

Exploring Important Elements of Regional Financial Arrangement by Using the Analytic Network Process¹

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1. Introduction

In its recent publication, the Asian Development Bank introduced four pillars of Regional Cooperation and Integration (ADB, 2006). Against the backdrop of the Asian Financial Crisis (AFC), the monetary and financial cooperation and integration pillar rests on three aspects: financial market development and integration, regional macroeconomic and financial stability, and exchange rates. A regional financial cooperation is encouraged for these purposes. Since the Chiang Mai Initiative (CMI) and the decision to collectivize its decision-making process, the efforts to strengthen and formalize the centripetal forces of integration are further enthused. Indeed, the concept of regional cooperation and integration in East Asia has entered a new era.

The growing global imbalances add a new dimension. Adjustments are imperative, because East Asia is one of the “major contributors” to the imbalances. The necessary adjustments, ranging from fiscal support of domestic demand, to monetary and exchange rate policy, will be more effective if coordinated within the region (collective policy adjustments) since the costs and risks associated with the imbalances and the adjustments will be perceived differently by individual countries, i.e., the attractiveness of adjustments is less if the burden is not shared by others. Absence of coordination and agreement to cooperate will cause the policy adjustments undersupplied.

Coordination can be more easily done through a formal cooperation. In this context, the idea of establishing an Asian Regional Financial Arrangement (RFA) has received wide supports from policy makers and scholars alike. Although progress in the preparation has been made, concrete actions are constrained by details that need to be worked out, limited political will, and the vicissitudes of domestic political climate. These numerous challenges and the choice of exchange rate system still need to be overcome as and when concrete moves are made towards establishing a formal regional arrangement.

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The main argument I put forth in this paper is, as the region continues to muddle along, the real costs and benefits of RFA must be thoroughly understood, articulated, and weighted, before moving forward with detailed agreements.

2. Commonality in East Asia and Limited Risk Sharing

Theoretically, regional and global financial integration will help deepen financial markets, strengthen the resilience of participating economies to external shocks, and facilitate the resource pool for investment. Essentially, the source of the benefits comes from the prediction that higher integration implies greater risk sharing and hence larger potential welfare gains.

An extensive literature has been written about increased integration in East Asia. Often quoted statistics are the rising share of intraregional trade. Excluding Japan, the intraregional trade share in emerging East Asia (14 countries) has doubled from 22 percent in 1980 to 44 percent in 2004 (it was from 35 to 55 percent if Japan is included).² This is larger than intraregional trade in NAFTA, but smaller than in EU. It is also well known that the trend has been accompanied by growing proliferation of regional Free Trade Agreements (FTAs).

In the financial sector, however, East Asian economies are less integrated with each other than with major economies particularly the U.S economy. All countries in the region have probably lent more individually to the U.S (from large accumulation of foreign reserves) than to other East Asian economies. But judged from the trend before and after the AFC by using alternative indicators, there is a sign that although still small the level of East Asian financial integration has also increased. Thus, the verdict is still out.³ There is a more important question, however: has the integration benefited the region? More specifically, has the risk sharing increased?

Looking at the intraregional correlations of stock market and real interest rates, with a few exceptions the co-movements and convergence trend are in general stronger after the crisis (Tables 1 and 2).⁴ The super low interest rates in Japan cause the resulting trend for the pairs with this country different than those with other pairs.

² The intraregional trade in ASEAN-10 increased from 18 to 24 percent, albeit with well-known knowledge that much of it is due to the role of *entr e-port* Singapore.

³ Park and Bae (2002) argued that the region has stronger ties with the global market especially with advanced countries rather than with one another. On the other hand, Rana (2006) shows that by using data of 58 new international bonds issued by various East Asian countries during 2002- 2005 the Asian share is recorded relatively high, i.e., over 40 percent in weighted average terms. In addition, data on syndicated credit facilities show that of those signed by borrowers in East Asia almost 70 percent were arranged by East Asian and Japanese banks. In terms of participation in syndicates, most East Asian banks provided 60–95 percent.

⁴ The correlations for interest rates peaked in 2002 when many countries in the region followed the round of interest rate easing by the US Federal Reserve in response to a synchronized global economic downturn. The trend of convergence using the nominal interest rates is even stronger.

Table 1. Correlations of Stock Market Indices

Before Crisis		indo	jap	korea	malay	phi	sing	thai
indo		1.0000						
jap		0.3305	1.0000					
korea		-0.6976	-0.1040	1.0000				
malay		0.7731	0.3760	-0.5562	1.0000			
phi		-0.3708	-0.0196	0.5676	-0.2736	1.0000		
sing		0.1090	0.5048	0.2815	0.3479	0.5067	1.0000	
thai		-0.7095	-0.0774	0.8460	-0.4124	0.6782	0.5042	1.0000

Note: * China was not included here due to data unavailability

After Crisis		china	indo	jap	korea	malay	phi	sing	thai
china		1.0000							
indo		-0.3207	1.0000						
jap		-0.0148	0.0881	1.0000					
korea		-0.1605	0.8854	0.1170	1.0000				
malay		-0.0181	0.7489	0.1506	0.8059	1.0000			
phi		-0.1677	0.7485	0.5242	0.7368	0.5679	1.0000		
sing		0.0352	0.7423	0.4424	0.6356	0.8340	0.7333	1.0000	
thai		-0.4608	0.8733	-0.0425	0.7694	0.7407	0.5030	0.6111	1.0000

Table 2. Correlations of Interest Rates

Before Crisis		china	indo	japan	korea	malay	phi	sing	thai
china		1.0000							
indo		0.6556	1.0000						
japan		0.3046	0.4893	1.0000					
korea		0.4436	0.4441	0.2206	1.0000				
malay		0.6877	0.7190	0.3385	0.4688	1.0000			
phi		0.5744	0.4829	0.7261	0.2157	0.2731	1.0000		
sing		0.4503	0.3649	0.3900	0.3316	0.1457	0.5478	1.0000	
thai		0.4793	0.6308	0.3435	0.1747	0.3377	0.5057	0.3937	1.0000

After Crisis		china	indo	japan	korea	malay	phi	sing	thai
china		1.0000							
indo		0.7878	1.0000						
japan		0.0637	0.0145	1.0000					
korea		0.7658	0.6152	0.0795	1.0000				
malay		0.7110	0.7180	0.1013	0.8210	1.0000			
phi		0.6499	0.6055	0.0365	0.8405	0.7267	1.0000		
sing		0.2652	0.2547	0.1777	0.3352	0.4127	0.3483	1.0000	
thai		0.7937	0.6779	0.1628	0.9030	0.8917	0.8171	0.4917	1.0000

The effect of financial integration on economic growth has been well documented, more so than the effect of integration on international risk sharing. Theoretically, the consumption growth rate in countries participating in integration will be cross-sectionally independent of idiosyncratic variables as financial integration increases (Cochrane, 1991). The key factor is greater insurance. If interregional or international capital markets are well integrated, countries can insure against idiosyncratic shocks. As argued by Obstfeld (1994), individuals will invest more in high risk and high returns assets if the risk can be shared or diversified.

By looking at the impact of financial integration on macroeconomic volatility (one of the indicators of risk sharing), Prasad, Rogoff, Wei and Kose (2003) shows that for more financial integrated developing countries, the consumption volatility relative to GDP volatility has increased. Looking at seven developed countries in East Asia, Brouwer and Dungey (undated) tested for Granger-causality between growth rates in consumption, investment and GDP between countries, and found that despite the evidence of common

trends and factors, the patterns of commonality differ between these variables.⁵ Most of the pairs of data do not reject the null hypothesis that there is no causality between growth rates in those variables across pairs of countries. Thus, there is little evidence of an East Asian business cycle. The authors used these results to advance an argument that there is a scope for policy action to advance integration. The large idiosyncrasy component especially of investment, they argued, suggest that there will be large gains from further integration and cooperation that deepen investment links in the region.

Since the work of Backus, Kehoe and Kydland (1992), there has been a number of studies to examine the presence of full risk sharing using cross-country income and consumption correlations. Most of these studies found that the hypothesis of perfect risk sharing tends to be rejected. Attention has therefore been focused on investigating the incompleteness of risk sharing by looking at the extent of consumption smoothing.

By using data from 1994q1 to 2006q1, I find no support for consumption smoothing among six East Asian countries. The coefficients either have a wrong sign or are insignificant (Table 3; * indicates a 10 percent significant level). Within ASEAN, only for Malaysia and Thailand the coefficients are positive and significant. Even when the period is split into before and after the AFC the results are generally the same: no evidence of consumption smoothing. If the integration in the region is more global, as argued by some observers, this result is not surprising. But when individual country is paired with Japan or with the U.S the results are generally the same, i.e., no evidence of consumption smoothing (available upon request).⁶

The results for investment show that there are slightly more co-movements. The coefficients are significant for Indonesia and Thailand, and with respect to ASEAN-4 the coefficient for the Philippines has also become significant. But there is no improvement in co-movements after the crisis (Table 4). The significant results for all ASEAN-4 during and after the AFC when Singapore is used as the reference country reflect the aggressive move of Singapore in investing in the neighboring countries during the last few years.⁷

Controlling for investment and consumption, the calculation for GDP indicates that there are strong co-movements during the period of observation, except for Indonesia. Most of the improved co-movements occur during and after the AFC, except for Thailand. A similar trend is observed for the co-movements within ASEAN-4. Thus, there is an indication of greater synchronization of business cycles among these countries.

⁵ The countries covered are: Australia, Japan, U.S.A, Korea, Singapore, Taiwan, and Hong Kong-China.

⁶ As a comparison, although statistically and economically different from unity, the consumption correlations in European countries are higher than in other regions. This suggests that more risk sharing is taking place within the EEC. See Backus, Kydland and Kehoe (1992), Devereux, Gregory and Smith (1992), and Canova and Ravn (1996). As expected, a more substantial risk sharing usually exists among sub-national regions due to greater physical mobility, common language, currency and institutions, and better insurance within a country. See, among others, Kalemli-Ozcan, Sorensen and Yosha (2003).

⁷ Using either Japan or the U.S as the reference country does not result in improved co-movements after the AFC.

Table 3. Consumption Smoothing Among East Asian Countries:

$$\Delta \log(C_{i,t}) = \alpha + \beta \Delta \log(C_{b,t}) + \gamma \Delta \log(Y_{i,t}) + e_{i,t}, i = 1, 2, \dots, R$$

	With all countries		Within Asean	
	C	Y	C	Y
Japan	0.008	0.977*		
Indonesia	0.09	0.96*	0.27	0.86*
Korea	-0.17*	1.2*		
Malaysia	-0.04	1.13*	0.12*	0.97*
Philippines	-0.04	0.98*	-0.03	1.01*
Thailand	-0.08*	1.07*	0.07*	0.96*

	With all countries			
	Before Crisis 1994q1-1997q2		During and After Crisis 1997q3-2006q1	
Japan	0.04	0.99*	0.02	0.95*
Indonesia	0.23*	0.95	-0.05	0.98*
Korea	0.01	0.91*	-0.20*	1.20*
Malaysia	-0.02	1.18*	0.2*	0.43*
Philippines	-0.004	0.95*	-0.1*	1.01*
Thailand	-0.05	0.59*	0.01	1.05*

Table 4. Investment Co-movements Among East Asian Countries:

$$\Delta \log(I_{i,t}) = \alpha + \beta \Delta \log(I_{b,t}) + \gamma \Delta \log(Y_{i,t}) + e_{i,t}, i = 1, 2, \dots, R$$

	With all countries		Within Asean	
	I	Y	I	Y
Japan	0.08*	0.91*		
Indonesia	0.9*	1.26*	1.18*	0.62*
Korea	-0.1	1.74*		
Malaysia	0.08	1.85*	-0.01	1.93*
Philippines	-0.04	1.11*	0.16*	0.78*
Thailand	0.51*	1.51	0.45*	1.56*

	With all countries			
	Before Crisis 1994q1-1997q2		During and After Crisis 1997q3-2006q1	
Japan	0.22*	0.78*	0.06*	0.97*
Indonesia	-0.08	1.44	-0.51	1.55*
Korea	0.01	1.15*	-0.03	1.74*
Malaysia	0.6*	0.76	-0.15	2.01*
Philippines	-0.6*	0.79	0.23	0.91*
Thailand	-0.02	2.15*	0.58*	1.5*

	With Singapore **			
	Before Crisis 1994q1-1997q2		During and After Crisis 1997q3-2006q1	
Indonesia	-0.75	-0.59	5.13*	4.58*
Malaysia	3.03*	1.48*	2.91*	2.57*
Philippines	-0.1	-0.4	1.06*	0.95*
Thailand	1.12	1.54*	2.39*	2.32*

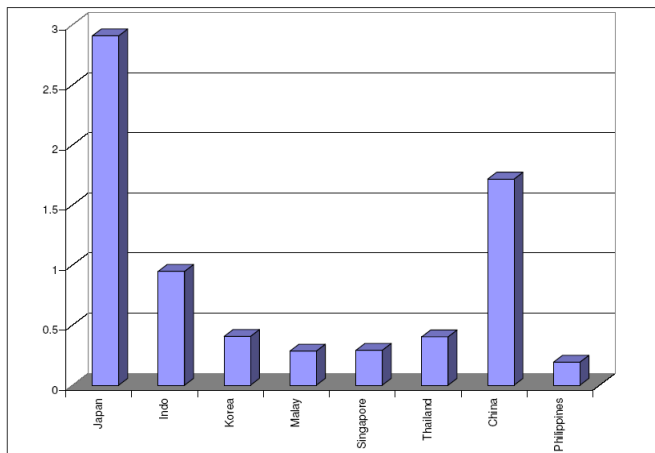
By using simple 10-year moving correlations between GDP growth of individual ASEAN+3 members and the group (excluding the individual member) for 1989-2003, Rana (2006) also found that the GDP correlations among East Asian countries increased after the financial crisis. On the other hand, with a few exceptions, co-movements with

the US declined. Interestingly, by imposing an external shock from the US and a regional shock from Korea and Thailand, it is found that the responses in East Asian countries in terms of industrial production became more pronounced in the post-crisis period.

All in all, while the level of East Asian financial integration may have increased, its benefits in terms of consumption and investment risk sharing have been limited. Even the advantage of having greater resilience to external shock, that could be potentially reaped from greater synchronization of business cycles, has not been evident. The mismatch can be caused by several factors, ranging from substantial share of domestic equity market as a source of finance (French and Poterba, 1991), time horizon and measurement errors (Canova & Ravn, 1996), consumption endowment uncertainty (Obstfeld, 1994a; Mendoza, 1995), to limited size of capital flows and higher sovereign default (Bai and Zhang, 2005).

With evidence showing that risk sharing across countries is far from perfect, alternative measures of welfare gains have been developed. One of such measures uses the permanent percentage increase in expected consumption by utilizing the information about mismatch factors mentioned above, the degree of risk aversion, and the elasticity of substitution between traded and non-traded goods (van Wincoop, 1999). Assuming that preferences are additively separable in tradables and non-tradables, and risk sharing with respect to non-tradables is not possible, Figure 1 shows the welfare gains from the risk sharing (see Appendix 1 for the precise formula). As it turns out, even with this approach the gains are small for all ASEAN countries. Even for Japan and China the gains are only over 1.5 and less-than 3 percent, respectively

Figure 1. Welfare Gains From Regional Risk Sharing



Put in the context of East Asian financial integration, and referring to the formula in Appendix 1, the welfare gain will be larger the longer the time horizon, and when some of the variables can change over-time (endogenous). Thus, although the level of risk sharing in the region is so far limited, the prospective benefits of increased financial integration could be large as the level of risk sharing increases.

The next issue I want to deal with is the exchange rate system deemed appropriate for the regional arrangement. To explore this, I will begin by analyzing the fluctuations of regional exchange rates with respect to some major currencies.

3. Patterns of Exchange Rate Fluctuations: A Basket System?

An extensive literature has been written about the benefit of a common currency in ensuring stability of intra-regional exchange rates. For East Asia, the widely discussed system is based on a basket consisting of the US dollar, the yen, and the euro (Bayoumi and Mauro, 1999; Kawai and Akiyama, 2000; and Kawai and Takagi, 1998). Pegging to the US dollar alone makes the regional currencies prone to a dollar shock that could destabilize the region's effective exchange rate, lowering growth, and endangering macroeconomic stability.⁸ Through a common currency basket, and cooperative and coordinated stabilization the targeting convenience from potential speculative pressure can be removed (Branson & Healy, 2005).

To what extent the effect of rate volatility in East Asia is detrimental to growth and macroeconomic stability? Based on the impulse response functions, fluctuations of regional exchange rates have produced a fairly strong inflationary effect to the regional economy.⁹ In the case of Indonesia, the inflationary pressure has been the largest and longest-lasting. The time required for the pressure to subside varies, ranging from three quarters (Korea) to six quarters (Indonesia). A sharp fluctuation (depreciation) of exchange rates has been therefore detrimental to the region's macroeconomic stability. Evaluating the response of GDP growth to one standard deviation of exchange rate, most cases show that GDP growth has been adversely affected by the depreciation.¹⁰ See Appendix 2 for the complete results. Thus, exchange rate depreciation has not only created an inflationary pressure but also lowered economic growth, among others through the balance-sheet effect during the crisis.

Testing the dynamics of the influence of major currencies of which the basket is likely to consist, the sum of the statistically significant coefficients is found to be very close to unity, especially for currencies with a fixed system, i.e., the Chinese RMB, the HK\$ and the Malaysian ringgit.¹¹ To remove the distortion caused by the sharp fluctuations of

⁸ Prior to the AFC, most economies in the region more or less pegged their currencies to the US dollar, pursued independent monetary policies, and rapidly liberalized their capital accounts. When the crisis struck, many of them scrambled to drop one of the three objectives, i.e., float the exchange rate. Only Malaysia opted to impose capital controls and fix the exchange rate with the US dollar. While Singapore and Taipei-China maintained their managed float exchange rate systems, Hong Kong-China kept its currency board regime. As a result, a diverse set of exchange rate regimes now exists in East Asia.

⁹ The exceptions (insignificant coefficients) are for Taipei-China, Singapore, the Philippines, and Hong Kong-China.

¹⁰ Results for Taipei-China, Singapore, and Hong Kong-China are insignificant.

¹¹ The following model is used: $\Delta e_t^j = \alpha + \beta_1 \Delta e_t^{USD} + \beta_2 \Delta e_t^{Yen} + \beta_3 \Delta e_t^{Euro} + u_t$, where Δe_t^j is the daily change in the log exchange rate of currency j on date t ; and u_t is the disturbances. All exchange rates are measured against the neutral currency (Swiss Franc).

regional exchange rates during the crisis, I conducted a series of rolling regressions by dividing the whole sample for March 1993-January 2006 into several small sub-samples.

Normalizing the statistically significant coefficients, the results are shown in Figures 2 to 7. It is clear that the weights of the US dollar, the yen, and the euro have been changing over the observation period. In most cases, the weight of the US dollar during the post-AFC has declined, and for the ASEAN-5 currencies the role of the Japanese yen increased until around mid-1999. In Thailand, Indonesia, Malaysia, and Korea the role of the yen and the euro exceeded that of the U.S dollar during that period. Since then the U.S dollar gradually regained its influence, but beginning in 2001 its role in the region fell again.

During the recent quarters, the dollar role returned to its pre-crisis level only in the Philippines and Indonesia; it continued to be lower than its pre-crisis level in Thailand, Korea, and Singapore. Thus, the prediction by McKinnon (2000) and Ogawa (2001) that the region will return to a dollar-standard is rather premature. In fact, the dispersion of the coefficients for the three major currencies in Thailand, Indonesia, Singapore, and Korea during the last few years has been smaller than before the crisis.

Figure 2. Thailand Baht

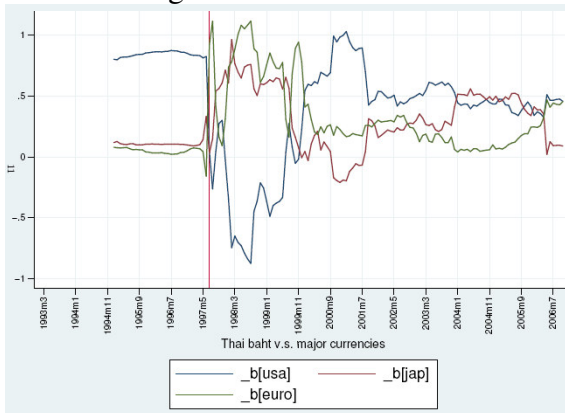


Figure 3. Indonesian Rupiah

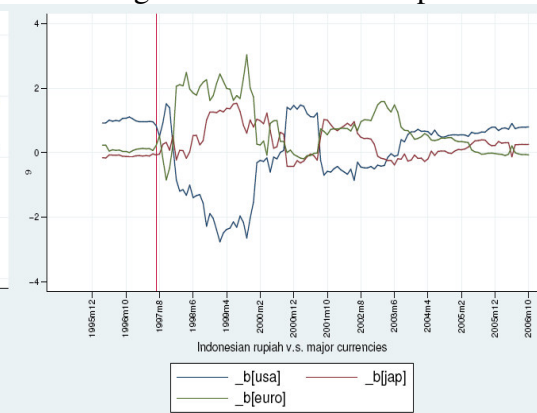


Figure 4. Korean Won

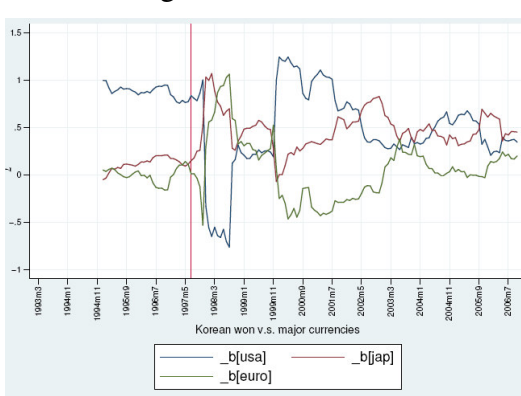


Figure 5. Malaysian Ringgit

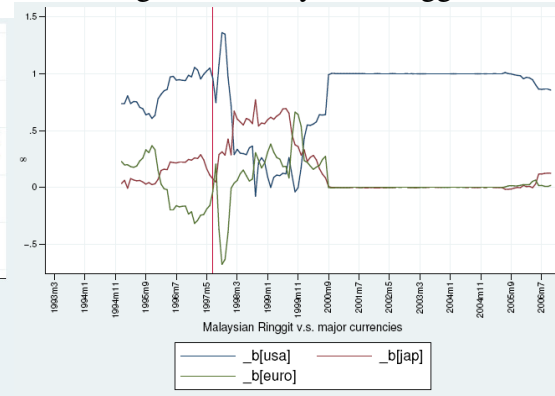


Figure 6. Philippines Peso

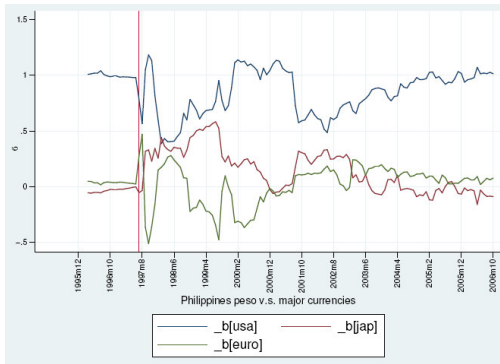
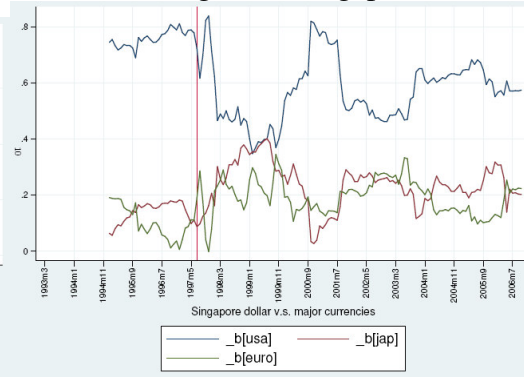


Figure 7. Singapore Dollar



From a separate VAR analysis, I found that the response of regional exchange rates to a symmetric shock is insignificant. The only exception is for the Indonesian case, in which a symmetric shock leading to a decline (an increase) in real GDP will cause the exchange rate to depreciate (appreciate). However, the rate will revert to the pre-shock level fairly quickly, i.e., within 3 quarters. The case of Hong Kong dollar also shows significant results, but the magnitudes of response are very low, ranging from -0.05 to 0.03 of the rate's standard deviation.

Thus, there is an indication that regional exchange rates do not really perform as a shock absorber to a symmetric shock. For the proponents of a basket peg system, this strengthens their arguments. But as revealed in the next two Sections, things are not one-sided. Even if the benefits of such a system can be demonstrated academically, there are plenty of costs and risks that may hamper those benefits from being realized.

4. Articulating Major Components of Regional Financial Arrangement

The framework of analysis to evaluate alternative forms of RFA and the exchange rate system is based on the Analytic Network Process (ANP), which is an advanced and more generalized version of the Analytic Hierarchy Process (AHP). The three alternative forms of RFA to be considered are: (1) RFA with a basket peg system, labeled *RFA Basket*; (2) RFA with a common exchange rate but not using a basket system, labeled *RFA With ER*; and (3) RFA without a common exchange rate system (*RFA Without ER*). In the latter case, each member country is allowed to adopt any system deemed appropriate.¹² Note that in all three alternatives there is a sort of exchange rate coordination.

In searching for the preferred form from those three alternatives, three strategic criteria are set out: securing financial stability (*Fin Stability*), enabling each country to better manage a crisis (*Crisis Management*), and strengthening the regional interdependence among ASEAN+3 countries (*Interdependence*); see Figure 8. Based on formal documents and official statements, securing financial stability to prevent a crisis and strengthening the management of a crisis are the most important strategic criteria.

¹² Note that *RFA Basket* may take a less rigid form, i.e., a basket system but not pegged or fixed. A noted example is a basket-band-crawl (BBC) system.

Figure 8. Searching For Preferred Form of RFA: Model Framework

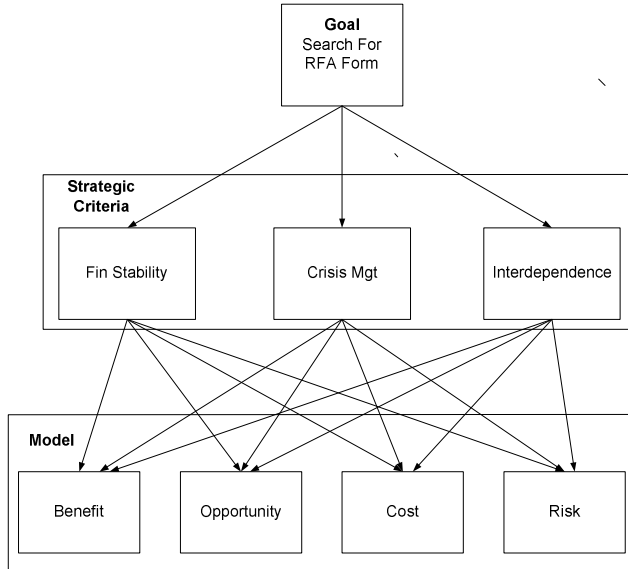
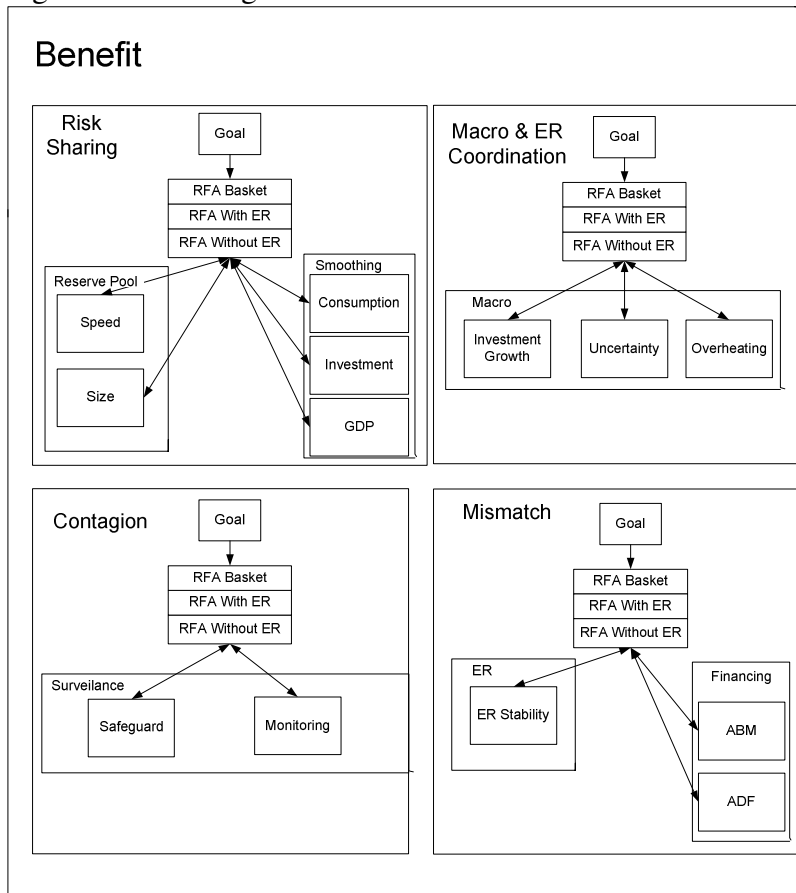


Figure 9. Searching For Preferred Form of RFA: Benefit Model



To fulfill each of those three criteria, the selected form of RFA will have to be evaluated based on its strengths and weaknesses. Some strengths and benefits can be felt in the

short-run (relatively immediately), others may be reaped only in the longer-run. Similarly, each alternative of RFA may have short-term weaknesses and long-term costs. In the model framework, the short-term and future benefits are denoted by *Benefit* (B) and *Opportunity* (O), respectively, and the short-term and future costs are represented by *Cost* (C) and *Risk* (R). Each of the BOCR forms a cluster, within which a relevant model for finding the preferred form of RFA is specified.

In the *Benefit* cluster (Figure 9), there are two-level sub-nets: the first consists of the types of short-term benefits, and the second contains the detailed network model in each of those types.¹³ The four types of short-run benefits are: providing greater latitude for risk sharing among EA countries (labeled *Risk Sharing*), making macro and exchange rate coordination more possible (*Macro & ER Coordination*), strengthening the capacity of each country to avert a potential contagion from others (*Contagion*), and enabling investors in each country to avoid a double *Mismatch*, i.e., in currency and maturity mismatch.

In the benefit of *Risk Sharing* network, the choice of RFA will influence--and is influenced by--the opportunity for each country to activate and strengthen the swap facility (*Reserve Pool*) should it be needed. In line with the CMI, the swap arrangement can eventually be multilateralized by earmarking a portion of foreign exchange reserves held by ASEAN+3 countries for financing members' short-term liquidity needs.

Slow disbursements and a relatively small size of IMF's support during the AFC may have deepened the confidence problem that has led to a rapid fall in regional currencies. Under the selected RFA, these problems can be overcome. Thus, in the *Reserve Pool* cluster there are two nodes: *Speed* and *Size* (Figure 9). Another type of benefits related to risk sharing is to have a greater scope for smoothing of *Consumption*, *Investment*, and *GDP*. As has been shown earlier, the degree of risk sharing through consumption smoothing in East Asia has been low, in contrast to the continually growing regional integration especially in trade area. Once RFA is formally established, the level of smoothing is expected to increase, allowing member countries to benefit from the risk sharing.

Another benefit of RFA is to allow members to conduct macroeconomic and exchange rate coordination (recall that all three forms of RFA to be considered involve some degrees of exchange rate coordination). This will contribute directly to stabilization and growth by reducing uncertainty.¹⁴ Making the exchange rate coordination explicit and

¹³ Unlike in a hierarchy, in a network system the feedback effects are taken into account. Thus, the alternatives can depend on the criteria as in a hierarchy but they may also depend on each other. The criteria themselves can depend on the alternatives and on each other as well. It has been proven that the results of such a network model are more stable because one can consider the influence on and survival in the face of other influences. Thus, the arrows at the bottom level of each block in Figures 9 to 12 point to both directions (a network system).

¹⁴ Take the case of currency realignment. Individual countries may be reluctant to allow their currencies to appreciate if this damages their competitiveness in other Asian markets as well as in markets outside the region. Thus, in the absence of an agreement on concerted action, the willingness to appreciate the currency is limited (free rider problem). A scenario of joint appreciation is therefore preferable, and it can be

formal could also rule out forestalling cascading speculation. This will contribute to the results for the Asian Bond Market (ABM) and the Asian Development Fund (ADF). Such coordination, however, should be approached cautiously. More so than the one in surveillance and reserves pooling because it requires substantial trust-building and political consensus. In the context of reducing the global imbalances, given the region's saving-investment gap the most important and realistic outcome expected from the coordination is a more favorable environment for *Investment Growth* and lowering *Uncertainty*.

Macroeconomic coordination could also provide the basis for surveillance, from which each country can safeguard from a possible contagion. Thus, another benefit cluster is to avoid *Contagion*. Since contagion effects of financial troubles affect countries within a region more severely, and a regional mechanism will respond more quickly to a financial crisis, providing *Safeguard* is ranked the highest, followed by *Monitoring*.

Having learned the hard lesson from having a double mismatch that led to a financial collapse in 1997, the benefit of reducing such a possibility is also notable. On the one hand, with or without an exchange rate arrangement the RFA could still stabilize the exchange rate (*ER Stability*), on the other hand the possibility of a maturity mismatch could be drastically reduced by enhancing the *ABM* and the *ADF*. Figure 9 displays all four clusters under the benefit of RFA.

Whatever form of RFA being selected, another set of benefits may also be reaped but not in the short-run; it is thus a kind of *Opportunity*. Two clusters for these long run benefits are: improvements in the *Capital Market*, and a larger scope for stronger *Supervision*. The development of capital market can provide an opportunity for agents to diversify risks (*Risk Diversity*) and to raise capital from sources other than banks. In some East Asian countries, post-crisis disintermediation has become a binding constraint to lending and investment growth. With a stronger capital market, problems in *Intermediation* can be partly solved. The stability provided by RFA is likely to attract *Capital Inflow* (see Figure 10).

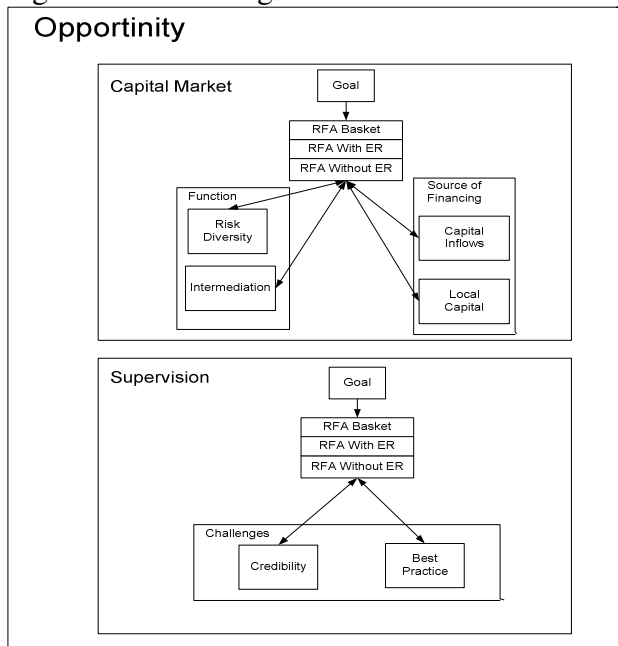
At the same time, if ABM and ADF can be strengthened, regional and *Local Capital* can also be channeled towards investment within the region, narrowing down the saving-investment gap and contributing to the rotation of demand away from exports (especially to the US) in favor of regional sources. Along with the completion of an Asian free trade area, this will help reduce the global imbalances. Again, it will take some time before these benefits take effect.¹⁵

bolstered by the adoption of a particular exchange rate system, e.g., common basket peg, or a common basket, band and crawl (BBC) regime. In such a case, the coordination efforts can focus only on monitoring the behavior of exchange rates themselves, as opposed to ascertaining the consistency of the entire range of national policies (Eichengreen, 2006).

¹⁵ The benefits for the region are not the same with the narrowing of global imbalances. The latter may take longer or shorter time than the said benefits, because it depends not only on the response of East Asian countries but, more importantly, on the policy reaction of the United States.

Establishing RFA will also provide an opportunity for the region to strengthen the *Supervision* function needed to secure financial stability. The choice of RFA in this context will depend on the extent to which the region can meet the formidable challenges in terms of maintaining good *Credibility* of the supervision and keeping it up with the international standard (*Best Practice*).¹⁶ While the two are equally important, maintaining credibility is considered more critical in the longer run. Of course credibility has to be founded upon a reliable judicial system, transparency, and well-defined institutional responsibilities. Strong and reliable legal and regulatory frameworks are the foundations upon which a credibility of supervision (or of any policy for that matter) and financial stability rests.¹⁷

Figure 10. Searching For Preferred Form of RFA: Opportunity Model



The *Cost* cluster in the model contains two subnets: *Coordination* and *Moral Hazard* (Figure 11). One of the worst scenarios is if the selected RFA fails to coordinate members such that the outcome leaves all member countries worse off. This *Coordination Failure* is the most important node within *Coordination* subnet. As discussed earlier, the decompositions of growth in key macroeconomic variables into common and idiosyncratic factors show that East Asia is a complex and heterogeneous entity. When benchmarked to the United States and Japan, the two important trade and investment partners, the differences are also striking. This *Heterogeneity* problem is likely to create difficulties in coordination.

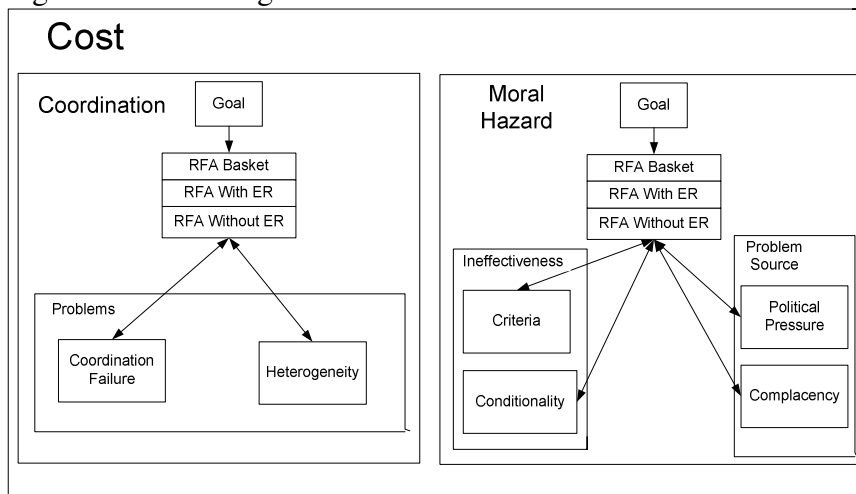
¹⁶ One of the principal tools for strengthening supervision, domestic policies and institutions is international best practice information in financial sector regulation and supervision, and capital market infrastructure.

¹⁷ Malaysia's capital control that was imposed immediately after the crisis is a case in point. The controls had a salutary effect not only because they were temporary and supported by a strong macroeconomic framework and accompanied by bank and corporate restructuring, but more importantly they were implemented with credible supervision (see Kawai and Takagi 2003).

In the *Moral Hazard* subnet, ineffectiveness of adopting the agreed *Criteria* (e.g., for reserve swap) is most costly to the RFA. Without a sufficient degree of compliance, the criteria are ineffective. The same applies to the agreed *Conditionality* (Figure 11). Lack of criteria adoption and low degree of compliance to conditionality will not only cause a credibility problem but more seriously it can lead to a total break down of the system, e.g., reserve-surplus countries cease to participate. Even if the latter continues to participate, moral hazard could be widespread no matter what form of RFA being selected.

Since the AFC, East Asian countries have been moving away from fixed exchange rates and making some progress toward reform of their financial infrastructure. With the recovery process in place, the next greatest danger is complacency. In a similar manner, there is a risk that *Complacency* will emerge once the RFA is established. Having many agreements reached during the process of establishing RFA, it is easy to say that no further work needs to be done.

Figure 11. Searching For Preferred Form of RFA: Cost Model



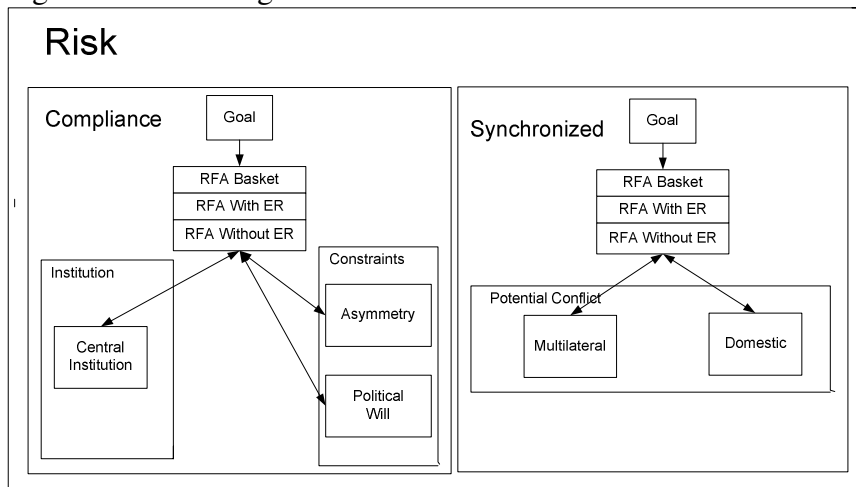
Domestic *Political Pressure* (especially when combined with the region's tradition of no-intervention) can also derail the process by which each member country and the RFA will have no opportunity to gain from acting contrary to the principles laid out by the agreement. Host government policies toward different types of foreign capital, for example, can shape the environment in which foreign capital participates in domestic policy process. Domestic sensitivity and sentiments against foreign capital can determine the political strength of foreign capital, including the strength of traditional policy networks, the presence of domestic allies (e.g., NGOs), and the quality of idea markets (e.g., media, think tanks). When RFA rules are considered too stringent, some agents may not see the strong need to meet the terms because they can get away by hiding behind these domestic forces. Thus, strong domestic political pressures can exacerbate the moral hazard problem (Figure 11).

Even if intensive efforts are made to avoid the presence of moral hazard, there remain some risks of no compliance for reasons ranging from lack of enforcing institution to absence of strong political will. Thus, in the *Risk* cluster there is a node representing

Compliance. The relevant institution under RFA must promote, among others, the development of private markets, which has been hindered by problems of coordination, lack of credibility, and problems of surveillance. Looking at the experience of ASEAN, despite the existence of formal Secretariat that was strengthened in 1992, the region still does not have a central institution to call member-states to always account for non-compliance (e.g., on rules for reserve composition disclosure to facilitate the coordination of reserve diversification and avoid destabilizing policy shifts). There is no reason that a similar faith would not happen with the East Asian RFA. Yet, with no strong *Central Institution* it is extremely difficult to expect a well functioning arrangement (Figure 12).

The presence of asymmetry can also create a serious problem. RFA typically involves an asymmetrical distribution of costs and benefits across member countries. In view of significant externalities in the provision of RFA services (e.g., reserve swap, surveillance, monitoring), it is important that countries coordinate in the design and implementation of the programs from a regional perspective. After all, this is one of the important reasons for setting up a financial arrangement at the regional level. But it is also precisely the same reason for which member countries may fall short of compliance. If, due to *Asymmetry* in the cost and benefit distribution some members cannot exploit economies of scale and externalities in a way that will overcome their original weaknesses, there will not be enough incentives for them to comply with the RFA agreements.

Figure 12. Searching For Preferred Form of RFA: Risk Model



Some argue that a major hindrance to an effective RFA in East Asia is the area's lack of historical experience in regionalism. Whatever economic benefits the RFA may bring, they are unlikely to be realized if each member country is unwilling to cooperate in the political arena. Judging from the recent and future development, China and Japan will have a key role to developing a common *Political Will* in the region.¹⁸ I have argued elsewhere that:

¹⁸ In 2003, the then Japanese vice minister of finance Sakakibara argued that the role of China and Japan in East Asia's integration process is synonymous with that of France and Germany in Europe's integration process. In the report submitted to the fourth gathering of the finance ministers of the Asia-Europe Meeting (ASEM) held in Copenhagen in July 2002, the so-called Kobe Research Project states that "It is essential for the Japan-China cooperation, as a core in East Asia, to lead the process of economic and

“.....most serious risk is the lack of a concrete political integration..... As long as there is no willingness to pool political sovereignty to make room for the creation of regional political institution with real power, any forms of RFA would not be effective. The absence of clear regional leadership and consensus only worsens the situation.....” (Azis, 2005a). Thus, lack of *Political Will* can derail the process of securing a well functioning RFA (Figure 12).¹⁹

The last *Risk* subnet is related to the difficulty of the system to be *Synchronized* with other standards, rules and regulations imposed either by *Multilateral* institutions (e.g., the IMF) or by sovereign governments. Potential conflicts may arise, for example, when the standard of surveillance is not the same, and consequently the assessment over the state of the economy is also different. At the multilateral level, this will raise concerns about the possibility that some member countries when receiving IMF support and RFA swap facility might bypass the IMF conditionality and receive easy money from the RFA because of differences in the assessment. Potential conflicts can also arise due to the inaptness of RFA rules with *Domestic* standards (Figure 12). While the extent of the potential conflict may not be as great as that caused by the sharply different views about the causes of--and appropriate policy response to--a crisis, the problem of domestic standards not being synchronized with RFA rules is of great consequence.²⁰

5. Prioritizing Benefits, Opportunities, Costs and Risks

Having ranked the importance of each node in each cluster and subnet, and by using the pairwise-comparisons to generate ratio scales, results of the calculation are as follow. Of the three strategic criteria, securing financial stability and managing crisis appear to be the highest ranked. As indicated earlier, this is consistent with formal documents and official statements arguing for the establishment of a regional arrangement.

In the *Benefit* cluster under *Risk Sharing* subnet, RFA with a basket exchange rate system (*RFA Basket*) is ranked the highest with respect to both speedy disbursement and consumption smoothing. Looking at the feedback effect, the speedy disbursement of fund through reserve pool and swap arrangement is perceived to be most important under *RFA Basket*.²¹ Despite the limited risk sharing among East Asian countries discussed in Section 2, the benefits of risk sharing through consumption smoothing are still considered most important under the RFA. Thus, from this viewpoint a basket system is superior.

financial integration, as the France-German alliance played a central role in the integration and cooperation process in Europe.”

¹⁹ Lack of political will can also arise from lack of trust. This is particularly true when a new idea floated by one country, e.g., designating the location of RFA head quarter, is viewed with a high suspicion, i.e., some members may ask why the proponent is pushing the idea, and why in such a location?

²⁰ I analyzed the differences between the IMF perspectives and the alternative views about the causes of, and the policy response to, the Asian Financial Crisis in Azis (2005b).

²¹ The typical question in this case is: to obtain the benefit of speedy disbursement, which of three RFA forms has greater relevance (or more preferred)? An example of the question for feedback channel is: under *RFA Basket*, which of two benefit criteria is more likely to be achieved (*Speed* or *Size*)?




However, that is not the case with the benefits of having a greater scope for macro and exchange rate coordination. The ANP calculation under this scenario shows that boosting investment growth in each country is considered most important, and it is consistent with the efforts to mitigate the problem of global imbalances. Consequently, the preferred RFA is the one without any exchange rate arrangement (*RFA Without ER*). Neither a basket system nor any other imposed exchange rate arrangement is preferred. That is, the RFA should be established by allowing each country to adopt whatever exchange rate regime deemed appropriate. It is the stability--not a particular regime--of exchange rate that matters in this scenario.

The same is true for the benefits of avoiding contagion, in which safeguarding member country is ranked the highest. As the financial openness increases and the financial integration deepens, external shocks can be easily transmitted to the region from which a contagion may result. This requires even greater efforts to strengthen the regional financial safeguards by allowing each member country to make necessary adjustments. Thus, *RFA Without ER* is even more preferred (the normalized eigen value is higher than under *Macro & ER Coordination* subnet, i.e., .5802 versus .4696; see Appendix 3).

From the perspective of benefits to avoid a double mismatch, the currency disparity part can be prevented if the selected RFA is able to make the exchange rate more stable. The part on the maturity mismatch, on the other hand, is preventable if the RFA can strengthen the ABM and expand the ADF. To effectively avoid the double mismatch, an exchange rate system based on a basket of major currencies (*RFA Basket*) is more preferred than the other two alternatives.

Thus, viewed from the two types of benefit, *Risk Sharing* and *Mismatch*, RFA with a basket system is ranked at the top. For the other two types (*Macro & ER Coordination* and *Contagion*) RFA without imposing and targeting an exchange rate system is ranked the highest (see Table 5).

Table 5. Net Results (Ranking) of the Benefits Cluster With Feedback Effects




Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.7999	0.3848	1.0000	1
	RFA With ER	0.5064	0.2437	0.6331	3
	RFA Without ER	0.7721	0.3715	0.9653	2

Note that these outcomes are based on a network--not a hierarchical--system. Thus, the feedback effects from RFA to each subnet have been taken into account. The outcomes are therefore more stable. After weighting the priority of the four subnets, the net result indicates that given all the information and considerations, the region would be better off if the RFA is established with neither imposing a basket system nor targeting any common currency regime.

As discussed earlier, the above benefits can take effect relatively immediately after the RFA is formed. But there are two other potential benefits (opportunities) that can be

reaped after the arrangement operates for some time, i.e., enhancing the capital market and strengthening the supervision. With improved capital market, there is a greater scope for member countries to diversify risks and attract capital inflows, especially if exchange rate stability can be maintained. Since the latter is more probable with a basket system, *RFA Basket* is ranked the highest. This alternative is also preferred under a scenario where member countries will have an opportunity to strengthen the financial supervisions. With stronger supervisions, the basket system will be more credible. Therefore, similar to the earlier analysis on the possible immediate benefits, viewed from future benefits (opportunities) a basket system is also preferable (see Table 6).²²

Table 6. Net Results (Ranking) of the Opportunity Cluster With Feedback Effects

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	1.0000	0.4935	1.0000	1
	RFA With ER	0.5494	0.2711	0.5494	2
	RFA Without ER	0.4771	0.2354	0.4771	3

The above analysis, however, neglects the costs and potential risks that may involve in *RFA Basket*. Results of the calculation for the *Cost* cluster show that the difficulty to coordinate and the undesirable effect of moral hazard put *RFA Basket* in the most costly category. On the one hand the coordination failure and the fact that the region is not homogenous tend to create a serious problem with RFA coordination especially under a basket system.²³ On the other hand, the difficulty to meet the agreed criteria combined with the presence of a strong domestic political pressure is likely to derail the process of achieving the benefits from such a system. Thus, while *RFA Basket* is preferred under the *Benefit* cluster, it is least preferred under the *Cost* cluster as it is considered very costly (see Table 7). The European experience with the Euro demonstrates how expensive it is to defend and maintain such a system.

Not only short-term costs that make *RFA Basket* least preferred. The longer-term costs also make it riskiest (Table 8). This is due particularly to the risks of non-compliance that may be caused by a lack of effective central institution to call member-states to always account for deviating from agreements, and by the asymmetrical distribution of costs and benefits across member countries.²⁴ A slightly less pronounced is the risk that RFA standards are not matched with those set out by multilateral institutions or sovereign governments (e.g., different standards of surveillance lead to different assessments about the state of the economy).

Table 7. Net Results (Ranking) of the Cost Cluster With Feedback Effects

²² The complete ranking for each subnet in the benefit, opportunity, cost, and risk clusters derived from the ANP calculation is shown in the Appendix.

²³ The fact that the Asian identity, economic and cultural wise, remains strange to many Asians, may worsen the heterogeneity problem

²⁴ It is worth noted that East Asia has benefited considerably from interactions with the global market. Thus, greater regional integration should not—and need not—come at the expense of the region's increased engagement with the rest of the world.







Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	1.0000	0.6925	1.0000	1
	RFA With ER	0.2891	0.2002	0.2891	2
	RFA Without ER	0.1550	0.1073	0.1550	3

Table 8. Net Results (Ranking) of the Risk Cluster With Feedback Effects

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	1.0000	0.6389	1.0000	1
	RFA With ER	0.3220	0.2057	0.3220	2
	RFA Without ER	0.2433	0.1554	0.2433	3

To sum up, establishing RFA with a basket exchange rate system can provide many short-run and long-run benefits, but it may also entail high costs and large risks. It is therefore important to weigh all costs and benefits before any conclusion is derived.

By assigning equal weight (rating) to the benefit (B), the opportunity (O), the cost (C), and the risk (R), there is a number of ways BOCR can be combined.²⁵ Using “Additive-Negative” approach, the final ranking is: -.2352; .5226; and 1.0 for, respectively, *RFA Basket*, *RFA With ER*, and *RFA Without ER*.²⁶ That is, RFA without imposing and targeting any exchange rate system is preferred. Thus, this observation makes clear that an attempt to suppress intra-regional exchange rate movements would be counterproductive. In the context of making adjustments to reduce global imbalances, it is a recipe for inaction to minimize the risk of a disorderly correction.

Under what circumstances will a basket system be preferable? *RFA Basket* is ranked the highest when preferences for the benefit and opportunity are set higher than for the cost and risk (an unequal BOCR rating, which is not entirely unlikely if the interest and optimism toward regional arrangement grow further). Thus, only with a very sanguine view towards regional arrangement a basket system is likely chosen. Figure 13 shows the results from two scenarios of different BOCR ratings.

Another interesting case is a scenario without feedback effects. That is, influence flows only downwards from criteria (*Risk Sharing*, *Contagion*, etc) to alternatives (the forms of RFA). This is a hierarchical setting that can be solved by using AHP, where the arrows in

²⁵ Rating the BOCR is necessary because in real world the importance of each component of the BOCR is often time weighted differently (Saaty, 1996). The standard benefit/cost approach (“Multiplicative”) is to take the ratio of benefit (B) times opportunity (O) over costs (C) times risk (R). In Azis (2005a) I used this approach. However, an alternative method known as “Additive-Negative” with the advantage that its results can be validated under any circumstances for any scales (e.g., can be compared with negative numbers) is used in the current study.

²⁶ Note that the ideal--instead of the normal--ranking is used because negative numbers are present. I thank Thomas and Rozann Saaty for explaining the main rationale why “Additive-Negative” approach is superior than others. As it turns out, the final ranking based on the “Multiplicative” approach is: .8000; 2.9900; and 9.7709 for *RFA Basket*, *RFA With ER*, and *RFA Without ER*, respectively. Thus, while the priority numbers are different from the “Additive-Negative” approach, in this case the ranking is the same.

Figures 9 to 12 are all set to point to downward direction. While in general the results are less stable than the case with feedback effects, it is not uncommon that policy and decision makers view the problem in this fashion. Results of the calculation using AHP show that, regardless of the BOCR rating the preferred RFA is always the one without imposing or targeting any exchange rate regime (Figure 14).²⁷

Figure 13. Results With Feedback Effects (Network) Under Different BOCR Ratings

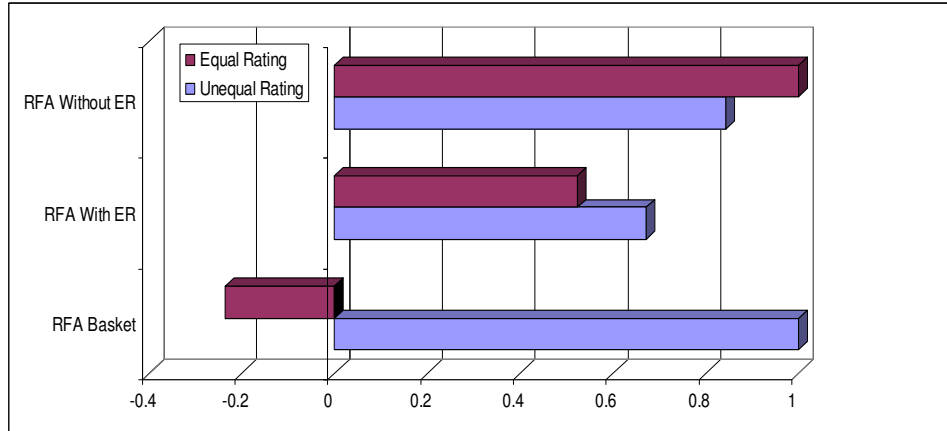
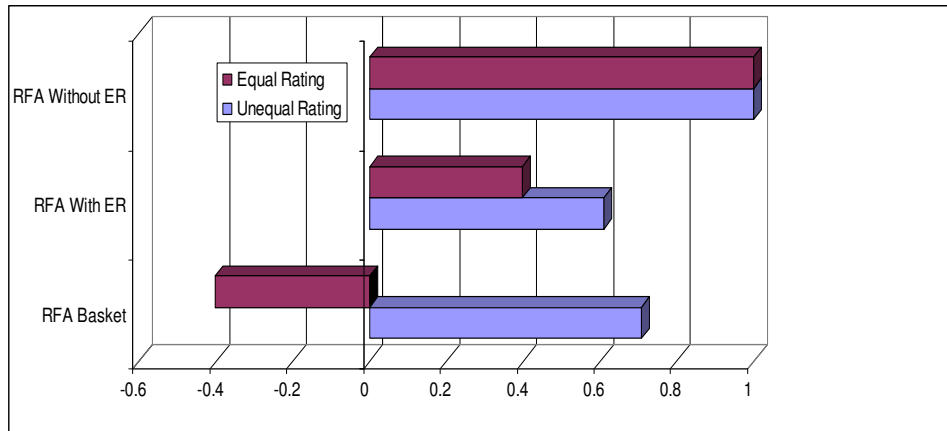


Figure 14. Results Without Feedback Effects (Hierarchy) Under Different BOCR Ratings



How sensitive are the above results to BOCR ratings? The unequal rating used in Figures 13 and 14 is only one of many combinations. To synthesize the whole range of BOCR combinations, a sensitivity analysis is conducted, the results of which are shown in Figures 15 and 16. It is clear that the adoption of a basket-based exchange rate system is preferred only when the weight assigned to the benefit and opportunity is set high, i.e., greater than .90 for benefit and larger than .45 for opportunity.²⁸ On the other hand, evaluating the sensitivity with respect to cost and risk makes virtually impossible for *RFA Basket* to be ranked highest (Figures 17 and 18). This is the reason why under an equal BOCR rating discussed earlier the basket system is not preferred.

²⁷ In applying AHP, here it is specified that all sub-nets under each cluster of the BOCR are weighted equally.

²⁸ This probably reflects the “promising approach” that Kuroda and Kawai (2004) asserted in their article for the Financial Times.

Figure 15. Sensitivity
With Respect to Benefit

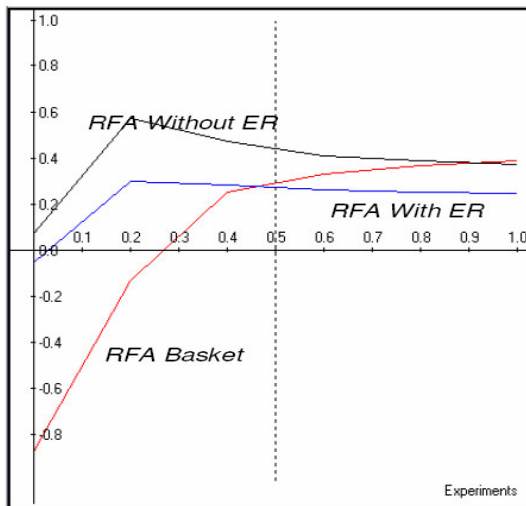


Figure 16. Sensitivity
With Respect to Opportunity

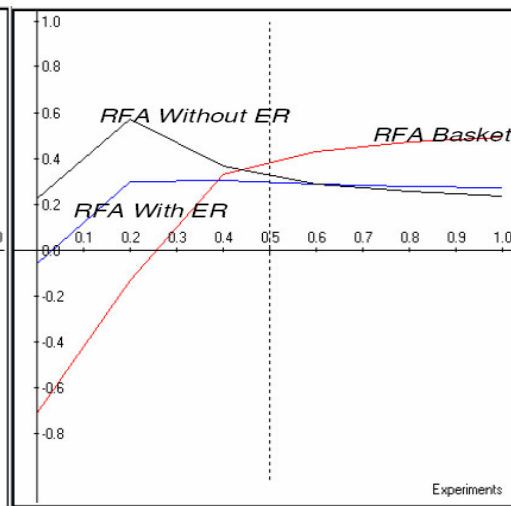


Figure 17. Sensitivity
With Respect to Cost

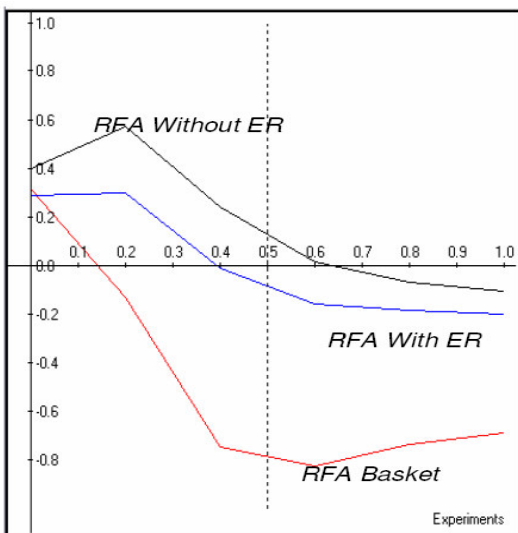
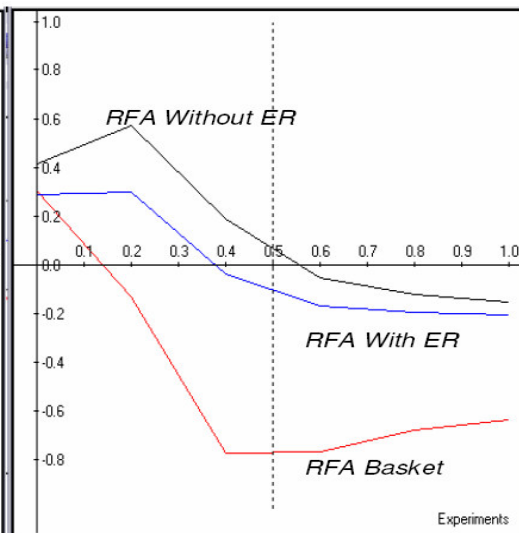


Figure 18. Sensitivity
With Respect to Risk



6. Conclusions

An Asian RFA can potentially help to stabilize the macroeconomic and financial sector commensurate with the efforts to prevent and manage another crisis. It can integrate the region's financial markets to secure and strengthen the existing interdependence. Asian RFA is also an attractive concept to internalize the intraregional spillovers associated with policy adjustments required to reduce the global imbalances. But to fulfill these potentials, and in order to select the appropriate exchange rate regime, member countries must recognize and weigh not only the prospective benefits but also the costs and risks of each alternative.

As demonstrated in the paper, when those factors are taken into account with equal BOCR rating, an exchange rate system based on a basket peg using U.S dollar, the euro, and the yen does not seem to augur well with the region's current conditions. While the system could bring short and long term benefits, the cost and the risk of adopting it are too high. Ideally, a basket peg can offer some cushions against third party exchange rate misalignment. When applied in a band system, it can provide some flexibility to deal with asymmetric shocks. It may also accommodate a certain degree of independence in the conduct of monetary policy. But policies must be predicated not on an ideal world but on the world as it is. In reality, the flexibility can be limited, defending the band at the margin may fail, and unless the compliance is high the system can suffer from a credibility problem.

A basket peg can be also problematic when viewed from efforts to reduce the global imbalances. If the regional currencies are expected to appreciate in order to reduce the global current account deficit, then requiring all countries to adjust their exchange rates by the same amount against a multicurrency basket would have different repercussions to different countries, because U.S trade shares are not the same for all countries. The possible compensatory fiscal policy may also differ because each country's capacity to conduct such a policy is not the same.

Establishing a closer financial cooperation with exchange rate coordination without imposing a common exchange rate system, let alone a basket peg, bodes better for the region at this moment. Only when the BO is rated dis-proportionally higher than the CR will the basket system be superior.

While the current analysis has scrutinized the important merits and costs of RFA, it shies away from assessing the dynamics of the arrangement under different stages and time horizon. I discuss neither a scenario where a centralized reserve pool could, in the later stage, support a common basket peg, nor a scenario under which the issuance of Asian Currency Unit (ACU) may eventually make it the sole legal tender. Such scenarios can be evaluated by using the same network model used in this paper; but I leave this for future study.

References

- Asian Development Bank (2006). *Regional Cooperation and Integration Strategy*, July, Manila.
- Azis, Iwan J. (2005a). "A Regional Cooperation To Support Financial Crisis Management and Prevention: An Application of A Model With Uncertainty and Feedback Influences," *International Journal of Organizational Analysis*, Vol 13, No 3
- _____ (2005b), "IMF Perspectives and Alternative Views on the Asian Crisis," in P. Gangopadhyay and M. Chatterji (eds) *Economics of Globalisation*, Ashgate, England
- Backus, D., P. Kehoe, and F. Kydland (1992). "International Real Business Cycles," *Journal of Political Economy*, 101, p 745-775
- Bai, Y and Jing Zhang (2005). "Financial Integration and International Risk Sharing," *Working Paper*, Department of Economics, Arizona State University, May.
- Bayoumi, Tamin and Paolo Mauro (1999), "The Suitability of ASEAN for a Regional Currency Arrangement." *IMF Working Paper* 99/162, December, Washington, D.C.
- Branson, W.H and Conor N. Healy, "Monetary and Exchange Rate Policy Coordination in ASEAN+1," *NBER Working Paper*, 11713.
- Brouwer, Gordon de and Mardi Dungey (undated), "Revealed Commonality: Linkages in Consumption, Investment and Output in East Asia," unpublished memo.
- Canova, Fabio and Morten O. Ravn (1996). "International Consumption Risk Sharing," *International Economic Review*, Vol 37, No 3. August.
- Cochrane, J. (1991): "A Simple Test of Consumption Insurance," *Journal of Political Economy*, 99(5), 957-976.
- Devereaux, M., A. Gregory, and G. Smith (1992). "Realistic Cross Country Consumption Correlations in a Two-Country, Equilibrium, Business Cycle Model," *Journal of International Money and Finance*, 11, p 3-16.
- Eichengreen, Barry (2006). "Global Imbalances and the Asian Economies: Implications for Regional Cooperation," *ADB Working Paper Series on Regional Economic Integration*, No. 4, August.
- French, K.R., Poterba, J.M., (1991). "Investor diversification and international equity markets," *American Economic Review*, Papers and Proceedings 81, 222-226.

Kalemli-Ozcan, S., B.E Sorensen and O. Yosha (2003). "Risk Sharing and Industrial Specialization: Regional and International Evidence," *The American Economic Review*, Vol 93, No 3, June.

Kuroda, Haruhiko., and Masahiro Kawai (2004). "Asia's New Financial Architecture Needs Support," *Financial Times*, June 17.

Kawai, Masahiro and Shigeru Akiyama (2000). "Implications of the Currency Crisis for Exchange Rate Arrangements in Emerging East Asia". *Working Paper*, World Bank, Washington D.C.

Kawai, Masahiro and Shinji Takagi (1998). "Proposed Strategy for a Regional Exchange Rate Arrangement in Post-Crisis East Asia". *Working Paper*, World Bank, Washington D.C.

Kim, Soyoung., Sunghyun H. Kim, and Yunjong Wang (2004). "Regional vs. Global Risk Sharing in East Asia." *Working Paper*, 04-02, The Korea Institute for International Economic Policy (KIEP)

McKinnon, Ronald M. (2000), "After the Crisis, the East Asian Dollar Standard Revisited," Mimeograph, Stanford University

Ogawa, Eiji (2001), "Causes, Effects and Lessons from the Asian Crisis: From a Viewpoint of Exchange Rate System," Mimeograph, Hitotsubashi University, Japan.

Mendoza, E., (1995). "The terms of trade, the real exchange rate and economic fluctuations." *International Economic Review* 36, 101–137.

Obstfeld, M. (1994). "Risk-taking, global diversification, and growth." *American Economic Review* 84, 1310–1329.

_____ (1994a). "Evaluating risky consumption paths: the role of intertemporal substitutability," *European Economic Review* 38, 1471–1486.

Park, YC, and K-H Bae (2002). "Financial Liberalization and Economic Integration in East Asia." Paper presented to PECC Finance Forum Conference on "Issues and Prospects for Regional Cooperation for Financial Stability and Development," Honolulu, 11-13 August.

Prasad, E., K. Rogoff, S. Wei and M. Kose (2003). "Financial Globalization on Developing Countries: Some Empirical Evidence," *IMF Working Paper*, Washington D.C.

Rana, Pradumna B (2006). "Economic Integration in East Asia: Trends, Prospects, and a Possible Roadmap," *ADB Working Paper Series on Regional Economic Integration*, No. 2.

Saaty, T. L. (1996). *Fundamentals of decision making and priority theory with the analytic hierarchy process*. Pittsburgh, PA: RWS Publication.

_____ (2001). *Decision making with dependence and feedback: The analytic network process*. Pittsburgh: RWS Publication.

van Wincoop, Eric (1999). "How big are potential welfare gains from international risksharing?" *Journal of International Economics* 47 (1999) 109–135

Appendix 1. Welfare Gains From Risk Sharing

Consider the following expected utility:

$$U = E \int_0^h e^{-\alpha t} \frac{(c_{it}^T)^{1-\delta}}{1-\delta} dt$$

where δ is the rate of risk-aversion, c_{it} is the consumption of tradables by residents of country i , and h is time horizon. Assuming consumption endowment of tradables, y_{it} , follows a random walk, then if there is no risk sharing at all the expected utility would be (van Wincoop, 1999):

$$U = \frac{(y_{i0}^T)^{1-\delta}}{1-\delta} \cdot \frac{1 - e^{-[\alpha + (\delta-1)(\rho - 0.5\delta\sigma_T^2)]T}}{\alpha + (\delta-1)(\rho - 0.5\delta\sigma_T^2)}$$

from which the welfare gain is:

$$- [1 - h(r - \bar{\rho}) \frac{e^{-(r-\bar{\rho})h}}{1 - e^{-(r-\bar{\rho})h}}]$$

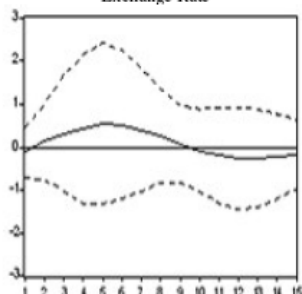
where ρ is the risk-adjusted growth rate of consumption, r is the risk-free adjusted interest rate, and $(r-\rho)$ is the discount rate.

In calculating the welfare gains for East Asian countries, some of the employed parameter values are taken from Kim, Kim and Wang (2004), and following van Wincoop (1999) the risk-aversion parameter is set to 3. The risk-free real interest rate $r=2.62$ is calculated from the average risk-free rate of ASEAN+3.

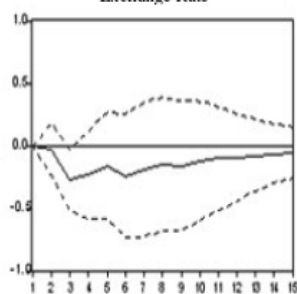
Appendix 2. Impulse Response of GDP Growth and Inflation to Exchange Rate Shock

Hong Kong

Response of GDP Growth To 1 S.D. of Exchange Rate

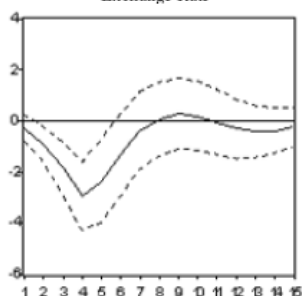


Response of Inflation To 1 S.D. of Exchange Rate

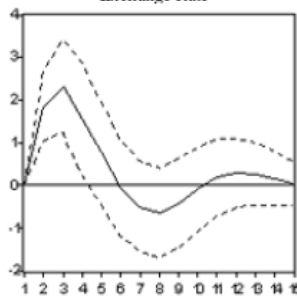


Indonesia

Response of GDP Growth To 1 S.D. of Exchange Rate

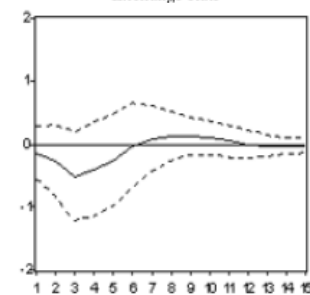


Response of Inflation To 1 S.D. of Exchange Rate

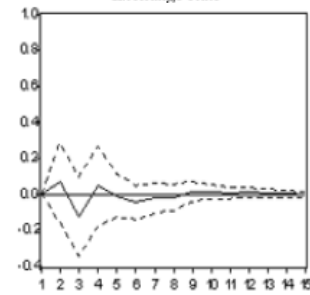


Taipei China

Response of GDP Growth To 1 S.D. of Exchange Rate

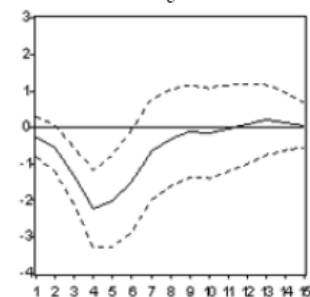


Response of Inflation To 1 S.D. of Exchange Rate

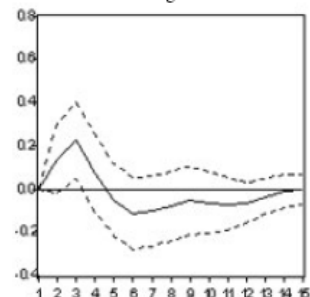


Thailand

Response of Inflation To 1 S.D. of Exchange Rate

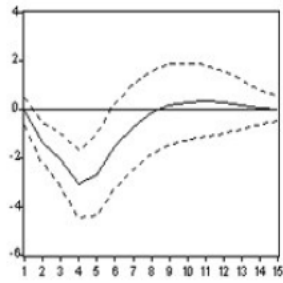


Response of GDP Growth To 1 S.D. of Exchange Rate

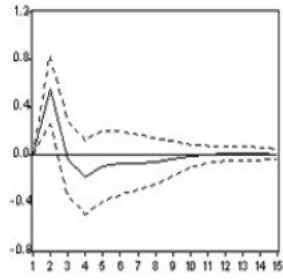


South Korea

Response of GDP Growth To 1 S.D. of
Exchange Rate

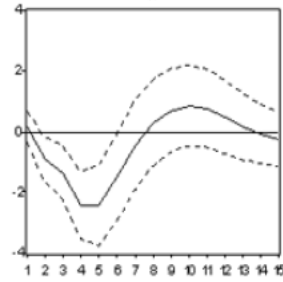


Response of Inflation To 1 S.D. of
Exchange Rate

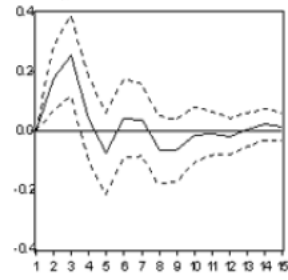


Malaysia

Response of GDP Growth To 1 S.D. of
Exchange Rate

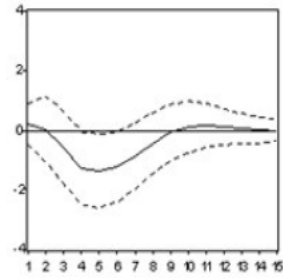


Response of Inflation To 1 S.D. of
Exchange Rate

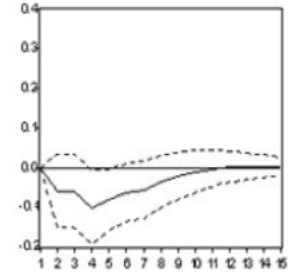


Singapore

Response of GDP Growth To 1 S.D. of
Exchange Rate






Response of Inflation To 1 S.D. of
Exchange Rate






Appendix 3. Results From Using A Network Model




Benefit → Risk Sharing

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.2308	0.4615	1.0000	1
	RFA With ER	0.1141	0.2283	0.4946	3
	RFA Without ER	0.1551	0.3102	0.6721	2




Benefit → Macro & ER Coordination

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.1218	0.2437	0.5189	3
	RFA With ER	0.1434	0.2868	0.6108	2
	RFA Without ER	0.2348	0.4696	1.0000	1




Benefit → Contagion

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.1147	0.2293	0.3952	2
	RFA With ER	0.0953	0.1905	0.3284	3
	RFA Without ER	0.2901	0.5802	1.0000	1



Benefit → Mismatch

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.3203	0.6406	1.0000	1
	RFA With ER	0.1247	0.2494	0.3893	2
	RFA Without ER	0.0550	0.1100	0.1718	3

Opportunity → Capital Market




Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.2292	0.4584	1.0000	1
	RFA With ER	0.1389	0.2778	0.6060	2
	RFA Without ER	0.1319	0.2639	0.5756	3

Opportunity → Supervision




Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.3203	0.6405	1.0000	1
	RFA With ER	0.1216	0.2432	0.3797	2

	RFA Without ER	0.0581	0.1162	0.1814	3
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Cost → Coordination

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.3481	0.6962	1.0000	1
	RFA With ER	0.0985	0.1970	0.2829	2
	RFA Without ER	0.0534	0.1069	0.1535	3




Cost → Moral Hazard

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.3409	0.6817	1.0000	1
	RFA With ER	0.1048	0.2097	0.3076	2
	RFA Without ER	0.0543	0.1086	0.1593	3

Risk → Compliance

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.3334	0.6668	1.0000	1
	RFA With ER	0.0941	0.1882	0.2823	2
	RFA Without ER	0.0725	0.1450	0.2174	3

Risk → Synchronized

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	RFA Basket	0.2736	0.5472	1.0000	1
	RFA With ER	0.1315	0.2631	0.4807	2
	RFA Without ER	0.0949	0.1897	0.3467	3