

Chapter 3 Literature Review

The first chapter has offered a preview of the present work while the second chapter has presented some perspectives on monetary arrangements in East Asia.

This chapter reviews the classical literature on optimum currency areas, the arguments against floating exchange rates, and the case for fixed exchange rates without overlooking the associated costs. The chapter also examines current empirical studies which implement the currency areas concept. This chapter helps to identify gaps in the body of knowledge and aids in developing an effective research model for the present study.

The chapter is segmented into eight main sections as portrayed in Figure 3.1. Section 3.1 introduces optimal currency areas theory, its definitions, and other key issues. Section 3.2 puts together the arguments against floating rates while Section 3.3 justifies the need for fixed exchange rates and monetary union with some highlighting on East Asia. Section 3.4 discusses coordination issues and degree of integration. Section 3.5 highlights possible shortcomings of monetary unification. Section 3.6 reviews the relevant empirical literature, sectioned according to the region surveyed. Section 3.7 describes how the literature review shapes the current work and explicates the way the present study addresses the gaps found in the literature. Finally, Section 3.8 is a brief conclusion.

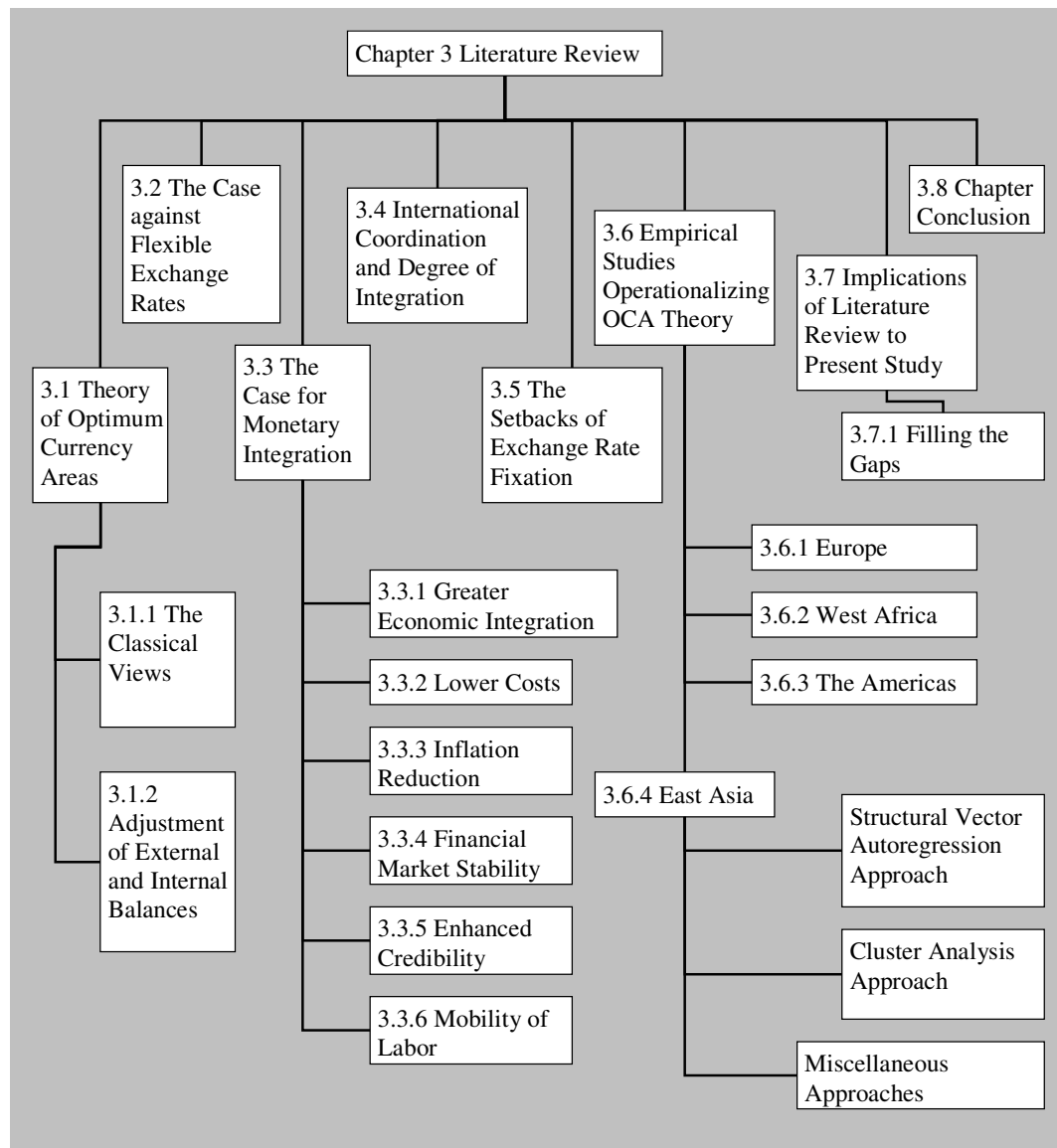


Figure 3.1 Structure of Chapter Three

3.1 Theory of Optimum Currency Areas

The theory of optimum currency areas (OCAs) underlies the conceptual framework of the present study. The following excerpts lay out the views from some current empirical scholars on what constitutes OCA theory.

The foundations of the traditional theory of optimum currency areas were laid by Mundell (1961) and McKinnon (1963), with important elaborations by among others, Kenen (1969) and Krugman (1990). The latter stresses that the OCA criteria can be seen as forming the basis for a cost-benefit calculus. Thus, the benefit of a common currency will be larger, the greater the scope of

economizing on exchange costs by adopting a common currency (e.g. the greater the volume of trade) whilst the costs are essentially the negative of the benefits of having independent monetary policy and exchange rate.

(Artis & Zhang, 2002, p. 58)

In addition to that, Artis and Zhang added that independent monetary policy with the potential for adjustment in the real exchange rate is useful as a means of coping with shocks that are asymmetric between members of a monetary union. According to them, a compensation for the lack of an independent policy can be found in a federal fiscal policy which effects transfers between countries impacted by asymmetric shocks.

Another author, Boreiko (2003, p. 315) expressed a similar view:

The OCA theory concerns about certain benefits and costs associated with adopting a single currency which depend on the degree of convergence of the economies. The benefits are associated with economizing on exchange costs and importing the credibility of the union's central bank, thus reducing the inflationary expectations and level of inflation. As for the associated costs, they are essentially the opposite of the benefits of having an independent monetary policy and exchange rate, which are useful as a means of coping with shocks that are asymmetric between the potential monetary union partners.

On the word of Boreiko again, the less effective the monetary policy is in counteracting idiosyncratic shocks from adjusting the nominal exchange rate, the lower will be the associated costs for exchange rate fixation. Domestic conditions such as sufficient labor mobility or fiscal federalism could reduce the need for independent monetary policy.

Here are some other viewpoints on OCA analysis.

Analyses of OCA theory are typically conceived in terms of balancing the micro benefits gained by expanding the currency domain against the macroeconomic costs of giving up monetary autonomy and a separate exchange rate, the important tools of macroeconomic adjustments. Nevertheless, monetary autonomy is not necessarily good because it might be a destabilizing source once used improperly.

(Nguyen, 2007, p. 5)

The OCA theory compares the benefits and costs to countries participating in a currency union. Benefits include lower transaction costs, price stabilization, improved efficiency of resource allocation, and increased access to product, factor, and financial markets. The main cost, however, is the loss of sovereignty to maintain national monetary and exchange rate policies.

(Tsangarides & Qureshi, 2008, p. 2)

The précis above are in agreement and reflect the fundamentals of OCA analysis. Basically, the OCA theory lays down the conditions or criteria by which a potential country could reap significant benefits and/or substantially reduce the costs of joining a currency area. The subsequent subsections inspect the classical analysis of OCAs which remains very relevant today.

3.1.1 The Classical Views

Tamim Bayoumi and Barry Eichengreen, two of today's distinguished authors on international economics have once remarked that (Bayoumi & Eichengreen, 1997, p. 762), "The theory of OCA has advanced only minimally since the seminal contributions of Mundell¹⁶ (1961), McKinnon (1963), and Kenen (1963). It remains difficult to move from theory to empirical work and policy analysis."

In his masterpiece published in 1961, Mundell defined the facets of optimality for a currency area. Succinctly, an optimal region is characterized by internal factor mobility and external factor immobility. Mundell asserted that the entire zone through which factors in particular labor can move freely delineates the right domain for currency area. Within the zone, interregional and interindustrial factor mobility can substitute for changes in exchange rates to restore internal and external equilibriums when asymmetric shocks between economic regions occur.

Upon contemplation of Mundell's thesis, Kenen (1969) elucidated Mundell's definition of optimality and economic region. An economic region was interpreted as a homogeneous collection of producers that use the same technology, face the same

¹⁶ Amongst the influential thinkers, Robert Mundell is universally recognized as the father of the literature on OCAs (Cesarano, 2006).

demand curve, and suffer or prosper together as circumstances change whereas optimality was understood as a state which relates to the labor market and exchange rate regime. If a prevailing exchange rate regime can maintain external balance of an area without causing unemployment or demand-induced wage inflation, that regime is optimal. Flexible prices, wage rates, and labor markets are the primary conditions defining optimality under which balances can be restored in the event of asymmetric shock.

Maintaining that perfect labor mobility rarely prevails, Kenen argued that a nation's diversity in product-mix or economic activity might be more relevant than labor mobility in defining OCAs. According to him, a well-diversified economy has little to lose from abandoning independent monetary policy and separate exchange rate.

Another view of optimality came from McKinnon (1963) which described optimality as a single currency area within which monetary-fiscal policy and flexible external exchange rate can be used to give the best resolution of three, sometimes conflicting objectives: (1) maintenance of full employment, (2) maintenance of balanced international payments, and (3) maintenance of stable average price level. Among these three conditions, McKinnon put greater weight on price level stability.

In light of the above, it appears that the demarcation of OCAs is closely connected with the aim of achieving external and internal balances. The following section reviews the arguments addressing this issue.

3.1.2 Adjustment of External and Internal Balances

Undoubtedly, the concern of external and internal balances plays the central theme when it comes to exchange rate policies. To put it simply, external balance adjustment concerns about a level of current account which is consistent with the maintenance of existing (or growing) levels of consumption, employment, and national output whereas internal balance adjustment concerns about maintaining domestic full employment and

price level stability.

In his 1953 defining essay on exchange rates, Milton Friedman (see also Lute, 1954; Meade, 1955) stressed that between two countries with pure floating exchange rates, currency depreciations by a deficit country and corresponding appreciations by the surplus country would automatically correct external imbalances between them, hence relieve unemployment in the deficit country and simultaneously restrain inflation in the surplus country. The adjustment process operates by itself without the need for government intervention.

Refuting the above contention, Mundell (1961) illustrated that floating rates do not serve to correct balance of payments disequilibrium between two product regions which do not coincide with national boundaries. Consider that Canada and the US employ flexible rates and that the East region of both countries which produces automobile experiences deficits whereas the West region which produces lumber experiences surplus. The burden of adjustment between the two regions can be adjusted through monetary-fiscal policies but both inflation and unemployment cannot be avoided because policies are effective nationwide not regionwide. Likewise, flexibility of external price of national currency cannot be expected to perform stabilization function between regions and one could expect varying rates of unemployment or inflation in different regions in a country.

On the other hand, if workers are mobile, workers would move from East to West, their purchases of cars will mean extra Eastern exports whilst their purchases of lumber will be transformed from Western exports into extra home demand. Hence, when workers are mobile, balance of payments disequilibrium will be corrected. In Mundell's opinion, labor mobility, not variable exchange rate is the solution to achieve external balances.

Even if employment problems can be resolved by the way postulated by Mundell,

Kenen (1969) doubted the effectiveness of labor movements in restoring perfect balance between regions. With major differences in labor intensities between product regions, Kenen hypothesized that migration might still leave a residual imbalance in one region's labor market. Thence, special patterns of consumer demand and methods of production may be needed in each region if a simple labor movement and the corresponding change in the locus of demand are to end an imbalance in labor markets as well as to equilibrate trade flows between regions.

In the words of Kenen, as workers move from the deficit to the surplus region, the increase in demand for products in the surplus region could stimulate additional investment, leading to an increase in the surplus region's income and imports that might be large enough to open up a current account deficit. Further, when regions are defined by their activities, not geographical boundaries, perfect interregional labor mobility requires perfect occupational mobility which can only come about when labor is homogeneous, and if so, an OCA must be very small or even be coextensive with a single-product region.

Along this line of argument, Kenen (1969) contended that Mundell's approach which marks off zones of perfect labor mobility may not be the best way to demarcate OCAs. In his opinion, diversity in a nation's product mix—the number of single-product regions contained in a single country may be more relevant than labor mobility. Kenen stressed that a continuum of national activities will maximize the number of employment opportunities for each specialized variety of labor. Kenen also made three fundamental conjectures: (1) a well-diversified national economy will not have to undergo changes in its terms of trade as often as a single-product economy, (2) when that economy confronts a drop in the demand for its principal exports, unemployment will not rise as sharply as it would in a less-diversified economy, and (3) the links between external and domestic demand, especially the link between exports and

domestic investments will be weaker in that diversified economy, so that variations in domestic employment imported from abroad will not be augmented by corresponding variations in domestic capital formation.¹⁷

Other than product (or export) diversification, Kenen also proposed a least-cost government that spans across single-product regions so that fiscal policies can be used to correct external and internal imbalances across the regions. This arrangement can be compared to a federal-state structure of a national government. It is least-cost in the sense that given economies of scale, centralized fiscal machineries could combat localized recessions with minimal costs. When a region suffers a trade-balance deficit and internal unemployment, its federal tax payments will diminish, slowing the decline in purchasing power and compressing cash outflows on balance of payments. At the same time, central government could provide unemployment benefits, financial, and technical aids to that deficit region. In addition, the deficit region can also borrow in the unified capital market more easily than if it were a separate entity. Hence, the costs of eschewing a separate currency can be more than compensated by the benefits gained from participating in a major fiscal system.

In such, Kenen's views add to the ways by which balances can be restored across product regions in addition to mobility of labor proposed by Mundell (1961). Indeed, Kenen's proposal of central authorities has actually been implied by Mundell when he mentioned, "... if central banks agreed that the burden of international adjustment should

¹⁷ The first conjecture can be explained most easily. On external balance, external shocks that are averaged out by export diversification can forestall the need for frequent changes in terms of trade or exchange rates. On internal stability, product diversification and labor mobility are inversely related and are substitutes to each other in maintaining full employment. When product diversification is low (high), industries are more (less) related, labor skills are more (less) homogeneous, and hence labor is more (less) flexible to switch jobs.

The second conjecture simply says that a diversified economy which produces both export and import-competing goods would suffer smaller change in employment, and the larger the fraction of the labor force engaged in import-competing production, the smaller is the change in employment occasioned by a change in terms of trade.

The third conjecture points out that when an economy is operating at full steam, an increase of demand for exports will introduce inflationary pressures amplified by the familiar Keynesian multiplier and the increase in capital formation. However, if exports are thoroughly diversified, the disturbances will be fairly well randomized so that the economy will be least exposed to inflationary pressures.

fall on surplus countries, unemployment in deficit countries can be eliminated.” (Mundell, 1961, p. 659). In other words, the policy of surplus countries in maintaining domestic price stability imparts a recessive tendency on deficit countries. But, if prices are allowed to rise in the surplus countries, the change in terms of trade will relieve deficit countries of the burden of adjustment. The pace of inflation in the surplus country is set by the willingness of central authorities in coordination with each other to allow for a certain level of unemployment in the deficit countries.

Besides the above, international financial capital flows could also help to harmonize asymmetries between regions. Ingram (1962) argued that complete mobility of financial resources within a monetary union could ease the financing of external imbalances, for instance, in the aftermath of a shock and reduce the need for exchange rate adjustments. Residents can adjust their wealth portfolio more smoothly in response to income fluctuations by buying and selling assets and by borrowing and lending on inter-regional credit markets. Under high degree of financial integration, even modest changes in interest rates would elicit equilibrating capital movements across partner countries. This would reduce differences in long-term interest rates and ease the financing of external imbalances between partner countries. Consequently, the need for exchange rate changes is significantly reduced.

In the same vein, Mundell (1973) posited that having a common currency or foreign reserves with exchange rates unified across countries can also mitigate asymmetric shocks between product regions. A country suffering an adverse shock can better share the loss with a trading partner because both countries hold claims on each other’s output. Dividends, interests, and rental revenues from these claims will insure income as long as output is imperfectly correlated. Conversely, under floating rates, a country facing an adverse shock and currency depreciation would find its domestic currency buy less on international markets. As a result, the cost is thus more bottled up in the country where

the shock originated.

Unlike Mundell who argued against floating rates in general, McKinnon (1963) specifically questioned the efficacy of exchange rate variability to small open economies. In these economies, foreign-currency prices of tradables are determined by external forces. In such, these economies' terms of trade are hardly influenced by domestic policies. Hence, a devaluation aimed at reducing consumption of tradable goods would only increase the domestic money prices of both exportables and importables. The prices of exportables, even those catering for domestic market would increase because their prices are largely determined by how much the goods can be sold to external markets in terms of domestic currency.

In another respect, McKinnon added that under variable exchange rates, when a small economy's currency liquidity is under threat, there would be pressures of capital outflows, straining the capital account balance. Unless capital controls are in place, domestic nationals will attempt to accumulate foreign bank balances. Quite the opposite, due to exchange risk and liquidity equivalence between large economies, short-term capital flows between currencies of equal liquidity are less likely. Therefore, small economies characterized by relatively large tradable to non-tradable goods should fix their currencies to a vehicle currency to maintain currency liquidity and to facilitate capital movements which promote efficient economic specialization and growth.

To sum up, the views above maintain that flexible exchange rate is not the appropriate antidote to internal and external imbalances. Instead, they put forward labor mobility, export diversification, supra-regional government, and integrated financial markets as the means by which imbalances can be corrected.

Besides its impotency in restoring external and internal balances, flexible rates may also be harmful. The following section details the arguments against flexible exchange rates.

3.2 The Case against Flexible Exchange Rates

Though Milton Friedman has always been portrayed as a strong advocate for floating rates, he actually has no objections toward hard fixed rates especially for small economies (Hanke, 2008). A direct quote from Friedman in Friedman and Mundell (2001, p. 10) makes this clear:

A hard fixed rate is a very different thing. My own view has long been that for a small country (economy), to quote from a lecture that I gave in 1972, “The best policy would be to eschew the revenue from money creation, to unify its currency with the currency of a large, relatively stable developed country with which it has close economic relations, and to impose no barriers to the movement of money or prices, wages, and interest rates. Such a policy requires not having a central bank”. Panama exemplifies this policy which has since come to be called ‘dollarization’. A currency board is a slightly less rigid version of a hard fixed rate than dollarization. A further movement to this direction, creating perhaps a number of currency blocs consisting of a major country and a number of much smaller countries with close economic ties to the major country, may well occur and be a good thing.

In fact, Friedman’s prescription is reflected in this study under which the model of a stable and large economy serving as the monetary anchor country for a number of smaller economies is used and evaluated using alternative anchor countries.

Of course Friedman (1953) also supported the other corner of exchange rate regime, purely floating rates, which could ease the process of adjustment to external shocks. Suppose the demand for exports of a country falls, necessitating a fall in relative prices of goods and labor to correct the deficit which might be difficult in the real world where prices and wages are always sticky—it will be easier for the change in terms of trade be accomplished through a decline in the value of domestic currency rather than through some combinations of inflation in the foreign country and unemployment in the home country. Furthermore, when exchange rates float, competitive buying and selling of currencies by speculators can offer stabilizing effects on the exchange markets.

Friedman (1968) also acknowledged that though flexible exchange rates provide independence for national monetary policy, such independence if utilized should be used to shield the domestic economy from inflationary policies from the outside, not to

pursue domestic unemployment targets because monetary policy is not potent for that purpose.

Though an adjustable peg can work and need not forsake the advantages of exchange rate flexibility, the need for credibility would render adjustable peg to be ineffective in smoothing out macroeconomic adjustments than a pure float.

As a matter of fact, increasing globalization has undermined the viability of intermediate exchange rate regimes, such as adjustable pegs, crawling bands, and target zones (Eichengreen, 2001). First, under a system of softly pegged exchange rates and free capital mobility, it is not possible to pursue an independent monetary policy on a sustained basis. Eventually, current account disequilibria and changes in reserves will provoke an attack on the exchange rate. Second, the enormous increase in capital flows has been accompanied by abrupt reversals of flows often originated in the capital account, have been difficult to predict, and have included the currencies of economies without substantial current account imbalances (also McKinnon, 1963).¹⁸ Third, there has been a tendency for instability in foreign exchange markets to be transmitted from one pegged exchange rate regime to others in a process that has come to be known as ‘contagion’ (Edwards, 2000). The victims of contagion have seemingly included economies with sound fundamentals, the currencies of which might not have been attacked had they adopted one of the corner solutions.

Floating exchange rates may not face those problems but it might be lacking in the aspects of practicality, effectiveness, and implementation.

On Practicality

The leading criticism on practicality came from Mundell (1961). According to Mundell, if floating rates are strictly followed, a multiple product-region country would need to

¹⁸ Capital flow reversals have involved a progression of speculative attacks, mostly against pegged exchange rate arrangements, beginning with the currencies in ERM in 1992–93, and continuing with the Mexican peso in 1994–95, the East Asian currencies in 1997–98, the Russian ruble in 1998, the Brazilian real in 1999, and the Turkish lira in 2001.

have multiple currencies. In this way, variable exchange rates would be able to cushion adverse shocks from a fall in product demand when factors are inflexible within a region or immobile across regions.

But, if every product-region owns a separate money, the associated costs would easily overwhelm the internal stabilization benefits (Mundell, 1961). The maintenance costs of valuation and money-changing of many currencies will be mounting and the roles of money will thus disappear. Foreign exchange markets would be so thin as to allow any speculator to influence the market prices. In addition, exchange rate changes between so many currencies will make international investment extremely difficult as single or least-diversified product regions tend to suffer significant disturbances in their foreign trade and payments (Kenen, 1969).

Moving from the hypothetical multiple-currency setting to the real world, the impracticality of flexible rates still holds. On the ability of floating rates in substituting the need for internal price and wage adjustments, the dozens of necessary industry-specific price adjustments cannot be duplicated by the single variable of national exchange rate (Mundell in Friedman and Mundell, 2001). Quite the opposite, under fixed exchange rates industries can import the scarcity relationships of the vast currency area without filtering these relationships through fluctuating and volatile exchange rates and hence the required adjustments can be more easily made.

In another respect, volatility and uncertainty about exchange rates are the likely causes of sluggishness in investment decisions which reduces international trade and investment (Tower & Willet, 1976; Krugman, 1990) particularly among vertically integrated firms (Eichengreen, 2001). The result is likely to be both too little total investment and too much investment in the wrong places, driven by the need of firms to hedge by locating within each major currency area even if economic efficiency would be better served by locating operations elsewhere and importing (Cooper, 2000).

Flexible exchange rates are especially detrimental to open economies with relatively large tradable goods sector. For these economies, McKinnon (1963) argued that exchange rate flexibility as a tool to control external balance is not compatible with internal price stability. If domestic currency is devalued to maintain external balance, the domestic money prices of exportables and importables will rise relative to non-tradable goods. By right, production of tradable goods should increase while their consumption should decline when their domestic prices rise, improving the balance of payments. However, this beneficial effect from devaluation would necessarily be offset by internal price increases (could even be amplified by expected inflation) with no or little improvement in trade balance.

Flexible rates would also not work in practice because when trade is extensive, domestic wages are most likely explicitly or implicitly indexed to a major foreign currency because international real income varies when exchange rate varies (Mundell, 1961; Krugman, 1990). As a result, lower nominal exchange rates would not succeed in lowering international relative wages and prices and hence will not reverse trade deficits—it will simply create inflation.¹⁹

Other than correcting external imbalances, some proponents of floating rates also claimed that flexible rates would allow any nation to pursue independent monetary policies and hence choose an optimum point along its Phillips curve. Nevertheless, this view of permanent trade-off between inflation and unemployment is undermined by the following factors (see McCallum, 1989).

First is the Friedman-Phelps hypothesis which postulates that steady-state unemployment rate is not related to steady-state inflation rate when the Phillips

¹⁹ Instead of changes in nominal exchange rates to ease external deficits, McKinnon (1963) suggested that expenditures be reduced and output levels be maintained. Accordingly, fiscal policy should be used to release domestically consumed exportables for exports, to curtail imports directly, and to increase domestically produced importables.

Indeed, McKinnon's prescription is reflected by the policies undertaken by the four Asian Tigers (South Korea, Taiwan, Hong Kong, and Singapore), Malaysia, and other post-colonization emerging economies in the region wherein these countries pushed exports and substituted imports.

relationship is augmented by a variable representing expected inflation where workers negotiate on the basis of real and not nominal wages.²⁰

Second, as shown by Lucas's work, even in the short-run perfectly anticipated changes in policy could under certain conditions (e.g. costless information; perfectly flexible prices and wages) exert no impact upon real variables. The experiences of many countries during the 1970s and early 1980s of rising unemployment and increasing inflation greatly supported those propositions. In light of this, the only benefit of floating rates might be the ability to choose a different rate of inflation but there is little reason to want to choose a positive rate of inflation (Artis, 1991).

Indeed, as the Japan's lost decade and the recent global financial and economic crisis demonstrate, monetary policy is effectively impotent in stimulating employment in almost all advanced countries even when short-term interest rates are driven down to virtually zero. Based on the reasons above, the economic costs associated with abandoning monetary policies can be assumed to be small.

With respect to domestic stability, floating rates and hence independent monetary policies are alleged to be able to facilitate the lender of last resort role and to stop bank runs in times of financial crisis.²¹ A common error however, is to think that the role is inextricably linked to the ability to print money (Calvo, 2002).

Following this, Calvo put forward three alternatives to provide for the lender of last resort role when exchange rates are fixed; the treasury and the central bank could (1) create a stabilization fund, (2) set up contingent credit lines with private banks (e.g. through put options with international banks), and (3) share seigniorage with the US

²⁰ By speeding up the rate of monetary expansion and aggregate demand, you can unquestionably increase output and employment temporarily only until people adjust their anticipations. From a logical point of view, the true trade-off is between unemployment today and unemployment at a later date. It is not between unemployment and inflation. There is no long-run, stable trade-off between inflation and unemployment (Friedman, 1966, pp. 58–60).

²¹ Nevertheless, discretionary monetary policies have also been blamed for causing financial crises. For instance, the Fed has been attributed by monetarists and Austrian economists to have caused the recent global financial crisis by setting interest rates to artificially low levels for too long which led to unsustainable boom in the real estate sector and the inevitable bust.

through a treaty (if exchange rate is fixed to the dollar). In the context of a monetary bloc anchored on a major currency (e.g. the dollar), member countries could set up a pooled fund (e.g. US treasury bills). Indeed, in wake of the recent global crisis ASEAN+3 countries have set up bilateral swap agreements and would have created a huge pooled dollar fund in 2009 (see Esguerra, 2008).

Exchange rate flexibility has also been posited to be capable in mitigating debt-induced deflation.²² Nonetheless, a fall in the exchange rate would not work in cases where firms are debt-dollarized (or tied to other foreign device) or whose debts are indexed to the price levels (Calvo, 2002). The debt-deflation problem stays even when currency is devalued because there is an offsetting effect from increased domestic value of foreign debts against the benefits from increased domestic prices. Even if the goods in question are non-tradable (e.g. real property), devaluation is likely to lower their relative prices against tradables whose prices would increase, hence worsening the deflation problem.

On Effectiveness

Suppose that flexible rates are practical, flexible rates however may not be as effective as postulated. First, following Ricardian equivalence, if changes in the real exchange rate and the current account are viewed as outcomes of intertemporal maximization macro policies, the effects on the nominal exchange rate can be ambiguous (De Grauwe, 1992). For instance, if a tax reduction is short-term or is interpreted by the market as one, there may be little or no appreciative effects on the exchange rate when it is expected that future taxes will be increased.

Second, the lags involved in bringing about external adjustment by floating rates

²² Debt-deflation is a situation when spending is depressed because individuals and firms are over-indebted (negative net equity) after a bubble bust and collapse in the price of the good in case, a result of over-investments during a boom especially because of new inventions. This hypothesis originally proposed by Irving Fisher has been credited for its ability to explain the events leading to the Great Depression, the dot-com bust, and perhaps the recent global economic recession.

would be considerably long and in some cases, exchange rate movements could even lead to currency inconvertibility (Krugman, 1991). According to portfolio-balance model, exchange rates are largely driven by forces similar to those that determine the price of any tradable asset instead of by trade flow movements. Hence, the state of national current account only influences exchange rates indirectly and with the presence of speculative bubble, exchange rates seldom react to fundamentals. In fact, devastating short-term capital flows that have risen precipitously since the breakdown of Bretton Woods in 1971 exemplify this point. Although the costs of exchange rate hedging for short-term transactions may be small, bid-ask spread especially for longer term horizons could widen with excess speculation and volatility. Since forward markets exist for only about a year or so into the future, the coverage of hedging is limited and long-term capital investment cannot be hedged financially (Cooper, 2000).

Third, a substantial fall in the currency value can introduce expectations of future changes that set in motion wage and price movements which start a country down the slippery slope of inflation (Mundell in Friedman & Mundell, 2001). Aside from prospects of depreciation, appreciative expectations could be damaging too. For instance, in the case of the ‘undervalued’ renminbi today, a revaluation against the US dollar could lead to spiraling upward pressures on the renminbi (because China is the largest trade surplus country for US) which would be costly to Chinese exports and to China-based merchants and financial institutions whose net liabilities are in renminbi (McKinnon & Schnabl, 2008).

Lastly, certain international firms may not respond to exchange rate changes in the way desired by policymakers. Based on the ‘sunk-cost’ model, Krugman (1990) asserted that oligopolistic firms have to incur comparatively substantial costs to enter and exit other countries’ markets. Therefore, they may be hesitant to adjust their patterns of specialization in response to exchange rate movements.

On Implementation

Suppose that the aforementioned criticisms on the practicality and effectiveness of flexible rates are unfounded, the implementation aspect of flexible exchange rates could still pose a problem. In the case of developing countries (which characterize most economies examined in this research), the loss of independent monetary policies might actually be a blessing in disguise because stabilization policies are typically not well implemented when exchange rates are flexible (Calvo & Reinhart, 2002). The governments of emerging countries tend to follow procyclical monetary policies, that is, they tend to raise interest rates in times of distress to defend the value of their currencies.

The following statement by Milton Friedman in Friedman and Mundell (2001, p. 13) clearly points out the phenomenon of inapt policies amongst developing countries in general.

There is every reason to believe that the monetary policy of the US, or Germany, now the euro, or Britain, however flawed from the large country's own point of view will provide much more stability than the small country will produce by itself.

Despite the above reservations against flexible exchange rates, it can still work well if the following conditions can be met (see Mundell, 1961): (1) an international price system based on flexible rates is dynamically stable after accounting for speculation; (2) exchange rate changes to eliminate normal disturbances to dynamic equilibrium are not so large as to cause violent and reversible shifts between export and import-competing industries; (3) the risk from variable rates can be covered at reasonable costs in the forward markets; (4) central banks refrain from monopolistic speculation; (5) monetary discipline is maintained by unfavorable political consequences of continuing depreciation, to some extent by threats to foreign exchange reserves; (6) reasonable protection of debtors and creditors to maintain increasing flow of long-term capital movements; and (7) wages and profits are not tied to a price index in which imported goods are heavily weighted. Certainly, these conditions hardly prevail in the real world.

Flexible rates may also be appropriate for closed economies with a large non-tradable sector. In times of trade deficits, the ideal policy is to fix the domestic currency price of non-tradable goods and change the domestic price of the tradable goods by altering the exchange rate to improve the trade balance (McKinnon, 1963). When exchange rate is devalued, the price increase in domestic currency in the tradable goods will stimulate its production and improve trade balance. In this case, the effect on the domestic price index and hence inflation is much less than a country with large tradable goods sector.

To sum up the criticisms, for open emerging economies with reasonably liberal capital markets and for economies heading towards that direction, adjustable or floating exchange rates is most probably inappropriate. For instance, in the 1990s, the series of devaluation in Latin America had been contractionary to the economy irrespective of the degree of devaluation (Calvo, 2002). Specifically, devaluation is useless when a shock comes from the capital account as when emerging markets are hit by contagion and face sharply higher interest rates.

Even a developed nation like Japan is not spared from the precarious effects of flexible rates. Evidently, the Japanese banking system was the casualty of excessive appreciation of the yen between 1985 and 1995 (Mundell, 2003). The tripling of the value of the yen against the dollar weakened corporate balance sheets whose assets were largely in dollars (can be compared to China today) and saddled the Japanese banking system with non-performing loans. And of course the sharp fluctuations in the yen-dollar rate were one of the culprits behind the Asian catastrophe of the late 1990s.

In conclusion, this section has discussed the demerits of flexible exchange rates. The next section presents the case for fixed exchange rates and monetary union, with some references to the context of East Asia.

3.3 The Case for Monetary Integration

The primary case in favor of exchange rate fixation against a pivotal currency rests upon the desirability of certainty (Krugman, 1990). By fixing participants' currency values against a hard currency (or a basket of hard currencies), the resulted system will confer a degree of exchange rate stability between the group of participants with the center country (or with different degrees of stability for each country under a currency basket system) as well as between the participants. The desirability of monetary union, in spite of the recent Greek crisis, is evidently shown by the expanding EMU which up till end of 2009 encompasses 16 members with 8 other states queuing to join the zone. In addition, from a recent literature survey by Tavlas, Dellas, & Stockman (2008), it was discovered that for lower-income developing countries, there is a positive association between pegged exchange rates and real growth (albeit at higher output volatility) and between pegged rates and lower inflation. The following items highlight the merits of fixed exchange rates and monetary union.

3.3.1 Greater Economic Integration

Economic integration in East Asia is ever warranted in the face of rising regional integration elsewhere such as NAFTA, EU, Mercosur, CEMAC, OECS, UEMOA, CACM, and so forth. In fact, there have been 238 regional trade agreements notified to the WTO by 2008.²³ To an extent, these arrangements have contributed to greater intra-regional stability but have also intensified inter-regional rivalry and exchange rate volatility between currency blocs.

Based on IMF statistics, in 2006 intra-regional trade in emerging Asia still lagged behind those in NAFTA and EU15 by more than 10 percent.²⁴ Meantime, the share of intraregional portfolio investment flows in East Asia was very low (a mere 6 percent in

²³ See http://www.wto.org/english/tratop_e/region_e/eif_e.xls

²⁴ See <http://www.imf.org/external/pubs/ft/survey/so/2008/CAR02608A.htm>

2005) when compared to those of NAFTA (16 percent) and EU15 (62 percent) (Kawai, 2008).

Against this backdrop, East Asia may need to reinforce its intra-regional trade and investment to further insulate its countries from disturbances originating outside the region. Indeed, a monetary bloc would commit countries in the region to pursue political integration toward obtaining greater foreign policy role vis-à-vis outside parties.

In theory, Asian countries could still achieve greater economic integration through regional free trade arrangements without monetary integration. Recent free trade deals in Asia have encompassed ASEAN 10, China, Japan, India, Australia, and New Zealand which cover various aspects of goods, services, investments, and intellectual properties (Kowsmann & Venkat, 2008). In practice however, trade liberalizations and economic integration often require stable exchange rates (Ngiam & Yuen, 2001). Otherwise, corporate lobbyists would pressure the government to impose tariffs or indirect barriers against a major foreign competitor and one common accusation is undervaluation of the competitor's currency.²⁵

On the contrary, that kind of accusation is not possible in a monetary union. With stable exchange rates among union members, firms operating in the region and the anchor country will not be subject to exchange risks and thus firms would have to compete on real grounds. In a study of 200 countries, Frankel and Rose (2002) discovered that trade amongst currency union members had more than tripled over a 20-year period and every 1 percent increase in trade-to-GDP ratio could raise income per capita by about 1/3 percent. The findings were robust to linguistic, historical, and political dimensions. In parallel, dollarization has been associated with increased trade and investments, and hence economic growth (Rose & van-Wincoop, 2001; Alesina, Barro, & Tenreyro, 2002). Indeed, a monetary union which encourages trade and

²⁵ The Japan-bashing in the 1980s and the recent China-bashing by US exemplify this point. The same is true for the periods after the world wars amongst trading countries.

economic integration constitutes a virtuous self-reinforcing circle (Bayoumi & Eichengreen, 1997).

Stable exchange rates contribute through elimination of currency exchange, forward hedging, and other costs related to uncertainty (Krugman, 1990). The costs would otherwise have to be incurred because a stable unit of account is crucial as firms tend to set prices which are sticky in nominal terms. In this regard, the larger the share of trade in GNP, the easier will be the adjustment process to external shock, and hence the greater will be the gains from cost reduction. When trade is large, the size of required price and wage adjustments to accommodate any given external shock will be smaller. Suppose that initial exports-to-GNP is 20 percent, a 1 percent trade deficit of GNP would require less fall in prices and wages than if the initial exports were 1 percent of GNP. In fact, when initial trade is large, domestic wages are likely indexed to exchange rates of major trading partners, rendering changes of nominal exchange rates ineffective in restoring external balance (Mundell, 1961). As mentioned before, when trade openness is high, a devaluation or depreciation would only produce domestic inflation (McKinnon, 1963; Krugman, 1990).

Even if initial trade is low, it does not mean that gains from stable exchange rates would be small too. In effect, the marginal gains from introduction of fixed rates would be greater if initial trade is low. As pointed out by Alesina, Barro, and Tenreyro (2002), when two countries do not trade much with each other, one likely reason is high trading costs. Hence, the trade that did occur must have higher marginal value and when exchange rates are fixed, the gains from reduced costs will be greater.

Specifically, stable exchange rates are important to Asian economies which are at different stages of development (Ngiam & Yuen, 2001). Since 1980s, MNCs operating in the region have placed their production processes across various countries to exploit comparative advantage over the countries. Examples are the tourism and electronics

industries which are largely concentrated in the Growth Triangles (GTs) in Southeast Asia. GTs are subregional economic zones which were set up for economic complementation within each zone (Ramos, 1994). The first GT, the Singapore-Johor-Riau GT (SIJORI) was initiated in 1988. R&D and capital intensive jobs are done in Singapore while labor intensive and manufacturing jobs are located in Johor and Riau. Other GTs are the East ASEAN Growth Area (EAGA) covering Brunei and parts of Malaysia, the Philippines, and Indonesia; a growth zone linking parts of Myanmar, Laos, Thailand, and China, with assistance from the Asian Development Bank; and the southern China-HongKong-Taiwan growth pole or Chinese Economic Triangle which began with Deng Xiaoping's vision of substituting economic development for class warfare as the highest order of business in post-Mao China.

Besides the above, exchange rate unification could also help in precluding international disputes. Even the implicit dollar pegs (or pseudo-exchange-rate union) implemented by the East Asian economies before the Asian crisis had actually insulated each other from damaging devaluations (McKinnon, 2005). Nonetheless, without an official monetary union, past experience has shown that beggar-thy-neighbor policies could still be a concern (Ngiam & Yuen, 2001). For instance, though not confronting currency attacks during the Asian crisis, Singapore nevertheless allowed its currency to fall against the dollar in line with the regional currencies to maintain its competitiveness.

3.3.2 Lower Costs

A monetary union enhances the unit of account role of money through economies of scale over multiple countries and reduces transaction costs, including the costs of information, search, exchange, lost trade, hedging, and calculation (Grubel, 1981). This is more so for a small economy where there is least scope for utilizing a separate currency—benefits can be reaped from the unit of account, means of payment, and store of value services provided by a major currency (Bayoumi & Eichengreen, 1997). For

instance, the US dollar has been commonly used in Vietnam and other small neighboring economies since the Vietnam War.

A monetary bloc hinges on a putative currency also promotes lower cost of capital. Under conservative banking environment, a credible fixed exchange rate linked to a hard currency such as the dollar would reduce the domestic cost of borrowing (McKinnon & Pill, 1999; Chang, 2000). Since the uncertainty arisen from currency risk and sudden regime change is eliminated, the cost of international and hence domestic borrowing will be lower.

Besides, a currency area also improves the allocational efficiency of financing process, providing borrowers and lenders with a broader spectrum of financial instruments in terms of duration and risk, as well as reduced risk from diversification across more regions (Robson, 1987).

In another respect, a currency union also reduces the need for reserves to ward off currency speculators when currency attacks within a currency area are removed (Fleming, 1971). In addition, if members are structurally diverse, reserves for intra-area transactions too can be substantially decreased because imbalances of payments across countries will be largely offsetting (Kafka, 1969). Given that East Asia is structurally more diverse than the European Common Market, the associated benefits could be greater when exchange rates are unified. With lower reserves requirement, supply of funds can be increased, resulting in lower costs of capital.

Along these lines, the costs and hence the resources saved from monetary unification can be utilized more productively in other parts of the economy.

3.3.3 Inflation Reduction

A monetary standard based on a credible anchor also helps to restrain inflation in several ways. First, exchange rate fixation facilitates inflation targeting through exchange rate targeting. In a way, exchange rate targeting is better than monetary

growth targeting because exchange rates are highly observable whereas money supply, to the extent that it is endogenous is difficult to measure and control (Giovannetti, 1992). Second, any high inflation country which abolishes its monetary sovereignty by joining a low inflation monetary bloc could reap the benefits of low inflation reputation without any loss of output and employment (De Grauwe, 1992). Third, collusion in the form of fixed exchange rates can remove internal monetary policy from governments and delegate it to a more independent foreign authority (Fратиanni & von Hagen, 1992). Indeed, the recent past has seen the establishments of currency board intended to import monetary policy credibility from a stable large country (Oomes & Meissner, 2008).

The benefits above are especially important in wake of inflation-bias discretionary monetary policy stemming from attempts to over-stimulate the economies on average and the incentives to monetize budget deficits and debt (Alesina, Barro, & Tenreyro, 2002). This is the major reason why internal monetary policy in a small country tends to be unstable with occasion episodes of high inflation (Milton Friedman in Hanke, 2008). Since there is no permanent Phillips curve trade-off (see e.g. Tavlas, 1993), other than political interests, high inflation countries have little to lose in the long run and much to gain by giving up monetary policies and adopt the policies of a low inflation country.

Evidence of association between fixed exchange rate and inflation reduction can be seen from countries that have implemented rigid rate regimes. Historically, countries with currency boards (e.g. Argentina, Estonia, Lithuania, and Bulgaria) have experienced lower inflation and higher growth than those with other regimes (Guide, Kähkönen, & Keller, 2000; Tavlas, Dellas, & Stockman, 2008). At the same time, whilst Chang (2000) found that dollarization enhances the credibility of government policies in curbing inflation, Edwards and Magendzo (2001) and Dornbusch (2001) have detected that dollarized countries tend to display significantly lower levels of inflation than their non-dollarized counterparts.

3.3.4 Financial Market Stability

A credible fixed peg against creditor's currency is a kind of stabilizer to highly indebted countries with soft currencies. This is so because in times of confidence crisis speculative capital flows could easily wreak havoc even to neighboring countries with healthy capital accounts. Steep fall in the exchange rate as a result of panic and currency attack amplifies the costs of debt-servicing, rendering illiquidity or even insolvency to debt-laden countries, resulting in disastrous reversals of foreign capital and investments (Reinhart, Rogoff, & Savastano, 2003). The Thai and the Indonesian experiences during the Asian crisis exemplify this clearly. In fact, many developing countries in East Asia are still heavily indebted (particularly in dollars) even after the Asian turmoil (e.g. Calvo, 2002; McKinnon, 2005).

Though IMF usually advises countries to float the exchange rates in face of domestic crisis, developing countries are held back by the so-called 'fear of floating' impasse (see Calvo & Reinhart, 2002) which appears pervasive in emerging middle-income economies with some access to global financial markets. While many industrial countries have operated floating exchange rates quite effectively, high-income economies have well-developed and -diversified financial systems which are able to minimize real sector disruptions from transitory exchange rate variations. More importantly, industrial countries are able to borrow abroad in their own currencies. On the other hand, many emerging economies are unable to do so, leading to an accumulation of foreign currency debt liabilities that are primarily dollar-denominated and unhedged—the so-called 'original sin'. The inability to borrow overseas in one's own currency is related to the seemingly lack of hedging infrastructure in emerging economies. Even if a country has the ability to hedge, the transaction costs could be too high to make it an attractive option especially in the short term. Another reason is

tendency for low income countries to monetize their debts which discourages lending in their domestic currencies.

3.3.5 Enhanced Credibility

A monetary bloc is a system with collective irrevocable fixed exchange rates which requires coordination among member countries. In contrast, unilateral soft pegs that were so prevalent in East Asia before the 1997 crisis were lacking in credibility and were highly vulnerable to one-way speculation.

At present, repurchase and swap arrangements in the region are exposed to moral hazard as countries might be tempted to engage in risky practices in the expectation of bailouts (Ngiam & Yuen, 2001). Quite the opposite, members of a monetary union can be obligated to discipline themselves and to help each other in defending their joint exchange rate. Accession into a union could thus be regarded as a commitment to tie authorities' hands. Plus, a multilateral agreement can be set obliging members to follow sound and disciplined fiscal policies.

To illustrate how credibility can be achieved in a monetary union, consider the money market equilibrium model below (see De Grauwe, 1992). For simplicity, two countries, j and k are considered, such that:

$$P_j L_j(Y_j, i_j) = M_j \quad (3.1)$$

$$P_k L_k(Y_k, i_k) = M_k \quad (3.2)$$

where P is the price level, L is the money demand function, Y is the real income, i is the interest rate, and M is the money supply. Assume that capital is freely mobile between the countries and that their financial assets are perfectly substitutable, the following interest rate parity condition is obtained:

$$i_j = i_k + e \quad (3.3)$$

where e is the expected depreciation of country j 's currency (appreciation of country k 's

currency). In a monetary union, $e = 0$, so that

$$i_j = i_k \quad (3.4)$$

When prices and real incomes are given, an undetermined system of three equations, (3.1), (3.2), and (3.4) with four unknowns (the two money supplies and two interest rates) prevails.

The undetermined system problem can be solved by agreeing on how monetary or exchange rate policy should be conducted. In theory, two broad options are available. First, they can jointly determine the level of money supply in the union. Once the level of money supply is chosen, the interest rates in the union will be determined. Both currencies will jointly float against all external currencies. Alternatively, one member can play the leadership role and sets its own money supply or exchange rate.

Second, both countries can agree to fix their currencies to an external currency (or a basket of external currencies) which will indirectly fix the exchange rates between the members. In such an arrangement, the money stocks of the members will be pinned down by the external money stock or by accumulation of foreign reserves.

In East Asia, due to absence of institutional, political, and economic groundwork, a monetary anchor would enable the region to leap-frog toward a currency area if potential members, including Japan were willing to use a pivotal monetary anchor such as the US dollar (see Mundell, 2003). In this study, a number of monetary anchors are examined sequentially.

3.3.6 Mobility of Labor

According to Mundell (1961), it is mobility of labor in geographical and industrial dimensions, not flexible exchange rates which can help to restore internal and external balances between economic regions. Alternatively, if labor markets are sufficiently flexible, real wages can adjust more easily to restore full employment (see Buti, Pench, & Sestito, 1998). The crucial question here is whether adequate labor mobility or labor

flexibility is present in East Asia to facilitate fixed exchange rates.

In 2008, Asis and Piper published a review paper on labor migration in Asia. Their findings might shed some light on the region's labor mobility in early 2000s. Amongst others, the findings revealed that the world's biggest net labor exporting country is the Philippines, which has overtaken Mexico in the top spot. Another major source is Indonesia whose main official migration destination is Middle East while the larger unofficial labor migration is directed toward Malaysia. India also exports mainly to Middle East. Meanwhile, most of the migrants from Vietnam, Myanmar, Cambodia, and Laos are directed toward Thailand. For China, labor exports are mostly connected with state-contracted projects overseas since the 1978 market reform but international migration has been eclipsed by the much larger and more pressing internal rural-to-urban migration.

Net labor importing countries include Japan, Hong Kong, Taiwan, Korea, Singapore, Brunei, Malaysia, and Thailand which draw workers from the lower income countries. In early 2000s, close to 20 percent of Malaysia and 30 percent of Singapore workforce are made up of foreigners. Malaysia and Thailand also export workers mainly to Singapore and Taiwan respectively.

Several features were recognized to characterize Asian labor migration. First, destination countries generally have a policy to keep foreign labor particularly less-skilled workers temporary. Second, much of international migration in Asia is intra-regional. Third, the portion of undocumented migrants is large. Fourth, the migration industry is well-developed and well-connected.

In a related study, Athukorala (2006) discovered that East Asian countries have come to rely more on foreign workers. The number of migrant workers per 1,000 in the labor force for Japan was 2 in 1986 but increased to 13 in 2003; Korea, 3(1993)–22(2002); Taiwan, 14(1990)–31(2004), Hong Kong, 81(1981)–72(2000); Singapore,

2(1970)–26(2000); Malaysia, 100(1984)–220(2003); and Thailand 6(1988)–30(2003).

In addition, it was found that reliance on migrant workers had been resilient. In Malaysia, following a notable decline in the first three years after the onset of the Asian crisis, the estimated stock of migrant workers reached an all time high (nearly 1.8 million or 22 per cent of the labor force) in 2003. In Korea, where unemployment rates rose much more sharply than in the other crisis-hit countries, migrant workers were not repatriated in large numbers. In Japan, despite lackluster economic performance over 1990–2003, the stock of foreign workers recorded an almost three-fold increase, accounting for 1.3 per cent of the Japanese labor force.

With respect to change in the degree of migration, intra-Asian labor migration had increased approximately from 1 million in the beginning of 1980s to 6.5 million in 2002 (see Huang & Guo, 2006). One reason for this rise could be the establishment of ASEAN Occupational Safety and Health Network in 2001. Indeed, Goto and Hamada (1994) and Eichengreen and Bayoumi (1999) were able to conclude that labor mobility in East Asia was higher than that in the pre-euro Western Europe.

With respect to flexibility in labor market, Ngiam and Yuen (2001) detected some evidence suggesting that labor markets in East Asia were more flexible than the European ones. Also, using 1999 data, 10 countries in Western Europe were found to have minimum wage policy whereas only 4 Asian economies had that kind of policy, signifying that wages could be relatively easily adjusted in East Asia to clear the labor markets. On top of that, unemployment rates in East Asia were also lower.

The above evidence suggests that labor markets in East Asia could be prepared to absorb asymmetric shocks that might arise in a multi-country monetary union.

3.4 International Coordination and Degree of Integration

Though exchange rate fixation provides numerous potential benefits and that the labor conditions might be sufficiently accommodating for that purpose, coordination between

countries is utmost crucial to produce a sustainable system of unified exchange rates.

Indeed, the choice of exchange regime plays an important role in molding good relationships between open economies. Countries implementing floating rates, for instance, have incentive to engage in beggar-thy-neighbor policies (Krugman, 1990). According to Krugman, by pursuing a tight monetary policy, a country can appreciate its currency and achieve a rapid reduction in inflation but if all countries try to do the same, they would have chosen a deeper recession than the true collective inflation-output trade-off. The reverse is true for devaluations aiming at closing external account deficits.

On the other hand, under fixed exchange rates monetary policies of countries are virtually synchronized wherein a common currency requires an explicit designation of a central bank whilst other fixed rate systems require an implicit central banking role.

Consider the case of a common currency system without a centralized monetary authority. Countries would issue community money wherein each central bank's credit creation would generate seigniorage for its authority but create inflation that falls on all member countries. Small economies in particular would be aggressive in creating money because the benefits of an additional real common money of seigniorage are just as large for them as for the big countries whereas the costs of an additional point of inflation are much less. With a centralized authority, countries can still earn seigniorage in terms of the receipts on its interest-earning reserve assets.

Fixed rate system can also work when one national central bank takes on the implicit role of central banker for the system as a whole. The classical gold standard was essentially the Bank of England standard; the Bretton Woods system, the Federal Reserve standard; and the EMU system, the Bundesbank standard. In this system comprising of more than one currency, the supply of international means of payments is conditional upon the cooperation of many central banks where no central bank can

expand its own liabilities much faster than other central banks without losing reserves and impairing convertibility (Mundell, 1961).

The case for a multiple-currency monetary union—a currency area with national currencies retained but rigidly fixed to the US dollar was proposed by Mundell (2003, 2005) for East Asia, particularly in the initial stage toward an Asian currency. A single currency across sovereign countries right in the beginning is highly unlikely because there are serious hindrances such as massive transition costs and loss of sense of national sovereignty. Moreover, East Asia does not have a strong political and economic institution as the European Common Market.

From another perspective, a multiple-currency union could even be more credible than a single currency union (Krugman, 1990). By retaining national moneys, Inflation-prone countries may be more willing to sacrifice their monetary independence because the governments do not need to face formal political humiliation. In contrast, with a single-currency area and a formal central bank, the views of the inflationary nations would be reflected.

The degree of monetary independence to be relinquished depends on the level of integration. The primary reason for several levels of integration has to do with the fundamental incompatibility of three desiderata of government—exchange rate stability, capital mobility, and monetary autonomy (see Padoa-Schioppa, 1988; Cohen, 1992). Under fixed exchange rates and free capital mobility, the pursuit of independent monetary policy will likely lead to disequilibrium in the balance of payments, resulting in speculative capital flows. Consequently, governments that attempt to maintain fixed rates will have to either relinquish their monetary policy autonomy, or resort to controls on capital flows. Alternatively, they will have to forsake fixed rates.

The above gave rise to the following main categories of integration. The first type of integration is exchange-rate union where exchange rates between participants are

irrevocably fixed and margins of fluctuations are not permitted. However, monetary policies need not be coordinated. As a result, some form of capital controls is needed.

The second variant is pseudo-exchange-rate union which involves fixed rates between members, free capital movements, and pledges of policy coordination, but no formal integration of monetary policies. As incompatibility of desiderata indicates, this will not result in irrevocably fixed rates because speculative capital flows will emerge.

The third category is monetary integration that is typically used interchangeably with the concept of currency areas which involves exchange rate unification—irrevocably fixed exchange rates and absence of margins of fluctuations. Monetary integration also includes full and irreversible convertibility of currencies (i.e. the absence of exchange controls), financial market integration, complete liberalization of movements on current transaction, and a common (union-wide) monetary policy. As Robson (1987) observed, financial integration also entails concerted adoption of measures to harmonize national financial regulations and structures of institutions.

The concept which involves a single currency and a common central bank is called monetary unification, the fourth category. Dollarization can be considered as a form of monetary unification whereby the effective monetary authority is the US Federal Reserve.

The abovementioned arrangements represent different degrees of integration. Due to incompatibility of the three objectives, the third or the fourth degree of integration ought to be significantly more robust.

3.5 The Setbacks of Exchange Rate Fixation

Notwithstanding the advantages of monetary unification, skeptics have raised the following main impediments to a monetary union (see Mongelli, 2002). Firstly, if the wrong nominal exchange rate parity of a member country is chosen at the onset of a monetary union, this country may be too competitive or too uncompetitive with respect

to the other members. The imbalance in the external accounts will likely persist until the structure of prices and wages and the level of economic activity adjust to those prevailing in the other members. The early Hong Kong currency board experience demonstrates this point (as discussed in Chapter 2).

Secondly, as the responsibility for setting monetary policy and exchange rates is transferred to a supra-national entity, no country can pursue some real adjustments using monetary policies in wake of asymmetric disturbances. When a member country exhibits higher nominal rigidities than those in other partner countries, the lower union-wide inflation rate might increase the country's frictional unemployment until its rigidities are reduced by means of structural changes.

Thirdly, if one or more member countries run sizeable budget deficits and accumulate unsustainable debts, the pecuniary externalities might ripple through the currency area. The recent fears of sovereign debt crisis which developed in Greece, Spain, Ireland, and Portugal have led to widening of bond-yield spreads between these countries with other members. Actually, Kenen (1969) already presaged this kind of problem decades ago when he proposed fiscal transfers to correct imbalances within a currency zone.

For more on possible costs of fixed exchange rates and monetary union, see for instance Tavlas (1993).

3.6 Empirical Studies Operationalizing OCA Theory

The preceding sections have discussed issues pertaining to the concept of OCA and exchange rate regimes. This section presents a review of applied research implementing OCA theory.

According to Crowley (2004), empirical time-series literature on OCA can be divided into three broad strands: a strand that uses basic regional data to evaluate whether countries use exchange rates to offset shocks, with the implication that similar

exchange rate volatilities would imply similar shock magnitudes; a strand that uses structural vector autoregression (SVAR) time series methodology to identify demand and supply shocks and then looks at the correlation of these shocks across countries or regions; and another strand which evaluates the synchronicity of business cycles across prospective monetary integration members. The synchronicity approach compares the cyclical components in GDP and then uses correlations in business cycles to draw out implications about suitability as constituents of an OCA.

The first strand has been criticized for being largely descriptive, whereas the second (SVAR) methodology has been discredited for being arbitrary in terms of the restrictions that are required for identification of monetary and real shocks. The second strand also responds to another criticism of SVAR methodology—that a shock approach ignores long-run business cycle synchronicity. The obvious drawback of the third strand is that this approach completely ignores the incidence of transitory shocks and does not consider the ability of exchange rates to also compensate for shocks.

A relatively recent approach, which is used in this paper, involves classifying countries using cluster analysis techniques according to the criteria prescribed by OCA theory. Cluster analysis has nonetheless been criticized for its rather ‘ad-hoc’ approach in determining the ‘optimal’ number of clusters (Martinez & Martinez, 2005). In light of this, this paper employs more than one cluster analysis method so that ‘robust’ groupings over methods can be recognized. The approach is detailed in Chapter 5 Methodology.

All the aforementioned approaches involve ex-ante evaluations—identifying clusters of countries which possess conforming preconditions. Nonetheless, they might ignore the Lucas critique in that new members of an OCA could modify policies to better suit to a monetary union (see Tavlas, 1993) or be more suited ex-post rather than ex-ante (Frankel & Rose, 1998). The OCA criteria may be endogenous in the sense that

the existence of a currency union formed by countries initially not positively indicated to participate in a union will by itself foster conditions in which the criteria are positively satisfied. At present, however, empirical support for the endogeneity view remains to be suggestive rather than conclusive (Artis & Zhang, 2001, 2002).

Despite the above, it should not be a significant setback for this paper since this study is concerned about identification of homogeneous groups and readiness for integration, so the results will indicate groups of countries which are more ready to form a monetary union. Should the OCA criteria are indeed endogenous, the identified countries will have some competitive advantage over the others, and the likely structural changes will be less dramatic.

The remainder of this section provides a review of empirical studies. The studies are categorized by regions: (1) Europe, (2) West Africa, (3) the Americas, and (4) East Asia. Since the region under study is East Asia, relevant literature on the region is discussed whereas for studies on other parts of the world, only those whose methods and/or variables which are adopted are surveyed.

3.6.1 Europe

Implementation of OCA study with cluster analysis is most probably first used by Artis and Zhang (2001). The study demonstrates that cluster analysis can be used to indicate more homogenous country subsets within a set of countries. The study looked for inhomogeneities in the actual and prospective memberships of the EMU by applying hierarchical clustering techniques to a set of OCA criteria. Germany was set as the reference country. The variables examined are synchronization in business cycle phase, volatility in the real exchange rate, synchronization in the real interest rate cycle, openness to trade, convergence of inflation, and labor market flexibility. Relatively well-defined groups were found and therefore a 'one-size-fits-all' monetary policy might not be appropriate to certain countries.

In 2002, Artis and Zhang updated their earlier work by applying fuzzy cluster analysis to EU member countries in order to arrive at an identification of preferred monetary union groupings. Unlike hierarchical clustering which provides each country an absolute belongingness to a cluster, fuzzy cluster analysis provides a degree of belongingness for each group. In addition to the OCA variables used in their 2001 paper, Maastricht Treaty criteria were also explored. The Maastricht criteria used pertain to convergence in inflation, convergence in long-run interest rates, stability of nominal exchange rates, budget deficits, and public debt. Despite some differences, the similarity between the groups distinguished by the alternative sets of criteria was quite striking.

The above studies have been cited extensively as far as cluster analysis and OCA theory are concerned and the criteria have been applied on other parts of the world. Accordingly, their variables, clustering approach, and diagnostic statistics (pseudo-F statistic, normalized Dunn's coefficient, and silhouette width) are adopted in this paper. Details on the variables and the approach are explained in Chapters 4 and 5 respectively.

Adopting the approach of Artis and Zhang (2002), Boreiko (2003) estimated the readiness of potential accession countries of Central and Eastern Europe for EMU or unilateral euroization. The OCA criteria used are synchronization of business cycles, volatility of real exchange rates, openness to trade, and inflation convergence. The Maastricht criteria used are as those used by Artis and Zhang. The algorithm revealed some leading countries in both nominal and real convergence terms.

The criteria above are commonly used in the literature. Nonetheless, as far as cluster analysis OCA studies on Asia are concerned, most likely only Ibrahim (2008) has examined the Maastricht criteria. Though the Maastricht conditions were originally designed for the European Common Market, it is compelling to compare the results across OCA and Maastricht criteria. For this reason, aside from OCA criteria, Maastricht dimensions are also investigated in this study.

3.6.2 West Africa

OCA theory and clustering technique can also be deployed to assess the viability of convergence between countries of different exchange regimes. Bénassy-Quéré and Coupet (2005) used hierarchical clustering to assess the desirability of moving from existing monetary arrangements in sub-Saharan Africa to one genuine monetary union. Criteria used are correlation of GDP with the euro area; export-to-GDP ratio; the share of EU in total exports; the share of the primary sector in GDP; the share of the first exported commodity in total exports; the share of oil in exports; and the debt service ratio. The study concluded that the countries cannot be viewed as one currency area.

Different from the clustering studies on Europe, the units of analysis in Bénassy-Quéré and Coupet are less developed African economies. Hence, it is not surprising to find that most of the criteria revolve around the primary sector (to measure economic structure) and only one financial dimension, namely debt service is examined.

In another OCA paper on Africa, Tsangarides and Qureishi (2008) applied both fuzzy and hierarchical clustering algorithms to a set of variables encompassing both OCA and Maastricht dimensions to evaluate the viability of currency unions in WAMZ and ECOWAS.²⁶ The variables selected are output volatility, terms of trade synchronization, real exchange rate variability, regional trade intensity, inflation, government budget balance, and debt-servicing requirement. Cophenetic correlation coefficient was used to choose the best clustering algorithm for hierarchical cluster analysis and a robustness check using principal component analysis was done. Similar approach is also implemented for this study.

The debt liability dimension used by the above Africa-based papers is also adopted. In addition, the export diversification dimension (the share of the first exported

²⁶ In April 2002, the West African Monetary Zone (WAMZ) was created comprising five countries (the Gambia, Ghana, Guinea, Nigeria, and Sierra Leone). ECOWAS (Economic Community of West African States) was established in 1975 amongst 15 West African countries.

commodity in total exports) used by Bénassy-Quéré and Coupet, an OCA dimension put forward by Kenen (1969) is also inspected. To an extent, these two criteria complement conventional OCA dimensions which cater mainly for industrialized countries (see Bénassy-Quéré & Coupet, 2005).

To an extent, the debt and the diversification dimension should be more relevant for developing countries. With respect to indebtedness, unlike advanced countries, developing countries could hardly borrow in their own currencies, plagued by the so-called original sin syndrome and hence might be susceptible to swings in exchange rates. On the export diversification dimension, having greater reliance on exports and less dependence on domestic markets for income, emerging economies could be significantly vulnerable to changes in the demand for their exports. Details on the variables and their relevance to the countries under review are explained in the next chapter, Chapter 4.

3.6.3 The Americas

In the context of the American continent, Crowley (2002) deployed model-based cluster analysis to evaluate the suitability of Central and South American countries for dollarization. Countries sharing similar experiences in movements of business cycles with the US were expected to be better candidates. Dimensions examined are correlations of real GDP and lagged real GDP, correlations of inflation rate, correlations of short-term interest rate, and correlations of unemployment rate.

In terms of methodology, Crowley employed model-based cluster analysis which according to Martinez and Martinez (2005) is a technique essentially used to overcome the problem of specification on the number of clusters and the restriction on the structure of clusters found in conventional clustering approach. A similar approach was applied to NAFTA members in Crowley (2004) and to European countries in Crowley (2008). The emphasis of these studies is still business cycle synchronicity. In this paper,

model-based cluster analysis is also utilized.

3.6.4 East Asia

The review of empirical literature concerning OCA in East Asia is sectioned by the main approach used, namely vector autoregression, cluster analysis, and miscellaneous approaches.

Structural Vector Autoregression (SVAR) Approach

In a nutshell, the structural VAR approach hinges on identification of homogenous countries so that the severity of the costs of monetary unification can be minimized. If the responses of certain macroeconomic variables (e.g. price level, exchange rate, unemployment, etc.) to internal and/or external shocks (e.g. demand and supply shocks) are symmetrical in terms of magnitude, pattern, and speed of adjustment among prospective countries, then the costs of integrating the monetary systems would be presumably small. In applied literature, Tamim Bayoumi and Barry Eichengreen can be regarded as the pioneering authors in the field.

Almost all VAR-based studies complement their VAR analyses by reviewing other relevant dimensions such as labor mobility, intra-regional trade, economic and financial interdependencies, and so forth. The main analyses however, still center on VAR. Generally, VAR studies on Asia can be categorized into those whose results support broad integration encompassing a substantial number of countries and those which suggest country pairs or small subgroups as prospective candidates.

Case for Broad Integration

One of the classics in applied OCA literature has to be the 1994 paper by Bayoumi and Eichengreen. The authors compared East Asia to Western Europe by asking whether Asia came as close as Europe to being an OCA. The time period studied is 1969–1989,

reflecting the ‘roaring’ era in the East Asia before the Asian crisis. The study deployed Blanchard-Quah (B-Q) shock extraction technique to extract and quantify two types of shocks—demand and supply shocks that affect a country’s economy. The greater the correlations between the shocks, the smaller the costs of eschewing independent policies, the stronger the case for integration between economies. The paper also investigated how rapidly each country adjusted to each type of shock.

The number of large positive correlations (for both demand and supply shocks) expressed as a percentage of the total country pairs in Asia exceeded the corresponding percentage in EU. The findings also signified that Asian countries adjusted more rapidly to both types of shocks than the EU countries did. Along these lines, it was concluded that East Asia came as close as the EU to being an OCA. Specifically, two country subsets were more potential: (1) a Northeast Asian bloc of Japan-Korea-Taiwan, and (2) a Southeast Asian bloc of HongKong-Indonesia-Malaysia-Singapore, and possibly Thailand.

In an update, Bayoumi and Mauro (2001) used similar techniques using a larger dataset of 1968–1998 which encompasses pre-crisis and crisis periods, and concluded that the size of disturbance in East Asia was larger than that in EMU but due to perhaps higher degree of labor flexibility or mobility, the speed of adjustment in Asia was faster than that in EMU. In terms of symmetrical response to aggregate supply disturbances, the results identified two subsets of countries which displayed faster speeds of adjustment: (1) HongKong-Indonesia-Malaysia-Singapore and (2) Philippines-Thailand.²⁷

Complementing SVAR approach with generalized purchasing power parity²⁸ (GPPP)

²⁷ Demand shocks were thought to be endogenous, that is, unlikely to be invariant to demand management policies and currency regimes, hence not investigated—reflecting the endogeneity argument of Frankel and Rose (1998).

²⁸ Long-run purchasing power parity (PPP) implies that real exchange rates are stationary. A vast literature has, however, shown that they are nonstationary. This is because fundamental macroeconomic variables that determine real exchange rates are nonstationary. A system of nonstationary real exchange

approach and using Japan as the base country, Ahn, Kim, and Chang (2006) managed to find a group of eight potential Asian economies for monetary union. Time periods studied are 1960–2002 (SVAR) and 1970–2003 (GPPP). The following results were found. First, neither Northeast Asia (China, Japan, and Korea) nor Southeast Asia could constitute an OCA on its own. Second, ASEAN 4 (Indonesia, Malaysia, Singapore, and Thailand), Hong Kong, Korea, and Taiwan have displayed significant symmetrical response to supply shocks in terms of magnitude and speed of adjustment. Third, ASEAN 4, Hong Kong, Korea, Taiwan, and Japan were indicated to share common trends in real exchange rate movements.

In a similar study, Huang and Guo (2006) examined symmetry of shocks through impulse response analysis based on 1970–2002 data. The paper also reviewed the degree of labor mobility within the region and the extent of intra-regional trade. A four-variable SVAR model was developed to extract external supply, domestic supply, demand shock, and monetary shock instead of the earlier two-variable model consisting of supply and demand shocks in Bayoumi-Eichengreen study. Benchmarking against EMU, the findings suggested that Hong Kong, Indonesia, Korea, Malaysia, Singapore, and Thailand might be viable for a common currency zone.

More recently, Sato, Zhang, and Allen (2009) managed to identify two highly potential groups for integration on the monetary side. One group comprises of the US, Taiwan, Hong Kong, and Singapore while the other group contains ASEAN 5 (Thailand, Malaysia, Singapore, the Philippines, and Indonesia) and Japan. The authors employed Johansen cointegration tests to check for long-run co-movements of real outputs among Asian countries, Japan and the US. Time period covered is 1978–2006. Data series were seasonally adjusted using the Census X-12 method. In addition to the results above, the analysis also discovered that China was not a potential member with any of the grouped

rates may have a long-run equilibrium path in common since the individual nations will experience a set of common real macroeconomic shocks. This is termed as GPPP hypothesis.

economies. Interestingly, the ASEAN countries were only indicated to be feasible to form a group when Japan was included.

Unlike the aforesaid studies which favor somewhat wide integration, the following VAR studies have detected smaller subsets of prospective countries.

Case for Smaller Clusters of Integration

Applying Bayoumi & Eichengreen's (1994) model, Ngiam and Yuen (2001) used 1967–1997 dataset and included more countries. The authors did not use impulse response function or EMU as benchmark. Considering correlations in supply disturbances with geographic proximity and social-cultural compatibility, the findings proposed three plausible clusters: (1) Brunei-Singapore-Malaysia, (2) Japan-Korea, and (3) Taiwan-HongKong. Similar to Bayoumi-Eichengreen study, their work also detected that supply shocks of Australia were not correlated with New Zealand or with any other country.

Kawai and Takagi (2005) applied a variation of SVAR model to study the response patterns of real GDP and price to exchange rate depreciations among East Asian economies. Time period under review is 1970–1998. Symmetry of response patterns in real GDP was detected in 'non-crisis' economies of (1) China-HongKong-Singapore-Taiwan and 'crisis' economies of (2) Indonesia-Korea-Philippines-Thailand. With respect to symmetric response pattern in price changes, the groups are: (1) China-HongKong-Singapore-Taiwan-Korea and (2) Indonesia-Malaysia-Philippines.

Sato and Zhang (2006) employed 1978–2004 data to assess real output co-movements in the region with cointegration test. The study also used Vahid test to examine for long-run relationships and Engle tests to check for short-run interactions in real outputs. Short-run common business cycles were found in Southeast region of (1) Singapore-Thailand-Indonesia and in the Northeast region consisting of (2) HongKong-Korea-China and (3) Japan-Taiwan.

In 2007, Kim presented a simple VAR structure on three aspects of macroeconomic fluctuations in East Asia. The paper investigated the dynamic behavior of prices over business cycle, the persistence of shocks, and the pattern of macroeconomic responses to demand and supply shocks. Using 1981–2005 data, the study indicated significant heterogeneities among the economies under review. The evidence only slightly favored a monetary unification between Hong Kong and China.

In a more recent paper, Bacha (2008) examined the feasibility of an OCA for ASEAN 5 economies based on SVAR and correlation analysis. Time period used is 1970–2003. For the SVAR analysis, the paper assessed the interrelationship among the real GDP growth rates and countries' response to external shocks represented by world real GDP. For the correlation analysis, the study explored similarity of inflation, trade relationships, similarity in business cycles, and extent of policy congruence. The results indicated the following potential country pairs: (1) Malaysia-Singapore, (2) Japan-Korea, (3) Indonesia-Thailand, and (4) Australia-NewZealand. The author postulated that geographic proximity could have enhanced trade intensity and factor mobility, thus enforcing the measures of monetary integration.

Focusing on the Chinese economies, Zhang and Sato (2008) used a dynamic measure of shock convergence to assess if there was an increasing symmetry of shocks between the Greater China economies of China, Hong Kong, and Taiwan. Data period used is 1980–2006. The study investigated the time-varying correlation in supply, real effective exchange rate, and monetary shocks. Findings suggested that these economies were more correlated in supply shocks before the early 2000s and in real effective exchange rate and monetary shocks over the sample period with an increasing trend of shock symmetry.

Cluster Analysis Approach

This segment reviews the works using cluster analysis, the approach used for this study. Asia-based OCA studies employing this approach are comparatively rare, only three such studies have been found.

A decade ago, Yuen (2000) applied hierarchical clustering to GDP per capita, real GDP growth, aggregate price inflation, deposit interest rates, gross domestic investment, value-added in agriculture, and value-added in services to identify prospective Asian countries for monetary integration. Period studied is 1990–1997. Instead of OCA theory, Yuen implemented the economic theory of convergence. The results suggested five potential country groups: (1) a mature group of Japan-Australia-NewZealand-US, (2) a high growth group of Korea-Malaysia-Thailand, (3) a moderate growth group of Indonesia-Philippines, (4) a small open economy group of HongKong-Singapore, and (5) China.

More recently, Nguyen (2007) implemented fuzzy cluster analysis (as that used by Artis & Zhang, 2002; Boreiko, 2003) and selected five OCA criteria: synchronization of business cycles, volatility of real exchange rate, degree of openness to regional trade, inflation differential from the regional average, and level of export diversification. No reference country was assigned. The study used a dataset of four overlapping periods: 1990–1996, 1990–2000, 1999–2003, and 1990–2003.

For 1990–1996, three prospective groups were found: (1) Korea-Singapore-Malaysia-Thailand-Indonesia-Philippines, (2) Japan-Taiwan, and (3) China-HongKong. For 1990–2000, four groups: (1) HongKong-Singapore-Malaysia-Thailand, (2) Japan-Korea-Taiwan, (3) China-Philippines, and (4) Indonesia. For 1999–2003: (1) HongKong-Singapore-Malaysia, (2) Japan-Korea-Taiwan-Thailand-Philippines, (3) China, and (4) Indonesia. For 1990–2003: (1) HongKong-Singapore-Malaysia-Thailand, (2) Japan-Korea, (3) China-Taiwan-Philippines, and (4) Indonesia. The only stable

linkage that weathered all the periods is that between Singapore and Malaysia.

Nguyen's (2007) work does not differ much from the fuzzy clustering studies discussed earlier and similar to Bénassy-Quéré and Coupet (2005), export diversification dimension was examined. Nguyen's method of measuring diversification is adopted here as it is computationally more rigorous and might also be more valid. Details are presented in Chapter 4. Differs from Nguyen's work which did not set any reference country, the present study considers a few alternative monetary anchor countries.

More recently, Ibrahim (2008) utilized both hierarchical and fuzzy cluster analysis methods to the alternative criteria sets of OCA theory and 'adjusted' Maastricht Treaty on seven East Asian economies. Pre-crisis (1991–1997) and post-crisis (1998–2004) periods were compared. Japan was set as the reference country. The OCA criteria used are volatility in real GDP, volatility in real exchange rate, volatility in interest rate, trade openness, and convergence of inflation. The adjusted Maastricht criteria used are budget deficit/GDP, (public and private) external debt/GDP, exchange rate volatility, inflation differential, and annual lending rate. Different from the original Maastricht prescription of government debt, the paper used gross external debt.

Results from both methods are similar but results for pre- and post-crisis periods are different. Results using the OCA and the Maastricht criteria for pre-crisis period indicated groupings of Indonesia-Philippines and Malaysia-Thailand-Korea. Meanwhile, post-crisis OCA results suggested groupings of Malaysia-Philippines-Thailand-Korea whereas post-crisis Maastricht results indicated groupings of Malaysia-Philippines-Thailand and Singapore-Korea-China. Thus, the connection between Malaysia and Thailand is robust across periods and criteria.

Though Ibrahim's study may be more comprehensive than other similar studies, at least four notable shortcomings could be detected.

Firstly, only seven countries are examined. With a limited set of countries, the study does not represent the East Asian region. Besides, selection bias problem could be serious. Secondly, using only Japan as the reference country may not be sufficient. Numerous studies have provided evidence against Japan being the monetary anchor country (e.g. Kwan, 1998; Chow & Kim, 2003; McKinnon, 2005; Katada, 2008; Shirono, 2009). More will be explained in Chapter 4. Thirdly, the OCA criteria employed are inadequate in reflecting the theory and the substantial international capital mobility in the region. The study has overlooked the importance of labor mobility (see Mundell, 1961), product (export) diversification (see Kenen, 1969), and external indebtedness (demonstrated by the Africa-based studies and current developments in international capital markets) as dimensions for convergence.

Nonetheless, Ibrahim's work needs to be commended for its ability to explore both Maastricht and OCA facets on East Asia. In fact, this approach was demonstrated earlier by Artis and Zhang (2002) and Boreiko (2003) in the European context. This approach is also applied in this research.

Miscellaneous Approaches

Besides VAR and cluster analysis methods, there have also been studies using various other approaches largely based on time-series modeling where some of which can be used with VAR approach.

In 1999, Eichengreen and Bayoumi regressed bilateral exchange rate volatility on relative output variability, dissimilarity of export composition, strength of bilateral trade, and economic size. Time period captured is 1976–1995. The simulated levels of exchange rate variability in East Asia were found to approach the Western European levels. Specifically, three country groups displayed significant correlations in exchange rate variability: (1) Singapore-Malaysia, (2) Singapore-Thailand, and (3) Singapore-HongKong-Taiwan.

Another support for integration using pre-crisis period came from Loayza, Lopez, and Ubide (2001) which used 1970–1994 data to present evidence from an error components model. The shock dimensions examined are country-specific, sector-specific, and common shocks. The study discovered significant short-run and long-run co-movements of shocks within East Asia, comparable to those found within Europe. The authors concluded that Asian countries are good candidates, better than their Latin American counterparts, for currency union. Specifically, two potential country groups were identified: (1) Japan-Korea-Singapore-Taiwan, and (2) Indonesia-Malaysia-Thailand.

In 2004, Lee, Park, and Shin also discovered some evidence supporting exchange rate unification, based on 1978–1999 annual data which encompass pre-crisis and crisis periods. The methods used are dynamic factor and regression models. The findings are as follows. First, the common shocks in Asia were comparable to those in Europe. In particular, Indonesia, Korea, Malaysia, Thailand, and the Philippines shared higher degree of regional output co-movements. Second, two most important determinants of business cycle synchronization were share in intra-regional trade and similarity in trade structure.

Stretching the time period to cover the post-crisis era, Kawai and Motonishi (2005) employed 1980-2002 data to demonstrate that real activity variables, namely growth rates of real GDP, real personal consumption, and real fixed investment were highly correlated among Japan, Korea, Taiwan, Singapore, Malaysia, and Thailand with Indonesia and the Philippines beginning to join this group. However, real activity variables of China and low-income ASEAN members were not significantly correlated with those of other Asian economies.

While most studies do not specify any reference country, Font-Vilalta and Costa-Font (2006) set Japan as the center economy. In this correlation-based paper, the authors

examined synchronization of exchange rates, business cycles, interest rates, exports, and imports to assess the feasibility of a yen bloc. To explore the pattern of convergence across different economic conditions, a multi-period analysis across three periods, 1963–1979, 1980–1997, and 1997–2001 was carried out. Among others, only Singapore and Korea were found to be increasingly synchronized.

In a 2007 paper, Wilson and Choy applied the theory of GPPP (as in Ahn, Kim, & Chang, 2006) with Johansen cointegration analysis. The study looked at the behavior of long-run real exchange rates of ASEAN 5 countries and these countries as a group were not indicated to be ready to unify their exchange rates with either the US or Japan in the pre-crisis period (1975–1997), the post-crisis period (1998–2004), and even when the ‘noisy’ period of the Asian crisis was omitted. Asymmetries in the ways countries adjusted to shocks and low speeds of adjustment were cited as the factors. Despite this, the long-run real exchange rates of Malaysia and Singapore were correlated in the pre-crisis period while those of Malaysia and Indonesia were correlated in the post-crisis period.

Using annual data of 11 Asian countries, Rana (2007) presented simple 10-year moving correlations between real GDP growths of individual countries with that of the group as a whole from 1989 to 2005. Correlations appeared to converge toward very high levels in (1) the Philippines, Indonesia, Japan, Malaysia, and Thailand. The correlations were however a bit lower in (2) Laos, China, Singapore, and Vietnam.

Another support for small groups of integration came from Kawai (2008) who reviewed various aspects of economic integration in East Asia. The author discussed how regional integration had been proceeding in trade and FDI; the evolution of exchange rate arrangements in the post-crisis period; the implications of a unwinding of global payments imbalances and surges in capital inflows; and the challenges for monetary coordination. Period examined is 1989–2003. The paper discovered the

following groups of economies to be sufficiently integrated: (1) Japan-Korea, (2) China-HongKong, and (3) Singapore-Malaysia-Brunei. Also, the paper proposed a currency basket as the pivotal anchor to enable all Asian currencies to collectively appreciate vis-à-vis the US dollar while maintaining intra-regional rate stability in the event of surges of capital inflows or rapid unwinding of global payments imbalances.²⁹

More recently in a 2009 paper, Quah, the author of the present paper, compared four dimensions related to OCA theory, namely inflation convergence, export diversification, labor market flexibility, and external indebtedness of 17 Asian economies with those of euroized and dollarized countries in attempt to draw comparable patterns from the Asian countries. The US was proposed as the monetary anchor country. Datasets used are 1980–1996, 1997–2000, and 2001–2007 representing pre-crisis, crisis, and post-crisis periods. Results suggested that: (1) convergence in inflation rate with US and levels of export diversification in East Asia were comparable to those in the dollarized countries; (2) labor markets in the region were as flexible as or more flexible than those in EMU; (3) external debt levels in Asia had fallen considerably in comparison to those of dollarized countries, indicating reduced incentive to fix their dollar rates; and (4) the most prospective countries to constitute a dollar bloc might be India, Thailand, and Malaysia.

3.7 Implications of Literature Review to Present Study

The preceding conceptual and empirical literature has offered great insights to the present effort. On the theoretical underpinning, this study subscribes to the theory of OCA. On empirical grounds, the present work has benefited in terms of the methods used and the relevant convergence dimensions. Upon weighing the pros and cons of the approaches demonstrated, cluster analysis—one approach under the school of pattern

²⁹ A number of studies (to be discussed in Chapter 4) have also proposed currency basket for Asia. For this reason, a currency basket is also set as an alternative anchor in this paper.

recognition is employed in this paper.

The OCA dimensions which are relevant to this study and which are compatible with cluster analysis are adopted. The dimensions are trade openness, real business cycle synchronization, labor market flexibility, export diversification, inflation convergence, exchange rate volatility, and real interest rate synchronization. Another related facet, external indebtedness is also included. Maastricht criteria are also explored. Details on the variables and their measurements will be presented in Chapter 4 and discussion on the methodology will be provided in Chapter 5. The following points highlight the reasons why cluster analysis is selected for the present work.

Firstly, in general empirical studies reviewed earlier have indicated certain subsets of East Asian countries as more feasible for monetary integration. Against this backdrop, cluster analysis is an appropriate tool since it is capable of drawing out homogeneous groupings of countries given a set of criteria.

Secondly, time-series modeling techniques by and large only examine a very limited number of dimensions at a time, such as symmetry in real exchange rate movements and/or symmetry in responses to shocks, assuming that those dimensions reflect other facets of convergence. Nevertheless, while these dimensions are important, they do not necessarily represent other important facets also. Dimensions such as trade intensity, export diversification, and labor market flexibility come into play as well. In this aspect, cluster analysis has obvious advantage as it can take into consideration multiple relevant dimensions simultaneously and gives equal importance to each dimension.

The main reason for the above could lie in the fit between the methods and the characteristics of the variables or data. Modeling techniques generally require data to be time-series, stationary at least after transformation, of certain variability, and satisfy specific distributional assumptions. Nevertheless, OCA facet such as export

diversification does not appear to fit into time-series modeling. Measures of labor and trade which are highly stable might also violate the relevant assumptions. Even if a least-rigorous modeling technique is used, the available data are most likely insufficient to analyze a short time period (the ‘crisis’ period used here, to be detailed in Chapter 5). Quite the reverse, cluster analysis is compatible with investigation of short time periods with few data points; a crucial feature when dealing with less developed Asian countries with limited dataset.

Thirdly, in structural modeling approach, other requirements must be met in addition to the standard econometric assumptions. As Crowley (2004) pointed out, the SVAR approach has been criticized for being arbitrary in terms of restrictions required for identification of monetary and real shocks. Cluster analysis, on the other hand, does not face this problem.

Lastly, cluster analysis techniques also offer the following useful features besides providing partitioning for the countries. Hierarchical cluster analysis can be used to indicate the amalgamation process amongst the countries while fuzzy cluster analysis could assign each country a degree for belongingness to every cluster.

3.7.1 Filling the Gaps

In light of the favorable features offered by cluster analysis, Yuen (2000) and Nguyen (2007) have performed hierarchical and fuzzy cluster analyses respectively in the context of East Asia. Specifically, Yuen carried out hierarchical cluster analysis with economic convergence theory (not OCA theory) on 12 Asia Pacific countries whilst Nguyen selected five OCA criteria to fuzzy cluster analyze 10 East Asian countries. The selection of variables by Nguyen however, has not taken into account convergence facets pertaining to labor mobility, monetary policy symmetry, and international capital flows. Both studies did not propose any monetary anchor country but as pointed out by Mundell (2003), a hard monetary anchor is necessary for East Asia which lacks in

institutional, political, and economic groundwork such as the European Common Market.

More recently, the analysis by Ibrahim (2008) appears to be more comprehensive than the above studies. The analysis has demonstrated both hierarchical and fuzzy cluster analysis methods, applied OCA and Maastricht criteria, and set Japan as the anchor country. In addition, Ibrahim's study as well as that of Nguyen has to an extent evaluated the impact of the Asian crisis on the results. Nonetheless, they did not segment a separate period accounting solely for the Asian crisis. This is important because stability of country groupings can be assessed when country clusters are compared over consecutive periods. More will be explained in Chapter 5.

Ibrahim's work can be improved in several ways. Firstly, with a limited sample of seven countries, the study could not reflect the inherent interdependencies among ASEAN 10 and other economies in the region. To overcome this shortcoming and to reduce selection bias, the present study includes 20 countries located in the Asia Pacific region.

Secondly, considering only Japan as the anchor country is not persuasive enough. Numerous studies have played down the role of Japan in the region and the viability of the yen as the pivotal currency (see Kwan, 1998; Chow & Kim, 2003; Mundell, 2003; McKinnon, 2005; Shirono, 2009). Recent studies have instead proposed the dollar or a common basket of main currencies as the monetary reference. The present work therefore considers a few possible monetary anchors.

Thirdly, similar to Nguyen's paper, the OCA dimensions Ibrahim investigated are inadequate to reflect the theory and the significance of international capital mobility. In response, this study has incorporated more relevant variables, to be discussed in the next chapter, Chapter 4.

Despite the above limitations, there are several features in Ibrahim (2008) which are

worthy to be adopted. Similar to Ibrahim, this thesis adopts the approach demonstrated by Artis and Zhang (2001, 2002) which operationalized the OCA theory via hierarchical and fuzzy clustering methods. Indeed, this methodology has been replicated by a number of studies (e.g. Boreiko, 2003; Bénassy-Quéré & Coupet, 2005; Nguyen, 2007; Tsangarides & Qureshi, 2008).

Along these lines, the following items indicate how the present study can contribute to the body of knowledge:

- With respect to OCA dimensions, this thesis examines eight criteria which not only represent the different facets of the theory but also current developments in the field in which existing Asia-based OCA cluster analysis studies have neglected. Specifically, Nguyen (2007) has left out the importance of monetary policy symmetry, labor market flexibility, and external indebtedness. Meanwhile, Ibrahim (2008) has not regarded the dimensions pertaining to export diversification, labor mobility, and indebtedness as OCA criteria.
- Aside from hierarchical and fuzzy cluster analysis methods, this study also demonstrates the usefulness of two techniques which are relatively scarcely used in the context of OCA: model-based cluster analysis and principal component analysis. Model-based cluster analysis is a relatively new and a computationally advanced clustering technique whereas principal component analysis is an established dimensional reduction technique in the sciences.
- Unlike other economic zones where the center country is quite certain, few options are still open when it comes to monetary anchor for East Asia. Hence, this paper assesses the findings across the dollar, currency basket, yen, euro, and yuan anchors.
- Most clustering-based OCA studies, including those on Asia have not assessed the degree of preparedness of countries for fixed exchange rates and for monetary union. While cluster analysis is able to identify homogeneous groups, the technique

nevertheless does not indicate how ready the groups might be. For this reason, this study also evaluates the degree of preparedness by using euroized and dollarized countries as benchmarks.

- In another respect, while Nguyen (2007) and Ibrahim (2008) did segment their dataset, they however did not section one single period for the Asian crisis. In this aspect, this study segments the time period into non-overlapping pre-crisis, crisis, and post-crisis periods to explore the impact of the Asian crisis on the findings and to ascertain the stable country linkages across the periods.

Even though time-series modeling is not used in this study, the way the modeling studies used the EMU countries as benchmarks (e.g. Bayoumi & Eichengreen, 1994; Bayoumi & Mauro, 2001; Kawai & Motonishi, 2005; Huang & Guo, 2006) to signify the level of preparedness for monetary union has nevertheless inspired this study to use euroized and dollarized countries as benchmarks.

Based on findings from this chapter, the following research questions and objectives are generated (Table 3.1), as introduced in Chapter 1.

Table 3.1 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
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.
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.
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.
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.
8 How would the results vary over different economic periods?	To compare the results across pre-crisis, crisis, and post-crisis periods.
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.

3.8 Chapter Conclusion

This chapter has reviewed the literature on the concept of OCA, arguments on exchange rate regimes, and relevant empirical works. It has also explained how the present work can improve existing research. The chapter actually set the groundwork for the next chapter on monetary anchor and convergence criteria.