Chapter 1 Introduction

This first chapter offers an introduction to the thesis. The chapter aims to establish foundations to the following chapters and to provide an overall picture of the study.

The chapter is presented in seven sections as portrayed in Figure 1.1. Section 1.1 describes the problem statement which underlies the rationale of the study. Section 1.2 introduces the unit of analysis. Section 1.3 outlines the main features of the research which bring about the significance of the study. Section 1.4 lists the research questions and objectives. Section 1.5 sets out the delimitations of study. Section 1.6 offers the main structure of the thesis, and finally Section 1.7 summarizes the chapter.

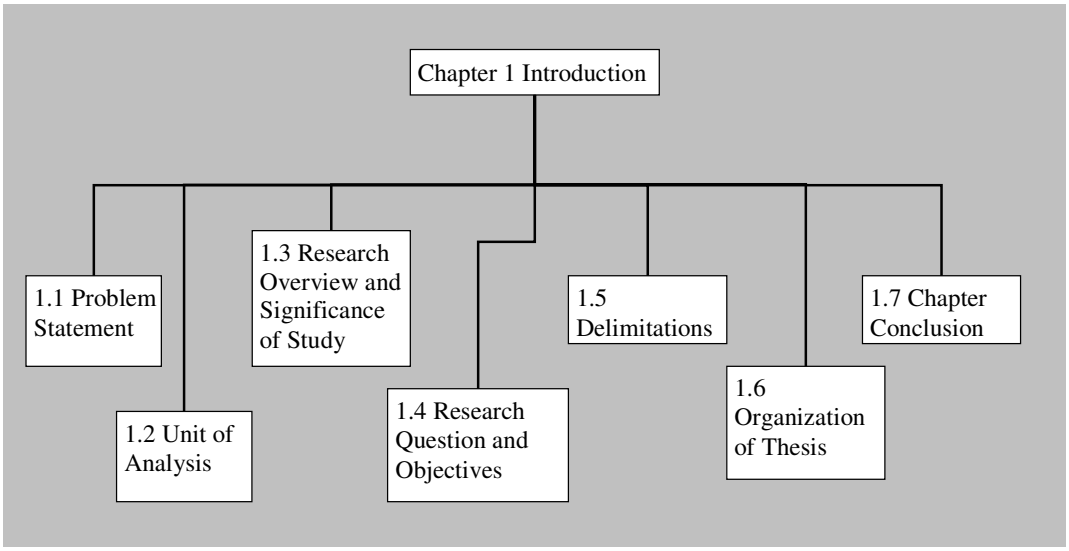


Figure 1.1 Structure of Chapter One

1.1 Problem Statement

> The international monetary system broke down in 1971 and we moved towards a system where every country has its own national monetary system with flexible exchange rates… I think it is a destructive paradigm, because no one seems to have noticed the fact that there were no financial crises during the Bretton Woods period … (or) under the gold standard, either.
>
> (Mundell, 2009, p. 494)

The quotation above demonstrates the relevance of fixed exchange rates in wake of the recent global financial and economic crisis.

Indeed, on Oct 25, 2009 at the Southeast Asian summit, Yukio Hatoyama, prime minister of Japan suggested a common currency for East Asia while Australian Prime Minister, Kevin Rudd proposed a pan-Pacific economic community that would include the US. Their views are consistent with a poll of corporate executives in 2002 where 43 percent of respondents favored an eventual monetary union in the region (Lincoln, 2004).

A leap forward began in May 2007 when the ASEAN[1]+3 (ASEAN plus Japan, Korea, and China) countries agreed on the Chiang Mai Initiative, a network of bilateral swap agreements which allows the Asian countries to borrow funds from one another. The issuance of Asian Currency Unit (ACU) was also put forward.

On another front, in 2008 the reconciliation between China and Taiwan, the long time arch-rivals since a civil war split which was accompanied by liberalization in foreign exchange, immigration, and trade has also brought regional integration to greater prospects (see "NT$-RMB", 2008). In the same year, the ASEAN+3 leaders agreed to create an $80 billion fund to defend against the global financial distress (Esguerra, 2008).

One key motivation behind these efforts is the continued progression toward

[1] Association of Southeast Asian Nations (ASEAN) was founded in 1967 and had five members initially (Indonesia, Malaysia, the Philippines, Singapore, and Thailand). Today, it has five more members (Brunei, Myanmar, Cambodia, Laos, and Vietnam).

interdependencies within the region and growing openness with the rest of the world. In early 2000s, more than half of East Asian trade is with itself and the share of intra-regional trade within the region is comparable to that in EU but exceeds that of NAFTA (Kawai & Motonishi, 2005). Moreover, business cycles in the region have been increasingly synchronized as a result of: (1) regional proximity and growing direct trade linkages, (2) intense intra-regional competition in exports to third markets such as US and Japan; and (3) vulnerability to fluctuations in the yen-dollar rate (McKinnon & Schnabl, 2003).

Regional monetary cooperation is also warranted by common susceptibility to increased cross-border capital flows which was exacerbated by the emergence of currency blocs elsewhere that reduced the options available for speculators to prey on (Ngiam & Yuen, 2001). Another factor for cooperation is the strong aversion to real appreciation of exchange rates derived from the region's long-standing reliance on export promotion; even more so after the Asian crisis (Kenen & Meade, 2008). Another motivation would be to reduce reliance on the IMF which, if involved, entails loans with restrictive conditions such as those experienced by Korea, Thailand, and Indonesia during the Asian turmoil (the so-called 'IMF conditionality').

The need for collaboration may be apparent but the potentiality of the region for monetary integration is still being intensely debated. In the literature, Bayoumi and Eichengreen (1994), Goto and Hamada (1994), and Kawai and Takagi (2005) have once concluded that East Asia came as close as Western Europe to being a currency area.

In particular, ASEAN a subset of East Asia has displayed even more promising attributes for a currency union (Bayoumi & Mauro, 2001). First, ASEAN's intra-regional trade as a share of regional GDP is as high as that of the euro area, and is higher than those of Mercosur and NAFTA. Second, following the rapid shift toward exports of manufactures that has occurred over the past two decades, ASEAN's trade is

now weighted heavily toward manufactures, more heavily than that in Mercosur.[2] Third, similarities in macroeconomic disturbances in ASEAN in recent decades have resembled those in EU in the 1980s.

Despite the above, some authors such as Wilson and Choy (2007) and Kim (2007) have demonstrated that East Asian countries are structurally different, experience asymmetric economic shocks in terms of size and response pattern, and therefore might not be prepared for a regionwide monetary union. At the same time, studies on structural shocks including those of Huang and Guo (2006) and Sato and Zhang (2006) have put forward some groups of countries of which one is more synchronized than the other.

The developments above motivate the rationale of the present paper which basically seeks to identify subsets of East Asian countries that might be more prospective than the others for integration on the monetary side. Parallel to most literature in the field, the primary tool used here to demarcate the monetary zones is the theory of optimum currency areas (OCA).

The OCA theory was led by the pioneering works of Mundell (1961) and McKinnon (1963) and can even be dated back to Friedman (1953). In brief, the theory concerns about the benefits and costs of adopting fixed exchange rates which depend on the degree of convergence of economies. In recent decades, the subject of OCA has gained ever greater interest amidst propagation of monetary collaborations such as the European Economic and Monetary Union (EMU), the West African Economic and Monetary Union (UEMOA), the Economic and Monetary Community of Central Africa (CEMAC), and the Organization of Eastern Caribbean States (OECS).

[2] The higher the share of trade in manufactures and similar goods whose prices are largely determined by the producer, as opposed to commodities whose prices are set in international markets, the greater the appeal of a common currency among trading partners (Bayoumi & Mauro, 2001). This is because fluctuations in bilateral exchange rates typically have more significant impact on intra-industry trade in differentiated but substitutable products than on trade in homogeneous products with a well integrated world market.

Despite the recent debacle in some parts of the eurozone, the remarkable expansion of the currency bloc from the original 11 members in 1999 to 16 members in 2009 has nonetheless exemplified the desirability and potentiality of fixed exchange rates and monetary union. In fact, the problems faced by EMU today exactly demonstrate the relevance of identifying homogeneous and prepared countries prior to amalgamation, which is the theme of the present study.

1.2 Unit of Analysis

In empirical OCA literature, it is common to find units of analysis or countries under review demarcated by geographical regions. For instance, authors have focused on the West European region (e.g. Loayza, Lopez, & Ubide, 2001; Boreiko, 2003; Crowley, 2008), the West African region (e.g. Bénassy-Quéré & Coupet, 2005; Tsangarides & Qureshi, 2008), the East Asian region (e.g. Nguyen, 2007; Plummer, 2007; Ibrahim, 2008), and the American region (e.g. Crowley, 2002, 2004).

For this study, an 'extended East Asia' comprising of 16 East Asian economies (Brunei, Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Laos, Macau, Malaysia, Myanmar, the Philippines, Singapore, Taiwan, Thailand, and Vietnam), India, Australia, New Zealand, and Canada is the region in analysis. For convenience, these economies as a whole are simply labeled as 'East Asia'. While the choice of East Asia as the subject of study is obvious, empirical studies have differed with respect to selection of countries, which might introduce selection bias to their analyses. For this reason, as many countries as possible (constrained by data availability) are examined here to reduce the degree of selection bias.

Empirical studies on the original members of ASEAN (except Brunei), Korea, Taiwan, China, Hong Kong, Japan, Australia, and New Zealand are common. However, less growth or less developed ASEAN economies such as Laos, Myanmar, Cambodia, Vietnam, and Brunei are often left out. Nevertheless, the fact that these nations

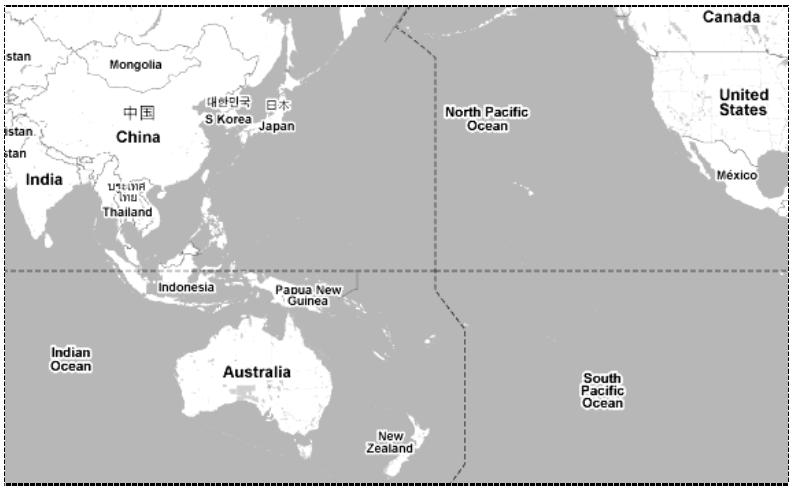
constitute part of ASEAN 10 today means that inclusion of these economies is warranted. Meantime, the consideration of the Chinese territories, Hong Kong and Macau as independent entities is also necessary as these economies maintain different exchange rate policies from mainland China. Moreover, they were reunited with China only after the onset of the Asian turmoil.

As for India, though located in South Asia geographically, it is nevertheless included here to reflect its rising economic power in the region and in the world.[3] Moreover, since 1993, India has been adopting a de facto dollar peg (Patnaik & Shah, 2008), a feature commonly shared by many economies in East Asia (McKinnon, 2005; Bauer & Herz, 2009). India has also been a participant in free trade deals with countries in East Asia in recent years (Kowsmann & Venkat, 2008).

Finally, the inclusion of Australia, New Zealand, and Canada in the analysis is also crucial to determine whether these advanced economies are symmetrical with the Asian countries. This is relevant because much greater stability can be attained if a monetary union in Asia can be extended to the whole Asia-Pacific rim (see Mundell, 2003). Besides, these countries are of course members of the Asia Pacific Economic Cooperation (APEC); Australia and New Zealand even maintain some free trade deals with ASEAN. The consideration of Australia is also relevant in light of the proposal by the Australian Prime Minister for a pan-Pacific economic community that would include the US.

Figure 1.2 provides a geographic view of the countries under review.

[3] As the data from World Economic Outlook database indicate, India is the fourth largest economy in the world by Purchasing Power Parity GDP in 2008. The combined PPP GDP of China, Japan, and India, is as large as that of the US.



Source: Google Map.

Figure 1.2 Geographical representation of the region in analysis

1.3 Research Overview and Significance of Study

Besides contributing to the academia, the present work also offers another piece of reference to government officials and business managers in their decisions on international and regional matters. The following items highlight the features and hence the significance of the study which may differentiate the present work from the rest in the field. Details are discussed in later chapters.

1.3.1 The Approach

Most empirical literature concentrates on time-series econometric modeling to assess issues pertaining to symmetrical economic shocks as a basis to identify potential countries for integration. While shock symmetry, a measure of cost from relinquishing independent monetary policies is important, symmetry in economic structure and other aspects of the OCA theory is important as well.

As revealed by Dellas and Tavlas (2005), in general the global repercussions of exchange rate volatility resurfacing elsewhere in the global financial system as a result of eliminating the volatility between two currencies because of monetary unification are limited when the economies that fix their currencies are sufficiently symmetric in the

OCA criteria.

Against this backdrop, this paper deploys cluster analysis to examine the East Asian countries so that relatively symmetrical groups of countries in respect of multiple economic dimensions can be identified. Symmetric clusters of countries are important because regardless whether the convergence criteria are achieved ex-post or otherwise (see Frankel & Rose, 1998), the countries would be fairly parallel to begin with and hence asymmetric experiences impeding integration efforts would be less likely or less severe especially in the presence of price and wage rigidities. Also, this approach is consistent with the degree of heterogeneity and diversity of economic and social developments within East Asia wherein one or more countries are more convergent than the others (see Kawai & Motonishi, 2005).

Whilst cluster analysis is a well-known technique in the science of pattern recognition, and commonly applied in other disciplines, its use in applied economics is comparatively rare. Applied monetary integration studies employing cluster analysis include those of Artis and Zhang (1997a, 2001, 2002), Boreiko (2003), Crowley (2002, 2004, 2008), Bénassy-Quéré and Coupet (2005), and Tsangarides and Qureshi (2008). Recent application of cluster analysis can be seen in Artis and Okubo (2009).

Amongst Asia-based studies implementing OCA theory, only the works of Nguyen (2007) and Ibrahim (2008) can be detected using cluster analysis.[4] Hence, the present paper lays out another example by which the usefulness of the approach may be judged.

In this paper, hierarchical cluster analysis, fuzzy cluster analysis, and model-based cluster analysis methods are used sequentially. To the author's best knowledge, model-based cluster analysis has not been utilized in the field in the Asian context. In addition to homogeneous clusters of countries, the two former methods could respectively indicate possible pattern of convergence and degree of belongingness for grouping of

[4] This is true till the end of 2009 as far as accessible online sources are concerned.

potential countries.

Since each approach relies on different algorithm, comparisons of the results are done so that 'robust' homogenous clusters of countries over the methods can be determined. The classification solutions are also compared to spatial plots of countries provided by principal component analysis. Besides that, this study also evaluates the appropriateness of partitioning amongst the clustering methods.

1.3.2 Criterion-variables

As demonstrated by Ibrahim (2008) in the context of Asia, the present study also compares the results using the criteria specified by the OCA theory with those using the Maastricht Treaty. Whilst the Maastricht Treaty criteria focus on the single criterion of 'stability orientation' as reflected in a range of nominal convergence variables, the OCA criteria pertain to convergence, emphasizing especially as criteria for a monetary union the prevalence of a high degree of intra-trade among the members and the absence of any pronounced asymmetry in the pattern of shocks impacting their economies (Artis & Zhang, 2002). The recent distress in eurozone might signify that convergence in OCA terms has not been achieved, not even ex-post as argued by Frankel and Rose (1998).

The OCA criteria used here encompass multiple facets of OCA, reflecting the traditional works and recent developments. Besides the six criteria from Artis and Zhang (2001, 2002) which were applied on developed economies in Western Europe, the present work adds two more criteria which should be relevant for economies in East Asia which are largely less developed.

The six criteria from Artis and Zhang respectively pertain to trade intensity, business cycle symmetry, inflation convergence, real exchange rate volatility, real interest rate cycle symmetry, and labor market flexibility. Amongst these dimensions, the labor criterion is comparatively rarely examined in the Asian context. One possible reason should be scarcity of consistent data, both over time and over countries. For

instance, recent OCA studies by Nguyen (2007) and Ibrahim (2008) did not consider this component.

The two criteria added for this study relate to external indebtedness (Bénassy-Quéré & Coupet, 2005; Tsangarides & Qureshi, 2008) and diversity in exports (Nguyen, 2007) respectively.

To put it briefly, the debt criterion is relevant because a large number of East Asian countries borrow in (hard) foreign currencies (e.g. US dollar) which makes them susceptible to swings in foreign capital flows and exchange rates (see McKinnon & Schnabl, 2004a). During the Asian turmoil, the devastating financial meltdown and the resulted slump in the exchange rates might not have transpired if exchange rates were credibly fixed, not softly pegged. To an extent, the consideration of the debt criterion also responds to the criticism raised in the literature (see e.g. Calvo, 2002; Boreiko; 2003) which argues that traditional OCA theory has not paid enough attention to the increased role of international financial markets and capital mobility. Indeed, the recent Greek debacle has made foreign indebtedness ever more important as a factor to the sustainability of a single currency zone.

As for the export diversification criterion, its consideration actually reflects the classical ideas pioneered by Peter Kenen in his celebrated 1969 piece. In a word, more diversified economies should better withstand asymmetric shocks and hence may be better candidates for exchange rate unification.

Besides the additional dimensions, the paper also explores the solutions when the benefit and the cost aspects of OCA criteria are treated equally. The study also investigates, how far, concentration on smaller subsets of the OCA criteria is representative of the rest of the criteria; and identifies subsets of criteria which would yield the most appropriate partitions by standards associated with cluster analysis.

For the Maastricht Treaty criteria, the variables used pertain to convergence in

inflation rate, convergence in long-term interest rate, stability of nominal exchange rate, and budget deficit. These criteria have been used by Artis and Zhang (2002) and Boreiko (2003) in their studies comparing OCA and Maastricht results. Due to data constraints, the government debt criterion originally specified by the Treaty is not examined. After all, the debt criterion was effectively set aside when the EU-11 countries were nominated.

As supplementary analysis, an exercise is carried out to indicate which set of criteria, whether OCA or Maastricht would produce more appropriate classification solutions.

1.3.3 Monetary Anchor

In currency area studies, it is common to find a dominant economy being proposed as the reference country whose currency would be the monetary anchor for a number of smaller economies. In practice, the EMU system is effectively the German standard. In clustering-based works, relevant criteria are measured relative to the reference to identify potential country groups.

In the context of East Asia, some authors have set the Japan as the center country (e.g. Ahn, Kim, & Chang, 2006; Font-Vilalta & Costa-Font, 2006; Ibrahim, 2008). At the same time, currency basket primarily made up of US dollar, yen, and euro has gained growing popularity (see Kawai & Akiyama, 2000; Ogawa & Ito, 2002; Williamson, 2005; Kawai, 2008). Yet, others like Nguyen (2007) did not propose any anchor. Meantime, there are proposals to use the US dollar as the anchor for Asia including Japan (see e.g. Mundell, 2003; McKinnon, 2005; Kenen & Meade, 2008).

While theoretically a group of countries can jointly determine their money supply and common interest rates in the move toward a monetary union without pegging to any anchor currency, given the dominance of certain large economies in the world and dependence of Asian economies on them, the designation of a monetary anchor for East

Asia is not only rational but also practical, particularly for ease of transition and enhanced credibility.

Moreover, due to absence of institutional, political, and economic groundwork such as the European Common Market, a monetary anchor would enable East Asia to leap-frog toward a currency area if the potential members including Japan were willing to use a monetary anchor such as the US dollar (see Mundell, 2003).

Following the putative role of the dollar since the Bretton Woods dollar standard but also increased skepticism against the US since the recent global financial crisis, the US dollar, the Japanese yen, the euro, and a weighted basket of these currencies are considered sequentially as the anchor in the analysis. The respective countries serve as the references.

In addition, due to rising influence of China, the second or the third largest economy today, China is also examined as a center country in the analysis despite the limited role of its renminbi in international monetary and financial system.

1.3.4 Assessment of Level of Preparedness

In addition to identifying homogeneous groups of countries which is what existing OCA clustering-based studies focus on, this study also attempts to evaluate the degree of preparedness of groups of countries for monetary integration. It is done by partitioning the Asian economies together with the countries that have implemented an extreme form of fixed exchange rate regime (i.e. dollarization) and with the founding members of a monetary union (i.e. the EMU countries). Common groupings with the dollarized and the euroized countries are expected to signify levels of readiness for fixed exchange rate and for currency union respectively.[5] Should convergence criteria are indeed endogenous (Frankel & Rose, 1998), to an extent this exercise should be able to suggest

[5] Similar approach has been demonstrated previously by the present author in Quah (2009) and Quah and Ismail (2009) without the use of cluster analysis.

the levels of preparedness amongst the East Asian economies.

1.3.5 Multi-period Analysis and Dataset

Multiple-period analysis allows the study to explore, among others, the change in the pattern of configuration and stability of country linkages amongst the Asian economies over successive time periods. While this approach is common in applied economics, it is comparatively rarely done in the context of Asian OCA. Even though the clustering works of Nguyen (2007) and Ibrahim (2008) did segment their analyses to distinguish the pre-crisis from the post-crisis period, they nevertheless did not set aside a separate segment to reflect the period of the Asian crisis.

Although some may argue that the crisis period is too short to be meaningful for a separate inspection, distinct consideration of this period nevertheless enables the study to assess the robustness of the country groupings in the period of distress. The time periods examined here are 1981–1996, 1997–2000, and 2001–2007 representing the pre-crisis, crisis, and post-crisis periods respectively. Indeed, as shown by the preliminary analysis in the findings, data patterns of certain variables of the crisis period are significantly different from those of other periods, necessitating a separate attention for the crisis period.

Regarding the data, secondary data are mainly sourced from databases of the International Monetary Fund (IMF), World Bank (WB), Asian Development Bank (ADB), Organization for Economic Cooperation and Development (OECD), national statistical bureaus, central banks, and other established statistics providers.

1.3.6 Comparison with Actual Monetary Arrangements

This study also evaluates the generated groups of countries against Asian economies which adopt fixed exchange rates in practice. Presently, Hong Kong and Macau maintain effective currency board arrangements on the US dollar whilst Singapore and

Brunei constitute a two-country monetary union. Since two different criteria sets are used, the evaluation will indicate the relationships amongst these economies with respect to the OCA and the Maastricht dimensions. Since Brunei and Macau are hardly examined in empirical texts in the field, the findings should provide essential information to policymakers and scholars.

1.4 Research Questions and Objectives

In relation to the approach and the features highlighted above, this thesis proposes the following research questions and the corresponding research objectives. In a sense, the research objectives lay out the ways to solve the research questions. Details on the items and the approaches used to address the objectives and questions are presented in Chapter 4 Monetary Anchor and Convergence Criteria and Chapter 5 Methodology respectively.

Table 1.1 Research questions and objectives

Main Research Question		
How homogenous and prepared are East Asian economies toward monetary union?		
Main Research Objective		
To identify and explore symmetrical groupings of East Asian economies and their level of preparedness for monetary integration across certain specific considerations.		
	Specific Research Question	Specific Research Objective
	Core Clustering Analysis	
1	How would the grouping configuration differ under different monetary anchor?	To evaluate and compare the results when different monetary anchors, namely dollar, currency basket, yen, euro, and yuan anchors are alternatively assigned.
2	How different are the partitions when different sets of criteria are used?	To explore and compare the results by OCA with those by Maastricht criteria.
3	How would the results differ across different clustering methods?	To assess and compare the results by hierarchical, fuzzy, and model-based cluster analysis methods. Results are also compared with those of principal component analysis.
	Weighting the Criteria	
4	How would the arrangements vary if benefits and costs of monetary integration are treated equally?	To inspect and compare the solutions when the sum of 'benefit' OCA criteria and the sum of 'cost' OCA criteria are weighted equally.
	Assessing the Preparedness Levels	
5	How prepared are generated country clusters for exchange rate fixation and for monetary union?	To infer the degree of readiness for fixed exchange rate and for monetary union by evaluating the groupings of East Asian countries with dollarized and euroized countries respectively.
	Relative Importance of Variables	
6	How dominant are some criteria in representing the rest of the criteria?	To detect and examine subsets of OCA criteria which are most representative of the rest in generating the results.
7	How important are certain criteria in producing the best partitions?	To detect and assess subsets of OCA criteria which produce the most data-fitting partitions as indicated by particular statistical measures.
	Differences across Economic Periods	
8	How would the results vary over different economic periods?	To compare the results across pre-crisis, crisis, and post-crisis periods.
	Comparisons with Actual Arrangements	
9	How do the findings compare with the actual HongKong-Macau and Singapore-Brunei fixed exchange rate arrangements?	To evaluate the results against the existing fixed exchange rate arrangements of HongKong-Macau and Singapore-Brunei.

1.5 Delimitations

Current currency areas studies have focused on countries within geographical regions which reflect economic integration arrangements such as EMU, NAFTA, UEMOA, and so forth. The present study which focuses on East Asia and parts of Pacific Rim is no exception. Other than that, the scope of countries and period reviewed is also constrained by availability of data.

In addition, the paper only deals with economic considerations provided that data are available from secondary sources. The study does not intend to assess the social, cultural, political, and other aspects of economic or monetary integration.

1.6 Organization of Thesis

The thesis is structured as follows. Chapter 1 which is the current chapter introduces the study. The chapter justifies the need for the study, defines the unit of analysis, presents an overview of the features of the study and their significance, lists out the research questions and research objectives, demarcates the scope of study, and provides the structure of this thesis report.

Chapter 2 is a brief account of monetary arrangements in the East Asian region. The chapter provides a background on exchange rate regimes and regional monetary and economic cooperation, emphasizing on currency boards and monetary union that exist in the region.

Chapter 3 is a review of conceptual and empirical literature on the topic wherein works pertaining to East Asia are emphasized. The chapter concludes with a summary of the gaps in the applied literature and points out how the present work can help to ameliorate the shortcomings.

Chapter 4 details the alternative monetary anchors and sets of criteria used. Definitions and measurements of variables are also provided. Chapter 5 discusses the

methodology used for attaining the research objectives. Chapters 6 and 7 reveal and explore the findings by OCA and Maastricht criteria respectively.

Finally, Chapter 8 explains how the findings would have answered the research questions and comments on the key results from the analysis. The chapter also presents the possible contributions and implications of the study. The chapter concludes with a note on the limitations of the research and some suggestions for future scholars.

1.7 Chapter Conclusion

This first chapter has introduced the main features of the study, including statement of problem, unit of analysis, significance of study, research questions and objectives, scope of study, and structure of the report. The next chapter, Chapter 2 will present a background of monetary arrangements and fixed exchange rate systems in the East Asian region.