpha_3 r_t + \rho(C/P)_{t-1} + u_t$, where (C/p) = logarithm of real total currency (C) in period t, Y_t = logarithm of real GDP in period t, i_t = real domestic interest rate in period t, and r_t = one-year London inter-bank offer rate on US dollar deposits in period t. ***, **, and * denotes significant level of 1%, 5%, and 10% respectively. Coefficient standard errors are in parenthesis.

	α_0	α_1	α_2	α_3	ρ	Adj. R2	DW	Obs.
Brunei Darussalam	15.069*** (4.0000)	0.227 (.1740)	-0.0004 (.0014)	-0.004 (.0115)	0.868*** (.1910)	0.66	1.30	18
Cambodia	-23.073*** (3.5300)	1.656*** (.1150)	0.001 (.0062)	-0.030* (.0177)	0.263 (.2770)	0.97	1.74	16
China	0.362 (1.9300)	0.922*** (.0638)	-0.005 (.0040)	-0.010 (.0106)	0.782*** (.1370)	0.99	1.38	24
Indonesia	-4.356 (2.9000)	1.034*** (.0814)	0.002 (.0023)	0.005 (.0125)	0.326 (.2840)	0.95	1.80	20
Japan	-3.110 (20.7000)	1.050* (.6140)	-0.144*** (.0241)	-0.021** (.0103)	-0.608* (.3250)	0.41	1.80	9
Korea	6.474** (2.7500)	0.706*** (.0798)	0.003 (.0099)	0.008 (.0149)	0.503** (.2080)	0.91	2.14	24
Lao	-19.804 (23.8000)	1.527** (.7720)	0.001 (.0049)	-0.007 (.0516)	0.886*** (.0880)	0.78	0.77	19
Malaysia	4.654*** (1.0300)	0.721*** (.0375)	0.012*** (.0035)	0.010 (.0071)	-0.079 (.2210)	0.95	2.01	20
Myanmar	15.053*** (3.9500)	0.435*** (.1320)	0.005** (.0023)	-0.032* (.0168)	0.313 (.2630)	0.85	1.49	15
Philippines	0.021 (3.0300)	0.901*** (.1030)	-0.007 (.0094)	0.004 (.0121)	0.144 (.2500)	0.88	1.89	20

Table 2.6C (continued)

	α_0	α_1	α_2	α_3	ρ	Adj. R2	DW	Obs.
Singapore	8.285*** (1.2700)	0.583*** (.0492)	0.004* (.0023)	-0.015*** (.0056)	0.806*** (.1210)	0.98	1.72	25
Thailand	-9.169 (10.2000)	1.222*** (.3480)	0.026*** (.0058)	-0.014 (.0119)	0.871*** (.1600)	0.94	1.27	20
Vietnam	-27.666*** (4.0600)	1.751*** (.1180)	0.0001 (.0043)	-0.005 (.0216)	0.346 (.2660)	0.97	1.80	15

It is important to fully understand the demand for money when considering the coordination, formulation and conduct of monetary policy. The demand for money has been shown to relate to a variety of factors including income and the opportunity cost of holding money. The opportunity cost of holding money in this study is considered to be the domestic interest rate and the international interest rate as proxied by LIBOR. Cointegration techniques have been used to study the money demand function. The technique is used to analyze the long-run equilibrium money demand relationships. It is also useful for exploring some short term dynamics like the speed of adjustment to the long run equilibrium and the stability of the demand itself. Tests were used on the narrow and broad definitions of money in the ASEAN+3 nations to compare the behavior of the functions.

It is important to determine the appropriateness of cointegration analysis before employing the method. The Weighted Symmetric (WS) test is a unit root test. The test indicates if the variables are nonstationary in levels which is necessary for proper use of the Engle-Granger (1987) or Johansen-Juselius (1990) approach. Table 2.7 shows the resulting p values for the WS test for unit root. These tests indicate that we cannot reject the null hypothesis of a unit root so cointegration analysis can be appropriately applied. Tests on all variables indicated that the nonstationarity in levels was sufficient to employ the cointegration method.

Table 2.7: Unit root test for variables

This table shows p-values of the Weighted Symmetric (WS) test for unit root. The WS test because has higher statistical power compared with the Dickey and Fuller test (see Pantula, Gonzalez-Farias, and Fuller, 1994). Optimal lag lengths were chosen using the Akaike Information Criterion and are shown in parenthesis.

	M1/P	M2/P	C/P	Y	I	r
Brunei	0.70 (6)	0.88 (6)	0.77 (6)	0.86 (6)	0.36 (3)	0.05 (6)
Cambodia	0.04 (5)	0.10 (3)	0.12 (5)	0.77 (4)	0.10 (5)	0.80 (5)
China	0.04 (9)	0.00 (9)	0.71 (9)	0.84 (9)	0.94 (9)	0.97 (9)
Indonesia	0.89 (7)	0.02 (7)	0.01 (2)	1.00 (7)	0.00 (7)	0.21 (7)
Japan	0.99 (9)	0.60 (9)	0.97 (1)	0.97 (1)	0.88 (1)	0.00 (1)
Korea	0.97 (9)	0.95 (4)	0.03 (7)	0.95 (3)	0.46 (3)	0.08 (9)
Lao	0.92 (6)	0.76 (6)	0.55 (3)	0.81 (2)	0.36 (6)	0.14 (6)
Malaysia	0.14 (7)	0.94 (7)	0.22 (7)	0.54 (2)	0.26 (2)	0.21 (7)
Myanmar	1.00 (4)	0.94 (4)	0.35 (4)	0.83 (3)	0.78 (4)	0.75 (2)
Philippines	0.00 (7)	0.98 (7)	0.19 (7)	0.37 (3)	0.96 (7)	0.21 (7)
Singapore	0.99 (9)	0.17 (3)	0.82 (3)	0.78 (5)	0.46 (9)	0.97 (9)
Thailand	0.65 (7)	0.74 (7)	0.18 (2)	0.00 (7)	0.29 (7)	0.21 (7)
Vietnam	0.89 (2)	0.93 (2)	0.93 (2)	1.00 (4)	0.20 (4)	0.37 (3)

The regression results of Table 2.6 A, B, and C were used in estimating the elasticity of the demand for (narrow and broad) money with respect to income, domestic interest rates, and international interest rates. The results are given in Tables 2.8 A, B, and C. Elasticity is estimated by regressing the log of real money on the log of real income, domestic interest rate, and international rate.

Tables 2.8 A, B and C confirm that international interest rates are negatively related with definitions of money in only a few countries. Domestic interest rates are more significant factors for most countries. The interest elasticity estimates for both broad and narrow monies are not large for any of these countries. The region has countries with both positive and negative relationships however none are particularly large enough to suggest that there exists an effective or consistent interest rate channel for monetary policy.

Table 2.8A shows the results of the Engle-Granger Cointegration Test using the narrow definition of money. The table shows the cointegration vectors, p-values and the optimal number of lags used for the model. Japan was included for comparison and had the highest coefficient for the relationships between demand for narrow money and foreign and domestic interest rates indicating more sensitivity to changes than the other countries.

Table 2.8A: Engle-Granger Cointegration Test for Narrow Money (M1/P)

This tables shows cointegration vectors, p-values and optimal number of lags used for the model:

$$\beta_0 (M1/P)_t + \beta_1 Y_t + \beta_2 i_t + \beta_3 r_t = 0$$

	β_0	β_1	β_2	β_3	p-value	# of lags
Brunei	1.000	0.082	0.010	-0.020	0.91	5
Cambodia	1.000	-0.403	-0.008	0.002	0.00	5
China	1.000	-0.869	-0.006	0.030	1.00	9
Indonesia	1.000	-0.860	-0.002	-0.014	0.81	2
Japan	1.000	-3.978	-0.088	-0.081	0.99	9
Korea	1.000	-0.449	0.028	0.001	0.97	5
Lao	1.000	-6.276	-0.005	0.001	0.84	2
Malaysia	1.000	-1.556	-0.012	0.010	0.93	2
Myanmar	1.000	-1.389	0.000	0.007	0.93	3
Philippines	1.000	-0.067	-0.001	-0.016	0.93	2
Singapore	1.000	-0.195	0.008	0.009	1.00	9
Thailand	1.000	-0.513	-0.008	0.017	0.46	2
Vietnam	1.000	-2.374	0.005	-0.004	0.52	2

For example, the elasticity coefficient of coefficient of real income variables is less than unity for many of these countries indicating that narrow money is an inferior good in these countries. If it is greater than unity, narrow money would be considered a luxury good. A one percent increase in real income raises the demand for narrow money by nearly 4 percent in Japan. In the Philippines, the same increase in income increases the demand for narrow money by less than one.

The size of the elasticity coefficient for either the domestic or foreign interest rates indicates that deposit rates are not particularly important. This would indicate that then demand for real balances in most of these economies is strongly dominated by the transactions motive for holding money when placed in context with the elasticity coefficient of real income.

Table 2.8B tested the broad definition of money (M/2). Similar results were obtained. Most of the ASEAN+3 countries do not seem to have very functional interest rate channels that would be important to the application of monetary policy. Given the mix of signs, it is most likely that monetary policy would not only be uneven but may have different results. As an example, changes in domestic interest rates have by 1 percent in Japan change the demand for broad money about.098 percent. In all other countries there will be no perceivable change. Again, the magnitude of the coefficients for income is greater than those of the interest rates indicating that the overwhelming motivation for holding money is for transactions.

Table 2.8B: Engle-Granger Cointegration Test for Broad Money (M2/P)

This tables shows cointegration vectors, p-values and optimal number of lags used for the model:

$$\beta_0 (M2/P)_t + \beta_1 Y_t + \beta_2 i_t + \beta_3 r_t = 0$$

	β_0	β_1	β_2	β_3	p-value	# of lags
Brunei	1.000	-0.012	0.008	-0.011	0.97	5
Cambodia	1.000	-1.313	0.006	0.008	0.60	2
China	1.000	-0.434	-0.005	0.021	0.97	9
Indonesia	1.000	-0.356	0.007	-0.004	0.98	3
Japan	1.000	-5.707	-0.098	-0.079	0.80	9
Korea	1.000	-0.948	-0.023	0.011	0.65	3
Lao	1.000	-2.174	0.006	0.031	0.59	2
Malaysia	1.000	-1.514	-0.014	-0.016	0.96	3
Myanmar	1.000	-1.553	0.002	-0.038	0.96	3
Philippines	1.000	0.996	0.000	-0.028	0.64	2
Singapore	1.000	-0.710	-0.009	-0.005	0.98	7
Thailand	1.000	-0.575	-0.005	0.007	0.93	2
Vietnam	1.000	-3.010	0.003	0.002	1.00	4

Table 2.8C tested the demand for real currency and its sensitivity to interest rates and GDP. The sizes of coefficients from country to country were inconsistent. Those associated with interest rates were minute. Currency tests as a luxury good in Lao, Malaysia, and Vietnam. These inconsistencies imply that a unified monetary policy would have inconsistent results if the policy even managed to transmit through the countries at all.

Table A2.8-C: Engle-Granger Cointegration Test for Real Currency (C/P)

This tables shows cointegration vectors, p-values and optimal number of lags used for the model:

$$\beta_0 (C/P)_t + \beta_1 Y_t + \beta_2 i_t + \beta_3 r_t = 0$$

	β_0	β_1	β_2	β_3	p-value	# of lags
Brunei	1.000	0.171	0.001	-0.019	0.81	2
Cambodia	1.000	-0.484	-0.007	0.006	0.11	5
China	1.000	0.108	0.011	0.017	1.00	9
Indonesia	1.000	-0.213	-0.001	-0.011	0.35	2
Japan	1.000	-1.103	-0.029	0.008	0.86	1
Korea	1.000	-1.399	-0.003	-0.006	0.36	2
Lao	1.000	-10.842	-0.008	0.005	0.97	3
Malaysia	1.000	-1.175	-0.014	-0.005	0.65	3
Myanmar	1.000	-0.830	-0.005	0.039	0.91	3
Philippines	1.000	-0.053	0.005	-0.016	0.80	2
Singapore	1.000	-0.263	0.005	0.007	0.99	9
Thailand	1.000	-0.431	-0.021	0.014	0.46	2
Vietnam	1.000	-2.987	0.004	0.013	0.65	2

Conclusions

Recent close coordination between ASEAN finance ministers and central banks should produce added benefits of stabilizing banks and bank credit in the region as well applying standardizing rules and regulations of financial intermediaries. However, results suggest that the ASEAN region is still fairly diverse in terms of depth and breadth of banking institutions and central bank policy. Coordination will be essential as recovery from both the financial crisis and the sovereign debt problems around the world begins. This should put upward pressure on export prices which are essential to growth in the region. The European Union presents a model where gradual coordination characterized launch of the Euro. This cautious example is a good one for ASEAN since it appears to still have some fundamental differences in financial depth and their banking systems. It's reasonable to suggest that four years may not be enough time to iron out all differences.

The agenda for further coordination becomes apparent given this analysis of the money supply multiplier, velocity of money, demand for money, and elasticity of money. The findings indicate that the ratio of currency to the supply of money has generally declined in the ASEAN region suggesting substantial growth in the monetized sectors but the high level of variation suggests that significant differences still exist. This result is apparent upon calculation and analysis of conventional estimations of the parameters of monetary policy.

Findings suggest that residents in Vietnam and Cambodia may have a higher preference for currency versus demand deposits when compared to residents in other ASEAN countries. These two member states have a lower degree of monetization and poor access to the banking sector when compared to the other members still committed to integration. Political commitment to modernization may incur cross country fiscal support to these countries. Myanmar is another country that has significant issues with financial market development. All countries have fairly undeveloped bond markets.

The substantial differences that were found in the money multipliers of ASEAN members may suggest that application of a unified monetary policy for all members may present difficulties. Again, cross country fiscal support may be required to bring weaker members' performance in line in several key areas prior to complete unification. Nearly all of these countries have vast infrastructure shortfalls so that it may be difficult to make the political case for helping out neighbors.

There are many other factors that necessitate caution. The coefficients of variation differ substantially between members for velocity. These differences reflect differences in the relative growth of currency, demand deposits, and quasi-money. The statistical results suggest that monetary authorities in the GCC integration should not base their policy decisions on a simple hypothesis such as the constant velocity of money since velocity is not consistent across the region. It would also be difficult to implement a Taylor rule.

Findings indicate that real income exerts a significant influence on the demand for real cash balances in the region. In addition, narrow demand for money is not sensitive to variations in domestic or international interest rates for all members. International interest rates significantly influence the demand for narrow money a few of these countries. A layered plan for unification may provide more pragmatic.

The decision to form a monetary union should not be based solely on issues surrounding monetary policy since fiscal policy is also an important element to success. However, strong consideration should be given to efficaciousness of regional monetary policy when contemplating

unification because monetary policy is delegated to a central bank. As a result, each individual member may have varying concerns and needs that will be subjugated to the needs of the union and the region. Some of the member states of ASEAN community have relatively weak banking systems and only four years to comply with the financial blueprint. Additionally, economic development in the region means that increased public infrastructure may be necessary and that requires additional funding from both domestic and foreign sources. Many countries still have undeveloped bond markets. Funding can be achieved from many sources but is always supported by investor faith in a functional credit market monitored by a central bank that recognizes the need for prudent monetary policy strategies. Homogenous policies, similar regulations, and enhanced financial integration can only help the process of monetary unification. While ASEAN has been a successful trading bloc and has meets many of the unification criteria proffered by theory, there are structural and systemic issues in members' monetary variables which warrant caution while proceeding forward.

Introduction

Many regions of the world would like to replicate the economic and financial market integration achieved by the European Union (EU) and other regions. Successful currency unions exist in many parts of the developing world already. Examples include the Eastern Caribbean Currency Union of OECS (established in 1965), the Economic and Monetary Community of Central Africa (established in 1945), and the West African Economic and Monetary Union (also established in 1945). There are about 15 proposed unions at this writing. Additionally, there are countries that belong to Currency Boards that share currencies but do not necessarily move to full economic integration. There are also countries that 'dollarize' or adopt the currencies of larger, influential economies.

Countries seeking full integration will eventually share a common currency and central bank. They commit to joint ways to increase the welfare and economic efficiency of members. The formation of the relationship is based on the idea of finding an optimum currency area (OCA). The most basic definition of an OCA is given in Mundell (1961). It is simply defined as "an area within which exchange rates are fixed."⁵ A current working definition might be that of a geographical area that maximizes economic efficiency by sharing a single currency, fully abolishing trade barriers and tariffs, and eventually establishing one central bank to handle a unified and credible monetary policy.

Steps to complete integration are gradual and begin by forming a preferential trading area. Once established, members typically set up a free trade zone followed by a customs union. Countries move to adopt institutional changes that remove differences in laws, financial institutions, and trade arrangements during these middle phases. ASEAN presented and passed a blueprint for this as the Chiang Mai Initiative during 2000-2001 that has been updated as recently as 2010. Goals include removing internal barriers-to-free trade, liberalization of financial markets, standardization of financial markets, regulations, and institutions, and increased factor mobility. Partner countries also attempt to move their economic performance closer together to achieve similar rates of inflation, GDP growth, and levels of per capita GDP. Convergence in economic variables eliminates the impact of price equilibrium shock once unification occurs and a common currency is established. Countries can move towards full

⁵ Mundell, Robert A. (1961); "A Theory of Optimum Currency Areas", *The American Economic Review*, vol. 51, no.4, (September, 1961), pp. 657-665

economic and monetary union and integration once a single market is established. Political will and coordination become essential at this point.

There are a number of nations that dollarize to achieve some of the benefits of the OCA. Dollarization basically means that a smaller country adopts the currency of a much larger neighbor and relies on the stability of the neighbor and its central bank to achieve effective financial markets and trade arrangements. For example, Bhutan and Nepal use the Indian rupee. Lesotho, Namibia, and Swaziland use the South African rand. Currency Unions are formal arrangements. Dollarization arrangements can be formal, informal, or de facto. Much planning and negotiation goes into complete economic integration. It can take years to achieve the coordination and cooperation necessary for success. It is a process and a commitment.

Many long standing, modern currency unions and boards resulted as colonial rule collapsed around the world. Currency unions frequently form within a geographically contiguous region between neighbors that share colonial heritage or some cultural features. The demise of the Bretton Woods System in the 1970s—with the resultant exchange rate havoc—also played an important role in the formation of OCAs. Many developing nations are looking at the experience of the EU to aid their development efforts.

Optimal Currency Area theory provides a framework that lets researchers study the potential costs and benefits of complete monetary and financial integration. It also provides insight into regional and country characteristics that smooth the transition or make transition difficult. Countries should be fully aware of all these factors when entering a proposed union. The benefits of the proposal should outweigh its costs. There are other regime choices available to a country including freely floating exchange rates, fully independent and controllable monetary policy, and open capital flows. This arrangement has been chosen by the U.S.A., the U.K., Japan and many larger or more developed nations. One primary benefit of this choice is that a political state retains its sovereignty. Coordination between sovereign nations with sovereign debt issues has become an issue challenging the stability of the modern EU. Sovereign debt differences within country members and its impact on the union is a popular research topic today for those studying integration's costs and benefits.⁶

It should be clear to a country's policy makers that the benefits of currency union for their country are superior to other regime choices. There are multiple choices and there is no agreement in the research community on one best choice that fits all. That is why it is imperative that research on each

⁶ See De Grauwe, Paul, "The Governance of a Fragile Eurozone", University of Leuven and CEPS, working paper, April, 2011.

union should encompass the many facets that influence success or failure along with attempts to assess the chance for success using the region's data. In this case, the EU serves as an important benchmark. Recent research even indicates that there are different costs and benefits for industrialized nations than those nations that are still developing so there is no cookie cutter approach or standard recipe for successful integration.

However, there are known benefits. Countries adopting a single currency within a region are generally thought to experience greater economic integration, lower transaction costs, and higher levels of both trade and investment. Unification eliminates issues of exchange rate instability. This is especially true for regions with limited hedging and risk management opportunities and shallow financial markets. A shared single currency, central bank, and monetary policy are usually the penultimate goal of financial integration. Financial integration can lead to increased development and credibility in nations with a history of inflation, poor financial institutions, and bad monetary policy. It has been shown to be a means of beneficial institutional change and can alleviate political pressure on monetary policy. It is these changes that can improve trade and investment opportunities in a country or region.

Mongelli (2002) provides a classification scheme for the primary benefits and costs of participating in an OCA. His paper examines research in the area and looks for prevailing themes. Mongelli considers the first set of benefits to be improvements in 'microeconomic efficiency'. This is attributed to the shared currency's ability to better function as money. There also exist benefits that reduce transaction costs and riskiness because of increased circulation of the single currency. The widespread adoption of a single currency in diverse markets heightens price transparency and deepens financial market offerings.

Monetary unification is thought to foster more competitive markets and increase the size and diversity of an economy. Mongelli reviews many studies to find increased macroeconomic stability as well as economic growth in countries that form an OCA. Again, price stability and a large populace of adopters will eventually lead to more sophisticated financial markets and increased ability to react and weather exogenous shocks. This means that small countries can access financial innovations and markets more quickly than they could alone and businesses and investors have access to multiple ways to best manage risk.

Beetsma and Giuliodori (2010) summarize research on the macroeconomic costs and benefits of monetary union. One of the major concerns of a sovereign nation is the loss of independent monetary policy. However, research shows that unification tends to remove ways for political interests to use

competitive currency devaluation as well as eliminates some instance of harmful monetary policy spillovers. Small and developing nations can more rapidly develop by accessing a nonpolitical and credible central bank.

Then, there is the 'Rose effect'. Rose (2000) began a line of study showing the relationship between currency union membership and international trade. This study concluded that members of a currency union were three times more likely to trade than similar countries using their own unique currencies. The results of this study set off a thread of research that eventually concluded that there is a large positive effect but probably not as large as Rose (2000) found.

Rose (2004) found that currency union membership generally "increases bilateral trade between 30% and 90%" by employing a meta-study. The results have been so consistent that it is now called the 'Rose Effect' and is an accepted benefit of currency union membership. While the Rose work and other research has established validity of the result, many felt that work was needed to determine the source of the result (Anderson & Van Wincoop, 2004) as well as the validity of the size estimates. Finance ministers and other country level policy creators were also interested in finding the specific channels of transmission for the Rose Effect to employ better structures and laws to take full advantage of the increased trade opportunities.

Early criticisms of Rose's work and the scope of his findings were based on measurement problems due to use of the naïve gravity model. Disparagement of Rose (2000)—with its highly controversial results—can be found in Nitsch (2002 and 2007). The issues have been addressed in ongoing research into the area. This criticism usually focuses on omitted variables, model misspecification, possibility of reverse causality, and complexities within the sample due to specific country characteristics. As a result of the criticism and further research, the naïve gravity model has been modified to address estimation issues typical when using this type of data. Efforts to refine the model continue.

Baldwin (2006) surveys the empirical literature on the EMU and international trade volumes. He discovered that recent research has identified three channels as the sources of the trade boosting effects of currency unions. The first is the relative price channel. When a single currency is introduced into a region, it lowers the relative price of traded goods coming from within the OCA. There are two sources of this impact. First, there is a reduction in bilateral trade costs associated with exchange rate risk or transaction costs. Then, there is the impact from increased competition within the OCA putting downward pressure on prices. The second channel comes from an increase in newly traded goods (Baldwin & Taglioni, 2004). In some regions, firms export a wider range of their products within the

community than they did before because of the reduced transactions costs. The third channel is Foreign Direct Investment (FDI). The FDI channel is the least investigated channel to date.

The FDI channel is an important area of research for several reasons. First, FDI is an essential part of a firm's international strategy which is important from a corporate finance standpoint. Second, FDI has a knowledge spill-over component. Firms can bring valuable foreign know-how when they bring capital or invest in a country. Attracting FDI is an important development strategy for an underdeveloped nation because it not only brings new jobs and funds; it brings new technologies, products, and methods.

Most research-to-date on the three channels has focused on the EU because the data is more available and considered more reliable. Data quality has been a big issue when dealing with FDI so it is also easier to study the other channels. There are now ten years of empirical data for the EU but there is still an obstacle to precise empirical measurements. EU integration studies are primarily post ante. Integration is a long process. Policy makers should be able to see benefit while in process to encourage liberalization and modernization of institutions and systems. Documentable benefits strengthen political will for cooperation and changes to law, institutions, and regulatory environment.

Since the EU was the first major union, other proposed regions have developed plans on their experience and have hope to achieve earlier and stronger results by learning and following the lessons. The post ante focus on the EU allows for consideration of theoretical underpinnings for existing unions. The EU data provides important estimates and insight into the benefits of the Rose Effect for developed nations and current unions. If the EU results are consistent with countries that have dollarized, integrated, or use currency boards, then, increasing improvement in FDI and trade should be noticeable in those countries moving towards unification as participants in market anticipate increasing benefit. Models used to study post EU data should be applicable to proposed regions and should demonstrate ongoing improvements in other nations that have unified or progress to unification as long as reliable data is available. This should help quantify and extend understanding of the Rose Effect. These are the major hypothesis, goal and motivation of this essay.

This study uses data from ASEAN+3 countries for two modified gravity models. The majority of these countries are now providing data to the IMF, the World Bank, and the Asian Development bank so data is becoming more plentiful and reliable in the region. These refined gravity models are used to study improvements in trade and FDI in the ASEAN region as it moves closer to unification. A variable will be used to control for positive steps (e.g. announced agreements) made by the community as it relates to steps towards unification. Positive moves towards unification should increase FDI and trade

activity to some degree, just as actual unification leads increased FDI and trade. Countries behind in the unification process—which is likely for some of the ASEAN countries—should experience significantly less FDI and trade than their neighbors who progress to unification. Trading zones with more advanced progress in the unification effort should attract significantly more FDI as world investors move to the region in search of their share of the “Rose Effect”.

As previously stated, this study uses two forms of a refined gravity model to capture trade and FDI effects. The gravity model has been used in recent empirical studies to estimate the Euro’s FDI effects. A general specification of the model (Baldwin & Desantis, 2008) is expressed thusly.

$$FDI_{od,t} = a_1 (Community) + a_2 D_d + a_3 D_t + a_4 D_o + a_5 X_{od,t} + \varepsilon_{od,t} \quad (3.1)$$

$FDI_{od,t}$ is the FDI flow from an originating nation (o) to a destination nation (d) in the year (t) as measured by capital account data. The D variables are dummies are fixed effect variables for originating and destination countries. The X vector can include other variables that may affect FDI flows. There are a set of a variables typical gravity model used to evaluate trade flows in the vector. These include GDP per capita, transaction costs as proxied by geographical distance between financial centers, the presence of adjacent borders, and various measures of financial depth or openness, exchange rate volatility or degree of liberalization or corruption within governments.

This study introduces an additional dummy variable into a gravity model in the spirit of Bénassy-Quéré et al (2000) that estimates FDI and controls for the impact of price competitiveness and exchange rate volatility. The same dummy variable will be used for a gravity model introduced de Sousa and Lochard (2004) that estimates trade using FDI as a control variable among others. The first estimates FDI directly. The second explores linkages between FDI and trade. The de Souse and Lochard model controls for EU membership. In the spirit of that model, the dummy variable in this model will identify progress in the ASEAN agreements via the dummy variable News and control for ASEAN membership instead.

Refinements to the gravity model have removed some of the earliest criticisms of measurements of the Rose effect in the Eurozone. It is possible to take these improvements to achieve better estimates of the Rose effect in other OCAs. This makes this analysis unique in that it studies countries moving towards unification rather than those that have already achieved unification.

Literature Review

Increased worldwide FDI has been one of the most significant consequences of globalization. There is growing interest in the both theory and empirical research dealing with this phenomenon. As previously stated, the gravity model is the most popular way to capture deviations from predicted trade volume due to policies or other frictions in markets (Eichengreen & Irwin, 1998). The gravity model of international trade was developed by two researchers working independently of each other in the early 1960s (Tinbergen, 1962 and Pöyhönen, 1963). The original model was augmented by Linnemann (1966). The gravity model in its most basic form shows how trade between countries is impacted by their size as measured by national income and the cost of transportation between countries as measured by the distance between major economic centers. Linnemann expanded the variable list by adding population as a measure of country size. It is also normal to use per capita income to augment the model as a control for development issues.

The augmented model captures the impact of policy on baseline trade through the use of various dummy variables. The Rose Effect shows that membership in a currency union is one significant policy variable that encourages increased trade. If there are greater benefits to actual economic and monetary integration as a national and regional policy then it follows those participant countries demonstrating momentum towards unification by actively following unification strategies should see increased FDI inflows. FDI should flow to the region in anticipation of the trade boom. One of the possible reasons this should occur is because steps towards unification--including increased factor and capital mobility accompanied by a free trade zone in the region--should be accompanied by increasing exchange rate stability which reduces the risk and costs of trade. Trade also increases linkages and promotes knowledge spill overs. Increased linkages leads and factor mobility move markets closer together so that underlying variables in the countries' economies become similar. Exchange rate risk is reduced and eventually eliminated within the OCA. Prices within the community should equilibrate during the process. Volatility should be reduced and convergence in fundamental macroeconomic variables should be indicated.

Currency unification eliminates exchange rate transactions cost within the OCA and provides a wider-used currency for which increased hedging opportunities should develop as the community adopts sharing of common trading platforms. A shared currency-based bond market also develops. Monetary integration especially encourages trade between members (Micco et al. 2003). Financial

market integration removes barriers to efficient cross-border allocation of capital thereby reducing the risk in investment decisions.

Researchers are starting to examine the effect of currency union and monetary integration on the FDI channel of international trade. Wei and Choi (2002) and de Sousa and Lochard (2004) found a positive relationship between monetary integration and FDI. Much of the early research was accomplished using countries that presently have complete dollarization or have joined a currency board. Many recent studies focus on data for the EU or more developed economies like Hong Kong (Baldwin et al, 2008). Recent research focusing on the Eurozone shows strong evidence that common euro usage has boosted bilateral FDI flows (Taylor, 2008 and Buch & Lipponer, 2007).

As previously noted, the research typically employs some form of refined gravity model. Bénassy-Quéré et al (2000) offer a modified gravity model demonstrating how exchange rate volatility matters to Foreign Direct Investment (FDI) and conclude that exchange rate regime choice is important to trade and FDI. Building on the idea that FDI is strongly influenced by geography, their work suggested that “frontiers of monetary areas” can be designed to influence the flow of FDI. Empirical data for their tests consisted of a panel of 42 developing countries receiving FDI from 17 investing countries. The panel of data was not concentrated on any particular region but did identify countries as emerging or developed. The model controls for the presence of oil in the target country as well as any price competitiveness that may exist. This model uses trade as the variable of interest and examines FDI as a channel of the Rose Effect. The first model in this study will employ this approach.

De Sousa & Lochard (2004) examine trade as the variable of interest. Their gravity model estimates both the impact of monetary union and FDI on trade. Their results—using recent EMU data—find that about half of the EMU effect on trade is indirect. This means that the trade comes from an increase in FDI. They use sensitivity analysis to test their results for robustness. Their results demonstrate the Rose Effect but do not determine the reasons for the increase in both intra-EMU trade and trade with countries outside of the EMU. Tests for sensitivity included controls for adjacency, language, GDP growth and geographical distance. The second model of this study will use this approach.

As with later research, de Sousa & Lochard deal with the endogeneity issue. This is the problem that the FDI variable may be an endogenous regressor meaning any OLS estimator may be inconsistent. Cheng and Wall (2005) discuss methods for controlling heterogeneity in Gravity Models. There have been advances in econometrics that have made the gravity model less problematic.

Ross (2007) uses the new open economy macro perspective—with exchange rate movements—to study FDI. The model is driven by volatility in nominal interest rates that impact exchange rate

volatility. The estimates then measure the impact on merger and analysis activity. Her results suggest that common euro usage increases merger and analysis activity.

Couerdacier, DeSantis, & Aviat (2008) explain determinants of cross border merger and acquisition (M&A) activity using sector data. This study uses data from the period of 1985-2004. The panel includes 21 developed countries for the originating FDI in 31 host countries. Within the host country panel, 20 are developed nations. The other 11 come from developing nations. Their sector data focuses on both manufacturing and service data from 10 areas apiece. The study includes around 10,000 observations so the data base is huge. Couerdacier et al try to isolate and measure M&A activity resulting from European integration. They use Poisson Maximum Likelihood estimators to overcome the problem of biased estimators in standard OLS. They found there has even been a higher degree of intra-activity within the EU and among the other nations that belong to the trade zone but not the monetary unification effort. The results were significantly larger for those countries that joined the monetary union.

These studies also support the conclusion that the EU and Euro area membership have a direct and positive effect on FDI and trade. Major trends identified in Baldwin et al (2008) were that impacts were stronger felt in manufacturing sectors than service sectors. Impact was larger within sectors than across sectors. Cross-border merger and analysis activity generally was achieved by “restructuring capital within the same sector of activity, rather than boosting the formation of conglomerate activities between sectors.” Additionally, relevant studies found that inbound FDI from countries outside the also EU increased; although that was about half as significant as the activity within the zone. Mathematical estimates of the impacts were varied.

This study looks for indications of similar enhanced FDI and trade improvements in the ASEAN zone. Ongoing improvements in gravity model will be used to capture these results by using estimators that have been shown to be more efficient for the EU studies. The study employs models successfully used to assess the impact of EU integration on ASEAN +3 data in an attempt to extend the usefulness of models and reinforce general theoretical conclusions from EU research.

Data and Methodology

There are several different approaches to define and measure FDI. Choice of approach depends on the focus of the study. There are two main empirical ways to study FDI that determine choice of preferred definition and measurement. One line of research uses data that primarily studies outbound

and inbound FDI to measure horizontal and vertical movements at the micro level. This research examines the underlying motivation for FDI. Some FDI is based on 'outsourcing' in that a corporation looks for a substitute for a step in production then re-imports product back to the home country or elsewhere. The other type is FDI with a goal to establishing a foothold in another country that will also serve as the final market for the goods or services. FDI in this sense is motivated by either lowering costs in the first case or expanding markets in the second. Overall direction of trade is not as important as the motivator.

Using capital flows data from balance of payments sources is more relevant when researchers are less concerned about the specific motivation and more interested in the movement in and out of specific countries. Motivation still underlies the data but is not of interest. This study looks at FDI as part of the capital account of balance of payments because the goal is to capture the momentum of FDI flows coming to a country with certain characteristics. Current, refined gravity models try capture firms' location decisions based on preference to defined characteristics present in a country rather than their overall motivation for relocation. The theoretical roots of these studies are found in new trade theory dealing with international location choice of Multinational Entities (MNE) advanced in Markusen (1994).

FDI is complex and can manifest in many forms and for as many reasons at the micro level. However, the results of combined decisions aggregate in a country's capital account. FDI is beneficial for a developing country which is why countries need strategies to encourage FDI inflows. Technological and knowledge spill overs increase factor productivity (Borenzstein and de Gregorio, 1995). FDI is a stable source of financing and considered superior to portfolio investment (Lipsey, 1999). FDI also provides more long term financing (Stiglitz, 1999) which enables long term investment commitments.

There are benefits and complications when using the definition associated with capital account data. It is frequently used because the numbers are easier to find. However, it is ultimately considered a proxy because it is indirectly related to real economic activity. The high level numbers capture all manners of FDI activity from establishing subsidiaries, buying affiliates, or starting from scratch with Greenfield operations. FDI activity also includes equity capital, reinvested earnings and loans. There are a variety of implied frictions that infiltrate data because of the variety of investment types captured by this definition.

Equations of interest in this study are estimated using annual data for the ASEAN+3 countries for the time period of 1992 to 2010. This includes data resulting from two major exogenous shocks. The first is the Asian Financial Crisis of 1997-1998. The second macroshock is the Global Financial Crisis of 2007-2008. Sources for data include the Organization for Economic Cooperation and Development (OECD),

the Asian Development Bank (ADB) and the International Monetary Fund's Direction of Trade IFS Databases. Distance data comes from CEPII.

Models

This study uses two refined gravity models. Model One gives a direct primary estimation of FDI. In contrast, Model Two provides a direct primary estimation of trade with FDI as one control variable among others. The basic goal of the research is to check for the implications of movement towards the proposed the ASEAN currency union on levels of FDI and trade. Monetary integration includes several phases that may ultimately progress to complete monetary unification. Typically, countries with some kind of mutual economic, political, or cultural interest meet to determine the feasibility of coordinating exchange rates, factor movement, and capital markets. This began in earnest for the ASEAN+3 countries in 1997 as a direct result of the Asian Currency crisis. China, South Korea and Japan are part of the Free Trade Area but are unlikely to become part of any monetary union formed by ASEAN itself. The ASEAN countries continue to assess their current situation and adopt plans to move their economies and financial markets closer together over time. The intermediate stages taken—prior to any country subset commitment to monetary unification—should measurably enhance trade and investment performance for the participating countries.

Quick transition is not possible for many reasons that are political, institutional, and theoretical in nature. As an example, easing transition to union is essential so that acute exchange rate adjustments do not disrupt the economies of participating countries. Intermediate steps like liberalization of capital accounts, establishment of Free Trade Agreements, and increased economic and financial openness have occurred. Continued policy advances may depend on noticeable, measured improvements. These steps are captured in country indexes and dummy variables in refined gravity models. Also of interest is when members join ASEAN as well as when they formed the Free Trade area.

The models also include a news component dummy that indicates an event in the ASEAN and ASEAN+3 community announcing or showing formal progress towards unification for the community and its members. This variable and the others aim to capture increased FDI and trade motivated by those seeking the known benefits from factors related to unification generally known as the Rose Effect as the ASEAN community moves to unification.

The first model controls for the impact of exchange rate stability and price competitiveness on FDI in addition to the news component dummy and other control variables. This refined gravity model form

was developed using a theoretical model developed by Bénassy-Quéré et al (2000) designed to study the choice of exchange rate regime by controlling for determinants of location choices of multinational entities. The authors used the model to show that exchange rate volatility has a negative impact on FDI and to argue that countries might be able to attract FDI inflows by forming currency unions to eliminate or alleviate exchange rate volatility.⁷

The augmented equation estimated in this study from the Bénassy-Quéré formulation is:

$$\begin{aligned} \log FDI_{i,t} = & a_0 + a_1 \log C_{i,k,t} + a_2 Vol_{i,k,t} + a_3 \rho_{i,k,t} \log C_{j,k,t} + a_4 \log D_{i,k,t} + \\ & + a_5 Open + a_6 News + a_7 ASEAN + a_8 FTA + e_{k,t} + v_t \end{aligned} \quad (3.2)$$

In keeping with the rationale that the capital account is the best place to capture a country's ability to attract FDI inflows, the variable ($FDI_{i,t}$) for each period is defined as:

$$\log FDI = \log \left[\frac{FDI \text{ stock in millions USD}}{World \text{ CPI}} \right] \quad (3.3)$$

where FDI stock is empirically represented by Total Foreign Direct Investment.

FDI is capital moving from one country to another so it basically represents an investment decision like any other. The volatility of return as well as the level of return impacts the decision. The competitiveness and volatility variables capture the impact of changes in the real exchange rate effects on FDI. The price competitive variables control for appreciation and depreciation through changes in real exchange rates. A depreciation of the home currency tends to induce more FDI inflows in general terms (Goldberg & Kelin, 1997). The reverse happens for an appreciation of the real exchange rate (Barrel & Pain, 1998, Udomkerdmongkol et al, 2008).

This model specification controls for the trade-off between price competitiveness and nominal exchange rate stability in the FDI decision to allow for a cleaner estimate of the how much of the FDI choice is due to announced progress towards the union and other variables. The competitiveness variables $C_{j,k}$ and $\rho_{i,k,t} C_{j,k}$ capture the price competitiveness. Variable $C_{j,k}$ is competitiveness of country i. It is calculated as the real exchange the rate between country i (host country) and country k (investor country). The rate is in direct quotation or units of the local currency of country required to buy one

⁷ Bénassy-Quéré, Agnès, Lionel Fontagené and Amina Lahrière-Révil, "Exchange rate strategies in the competition for attracting FDI", January 2000, presented at ADBI/CEPII/KIEP Conference on Exchange Rate Regimes in Emerging Market Economies, Tokyo, December, 1999

unit of foreign currency. Model results should show a direct relationship between FDI inflows and competitiveness of country i which indicates that a depreciation of the currency from i against country k increases FDI inflows.

Variable $\rho_{I,k,t}C_{j,k}$ is the competitiveness of region j that are countries considered alternative location to country i . It is calculated as the real exchange rate between countries j and country k . This rate is also in direct quotation or units of local currency to buy one unit of foreign currency. It is the real exchange rate where each country in the region's exchange rate is weighted by the GDP of this country and the total GDP of the region. Country i should attract more FDI inflows when its currency depreciates against possible alternative locations.

The impact of the volatility of exchange rates is accounted for with variable $Vol_{i,k}$. It is empirically represented by the difference in the log of the nominal bilateral exchange rate. The rate is in direct quotation or the number of units of local currency to buy one unit of foreign currency. FDI should be negatively impacted by volatility since this should indicate more risk and the need for higher return. High nominal exchange rate volatility should decrease FDI inflows.

The impact of differences in transportations costs is proxied by the geographic distance in miles between financial capitals of country i (host country) and country k (investor country) represented here as $D_{i,k,t}$. This is the traditional proxy for such costs in these kinds of models. FDI should be negatively related to costs because large distances should represent higher transactional costs and potentially lower rates of return. The variable $Open$ is empirically calculated as the ratio of total exports and imports between i and k divided by GDP of I . This is a variable introduced in the Bénassy-Quéré et al study to control for "the nature of foreign direct investment". The proxy was designed so that a large openness ratio would indicate FDI with a goal of re-exportation and would elucidate some underlying motives for FDI in that country. FDI should be positively related to $Open$.

The dummy variable $News$ is given a value when a meeting of ASEAN members produces a formal agreement or signed strategy that shows progress towards unification. Examples include years the November 2007 charter signing, the 2001 Chiang Mai Initiative or the 2004 Framework Agreement or Integration of Priority Sectors. Since the $News$ variable specifies positive steps, it should be positively related to FDI and would be significant if any of the news encourages FDI. The dummy FTA represents the presence of a signed multilateral or bilateral Free Trade Agreement with a country other than ASEAN membership. This research adds a control for Free Trade Agreement. Given these countries established free trade agreements during the period. Free Trade Agreements and the establishment of Free Trade Zones is one important step towards unification. ASEAN membership is assigned its own dummy

variable. Cambodia—as an example—joined ASEAN during the period under investigation. This should control for any preferences for other ASEAN members or special arrangements. Models One’s estimates were calculated using country and year fixed effect estimation with robust heteroscedasticity errors applied.

The second gravity model is based on one developed in de Sousa & Lochard (2004)⁸. This gravity model directly estimates trade and uses FDI as a control variable. It is a more typical gravity model used to examine trade. The augmented version used in this study controls for the existence of a Free Trade Agreements and uses the News variable to see if announced progress towards unification effects trade.

$$\begin{aligned} \log Trade_{i,k,t} = & b_0 + b_1 \log(Y_{i,t} Y_{k,t}) + b_2 \log D_{i,k,t} + b_3 Vol_{i,k,t} \\ & + b_4 \log FDI_{i,t} + b_5 News + b_6 ASEAN + b_7 FTA + e_{i,t} + e_{k,t} + \nu_t \end{aligned} \quad (3.4)$$

The variable Trade captures bilateral trade between countries i and k in USD at time t . Y is GDP of the country. The variable $\log(Y_{i,t} Y_{k,t})$ is a conventional proxy that controls for size of a country’s economy. The other variables for distance, exchange rate volatility, positive news, and ASEAN membership, presence of a FTA and the log of FDI are the same as those defined for Model One. Models Two estimates were calculated using country, partner and year fixed effect estimation. The authors of the original model expressed concerns about a potential simultaneity issue that could lead to an inconsistent OLS estimator since trade and FDI are related but the direction of causality is unknown. This estimation technique handles those concerns. If traditional gravity model estimations hold true, size should be positively related to Trade. Distance and Volatility should be negatively related to trade. News, ASEAN and FTA are predicted to be directly related to trade.

Results

The results of the econometric estimation for Model 1 are shown in Table 3.1. Estimations were run for the ASEAN countries as a group and the ASEAN+3 countries. The ASEAN model uses data of the ASEAN community members while ASEAN+3 results include the region’s three economic powerhouses of China, South Korea, and Japan.

The estimation for ASEAN+3 is given

⁸ de Sousa, José and Julie Lochard, (2004) ‘The currency union effect on trade and the FDI channel’, working paper, University of Rennes and University of Paris

$$\log FDI_{i,t} = 5.607 + .392 \log C_{i,k,t} - 11.067 Vol_{i,k,t} + .976 \log C_{j,k,t} + .4842 \log D_{i,k,t} + 5.588 Open - 0.153 News - 1.385 ASEAN - 0.693 FTA \quad (3.5)$$

All variables were significant at the 10% level with the exception of the news variable for this ASEAN+3 countries estimation stated above. The coefficient for $C_{i,k,t}$ representing price competitiveness of country i is positive as expected. This estimation infers that a 1% appreciation in the real exchange rate reduces the FDI stock by 39%. Depreciation in the home country currency induces higher foreign direct investment inflows. The coefficient for volatility is negative indicating that an increase in nominal exchange volatility reduces FDI inflows. This reinforces the Bénassy-Quéré et al result. The coefficient value is large indicating that a 1% increase in exchange rate increased FDI inflows by over 1000 percent. The coefficient for $\rho_{i,k,t} C_{j,k,t}$ is positive which is a somewhat unexpected sign. A positive relationships here implies that when the exchange rate of country i and its location competitors in group j depreciated against other countries, the result is higher FDI for both, country i and alternative location or competitors j.

Table 3.1: Estimation of Gravity Equation for Model One stated as:

$$\log FDI_{i,t} = a_0 + a_1 \log C_{i,k,t} + a_2 Vol_{i,k,t} + a_3 \rho_{i,k,t} \log C_{j,k,t} + a_4 \log D_{i,k,t} + a_5 Open + a_6 News + a_7 ASEAN + a_8 FTA + e_{k,t} + v_t$$

	ASEAN+3	ASEAN
Constant	5.607*** (12.323)	6.559*** (14.365)
$\log C_{i,k,t}$	0.392*** (5.381)	0.689*** (11.969)
$Vol_{i,k,t}$	-11.067*** (-8.156)	-11.033*** (-7.996)
$\rho_{i,k,t} \log C_{j,k,t}$	0.976*** (8.265)	0.384*** (4.117)
$\log D_{i,k,t}$	0.4852*** (8.555)	0.213*** (3.661)
Open	5.588*** (9.856)	6.563*** (13.304)
News	-0.153 (-0.734)	-0.320* (-1.739)
ASEAN	-1.385*** (-16.041)	0.929*** (9.673)
FTA	-0.693*** (-5.004)	-0.719*** (-4.681)
Adj R2	0.26	0.33
# Obs	2565	1929

*significant at 1% level, **significant at 5% level, ***significant at 10% level,

White robust standard errors are in parentheses

Country and year dummies not reported

(Table 3.1 continued)

Variables Definitions

FDI_i: Total **Foreign Direct Investment** in country *i* divided by World CPI

Vol_{i,k}: **Volatility** The difference in the log of the nominal bilateral exchange; the nominal exchange rate is in direct quotation or units of local currency *j* to buy one unit of foreign currency *k*

C_{i,k}: **Competitiveness of country i** as given by the real exchange rate between country *i* and country *k*, the rate is in direct quotation or units of local currency to buy one unit of foreign currency

ρ_{i,k,t}C_{j,k}: **Competitiveness of country j** as given by the real exchange rate between alternative countries *j* and country *k* during period *p*. (The rate is in direct quotation: units of local currency to buy one unit of foreign currency. It is the real exchange rate, where each alternate location country's exchange rate is weighted by the GDP in this country and the total GDP of the alternate location countries.)

Open: Ratio of total export and import between *i* and *k* divided by GDP of *i*

News: a dummy of positive news for the ASEAN countries

ASEAN: a dummy indicating both country and partner belongs to ASEAN at time *t*

D_{i,k}: Distance in miles between capital of country *i* and country *k*

The coefficient sign for Distance ($D_{i,k,t}$) that proxies for transportation cost is positive. This is possible even though the sign differs from the results of the Bénassy-Quéré study. Their study covered a much larger geographical region where transportation costs could be quite varied. However, it is reasonable to think that the higher transportation cost implied by the higher the distance means the investor may be more likely to invest in the economy rather than export towards that economy. Distance in this sample has a more strategic role than the Bénassy-Quéré results. This may be due this studies sample which includes countries that are not necessarily contiguous and are somewhat spread out but are basically in the same region.

The coefficient for the variable Open is positive and large indicating that the FDI may be partially aimed towards re-exporting. This is as expected and not surprising given the large number of firms that move to the ASEAN nations in outsourcing strategies. The News variable did not test significant for the ASEAN+3 countries. It did test significant at the 1% level for the ASEAN group. The News variable had a negative sign in this model indicating FDI was less likely as announced progress in unification took place. ASEAN membership had a negative coefficient as did FTA for the ASEAN+3 countries. The ASEAN coefficient sign was positive for the ASEAN sample only. This possibly indicates the increased relationship between the ASEAN nations increases the level of cooperation between the nations and

induces a sense of shared community. ASEAN membership is more valued by ASEAN members than by the ASEAN+3 free trade area. The inverse relationship for FTA is possible since two countries that have a free trade agreement may be more likely to export so there is less need for FDI between them.

Results for model two are shown in Table 3.2. The ASEAN+3 countries estimates are made with and without FDI using variable country, partner and year fixed effect estimation with robust heteroscedasticity errors applied. The first estimation serves as a benchmark so that the gross impact of the associations can be measured on trade. This is a technique used in other research—notably Rose (2000)—as well as de Sousa & Lochard. The second estimation controls for the FDI channel. There is a small difference in the number a data available for the second estimation. The coefficient signs remained consistent between estimations.

Table 3.2: Estimation of Gravity Equation for Model Two

$$\log Trade_{i,k,t} = b_0 + b_1 \log(Y_{i,t}Y_{k,t}) + b_2 \log D_{i,k,t} + b_3 Vol_{i,k,t} + b_4 \log FDI_{i,t} + b_5 News + e_{i,t} + e_{k,t} + v_t$$

ASEAN+3 Countries		
	Benchmark	With FDI
Constant	-9.180*** (-10.990)	-5.436*** (-3.897)
$\log(Y_{i,t}Y_{k,t})$	0.588*** (12.649)	0.330*** (4.050)
$\log D_{i,k,t}$	-0.126*** (-2.777)	-0.146*** (-3.024)
$Vol_{i,k,t}$	1.980* (1.755)	1.724 (1.247)
NEWS	0.010 (0.059)	-0.237 (-1.271)
ASEAN	0.283** (2.490)	0.277** (2.370)
FTA	0.708*** (5.585)	0.737*** (5.314)
$\log FDI_{i,t}$		0.037 (1.020)
Adj-R2	0.84	0.84
# Obs	2641	2371

*significant at 1% level, **significant at 5% level, ***significant at 10% level,

White robust standard errors are in parentheses

Country and year dummies not reported

(Table 3.2 Continued)

Variables definition:

FDI_i: Total **Foreign Direct Investment** in country i from the world divided by World CPI

Vol_{i,k}: **Volatility** The difference in the log of the nominal bilateral exchange; the nominal exchange rate is in direct quotation or units of local currency j to buy one unit of foreign currency k

FTA: A dummy indicating that both country and partner belong to a free trade agreement (besides ASEAN)

trade: Bilateral trade between country i and k.

Y_{i,t}: GDP of country i at time t

Y_{k,t}: GDP of country k at time t

There is a difference in the estimation with the control for the FDI channel applied. ASEAN membership tested significant and positive at the 5% level. The constant, distance, the size proxy, and the existence of the Free Trade Agreement all tested significant at the 10% level. Size had a positive and significant impact on trade as did ASEAN membership and the existence of the FTA. Distance had significant and inverse relationship with trade which means that trade is inversely related to the proxy for transportation costs.

Belonging to ASEAN and being part of the ASEAN+3 Free Trade Zone has a positive influence on trade. ASEAN membership is worth slightly less to trade in the second estimation than the first while the FTA has a more positive relationship in the second estimation than the first. The surprising result was the positive coefficient for volatility that was significant in the benchmark model and not the second. However, the exchange rate volatility that impacts trade in lieu of FDI like the first model may not be a completely unreasonable result in a region with the presence of huge economies like Japan that import food and other basics from nearby countries and rely on exports to other developed nations to pay for the resources their country lacks.

Conclusions

Interest in the costs and benefits of exchange rate regimes has increased along with the increase in global trade and financing. The notion that each country should select a one size-fits-all regime has generally been replaced with considering a correct regime for certain circumstances. Developed and

developing regions have committed to monetary and financial integration to increase their share of world trade and FDI because of the experience of the EU. However, the chance for successful unification in regions less developed is still an area under intense scrutiny. There are many factors that can inhibit unification. These include fiscal and monetary factors as well as geographical, political, and cultural factors. More research is needed to estimate the benefits and costs of unification as well as the preparedness of regions for unification. There is a definite need for determination as to why currency unions tend to raise the level of trade and FDI. There are potential explanations, but none have been thoroughly investigated.

Models frequently focus on EU experience. It is reasonable to assume that models developed to analyze EU data should be applicable to other monetary unions and trade arrangements if the data is available. Of special interest is a potential monetary union that is in process. It should be possible to measure and capture the positive benefits of association, movement towards integration, and the existence of free trade arrangements as the proposed currency union region progresses towards integration.

The refined gravity models in this research evaluate data from ASEAN as it furthers its process of unification and study the relevant factors to unification and their impact on trade and FDI. Since much of the research has been done on the EU, the aim is to capture more fully the sources of the costs and benefits to the unification process in lieu of post-unification status. The model with direct estimation of Trade based on deSousa & Lochard (2004) showed different results than the model with direct estimation of FDI based on Bénassy-Quéré et al (2000) suggesting the difference in underlying basic motivators and decision variables for each. FDI—at the micro level—is basically a business and individual investment decided by expected returns, patterns of volatility, and opportunity for profit. In the FDI model, exchange rate volatility was determined to have a significantly negative effect on FDI inflows around the region. Volatility means uncertainty and increased risk which deters investment. FDI responds positively to countries experiencing currency devaluation in the region.

While, businesses that engage in trade are motivated by these factors, trade—at a macro level—is motivated by the desire to either grow a domestic economy or provide additional goods and services not adequately produced by the domestic market. The unification step of establishing Free Trade Agreements or announcements of agreement was found significant in the FDI model. The Trade model found ASEAN membership and Free Trade agreements significant and positively related to trade. This indicates that progression to unification can carry benefits to member countries.

References

ASEAN Community Blue Print

Adams, Charles, "Emerging East Asian Banking Systems Ten Years after the 1997/98 Crisis" (May 2008), Working paper series on Regional Economic Integration No. 16

Aizenman, J. and Lee, J. (2007), "International Reserves: precautionary versus mercantilist views, theory and evidence", *Open Economies Review*, 2007, 18 (2), pp. 191-214

Aizenman, J, M.D. Chinn, and H. Ito (2008), "The "Impossible Trinity" Hypothesis in an Era of Global Imbalances: Measurement and Testing, UCSC WP

Aizenman, J., M.D. Chinn, and H. Ito (2009), "Assessing the Emerging Global Financial Architecture: Measuring the Trilemma's Configurations over Time", NBER WP 14533

Alesina, Alberto F., Barro, Robert J. and Tenreyro, Silvana (2002), "*Optimal Currency Areas*", NBER WP W9072 (July)

Anderson, James and Eric van Wincoop (2003), 'Gravity with gravitas' A solution to the border puzzle'. *American Economic Review* **93**(1), 170-192.

Anderson, James and Eric van Wincoop (2004), 'Trade costs', *Journal of Economic Literature* **42**(3), 691-751.

Arango, S and Nadiri, M.I (1981), "Demand for Money in Open Economies", *Journal of Monetary Economics*, vol. 7, no. 2, pp. 31-39

Arone, Marco, Bernard J. Laurens, Jean-Francois Segalotto and Martin Sommer (2008), "Central Bank Autonomy: Lessons from Global Trends", IMF Staff Papers

Azali, M., K.S. Wong, Lee Kelly, and Ahmad Nazar Shaafinaz (2008), "*The ASEAN-5 Future Currency: Maastricht Criteria*", MPRA Paper No. 10272 (September)

Baba, Y., Hendry, D.F and Starr, R.M (1992), "The Demand for M1 in the USA: 1960 -1988, *The Review of Economic Studies*, vol. 59, pp.25-61

Baldwin Richard and Taglioni, Daria "Positive OCA criteria: Microfoundations for the Rose Effect", March 2004.

Baldwin, Richard, Virginia DiNino, Lionel Fontagne, Robert A. De Santis and Daria Taglioni (2008), 'Study on the Impact of the Euro on Trade and Foreign Direct Investment', European Commission, Directorate-General for Economic and Financial Affairs, Publications Economic Papers 321, May 2008.

Baltagi, B, Peter Egger, and Michael Pfaffermayr (2005) 'Estimating models of complex FDI: are there third-country effects?', Center for Policy Research Working Paper No. 73 Syracuse University.

- Bayoumi, Tamim and Paolo Mauro (1999), "The Suitability of ASEAN for a Regional Currency Arrangement", IMF WP 99/162 (December)
- Beetsma, Roel and Massimo Giuliodori (2010), "The Macroeconomic Costs and Benefits of the EMU and other Monetary Unions: An Overview of Recent Research, *Journal of Economic Literature*, Volume XLVIII, no. 3, pp. 603-641, (September)
- Bénassy-Quéré, Agnès, Lionel Fontagé and Amina Lahrèche-Révil (2000), 'Exchange rate strategies in the competition for attracting FDI', ADBI/CEPII/KIEP Conference on Exchange Rate Regimes in Emerging Market Economies, Tokyo, December, 1999.
- Bergstrand Jeffrey and Peter Egger (2007), "A knowledge-and-physical-capital model," *Journal of International Economics*, Volume **73**, Issue 2, November 2007, Pages 278-308.
- Bomberger, W.A., (1993) "Income, Wealth and Household Demand for Deposits", *American Economic Review*, vol. 83, pp. 1034-1044
- Bubula, Andrea and Inci Otker-Rober (2002), "The Evolution of Exchange Rate Regimes since 1990: Evidence from De Facto Policies," IMF WP 02/155 (September)
- Buch, C.M. and A. Lipponer (2007), 'FDI-versus-exports: Evidence from German banks', *Journal of Banking and Finance*, 31, 805-826
- Calvo, G. (1998), "Capital Flows and Capital-market Crises: The Simple Economics of Sudden Stops", *Journal of Applied Economics* 1, pp. 35-54
- Calvo, Guillermo A. and Carmen Reinhart. 2002. "Fear of Floating," *Quarterly Journal of Economics* 117, (May), pp. 379-408.
- Campbell, J.Y (1996), "A Defense of Traditional Hypothesis about the Term Structure of Interest Rates", *Journal of Finance*, vol. XL1, pp. 183-193.
- Cecchetti, Stephen, and Stephan Krause (2002), "Central Bank Structure, Policy Efficiency, and Macroeconomic Performance: Exploring Empirical Relationships", *Review*, Federal Reserve Bank of St. Louis, July/August, vol. 84, no. 2, pp. 47-59.
- Chami, Ralph and Thomas F. Cosimano, (2001) "Monetary Policy with a Touch of Basel", IMF Working Paper, WP/01/151, October, 2001.
- Chinn, M.D. and H. Ito (2008), 'A New Measure of Financial Openness', *Journal of Comparative Policy Analysis*, Volume 19, Issue 3, p. 309-322
- Chowdhury, Abdur R., and Mark Wheeler (1999), "The Velocity of US M2 in the 1990's: Some Further Evidence", *Applied Economics*, vol. 31, no. 9, pp. 1137-1147.

- Choudry, Taufiq (2005) "Asian Currency Crisis and the Generalized PPP: Evidence from the Far East", *Asian Economic Journal*, Vol. 19 no. 2 pp. 137-157
- Committee on the Global Financial System, (2009) "Capital Flows and Emerging Market Economies", CGFS Papers No. 33 (January).
- Corden, W.M. (1972), "Monetary Integration, Essays in International Finance," *International Finance* Section No. 93, Princeton University, Department of Economics.
- Corsetti, Giancarlo (2008), "A Modern Reconsideration of the Theory of Optimal Currency Areas", European University Institute, University of Rome III, and CEPR, Economic Papers 308, (March)
- de Sousa, José and Julie Lochard, (2004) 'The currency union effect on trade and the FDI channel', working paper, University of Rennes and University of Paris
- Duca, J. V. (1995), "Should Bond Funds be Included in M2?", *Journal of Banking and Finance*, vol. 19, pp. 131-152.
- Eichengreen, Barry (2007), "The Cautious Case for Capital Flows." Paper presented at Rating Agency Malaysia's Conference on "Free Capital Mobility: What's in Store for Asia?" Singapore, August 1. Available at: <http://emlab.berkeley.edu/users/eichengr/policy.html>
- Eichengreen, Barry (2008), "Exchange Rate Regimes and Capital Mobility: How much of the Swoboda Thesis Survives?" University of California Berkeley WP, May 2008
- Enders, Walter (2004), *Applied Econometric Time Series*, Second Edition, John Wiley & Sons
- Enders, Walter and Stan Hurn (1994), "Theory and Tests of Generalized Purchasing-Power Parity: Common Trends and Real Exchange Rates in the Pacific Rim," *Review of International Economics*, 2(20), pp. 179-190
- Engle, R.F. and C.W. J. Granger (1987), "Co-integration and error correction: representation, estimation, and testing", *Econometrica*, 55, pp.251-276
- Ericsson, N.K, Hendry, D.F and Prestwich, K.M (1998), "The Demand for Broad Money in the United Kingdom: 1978-1993", *Scandinavian Journal of Economics*", vol. 100, pp.289-324.
- Fah Yee, Chow, Sharifah Sakinah, and Mazni Mohamad, (2008), "Financial Liberalization and the Malaysian Banking Sector: Some Statistical Evidence
- Feinman, J. N., and Porter, R. D. (1992), "The Continuing Weakness in M", *Board of Governors of the Federal Reserve Bank*, working paper no. 209
- Fleming, J. Marcus (1971), "On Exchange Rate Unification", *The Economic Journal*, Vol. 81, No. 323 ,Sep. 1971),pp.467-488

- Frankel, J., and A. Rose (1998), "The Endogeneity of the Optimum Currency Area Criteria", *Economic Journal*, 108, 1009-1025.
- Friedman, M. (1953), "The Case of Flexible Exchange Rates", in M. Friedman (ed.), *Essays in Positive Economics*, Chicago: University of Chicago Press
- Friedman, M. (1970), "A Theoretical Framework of Monetary Analysis", *Journal of Political Economy*, vol. 68, no.2, pp.81-84
- Glick, Reuven and Michael Hutchison (2008), "Navigating the Trilemma: Capital Flows and Monetary Policy in China", WP 2008-32, Economic Research Department of the Federal Reserve Bank of San Francisco
- Greene, William H., (2000), *Econometrics*. Princeton, N.J.: Princeton University Press
- Harris, Richard (1995), "Cointegration Analysis in Econometric Modeling", London: Prentice Hall/Harvester Wheatsheaf, 1995
- Head, K and J. Ries (2007), "FDI as an outcome of the market for corporate control: Theory and evidence", *Journal of International Economics*, 74, 2-20.
- Hoffman, D.L and Rasche, R.H (1991), "Long-run Income and Interest Elasticity of Money Demand in the United States", *The Review of Economics and Statistics*, vol. 73, pp.665-674
- Ibrahim, Saifuzzaman (2008), "A Study of Optimum Currency Area in East Asia: a Cluster Analysis", *Journal of Economic Integration*, vol. 23, no. 4, pp. 765-70- (December)
- IMF, International Financial Statistics, IMF, various issues
- Ingram, J. C. (1969), The Currency Area Problem, in R.A. Mundell & A.K. Svoboda (eds.), *Monetary Problems of the International Economy*, Chicago II, Chicago University Press
- Ingram, J.C. (1973), *The Case for European Monetary Integration*, Princeton, Essays in International Finance No.98, Princeton NJ, Princeton University, International Finance Section.
- Ishiyama, I. (1975), "The Theory of Optimum Currency Areas: A Survey", Staff papers, International Monetary Fund, 22, pp. 344-383.
- Johansen, Soren (1988), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamic and Control*, vol. 23, pp. 213-254
- Johansen, Soren and Katarin Juselius (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money", *Oxford Bulletin of Economics and Statistics* 52, pp. 169-210
- Kawai, M. (1987), "The Optimum Currency Areas", *The New Palgrave: A Dictionary of Economics*. New York: Stockton Press.

- Kawai, M. (2009), "International Exchange and Monetary System in East Asia", *Financial Review*, No.93, pp. 176-194.
- Kawai, M. (2008), "The Role of an Asian Currency Unit for Asian Monetary Integration", paper presented at "Beyond Bretton Woods: The Transnational Economy in Search of New Institutions", Mexico City, (October)
- Keidel, Albert (2004), *Exchange-Rate Regime and Capital Flows in East Asia*, an essay on policy issues for discussion purposes only.
- Kenen, P. (1969), "The Theory of Optimum Currency Areas: An Eclectic View", reprinted in *Exchange Rates and the Monetary System: Selected Essays of Peter B. Kenen*, Aldershot: Elgar, 1994, pp. 3-22
- Robert G. King, Charles I. Plosser, James H. Stock, Mark W. Watson, (1991) "Stochastic Trends and Economic Fluctuations", *The American Economic Review*, vol. 81, no.4 pp. 819-40 (September)
- Klein, Michael W. (2005), "Dollarization and Trade" *Journal of International Money and Finance* 24:6, 935-943
- Klein, Michael W. and Jay C. Shambaugh (2004), "Fixed Exchange Rates and Trade", NBER WP 10696.
- Krugman, P. (1993), "Integration, Specialization and Regional Growth: Notes on 1992", in Torres, Francisco and Francesco Giavazzi, eds. *Adjustment and growth in the European Monetary Union*, Cambridge: Cambridge University Press.
- Laidler, D.E.W (1977), *The Demand for Money: Theories and Evidence*, 2nd ed. New York: Harper and Row.
- Liang, Hong (1999), "Do Hong Kong SAR and China Constitute an Optimal Currency Area? An Empirical Test of the Generalized Purchasing Power Hypothesis, IMF Working Paper, WP/99/79
- Mai, Nguyen Xuan Huong, (2009), "Finance Sector IN ASEAN: Implications of the Liberalization of Financial Services for Labour in the Region, FES-ASETUC research project.
- McKinnon, R. (1963), "Optimum Currency Areas", *American Economic Review*, 53, September, pp. 717-724
- McKinnon, R "Mundell, the Euro, and Optimum Currency Areas", *Essays in Honor of Robert Mundell*, T. Courchene, ed., Queen's University, 2001
- Mehanna, Rock-Antoine, and M. Kabir Hassan (2008), Readiness of the Gulf Monetary Union, Economic Research Forum, working paper no 441

- Micco, Alejandro, Ernesto Stein and Guillermo Ordóñez (2003), 'The currency union effect on trade: early evidence from the EMU', *Economic Policy* **37**, 315-356.
- Mongelli, Francesco Paolo (2002), "New Views on the Optimum Currency Area Theory: What is EMU Telling us?" *European Central Bank Working Paper*, No 137, April 2002
- Mongelli, Francesco Paolo (2008), "European economic and monetary integration and the optimum currency area theory", European Commission, Economic Papers 302, February 2008
- Mundell, Robert A. (1961), "A Theory of Optimum Currency Areas", *The American Economic Review*, Vol. 51, No.4, (Sep., 1961), pp 657-665.
- Mundell, Robert A. (1973), "Uncommon Arguments for Common Currencies", in H.G. Johnson and A.K. Swoboda, *The Economics of Common Currencies*, Allen and Unwin, pp.114-32.
- Ndikumana, Leonce (2003), "Capital Flows, Capital Account Regimes, and Foreign Exchange Rate Regimes in Africa", Political Economy Research Institute, WP
- Newbery, D.M and J.E. Stiglitz (1984): "Pareto inferior trade", *Review of Economic studies*, vol. 51, pp. 1-12, January
- Nitsch, Volker, (2002) "Honey I Shrunk the Currency Union Effect on trade", *World Economy* 25-4, pp 457-474
- Nitsch, Volker (2007). "Monetary Integration and Trade: What Do We Know?" Background paper prepared for the DIE conference on "Regional Economic Integration Beyond Europe". ETH Zürich, December 2007
- Obstfeld, Maurice, Jay C. Shambaugh, and Alan M. Taylor (2004), "The Trilemma in History: Tradeoffs among Exchange Rates, Monetary Policies, and Capital Mobility", Paper for conference "The Political Economy of Globalization: Can the Past Inform the Present?" and NBER WP.
- Ocampo, J.A. and J.E. Stiglitz, (2008), "Capital market liberalization and development", Oxford University Press
- Ogawa, Eiji and Kentaro Kawasaki, (2003), "Possibility of creating a common currency basket for East Asia", Discussion paper No.5, JBIC Institute, Tokyo, Japan
- Osterwald-Lenum, Michael (1992), "A Note with Quantiles of the Asymptotic Distribution of the Maximum Likelihood Cointegration Rank Test Statistics: Four Cases", *Oxford Bulletin of Economics and Statistics*, 54, pp. 461-472
- Palivos, Theodore, and Ping Wang (1995), "Money, Output and Income Velocity", *Applied Economics*, vol. 27, no. 11, pp. 1113- 1121

- Park, Y.C. (1970), "The Variability of Velocity: An International Comparison", *IMF Staff Papers*, vol.17, no.3
- Park, Y.C. (1973), "The Role of Money Stabilization Policy in Developing Countries", *IMF Staff Papers*, vol.20, no.2
- Park, Y.C. (2005), "East Asian Economic Integration: Current Status, Institutionalization and Alternative Scenarios", NESCA Conference papers, 2005
- Pernia, Ernesto M. and Pilipinas F Quisina (2002), "Is Economic Openness good for Regional Development and Poverty Reduction? The Philippines", Asian Development Bank, ERD Policy Brief Series, Economics and Research Department, No. 10 (October)
- Reinhart, Carmen and Kenneth S. Rogoff (2004), "The Modern History of Exchange Rate Arrangements: A Reinterpretation," *Quarterly Journal of Economics* 119, pp 1-48
- Rodrick, D (1998), "Who needs capital account convertibility?" *Princeton Essays in International Finance*, no 207, pp 55-65
- Rodrick, D and A Subramanian (2009), "Why did financial globalization disappoint?" *IMF Staff Papers*, vol. 56, no. 1, (March)
- Rogoff, Kenneth (1996), "The Purchasing Power Parity Puzzle", *The Journal of Economic Literature*, vol. xxxiv, pp.647-669 (June)
- Rose, A.K. and C. Engel (2000), "Currency Unions and International Integration", NBER Working Paper No. 7872
- Rose, Andrew (2004), "Do We Really Know That the WTO Increases Trade?" *American Economic Review* 94:1, 98-114
- Russ, Kathryn N. (2007a), "The endogeneity of the exchange rate as a determinant of FDI: A model of entry and multinational firms," *Journal of International Economics* **71** (2007) 344–372
- Russ, Kathryn N. (2007b), "Exchange rate volatility and first-time entry by multinational firms", NBER WP 13659, (November)
- Sastry G. Pantula, Gracielela Gonzalez-Farias and Wayne A. Fuller (1994), "A Comparison of Unit-Root Test Criteria", *Journal of Business & Economic Statistics*, vol. 12, no. 4, pp. 449-459 (October)
- Sato, K., ZY Zhang, and M. Mcleer, (2004), "Towards an East Asian Monetary Union: An Econometric Analysis of Shocks"
- Schiavo S., 2007, "Common currencies and FDI flows", *Oxford Economic Papers*, **59**: 536-560.
- Sriram, Subramanian (2001), "A Survey of Recent Empirical Money Demand Studies" *IMF Staff Papers*, vol. 47, no. 3, pp. 334-363

- Stiglitz, J.E. (2008): "Capital market liberalization, globalization, and the IMF", in Ocampo and Stiglitz , pp. 76-100
- Stock, James H. and Mark Watson, (1998), "Testing for Common Trends", *Journal of the American Statistical Association* 83, no. 404, pp. 1097-107
- Swoboda, Alexander (1986), "Credibility and Viability in International Monetary Arrangements," *Finance and Development* 23, pp. 15-18
- Taglioni, D. (2002): "Exchange Rate Volatility as a Barrier to Trade: New Methodologies and Recent Evidence," *Economie Internationale*, (1Q-2Q), 227-259
- Taguchi, Hiroyuki (2010), "Feasibility of Currency Unions in Asia—an Assessment Using Generalized Purchasing Power Parity", Policy Research Institute, Ministry of Finance, Japan, Public Policy Review, Vol. 6, No. 5, June 2010
- Tang, Hsiao Chink (2006), "An Asian Monetary Union?" CAMA WP 13/2006
- Taylor, Christopher (2008), "Foreign Direct Investment and the Euro: The First Five Years", *Cambridge Journal of Economics*, 32(1): 1-28
- Udomkerdmogkol, Manop, and Oliver Morrissey and Holger Görg (2008) US FDI in Emerging Economies, UNU-Wider, World Institute for Development Economics Research
- Wei, Shang-Jin and Changkyu Choi (2002), 'Currency blocs and cross-border investment', Working Paper
- Xafa, Miranda (2008), "Monetary Stability, Exchange Rate Regimes, and Capital Controls: What Have We Learned?" *Cato Journal*, Vol.28, No. 2 (Spring/Summer 2008), pp. 237-246
- Yuen, Hazel (2000), "A Cluster-Based Approach for identifying East Asian Economies: A Foundation for Monetary Integration", Department of Economics Working Paper Series, National University of Singapore
- Zhang, Ji Kang and Lan Yin (2005), "Is East Asia suitable for a Monetary Union? Experiences from EU and evidence from China, Japan, and South Korea", EU-NESCA papers, (November)
- Zhang, Zhaoyong, Kiyotaka Sato and Michael McAleer (2004), "Is a monetary union feasible for East Asia?", *Applied Economics*, 35, pp. 1031-1043

Data Sources

Asian Development Bank (ADB), databases downloadable at <http://www.adb.org/>

CEPII Distance Data for use with gravity models downloadable at <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

[The Chinn-Ito Index](#) updated to 2009

International Monetary Fund (IMF), Annual Report on Exchange Rate Arrangements and Restrictions, IFS and DOTS downloadable [at http://www.imf.org/external/data.htm](http://www.imf.org/external/data.htm)

Organization for Economic Co-operation and Development downloadable at http://www.oecd.org/document/0,3746,en_2649_201185_46462759_1_1_1_1,00.html

United Nations Conference on Trade and Development (UNCTAD), Export, Import Concentration Indexes downloadable at <http://www.unctad.org/>

World Bank, World Development Indicators, downloadable at <http://web.worldbank.org/>

Appendix A

Table A.13: Key Dates and Steps in ASEAN History

<u>Date</u>	<u>Action</u>
08/1967	ASEAN established by the five original member countries: Indonesia, Malaysia, Philippines, Singapore and Thailand
02/1976	First ASEAN Summit convenes in Bali, Indonesia
09/1978	First ASEAN-European Economic Community ministerial meeting held in Brussels
01/1984	Brunei joins ASEAN
01/1994	ASEAN establishes the ASEAN Regional Forum (ARF) focused on security interdependence
07/1995	Vietnam joins ASEAN
07/1997	Laos and Myanmar join ASEAN
12/1997	First meeting of ASEAN Plus Three, comprising leaders of the 10 ASEAN members and their counterparts from East Asia -- China, Japan and South Korea
12/1997	First ASEAN-China Summit convenes in Malaysia
04/1999	Cambodia joins ASEAN
05/2000	Chiang Mai Initiative announced to stabilize exchange rates using a currency swap arrangement for ASEAN+3
04/2003	RIA Fin Blueprint for integration of financial and monetary sectors announced
11/2004	Framework Agreement for the Integration of Priority Sectors
12/2005	First meeting of the ASEAN Plus Six—also called the East Asia Summit—comprising the ASEAN countries plus China, Japan, South Korea, India, Australia and New Zealand
11/2007	ASEAN signs charter giving its 10 member states a legal identity
05/2007	Further Expansion of CMI for ASEAN+3 announced
11/2009	16 Bilateral agreements made on CMI for ASEAN+3 on state contributions to currency reserves pool, Hong Kong SAR joins
12/2010	CMI signed
03/2010	CMI initiates multilateral swap arranges for ASEAN+3
<u>Shocks:</u>	
1997-98	Asian Financial Crisis
2007-08	Global Financial Crisis
2008-10	Thai Political Crisis
<u>FTAS</u>	
	ASEAN–Japan Comprehensive Economic Partnership (AJCEP): effective December 2008
	ASEAN – Australia – New Zealand Free Trade Area (AANZFTA): between ASEAN and ANZCERTA effective January 2010
	ASEAN–China Free Trade Area (ACFTA): effective January 2010
	ASEAN-India Trade in Goods (TIG) Agreement: effective January 2010 ,ASEAN-India Trade in Services and Investment Agreements still under negotiation
	ASEAN-Korea Free Trade Agreement: trade in goods provisions effective June 2007, trade in services signed 2007, trade in investments provisions signed 2009
	Comprehensive Economic Partnership for East Asia and additional ASEAN+3 Joint Arrangements talks to commence in 2012

Vita

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