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Hiroshi Fujiki and Akiko Terada-Hagiwara

Discussion Paper No. 2007-E-12

IMES

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Financial Integration in East Asia

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 the euro area economies. Third, the degrees of smoothing of idiosyncratic shock by cross-holding of financial assets are lower than the euro area economies. These results suggest two policy implications. First, there is some room for improvement in welfare gains in those economies by means of further risk sharing. Second, holding all other conditions equal, 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: F33, F36

* 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, Shaghil Ahmed, Masahiro Kawai, Sebnem Kalemli-Ozcan, Jing Zhang, the participants of the 14th International Conference hosted by the Institute for Monetary and Economic Studies, Bank of Japan (the BoJ) and 2007 Annual Pacific Basin Conference at the Federal Reserve Bank of San Francisco and the staff of the BoJ 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 BoJ.

I. 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 takeoff, but at the same time were blamed for the subsequent Asian currency and banking crisis.

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

The export-led growth in those economies supported by the capital inflows led to massive accumulation of gross foreign assets, especially in the form of foreign reserves, and the accumulation of gross foreign liabilities, especially in the form of foreign direct investment (FDI), as documented by Lane and Milesi-Ferretti (2006). 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 (Obstfeld and Rogoff, [2005a, b], and Lane and Milesi-Ferretti [2002 and 2004]).

Motivated with regional trade integration and global imbalance in world financial markets, we ask the following questions in this paper. First, have the degrees of integration into world financial markets in the Asian economies increased or not after the Asian currency and banking crisis? Have the Asian economies benefited from the

increased integration into such markets? And which exchange rate regimes should the Asian economies adopt given the active capital inflows and outflows?

To answer these 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) group.¹

In examining the impact of integration, we will employ relatively simple empirical methods in reduced forms rather than a fully specified general equilibrium model. Our approach has the advantage that it is comparable with many previous studies, and that it can be reconciled with the lack of the consensus on the general equilibrium model to analyze the issue of global imbalance.²

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 the EMEAP economies are increasing, according to our analysis of the database by Lane and Milesi-Ferretti (2006). 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 those of the euro area economies. Third, the degrees of smoothing of idiosyncratic

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 11 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.

² Admittedly, the reduced form approach does not allow us to conduct welfare analysis. See, for example, Athanasoulis and van Wincoop (2000), and Gourinchas and Jeanne (2006) for discussion on this issue.

shock by cross-holding of financial assets are lower than in the euro area economies.

These results suggest two policy implications. First, there is some room for improvement in welfare gains by further risk sharing in the EMEAP economies. Second, holding all other conditions equal, 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 II documents the degree of integration into world financial markets through various measures. These include the data on foreign assets and liabilities constructed in Lane and Milesi-Ferretti (2006), a de jure measure by Chinn and Ito (2006, data until 2003), and data on Coordinated Portfolio Investment Survey by the International Monetary Fund (IMF). Section III presents a series of tests to illustrate the effects of integration into world financial markets. We begin by examining several hypotheses, where that integration into world financial markets has some effects 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 Ravallion and Chaudhuri (1997) to see whether consumption growth smoothing is taking place as integration into world financial markets has been progressing in Asia. In Section IV, we discuss policy implications particularly on exchange rate regimes in the EMEAP economies. The final section concludes the paper.

II. Integration into World Financial Markets in East Asia

This section examines trends of integration into world financial markets in the EMEAP economies by looking at several measures. Particular attention is paid to the “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 the euro area economies excluding Luxemburg and Slovenia as the Euro 11.³ Our broadest sample of economies consists of the EMEAP economies, the Euro 11, Canada, Switzerland, the U.K., and the U.S. (See Table 1 for the availability of the data series).

A. External Assets and Liabilities to GDP

Lane and Milesi-Ferretti (2006) propose two ways of measuring degree of de facto integration into world financial markets.⁴ The first measure is the ratio of the sum of external assets and liabilities to 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 assets (liabilities).

Figure 3 shows the first measure of integration into world financial markets,

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

⁴ Lane and Milesi-Ferretti (2006) construct 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 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, holdings of Special Drawing Rights, IMF).

IFIGDP over the period from 1970 to 2004. Consistent with Lane and Milesi-Ferretti (2006), IFIGDP accelerated its growth especially around the mid-1990s across all regions.

Does the increase of integration into world financial markets observed in the data on aggregate the EMEAP economies 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 1980-84, 1985-89, 1990-94, and 1995-99, and 2000-04. The Hong Kong Special Administrative Region (S.A.R.) of China (hereafter, Hong Kong) 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 rise from that year followed by a sharp acceleration beginning in 1996, except for 2001-02—replicating the finding in Lane and Milesi-Ferretti (2006) for the industrialized countries, developing countries, and emerging countries. Again, Hong Kong and Singapore have remarkably high ratios, but do not alter the overall trend.

B. De Jure Measure

We see another measure of capital account openness based on the information on

controls on financial flows to and from 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. Indices measuring de jure integration into world financial markets, such as those by Chinn and Ito (2006, data until 2003)⁵ and Kose et al. (2006, data until 2004), are usually constructed using the disaggregated capital and current account restrictions found in the annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) published by the IMF.⁶

Figure 5 shows two measures. As opposed to the persistent upward trend in the de facto measure, there appeared a reversal in the progress of the current and capital account openness in the mid-1990s. According to Chinn and Ito (2006), the reversal in the de jure measure is due to Indonesia and Malaysia. This might reflect the introduction of a monitoring system for capital flows in Indonesia and a reimposition of controls on capital flows in Malaysia. Nonetheless, the capital accounts have generally been kept open, and the de facto measure has continued to rise.

C. Bilateral Financial Flows

While both IFIGDP and GDOGDP exhibit clear upward trends, one could claim that this is due to increasing intra-regional integration, and not to world financial markets. As data on bilateral financial flows are still limited, it is hard to determine this claim. Nonetheless, the data series in the Coordinated Portfolio Investment Survey that the IMF compiles provides some insights on this issue. The survey reports bilateral flows

⁵ 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).

⁶ Kose et al. (2006) use two financial openness variables. One variable is the financial openness variable as defined by Chinn and Ito (2006). The other variable is a binary indicator created by the authors based on data from the AREAER line E2, which signifies "restrictions on payments for capital transactions."

in equity and debt securities for years 1997 and 2001-05. The data are available for all the EMEAP8 economies except China.

Table 3 reports, for the seven EMEAP8 economies, the average outward investment going to the EMEAP8 (minus the own-country) economies and to the G-7 countries as a percentage of total outward investment. On average, the EMEAP8 economies invested about 16% of the total within the region, while almost half of the total investment went to the G-7 countries. Within the investment flowing into the G-7 economies, the United States was the major recipient. Although the short sample period does not allow us to generalize as to trends, at the very least it is clear that despite the geographical proximity and the increasingly tightened trade link, the industrialized countries remain the major investment destinations for the EMEAP8 economies rather than the neighbors.

D. Capital Structure

Given the increasing trend in the degree of integration into world financial markets, Lane and Milesi-Ferretti (2006) also show that a measure of capital structure, the ratio of equity (portfolio plus FDI) liabilities to total financial liabilities, has been also rising globally. Figure 6 shows that the ratio for the EMEAP8 economies was quite stable until it started to increase in the 1990s. In the other regions, EMEAP, Euro11 and all the sample economies, the ratio declined during the 1970s, but turned to an increasing trend in the 1980s followed by a rapid increase in the 1990s, consistent with the analysis by Lane and Milesi-Ferretti (2006). The trends in individual economies shown in Figure 7 are similar to the trend in the EMEAP8 aggregate, although the ratio for China did not drop even in 1997-98. Regarding the composition of equity share, most of the

increase in external liabilities in China was explained by the FDI liabilities, rather than the portfolio equity liability. The increase in FDI liabilities has been common in the EMEAP economies except for Indonesia and Korea where the growth in FDI liabilities 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 9).⁷ However, Figure 10 shows that not all the EMEAP economies follow the downward trend in debt liabilities as in Figure 8. The ratio for Hong Kong generally increased until 1990 and decreased steadily thereafter. The ratio for Singapore increased steadily even from the mid-1990s. For China, the ratio has been almost constant since 1990. The ratio for the crisis-hit economies, Indonesia, Korea, Malaysia and Thailand, shows a trend similar to that observed in Figure 8 while a spike is recorded in Thailand in 1998.

A notable change in the composition of gross foreign assets is the rapid increase in official reserves in the Asian economies, as can be seen in Figure 8. We view the rapid increase as a region-wide phenomenon in the EMEAP8 economies. Table 4 shows the sample average of the ratio of reserves to GDP for each EMEAP8 economy for the period from 1980-84, 1985-89, 1990-94, 1995-99, and 2000-04. Hong Kong and Singapore have relatively high ratios, but, 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 deteriorated while that of emerging economies has been improving (Lane and Milesi-Ferretti [2006, figure 7]). Figure 11 shows that the recovery of the net foreign asset position applies to the EMEAP economies. Hong Kong, Japan, and

⁷ Limitations of the data reported in the International Financial Statistics forces us to take the sample periods from 1982 to 2004 for the EMEAP8 economies minus Hong Kong, and 1998 to 2004 for the EMEAP8 economies in Figure 9.

Singapore remained net creditors after 1995, and China became a net creditor after 2003. While improving their net asset positions, the other EMEAP8 economies are still net debtors.

E. Summary and Caveats

This section summarizes the findings, and discusses some of the caveats deserving attention in the interpretation of our findings.

1. Summary

In sum, the 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 facto integration into world financial markets, IFIGDP (the ratio for the sum of external assets and liabilities divided by GDP), indicates that the integration has been progressing in the last 35 years, and this trend is especially strong after the mid-1990s. The evidence from the bilateral financial flows indicates that about half of the outward investment of the EMEAP8 economies goes to the industrialized countries, while 16% on average flows into the EMEAP8 economies.

Second, on liabilities side, the share of equity (portfolio plus FDI) liabilities in total financial liabilities has been rising for some of the EMEAP economies except for 1997-98. Third, the ratio of gross external debt to GDP varies from economy to economy. The average trend of the EMEAP economies is close to that of the crisis-hit economies, however.

2. Caveats

We presented one widely accepted measure of the degree of financial integration using data by Lane and Milesi-Ferretti (2006). One shortcoming of the measure is that we can see a clear and increasing trend, say in Figure 3, but without a theoretical model we cannot determine the level of IFIGDP measure that corresponds to the state of financial integration. One might argue that it would be better to conclude that financial integration is achieved if the expected risk adjusted returns from the same financial assets are equalized among economies.⁸ We do not look at price measures based on cross-economy differences in the expected risk adjusted returns on the same financial assets, 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). Nonetheless, we acknowledge that it is important to look at both the quantity measure, as we do, as well as the price measure, as they complement each other.

Another measurement issue is on the deviation between de facto and de jure measures. As found in our analysis and in general, the two measures could deviate from each other. When the deviation occurs, a usual treatment seems to favor the de facto measure over the de jure one. Apparently, however, we should remember that both measures have loopholes; the de facto measure is subject to fluctuations in prices and output, while the de jure one is affected by the degree of enforcement of the controls.

III. Integration into World Financial Markets and Risk Sharing

⁸ Cheung, Chinn and Fujii (2006), for example, examine the integration between China, Hong Kong, Taiwan, the United States, and Japan using this measure.

A. 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 ones and in the long run the steady-state output per capita and return on capital will be equalized. If the inflow of new technology accompanies the inflow of capital, such technology will help the capital-poor economies grow faster.⁹ Second, the effects of integration into world financial markets on output volatility are unclear, because integration 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 at an early stage of economic development, for example, specialized in agricultural production and susceptible to weather shock, to diversify their narrow production basis. In a 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 measure of integration into world financial markets, IFIGDP, against four macroeconomic variables of our interest. Figure 12

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

plots mean IFIGDP against mean growth rate of real GDP from 1980 to 2004. Among the EMEAP8 economies, we do not see a 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 these relationships become unclear when excluding two very open economies, Hong Kong and Singapore. The results here might be consistent with what theory predicts for GDP volatility. However, the result for consumption contradicts what the theory predicts.¹⁰

B. Saving and Investment Correlation based on Feldstein and Horioka (1980)

In this subsection, we test whether the saving-investment correlation increased or decreased before and after the Asian Crisis using the methods proposed by Feldstein-Horioka (1980). The general finding in the literature is that the saving-investment correlation falls as capital mobility increases (for a recent review and results including Asian economies, Kim, Kim and Wang (KKW [2007]).¹¹

Using the statistics from the OECD and Asian Development Bank, we construct a 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 Figures 12 to 15 use data from 1980 to 2004 except for Hong Kong, where data start in 1981, and Thailand and Malaysia, where 2004 consumption is missing.

¹¹ Feldstein (2005) argues that the drops in the saving-investment correlation after the mid-1990s apply to smaller OECD economies, but not to large economies. When observations are weighted by each country GDP, the 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 5 for three periods: 1981-2004, 1981-96, and 2000-04, which shows large drops in I/Y in 2000-04 compared with 1981-96 in the EMEAP8 and EMEAP economies. One notable exception to this trend is China, whose investment rate does not fall in 2000-04.

How should we interpret the significant drops of I/Y in 2000-04 that are not unique to East Asia? Prasad, Rajan, and Subramanian (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 U.S. The rise in U.S. productivity accompanied by reorganization of the global production mechanism and the global supply chain and trade has been transmitted to emerging market economies and raised their income. But the weaker 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):

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

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, 1981-96, and 2000-04. Table 6 summarizes the results.

First row of Table 6 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 6 show the

disposals of valuables.

results for the 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 6 shows results for the Euro11 economies; we see no significant saving-investment correlation, but the coefficients take negative values for whole sample periods and subsample from 2000 to 04.

For the sake of a robustness check, we choose five-year window beginning in 1981 to run rolling regressions for the EMEAP8 economies, EMEAP economies, and all economies. The results are summarized in Figure 16. The figure shows that the saving-investment correlations and their lower bound of confidence intervals—the estimates of the coefficients minus 1.96 standard errors. The saving-investment correlations started falling around 1993, and the lower bounds even became negative around the end of the 1990s.

These results using the method of Feldstein and Horioka (1980) suggest the increase in the degrees of integration into world financial markets in the EMEAP economies after the Asian financial crisis, or between 2000 and 04. However, it is important to note that this period corresponds to the large drops in I/Y relative to S/Y in some EMEAP8 economies, which contradicts the theoretical prediction that greater integration into world financial markets leads to capital flowing from capital-rich economies to capital-poor ones.

C. Risk sharing

Integration into world financial markets allows economies to share their idiosyncratic risks in consumption and improves welfare. Empirical investigations on this point are abundant both for international and intranational risk sharing. Kalemli-Ozcan,

Sørensen, and Yosha (2003) find, for example, the fraction of idiosyncratic shock smoothed by cross-holding of financial assets (*ex ante* insurance) in the euro area was 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 the 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, next 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 that of Ravallion and Chaudhri (1997).

1. International Risk sharing based on ASY (1996)

ASY (1996) propose the decomposition of cross-sectional variance in the 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 European Community (EC) and OECD economies during the period from 1966 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, KKW (2006), among others, report that the 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 the 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 co-moves with world consumption, but does not co-move with an 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 stockholding, and the cross-economy factor income flow can smooth the income of the citizen in the lending economy. In that case, under full risk sharing, the GNP of the lending economy co-move 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, for

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

example, through bank deposits and under full risk sharing, consumption of each economy commoves with world consumption as a result. 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.

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

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).

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

We interpret the degree of overall income and consumption smoothing against idiosyncratic regional shock to GDP of economy i as measured by three sources: (1) the fraction of idiosyncratic shock smoothed by cross-holding of financial assets (*ex ante* insurance) measured by g_k ; (2) 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 ; and (3) 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 (2006).

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 co-moves with the world consumption and GNP 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 the international capital market and credit markets, consumption of each economy co-moves 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 a crucial role to capture the year-specific effects on the GDP growth rate, presumably the aggregate shocks to GDP of each economy.

The first row of Table 7 shows the result for the period between 1981 and 2004. The credit market plays a larger role in smoothing shocks to GDP in the EMEAP8 economies with more than 30% (the estimate of g_c) while only about 6% of the shock to GDP is smoothed through the 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 suggest 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 of KKW (2006) and Jeon, Oh, and Yang (2005).¹⁷

Meanwhile, this trend is somewhat weak for 10 Euro area economies for the same period. As the second row of Table 7 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 the International Financial Statistics, while the purchasing power parity is from Penn World Table. It is better to 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 currently GNP statistics do not report the country breakdown of factor income from other economies.

¹⁷ Each of the smoothed portions 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.

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

Figure 17 (the three panels) show the results of estimation of equation (3) respectively using 10-year subsamples. Figure 17 shows that the fraction smoothed through the credit market channel peaked during the window of 1983-92, when major financial deregulation, particularly in the banking sector, took place in Asia. Meanwhile, the fraction smoothed through the international capital market, g_k , was close to zero, and even experienced a sharp drop into negative territory from the mid-1980s to the early 1990s windows. The drops in the 10-year sub-samples beginning from 1988 may be partly due to the Asian crisis with the reversals of international capital inflows. While g_k experienced a dramatic increase reaching above 30% of the total shocks to GDP, its significance is doubtful as g_k is not significantly different from zero when looking at the 95% confidence interval.

Figure 18 (the three panels) reports the result using all sample economies including EMEAP, the euro area, and the U.S. The result is similar to the result in Figure 17 based on the EMEAP8 economies. This result seems to be consistent with the finding by Kim, Lee, and Shin (2006), arguing that the economies of the Asian

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

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

2. International risk sharing based on Ravallion and Chaudhuri (1997)

We cross-check the result in the previous section using another way of measuring the degree of risk sharing. Ravallion and Chaudhuri (1997) propose a way to measure a degree of village-wide risk sharing by examining household-level consumption and income data taking into account of the labor-leisure choice of households. They posit that if the co-movement in consumption across families is being driven by risk sharing, and if the correlation between individual consumption changes and income changes is due to endogeneity of the labor-leisure choice, then the associated individual household consumption changes being correlated with aggregate income changes because the risk sharing implies the pooling of incomes.

We apply their setup to risk sharing among the EMEAP8 economies.

Specifically, we estimate the following equation (4):

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

where $\overline{\Delta \log GDP_t} = 1/N \sum_{i=1}^N \Delta \log GDP_{i,t}$ where N stands for the number of economies,

and $E[(u_t + \varepsilon_{i,t}) | \overline{\Delta \log GDP}] = 0$. Equation (4) is equal to the third equation of

equation (3) if we replace the second term, $\overline{\Delta \log GDP_t} = 1/N \sum_{i=1}^N \Delta \log GDP_{i,t}$, with the time dummy variable d_{ut} . Hence, we should expect $\beta = g_u = 1 - (g_k + g_c)$.

The coefficient β , attached to domestic output growth, measures the deviation from the risk-sharing arrangement, and the orthogonal coefficient α , attached to average output growth, measures the extent of risk sharing within the group of economies under consideration.

Table 8 reports the results for estimation of equation (4) using the data on the EMEAP8 economies for the whole sample period from 1981 to 2004 and by decade.¹⁹ For all the regression estimations, the estimates of β are more significant than those of α , suggesting that while changes in an economy's income have a significant effect on consumption, the effect of changes in the sample mean income differs from period to period. The estimates of β based on the sample period from 1981 to 2004 are close to the estimates of g_u in Table 7. The degree of international risk sharing as explicitly captured by α does seem to increase in the recent years as has also been indicated by the estimation of the equation (3). The significance of these coefficients may not be very robust when looking at the short subsample period with the higher standard errors accompanying the results, which is also consistent with the previous analysis.

D. Summary and Reservations

1. Summary

The analyses in Section III provide us with supporting evidence for integration into world financial markets, and more limited progress in risk sharing within the EMEAP

¹⁹ All variables in the regressions are real in domestic currency and in per capita terms.

economies than the economic theory suggests.²⁰ 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 the EMEAP economies is higher than that in the euro area economies. As for the international risk sharing, the analysis based on ASY (1996) and Ravallion and Chaudhuri (1997) both indicate a possible increasing level of financial integration within the EMEAP8 economies. The significance of these results remains to be addressed, however.

2. Reservations

Why does the increased integration into world financial markets not lead to clear-cut empirical evidence for better risk sharing and improvement of welfare in the EMEAP economies? Regarding this question, several points are worth attention.

First, the decreasing saving-investment correlation coefficient, \hat{b} , that we find is subject to various explanations depending on which economic models we rely on. Thus, there are other ways of interpreting the result than the increase in financial

²⁰ 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 Bank for International Settlements 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.

integration. The Asian financial crisis, for example, forced current accounts to reverse in the affected economies, which would point toward the reduction of the saving-investment correlation coefficient. Furthermore, the collapse of investment in recent years in most of the EMEAP8 economies with the exception of China contradicts the progress of financial integration. To facilitate understanding of the correlation, van Wincoop (2000) suggests controlling for common factors or global supply of funds. After controlling for the common factors, he claims that the saving-investment correlation approaches zero if markets are integrated.

Second, the framework for measuring risk sharing may not be appropriate. Because of the rapid accumulation of foreign reserves, particularly during the post-crisis period, one might argue that “self-insurance” has occurred, and it is not surprising that international risk sharing of idiosyncratic shock is empirically insignificant.²¹ In this regard, the EMEAP economies might have resorted to an alternative mechanism, or self-insurance through accumulation of assets, which requires an adjustment in consumption to idiosyncratic shocks.

Alternatively, if the risk-sharing framework is based on incomplete financial markets instead of a complete market as is often the case in the previous studies, the level of risk sharing to be expected might be much lower. Bai and Zhang (2005), for example, argue that the progress in financial integration would not lead to better risk sharing if it is accompanied by an increase in the probability of default. For the risk sharing to occur, a country would need a much higher level of capital flows than the

²¹ As the EMEAP8 economies have been increasingly integrated as a way of production chain in trade, an idiosyncratic shock to one of final goods originating from non-EMEAP8 economies may spread over the other EMEAP8 economies, producing the intermediate input to the final goods. In this regard, a common shock in the region might be a more relevant one to examine than an idiosyncratic shock, and one may interpret the rising estimates of α in the equation (4) as the result of the evolving production chain in the region.

level that is conventionally understood.^{22, 23} In this regard, we admit that there are other benchmarks or the expected level of risk sharing to base our priors.

The third point is the endogeneity of the quality of institutions, known as “collateral benefits” to the integration into world financial markets. “Collateral benefits,” proposed by Kose et al. (2006), consists of a broad set of economic fundamentals that provide the benefits of integration into world financial markets in addition to the traditional channels (e.g., capital accumulation). The collateral benefits, such as development of the domestic financial sector, improvements in institutions, and better macroeconomic policies, would play a dual role: they are prerequisites for the financial integration to occur, and a catalyst for higher growth and lower volatility.

The collateral benefits as a prerequisite may be there for the EMEAP8 economies, but the level may not have achieved the “threshold” as in Kose et al. (2006) or be sufficiently high to serve as the catalyst for higher growth. For example, compared with the euro area economies, the EMEAP8 economies so far have achieved only limited development toward a regional capital market, regional international institutions, and regional common economic policies. 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 systems of the average EMEAP economies is below the average of 30 developing economies if Singapore and Hong

²² Wyplosz (2007) interprets the accumulation of reserves by the EMEAP8 economies to mean that 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 (2007) agrees that accumulating foreign exchange reserves is one way of bringing down the probability, but warns that it is easy to imagine how a domestic financial distress or serious political turmoil could precipitate a speculative attack on the currency.

²³ Another possible explanation for lower expected risk-sharing in the context of incomplete financial market is a weak enforcement issue.

Kong are excluded.²⁴

IV. Implications for the Future of Currency Union in the East Asian Economies

Can we learn any implications for the future of a currency union in the East Asian economies? Our empirical results suggest that ample room remains for improvement in intra-regional risk sharing and welfare in East Asia.²⁵ Specifically, compared with the euro area economies, we find a higher saving-investment correlation, a lower degree of the fraction of idiosyncratic shock smoothed by cross-holding of financial assets, and a limited extent of risk sharing within the 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 markets flexible, our evidence against the consumption smoothing mechanism via the international capital market and a credit market in Asia suggests that it is unlikely that a currency union in East 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.²⁶

²⁴ The data are originally constructed by PricewaterhouseCoopers. The index is presented for only 6 economies; Hong Kong, Indonesia, Korea, the Philippines, Singapore, and Thailand. See the details in table AII, column 2 of Gelos and Wei (2005).

²⁵ 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 the labor market and international transfer system to cope with an economy-specific shock. Moreover, the Asian economies do not have common strong political leadership moving toward a currency union compared with the European economies. The lack of clear regional leadership leads some economists to wonder if China or Japan would really participate in such a union, if it is ever created. For example, Fischer (2006) expects that the non-Chinese members would like to have a common currency so that they can achieve some impact on region-wide monetary policy, but it is unclear whether China would agree to such a currency. Fischer also expects that Japan would play an independent role by retaining its currency, rather like the United Kingdom currently does in Europe.

²⁶ This paper does not deal with the debate over the appropriateness of the 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 the basket peg below for reference. Kawai (2002) argued that (1) a system which ensures intra-regional exchange rate stability will be

Note that we examine the degree of financial integration in the context of preparedness for some currency union in the EMEAP economies. This analysis, however, poses a question on the role of a common currency promoting financial integration—causality running from an opposite direction. While economies should be integrated to some extent before forming a currency union, it is generally understood that, particularly in the case of the euro area, the introduction of a common currency, the euro, helped significantly to promote further integration. In this sense, other factors should complement the degree of financial integration in judging the readiness for a currency union.²⁷

V. Concluding Remarks

This paper examines the degree of integration into world financial markets and its

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 Branson and Healy [2005] for the same argument and see the opposite argument in Sa and Guérin [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 U.S. 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 that after the East Asian crisis the yen became one of the currencies to be included in the currency basket that stabilized the other Asian currencies. They argue that the results suggest that the common currency basket arrangement for the ASEAN plus three economies should include the yen. Yoshino, Kaji, and Suzuki (2004) provide 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 the 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 emphasizes on, but also on the choice of invoicing currency. Shioji (2006) concludes that under the invoicing currency pricing, East Asian economies should assign more weight to the yen, rather than the standard assumption of the 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-through in Asia. See Parsons and Sato (2005) and Ito and Sato (2006) on the degree of pass-through.

²⁷ A related issue is the reference region to use. We examine the euro area as a reference region, but if the endogeneity of the currency union is really significant, then the reference should be the region where a currency union has not been put into place. Regions such as Latin America might be relevant in this regard.

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 the euro area economies. Third, the degrees of smoothing of idiosyncratic shock by cross-holding of financial assets are lower than in the euro area economies. These results suggest two policy implications. First, there is some room for improvement in welfare gains in those economies by means of further risk sharing. Second, holding all other conditions equal, 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.

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Table 1 Country Group and Data Availability

	Group				Data sample starting year (Blank indicates 1970 unless indicated otherwise)								
	EMEAP	EMEAP8	Euro11	All	Portfolio equity assets	Portfolio equity liabilities	FDI assets	FDI liabilities	Debt assets (portfolio debt plus other investment)	Debt liabilities (portfolio debt plus other investment)	Financial derivatives (assets)	Financial derivatives (liabilities)	Total reserves minus gold
China	yes	yes		yes	1980						n.a.	n.a.	1977
Hong Kong	yes	yes		yes	1979						2000	2000	
Indonesia	yes	yes		yes							2002	2002	
Korea	yes	yes		yes							2001	2001	
Malaysia	yes	yes		yes							2001	2001	
Philippines	yes	yes		yes	1980		1980				2001	2001	
Singapore	yes	yes		yes							2001	2001	
Thailand	yes	yes		yes							2000	2000	
Australia	yes			yes					1986	1986			
New Zealand	yes			yes					2000	2000			
Japan	yes			yes					1995	1995			
Austria			yes	yes							1994	1994	
Belgium			yes	yes							1995	1995	
Finland			yes	yes							1993	1993	
France			yes	yes							1994	1994	
Germany			yes	yes							n.a.	n.a.	
Greece			yes	yes		1986					2000	2000	
Ireland			yes	yes							2001	2001	
Italy			yes	yes							2000	2000	
Netherlands			yes	yes							1999	1999	
Portugal			yes	yes							1996	1996	
Spain			yes	yes					1972	1972	n.a.	n.a.	
Canada				yes							n.a.	n.a.	
Switzerland				yes							n.a.	n.a.	
United Kingdom				yes							n.a.	n.a.	
United States				yes							n.a.	n.a.	

Note: n.a.=Not available

**Table 2 The Ratio for the Sum of External Assets and Liabilities
Divided by GDP (IFIGDP)**

Period of the data	1980-84	1985-89	1990-94	1995-99	2000-04
China	0.134	0.230	0.448	0.707	0.932
Hong Kong	5.035	11.233	13.535	11.883	12.276
Indonesia	0.407	0.716	0.836	1.297	1.177
Korea	0.663	0.532	0.393	0.737	0.947
Malaysia	1.045	1.397	1.493	1.780	2.035
Philippines	0.858	1.070	1.045	1.192	1.418
Singapore	2.266	3.473	3.634	6.050	9.266
Thailand	0.455	0.626	0.865	1.042	1.334
Australia	0.452	0.861	1.112	1.453	2.036
New Zealand	0.642	1.218	1.514	1.823	2.223
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

Note: IFIGDP is 5-year sample average.

**Table 3 Securities Issued by Nonresidents and Owned by Residents:
Outward Investment**

	To EMEAP8	G-7
From		
Hong Kong	13	41
Indonesia	16	40
Korea	9	60
Malaysia	31	36
Philippines	6	49
Singapore	22	49
Thailand	15	63
Average	16	48

Note: Percent of total value of investment, 5-year sample average 2001-05.

Table 4 Rratio for the Reserves Divided by GDP:

	1980-84	1985-89	1990-94	1995-99	2000-04
China	0.035	0.043	0.072	0.143	0.246
Hong Kong	0.196	0.275	0.347	0.495	0.706
Indonesia	0.048	0.057	0.070	0.130	0.176
Korea	0.034	0.043	0.053	0.096	0.234
Malaysia	0.144	0.201	0.297	0.297	0.405
Philippines	0.042	0.033	0.071	0.120	0.171
Singapore	0.544	0.704	0.800	0.849	0.952
Thailand	0.045	0.086	0.186	0.226	0.285
EMEAP8	0.063	0.087	0.135	0.197	0.299

Note: Sample average from 1981-90, 1991–2000, 2001–04.

Table 5 Unconditional Mean of Saving and Investment

Sample	1981-2004		1981-96		2000-04	
	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 6 Saving-Investment Correlation

Sample	1981-2004		1981-96		2000-2004	
	\hat{b}	(s.e.)	\hat{b}	(s.e.)	\hat{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 7 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)
G-7	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 Luxembourg, Greece, and Slovenia.

Table 8 Estimation Result of Equation (4) for EMEAP8

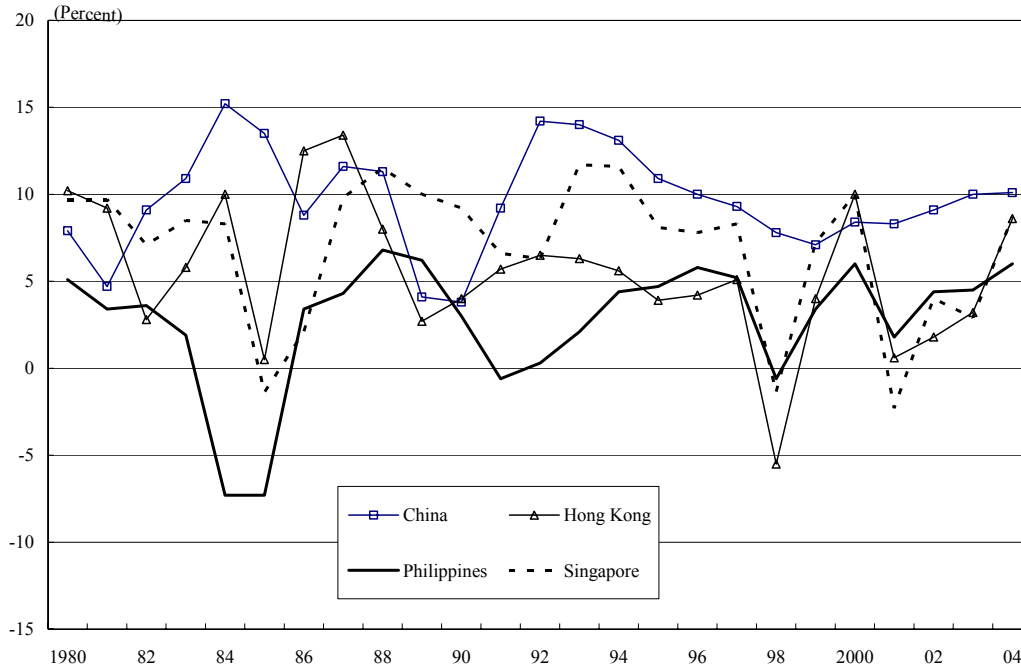
Sample	Country i GDP (β)	(s.e.)	EMEAP8 average GDP (α)	(s.e.)	Wald test ($\chi^2(2)$)
1981–2004	0.608	(0.057)	0.206	(0.071)	203.34
1980s	0.627	(0.063)	0.037	(0.092)	196.72
1990s	0.777	(0.088)	0.195	(0.112)	280.55
2000s	0.498	(0.128)	0.292	(0.133)	45.45

Note:

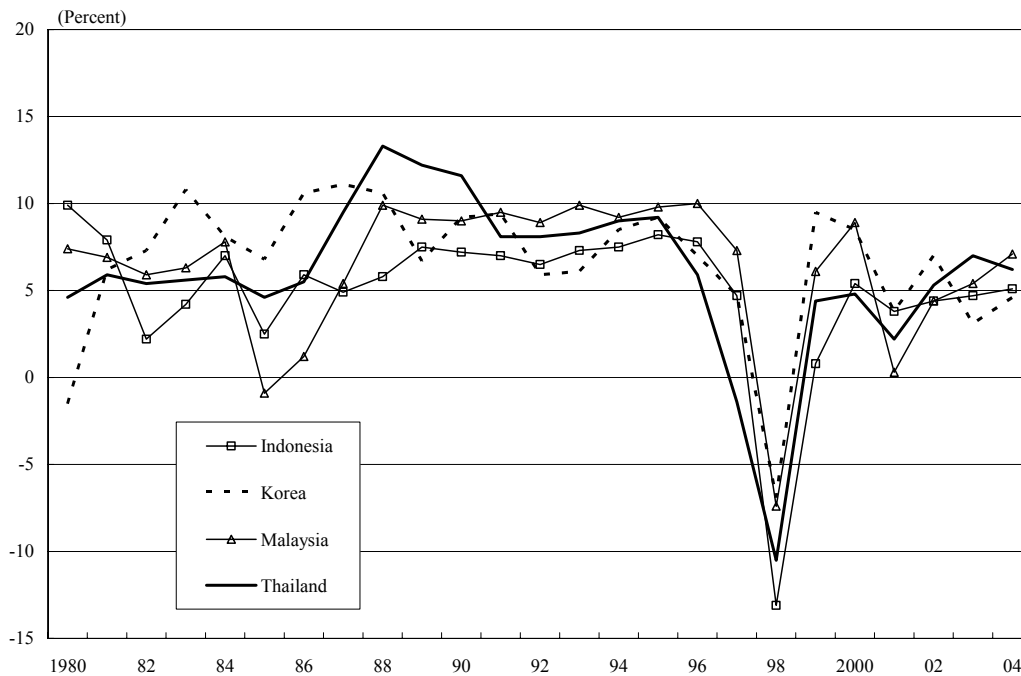
The coefficient β , attached to domestic output growth, measures the deviation from risk sharing arrangement for idiosyncratic GDP shocks within the economies, and the coefficient α , attached to aggregate output growth, measures the extent of risk sharing within the group of economies under consideration.

Figure 1 Real GDP Growth Rate

Panel 1

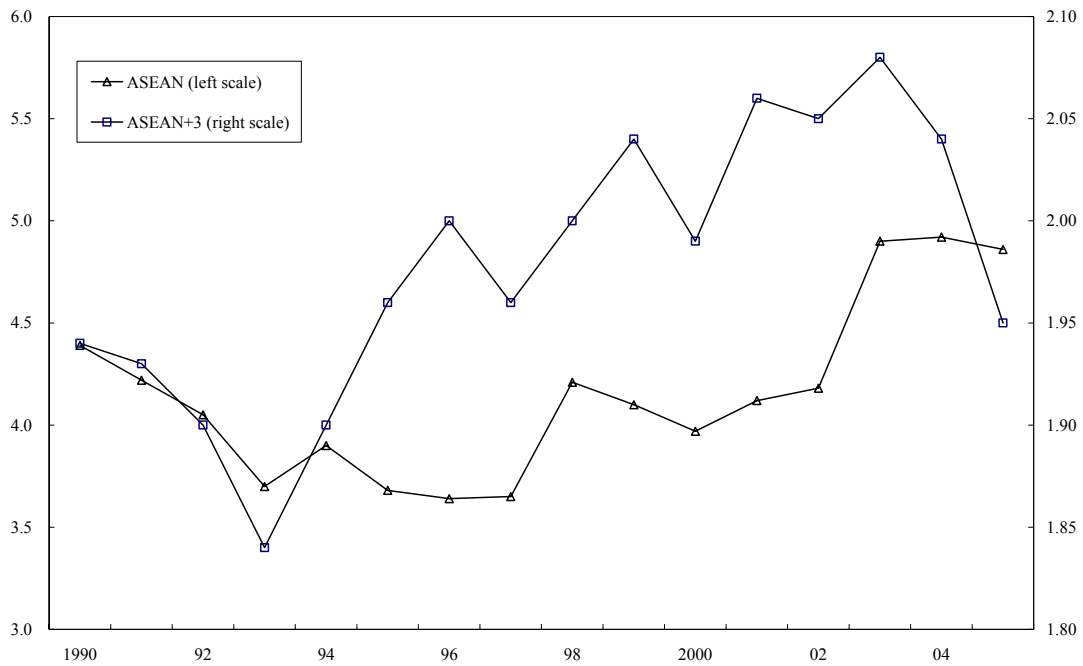


Panel 2



Source: International Monetary Fund (IMF) World Economic Outlook (WEO) database for gross domestic product (constant prices, annual percentage change).

Figure 2 Intra-Regional Trade Intensity Index

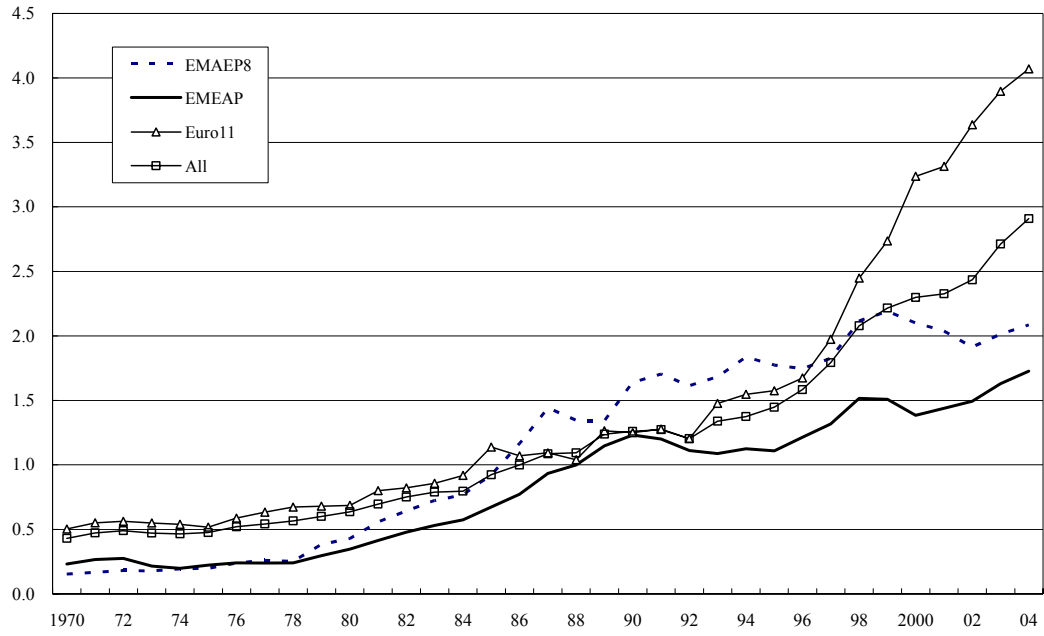


Note:

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 export 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.

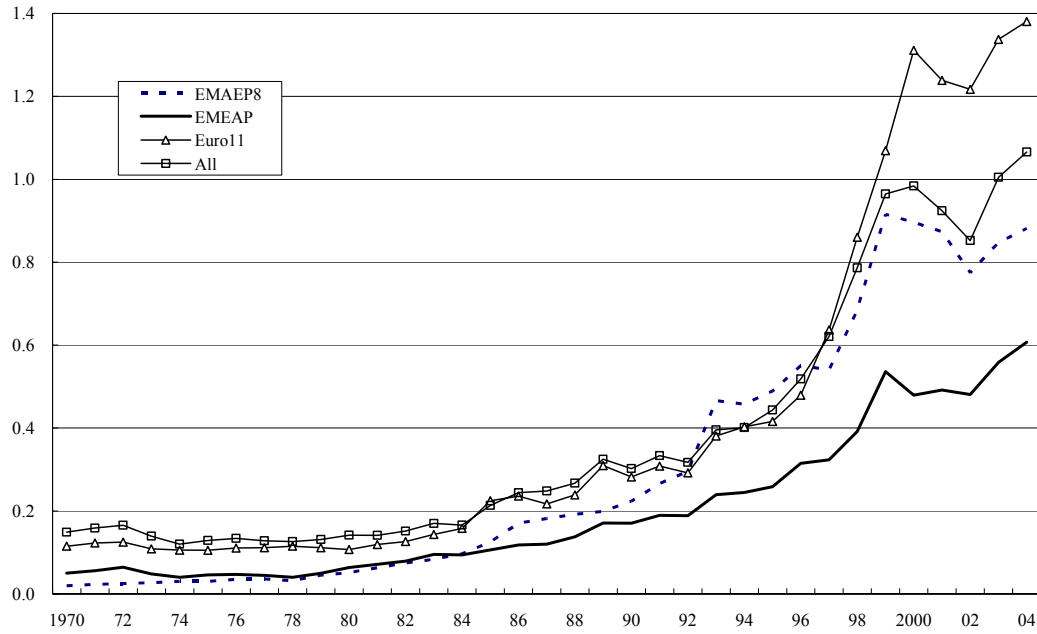
Source: Asian Development Bank, Regional integration indicator database.

Figure 3 Integration into World Financial Markets



Note: The ratio for the sum of external assets and liabilities divided by GDP.

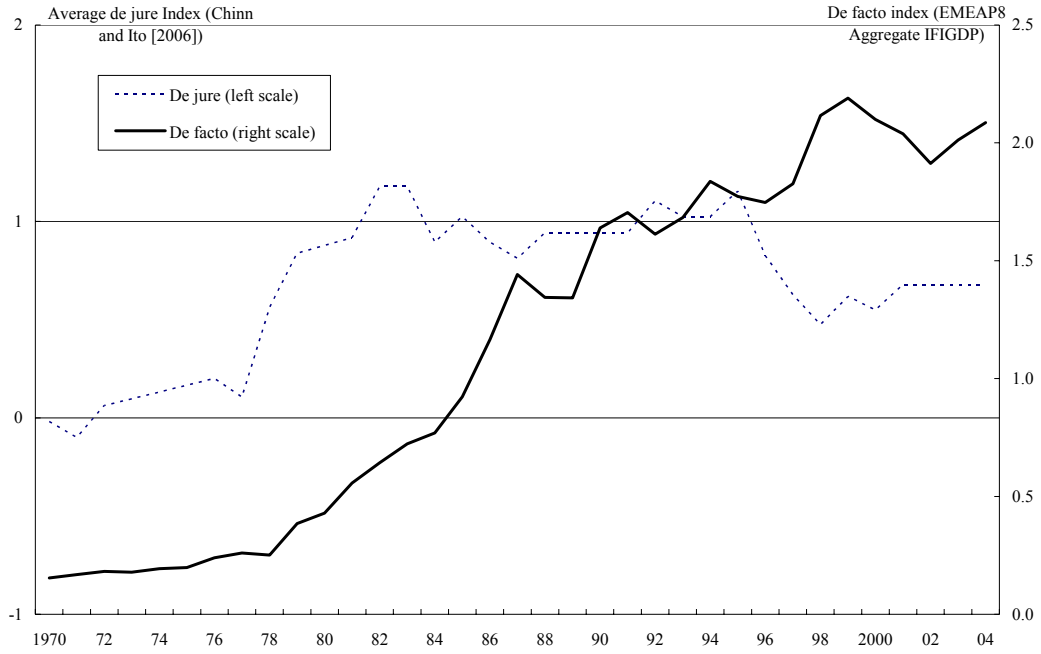
Figure 4 International Equity Integration



Note:

The ratio for stock of portfolio equity assets and liabilities and stock of direct investment assets and liabilities divided by GDP.

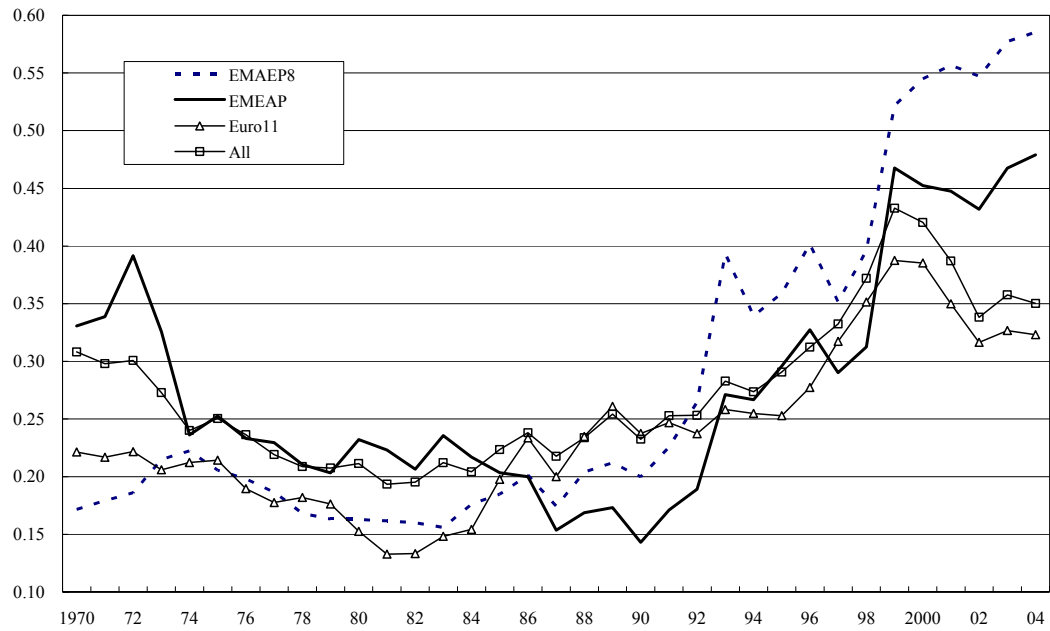
Figure 5 De jure vs De facto Integration into World Financial Markets



Note:

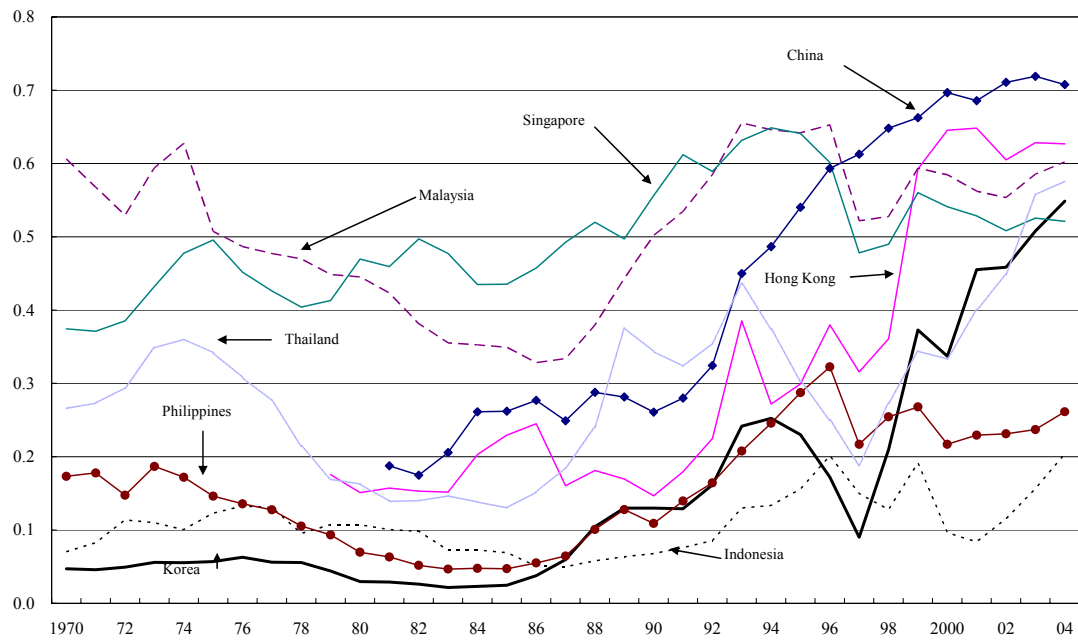
De jure measure is the one created in Chinn and Ito (2006). De facto measure is IFIGDP proposed by Lane and Milesi-Ferretti (2006).

Figure 6 Equity Share in External Liabilities



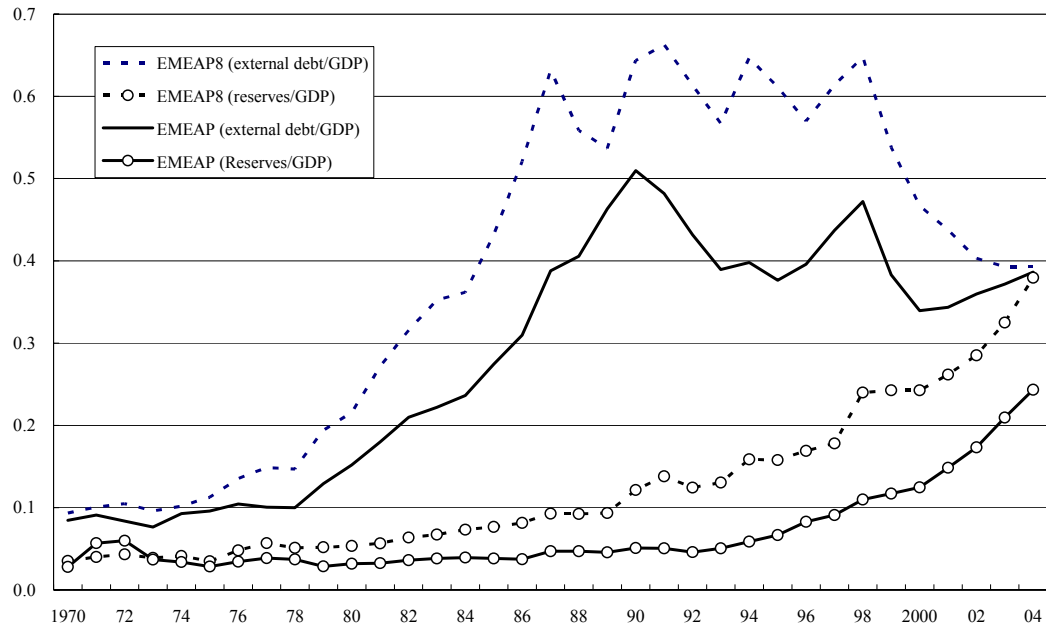
Note: Share of equity (portfolio plus FDI) liability in total financial liabilities.

Figure 7 Equity Share in External Liabilities in the EMEAP8 Economies



Note: Share of equity (portfolio plus FDI) liabilities in total financial liabilities.

Figure 8 Gross External Debt and Official Reserves to GDP



**Figure 9 Gross External Debt and Official Reserves
to Exports of Goods and Services**

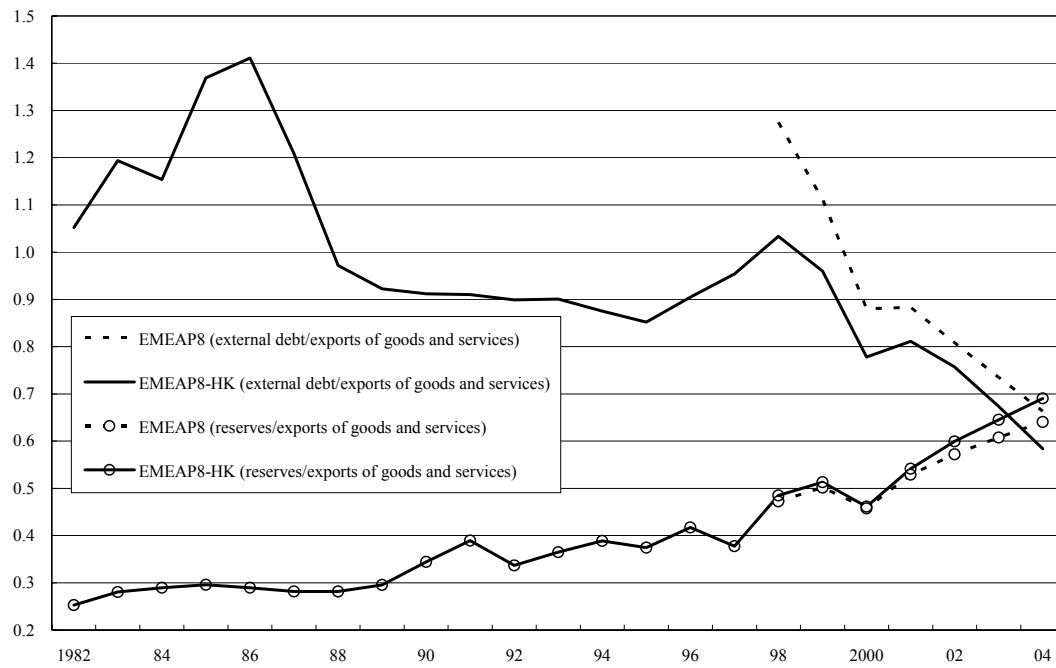


Figure 10 Gross External Debt to GDP in the EMEAP8 Economies

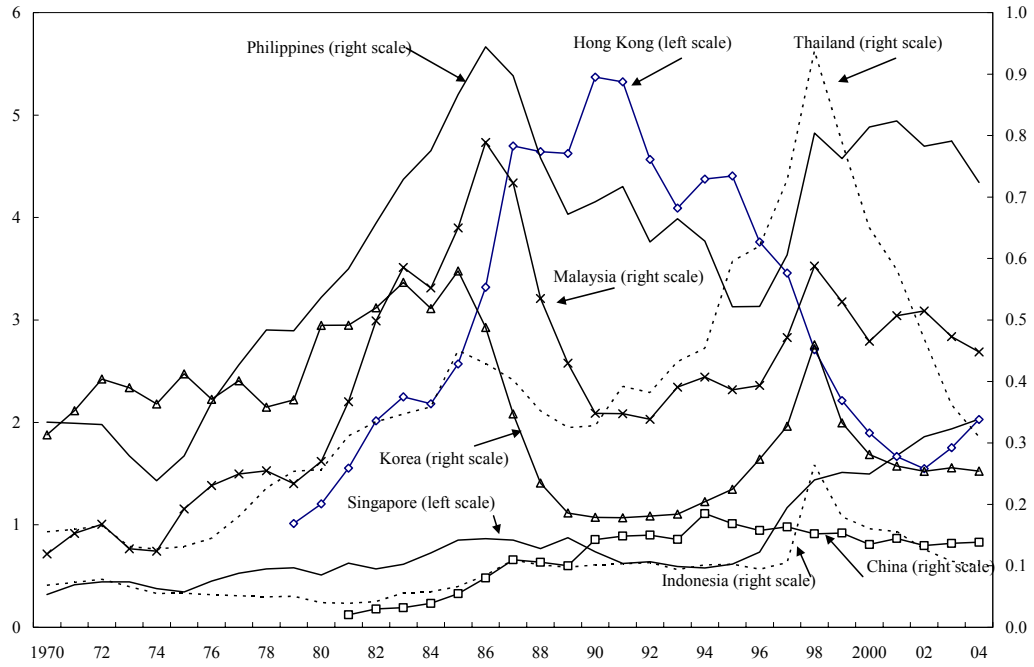


Figure 11 Net Foreign Assets to Group GDP by Country

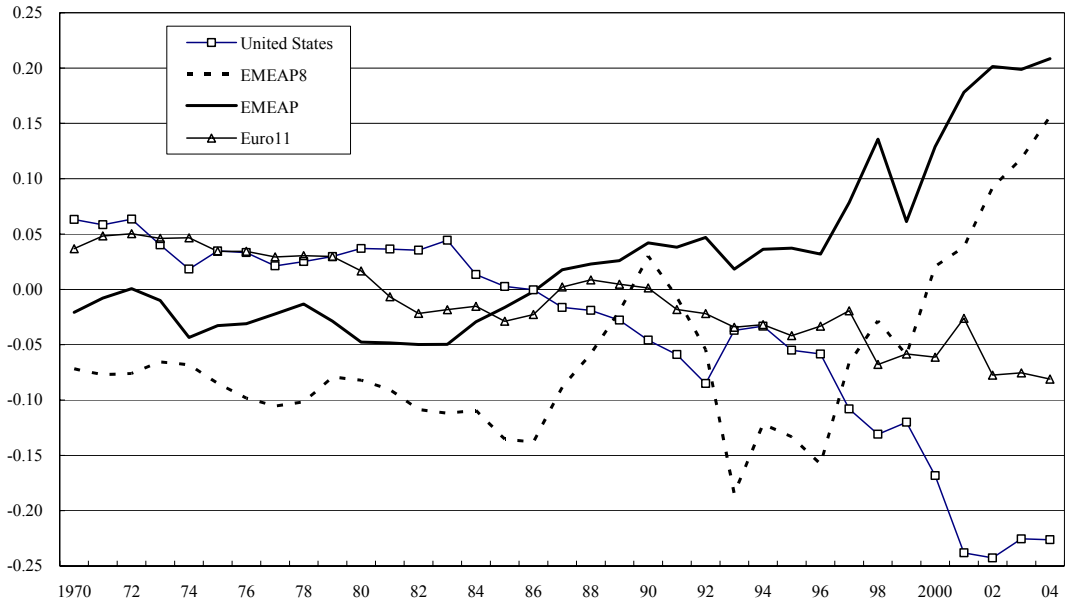
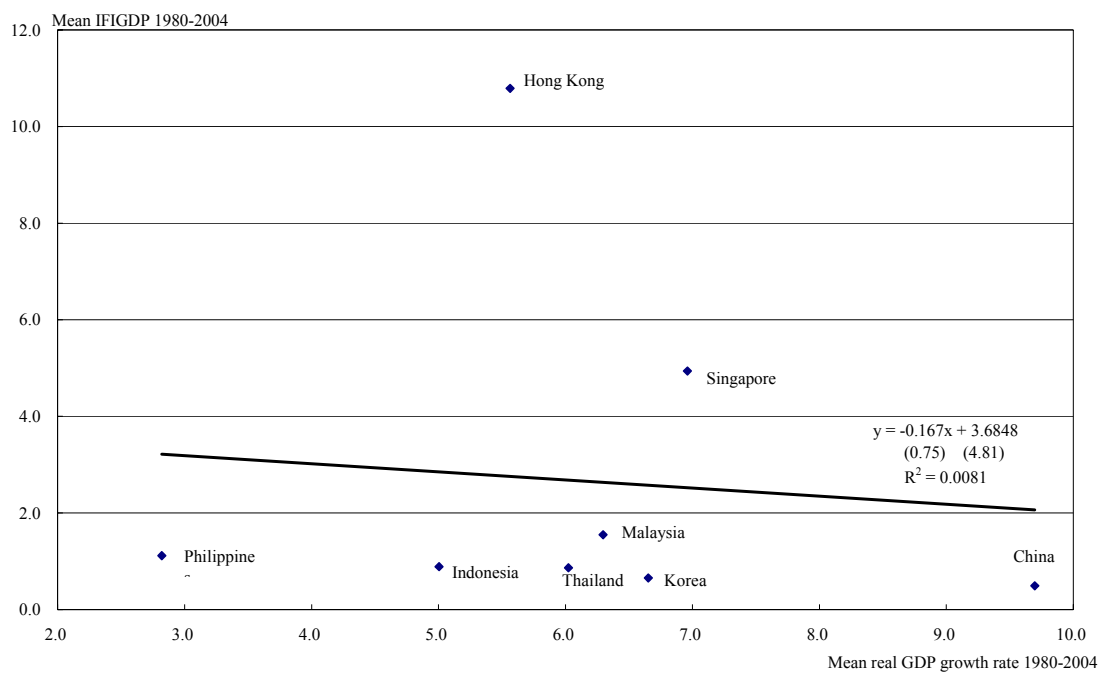
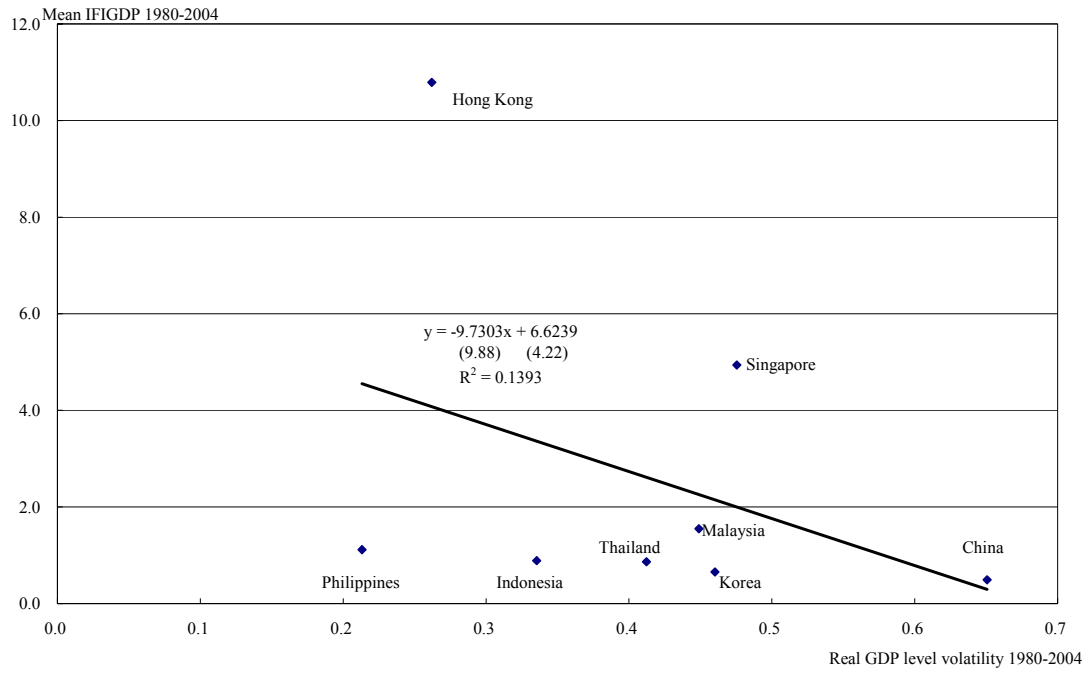


Figure 12 Integration into World Financial Markets and GDP Growth Rate



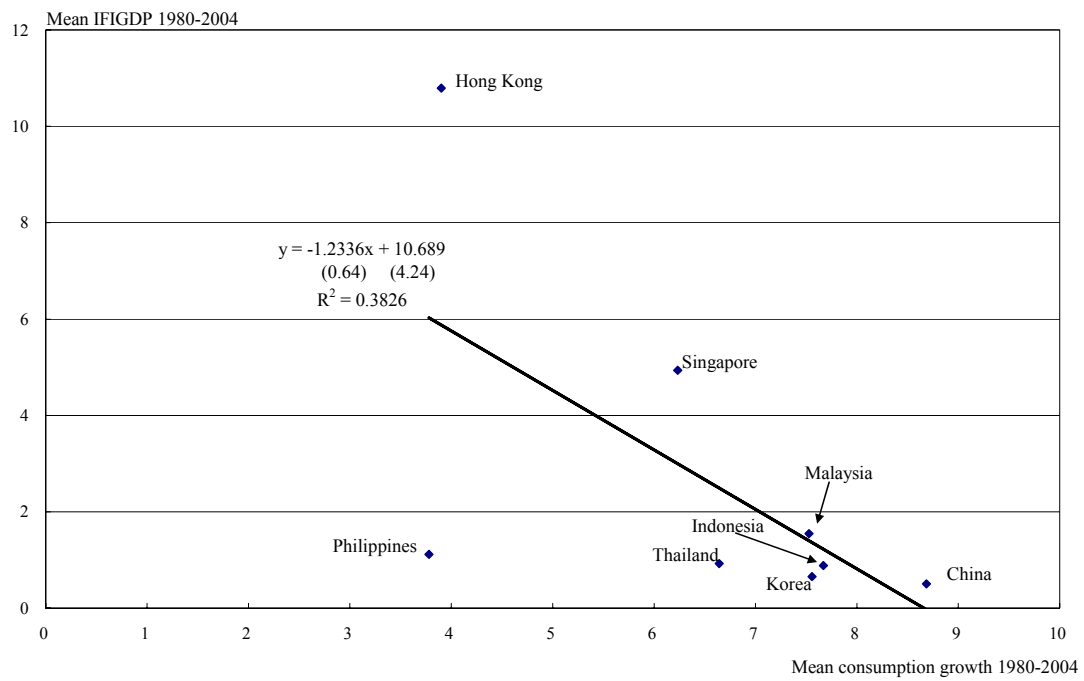
Note: GDP growth rate (domestic currency, constant price) from the IMF WEO database.

Figure 13 Integration into World Financial Markets and GDP Volatility



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

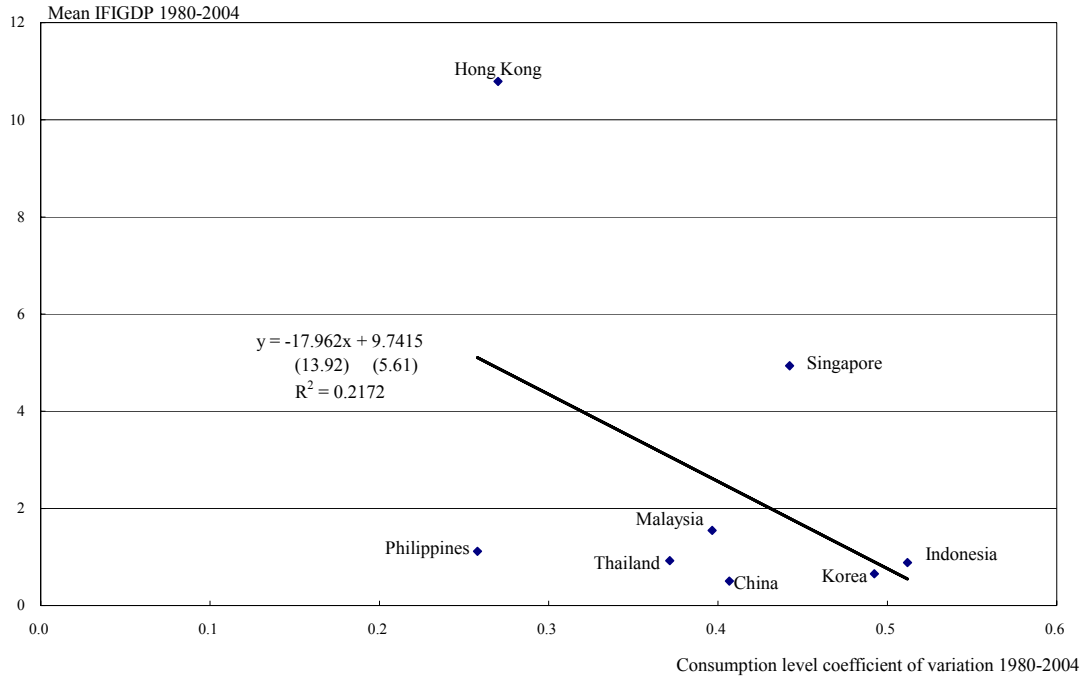
Figure 14 Integration into World Financial Markets and Consumption Growth



Note:

Household consumption growth in domestic currency deflated by CPI. Data are 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 domestic currency deflated by CPI.

Data are taken from International Financial Statistics.

Figure 16 Results to 5-Year Rolling Between Regressions

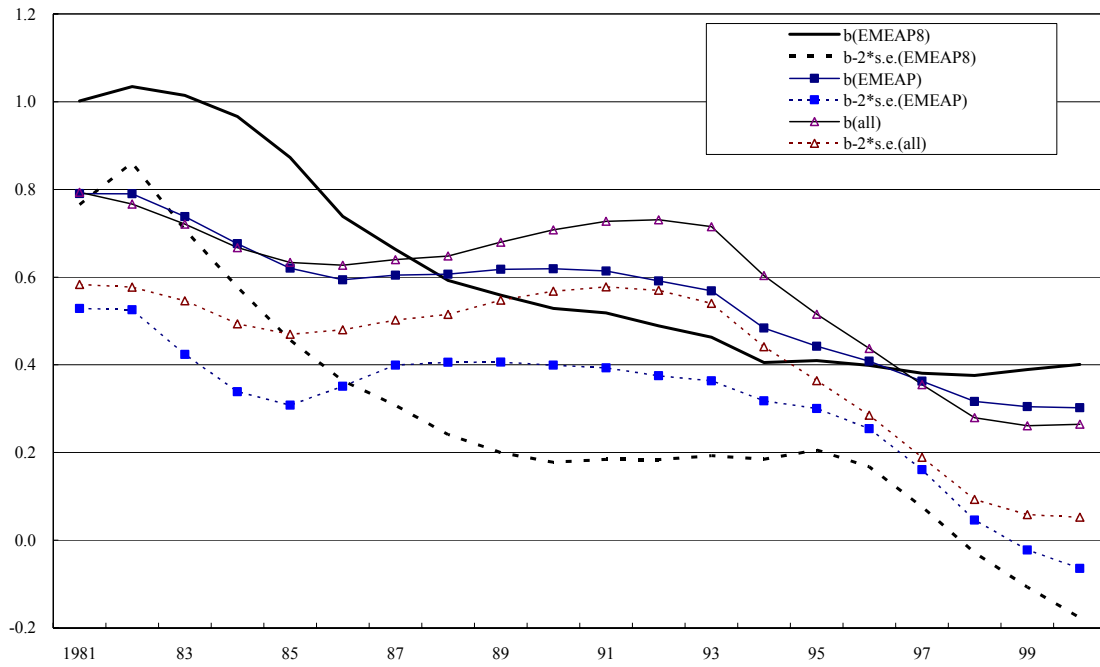
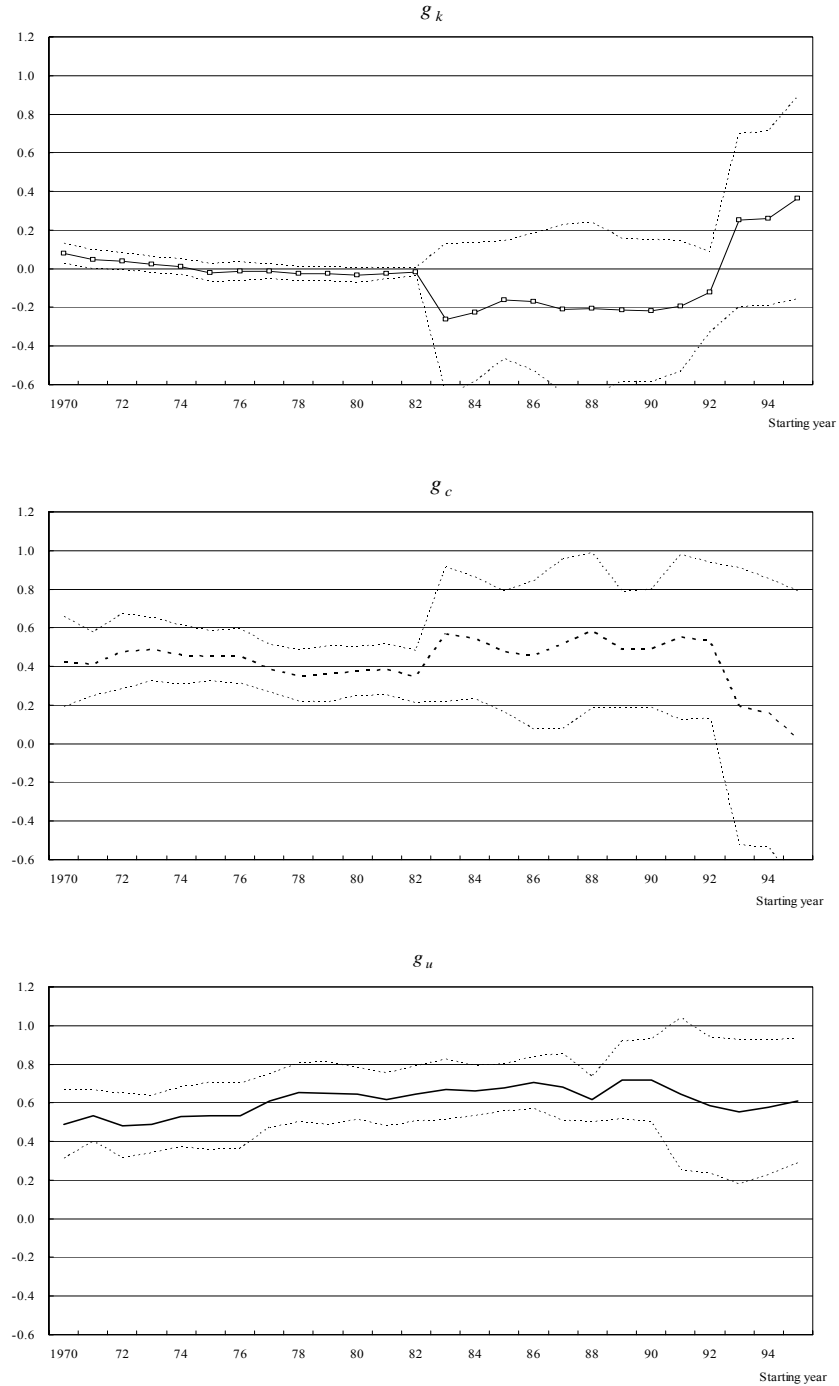


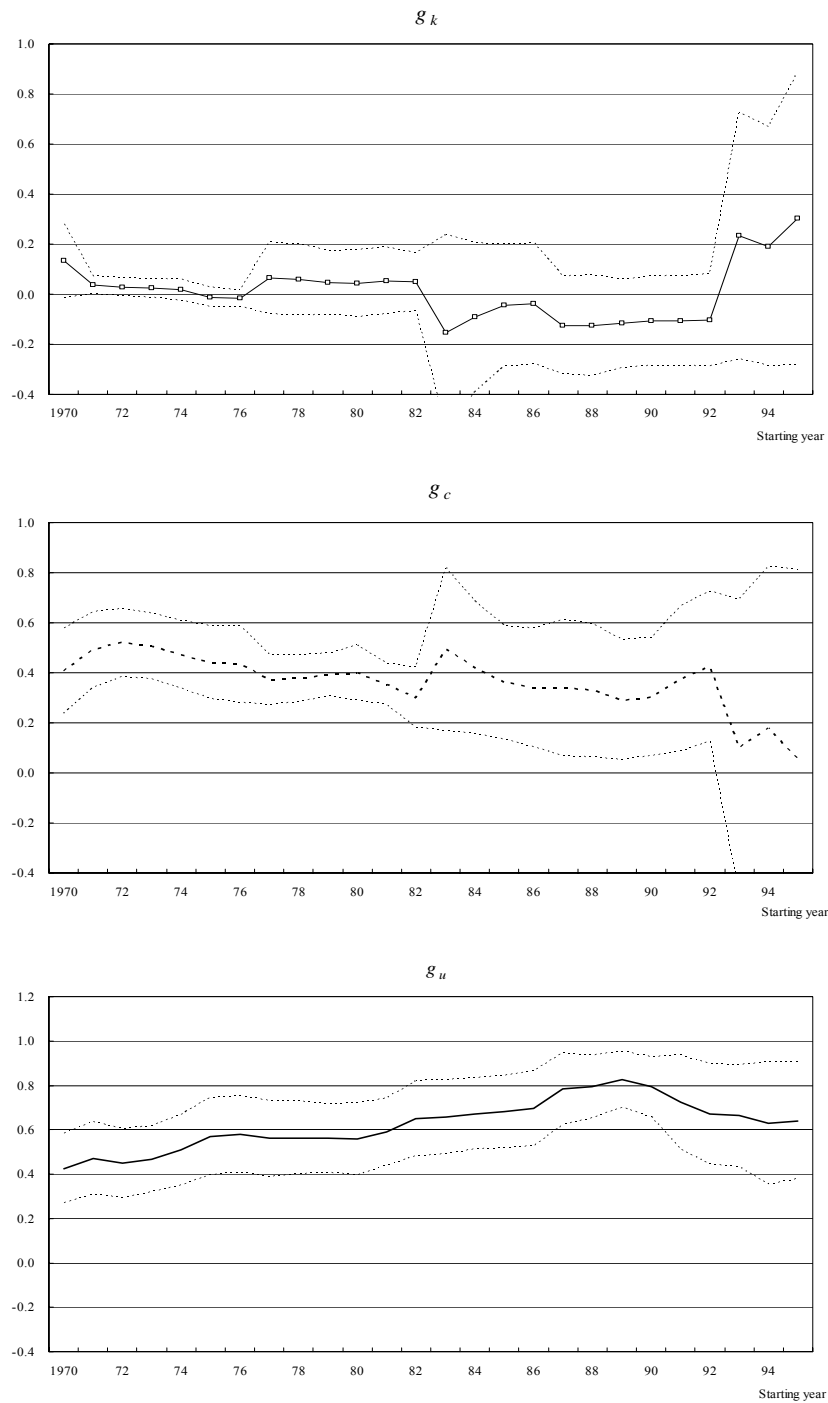
Figure 17 EMEAP8: Rolling Estimation Result of Equation (3)



Note:

Estimation results using a window of 10 years for the EMEAP8. Dotted lines indicate 1.96*standard error plus/minus the estimated coefficients, g_k , g_c , and g_u .

Figure 18 Global: Rolling Estimation Result of Equation (3)



Note:

Estimation results using a window of 10 years for euro area + Asia + United States. Dotted lines indicate 1.96*standard error plus/minus the estimated coefficients, g_k , g_c , and g_u .