

**THE DETERMINANTS AND PROSPECTS OF ECONOMIC
GROWTH IN ASIA***

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This paper analyzes Asia's growth experience in a broad historical and international context. East Asian countries grew faster than the rest of the world for four key reasons: they had substantial potential for catching up, their geography and structural characteristics were by-and-large favorable, demographic changes worked in favor of more rapid growth, and their economic policies and strategy were conducive to sustained growth. Although the financial crisis of 1997 abruptly brought a halt to Asia's period of robust growth, there was little in Asia's fundamental growth strategy that inevitably led to the crisis. The key to the crisis was too much short-term capital flowing into weak and under-supervised financial systems. This suggests that with better financial management and a return to the core policies that resulted in rapid growth, the East Asian economies can again return to sustained growth. [O11, O40, O53]

1. INTRODUCTION

The countries of East and Southeast Asia grew extremely rapidly from the 1960s through the mid-1990s. The eight best performers -- Hong Kong, Singapore, Taiwan, Korea, China, Malaysia, Thailand, and Indonesia -- grew at an

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average of over 5.5% per year in per capita terms between 1965 and 1995. With the exception of several European countries in the immediate post-World War II period, growth rates of this magnitude and duration are apparently unprecedented in history. Although Asia's period of rapid economic growth has come to an end, at least temporarily, with the Asian financial crisis, the region's rapid economic growth during the past three decades continues to fuel an intense debate among economists and policymakers. Was the rapid growth the result of a unique model of economic development? Are there lessons from the East Asian experience that are applicable to other developing countries? Did the strategies that led to Asia's rapid growth inevitably lead to the financial crisis? Can the East Asian countries resume robust long-term growth?

This paper begins to address these critical questions by placing Asia's growth experience in a broad historical and international context. We explore Asian growth patterns by quantifying the empirical relationships between long-term growth and various structural and policy variables. Our objective is to understand the critical dimensions in which the East Asian countries differed from other countries that allowed them to achieve rapid growth, and to explore the extent to which those dimensions are unique to these fast-growing economies. Our basic conclusion is that East Asia's growth record can indeed be understood according to the patterns of global growth.¹ We also explore the extent to which East Asia's rapid growth can be emulated by other Asian countries, particularly the slower growing countries of South Asia. We believe that the East Asian record is broadly transferable to many other countries of Asia, and especially to the countries of South Asia. At the same time, we stress that parts of Asia have physical constraints that will limit their dynamism. For example, the mountainous, landlocked countries of Central Asia and the distant, lightly populated states of the Pacific Islands will have a difficult time generating the same success in export-led growth as the fast-growing East Asian economies.

The financial crisis that began in the middle of 1997 abruptly brought a halt to Asia's period of robust growth. In our interpretation, the crisis was at least as much due to weaknesses in global capital markets and policy mismanagement in the early stages of the crisis, as to fundamental problems in the crisis economies. Our conclusion is that there was little in Asia's fundamental growth strategy that inevitably led to the crisis, with one key exception: the Asian countries most adversely affected by the crisis mismanaged the process of financial liberalization in the early 1990s. The key to the crisis was too much short-term capital flowing into weak and under-supervised financial systems. This suggests that with better

¹Throughout this paper, "East Asia" refers to the ten countries for which we have complete data in the region: the PRC, Hong Kong, Indonesia, Korea, Malaysia, Papua New Guinea, the Philippines, Singapore, Taipei, China, and Thailand. The "Four Tigers" include Hong Kong, Korea, Singapore, and Taipei, China. "Southeast Asia" refers to Indonesia, Malaysia, the Philippines, and Thailand; and "South Asia" includes Bangladesh, India, Pakistan, and Sri Lanka.

financial management and a return to the core policies that resulted in rapid growth, the East Asian economies can again return to sustained growth. As these economies become richer, and the population ages, growth rates will gradually slow over time. Nevertheless, most Asian countries continue to have the capacity for sustained long-term growth.

We should be clear at the outset that the cross-country growth framework that we follow is not designed to answer all of the many questions about the process of long-term growth. The approach does not identify all of the specific factors associated with economic growth across countries, nor does it in every case clarify the precise channels through which certain variables affect growth. Rather, it is an attempt to distill the vast amounts of information available on dozens of countries into a tractable, parsimonious framework that identifies a small set of variables that stand out as the factors most strongly associated with rates of growth around the world. This approach allows us to discern broad trends across countries that illuminate some of the key differences between fast and slow growing economies. It also provides a foundation to consider the prospects for long-run growth in the future in Asia and other developing regions.

Our analysis proceeds as follows. In Section II, we outline the basic cross-country growth framework. Section III discusses the empirical results from estimating the model for a large sample of countries. Section IV estimates the quantitative importance of various policy, structural, and demographic factors in accounting for the differences in growth rates between East Asia and other developing regions. Section V briefly discusses the East Asian financial crisis and its implications for long-term growth. Section VI provides some concluding observations.

2. THE BASIC GROWTH FRAMEWORK

The basic empirical framework is based on an extended version of the neoclassical growth model, as described by Barro (1991), Barro and Lee (1994), and Sachs and Warner (1995a and 1995b). This model predicts conditional convergence of income: a country with a low initial income relative to its own long-run (or steady-state) potential level of income will grow faster than a country that is already closer to its long-run potential level of income. The fundamental idea is that the farther an economy is located from its steady-state income level, the greater is the gap of reproducible (physical and human) capital and technical efficiency from their long-run levels. The gap of existing capital and technology from steady-state levels offers the chance for rapid “catching up,” via high rates of capital accumulation as well as the diffusion of technology from more technically advanced economies. Hence, the lower is the initial level of per capita income relative to steady state, the higher will tend to be the subsequent growth. This framework presumably helps to explain why wealthier countries, with relatively large capital stocks and already operating near the world’s technological frontier,

tend to grow more slowly than some lower-income countries that are catching up with the leaders.

If we could presume that all countries have the same steady-state income levels, then the neoclassical approach would imply, simply, that poorer countries would grow faster than richer countries. In fact, such a pattern is not generally observed. The cross-country growth framework therefore builds in a crucial assumption, that countries have *distinctive* long-term levels of per capita income to which each is converging. The long-term levels depend on two main kinds of variables: economic policies and economic structure. Countries with favorable economic policies and economic structure (as identified below) tend to have a higher steady-state level of income, and therefore faster growth at any given initial level of income.

We should stress the precise meaning of “long-term” or “steady-state” as used in this analysis. In our interpretation, the steady state to which an economy is converging at any time t is conditional on the actual policies in place at time t . For example, an economy that is closed to international trade at time t is found to have a lower “steady-state” income level than an open economy. Strictly speaking, we are measuring the “steady state” on the assumption of *no future changes* in the explanatory (policy and structural) variables. If a closed economy subsequently opens to trade, then we interpret this as raising the steady-state level of income to which the country tends to converge.

The basic model is summarized in two equations:

$$\log(QL_t^i) = a + bZ_t^i \quad (1)$$

$$d\log(Q_t^i)/dt = c[\log(QL_t^i) - \log(Q_t^i)] \quad (2)$$

According to equation (1), the logarithm of the long-run steady-state level of output per worker in country i , denoted QL_t^i , is a function of a vector of variables Z_t^i , which includes both policy and structural variables as of time t . According to equation (2), the instantaneous proportionate growth rate of output per worker, $d\log(Q_t^i)/dt$, is proportional to the gap between the long-run level and the current level of output. By combining (1) and (2), we arrive at:

$$d\log(Q_t^i)/dt = a' + b'Z_t^i - c\log(Q_t^i) \quad (3)$$

where $a' = ac$ and $b' = bc$

This equation describes current economic growth per worker as a function of structural and policy variables as well as current income. Of course, current output, all other things equal, has a negative effect on growth: countries with higher output have less chance to “catch up” with their own potential. The next step in getting an estimated cross-country equation is to integrate the differential equation in (3) between time periods 0 (the initial year) and T (the final year). Simple manipulation of (3) gives:

$$(1/T) \log(Q_T^i/Q_0^i) = a'' + b'Za^i - c'' \log(Q_0^i) \quad (4)$$

$$\text{where } a'' = a(1 - e^{-cT})/T, \quad Za^i = (e^{-cT}/T) \int (e^{ct} Z_t^i) dt, \quad c'' = (1 - e^{-cT})/T$$

Note that Za^i is, essentially, an average value of Z^i during the period of observation. Note that in a growth equation estimated over the time period 0 to T, we use *initial income* at time 0 rather than average income during 0 to T, as the level of “current” income which determines the growth over the period of observation. Finally, consistent with most other growth studies, we would like to express the dependent variable as the growth in income per capita (rather than per worker). We note that:

$$Q_T^i/Q_0^i = Y_T^i/Y_0^i * N_T^i/N_0^i * W_0^i/W_T^i \quad (5)$$

where Y_T^i , N_T^i , and W_T^i denote per capita income, population, and labor force, respectively, in country i at time T . Substituting equation (5) into (4) and rearranging yields:

$$(1/T) \log(Y_T^i/Y_0^i) = a'' + b'Za^i - c'' \log(Q_0^i) + (1/T) \log(W_T^i/W_0^i) \\ - (1/T) \log(N_T^i/N_0^i) \quad (6)$$

The two final terms in equation (6) are the instantaneous growth rate of the labor force and the total population, respectively. Equation (6) is the key equation for estimation.

In order to account for cross-country difference in growth rates, we consider a wide variety of policy and structural variables Z^i that have been proposed by earlier studies as important determinants of long-run income, and therefore current

economic growth. We categorize these explanatory variables into four broad dimensions: (1) initial conditions (initial per capita GDP and initial human capital stock); (2) natural resources and geography, including natural resource intensity, landlockedness, location in the tropics, and the ratio of coastline distance to land area; (3) policy variables (government savings, quality of institutions, and openness); and (4) demographic variables (growth of the working age population, growth of the total population, and initial life expectancy at birth). A summary of the variables, grouped by regions, is presented in Table 1.

A. Initial Conditions

In the basic framework, for given values of the other explanatory variables, the model predicts that a country with a lower initial per capita GDP is in a more favorable position for future growth. However, it is well-known that, without controlling for other factors, poor countries do not generally grow faster than rich countries. Empirical evidence shows that without controlling for other variables, there is no simple relationship between income levels and growth rates (Barro, 1991).

However, a considerable body of empirical evidence has shown that once important structural and policy variables are taken into account, poor countries indeed grow faster than rich countries (Barro, 1991, Mankiw, Romer, and Weil, 1992, Barro and Sala-i-Martin, 1992, Barro and Lee, 1994, Sachs and Warner, 1995a). This outcome has become known as conditional convergence. Sachs and Warner (1995a), for example, found that poor but open economies tend to grow faster than rich open countries. Countries that isolate themselves from the global economy are in a much weaker position to take advantage of new technologies, or to develop as extensive a division of labor, and therefore show less tendency to catch up. For the group of countries that have been most open to the global economy, there is a strong negative relationship between the initial level of income and the subsequent rate of economic growth.

The tendency for poor countries to grow faster than rich countries has two important implications in the Asian context. First, it provides one piece to the puzzle of explaining East Asia's rapid growth during the last thirty years. Low levels of income in the 1960s provided the *potential* for rapid growth. Importantly, this reasoning also implies that some of the other, slow-growing Asian countries have the capacity for more rapid growth in the future. Second, as East Asian countries become wealthier, their growth rates are likely to slow. Japan is a clear example of this pattern; its expansion slowed considerably during the 1980s as it narrowed the gap in per capita income with Europe and the United States (Figure 1). When income per capita in Japan was less than 50% of the U.S. average in the 1960s, annual growth exceeded 9%. By the time Japan had reached 70% of U.S. income, its annual growth rate had slowed to 4%, and now that its income is about 90% of the U.S. level, its growth rate is closer to 2%.

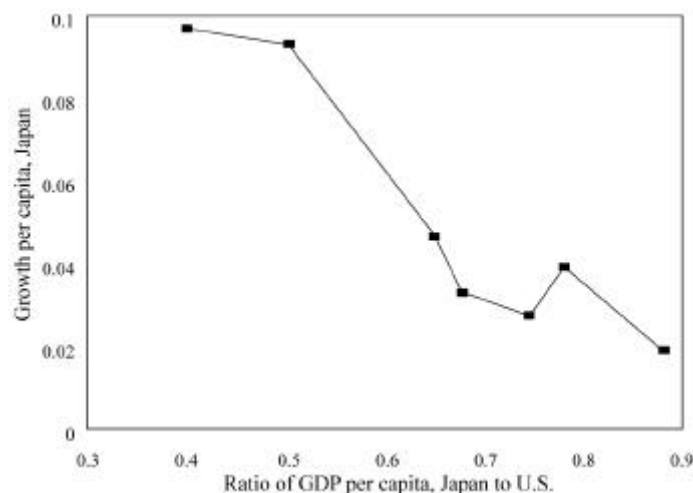


Figure 1. Japan's Relative Income Level and Growth Rate
5 year averages, 1960-94

The data on 1965 income in Table 1 indicate that all three groups of Asian countries were well placed for rapid growth, based on their relatively low levels of income. But obviously there is more to the story -- sub-Saharan Africa and South Asia had the lowest initial income levels, and therefore had the potential, all other things equal, to grow more rapidly than the East Asian countries. Clearly, differences in long-term potential income, as conditioned by policies, structure, and demography, have played a role in the differences in growth within Asia and between East Asia and the rest of the world.

Human capital, measured in terms of levels of education and health, is often suggested as a possible source of growth. A better educated, more skilled workforce is likely to be able to produce more from a given resource base than less-skilled workers. Following Barro and Lee (1996), we use the average years of secondary schooling for the working-age population at the start of the period of observation (1965) as our primary measure of the initial skill level of the population. The Four Tigers' average of 1.5 years of secondary schooling was the highest of the developing country regions in our sample.

B. Natural Resources and Geography

We examine four kinds of structural variables that may represent natural barriers to economic growth. The first variable measures natural resource

abundance, and is calculated as the ratio of primary-product exports to GDP in 1971 (the earliest year in which data are available for all countries). Sachs and Warner (1995b) observe that natural resource-abundant economies have tended to grow *more slowly* than resource-rich economies during the past twenty years. For example, countries with primary product exports valued at between 0 and 5 percent of GDP recorded growth per person of over 3.2 percent between 1965 and 1990, whereas countries with primary product exports equivalent to over 20 percent of GDP grew just 0.8 percent per person per year. This pattern continues to hold once other variables, including initial income, geography, government policies, are taken into account.

The reasons for this negative relationship remain unclear. After all, natural resource exports can provide foreign exchange earnings and finance investments in infrastructure, health, and education. Indonesia and Malaysia are examples of how governments can use the revenues earned from natural resource exports to boost incomes and improve welfare. During the last century, exports of natural resources also played a critical role in supporting sustained growth and development in several countries, including the United States and Argentina.

Over the last thirty years, however, many countries with abundant natural resources have performed poorly. In Mexico, Venezuela, Nigeria, Zambia, and a host of other countries, the initial fillip to income from natural resource exports was followed by long periods of stagnation or even decline. There are several possible explanations for this poor performance. First, natural resource abundance tends to produce a “Dutch Disease” phenomenon, in which a strong resource base causes an appreciation of the real exchange rate, and thereby renders unprofitable an export-oriented or import-competing manufacturing sector. Second, profitable investments in the resource sector itself tend to be limited in scope, so that after the resource sector is developed, it usually does not generate continuing marked improvements in technology and job growth. Third, it is possible that resource-abundant economies may provide greater opportunity and incentive for rent seeking and corruption, particularly if the resources are government owned, or heavily taxed. Fourth, resource abundant countries tend to follow boom-and-bust cycles in line with sharply fluctuating prices of their export commodities, complicating macroeconomic management, creating uncertainty, and undermining long-term investment. Fifth, long-term structural trends in commodity markets may have put primary producers at a disadvantage, as was argued long ago by Raul Prebisch (1950, 1959) and Ragnar Nurske (1961). Although there is much debate on these trends, the evidence appears to support both a gradual decline in commodity prices and slower growth in demand for primary products, especially since 1970.²

The second structural variable we examine is access to the sea, as indicated by whether or not a country is landlocked. Landlocked countries have enormous

²For summaries of these studies, see Sapsford and Balasubramanyam (1994) and Balassa (1989).

cost and risk disadvantages that they must overcome to compete on world markets. Shipping costs for all imported goods are much higher, as landlocked countries must pay for transport by road and rail, as well as the costs associated with crossing at least one additional international border. The cost of extra shipping is magnified by the uncertainty of inland road conditions and customs clearance, which lead to higher insurance costs for each shipment. Their only alternative is to ship by air, which can be prohibitively expensive for many goods.

A third, and closely related structural variable is the ratio of a country's coastline distance to its total land area. This indicator gives a rough measure of the share of the population with relatively easy access to the sea. In countries where this ratio is relatively high (such as island economies), a larger share of the population is likely to be engaged in activities grounded in international trade. Adam Smith, who pointed out in *The Wealth of Nations* the difficulties facing landlocked countries, also discussed the importance of access to the sea *within* countries. He predicted that an extensive division of labor would develop mainly where sea-based trade was feasible. "[S]o it is upon the sea-coast, and along the banks of navigable rivers, that industry of every kind naturally begins to subdivide and improve itself, and it is frequently not till a long time after that those improvements extend themselves to the inland part of the country." China represents an excellent example of this phenomenon, with basically all of its fast-growing economy activity located along the Southeast coastline, and little dynamism in its more inland regions. Smith's example was England, where he attributed the economy's relatively high productivity to, in part, its access to the sea. "England, on account of the natural fertility of the soil, of the great extent of the sea-coast in proportion to that of the whole country, and of the many navigable rivers which run through it, and afford the convenience of water carriage to some of the most inland parts of it, is perhaps as well fitted by nature as any large country in Europe, to be the seat of foreign commerce, of manufactures for distant sale, and of all of the improvements which these can occasion." Our variable, the ratio of coastline distance to total land area, is Smith's suggested specification. In the terminology of the neoclassical model, we expect higher values of this indicator to be associated with higher steady state levels of GDP, and therefore higher growth rates. The Four Tigers' ratio of coastline to land area was by far the highest of any region in the world, with Southeast Asia's the second highest.

Our fourth structural variable is location in the tropics. Very few countries located in the tropics have achieved sustained economic success. Tropical countries face several important disadvantages. The prevalence and burden of infectious diseases is much higher in the tropics than in more temperate climates. Malaria, schistosomiasis, and many other debilitating maladies are most prominent in tropical climates. These diseases reduce worker productivity and add to the cost of health care. In addition, tropical agriculture is hindered by warmer temperatures and torrential rains (which tend to leech soils of important nutrients). There are some exceptions -- such as the richly fertile volcanic soils of Java -- but

such cases are relatively rare. As a result of these influences, tropical climates tend to support much lower population densities and thereby a less extensive division of labor than more temperate climates. Singapore and Hong Kong have been much less affected by their location in the tropics, probably because as city states, they have always had a relatively large share of manufacturing and small share of agriculture in GDP. The tropics are likely to have a far smaller deleterious impact on manufacturing firms in the tropics than on agriculture. In the closed space of a factory, air conditioning can compensate for hot, humid weather, putting tropical manufacturing on a par with factories in more temperate climates. This reasoning suggests the possibility of a tropical poverty trap. Agricultural-based economies will have great difficulty in generating sustained growth and affecting the transformation to a manufacturing-based economy. The few economies that are able to make the jump to manufacturing -- like Singapore and Hong Kong -- are in a much better position for rapid growth and catching-up with the world economic leaders.

C. Policy Variables

The first policy variable we consider is openness to international trade. Open countries have greater access to new technologies, larger markets, and improved management techniques. They also tend to have fewer distortions and better resource allocation, and their firms are more likely to be competitive on world markets. We use the openness measure constructed by Sachs and Warner (1995a). This index is the fraction of years between 1965 and 1990 that the country was considered to be open to trade. The judgement on the country's openness is made on the basis of four policy dimensions: (i) average tariff rates, (ii) extent of imports governed by quotas and licensing, (iii) average export taxes, and (iv) the size of the black market premium on the exchange rate. A country is considered to be open if it meets minimum criteria on all four aspects of trade policy: average tariffs must be lower than 40 percent; quotas and licensing must cover less than 40 percent of total imports; the black market premium must be less than 20 percent; and export taxes should be moderate.

Second, neoclassical growth theory suggests that an increase in the national saving rate will raise the growth rate associated with any level of income. However, there is a strong simultaneous relationship between aggregate saving and growth -- growth may influence saving as much or more than saving affects growth. The precise nature of the saving-growth relationship remains unclear.³ As an alternative, we explore the relationship between government saving (defined as the difference between current government revenues and current government expenditures) and economic growth. There are two distinct channels through which government budget policies are likely to influence growth. First, the more

³See Radelet, Sachs, and Lee (1997) for more discussion of these issues.

governments save, the more the nation as a whole saves (though the relationship is not one to one). This adds to the pool of finances available for investment. Second, higher government saving tends to be indicative of sounder overall macroeconomic management, including lower rates of inflation, prudent exchange rate policies, and capable monetary management. Stable economies, in turn, lower the risks for investors and therefore lower the cost of capital for long-term investments. Government savings in the Four Tigers were far higher than any other region of the world between 1965-90, averaging 5.6 percent of GDP, whereas governments in the four Southeast Asian countries saved 3.5 percent of GDP. By comparison, government savings in South Asia averaged just 1 percent of GDP during the period.

A third policy indicator is a measure of the quality of public-sector institutions and their relationship to the functioning of markets. We use the index from Knack and Keefer (1995), which is based on data compiled in the International Country Risk Guide (1995). The overall index is itself an average of five indicators of the quality of public institutions, including: (i) the perceived efficiency of the government bureaucracy; (ii) the extent of governmental corruption; (iii) efficacy of the rule of law; (iv) the presence or absence of expropriation risk; and (v) the perceived risk of repudiation of contracts by the government. Each country is scored on these five dimensions on the basis of surveys of business attitudes within the countries. The sub-indexes on the five measures are then averaged to produce a single, overall index that is scaled between 0 and 10. The overall index therefore aims to measure the security of property and contractual rights, the efficiency of the government's intervention in markets, and the allocation of public goods. A lower index indicates poorer quality institutions, and thus higher investment risks and production costs. The Four Tigers' institutions score very high, registering 7.8 on a scale of 1 to 10. For all the other developing regions, the average index ranges between 4.3-4.9. Malaysia and Thailand both score above 6.0, and India records 5.8. The lowest institutional scores in Asia were recorded by Bangladesh (2.7), the Philippines (3.0), and Indonesia (3.7). These scores compare with an average score of 4.5 for both Latin American and sub-Saharan African countries included in the International Country Risk Guide data.

D. Demographic Variables

Economists have generally given scant attention to the relationship between demographic change and economic growth. Explorations of the role of demography are usually limited to aggregate population growth, which has yielded mixed results. In this paper, we explore the role of changes in the structure of the population, as well as its size, in economic growth. We do so by including the growth rates of both the working-age population (aged 15-64) and the total population in the

growth equation.⁴ For a given population growth rate, faster growth in the working-age population increases the size of the workforce, which should be positively related to output growth. At the same time, for a given growth rate of the working-age population, faster overall population growth implies an increase in the relative size of the dependent population. Therefore, the growth of GDP per capita is favored when the growth of the working-age population outpaces overall population growth; and GDP growth per capita is reduced in the opposite case, when population growth outpaces the growth of the working-age population.

Our basic growth specification in equation (6) stipulates a precise relationship between income growth, population growth, and labor force growth. It predicts that for a given population growth rate, a one percentage point increase in the growth rate of the labor force should lead to a one percentage point *increase* in the growth rate of per capita income. Similarly, for a given growth rate of the labor force, a one percentage point increase in the growth rate of the total population should lead to a one percentage point *decrease* in the growth rate of per capita income. In the four fast-growing East Asian economies, between 1965-90 the working age population grew one percentage point faster than the total population. In Southeast and South Asia, the differences were 0.55 and 0.25 percentage points, respectively. This suggests that the Four Tigers were given an important demographic boost which raised growth rates.

Our final demographic variable is Life Expectancy at Birth (LEB), measured in the initial year of the growth period. LEB can be viewed as a broad measure of the overall health of the population, encompassing the prevalence of disease and illness of the workforce. A higher life expectancy would tend to indicate a healthier, more productive workforce. LEB also measures changes in population structure, with a higher LEB associated with lower mortality rates and a longer life span for older workers and retirees. In the data, East Asia recorded a much higher level of life expectancy than the other developing countries in 1965. Life expectancy at birth was already 63 years in the Four Tigers in 1965, whereas it was only 49 years and 52 years, respectively in South and Southeast Asia. These lower levels presumably reflect both inherent geographic deficits (i.e. a tropic climate, prone to microparasitism) and lags in public health as of 1965.

3. ESTIMATION RESULTS

In Table 2, we present the results of our regression estimates, using the framework of equation (6) and the explanatory variables just described. The dependent variable is the annual growth rate of real GDP per capita between 1965-90, as measured by the Penn World Tables, version 5.6.⁵ The regressions apply to a data set

⁴We are grateful to David Bloom and Jeffrey Williamson for suggesting this specification.

⁵The PPP-adjusted income data from the Penn World Tables for China differ widely from other sources. Therefore, we used the growth rate data in Gang, Perkins, and Sabin (1997).

for 78 countries, including all countries for which we could obtain a complete data set for all variables. Column (1) of Table 2 shows the results of the basic regression.

Table 2. Cross Country Growth Regressions, Base Specification
Dependent Variable: Growth of real per capita GDP, 1965-90 (78 countries)

Independent Variable	Coefficients (t-statistics)		
Initial Output per worker (log)	-1.978 (-9.42)	-1.975 (-8.78)	-2.137 (-8.34)
Schooling (log)	0.208 (1.53)	0.200 (1.43)	0.205 (1.43)
Natural Resource Abundance	-2.430 (-2.36)	-2.439 (-2.31)	-2.217 (-2.04)
Landlocked	-0.605 (-2.28)	-0.613 (-2.27)	-0.548 (-2.01)
Tropics	-1.263 (-4.29)	-1.337 (-4.42)	-1.118 (-3.03)
Coast / Land area	0.262 (2.37)	0.249 (2.18)	0.269 (2.30)
Government Savings Rate	0.123 (4.94)	0.122 (4.81)	0.123 (4.83)
Openness	1.965 (6.20)	1.871 (5.61)	1.669 (4.58)
Quality of Institutions	0.248 (3.47)	0.238 (3.28)	0.285 (3.22)
Life Expectancy	0.336 (2.81)	0.329 (2.72)	0.313 (2.55)
Life Expectancy Squared	-0.002 (-2.23)	-0.002 (-2.14)	-0.002 (-2.01)
Growth of Working Age Population	1.129 (2.86)	1.082 (2.61)	0.977 (2.20)
Growth of Total Population	-0.774 (-1.83)	-0.731 (-1.64)	-0.596 (-1.22)
East/Southeast Asia		0.197 (0.51)	-0.209 (-0.42)
South Asia		-0.395 (-0.95)	-0.824 (-1.58)
Latin America			-0.348 (-0.82)
Sub-Saharan Africa			-0.840 (-1.59)
Adjusted R ²	0.87	0.86	0.86

Note: Constant term not reported.

A. Basic Results

The results show strong evidence for conditional convergence. For the basic set of results in column 1, the coefficient on the log value of initial GDP is highly significant, and the estimated coefficient is -1.98 ($t = -9.42$). Countries with lower incomes in 1965 grew faster than countries that began with higher incomes, after controlling for the other variables that influence the steady-state level of income. Specifically, a country at half the income level of another country tends to grow by 1.4 percentage points ($= 1.98 \times \ln(2)$) faster than the richer country, assuming the same level of long-term income. Much of the variation in cross-country growth is the result of poorer countries catching up with richer countries. For example, since average income in the Four Tigers was one-sixth the U.S. level in 1965, the catch-up factor boosted their growth rates by 3.5 percentage points a year relative to the U.S. between 1965 and 1990.

The estimated coefficient on the initial educational attainment variable (the log value of mean years of secondary schooling) is positive, but is not statistically significant. This result is consistent with other studies that have found a weak direct link between education and growth. One possible explanation is measurement problems. For example, available data do not make any adjustment for the quality of schooling, which arguably is a key determinant of human capital accumulation. It is also possible that low levels of schooling in 1965 implied faster increases in schooling after 1965, and therefore a faster improvement in human capital in the subsequent 25 years.

The estimated coefficient for the natural resource abundance variable is -2.43 ($t = -2.36$), indicating that during the period 1965-90, countries with abundant natural resources grew more slowly than other countries. This result is consistent with that of Sachs and Warner (1995b). The finding suggests that one reason the Four Tigers grew rapidly was that they were resource poor, which may have induced them to turn to manufacturing more quickly and vigorously than other countries. Of course, there were exceptions to the general correlation of natural resource abundance and slow growth: resource-poor India grew slowly while resource-rich Malaysia and Indonesia both recorded strong growth rates. The negative relationship between resource abundance and growth is a tendency, not a straightjacket. Natural resource abundance is not necessarily an impediment to growth, but it creates challenges in economic management with which many countries have had difficulty coping. As a result, resource abundant countries have tended to grow more slowly than others.

The regression results confirm our hypotheses about geography: countries that were landlocked, or whose populations had relatively little access to the sea, or that were located in the tropics all recorded lower growth rates between 1965-90. Landlocked countries grew on average six-tenths of a percentage point more slowly than other countries between 1965 and 1990, accounting for a cumulative 14 percent lower level of income by the end of the period. Similarly, countries

with less coastline relative to their total area grew significantly more slowly than other countries, after controlling for other variables.

Location in the tropics had a very strong, negative impact on growth. We find that countries located in the tropics grew 1.26 ($t = -4.29$) percentage points slower than countries located in more temperate zones. More specifically, the estimated coefficient on tropics (-1.26), together with the estimated coefficient on initial income (-1.98), imply that the long-run level of income in countries in the tropics is only 53% ($1/e^{(-1.26/-1.98)}$) of the long-run level for countries outside of the tropics. Only eight countries in the tropics (out of sixty tropical countries for which we have data) recorded growth rates in per capita GDP in excess of 3 percent between 1965-90. Five were in East Asia (Singapore, Hong Kong, Malaysia, Indonesia, and Thailand), and the other three were very small island economies (Cape Verde, Barbados, and the Seychelles), which because of their geographic separation may have been spared some of the worst effects of endemic tropical diseases.

The regression results forcefully point to the role of policy variables in determining the rate of economic growth. We find that openness to international trade is very strongly and positively associated with long-term growth, as much theory and previous evidence has indicated. We find that an economy open to trade during the entire period 1965-90 grew 1.97 percentage points faster per year ($t = 6.20$) compared with an economy that was completely closed throughout the period. This result is consistent with Sachs and Warner (1995a), and indeed a long tradition of studies of growth and trade, which have shown that integration with the global economy is associated with faster growth. Trade openness conveys a variety of advantages to a developing economy: it allows countries to undertake more specialized production processes, provides a means to earn foreign exchange to purchase capital goods imports, facilitates inflows of technology from more advanced economies, and provides competitive pressures necessary to increase efficiency and productivity.

The East Asian countries were among the most open of all developing countries between 1965 and 1990. Following an initial stage of modest import substitution, most of the fast-growing Asian countries lowered import tariffs and export taxes, removed quantity restrictions on trade, and reduced the barriers to international flows of capital. Although import barriers remained high in some sectors in certain countries, each of the successful East Asian countries took steps to ensure high profitability for manufactured exporters. Although to some degree Asia's success in manufactured exports can be understood as the outcome of market forces, more than markets were required. The successful Asian economies introduced measures to link multinational production enterprises and their technologies to domestic production processes. The precise strategies varied by country, and included facilitating foreign direct investment, joint ventures, own-equipment manufacturing (OEM) arrangements, licensing agreements, duty exemption systems, export processing zones, and bonded warehouses. These various systems gave exporters easy access to inputs at world

market prices, allowed them to overcome the inefficiencies that plagued the rest of the domestic economy, and facilitated direct relationships with leading-edge, competitive firms. In a nutshell, Asia's successful industrial policy was the promotion of labor intensive manufactured exports, not "picking winners" in heavy industry, as is sometimes argued.⁶

The results show that other policies also supported rapid growth. Government saving has a positive and statistically significant impact on growth. The estimated coefficient implies that a 10 percentage point increase in the government saving-GDP ratio is associated with higher growth of 1.2 percentage points per year. Countries in which governments kept spending programs under control and realized larger surpluses on their current budget grew substantially faster than those with smaller surpluses or deficits. Such surpluses financed government investment programs, and had a net positive impact on total national saving.

Our third policy related variable is the quality of government institutions vis-à-vis market regulation. As expected, countries with more constructive interactions between the government and the market tended to record faster economic growth. According to our estimation results, each increment of 1.0 in this index (which is measured on a scale from a low of 0 to a high of 10) is associated with an increase in the growth rate of 0.25 percentage points. Thus, the difference between the Philippines' relatively poor score on institutional quality (2.97) and Singapore's high rating (8.56) accounts for a 1.4 percentage point difference in their average annual growth rates.

Finally, demographic variables are strongly associated with differences in growth rates. Both of the population change variables are of the expected sign and approximately the expected magnitude. As we discussed previously, in theory, the estimated coefficients for the growth rates of the working-age population and the total population should be 1 and -1, respectively. The empirical results do not permit rejection of these hypotheses, since the estimated coefficients (1.13 and -0.77) are not significantly different from 1 and -1, respectively. Bloom and Williamson (1997) explore these issues in much more depth. The important, and usually unrecognized point, is that part of East Asia's rapid growth in income is simply due to the rising share of the working age population among the total population between 1965-90. In South Asia, the share of the working age population increased much more slowly, partly accounting for that region's slower growth performance. These patterns are likely to change in the near future, as we discuss later in the paper.

We find evidence for a non-linear relationship between life expectancy at birth and economic growth. At low levels of life expectancy, further increases are strongly associated with more rapid economic growth. In this range, higher life expectancy probably boosts growth by increasing the supply of working-age labor

⁶See Radelet, Sachs and Lee (1997) for a more complete discussion on the relationships between manufactured exports, industrial policies, and economic growth in Asia.

(as a result of lower morbidity); by raising labor productivity (as a healthier population is also a more productive one); by raising the rates of human capital accumulation (as people are more likely to invest in skills and education if they live longer); and by promoting more saving for retirement. Higher life expectancy in East Asia in 1965 (63 years) gave the sub-region a higher growth potential than South Asia, where life expectancy was just 49 years. But the positive effect on growth diminishes as life expectancy increases, and once it passes 68 years, further increases actually have a *negative* effect on growth. The most plausible explanation for this shift is that after 68 years, further increases in life expectancy indicate that the retired age population is living longer and consuming out of their lifetime savings, with a negative impact on aggregate growth.

Columns 2 and 3 show the results after adding regional dummy variables for East and Southeast Asia (combined), South Asia, Latin America, and sub-Saharan Africa. In each case, these regional variables are insignificant, and there is little change in the estimated coefficients of the other explanatory variables. This result indicates that the basic set of explanatory variables account for most of the differences in growth rates between these regions and the full sample.

Of course, these results represent the “average” relationships across countries, rather than a precise recipe applicable to all countries across time. Some individual countries undoubtedly differ in terms of the magnitude of the relationships, and in terms of the list of the most important variables affecting growth. Nevertheless, the basic specification captures the broad relationships influencing economic growth across countries very well. The adjusted R^2 for our base specification is 0.87, indicating that this set of variables explain about 87 percent of the variation in growth rates across the sample, a strong result for this kind of analysis.

In particular, the basic specification tracks the actual growth performance of Asian countries very well. The “fitted” growth rates for each country (calculated by multiplying the estimated coefficients by the actual value for each variable for each country, and adding these terms together) correspond closely with the actual growth rates in most cases. For example, the fitted growth rate for India for 1965-90 is 2.16 percent, compared to the actual rate of 2.03 percent. China’s fitted growth rate is 5.30 percent, compared to the actual rate of 5.09 percent. The largest Asian outlier is Malaysia, for which the fitted growth rate (3.53 percent) fell below the actual rate (4.49 percent) by about one percentage point. Indonesia was also a relatively large outlier. These differences are most likely due to Malaysia’s and Indonesia’s ability to deftly manage the challenges that accompany natural resource abundance. Malaysia and Indonesia managed to avoid the most deleterious effects of the Dutch disease and disruptive terms of trade shocks by diversifying their economies (exploiting a wide range of natural resources as well as encouraging manufactured exports) and reacting quickly to changing international circumstances.

On a regional basis, the basic regression accounts for 6.6 percent growth for the “Four Tigers,” very close to the actual rate of 6.7 percent during the period. Similarly, the fitted growth rates are close to the actuals for Southeast Asia (3.4 percent fitted versus 3.8 actual), South Asia (2.1 percent fitted versus 1.7 actual), and almost exactly the same for sub-Saharan Africa (0.7 percent fitted versus 0.6 actual) and Latin America (0.8 percent fitted versus 0.8 actual).

B. Variations in Sample Size and Specification

To test the robustness of these results, we re-estimated the equation in a variety of ways. The full results of these tests are reported in detail in Radelet, Sachs, and Lee (1997). First, we reduced the sample size in two separate ways: by randomly dropping one-fourth of the countries, and by dropping all the Asian countries. In both cases, the estimation results were broadly similar to those from the full sample. We then used these new results to estimate fitted values for the countries that we omitted. In both cases, the fitted values for the out-of-sample countries matched the actual values with a correlation of over 92 percent. These results suggest that our basic results are not particularly sensitive to the sample. Second, we substituted national savings for government savings, and re-estimated the equation using both OLS and a two-stages estimations procedure. Once again, the results did not differ substantially from our basic results.

Finally, we re-estimated the regression with a variety of alternative specifications and explanatory variables. For example, we explored many alternative measures of education and human capital accumulation, with little success in strengthening the results. We substituted government consumption and total government expenditures, respectively, for the government saving rate. The results are similar to, but weaker than, our basic results. We examined the impact of inflation, the initial distribution of income, political stability, and political rights. Each of these variables turned out to have a statistically insignificant impact on growth in our sample once all the other explanatory variables are included. The same was true of levels of foreign debt, financial depth (proxied by M2/GDP), prevalence of malaria, components of government spending, and so on. Note that these results do not necessarily mean that these variables are unimportant, especially in some countries. In some cases, it indicates that some of the effects of these variables on growth are captured by the variables already included in the regressions. For instance, inflation rates are closely related to openness and government saving, and the effects of political instability are at least partially captured by the index of institutional quality and the government saving rate.

4. ECONOMIC GROWTH OF THE ASIAN COUNTRIES IN COMPARATIVE PERSPECTIVE

These results also allow us to undertake a simple “growth accounting” exercise that explores the relative contribution of each of the explanatory variables in the basic regression to differences in growth rates across regions. Table 3 presents the results. For ease of presentation, and because of the strong interest in explaining the very rapid growth of most of the countries of East and Southeast Asia, we use the ten countries in this geographic region⁷ as the benchmark, and account for the differences in growth rates between this group of countries and the other regions. Average per capita growth for the four South Asian countries was 2.9 percentage points lower than the average for East/Southeast Asia, and the basic regression can account for a difference of 2.5 percentage points. South Asia started with a lower per capita income in 1965, which, all else being equal, should have led to a growth rate 0.5 percentage points *higher* than in East Asia. However, the positive effect on growth from low initial income was partially offset by the negative effect from low secondary school attainment. Similarly, natural resources and geography had little net effect on South Asia’s performance. South Asian countries have fewer natural resources and are located in more temperate climates, on average, than the nine East/Southeast Asian countries, giving them additional potential for faster growth. The net effects of initial income, education, geography and natural resources are relatively small, and suggest the potential for *faster* growth in South Asia by 0.5 percentage points relative to East/Southeast Asia.

By contrast, policy choices had a relatively large effect on differences in growth rates. *The combined effect of differences in government saving, openness, and the quality of institutions reduced South Asia’s growth rate by 2.1 percentage points relative to its East/Southeast Asian neighbors.* Openness was by far the most important variable: South Asia’s inward-oriented trade strategy accounted for slower growth of 1.2 percentage points. Finally, South Asia received less of a boost from demographic change than did East/Southeast Asia. South Asia had lower life expectancy, slower growth in its working age population, and faster overall population growth. These three factors accounted for 0.9 percentage points slower growth in South Asia relative to East/Southeast Asia.

The strong relationship between policies and economic growth is also visible in the comparison between East/Southeast Asia and sub-Saharan Africa (SSA). Between these regions, 1.7 percentage points of the predicted difference in growth rates is due to policy variables, with differences in openness again explaining the bulk of the difference. The demographic variables also explain much of the

⁷The ten economies in our sample from the East/Southeast Asia geographical region include the PRC, Hong Kong, Singapore, Korea, Taiwan, Thailand, Malaysia, Indonesia, the Philippines, and Papua New Guinea.

difference in growth rates. SSA's lower life expectancy and more rapid population growth (relative to growth of the working-age population) accounted for slower growth of 1.9 percentage points. In addition, all of the geography and natural resource variables worked against countries in SSA. There are more landlocked countries in SSA than any other region in the world, and countries in the region, on average, have more natural resources, are more tropical, and have less coastline relative to their area than the countries of East/Southeast Asia. These four variables combined accounted for 1.0 slower growth in SSA relative to East/Southeast Asia.

Table 3. Contributions to Growth Differentials Between East/Southeast Asia and Various Regions, 1965-90 (percent, annual average)

	Contribution of each variable to the difference in per capita growth relative to East/Southeast Asia		
	South Asia	Sub-Saharan Africa	Latin America
Initial Conditions	0.3	0.7	-1.2
Initial GDP per capita	0.5	1.0	-1.2
Schooling	-0.2	-0.4	-0.1
Resources and Geography	0.2	-1.0	-0.6
Natural Resources	0.1	-0.2	-0.2
Landlocked	0.0	-0.3	-0.1
Tropics	0.5	-0.2	-0.0
Coastline/land area	-0.3	-0.3	-0.3
Policy Variables	-2.1	-1.7	-1.8
Government Savings Rate	-0.4	-0.1	-0.3
Openness	-1.2	-1.2	-1.0
Institutions	-0.5	-0.4	-0.5
Demography	-0.9	-1.9	-0.2
Life Expectancy	-0.5	-1.3	0.1
Growth in working age population	-0.3	0.1	-0.2
Growth in total population	-0.2	-0.7	-0.1
Difference in:			
Predicted Growth	-2.5	-3.9	-3.8
Actual Growth	-2.9	-4.0	-3.9

Note: The ten economies in our sample from the East/Southeast Asia region are Hong Kong, PRC, Singapore, Korea, Taipei, China, Thailand, Malaysia, Indonesia, the Philippines, and Papua New Guinea.

With respect to Latin America, initial conditions play a more prominent role, mainly because Latin America started with higher income per capita, which reduced its relative growth potential. However, the largest difference between Latin America and East/Southeast Asia lies with the policy variables, which together account for 1.8 percentage points slower annual growth in per capita incomes.

The key lesson from the growth accounting exercise is that initial and resource conditions account for only moderate differences in growth rates. The major role is played by policy variables: high rates of government saving, trade openness, and maintenance of good institutions have been the most important factors behind East Asia's rapid growth during the last three decades. In particular, integration of domestic manufacturing with global production systems (through OEM agreements, EPZs, licensing, and other arrangements) stands out as a key dimension of Asia's success.

The cross-country growth regressions provide a useful starting point for exploring the performance of the Asian developing economies by furnishing a framework which identifies many of the most critical factors that distinguish growth performances across regions and countries. Of course, this framework by itself obviously does not fully explain the process of economic growth. It does not wholly capture the relationships between policy choices, institutional settings, and economic outcomes, nor does it shed light on the important role of economic leadership and skillful policy making. Many of these relationships are explored more fully in our earlier paper (Radelet, Sachs, and Lee 1997). While this framework clearly does not explain everything, it does highlight, at a very broad level, several important common elements within the most successful Asian economies that contributed to robust economic growth.

5. THE EAST ASIAN FINANCIAL CRISIS

East and Southeast Asia's long period of robust economic growth abruptly came to a halt in the middle of 1997 with the outbreak of the Asian financial crisis. Foreign capital that had been flowing into the Asian economies in large quantities suddenly fled, especially from Indonesia, Korea, Malaysia, the Philippines, and Thailand. The capital withdrawal quickly turned into a financial panic. The panic and its aftermath have had devastating impacts on these economies, with severe economic contraction, rising unemployment, and widespread increases in poverty expected in 1998. Although a full analysis of the crisis is beyond the scope of this paper, here we briefly review the most salient points, and the relationships between the crisis and Asia's long-term growth.⁸

⁸For analyses of the crisis, see Radelet and Sachs (1998a and 1998b); Borensztein and Lee (1998); Park (1998); Krugman (1998); Goldstein (1998); and Roubini, Corsetti and Pesenti (1998).

At the heart of the crisis was the buildup during the early 1990s of large, short-maturing capital inflows into weak financial and corporate systems. Net private capital inflows into Indonesia, Korea, Malaysia, the Philippines, and Thailand were enormous, reaching \$97 billion in 1996. Many factors contributed to this buildup in capital inflows, including financial deregulation in the industrialized countries, low interest rates in Japan and the United States, and the rapid growth and long success of the Asian economies themselves. In addition, each of the crisis economies maintained fixed or very predictable exchange rates, which reduced borrowers' perceived exchange rate risk, and encouraged greater capital inflows. Perhaps most importantly, each of the severely affected economies had undertaken partial financial sector reforms in the late 1980s and early 1990s that gave banks, financial institutions, and private corporations much greater latitude to borrow abroad.

A critical feature of the capital inflows was that a growing share was short-term, with maturity structures of one year or less. In Indonesia, Korea, and Thailand, over 60 percent of funds owed to foreign banks in mid-1997 were short-term loans. As long as these economies kept growing, these short-term debts posed no problem, since foreign creditors would simply roll them over. But the buildup in short-term debt left these countries vulnerable to rapid credit withdrawals and financial panic. In the three worst hit economies (Indonesia, Korea, and Thailand), short-term debt liabilities exceeded foreign exchange reserves, implying that there was not enough foreign exchange on hand to repay everyone at once.

The capital inflows, while financing new investments, had several adverse consequences. Exchange rates appreciated in real terms, and a greater share of investment was directed towards non-tradable activities such as real estate and property. The appreciating real exchange rate, together with a glut in global electronics production, the slowdown in the Japanese economy, and perhaps the rise in exports from China all contributed to a dramatic slowdown in export growth in 1996. In most of the crisis economies, a substantial share of the capital inflows were channeled through the domestic banking systems (Indonesia, however, is an important exception, where funds were borrowed mainly by private corporations). Bank lending expanded rapidly, reaching the equivalent of over 140% of GDP in Thailand, Korea, and Malaysia by the end of 1996. This expansion strained the capacity of the commercial banks, financial institutions, and the central banks. Generally speaking, bank regulation and supervision were inadequate to keep up with the rapid expansion in activity.⁹

There is little question that these growing weaknesses in the Asian economies required adjustments and that they contributed to the crisis. These problems

⁹Radelet and Sachs (1998b) analyze a range of possible explanatory factors for financial crises in emerging markets in the early 1990s. The two factors that emerge as the most important are the buildup of short term foreign debt (relative to foreign exchange reserves), and the rapid expansion in bank lending.

alone, however, cannot explain the speed, severity and depth of the financial crisis. Several other factors combined to create a full-fledged financial panic, making the crisis much deeper than was either necessary or inevitable.

First, the crisis was in large measure due to the inherent instability in global capital markets. Crises develop when global capital markets first pour large amounts of capital into an emerging market, then suddenly demand repayment when sentiment sours. Developing countries have seen a long succession of sensational international financial crises in this century, including the Latin American debt default in 1929 and 1930, the global debt crisis of the 1980s, and financial crises in the 1990s in Mexico, Argentina, Venezuela, and Turkey. More industrialized countries are not immune, as illustrated most recently in Finland, Sweden, and Norway.¹⁰ Asia was no exception, with creditors -- both foreign and domestic -- first providing extraordinarily large amounts of foreign-currency financing when these economies were growing quickly, then overreacting with panicked withdrawals in the early stages of the crisis.

Second, Asian governments made some critical mistakes along the way that added to the withdrawals. Thailand took little action in late 1996 when property and equity prices fell and its financial institutions and banks came under heavy pressure. Had Thailand acted earlier, the worst of the crisis could have been avoided. Korea and Thailand used up substantial portions of their liquid reserves trying to defend their currencies, and Indonesia gave contradicting signals about its approach to addressing the crisis. Inflammatory statements by government officials and market participants (such as the interchanges between the Malaysian Prime Minister and financier George Soros) fanned the flames and added to the withdrawals.

Third, poorly designed IMF programs by some extent added to the rapid withdrawal of funds, and led to a much deeper economic contraction than was necessary. The IMF's ill-conceived approach to financial restructuring and its heavy reliance on strongly contractionary fiscal and monetary policies made a bad situation worse in the early stages of the crisis. Its failure to include debt restructuring or rescheduling in its original programs deepened the panic and the resulting economic recession (debt rescheduling was central to Korea's second program, included on the insistence of the US government after the IMF's first program had failed).

Fourth, the economic crisis soon evolved into a political crisis in several countries. Thailand and Korea both brought in new governments in late 1997. In Indonesia, political protests led to violent riots and the eventual resignation of President Suharto after three decades in power. In each case, political uncertainty added to the negative sentiment and the capital withdrawals.

By mid-1998, the crisis had devolved into a deep recession, with output

¹⁰A growing number of observers point to global capital market instability as a key part of the explanation of financial crises, including Kaminsky and Reinhart (1996) and Eichengreen, et. al (1997).

contracted in 1998 by 6.7% in Korea, 7.5% in Malaysia, 10.4% in Thailand and an incredible 13.2% in Indonesia. Financial systems were moribund, and even the best firms were unable to obtain credit. Many corporations, including a large number of normally well-run, viable firms, were facing bankruptcy. Unemployment and poverty were rising quickly.

Asia's long period of rapid growth, followed by the deep contraction in some of the same economies, begs a question: was there something in Asia's growth strategy that inevitably led to the crisis? Many analysts, with a strong air of vindication for western economies, have confidently argued that it was precisely Asia's growth strategy that led to the crisis. The argument is based on the idea that Asia's rapid growth was due to strong authoritarian governments, a close-knit relationship between government and business, and selected government subsidies in "picking winners." According to this view, the government-led model led to massive inefficiencies, and ultimately to the financial crisis.

Although there is a grain of truth in these arguments (in that weak investments contributed to the buildup of bad debts in Asian banks), the argument is easily pushed too far. At one level, since the depth of the crisis was in large measure due to instabilities in global financial markets and mismanagement of the early stages of the crisis, Asia's long-term growth strategy clearly does not bear all of the blame. More to the point, in the results from our growth model, and the more complete analysis of Asia's growth in our earlier paper (Radelet, Sachs, and Lee, 1997), we found little evidence to support the claims that authoritarian governments and selected investments in heavy industries were the key to Asia's success in the first place. Instead, the critical elements of Asia's growth were prudent macroeconomic policies (reflected by high government savings rates), openness to the world economy, and relatively high quality institutions compared to other developing countries. If anything, the crisis would seem to strengthen the case for prudent macroeconomic policies and strong institutions.

However, there are some who now question the wisdom of openness and integration with the world economy. In this vein, an important distinction should be made between Asia's success in global integration in manufactured products, and its failure (at least in the crisis economies) to effectively manage integration in world financial markets. As we have shown, at the core of Asia's sustained growth was its success in linking up with global markets through the manufacture of labor-intensive exports. There is little evidence that Asia's export industries were the weak link that led to the crisis.¹¹ In fact, almost everyone now argues that export industries hold the key to Asia's recovery.

The critical error in the evolution of the crisis economies seems to have been mismanagement of the process of financial liberalization in the early 1990s, in combination with weaknesses in international capital markets which lead to herd

¹¹Overcapacity and weak prices for some export products -- especially in semiconductors -- probably contributed to the crisis, but appear to have played a relatively minor role in comparison with other factors. See Radelet and Sachs (1998b) for a more thorough analysis.

behavior among foreign investors. The crisis does suggest some dangers in integrating too rapidly with global financial markets. In particular, rapidly opening up domestic financial markets to foreign capital inflows -- especially allowing domestic banks to borrow heavily from abroad -- without introducing the appropriate legal and regulatory framework, tends to expose emerging economies to the instabilities of global financial markets. It is important to recognize at this juncture that the hardest hit Asian economies were those that had started, but not fully completed, the process of financial liberalization. Not all of the successful Asian economies succumbed equally to the crisis. At one end of the spectrum, Singapore (and to a lesser extent Hong Kong), with well-developed regulatory and legal systems, avoided the rapid expansion of the banking system and the build-up of bad loans that characterized the crisis economies. At the other end of the spectrum, Asian countries that had barely begun the process of financial liberalization in earnest (such as China and Vietnam) avoided the crisis because they had not received large capital inflows in recent years. Many analysts believe that the Philippines was affected less than other ASEAN countries simply because it started the process of financial liberalization later than the other economies, and therefore had received less capital inflow in the years before 1997. Perhaps the clearest lesson of the crisis is the need to rethink the pace and sequencing of financial liberalization in emerging markets, especially in reforms affecting short term capital flows.

The growth model used earlier in the paper could not have predicted the crisis and the sharp economic contraction which will follow. At a technical level, the model is intended to capture long-term growth trends and capacities, not short or medium-term variations in these trends. In the 1965-90 period covered by our earlier analysis, many of the Asian economies went through episodes of both relatively fast and slow growth that were not captured by the growth model. Korea's growth slowed markedly in the 1980s, for example. Indonesia started the 1965-90 period with an economic collapse, followed by strong growth in the 1970s when oil prices were high, a dramatic slowdown in the mid-1980s when oil prices plunged, and renewed growth in the late 1980s and early 1990s. The growth model is not designed to capture these kinds of short and medium term variations due to business cycles, terms of trade shocks, or political upheaval and change. The financial crisis is a similar kind of episode, albeit of a much larger magnitude, that is not captured in this kind of long-run model of economic growth.

6. CONCLUSIONS

Asia's episode of rapid economic growth since the 1960s, as remarkable as it was by historical standards, can be explained in an international comparative context. East Asian countries grew faster than the rest of the world for four key reasons: they had substantial potential for catching up (since they entered the 1960s

with relatively low incomes), their geography and structural characteristics were by-and-large favorable, demographic changes following World War II worked in favor of more rapid growth, and their economic policies and strategy were conducive to sustained growth.

At the core of East Asia's success was the recognition of the importance of joining the world economy through the promotion of labor-intensive manufactured exports. Rapid growth was supported by key demographic developments, favorable trends in literacy and education, public health policies which raised life expectancy, government attention to the agricultural sector, high levels of budgetary saving, and the protection of private property rights. Even salutary geographic considerations, such as favorable natural harbors and proximity to major sea lanes have played a role. Quantitatively, however, it seems clear that economic institutions and policies have been the most important factors differentiating the performance of fast-growing and slow-growing nations.

East Asia's policies, however, were far from perfect. The weakest link, at least in several of the East Asian economies, was a haphazard approach to financial liberalization in the early 1990s. A very rapid opening to world financial markets, coupled with an equally rapid and under-supervised expansion of the domestic financial system, created vulnerabilities that led to widespread financial crisis in mid-1997.

It takes several years for the crisis economies to recover. Other Asian economies, notably China, may become vulnerable to a financial crisis at some point in the future, as have nearly all market economies. But, throughout much of Asia, in the long run there will be a continuing opportunity for sustained growth and development. In the richer economies (such as Singapore and Hong Kong), the rates of growth are likely to be somewhat slower than in the past, precisely because the process of catching up has been so successful to date. The middle-income economies, with appropriate economic and financial management, have the potential and capacity to return to rapid growth over the long run, once the financial crisis comes to end.

Of course, future growth, even in the long run, is far from guaranteed. It will require successful institutional adaptations to new challenges, including: the pressures related to increasing integration of the global economy (especially the inherent instabilities of the world financial markets); an aging population; increasing urbanization and political participation. As a result, these countries will face increased stresses on public-sector budgets, pressures for continued reforms of the legal system, and the need for flexibility and adjustment of political institutions, including the allocation of powers between central and local governments. For countries that grew more slowly during the past thirty years, the main message is that faster growth is possible, and indeed likely, as these countries adopt market-based strategies, increased openness to world markets, and stronger institutions to support economic growth.

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