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## Why Does Population Aging Matter So Much for Asia? Population Aging, Economic Growth, and Economic Security in Asia

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## ADB Economics Working Paper Series



### Why Does Population Aging Matter So Much for Asia? Population Aging, Economic Growth, and Economic Security in Asia

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Sang-Hyop Lee, Andrew Mason, and Donghyun Park

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# **Why Does Population Aging Matter So Much for Asia? Population Aging, Economic Growth, and Economic Security in Asia**

**Sang-Hyop Lee, Andrew Mason, and Donghyun Park**  
October 2011

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## **Contents**

Abstract	v
I. Introduction	1
II. Key Features of Aging in Asia	3
A. The Three Phases of the Transition	3
B. How and Why Age Structures are Changing	6
III. The Economic Lifecycle and the Support Ratio	8
A. Support Systems in Asia	11
B. Options for Sustaining Growth in the Face of Population Aging	15
IV. Conclusions	18
Appendix: Population Statistics	20
References	23



## **Abstract**

Asia as a whole is experiencing a rapid demographic transition toward older populations, though different countries are at different stages of this region-wide trend. We document Asia's aging population, describe the region's old-age support systems, and highlight the regional socioeconomic implications of the transition for those support systems. Aging populations present two fundamental challenges to Asian policymakers: (1) developing socioeconomic systems that can provide economic security to growing numbers of elderly while (2) sustaining strong economic growth over the next few decades. Successfully addressing these two challenges will be vital for ensuring Asia's continued economic success in the medium and long term.





## I. Introduction

The speed and strength of developing Asia's recovery from the global financial and economic crisis has been surprising. Although exports and economic growth plummeted during the fourth quarter of 2008 and the first quarter of 2009, the sizable fiscal and monetary stimulus programs quickly enacted by governments around the region initially supported aggregate demand and growth in the face of collapsing world trade. The region's resilient V-shaped recovery has gained depth and breadth as exports have recovered and private domestic demand has strengthened. What is all the more surprising is that the turnaround has taken place despite the continued fragility and uncertainty of the advanced economies. While it is far too early to tell whether Asia has decoupled from the business cycles of the advanced economies, the region's robust performance is making a substantial contribution to the global outlook.

The region now faces the difficult, fundamental challenge of sustaining growth beyond the crisis into the medium and long term. For decades prior to the crisis, Asia was the world's fastest growing economic region; this strong, sustained performance transformed it from a group of typical developing countries into the third center of gravity of the world economy along with the European Union (EU) and the United States (US). The question remains, will Asia be able to return to its high-growth trajectory once the global crisis abates?

Asia's continued postcrisis success is far from automatic. The external environment is likely to be less benign because to a large extent, the weakness of the advanced economies reflects structural problems—failures in the US housing and financial markets and fiscal concerns in some EU countries—that will take time to sort out. The medium-term weakening of the advanced economies has negative repercussions for Asia's medium-term growth since those economies have traditionally been and remain key markets for its exports.

In addition to a less benign external environment, Asia also faces structural shifts that impinge on long-term economic growth. Above all, the first demographic dividend—a major contributor to growth in the past—is coming to an end. The first demographic dividend refers to the accelerated economic growth associated with a rise in the share of people of working age in the total population. That rise leads to an increase in per capita income; hence, for a given savings rate, the rise in the share of working-age people leads to an increase in consumption per person, i.e., to a higher living standard. The first demographic dividend is not, however, an automatic consequence of favorable demographics; it depends on the ability of the economy to productively use the additional

workers. The success of East Asian economies in creating policy environments conducive to taking full advantage of their demographic dividends played a major role in the East Asian miracle.<sup>1</sup>

As the large working-age cohort that drove the demographic dividend grows older, however, population aging sets in. An aging population implies a fall in the working-age population that will lead to lower output. Aging also implies that each worker will have to support more and more retirees under public pension and health care systems. All in all, while demographic trends in Asia were conducive to economic growth in the past, they will be markedly less so in the future. Responses to population aging can lead to very different outcomes. People may work longer, workers may increase savings to cover longer life expectancy, or there may be greater investment in human capital that will lead to higher productivity. If, for example, workers accumulate assets in anticipation of living longer, then population aging may possibly lead to a more favorable outcome for the economy. This increase in the demand for capital in response to aging is called the second demographic dividend (Mason and Lee 2007).

Achieving the second demographic dividend in large part relies on policy. In fact, for Asian policy makers, population aging gives rise to two major objectives that sometimes sharply conflict with each other. The first is to sustain strong economic growth over the next few decades, and the second is to develop social systems that will provide economic security to a growing number of elderly people. Success in achieving these two objectives will require policies that promote savings, investment in human capital, well-functioning financial and labor markets, and macroeconomic stability. It will also require avoiding disproportionately large transfer programs for the elderly.

As in other parts of the world, population aging in Asia is due to two factors: lower fertility and longer life expectancy. Asian economies are at very different stages of population aging due to significant differences in the timing and speed of fertility and mortality declines. In South Asia, for example, populations are still relatively young while in East Asia they are substantially older, although two important demographic changes are common to all. The percentage of children is declining or has already reached low levels due to rapid declines in birth rates, and the share of the working-age population is increasing or has reached very high levels.

As indicated above, the increase in the working-age population has had a direct and favorable impact on growth in per capita income, but this is a transitory phenomenon. In some East Asian economies, the working-age cohort has already started to decline and the older population is increasing rapidly particularly in high-income economies in large part because they have very low fertility rates. Lower-income economies will also experience significant increases in the share of older people in the next few decades. This rapid and massive transition will have important implications for economic

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<sup>1</sup> See, for example, Bloom et al. (2000) and Bloom and Williamson (1998).

growth, the sustainability of publicly funded pension and health care systems, labor supply, savings and capital formation, spending on human resources, poverty, and intergenerational inequality.

## **II. Key Features of Aging in Asia**

To understand the economic implications of the demographic transition, we must identify its key features, explain why it is occurring, and describe how it varies across countries. The estimates and projections presented here are based on the United Nations (UN) Population Division's World Population Prospects: The 2008 Revision (UN 2009).

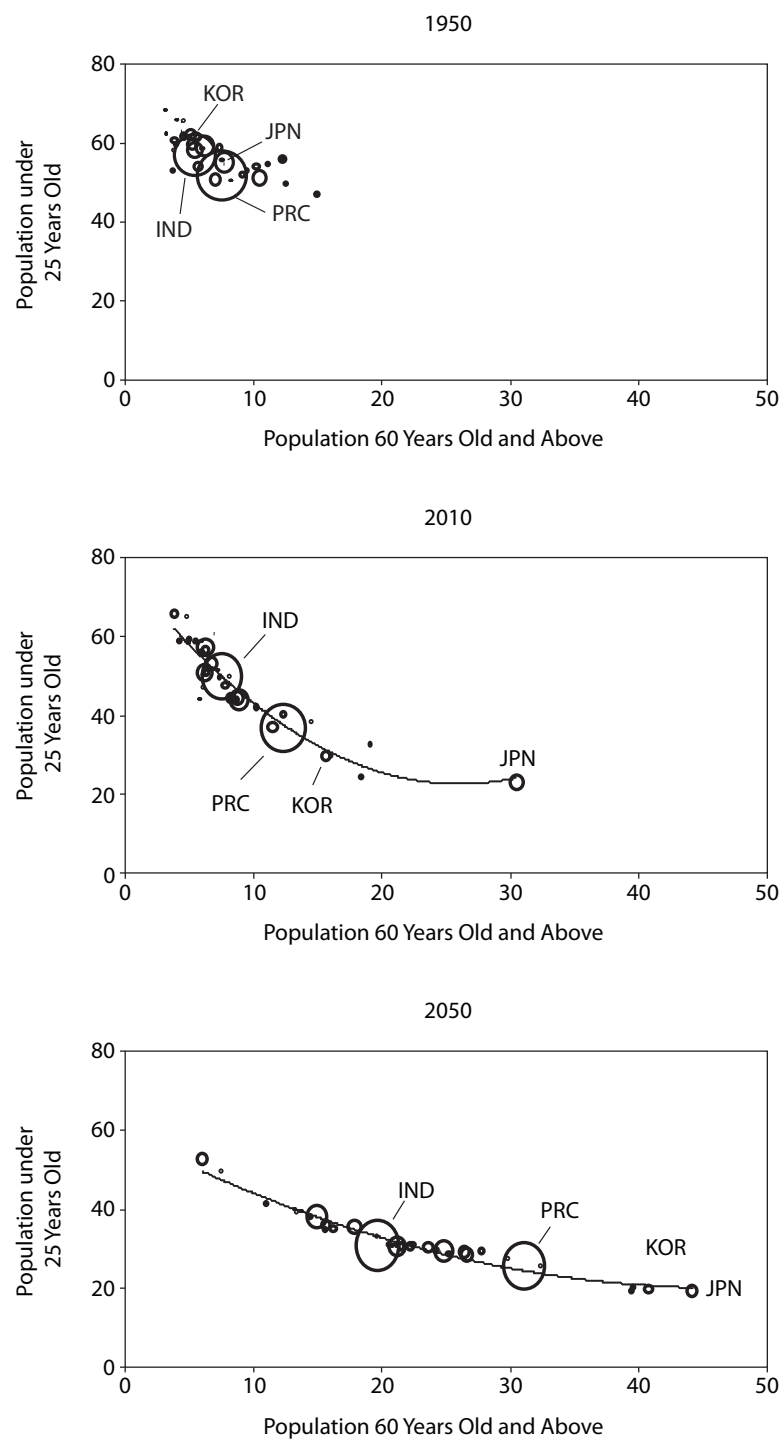
### **A. The Three Phases of the Transition**

Important changes in the age structure in Asia began to occur around 1950. Most populations were then young with more than half under the age of 25. The rest were concentrated in the prime working ages of 25–59 while the percentage of the total population 60 and older ranged from 3% to 15%.

The range of age structure in 1950 is the first panel in Figure 1. Countries are represented by bubbles that are proportional to the size of their populations. The percentage of the population under age 25 is measured on the vertical axis, the percentage 60 and older on the horizontal axis, and the percentage aged 25–59 can be represented by diagonal gridlines. Only the 50% gridline is shown. In 1950, no Asian country had a large population concentration in the prime working ages. India's population was somewhat younger than that of the People's Republic of China (PRC), and Japan's age structure was very similar to that of the PRC.

Asia's age structure changed very dramatically between 1950 and 2010 (second panel). During the 1950s and 1960s, most Asian countries except Japan became younger, but after that the percentage under age 25 declined very markedly while the percentage in the prime working ages increased. The percentage 60 and older also increased in many countries, most notably in Japan.

**Figure 1: Population Age Structure for Asian Countries, 1950, 2010, and 2050 (percent)**



IND = India; JPN = Japan; KOR = Republic of Korea, PRC = People's Republic of China.

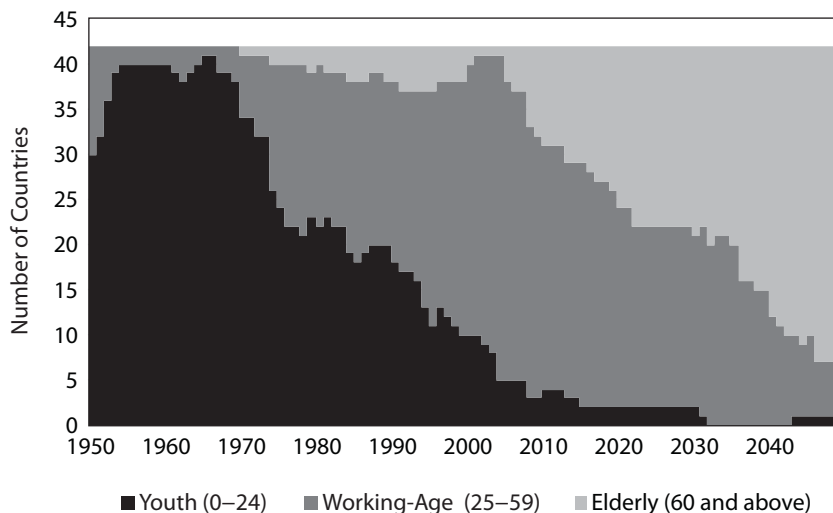
Note: Below diagonal line population exceeds 50% of the total population.

Source: UN (2009) accessed 1 July 2011.

In the coming decades, the age structure will continue to change (third panel). The percentage of children will continue to decline, although in many countries the decline is expected to be modest. The dominant change will be a shift from working ages to old age. The percentage aged 25–59 will decline while the percentage 60 and older will rise to unprecedented levels. Japan is projected to have the oldest population in 2050 with 44% aged 60 or older. The 60 and older populations of the Republic of Korea are projected to reach 40% by 2050.

The transition in age structure is summarized in Figure 2 by classifying countries by the age group experiencing the largest absolute increase: youth (under age 25), working-age adults (25–59), or elderly (60 and older). Throughout the 1950s and 1960s, the dominant trend was a large increase in the number of children.<sup>2</sup> In fact, in 1965, Japan was the only country in which demographic change was not dominated by an increase in the number of youth. The second phase emerged in the 1970s when the increase in the number of people of working age exceeded the increase in the number of youth in a growing number of countries. By 1985 more Asian countries were in the second phase of the age transition than in the first. During the last few decades, growth in the working-age population has become dominant. In 2004, the peak year, 36 of 42 countries experienced a greater increase in the working-age population than in either the youth or elderly populations.

**Figure 2: Phases of Age Transition in Asia by Age Group, 1950–2040**



Note: Countries are classified by age group with the largest absolute increase in population in each year.

Source: UN (2009) accessed 1 July 2011.

<sup>2</sup> Often studies emphasize the growth rates of each age group, but this tends to overstate the economic impact of population aging for the many countries in which the older population is relatively small.

Asia is now entering the third phase of the transition. While in 2010 countries in the second phase outnumbered those in the third phase by three to one, the trend is, however, very clear. By 2030, 20 of 42 countries will have reached the final phase of the transition. During the last year of the projection, the change in the 60 and older population will dominate changes in other age groups in 34 countries.

## **B. How and Why Age Structures are Changing**

Changes in age structure are a consequence of the demographic transition. Before the onset of the transition, birth and death rates were quite high and populations grew relatively slowly or not at all. The demographic transition began in most countries with a decline in death rates. Improvements in mortality were particularly concentrated among children and infants, and this led to substantial growth in the young population. In developing Asia, this transition occurred mainly in the 1950s and the 1960s. Then birth rates began to decline, and the large birth cohorts of the 1950s and 1960s began to reach maturity starting in the 1970s fueling the growth of the working-age population; phase two of the transition began.

Over time, the decline in death rates has become increasingly concentrated at older ages. People are not only more likely to survive childhood, they are more likely to survive well into retirement. While improvements in mortality rates at older ages have led to more rapid population aging, the most important factor leading to an increase in the share of the old-age population is low fertility. The share of the old-age population in countries like Japan, the Republic of Korea, and Singapore is projected to reach high levels because low fertility rates will lead to substantial declines in the working-age population.

Understanding the reasons for population aging is important for identifying solutions. For example, a solution frequently offered for a shrinking working-age population is to extend the retirement age. The logic behind this idea is powerful: if people are living longer they should work longer. This solution is a potentially important response to population aging, but it does not address the low fertility problem. In many countries the elderly are heavily dependent on workers (taxpayers) who fund public pension and health care programs. Low fertility will lead to fewer children and then to fewer taxpayers on whom the elderly can rely.

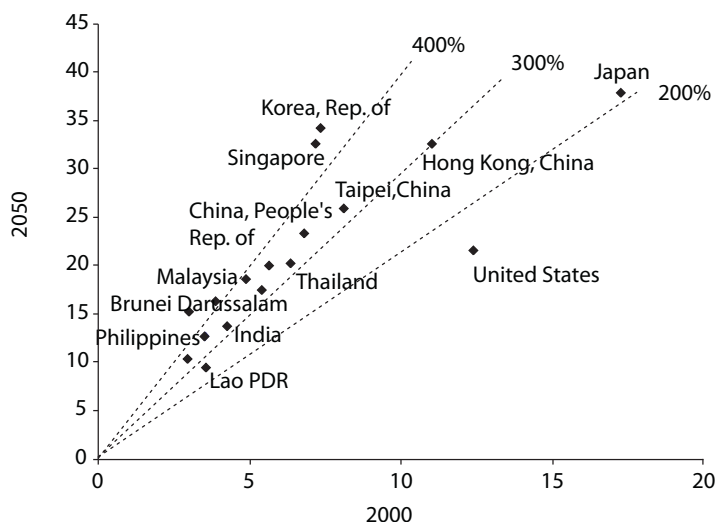
Although this broad outline of a changing age structure appears to be common to all Asian economies, there is enormous diversity and uncertainty about the path any one of them should take to address it. East Asian and a few Southeast Asian economies are relatively far along in their demographic transitions. Life expectancy has already reached high levels and continues to rise steadily. Fertility has dropped to very low levels in East Asia and is in fact much lower than in the US and in many European countries. Recently, fertility has increased in the lowest fertility countries of Europe, but this has not happened in low-fertility Asia (Goldstein et al. 2009).

Elsewhere in Asia, the demographic transition is an evolving event. Birth and death rates continue to decline steadily in some cases and more erratically in others (Appendix Tables 1–3). There is considerable uncertainty, however, about the speed and the extent of fertility decline. If other Asian economies follow the path of East Asia and fertility rates drop to very low levels, their populations will age more rapidly than the projections in Figure 1 indicate.

There is also considerable diversity within economies. The regional and urban–rural differences in fertility in the PRC and India are quite substantial. By 2000, more than 500 million Chinese were living in provinces where the estimated total fertility rate was 1.3 or less, a fertility rate similar to Japan’s (National Bureau of Statistics of China and East-West Center 2007).

One notable feature of Asia’s demographic transition is its exceptional speed. While the basic picture is the same worldwide, Asia is aging more rapidly than elsewhere primarily because fertility rates have declined more rapidly than elsewhere. Figure 3 illustrates how rapidly Asian economies are aging and how diverse they are. By 2000, the share of the population aged 65 and older had exceeded 15% only in Japan, but by 2050 a majority of economies in the region will surpass this level, including a number of low-income ones such as Indonesia, Myanmar, and Viet Nam. India’s elderly population is also expected to be close to 14% by 2050. In short, the percentage of elderly people will more than triple between 2000 and 2050 throughout the region. In only two economies—Japan and the Lao People’s Democratic Republic—will the proportion less than double during this period while it will more than double in Brunei Darussalam, Malaysia, the Republic of Korea, and actually quadruple in Singapore. This is in stark contrast to the US, which is aging at a relatively slow pace due to a relatively high birth rate, a somewhat shorter life expectancy, and a high rate of immigration.

**Figure 3: Percentage of People Aged 65 and Older in Asia and the US, 2000 and 2050 (percent)**



Sources: UN (2009) and Council for Economic Planning and Development Statistics Database (CEPD 2009) accessed 1 July 2011.



The first group of aging societies in Asia—Japan; the Republic of Korea; Singapore; and Taipei, China—are all relatively rich, and many of the institutional elements that are important in aging societies are in place. Their governments are stable, relatively efficient, and capable of managing public health care systems and pension programs, although even the most advanced Asian economies have encountered difficulties in effectively administering their social security systems. Moreover, the private financial systems in these economies provide a relatively secure economic environment in which workers can accumulate wealth and provide for their own material needs at the end of life.

Asia's next wave of aging economies may be less prepared to meet these challenges. The speed at which their age structures are changing is unprecedented in human history. In fact, aging is occurring more rapidly than development; hence, they will grow old before they grow rich. The concern is not wealth per se but that the financial and political institutions important in aging societies may be relatively underdeveloped. This is not what the first group experienced.

### III. The Economic Lifecycle and the Support Ratio

The age structure of a population is important due to a fundamental feature of human society: the economic life cycle. In all modern societies, there are periods of dependency at the beginning of life and at the end of life because children and the elderly consume more resources than they produce through their labor. The gaps between consumption and labor income—the life cycle deficit—should be filled by reallocations from people of working age.

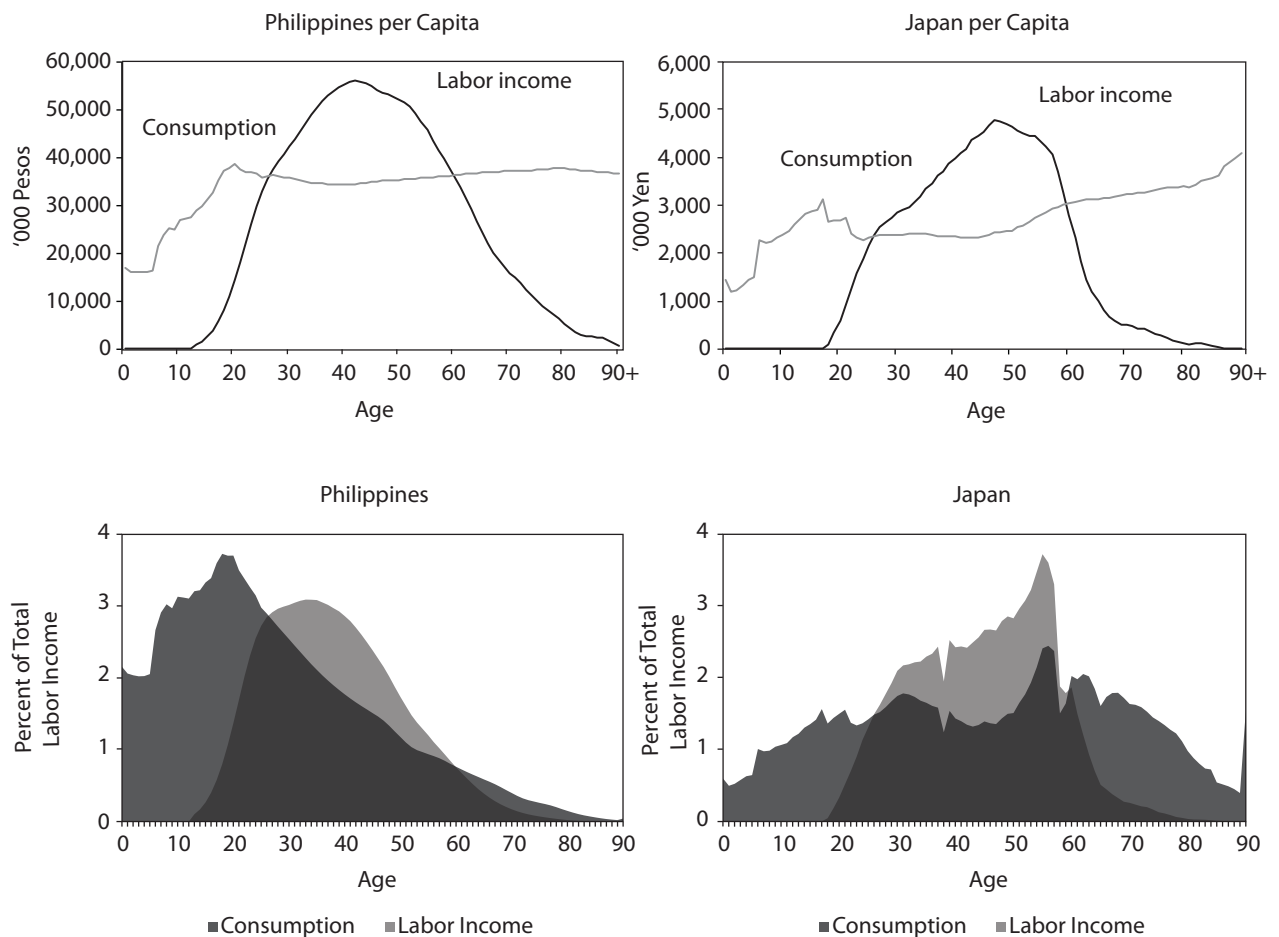
Our understanding of the economic life cycle and the ability to measure resource reallocations across ages have been vastly improved due to the recent development of national transfer accounts (NTA) that measure on the aggregate how people at each age in the life cycle acquire and use economic resources (Lee 1994, Mason et al. 2009, Lee and Mason 2011).<sup>3</sup> The NTA represent a significant advance because they provide a comprehensive set of measures of production, consumption, savings, and transfers in a manner consistent with national income and product accounts.<sup>4</sup> The NTA also consider the public and private sectors, both of which mediate economic flows across ages, so they can be used to study the implications of population aging for both.

<sup>3</sup> NTAs were developed as an international project led by Ronald Lee of the University of California at Berkeley and Andrew Mason of the East-West Center.

<sup>4</sup> NTA are estimated relying on a variety of data sources. In addition to national income and product accounts, government financial statistics and government administrative records are used to estimate economywide aggregates. Age profiles are estimated by making extensive use of administrative records and nationally representative income and expenditure surveys, labor force surveys, health expenditure surveys, and special-purpose household surveys.

Using NTA data, the economic life cycle is represented by labor income and consumption by age for Japan and the Philippines in Figure 4. The per capita economic life cycle varies by age because of individual characteristics and behaviors, institutions, and market forces. Productivity increases as children mature and benefit from human capital investments. Subsequently, productivity declines as health deteriorates and disability increases. Labor force participation, hours worked, and unemployment all vary with age as does their influence on the labor-income profile. Consumption is influenced by preferences, prices, interest rates, income, and public institutions. Both profiles depend on many other historical, cultural, political, social, and economic factors.

**Figure 4: Comparison of Labor Income and Consumption by Age in Japan (2004) and the Philippines (1999), Per Capita and Aggregate**



Note: Labor income is a broad measure consisting of earnings and benefits received by employees and the estimated value of the labor of the self-employed, including unpaid family workers. Consumption is also a broad measure that includes the value of all goods and services consumed by individuals and by governments on their behalf.

Source: NTA database, available: [www.ntaccounts.org](http://www.ntaccounts.org), accessed 1 July 2011.

The economic life cycle to a large extent reflects population age structure. Essentially, countries are trading a youth deficit for an old-age deficit of similar size over the course of the demographic transition. The Philippines, for example, has a very young population and a very large deficit at young ages. In Japan, which has an older population, the deficit is much larger at older ages compared with the youth deficit; the old-age deficit will grow substantially unless consumption and labor income patterns change radically.

There are, however, several important opportunities for changing course. Between the two points of high dependency in the last 3 decades, Asia has had an age structure very favorable to rapid economic growth—the first demographic dividend (Bloom and Williamson 1998, Kelley and Schmidt 2001, Mason 2001, and Mason and Lee 2007). This direct impact of the age structure is effectively described as a change in support ratios—the number of workers per person—that is direct and unambiguous. Many Asian and Pacific countries including Bangladesh, India, Indonesia, Pakistan, and the Philippines will continue to experience the first demographic dividend as their working-age populations grow relative to their dependent populations. Favorable conditions should persist for at least the next 15 years and, in most cases, for much longer. The magnitude of the demographic dividend depends on age patterns of labor income and consumption, but estimates of these patterns are not available for most countries. Based, however, on the eight Asian countries for which age profiles have been constructed in the NTA, a substantial demographic dividend can be expected (Table 1).

**Table 1: Growth in the Support Ratio during First Dividend for Selected Countries**

	Minimum		Maximum		Support Ratio in 2050	Annual Gain (Max-Min %)	Annual Loss (2050–Max %)
	Support Ratio	Year	Support Ratio	Year			
Bangladesh	0.69	1982	0.98	2033	0.94	0.69	–0.22
China, People's Rep. of	0.75	1972	1.00	2015	0.87	0.66	–0.39
India	0.75	1973	0.97	2042	0.96	0.37	–0.12
Indonesia	0.74	1976	0.96	2026	0.91	0.53	–0.26
Japan	0.69	1950	0.86	1978	0.64	0.78	–0.42
Korea, Rep. of	0.64	1966	0.93	2010	0.68	0.86	–0.79
Pakistan	0.71	1986	0.92	2050	0.92	0.42	na
Philippines	0.68	1969	0.92	2046	0.92	0.40	–0.03
Thailand	0.71	1971	0.99	2011	0.89	0.84	–0.27
Viet Nam	0.67	1980	0.97	2021	0.89	0.90	–0.30

Source: Mason and Lee (2011).

Over time, the populations of the Asia and the Pacific region will become increasingly concentrated at older ages where in all cases labor income is quite modest. In part this reflects low levels of employment at older ages, but it also reflects low wages and productivity for older adults. Population aging could serve as a drag on economic growth as the effective number of workers declines relative to the effective number of consumers. East Asia faces the most serious problems. In the Republic of Korea, for example, the support ratio is expected to decline by 0.8% per year over the next 40 years. In the

absence of measures to compensate for this change, standards of living will be reduced by more than 25% between 2010 and 2050.

A second potential problem caused by population aging is the strain on public transfer systems. The old-age transfer system is relatively underdeveloped in many developing Asian countries, so the effects would be smaller than in Europe, Japan, or Latin America, but the effects will nonetheless be significant. In a business-as-usual simulation, transfers of wealth (or implicit debt) would range from 90% of total labor income in the Pacific island nations to 240% of total labor income in East Asia. If countries in the region were to shift toward the consumption, labor income, and transfer patterns characteristic of rich countries, implicit debt will increase to much higher levels. For Asian Development Bank developing member countries as a whole, implicit debt would reach 320% of total labor income in 2030 and 540% of total labor income in 2050 (Mason and Lee forthcoming).

## **A. Support Systems in Asia**

Economic life cycles are sustainable only because a complex system of institutions and economic mechanisms enables economic resources to flow from surplus ages to deficit ages. Essentially, two economic mechanisms are used for age reallocations: transfers and asset-based reallocations. A defining feature of transfers is that they involve no explicit *quid pro quo*. Resources flow from one party to another either voluntarily in the case of most private transfers or involuntarily in the case of public transfers though private transfers may involve implicit contracts enforced by social conventions. Asset-based reallocations rely on intertemporal exchanges. An asset acquired in one period can be used to support consumption in subsequent periods either by using income from the asset or by disposing of it. When individuals accumulate pension funds or personal savings during their working years and rely on income from and/or the disposal of those assets during retirement, they are relying on asset-based reallocations. Likewise, when individuals borrow to finance education or to buy a car or a home, they are relying on asset-based reallocations to consume more than their current labor income. This means that they must forego consumption in later periods to repay those loans.

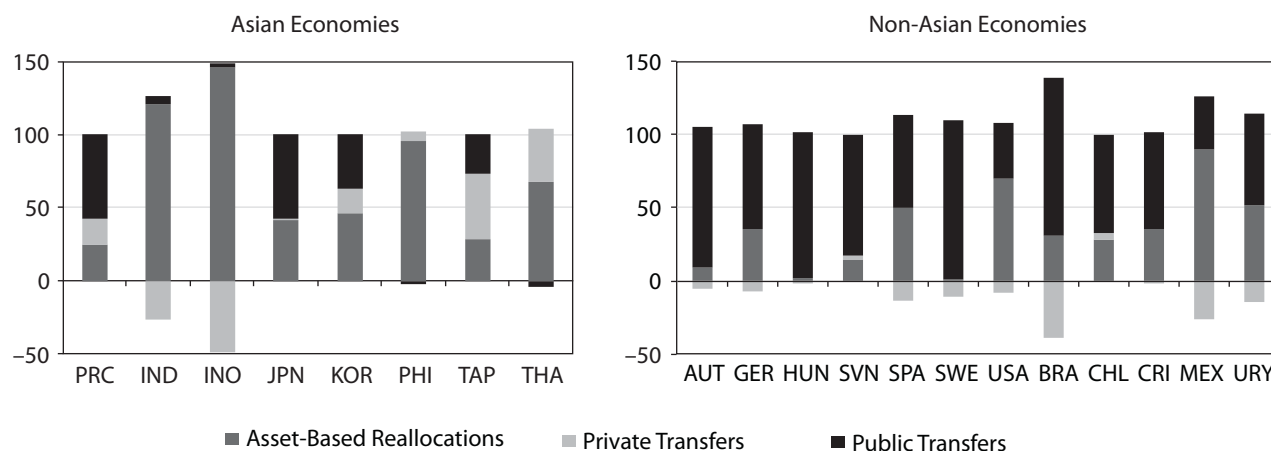
Both the public and private sectors mediate economic flows across age groups. The public sector reallocates resources relying on social mandates embodied in laws and regulations and implemented by governments. Education, public pensions, and health care programs are important examples of public reallocations. Private sector reallocations are sometimes governed by law but are also governed by voluntary contracts, social conventions, and deeply ingrained behavior patterns that are mediated by markets, households, families, charitable organizations, and other private institutions.

Familial transfers are the dominant support system for children, not just in Asia. The difference between Asia and non-Asian countries is that in Asia, familial transfers are especially important for supporting the elderly as well. Although in Japan and the

Republic of Korea, the extended family as an institution has declined very rapidly in the last few decades, roughly half the elderly still live with their children. In other Asian countries, the great majority of elderly live with their children, and there is a surprising degree of stability in these arrangements.

Figure 5 shows the relative importance in Asian, Latin American, and European economies with available data and in the US of the three ways the elderly fund the gap between what they consume and their labor incomes. Private and public transfers are measured as net transfers—transfers received minus transfers made—relative to consumption in excess of labor income for those 65 and older. Reliance on assets is measured as asset-based reallocations—asset income minus savings—relative to consumption in excess of labor income for those 65 and older. The life cycle deficit—consumption minus labor income—must equal net public transfers plus net private transfers plus asset-based reallocations, i.e., the three components of the support systems must add up to 100% (Lee and Mason forthcoming).

**Figure 5: Support Systems for People 65 and Older for Asian and Non-Asian Economies (percent)**



AUT = Austria (2000); BRA = Brazil (1996); CHL = Chile (1997); CRI = Costa Rica (2004); IND = India (2004); INO = Indonesia; GER = Germany (2003); HUN = Hungary (2005); JPN = Japan (2004); KOR = Republic of Korea (2000); MX = Mexico (2004); PHI = Philippines (1999); PRC = People's Republic of China (2002); SE = Sweden (2003); SI = Slovenia (2004); SPA = Spain (2000); TAP = Taipei, China (1998); THA = Thailand (2004); US = United States (2003); UY = Uruguay (2006).  
 Note: Negative values represent net outflows, i.e., elderly provide more support to their families than they receive. If values in one support system are negative, values in another support system can be greater than 100%.  
 Source: NTA database, available: [www.ntaccounts.org](http://www.ntaccounts.org), accessed 1 July 2011.

There are interesting regional patterns in the support systems. Familial transfers for old age are much more significant in many Asian economies than in the other economies in Figure 5. Familial transfers fund about 45% of the life cycle deficit for the elderly in Taipei, China, 33% in Thailand, and slightly under 20% in the PRC and the Republic of Korea. Compared with European and Latin American countries, the public sector is generally less important to the elderly in Asia. In the Philippines and Thailand, net public transfers are zero, i.e., the elderly are paying as much in taxes as they are receiving

in benefits. In Indonesia, the elderly pay somewhat more in taxes than they receive in benefits. In the Republic of Korea and Taipei, China, net public transfers are funding about 33% of the life cycle deficits of the elderly. Elderly people in the PRC and Japan rely more on public transfers than do the elderly in the US, but less than the elderly in many European welfare states do.

Assets are an important source of support in all Asian countries except the PRC and Taipei, China where transfers are more important. In Indonesia and the Philippines, the elderly rely almost entirely on assets. Certainly some elderly in those economies do depend on familial and public transfers, but as a group, net transfers to the elderly are zero or negative, and asset-based reallocations are equal to or exceed the life cycle deficit. Thailand's elderly also rely heavily on assets. In the PRC, asset-based reallocations are the lowest among the Asian economies in this study. The elderly are saving quite a bit, but they also have relatively low asset-based incomes.

There are some interesting savings patterns for Asian countries that require further examination. In the conventional life cycle savings model, asset-based reallocations follow a simple age pattern: they are negative during the working years as individuals save some portion of their labor incomes and are positive in old age as individuals rely on asset-based income and draw down on their savings to fund consumption. There are elements of this life cycle model that are supported by NTA estimates. In countries without extensive old-age transfer systems, the elderly do rely heavily on assets to support themselves as shown in Figure 5. Available evidence from the NTA and other studies is, however, that the elderly do not in fact dissave. With minor exceptions, the elderly continue to save and often at surprisingly high rates. In other words, the elderly in Asia are relying on asset income and do not dissave to support themselves. Although some have speculated that the elderly in low-income settings might rely more on family transfers than on assets, we did not find this to be the case.

Changes in age structure have a strong effect on financing public transfers; Miller (2011) calculated the fiscal support ratio to assess the pressure those transfers exert on fiscal sustainability. The ratio is calculated holding age-specific public transfer inflows and outflows constant while allowing the population's age structure to change in accordance with historical estimates and projections. Table 2 shows the evolution of the fiscal support ratio for selected Asian economies using the age profiles of public transfers in NTA data sets. The effective number of taxpayers is calculated by weighting the population in each year using the age profile of per capita taxes paid. The effective number of beneficiaries is calculated using per capita benefits in the base year to weight the population age distribution. The ratio is set at 100 in the base year of 2010 so that all values are expressed relative to the fiscal position in 2010.

**Table 2: Fiscal Support Ratios for Selected Asian Economies and the United States, 1950–2050 (percent)**

	1950	2010	2020	2030	2050	Year of Most Favorable Age Structure
China, People's Rep. of	89	100	97	89	82	2012
India	97	100	102	103	102	2028
Indonesia	79	100	106	110	108	2033
Japan	91	100	92	87	74	1976
Philippines	87	100	106	111	116	2050
Korea, Rep. of	76	100	97	89	80	2008
Taipei, China	68	100	100	94	78	2015
Thailand	66	100	104	104	104	2039
United States	99	100	96	92	89	2006

Note : Recalculated based on Miller (2011).

Source: NTA database, available: [www.ntaccounts.org](http://www.ntaccounts.org), accessed 1 July 2011.

In Japan, population aging combined with the current tax and benefit policies would lead to a 26% decline in the fiscal support ratio by 2050. Thus, taxes must increase, or benefits must decrease, or deficits must increase, or some combination of the three must occur. The PRC; the Republic of Korea; and Taipei, China show somewhat smaller fiscal impacts with an 18%–22% reduction in the fiscal support ratio by 2050. In contrast, India, Indonesia, the Philippines, and Thailand will see an increase in their fiscal support ratios because net transfers to the elderly are modest or in some cases negative and because changes in their age structures are partially concentrated at ages when net transfers are generally negative. For these four, changes in age structure will relax public sector budget constraints.

The danger, of course, is that countries with favorable demographics will implement generous transfer systems that ultimately prove to be unsustainable. The role of the public sector is, in fact, growing quite rapidly in the region. In the Republic of Korea, for example, social welfare benefits for the elderly rose sharply over a very short time span. Medical insurance benefits rose 15.3% annually between 2000 and 2005, and public pension benefits grew by 9% annually during the same period (An et al. 2011). Such a sharp rise is somewhat exceptional, but low-income countries are also experiencing a rapid increase in per capita public transfers to the elderly. Recognizing the importance of a guaranteed support system for its aging population, in 2006 the Government of Indonesia issued Law No. 40/2004 expanding the social security system to include a national pension system for workers in both the formal and informal sectors (Maliki 2011). In 2009, the PRC committed itself to building a universal public pension system in rural areas funded by individual premiums and government subsidies. The government also made public health insurance available to urban employees in 1998, to rural citizens in 2003, and to urban citizens in 2007 (Li et al. 2011).



The elderly in Asia are relying less on their families than they did in the past. The question is, what strategy should be used to compensate for the decline in this traditional source of old-age support: developing extensive social welfare systems as in Europe and parts of Latin America or relying more on accumulating personal assets as in the Philippines, Thailand, and the US? The strategy must simultaneously meet both challenges of providing economic security for the elderly and sustaining economic growth.

## **B. Options for Sustaining Growth in the Face of Population Aging**

One strategy for responding to population aging emphasizes capital accumulation. Many of the fundamental insights were established by Modigliani and Brumberg (1954) and Tobin (1967) who explored the implications of the economic life cycle for savings and investment. The life cycle has implications for both because the old-age deficit is funded in part by asset-based reallocations. Population aging will lead to an increase in the demand for assets for three reasons. First, to the extent that longer life expectancy leads to longer retirements, the incentive to accumulate more during the working years will increase. Second, because fertility is lower, fewer resources may be devoted to child rearing and more to saving for retirement. The third reason is simply due to age composition. Older individuals are wealthier because they have had longer to accumulate wealth; hence, a population composed of more old people will have greater wealth per capita.

The strength of the relationship between age structure and capital depends, however, on the nature of the old-age income support system. This idea has been explored in many industrialized countries and to a more limited extent in developing countries. The primary focus has been the possibility that public transfers will crowd out savings (Feldstein 1974 and 1998, Gale 1998, and Munnell 1974). These and similar studies inform efforts to evaluate existing transfer systems, guide the development of new systems, and anticipate the implications of alternative reform proposals. Social security reform, in particular, has been the subject of an enormous amount of research (Feldstein and Samwick 2001, Feldstein 1998, and Krueger and Kubler 2002).

The evidence suggests that East Asian countries have actively pursued the high savings, high investment paradigm. Singapore is an interesting example because it has institutionalized this approach to aging through its Central Provident Fund in which Singaporeans are required to save a high fraction of their earnings through mandatory contributions. The fund provides pension benefits and has led to high rates of savings, investment, and economic growth. This is quite different from the public pension systems in Japan, Europe, Latin America, and the US that provide for retirees out of current taxes and therefore have no positive growth effects.

The experience of other East Asian countries indicates that mandatory savings may not be required as very high rates of savings have accompanied the age transition in



the absence of mandatory schemes. This is certainly true of the PRC today. East Asian economies share two important features: rapid population aging and low reliance on public transfers. Thus, the incentive to save more generated by population aging is not undermined by large public transfers to the elderly (Feldstein 1974, Gale 1998, Lee et al. 2003, and Lee and Mason 2010).

Nevertheless, health care for the elderly is a large and increasing cost that is often heavily subsidized by the public sector, and familial transfers to the elderly may be very important in Asia. Thus, aging in Asia may lead to large implicit debts that are shared by taxpayers and the adult children of the elderly. If the needs of a growing elderly population are met through greater reliance on life cycle savings, population aging will lead to an increase in assets with favorable implications for economic growth. Previous studies and the following analysis show that through this mechanism, changes in age structure can lead to the second demographic dividend (Mason and Lee 2007), i.e., to higher standards of living that persist long after the favorable effects of the first dividend have ended.

According to estimates by Lee and Mason (2011 forthcoming), population aging will lead to substantial capital deepening, a strategy very much in line with Asia's traditionally high savings and investment rates. Table 3 shows that pension assets in developing member countries of the Asian Development Bank would rise from 1.2 times total labor income in 2010, to 2.1 times total labor income in 2030, and 2.7 times total labor income in 2050. This capital deepening should provide a boost to economic growth that easily dominates the effects of a declining support ratio.

**Table 3: Pension Assets Relative to Labor Income in Asia and the Pacific, 2010–2050**

	Low-Income Profiles			High-Income Profiles		
	2010	2030	2050	2010	2030	2050
Asia-Pacific Countries	1.6	2.4	3.0	1.1	1.6	2.0
Developing Countries	1.2	2.1	2.7	0.8	1.4	1.8
Central and West Asia	0.9	1.3	1.9	0.6	0.9	1.3
East Asia	1.4	2.4	3.0	0.9	1.6	2.0
South Asia	0.9	1.3	2.0	0.6	0.9	1.3
Southeast Asia	1.1	1.9	2.5	0.8	1.3	1.6
Pacific Island Nations	0.7	1.0	1.4	0.5	0.7	1.0
Nondeveloping Countries	2.9	3.7	4.4	1.9	2.5	3.0

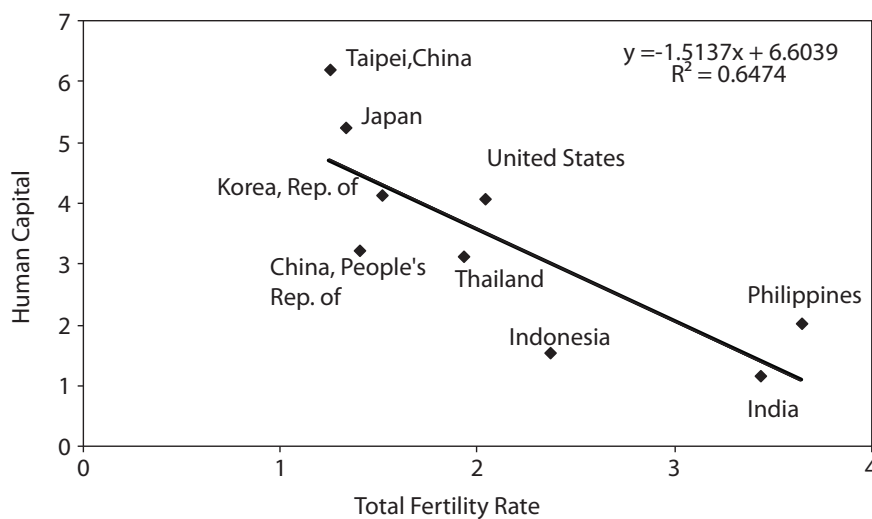
Source: Authors' calculation based on NTA database, available: [www.ntaccounts.org](http://www.ntaccounts.org), accessed 1 July 2011.

Given current patterns of old-age consumption, production, and transfers, the total demand for pension assets will increase very substantially over the coming decades, rising from \$26 trillion in 2010 to \$157 trillion in 2050. Thus, under these circumstances, aging should not depress savings rates. The gross savings rates required to meet the demand for pension assets will increase from 12.2% of gross domestic product (GDP) from 2010 to 2020 to 15.4% of GDP from 2040 to 2050.

Another possible response to population aging is to scale up investment in human capital. Children rely almost exclusively on transfers to fund their life cycle deficit, but countries vary in the extent to which those resources are provided through the public sector rather than the private sector. They also vary a great deal in the extent to which transfers are devoted to investments in human capital, i.e. education and health care. Asia's population aging is primarily a consequence of low fertility. The total productivity of the working-age population is not, however, determined exclusively by the number of workers. Total labor income could be raised by increasing the quality of the labor force through investments in human capital (Becker and Barro 1988)

A recent analysis by Lee and Mason (2010) showed that the impact of spending on education is strong enough to offset the adverse effects of population aging, but this conclusion depends on the effectiveness of the investment. Figure 6 compares human capital spending per child and the total fertility rate for Asian economies for which estimates are available (Mason et al. 2010). The total fertility rate is the average number of births per woman over her reproductive life given current age-specific birth rates. Human capital spending is measured in a similar way as the average expenditure on health and education during childhood given current age-specific spending. To facilitate comparisons across economies at very different levels of development, human spending is expressed as a fraction of the average labor income of a working adult aged 30–49. Therefore, the highest level of human capital investment in Figure 6—6.2 for Taipei, China—means that human capital spending during childhood is equal to about six years' worth of the pre-tax labor income of a working-age adult. Note that this value includes both public and private spending on education.

**Figure 6: Human Capital Spending per Child in Years of Average Labor Income for a Worker Aged 30–49 in Relation to Total Fertility Rates in Eight Asian Economies and the United States**



Note: Human capital spending is cumulated per capita values (public and private combined) for ages 0–26 for education and 0–18 for health care for the most recent year available (1997–2005).

Source: Recalculated from Lee and Mason (2010).

The investment response to population aging naturally integrates sustaining economic growth and providing economic security to the elderly. This is because the high rate of investment is a consequence of workers saving more for their retirement. The situation is very different with human capital. Retirees do not own the human capital in which they have invested; instead it is owned by the children who received it. The only way to recoup the investment is through expanded public transfers. Given current trends in private transfers, it seems unlikely that parents who invest more in their children will be compensated by old-age support directly from their children. The compensation is more likely to take the form of public transfers intermediated by the government. Smaller cohorts of workers would thus pay higher taxes to support the elderly as compensation for the higher levels of human capital investment they received.

It should be emphasized that the two paths to successfully coping with population aging—investing in physical capital and human capital—are not mutually exclusive. A sound approach to sustaining economic growth *and* providing economic security for the elderly would strike the right balance between assets and public transfers while promoting high rates of human capital investment. Finally, although this discussion has centered on economic growth and average standards of living, poverty and inequality are also inextricably linked to population aging. Unfortunately, little is known about these issues in Asia though several studies have examined the link between population aging and poverty/inequality in Latin America. One school of thought views intergenerational conflict through the prism of intragenerational inequality. For example, Turra and Holz (2009) using NTA data for Brazil stress a view of government as controlled by class interests in which most public pension benefits are directed to the wealthy elderly and most public tertiary education benefits are directed toward wealthy university students. Although studies for Asia are limited, we hope that enriched microeconomic data can shed light on this issue soon.

## IV. Conclusions

After recovering from the global financial and economic crisis with remarkable speed and vigor, Asia now faces the fundamental challenge of sustaining economic growth in the medium and long term. The external environment is likely to be less favorable for Asia's spectacularly successful export-led growth strategy in light of the prospective weakness of the advanced economies and their declining demand for imports. In addition, Asia faces the challenge of population aging. The youthful populations that contributed substantially to growth in the past are maturing; even countries that currently have relatively youthful populations will experience substantial graying in the years to come.

Asia's demographic transition poses two huge challenges: (i) developing social systems and institutions that can provide economic security to the growing number of elderly and (ii) sustaining strong economic growth over the next few decades. How well Asia tackles these two challenges will determine whether the region will be able to revert to its pre-crisis high-growth trajectory in the medium and long term. One strategy for supporting the elderly *and* achieving strong, sustained growth is to promote investment in physical capital, a strategy very much in line with Asia's traditionally high savings and investment rates. The other strategy is to promote investment in human capital to make workers more productive. Parents' recovery of human capital investments in their children will require taxes and public transfers.

Asian policymakers face a number of difficult obstacles in meeting the two challenges posed by population aging. Asia's financial systems still lag substantially behind the region's dynamic real economy, and many Asian countries are saddled with rigid, inflexible labor markets that discourage employers from hiring any workers, let alone older workers. Governments need to put in place policies that are conducive to working, to generating high rates of savings and investment, and to greater investment in human capital. Closer regional cooperation and integration are integral components of such policies.

The sheer speed and scale of Asia's demographic transition, which is unprecedented in human history, adds a sense of urgency to policymakers' tasks. While it is true that the more immediate priority for younger countries is to fully take advantage of a still wide-open window of demographic opportunity, they too should start planning for a grayer future. Even though the age structure of 2050 may seem too distant to be relevant today, the policies implemented by today's governments influence the ability of today's workers to adequately prepare for retirement. In fact, regardless of their current demographic profiles, countries across the region should prepare as early as possible to cope with the socioeconomic impacts of population aging. They would also do well to learn from the policy mistakes of advanced economies that aged earlier, e.g., fiscally unsustainable public transfers and premature retirement ages. Once inappropriate old-age support policies become entrenched, they are politically almost impossible to reverse as is evident in the vocal opposition to even relatively limited pension reforms in the advanced economies. On the other hand, the failure to spread the fruits of growth to the elderly will not only be socially costly but may adversely affect economic growth by causing political instability.

## Appendix: Population Statistics

**Appendix Table 1: Share of Population Aged 0–19**

	1950	1975	2000	2010	2025	2050
<b>Central and West Asia</b>						
Afghanistan	0.529	0.548	0.576	0.569	0.536	0.432
Armenia	0.443	0.464	0.355	0.288	0.269	0.222
Azerbaijan	0.441	0.521	0.411	0.338	0.300	0.231
Georgia	0.365	0.381	0.299	0.246	0.229	0.208
Kazakhstan	0.429	0.458	0.371	0.326	0.318	0.252
Kyrgyz Republic	0.389	0.511	0.455	0.395	0.339	0.252
Pakistan	0.437	0.521	0.521	0.474	0.412	0.308
Tajikistan	0.451	0.561	0.534	0.483	0.404	0.278
Turkmenistan	0.429	0.546	0.470	0.399	0.328	0.250
Uzbekistan	0.418	0.548	0.483	0.401	0.325	0.243
<b>East Asia</b>						
China, People's Rep. of	0.433	0.489	0.338	0.277	0.240	0.204
Hong Kong, China	0.412	0.423	0.237	0.181	0.156	0.151
Korea, Rep. of	0.518	0.501	0.289	0.233	0.175	0.156
Mongolia	0.519	0.541	0.461	0.358	0.305	0.236
Taipei, China	0.525	0.473	0.296	0.226	0.152	0.128
<b>South Asia</b>						
Bangladesh	0.491	0.553	0.484	0.410	0.325	0.244
Bhutan	0.541	0.508	0.517	0.408	0.327	0.246
India	0.477	0.506	0.452	0.408	0.332	0.245
Maldives	0.421	0.524	0.527	0.393	0.311	0.233
Nepal	0.514	0.524	0.516	0.470	0.381	0.287
Sri Lanka	0.474	0.483	0.364	0.319	0.291	0.235
<b>Southeast Asia</b>						
Brunei Darussalam	0.460	0.505	0.400	0.351	0.285	0.242
Cambodia	0.526	0.528	0.543	0.448	0.375	0.282
Indonesia	0.500	0.523	0.406	0.355	0.289	0.236
Lao People's Democratic Republic	0.504	0.527	0.538	0.487	0.407	0.305
Malaysia	0.504	0.532	0.436	0.386	0.316	0.245
Myanmar	0.443	0.517	0.409	0.355	0.305	0.242
Philippines	0.537	0.553	0.484	0.439	0.373	0.283
Singapore	0.500	0.457	0.281	0.233	0.164	0.156
Thailand	0.530	0.535	0.337	0.293	0.260	0.232
Viet Nam	0.419	0.538	0.440	0.352	0.278	0.225
<b>The Pacific</b>						
Fiji, Rep. of	0.571	0.524	0.450	0.410	0.341	0.262
Micronesia, Fed. States of	0.505	0.587	0.527	0.483	0.397	0.277
Papua New Guinea	0.495	0.545	0.516	0.499	0.435	0.334
Samoa	0.569	0.576	0.506	0.511	0.401	0.309
Solomon Islands	0.538	0.578	0.532	0.494	0.418	0.316
Timor-Leste	0.507	0.523	0.597	0.559	0.533	0.408
Tonga	0.596	0.586	0.507	0.478	0.421	0.331
Vanuatu	0.567	0.561	0.528	0.490	0.423	0.320
<b>Developed Asian Countries</b>						
Japan	0.457	0.314	0.205	0.179	0.154	0.152
New Zealand	0.361	0.396	0.298	0.276	0.249	0.222
Australia	0.333	0.366	0.276	0.256	0.239	0.223

Source: UN (2009).

**Appendix Table 2: Share of Population Aged 65 and Older**

	1950	1975	2000	2010	2025	2050
<b>Central and West Asia</b>						
Afghanistan	0.026	0.023	0.022	0.022	0.024	0.036
Armenia	0.083	0.058	0.100	0.110	0.153	0.215
Azerbaijan	0.069	0.056	0.057	0.066	0.099	0.179
Georgia	0.101	0.085	0.124	0.143	0.183	0.242
Kazakhstan	0.065	0.057	0.068	0.069	0.096	0.156
Kyrgyz Republic	0.082	0.059	0.055	0.050	0.075	0.147
Pakistan	0.070	0.050	0.037	0.041	0.051	0.100
Tajikistan	0.044	0.047	0.036	0.036	0.048	0.100
Turkmenistan	0.059	0.045	0.043	0.041	0.065	0.140
Uzbekistan	0.056	0.055	0.043	0.044	0.069	0.148
<b>East Asia</b>						
China, People's Rep. of	0.045	0.044	0.068	0.082	0.134	0.233
Hong Kong, China	0.025	0.054	0.110	0.129	0.221	0.326
Korea, Rep. of	0.029	0.035	0.073	0.110	0.193	0.342
Mongolia	0.033	0.029	0.034	0.041	0.064	0.168
Taipei, China	0.025	0.035	0.086	0.107	0.203	0.379
<b>South Asia</b>						
Bangladesh	0.031	0.031	0.034	0.040	0.061	0.149
Bhutan	0.025	0.027	0.044	0.049	0.065	0.150
India	0.031	0.034	0.043	0.049	0.073	0.137
Maldives	0.051	0.044	0.034	0.044	0.055	0.168
Nepal	0.019	0.030	0.035	0.041	0.052	0.106
Sri Lanka	0.100	0.040	0.064	0.077	0.139	0.214
<b>Southeast Asia</b>						
Brunei Darussalam	0.049	0.035	0.029	0.035	0.078	0.153
Cambodia	0.027	0.028	0.030	0.036	0.053	0.104
Indonesia	0.040	0.033	0.049	0.061	0.090	0.186
Lao People's Democratic Republic	0.021	0.032	0.036	0.037	0.047	0.095
Malaysia	0.051	0.037	0.039	0.048	0.087	0.163
Myanmar	0.034	0.043	0.054	0.055	0.086	0.175
Philippines	0.036	0.031	0.035	0.043	0.066	0.127
Singapore	0.024	0.041	0.072	0.102	0.229	0.326
Thailand	0.032	0.036	0.063	0.077	0.129	0.202
Viet Nam	0.042	0.049	0.056	0.063	0.098	0.200
<b>The Pacific</b>						
Fiji	0.028	0.027	0.035	0.050	0.085	0.142
Micronesia, Fed. States of	0.041	0.042	0.037	0.037	0.063	0.101
Papua New Guinea	0.041	0.021	0.022	0.025	0.038	0.074
Samoa	0.023	0.018	0.044	0.049	0.065	0.089
Solomon Islands	0.020	0.033	0.029	0.031	0.041	0.090
Timor-Leste	0.033	0.027	0.025	0.030	0.034	0.046
Tonga	0.018	0.025	0.055	0.059	0.068	0.101
Vanuatu	0.027	0.029	0.033	0.033	0.048	0.093
<b>Developed Asian Countries</b>						
Japan	0.049	0.079	0.172	0.226	0.297	0.378
New Zealand	0.090	0.087	0.118	0.130	0.181	0.232
Australia	0.081	0.087	0.125	0.139	0.191	0.238

Source: UN (2009).

**Appendix Table 3: Share of Population Aged 20–64**

	1950	1975	2000	2010	2025	2050
<b>Central and West Asia</b>						
Afghanistan	0.446	0.428	0.402	0.409	0.440	0.532
Armenia	0.473	0.478	0.545	0.602	0.578	0.563
Azerbaijan	0.490	0.423	0.533	0.596	0.601	0.590
Georgia	0.534	0.534	0.577	0.612	0.589	0.550
Kazakhstan	0.506	0.485	0.561	0.605	0.586	0.592
Kyrgyz Republic	0.529	0.430	0.490	0.555	0.586	0.601
Pakistan	0.493	0.429	0.442	0.485	0.536	0.592
Tajikistan	0.506	0.393	0.430	0.481	0.547	0.622
Turkmenistan	0.512	0.409	0.487	0.559	0.607	0.610
Uzbekistan	0.527	0.397	0.474	0.555	0.606	0.609
<b>East Asia</b>						
China, People's Rep. of	0.522	0.467	0.594	0.640	0.626	0.562
Hong Kong, China	0.563	0.523	0.653	0.690	0.622	0.523
Korea, Rep. of	0.453	0.464	0.637	0.656	0.632	0.502
Mongolia	0.447	0.429	0.505	0.602	0.631	0.596
Taipei, China	0.450	0.492	0.618	0.667	0.645	0.493
<b>South Asia</b>						
Bangladesh	0.479	0.416	0.482	0.550	0.614	0.606
Bhutan	0.433	0.466	0.439	0.543	0.607	0.603
India	0.492	0.460	0.505	0.543	0.594	0.618
Maldives	0.528	0.432	0.439	0.563	0.634	0.599
Nepal	0.467	0.446	0.449	0.489	0.567	0.607
Sri Lanka	0.427	0.477	0.572	0.603	0.570	0.551
<b>Southeast Asia</b>						
Brunei Darussalam	0.492	0.460	0.570	0.615	0.637	0.604
Cambodia	0.447	0.444	0.427	0.516	0.572	0.615
Indonesia	0.461	0.444	0.545	0.584	0.621	0.578
Lao People's Democratic Republic	0.474	0.441	0.427	0.477	0.545	0.601
Malaysia	0.446	0.430	0.525	0.565	0.597	0.592
Myanmar	0.523	0.440	0.537	0.590	0.609	0.583
Philippines	0.427	0.416	0.481	0.518	0.561	0.590
Singapore	0.476	0.501	0.648	0.665	0.607	0.518
Thailand	0.438	0.429	0.600	0.630	0.611	0.565
Viet Nam	0.539	0.413	0.504	0.584	0.624	0.575
<b>The Pacific</b>						
Fiji, Rep. of	0.401	0.449	0.514	0.540	0.574	0.596
Micronesia, Fed. States of	0.455	0.371	0.436	0.480	0.540	0.622
Papua New Guinea	0.463	0.434	0.461	0.476	0.527	0.592
Samoa	0.408	0.406	0.451	0.440	0.535	0.602
Solomon Islands	0.442	0.390	0.439	0.475	0.541	0.594
Timor-Leste	0.459	0.450	0.379	0.411	0.433	0.546
Tonga	0.386	0.390	0.438	0.464	0.511	0.567
Vanuatu	0.405	0.410	0.439	0.476	0.529	0.588
<b>Developed Asian Countries</b>						
Japan	0.493	0.607	0.622	0.595	0.550	0.469
New Zealand	0.550	0.517	0.584	0.594	0.570	0.546
Australia	0.586	0.547	0.599	0.605	0.570	0.539

Source: UN (2009).



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### **About the Paper**

Sang-Hyop Lee, Andrew Mason, and Donghyun Park document Asia's aging population, describe the region's old-age support systems, and highlight the socioeconomic implications of the demographic transition. Aging populations present two fundamental challenges to Asian policymakers: (1) developing socioeconomic systems that can provide economic security to growing numbers of elderly while (2) sustaining strong economic growth over the next few decades. Successfully addressing these two challenges will be vital for ensuring Asia's continued economic success in the medium and long term.


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