Population change and economic growth in Asia: New findings from the National Transfer Accounts (NTA) project

Population age structures are changing everywhere in the developing world, linked primarily to fertility decline, but nowhere have the changes been more rapid or dramatic than in Asia. And changing age structures can have a profound effect on wellbeing and economic growth.

How many consumers and producers are there in a population? How much do they earn and how much do they consume at every stage of life? To what extent do the elderly support themselves from assets acquired during their working years? And how do families and governments meet the needs of children and the elderly who consume more than they produce?

The National Transfer Accounts (NTA) project is bringing together data and developing analytical tools to help answer these important questions. By providing estimates of income, public and private transfers, and consumption and saving by age, NTA adds an important dimension to measures of Gross Domestic Product (GDP) and other widely used economic indicators.

Initiated in 2004, NTA has grown to a network of research scholars, graduate students, and government analysts in 47 countries around the world, including 12 countries and economies in Asia. Lead institutions are the Center for the Economics and Demography of Aging, University of California at Berkeley, and the East-West Center in Honolulu. Among many publications based on NTA analysis are an overview of results from 23 countries (Lee and Mason 2011) and a manual explaining the NTA methodology (United Nations 2013).

In 2014, the Asia-Pacific Regional Office of the United Nations Population Fund (UNFPA APRO) and the East-West Center launched a project to expand and update NTA analysis in Cambodia, China, India, Indonesia, Lao People’s Democratic Republic (PDR), the Philippines, Thailand, and Vietnam. Bangladesh and Malaysia joined the group later. The project includes national-level training, south-south exchange visits, NTA research-based policy briefs, and regional meetings showcasing best practices and progress, including comparisons with findings from other NTA member countries. This issue of the NTA Bulletin highlights early findings from this expansion of NTA analysis in the region. Note that some of the results reported here are preliminary and should be interpreted with caution.
The economic lifecycle

Changes in population age structure have an important economic impact because people earn income and consume resources at very different levels over the course of their lives. The NTA project provides measures of income and consumption at all stages of the lifecycle.

Working-age adults, as a group, produce more through their labor than they consume. They may use their “extra” income to save and invest for the future or to provide support to children and the elderly, who consume more than they produce. This transfer of resources between age groups can occur through private channels, largely within families, or through public channels when working-age adults pay taxes that support public programs such as education, healthcare, and pensions that benefit children or the elderly.

Using NTA data for a recent year, Figure 1 (page 4) shows per capita labor income and consumption at all ages for seven low- and middle-income countries (Cambodia, Lao PDR, Indonesia, Thailand, the Philippines, Vietnam, and China) and one high-income country (Japan) in Asia. In each country where NTA researchers have analyzed data, consumption exceeds labor income for two long periods of life. These bracket a surprisingly short period—little more than 30 years and often less—during which more is being produced than consumed. This pattern is remarkably similar among countries at widely different stages of economic development.

Although the eight Asian countries analyzed here have very different income levels, the age pattern of labor income is broadly similar, with income rising steeply for those in their 20s, reaching a peak, and declining thereafter. Within this broad pattern, however, there are variations that have important implications for wellbeing and economic growth.

In lower-income countries, young adults tend to complete their schooling at an earlier age than in higher-income countries. If employment opportunities are plentiful, young adults in lower-income countries can move from school directly into employment, while young adults in higher-income countries are still in secondary school or university.

In economies that are modernizing rapidly, growing numbers of young workers are employed in the highly paid manufacturing and service sectors, while many older workers are still employed in agriculture. For example in Cambodia, the labor-income curve tilts toward the younger ages at the left, and labor income peaks at the early age of 29. The pattern in China is similar, with the highest per capita labor income at age 32. Labor income in Japan shows the opposite pattern, with the curve tilting toward the older ages at the right, and labor income peaking at age 51. In Thailand, labor income peaks even later—at age 53.

In countries such as Cambodia, workers are likely to continue working into old age, often in agriculture or the informal sector, while in higher-income countries, they are more likely to stop working at or near an official retirement age. For Japan, the right side of the labor-income curve drops sharply after peaking in the early 50s, while the decline in labor income in Cambodia, Lao PDR, and the Philippines is much more gradual. China stands out for a sharp decline in labor income at an early age—per capita labor income at age 50 is about one-half of income at age 32. In India (not shown), the drop in labor income for workers in their late 50s is particularly steep, indicating the importance of the public sector, with its mandatory retirement age. But whether the curve is steep or sloping, older workers in all countries earn much less than prime-age adults.

Figure 1 also shows interesting variations in per capita consumption patterns by age. For all age groups, consumption levels are particularly low in China compared with labor income, due in part to high saving rates. By contrast, consumption is particularly high compared with labor income in Cambodia. In these two countries plus Thailand, per capita consumption among the elderly is similar to consumption among working-age adults. In the Philippines, consumption rises slightly at older ages, while in Lao PDR, Indonesia, and Vietnam, consumption drops at older ages, raising a concern about the wellbeing of the elderly. Consumption is particularly high among the elderly in Japan. More detailed NTA data (not shown) indicate that this high consumption is largely related to spending on healthcare and long-term care.

In Japan and Thailand, there are sharp spikes in consumption in late adolescence, reflecting substantial spending on secondary and university education. More modest spikes are visible in Indonesia, the Philippines, Vietnam, and China, and little or none in Cambodia or Lao PDR, suggesting that these six countries may not be making the investments in human-capital development that could lead to a more productive workforce.

Striking differences occur when population age structure is added to these per capita values to estimate consumption and labor income for an economy as a whole (Figure 2, page 5). The lifecycle deficit, defined as consumption in excess of labor income, is particularly high for the young in Cambodia, Lao PDR, Indonesia, Thailand, and the Philippines. For these lower- and middle-income countries, this is not because children have such high consumption. Indeed, per capita estimates (Figure 1) show that children’s consumption tends to be quite low. Rather, children as a whole consume so much in these countries because there are so many children. By contrast, consumption is particularly high among the elderly in Japan. Here two factors are at work—old people have high per capita consumption, and there are also many old people in the population.

The changing dynamics of these population age groups have potentially important implications for crafting sound and sustainable public policy. As fertility declines and the proportion of children goes down, countries have an opportunity to invest more in each child. At the other end of the lifecycle, public healthcare and pension programs require fairly modest funding at the early stages of the demographic transition when there are few elderly recipients, but especially generous programs may become unaffordable as elderly populations expand.

The support ratio and the demographic dividend

Countries in Asia are at widely different stages of a demographic transition that has occurred or is occurring everywhere in the world. As fertility goes down, the number of children needing support declines relative
to the number of workers and taxpayers. At the same time, the number of elderly people, born in an earlier era of high mortality, remains small. With relatively few children and few old people, the proportion of the population in working ages reaches an all-time high, which provides a boost to economic growth called the “first demographic dividend.” The magnitude of the boost depends on the speed of fertility decline, the success with which young people enter the labor market, and other factors that can be influenced by sound policy. Importantly, this stage of demographic transition presents an opportunity for further investment in human and physical capital that can lead to a “second demographic dividend,” potentially providing another strong boost to economic growth.

NTA measures the potential for an economy to enjoy a demographic dividend in terms of changes in the “support ratio”—the number of “effective workers” relative to the number of “effective consumers.” To estimate the number of effective workers and effective consumers, individuals at each age are counted in terms of their labor income and consumption relative to individuals in the prime working-age group of 30–49. For example, people age 50 might, on average, earn more than people in the prime working-age group, so each of them would count as more than one effective worker. A young adult age 20 and an elderly person age 70 are both likely to earn considerably less than a person age 30–49, so each would count as less than one effective worker. Similarly, the average consumption level for individuals age 30–49 is counted as one effective consumer, and all others are measured relative to this base group.

Thus, the support ratio—the number of effective workers relative to the number of effective consumers—goes beyond simple demographic measures of age structure by incorporating information about how much people produce and consume at every age. A support ratio of 0.5 means that each worker is, on average, supporting himself or herself plus one other consumer. A rise in the support ratio means that each effective worker is supporting fewer effective consumers. An economy enjoys the first demographic dividend during the period when the support ratio is rising, freeing up resources that can be used to raise per capita consumption, or saving and investment, or both.

Table 1 shows the number of effective workers and effective consumers in 12 Asian economies, expressed as percentages of the total population. These numbers are used to calculate the support ratio in 2015. The table also gives the average annual percentage change in the support ratio from 2005 to 2015 and the estimated annual change from 2015 to 2025. As background, the table includes the total population of each economy, the total fertility rate (average number of births per woman), the per capita gross domestic product (GDP), and the annual percentage growth of per capita GDP.

Among these 12 Asian economies, the support ratio grew most quickly between 2005 and 2015 in Lao PDR, Bangladesh, Cambodia, China, and India. In these and other Asian economies, the support ratio is likely to rise for some time to come. An economy enjoys the first demographic dividend during the period when the support ratio is rising, freeing up resources that can be used to raise per capita consumption, or saving and investment, or both.

Table 1. Demographic and economic indicators for 12 economies in Asia, 2015.

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<tbody>
<tr>
<td>Bangladesh (BGD) 2010</td>
<td>160,996</td>
<td>2.2</td>
<td>1,093</td>
<td>4.8</td>
<td>51</td>
<td>88</td>
<td>0.58</td>
<td>0.84</td>
<td>0.56</td>
</tr>
<tr>
<td>Cambodia (KHM) 2009</td>
<td>15,578</td>
<td>2.7</td>
<td>1,090</td>
<td>5.3</td>
<td>58</td>
<td>84</td>
<td>0.69</td>
<td>0.71</td>
<td>–0.01</td>
</tr>
<tr>
<td>China (CHN) 2007</td>
<td>1,376,049</td>
<td>1.6</td>
<td>7,594</td>
<td>6.8</td>
<td>56</td>
<td>104</td>
<td>0.53</td>
<td>0.29</td>
<td>–0.89</td>
</tr>
<tr>
<td>India (IND) 2004</td>
<td>1,311,051</td>
<td>2.5</td>
<td>1,596</td>
<td>5.1</td>
<td>49</td>
<td>86</td>
<td>0.56</td>
<td>0.49</td>
<td>0.36</td>
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<tr>
<td>Indonesia (IDN) 2012</td>
<td>257,564</td>
<td>2.5</td>
<td>3,492</td>
<td>3.7</td>
<td>52</td>
<td>91</td>
<td>0.57</td>
<td>0.60</td>
<td>0.15</td>
</tr>
<tr>
<td>Japan (JPN) 2009</td>
<td>126,573</td>
<td>1.4</td>
<td>36,194</td>
<td>0.1</td>
<td>53</td>
<td>116</td>
<td>0.46</td>
<td>–0.74</td>
<td>–0.40</td>
</tr>
<tr>
<td>Republic of Korea (KOR) 2010</td>
<td>50,293</td>
<td>1.3</td>
<td>27,971</td>
<td>2.9</td>
<td>52</td>
<td>101</td>
<td>0.52</td>
<td>0.15</td>
<td>–0.58</td>
</tr>
<tr>
<td>Lao PDR (LAO) 2012</td>
<td>6,802</td>
<td>3.1</td>
<td>1,760</td>
<td>5.7</td>
<td>43</td>
<td>79</td>
<td>0.54</td>
<td>0.92</td>
<td>0.83</td>
</tr>
<tr>
<td>Philippines (PHL) 2011</td>
<td>100,699</td>
<td>3.0</td>
<td>2,871</td>
<td>4.4</td>
<td>48</td>
<td>87</td>
<td>0.55</td>
<td>0.45</td>
<td>0.20</td>
</tr>
<tr>
<td>Taiwan Province of China (TWN) 1998</td>
<td>23,461</td>
<td>1.2</td>
<td>22,635</td>
<td>5.4</td>
<td>54</td>
<td>98</td>
<td>0.55</td>
<td>0.10</td>
<td>–0.47</td>
</tr>
<tr>
<td>Thailand (THA) 2011</td>
<td>69,122</td>
<td>1.5</td>
<td>5,519</td>
<td>0.3</td>
<td>59</td>
<td>97</td>
<td>0.61</td>
<td>0.62</td>
<td>–0.27</td>
</tr>
<tr>
<td>Vietnam (VNM) 2012</td>
<td>93,448</td>
<td>2.0</td>
<td>2,052</td>
<td>4.8</td>
<td>57</td>
<td>90</td>
<td>0.63</td>
<td>0.62</td>
<td>–0.49</td>
</tr>
</tbody>
</table>


Note: The values for effective number of workers and effective number of consumers are based on population estimates for 2015 and lifecycle estimates for a base year that varies among countries.

The total fertility rate (TFR) for Taiwan Province of China is for 2014.
Figure 1. Per capita labor income and consumption by one-year age groups for eight countries in East and Southeast Asia, recent year.

Source: Calculated from NTA data.

Note: The green lines depict labor income, and the blue lines depict consumption. Both labor income and consumption are measured in thousand US dollars, PPP (purchasing power parity) in 2010, as shown on the y axis. The x axis shows age, which is calculated in one-year intervals. Table 1 gives the base year for which the NTA was constructed for each country.
Figure 2. Aggregate labor income and consumption by one-year age groups for eight countries in East and Southeast Asia, recent year.

Source: Calculated from NTA data.

Note: The green areas depict labor income, and the blue areas depict consumption. Both labor income and consumption are measured in billion US dollars, PPP (purchasing power parity) in 2010, as shown on the y axis. The x axis shows age, which is calculated in one-year intervals. Table 1 gives the base year for which the NTA was constructed for each country.
Cambodia, Thailand, Vietnam, and Indonesia, indicating that these countries were enjoying a strong first demographic dividend. Japan, with its large elderly population, enjoyed its peak support ratio in 1996. Now it has the lowest support ratio in the group, and it is the only country in which the support ratio actually went down between 2005 and 2015.

Between 2015 and 2025, the support ratio will also start declining in six other economies—Cambodia, China, the Republic of Korea, Taiwan Province of China, Thailand, and Vietnam. For these economies, the period of the first demographic dividend is over, but they still have the opportunity to enjoy a second demographic dividend based on further investments in human and physical capital.

**Some implications for policy**

Every stage of population change calls for appropriate policy responses, and these need to be fine-tuned according to each country’s specific demographic, social, economic, and political conditions. A good understanding of the demographic transition—and the associated opportunities and challenges—can help policymakers pursue policies that promote economic growth, provide for the wellbeing of all age groups, and prepare for the challenges of population aging.

**Maintaining a favorable level of fertility**

Total fertility rates in 12 NTA-member economies in Asia range widely—from more than three children per woman in Lao PDR and the Philippines to less than 1.5 in Japan, the Republic of Korea, and Taiwan Province of China (Table 1). In Lao PDR, fertility has been declining very quickly since the 1990s, but fertility decline has been slow in the Philippines, Indonesia, and India, providing a very modest rise in the support ratio over a period of several decades. If fertility in these three countries were to decline more rapidly than anticipated, they could enjoy a larger demographic dividend and a greater boost to economic growth.

This analysis includes three highly developed economies in East Asia—Japan, the Republic of Korea, and Taiwan Province of China—that enjoyed a large first demographic dividend associated with a very rapid fertility decline. Today, however, the period of rising support ratios in these economies has passed, and policymakers are challenged to realize a second demographic dividend that will sustain economic growth in spite of an unprecedented pace of population aging. China, Thailand, and Vietnam will soon face similar challenges at a much lower level of national income.

One response has been efforts to achieve a modest increase in fertility levels. The governments of Japan, the Republic of Korea, and Taiwan Province of China all have policies and programs in place aimed at helping parents raise their children while remaining in the workforce. These include maternity and parental leave, cash payments and tax breaks for families with children, opportunities for part-time work, flexibility in the workplace, and free or subsidized childcare.

A recent project on low fertility and policy responses around the world (Rindfuss and Choe 2015) suggests that wide-reaching and well-funded policy efforts may have some positive effect on fertility, but it is very difficult to achieve measurable results. One major hurdle is the current climate of income and job insecurity in many countries that makes young people reluctant to marry or start a family.

**Investing in child health and education**

A drop in the proportion of dependent children in a population frees up resources that families and governments can invest in the health and education of each child. As these children grow older and enter the labor force, their increased productivity will have a strong positive impact on the economy.

Countries that invest significantly in human capital will be replacing large cohorts of less productive workers with smaller cohorts of more productive workers as their populations age. By doing so, they may achieve a second demographic dividend that will boost economic growth even as the support ratio begins to decline.

NTA data from around the world show that, in fact, most countries are taking advantage of fertility decline to increase spending on the health and education of children. Estimates from 41 countries confirm that human-capital spending per child tends to be highest in countries with low fertility (Figure 3). Spending on children’s health and education in 11 Asian economies tends to follow this general pattern, but seven of these economies fall below the trend line, indicating that they spend less on child health and education.
than would be expected for their level of fertility. Lao PDR, Vietnam, Indonesia, and the Philippines have particularly low spending on child health and education.

In comparing levels of human-capital investment, NTA data also capture the balance between public and private spending (not shown). Among high-income countries, private spending on children’s health and education plays a much more important role in the Republic of Korea than in Japan, for example. Public programs play a strikingly small role in supporting children’s health and education in Vietnam and Cambodia, leaving young people dependent on support from their families. This means that children from poor families are particularly disadvantaged, with limited potential for economic mobility. Investment in children is especially low in Lao PDR from both public and private sources.

The first dividend, based on growth in the support ratio, provides an important, but ultimately transitory, boost to economic growth. The second dividend, capturing the effects of changing investment in human and physical capital, is substantial and long lasting. Economic growth depends on many factors, of course, but greater investment in children’s health and education, along with sound investment in technology, infrastructure, and other forms of physical capital is bound to play an important role.

Table 2. Per capita labor income of adolescents and young adults in three age groups, recent year (percent average annual labor income of a prime-age (30–49) adult).

<table>
<thead>
<tr>
<th>Country and base year</th>
<th>Age 15–19</th>
<th>Age 20–24</th>
<th>Age 25–29</th>
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<tbody>
<tr>
<td>Japan 2009</td>
<td>31.1</td>
<td>27.6</td>
<td>54.9</td>
</tr>
<tr>
<td>Korea, Rep. 2010</td>
<td>35.0</td>
<td>30.3</td>
<td>68.5</td>
</tr>
<tr>
<td>Thailand 2011</td>
<td>8.9</td>
<td>37.6</td>
<td>72.4</td>
</tr>
<tr>
<td>India 2004</td>
<td>14.6</td>
<td>39.1</td>
<td>68.8</td>
</tr>
<tr>
<td>Lao PDR 2012</td>
<td>15.0</td>
<td>42.0</td>
<td>77.1</td>
</tr>
<tr>
<td>Taiwan Province of China 1998</td>
<td>7.6</td>
<td>46.0</td>
<td>86.3</td>
</tr>
<tr>
<td>Indonesia 2012</td>
<td>15.3</td>
<td>48.3</td>
<td>74.6</td>
</tr>
<tr>
<td>Bangladesh 2010</td>
<td>28.8</td>
<td>53.6</td>
<td>76.4</td>
</tr>
<tr>
<td>Vietnam 2012</td>
<td>15.6</td>
<td>59.5</td>
<td>106.6</td>
</tr>
<tr>
<td>China 2007</td>
<td>16.7</td>
<td>60.3</td>
<td>105.4</td>
</tr>
<tr>
<td>Philippines 2011</td>
<td>13.9</td>
<td>61.1</td>
<td>92.0</td>
</tr>
<tr>
<td>Cambodia 2009</td>
<td>46.3</td>
<td>91.1</td>
<td>111.2</td>
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</table>

Figure 4. Per capita labor income of women and men in Lao PDR, 2012. Source: Calculated from NTA data.

Providing opportunities for young adults
In every country in the world, the transition from school into the labor force has important implications for human wellbeing and economic growth. The greatest demographic dividend will be achieved in countries that can provide the best employment opportunities for young adults (Mason and Lee 2013).

In looking at the role of young adults and other age groups in the labor force, NTA employs a comprehensive definition of labor income that includes the value of most productive work—the earnings of employees, employer-provided benefits, taxes paid to the government by employers on behalf of employees, the proportion of entrepreneurial income that is a return to labor, and the estimated value of unpaid family labor that results in the production of goods.

These comprehensive data on labor income by age show wide variation in the labor income of young adults compared with the income of prime-age workers (Table 2). Per capita labor income at age 20–24 is particularly low in Japan, the Republic of Korea, and Thailand, for example. This is as expected because a relatively high proportion of young adults in these countries are still in school or university and are earning little or no income.

But labor income is also quite low among young adults in India and Lao PDR, and these countries have among the lowest levels of secondary and tertiary enrollment in the region (World Bank 2015). This suggests that many of these young people are not in school, but they are also not earning much income. Because these countries have young populations, low labor income for this large age group has a particularly strong impact on the support ratio, undermining efforts to achieve a robust demographic dividend.

Recognizing the full economic contribution of women
In NTA member countries all over the world, women’s labor income appears to be somewhat lower than the labor income of men throughout the lifecycle. The pattern for Lao PDR (Figure 4) is, in fact, atypical in that labor income for the two sexes is quite similar.

NTA’s definition of labor income, although very comprehensive, does not include the value of time associated with childrearing, elderly care, or other at-home...
activities that do not produce market goods or services. As a consequence, women’s labor is not fully documented.

Women’s labor associated with housekeeping and the care of children and the elderly can be quite significant. For example, analysis of 2004 time-use data for the Republic of Korea found that adding the value of non-market activities increased per capita labor income by 40 percent (Hwang and Lee 2013). And nearly all of this additional labor was provided by women. This is likely to be the case in other NTA member countries in Asia.

The NTA project has developed methodology to incorporate the value of housework and family care into estimates of labor income for women and men at all ages. These extended accounts are now being constructed in many countries around the world. Meanwhile, calls to increase women’s participation in the formal economy need to be tempered by a realization of how much labor women are already contributing in their homes.

**Planning for population aging**

NTA estimates show that elderly populations are supporting one-third or less of their consumption through their labor. This is true in countries at all levels of economic development. To fill the gap between what they consume and what they earn, the elderly may rely on their families or on government pensions and healthcare programs or on the assets they accumulated earlier in life.

Populating aging may not necessarily create a financial burden or put a brake on economic growth, however. Productive investments during the first demographic dividend can provide the basis for a second dividend that is substantial and prolonged.

Economic benefits accrue when the elderly support themselves from productive investments they made during their working years, and indeed, many are doing just that. NTA data indicate that in many countries old people provide more support to their families than they receive in return, with the balance of support only shifting in extreme old age. In some countries, the elderly, who pay taxes on their houses and other assets, actually pay more to the government than they receive in benefits.

Policymakers need to think ahead about how their growing elderly populations will be supported in the future without overburdening those at working age or sacrificing economic growth. The goal should be to establish public programs that provide some basic level of security but that can be sustained in the years ahead.

Priorities include enacting labor laws that discourage discrimination against older workers, extending or eliminating mandatory retirement ages, and possibly raising the age of eligibility for pensions. In addition, governments can play an important role by creating an economic environment that helps working-age populations accumulate savings and establish some degree of financial independence. Well-functioning financial markets, a strong banking system, secure property rights, a competitive economy, and financial literacy all play a role in assuring the economic security of all age groups, including the elderly.

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**Additional resources**


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**The East-West Center** promotes better relations and understanding among the people and nations of the United States, Asia, and the Pacific through cooperative study, research, and dialogue. Established by the United States Congress in 1960, the Center serves as a resource for information and analysis on critical issues of common concern, bringing people together to exchange views, build expertise, and develop policy options.

**UNFPA, the United Nations Population Fund**, is the lead UN agency for delivering a world where every pregnancy is wanted, every childbirth is safe, and every young person’s potential is fulfilled. UNFPA supports countries in using population data for policies and programs encompassing a range of issues including aging, the demographic dividend, migration, and urbanization.