



## *Population Change and Economic Development: Success Stories from Asia*

Forty years ago, the countries of East and Southeast Asia were among the most densely populated in the world. In most countries of the region, natural resources were limited, populations were growing, and standards of living were low. Few observers were optimistic about the region's development prospects. Beginning in the 1960s, however, several East and Southeast Asian countries adopted and vigorously pursued policies that have successfully slowed population growth and accelerated economic development.

The experience of six Asian countries—Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia—provides strong evidence that economic gains can be achieved by lowering rates of childbearing. Between 1960 and 1990, childbearing and population growth rates dropped steeply in these countries. During the same period, all six countries also achieved unparalleled economic development, progressing from poverty to catch up with, or even surpass, the high-income countries of the West. But did demographic change in general—and population policies in particular—play an important role in achieving economic success?

### *The situation in 1960*

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In 1960, per capita gross national product (GNP) in Japan was US\$8,208 in constant 1995 US dollars (Appendix Table 1), compared with US\$13,330 in the United States. In the other five countries, per capita GNP was much lower, ranging from US\$252 in Indonesia to US\$2,776 in Singapore.

Except in Japan and Thailand, a history of foreign domination had undermined the development of strong political and economic institutions. War and revolution—World War II, civil war in China, and the Korean War—had destroyed much of these countries' national institutions and wealth, and efforts to rebuild physical infrastructure and industrialization were hampered by low saving and investment rates. Although the economies were overwhelmingly agricultural, prospects for increasing food production or agricultural employment appeared bleak, especially in Japan, South Korea, and Taiwan where the supply of arable land was extremely limited. With the exception of Indonesia's large petroleum reserves, the countries were poorly endowed in natural resources.

Accelerating rates of population growth—due to high birth rates and declining death rates—were also a serious concern. In the 1950s, population growth rates reached historically high levels in Japan, Korea, Taiwan, and Singapore, and were rising in Thailand and Indonesia. Significant declines in infant and

*The experience of Asia's fastest-growing economies provides strong evidence that lowering fertility can boost economic growth (Singapore)*  
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child mortality were leading to much larger families and to large concentrations of population at young ages.

In Japan, South Korea, and Taiwan, there were also a few bright spots. Income inequality was relatively low, in part as a consequence of wartime destruction. In Taiwan and South Korea, major land-reform programs had also helped reduce inequality. The three countries all benefited from relatively high levels of literacy and significant pools of educated manpower. Substantial levels of foreign assistance, especially from the United States, helped with reconstruction efforts.

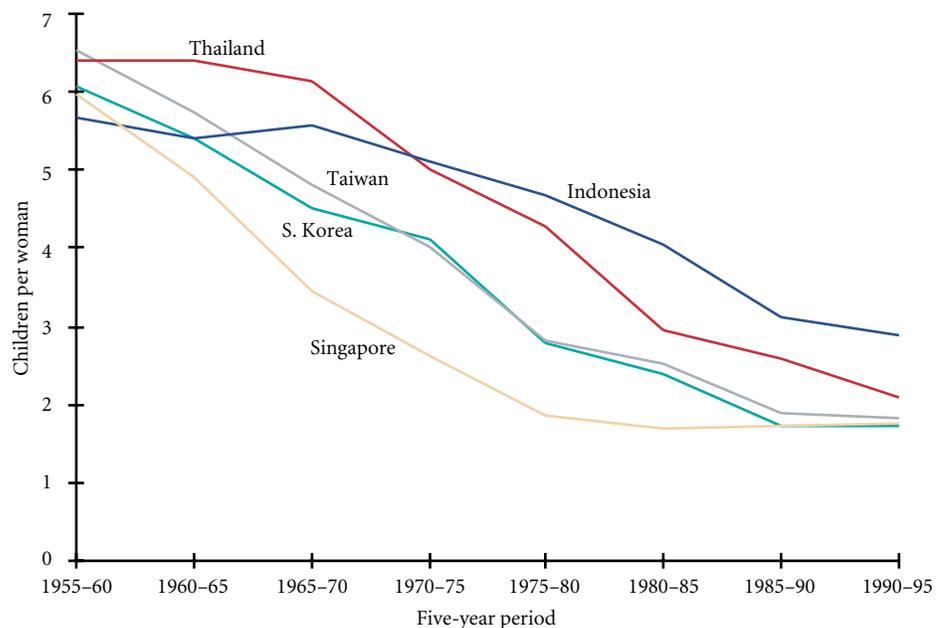
### *Slowing down population growth*

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Beginning in the 1960s and 1970s, women in South Korea, Taiwan, Singapore, Thailand, and Indonesia reduced their rate of childbearing at remarkable speed (Figure 1). The pace of this transition to low fertility is unique in history. Of 81 countries in the world that had total fertility of 4.5 children per woman or higher in 1960, only six managed to bring births down to two or fewer per woman by 1990. These were South Korea, Taiwan, Singapore, Thailand, Hong Kong, and China (Feeney and Mason 2001).

As a result of the decline in childbearing, Japan's population growth dropped to only 0.2 percent per annum by the early 1990s. Population growth in South Korea, Taiwan, Singapore, and Thailand declined to about 1 percent per annum. In Indonesia, where fertility declined somewhat later, population growth dropped to 1.6 percent per annum by 1990–94.

Figure 1. Total fertility rate (average number of children per woman): Singapore, South Korea, Taiwan, Thailand, and Indonesia, 1955–95



Source: United Nations (1994).

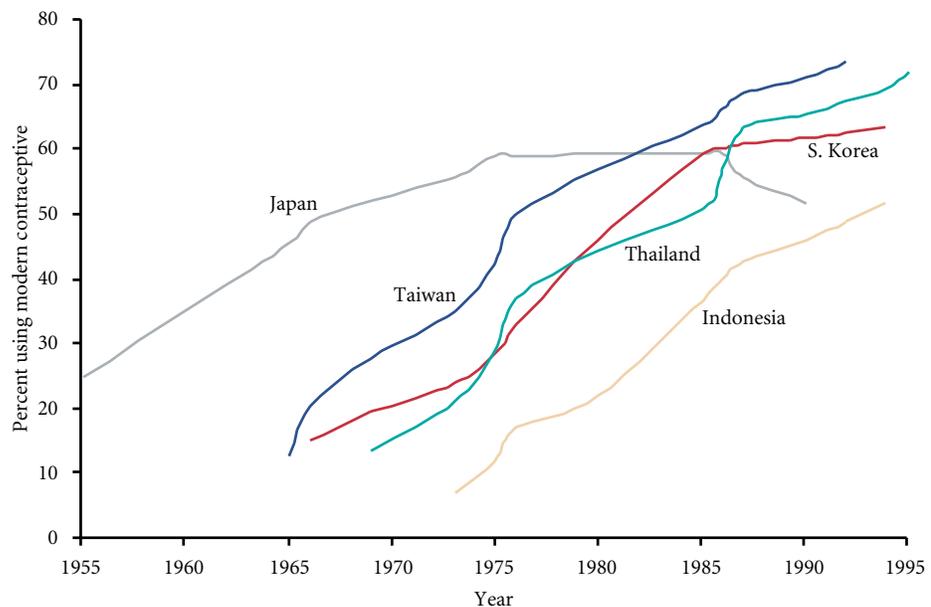
What caused the remarkable decline in fertility? Delays in marriage accounted for some of the drop in childbearing, but the most important factor was the overwhelming acceptance of modern contraception among married women. In all six countries, more than half of married women of reproductive age now use a modern contraceptive method. Prevalence rates for modern contraceptives in the mid-1990s ranged from 52 percent in Indonesia to 74 percent in Taiwan (Figure 2).

In evaluating the factors that contributed to increased contraceptive use, it is difficult to weigh the role of government family planning programs against the effects of social and economic development. The Japanese government reduced legal impediments to contraception and abortion and supported nongovernmental organizations (NGOs) that promoted family planning. The other five countries established national family planning programs that were arguably the best managed in the world.

Reductions in child mortality, increases in life expectancy, gains in female employment, higher wages, improved educational opportunities for women, and a host of other factors contributed to changing attitudes toward childbearing. Fertility preferences may have changed more rapidly because of government initiatives, but how large a contribution did government education and persuasion efforts make? And what was the true impact of government programs that made effective, safe, and inexpensive birth control widely accessible?

In an effort to estimate the contribution of family planning programs compared with the impact of economic and social development, Tsui (2001) concludes that total fertility in other developing countries might have been lower by at least two births per woman by 1994 had they implemented family planning programs similar to those in the Asian countries considered here.

Figure 2. Percentage of married women of reproductive age using modern contraceptive methods: Japan, Taiwan, South Korea, Thailand, and Indonesia, 1955–95



Source: Tsui (2001).

Although policies and programs made a strong contribution to fertility decline, it was not possible to achieve population stabilization overnight. Between 1950 and 1995, Japan's population increased by 50 percent, the populations of South Korea and Indonesia more than doubled, and those of Taiwan, Singapore, and Thailand nearly tripled (Feeney and Mason 2001).

### *Meeting development challenges*

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In 1960, rapid population growth presented the six countries with two key challenges. These were to feed their growing population and to provide jobs for their expanding labor force.

Despite the limited supply of agricultural land, the food challenge was met with spectacular success. Food production grew dramatically, easily outstripping population growth. Between 1963 and 1992, food output per capita increased by 36 percent in Asia as a whole and by 47 percent in East Asia. During the same period, food production per capita increased by only 13 percent in Latin America and declined by 7 percent in Africa. East Asia succeeded by greatly increasing agricultural yields through the development of new, high-yielding rice varieties combined with increased levels of fertilizer and other agricultural inputs (Hayami 2001).

The employment challenge was met most successfully in Japan, South Korea, and Taiwan, where expansion of manufacturing and service-sector employment was sufficient to match the rapidly growing working-age population and also absorb substantial numbers of agricultural workers and women newly entering the labor force. Between 1960 and 1990, while the total labor force was expanding, the agricultural labor force actually declined in these countries—by 4 percent per year in Japan, by 2 percent in Taiwan, and by 1 percent in South Korea.

Thailand and Indonesia coped with the challenge of an expanding labor force somewhat differently and less effectively than the other countries. Both achieved rapid growth in manufacturing and service-sector employment, but these sectors were so small in 1960 that, even with rapid expansion, they could not absorb all the new entrants to the labor force or draw workers out of agriculture. Thailand managed to absorb substantial numbers of agricultural workers by expanding land under cultivation. In Indonesia, agricultural production intensified, as indicated by a drop in arable land per agricultural worker.

In Japan, South Korea, and Singapore, labor productivity in the agricultural sector grew even more rapidly than in manufacturing and services. In Taiwan, labor productivity also grew rapidly in agriculture. But in Indonesia and Thailand, where the agricultural sector had to absorb large numbers of new workers, labor productivity in agriculture grew much more slowly (Table 1). Not only was this a drag on economic growth but also a source of rising inequality between urban and rural residents.

All six countries achieved remarkable economic growth, beginning in the

*In Asia's most successful economies, food production has increased dramatically, easily outstripping population growth (Shimane, Japan)*  
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1950s in Japan, in the 1960s in South Korea, Taiwan, Singapore, and Thailand, and in the 1970s in Indonesia. From 1960 to 1990, South Korea, Singapore, Taiwan, and Japan were among the five top-performing economies in the world (with Hong Kong), and Thailand and Indonesia were not far behind (Figure 3). In spite of population growth, per capita income in South Korea increased nearly 10-fold between 1960 and 1999—from US\$1,321 to US\$11,958 in constant 1995 US dollars (World Bank 2001). In Singapore, per capita income rose from US\$2,776 to US\$28,486 during the same period.

In addition to increases in food production, job creation, and per capita incomes, all six countries achieved substantial improvements in literacy and educational attainment. Rates of saving and investment rose to high levels, and the more-advanced economies became major lenders on international capital markets. The status of women improved, as evidenced by substantial declines in the gender gap in educational attainment, employment, and wages.

In retrospect, fears about the development impact of population growth per se were probably exaggerated. Substantial population growth was accommodated in Japan, South Korea, Taiwan, and Singapore with no apparent adverse economic effects and in Thailand and Indonesia with only modest difficulties. Several points should be born in mind, however. The first is that population growth, although significant, did slow substantially during this

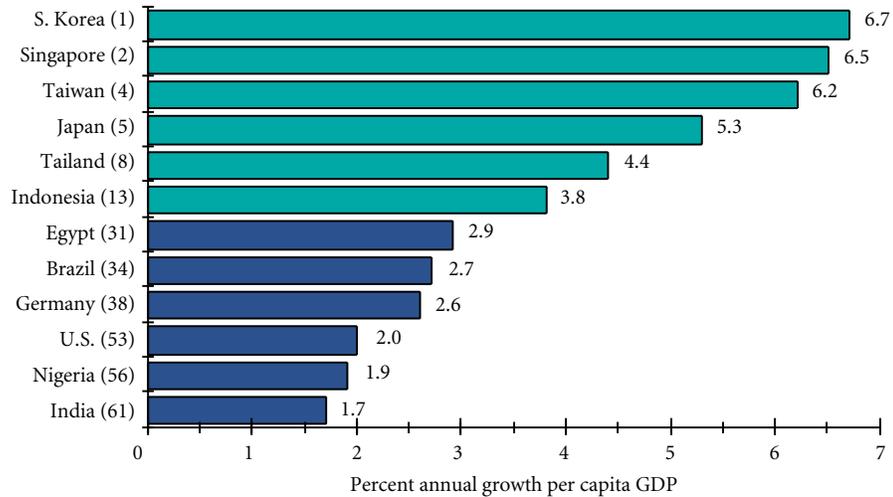
**Table 1. Summary of labor statistics: Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia, 1960–90**

Statistic	Japan	South Korea	Taiwan <sup>a</sup>	Singapore	Thailand	Indonesia
<b>Annual labor force growth, 1960–90 (%)</b>						
Agriculture	-3.9	-1.2	-1.9	-6.5	2.0	1.5
Nonagriculture	2.3	5.4	5.4	3.7	5.5	4.5
Combined	1.2	2.9	3.1	3.5	2.9	2.5
<b>Intensification of agriculture: Hectares arable land per agricultural worker</b>						
1970	0.47	0.38	0.54	0.18	0.88	0.61
1990	0.88	0.55	0.84	0.20	0.86	0.47
<b>Percentage of total labor force in manufacturing and services</b>						
1960	66.9	38.7	43.9	92.6	16.3	25.2
1990	92.7	81.9	87.4	99.6	35.9	44.8
<b>Labor productivity: Annual growth in GDP per worker, 1960–90 (%)</b>						
Agriculture	4.5	4.4	4.1	5.9	1.8	1.2
Nonagriculture	4.2	3.7	4.4	4.6	2.9	3.2
Combined	4.9	5.0	5.7	4.8	4.5	3.4

Source: Mason (2001).

<sup>a</sup> Labor force statistics for Taiwan are based on employment rather than on the labor force.

Figure 3. Percent annual growth of per capita gross domestic product (GDP): Selected countries, 1960–90



Source: Summers and Heston (1991).

Notes: All GDP figures are expressed in 1995 international prices and are taken from the Penn World Tables. International rankings are in parentheses.

period because of the rapid decline in fertility. Secondly, the favorable outcome in these countries was not automatic, but a consequence of effective development policies combined with a favorable international economic environment.

The third point is that changes in population age structure, childbearing, and life expectancy created special opportunities for rapid economic growth. These opportunities came in three forms: the emergence of a large gap between population growth and potential labor force growth; changes in incentives and age structure that favored higher rates of saving and investment; and changes in incentives and age structure that favored greater investment in human resources. The success of the six countries discussed here is based in large part on how they seized these three opportunities.

### *Opportunity one*

**Expansion of the potential labor force.** Declining fertility and mortality in the six Asian countries resulted in changes in the age structure of their populations. Of particular importance to economic growth were changes in the size of the working-age population relative to the two dependent populations—children and the elderly.

In addition to favorable changes in population age structure, Asian economies benefited substantially from increased participation of women in the labor force. Women’s greater participation in the formal labor force can be traced to a complex set of changes, some demographic (later age at marriage and declining childrearing responsibilities), others economic (rising wages and changes in employment structure), and still others political (changes in tax codes and policies on gender discrimination) (Bauer 2001; Okunishi 2001).

**Table 2. Population and labor force growth: Average annual growth rates in major world regions, 1960–90**

Region	Annual growth rate (percent)		
	Population	Labor force	Difference
Asia: High-performing economies <sup>a</sup>	1.9	2.7	0.8
Europe and North America	0.8	1.1	0.3
Latin America	2.3	2.7	0.4
South Asia	2.6	2.5	-0.1
Africa	2.6	2.3	-0.3

Source: Mason 2001.

Note: Values are unweighted averages of country values.

<sup>a</sup> Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia.

Between 1960 and 1990, the labor force in Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia grew more rapidly than the total population by an average of 25 percent (Table 2). The result of this “demographic bonus” was an increase in per capita income of about 0.8 percent per year.

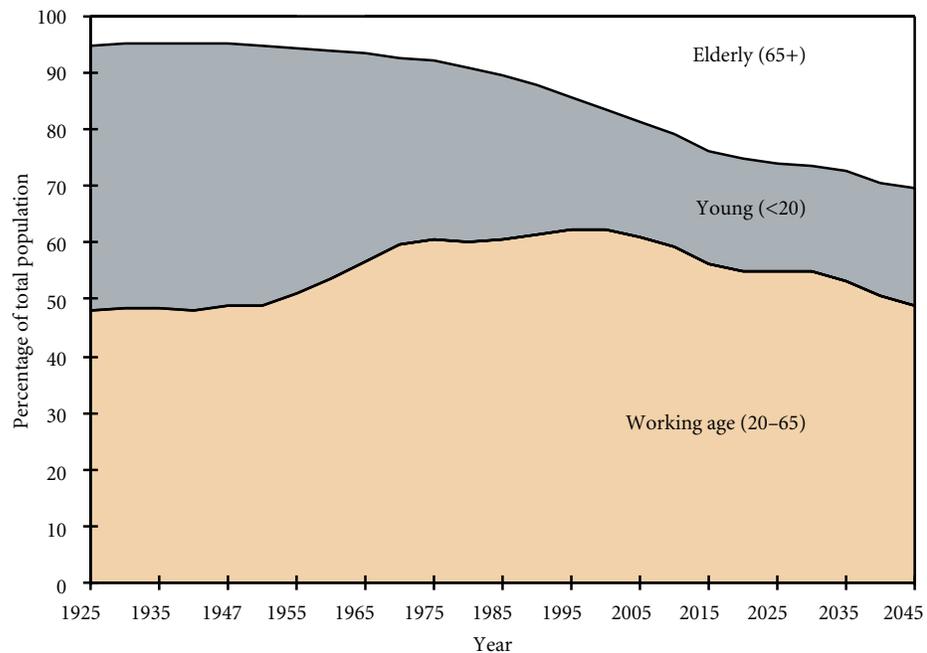
All six countries are progressing through three phases. During the first phase, dependent populations grow relative to working-age populations because declining infant and child mortality rates lead to increasing numbers of children. During the second phase, working-age populations expand relative to dependent populations because the number of dependent children stabilizes (or declines) with lower birth rates while working-age populations increase as the large number of children from the first phase grow older and enter the work force. During the third phase, the number of dependent children remains stable or declines, expansion of the working-age population slows and may begin to decline, and the older dependent population grows rapidly.

Between 1960 and 1990, populations in the six Asian countries were largely in the second phase. Japan has now entered the third phase (Figure 4), and the other countries will follow in the coming decades.

### *Opportunity two*

*Favorable conditions for saving and investment.* Studies of economic development in East Asia consistently find that capital deepening—the increase in capital per worker—is one of the primary reasons why economic growth has been so outstanding. Between 1965 and 1990, capital per worker grew at an annual rate of more than 8 percent in South Korea and Taiwan, nearly 8 percent in Japan, and more than 6 percent in Thailand (Figure 5). This was two to three times faster than the growth of capital per worker in the United States. In fact, Japan surpassed the United States in terms of capital per worker in 1988.

Figure 4. Transition in the age structure of Japan's population: 1925–2045



Source: Mason (2001).

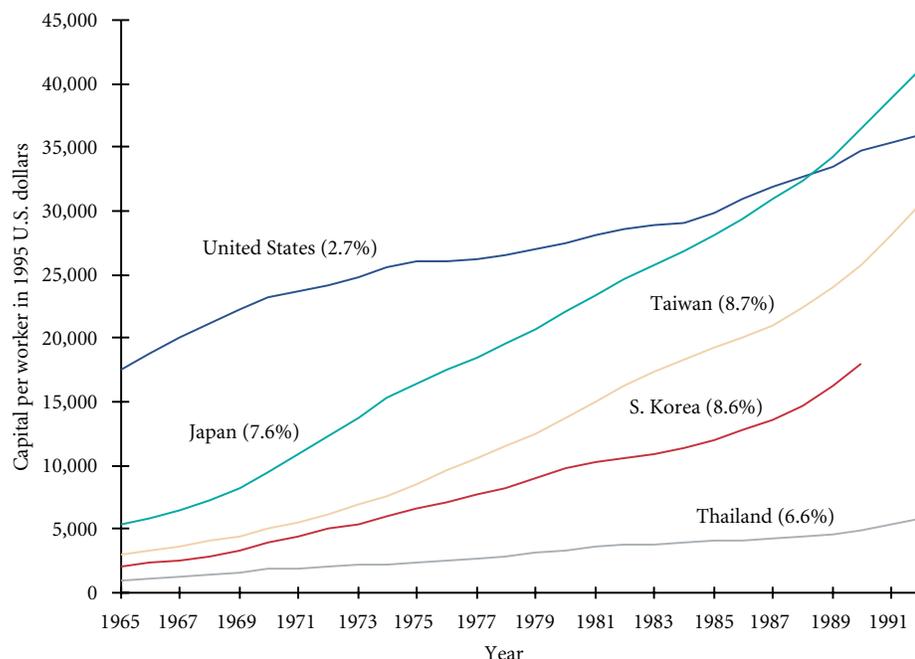
The rapid pace of capital deepening can be traced to high and increasing rates of saving and investment. Compared with levels in the 1970s, average annual saving and investment nearly doubled in the 1980s and nearly doubled again in the 1990s. In Japan, Taiwan, and Singapore, saving rates have been high enough to finance all domestic investment plus substantial investment abroad. In 1992, for example, the current account surplus for Japan—essentially Japan's net foreign investment—totaled US\$121 billion, compared with US\$70 billion for all other surplus countries in the world combined.

Why are saving rates so high in East Asia? Recent research shows that changes in population age structure, childbearing, and life expectancy all have an effect. As East Asians have fewer children, they can afford to save more. With life expectancy increasing and the average retirement age declining, they also have a greater incentive to save in anticipation of longer periods of retirement. In Japan, the expected retirement period for men nearly doubled between 1975 and 1990—from 4.4 to 8.7 years.

In the past, elderly East Asians relied on their children for old-age support, but with fewer children, the elderly will increasingly rely on accumulated wealth for economic security. In Japan, the proportion of men and women age 60 and above who mentioned children as a source of income dropped from 30 percent in 1981 to 15 percent in 1996.

Although researchers agree that these demographic changes have helped raise saving rates, estimates of the size of the effect vary greatly from study to study. Employing a “middle-of-the-road” estimate for Taiwan suggests that higher rates

Figure 5. Rising capital per worker: United States, Japan, Taiwan, South Korea, and Thailand, 1965–91



Source: Summers and Heston (1991).

Note: Average annual growth rates are in parentheses.

of saving and investment due to changing demographic factors accounted for 18 percent of the increase in output per worker between 1960 and 1990. When combined with the relative expansion of the labor force compared with the dependent population, it appears that demographic factors accounted for about 28 percent of Taiwan’s increase in output per capita. This compares with an estimate based on econometric evidence by Bloom and Williamson (1998) that demographic changes accounted for about one-third of East Asia’s “economic miracle.”

### *Opportunity three*

**Favorable conditions for investment in human resources.** Fertility decline has an almost immediate impact on education budgets, both for families and for nations. Fewer births mean fewer children entering school some years later. If a country’s education budget remains constant, then expenditures per school-age child will be higher. Alternatively, a reduced share of national income can be invested in education without reducing expenditures per child. Fertility decline has a similar impact on resources available for child-health programs and on family-level spending on child health and education.

Over the past few decades, the countries of East Asia have actually increased, rather than reduced, the share of national income invested in education. In Taiwan, for example, the decline in the relative size of the school-age population in the 1970s and 1980s was accompanied by an increase in the share of

GNP devoted to education. Combined with the rapid growth of GNP as a whole, this allocation of resources resulted in a dramatic increase in expenditure per school-age child.

Increasing funds available for education can be used either to improve or expand the schooling system, or a combination of both. In South Korea, the proportion of the school-age population enrolled in school increased from 54 percent in 1950 to 97 percent in 1990. In Indonesia over the same period, the increase was from 21 percent to 81 percent. In other countries, the additional funds available for education have been used primarily to increase expenditures on existing students rather than bringing more students into the system. In some countries, funds have been used to reduce class size, in others to improve the quality of teachers.

Given the lag time between investment in children and improvements in the characteristics of workers, fertility decline could not have influenced labor-force quality to any great extent until the 1980s or later. The important effects of population change on human-resource development will be felt more in the future than evidenced in the past (Ahlburg and Jensen 2001; Jensen and Ahlburg 2001).

### *Policy lessons*

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Between 1960 and 1990, Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia were extraordinarily successful in reducing fertility and slowing population growth, in overcoming the potential problems associated with the population growth that did occur, and in turning changes in population age structure to their economic advantage. How this was accomplished is an important story because the experience of these countries offers four lessons for other countries facing similar problems.

The first lesson is that, given the right conditions and policies, it is possible to reduce fertility to low levels with remarkable speed. Within a period of two to three decades, the total fertility rate dropped in four of these countries—South Korea, Taiwan, Singapore, and Thailand—from six births per woman to two births per woman or less. Fertility declined earlier in Japan, and the process is still ongoing in Indonesia. For the most part, coercion did not play an important role in any of these countries.

Second, there are different paths to low fertility. In Japan, social and economic development drove fertility to low levels in the absence of strong government population programs. Social and economic development played a role in the other countries, but government programs were also very important, encouraging couples to reduce their childbearing and providing them with effective family planning methods at low cost.

Third, the development impact of population change is complex and multifaceted. During East Asia's unusually rapid demographic transition, countries

The image that appears here in the printed version of this publication was not made available for use on the internet.

*To reap the benefits of fertility decline, governments need effective policies to promote gainful employment and encourage saving and investment (Seoul, South Korea)*  
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were experiencing large changes in population size and growth rates, birth and death rates, and age structure. These demographic changes influenced the relative sizes of the dependent and working-age populations, the economic role of women, incentives for saving and investment, and decision-making about investing in the health and education of children.

Fourth, the development benefits of fertility decline and demographic transition are not automatic. Favorable outcomes depend to a great extent on effective development policies. In the countries considered here, the gap between labor force and population growth was advantageous only because a wide range

of successful development policies provided gainful employment to the expanding number of workers. These policies included outward-looking strategies that encouraged domestic enterprises to compete in the global marketplace; stable macroeconomic policies that ensured low rates of inflation, discouraged capital flight, and promoted economic efficiency; and the use of financial incentives, subsidies, and access to credit to promote the growth of key industries.

Similarly, demographic change led to high saving rates because macroeconomic stability and the development of financial institutions encouraged saving and because governments avoided large-scale transfer programs (such as expensive public pension schemes) that might have undermined saving incentives. Changes in the population age structure led to greater spending on education because both governments and parents attached a high priority to education. Changes in the childbearing responsibilities of women had a favorable economic effect because governments eliminated laws and administrative policies that discriminated against women in the workplace. In short, rapid demographic change was a necessary but by no means sufficient condition for rapid economic growth.

And what about the future? Although economic trends will ultimately depend on myriad forces, demographic conditions—except in Japan—will favor strong economic growth for several decades to come. Populations will be heavily concentrated at the working ages, high rates of investment in education will ensure an educated, productive labor force, and high rates of saving will support additional capital deepening at home and investment abroad.

First in Japan and later in the other countries, saving rates are likely to decline as the elderly population grows more quickly than other age groups. This possibility has been the source of a good deal of pessimism about the future of the Japanese economy. Is this pessimism warranted? Probably not.

The anticipated downturn in saving rates in Japan, and eventually elsewhere in East Asia, mirrors not only demographic changes, but also fundamental changes in capital requirements. At the end of World War II, the investment opportunities in Japan were enormous. There were severe shortages of capital due to war-time destruction, and a rapidly growing labor force had to be “equipped.” Under these circumstances, high rates of saving and investment could fuel rapid economic growth. In recent years, attractive domestic investment opportunities have not kept up with the accumulation of wealth so that Japan’s high level of saving is increasingly financing the country’s remarkable rate of foreign investment.

In the absence of a new economic miracle, the extraordinary growth rates of the past four decades are unlikely to continue in Japan. Yet the economic growth that has already occurred has allowed the Japanese to achieve a standard of living among the highest in the world, with a per capita GNP in 1999 of US\$42,783. Several other East Asian countries are following the same path. Such a situation should not be grounds for undue pessimism.