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## Saving, Investment, and Current Account Surplus in Developing Asia

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## ADB Economics Working Paper Series



### Saving, Investment, and Current Account Surplus in Developing Asia

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Donghyun Park and Kwanho Shin

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**Donghyun Park and Kwanho Shin**

April 2009

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## **Abstract**

An integral part of global current account imbalances is the large and persistent current account surplus developing Asia has run since the 1997–1998 Asian crisis. A country's current account surplus is, by definition, equal to its net saving. The central objective of this paper is to investigate the extent to which the saving and investment rate of Asian countries can be explained by the underlying fundamental determinants of saving and investment such as gross domestic product growth and demographic factors. Our empirical analysis yields two key findings. First, we find stronger evidence of oversaving than underinvestment in the region. Second, we find stronger evidence of overinvestment prior to the Asian crisis than underinvestment after the Asian crisis. This suggests that the key to rebalancing Asian growth toward domestic sources lies in promoting consumption rather than investment.





## I. Introduction

Broadly speaking, a country's current account balance reflects the difference between its income and its expenditures. A deficit country spends more than it is producing whereas the reverse is true for a surplus country. A surplus country saves more than it invests whereas the reverse is true for a deficit country. Since saving is the difference between income and consumption, and expenditure consists of consumption and investment, it is also possible to view the current account balance as the difference between saving and investment. Large and persistent current account surpluses are a relatively new phenomenon in Asia. In fact, the region as a whole ran current account deficits before the 1997–1998 Asian crisis even though the region enjoyed high savings rates. The underlying reason was that exceptionally high investment rates exceeded saving rates, which were themselves very high in historical terms and in comparison with other parts of the world.

Two stylized facts about saving and investment in postcrisis Asia help to explain why Asia has been transformed from a region of current account deficit into a region of current account surplus, or, equivalently, from a net importer of capital to a net exporter of capital. One stylized fact is that the investment rate fell sharply in some countries while the other is that the saving rate continues to remain high throughout the region. Whereas the investment rate matched or exceeded the saving rate in the precrisis period, it fell behind the saving rate on a sustained basis due to a large and sustained drop-off in the investment rate. The two stylized facts bring to the fore two interrelated and somewhat puzzling questions. First, why have investment rates in some Asian countries dropped in the postcrisis period? Second, in light of sharply reduced investment, why have saving rates remained buoyant?

It is possible to interpret Asia's large and persistent current account surplus in the postcrisis period as the result of suboptimal levels of saving or investment. More specifically, this school of thought argues that the fall in investment rates is an anomalous phenomenon that cannot be explained by economic fundamentals. That is, postcrisis investment rates may be "too low". This implies that various policy distortions restrict investment and hence growth to levels below those that prevailed prior to the Asian crisis.

The key to restoring investment and growth is to remove the various policy distortions that shackle entrepreneurship and risk taking. Yet another school of thought contends that precrisis investment rates may have been “too high” rather than lower postcrisis investment rates being “too low”. According to this school of thought, poor corporate governance and other market failures led to overinvestment and misallocation of resources. The logical corollary is that the investment drop-off in the postcrisis period is a return to more desirable and sustainable levels of investment.

The other potential explanation for why Asia’s current account surplus in the postcrisis period is suboptimal is that the region saves too much. Investing too little and saving too much are not mutually exclusive and indeed it is entirely possible that Asia has done both since the Asian crisis. Even before the Asian crisis, there was a widespread perception that there was something different or unique about Asian savings behavior. Noneconomic factors such as culture were put forth as explanations for why Asian savings were high relative to other parts of the world (see Hayashi 1997). The fact that Asian saving rates have held up well in the postcrisis period despite the decline in investment rates has given further ammunition to this view. Of particular interest is the savings rate of the People’s Republic of China (PRC), which is astonishingly high for the country’s per capita income level.

The central objective of this paper is to empirically investigate the issues of underinvestment and oversaving in Asia in the postcrisis period. Whether or not Asia is investing too little or saving too much or doing both is ultimately an empirical question that can only be addressed by looking at the data. The empirical methodology we use to is to estimate the extent to which the fundamental determinants of investment can explain investment in Asia. Likewise, we examine the extent to which the fundamental determinants of savings can explain saving in Asia to address the issue of whether the region saves too much. If fundamentals such as gross domestic product (GDP) growth rate, per capita GDP, and demographic variables can largely explain investment and saving in Asia, it is less likely that Asia suffers from underinvestment or oversaving. On the other hand, if much of Asian investment and saving cannot be explained by such fundamentals, this can be viewed as evidence in favor of the underinvestment and oversaving hypotheses.

Whether or not Asia suffers from underinvestment or oversaving or both in the postcrisis period has vast implications for regional policymakers. To the extent that Asia’s current account surplus is in fact driven by suboptimal saving and investment levels, it is in Asia’s self-interest to pursue policies that increase investment and reduce saving toward their optimal levels. A further related empirical issue is the relative importance of underinvestment versus oversaving as potential causes of Asia’s current account surplus. Although both underinvestment and oversaving can contribute to the current account surplus, it is conceivable that the contribution is predominantly from oversaving rather than underinvestment or vice versa. This matters since the policy prescriptions

for addressing underinvestment are fundamentally different from those for addressing oversaving.

The rest of this paper is organized as follows. Section II takes a look at the actual trends in saving and investment rates in Asian countries. Before we can meaningfully discuss the issues of Asian oversaving and underinvestment, we have to understand the precrisis and postcrisis trends in the region's saving and investment. Section III outlines the data and empirical model used in this paper to explore the determinants of saving and investment in Asia. This section explains the specification of the equations that we use for estimating saving and investment rates, in particular the economic intuition behind the explanatory variables in the right hand side of those equations. Section IV reports and discusses the main findings emerging from our empirical analysis. One key finding is that a substantial part of Asia's savings, investment, and hence current account surplus in the postcrisis cannot be explained by fundamentals. For our purposes, perhaps the most interesting finding is stronger evidence of oversaving than underinvestment in the postcrisis period. Finally, Section V brings our paper to a close by highlighting its central messages along with their implications for the region's policymakers.

## **II. Stylized Facts of Saving and Investment in Asia**

High saving and high investment rates have long been a defining structural characteristic of East Asian economies. They served as key ingredients in the East Asian miracle that transformed eight market-based regional economies—Hong Kong, China; Indonesia; Japan; Republic of Korea (henceforth Korea); Malaysia; Singapore; Taipei, China; and Thailand—between 1960 and 1990. While there were other ingredients, including sound macroeconomic policies, limited price distortions, human capital accumulation, strong civil service and institutions, and openness to foreign trade and technology, high saving and investment rates lay at the heart of the miracle. Furthermore, they were a tangible, measurable difference between the region and other parts of the developing world. East Asia's saving and investment rates were initially comparable to those of other developing regions but a marked growth in both opened up a sizable gap over time. For example, while the saving and investment rates of East Asia and Latin America were more or less equal in 1965, East Asian rates were almost double Latin American rates by 1990.

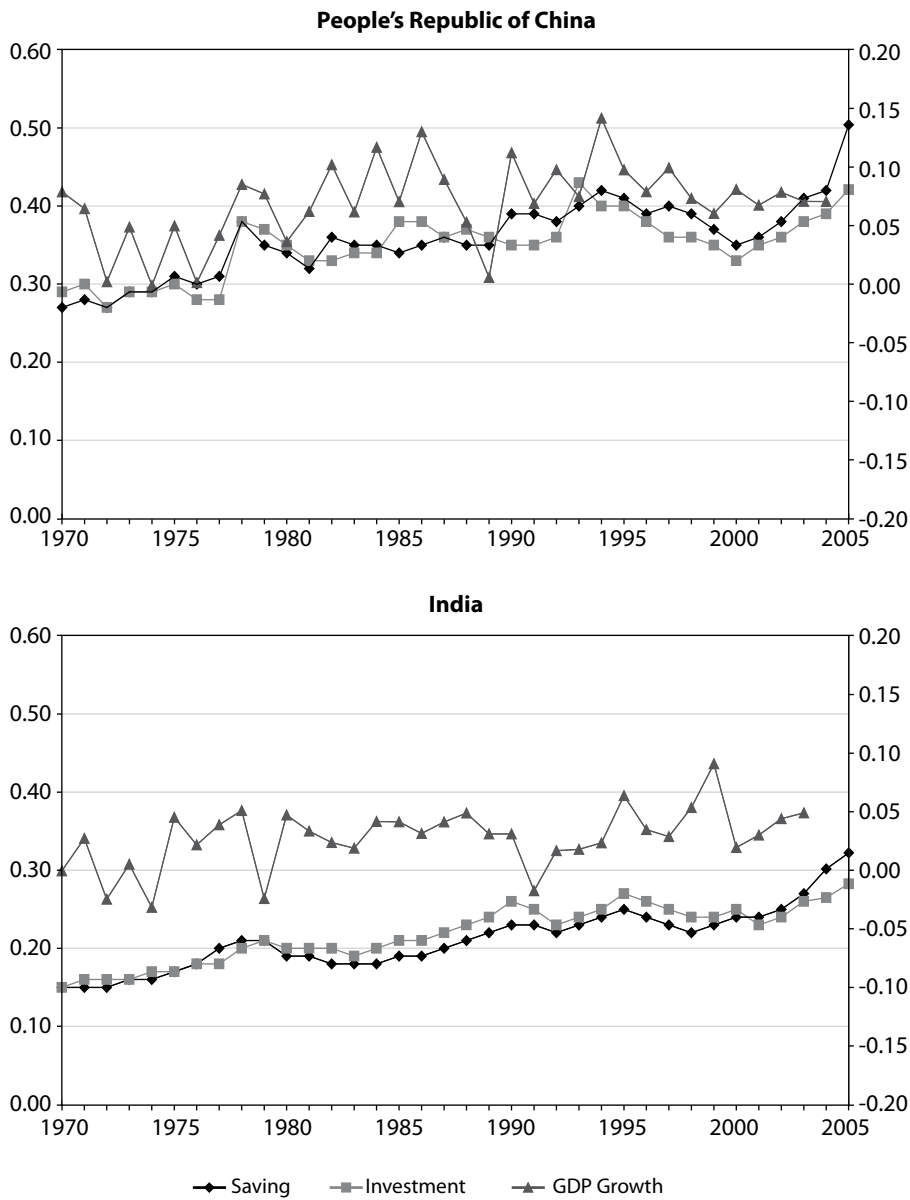
The high saving rates of East Asian economies have often been attributed to noneconomic factors. In particular, there is a widespread tendency, especially among those outside the region, to view the region's saving rates as a symptom of a culture that places an extra premium on thrift and making sacrifices today for a better tomorrow. That is, East Asia's high saving rates are viewed by many as the peculiar outcome of a peculiar culture. In fact, the miracle economies had two fundamental pro-saving policies that differentiated them from other developing countries. One was sound macroeconomic

management that prevented inflation and hence negative or variable rates of return on deposits. The other was relatively strong prudential regulation and supervision that enhanced deposit safety. The miracle economies also pursued various policies to promote investment. For one, their governments were more effective in setting up the infrastructure—roads, ports, airports, power plants, water supply—that raises the rate of return on and hence encourages private investments.

According to conventional wisdom, the emergence of a chronic current account surplus in developing Asia in the postcrisis period is the result of a chronic gap between saving and investment. Broadly speaking, there are two different types of saving–investment gaps in the region. The first type is the crisis-hit countries, such as Korea and Thailand, where investment rates fell sharply whereas saving rates remained stable. In these countries, the current account surplus is driven by lower investment rates. The second type of saving–investment gap characterizes the PRC where, in stark contrast to the crisis-hit economies, the investment rates remain elevated but the saving rates are even higher and have surged since 2003. In the unique case of the PRC, the current account surplus is driven by astonishingly high saving rates. In any case, we need to look at the actual trends in postcrisis saving and investment rates in the region to check whether or not such widely held conjectures are grounded in facts.

Of particular interest for us is whether the Asian crisis has had a perceptible impact on the saving and investment rates of countries in the region. As noted above, the crisis-hit economies are believed to be suffering from a drop-off in investment since the crisis. However, even if we do find such a negative effect, the effect may be bigger in some countries than in others. The crisis may also have had a positive impact on precautionary saving in the crisis-hit economies. It is also possible that the crisis influenced the saving and investment rates of countries that were not directly hit by the crisis. For example, the psychological impact of witnessing a severe crisis in neighboring countries can conceivably increase precautionary saving in those countries. In any case, understanding potential oversaving or underinvestment in the region requires first looking at the actual pattern of saving and investment in both the precrisis and postcrisis period. More precisely, Figure 1 below shows the saving–GDP ratio and investment–GDP ratio of eight regional countries (PRC, India, Japan, Korea, Indonesia, Malaysia, Philippines, and Thailand) between 1970 and 2005.

**Figure 1: Saving Rate, Investment Rate, and Real GDP Growth in Selected Asian Countries, 1970-2005**



**Figure 1:** *continued.*

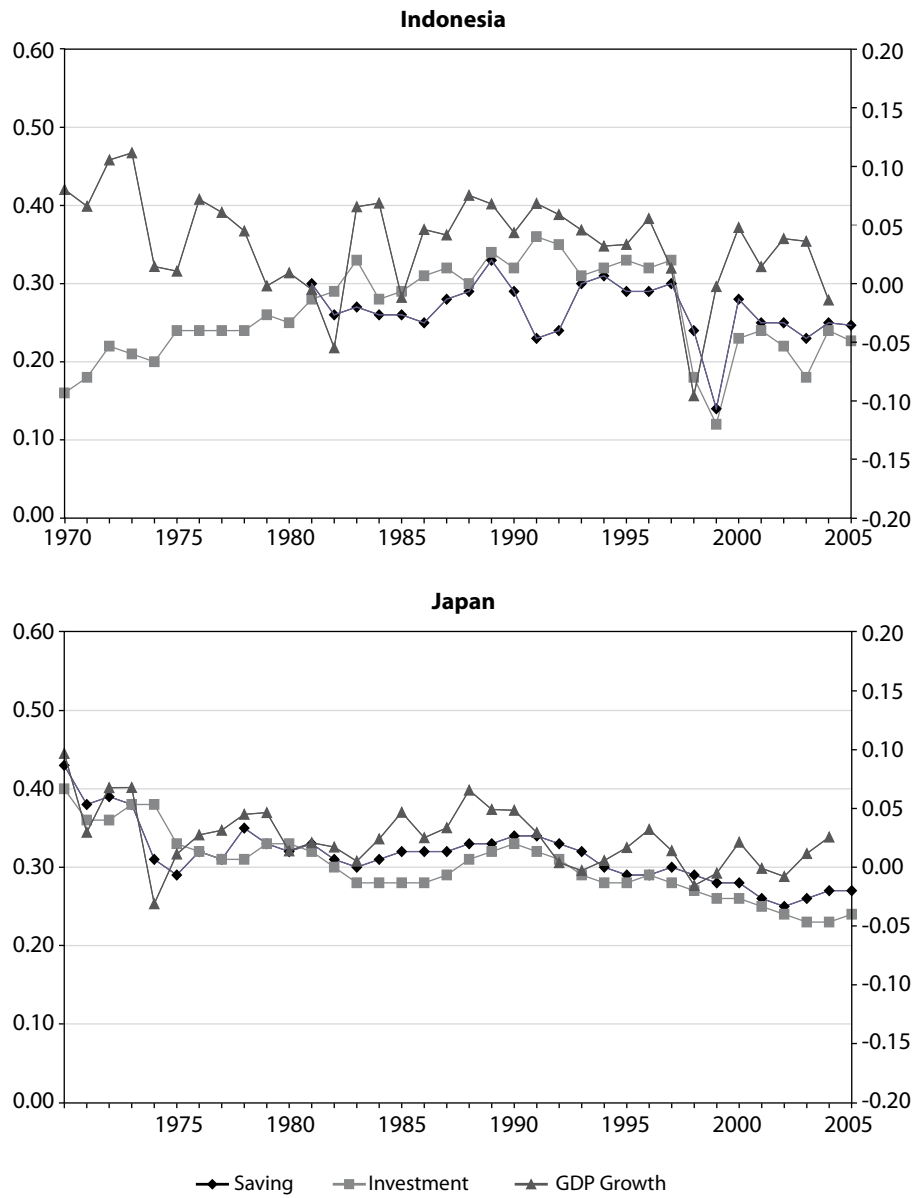
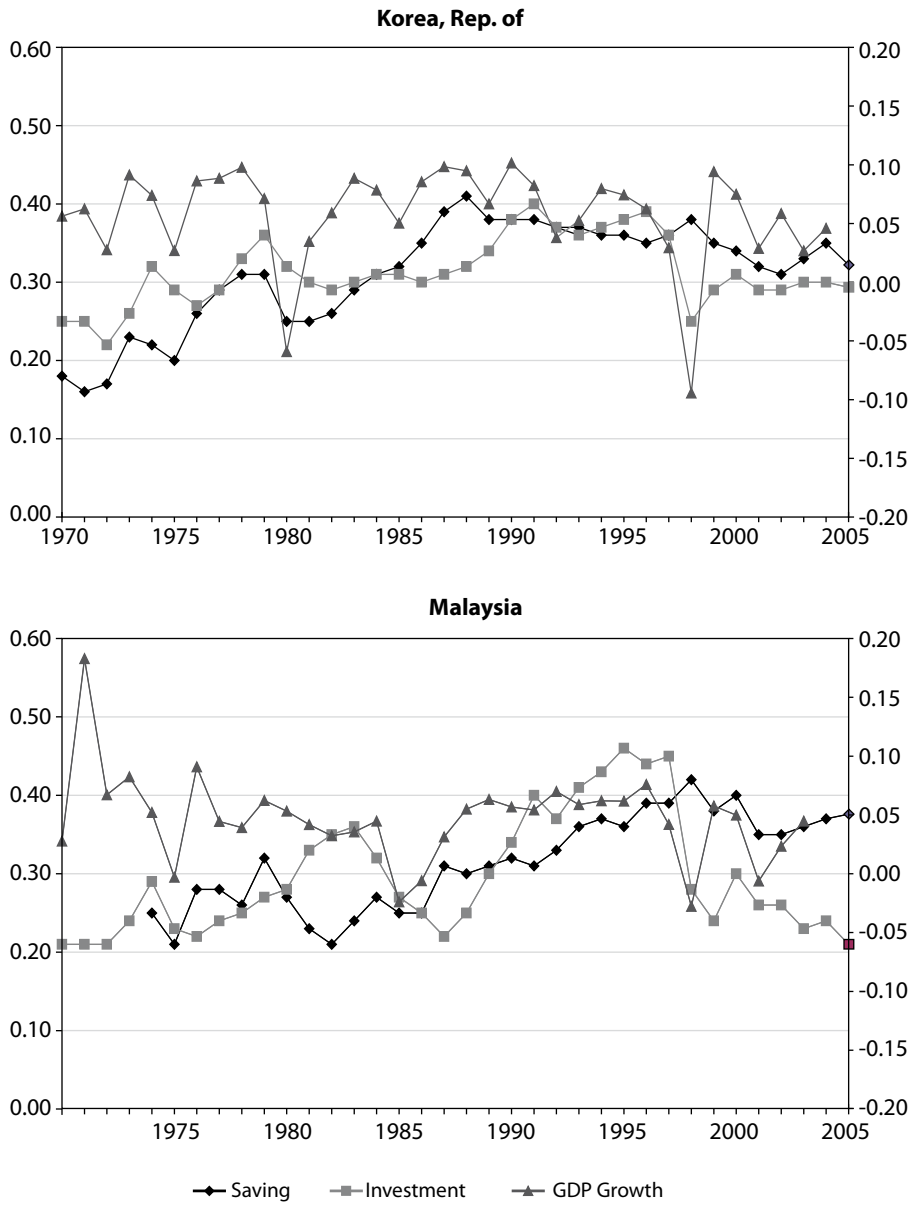
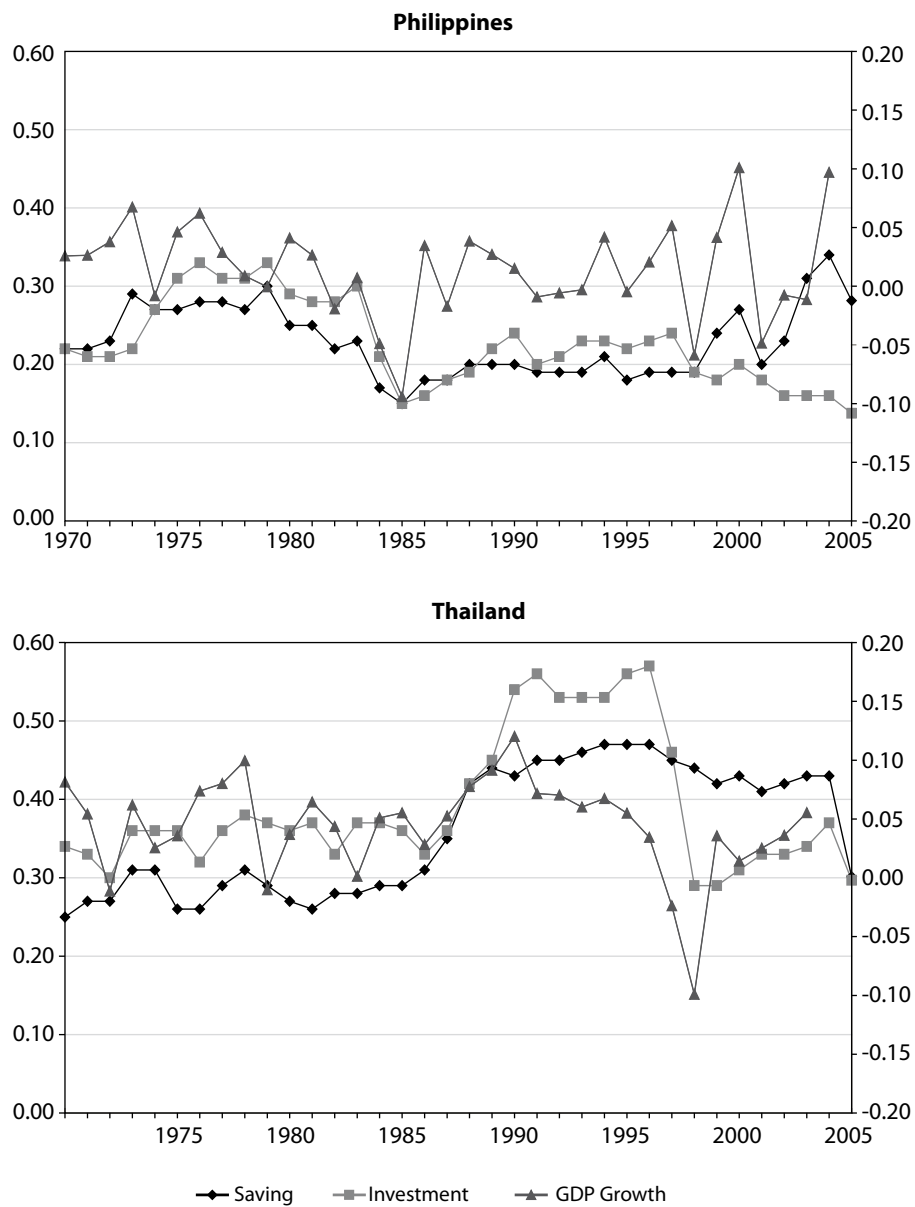


Figure 1: continued.





**Figure 1: continued.**



GDP = gross domestic product.

Note: Saving and investment rates are measured by the left axis and GDP growth rate by the right axis.

Overall, Figure 1 shows that Asian economies continue to save more and invest more than other developing countries in the postcrisis period. This helps to explain why the region as a whole continues to outperform other parts of the developing world. Although there is variation across countries and over time, Asia is indeed a high-saving, high-investment, and high-growth region, and this pattern continues to hold even after the crisis. The pattern of saving and investment in the PRC shows a continuous increase in both saving and investment rates during the sample period. A systematic excess of saving over investment has begun to emerge since around 1990. If we focus on trends since the mid-1990s, both declined until about 2000 but have jumped sharply since then. Furthermore, since 2000 the saving–investment gap also widened, and this has fueled the growth of the current account surplus.

The distinction between the precrisis and postcrisis periods is obviously most relevant for the economies that suffered the most during the Asian crisis. While Indonesia, Korea, Malaysia, Philippines, and Thailand share the common denominator of the Asian crisis, they are nevertheless a heterogeneous group of countries in terms of income and economic structures. Figure 1 unambiguously confirms the conventional wisdom that there has been a noticeable drop in the investment rate of all five countries in the postcrisis period. Another common trend is that while the exact movement of the saving rate differs from country to country, it has fallen by less than the fall in the investment rate. Therefore, the postcrisis movements of the saving and investment rates have clearly contributed to the emergence of large and persistent surpluses in the crisis economies. The investment fall has been especially pronounced in Malaysia and Thailand. Overall, the pattern of investment rates in the crisis countries gives a strong hint of at least some overinvestment during the precrisis period. Figure 1 shows that investment rates accelerated in the 5–10 year period preceding the Asian crisis and fell back to levels that prevailed prior to the acceleration. To the extent that the precrisis elevation of investment rates reflected overinvestment, the postcrisis drop-off represents a desirable correction toward more sustainable investment and growth rates.

### **III. Data and Empirical Framework**

In this section, we describe the data and empirical framework we use to estimate the saving and investment functions. Broadly speaking, our empirical methodology for establishing whether there is oversaving or undersaving in Asian countries is based on determining the extent to which their saving and investment rates can be explained by fundamentals. Economic theory suggests that certain economic and demographic variables will influence the level of savings and investment across countries and over time. It is possible to interpret a positive gap between the actual saving rate and the saving rate predicted by fundamentals as evidence of oversaving. Likewise, we may view a negative gap between the actual investment rate and the investment rate predicted by

fundamentals as evidence of underinvestment. Strictly speaking, an economic model of saving and investment can only tell us which variables are important in explaining saving and investment, and its predictions are not optimal or welfare-maximizing in any sense. Nevertheless, any meaningful discussion of oversaving or underinvestment requires adequately controlling for variables that affect saving and investment. If, for example, a country's lower saving rate is largely due to its low income level, then we cannot say that the country is saving too little. Therefore, the saving and investment rates estimated by economic models give us a rough first-order approximation of the "appropriate" saving and investment rates.

Given the central role of saving and investment in economic growth, it is only natural that a large body of research has emerged to investigate the determinants of saving and investment. There is a large and well-established theoretical literature that seeks to formally model the relationship between various economic and demographic variables on one hand and saving and investment on the other. An equally large and well-established empirical literature has sprung up to empirically test how well the various theoretical models can explain the actual variation of saving and investment over time and across countries. The model of saving and investment we test in this paper is based on Higgins (1998) and Bosworth and Chodorow-Reich (2006), which set out straightforward models that incorporate standard explanatory variables used by much of the existing literature. More precisely, those models assume that saving and investment rates are influenced by three sets of variables: country-specific factors that change over time ( $X_{it}$ ), factors that vary across countries but not over time ( $C_i$ ), and demographic structure of the population ( $P_{it}$ ). The basic forms of the empirical specifications are as follows:

$$S_{it} = S(X_{it}, C_i, P_{it}) + u_{it} \quad (1)$$

$$I_{it} = I(X_{it}, C_i, P_{it}) + v_{it} \quad (2)$$

The empirical literature using cross-country data finds two economic variables—the level of per capita income and its growth rate—to be particularly significant determinants of saving rates. For example, empirical analysis by the IMF (2005) finds that a 1 percentage point increase in per capita income growth raises the national saving rate by 1% in industrialized countries and 0.5% in developing countries. Richer countries tend to save more than poorer countries and faster-growing countries tend to save more than slower-growing countries, i.e., the expected signs are positive for both variables. Intuitively, this makes sense since the average household in poor countries will tend to save less of its income than the average household in rich countries due to lower consumption level and higher marginal utility of consumption. Furthermore, economic growth boosts the income of the working-age population, which tends to save, relative to the population of the retiree population, which tends to dissave, pushing up aggregate saving in the process (see Modigliani 1975). We also include life expectancy as a measure of the length of the expected retirement period. The higher the life expectancy, the greater the need for

postretirement income and hence the higher will be the saving rate. We also include financial development, defined as the ratio of M2 to nominal GDP, as an additional explanatory variable.<sup>1</sup>

We eliminate time-invariant factors that vary across countries ( $C_i$ ) from our empirical analysis by controlling for country-specific effects. The demographic structure of a country's population ( $P_{it}$ ) is captured by two dependency rates: aged dependency rate (ratio of the population 65 and above to those aged 15–64) and youth dependency rate (ratio of the population under 15 to those aged 15–64). Clearly, the demographic structure can change over time, especially when a country makes the transition from a high-fertility regime to a low-fertility regime. According to the life-cycle hypothesis, which lies at the core of savings theory, individuals save when they are working and use up their savings after their retirement. A high-aged dependency rate implies that the number of those who are dissaving rises relative to the number of those who are saving, and thus reduces aggregate saving. A high youth dependency rate implies that those who are working have to provide for the material needs of large numbers of children, and thus reduces their capacity to save. Higher dependency rates can also have adverse consequences for the government budget balance and hence public savings. For one, a smaller workforce generates lower tax revenues. For another, a high youth dependency rate requires large spending on child care and education. More significantly, a higher-aged dependency rate calls for greater outlays on pensions, health care, and other expenditures for the elderly. Indeed population ageing is putting a serious strain on the government finances of many ageing industrialized countries.<sup>2</sup>

The specification of our investment equation is basically same as that of our saving equation. We can expect the growth of per capita output to be an important explanatory variable since investment is determined by the growth of the capital stock, which parallels the growth of output in the long run.<sup>3</sup> Productivity growth driven by technological shocks, improvement in corporate governance, reallocation of factors from low-productivity sectors to high-productivity sectors, and other structural changes are the primary drivers of long-run output growth. In the short run, positive demand shocks that raise profitability

<sup>1</sup> As Ito and Chinn (2007) point out, the effect of financial development on saving may be either positive or negative. According to the more traditional view, typified by Edwards (1996), financial deepening induces higher saving by creating deeper and more sophisticated financial systems. An alternative view suggests that more developed financial markets lessen the need for precautionary saving, and thereby lowering the saving rate.

<sup>2</sup> A large number of cross-country empirical studies have clearly established a negative and significant impact of demographic variables—youth and old-age dependency ratios—on saving rates. These include Kim and Lee (2008), Bosworth and Chodorow-Reich (2007), IMF (2005), Luhrmann (2003), and Chinn and Prasad (2003). With respect to the impact of financial development on saving, Ito and Chinn (2007) fail to find any definitive evidence, other than that the impact depends on the degree of capital account liberalization and legal and institutional development.

<sup>3</sup> In the short run, output fluctuations are driven mainly by changes in labor input. However, in the medium or long run, as in our empirical framework using 5-year averages, output growth is driven mainly by technological progress and capital accumulation. If the economy is in a transition period, as is likely the case in most countries in developing Asia, capital accumulation is the main source of growth. In a Solow model, the growth in the transition period is temporarily high as the economy catches up with rich economies by accumulating capital. Even in a steady state where both technological progress and capital accumulation matter, it is easy to show that the growth rate of output is equal to the growth rate of capital if technological progress is labor-augmenting.

will encourage investment. Financial market imperfections that increase the relative importance of internal funds in financing investments also suggest a positive effect of output growth on investment. A well-established stylized fact lends strong support to a hump-shaped relationship between the level of per capita income and investment rate. The marginal returns to capital are low in poor countries due to the absence of complementary factors such as human capital and good governance. The marginal returns to capital rise as income rises due to an increasing supply of complementary factors such as human capital, macroeconomic stability, and good governance. As a result, income begins to catch up with rich countries. However, after the catch-up is complete and the catch-up country has itself become a mature, rich economy, diminishing marginal returns begin to set in. This explains why the income–investment relationship turns from positive to negative beyond a certain income level.

Economic intuition suggests that demographic factors should also influence the investment rate.<sup>4</sup> Slower growth of the working-age population will slow down economic growth, which will reduce the returns to investment. In the absence of technological progress and other structural changes that raise labor productivity, investment will fall. In the short run, however, it is possible that firms will invest more to substitute capital for labor as a means of coping with the growing shortage of labor. Since demographic variables influence both saving and investment their impact on the current account balance will depend on the relative size of the saving impact versus the investment effect. The balance of evidence indicates that higher dependency rates have a substantially bigger effect on saving than on investment. This suggests that demographic transition toward older populations will lead to a significant deterioration of the current account balance. The Appendix provides a description of all the variables used in our empirical analysis, along with the data sources for those variables.<sup>5</sup>

## IV. Empirical Results

Table 1 below shows the estimated relationship between saving and investment rate on one hand and economic and demographic variables on the other. The results of Table 1 are based on controlling for the impact of country-specific factors using fixed-effects estimation, i.e., the underlying empirical analysis concentrates on the time-series variation of the variables. Our total sample for the saving and investment regression consists of 137 and 141 countries, respectively. For both, 12 countries are from Asia. Our Asian

<sup>4</sup> Kim and Lee (2008) point out that slower growth of the working-age population slows down economic growth, which reduces the returns to investment. In the absence of technological progress and other structural changes that raise labor productivity, investment will fall. In the short run, however, it is possible that firms will invest more to substitute capital for labor as a means of coping with the growing shortage of labor.

<sup>5</sup> Our primary source for the savings and investment data is Bosworth and Chodorow-Reich (2007). We collected some additional data from WDI. We thank Bosworth and Chodorow-Reich (2007) for sharing their data set. We collected data for the other variables directly from WDI or IFS.

sub-sample consists of Bangladesh; PRC; Hong Kong, China; India; Indonesia; Korea; Malaysia; Pakistan; Philippines; Singapore; Sri Lanka; and Thailand. We include per capita income squared to see whether, for reasons outlined in the previous section, the savings and investment functions are hump-backed. We run regressions for the whole sample to as well as separate additional regressions for the Asian subsample and the non-Asian subsample for comparative purposes.

**Table 1: Saving and Investment Regressions, Country Fixed Effects**

	Saving			Investment		
	All Countries	Asia	All Countries Minus Asia	All Countries	Asia	All Countries Minus Asia
GDP Growth	0.354** [0.077]	0.563* [0.221]	0.371** [0.080]	0.258** [0.062]	0.838** [0.266]	0.232** [0.063]
Lagged GDP Growth	0.122 [0.070]	0.469* [0.210]	0.121 [0.073]	0.250** [0.054]	0.700** [0.263]	0.229** [0.056]
Per Capita Income	0.092 [0.080]	-0.447** [0.115]	0.261** [0.097]	0.335** [0.066]	0.140 [0.148]	0.361** [0.076]
Per Capita Income Squared	0.000 [0.005]	0.032** [0.007]	-0.011 [0.006]	-0.017** [0.004]	-0.006 [0.009]	-0.019** [0.005]
Life Expectancy	0.054 [0.034]	0.197* [0.091]	0.046 [0.036]	0.039 [0.029]	0.077 [0.117]	0.039 [0.029]
Aged Dependency	-0.985** [0.204]	-1.230 [0.662]	-0.764** [0.214]	-0.568** [0.175]	-1.695* [0.825]	-0.450* [0.180]
Youth Dependency	0.028 [0.030]	-0.215* [0.085]	0.033 [0.032]	0.056* [0.024]	-0.297** [0.109]	0.069** [0.025]
Financial Development	-0.003 [0.008]	-0.034 [0.020]	-0.001 [0.008]	-0.005 [0.005]	-0.053* [0.026]	-0.004 [0.005]
Observations	724	83	641	783	84	699
R-squared	0.18	0.53	0.15	0.19	0.78	0.13

\* and \*\* denote statistical significance at 5% and 1% level.

GDP = gross domestic product.

Note: GDP growth is real GDP growth rate based on constant local currency. Per capita income is log of real GDP per capita (\$ in 2000 constant prices: chain series). Life expectancy is obtained from United Nations' projections. Aged dependency rate is the ratio of those aged 65 and over to those aged 15–64. Youth dependency rate is the ratio of those under 15 to those aged 15–64. Financial development is the ratio of M2 to nominal GDP. Numbers in parenthesis represent standard error.

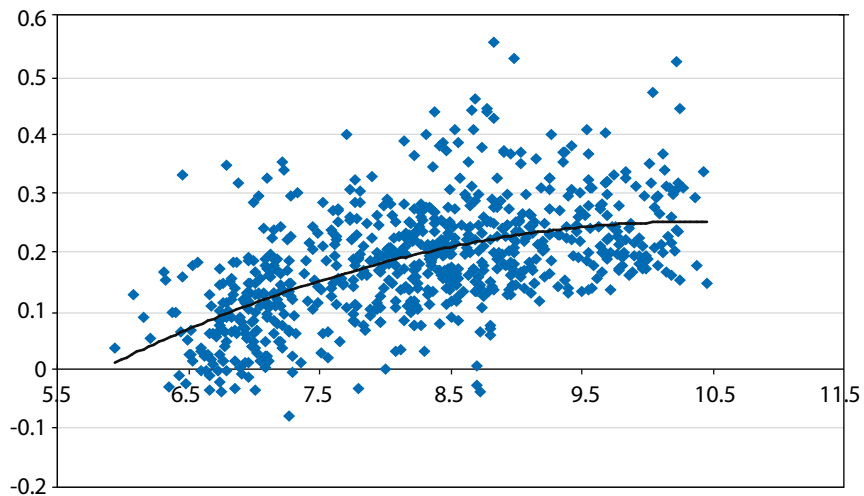
The most noticeable and consistent result in Table 1 is the positive impact of current GDP growth on both saving and investment rates, for the whole sample as well as the Asian and non-Asian subsamples. The estimated coefficient of current GDP growth is larger for Asia than it is for the rest of the world, which suggests that growth has a pronounced effect on Asian saving and investment. To some extent, this may simply reflect the region's exceptionally high growth rates. Lagged GDP growth also has a positive effect on both saving and investment for the whole sample, but the effect is significant only for investment. However, in the Asian subsample, the effect of lagged growth on saving is significant. As with current growth, lagged growth has a bigger effect on Asian saving and

investment than the world at large. The results do not indicate a hump-shaped savings function, i.e., savings rising with per capita income up to a certain income level before falling as income rises further. In contrast, we find strong evidence of a hump-shaped investment function since the estimated coefficient is positive for per capita income but negative for per capita income squared. Those coefficients, 0.335 and  $-0.017$ , imply that the investment rate peaks at a per capita income of \$19,000.

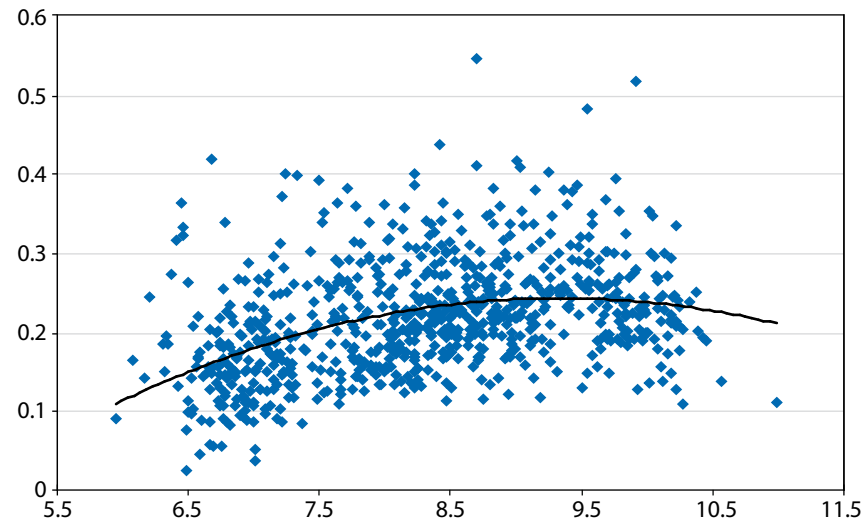
It is important to note that the estimated per capita income coefficient of  $-0.447$  for Asian savings does *not* imply a negative relationship between per capita income and saving rate in the region. The positive and significant coefficient of 0.032 for per capita income squared means that the saving rate will rise with income, as expected. The negative sign for income and positive sign for income squared implies a convex relationship between income and saving rate, as Figure 3 below confirms. Aged dependency generally has a negative and significant effect on both saving and investment except for Asian saving, where the effect is negative but marginally insignificant. For the whole sample, youth dependency is insignificant for saving but positive and significant for investment. For the Asian subsample, youth dependency has a negative effect on both saving and investment. The impact of financial development is generally insignificant except for Asian investment, for which the impact is negative and significant—although this is somewhat unexpected since financial development improves the access of firms to financing and thus promotes investment. However, in the case of Asia, financial underdevelopment may have led to overinvestment, so that financial development raises the quality of investment even though it reduces the quantity of investment. Finally, for both saving and investment, we find that economic and demographic variables can account for much of Asia's saving and investment.

Figures 2a–2c below show how the saving and investment rate changes as per capita income changes for the whole sample. To get a broad picture of the relationship between income on one hand and saving and investment rate on the other, we do not control for the other determinants of saving and investment. Figure 2a plots the relationship between per capita income and saving rate. As income increases, the saving rate increases as well but at a decreasing rate. Such concavity implies a hump-shaped saving function although the peak saving rate occurs at a relative high income level of \$32,000, which is far higher than the income levels of most countries in developing Asia. Figure 2b, which plots the relationship between per capita income and investment rate, shows much more definitive evidence of a hump-shaped investment function. We can quite clearly see that investment rises with income up to about \$11,400 but falls with income beyond that income. Figure 2c, which puts together Figures 2a and 2b, gives us some idea about the relationship between net saving, i.e., current account balance, and per capita income. Net saving is negative at low income levels but turns positive beyond \$13,800. This is inconsistent with the fact that developing Asia runs a current account surplus while the much richer US runs a current account deficit.

**Figure 2a: Saving Rate and Per Capita Income**



**Figure 2b: Investment Rate and Per Capita Income**



**Figure 2c: Saving Rate, Investment Rate, and Per Capita Income**

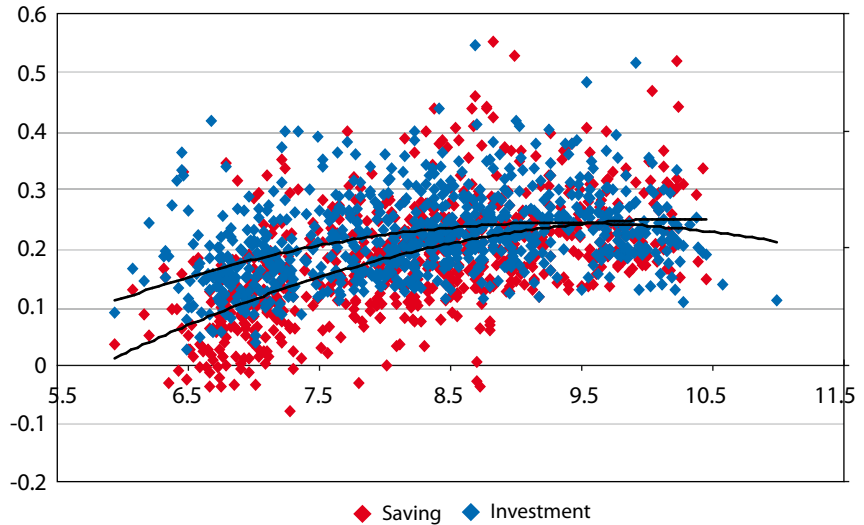
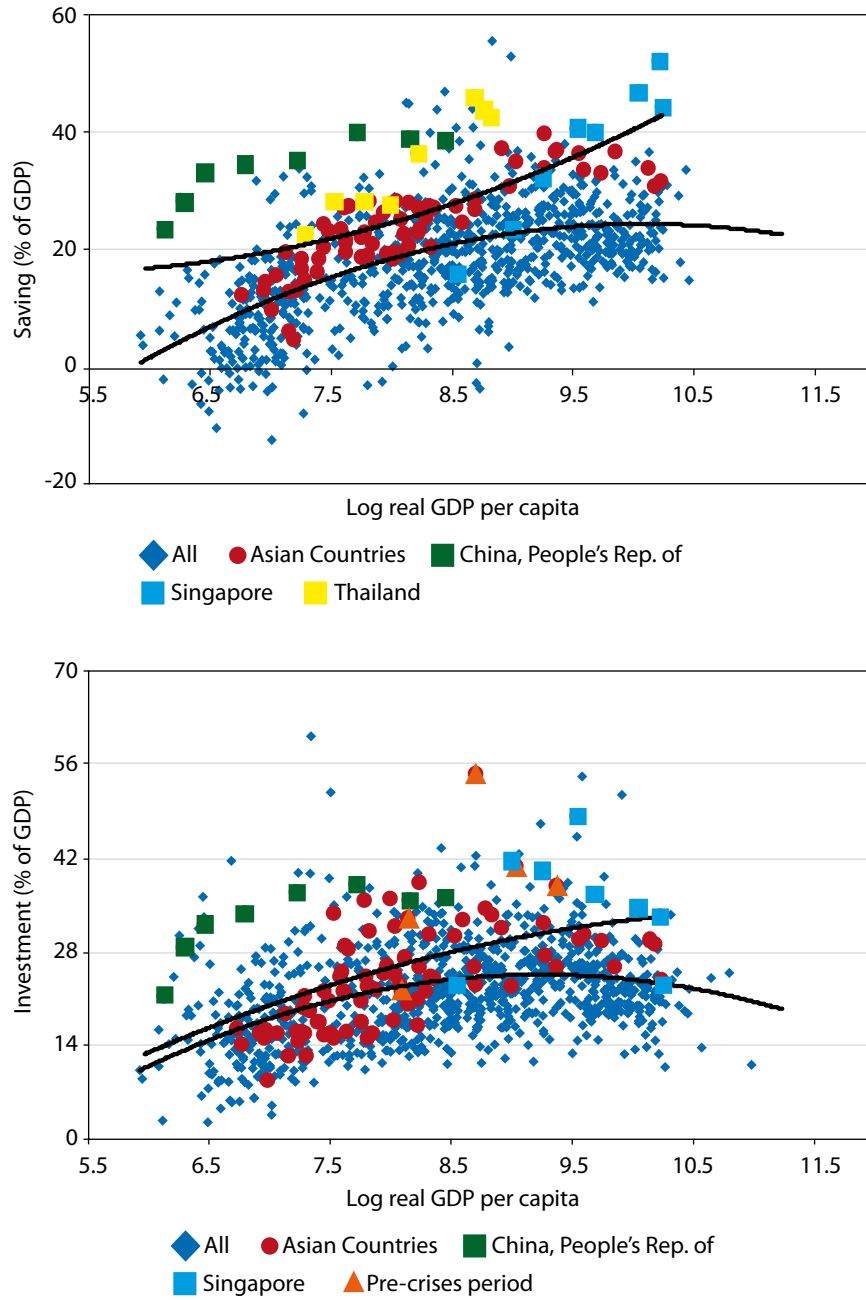




Figure 3 allows us to visually compare the saving and investment behavior of Asian countries with that of the rest of the world. Such a visual inspection not only allows us to see whether Asian saving or investment is unique but also helps us to identify individual Asian countries that are outliers in the sense of having unusual patterns of saving or investment. In Figure 3, data for non-Asian countries are shown as small blue dots while all other dots show data for Asian countries. A quick look at Figure 3 reveals that three countries in particular behaved differently from other Asian countries as well as non-Asian countries: PRC (green dots), Thailand (yellow dots), and Singapore (purple dots). These countries have had unusually high saving relative to income, at least for some range of income. While there are no drastic differences between the saving pattern of the Asian countries as a whole (red dots) and non-Asian countries, the differences that do exist seem to be driven by the three outliers. For example, the convexity of Asia's saving function is likely to be the result of Singapore's remarkably high saving rates at high income levels. We will explore the peculiar saving behavior of PRC, Singapore, and Thailand in Table 2 below. In terms of investment, the two outliers are the PRC and Singapore, both of which invest too much relative to their income. We will examine their investment in Table 2. An additional puzzle is the extremely high investment rates of five crisis countries during 1990–1996, denoted by x in Figure 3. We will address this puzzle in Table 3 below.

As noted above, the saving and investment behavior of the PRC and Singapore seems to differ from other Asian countries, as does the saving behavior of Thailand. We seek to assess whether the seemingly abnormal saving and investment patterns of those three countries are in fact abnormal. Our strategy for making this assessment is to gauge the extent to which the saving and investment rates of those countries can be accounted for by the underlying determinants of saving and investment. For example, it is difficult to say that exceptionally high saving rates are abnormal if they are mainly the result of exceptionally high GDP growth. Table 2 below reports the results of this empirical exercise.

**Figure 3: Saving and Investment Rates of Asian and Non-Asian Countries**



**Table 2: Saving and Investment Rates of Selected Asian Countries: Explained versus Nonexplained Parts (percent)****Saving**

$$\text{Saving}_t = -0.498 + [0.548 * \text{GGDP}_t] + [0.241 * \text{GGDP}_{t-1}] + [0.063 * \text{PCGGDP}_t] - [0.001 * \text{GGDP}_t^2] + [0.065 * \text{Life}_t] - [0.675 * \text{Aged}_t] - [0.059 * \text{Youth}_t] + [0.025 * \text{FD}_t]$$

	<b>Actual Saving</b>	<b>GDP Growth</b>	<b>Lag GDP Growth</b>	<b>Youth Dependency</b>	<b>Aged Dependency</b>	<b>Life Expectancy</b>	<b>Financial Development</b>	<b>Country Dummy</b>
<b>PRC</b>	36.2	7.4	6.6	48.6	8.5	4.2	4.0	14.8
Others	14.7	1.4	1.1	80.5	6.7	4.0	3.2	0.0
Difference	21.4	3.3	1.3	1.9	-1.2	1.4	2.1	14.8
<b>Singapore</b>	44.8	3.7	4.7	32.7	8.1	4.3	4.4	11.8
Others	24.3	2.2	2.4	39.3	15.9	4.3	4.0	0.0
Difference	20.5	0.8	0.5	0.4	5.2	0.1	1.0	11.8
<b>Thailand</b>	34.3	4.0	3.7	60.9	6.6	4.2	4.0	11.2
Others	17.5	1.8	1.6	74.8	7.4	4.1	3.3	0.0
Difference	16.8	1.2	0.5	0.8	0.5	0.6	1.6	11.2

GDP = gross domestic product.

Note: At the top we report the estimated equation of the saving rate using the whole sample. This equation is equivalent to the first column in Table 3. For each country, we selected countries/periods that have approximately the same level of per capita GDP and define them to be "Others". For each country, in the first row, we report the average of a savings determinant, e.g., GDP growth, for that country. In the second row, we do the same for "Others". In the third row, we report the difference in saving rate between the country and "Others" that is explained by the difference in the savings determinant. For example, 1.2% of the 16.8 difference in saving between Thailand and "Others" is accounted for by the difference in GDP growth between Thailand and "Others".

**Investment**

$$\text{Investment}_t = -0.553 + [0.482 * \text{GGDP}_t] + [0.363 * \text{GGDP}_{t-1}] + [0.125 * \text{PCGGDP}_t] - [0.007 * \text{GGDP}_t^2] + [0.030 * \text{Life}_t] - [0.123 * \text{Aged}_t] + [0.005 * \text{Youth}_t] + [0.014 * \text{FD}_t]$$

	<b>Actual Investment</b>	<b>GDP Growth</b>	<b>Lag GDP Growth</b>	<b>Youth Dependency</b>	<b>Aged Dependency</b>	<b>Life Expectancy</b>	<b>Financial Development</b>	<b>Country Dummy</b>
<b>PRC</b>	35.4	7.4	6.6	48.6	8.5	4.2	4.0	10.1
Others	19.9	1.5	1.2	81.0	6.7	4.0	3.2	0.0
Difference	15.5	2.8	2.0	-0.2	-0.2	0.7	1.1	10.1
<b>Singapore</b>	38.2	3.7	4.7	32.7	8.1	4.3	4.4	9.4
Others	24.7	2.0	2.2	41.2	14.8	4.3	4.0	0.0
Difference	13.4	0.8	0.0%	0.0	0.8	0.0	0.5	9.4

Note: At the top we report the estimated equation of the investment rate using the whole sample. This equation is equivalent to the fourth column in Table 3. Please refer to the table footnote for the Saving table above for further explanation.

We report the estimated saving equation at the top of Table 2. This estimated equation is equivalent to the first column in Table 3 below. This equation shows the relationship between the determinants of saving and the saving rate. Table 2 indicates that the PRC's average saving rate over the entire sample period is 36.2%. We selected countries/periods that have approximately the same level of per capita GDP as the PRC and define them to be "Others". Their average saving rate is 14.7%. Therefore, the PRC saves 21.5 % points more than other countries/periods of similar incomes. The table shows the difference in fundamentals between the PRC and others. For example, the PRC grew

by 7.4% on average while others grew by 1.4% on average. Multiplying the estimated GDP growth coefficient of 0.548 and the difference in average growth rate gives us 3.30%. This implies that the PRC's higher growth rate can explain 3.30% of the 21.5% difference in saving rate. We repeat the exercise for all other determinants of saving to estimate their contribution to the PRC's higher saving rate. In the last column we report the estimated coefficient of a dummy variable that takes the value of 1 if the observation is the PRC and 0 otherwise. This estimated coefficient (14.8%) represents the difference in saving that cannot be explained by the fundamentals. Overall about 69% of the PRC's higher saving rate (14.8% out of 21.5%) cannot be explained by fundamentals. Applying the same methodology, we find that fundamentals can explain 42% of Singapore's higher saving rate, 33% of Thailand's higher saving rate, 65% of the PRC's higher investment rate, and 70% of Singapore's higher investment rate.

**Table 3: Saving and Investment Regressions, Asia-Crisis Country Dummies and Time Fixed Effects**

	Saving			Investment		
	All Countries	Asia Crisis Country Dummy	Asia Country Crisis Sub-period Dummy	All Countries	Asia Crisis Country Dummy	Asia Country Crisis Sub-period Dummy
GDP Growth	0.548** [0.093]	0.515** [0.092]	0.528** [0.093]	0.482** [0.073]	0.458** [0.072]	0.444** [0.073]
Lagged GDP Growth	0.241** [0.084]	0.216** [0.083]	0.215* [0.084]	0.363** [0.063]	0.341** [0.063]	0.334** [0.063]
Per Capita Income	0.063 [0.047]	0.054 [0.047]	0.053 [0.047]	0.125** [0.035]	0.115** [0.035]	0.111** [0.035]
Per Capita Income Squared	-0.001 [0.003]	-0.001 [0.003]	-0.001 [0.003]	-0.007** [0.002]	-0.006** [0.002]	-0.006** [0.002]
Life Expectancy	0.065* [0.028]	0.061* [0.028]	0.064* [0.028]	0.030 [0.023]	0.028 [0.023]	0.031 [0.023]
Aged Dependency	-0.675** [0.097]	-0.571** [0.098]	-0.558** [0.099]	-0.123 [0.070]	-0.056 [0.071]	-0.045 [0.071]
Youth Dependency	-0.059* [0.026]	-0.037 [0.026]	-0.033 [0.026]	0.005 [0.021]	0.021 [0.021]	0.026 [0.021]
Financial Development	0.025** [0.005]	0.022** [0.005]	0.022** [0.005]	0.014** [0.004]	0.013** [0.004]	0.013** [0.004]
Asia Crisis Country Dummy		0.061** [0.013]			0.045** [0.010]	
Asia Crisis Country Dummy 1965–1969			0.035 [0.043]			0.003 [0.031]

*continued.*

**Table 3:** *continued.*

Asia Crisis Country Dummy 1970–1974			0.037 [0.038]			0.025 [0.028]
Asia Crisis Country Dummy 1975–1979			0.044 [0.037]			0.036 [0.028]
Asia Crisis Country Dummy 1980–1984			0.050 [0.034]			0.065* [0.028]
Asia Crisis Country Dummy 1985–1989			0.070* [0.034]			0.053 [0.028]
Asia Crisis Country Dummy 1990–1996			0.070* [0.034]			0.121** [0.028]
Asia Crisis Country Dummy 1997–1999			0.088** [0.034]			0.030 [0.028]
Asia Crisis Country Dummy 2000–2004			0.074* [0.034]			0.024 [0.028]
Observations	724	724	724	783	783	783
R-squared	0.44	0.46	0.46	0.30	0.31	0.32

Note: Asia crisis dummy is a dummy that takes the value of 1 if a country is one of the five crisis countries (Indonesia, Korea, Malaysia, Philippines, and Thailand), and 0 otherwise. Asia crisis dummy for a subperiod, e.g., 1990–1996, takes the value of 1 if a country is a crisis country *and* the observation is from that subperiod, e.g., 1990–1996. Refer to Table 1 for the definition of the other variables.

Table 3 above reports the results from a random-effect estimation of the saving and investment equations that controls for time effects. This allows us to examine the variation of the variables across countries. The estimates from the time fixed effects regressions allow us to check the estimates from the country fixed effects regressions in Table 1. To control for the effect of the Asian crisis, we also include an Asian crisis country dummy variable if the country is one of the five crisis countries (Indonesia, Korea, Malaysia, Philippines, or Thailand). To see the behavior of saving and investment in the crisis countries during different subperiods, e.g., 1990–1996) we also include an additional Asian crisis country dummy variable for each subperiod. We are particularly interested in the crisis subperiod—1997–1999—and the immediate precrisis and postcrisis subperiods.

Current GDP growth and lagged GDP growth exert a positive and highly significant effect on saving and investment for the whole sample as well as the Asian and non-Asian subsamples, suggesting that growth is one of the most important sources of variation in saving and investment rates across countries. Faster-growing countries are likely to save and invest more than slower-growing countries. Table 3 also provides strong empirical support for a hump-shaped investment function in which investment initially

rises with income but subsequently falls with income. The estimated coefficients for per capita income and per capita income squared, 0.125 and  $-0.007$  respectively, imply that investment peaks at an income of \$7,500. Life expectancy has a positive and significant impact on saving but an insignificant effect on investment. Both aged dependency and youth dependency have negative effects on the saving rate but the effect of the aged dependency is bigger and more significant. The highly significant nature of the estimated coefficients for aged dependency suggests that the share of the elderly in the population is an importance source of cross-country differences in saving. Table 3 also reveals a positive relationship between financial development and both saving and investment. Although financial development has a significant effect on both, it seems to have a somewhat bigger influence on saving.

The estimated coefficient of the Asian crisis dummy indicates that on average the saving rate and investment rate of the five crisis countries is 6.1% and 4.5% higher, respectively, than would be expected of countries with their characteristics. If we look at the subperiod dummies for the crisis countries in the saving regressions, the estimated coefficients are positive and significant in 1985–1990, 1990–1996, 1997–1999, and 2000–2004. Interestingly, the estimated coefficients are insignificant in all the earlier subperiods. This indicates that the fundamental determinants of saving better explain the five countries' high saving rate before the mid-1980s than after then. To the extent that we interpret unexplained saving as oversaving, there is some evidence of oversaving in the region since the mid-1980s. The coefficients become larger after the Asian crisis, which suggests that precautionary saving may have increased in the postcrisis period. Given the wrenching socioeconomic havoc wrought by the crisis, both households and firms have strong incentive to save more for unexpected contingencies. The heightened postcrisis caution is a perfectly rational response to the experience suffered during the crisis, and this weakens the case for equating unexplained saving as oversaving.

Turning to the subperiod dummies in the investment regressions, the estimated coefficients are positive and significant in 1980–1984 and 1990–1996. What is particularly striking is that the coefficient of the subperiod dummy is by far the highest during the immediate precrisis subperiod. More precisely, during 1990–1996, the investment rate of the crisis countries is 12.1% higher than would be expected of countries with their characteristics. This means that the fundamental determinants of investment fail to explain a large part of the region's precrisis investment boom. It is thus possible to interpret the positive and significant coefficient of the dummy for 1990–1996 as lending some support to the widely held view that the region suffered from a serious bout of overinvestment. Indeed it was widely believed that overinvestment and the consequent deterioration in the quality of investment eventually led to the collapse of investor confidence that brought about the Asian crisis. It is also interesting to note that the estimated coefficients for the postcrisis subperiod dummies are relatively small and insignificant. This implies that investment rates have come down to more sustainable levels in the postcrisis period as a result of restructuring and reform. The absence of

a negative coefficient in the postcrisis period does not support the hypothesis that the region has swung from precrisis overinvestment to postcrisis underinvestment.

What emerges from Table 3 is that the five crisis countries as a whole may have experienced overinvestment in the immediate precrisis period. The next logical question to ask is whether overinvestment was more pronounced in some of the crisis countries than others. It is conceivable that our finding of evidence consistent with overinvestment is driven by a few crisis countries. Table 4 below reports the results of running investment regressions when we include dummy variables for each of the five crisis countries. For each country dummy, we include subperiod dummies to check if there are any differences in the investment behavior of a country at different points in time. In particular, what interests us is whether there has been a noticeable increase in the investment rate in individual crisis countries. The most striking result in Table 4 is the positive and significant estimated coefficients for Malaysia and Thailand in the immediate precrisis period of 1990–1996. In contrast, the coefficients for Indonesia, Korea, and Philippines are also positive but smaller and insignificant. This suggests that the evidence of precrisis overinvestment is stronger for Malaysia and Thailand than for the other three countries. Lending further credibility to this finding is the fact that Malaysia and Thailand have suffered the most persistent decline in investment rate since the Asian crisis. Our lack of evidence of precrisis overinvestment in Indonesia, Korea, and Philippines may be due to the limited number of observations for each individual country. To address this possibility, we combine the observations of Indonesia and Korea into one dummy. The estimated coefficient for this combined dummy is positive and significant in the 1990–1996 subperiod, and thus provides somewhat stronger evidence of overinvestment in those two countries than when we use individual country dummies. Finally, the estimated coefficient of a dummy that combines the observations of the Philippines in addition to those of Indonesia and Korea is insignificant. This may be interpreted as evidence against precrisis overinvestment in the Philippines.

**Table 4: Investment Regressions with Individual Crisis Country Dummies**

	Investment						
	Indonesia	Malaysia	Korea	Philippines	Thailand	Indonesia+ Korea	Indonesia+ Korea + Philippines
GDP Growth	0.476** [0.073]	0.475** [0.073]	0.471** [0.073]	0.481** [0.073]	0.464** [0.072]	0.466** [0.073]	0.471** [0.073]
Lagged GDP Growth	0.361** [0.064]	0.364** [0.064]	0.353** [0.064]	0.362** [0.064]	0.348** [0.063]	0.351** [0.064]	0.352** [0.064]
Income	0.122** [0.036]	0.125** [0.036]	0.126** [0.036]	0.125** [0.036]	0.116** [0.035]	0.126** [0.035]	0.120** [0.036]
Income Squared	-0.006** [0.002]	-0.007** [0.002]	-0.007** [0.002]	-0.007** [0.002]	-0.006** [0.002]	-0.007** [0.002]	-0.006** [0.002]
Life Expectancy	0.032 [0.023]	0.031 [0.023]	0.031 [0.023]	0.031 [0.023]	0.031 [0.023]	0.032 [0.023]	0.031 [0.023]
Age Dependency	-0.115 [0.070]	-0.115 [0.070]	-0.101 [0.071]	-0.125 [0.070]	-0.078 [0.069]	-0.095 [0.071]	-0.100 [0.071]
Youth Dependency	0.009 [0.021]	0.006 [0.021]	0.011 [0.021]	0.005 [0.021]	0.020 [0.021]	0.011 [0.021]	0.012 [0.021]
Financial Development	0.014** [0.004]	0.014** [0.004]	0.014** [0.004]	0.014** [0.004]	0.012** [0.004]	0.014** [0.004]	0.015** [0.004]
Country 1965–1969 Dummy	0.000 [0.000]	-0.032 [0.062]	0.008 [0.062]	0.011 [0.062]	0.021 [0.060]	-0.012 [0.044]	0.010 [0.044]
Country 1970–1974 Dummy	-0.010 [0.062]	-0.024 [0.062]	0.007 [0.062]	0.017 [0.062]	0.113 [0.060]	0.000 [0.000]	0.000 [0.000]
Country 1975–1979 Dummy	0.003 [0.061]	-0.050 [0.061]	0.025 [0.062]	0.077 [0.061]	0.099 [0.060]	-0.012 [0.044]	0.037 [0.036]
Country 1980–1984 Dummy	0.068 [0.061]	0.048 [0.061]	0.032 [0.062]	0.043 [0.061]	0.102 [0.060]	0.041 [0.044]	0.050 [0.036]
Country 1985–1989 Dummy	0.090 [0.061]	-0.006 [0.061]	0.047 [0.062]	-0.025 [0.061]	0.127* [0.060]	0.022 [0.044]	0.039 [0.036]
Country 1990–1996 Dummy	0.076 [0.061]	0.127* [0.061]	0.091 [0.062]	0.001 [0.061]	0.264** [0.060]	0.111* [0.044]	0.058 [0.036]
Country 1997–1999 Dummy	-0.017 [0.061]	0.039 [0.061]	0.038 [0.062]	-0.034 [0.061]	0.101 [0.060]	0.039 [0.044]	-0.004 [0.036]
Country 2000–2004 Dummy	0.011 [0.061]	-0.003 [0.061]	0.048 [0.061]	-0.062 [0.061]	0.107 [0.060]	0.023 [0.044]	-0.001 [0.036]
Observations	783	783	783	783	783	783	783
R-squared	0.30	0.30	0.30	0.30	0.33	0.31	0.30

Note: Individual crisis country dummy is a dummy that takes the value of 1 if the observation belongs to a particular crisis country and 0 otherwise. For example, Indonesia dummy takes the value of 1 if the observation belongs to Indonesia. Indonesia dummy for a subperiod, e.g., 1990–1996, takes the value of 1 if the observation belongs to Indonesia *and* the observation is from that subperiod, e.g., 1990–1996. Refer to Table 1 for the definition of the other variables.



## V. Concluding Observations

The current account surplus of developing Asia has played a large and growing role in the global current account imbalances that underlie the global financial crisis. Those surpluses, which have emerged only since the Asian crisis, reflect an imbalance between saving and investment in the region. In this context, a key issue that needs to be examined is whether Asia's saving and investment rates are optimal. In this paper, we attempt to shed light on the key issue of whether there is oversaving and underinvestment in developing Asia by estimating saving and investment equations. Those equations attempt to explain saving and investment rates through a number of fundamental determinants of saving and investment. It is possible to interpret a large difference between actual levels and the levels predicted by the fundamentals as evidence of underinvestment or oversaving.

One noteworthy finding from our preliminary empirical analysis is that, as theory predicts, both saving and investment rates initially rise with income but beyond a certain income level, both begin to fall as income rises. However, the evidence of such a hump-shaped function is much stronger for investment than it is for saving. What is interesting and relevant for our purposes is that the threshold income level at which the positive relationship turns into a negative relationship occurs at a much lower income for investment than savings. This suggests a relatively simple and straightforward explanation for developing Asia's large and persistent current account surpluses. As the per capita income of fast-growing Asia rises, saving rates continue to rise but investment begins to fall. This explanation of current account surplus is more applicable to the crisis-hit economies than it is for the PRC, where investment rates remain high. More generally, our finding raises the possibility that Asia's current account surplus is structural and driven by the determinants of saving and investment.

The central objective of our paper is to empirically examine the issue of why developing Asia has experienced large and persistent current account surplus in recent years. A critical turning point in this context was the Asian crisis, since it is only since the Asian crisis that the region has emerged as a chronic surplus region. Interestingly and significantly, we find stronger evidence of oversaving than underinvestment in Asia in the postcrisis period. Our evidence also lends some support to those who contend that Asia suffered from overinvestment in the precrisis period rather than underinvestment in the postcrisis period. Our results indicate that the Asian crisis had a significant positive impact on the saving rate. One possible interpretation is that the painful memories of the devastating Asian crisis encouraged Asians to save more for precautionary purposes. Our evidence is interesting since it suggests that the region's persistently high saving rate has contributed more to its saving–investment gap than the drop-off of investment rate in the postcrisis period. The logical corollary is that policies aimed at encouraging consumption will be more effective in rebalancing growth toward domestic demand than policies geared toward promoting investment.

It should be emphasized that our empirical analysis of saving, investment, and current account surplus in developing Asia is by no means intended to be the final or definitive work on the issue. While our results are fairly robust in the sense that a number of robustness checks fail to overturn our basic results, there are a number of ways in which our analysis can be strengthened. First, it may be helpful to use more disaggregated investment data such as construction investment data and plant and equipment investment data. Second, it would be interesting to see how our results are influenced if we use more disaggregated saving data such as household, corporate, and government saving data. Third, and most importantly, data limitations prevent us from including a large number of explanatory variables that intuitively should influence investment. To name just a few examples, political stability, institutions such as rule of law, and physical infrastructure such as roads and ports are all variables affecting investment decisions. Data limitations also prevent us from using more accurate empirical measures for the variables in our investment equations. For example, our choice of the M2–GDP ratio, which is mainly relevant for the banking sector, as our measure of overall financial development was motivated largely by data availability. All in all, given the significant limitations and qualifications to our empirical analysis, we should exercise a great deal of caution in interpreting our results.

In particular, our failure to find strong evidence of underinvestment in the crisis countries in the postcrisis period does *not* necessarily suggest that investment rates are more or less at their optimal levels. It also does *not* suggest that regional governments should sit back and do nothing to improve the investment climate of their countries, which lags far behind that of the most competitive economies. Our result also highlights an analytical mistake often made in comparing the investment and GDP growth rates of the crisis countries between the precrisis and postcrisis period. This is the notion that somehow the sky-high investment and growth rates of the immediate precrisis period are natural norms to which the region must eventually return. In fact, a quick look over a longer time horizon reveals that the region's investment and GDP growth in the immediate precrisis period was abnormally high. More generally, it is worth remembering that the region's postcrisis investment and growth rates are still impressively high, both in historical terms and relative to other parts of the developing world.

In discussing the postcrisis decline in investment, we should not ignore the diversity of the crisis countries. For example, Malaysia and Thailand are middle-income countries seeking to move up the global value chain by shifting their output structure away from labor-intensive goods to skill-, capital-, and technology-intensive goods. Therefore, investment in those two economies is complicated by ongoing structural changes, and depends on an adequate supply of complementary factors such as skilled labor. Korea differs from the other four crisis countries insofar as it is a mature high-income economy where diminishing returns to capital may have already set in. Therefore, the decline in investment rate in Korea is least likely to reflect underinvestment. Finally, Indonesia and the Philippines are at income levels where we can expect high marginal returns to capital.

However, deep-seated structural weaknesses in the investment climate such as inflexible labor markets, poor infrastructure, and weak governance may be holding back investment and growth below their potential.

Within the confines of our incomplete analysis, we failed to find strong evidence of underinvestment in the postcrisis period. However, underinvestment and overinvestment are fluid imprecise concepts that must be used carefully. In particular, the definition of underinvestment and overinvestment necessarily depends on the definition of optimal investment levels, which, in turn, ultimately depends on the investment environment. Firms may be making the appropriate amounts of investments given the constraints they face, but mitigating those constraints will unleash the full investment potential of the private sector. For example, financial underdevelopment deprives firms of instruments to adequately cope with the risk and uncertainty that are intrinsic components of any investment. Investment may be more or less optimal given the low level of financial development but in this case the more fundamental policy challenge is to speed up financial development, which, in turn, will help to improve the investment environment. To cite another example, if labor market rigidities or poor infrastructure lower the returns to investment, the private sector may be investing at optimal levels *given* such impediments in the investment climate, but the relevant policy challenge is to alleviate such impediments so as to unleash potential investment.

Finally, if we assume that Asian countries are not unique, and Asian saving and investment rates will eventually settle down to those prevailing in the rest of the world, then the postcrisis drop-off in investment rate in the crisis countries should not be a source of undue concern for policymakers. On the other hand, if we assume that high saving and high investment is an intrinsic component of the Asian growth paradigm and they are essential ingredients of sustained growth in the future, then regional policymakers face stronger incentives for encouraging investment. The key issue then becomes, Why has investment failed to recover in the crisis countries in the postcrisis period? One possibility is that lack of adequate mechanisms for coping with risk and uncertainty in the postcrisis period is undermining corporate risk taking and hence corporate investment. Implicit government guarantees for investments and poor corporate governance, e.g., cross-subsidies between component firms of a conglomerate, may have encouraged firms to take risks and hence to make investments in the precrisis period. While such distortions may have led to overinvestment, they were nevertheless a mechanism for companies to cope with risk and uncertainty.

Therefore, the crisis economies may be suffering from a vacuum in their risk- and uncertainty-coping mechanisms since while improved public and corporate governance have weakened the precrisis mechanisms, no new mechanisms have emerged to take their place. In particular, strong and efficient financial systems allow firms to cope with risk and uncertainty but the region's financial systems continue to lag behind its real economy. According to this view, the region's financial underdevelopment is undermining

corporate risk taking, thus preventing a more robust recovery of the region's investment rates toward desirable levels. Hence the key to reviving investment momentum in the crisis economies lies in developing broader, deeper, and more liquid financial markets. Since financial development is necessarily a protracted and complex structural process, in the medium term there may be a case for greater government role in investment in the region. This role may take the form of either direct investment by the government, for example in infrastructure, or government guarantees of private sector investments. In either case, the government will be playing a bridging role to alleviate the medium-term vacuum in corporate mechanisms for coping with risk and uncertainty, a vacuum that needs to be filled by well-developed financial markets in the long run.

## Appendix 1: Description of Variable and Data Sources

We have converted all variables to 5-year averages of eight subperiods, beginning with 1965–1969 and ending with 2000–2004. We make exceptions for the sixth subperiod (1990–1996) and seventh subperiod (1997–1999) to better capture the impact of the Asian crisis. The total number of countries in our sample is 137 countries for the saving regressions and 141 countries for the investment regressions.

- *Saving ratio*: Average ratio of domestic savings to GDP for each 5-year period. Source: Bosworth and Chodorow-Reich (2007) and *World Development Indicators* (World Bank 2007).
- *Investment ratio*: Average ratio of domestic investment to GDP for each 5-year period. Source: Bosworth and Chodorow-Reich (2007) and *World Development Indicators* (World Bank 2007).  
*Real per capita GDP*: Log of purchasing power parity-adjusted real per capita GDP at the beginning of each period. Sources: Penn World Tables Ver. 6.2.
- *Growth rate of real per capita GDP*: Average growth rate for each 5-year period.
- *Financial development*: Nominal M2/nominal GDP. Source: IFS.
- *Aged dependency rate*: Ratio of those aged 65 and over to those aged 15–64. Source: *World Development Indicators* (World Bank 2007).

*Youth dependency rate*: Ratio of those under 15 to those aged 15–64. Source: *World Development Indicators* (World Bank 2008).  
*Life expectancy*: Expected life span at birth in number of years. Source: *World Development Indicators* (World Bank 2008).

In addition to the above variables, we also include dummy variables for the Asian crisis of 1997–1998. These take on the value of 1 if the observation belongs to a crisis country (Indonesia, Korea, Malaysia, Philippines, and Thailand) and 0 otherwise. Our motive for including the Asian crisis dummy is obviously to examine the impact of the crisis on saving and investment in those countries. We also include additional Asian crisis country dummy variables for each subperiod, e.g., 1990–1996, to examine whether saving and investment behaved differently in the crisis countries during different subperiods.

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## **About the Paper**

Donghyun Park and Kwanho Shin use macroeconomic data to empirically examine the role of oversaving and underinvestment as causes of developing Asia's post-Asian crisis current account surplus. They find stronger evidence of oversaving than underinvestment. This suggests that the key to rebalancing the region's growth toward domestic demand lies in strengthening consumption rather than investment.

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