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Which Exchange Rate Regime for Asia?

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ABSTRACT

Following the 1997 economic crisis in Asia there is a continuing debate on the appropriate exchange rate regime for Asian economies. A number of alternative exchange rate regimes have been proposed but there has been little empirical assessment of the consequences of the alternatives for the individual Asian economies. This paper offers some preliminary empirical evidence on the impacts of alternative regimes using a global empirical model containing considerable detail on individual Asian economies including both sectoral dis-aggregation for each economy, macroeconomic features, and the linkages between countries in the region through international trade of goods and financial assets.

In evaluating the performance of alternative exchange rate arrangements in Asia for output and inflation variability, this paper considers a number of shocks. The exchange rate regimes compared are floating exchange rates throughout Asia (with each central bank targeting inflation) and three forms of fixed exchange rates: a basket peg in which each Asian economy pegs their exchange rate to a basket of the Euro, $US and Yen (with Japan pegging to a basket of the Euro and $US); a Yen zone in which each Asian economy pegs their exchange rate to the Yen (and the Bank of Japan targets inflation); and an Asian Currency Unit in which a single currency circulates in Asia and an Asian central bank targets average Asia-wide inflation. The shocks considered are shocks to aggregate demand, aggregate supply and economy wide risk that are either global, Asia wide or country specific.

Not surprisingly, given the empirical literature for industrial economies from the last two decades, we find that the appropriate exchange rate regime varies across countries depending on, amongst other things, the economic structure of each country as well as the nature of the shocks hitting each economy, and the target variables that policymakers care about. No regime dominates for all shocks but the regimes of floating and a basket peg to the $US, Euro and yen generally perform better than the Asian currency union on Yen zone regimes.

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1. Introduction

There is an important debate under way on the appropriate exchange rate regime for economies in Asia. This debate has been accentuated by the Asian currency crisis and a perceived increase in volatility in the world economy. On the one side there are calls for maintaining floating exchange rates (Mussa (2000)) while of the other there are various forms of fixed exchange rate regimes being proposed (McKinnon (2000), Williamson (2000)). These range from a Yen bloc, to an Asian currency unit (ACU) (Ogawa and Ito (2000)) or to various forms of basket pegs within each economy. The arguments on both sides of the debate are familiar from earlier debates going at least back to the "optimal currency area" literature pioneered by Mundell (1961). It is well known that it is difficult to make much headway on deciding which exchange rate regime a country should adopt without an empirical evaluation of the various alternatives. From the theory of exchange rate regimes, we find that the optimal exchange rate regime depends on a range of empirical features of economies (both the economic structure and the nature of shocks). The large body of evidence in Bryant et al (1993) for industrial economies demonstrates that not only is the theoretical choice of the optimal exchange rate regime ambiguous, but different empirical approaches generate different conclusions for the industrial economies.

In the case of Asia, there has been almost no empirical research into the important questions of comparing the performance of different exchange regimes in an empirical framework. This paper attempts to fill this void. In section 2, we first summarize the theory of exchange regime choice and then in section 3, summarize the overall debate in the Asian context. In section 4 we survey other empirical studies of exchange rate regimes in Asia.

In order to capture the many issues of exchange rate regime choice in a general equilibrium framework, this paper uses the G-Cubed (Asia-Pacific) model. This model is outlined in section 5. It is derived from the G-Cubed model developed by McKibbin and Wilcoxen (1998) but with a specific focus on the Asian economies. As with the G-Cubed model, this model captures simultaneously the macroeconomic and sectoral linkages in a global model with partially forward looking asset market and spending decisions in which expectations of risk are integral to the functioning of domestic economies and the global economy. The G-Cubed (Asia Pacific) model has country/regional ids-aggregation of: Korea, Japan, Thailand, Indonesia, China, Malaysia,

Singapore, Taiwan, Hong Kong, Philippines, Australia, New Zealand, United States, India, Rest of the OECD, Oil exporting developing countries, Eastern Europe and Former Soviet Union and all other developing countries. Each country/region has an explicit internal macroeconomic and sectoral structure with sectoral disaggregation in production and trade into 6 sectors.

This is a model in the class of dynamic intertemporal general equilibrium models[1] that incorporate both financial and real economic activity in a global framework. This new class of models designed specifically for the highly integrated world economy of the late 20th century, integrates the desirable features on both macroeconometric models and computable general equilibrium models. This approach to modeling has proven useful in understanding other recent global shocks such as US fiscal policy in the 1980s, the consequences of NAFTA, German Unification and the recent crisis in Asia[2]. A key feature of this model is the role of international capital mobility in economic adjustment and the role of financial markets in real economic activity when there are adjustment costs and unemployment in labor markets as well as liquidity constrained households and firms but forward looking asset markets[3].

Using this model, in section 6 we explore the relative performance of four regimes: floating exchange rates (with central banks targeting inflation); a fixed peg to the Euro and $US with equal and fixed weights; a fixed peg by each Asian economy to the Yen (i.e. a Yen zone much like the European Monetary System except with Japan rather than Germany as the anchor country – with Japan targeting inflation); and a regime in which there is a single Asian Currency Unit (ACU) and the value of that unit is set by the Asian Central Bank (ACB) so as to minimize the variance of the Asia wide inflation rate calculated by weighting the inflation rate of each economy by its relative GDP weight in Asia4. The performance of each regime is assessed relative to three types of shocks: demand shocks, supply shocks and changes in country risk under differing assumptions about whether these shocks are global (symmetric), regional (symmetric

1 Referred to as DIGEM models
2 See McKibbin and Sachs (1991), McKibbin and Vines (2001) and McKibbin and Martin (1998)
3 The classic paper by Dornbusch(1976) illustrated that with rapidly adjusting asset markets and sticky goods markets considerable overshooting of asset prices can occur. This intuition is generalized in the G-Cubed model.
4 Weighted by 1999 GDP in $US1999.

within Asia) or country specific (asymmetric).

We find that consistent with the literature on regime choice in the OECD economies, the optimal choice of exchange rate regimes differ across economies depending on the structures of economies and the nature of the shocks. Despite this, a few preliminary conclusions can be drawn and these are outlined in section 7.

2. Issues in The Choice of Exchange Rate Regimes

a. Theories on exchange rate regime choice

The theory of the choice of an optimal exchange rate regime has been principally based on the classical theory of Optimum Currency Areas developed by Mundell (1961). An optimum currency area is defined as a geographical area in which member countries should use absolutely fixed exchange rates among themselves or, equivalently, have a common currency. Mundell and his followers have stipulated several criteria to assess whether a country should belong to an optimal currency area. These include: the symmetry of external shocks; the degree of labor mobility, the degree of openness; and the extent of economic diversification (Mundell 1961), (McKinnon 1963), (Kenen 1969). The more recent literature uses the same criteria to assess whether a country should fix or float its currency against currencies of countries in a specific optimal currency area. If the country in question is relatively open in terms of trade to another country (or a group of countries in a currency block), but has no or negligible labor mobility across its border, its economy is not well diversified, and it faces different external shocks, a flexible exchange rate is likely to be a better choice for that country.

The intuition behind the optimal currency area criteria is that real adjustments within an economy that has been hit by external shocks, usually take time if nominal rigidities (i.e. in wages and prices) exist. The absence of labor mobility across borders rules out another adjustment mechanism. Thus, flexible exchange rate would be the only automatic shock absorber that the country may rely on. Although Mundell did not discuss directly the other benefits of using fixed

exchange rates such as minimizing transactions costs in trade etc, he implied that if the cost of adjustment for a country is not large, i.e. if the OCA criteria are met to some extent, it's better to choose a fixed exchange rate in order to get the benefit from the stability of the currency.

A more recent literature discusses another benefit of flexible exchange rate relying on the doctrine of the "impossible trinity", which simply means the impossibility of having fixed exchange rate, capital mobility, and monetary independence at the same time (e.g. Frankel 1999). Under this doctrine, having a flexible exchange rate under the condition of high international capital mobility allows policy makers to conduct independent monetary policies for domestic purposes. But if domestic authorities cannot make good use of the independence of monetary policies, it may be better to surrender this independence in order to import stability from other countries. Furthermore, other factors such as central bank independence, administrative capacity, foreign exchange market capacity (i.e. depth and liquidity) can also influence to the trade-off between monetary independence and exchange rate stability.

Some theoretical models have been developed to formalize these ideas, e.g. (Edwards 1996), (Calvo 1999), (Ogawa and Ito 2000), (Devereux and Engel 1998)[5]. The models either minimize the variance of output, the trade balance, the authorities' loss functions, or maximize consumer welfare in a general equilibrium setting. Then they compare the outcomes under the two exchange rate regimes and specify the conditions under which fixed or flexible exchange rates is preferred. The findings generally confirm (or repeat) the intuition from the early optimal currency area literature and the "impossible trinity" literature. A problem with these theoretical studies is that the models used have to be simplified in order to be able to derive analytical solutions. Although they offer particular insights, it is not clear how reasonable these theoretical models might be in deciding on the exchange rate regime choice for a particular country. More realistic

5 Other class of models which do not directly address the exchange rate regime choice but look specifically at a certain exchange rate regime (e.g. common currency, dollarization) have also developed. See for example Bayoumi, T. (1994). "A Formal Model of Optimum Currency Areas." IMF Staff Papars **41**(4)., Ricci, L.-A. (1997). "A Model of an Optimum Currency Area." IMF Working Paper WP/97/76.

and empirically based models of a particular country are needed before a choice of exchange rate regime can be considered for that particular country.

3. Current debates on Exchange Rate Regimes in East Asia

After the 1997-1998 Asian crisis, the debate on the appropriate exchange rate regime has intensified especially because many authors find that the fixed exchange rate pegs in the region before the crisis was one of the causes of the crisis. It has been popular to argue that "*hollowing of the middle*" of the exchange rate regime choice has occurred. This essentially means only a hard peg and independent float are the viable regimes among all the regimes in the continuum of exchange rate regimes. All the middle regimes such as a soft peg or a managed float are argued to be unsustainable and crisis-prone because they lack credibility and are vulnerable to speculation attacks. However, "*hollowing of the middle*" followers soon go back to the "impossible trinity". In their recent papers (Fischer 2001), and (Mussa et al. 2000), recognize that managed floating and other middle regimes are viable for many countries with certain conditions of capital mobility and economic development. Interior solutions turn out to be the best (or at least the second best) for many countries with low capital mobility, underdeveloped capital and foreign exchange markets.

The second concept, which has become popular in the recent literature on exchange rate regime choice, is the "*fear of floating*". This is the title of a paper by (Calvo and Reinhart 2000), in which the authors show that only a short time after the crisis, the exchange rate regimes of East Asian economies have in fact returned to their previous fixed regimes (de facto) despite their official announcements that exchange rates are flexible. Similar evidence has also been found by other authors (McKinnon 2000), (Hernandez and Montiel 2001). Although the distinction between de facto and de jure exchange rate regimes was raised before the crisis (Ghosh and et al. 1995), the fact that exchange rate regimes in emerging markets (EM) have a tendency to become fixed de facto, has only been found since the crisis.

There are two main explanations for the *fear of floating*. First, although there is no direct implication from standard theory that the choice of the exchange rate regimes would have a significant impact on trade and investment. Yet there is a widespread belief that exchange rate stability would significantly promote trade although most empirical studies have not strongly supported this argument[6]. Given the openness in the economies of East Asia and this argument, the de facto exchange rate regimes is Asia are found to be mostly fixed. Some other empirical evidence shows that fixed exchange rates have positive effect on investment, directly or indirectly through real interest rate (Ghosh and et al. 1995, Levy-Yeyati and Sturzenegger 2001). Therefore, the use of fixed exchange rates is argued to help the emerging market economies in East Asia to promote growth through high saving and investment.

The second explanation for the *fear of floating* is dollarization liability. Since most of developing countries cannot borrow overseas in their own currencies, which has been labeled by the literature as the "original sin", most of their foreign liabilities are denominated in one or several major foreign currencies. Therefore, a sharp depreciation of their exchange rate would put domestic banking and corporate sectors under severe bankruptcy pressure (Williamson 2000). This is often argued to be the reason for a financial crisis turns into an economic depression. Since East Asian economies cannot preclude themselves from the original sin, more or less fixed exchange rate is argued to be preferable for this reason.

Regarding specific exchange rate regimes for East Asia, there have been several proposals. The IMF advocates more flexible exchange rate regimes among East Asian NICs, or at least those countries should prepare for an exist strategy if they currently adopt fixed exchange rates (Mussa et al. 2000). Recent experience of financial crises suggest that openness, capital mobility and low inflation, which are typical for emerging markets in East Asia, make flexible exchange rates more

6 An exeption is an empirical study by Andrew Rose Rose, A. (2000), Currency Unions: Their Dramatic Effect on International Trade. Economic Policy: A European Forum. in which the author shows that currency union, the hardest peg, has a huge impact on trade, to the extent of several hundred per cents.

desirable. For other countries in Asia, which are less developed such as China and Indochina countries, fixed exchange rates of some kinds might be more relevant. The prospect of a regional currency arrangement among ASEAN countries or a wider group in the region is not currently applicable for the region lacks institutional capability and political consensus. Nonetheless it is worth considering the implications of a such as system.

Opposite to the IMF opinion is the idea of making the exchange rate across the region fixed, either to the USD (dollar standard bloc) (McKinnon 2000), or a common basket of USD/Euro/Yen (Goto and Kawai 2001), the basket/band/crawl – or BBC (Williamson 2000), or a common Asian currency unit (ACU) (Ogawa and Ito 2000). These authors point out many weaknesses of flexible exchange rates under the conditions found in East Asia. These problems are similar to the arguments of the *fear of floating* school. McKinnon (2000) even pushes further by suggesting that East Asian countries should pre-announce "*restoration rules*" which are essentially a promise of going back to the fixed exchange rates in case they have to temporarily abandon the peg. Besides using a fixed exchange rate, these authors also emphasize a common arrangement among East Asian countries, hence, they seem to believe East Asia is an optimal currency area.

Some other authors also support the idea that East Asia could form an optimal currency area given economic fundamentals, but they do not believe political and institutional conditions in the region are mature enough for this move (Bayoumi and Mauro 1999), (Wyplosz 2001). Opposing more strongly the idea of the East Asian OCA, de Brouwer (2001) argues on economic grounds that East Asia countries are so diversified in terms of trading partners and export components, that they require very different monetary and exchange rate responses in the case of external shocks. The results of this current paper support this view. Although these authors do not recommend any specific exchange rate regime for the East Asia, they all recognize the importance of exchange rate stability within the region, and hence they seem to favor an exchange rate regime that is pegged to some degree.

There are other papers arguing that current exchange rate regimes in East Asia, specifically in Thailand, Indonesia, Philippines, and Korea, are already optimal based on second best arguments. Hernandez and Montiel (2001) take a stand in between of the fear of floating camp and the hollowing of the middle camp. They show that the exchange rate regimes in the most crisis-affected countries indeed have become more flexible compared to their pre-crisis regimes but the authorities in those countries have also tried to keep exchange rate variability low. In the aftermath of the crisis, the exchange rate regimes have been successful in terms of achieving the objectives of accumulating reserves, slowing down real appreciation, and keeping exchange rate variability low.

4. Recent Empirical studies for East Asia

Although the debate about which exchange rate regime is best for East Asia is important, there are not many empirical studies that focus on this issue. The current empirical literature can be divided into two groups. The first group tries to identify the nature of East Asian exchange rate regimes eg. Frankel and Wei (1994), Calvo and Reinhart (2000), McKinnon (2000), Hernandez (2001). The second group experiment with some sorts basket fixed exchange rate regimes to test the effect of moving to a basket regime on the exchange rate stability, trade balance, capital flow, or other macroeconomic indicators (Ohno 1999; Ogawa and Sun 2000; de Brouwer 2001).

The first group of empirical studies usually takes the approach used by Frankel and Wei (1994) which regressed a domestic currency on the US dollar, the Japanese Yen, the German Mark or the Euro to investigate which major foreign currency the domestic currency follows the most. Not surprisingly, East Asia countries are found to have a large weight on the US dollar, both before and after the crisis. A table below from McKinnon (2000) illustrates this type of

empirical literature. Although the findings are useful for positive purpose, they do not help directly to answer the normative questions of exchange rate regime selection.

Country	USD coefficient (standard error)	
	Pre-crisis (Jan 94 – May 97)	**Post-crisis (Jan 99 – May 00)**
China	1.006 (0.006)	1.000 (0.001)
Hong Kong	0.993 (0.003)	1.000 (0.002)
Indonesia	0.988 (0.016)	0.456 (0.356)
Korea	0.934 (0.035)	0.960 (0.092)
Malaysia	0.924 (0.033)	1.000 (0.000)
Philippines	1.005 (0.044)	0.893 (0.064)
Singapore	0.852 (0.021)	0.755 (0.056)
Thailand	0.893 (0.013)	0.721 (0.085)
Taiwan	0.929 (0.022)	0.902 (0.041)

Source (McKinnon 2000)

The second group of studies simulates various hypothesized basket fixed exchange rate regimes to determine the effect on various economic indicators. The weights of the basket are usually calculated from trade data (Ohno (1999), de Brouwer (2001)), or from a reduced form theoretical model (Ogawa (2000)). Since these studies only look at the fixed basket regimes, other possible exchange rate regimes have not been considered. In addition, looking at separate macroeconomic indicators from reduced form models may not give the general equilibrium consequences of different exchange rate regimes especially as the regime affects the structural relationships in an economy.

In this paper we contribute to this literature by examining explicitly a range of exchange regimes under a variety of shocks in a structural model that captures the sectoral and macroeconomic features of each Asian economy as well as their interdependence.

5. The G-Cubed (Asia Pacific) model

The G-Cubed (Asia Pacific) multi-country model is based on the G-Cubed model developed in McKibbin and Wilcoxen (1998). It combines the intertemporal macroeconomic approach taken in the MSG2 model of McKibbin and Sachs (1991) with the disaggregated, econometrically-estimated, intertemporal general equilibrium model of the U.S. economy by Jorgenson and Wilcoxen (1989).

The G-Cubed model was constructed to contribute to the current policy debate on global warming, trade policy and international capital flows, but it has many features that make it useful for answering a range of issues in environmental regulation, microeconomic, macroeconomic and trade policy questions. It is a world model with substantial regional disaggregation and sectoral detail. In addition, countries and regions are linked both temporally and intertemporally through trade and financial markets. G-Cubed contains a strong foundation for analysis of both short run macroeconomic policy analysis as well as long run growth consideration of alternative macroeconomic policies.

Intertemporal budget constraints on households, governments and nations (the latter through accumulations of foreign debt) are imposed. To accommodate these constraints, forward looking behavior is incorporated in consumption and investment decisions. Unlike the MSG2 model, the G-Cubed model also contains substantial sectoral detail. This permits analysis of environmental and trade policies which tend to have their largest effects on small segments of the economy. By integrating sectoral detail with the macroeconomic features of the MSG2 model, G-Cubed can be used to consider the long run costs of alternative environmental regulations and trade policy changes yet at the same time consider the macroeconomic implications of these policies over time. The response of monetary and fiscal authorities in different countries can have important effects in the short to medium run which, given the long lags in physical capital and other asset accumulation, can be a substantial period of time. Overall, the model is designed to provide a bridge between computable general equilibrium models and macroeconomic models by

integrating the more desirable features of both approaches. The G-Cubed (Asia Pacific) model differs from the G-Cubed model because of the focus on the Asia-Pacific region as well as having 6 sectors compared to 12 for G-CUBED. The theoretical structure is essentially the same.

The key features of the G-Cubed (Asia Pacific) model are summarized in Table 1. The country and sectoral breakdown of the model are summarized in Table 2. The model consists of eighteen economic regions with six sectors in each region (there are also two additional sectors in each region that produce the capital good for firms and the household capital good). For all regions, the internal macroeconomic structure as well as the external trade and financial linkages are completely specified in the model.

Each economy or region in the model consists of several economic agents: households, the government, the financial sector and the 6 production sectors listed in table 2. Each of these economic actors interact in a variety of markets, both domestic and foreign.

Table 1: Summary of Key Features of the G-Cubed (Asia Pacific Model)

- Specification of the demand and supply sides of economies;
- Integration of real and financial markets of these economies with explicit arbitrage linkage real and financial rates of return;
- Intertemporal accounting of stocks and flows of real resources and financial assets;
- Imposition of intertemporal budget constraints so that agents and countries cannot forever borrow or lend without undertaking the required resource transfers necessary to service outstanding liabilities;
- Short run behavior is a weighted average of neoclassical optimizing behavior based on expected future income streams and Keynesian current income;
- The real side of the model is dis-aggregated to allow for production of multiple goods and services within economies;
- International trade in goods, services and financial assets;
- Full short run and long run macroeconomic closure with macro dynamics at an annual frequency around a long run Solow/Swan/Ramsey neoclassical growth model.
- The model is solved for a full rational expectations equilibrium at an annual frequency from 1996 to 2070.

Table 2: Overview of the AP-G-CUBED Model

Regions:

United States
Japan (*)
Australia
New Zealand
Rest of the OECD
India
Korea (*)
Thailand (*)
Indonesia (*)
China (*)
Malaysia (*)
Singapore (*)
Taiwan (*)
Hong Kong (*)
Philippines (*)
Oil Exporting Developing Countries
Eastern Europe and the former Soviet Union
Other Developing Countries

(*) indicates that a country is included in the definition of Asia for shocks and the Asian currency union

Sectors:

Energy
Mining
Agriculture
Non Durable Manufacturing
Durable Manufacturing
Services

Agents

Households
Firms
Governments

Markets:

Final Goods
Services
Factors of production
Money
Bonds
Equities
Foreign Exchange

The eighteen regions in the model are linked by flows of goods and assets. Flows of goods are determined by import demands for final consumption as well as for intermediate inputs. Differences between exports and imports are financed by flows of financial assets between countries. It is assumed (based on calibrating the model to a 1999 base year) that existing wedges between rates of return in different economies are generated by various restrictions that generate a risk premium on country denominated assets. These wedges are calculated using a technique outlined in McKibbin and Martin (1998). They are assumed to be exogenous during simulation. Thus in general when the model is simulated, the induced changes in expected rates of return in different countries generate flows of financial capital reacting to return differentials at the margin.

International capital flows are assumed to be composed of portfolio investment, direct investment and other capital flows. These alternative forms of capital flows are perfectly substitutable ex ante, adjusting to the expected rates of return across economies and across sectors. Within an economy, the expected return to each type of asset (i.e. bonds of all maturities, equity for each sector etc) are arbitraged, taking into account the costs of adjusting physical capital stock and allowing for exogenous risk premia. Because physical capital is costly to adjust, any inflow of financial capital that is invested in physical capital (i.e. direct investment) will also be costly to shift once it is in place. The decision to invest in physical assets is based on expected rates of return. However, if there is an unanticipated shock then ex-post returns could vary significantly. Total net capital flows for each economy in which there are open capital markets are equal to the current account position of that country. The global net flows of private capital are constrained to zero.

Before running counterfactual simulations, we first solve the model from 1999 to 2070 to generate a model baseline based on a range of assumptions. These assumptions include assumptions about population growth by country (based on World Bank projections) and sectoral productivity growth by country by sector as well as assumptions about tariff rates, tax rates, and a range of other fiscal and monetary policy settings. Monetary policy is defined by the various

exchange rate regimes or is assumed to target inflation in Asian economies. In the rest of the world we assume a simple form of monetary targeting. Fiscal policy is defined as a set of fixed tax rates (apart from a lump sum tax on households that varies to satisfy the intertemporal budget constraint facing the government) and government spending constant relative to simulated GDP. With higher output, tax revenues rise implying a move towards fiscal surplus in each economy.

Given all of the exogenous assumptions and initial conditions the full rational expectations solution of the model is found using a numerical technique outlined in Appendix C of McKibbin and Sachs (1991). Note that not all agents are rational but for those that are we need to solve the model for this solution. Without additional intervention, this solution will not replicate the actual outcomes for the first year of simulation (in the current example 1999) because a range of forward looking variables such as human wealth, exchange rates, share markets etc will be conditioned on the future path of the world economy and there is no reason these should be equal to the observed values for the initial year. The next step of baseline generation is then to calculate a vector of constants for all equations in the model, including arbitrage equations, such that the solution of the model in the base year (1999) is exactly equal to the observed data in that year. It is important to stress that in no way are we assuming that 1999 is a steady state solution of the model. It clearly cannot be. What we are imposing is that the 1999 database is on the stable manifold of the model in which all variables are moving on a stable path towards a steady state in the long distant future.

6. Empirical Results

In this section we explore the steady state variance of a range of variables in response to different shocks under assumptions about a range of exchange rate regimes. The regimes and shocks are summarized in Table 3 and 4. In defining an exchange rate regime, it is critical to also specify the assumptions under which other macroeconomic policies operate. These are also set out in Table 3. Note that in regimes in which some exchange rates are fixed, the monetary policy of that country is already assigned to the exchange rate and therefore cannot be assigned to any other targets. In cases such as the floating exchange rate, monetary policy is free to be assigned to other

targets. We assume that inflation targeting is the regime in place in each case where monetary policy is not already assigned to an exchange rate target. There are of course many alternative assumption for monetary policy such as nominal income rules, Taylor Rules or Henderson-McKibbin Rules but these alternatives will be ignored in this paper[7].

7 See Henderson and McKibbin (1993) for an overview

Table 3: Policy Assignment Under Each Monetary Regime

Exchange Rate regime	***Monetary Policy assumption***	***Fiscal Policy assumption***
Floating exchange rates	Each Asian economy targets inflation	Government spending on each sector is a fixed share to GDP. Incremental lump sum taxed levied on households to cover the servicing costs of additional debt
Peg to basket Euro, $US and Yen (equal weights)	Monetary policy targets exchange rate; Japan targets a basket of the Euro and $US	Same
Peg to Japanese Yen	Monetary Policy in each Asian country targets the bilateral exchange rate to the Yen; Japan targets Japanese inflation	Same
Asian Currency Unit (ACU)	A single currency exists in Asia with an Asian central bank adjusting regional monetary policy to target a weighted average inflation rate for the region (weights are GDP shares)	Same

Table 4: Shocks impacting on each country

Shock	Definition	Coverage
Demand	Change in aggregate consumption	Global (Occurs in all countries inside and outside Asia) Regional (Occurs simultaneously in all Asian economies) Specific (occurs independently in each Asian economy)
Supply	Change in Productivity in the capital producing sector (e.g computers)	Global Regional Country Specific
Risk	Change in the country risk premium in the uncovered interest parity condition	Global Regional Country Specific

The overall exchange rate regimes we explore are: floating exchange rates; a fixed peg to the Euro, $US and Yen with equal and fixed weights; a fixed peg by each Asian economy to the Yen (i.e. a Yen zone much like the European Monetary System except with Japan rather than Germany as the anchor country); and a regime in which there is a single Asian currency unit and the value of that unit is set by the Asian Central Bank (ACB) so as to minimize the variance of the Asia wide inflation rate, calculated by weighting the inflation rate of each economy by its relative GDP weight (expressed in $US1999).

One of the attractions of using a model like the G-Cubed model for this type of analysis is that it is a fully structural model with rational expectations and thus the policy regime is conditioning the formation of expectations. When the policy regime is changed, we allow the expectations of economic agents to condition on the new regime and therefore this type of approach is far less susceptible to the Lucas (1973) Critique than reduced form econometric analysis.

In the general modeling literature on regime evaluation as encompassed by the classic volume by Bryant et al (1993), there are two broad applied approaches to evaluating policy

regimes. The first is backward looking. Given an estimate of the historical variance covariance matrix of all shocks experience by a country or by the world, how would alternative regimes have handled these shocks? In a sense history is re-run under alternative regimes. This historical evaluation has a number of strengths but a major weakness. This weakness is that the estimate of shocks contains both the actual shocks plus any mis-specification in the underlying model. It is not completely clear the role of the policy regime plays in ameliorating or propagating shocks versus its role in offsetting specification errors in the model.

The other approach, which is the approach taken in this paper, is to explore possible shocks individually and see how each regime handles the type of shocks that might occur. The results of this type of analysis can be used by policymakers to determine which regime dominates under alternative possible circumstances. The researcher does not impose an prior distribution on the shocks that might face an economy in the future. The advantage of this approach is that regimes can be assessed in how well they perform under certain circumstances as well as how poorly they might perform under other conditions. Thus it enables policymakers to prepare an exit strategy for a regime when a shock for which it does not perform well actually occurs.

In this paper we use the approach in McKibbin (1993) to calculate the variance of key variables in response to shocks to demand, supply and economy wide risk which are global shocks, Asia wide shocks and country specific shocks. The demand shocks are shocks to aggregate consumption. The supply shocks are shocks to TFP growth in the capital goods producing sector (this can be thought of as a shock to computer productivity). The overall type of shock is familiar from the theoretical literature on regime choice although the specific nature of the supply shock, is unique to this paper. The final shock to country risk premia is quite different and to our knowledge has not been systematically explored before in the contest of exchange rate regime choice. To understand the shock, consider the uncovered interest parity condition in equation (1).

$$(1) \qquad r_t^i = r_t^u + E_t \Delta e_t + \gamma_t^i$$

where r_t^i is the rate of return on government securities in country i; r_t^u the interest rate on comparable securities in the United States (or some other reference country); $E_t \Delta e_t$ is the expected depreciation of the nominal exchange rate in time t; and γ_t^i is the risk premium reflecting the market's perceptions of the risk differential associated with the securities issued by country i's government.

Clearly, when the economy reaches an equilibrium in which the expected depreciation of its currency is zero, its interest rate will be higher by the risk premium associated with its securities. During the transition path from the initial shock to the final equilibrium, the domestic interest rate and the risk premium will together determine the expected path of the exchange rate. If $r_t^u + \gamma_t^i$ exceeds the domestic interest rate, then the exchange rate will be expected to undergo an appreciation.

The third type of shock is in the risk premium in equation (1). McKibbin and Martin (1998) argue that this is one of the important shocks experienced during the Asia Crisis of 1997. It is therefore interesting to know how each of the alternative exchange rate regimes handle this particular type of shock.

In the results that follow, we implement each regime separately in the model. We explore the impact of each type of shock under each regime. In all there are 144 distinct stochastic simulations undertaken (4 regimes * 3 shocks *12 possible sources of shocks (global/regional/each country)). This is an enormous computing task in a global rational expectations model like the G-Cubed (Asia pacific) model.

In presenting the results we need to be careful to distill the large amount of information produced. We present in the body of the paper, 3 tables for each type of shock. These are Table 5 for demand shocks, Table 6 for supply shocks and Table 7 for risk shocks. The results in each table are presented grouped by country. For each country results are presented for four variables: real GDP, real effective exchange rates, short term interest rates and inflation. For each variable, results are listed by row for each regime and by column the source of the shock. In order to make comparison clearer, we rescale the raw variance results (which are contained in tables A1 through A3 in Appendix A) so that they are presented as variance relative to the variance of the Asian

Currency Unit (ACU). Thus all results for ACU are equal to unity.[8]

Referring to Table 5, note that the relative variance (relative to the variance found under the ACU) of Japanese GDP, under a Global demand shock in a floating exchange rate regime is 1.8906. This compares to the result for a global demand shock for Japanese GDP under a basket peg regime (with Japan pegging to the $US and Euro and the rest of Asia targeting a basket of the Euro, $US and Yen) of 3.2816. Thus the variance for Japanese GDP under a floating exchange rate is higher than under an ACU regime but quite a bit lower than the variance under a basket peg.

It is worth noting that in the case of Japan, you might expect that the regime of Japan floating (and targeting inflation) might yield the same variance as the regime of a yen peg (with Japan targeting inflation and all Asian economies pegging to the Yen) given that in both cases Japan has exactly the same inflation targeting policy rule internally. However, the results are different because even though the policy rule in Japan is the same under both regimes, under the yen peg, the rest of Asia is changing policy to target the yen whereas under the floating exchange rate they are changing policy to target own inflation. Thus the different policy responses in the rest of Asia are indirectly changing the outcomes for Japanese policymakers. The differences dues to the policy interdependence tend to be small for most shocks but not all, especially the risk shocks. Now turn to the results for each shock is some detail.

a) Demand shocks

The variance of a range of variable in response to shock to private consumption with a variance of 1% of GDP are contained in Table A1. The variance relative to the ACU regime is contained in Table 5. The relative variance will be the focus of the discussion.

First consider the nature of the expected theoretical adjustment to a rise in consumption

8 In practice any regime could have been chosen as numeraire. However we wanted a regime in which zero variance was rare otherwise we would find infinite relative variance. The ACU satisfied this requirement.

Table 5: Relative Variance of Variables for Demand Shocks

COUNTRY:	***REGIME***	***Source of SHOCK***		
VARIABLE		Global	Asia Wide	Country
JAPAN				
GDP	Float	1.8906	1.8866	1.2578
	basket peg	3.2816	6.9466	4.7476
	Yen peg	1.8850	1.8731	1.2577
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	2.5880	1.6604	2.3039
	basket peg	0.0975	0.2118	0.4128
	Yen peg	2.1070	1.5154	1.9405
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	1.9736	2.0543	4.2933
	basket peg	0.2248	0.0009	0.0003
	Yen peg	1.9785	2.0596	4.4037
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	6.3344	12.4288	4.0337
	Yen peg	0.0000	0.0000	0.0000
	ACB	1.0000	1.0000	1.0000
Indonesia				
GDP	Float	0.2753	0.3844	3.1051
	basket peg	0.1736	0.1182	0.9910
	Yen peg	1.9844	1.8759	0.9901
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.6602	0.7290	0.9841
	basket peg	0.3693	2.7878	1.0384
	Yen peg	1.8654	1.2890	1.0316
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.2631	0.2763	143.2622
	basket peg	0.2248	0.0009	0.0034
	Yen peg	1.9785	2.0596	0.0451
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0587	1.4507	1.1770
	Yen peg	3.4401	3.7448	1.1465
	ACB	1.0000	1.0000	1.0000
Malaysia				
GDP	Float	0.0259	0.0318	0.0875
	basket peg	0.0158	0.4749	1.1218
	Yen peg	2.6956	2.8590	1.1058
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0766	0.2010	1.1978
	basket peg	0.6020	0.3000	1.0211
	Yen peg	1.5245	2.2669	1.0179
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.2064	0.2121	414.9034
	basket peg	0.2248	0.0009	0.0039
	Yen peg	1.9785	2.0596	0.0327
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0033	0.6181	1.1001
	Yen peg	2.9070	3.1731	1.0871
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Philippines				
GDP	Float	0.0237	0.0625	0.1847
	basket peg	0.0750	0.3663	1.0771
	Yen peg	2.2920	2.6747	1.0649
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.4591	0.2177	0.3731
	basket peg	0.3283	1.3058	1.0413
	Yen peg	1.7475	3.4990	1.0347
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.1081	0.1741	381.1471
	basket peg	0.2248	0.0009	0.0050
	Yen peg	1.9785	2.0596	0.0435
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0439	0.4078	1.0978
	Yen peg	2.4684	2.9296	1.0826
	ACB	1.0000	1.0000	1.0000
Singapore				
GDP	Float	0.2378	0.1597	0.4389
	basket peg	0.1425	0.2245	1.1164
	Yen peg	2.4512	2.4115	1.0875
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.8762	0.0869	1.2355
	basket peg	0.6547	0.1639	1.0153
	Yen peg	1.5802	2.1795	1.0117
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.4262	0.3244	498.1589
	basket peg	0.2248	0.0009	0.0084
	Yen peg	1.9785	2.0596	0.0895
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0711	0.7930	1.0779
	Yen peg	3.6433	3.3298	1.0593
	ACB	1.0000	1.0000	1.0000
Thailand				
GDP	Float	0.3586	0.3792	1.9715
	basket peg	0.1751	0.1852	1.0388
	Yen peg	2.0719	1.9730	1.0312
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.6769	0.1994	0.9453
	basket peg	0.3915	2.2060	1.0370
	Yen peg	1.8411	1.9380	1.0310
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.3649	0.3166	189.8976
	basket peg	0.2248	0.0009	0.0022
	Yen peg	1.9785	2.0596	0.0361
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.1408	1.3621	1.1476
	Yen peg	3.8393	3.7011	1.1244
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
China				
GDP	Float	0.4012	0.4694	0.0547
	basket peg	2.4902	10.3057	1.3242
	Yen peg	5.7224	5.9092	1.2946
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.6030	0.7289	3.4295
	basket peg	0.3827	0.1750	0.9071
	Yen peg	2.6752	1.7411	0.9142
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.8131	0.8209	71.7383
	basket peg	0.2248	0.0009	0.0009
	Yen peg	1.9785	2.0596	0.0121
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	14.4411	61.4848	1.2910
	Yen peg	17.3073	20.5001	1.2640
	ACB	1.0000	1.0000	1.0000
Taiwan				
GDP	Float	0.2506	0.3345	0.4185
	basket peg	0.1873	0.9178	1.1271
	Yen peg	2.9198	2.6380	1.1006
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.8387	0.3206	1.6648
	basket peg	0.5916	0.5032	1.0029
	Yen peg	1.8169	1.4589	1.0023
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.5815	0.4790	161.8681
	basket peg	0.2248	0.0009	0.0065
	Yen peg	1.9785	2.0596	0.0678
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.6608	2.7880	1.1523
	Yen peg	5.0843	4.5057	1.1211
	ACB	1.0000	1.0000	1.0000
Korea				
GDP	Float	0.4696	0.5293	2.1366
	basket peg	0.1530	0.2891	1.1709
	Yen peg	2.2369	2.0299	1.1368
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.7443	0.4383	1.6858
	basket peg	0.6319	0.5726	1.0048
	Yen peg	1.7347	1.4221	1.0037
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.6243	0.5643	53.2177
	basket peg	0.2248	0.0009	0.0036
	Yen peg	1.9785	2.0596	0.0450
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.4278	5.6969	1.2912
	Yen peg	6.1787	5.7494	1.2403
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Hong Kong				
GDP	Float	0.3732	0.2019	0.5747
	basket peg	0.1307	0.2063	1.1454
	Yen peg	2.3003	2.3060	1.1128
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.1642	1.2569	1.5161
	basket peg	0.4628	0.3410	1.0155
	Yen peg	1.6714	2.0924	1.0122
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.3789	0.2345	221.8003
	basket peg	0.2248	0.0009	0.0062
	Yen peg	1.9785	2.0596	0.0726
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.2620	0.7763	1.1294
	Yen peg	4.2415	3.2649	1.1014
	ACB	1.0000	1.0000	1.0000

under each regime. In the case of an own country shock in Japan under a under a floating exchange rate, the yen would appreciate initially. There would be tendency for inflation to rise because of the additional demand but this will be offset by cheaper import prices due to the exchange rate appreciation. To the extent that the demand effect dominates (largely depending on the degree of openness of the economy), the rise in inflation would cause a tightening of monetary policy. This would further appreciate the yen but dampen both inflation and output. Under the ACU you would expect some tightening of policy for all Asia by the ACB, but less than that under floating with a Japanese inflation target. Indeed it can be seen in Table 5, that Japanese interest rates are 4 times more variable under a Japanese shock in the case of flexible exchange rates than they are under the ACU. Indeed inflation is unchanged under a float but not under the ACU because the weight on Japan in the average inflation target is less than infinite. Interestingly real GDP is more variable under the float than under the ACU. This is because the Bank of Japan contracts monetary policy reducing GDP in an attempt to prevent inflation from rising under the float whereas the ACB contracts Asian monetary policy in order to partially offset the rise in Japanese inflation on average inflation. Under the basket peg, the Bank of Japan loosens monetary policy to prevent the demand shock appreciating the Yen. Thus real output is stimulated by the shock and then further stimulated by the monetary response.

In terms of Japan, the ACU works well for a demand shock in terms of GDP variability but performs less well than floating for inflation variability. For other countries there are a variety of rankings in the results. First the main difference to the Japanese ranking is in terms of the yen peg. For Japan this was a float with other countries pegging to Japan. For other Asian economies it means a fixed exchange rate to the yen and so monetary policy responds quite differently outside Japan under this regime. For country specific shocks, it would be expected that the yen peg would be much like the basket peg for non Japanese Asia. The main difference between the basket peg and the Yen peg occurs for an Asia wide shock relative to a global shock because in the Asia wide shock the yen is likely to appreciate relative to the Euro and $US but under a world shock it is less likely to change. For all countries it is indeed the case that the Yen peg and the basket peg perform similarly for own shocks but differ substantially for Asia wide shocks and global shocks.

Overall there is no clear pattern of the best performing regime however the yen peg performs worst for each country both in terms of GDP variability and inflation variability for Asia wide and global shocks and is similar to a basket peg for own shocks. The ACU is also dominated by both floating and the basket peg for all countries, both in terms of output and inflation variability for demand shocks. The remaining ranking of floating versus the basket peg vary between countries in terms of both inflation and output variability and in terms of the type of shock. For Indonesia, the basket peg dominates the float in terms of output variability but the opposite is true for inflation variability. This is also true for Thailand and Korea. The ranking holds for global shocks for Malaysia, Singapore, Hong Kong and Taiwan but the opposite ranking holds for these countries for Asia wide and own shocks. A floating exchange rate is preferred for Philippines and China across all demand shocks.

b) Supply Shocks

Next consider the relative variance of variables under shocks to the productivity growth of the capital producing sector. This is not a shock to the overall TFP growth of the economy, but in the sector in the model that produces capital goods. This shock has a much more persistent effect on growth in the economy since it reduces the cost of capital goods and changes investment with sustained impacts on overall output in the economy. This shock is like the TFP shocks in the 1990s with the rise in computer productivity especially in the US.

Results are contained in Table A2 for absolute variance and in Table 6 for relative variance. Again it is worth first considering the expected theoretical adjustment to a shock of this type under each regime. In Japan, the supply shock would be expected to raise output and lower inflation both directly through the expansion of supply and through a depreciation of the exchange rate in a floating world. Under a floating exchange rate with an inflation target, the bank of Japan would expand monetary policy if the fall in inflation from excess supply dominates the rise in inflation from a depreciating exchange rate. This is indeed what happens. Under the ACU, the

Table 6: Relative Variance of Variables for Supply Shocks

COUNTRY: *VARIABLE*	*REGIME*	*Source of SHOCK*		
		Global	Asia Wide	Country
JAPAN				
GDP	Float	0.9350	0.9339	0.9288
	basket peg	0.8914	1.1474	1.1380
	Yen peg	0.9351	0.9300	0.9259
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.2346	1.2689	1.0572
	basket peg	1.1974	0.7805	0.9255
	Yen peg	1.1968	1.1655	1.0638
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	1.7203	1.8236	2.8258
	basket peg	0.8190	0.0171	0.0104
	Yen peg	1.6985	1.7913	2.7580
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.7432	12.9078	6.7509
	Yen peg	0.0000	0.0000	0.0000
	ACB	1.0000	1.0000	1.0000
Indonesia				
GDP	Float	1.1554	1.1509	1.1243
	basket peg	0.9393	1.0475	0.9977
	Yen peg	0.9801	0.9696	0.9990
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.1929	1.2167	1.0605
	basket peg	0.9632	1.0365	0.9996
	Yen peg	1.0270	0.9812	1.0013
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.3934	0.5279	846.3301
	basket peg	0.8190	0.0171	0.0540
	Yen peg	1.6985	1.7913	1.1355
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.0669	0.4352	1.0694
	Yen peg	2.1230	2.1818	1.0930
	ACB	1.0000	1.0000	1.0000
Malaysia				
GDP	Float	1.0395	1.0664	0.9845
	basket peg	0.8538	1.1609	0.9994
	Yen peg	0.9776	0.9431	1.0023
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0320	1.1758	0.9675
	basket peg	0.8880	1.2023	0.9994
	Yen peg	1.1355	1.0146	1.0009
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.4254	0.2888	183.8713
	basket peg	0.8190	0.0171	0.0760
	Yen peg	1.6985	1.7913	1.4206
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.8020	0.9208	1.0344
	Yen peg	3.7794	3.4042	1.0680
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Philippines				
GDP	Float	1.0676	1.0165	1.0093
	basket peg	0.8645	1.0393	1.0003
	Yen peg	1.0439	0.9759	1.0006
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.8397	1.1005	0.9193
	basket peg	0.9798	1.1057	1.0013
	Yen peg	1.1675	1.1424	1.0018
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.1349	0.2071	937.7676
	basket peg	0.8190	0.0171	0.0393
	Yen peg	1.6985	1.7913	0.3034
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.9476	0.3598	1.0589
	Yen peg	2.1496	2.7141	1.0460
	ACB	1.0000	1.0000	1.0000
Singapore				
GDP	Float	1.0048	1.0632	1.0142
	basket peg	0.9138	1.0721	1.0000
	Yen peg	0.9752	0.9632	1.0007
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0163	1.1451	0.9682
	basket peg	0.8777	1.1277	0.9999
	Yen peg	0.9570	0.9516	1.0010
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.7755	0.4342	1326.4705
	basket peg	0.8190	0.0171	0.1611
	Yen peg	1.6985	1.7913	3.4859
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.2972	0.9057	0.9860
	Yen peg	7.5158	3.3006	1.0598
	ACB	1.0000	1.0000	1.0000
Thailand				
GDP	Float	1.0742	1.0803	1.0516
	basket peg	0.9313	1.0491	0.9980
	Yen peg	0.9784	0.9680	0.9992
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0830	1.0841	1.0045
	basket peg	0.9655	1.0560	0.9990
	Yen peg	1.0160	0.9752	1.0004
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.6197	0.5989	322.5218
	basket peg	0.8190	0.0171	0.0204
	Yen peg	1.6985	1.7913	0.6175
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.3791	1.1881	1.0820
	Yen peg	3.6289	3.1269	1.0648
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
China				
GDP	Float	1.0917	1.0763	0.9696
	basket peg	0.8699	1.1703	1.0071
	Yen peg	0.9507	0.9314	1.0080
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.2498	1.0017	0.9813
	basket peg	0.8106	1.0199	1.0019
	Yen peg	1.0821	1.0296	1.0048
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.5517	0.4579	27.0738
	basket peg	0.8190	0.0171	0.0433
	Yen peg	1.6985	1.7913	0.9827
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.8510	1.6667	1.3058
	Yen peg	3.2325	3.1803	1.3345
	ACB	1.0000	1.0000	1.0000
Taiwan				
GDP	Float	1.0219	1.0856	1.0121
	basket peg	0.8715	1.1180	1.0002
	Yen peg	0.9562	0.9455	1.0009
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0075	1.0711	0.9648
	basket peg	0.8874	1.0723	1.0009
	Yen peg	0.9807	0.9829	1.0021
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.8738	0.5481	368.5168
	basket peg	0.8190	0.0171	0.0517
	Yen peg	1.6985	1.7913	1.0559
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	2.7700	1.7462	1.0726
	Yen peg	9.1868	3.6225	1.1051
	ACB	1.0000	1.0000	1.0000
Korea				
GDP	Float	1.0573	1.0780	1.0147
	basket peg	0.9180	1.0928	0.9992
	Yen peg	0.9633	0.9551	1.0006
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0723	1.0696	0.9817
	basket peg	0.9091	1.1056	1.0008
	Yen peg	0.9604	0.9575	1.0026
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.9572	0.9344	83.5444
	basket peg	0.8190	0.0171	0.0285
	Yen peg	1.6985	1.7913	0.6311
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	3.7505	4.8717	1.1897
	Yen peg	6.2637	3.8922	1.1829
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Hong Kong				
GDP	Float	1.0406	1.0604	1.0157
	basket peg	0.9173	1.0876	1.0003
	Yen peg	0.9740	0.9591	1.0012
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.0128	1.0326	0.9668
	basket peg	0.9560	1.0235	0.9999
	Yen peg	1.0149	0.9853	1.0010
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.7431	0.5948	559.4050
	basket peg	0.8190	0.0171	0.0759
	Yen peg	1.6985	1.7913	1.8413
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.0935	0.7190	0.9960
	Yen peg	3.3358	2.5218	1.0663
	ACB	1.0000	1.0000	1.0000

Asia central bank takes into account that Japanese inflation is falling and that the weaker yen lowers inflation throughout Asia and so the ACB follows a more expansionary monetary policy. Thus the variance of output under the ACU is larger than under a float for Japan because of the nature of the policy response to inflation.

Interestingly the basket peg now performs badly for Japan both in terms of output and inflation variability. The reason is that the peg forces Japan to loosen monetary policy in response to falling prices, which accentuates the rise in output from the productivity shock. Thus output is more variable under the basket peg. This is true for Japan for the Asia wide shock, but not for the global shock since both the US and Europe experience a shock as well and there is far less change in the basket relative to the yen under this shock. Thus there is little policy response by the BoJ to a global shock under a basket peg.

For non Japan Asia the float with inflation targeting performs less well relative to other regimes for a supply shock, than it did for a demand shock. This is not surprising, since it is well know in theory and in empirical studies of alternative monetary regimes, that inflation targeting doesn't handle supply shocks well. Taylor rules and Henderson McKibbin rules dominate for supply shocks. Thus there could be other monetary rules, within a flexible exchange rate regime, that dominate those for inflation targeting in the comparison tables, but they are not considered in this paper.

The yen peg, basket peg and ACU appear to switch rankings across countries for output variability but the yen peg is consistently poor for inflation variability for all countries (except in some cases of own shocks). For all non Japan Asia, the basket peg minimizes output variability for the global shock but the yen peg dominates for the Asia wide shock. This is because with an Asia wide shock, it is better for countries to have their exchange rates change relative to the US and Europe and by pegging to the yen this can happen because the yen is floating relative to the US and Euro under a yen peg. The basket peg performs well for all countries in terms of output variability except in the case of an Asia wide shock in which case it performs worst. This is not surprising because all of Asia would be better off with a floating exchange rate when there is a shock in all of Asia.

c) Risk Shocks

Finally, Table 7 contains results for the relative variance of variables in the case of a rise in the country risk premium on each country. It should be noted that as the US is the numeraire country in the interest arbitrage condition, the global shock is a rise in risk of all countries relative to the United States so it is not truly global in the sense of every country. It is every country except the United States.

Consider the theoretical adjustment that would be expected (based on McKibbin and Martin (1998)). As investors lose confidence in an economy, they require a higher rate of return on all assets in that country. The rise in risk leads to a large outflow of financial capital. This outflow depreciates the nominal and real exchange rates. The capital outflow would cause a sharp rise in real interest rates in each economy and a general deflation of asset prices and a contraction of private wealth. The rise in real interest rates, decline in wealth and sharp reduction in expected future incomes leads to a sharp drop in domestic demand through both lower consumption and a collapse of investment. This sharp contraction in economic activity reflects the large capital losses experienced by residents of these economies. In particular the fixity of physical capital implies a significant reduction in capital use given the large increase in the cost of capital.

Consider the monetary policy response in an economy under floating exchange rates with an inflation target. The collapse in demand would tend to push inflation down but the sharp exchange rate depreciation would push inflation up. Which effect dominates depends on the openness of the economy because rising import prices are an important part of the inflation increase. In a very open economy in which the exchange rate induced, spike in inflation dominated the effect of a fall in demand, the central bank would tighten policy and exacerbate the shock in terms of output contraction. In an economy with a small import share in consumption, falling inflation would lead to an expansion of monetary policy. Under the various exchange rate pegs the monetary authorities unambiguously tighten policy in response to a collapsing exchange rate causing a further fall in real output.

Table 7: Relative Variance of Variables for Risk Shocks

COUNTRY: *VARIABLE*	*REGIME*	*Source of SHOCK*		
		Global	Asia Wide	Country
JAPAN				
GDP	Float	0.1738	0.4244	0.3941
	basket peg	2.1121	3.4126	2.3795
	Yen peg	0.2125	0.4231	0.3931
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.8181	1.5121	1.5350
	basket peg	0.7221	0.4662	0.6596
	Yen peg	1.5397	1.3643	1.3966
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	1.8765	2.1429	3.6904
	basket peg	0.5402	0.0060	0.0033
	Yen peg	1.8992	2.1829	3.8295
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	3.0920	10.6957	4.8470
	Yen peg	0.0000	0.0000	0.0000
	ACB	1.0000	1.0000	1.0000
Indonesia				
GDP	Float	2.6229	1.7318	1.1190
	basket peg	1.3959	1.6438	1.0034
	Yen peg	0.7368	0.7599	1.0012
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.3718	1.6170	0.8646
	basket peg	0.9727	1.7763	1.0073
	Yen peg	1.0721	0.7279	1.0049
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.1601	0.1565	196.5400
	basket peg	0.5402	0.0060	0.0136
	Yen peg	1.8992	2.1829	0.1074
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.3449	0.2032	1.1544
	Yen peg	2.5007	2.8724	1.1119
	ACB	1.0000	1.0000	1.0000
Malaysia				
GDP	Float	0.5314	1.1275	0.8896
	basket peg	0.2470	1.8946	1.0126
	Yen peg	3.9615	2.0394	1.0074
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.7700	1.3034	0.9189
	basket peg	0.9644	1.2965	1.0023
	Yen peg	1.1457	1.0413	1.0018
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.2874	0.1812	344.4308
	basket peg	0.5402	0.0060	0.0380
	Yen peg	1.8992	2.1829	0.1675
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.2103	0.3380	1.1187
	Yen peg	3.1680	3.3073	1.0804
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Philippines				
GDP	Float	0.3696	0.8090	0.9966
	basket peg	0.6255	0.8651	1.0037
	Yen peg	1.7972	1.4857	1.0029
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.8270	1.1068	0.7905
	basket peg	0.8084	0.8422	1.0075
	Yen peg	1.3243	1.9404	1.0064
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.0634	0.0829	496.7890
	basket peg	0.5402	0.0060	0.0126
	Yen peg	1.8992	2.1829	0.0499
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.4356	0.0938	1.0858
	Yen peg	2.2020	2.7865	1.0719
	ACB	1.0000	1.0000	1.0000
Singapore				
GDP	Float	1.8308	1.4125	0.9982
	basket peg	1.8449	1.8194	1.0037
	Yen peg	1.2486	0.7744	1.0008
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.2543	1.4047	0.9241
	basket peg	1.7475	2.0916	1.0030
	Yen peg	1.8613	0.7140	1.0012
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.5892	0.3180	426.5995
	basket peg	0.5402	0.0060	0.0616
	Yen peg	1.8992	2.1829	0.3288
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0193	0.4576	1.0873
	Yen peg	5.0321	3.4417	1.0485
	ACB	1.0000	1.0000	1.0000
Thailand				
GDP	Float	1.7544	1.4249	0.9819
	basket peg	1.3120	1.6342	1.0068
	Yen peg	0.9727	0.7810	1.0042
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.6568	1.6082	0.8751
	basket peg	1.0998	1.8764	1.0090
	Yen peg	0.9541	0.6809	1.0066
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.4062	0.3105	251.1756
	basket peg	0.5402	0.0060	0.0093
	Yen peg	1.8992	2.1829	0.0790
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.1467	0.6324	1.1407
	Yen peg	3.5580	3.5516	1.1051
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
China				
GDP	Float	1.7881	1.4684	0.4391
	basket peg	2.6743	6.8044	1.1651
	Yen peg	8.9029	1.8016	1.1128
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	0.1598	0.8142	1.1398
	basket peg	0.2413	0.6939	0.9895
	Yen peg	3.1441	1.2787	0.9937
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.7337	0.7353	45.1318
	basket peg	0.5402	0.0060	0.0130
	Yen peg	1.8992	2.1829	0.1051
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.2611	12.8914	1.3704
	Yen peg	6.9718	8.5924	1.2659
	ACB	1.0000	1.0000	1.0000
Taiwan				
GDP	Float	1.8803	1.4339	0.9090
	basket peg	1.9107	2.1235	1.0124
	Yen peg	2.8079	0.9288	1.0069
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	2.0700	1.2641	0.9063
	basket peg	1.3759	1.4164	1.0059
	Yen peg	0.8361	0.9292	1.0046
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.6567	0.3815	171.7385
	basket peg	0.5402	0.0060	0.0202
	Yen peg	1.8992	2.1829	0.1115
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0139	0.9637	1.1533
	Yen peg	5.9291	3.8209	1.1099
	ACB	1.0000	1.0000	1.0000
Korea				
GDP	Float	2.0624	1.4033	0.8290
	basket peg	2.2766	2.2241	1.0325
	Yen peg	0.5493	0.6404	1.0208
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.5899	1.0935	0.8970
	basket peg	1.4395	1.4848	1.0178
	Yen peg	0.6098	0.8462	1.0127
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.7383	0.6081	55.8064
	basket peg	0.5402	0.0060	0.0119
	Yen peg	1.8992	2.1829	0.0823
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.1606	4.2967	1.2904
	Yen peg	7.6048	5.9609	1.2150
	ACB	1.0000	1.0000	1.0000

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Hong Kong				
GDP	Float	1.2049	1.5719	0.9807
	basket peg	0.9930	2.1808	1.0104
	Yen peg	1.5982	0.7567	1.0044
	ACB	1.0000	1.0000	1.0000
Real effective ER	Float	1.5308	1.5358	0.9165
	basket peg	1.0444	1.4865	1.0036
	Yen peg	0.9873	0.7883	1.0023
	ACB	1.0000	1.0000	1.0000
Short Interest Rate	Float	0.4985	0.2914	204.8785
	basket peg	0.5402	0.0060	0.0337
	Yen peg	1.8992	2.1829	0.2027
	ACB	1.0000	1.0000	1.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0607	0.5163	1.1442
	Yen peg	4.5047	3.3649	1.0929
	ACB	1.0000	1.0000	1.0000

Now consider the specific results in Table 7. In the case of Japan, the basket peg is the worst regime for output volatility precisely because the peg induces a contractionary monetary policy in an economy with output already falling. The flexible exchange rate regime dominates this regime in terms of both inflation and output variability but is dominated by the ACU in terms of output variability. In adjusting Asia wide monetary policy, the ACB weights up economies with falling inflation with economies with rising inflation and implements a less contractionary monetary policy for Japan than the BOJ acting alone would follow. This result of ACB dominance over floating does not apply across all countries in Asia however. Clearly because the ACB is reacting to average inflation across Asia, and the inflationary results differ across countries, some countries will have more contractionary monetary policy when acting alone under flexible exchange rates, relative to the ACB reaction than other countries.

Thus most countries prefer to have floating exchange rates with their own monetary reaction rather than follow the ACB response (the exceptions are Thailand and Korea for own shocks) at least as far as output and inflation variability is concerned and certainly prefer these regimes to the Yen peg. Again, the basket peg performs well for output variability of all countries for common shocks but floating dominates for country specific shocks and in terms of inflation variability.

7. Conclusion

The choice of an exchange rate regime for individual economies in Asia is a complex issue. Simple rules of thumb based on the insights of simplified theoretical models can be misleading when moving towards more realistic models that capture a range of economic features of actual economies. In the exercise in this paper, we have only begun to explore some of the key issues. Indeed we have taken the true model as given, yet in practice there is uncertainty about a wide range of issues such as the values of parameters, the credibility of policymakers etc. A great deal of sensitivity analysis is required within the framework used in this paper.

We have laid out a range of results that demonstrate that the choice of any exchange rate regime for a given country depends very much on the special characteristics of that country and on the policy choices made by neighboring countries. The choice of a regime also depends on the ultimate preferences of policymakers (i.e. output versus inflation variability). Most importantly, the performance of alternative exchange rate regimes depends on the nature of shocks. We have shown that for the same shock but within a country versus globally, the ranking of regimes can be the opposite. Also for different shocks, the regime ranking can switch. We have not offered any insight into which shocks are likely to dominate in future years. In economies undergoing structural change as quickly as many of the countries we examine, supply shocks must be a high probability. Indeed empirical studies of the historical distribution of shocks tend to show that TFP shocks are more dominant in developing countries relative to industrialized economies.

Despite the enormous number of results generated in this paper, some broad and tentative conclusions can be drawn. First, both the yen block and the Asian currency union (ACU) tend to be dominated by floating exchange rates and a basket peg over most combinations of shock for most countries. Sure it is possible to point to cases where the yen block and the ACU perform well, but when they perform poorly they are quite bad. If a policymaker had a prior distribution of equal probability of all shocks then these regimes would not be the most likely to be implemented. Surprisingly, it is difficult to separate the performance of the basket peg to the $US, Euro and Yen relative to a floating exchange rate when only considering the impact on output variability, although the floating exchange rate always dominates the basket peg in terms of inflation variability. This result poses a dilemma because in fact, no inflation targeting regime as followed in practice, would exactly target inflation the way we specify in the simulations. If we allowed for partial instrument adjustment so that inflation was traded off with output variability (such as in the Taylor of Henderson McKibbin Rules) the variance of output would fall and that of inflation would rise for most shocks. This comparison would then likely show that the floating exchange rate regime is preferable in the case where policymakers care about both output and inflation variability but more research is needed to explore this further.

We have also not taken into account the entire debate on credibility of policymakers –

neither on the credibility of a particular target for an exchange rate peg nor the credibility of the monetary authorities under floating exchange rates. Clearly this is an aspect of the debate that needs to be incorporated into the quantitative evaluation of alternative regimes.

There is a great deal of research left to be done with the modeling framework used in this paper as well as other alternative models of the Asia region. Even after all this research, no definitive answer as to the optimal exchange rate regime can emerge from such a study because as we have shown, the performance of alternative regimes are conditioned on a range of factors that are inherently uncertain. What such a study can do, however, is inform policymakers who must ultimately make the choice of an exchange rate regime, of the key factors to consider. Such a study also illustrates that a simple solution for all countries at all times, might seem to be too good to be true, because it is too good to be true. The world is a complicated place and actual economies differ in important respects. An important lesson from this paper is that in practice, policymakers must not only take into account the various economic factors touched upon in this paper in choosing an exchange rate regime, but more importantly they need to understand how to adjust the exchange rate regime or monetary policy rule quickly (i.e. what exit strategy to follow) in the event that a shock occurs for which the regime they have adopted doesn't perform well.

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Table A1: Variance of Variables for Demand Shocks

COUNTRY:	***REGIME***	***Source of SHOCK***		
VARIABLE		Global	Asia Wide	Country
JAPAN				
GDP	Float	0.2027	0.1705	0.1550
	basket peg	0.3519	0.6278	0.5850
	Yen peg	0.2021	0.1693	0.1550
	ACB	0.1072	0.0904	0.1232
Real effective ER	Float	4.0680	7.0037	9.1392
	basket peg	0.1532	0.8933	1.6376
	Yen peg	3.3120	6.3919	7.6974
	ACB	1.5719	4.2180	3.9668
Short Interest Rate	Float	24.8300	18.2297	16.1895
	basket peg	2.8277	0.0081	0.0011
	Yen peg	24.8914	18.2767	16.6056
	ACB	12.5811	8.8738	3.7708
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	3.3502	5.2500	4.8768
	Yen peg	0.0000	0.0000	0.0000
	ACB	0.5289	0.4224	1.2090
Indonesia				
GDP	Float	0.2063	0.2726	0.2539
	basket peg	0.1301	0.0838	0.0810
	Yen peg	1.4873	1.3302	0.0810
	ACB	0.7495	0.7091	0.0818
Real effective ER	Float	0.6549	0.3453	1.9833
	basket peg	0.3663	1.3206	2.0927
	Yen peg	1.8503	0.6106	2.0791
	ACB	0.9919	0.4737	2.0153
Short Interest Rate	Float	3.3106	2.4516	2.2035
	basket peg	2.8277	0.0081	0.0001
	Yen peg	24.8914	18.2767	0.0007
	ACB	12.5811	8.8738	0.0154
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.3411	5.6379	4.4729
	Yen peg	19.9822	14.5532	4.3570
	ACB	5.8087	3.8863	3.8002
Malaysia				
GDP	Float	0.0744	0.0637	0.0305
	basket peg	0.0454	0.9511	0.3904
	Yen peg	7.7481	5.7262	0.3849
	ACB	2.8744	2.0029	0.3481
Real effective ER	Float	1.0629	0.0510	0.4232
	basket peg	0.5943	0.0761	0.3608
	Yen peg	1.5052	0.5750	0.3596
	ACB	0.9873	0.2536	0.3533
Short Interest Rate	Float	2.5962	1.8820	1.0016
	basket peg	2.8277	0.0081	0.0000
	Yen peg	24.8914	18.2767	0.0001
	ACB	12.5811	8.8738	0.0024
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0554	6.7732	3.8060
	Yen peg	48.0800	34.7727	3.7610
	ACB	16.5394	10.9584	3.4595

Table A2: Variance of Variables for Supply Shocks

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
JAPAN				
GDP	Float	0.1006	0.1189	0.1219
	basket peg	0.0959	0.1461	0.1493
	Yen peg	0.1006	0.1184	0.1215
	ACB	0.1076	0.1274	0.1312
Real effective ER	Float	0.0247	0.0501	0.0766
	basket peg	0.0240	0.0308	0.0670
	Yen peg	0.0240	0.0460	0.0771
	ACB	0.0200	0.0395	0.0724
Short Interest Rate	Float	0.0726	0.0293	0.0214
	basket peg	0.0346	0.0003	0.0001
	Yen peg	0.0717	0.0288	0.0209
	ACB	0.0422	0.0161	0.0076
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0033	0.0172	0.0151
	Yen peg	0.0000	0.0000	0.0000
	ACB	0.0019	0.0013	0.0022
Indonesia				
GDP	Float	0.3078	0.4119	0.4759
	basket peg	0.2502	0.3749	0.4223
	Yen peg	0.2611	0.3470	0.4229
	ACB	0.2664	0.3578	0.4233
Real effective ER	Float	0.1894	0.1716	0.2693
	basket peg	0.1530	0.1462	0.2538
	Yen peg	0.1631	0.1384	0.2543
	ACB	0.1588	0.1411	0.2539
Short Interest Rate	Float	0.0166	0.0085	0.0065
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0465	0.0088	0.0086
	Yen peg	0.0925	0.0443	0.0088
	ACB	0.0436	0.0203	0.0081
Malaysia				
GDP	Float	0.2394	0.3041	0.3307
	basket peg	0.1966	0.3310	0.3357
	Yen peg	0.2251	0.2689	0.3367
	ACB	0.2303	0.2851	0.3359
Real effective ER	Float	0.0129	0.0177	0.1007
	basket peg	0.0111	0.0181	0.1041
	Yen peg	0.0142	0.0153	0.1042
	ACB	0.0125	0.0151	0.1041
Short Interest Rate	Float	0.0180	0.0046	0.0015
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0164	0.0106	0.0026
	Yen peg	0.0774	0.0393	0.0027
	ACB	0.0205	0.0116	0.0025

Table A3: Variance of Variables for Risk Shocks

COUNTRY:	***REGIME***	***Source of SHOCK***		
VARIABLE		Global	Asia Wide	Country
JAPAN				
GDP	Float	0.0013	0.0053	0.0069
	basket peg	0.0155	0.0426	0.0418
	Yen peg	0.0016	0.0053	0.0069
	ACB	0.0073	0.0125	0.0176
Real effective ER	Float	0.1592	0.2346	0.2695
	basket peg	0.0632	0.0723	0.1158
	Yen peg	0.1348	0.2117	0.2452
	ACB	0.0876	0.1552	0.1756
Short Interest Rate	Float	0.4254	0.2201	0.1894
	basket peg	0.1225	0.0006	0.0002
	Yen peg	0.4305	0.2242	0.1965
	ACB	0.2267	0.1027	0.0513
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0373	0.0952	0.0847
	Yen peg	0.0000	0.0000	0.0000
	ACB	0.0121	0.0089	0.0175
Indonesia				
GDP	Float	0.0555	0.1146	0.1587
	basket peg	0.0295	0.1088	0.1423
	Yen peg	0.0156	0.0503	0.1420
	ACB	0.0212	0.0662	0.1418
Real effective ER	Float	0.1989	0.0866	0.1434
	basket peg	0.1410	0.0951	0.1671
	Yen peg	0.1554	0.0390	0.1667
	ACB	0.1450	0.0536	0.1659
Short Interest Rate	Float	0.0363	0.0161	0.0108
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0001
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0812	0.0244	0.0148
	Yen peg	0.5884	0.3455	0.0142
	ACB	0.2353	0.1203	0.0128
Malaysia				
GDP	Float	0.0123	0.0417	0.0670
	basket peg	0.0057	0.0700	0.0763
	Yen peg	0.0919	0.0754	0.0759
	ACB	0.0232	0.0370	0.0753
Real effective ER	Float	0.0478	0.0310	0.1007
	basket peg	0.0261	0.0308	0.1099
	Yen peg	0.0310	0.0248	0.1098
	ACB	0.0270	0.0238	0.1096
Short Interest Rate	Float	0.0651	0.0186	0.0062
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0522	0.0558	0.0185
	Yen peg	0.7856	0.5460	0.0179
	ACB	0.2480	0.1651	0.0165

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Philippines				
GDP	Float	0.0275	0.0453	0.0583
	basket peg	0.0465	0.0484	0.0587
	Yen peg	0.1337	0.0831	0.0587
	ACB	0.0744	0.0560	0.0585
Real effective ER	Float	0.3065	0.0454	0.0761
	basket peg	0.2996	0.0345	0.0970
	Yen peg	0.4908	0.0796	0.0969
	ACB	0.3706	0.0410	0.0963
Short Interest Rate	Float	0.0144	0.0085	0.0035
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.3677	0.0306	0.0193
	Yen peg	1.8589	0.9103	0.0190
	ACB	0.8442	0.3267	0.0177
Singapore				
GDP	Float	0.0095	0.0609	0.1101
	basket peg	0.0095	0.0785	0.1107
	Yen peg	0.0064	0.0334	0.1104
	ACB	0.0052	0.0431	0.1103
Real effective ER	Float	0.0010	0.0095	0.0516
	basket peg	0.0014	0.0141	0.0560
	Yen peg	0.0015	0.0048	0.0559
	ACB	0.0008	0.0068	0.0559
Short Interest Rate	Float	0.1336	0.0327	0.0044
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0011	0.0386	0.0069
	Yen peg	0.2780	0.2901	0.0067
	ACB	0.0552	0.0843	0.0064
Thailand				
GDP	Float	0.0244	0.0760	0.1186
	basket peg	0.0183	0.0872	0.1216
	Yen peg	0.0136	0.0417	0.1213
	ACB	0.0139	0.0533	0.1208
Real effective ER	Float	0.0876	0.0747	0.1489
	basket peg	0.0582	0.0872	0.1717
	Yen peg	0.0505	0.0316	0.1713
	ACB	0.0529	0.0465	0.1702
Short Interest Rate	Float	0.0921	0.0319	0.0162
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0001
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0160	0.0510	0.0293
	Yen peg	0.3892	0.2861	0.0284
	ACB	0.1094	0.0806	0.0257

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
China				
GDP	Float	0.0030	0.0094	0.0142
	basket peg	0.0044	0.0435	0.0375
	Yen peg	0.0148	0.0115	0.0359
	ACB	0.0017	0.0064	0.0322
Real effective ER	Float	0.0011	0.0595	0.1673
	basket peg	0.0017	0.0507	0.1452
	Yen peg	0.0217	0.0935	0.1458
	ACB	0.0069	0.0731	0.1468
Short Interest Rate	Float	0.1663	0.0755	0.0450
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0001
	ACB	0.2267	0.1027	0.0010
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0016	0.0414	0.0276
	Yen peg	0.0428	0.0276	0.0255
	ACB	0.0061	0.0032	0.0201
Taiwan				
GDP	Float	0.0064	0.0373	0.0618
	basket peg	0.0065	0.0553	0.0688
	Yen peg	0.0095	0.0242	0.0685
	ACB	0.0034	0.0260	0.0680
Real effective ER	Float	0.0149	0.0266	0.0641
	basket peg	0.0099	0.0298	0.0711
	Yen peg	0.0060	0.0196	0.0710
	ACB	0.0072	0.0211	0.0707
Short Interest Rate	Float	0.1489	0.0392	0.0105
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0001
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0003	0.0346	0.0126
	Yen peg	0.1302	0.1371	0.0121
	ACB	0.0220	0.0359	0.0109
Korea				
GDP	Float	0.0114	0.0517	0.0837
	basket peg	0.0126	0.0819	0.1043
	Yen peg	0.0030	0.0236	0.1031
	ACB	0.0055	0.0368	0.1010
Real effective ER	Float	0.0331	0.0705	0.1385
	basket peg	0.0300	0.0957	0.1572
	Yen peg	0.0127	0.0546	0.1564
	ACB	0.0208	0.0645	0.1544
Short Interest Rate	Float	0.1674	0.0625	0.0287
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0005
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0021	0.0602	0.0339
	Yen peg	0.0977	0.0836	0.0320
	ACB	0.0129	0.0140	0.0263

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Hong Kong				
GDP	Float	0.0160	0.0430	0.0776
	basket peg	0.0132	0.0596	0.0800
	Yen peg	0.0212	0.0207	0.0795
	ACB	0.0133	0.0273	0.0791
Real effective ER	Float	0.0246	0.0258	0.0730
	basket peg	0.0168	0.0250	0.0800
	Yen peg	0.0159	0.0133	0.0799
	ACB	0.0161	0.0168	0.0797
Short Interest Rate	Float	0.1130	0.0299	0.0098
	basket peg	0.1225	0.0006	0.0000
	Yen peg	0.4305	0.2242	0.0000
	ACB	0.2267	0.1027	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0031	0.0347	0.0126
	Yen peg	0.2334	0.2263	0.0121
	ACB	0.0518	0.0672	0.0110

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Philippines				
GDP	Float	0.0974	0.1340	0.1496
	basket peg	0.0789	0.1370	0.1483
	Yen peg	0.0952	0.1286	0.1483
	ACB	0.0912	0.1318	0.1482
Real effective ER	Float	0.1051	0.0297	0.0869
	basket peg	0.1226	0.0298	0.0947
	Yen peg	0.1461	0.0308	0.0947
	ACB	0.1251	0.0269	0.0945
Short Interest Rate	Float	0.0057	0.0033	0.0017
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0886	0.0085	0.0050
	Yen peg	0.2011	0.0645	0.0049
	ACB	0.0935	0.0237	0.0047
Singapore				
GDP	Float	0.1723	0.2610	0.3062
	basket peg	0.1567	0.2632	0.3019
	Yen peg	0.1672	0.2364	0.3021
	ACB	0.1715	0.2454	0.3019
Real effective ER	Float	0.0063	0.0187	0.0728
	basket peg	0.0054	0.0184	0.0752
	Yen peg	0.0059	0.0156	0.0753
	ACB	0.0062	0.0164	0.0752
Short Interest Rate	Float	0.0327	0.0070	0.0028
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0046	0.0067	0.0039
	Yen peg	0.0267	0.0244	0.0041
	ACB	0.0036	0.0074	0.0039
Thailand				
GDP	Float	0.2298	0.3294	0.3832
	basket peg	0.1992	0.3199	0.3637
	Yen peg	0.2093	0.2951	0.3641
	ACB	0.2139	0.3049	0.3644
Real effective ER	Float	0.0912	0.1108	0.2165
	basket peg	0.0813	0.1079	0.2154
	Yen peg	0.0855	0.0997	0.2157
	ACB	0.0842	0.1022	0.2156
Short Interest Rate	Float	0.0262	0.0096	0.0058
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0169	0.0102	0.0071
	Yen peg	0.0444	0.0269	0.0070
	ACB	0.0122	0.0086	0.0066

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
China				
GDP	Float	0.1818	0.2056	0.2153
	basket peg	0.1449	0.2235	0.2237
	Yen peg	0.1584	0.1779	0.2239
	ACB	0.1666	0.1910	0.2221
Real effective ER	Float	0.0100	0.0490	0.1331
	basket peg	0.0065	0.0499	0.1359
	Yen peg	0.0086	0.0504	0.1363
	ACB	0.0080	0.0489	0.1357
Short Interest Rate	Float	0.0233	0.0074	0.0040
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0001
	ACB	0.0422	0.0161	0.0001
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0080	0.0047	0.0031
	Yen peg	0.0140	0.0090	0.0031
	ACB	0.0043	0.0028	0.0024
Taiwan				
GDP	Float	0.1035	0.1635	0.1935
	basket peg	0.0882	0.1684	0.1913
	Yen peg	0.0968	0.1424	0.1914
	ACB	0.1013	0.1506	0.1912
Real effective ER	Float	0.0133	0.0353	0.0852
	basket peg	0.0117	0.0353	0.0884
	Yen peg	0.0129	0.0324	0.0885
	ACB	0.0132	0.0329	0.0883
Short Interest Rate	Float	0.0369	0.0088	0.0033
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0039	0.0069	0.0035
	Yen peg	0.0130	0.0143	0.0036
	ACB	0.0014	0.0040	0.0033
Korea				
GDP	Float	0.1984	0.2874	0.3378
	basket peg	0.1723	0.2914	0.3327
	Yen peg	0.1808	0.2547	0.3331
	ACB	0.1877	0.2666	0.3329
Real effective ER	Float	0.0719	0.1193	0.2012
	basket peg	0.0609	0.1233	0.2052
	Yen peg	0.0644	0.1068	0.2055
	ACB	0.0670	0.1116	0.2050
Short Interest Rate	Float	0.0404	0.0150	0.0075
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0001
	ACB	0.0422	0.0161	0.0001
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0071	0.0122	0.0074
	Yen peg	0.0118	0.0097	0.0074
	ACB	0.0019	0.0025	0.0063

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Hong Kong				
GDP	Float	0.1800	0.2520	0.2772
	basket peg	0.1587	0.2585	0.2729
	Yen peg	0.1685	0.2280	0.2732
	ACB	0.1730	0.2377	0.2729
Real effective ER	Float	0.0248	0.0326	0.0972
	basket peg	0.0234	0.0323	0.1006
	Yen peg	0.0249	0.0311	0.1007
	ACB	0.0245	0.0316	0.1006
Short Interest Rate	Float	0.0314	0.0096	0.0052
	basket peg	0.0346	0.0003	0.0000
	Yen peg	0.0717	0.0288	0.0000
	ACB	0.0422	0.0161	0.0000
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.0124	0.0082	0.0060
	Yen peg	0.0378	0.0288	0.0064
	ACB	0.0113	0.0114	0.0060

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Philippines				
GDP	Float	0.0544	0.0748	0.0735
	basket peg	0.1726	0.4387	0.4286
	Yen peg	5.2740	3.2031	0.4237
	ACB	2.3010	1.1975	0.3979
Real effective ER	Float	3.0731	0.1921	0.8606
	basket peg	2.1978	1.1524	2.4020
	Yen peg	11.6980	3.0879	2.3869
	ACB	6.6941	0.8825	2.3068
Short Interest Rate	Float	1.3604	1.5447	1.1944
	basket peg	2.8277	0.0081	0.0000
	Yen peg	24.8914	18.2767	0.0001
	ACB	12.5811	8.8738	0.0031
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.4496	7.0417	6.2820
	Yen peg	81.5251	50.5918	6.1947
	ACB	33.0269	17.2692	5.7221
Singapore				
GDP	Float	0.1181	0.0717	0.0128
	basket peg	0.0708	0.1009	0.0324
	Yen peg	1.2171	1.0833	0.0316
	ACB	0.4965	0.4492	0.0291
Real effective ER	Float	0.2784	0.0105	0.1467
	basket peg	0.2080	0.0198	0.1206
	Yen peg	0.5021	0.2629	0.1201
	ACB	0.3177	0.1206	0.1188
Short Interest Rate	Float	5.3615	2.8784	0.6989
	basket peg	2.8277	0.0081	0.0000
	Yen peg	24.8914	18.2767	0.0001
	ACB	12.5811	8.8738	0.0014
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.3946	4.3102	1.8766
	Yen peg	20.2248	18.0977	1.8442
	ACB	5.5512	5.4350	1.7409
Thailand				
GDP	Float	0.2275	0.2210	0.1570
	basket peg	0.1111	0.1079	0.0827
	Yen peg	1.3146	1.1500	0.0821
	ACB	0.6345	0.5829	0.0796
Real effective ER	Float	0.5259	0.0528	1.0723
	basket peg	0.3042	0.5839	1.1762
	Yen peg	1.4305	0.5130	1.1695
	ACB	0.7770	0.2647	1.1343
Short Interest Rate	Float	4.5914	2.8096	1.8410
	basket peg	2.8277	0.0081	0.0000
	Yen peg	24.8914	18.2767	0.0004
	ACB	12.5811	8.8738	0.0097
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.6935	5.8027	4.3098
	Yen peg	18.9143	15.7667	4.2226
	ACB	4.9265	4.2600	3.7555

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
China				
GDP	Float	0.0714	0.0617	0.0437
	basket peg	0.4432	1.3537	1.0576
	Yen peg	1.0185	0.7762	1.0340
	ACB	0.1780	0.1314	0.7987
Real effective ER	Float	0.2356	0.8435	2.5669
	basket peg	0.1495	0.2025	0.6790
	Yen peg	1.0451	2.0148	0.6842
	ACB	0.3906	1.1572	0.7485
Short Interest Rate	Float	10.2296	7.2849	5.1914
	basket peg	2.8277	0.0081	0.0001
	Yen peg	24.8914	18.2767	0.0009
	ACB	12.5811	8.8738	0.0724
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.2124	3.3183	2.5947
	Yen peg	1.4530	1.1064	2.5405
	ACB	0.0840	0.0540	2.0098
Taiwan				
GDP	Float	0.1104	0.1443	0.1009
	basket peg	0.0825	0.3960	0.2717
	Yen peg	1.2862	1.1383	0.2653
	ACB	0.4405	0.4315	0.2411
Real effective ER	Float	0.2479	0.1644	1.1759
	basket peg	0.1749	0.2581	0.7084
	Yen peg	0.5371	0.7481	0.7080
	ACB	0.2956	0.5128	0.7063
Short Interest Rate	Float	7.3162	4.2505	1.9579
	basket peg	2.8277	0.0081	0.0001
	Yen peg	24.8914	18.2767	0.0008
	ACB	12.5811	8.8738	0.0121
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.9521	4.0554	2.5755
	Yen peg	7.3251	6.5540	2.5056
	ACB	1.4407	1.4546	2.2350
Korea				
GDP	Float	0.2463	0.2903	0.2194
	basket peg	0.0802	0.1585	0.1202
	Yen peg	1.1730	1.1134	0.1167
	ACB	0.5244	0.5485	0.1027
Real effective ER	Float	0.3511	0.3772	1.6714
	basket peg	0.2981	0.4927	0.9963
	Yen peg	0.8184	1.2237	0.9952
	ACB	0.4717	0.8604	0.9915
Short Interest Rate	Float	7.8542	5.0072	2.8945
	basket peg	2.8277	0.0081	0.0002
	Yen peg	24.8914	18.2767	0.0024
	ACB	12.5811	8.8738	0.0544
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	1.2682	4.5933	3.3803
	Yen peg	5.4880	4.6356	3.2470
	ACB	0.8882	0.8063	2.6180

COUNTRY:	*REGIME*	*Source of SHOCK*		
VARIABLE		Global	Asia Wide	Country
Hong Kong				
GDP	Float	0.2377	0.1063	0.0282
	basket peg	0.0832	0.1086	0.0563
	Yen peg	1.4651	1.2139	0.0547
	ACB	0.6369	0.5264	0.0492
Real effective ER	Float	0.2629	0.0966	0.3851
	basket peg	0.1045	0.0262	0.2579
	Yen peg	0.3774	0.1609	0.2571
	ACB	0.2258	0.0769	0.2540
Short Interest Rate	Float	4.7673	2.0805	1.0631
	basket peg	2.8277	0.0081	0.0000
	Yen peg	24.8914	18.2767	0.0003
	ACB	12.5811	8.8738	0.0048
Inflation	Float	0.0000	0.0000	0.0000
	basket peg	0.8258	3.3366	2.0273
	Yen peg	13.3714	14.0328	1.9769
	ACB	3.1525	4.2980	1.7950