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Domestic Investment and External Imbalances in East Asia*

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Abstract

Since the 1997~98 financial crisis, many East Asian economies have experienced permanent declines of domestic investment and output growth, mainly resulting from the increase in financial risk and decrease in the return on investment. The investment decline in East Asia, outside of China, combined with the falling in public and private savings in the United States, has contributed to recent surges in global current account imbalances. The reduction of global current account imbalances requires adjustment polices to raise domestic investment in East Asia, such as expansion of public infrastructure investment and an increase in R&D and human capital investment. Continuous structural reforms in the corporate and financial sectors are also required to lower financial risk and improve investment efficiency. Simulations with a global general equilibrium model support the positive role of the investment increase or strong productivity related growth in reducing current account surpluses in East Asia. Nevertheless, a fiscal adjustment in the United States turns out to be more effective in reducing the US current account deficit and thereby correcting global imbalance.

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I. Introduction

The financial crisis of 1997~98 was an adverse shock of unprecedented magnitude for East Asia, especially for the five countries that were directly affected by the crisis. The GDP growth rate plunged sharply in 1998. Real per capita GDP (the purchasing-power adjusted value) fell by 13 percent in Indonesia, 11 percent in Thailand, and 7 percent in South Korea and Malaysia (Figure 1). The initial sharp contraction of GDP in 1998 was largely caused by the collapse in investment. Four of the Asian-crisis countries—Indonesia, South Korea (henceforth, referred to as Korea), Malaysia, and Thailand—suffered dramatic declines in 1998, by greater than ten percentage points (Figure 2).

Although rates of economic growth in East Asia have rebounded since 1999, many crisis-hit East Asian economies have not recovered to pre-crisis investment ratios. The failure of investment ratios to rebound significantly in the crisis countries suggests that the crisis resulted in long-term adverse effects.[1] This is partly the result of excessive investment prior to the crisis. However, since 1997, investment rates as well as GDP growth rates have been depressed not only in the crisis-hit East Asian economies but also in other East Asian economies, excluding China. This appears to indicate that a permanently depressing situation has emerged in East Asia. Investors' perceptions of the risk inherent in East Asian economies have increased after the crisis. Growth prospects

[1] Barro and Lee (2003) show evidence from the broad sample of 85 countries that currency and banking crises are associated with contemporaneously reduced values of economic growth and investment over the five-year period following a crisis. The magnitude of the typical effect is quantitatively similar to that observed seen in the recent period in the Asian crisis countries. The broad evidence indicates that while currency crises do not have a persisting adverse influence on economic growth, banking crises have had a long-term adverse effect on investment for over 10 years.

for the East Asian economies may also have changed permanently. As the East Asian economies continue to grow, rates of return on investment have declined. This must impact on future growth prospects in the region in the medium term.

The most important consequence of depressed investment is the widening of saving-investment imbalances in the region reflected in rising current account imbalances. The sharp declines in investment rates, while saving rates remained relatively stable, resulted in dramatic improvements in current account balances for East Asian economies after the financial crisis. The growing current account surpluses in East Asian economies have mirrored the continued current account deficit of the United States. External imbalances have never been larger in the post-war period. The growing current account imbalances between regions across the Pacific have provoked vigorous debates among policy makers and scholars.

The purpose of this paper is to analyze the post-crisis evolution of the East Asian economies, focusing on domestic investment, and the consequences of this weak investment on global current account imbalances. The cause of the investment declines and subsequent current account surpluses in East Asia is assessed. In an earlier paper we found that a substantial part of the changes in investment and current account balances in East Asia over the period from 1997 and 2004 is explained by the adverse shock to private investment. Looking forward we assess what events might reduce the global current account imbalances in coming years. The role of various policies such as exchange rate revaluation, expansionary macroeconomic polices, and structural reform on domestic demand and external balances in the East Asian economies are summarized. Using a global general equilibrium model, we explore the impacts of a fall in the equity

risk premium in Asia and a surge in productivity growth on the imbalances. We also explore the impact of fiscal adjustment in the United States and a bursting of the US housing bubble.

The paper is organized as follows. Section II reviews the recent performance of East Asian economies in terms of GDP growth, investment, stock prices, and current account balances. The focus is on assessing whether a permanent change has occurred to domestic investment in East Asia after the financial crisis. Section III discusses the development of global current account imbalances and evaluates diverse views on the causes and consequences of the imbalances. Section IV discusses various macroeconomic policies and shocks that might remedy the imbalances. Concluding remarks are found in the final section.

II. Economic Performance in the East Asian Economies after the Financial Crisis

A. Economic Growth

Figure 1.A and B demonstrate the annual growth rate of real GDP for each of the East Asian economies from 1990 to 2005.[2] The sharp economic contractions in 1998 for the five Asian-crisis countries are evident: real GDP fell by 13 percent in Indonesia, 11 percent in Thailand, 7 percent in South Korea, and 7 percent in Malaysia, but only 1 percent in the Philippines. Other East Asian economies were also affected but to a lesser degree: real GDP growth rate during 1998 was -5.0 percent in Hong Kong, -0.8 percent

[2]The underlying GDP data are from the International Monetary Fund, *World Economic Outlook Data Base*.

in Singapore, and -1.0 percent in Japan. The GDP growth rates were positive for China and Taiwan— 7.8 percent and 4.3 percent, respectively.

In 1999-2000, economies recovered, and the GDP growth rates were positive in all ten economies. Among the five crisis countries, the growth rate in 1999 was 9.5 percent in South Korea, 6.1 percent in Malaysia, 4.4 percent in Thailand, 3.4 percent in the Philippines, and 0.8 percent in Indonesia. For the other five economies, the rate was 7.1 percent in China, 6.8 percent in Singapore, 5.3 percent in Taiwan, 3.4 percent in Hong Kong, and -0.1 percent in Japan.

The rapid recoveries in the years following the crisis did not lead to the return to previous patterns of growth for the crisis-hit East Asian economies. In fact, the rebound of growth for 1999-2000 slowed down in subsequent periods. Thus, it looks likely that the financial crisis in 1997-98 had persisting negative effects on growth. However, the subsequent downturn over the period 2001-2002 may have come from the global recession. During the same period, the non-crisis East Asian economies also experienced a drastic fall in growth rates.

Since 2003, growth rates rebounded: the annualized per capita growth rates over the period of 2003-2005 were 6.0 percent in Malaysia, 5.9 percent in Hong Kong, 5.5 percent in Thailand, 5.3 percent in Indonesia, 5.1 percent in the Philippines, 4.1 percent in Taiwan, 3.8 percent in Korea, and 2.0 percent in Japan.

Looking ahead, East Asia's growth prospects are relatively bright. Japan is finally emerging from a decade-long recession. China continues its spectacular economic growth. Despite the favorable outlook, however, East Asian economies as a whole are expected to become inevitably adjusted to a lower growth path. In particular, for the crisis-hit East

Asian economies, despite the rebound of growth for 2003-2005 the average growth rates are lower than the high growth rates of between 7 and 8 percent achieved in the decades before the crises. These economies are unlikely to return to the high pre-crisis growth path. The East Asian economies have become so much richer than these economies were a few decades ago. However, these economies now face a much smaller gap in physical and human capital in the long-run potential levels attained in previous decades. Consequently, as the "catching-up" process through capital accumulation is expected to slow down over time, the economies will inevitably turn to slower economic growth.

B. Investment Ratios

Figure 2.A and B depict the investment ratios for the East Asian economies from 1990 to 2004. The ratios are for total capital formation (private plus public) relative to GDP.[3]

Four of the Asian-crisis countries— Indonesia, South Korea, Malaysia, and Thailand— showed dramatic declines in 1998, by well over ten percentage points. For the Philippines, which historically had a low investment ratio, the reduction in 1998 was comparatively small, amounting to approximately 4 percentage points. For the five countries in which investment declined sharply, no substantial recoveries have occurred until 2004. The investment ratios in 2004 remained at 21.3 percent in Indonesia, 30.2 percent in South Korea, 22.5 percent in Malaysia, 17.1 percent in the Philippines, and 27.1 percent in Thailand.

[3] The underlying data are from the International Monetary Fund, *World Economic Outlook* and the Asian Development Bank, *Key Indicators of Developing Asian and Pacific Countries.*

The other five non-crisis East Asian economies except China also exhibited decreases in investment ratios after the crisis. Investment ratios declined by 7 percentage points in Singapore and 5 percentage points in Hong Kong in 1998, and then continued to decline afterwards. The investment ratios in Japan and Taiwan have also declined: in 2004, the investment ratios were 23.9 percent and 17.5 percent respectively, which dropped by 5 and 7 percentage points from their peak ratios in 1997. Investment ratios still remained high in China, increasing from 38.0 percent in 1997 to 45.8 percent in 2003. While both public and private investment declined in East Asia, the fall in private investment has been more dramatic.[4]

While the dramatic falls in the investment ratios in Indonesia, South Korea, Malaysia, and Thailand were specifically related to the Asian financial crisis, a situation occurred that permanently depressed private investment demand in East Asian economies, except China.

It is important to understand the factors resulting in investment falls in East Asia. First, part of the sharp declines in investment is attributed to the increase in prices of imported investment goods due to considerable exchange rate depreciation. However, evidence presents limited 'pass-through' of exchange rate changes. This means that there must be other more important factors that have contributed to the permanent depression in investment. Second, the crisis-hit economies were forced to reduce excessive investment prior to the 1997-98 crisis. Many East Asian economies found themselves with large underutilized capacity in manufacturing and vacant commercial and residential

[4] According to the IMF, World Economic Outlook Data, the average of public investment-to-GDP rate declined from 9.6 percent in 1997 to 6.2 percent of GDP in 2002 for East Asia NIES. Data on public investment in individual countries are limited.

buildings that were constructed prior to the crisis. The existing excess capacity, despite the sharp decline in real interest rates, held back new investment in many East Asian countries. The adjustment in excessive investment contributed to some of the investment decline after the crisis, and cannot explain the complete story. It would be challenging to argue that the adjustment has resulted in adverse effects on investment over a long period, such as eight years since the 1997 crisis in both the crisis-hit and the non crisis-hit East Asian economies.

Third, investors' perceptions of the risk for East Asian economies have increased. Investors have observed that structural problems in the corporate and financial sectors such as the illiquidity of financial institutions, and the high leverage of the corporate sector resulted in the overall economy being extremely vulnerable to financial panic and economic crisis in East Asia. The increase in perceived corporate and financial risk by investors after the crisis affected the long-term decline in domestic investment. Banks were required to reduce lending to the firms that were over-indebted and perceived as high risk. Highly-leveraged corporate firms were more vulnerable to financial risk, and the associated investment demand declined substantially. Evidence in Korea reveals that *Chaebol* (conglomerate)-affiliated firms with a higher debt-equity ratio prior to the crisis reduced investment more aggressively (Hong, Lee, and Lee 2006). While corporate and financial restructuring has been progressing, it has not completely resolved all the structural problems. Even if all problems were solved, Asian investors burned by the crisis would be more conservative. Overall, less dependence on external borrowing and risky investment is preferred.

Fourth, there is also expectation that productivity of investment will be declining in East Asian economies. As the East Asian economies continue to grow, they approach to the steady-state levels of capital stock. The “convergence” factor implies diminishing rate of return to new investment.

Fifth, in recent years, the capital intensity of East Asian products has declined as industry structures have shifted to more skill and knowledge intensive structures, such as IT products and services. This shift has also contributed to weaker investment demand.

Lastly, there is the argument that China has drawn in foreign investments that would have previously been directed to other Asian economies. However, evidence by Eichengreen and Tong (2006) and results from the modeling framework used in this paper by McKibbin and Woo (2003) demonstrate that FDI into China encourages greater investment in other Asian countries because they are interconnected in global production networks.

Investment demand in East Asia moderated in 2005 after a slight recovery in 2004. It is unlikely that East Asian economies will recover pre-crisis levels. As GDP growth decelerated, private investment revealed a declining trend in four East Asian NIES. In China, policy tightening began to curb investment in a number of overheated sectors (IMF, 2005).

C. Stock-Market Prices

Figure 3.A and B examine patterns in real stock-market prices. The general idea is that a change in an economy's stock market likely reflects the change in the market's perception

of long-term growth prospects. In the figures, the real stock-market values are computed by converting local currency values of stock-market indexes to U.S. dollars and then dividing by the U.S. price level. The values in January 1998 were normalized to one.

The five Asian-crisis countries saw sharp declines in real stock-market valuations from the beginning of the financial crisis in summer 1997 until the fall of 1998. Although the stock prices rebounded between 1999 and 2000, they fell again between 2001 and 2002. The ratios of values for December 2002 to those for January 1997 are 0.10 for the Philippines, 0.14 for Indonesia, 0.31 for Malaysia, 0.43 for Thailand, and 0.65 for South Korea. Stock prices have increased continuously since 2002. However, the valuations in 2005 still fall short of those from early 1997 in these Asian-crisis countries, except for South Korea. The ratios of values for September 2005 to those for January 1997 are 0.67 for the Philippines, 0.29 for Indonesia, 0.40 for Malaysia, and 0.44 for Thailand. The ratio is 1.16 for South Korea in which stock prices rose rapidly in 2005.

For the five other non-crisis East Asian economies, the declines in stock-market valuations are less dramatic. The ratios of values for September 2005 (December 2002) to those for January 1997 are 0.61 (0.42) for Taiwan, 0.75 (0.51) for Singapore, 0.86 (0.55) for Japan, 0.90 (0.63) for Hong Kong, and 1.85 (1.24) for China. Stock prices dropped over 1997-2002 and have recovered slowly, exhibiting fluctuations similar to those of the crisis-hit economies. In contrast, China's stock market valuation has continued to decline since 2002 through to 2005.

From the perspective of the financial markets, the slow recovery in real stock market valuation since the 1997 financial crisis appears to reflect permanent negative

effects of the shocks on the economic outlook of East Asian economies. A fall in an economy's stock market valuations likely reflects the market's belief that long-term growth prospects have diminished. The recent surges of stock prices may indicate that the outlook for the East Asian region has become brighter. It is, however, currently unclear whether stock prices will continue to recover.

D. Current Account Balances

In an open economy with capital mobility, a saving-investment imbalance leads to the current account imbalance as the gap between domestic saving and investment is filled by net capital inflows. The recent changes in current accounts in the East Asian economies have reflected that of investment ratios, as saving ratios have been relatively stable. As global capital markets integrate, low investment rates are likely to be converted to net capital outflows and current-account surpluses.

Figure 4.A and B show the changes of current account balances. The Asian crisis-hit economies reversed the current account position from a deficit in the pre-crisis period to a surplus after a crisis. In 1997, the current account deficits were 5.9 percent of GDP for Malaysia, 5.2 percent for the Philippines, 2.1 for Thailand, and 1.6 percent for Indonesia and South Korea. All these countries have had substantial current account surpluses in the post-crisis period. In 1998, the surpluses were greater than 11 percent of GDP in Korea, Malaysia and Thailand, where investment ratios declined significantly. However, despite a dramatic decline in investment ratio, Indonesia had a smaller current account surplus, amounting to 3.8 percent of GDP. This reflects a substantial decline in private saving rates

in Indonesia. These crisis-hit Asian economies continue to accumulate current account surpluses, but in 2005, Thailand is expected to exhibit current account deficits of approximately 2.5 percent of GDP.

In other Asian economies, current account balances have continuously revealed surpluses over time. Japan's current account surplus was 2.2 percent of GDP in 1997 and increased to 3.7 percent in 2004. China has persistently accumulated large amounts of current account surpluses, amounting to over 6 percent of GDP in 2005. Singapore and Taiwan have also revealed persistent surpluses before 1998 and afterwards. In 2004, the current account-to-GDP ratios amounted to 26 percent in Singapore and 6 percent in Taiwan.

The data demonstrates that for the five crisis-hit economies in East Asia, the current accounts continued to improve until reaching a level permanently above that of the pre-crisis period. This must be attributed to the Asian financial crisis, which resulted in currency collapses and investment depression. For non-crisis countries, the continuing improvement in current accounts also reflects the declines in investment demand. In contrast, China's continuing current account surpluses are attributed to its higher saving rates particularly corporate saving (see Figure 9.A).

IV. Global Current Account Imbalances

A. The Trans-Pacific Imbalances

One of the major consequences of depressed investment and increased current account surpluses in East Asia is the growing global imbalances between regions across the Pacific. The current account surpluses in East Asian economies have mirrored the

current account deficit of the United States (see Figure 5). The recent surge of the global current account imbalances are attributed to the regional saving-investment imbalances, particularly the fall in savings in the United States and investment decline in emerging East Asian economies.[5]

The United States current account deficit has increased significantly in recent years. In 2004, the US deficit stood at $666 billion, up from $136 billion in 1997. This deficit amounts to 5.7 percent of GDP, increasing from 1.6 percent seven years earlier.

The principal cause of the US current account deficits is the low levels of saving rates relative to investment in the United States (Figure 6.A). The US gross private saving rates dropped continuously from over 19 percent in the 1980s to 15.1 percent in 2004. In recent years, corporate savings has risen substantially, offsetting lower household saving. In 2004 the US corporate savings rate is 11.5 percent of GDP, while the household savings rate is 3.1 percent (Figure 6.B).

In particular, the recent deterioration in the US current account deficits reflects the deterioration of public savings.[6] During the 1990s, the US fiscal balance improved dramatically from negative savings to positive, peaking at 4.4 percent of GDP in 2000. However, in 2002, fiscal saving switched back to negative, –0.2 percent of GDP, as the US government loosened fiscal policy beginning from early 2001 as the US economy

[5] While saving-investment imbalances is focused on in both the US and East Asian regions for the explanation of the global imbalances, there are a number of different views. Roubini (2005) summarizes five different views and likens the existence of diverse interpretations of the global imbalances to the Kurosa film *Rashmon*, in which a number of four witnesses give varying accounts of the same crime. Eichengreen(2005) considers these different views are not incompatible but explain only part of the facts, which is analogous to the situation of "the blind men and the elephant". The next subsection discusses the different perspectives on the global imbalances.

[6] It is generally controversial how strong budget deficits are associated with current account deficits. Critics point out that there is no strong positive co-movements of the budget and current account balance over the long run and econometric studies show evidence of a relatively weak correlation between these variables controlling other important factors. See discussions in Eichengreen (2005).

was heading towards a recession (Figure 6.B). In 2004, the US public saving rate was -1.3 percent of GDP.

On the other hand, the East Asian economies have continuously accumulated current account surpluses. The total surplus of 10 economies amounted to $354 billion in 2004, up from $120 billion in 1997. As the massive US current account deficit is attributed to low savings relative to investment, the East Asian current account surplus reflects their low investment relative to savings. In Japan, during the 1990s there was a secular downward trend in both saving and investment rates (Figure 7.A). However, investment declines have surpassed declines in savings. In 2004, the savings rate is 27.3 percent and the investment rate is 24.3 percent of GDP. While household and public saving rates have declined continuously, the corporate saving rate has risen significantly. In 2003, the Japanese corporate saving rate is 21.3 percent of GDP, while the household saving rate is 8.4 and the public saving rate is -2.5 percent (Figure 7.B).

In other East Asian economies except China, investment rates fell dramatically after the financial crisis (Figure 8.A). In contrast, saving rates- both private and public- remain high, although they have declined steadily (Figure 8.B). In China, both the saving and investment rates revealed a declining trend during the latter half of 1990s, and since 2001, resumed their secular rising trend, reaching a record-high of 46 percent in 2004 (Figure 9.A). There have been substantial increases in the corporate saving rate and public saving rates, offsetting the decline in household saving rate (Figure 9.B).

The saving-investment imbalances have resulted in massive current account surpluses in East Asia (Figure 5). In recent years, East Asian economies have persistently accumulated large amounts of surplus on their current accounts, particularly after the

1997~98 financial crisis. In 2004, Japan had a current account surplus of $172 billion, amounting to 3.7 percent of GDP, and the four East Asian East Asian NIES (newly industrialized economies) including Hong Kong SAR, Korea, Singapore, and Taiwan had a surplus of $90 billion, or 7.2 percent of their GDP. The ASEAN-4 including Indonesia, Malaysia, Thailand, and the Philippines had a surplus of $28 billion, amounting to 4.4 percent of GDP. China also had a surplus of approximately $69 billion or 4.2 percent of GDP in 2004. For 10 East Asian economies, the total current account surpluses in 2004, amounted to $386 billion. A significant portion of East Asia's current account surpluses originated from the region's trade with the U.S. In 2004, US trade deficit with 10 East Asian countries including Japan and China, amounted to $ 284 billion (Table 3), which amounted to over 40 percent of the U.S. current account deficit.

In 2005, current account surpluses in East Asia have generally declined, with the exception of China. The current accounts of Indonesia and Thailand interestingly shifted into deficits. The current account surpluses of Korea and Taiwan also fell from 4 percent to 2 percent of GDP. The current account deterioration reflects rising oil prices and soaring import demand balances in most East Asian countries. However, in China, the current account balance continued to increase due to strong export growth.

B. Can the Global Imbalances be Sustained?[7]

In recent years, there have been increasing concerns regarding the growing global current account imbalances. The most serious question is whether the U.S. current account deficits can be sustained as the accumulation of current account deficits has led

[7] See Corden (2006) for a clear analytical overview of the various arguments in this section.

to a substantial increase in U.S. indebtedness to foreign countries. At the end of 2003, the net external debt of the United States was approximately 25 percent of GDP, amounting to over 250 percent of exports of goods and services, as exports are a small fraction of the U.S. GDP. This provides an indication that the United States cannot continue increasing its external debt at this pace (Roubini and Setser 2004).

In theory, persistent U.S. deficits should ultimately result in real depreciation of the US dollar and an increase in U.S. interest rates, thereby assisting in the reduction of the deficits. However, US deficits have been sustained, despite continuous warnings of an imminent collapse, and currently, there has been almost no significant force towards reducing the global imbalances.

A number of research papers argue that the abrupt adjustment would take place sooner than later. For instance, Obstfeld and Rogoff (2004) argue that the reduction of U.S current account balances would be accompanied by a substantial change in real exchange rates, amounting to 40 percent depreciation. Substantial depreciation of real exchange rate is required in order to switch spending on traded goods into non-traded goods, rendering the necessary reductions to trade deficits. This is because U.S. spending on traded goods is a small share of total spending.

The reason the U.S. current account deficits have been sustained is due to the fact that foreign investors have continued financing. The majority of the capital inflows financing the U.S. deficits have originated from surplus countries in East Asia, as well as the Middle East region.[8] Private investors as well as the official sector in these regions have maintained a strong appetite for U.S. assets.

[8] Dooley et al. (2005) demonstrated that three-quarters of the increase in Asian and Middle Eastern savings over the period from 1999 to 2004 has been placed in international reserves as U.S. assets. .

Foreign central banks have bought U.S. treasury bills in order to accumulate international reserves as U.S. assets. As a consequence of continuous interventions in foreign exchange markets, the international reserves of East Asian economies have increased significantly in recent years. East Asian reserves reached 2.5 trillion US dollars in mid-2005, which is an excessive level compared to standard measures of reserve requirements. The hoarding of reserves entails cost. East Asian economies hold the majority of international reserves in low-yielding U.S. treasury bills, while paying for higher rates of returns to securities held by foreign investors. The fiscal costs are involved with the sterilization. The continuing accumulation of foreign assets cannot always be successfully sterilized. A subsequent increase in the supply of money is bound to be translated into inflation of goods as well as real and financial assets. Foreign central banks may stop accumulating international reserves as U.S. assets if the cost of intervention is considered too high. For instance, the People's Bank of China may stop purchasing U.S. Treasury securities, if the expanding reserve accumulations spill over into monetary creation that makes inflation soar above a certain policy objective.

The prospects of massive losses as a result of the dollar's fall will force foreign central banks to reduce their large dollar-denominated asset holdings. Recently, East Asian central banks appeared to begin to diversify their reserve holdings into other strong currency assets.

While foreign private investors continue to purchase U.S assets, they will also pull back from financing U.S. deficits once the dollar's decline is expected. Private equity and bond investors will most likely scale back their purchase of dollar assets and shift the composition of their portfolio.

Blanchard et al. (2005) attribute increasing global current account imbalances to an increase in the U.S. demand for foreign goods, and an increase in the foreign demand for U.S. assets. A large depreciation of the U.S. dollar is anticipated when investors' preferences for dollar assets drop. The accumulation of the foreign debt makes the long-run value of the dollar continue to fall. Hence, the more prolonged U.S. foreign borrowing, the sharper the adjustment of the dollar and the current account.

However, a number of experts argue that the U.S. current account deficit is sustainable, and the adjustment, if it occurs, will take years and more likely occur in an orderly manner. Some argue that the widening current account deficit of the U.S. is not a problem. One view is that there is a global savings "glut." According to this view, the global current account imbalances occur largely as a result of a post-bubble global savings glut (Bernanke 2005). The excess savings in East Asia, as well as Europe, has depressed global interest rates and required a large current account deficit in the global economy, particularly in the United States, because of the greater attractiveness of associated financial assets. Globalization of financial markets will continue to assist channeling of the supply of global savings to U.S. markets. This will continue as long as excess savings persist and foreign investors continue to purchase American assets, the U.S. current account deficits can be sustained.

This savings glut story may have some intellectual appeal. However, the most accurate explanation for the global imbalances, particularly from the perspectives of East Asia, is insufficient investment, rather than excess saving by East Asian economies. While the high saving rates in East Asia, particularly in China, have contributed to the global imbalances, the recent surge of surpluses in East Asia is largely a result of the

reduction in investment demand. As explained in the earlier section, much of the increase in current account surpluses over the post-crisis period is explained by a sharp reduction in domestic investment demand in East Asia. In contrast, domestic saving as a proportion of GDP has remained largely unchanged in most East Asian economies. The flows of global savings into the U.S. financial markets may not continue when foreign investors begin to worry about the sustainability of the U.S. deficits and the prospects of capital losses due to dollar depreciation. The adjustment will most likely occur when the U.S. Federal Reserve Board does not continue to raise interest rates.

Another view, as argued by Dooley, Folkerts-Landau and Garber (2003), is that East Asia's pursuit of 'export-led growth' strategy is most responsible for continuous current account imbalances. In their view, U.S. current account deficits have persisted because East Asia is willing to finance these deficits by accumulating an unlimited amount of dollar reserve assets in order to keep exchange rates undervalued.

Dooley et al. named the current situation as a 'revived Bretton Woods system', where East Asian countries are pegged to the center's currency, the US dollar, as the European countries did under the Bretton Woods system. The periphery countries hoard their export earnings in low-yielding US Treasuries and other dollar denominated assets in order to maintain exchange rates stable vis-à-vis the US dollar.

East Asia's craving for dollar assets must have assisted the persisting U.S. current account imbalance, or more importantly affected the price at which these imbalances are sustainable. However, it is incorrect to argue that a conscious strategy of undervaluation by East Asian countries is the principle cause of growing global imbalances. Many East Asian countries run large current account deficits in the course of

promoting exports prior to the crisis. The accumulation of reserves in East Asia after the crisis can be attributed to precautionary motives rather than mercantilist motives (Aizenman and Lee, 2005).

Cooper (2005) claims that the US current account deficit is not only sustainable but also a natural feature of today's technology and globalization[9]. The United States creates substantial investment in education and R&D, which has a high future payoff. The foreign capital inflows that finance the U.S. deficits have been attracted by higher returns on investment due to higher productivity in the U.S than in other regions including Europe and Japan. The U.S. financial assets are more secure and less volatile than those in many emerging markets. Hence, as long as foreigners continue to desire accumulation of US dollar assets, the US current account is sustainable.

An objection to this view is that the productivity differential between the U.S. and other regions, such as Europe, does not appear to be sufficiently large to result in a 6-percent-to-GDP swing in the U.S. account balance (Eichengreen 2006). Our results presented in the following section support the view that productivity growth differentials don't have a significant impact on the current account because both savings and investment are affected. Critics also note that in terms of financing the U.S. deficits, the official sector plays a more important role than the private sector.[10] The motivation of differential in investment returns cannot explain the foreign official sector's accumulation of U.S. financial assets in recent years.

[9] This is also the view of Corden (2006) although with some qualifications.

[10] In 2004, more than two-thirds of the external financing required for the U.S current account deficits came from the foreign official sector (Roubini and Setser, 2005). While purchases of U.S. assets by private investors are a major fraction- about 75 percent- of total foreign purchase of U.S. assets, the private purchases of U.S. assets by foreigners are largely offset by private purchases of foreign assets by Americans.

IV. How to Adjust to the Imbalances

The growing current account imbalances call for adjustment from East Asian economies as well as adjustment in the United States. The accumulation of current account surplus *per se* should not be a primary policy objective. The continuing imbalances and massive reserve accumulation has created serious problems for East Asian economies. The appreciation of real exchange rates has discouraged investment in the non-tradable sector, such as the service industry, which in turn results in unbalanced economic growth. The continuing accumulation of foreign assets has not always been successfully sterilized. A subsequent increase in the supply of money has resulted in inflation of goods and services, as well as real and financial assets. While price increases have so far been modest in East Asia, it is inevitable that amassed current account surpluses and net capital inflows will increase the inflation rate. Recent data for China suggests a significant acceleration in inflation, jumping from 1.3 percent per annum in 2003 to 3.9 percent in 2004.

One policy that might be adopted to adjust the global imbalances is the appreciation of East Asian currencies. Various government officials, as well as a number of economists in the U.S. argue that East Asian economies should abandon the strategy of exchange rate undervaluation and increase exchange rate flexibility in order to share the burden of global readjustments. An important issue is the extent to which an appreciation of East Asian currencies can assist in adjustment of the global current account imbalance. The impact depends considerably on the source of the currency appreciation— whether it is effectively a currency adjustment, a change in monetary policy, or whether it is brought

about through other policy changes. What matters for a sustained impact on the current account balance is a permanent change in real exchange rates. It is unclear whether a moderate adjustment of real exchange rates can assist in repairing global current account imbalances. Many analysts argue that a revaluation of East Asian currencies across the board on the order of, for example, an average of five to ten percent, will not bring about a sizable reduction in East Asia's aggregate current account surpluses (Lee, McKibbin and Park, 2006).

A region-wide currency adjustment would be difficult because there is no coordination of exchange policies among East Asian countries (Lee, McKibbin and Park, 2006). There is a collective action problem regarding this issue because many East Asian countries are less inclined to allow their currencies to appreciate unless others, particularly China and Japan, also appreciate. An independent revaluation by individual East Asian countries leads to a loss of relative currency competitiveness. The exchange rate adjustment is not a feasible or effective way to adjust global imbalances. Nevertheless, increasing exchange rate flexibility is desirable, as it assists in speeding up the adjustment to the changes in macroeconomic policies that would be called for to fix the imbalances.

East Asian economies need to increase their investment; this will assist in fixing current account imbalances as well as raise output growth rates.[11] This issue is examined further at the end of this section. Results presented in Lee, McKibbin and Park (2006)

[11] An alternative policy that East Asia, especially China, can adopt to reduce current account surpluses, is the lowering of saving rate. Chinese government may decrease public saving by raising spending on education, health care, social welfare and housing. The increased social security can in turn help to reduce private saving. Rapid population aging and financial market development will also make private saving decline in China as well as other East Asian economies. However, this adjustment would take place over a long time. See the discussions in Eichegreen and Park (2006).

and updated below imply that investment recovery in East Asia can lead to a substantial reduction of current account surpluses. The issue is whether Asian governments need to adopt active macroeconomic policies to stimulate private investment. It can be argued that a major part of investment reduction after the financial crisis is a necessary adjustment to reduce excessive investment prior to the financial crisis. Consequently, when the adjustment is fulfilled, investment raises to an optimum level. However, the large decline and the lingering depression of East Asian investment after the crisis appear to indicate that the investment rates have dropped below the optimal level. IMF(2005) estimates that the current levels of investment in the majority of East Asian economies are below their long-run steady-state levels. The low level of investment despite the continuous uprising of corporate saving is not an optimal situation for East Asian economies.

It is not clear how investment in East Asia will regain its pre crisis levels in the immediate future. As discussed earlier, stock market valuations have not rebounded to their peaked levels in East Asia, indicating that the increase in financial risks and decline in rates of return to investment have a prevailing effect. The recent surges in stock market prices may forestall further recovery in investment rates; however, it is too early to judge whether it is a permanent change.

Expansionary monetary policies, if East Asian central banks were capable of maintaining these policies, would assist in revival of private investment demand. However, with increasing inflation pressures due to the rise in commodity prices, capital inflows and real assets bubbles, and the upward movements in U.S. interest rates, many East Asian governments have little room to implement expansionary monetary policy and

thereby stimulate private spending. Average nominal and real interest rates have already fallen and are currently at substantially low levels (Table 4). Furthermore, combined with the increase in U.S. interest rates, lowering domestic interest rates in East Asia will result in exchange rate depreciation, which can further contribute to the widening of current account imbalances.

Unable to expand private investment demand by monetary policy, East Asian governments can consider an increase in public investment as another means. Fiscal expansion results in appreciation of real exchange rates and therefore assists in reducing current account surpluses.[12] Moreover, expansion of public investment, particularly infrastructure investment, can contribute to robust economic growth. Recently, the continuing decline of the ratio of public investment to GDP has raised some concerns in developing East Asian economies. It is claimed that East Asia faces a considerable infrastructure gap as investment in infrastructure has lagged in recent years (IMF, 2005). An increase in high-quality infrastructure investment would help raise long-term growth as well as repair current account imbalances. However, the increase in public resources is often allocated to inefficient sectors. Prior to raising public infrastructure investment, strengthening institutional capacity and transparency is necessary in ensuring adequate economic and social rates of return to public investment. Identifying and eliminating inefficiencies in fiscal expenditures such as wasteful investment projects, badly targeted transfer and subsidy programs, and extravagant civil service payrolls must be undertaken.

[12] The effects of fiscal expansion may not be as large as expected if it crowds out private demand. The simulation in Lee, McKibbin, and Park (2006) shows that the effects of fiscal expansion on domestic demand and external balances become smaller as crowding-out effects mitigate them. A permanent expansion of fiscal deficit by 2 percent of GDP in East Asia except Japan is estimated to have small effects on current account balances, ranging from no change to a decrease of one percent of GDP in five years following the shock.

It is a practical question whether the majority of East Asian economies which have traditionally valued fiscal prudence highly, can implement lax fiscal policy. The public debt to GDP ratios have increased steadily since the financial crisis (Table 5). As the IMF (2005) argues, few East Asian economies are currently in the position of contemplating fiscal expansion.

Some countries are increasingly resorting to public-private-partnerships (PPPs) to finance infrastructure demand in times of limited public resources. In infusing private capital and management, PPPs can deliver higher-quality and lower-cost public infrastructure than the government (Hemming 2006). However, resorting to government guarantees to secure private sector involvement also entails an increase in potential fiscal costs and risks.

In order to revive the levels of investment as well as improve the efficiency of investment, the macroeconomic adjustment must go along with structural reform polices. It is uncertain whether expansionary macroeconomic polices can raise investment rates to optimal levels. Furthermore, the stimulus of investment does not guarantee efficient allocation of investment funds. After the crisis, observed structural problems in the corporate and financial sectors in East Asian economies have increased the investors' perceived risk sharply, resulting in a significant decline in domestic investment. During the crisis and subsequent recovery process, East Asian economies have accomplished a great deal in improving the soundness and profitability of financial institutions and alleviating corporate distress. However, the significant parts of the structural problems still remain in these economies, impeding the recovery of investment as well as the efficient allocation of investment. The unhealthy connections among large firms,

financial institutions and the government that undermined the allocation of capital and weakened financial systems have not been completely resolved. For many East Asian economies, financial institutions still remain under the heavy influence of the government. Whether real practices in corporate governance and financial management and supervision have improved is still questionable. Underdevelopment of equity and bond markets renders substantial barriers in the efficient allocation of long-term investment funds in the region. More structural reforms will assist in diminishing corporate and financial risk and improve the rate of return on investment, thereby encouraging domestic investment.

In many East Asian countries, the lower productivity growth of nontradable sectors, such as service industries relative to the manufacturing sector has also raised concerns (Lee, 2005). Reforms targeting stagnant service industries can assist in improving the productivity growth of the overall economy, and can also contribute to lowering trade surpluses.

Some advanced East Asian economies such as Hong Kong, Korea and Singapore need to focus on investment for technology development and human resource improvement, rather than physical capital accumulation. The importance of physical capital investment tends to decrease as the economy shifts from accumulation-driven growth to technology-driven growth.

According to the prediction of "convergence," it is likely that East Asian economies experienced slower factor accumulation than they had in previous decades.
Facing a diminished chance for rapid "catching up" through high rates of factor accumulation, the greatest challenge for the East Asian economies is to expedite its

productivity growth.[13] Efforts to increase technology investment and to enhance the quality of human resources are crucial for productivity improvement. In this regard, fiscal expansion focusing on R&D and human capital investment will be more helpful in initiating sustained growth, in addition to reducing the current account imbalances. The available data reveals that many East Asian economies spend a substantial percentage of total GDP as R&D, education and health expenditure (Tables 4 and 5). However, in terms of the absolute amount or per capita expenditure, investments are far smaller than those of more advanced economies. For instance, Korea spent 2.6 percent of GDP in the R&D sector (both private and public sources) in 2003. This figure is comparable to that of advanced countries, but in terms of its absolute amount, Korea's 24.3 billion dollars is still far lower than that of Germany (57.5 billion) or the United States (292.4 billion).

In the remainder of this section we explore the sensitivity of current account balances and GDP growth to four possible scenarios based on simulations with a global general equilibrium model.[14] The first is a fall in equity risk premiums in Asia to levels consistent with investment rates found before the Asian crisis. The second is a boost to productivity growth in Asia of 1% per year for a decade. This could be interpreted as due to economic reforms in East Asia. The third is a fiscal consolidation in the United States sufficient to turn around the US fiscal position by 5.25% of GDP over 3 years. The final event is a sharp fall in the housing market in the United States due to the bursting of a housing bubble – modeled as a decline in the expected return to housing of 1% per year for a decade.

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[13] See Lee (2005) for the detailed assessment of productivity growth performance and prospects for the South Korean economy.

[14] Our experiments are based on the Asia-Pacific G-cubed Model (see McKibbin and Wilcoxen, 1998 and Lee, McKibbin, and Park, 2006).

Results are presented in Tables 6 through 9 for the change in the current account (as a percent of GDP); the change in investment (as a percent of GDP) and the change in GDP. All variables are expressed relative to the baseline outcome without the shock imposed.

a) Fall in Equity Risk Premium

The fall in the equity risk premium is calculated to approximately generate a rise in investment similar in magnitude to the average fall in investment as a share of GDP since 1996. The changes in the equity risk premia by country are: 2.5% for Indonesia, Malaysia and Thailand; 1.5% for Korea and 1.2% for Singapore; and 1% for Philippines and Taiwan.

Results are presented in Table 6 for each country of interest. The fall in the equity risk premium in Asian economies makes investment more attractive. This causes a rise in investment and a flow of capital from non Asian economies into Asia in response. This reallocation of global capital causes a worsening on the current accounts in Asia and an improvement in the current accounts outside Asia. In the United States after 10 years the current account has improved by 0.3 percent of GDP. Note however that the capital inflows into Asia are sourced globally and although the current accounts of Asian economies deteriorate significantly, this is supplied by all countries and not just the United States. Thus the impact on the US current account deficit is proportionately much lower than the impact on the Asian economies, even adjusting for relative country size. The reallocation of global capital is also reflected in the investment changes in non-Asian economies. Part of the capital is from investment in the rest of the world and part

from increased saving in the rest of the world. This is also reflected in the outcomes for GDP outside Asia.

b) Rise in Asian Productivity

The rise in Asian Productivity is modeled as a rise in the growth rate of labor augmenting technical change of 1% per year for 10 years in each of the Asian economies in the model. In many ways this rise in actual and expected productivity growth is similar to the fall in the equity risk premium. Capital flows into the Asian economies in anticipation of higher returns. Households within the Asia economies faced higher expected future incomes which would tend to raise consumption at the expense of savings but also they face higher returns to saving which would tend to raise saving. Households in the model also face inertia in adjusting consumption to expected higher incomes and so initially private saving rises with higher economic growth - as is observed empirically. However the investment rise dominates in the effect on the current account and much of the new investment comes from foreign economies. Part of this is from foreign savings and part from a relocation of foreign investment into the Asian economies. After 5 years, the current accounts of non-Asian economies tend to improve whereas the inflow of capital into the Asian economies worsens the current accounts of Asia. The effect on GDP globally is positive. The fall in foreign GDP reflects the reallocation of global capital towards Asia where returns are higher. Note that the scale of this effect is smaller for the positive productivity shock than the risk shock in Asia because the rest of the world gains income from the higher productivity and thus a

positive productivity shock has a stronger positive impact on the global economy relative to a fall in equity risk.

c) US Fiscal Consolidation

The policy change is assumed to be a reduction in the fiscal deficit of the United States of approximately 5.25 of GDP comprising a fall in government spending on goods and services of 2 percent of GDP, a fall in government spending on labor of 2 percent of GDP and a rise in household taxes sufficient to generate the change in the fiscal deficit of 5.25 percent of GDP. The policy is assumed to be phased in over three years with the adjustment of one third in year one, two thirds in year two and completed by year three.

Results are presented in Table 8. The reduction in fiscal spending and increase in taxes tend to reduce GDP through traditional Keynesian channels. US GDP is 0.74% below base in the first year and 2.1% below base by year 5. By year 10 US GDP is above baseline. The freeing up of resources by the federal government eventually is allocated by the private sectors, generating an increase in GDP relative to baseline forever. The growth rate of GDP eventually returns to baseline because the long run growth rate is determined by productivity and population growth which is unchanged in the simulation. The fiscal adjustment in the United States reduces long term real interest rates and frees up capital to go into global capital stock accumulation. The transmission to the rest of the world is positive since the effects on financial markets through lower long term real interest rates dominates the negative Keynesian spillover on demand for imports from the rest of the world. The fiscal contraction causes capital to flow out of the US which depreciates the US dollar and makes US exports more competitive, improving the US

current account by 1.5% of GDP in the first year and 2.4% by year 5.[15] The current accounts of the rest of the world go into deficit as this capital is reallocated.

d) Bursting of the US Housing Bubble

Modeling the bursting of a housing bubble is difficult. In the model, part of household consumption is generated by a stock of household capital (which is actually housing as well as white goods and automobiles) that households invest in each year in order to generate a flow of housing services over time. To capture the idea of a housing bubble bursting we model the shock as a fall in the expected productivity of the investments that are made into the stock of household capital of 1 % per year for 10 years.

Results are presented in Table 9. The fall in the expected return to housing generates a reallocation of capital within the United States away from housing into other assets such as government bonds and equities. However the fall in wealth from the sharp fall in the value of housing causes consumption to drop sharply and results in an economic slowdown with GDP 4.1% below baseline. This recession causes much of the asset reallocation to go offshore rather than staying within US assets because returns to all asset classes within the United States are negatively affected. Thus capital flows out of the United States into other economies. This capital outflow is reflected in an improvement in the US current account of 1.2% of GDP in the first year and 1.6% of GDP by the fifth year. The current accounts of the rest of the world worsen as a result. The reallocation of capital out of US housing into other countries raises the investment rate globally except the United States since the economic slowdown caused by the

[15] This current account multiplier of roughly 0.4% of GDP change in the current account deficit for a 1% change in the US fiscal deficit has been a feature of the MSG3/G-Cubed models for decades.

consumption contraction of 10% relative to baseline causes the return to capital in the US to be temporarily reduced. There are thus two effects in the rest of the world. A negative shock from the contraction of the US economy and a positive effect from the reallocation of a significant amount of capital pulled out of the US housing market. To the extent that countries rely on the US market for demand the shock tends to be negatively transmitted. Thus Singapore, Philippines and Hong Kong experience a slight decline in GDP relative to baseline in the initial year.

VI. Concluding Remarks

This paper demonstrates that since the 1997~98 financial crisis, there have been permanent depressions of domestic investment and output growth in many East Asian economies, mainly resulting from the increased financial risk and decreased rate of return on investment. The investment declines in East Asia outside of China, combined with the reduction in private and public saving in the United States, have led to a recent surge of global current account imbalances.

East Asia should adopt public policies in order to raise investment rates, which remain below what is likely to be the optimal levels. The revival of private investment will assist in diminishing the global imbalances, and moreover contribute to robust economic growth for the next decades. Continuous structural reforms in the corporate and financial sectors will help to reduce risk and improve rates of return on private investment**.** Expansion of public infrastructure investment is called for in most developing Asian economies. However, for maturing industrialized economies, an increase in R&D and human capital investment, rather than physical capital investment,

must be crucial for sustained growth. In China, an increase in public spending on education, health care, social welfare and housing would be helpful to reduce national saving, and thereby diminish current account surplus.

It is unclear that despite all the efforts of East Asia's expansionary adjustment, a reduction in East Asia's surplus will necessarily lead to a significant reduction in the US current account deficit. The effects of the East Asia's expansionary policies on the US current accounts are relatively minor in terms of the U.S. GDP, because the size of the expanding countries is small relative to the United States.

The saving and investment imbalances both in East Asia and the United States have resulted in global imbalances. Therefore, in correcting global imbalances, a concerted effort by both sides is required. The increase in saving rates is more effective for reducing the U.S. current account deficit. A U.S. fiscal contraction will have a much larger impact on the U.S. current account deficit than the investment increase in East Asia or strong productivity related growth in East Asia. Also a fiscal adjustment in the United States is preferable to an adjustment to household saving that might, for example, be induced by a sharp correction in the US housing market.

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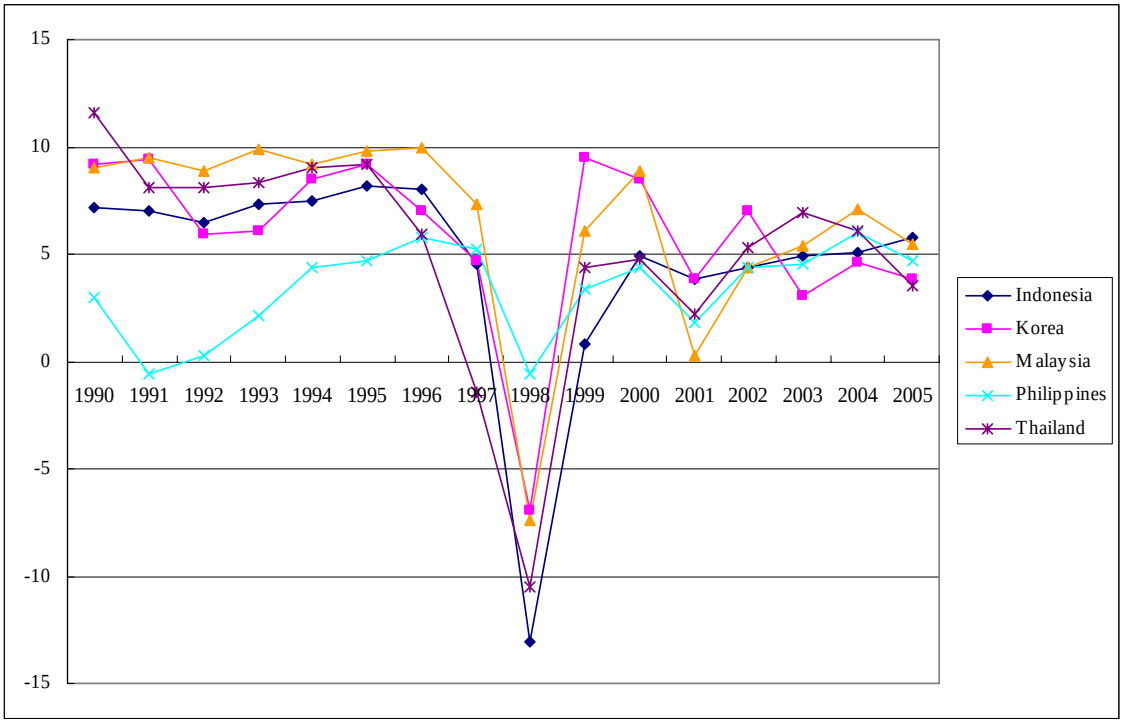
Figure 1. Growth Rate of GDP in East Asia, 1990-2005

A.



B.

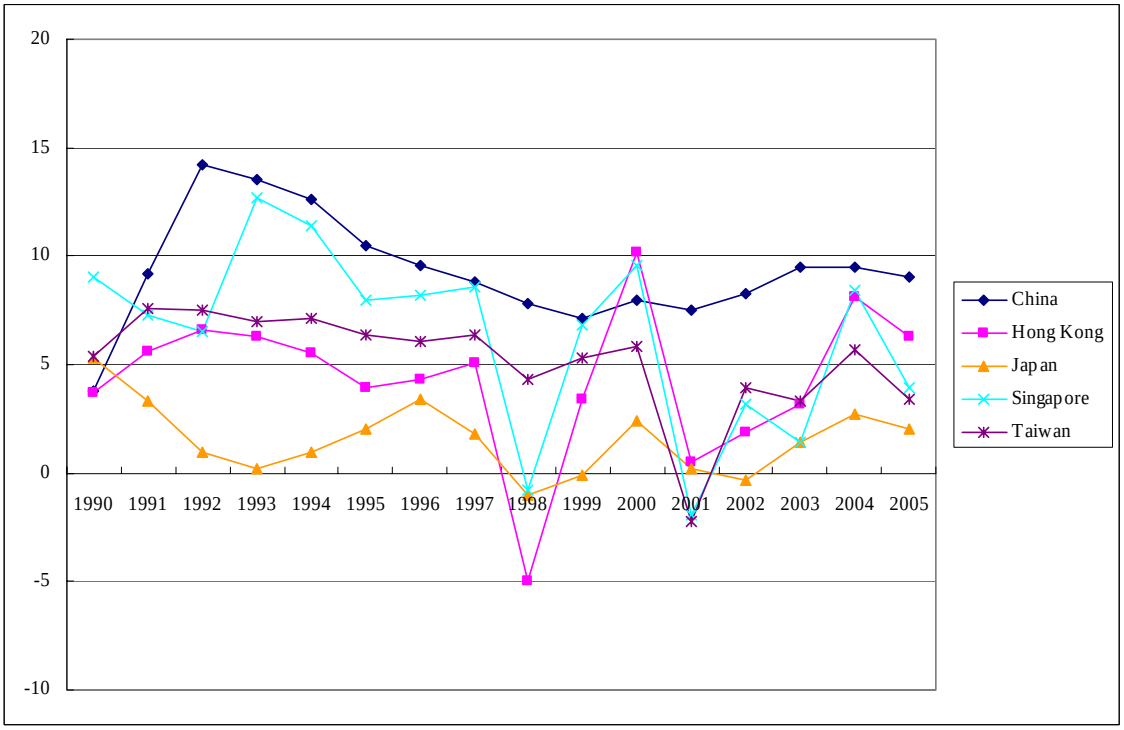
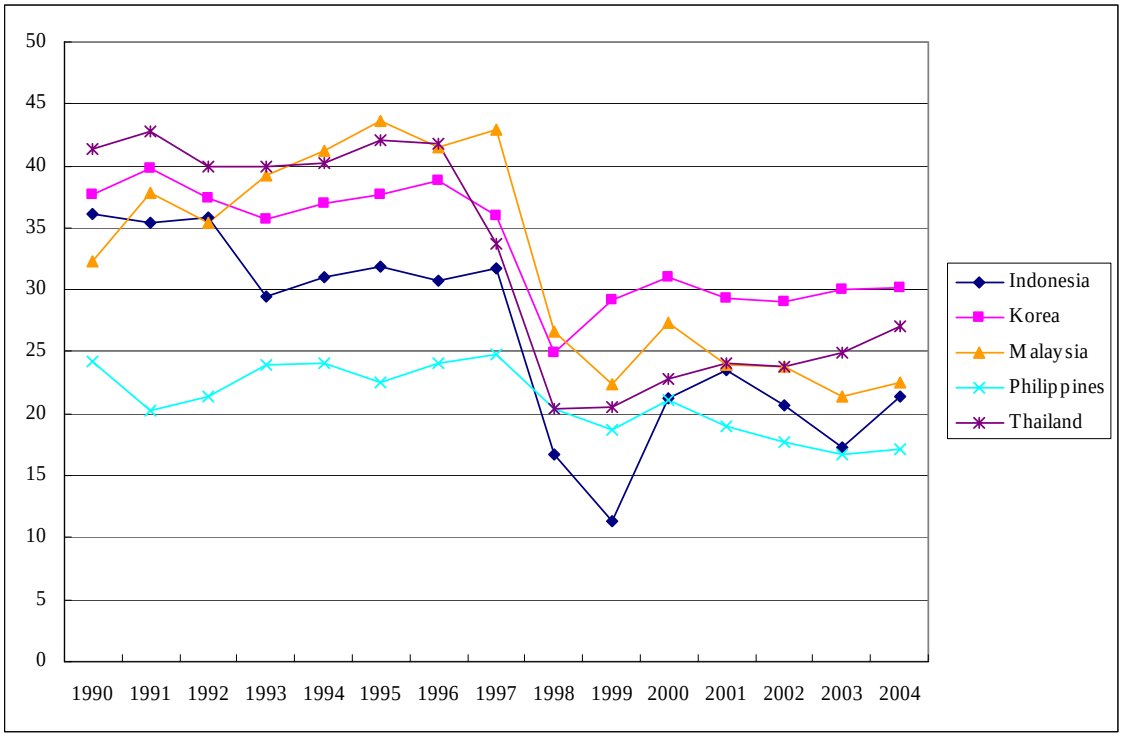


Figure 2. Investment Ratios in East Asia (as a percentage of GDP), 1990-2005

A.



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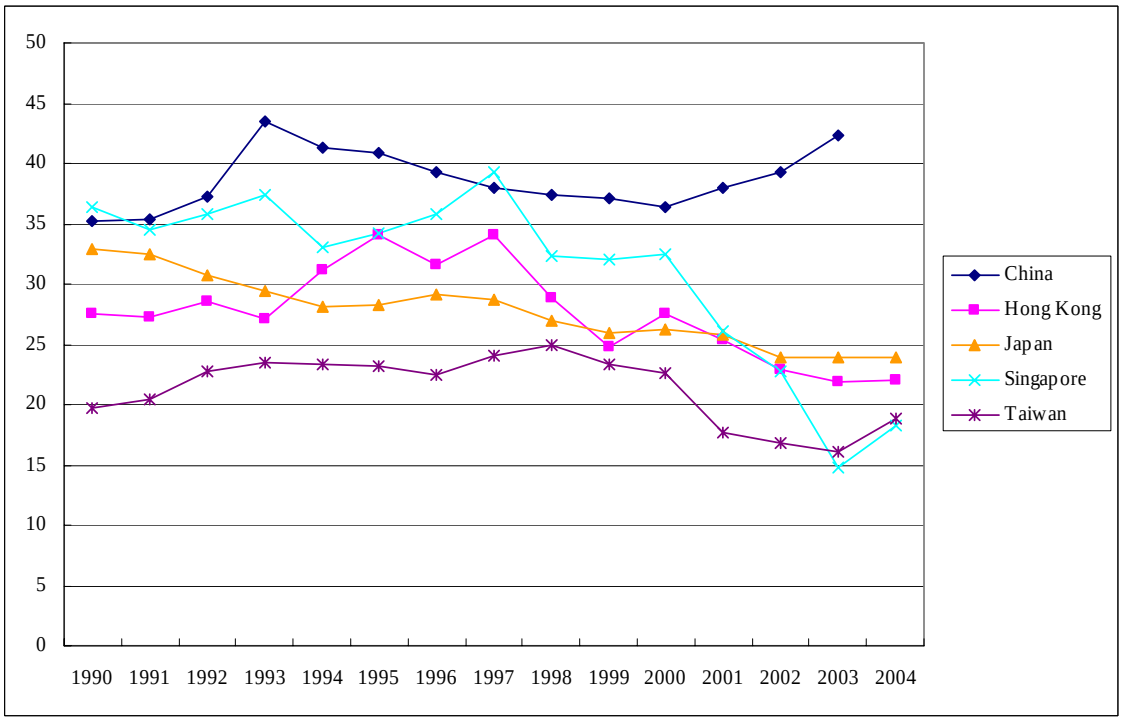


Figure 3. Real Stock Price Index in East Asia, 1990-2005

A.

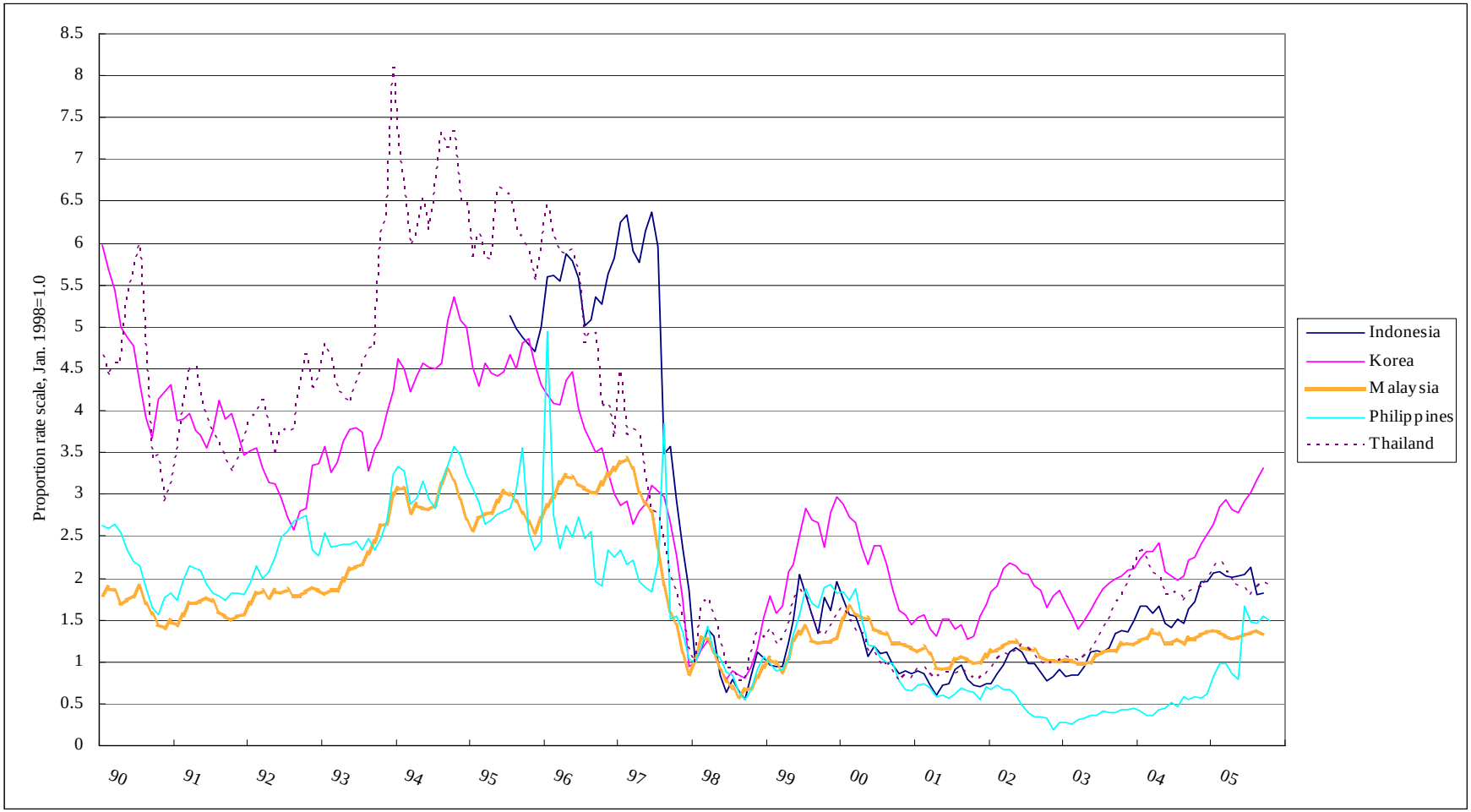


Figure 3. B Continued.

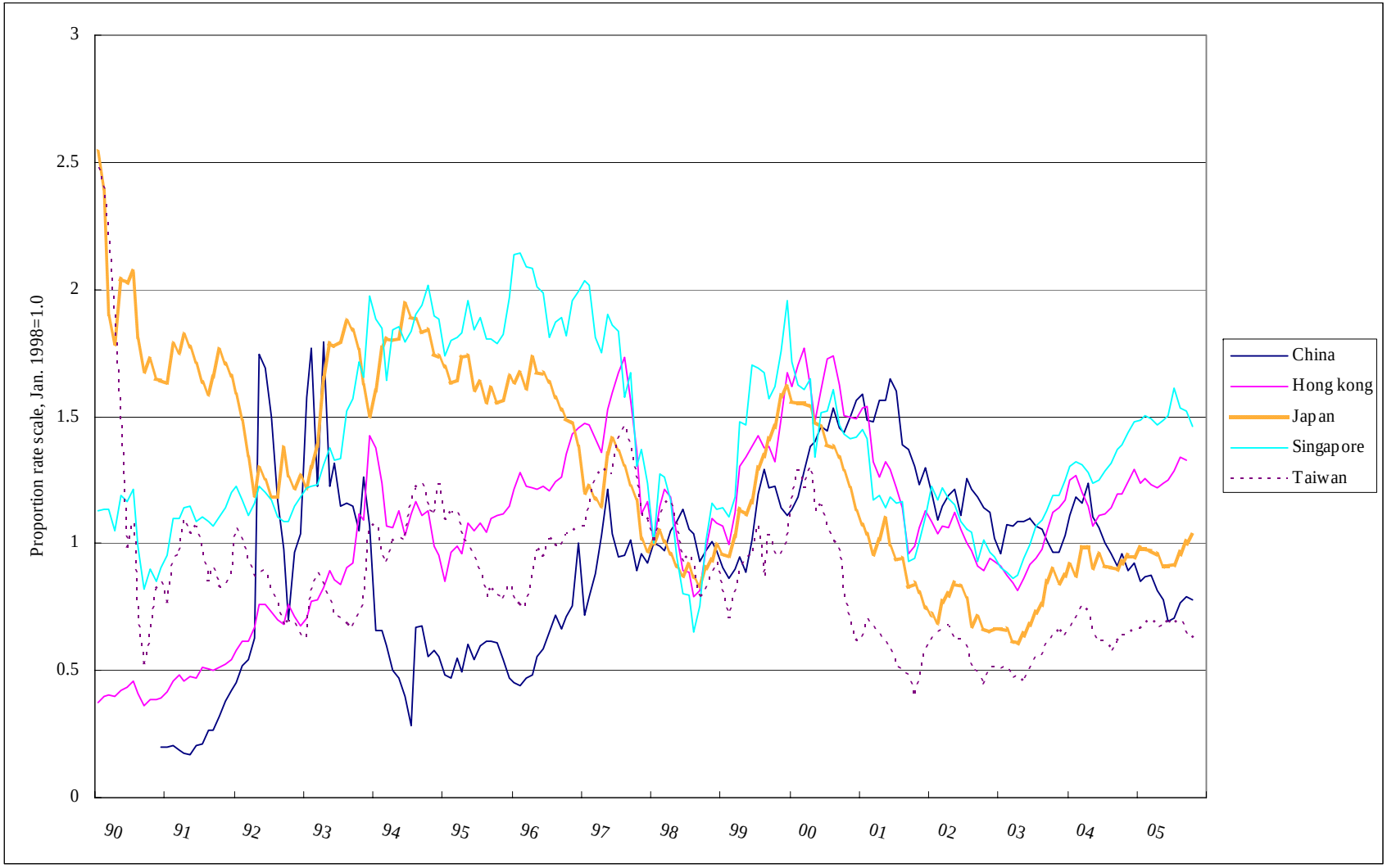


Figure 4. Current Account Ratios in East Asia (as a percentage of GDP), 1990-2005

A.

B.

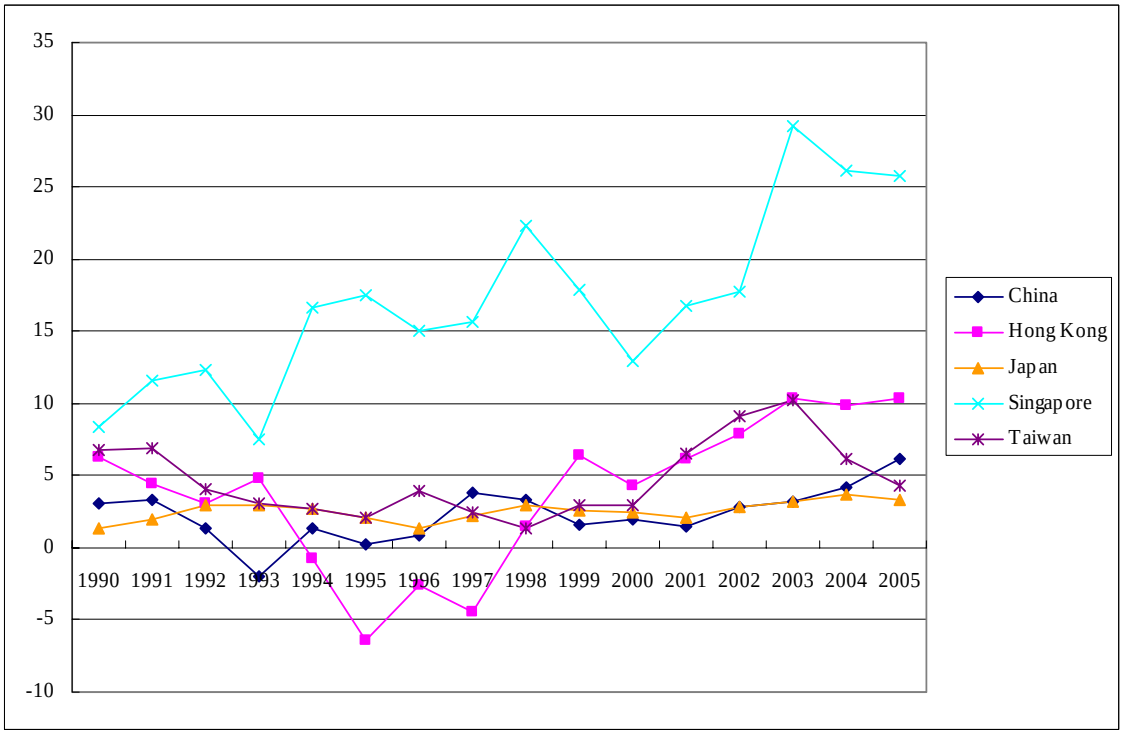
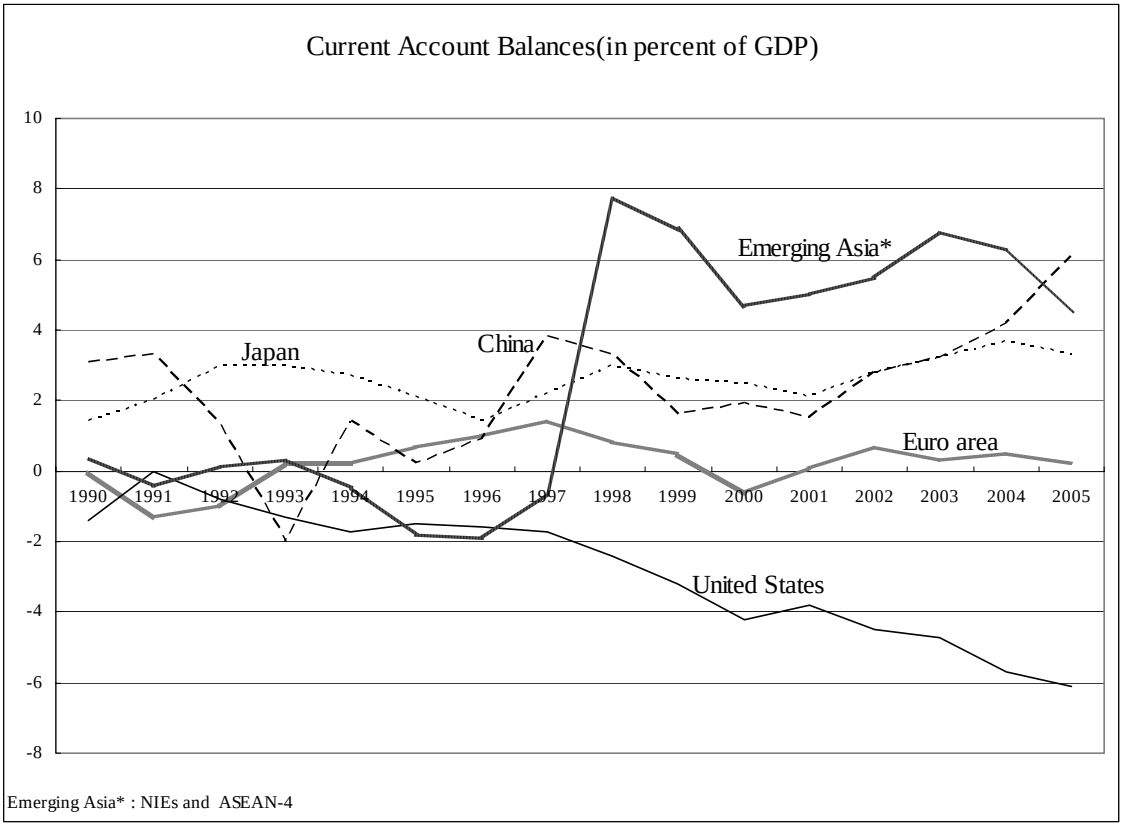


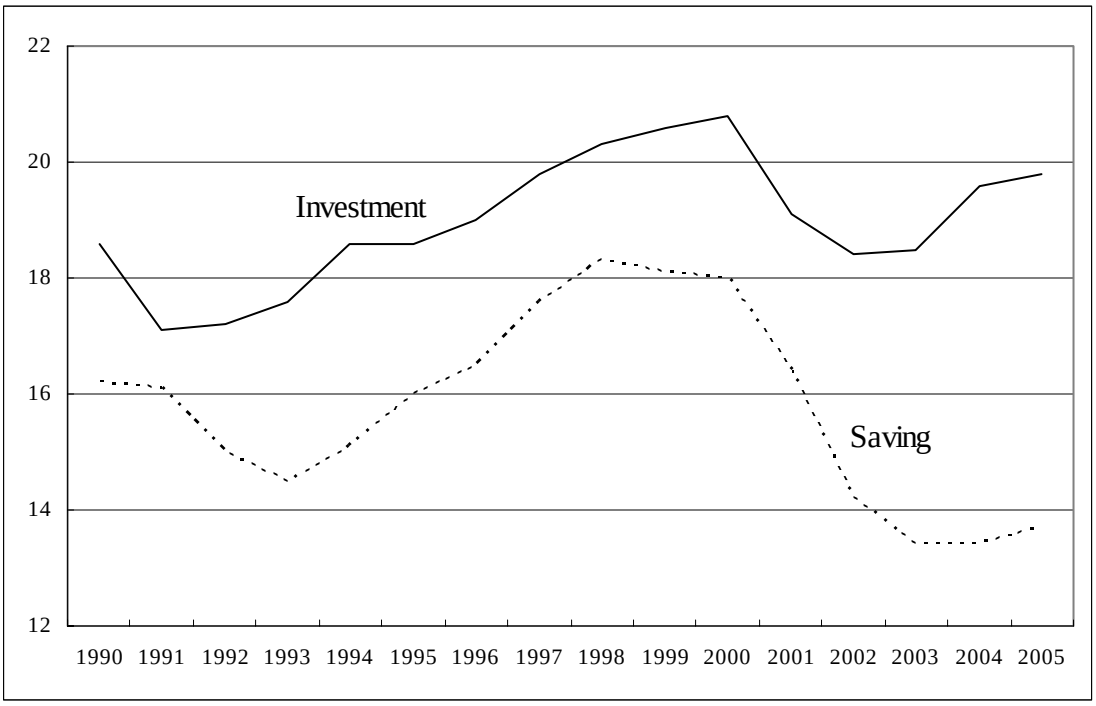
Figure 5. Changes in Global Current Account Balances, 1990-2005



Source: International Monetary Fund, World Economic Outlook Database, September 2005.

Figure 6. Saving and Investment in the United States (as a percentage of GDP) , 1990-2005

A.



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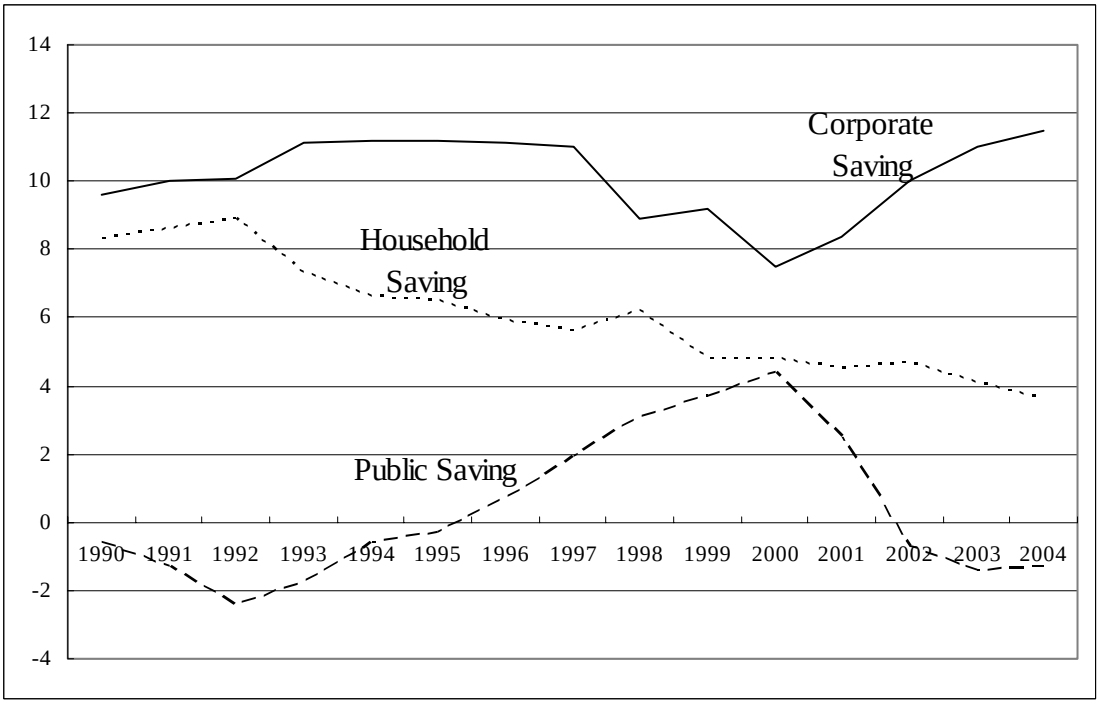
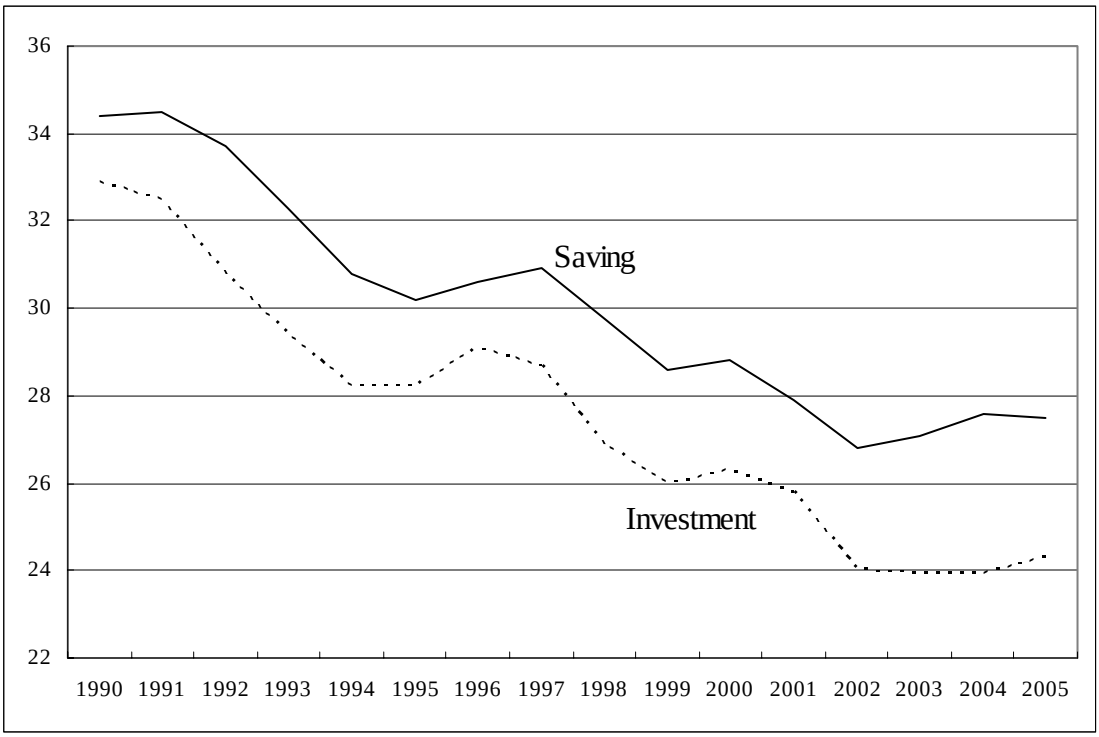


Source: International Monetary Fund, World Economic Outlook Database, September 2005.

Figure 7. Saving and Investment in Japan (as a percentage of GDP) , 1990-2005

A.



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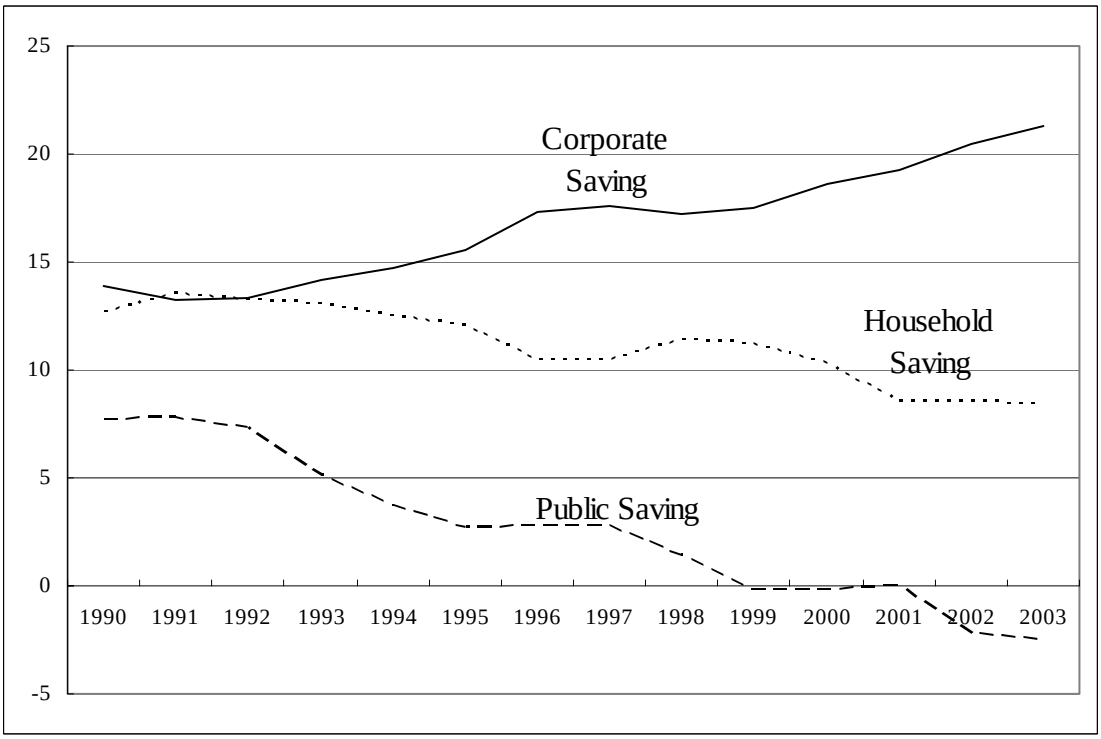
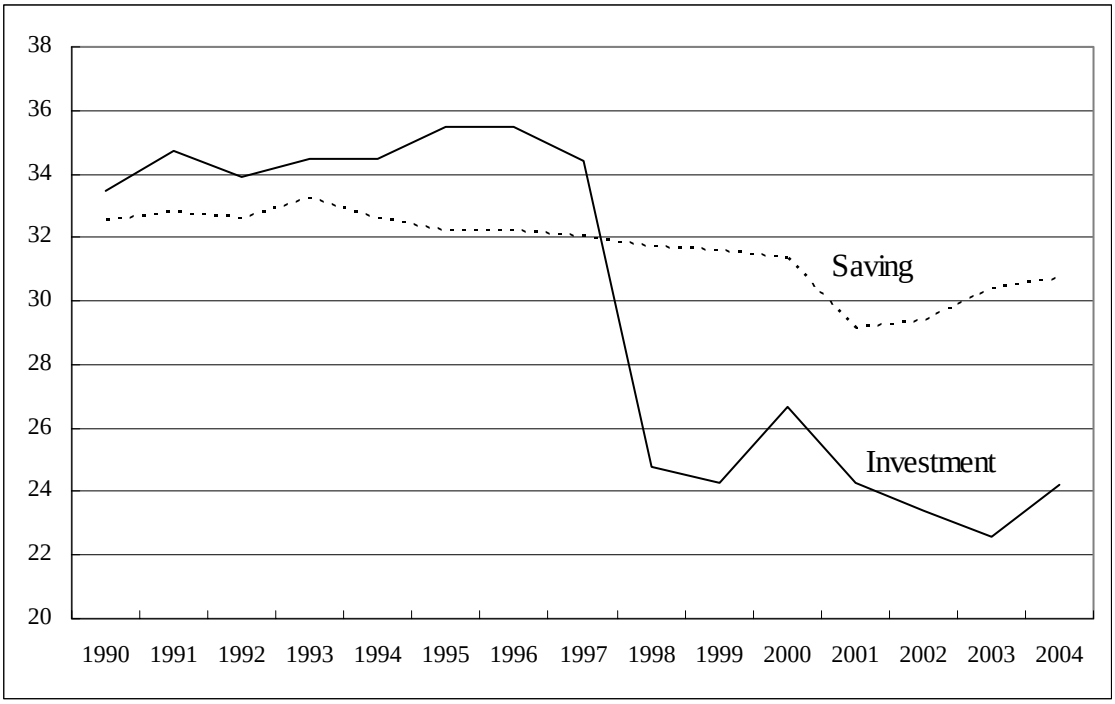


Source: International Monetary Fund, World Economic Outlook Database, September 2005.

Figure 8. Saving and Investment in Emerging Asia(NIEs and ASEAN-4) (as a percentage of GDP) , 1990-2004

A.



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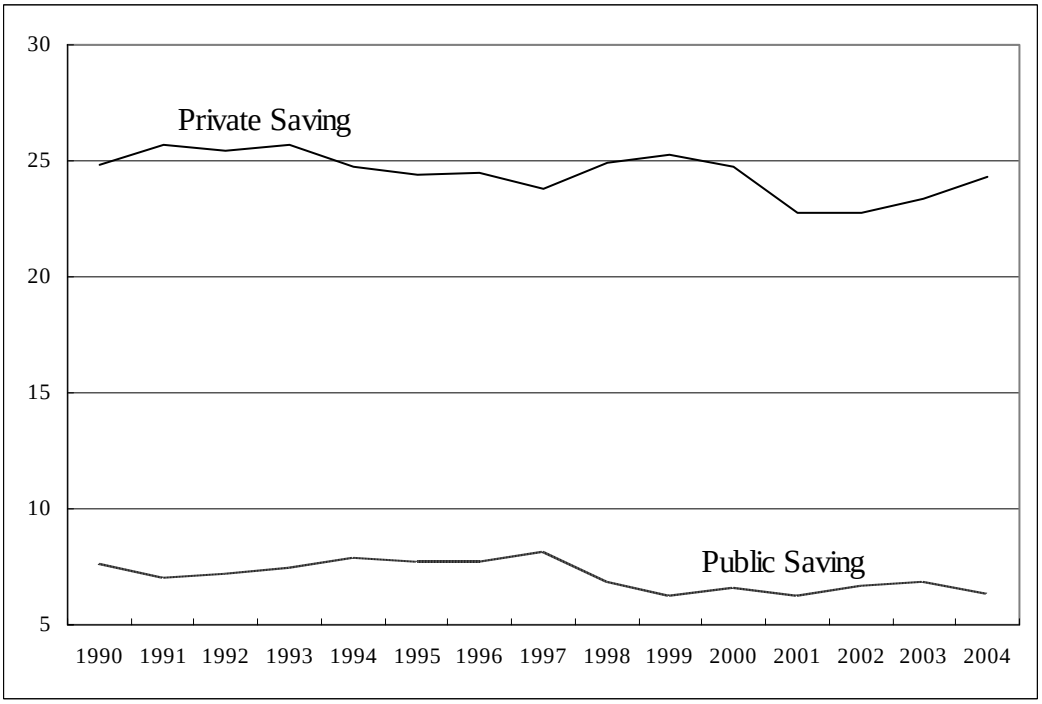
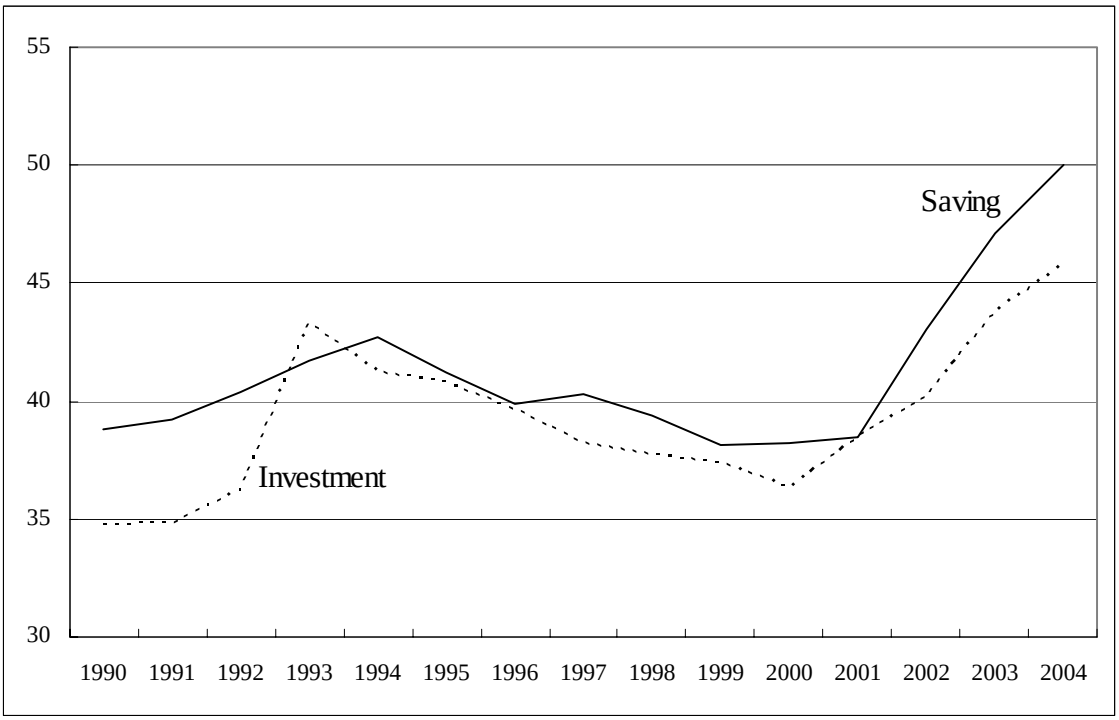


Source: International Monetary Fund, World Economic Outlook Database, September 2005.

Figure 9. Saving and Investment in China (as a percentage of GDP), 1990-2004

A.



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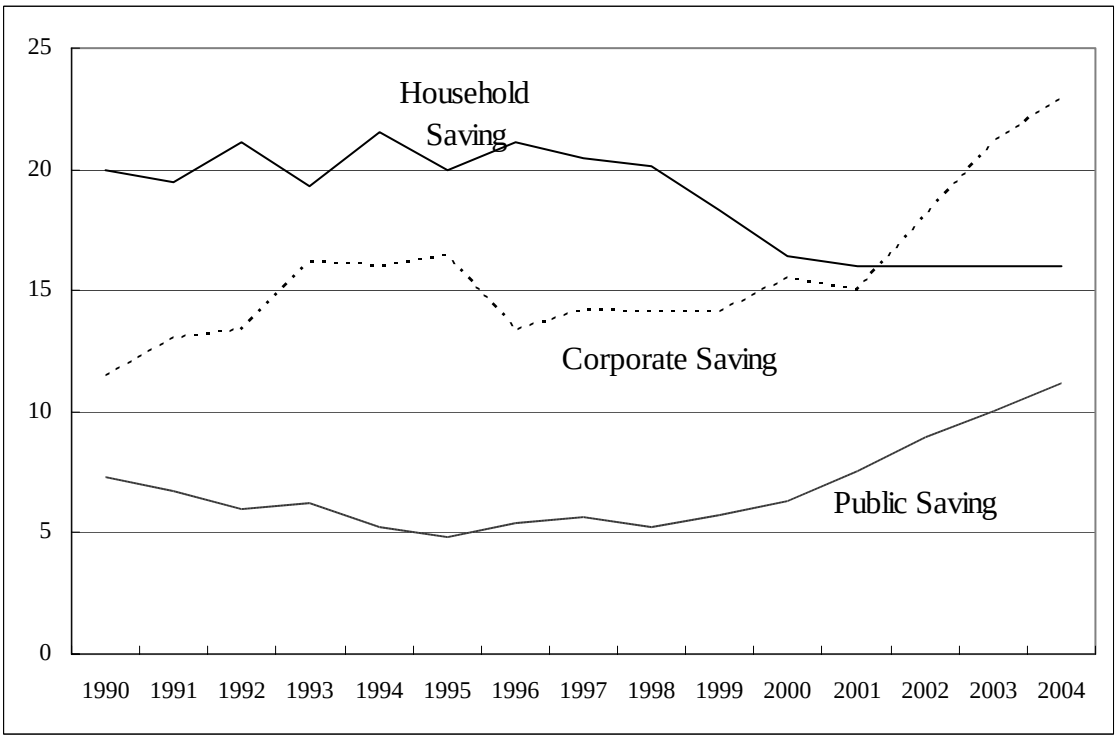

Source: International Monetary Fund, World Economic Outlook Database, September 2005.

Table 1. Bilateral trade of U.S. with East Asian Countries, 2004

(Millions of US$)

Country	U.S. Export to	U.S. Import from	Balance
Japan	54,243.1	129,805.2	-75,562.1
Hong Kong	15,827.4	9,313.9	6,513.5
Korea, South	8,955.2	14,650.6	-5,695.4
Singapore	19,608.5	15,370.4	4,238.1
Taiwan	21,744.4	34,623.6	-12,879.2
Indonesia	2,671.4	10,810.5	-8,139.1
Malaysia	10,921.2	28,178.9	-17,257.6
Philippines	7,087.0	9,136.7	-2,049.7
Thailand	6,368.4	17,578.9	-11,210.5
China	34,744.1	19,6682.0	-161,938.0
Total	182,170.7	466,150.7	-283,980.0

Source : U.S. Census Bureau

Table 2. Real Interest rates in East Asian Economies

	1996	1997	1998	1999	2000	2001	2002	2003	2004
China[1]	0.7	5.8	5.4	4.6	2.8	2.5	3.5	1.5	-0.6
Hong Kong	-1.2	-1.3	2.6	9.8	10.8	4.3	4.5	2.7	0.5
Indonesia	7.1	21.6	4.8	2.9	6.5	3.5	1.7	1.0	-0.7
Japan	0.2	-1.2	-0.2	0.4	1.0	0.8	1.0	0.2	0.00
Korea	7.5	8.8	7.5	4.2	2.9	0.6	1.4	0.5	0.05
Malaysia	3.4	4.9	3.2	0.7	1.2	1.4	0.9	1.6	1.3
Philippines	4.9	10.3	4.2	3.7	6.5	3.0	4.1	3.5	1.0
Singapore	1.5	2.4	5.3	2	1.3	1.0	1.4	0.2	-0.7
Taiwan[2]	2.9	4.8	4.4	4.5	3.4	3.6	2.2	1.6	-0.4
Thailand	3.3	9.0	4.9	1.5	0.3	0.3	1.2	-0.5	-1.5

Source: IMF, WEO and IFS database; and ADB key indicator 2005 for Taiwan data.
Money market rate is used as short-term nominal interest-rate and real interest rate is based on contemporaneous inflation.
1. Discount Rate which the central banks lend or discount eligible paper for deposit money banks is used instead of money market rate.
2. 6months interest rate.

Table 3. Selected Fiscal Indicators in East Asian Economies

	General government gross debt in percent of GDP										General government balance in percent of GDP									
	1996	1997	1998	1999	2000	2001	2002	2003	2004 Est.	2005 Proj.	1996	1997	1998	1999	2000	2001	2002	2003	2004 Est.	2005 Proj.
China	7.1	8.4	11.0	14.5	16.9	18.7	20.6	21.3	20	19.1	-1.6	-1.9	-3.0	-4.0	-3.6	-3.1	-3.3	-2.8	-1.7	-1.7
Hong Kong	--	--	--	--	--	--	--	--	--	--	2.1	6.5	-1.8	0.8	-0.6	-5.0	-4.9	-3.2	-0.8	-0.7
Indonesia[1]	23.5	72.3	65.9	82.9	91.3	78.2	69.2	60.2	57.9	53.3	1.1	-1.1	-2.2	-1.4	-3.4	-3.2	-1.5	-1.9	-1.4	-1.6
Japan	99.3	105.8	117.8	131.1	139.3	148.8	158.4	164.7	169.2	174.4	-5.1	-3.8	-5.5	-7.2	-7.5	-6.1	-7.9	-7.8	-7.2	-6.7
Korea[2]	8.2	11.7	22.7	28.9	29.2	33.8	32.4	32.6	33.6	32.9	0.0	-1.5	-3.9	-3	1.1	0.6	2.3	2.7	2.3	2.2
Malaysia	35.7	32.3	36.6	37.4	36.7	43.6	45.6	47.1	46	44.8	0.7	2.4	-1.8	-3.2	-5.7	-5.5	-5.6	-5.3	-4.3	-3.5
Philippines[3]	79.3	87.9	86.3	84.3	89.1	88.4	93.8	101.3	99.6	97.0	-0.3	-0.7	-2.7	-4.4	-4.6	-4.6	-5.6	-5	-4.2	-3.9
Singapore	--	--	--	--	--	--	--	--	--	--	9.3	9.2	3.6	4.6	7.9	4.8	4.0	5.8	5.2	4.5
Taiwan	13.0	12.5	15	20.5	24.4	31.5	35.1	37.6	39.6	41.5	-5.1	-3.8	-3.4	-6	-4.7	-6.7	-4.5	-2.9	-3.4	-3
Thailand[4]	3.8	5.1	10.7	20.8	23	24.8	31.3	28.5	28.6	26.2	2.3	-2.1	-2.2	-2.3	-2.0	-2.1	-2.3	0.4	0.3	0.5

Source: IMF, Asia and Pacific Department, *Regional Outlook 2005*, September 2005.
1. Central government only.
2. Consolidated central government debt including government guaranteed debt for financial sector restructuring.
3. Non-financial public sector debt.
4. Fiscal year ending September

Table 4. Education and Health Expenditures for Selected Economies in 2002

	Educational Expenditure		Educational Expenditure per Pupil[1)] (PPP US$)	Health Expenditure		Health Expenditure per capita (PPP US$)
	Public[2)] (as % of GDP)	Private[3)] (as % of GDP)		Public (as % of GDP)	Private (as % of GDP)	
China	--	--	--	2.0	3.8	261
Indonesia	1.2	0.6	262	1.2	2.0	110
Japan	3.5	1.2	7438	6.5	1.4	2133
Korea	4.2	2.9	5053	2.6	2.4	982
Malaysia	8.1	--	3239	2.0	1.8	349
Philippines	3.1	2.0	548	1.1	1.8	153
Singapore	-	-	-	1.3	3.0	1105
Thailand	4.6	2.2	--	3.1	1.3	321
France	5.7	0.4	7467	7.4	2.3	2736
Germany	4.4	0.9	7129	8.6	2.3	2817
United Kingdom	5.0	0.9	6691	6.4	1.3	2160
United States	5.3	1.9	11152	6.6	8.0	5274

Source: OECD, *Education at a Glance: OECD Indicators 2005* for education data, and UNDP, *Human Development Report 2005* for health data.
1) Total educational expenditures on educational institutions. In equivalent US dollars converted using PPPs for GDP based on full-time equivalents
2) Including public subsidies to households attributable for educational institutions and direct expenditure on educational institutions from international sources.
3) Net of public subsides attributable for educational institutions.

Table 5. R&D Expenditure and Researchers for Selected Economies in 2003

	Gross Domestic R&D expenditure		Total researchers	
	Amount (million ppp$)	**Percentage of GDP**	**Persons**	**Persons per thousand total employment**
China	84,647	1.31	862,108	1.2
Japan	112,715	3.15	675,330	10.4
Korea	24,274	2.63	151,254	6.8
Singapore	2,251	2.13	20,024	9.8
Taiwan	13,494	2.45	67,599	7.1
France	38,144	2.18	192,790	7.7
Germany	57,514	2.52	268,943	6.9
United Kingdom	33,706	1.88	-	-
United States	292,437	2.68	1,334,628[1)]	9.6[1)]

Source: OECD, *Main Science and Technology Indicators*, 2005
1) : data in 2002

Table 6: Results for a Reduction in Asian Equity Risk Premia (change relative to baseline)

	Change in Current Accounts (%GDP)			*Change in Investment (%GDP)*			*Change in GDP*		
	year 1	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*
USA	0.12	0.25	0.30	-0.11	-0.36	-0.36	-0.05	-0.22	-0.31
Japan	0.21	0.55	0.73	-0.14	-0.68	-0.85	-0.07	-0.33	-0.63
United Kingdom	0.16	0.35	0.45	-0.11	-0.43	-0.54	-0.05	-0.24	-0.43
Europe	0.15	0.31	0.41	-0.12	-0.42	-0.52	-0.08	-0.28	-0.50
Canada	0.21	0.43	0.51	-0.15	-0.55	-0.55	-0.07	-0.33	-0.44
Australia	0.09	0.37	0.57	-0.07	-0.47	-0.67	-0.05	-0.26	-0.54
New Zealand	0.45	1.16	1.30	-0.39	-1.12	-0.92	-0.11	-0.70	-0.93
Indonesia	-2.50	-5.10	-5.69	4.96	12.16	14.38	1.76	9.31	16.22
Malaysia	-6.27	-15.84	-17.75	9.41	23.63	22.80	2.31	14.80	26.66
Philippines	-4.66	-10.61	-10.79	4.73	11.16	9.34	3.35	9.59	12.44
Singapore	-3.56	-9.51	-12.78	4.40	12.98	14.37	1.18	8.68	15.63
Thailand	-2.55	-5.64	-7.38	5.14	14.21	22.03	-0.18	10.61	26.66
China	0.13	0.32	0.36	-0.14	-0.54	-0.54	-0.09	-0.35	-0.42
India	0.18	0.33	0.37	-0.20	-0.51	-0.55	-0.14	-0.32	-0.49
Taiwan	-1.37	-3.40	-4.72	2.21	6.60	8.31	0.07	4.59	9.23
Korea	-2.64	-4.85	-5.33	4.92	11.64	14.85	2.24	8.50	15.89
Hong Kong	-0.04	0.15	0.25	0.06	-0.03	0.02	0.05	0.06	0.19

Source: Gcubed (Asia Pacific) model - version 63A

Table 7: Results for a Rise in Asian Productivity Growth (change relative to baseline)

	Change in Current Accounts (%GDP)			*Change in Investment (%GDP)*			*Change in GDP*		
	year 1	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*
USA	0.01	0.10	0.24	0.01	-0.09	-0.31	-0.02	-0.05	-0.19
Japan	-0.04	0.17	0.56	0.08	-0.09	-0.69	-0.02	0.00	-0.35
United Kingdom	0.03	0.15	0.36	0.00	-0.13	-0.43	-0.03	-0.07	-0.27
Europe	0.02	0.13	0.34	0.00	-0.12	-0.43	-0.03	-0.08	-0.31
Canada	0.04	0.19	0.43	-0.01	-0.17	-0.49	-0.04	-0.10	-0.31
Australia	-0.11	0.00	0.35	0.13	0.13	-0.35	0.03	0.13	-0.08
New Zealand	0.03	0.33	0.86	0.00	-0.31	-0.75	-0.04	-0.13	-0.47
Indonesia	-0.21	-1.34	-2.68	0.57	4.69	8.65	0.49	3.71	8.20
Malaysia	-0.42	-3.06	-7.23	0.78	6.53	13.37	0.57	3.22	9.44
Philippines	-3.46	-10.35	-14.35	3.29	12.02	15.10	3.22	9.98	16.38
Singapore	-0.25	-3.26	-9.47	0.28	5.78	14.24	0.17	3.56	11.14
Thailand	0.62	-0.23	-2.60	-0.22	3.62	10.66	-0.06	1.27	6.60
China	0.07	-0.41	-1.17	0.02	3.84	8.58	0.26	3.30	7.78
India	0.06	0.17	0.31	-0.04	-0.21	-0.44	-0.06	-0.12	-0.31
Taiwan	-0.33	-2.15	-5.70	0.28	5.42	13.30	0.03	4.31	12.40
Korea	0.29	-0.47	-2.59	-0.31	4.76	13.74	0.22	3.66	11.60
Hong Kong	-0.56	-0.38	0.10	0.82	1.13	0.75	0.72	1.42	1.91

Source: Gcubed (Asia Pacific) model - version 63A

Table 8: Results for a US Fiscal Adjustment (change relative to baseline)

	Change in Current Accounts (%GDP)			*Change in Investment (%GDP)*			*Change in GDP*		
	year 1	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*
USA	1.45	2.44	2.21	-1.19	0.27	2.67	-0.74	-2.11	0.43
Japan	-0.90	-1.06	-0.90	1.25	2.68	1.86	0.60	2.03	2.31
United Kingdom	-0.46	-0.84	-0.91	0.27	0.86	0.92	0.16	0.59	0.89
Europe	-0.46	-0.72	-0.73	0.66	1.70	1.63	0.55	1.46	2.15
Canada	-1.03	-2.77	-2.63	1.12	4.98	4.22	0.73	3.44	4.30
Australia	-1.01	-1.57	-1.53	0.58	1.56	1.46	0.38	1.23	1.69
New Zealand	-1.61	-3.15	-2.86	1.21	2.76	1.68	0.36	2.08	2.27
Indonesia	-0.69	-1.05	-0.79	1.52	1.60	1.12	3.01	1.18	1.31
Malaysia	-1.48	-3.29	-2.72	2.21	4.52	2.90	1.45	2.87	3.93
Philippines	-2.93	-4.13	-2.88	0.85	1.12	0.11	2.22	1.00	0.52
Singapore	0.14	-1.18	-1.84	1.41	4.74	4.31	0.49	2.94	4.90
Thailand	-1.26	-2.13	-1.78	0.75	1.28	0.92	0.79	0.81	1.29
China	-0.69	-1.04	-0.77	1.64	1.03	0.77	2.60	0.76	0.85
India	-0.55	-0.84	-0.74	1.08	1.02	0.96	2.14	0.68	1.01
Taiwan	-0.19	-1.00	-1.15	1.37	4.37	4.20	0.45	2.60	4.34
Korea	-0.97	-1.87	-1.48	2.26	2.77	1.93	2.56	2.30	2.69
Hong Kong	-0.08	-0.17	0.05	1.31	1.31	0.88	2.04	1.10	1.59

Source: Gcubed (Asia Pacific) model - version 63A

Table 9: Results for a Bursting of US Housing Bubble (change relative to baseline)

	Change in Current Accounts (%GDP)			*Change in Investment (%GDP)*			*Change in GDP*		
	year 1	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*	*year 1*	*year 5*	*year 10*
USA	1.16	1.61	1.37	-1.55	-1.40	0.91	-4.11	-2.57	-0.33
Japan	-0.63	-0.73	-0.53	0.76	1.65	1.04	0.29	1.22	1.35
United Kingdom	-0.37	-0.54	-0.58	0.18	0.58	0.59	0.05	0.39	0.59
Europe	-0.41	-0.50	-0.46	0.42	1.06	0.94	0.25	0.88	1.29
Canada	-0.78	-1.82	-1.58	0.58	2.84	2.35	0.20	1.76	2.37
Australia	-0.63	-0.96	-0.91	0.35	0.99	0.90	0.20	0.75	1.05
New Zealand	-0.95	-1.87	-1.64	0.71	1.62	0.92	0.13	1.19	1.31
Indonesia	-0.52	-0.65	-0.47	0.48	0.92	0.65	0.36	0.64	0.74
Malaysia	-0.98	-2.11	-1.69	0.93	2.69	1.75	0.17	1.49	2.32
Philippines	-1.48	-2.55	-1.87	0.27	0.95	0.29	-0.14	0.64	0.56
Singapore	0.11	-1.18	-1.34	0.76	2.89	2.59	-0.03	1.60	2.97
Thailand	-1.00	-1.37	-1.13	0.40	0.94	0.65	0.05	0.54	0.94
China	-0.54	-0.67	-0.48	0.38	0.76	0.53	0.19	0.50	0.55
India	-0.41	-0.54	-0.46	0.31	0.63	0.59	0.17	0.39	0.60
Taiwan	-0.25	-0.88	-0.73	0.76	2.57	2.33	0.14	1.45	2.49
Korea	-0.76	-1.20	-0.93	0.64	1.68	1.23	0.35	1.17	1.58
Hong Kong	-0.44	-0.30	-0.04	0.37	0.74	0.50	-0.53	0.42	0.87

Source: Gcubed (Asia Pacific) model - version 63A