FEDERAL RESERVE BANK OF SAN FRANCISCO

WORKING PAPER SERIES

Financial Integration in East Asia

Hiroshi Fujiki
Institute for Monetary and Economic Studies, Bank of Japan

Akiko Terada-Hagiwara
Institute for Monetary and Economic Studies, Bank of Japan

April 2007

Working Paper 2007-30
http://www.frbsf.org/publications/economics/papers/2007/wp07-30bk.pdf

First draft, no quotation please

Financial Integration in East Asia

Version: April 17, 2007

Hiroshi Fujiki* and Akiko Terada-Hagiwara**

Abstract

This paper examines the degree of integration into world financial markets and the impacts on several key macroeconomic variables of selected East Asian economies, and draws policy implications. According to our analysis, the degrees of integration into world financial markets in those economies are increasing. Regarding the impacts of increasing integration into world financial markets on several macroeconomic variables, we find three results. First, casual two-way plots among macroeconomic variables do not support the theoretical prediction of reduction in relative consumption volatility. Second, the saving-investment correlation is higher than those of in Euro area economies. Third, the degrees of smoothing of idiosyncratic shock by cross-holding of financial assets are lower than Euro area economies. Those results suggest two policy implications. First, there's some room for improvement in welfare gains in those economies by further risk sharing. Second, holding all other conditions given, the increasing integration into world financial markets alone is unlikely to provide a sound ground for a currency union in East Asia at this stage.

Keywords: Exchange rate regime, financial integration, risk sharing

JEL classification code: F36, F33

* Director and Senior Economist, Institute for Monetary and Economic Studies, Bank of Japan (E-Mail: hiroshi.fujiki@boj.or.jp)

** Institute for Monetary and Economic Studies, Bank of Japan (E-mail:akiko.hagiwara@boj.or.jp)

The authors thank Eswar Prasad and his co-authors for sharing their dataset on de-jure integration. We also thank Maurice Obstfeld and the staff of the Bank of Japan for their helpful comments. Hiroyuki Ooi and Kiyoshi Watanabe provided excellent research assistance. Views expressed in this paper are those of the authors and do not necessarily reflect the official views of the Bank of Japan.

Introduction

The wave of financial liberalization since the mid 1980s facilitated massive capital inflows to the Asian economies. The capital inflows helped those economies to take-off, but at the same time were blamed for the subsequent Asian currency and banking crisis.

Even after the Asian currency and banking crisis, Asian economies have recorded remarkable economic growth mainly driven by the region's growth engine, People's Republic of China (China, hereafter) (see Figure 1) and regional trade integration seems to have increased. As distinct from the pre-crisis period, not only larger economies, but also smaller economies record fast growth as the expansion of so-called vertical chain of production. The expansion of vertical chain of production contributes to the rising intra-regional trade intensity index in ASEAN and ASEAN+3 economies, despite the adverse effects of East Asian financial crisis (see Figure 2).

The export-led growth in those economies supported by the capital inflows lead to massive accumulation of gross foreign assets, especially in the form of foreign reserve, and the accumulation of gross foreign liabilities, especially in the form of foreign direct investment, as documented by Lane and Milesi-Ferretti (2006a). The accumulation of gross foreign assets and liabilities, and the significance of valuation effects arising from exchange rate fluctuations, originally discussed in the context of "original sin," constitute the core issues of global imbalance (See Obstfeld and Rogoff, 2005a and b, and Lane and Milesi-Ferretti 2002 and 2004).

Motivated with regional trade integration and global imbalance in the world financial market, we ask the following questions in this paper. First, have the degrees

of integration into world financial markets in Asian economies increased or not after the Asian currency and banking crisis? Have Asian economies benefit from the increased integration into world financial markets? Should Asian economies adopt exchange rate regimes that are robust to active capital inflows and outflows?

To answer those questions, we examine the degree of integration into world financial markets and its impacts on several key macroeconomic variables, and draw policy implications, paying special attention to the emerging market economies in the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP)[1] economies.

In examining its impact, we will employ relatively simple empirical methods in reduced forms rather than a fully specified general equilibrium model. Our approach has an advantage to be comparable with the abundant past studies, and to reconcile with the lack of the consensus on the general equilibrium model to analyze the issue of global imbalance.

Our analysis shows the following results on the degree of integration into world financial markets and its impacts on several key macroeconomic variables. The degrees of integration into world financial markets in EMEAP economies are increasing according to our analysis of the new database by Lane and Milesi-Ferretti (2006a). Regarding the impacts of increasing integration into world financial markets on several macroeconomic variables, we find three results. First, casual two-way plots among macroeconomic variables hardly support the theoretical prediction of reduction in relative consumption volatility. Second, the saving-investment correlation is higher than

[1] EMEAP, the Executives' Meeting of East Asia-Pacific Central Banks, is a cooperative organization of central banks and monetary authorities in the East Asia and Pacific region. Its primary objective is to strengthen the cooperative relationship among its members. It comprises the central banks of eleven economies: Reserve Bank of Australia, People's Bank of China, Hong Kong Monetary Authority, Bank Indonesia, Bank of Japan, The Bank of Korea, Bank Negara Malaysia, Reserve Bank of New Zealand, Bangko Sentral ng Pilipinas, Monetary Authority of Singapore, and Bank of Thailand.

those of Euro area economies. Third, the degrees of smoothing of idiosyncratic shock by cross-holding of financial assets are lower than in Euro area economies.

Those results suggest two policy implications. First, there's some room for improvement in welfare gains by further risk sharing in EMEAP economies. Second, holding all other conditions given, the increasing integration into world financial markets alone is unlikely to provide a sound ground for a currency union in East Asia at this stage.

The organization of this paper is as follows. Section 1 documents the degree of integration into world financial markets by utilizing the foreign assets and liabilities data constructed in Lane and Milesi-Ferretti (2006a). Section 2 presents a series of tests to illustrate the effects of integration into world financial markets. We begin by examining several hypotheses that integration into world financial markets would imply on key macroeconomic variables such as economic growth and consumption volatilities. We then test the saving-investment nexus as claimed by Feldstein-Horioka (1980) to see whether the degree of international capital mobility has increased especially after the Asian financial crisis. Further, we test risk-sharing hypothesis as in Asdrubali, Sørensen, and Yosha(1996) (hereafter, ASY [1996]) in the international context and Asdrubali and Kim (2006) to see whether consumption growth smoothing is taking place as integration into world financial markets has been progressing in Asia. In Section 3, we discuss policy implications particularly on exchange rate regime in EMEAP economies. The final section concludes the paper.

1. Integration into World Financial Markets in East Asia

This section examines trends of integration into world financial markets in the EMEAP

economies based on the dataset by Lane and Milesi-Ferretti (2006a).[2] Particular attention is paid to "EMEAP8" economies excluding the three high per capita income economies, Australia, New Zealand, and Japan. We compare their trends of international integration into world financial markets with those in the euro area economies and other advanced economies. In the following analysis, we refer to euro area economies excluding Luxemburg and Slovenia as Euro 11.[3] Our broadest sample of economies consists of EMPAP economies, Euro 11, Canada, Switzerland, the U.K., and the U.S. (See Table 1 for the availability of the data series).

(1) Integration into World Financial Markets

Lane and Milesi-Ferretti (2006a) propose two ways of measuring degree of de-fact integration into world financial markets. The first measure is the ratio of the sum of external asset and liability divided by GDP (IFIGDP). The second measure, GDOGDP, focuses on portfolio equity and direct investment: GDOGDP=(PEQA+FDIA+PEQL+FDIL)/GDP, where PEQA (PEQL) denotes the stock of portfolio equity assets (liability) and FDIA (FDIL) denotes the stock of direct investment asset (liability).[4]

[2] Lane and Milesi-Ferretti (2006a) constructs a consistent series of external assets and liabilities, as well as capital inflows and outflows on the basis of residence principle for 145 economies over the period of 1970-2004. The data are classified in the following five broad categories: (1) Portfolio investment (ownership of shares of companies and mutual funds below 10 percent) subdivided into equity securities and debt securities (including bonds and money market instruments), (2) Foreign direct investment (equity participations above 10 percent), (3) Other investment (which includes debt instruments such as loans, deposits, and trade credits), (4) Financial derivatives (the value of the outstanding derivative's contract), and (5) Reserve assets (foreign exchange, SDR holdings and reserve position in the International Monetary Fund).

[3] Data on Luxemburg is available only after 2000, and thus excluded from the following analysis.

[4] Another important way of measuring financial integration is to examine whether the expected return from financial assets, such as the real interest rate parity or uncovered interest parity, is shrinking over time (For an example on integration between China, Hong Kong, Taiwan, the U.S. and Japan in Cheung, Chinn and Fujii (2006)). We have not examined these measures because domestic financial markets in some of the EMEAP economies do not seem sufficiently deep or liquid to allow efficient arbitrage of price differentials to take place. See Karolyi and Stulz (2003) for a survey on this issue.

Figure3 shows the first measure of integration into world financial markets, IFIGDP over the period from 1970 to 2004. Consistent with Lane and Milesi-Ferretti (2006a), IFIGDP accelerated its growth especially around the middle of 1990s across all regions.

Does the increase of integration into world financial markets observed in the aggregate EMEAP economies data apply to individual EMEAP economies? To see this point, Table 2 shows the sample average of IFIGDP for each EMEAP economy for the period from 1980 to 84, 85 to 89, 90 to 94, and 95 to 99, and 2000 to 2004. Hong Kong S.A.R. of China and Singapore have remarkably high ratios, however, they do not alter the overall trend indicating that IFIGDP increased irrespective of an economy's initial degree of integration into world financial markets.

Figure 4 shows the second measure: GDOGDP over the period from 1970 to 2004. The second ratio aims at checking whether the general increase in the degree of integration into world financial markets applies to the subgroup of portfolio equity and FDI holdings, because the trend observed in the first measure might be driven by special factors in international trade in debt instruments.

The ratio had been stable until 1985, but started to hike in 1985 followed by a sharp acceleration beginning in 1996 except for the 2001-2002—replicating the finding in Lane and Milesi-Ferretti (2006a) for the industrial countries, developing countries and emerging countries. Again, Hong Kong S.A.R. of China and Singapore have remarkably high ratios, however, they do not alter the overall trend.

We see another measure of capital account openness based on the information on controls on financial flows to and from in each economy, namely a de-jure index, because the de-facto (e.g. IFIGDP or GDOGDP) and de-jure measures can deviate from

each other for several reasons.[5] Indices measuring de-jure integration into world financial markets, such as those by Chinn and Ito (2005, data till 2003)[6] and Kose et al. (2006, data till 2004), are usually constructed using the disaggregated capital and current account restrictions found in annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) published by the International Monetary Fund (IMF).[7]

Figure 5 shows two measures. As opposed to the persistent upward trend in the de-fact measures, there appeared a reversal in the progress of the current and capital account openness in the mid 1990s. The reversal in de-jure measure probably reflects the re-imposition of controls on capital inflows in Indonesia and Malaysia in 1995 and 96. The de-fact measure continues to rise because the gross foreign liability experienced a dramatic increase due to the revaluation effects during the Asian financial crisis even after the re-imposition of the control, while gross foreign asset increased somewhat slowly.

(2) Capital Structure

Given the increasing trend in the degree of integration into world financial markets, Lane and Milesi-Ferretti (2006a) also show that a measure of capital structure, ratio of equity (Portfolio + Foreign Direct Investment (FDI)) liabilities to total financial liabilities, has been rising globally. Figure 6 shows that the ratio for EMEAP8 economies was quite stable until it started to increase in the 1990s. In the other

[5] For reasons why the two can be different, see Kose et al. (2006).
[6] Their index is the first principle component of the four IMF binary variables on multiple exchange rates, capital account, current account, and requirements to surrender export proceeds. For the extension of the four binary classifications after 1996, they follow Mody and Murshid (2005).
[7] Kose et al. (2006) uses two financial openness variables. One variable is the financial openness variable as defined by Chinn and Ito (2005). The other variable is a binary indicator created by the authors based

regions, EMEAP, Euro11 and all sample economies, the ratio declined in during the 1970s, but turned to an increasing trend in the 1980s followed by the rapid increase in the 1990s, consistent with the analysis by Lane and Milesi-Ferretti (2006a). The trends of individual economy shown in Figure 7 are similar to the trend of EMEAP8 aggregate, although the ratio for China did not drop even in the year 1997 and 1998. Regarding the composition of equity share, most of the increase in external liability in China was explained by the FDI liabilities, rather than the portfolio equity liability. The increase in FDI liabilities has been common to EMEAP economies except for Indonesia and Korea where the growth in FDI liability has been slow.

Behind the increase in equity share in total financial liabilities, we find a downward trend in debt liabilities particularly in the 2000s (Figure 8 and Figure 9).[8] However, Figure 10 shows that not all EMEAP economies follow the downward trend in debt liabilities as in Figure 8 The ratio for Hong Kong S.A.R. of China increased till 1990 and decreased steadily since then. The ratio for Singapore increased steadily even in the 1990s. For China, the ratio has been almost constant after 1990. The ratio for the crisis-hit economies, Indonesia, Korea, Malaysia and Thailand, shows a similar trend observed in Figure 8 while the spike is recorded in Thailand in 1998.

A notable change in the composition of the gross foreign asset is the rapid increase in official reserves in Asian economies, as can be seen in Figure 8. We view the rapid increase as a region-wide phenomenon in EMEAP8 economies. **Table 3** shows the sample average of the ratio of reserve to GDP for each EMEAP8 economy for the period from 1980 to 84, 85 to 89, 90 to 94, 95 to 99, and 2000 to 2004. Hong Kong

on data from the AREAER line E2, which signifies"restrictions on payments for capital transactions."

[8] Limitation of the data reported in the International Financial Statistics forces us to take the sample periods from 1982 to 2004 for EMEAP8 economies minus Hong Kong S.A.R. of China, and 1998 to 2004 for EMEAP8 economies in Figure 9.

S.A.R. of China and Singapore have relatively high ratios, however, they do not alter the overall trend.

Regarding the net foreign asset position, it is well known that the U.S. net external position has been deteriorated while that of emerging economies has been improving (Lane and Milesi-Ferretti (2006a), Figure 7). Figure 11 shows that the recovery of the net foreign asset position applies to EMEAP economies. Hong Kong S.A.R. of China, Japan and Singapore remain net creditors after 1995, and China became a net creditor after 2003. While improving the net asset positions, the other EMEAP8 economies are still net debtors.

(3) Summary

In sum, EMEAP economies are more open to international financial markets, though the composition of assets and liabilities varies from economy to economy.

We summarize the analyses of external assets and liabilities as follows. First, our measure of de-fact integration into world financial markets, IFIGDP (the ratio for the sum of external asset and liability divided by GDP), indicates that the integration has been progressing in the last 35 years, and this trend is especially strong after the middle of the 1990s. Second, on liabilities side, share of equity (Portfolio + FDI) liabilities in total financial liabilities has been rising for some of the EMEAP economies except for the years 1997 and 1998. Third, the ratio of gross external debt to GDP varies from economy to economy. The average trend of EMEAP economies is close to that of crisis-hit economies, however.

2. Integration into World Financial Markets and Risk Sharing

(1) Integration into World Financial Markets, Growth, and Consumption

Neoclassical economics predicts that integration into world financial markets would have certain effects on macroeconomic variables. First, in a one sector Solow type growth model, integration into world financial markets leads to flows of capital from capital-rich economies to capital-poor economies and in the long run the steady state output per capita and return to the capital will be equalized. If the inflow of new technology accompanies the inflow of capital, that technology would help the capital poor economies grow faster.[9] Second, the effects of integration into world financial markets on output volatility are unclear because it has two offsetting effects on the country specific shocks and industry specific shocks depending on the stage of economic development. Namely, integration into world financial markets allows capital-poor economies in early stage of economic development, for example specialized in agricultural production and susceptive to weather shock, to diversify their narrow production basis. In the later stage of economic development, the integration into world financial markets and trade integration could simultaneously allow economies to specialize in particular industries according to their comparative advantages and makes those economies more susceptible to industry specific shocks. Third, integration into world financial markets should unambiguously lead to reductions in the relative volatility of consumption because it allows risk-averse consumers in an economy to smooth the effects from idiosyncratic fluctuations in income growth on consumption growth.

Figure 12 to Figure 15 plot our integration into world financial markets measure, IFIGDP against four macroeconomic variables of our interest. Figure 12

[9] Past studies, however, report that the welfare gain by receiving capital inflows is minimal. See Gourinchas and Jeanne (2006) for example.

plots average growth rate of real GDP and average IFIGDP from 1980 to 2004. Among EMEAP8 economies, we do not see clear positive correlation between the two variables, which is consistent with those reported in Kose et al. (2006) and also with the vast empirical literature providing little robust evidence of a causal relationship between integration into world financial markets and growth. In Figure 13 to Figure 15, the three variables, GDP volatility, consumption growth, and consumption volatility show negative relationships at first sight, but those relationships become unclear when excluding two very open economies, Hong Kong S.A.R. and Singapore. The results here might be consistent with what theory predicts for GDP volatility, but not the case for consumption.[10]

(2) Saving and Investment Correlation based on Feldstein and Horioka (1980)

In this section, we test whether the saving investment correlation increased or decreased before and after the Asian Crisis using the methods proposed by Feldstein-Horioka (1980). General finding in the literature is that the saving investment correlation falls as capital mobility increases (See recent review and results including Asian economies Kim, Kim and Wang (2006b)).[11]

Using the statistics from OECD and Asian Development Bank, we construct data series for the ratio of gross domestic saving to GDP (hereafter S/Y) and the ratio of gross domestic capital formation to GDP (hereafter I/Y).[12] We show unconditional

[10] Figure 12 to 15 use data from 1980 to 2004 except for Hong Kong S.A.R. where data starts in 1981, and Thailand and Malaysia where 2004 consumption is missing.

[11] Feldstein (2005a) argues that the drops in the saving investment correlation after mid 1990s apply to smaller OECD economies, but not for large economies. When observations are weighted by each country GDP, saving-investment correlation remains.

[12] Gross domestic savings are calculated as the difference between GDP and total consumption, where total consumption is the sum of private consumption and government consumption. Gross capital formation is the total value of gross fixed capital formation, changes in inventories and acquisitions less

means of S/Y and I/Y in **Table 4** for three periods: 1981-2004, 1981-1996, and 2000-2004, which shows large drops in I/Y in the period of 2000-2004 compared with the period 1981-1996 in EMEAP8 and EMEAP economies. One notable exception to this trend is China, whose investment rate does not fall in the period of 2000-2004.

How should we interpret the significant drops of I/Y in the period of 2000-2004 that are not unique to East Asia? Prasad *et al.* (2006) speculate that the post-crisis increase in savings and reduction in investment in many emerging market economies are a response of countries with weak financial systems to productivity shocks in the US. The rise in the U.S. productivity accompanied by the reorganization of global production mechanism and the global supply chain and trade has been transmitted to emerging market economies and raised their income. But the weak financial sector in emerging markets does not intermediate additional domestic savings to domestic investment.

Armed with the annual time-series data for saving and investment from 1981 to 2004, we derive a between estimator of saving-investment correlation proposed by Feldstein and Horioka (1980), hereafter $\hat{b}$, which is an estimator for equation (1) :

$$(\frac{1}{T})\sum_{t=1}^{T}(\frac{I}{Y})_{it} = a + b\cdot(\frac{1}{T})\sum_{t=1}^{T}(\frac{S}{Y})_{it} + u_{it}, \qquad (1)$$

where the subscript *t* denotes the period, subscript *i* denote country, and *u* is an error term. We divide the sample into three periods: 1981-2004, 1981-1996, and 2000-2004. Table 5 summarizes the results.

First row of Table 5 shows the results for EMAP8 economies. The saving investment correlation decreases after the Asian financial crisis, and the statistical significance becomes weak. The second and third rows of Table 5 show the results for

---

disposals of valuables.

EMEAP economies and all economies in our sample. We confirm the reductions in the estimates of saving and investment correlations after the East Asian crisis. The fourth row of Table 5 shows for Euro 11 economies, we see no significant saving and investment correlation, but the coefficients take negative values for whole sample periods and sub-sample from 2000 to 2004.

For the sake of robustness check, we choose five-year window beginning in 1981 to run rolling regressions for EMEAP8 economies, EMEAP economies and all economies. The results are summarized in Figure 16. The figure shows that the saving and investment correlations and their lower bound of confidence intervals—the estimates of the coefficients minus 1.96 standard errors. The saving and investment correlations started falling around 1993 and the lower bounds became even negative around the end of 1990s. These results show that the method of Feldstein and Horioka (1980) suggests the increase in the degrees of integration into world financial markets in the EMEAP economies after the Asian financial crisis, or the period between 2000 and 2004. However, it is important to note that this period corresponds to large drops in I/Y relative to S/Y in some EMEAP8 economies, which contradict the theoretical prediction that greater integration into world financial markets leads to capital flowing from capital-rich economies to capital-poor economies.

(3) Risk sharing

Integration into world financial markets allows economies to share their idiosyncratic risks in consumptions and improves welfare. Empirical investigations on this point are abundant both for international and intranational risk sharing. Kalemli-Ozcan, Sørensen, and Yosha (2003) finds, for example, the fraction of idiosyncratic shock

smoothed by cross-holding of financial assets (*ex ante* insurance) in the Euro area are 9% for the period between 1993 and 2000—a significant increase from small and/or almost negative estimates for the preceding years—possibly due to the creation of Euro area. The general findings in the literature are scarce international risk sharing, where home bias in asset holdings is prevalent and consumption smoothing takes place essentially through domestic saving, and richer intranational risk sharing, where the role of capital markets sometimes became preponderant.

Motivated by the evidence of increasing integration into world financial markets for the EMEAP economies in the previous sections, we examine whether consumption risk sharing has improved in the region. We examine the extent of risk sharing through two methods; the method by ASY (1996) in the international context and the method by Asdrubali and Kim (2006).

A. Decomposition of cross-sectional variance in gross product of an economy

ASY (1996) proposes the decomposition of cross-sectional variance in gross product of an economy (originally applied to that of U.S. states) into four parts: fractions of shocks to gross state product smoothed via capital markets, fractions of shocks to gross state product smoothed by the federal fiscal system, fractions of shocks to gross state product smoothed by credit markets, and an unsmoothed residual fraction. Sørensen and Yosha (1998) advanced ASY (1996) to an international setting and analyzed consumption smoothing among EC and OECD economies during the period from 1996 to 1990. They find that the contribution of cross-economy factor income flows to

cross-economy risk sharing among EC as well as OECD economies is not significantly different from zero.[13]

For an application of Sørensen and Yosha (1998) to Asian economies, Kim, Kim, and Wang (KKW, 2006a) among others report that credit market channel is more important than that of international capital market. For the sample of 10 Asian economies from 1970 to 2000, they find that about 20% of the shocks to income is smoothed through the credit market channel while almost no smoothing takes place through the international capital market leaving the rest unsmoothed. We first extend their analysis to EMEAP economies including more recent data to see whether this ex ante insurance via asset markets is in fact insignificant.

Following Sørensen and Yosha (1998), suppose that GDP for each economy is a homogeneous tradable good and an exogenous random variable. Suppose further that the representative consumer in each economy is an identical risk averse expected utility maximizer who obtains utility from consumption. If the utility function is in log form, under full risk sharing, consumption of each economy commoves with world consumption, but does not commove with economy specific GDP shock.

Suppose there is an international capital market and a citizen in one economy can own claims to GDP in the other economies, say, through stock holding, and the cross-economy factor income flow can smooth the income of citizen in the lending economy. In that case, under full risk sharing, GNP of the lending economy commove with the world consumption. Even if the risk is not fully shared through cross-economy factor income flows, suppose there is a credit market. Then, a citizen can smooth consumption via savings and dissavings using the credit market, say

[13] See also Mélitz (2004) for a useful survey of the literature, especially regarding evidence from European economies.

through bank deposit and under full risk sharing, consumption of each economy commoves with world consumption. We consider the consumption allocation under full risk sharing as a benchmark, and measure the fraction of shocks to GDP absorbed by the international capital market channel and credit market channel through the variance decomposition explained below.

We consider the GDP identity for any period t. Shocks to GDP are decomposed into two factors as follows.

$$GDP_i = \frac{GDP_i}{GNP_i}\frac{GNP_i}{C_i}C_i \qquad (2)$$

where all the magnitudes are in per capita terms, and i is an index of the economies.[14] Following KKW(2006a), equation (2) can be transformed to estimate the following panel equation system (3) with seemingly unrelated regression (SUR).

$$\begin{aligned}
\Delta \log GDP_{i,t} - \Delta \log GNP_{i,t} &= d_{kt} + g_k \Delta \log GDP_{i,t} + e_{i,kt} \\
\Delta \log GNP_{i,t} - \Delta \log C_{i,t} &= d_{ct} + g_c \Delta \log GDP_{i,t} + e_{i,ct} \qquad (3) \\
\Delta \log C_{i,t} &= d_{ut} + g_u \Delta \log GDP_{i,t} + e_{i,ut}
\end{aligned}$$

We interpret the degree of overall income and consumption smoothing against idiosyncratic regional shock to *GDP* of economy i as measured by three sources: first, the fraction of idiosyncratic shock smoothed by cross-holding of financial assets (*ex ante* insurance) measured by g_k; second, the fraction of idiosyncratic shock smoothed by the changes in savings and dissavings typically instigated by the credit markets after the realization of idiosyncratic shock, measured by g_c; third, the fraction of idiosyncratic shock unsmoothed (namely, deviation of international consumption patterns from the full risk sharing allocation) measured by g_u and $g_k + g_c + g_u = 1$.[15]

[14] We ignore the role of international government transfer in the following analysis following KKW(2006a).

[15] Note that the last equation of equation (3) is almost the same as Cochrane's (1991) empirical model, which measures whether the consumption of economies responds only to aggregate shocks or not. The

Regarding the first source, if full risk sharing is achieved through international capital market channel, GNP of the economy commoves with the world consumption and GDP is orthogonal to GDP of that economy. In this case, we get g_k =1.

Regarding the second source, if full risk sharing is achieved through the combination of international capital market and credit markets, consumption of each economy commove with world consumption. In this case g_c measures the incremental fraction of shocks to GDP smoothed via savings and we get $g_k + g_c = 1, g_u = 0$. Time fixed effects in equation (3), d_{kt}, d_{ct}, d_{ut}, play crucial role to capture the year specific effects on GDP growth rate, presumably the aggregate shocks to GDP of each economy.

The first row of Table 6 shows the result for the period between 1981 and 2004. The credit market plays a larger role in smoothing shocks to GDP in EMEAP8 countries with more than 30% (the estimate of g_c) while only about 6% of the shock to GDP is smoothed through international capital market (the estimate of g_k). Moreover, the larger values of standard errors for the parameter reported for the estimate of g_k suggests that the smoothing effect from the international capital market is weak.[16] This trend—credit market being more important in Asia– is consistent with the finding by KKW (2006a) and Jeon, Oh, and Yang (2005).[17]

Meanwhile, this trend is somewhat weak for ten Euro area economies for the same period. As the second row of Table 6 shows, about 24% is smoothed via credit

---

focus here is the measurement of fraction of region-specific *GDP* shocks absorbed through the various channels of international insurance.

[16] Our national account and population data is taken from IFS while the purchasing power parity are from Penn World Table. We should better use GNP statistics that include the cross-economy factor income flow from the economies under consideration alone to be consistent with the theoretical model, but the data limitation does not allow us to do such analysis.

[17] Each of the smoothed portion in their estimate is about half those of ours mainly due to the difference in the deflator used and partly to the difference in the countries included.

market while 16%, more than double that of EMEAP8, goes through international capital market although the larger value of standard error for the parameters prevents us taking the results in their face values.[18] One might claim that Asian economies are financially integrated more with the U.S. and Euro area rather than the economies in the region, and these financial centers should be included in the estimation. The results for risk sharing among EMEAP (all 11 economies), the U.S., and Euro area combined are quite similar to the results based on EMEAP8 economies.

Figure 17 shows the results of estimation of equation (3) using ten-year sub-samples. Figure 17 shows that the fraction smoothed through credit market channel peaked during the window of 1983-92 when major financial deregulation, particularly in their banking sectors, took place in Asia. Meanwhile, the fraction smoothed through international capital market has been close to zero, and even experienced a sharp drop to negative from the mid-80s to early 90s windows. The drops in the ten-year sub-samples beginning from 1988 may be partly due to the Asian crisis with the reversals of international capital inflows. However, toward the end of the sample, the smoothed fraction experienced a dramatic increase reaching above 30% of the total shocks to GDP possibly driven by a surge in international capital inflows to the region.

Figure 18 reports the result using all sample economies including EMEAP, Euro area, and the U.S. The result is similar to the result in Figure 17 based on EMEAP8 economies. This result seems to be consistent with the finding by Kim, Lee, and Shin (2005), arguing that Asian region is more integrated with global markets than with each other. It may be fair to say, then, that what is developing in the region reflects what is happening in the global market. These findings further confirm those

[18] See also Sørensen, and Yosha (1998), though for a different sample period.

found in the past literature—credit market channel is more important than that of international capital market, and the degree of risk sharing among EMEAP8 is far from complete, because the unsmoothed part of consumption against the idiosyncratic shock is around 60% on average according to our results.

B. Intertemporal Smoothing based on Asdrubali and Kim (2006)

Asdrubali and Kim (2004) argue that for some smoothing channels, dynamics of smoothing is much richer than the impact estimates captured in the simple static model as in the subsection A. Those channels include smoothing via tax/transfer system and/or via credit channels. Given consistently high, around 40%, shocks smoothed through credit market in the EMEAP economies, we suspect that intertemporal smoothing may be worth an attention. Motivated by those arguments, we gauge the cross-sectional smoothing from different perspective from KSY (2003), and measure intertemporal smoothing in EMEAP8 based on an imperfect risk sharing framework as proposed by Asdrubali and Kim (2006).

First, Asdrubali and Kim (2006) propose a way to measure risk sharing, taking into account time heterogeneity by modeling the time effect term as random, and correlated with aggregate output growth, which is approximated by average domestic output growth of economies under consideration. Specifically, they estimate the following equation (4):

$$\Delta \log C_{i,t} = u_t + \beta \Delta \log GDP_{i,t} + \alpha \overline{\Delta \log GDP_t} + \varepsilon_{i,t}, \qquad (4)$$

where $\overline{\Delta \log GDP_t} = \sum_i \Delta \log GDP_{i,t}$ and $E[(u_t + \varepsilon_{i,t}) \mid \overline{\Delta \log GDP}] = 0$. According to their model, the coefficient β, attached to domestic output growth, measures the deviation from the risk sharing arrangement, and the orthogonal coefficient α, attached

to aggregate output growth, measures the extent of risk sharing within the group of economies under consideration. The innovation in the method of Asdrubali and Kim (2006) lies in the identification of the extent of risk sharing from aggregate output growth (the coefficient α), rather than individual economy's output growth as in KSY (2003) (the third equation of Equation (3)).

Table 7 reports the results for estimation of equation (4) using the data on EMEAP8 economies for whole sample periods from 1971 to 2005 and for decades.[19] The estimates of β suggest that about 40% of idiosyncratic income growth shocks are insured on average during the last four decades. As for the degree of international risk sharing which is explicitly captured by α, there seem to be an increasing trend in international risk sharing toward the recent years as regional financial integration progresses. However, the magnitude of international risk sharing is limited, around 3% in contrast to 21% as found for OECD countries by Asdrubali and Kim (2006).

Second, Asdrubali and Kim (2006) propose a way to measure the intertemporal smoothing effects by estimating the following equation (5):

$$\Delta \log C_{i,t} = \varsigma_i + \gamma \Delta \log GDP_{i,t} + \delta \overline{\Delta \log GDP_i} + \upsilon_{i,t} \qquad (5)$$

where $\overline{\Delta \log GDP_i}$ is the time average of output. The coefficient γ, attached to domestic output growth, measures the extent of consumption smoothing out of temporary income growth. Suppose that permanent output growth for an economy is approximated by the time average output growth of that economy, and suppose further that individual heterogeneity is correlated with the time average output growth. Then, the orthogonal coefficient δ, attached to the time average of output growth can be interpreted as consumption smoothing out of permanent output growth.

[19] All variables in the regressions are real in domestic currency and in per capita term.

Table 8 report the estimation results of equation (5) for whole sample period from 1971 to 2004, and sub-sample periods before, during and after the Asian crisis: 1971 to 1996, 1998 to 2000, and 2000 to 2004. The results in the first row suggest that while about 40% of temporary shock is smoothed overtime, only 28% of permanent shock is smoothed, in the sense that country consumption growth follows less than a third of a measurement of permanent income growth on average.[20]

One might expect that the EMEAP economies had experienced more difficulty in using both short-term and long-term borrowings to smooth domestic consumption during the Asian financial and banking crisis. However, the estimates based on the data after the crisis period from 2001 to 2005 show that both channels appear improved dramatically. As the last row of Table 8 shows, more than 50% of temporary shock is smoothed overtime, and close to half of the permanent shock is smoothed.

Overall, the results based on equation (5), with explicit intertemporal factor, are strikingly similar to the results obtained from the sample of OECD economies (Asdrubali and Kim, [2006]). However, the results based on equation (4), using aggregate income growth to measure the extent of cross-sectional risk sharing, show small extent of risk sharing compared with the results base on the data on advanced economies. We interpret the results that international risk sharing in EMEAP economies is still limited, although the intertemporal smoothing in EMEAP economies may be comparable to the one in the developed countries.

(4) Summary

The analyses in section 2 provide us with supporting evidence for integration into world

[20] Again, note that we assume that permanent output growth for an economy is approximated by the average output growth of that economy in estimating equation (5).

financial markets, and limited progress in risk sharing within EMEAP economies than the economic theory suggests.[21] Specifically, casual two-way plots between integration into world financial markets and several macroeconomic variables do not support the prediction of reduction in relative consumption volatility. Testing the saving-investment correlation proposed by Feldstein and Horioka (1980) suggests a significant increase in the degree of international capital mobility in the EMEAP economies during the years after the Asian financial crisis, but the saving-investment correlation in EMEAP economies is higher than that in euro area economies. As for the risk sharing, the degree of intertemporal smoothing may be comparable to the one in the OECD countries, but the international risk sharing is limited.

Why the increased integration into world financial markets does not lead to clear-cut empirical evidence for better risk sharing and improvement of welfare in the EMEAP economies? One answer to this question is the endogeniety of the quality of institutions, known as "collateral benefits," and integration into world financial markets.

"Collateral benefits," proposed by Kose et al. (2006), consists of a broad set of economic fundamentals that provides the benefit of integration into world financial markets in addition to the traditional channels (e.g., capital accumulation). The collateral benefits could include development of the domestic financial sector, improvements in institutions, better macroeconomic policies, etc., which then result in

[21] This main message—that global integration progresses, whereas regional integration remains weak—appears a robust one, as it is supported by other studies on financial integration using different integration measures, with a few exceptions. For example, Forbes and Chinn (2004) find that stock returns have quantitatively important impacts on five major Asian economies, and the significant impacts result from the direct trade linkage. Eichengreen and Park (2003) use a gravity model to explain the patterns of consolidated international bank claims reported to BIS that shows slower financial integration in Asia. In contrast, Eichengreen and Luengnaruemitchai (2006) use a gravity model to explain the patterns of bilateral international portfolio holding measured by the IMF for 2001 to 2003. They find that the Asian bond markets are more integrated than a randomly selected pair of bond markets, holding other determinants of the bilateral international portfolio constant.

higher growth, usually through gains in allocative efficiency.

EMEAP economies have a long way to go to obtain those collateral benefits. For example, compared with euro area economies, EMAEP economies so far do not have deep and liquid regional capital market, regional international institutions, and regional common economic policies. Compared with selected developing economies a composite opacity index presented in Gelos and Wei (2005) indicates that the degree of opacity in areas such as accounting standards, macroeconomic policies, and legal system of average EMEAP economies is below the average of 30 developing economies when excluding Singapore and Hong Kong S.A.R..[22]

We argue that the integration into world financial markets in EMEAP economies has progressed, but is not deep and lasted long enough to establish the collateral benefits. Hence we find it difficult to recover the associated macroeconomic gains from the increasing degree of integration into world financial markets through our econometric analysis.

Do we learn any implications for the future of currency union in Asian economies? Our empirical results suggest that an ample room remains for improvement in intraregional risk sharing and welfare in Asia.[23] Specifically compared with the Euro area economies, we find the higher saving-investment

[22] The data is originally constructed by PricewaterhouseCoopers. The index is presented for only 6 economies; Hong Kong S.A.R., Indonesia. Korea, Philippines, Singapore, and Thailand. See details in Table AII, column 2 of Gelos and Wei (2005).

[23] Note that the integration into world financial markets is only one of the many important conditions for a currency union, such as the flexibility of labor market and international transfer system to cope with economy-specific shock. Moreover, Asian economies do not have common strong political leadership toward a currency union compared with European economies. The lack of clear regional leadership leads to some economists wonders if China or Japan would really participate into the union, if ever created. For example, Fischer (2006) expects that the non-Chinese members would like to have a common currency so as to have some impact on region-wide monetary policy, but whether China would grant that role would be up to China. Fischer also expects that Japan plays an independent role by retaining its currency, rather like the United Kingdom currently does in Europe.

correlation, the lower degrees of the fraction of idiosyncratic shock smoothed by cross-holding of financial assets and a limited extent of risk sharing within EMEAP8 economies. Given the lack of area-wide alternative mechanisms to cope with economy specific shocks, such as coordinated fiscal policy and measures to make labor market flexible, our evidence against the consumption smoothing mechanism via international capital market and a credit market in Asia suggests that it is unlikely that a currency union in Asia is a feasible solution because a currency union takes away an important adjustment mechanism against idiosyncratic shock, namely the adjustment of the bilateral nominal exchange rate.

3. Implications of Integration into World Financial Markets on Exchange Rate Regimes in Asia

The analyses in section 2 raise an important question surrounding exchange rate fluctuations and regimes; what is the appropriate exchange rate regime when capital account is open? This section reviews selected literatures in searching for possible answers to the question.[24]

Motivated with the Asian currency and banking crisis, influential economists argue that increasing integration into world financial markets suggests that the appropriate exchange rate regime is either flexible exchange rate or a fixed exchange

[24] One of the other important topics about integration into world financial markets and exchange rate is so called valuation channel. As summarized by Lane and Milesi-Ferretti (2006b), even if net external balance is zero, economies are exposed to asset price movements including exchange rates. The effects of asset price changes would differ from economy to economy depending on the composition of assets and liabilities—reflecting the wedge between domestic and foreign real returns. Lane and Milesi-Ferretti (2005a) provides numerical examples on the effects through valuation channel for Indonesia and Malaysia. The two economies track a similar trend—net capital gains and the valuation effects through exchange rate fluctuations are fairly big and negative offsetting the positive gains in trade balance for the period from 1990 to 2002. However, the estimates of total quantitative magnitude of valuation channel in emerging market economies were not available so far due to the lack of precise historical data for this purpose.

rate supported, if necessary, by a commitment to give up altogether an independent monetary policy (For example, Summers [2000] and Fischer [2001]). Although the crisis in Argentina showed the difficulty of implementing the hard-peg exchange rate regime, as Obstfeld (2004) observes, majority of emerging market economies appear to be practicing extensive smoothing of exchange rate, though to a lesser extent as compared to the pre-crisis period, and also to allow longer-term trends to accommodate trade competitiveness. Obstfeld (2004) states that it is difficult for those emerging market economies to embrace floating U.S. dollar exchange rates due to the fact that the contractual unit of account being a foreign currency, often U.S/ dollar, leading to dollarized liabilities and/or a lack of deep and resilient financial markets.

Kose et al. (2006) argues that for economies with weak financial systems, an open capital account and a fixed exchange rate regime are not an auspicious combination. In this context, “Managed floating plus” position for larger emerging market economies, recommended by Goldstein (2002) makes sense. “Managed floating plus” means the combination of inflation targeting and aggressive measures to reduce currency mismatches in assets and liabilities. Goldstein proposes a variety of measures to limit currency mismatches; these include a periodic announcement of the ratio of short-term foreign debt to foreign reserves, a development of deeper capital markets that allow better hedging mechanism and a prohibition against government borrowing in foreign currencies.

Consistent with the argument of Kose et al. (2006) and Goldstein (2002), there is a line of literature that supports floating exchange rate regime under strong balance sheet effects due to financial imperfection, rather than fixed exchange rate regime. First, Céspedes, Chang, and Velasco (2004) show that in spite of financial imperfections and

balance sheet effects, flexible exchange rates do play a useful insulating role against real external shocks even with foreign denominated borrowing from the world capital market. Consider an unanticipated shock to the world interest rate. The shock always calls for a real devaluation, which can increase the burden of inherited dollarized debt, worsen the net worth, and push up the risk premium. Meanwhile, this negative effect would be offset partially by positive effects on the asset side through increases in demand for domestic goods, which lead to hikes in both output and the return earned by entrepreneurs. According to their specification, under a floating exchange rate regime, where the central bank targets the price of home output, the necessary real devaluation is accomplished by a nominal depreciation, which leaves the product real wage and hence current employment unchanged, but decreases investment and future output. Under fixed exchange rate regime, the necessary real devaluation is accomplished by deflation, which increases the product real wage and causes a fall in current employment and current output. The fall in current output decreases net worth, pushes up the risk premium further, and decreases investment and future output to a greater degree than the case of a flexible exchange rate regime. In their model, the floating exchange rate regime provides higher welfare than the fixed exchange rate regime does.[25]

Another important contribution is by Gertler, Gilchrist and Natalucci (2006), which supports the floating exchange rate regime with foreign currency denominated debt. They consider a small open economy macroeconomic model to capture the key

[25] While their model does not allow for sluggish price-level dynamics, the fact that price deflation tends to be slow and more predictable than currency depreciation (especially in a crisis setting) in reality would alleviate the increases in the burden of inherited dollarized debt under a fixed exchange rate regime. The moderate increase in the burden of inherited dollarized debt might be comparable to the benefit of output stabilization arising under the flexible exchange rate regime. See Devereux and Lane (2003) for an exposition of this case.

feature of Korean experience 1997-98, where money and nominal price rigidities are extended to show a link between exchange rate regimes and financial distress based on the financial accelerator mechanism. In response to an exogenous rise in the country risk premium, their model shows a sharp increase in lending rates and large drop in output, employment, investment and measured productivity. According to their calibration to match their model to Korean experience 1997-98, the financial accelerator mechanism explains a half of the economic downturn.

Gertler, Gilchrist and Natalucci (2006) compare the performance of fixed exchange rate regime, floating exchange rate regime with Taylor rule, and fixed exchange rate regime later abandons in favor of floating exchange rate regime using simulations. The simulations show that a credible floating exchange rate regime is better than a fixed exchange rate regime. While domestic interest rate is tied to the foreign interest rate under the fixed exchange rate regime, under floating exchange rate regime, the domestic interest rate is governed by a feed back rule like a Taylor-rule. Hence, an increase in the country risk premium under floating exchange rate shows immediate depreciation of currency, prompt increase in exports and a sharp rise in CPI inflation. Rising nominal interest rate in response to CPI inflation reduces investment demand, but it is partly offset by the increasing exports. With foreign currency denominated liabilities, the floating exchange rate becomes less attractive because depreciation means reductions of entrepreneurial net worth and enhances financial accelerator mechanism, however, floating exchange rate regime is still attractive in a sense that the output drop remains smaller under flexible exchange rate regime than

fixed exchange rate regime.[26]

Note that the two examples only deal with special cases in tractable macroeconomic models, and thus the policy implications of their models should not be taken literally. For example, those examples consider the effects of country specific shock to small open economies, and they do not investigate the effects of area-wide shock in a currency union, which may be relevant for a hypothetical currency union in Asian economies. Moreover, as Kose et al (2006) summarizes, the literature does not imply that the fixed exchange rate regime is necessarily a problem for economies prior to international capital market liberalization. Maintaining either a free float or a hard peg along with capital account openness requires a strong commitment to fostering good institutions, especially with respect to financial market regulation and supervision.

Indeed, the Asian economies have generally decided to maintain floating exchange rates with some degrees of foreign exchange interventions. Wyplosz (2006) interprets their behavior as they have decided to trade off the benefits from an export-led strategy, based on exchange rate stability and external competitiveness, against the probability of renewed speculative attacks. If the probability is low enough, which we do not know, the choice is reasonable. Wyplosz (2006) agrees that accumulating foreign exchange reserves is one way of bringing the probability down, but warns that it is easy to imagine how a domestic financial distress or a serious political turmoil could precipitate a speculative attack on the currency.[27]

---

[26] See also Devereux, Land and Xu (2006) and Cúrida (2005) for similar results.

[27] This paper does not deal with the debate over the appropriateness of basket-peg proposal for Asian economies, because those papers generally focus on trade integration, rather than integration into world financial markets. We list a few studies on the pros and cons for basket-peg below for reference. Kawai (2002) argued that (1) a system which ensures intra-regional exchange rate stability will be beneficial for emerging East Asia to promote trade, FDI, and economic growth; (2) given the high degree of intra-regional trade and the rising similarity of trade composition in East Asia, each economy's exchange rate policy should be directed toward maintaining intra-regional exchange rate stability (see

4. Concluding Remarks

This paper examines the degree of integration into world financial markets and its impacts on several key macroeconomic variables for selected East Asian economies, and draws policy implications. According to our analysis, the degrees of integration into world financial markets in those economies are increasing. Regarding the impacts of increasing integration into world financial markets on several macroeconomic variables, we find three results. First, casual two-way plots among macroeconomic variables do not support the theoretical prediction of reduction in relative consumption volatility. Second, the saving-investment correlation is higher than those of Euro area economies. Third, the degrees of smoothing of idiosyncratic shock by cross-holding of financial assets are lower than in Euro area economies. Those results suggest two policy implications. First, there's some room for improvement in welfare gains in those economies by further risk sharing. Second, holding all other conditions given, the increasing integration into world financial markets alone is unlikely to provide a sound ground for a currency union in East Asia at this stage.

Branson and Healy(2005) for the same argument and see the opposite argument in Sa and Gurin(2006)); and (3) The diverse economic linkages of emerging East Asia with the rest of the world suggest that exchange rate stabilization vis-à-vis a well-balanced currency basket comprising the dollar, the yen, and the euro is a reasonable option. Ogawa and Kawasaki (2006) examine the cointegration relationship among real effective exchange rates and find after the East Asian crisis, the Japanese yen becomes one of the currencies to be included that stabilizes the other Asian currencies. They argue that the results suggests that the common currency basket arrangement into the ASEAN plus three economies that include Japan. Yoshino et al. (2004) provides an example that the choice of exchange rate regime depends on the choice of policy objectives, and a basket-peg with trade weight in general is not the best choice. Shioji (2006) examines the optimal weight for East Asia's currency basket peg to the dollar and the yen based on a three economy version of new open economy macroeconomics model for Asia, Japan and the U.S. According to his model, the weight of the basket peg depends not only on the trade share that the traditional literature of basket peg puts emphasis on, but also on the choice of invoicing currency. Shioji concludes that under the invoicing currency pricing, East Asian economies should assign more weight to Japanese yen, rather than the standard assumption of seller's currency pricing. The results of Shioji (2006) highlight the importance of the understanding on the choice of invoice currency and the degree of pass-though in Asia. See Parsons and Sato (2006) and Ito and Sato (2006) on the degree of pass-through.

References

Asdrubali, Pierfederico and Soyoung Kim, "On the Empirics of International Smoothing," 2006, mimeo.

Asdrubali, Pierfederico, and Soyoung Kim, "Dynamic Risksharing in the United States and Europe," *Journal of Monetary Economics*, 51 (4), 2004, pp.809–836.

Asdrubali, Pierfederico, Bent E. Sørensen, and Oved Yosha, "Channels of Interstate Risksharing: United States 1963–1990, "*Quarterly Journal of Economics*, 111 (4), 1996, pp.1081–1110.

Branson, William H. and Conor N. Healy, "Monetary and Exchange Rate Policy Coordination in ASEAN+1," NBER Working Paper Series No. 11713, 2005.

Céspedes, Luis Felipe, Roberto Chang, and Andrés Velasco, "Balance Sheets and Exchange Rate Policy," *American Economic Review* 94 (4) 2004, 1183–1193.

Chinn, Menzie D. and Hiro Ito, "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," forthcoming in Journal of Development Economics, 2005.

Cheung Yin-Wong, Manzie D. Chinn, and Eiji Fujii, "The Chinese Economies in Global Context: The Integration Process and its Determinants," *Journal of the Japanese and International Economies* 20, 2006, 128–153.

Cochrane, John H., "A Simple Test of Consumption Insurance," *Journal of Political Economy*, 99 (5), 1991, pp.957–976.

Cúrdia, Vasco. 2006. "Monetary Policy under Sudden Stops," Working Paper, Federal Reserve Bank of New York, 2005.

Devereux, Michael B. and Philip R. Lane, "Understanding Bilateral Exchange Rate Volatility," *Journal of International Economics* 60, 109–132, 2003.

Devereux, Michael B., Philip R. Lane, and Janyi Xu, “Exchange Rates and Monetary Policy in Emerging Market Economies,” *Economic Journal* 116, 478–506, 2006.

Eichengreen, Barry, and Yung C. Park, “Why Has There Been Less Financial Integration in Asia than in Europe?,” Institute of European Studies, University of California, Berkeley, 2003.

Eichengreen, Barry, and Pipat Luengnaruemitchai, “Bond Markets as Conduits for Capital Flows: How does Asia Compare?,” NBER Working Paper Series No. 12408, 2006.

Feldstein, Martin, “Monetary Policy in a Changing International Environment: The Role of Capital Flows,” NBER Working Paper Series No. 11856, 2005a.

Feldstein, Martin, and Charles Yuji Horioka, “Domestic Saving and International Capital Flows,” *Economic Journal* 90, 314–330, 1980.

Fischer, S., 2001, "Distinguished Lecture on Economies in Government: Exchange Rate Regimes: Is the Bipolar View Correct?" *Journal of Economic Perspective*, 15 (2), 3–24.

Fischer, Stanley, “The New Global Economic Geography,” paper presented at the Federal Reserve Bank of Kansas City Conference on August 25–26, 2006.

Forbes, Kristin J., and Menzie D. Chinn, “A Decomposition of Global Linkages in Financial Markets Over Time,” *The Review of Economics and Statistics*, August 2004, 86(3), 705–722.

Gelos, R. Gaston, and Shang-Jin Wei, “Transparency and International Portfolio Holdings,” *Journal of Finance* 60(6), 2005, 2987–3020.

Gertler, Mark, Simon Gilchrist and Fabio M. Natalucci, “External Constraints on Monetary Policy and Financial Accelerator,” *Journal of Money, Credit and*

Banking, forthcoming, 2006.

Goldstein, Morris, *Managed Floating Plus*, Washington, D.C.: Institute for International Economics, 2002

Gourinchas, Pierre-Oliver and Hélène Ray, "International Financial Adjustment," NBER Working Paper Series, 11155, 2005.

Gourinchas, Pierre-Oliver and Olivier Jeanne, "The Elusive Gains from International Financial Integration," *Review of Economic Studies* 73, 2006, 715–741.

Ito, Takatoshi and Kiyotaka Sato, "Exchange Rate Changes and Inflation in Post-Crisis Asian Economies: VAR Analysis of the Exchange Rate Pass-Through," CIRJE Working Paper Series, F-406, 2006.

Jeon, Jongkyou, Yonghyup Oh, and Doo Yong Yang, "Financial Market Integration in East Asia: Regional or Global?" Korean Institute for International Economic Policy working paper 05-02, 2005.

Kalemli-Ozcan, Sebnem, Bent E. Sørensen, and Oved Yosha, "Risk Sharing and Industrial Specialization: Regional and International Evidence," *American Economic Review*, 93 (3), 2003, pp.903–916.

Karolyi, George Andrew, and René M. Stulz, "Are Assets Priced Locally or Globally?" in Handbook of the Economics of Finance, by Milton Harris George and René M. Stulz (Elsevier: North-Holland), 2003.

Kawai, Masahiro "Exchange Rate Arrangements in East Asia: Lessons from the 1997–98 Currency Crisis," Monetary and Economic Studies 20 (S-1), 167–204, 2002.

Kim, Soyoung, Jong-Wha Lee and Kwanho Shin, "Regional and Global Financial Integration in East Asia," mimeo 2005.

Kim, Soyoung, Sunghyun H. Kim and Yunjong Wang, “Financial Integration and Consumption Risk Sharing in East Asia,” *Japan and the World Economy*, 18, December 2006a, 143–157.

Kim, Soyoung, Sunghyun H. Kim and Yunjong Wang, “Saving, investment and international, capital mobility in East Asia,” *Japan and the World Economy*, 2006b, forthcoming.

Kose, M. Ayhan, Eswar Prasad, Kenneth Rogoff, and Shang-Jin Wei, “Financial Globalization: A Reappraisal,” IMF Working Paper 06/189, 2006.

Lane, Philip R. and Gian Maria Milesi-Ferretti, “External Wealth, the Trade Balance, and the Real Exchange Rate,” *European Economic Review*, 46, 1049–1071, 2002.

Lane, Philip R. and Milesi-Ferretti, Gian Maria, “The Transfer Problem Revisited: Net Foreign Assets and Real Exchange Rates,” *The Review of Economics and Statistics*, 86 (4), 841–857, 2004.

Lane, Philip R. and Milesi-Ferretti, Gian Maria, “Financial Globalization and Exchange Rates,” IMF Working Paper 05/3, 2005a.

Lane, Philip R. and Milesi-Ferretti, Gian Maria, “The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004,” IMF Working Paper 06/69, 2006a.

Lane, Philip R. and Gian Maria Milesi-Ferretti, “Exchange Rates and External Adjustment: Does Financial Globalization Matter?” IIIS Discussion Paper No. 129, 2006b.

Mélitz, Jacques, “Risk Sharing and EMC,” CEPR Discussion Paper Series, No. 4460, Center for Economic Research, 2004.

Mody, Ashoka, and Antu Panini Murshid, “Growing Up with Capital Flows,” *Journal of International Economics*, 65 (1), 23005, 249–66.

Obstfeld, Maurice, “Globalization, Macroeconomic Performance, and the Exchange Rates of Emerging Economies,” *Monetary and Economic Studies*, 22, S-1, 2004.

Obstfeld, Maurice and Kenneth Rogoff, “Global Current Account Imbalances and Exchange Rates Adjustments,” *Brookings Papers on Economic Activity*, I: 2005a, 67–123.

Obstfeld, Maurice and Kenneth Rogoff, “The Unsustainable US Current Account Position Revisited,” NBER Working Paper Series No. 10869, 2004, revised 2005b.

Obstfeld, Maurice, “Implications for the Yen of Japanese Current Account Adjustment,” IMES Discussion Paper Series 2006-E-15, 2006.

Ogawa, Eiji and Kentaro Kawasaki, “Adopting a Common Currency Basket Arrangement into the ‘ASEAN plus Three,’” mimeo 2006.

Parsons, Craig and Kiyotaka Sato, “Exchange Rate Pass-Through in East Asia,” CITS Working Paper 2005–09, 2005.

Prasad, Eswar, Raghuram Rajan, and Arvind Subramanian, “Patterns of International Capital Flows and their Implications for Economic Development,” mimeo, International Monetary Fund, 2006.

Sa, Sopanha, and Julia Guérin, “Recent Developments in Monetary and Financial Integration in Asia,” Financial Stability Review, Banque de France, 8, 2006, 111–129.

Shioji, Etsuro, “Invoicing Currency and the Optimal Basket Peg for East Asia: Analysis using a New Open Economy Macroeconomic Model,” *Journal of the Japanese*

and International Economies, forthcoming, 2006.

Sørensen, Bent E., and Oved Yosha, 1998, "International Risk Sharing and European Monetary Unification," *Journal of International Economics* 45, 1998, 211–238.

Summers, Lawrence, "International Financial Crises: Causes, Prevention and Cures," *American Economic Review*, Papers and Proceedings, 90, 2000, p. 1–16.

Wyplosz, Charles, "Is East Asia Safe from Financial Crises?" 2006.

Yoshino Naoyuki, Sahoko Kaji and Ayako Suzuki, "The Basket-peg, Dollar-peg, and Floating: A Comparative Analysis," *Journal of the Japanese and International Economies* 18, 2004, 183–217.

Table 1 : Country Group and Data availability

		Group				Data sample starting year (Blank means 1970)								
		EMEAP	EMEAP8	Euro11	All	Portfolio equity assets	Portfolio equity liabilities	FDI assets	FDI liabilities	Debt assets (portfolio debt + other investment)	Debt liabilities (portfolio debt + other	financial derivatives (assets)	financial derivatives (liabilities)	Total reserves minus gold
1	China,P.R.: Mainland	○	○		○	1980	1980	1981	1981	1981	1981	n.a.	n.a.	1977
2	Hong Kong S.A.R. of China	○	○		○	1979	1979	1979	1979	1979	1979	2000	2000	
3	Indonesia	○	○		○			1979				2002	2002	
4	Korea	○	○		○							2001	2001	
5	Malaysia	○	○		○							2001	2001	
6	Philippines	○	○		○	1980		1980				2001	2001	
7	Singapore	○	○		○							2001	2001	
8	Thailand	○	○		○							2000	2000	
9	Australia	○			○					1986	1986			
10	New Zealand	○			○					2000	2000			
11	Japan	○			○					1995	1995			
12	Austria			○	○							1994	1994	
13	Belgium			○	○							1995	1995	
14	Finland			○	○							1993	1993	
15	France			○	○							1994	1994	
16	Germany			○	○							n.a.	n.a.	
17	Greece			○	○		1986					2000	2000	
18	Ireland			○	○							2001	2001	
19	Italy			○	○							2000	2000	
20	Netherlands			○	○							1999	1999	
21	Portugal			○	○					1972	1972	1996	1996	
22	Spain			○	○							n.a.	n.a.	
23	Canada				○							n.a.	n.a.	
24	Switzerland				○							n.a.	n.a.	
25	United Kingdom				○							n.a.	n.a.	
26	United States				○							n.a.	n.a.	

Table 2 : The ratio for the sum of external asset and liability divided by GDP (IFIGDP): Five Year Sample Average.

	Period of the data	80-84	85-89	90-94	95-99	00-04
1	China,P.R.: Mainland	0.134	0.230	0.448	0.707	0.932
2	Hong Kong S.A.R. of China	5.035	11.233	13.535	11.883	12.276
3	Indonesia	0.407	0.716	0.836	1.297	1.177
4	Korea	0.663	0.532	0.393	0.737	0.947
5	Malaysia	1.045	1.397	1.493	1.780	2.035
6	Philippines	0.858	1.070	1.045	1.192	1.418
7	Singapore	2.266	3.473	3.634	6.050	9.266
8	Thailand	0.455	0.626	0.865	1.042	1.334
9	Australia	0.452	0.861	1.112	1.453	2.036
10	New Zealand	0.642	1.218	1.514	1.823	2.223
11	Japan	0.386	0.790	0.964	1.042	1.184
	EMEAP8	0.624	1.243	1.695	1.930	2.030
	EMEAP	0.469	0.905	1.151	1.333	1.535

Table 3 : The ratio for the reserve divided by GDP:

Sample average from 1981 to 90, 1991–2000, 2001–2004.

		80—84	85—89	90—94	95—99	00—04
1	China,P.R.: Mainland	0.035	0.043	0.072	0.143	0.246
2	Hong Kong S.A.R. of China	0.196	0.275	0.347	0.495	0.706
3	Indonesia	0.048	0.057	0.070	0.130	0.176
4	Korea	0.034	0.043	0.053	0.096	0.234
5	Malaysia	0.144	0.201	0.297	0.297	0.405
6	Philippines	0.042	0.033	0.071	0.120	0.171
7	Singapore	0.544	0.704	0.800	0.849	0.952
8	Thailand	0.045	0.086	0.186	0.226	0.285
	EMEAP8	0.063	0.087	0.135	0.197	0.299

Table 4 : Unconditional mean of Saving and Investment

Sample	1981-2004		1981-1996		2000-2004	
	Mean(i/y)	Mean(s/y)	Mean(i/y)	Mean(s/y)	Mean(i/y)	Mean(s/y)
EMEAP8	30.260	33.298	31.982	32.748	25.750	33.988
(s.e.)	(7.640)	(8.778)	(7.064)	(8.231)	(7.182)	(8.280)
EMEAP	28.871	30.392	30.319	30.132	25.146	30.600
(s.e.)	(7.110)	(9.389)	(6.878)	(8.885)	(6.223)	(9.194)
All	24.851	25.036	25.532	24.738	23.087	25.332
(s.e.)	(6.486)	(8.361)	(6.825)	(8.098)	(5.150)	(8.358)
Euro11	22.394	21.281	22.416	20.967	22.324	21.573
(s.e.)	(3.982)	(3.516)	(4.133)	(3.472)	(3.674)	(3.661)

Table 5: Saving and Investment Correlation

Sample	1981-2004		1981-1996		2000-2004	
	b	(s.e.)	b	(s.e.)	b	(s.e.)
EMEAP8	0.572	0.108	0.674	0.093	0.401	0.289
EMEAP	0.521	0.071	0.625	0.064	0.302	0.183
ALL	0.574	0.071	0.712	0.066	0.264	0.106
Euro11	-0.080	0.438	0.438	0.405	-0.453	0.290

Table 6: Estimation result of equation (3) (1981–2004)

	g_k	g_c	g_u
EMEAP8	0.062 (0.062)	0.308 (0.124)	0.622 (0.068)
Euro10	0.160 (0.124)	0.240 (0.128)	0.603 (0.126)
G7	0.030 (0.111)	0.169 (0.177)	0.801 (0.177)
EMEAP, the U.S. and Euro10	0.060 (0.051)	0.303 (0.079)	0.636 (0.053)

Note: Standard errors are in brackets. Euro 10 economies includes 10 countries excluding Luxemburg, Greece, and Slovenia.

Table 7: Estimation result of equation (4) for EMEAP8

Sample	Country i GDP (β)	(s.e.)	EMEAP8 aggregate GDP (α)	(s.e.)	Wald test ($\chi^2(2)$)
1971–2005	0.591	(0.043)	0.018	(0.009)	272.98
1970s	0.685	(0.080)	–0.004	(0.017)	84.04
1980s	0.558	(0.064	0.022	(0.011)	235.37
1990s	0.653	(0.104)	0.033	(0.014)	207.91
1991–2005	0.632	(0.083)	0.032	(0.011)	202.18

Note: The coefficient β, attached to domestic output growth, measures the effects of risk sharing arrangement for idiosyncratic GDP shocks within the economies, and the coefficient α, attached to aggregate output growth, measures the extent of risk sharing within the group of economies under consideration

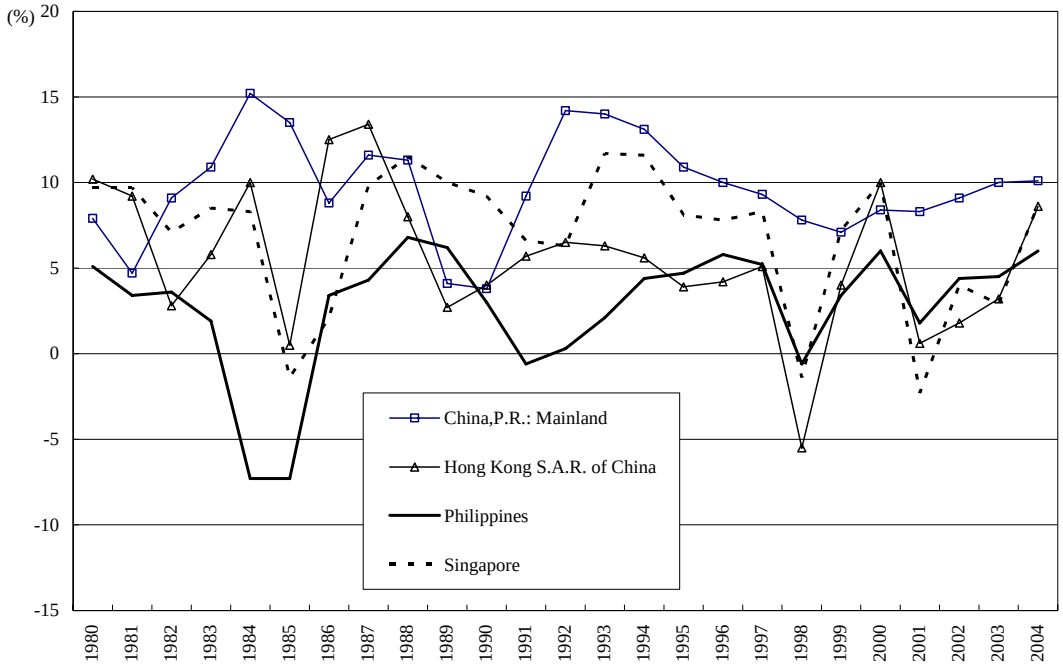
Table 8: Estimation result of equation (5) for EMEAP8

Sample	Temporary (γ)	(s.e.)	Permanent (δ)	(s.e.)	Wald test ($\chi^2(2)$)
1971–2005 (Whole sample)	0.593	(0.033)	0.275	(0.048)	904.66
1971–1996 (Before the Crisis)	0.555	(0.039)	0.279	(0.052)	804.13
1997–2000 (During the Crisis)	0.726	(0.119)	0.215	(0.260)	53.83
2001–2005 (After the Crisis)	0.463	(0.101)	0.448	(0.132)	151.08

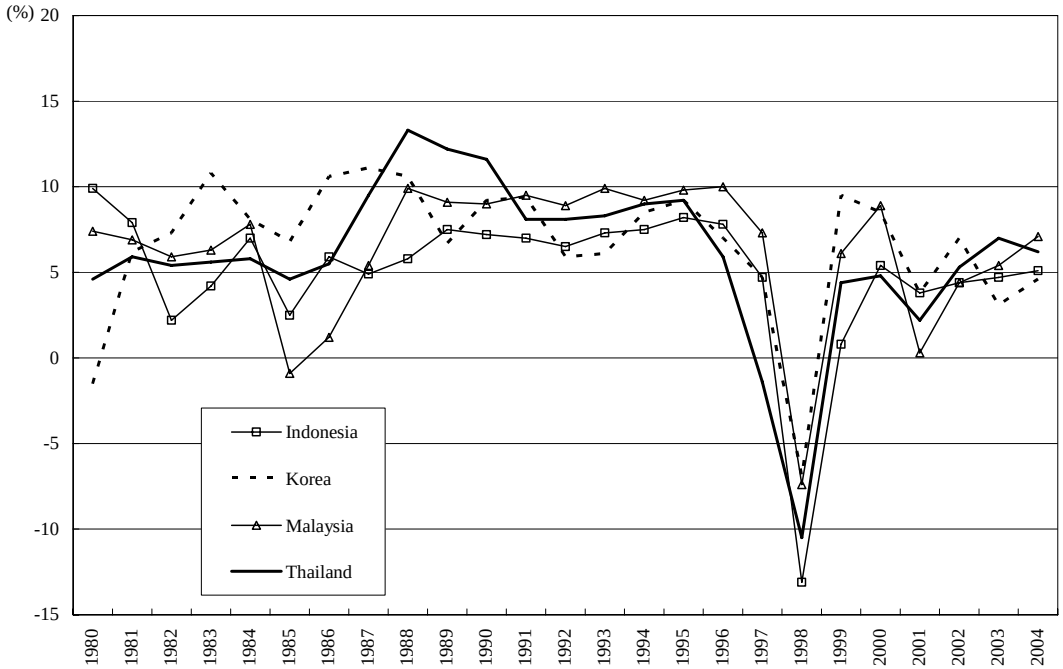
Note: The coefficient γ measures the extent of consumption smoothing out of temporary income growth, and the coefficient δ can be interpreted as consumption smoothing out of permanent output growth.

Figure 1. Real GDP Growth Rate

Panel 1

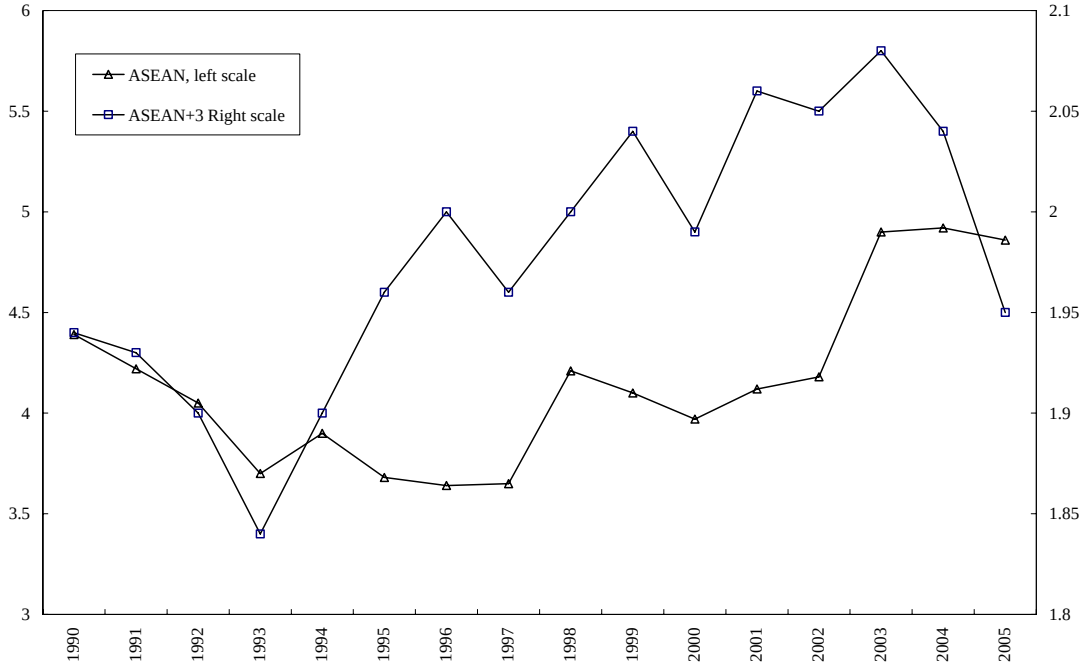


Panel 2



Source: IMF WEO database Gross domestic product, constant prices, annual percent change.

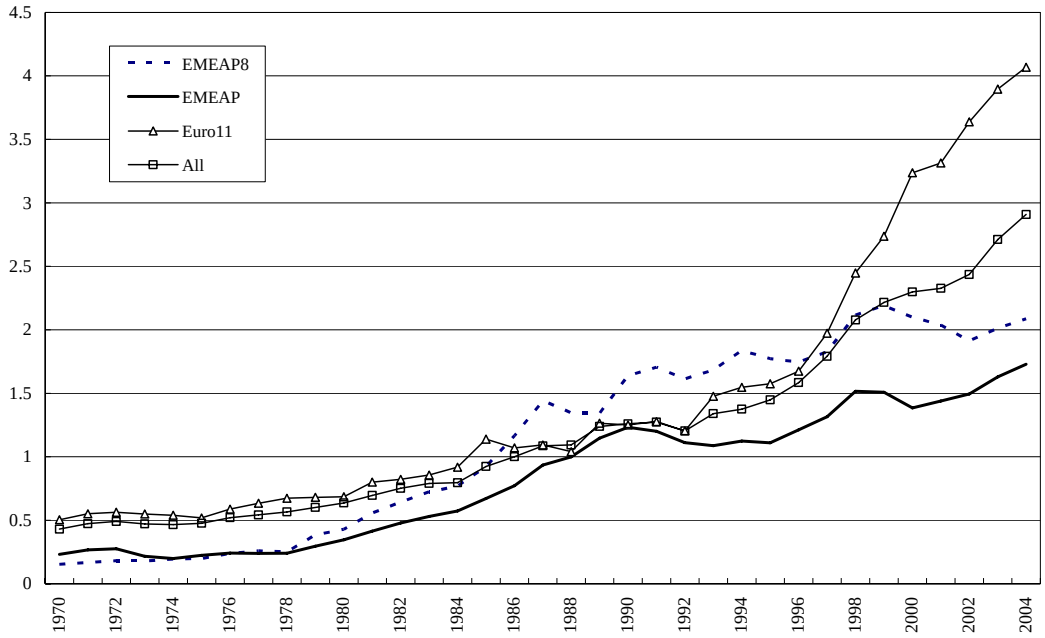
Figure 2 Intra-regional trade intensity index



Source: ADB, Regional integration indicator database.

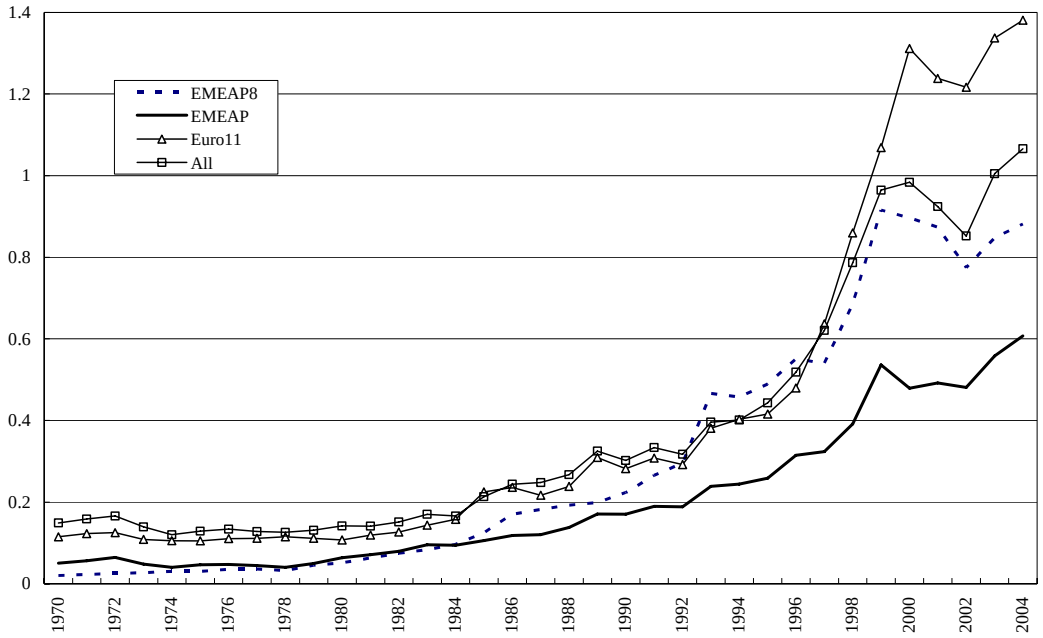
Note: An index of more than one indicates that trade flow within the region is larger than expected given the importance of the region in world trade. The index is defined as the ratio of intra-regional trade share to the share of world trade with the region. The index is calculated using exports data, and determines whether trade within the region is greater or smaller than should be expected on the basis of the region's importance in world trade.

Figure 3: Integration into world financial markets



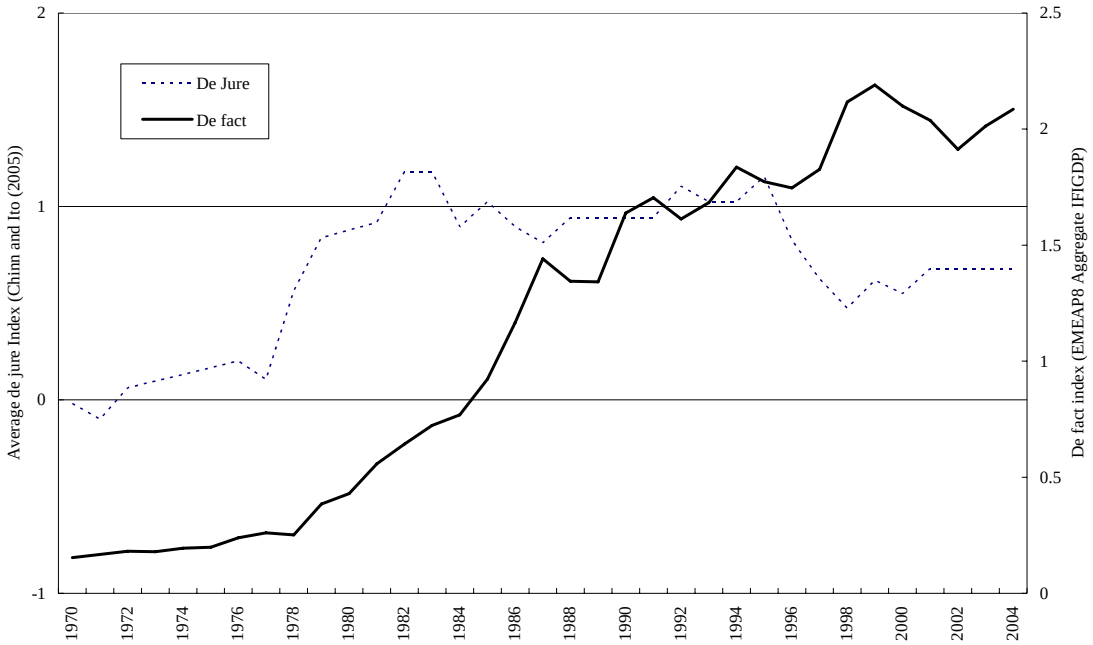
Note: The ratio for the sum of external asset and liability divided by GDP.

Figure 4: International Equity Integration



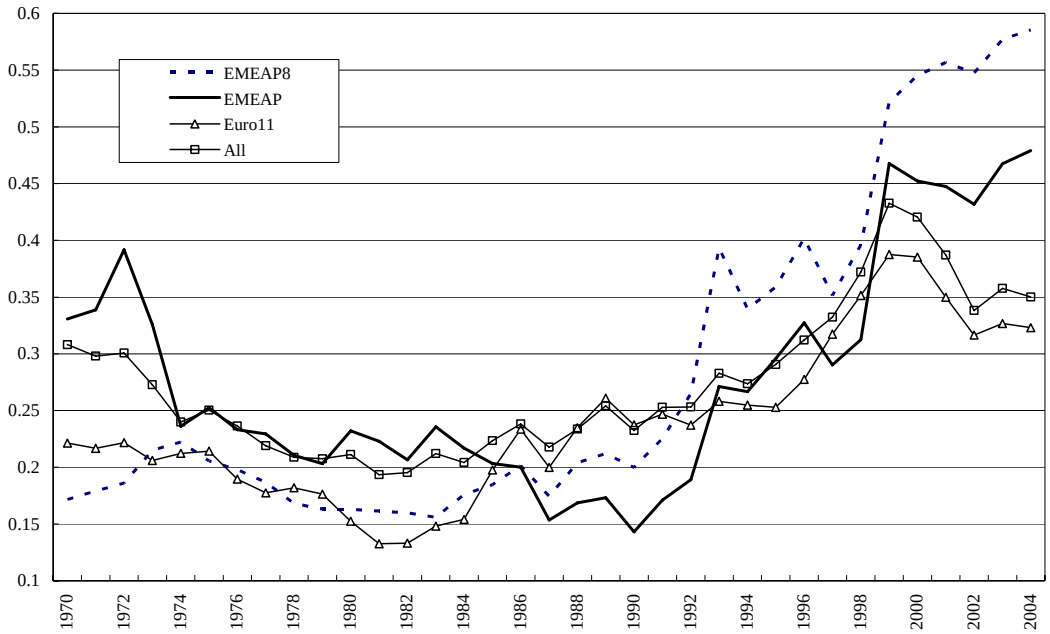
Note: The ratio for stock of portfolio equity asset and liability and stock of direct investment asset and liability divided by GDP.

Figure 5: De factor vs De jure Integration into world financial markets



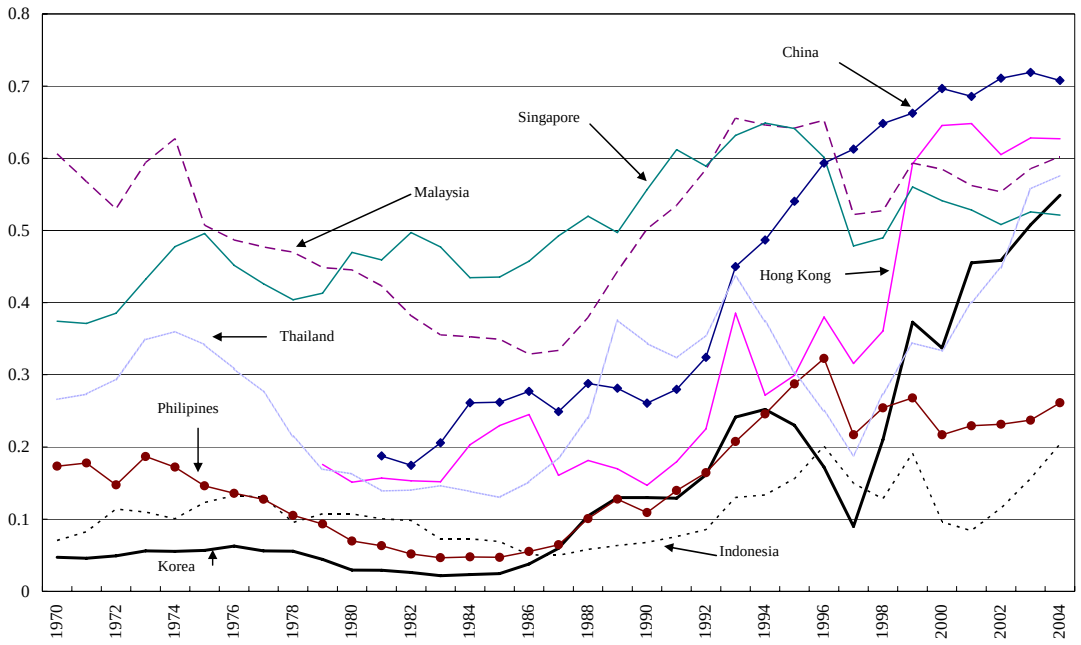
Note: De jure measure is the one created in Chinn and Ito (2005). De fact measure is IFIGDP proposed by Lane and Milesi-Ferretti (2006a).

Figure 6: Equity Share in External Liability



Note: Share of equity (Portfolio + FDI) liability in total financial liability.

Figure 7: Equity Share in External Liability in EMEAP8 Economies



Note: Share of equity (Portfolio + FDI) liability in total financial liability.

Figure 8: Gross External Debt and Official Reserve

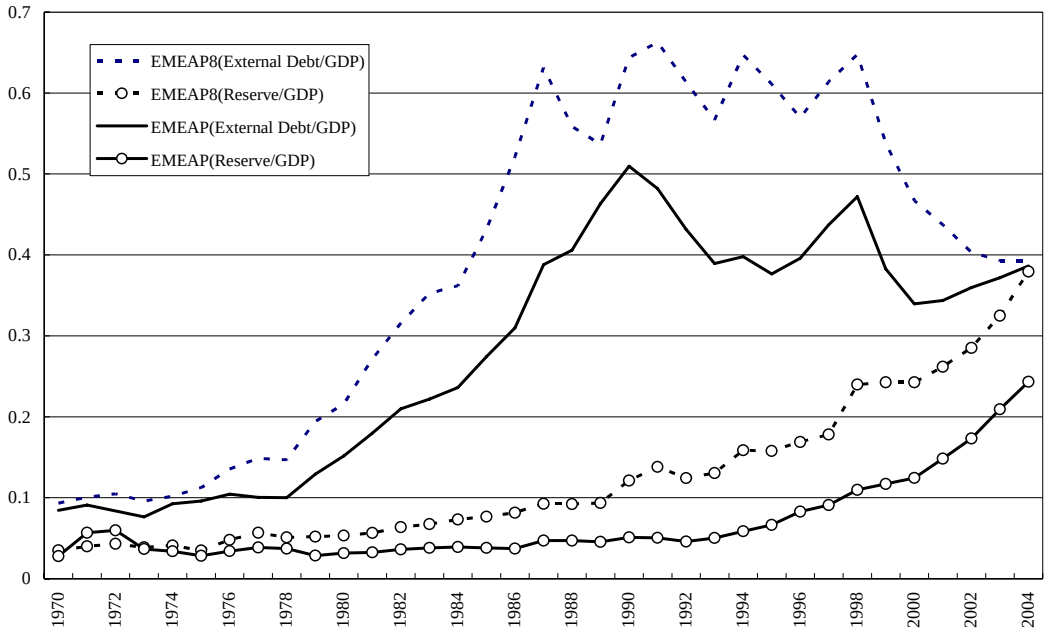


Figure 9: Gross External Debt and Official Reserve

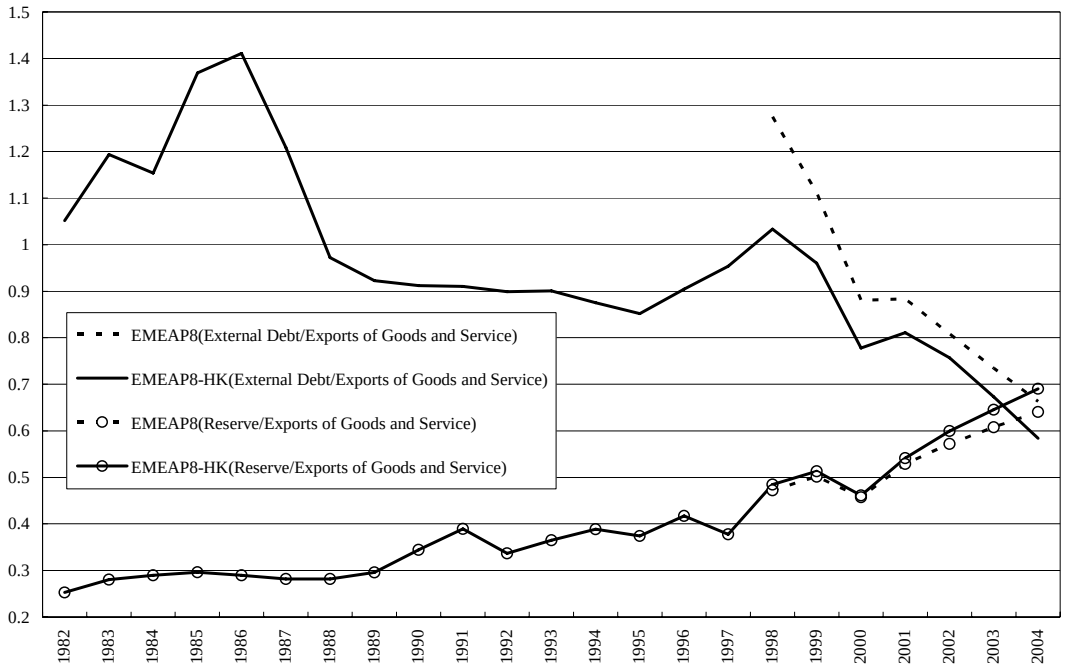


Figure 10: Gross External Debt to GDP in EMEAP8 Economies

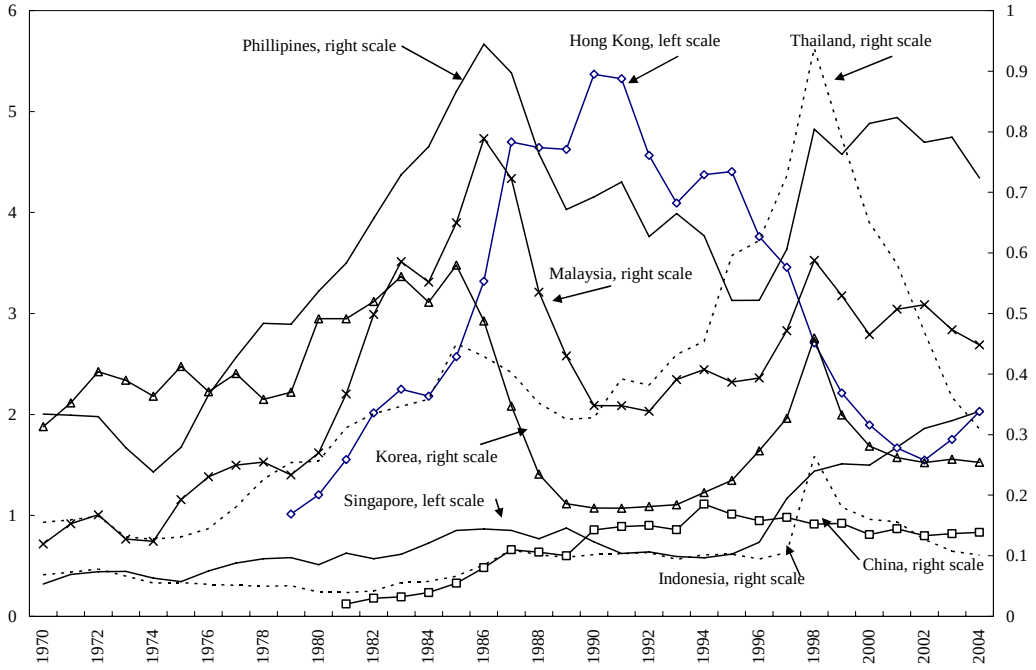


Figure 11: Net Foreign Asset by Country

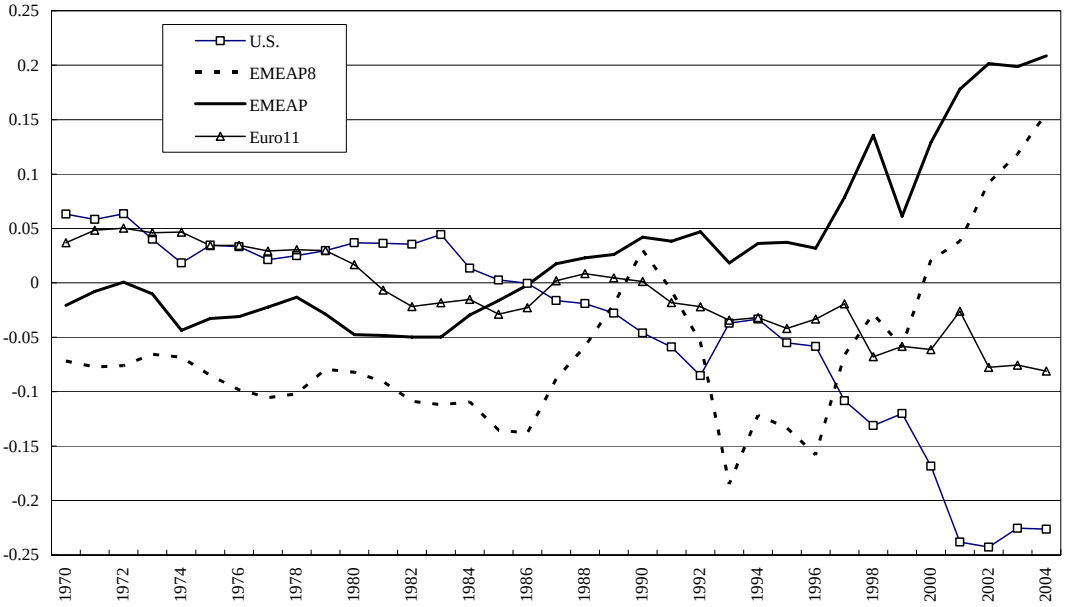
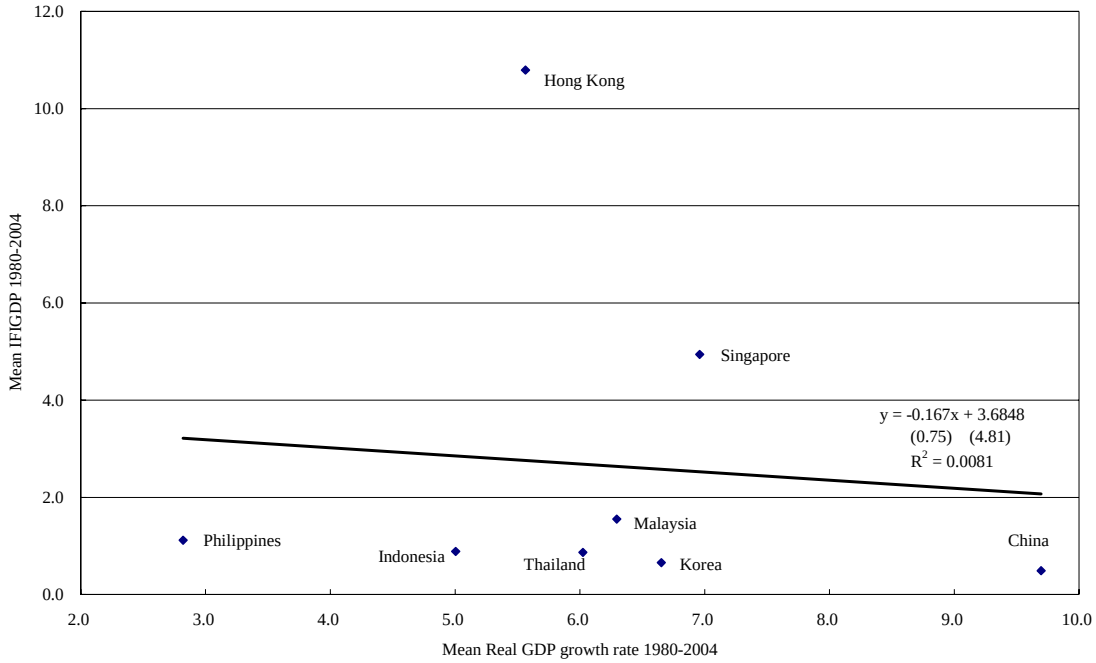
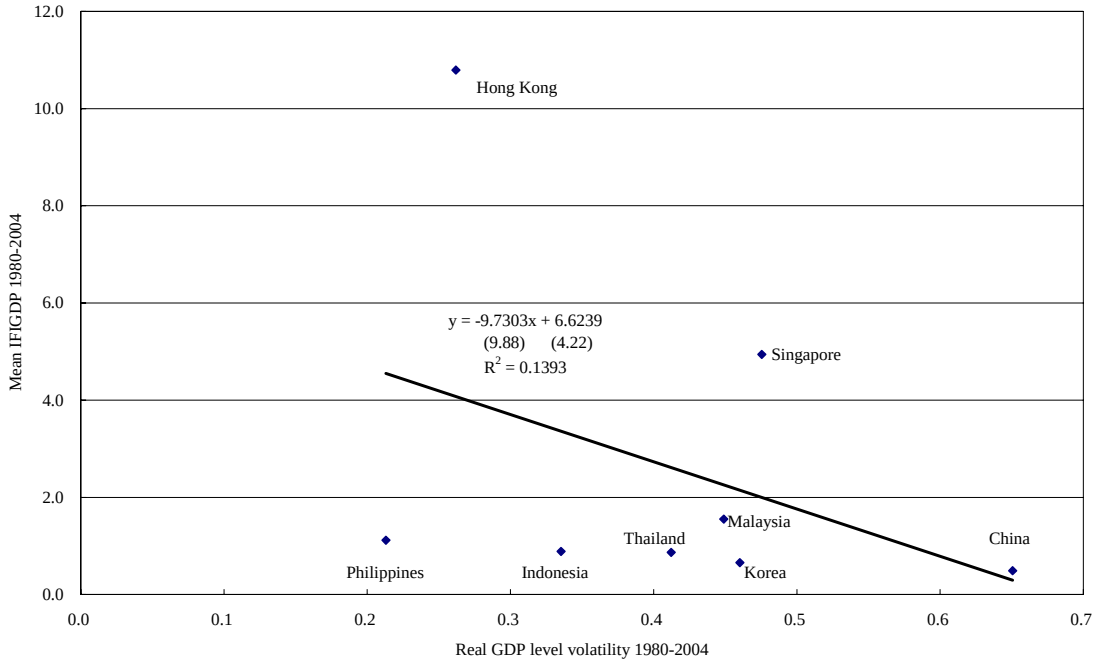


Figure 12: Integration into world financial markets and GDP growth rate



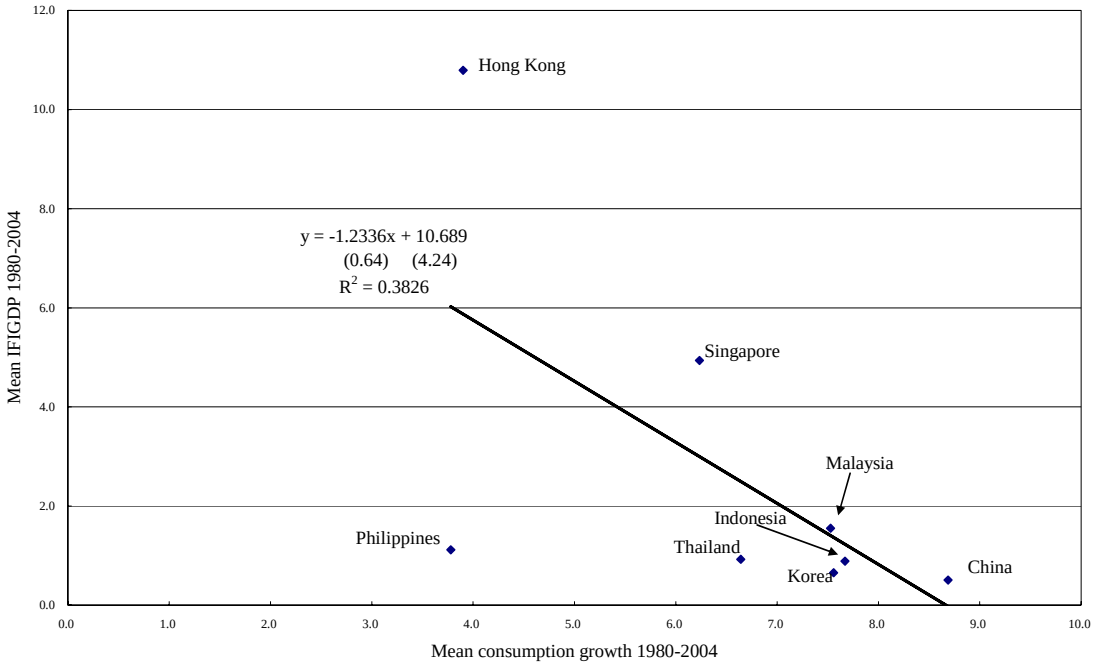
Note: GDP growth rate (Domestic currency, constant price) from IMF WEO database.

Figure 13: Integration into world financial markets and GDP volatility



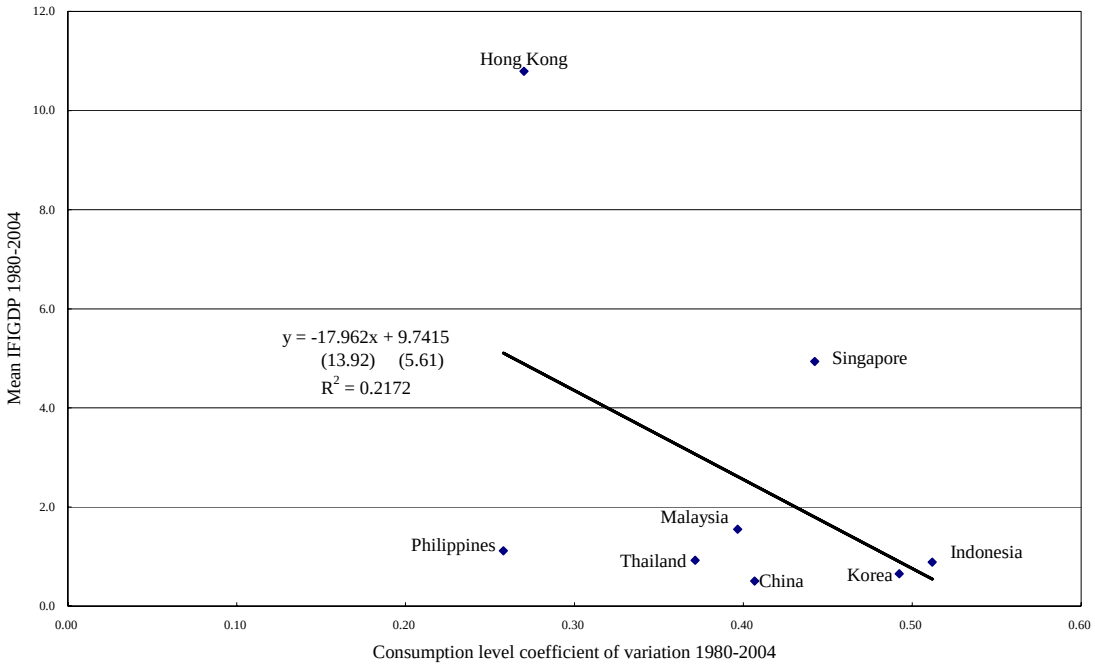
Note: Coefficient of variation of GDP (Domestic currency, constant price) from IMF WEO database.

Figure 14: Integration into world financial markets and Consumption Growth



Note: Household consumption growth in national currency deflated by CPI. Data is taken from International Financial Statistics.

Figure 15: Integration into world financial markets and Consumption Volatility



Note: Coefficient of variation of level of household consumption in national currency deflated by CPI. Data is taken from International Financial Statistics.

Figure 16: Results to five year rolling between regressions

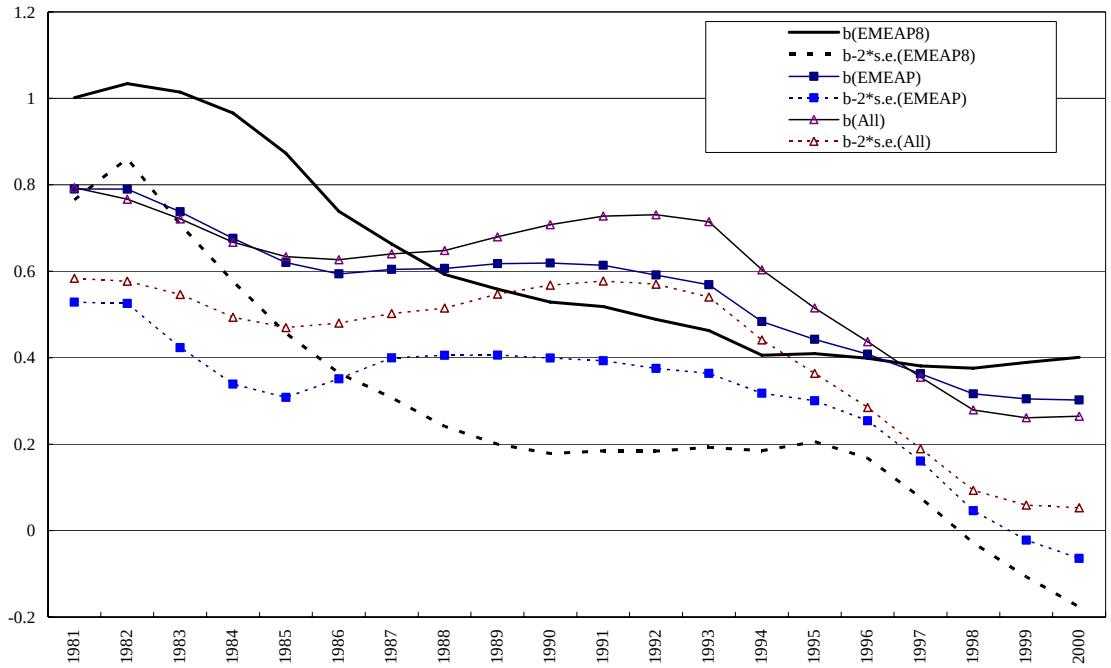
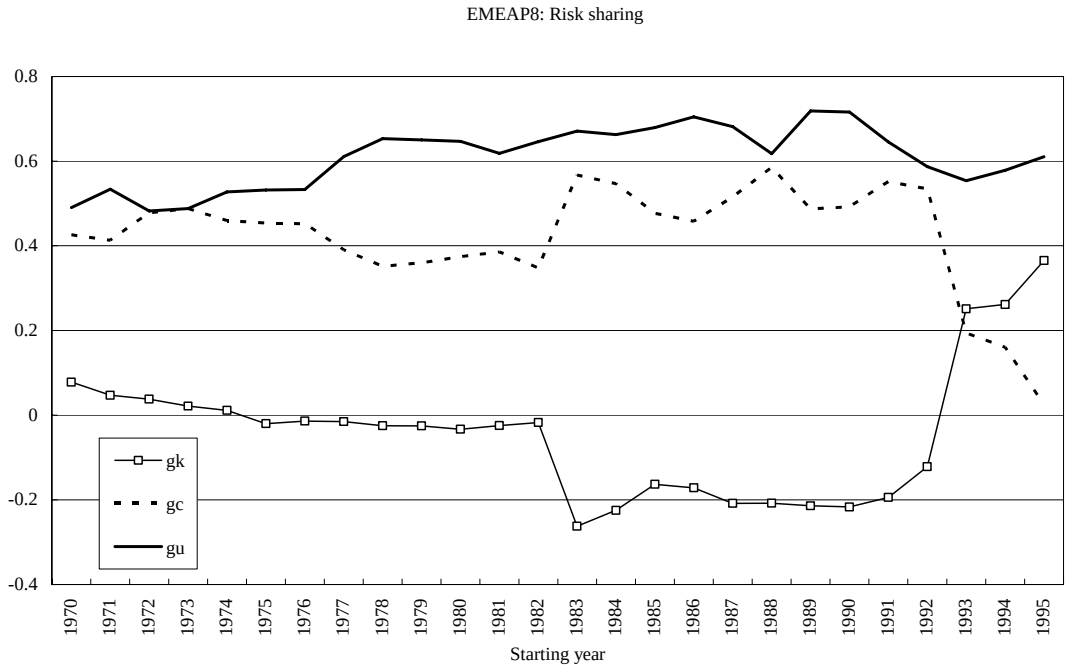
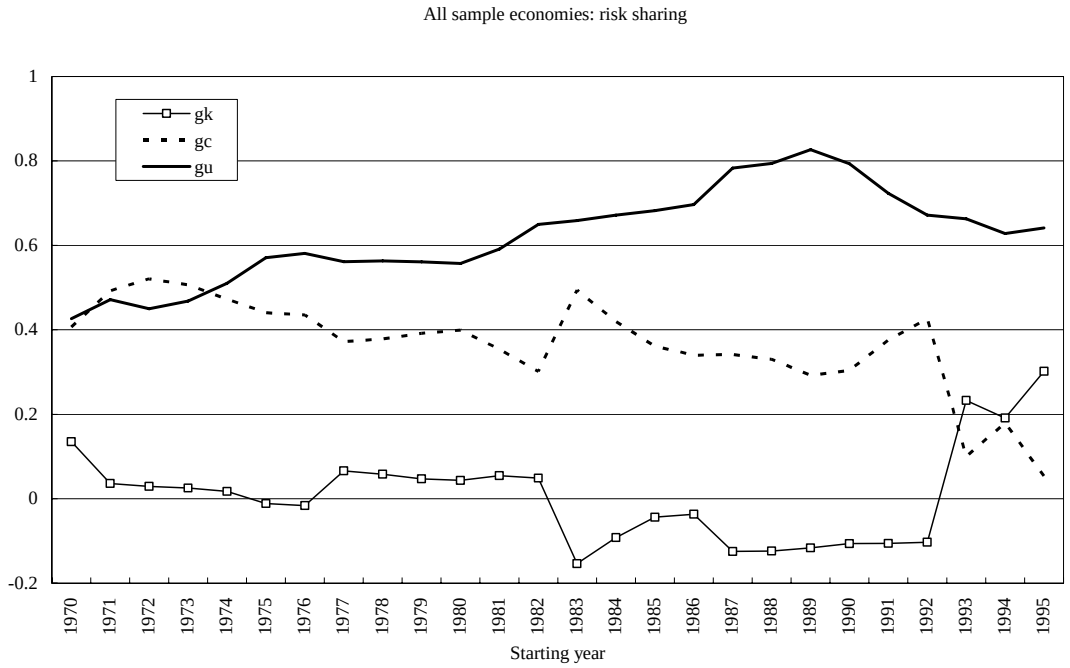


Figure 17: EMEAP: Rolling Estimation result of equation (3)



Note: Window of 10 years for EMEAP8.

Figure 18: Global: Rolling Estimation result of equation (3)



Note: Window of 10 years for Euro area + Asia + U.S.