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Working Paper

The Economic Life Cycle and Support Systems in Asia

ADB Economics Working Paper Series, No. 283

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Lee, Sang-Hyop; Mason, Andrew (2011) : The Economic Life Cycle and Support Systems in Asia, ADB Economics Working Paper Series, No. 283, Asian Development Bank (ADB), Manila,
<https://hdl.handle.net/11540/2001>

This Version is available at:

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ADB Economics Working Paper Series



The Economic Life Cycle and Support Systems in Asia

Sang-Hyop Lee and Andrew Mason

No. 283 | October 2011

Asian Development Bank



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Asian Development Bank

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics

©2011 by Asian Development Bank
October 2011
ISSN 1655-5252
Publication Stock No. WPS114130

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Abstract

We describe the complex support systems in Asia and highlight their importance for economic growth and fiscal sustainability. Familial transfers for old age support are significant in many Asian economies, though their extent varies quite widely, and public transfer systems are less significant. This is important because the region has the opportunity to develop sustainable systems less encumbered by obligations made to current and future generations of elderly. Relying on accumulated assets rather than transfers will help the region to create capital-intensive economies that can maintain standards of living.

I. Introduction

Complex systems of institutions and economic mechanisms make the periods of dependency in the economic life cycle possible. An understanding of the life cycle and of reallocation systems is fundamental to understanding the support system in an economy and the consequences of changes in population age structure. First, countries vary greatly in per capita economic life cycles. Second, aggregate profiles vary greatly as well because population age structures differ. Third, countries vary greatly in the systems they employ to fund the life cycle deficit, i.e., their reallocation systems. Our objective is to describe the support systems in Asia in detail and to highlight the importance of those support systems for economic growth, fiscal sustainability, and other policy issues.

The importance of support systems in Asia will increase substantially in the coming years because population aging is expected to be very rapid. Since the elderly will live longer and will be healthier, attitudes and policies about working life and retirement will and must change. Just working longer will not be sufficient. The current low reliance on public transfers will allow Asian economies to develop sustainable systems less encumbered by obligations to current and future generations of elderly (Mason and Lee 2011). Keeping publicly funded health care for the elderly at a reasonable level will be crucial to developing sustainable systems.

The impacts of changing support systems on other means of support will be significant. Relying heavily on public transfers may reduce reliance on labor income and reduce savings, but if public transfers are maintained at low levels and labor income and familial transfers play a limited role in the future, Asia's elderly will have to rely on accumulating assets. This will help to create capital-intensive economies that can maintain standards of living as other support systems grow slowly or decline.

II. Labor Income

The young and the old can be somewhat self-sufficient to the extent that they work and generate the resources they need to fund their consumption. For the young, a critical decision is choosing between school and work. By continuing in school, the young sacrifice current income, but by investing in human capital, they realize greater incomes in the future. The elderly may opt for more leisure at the end of life and withdraw from the

labor force. In either case, a longer working life yields greater labor income but at a cost not captured in standard measures of economic performance. For the many developing Asian economies that are relatively young, the transition to the workplace is a critical issue. The work forces of the more advanced Asian economies, on the other hand, are increasingly older; their success in dealing with changing age structures will depend more on how successfully they deal with the transition out of the labor force.

Individuals younger than 20 do not support themselves through their labor to any significant degree in any of the Asian economies for which estimates are available, and the labor income of children plays a secondary role even in the lower-income countries (Table 1). By their late teens, children in the People's Republic of China (PRC), India, and Indonesia are funding about 25% of their consumption through their labor income while those living in the Philippines and Thailand are funding about 20%.

The picture changes as they enter their 20s. In Japan, those in their early 20s contribute the least to their own support, funding only half of their consumption, but in their late 20s they are funding all of their consumption through their labor. Individuals in their early 20s have relatively high labor incomes in the PRC and the Republic of Korea, but the differences among the other economies are relatively small with young adults aged 20–24 funding between 59% and 65% of their consumption through their labor income. In the Republic of Korea and Taipei, China, workers in their late 20s have labor incomes that exceed their consumption by over 30%. Labor income is especially high relative to consumption among Chinese workers in their 20s, a feature driven in large part by the high savings rates and low levels of consumption at all ages in the PRC.

Table 1: Ratio of Labor Income to Per Capita Consumption of Children and Young Adults in Eight Asian Economies in Various Years

	Age Group			
	0–19	15–19	20–24	25–29
China, People's Rep. of (2002)	0.11	0.25	0.96	1.99
India (2004–05)	0.09	0.24	0.63	1.09
Indonesia (2005)	0.09	0.28	0.65	0.93
Japan (2004)	0.01	0.03	0.50	1.05
Korea, Rep. of (2000)	0.05	0.14	0.73	1.33
Philippines (1999)	0.07	0.18	0.59	1.03
Taipei, China (1998)	0.03	0.10	0.65	1.30
Thailand (2004)	0.07	0.20	0.65	1.11

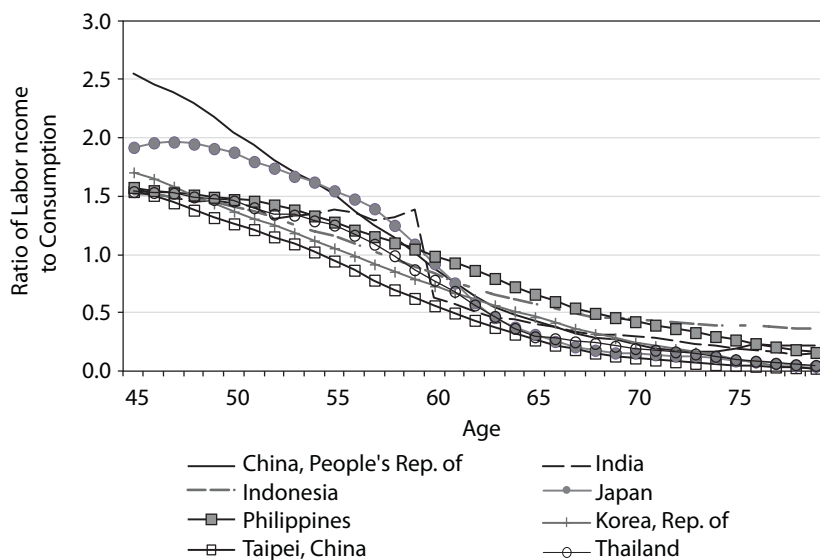
Note: These are synthetic cohort values that are calculated using recent data on survival weights of the United States. Values are the ratio of the sum of per capita labor income at each single year of age and the sum of per capita consumption at each single year of age within the age group.

Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

Labor income peaks at relatively young ages in the eight Asian economies in Figure 1 and then drops for individuals in their late 40s. Note that this is a cross-sectional profile; longitudinal profiles will peak at a later age because the cross-sectional profiles shift upward over time. Labor income is quite high relative to consumption at age 45 in the PRC and Japan but for different reasons. In the PRC, savings rates are very high, thus labor income is high relative to consumption, which is low at all ages, while in Japan, the seniority-based wage system leads to steady increases in labor income until relatively late in working life.

In all eight economies, there is a relatively rapid transition to low incomes at older ages. Labor income drops below consumption at age 55 in Taipei, China followed by the Republic of Korea at 56 and Indonesia and Thailand at 58. In none do 60-year-olds produce more than they consume. In general, labor income is more important at older ages in low-income countries as discussed in Mason and Lee (2011). Here we see that Indonesia and the Philippines have high labor incomes at old ages relative to more advanced Asian countries. This limited time-series evidence is consistent with the observation that economic growth leads to lower labor income at older ages. A relatively long time series for Taipei, China shows a sharp decline in labor income at older ages bearing out this generalization (NTA database, available: www.ntaccounts.org, accessed 1 July 2011).

Figure 1: Labor Income Funding Consumption from Age 45 to 79 in Recent Years for Eight Asian Economies



Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

The low level of labor income at older ages suggests that delaying retirement might provide an important mechanism for reducing old-age dependency in countries that are aging rapidly. Lee and Ogawa (2011) explore this idea by estimating the effect of delaying retirement on the labor income of those aged 65–74. The effect is relatively small for many developing Asian countries because older adults already have relatively high activity rates. The problem is that their productivity is low, but reducing unused productive capacity would have little effect. Older workers may have relatively low earnings because they are employed in low-productivity sectors, or because they have less education than young workers, or because they are forced into low-productivity jobs by mandatory retirement provisions and inflexible labor markets. The key to raising labor income at older ages in many Asian countries is to improve the productivity of older workers; reducing impediments to continued employment may also serve to reduce the dependency of older adults.

III. The Age Reallocation System

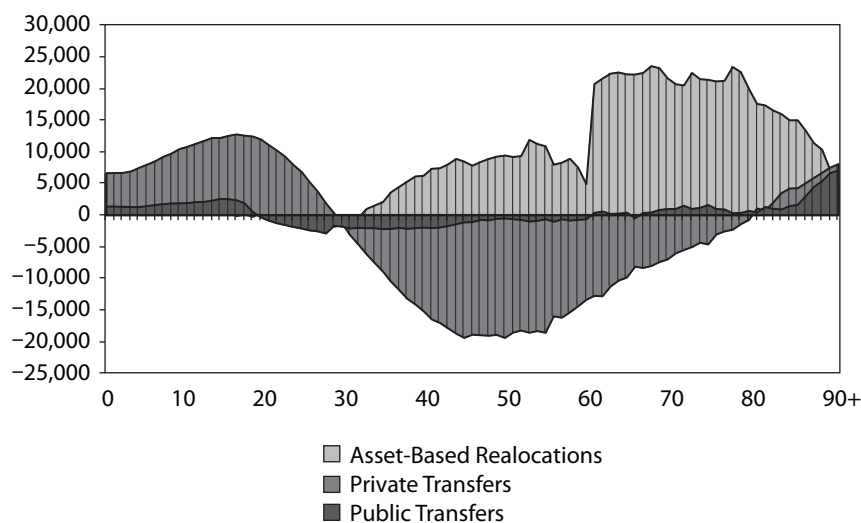
Children and the elderly consume more than they produce, so economic mechanisms are required to shift resources from the surplus working ages to the deficit ages. The economic system that fulfills this critical need is called the age reallocation system. It consists of three components: public transfers, private transfers, and asset-based reallocations. Countries differ considerably in the ways that they deal with age reallocations, with important implications for the effects of population aging on their economies.

Local, regional, and national governments play an important role by taxing working-age adults and providing benefits to the young and the old. Education, public pensions, and health care are important examples of public-transfer programs that serve this purpose. Parents and grandparents perform a similar role by using their resources to support children, and to varying degrees, adult children provide for elderly parents. There are important differences between government transfers and familial transfers, however. Families are informal institutions, and transfers among members are more or less voluntary although heavily influenced by social conventions and deeply ingrained attitudes. Public transfers, in contrast, are governed by law and are not voluntary. Asset-based reallocations refer to the flows across ages realized by acquired assets including debt. Asset-based reallocations rely on intertemporal exchanges and are heavily dependent on well-functioning legal institutions and financial markets, but even in a very traditional setting, individuals can accumulate real assets that can be relied on later in life. In more contemporary settings, individuals can accumulate pension funds or personal savings during their working years and then rely on asset income or on dissaving those assets during retirement. Individuals can also borrow to finance their present consumption and reduce consumption in later periods to repay the loans.

The important contribution of the National Transfer Accounts (NTA) Project was to improve the ability to measure and to understand how economic resources are reallocated from surplus to deficit ages. The NTA provide a comprehensive measure that has been lacking, for example, by estimating the extent to which the elderly rely on dissaving and familial transfers, including intrahousehold transfers. This feature of the NTA is very important for studying support systems in Asia where familial transfers are significant. Moreover, the analysis shows how in developed Asian countries the dependence of the elderly on their children for economic support is sharply declining. More detailed information on the methodology for calculating NTA is available from Mason et al. (2009); from Lee et al. (2008); or on the project website, www.ntaccounts.org.

The main features of the age reallocation system are illustrated in Figure 2, which reports per capita net economic flows by age in India in 2004 and 2005. Flows to both children and the elderly are shown to emphasize that transfers go in both directions—upward to the elderly and downward to the young. Children depend mostly on a combination of public and private transfers. The support system for older adults varies considerably with age in India as it does in most countries. Those 60 and older rely primarily on assets while public transfers are more important for the very old. Asset-based reallocations increase abruptly at age 60 because labor income continues to grow until age 60 then drops very rapidly thereafter. Those younger than age 79 gave more to their descendants than they received, while those in their mid-80s to late 80s and older relied heavily on their adult children.

Figure 2: Per Capita Net Flows by Age in India, 2004 and 2005 (Rupees)



Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

Two features of Figure 2 are notable. First is the substantial difference in the composition of transfers to the elderly versus transfers to young. Per capita private transfers to the young are much more important than per capita public transfers. For the old, the opposite is true. The second feature is the importance of assets for the elderly, as those in their 60s and 70s rely heavily on them. As we shall see in the following sections, however, support systems vary considerably from country to country.

A. Support Systems for Children

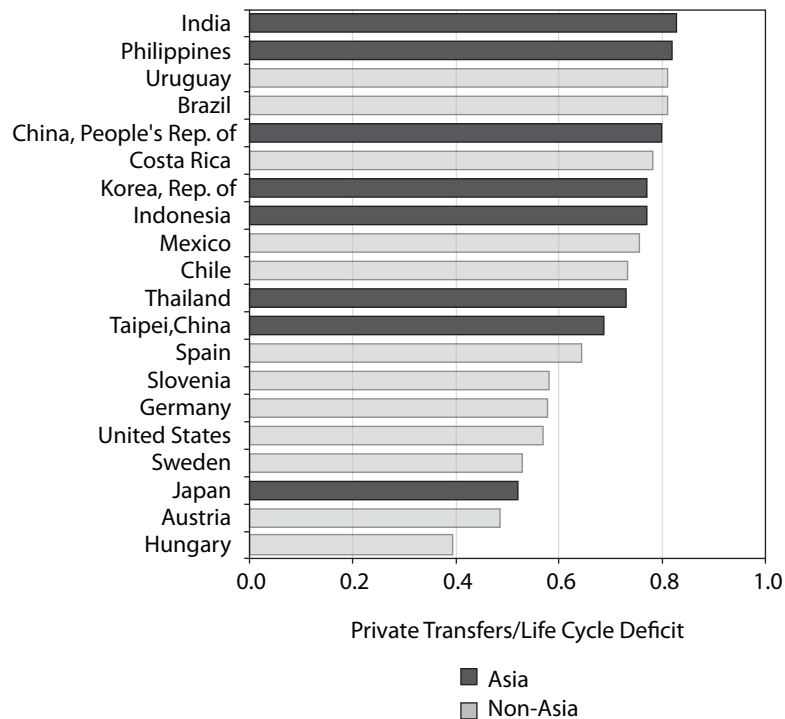
In countries with relatively young age structures like India, providing for the material needs of children is a great challenge, especially the needs of young children who are entirely dependent on others. In developing countries, the gap between consumption and labor income for children is filled almost entirely by a combination of public and private transfers.

Although public transfers to children (and to the elderly) are both high in European economies, the same is not true in Latin America (Figure 3). There, public transfers to the elderly are quite large but public transfers to children are not. In a few high-income economies outside of Asia, net public transfers to children are larger than net private transfers, i.e., the state bears the cost of children to a greater extent than the family. Two examples are Hungary and Austria.¹ In most rich economies, however, private transfers to children fund more than half of their life cycle deficit. In Japan, for example, private transfers cover 52% of the cost of raising a child from birth to age 19.² In the United States (US), families assume 57% of the cost of raising children. In the six European economies in Figure 3, private transfers as a percentage of the life cycle deficit over the childhood years vary from a low of 40% in Hungary to a high of 64% in Spain.

¹ Public transfers are broadly measured here and include children's pro rata share of all public consumption in addition to education and health care spending that is more directly consumed by children.

² This is a synthetic cohort value calculated by taking the ratio of the sum of age-specific per capita net private transfers from ages 0 to 19 to the sum the life cycle deficit, i.e., consumption less labor income, from ages 0 to 19.

Figure 3: Private Transfers as a Proportion of the Life Cycle Deficit for Ages 0–19 in Asian and Non-Asian Economies



Note: These are synthetic cohort values calculated by summing per capita consumption for ages 0–19 and dividing by the sum of the per capita life cycle deficit for ages 0–19.

Years: Austria (2000); Brazil (1996); Chile (1997); Costa Rica (2004); India (2004); Indonesia (2005); Republic of Korea (2000); Germany (2003); Hungary (2005); Japan (2004); Mexico (2004); Philippines (1999); People's Republic of China (2002); Spain (2000); Slovenia (2004); Sweden (2003); Taipei, China (1998); Thailand (2004); United States (2003); Uruguay (2006).

Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

In Latin America and in Asia, Japan aside, families bear a higher share of the cost of children, and the public sector plays a less important role. In Taipei, China, private transfers to children are just under 70% of the total resources they require. In India, the private share is the highest at 83% of the total, followed by the Philippines at 82%.

Clearly there is a close relationship between development level and the importance of private transfers (not shown). The simple correlation between purchasing power parity adjusted per capita income and the private transfer share is -0.79 . An increase in per capita income of US\$1,000 is associated roughly with a decline in the share of the deficit funded through private transfers by 0.8 percentage point. The Republic of Korea and the US have high private transfers relative to the predicted level. Austria and especially Hungary have low private transfers relative to the predicted values.

The size of private transfers to children in Asia is potentially important for a number of reasons. In some Asian economies, private transfers seem to be substitutes for public

transfers. The per capita consumption of children in India, Indonesia, and Philippines, is on the low side relative to consumption by adults aged 20–64 while in the PRC; the Republic of Korea; and Taipei, China private consumption by children is higher relative to consumption by adults than in any other NTA economy. Moreover, total consumption by children in these economies tends to be relatively high compared with others (Tung 2011).

An interesting possibility is that the high private transfer burden in Asia may serve to depress childbearing. This may be true, but the simple correlation between the total fertility rate and the private transfer proportion is positive, i.e., high fertility is associated with families bearing a higher share of the cost of children. Thus, the private cost of children is particularly high in high-fertility countries. Not only do couples have more children in low-income countries, they receive less help from the public sector in providing for their children as well.³

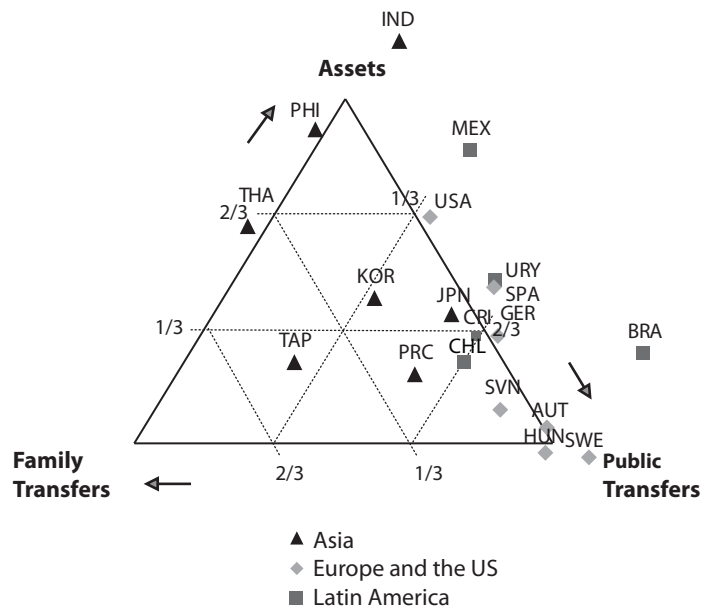
B. Support Systems for the Elderly

Figure 4 shows the relative importance of the three sources of old-age support—assets, private transfers, and public transfers—in Asian, Latin American, and European economies for which estimates are available, including the US. Private and public transfers are measured as net transfers—transfers received less transfers made—relative to consumption in excess of labor income for those 65 and older. Reliance on assets is measured as asset-based reallocations, i.e., asset income less savings relative to consumption in excess of labor income for those 65 and older. The life cycle deficit—consumption less labor income—must equal net public transfers plus net private transfers plus asset-based reallocations; hence, the three components of the support systems must sum to 1.

The support systems of Asian and other economies around the world are conveniently represented by the triangular graph in Figure 4. Any of the three vertices of the triangle represents exclusive reliance on one of the three sources of support leaving the other two at zero. Along the sides of the triangle, one source is zero while the other two vary. Movement along one of the gridlines implies that one source is constant at 1/3 or 2/3 of the life cycle deficit while the other two vary. Some values lie outside to the right of the triangle indicating that net familial transfers to the elderly are negative, i.e., they are giving more to their descendants than they are receiving from them.

³ Authors' calculation based on the NTA database.

Figure 4: Support Systems for People aged 65 and Older in Recent Years for 18 National Transfer Account Economies



Note: AUT = Austria (2000); BR = Brazil (1996); CL = Chile (1997); CR = Costa Rica (2004); GER = Germany (2003); SPA = Spain (2000); HU = Hungary (2005); IND = India (2004); JPN = Japan (2004); KOR = Republic of Korea (2000); MX = Mexico (2004); PHI = Philippines (1999); PRC = People's Republic of China (2002); SWE = Sweden (2003); SI = Slovenia (2004); THA = Thailand (2004); TAP = Taipei, China (1998); USA = United States (2003); UY = Uruguay (2006).

Source: NTA database, available: 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 Asia than in the other economies. Familial transfers fund about 45% of the life cycle deficit for the elderly in Taipei, China, 33% in Thailand, and slightly under 20% in PRC and Republic of Korea. In Japan and the Philippines, however, the elderly provide as much support to their children and grandchildren as they receive. India and Indonesia are distinctive in that their net private transfers are negative for those 65 and older.⁴ Net familial transfers are quite small or negative in Europe, Latin America, and the US. No estimates are currently available for African countries.

In comparison with Europe and Latin America, the public sector is less important to the elderly in Asia, except as noted below. In the Philippines and Thailand, for example, net public transfers are zero—the elderly pay as much in taxes as they receive in benefits—while in Indonesia, the elderly pay somewhat more in taxes than they receive in benefits. None of these economies has large public pension programs or health care systems that target the elderly. In Republic of Korea and Taipei, China, net public transfers are funding nearly 33% of the life cycle deficits of the elderly. Social programs for the elderly are also similar in their net effect to those found in Mexico or the US, but they are relatively

⁴ Indonesia is not shown in Figure 4 because it is an outlier.

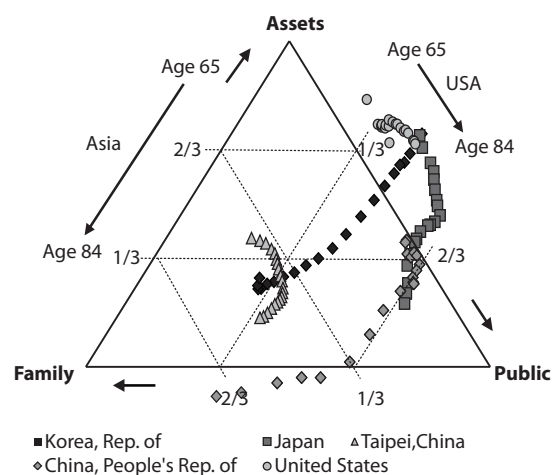
small in comparison with programs in Europe and South America. Among the Asian NTA economies, only Japan has large public transfers. The elderly in the PRC and Japan rely more on public transfers than do the elderly in the US but less so than the elderly in many European welfare states.

Assets are an important source of support in all Asian economies except the PRC and Taipei, China. In Indonesia and the Philippines, the elderly rely entirely on assets. Certainly some elderly in those countries 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 studied.

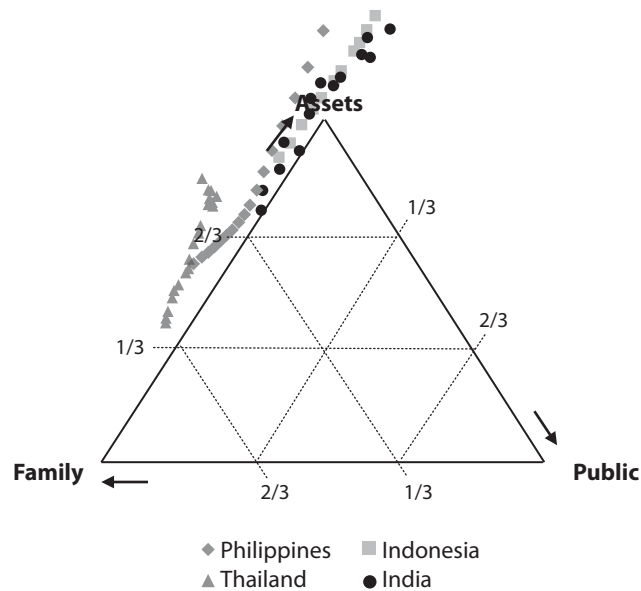
Figure 4 provides an important summary of support systems for the elderly, but it masks very important details about the enormous variations in those systems. Figure 5 shows the reallocation system for ages 65–84 in eight Asian economies and the US by single year of age. In every case, people 65 years old are most dependent on asset-based reallocations. As age increases, the importance of asset-based reallocations declines and is replaced to varying degrees by public transfers or by familial transfers. In general, the elderly of Asia rely much more on familial transfers as age increases; at the oldest ages, familial transfers are quite important in filling the gap between the life cycle deficit and decreasing asset-based reallocations.

Figure 5: Support System by Single Year of Age for People Aged 65–84 in Eight Asian Economies and the United States

Panel A



continued.

Figure 5: continued.**Panel B**

Note: Years of data are the same as those in Figure 4.

Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

The comparison between the Republic of Korea and the US in Panel A is instructive. In the US, public transfers rise in importance for the older elderly primarily because of higher levels of publicly funded health care. Net familial transfers to the elderly are quite small and negative at every age in the US while in the Republic of Korea, net public transfers do not increase at all with age. All of the substitution is between asset-based reallocations and familial transfers. At the oldest ages we even see an acceleration of this pattern with both public transfers and asset-based reallocations declining in favor of familial transfers. The age patterns for the PRC, India, Indonesia, the Philippines, and Thailand (Panel B) are very similar to the pattern for the Republic of Korea.

The patterns for Japan and Taipei, China in Panel A are somewhat distinctive. In both economies, their declines in asset-based reallocations are matched by a combination of increasing familial transfers and public transfers. In Taipei, China, the rise in public transfers is more important among the young elderly while familial transfers are more important among the older elderly. In Japan, the increase is fairly evenly balanced between the two forms of transfers with a slight shift toward familial transfers among the elderly in their late 70s.

Decreasing asset-based reallocations for the very old is a common feature of the support systems in Asia and elsewhere. In most European countries, the age profiles are similar to the US profile with asset-based flows declining in favor of public transfers. Latin

American economies are similar to Asian economies in that asset-based flows decline in favor of familial transfers. The decline does not, however, appear to be a consequence of dissaving among the elderly; rather, the very old have fewer assets because they have transferred assets to their children, or they have accumulated less over their working lives because the lifetime labor income of the very old is low relative to the lifetime labor income of younger elderly. The latter phenomenon is obviously linked with rapid growth in income, for example, in the PRC; the Republic of Korea; and Taipei, China. The PRC is also a special case because many elderly could not accumulate assets because private ownership was not allowed when they were young (Mason et al. 2010).

How support systems are likely to change in the future is a very important question about which there is relatively limited information. Time series NTA estimates have been constructed for a few East Asian economies. In Japan; the Republic of Korea; and Taipei, China, the importance of familial transfers has declined over time. Preliminary estimates based on more recent data suggest that net familial transfers to the elderly are now essentially zero in the Republic of Korea. In each of the East Asian economies, public transfers and asset-based reallocations have increased in importance as familial transfers have decreased (NTA database accessed 1 July 2011). The causal mechanisms for these changes are unclear. The Republic of Korea and Taipei, China have both implemented more generous public pension programs. As these programs mature, net transfers to the elderly are likely to rise. In the absence of pension reform, these programs will be increasingly difficult to sustain in the face of the dramatic population aging anticipated in East Asia.

IV. Relying on Assets

Assets provide the final backstop for individuals or families mobilizing resources to fund their needs. At some ages, labor income plus transfers received are insufficient to fund consumption, and the gap must be filled by asset income and, if necessary, by accumulating debt or by drawing down on assets. At some ages, labor income plus transfers may exceed consumption plus transfers, and the surplus is saved. The life cycle deficit—consumption less labor income—must equal net transfers plus asset-based reallocations—asset income less savings.

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 income and are positive in old age as individuals rely on asset income and draw down their savings to fund consumption. There are elements of this model that are supported by NTA estimates. In countries without extensive old-age transfer systems, the elderly do rely heavily on their assets to support themselves, but the available evidence from NTA data and from other studies is that the elderly do not dissave. With minor

exceptions, they continue to save and often at surprisingly high rates. This is true for the elderly in Asia: they are relying on asset income but are not dissaving to support themselves.

Not all asset flows align with the model. Although some have speculated that the elderly in low-income settings might rely more on familial transfers than on assets, we do not find this to be the case in Asia. In fact, asset-based reallocations are particularly important to the elderly in some low-income Asian countries, e.g., India, the Philippines, and Thailand. Consumption smoothing might also induce young adults whose labor income is low relative to their anticipated lifetime labor income to go into debt to fund their current needs though constraints on indebtedness may limit the extent to which this occurs. Among the Asian NTA economies we see some evidence of this behavior in Japan and possibly the Philippines.

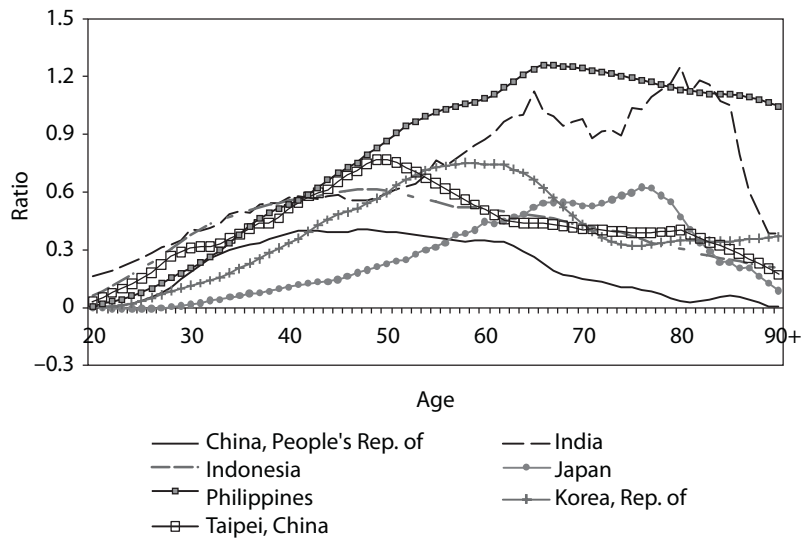
Two other features of asset-based flows do not align well with the life cycle savings model. First, the model assumes that working-age individuals accumulate assets by saving labor income. We find, however, that the asset income of younger adults is far too high to be consistent with exclusive reliance on the accumulation of labor income. Rather, a large share of the assets of young adults appears to be inherited or obtained through other forms of capital transfers. Second, working-age adults rely heavily on asset income. They may have high labor incomes, but they also have heavy financial obligations. They have to fund their own consumption, pay taxes that provide support for children and the elderly, and provide direct support to their dependent children and their elderly parents. Labor income is thus not sufficient to meet the financial burdens faced by working-age adults.

These observations must be tempered with caution because of the difficulties attached to interpreting age patterns of asset-based flows. First, asset-based flows occur within households, and there is no method to reliably assign asset income or savings to individuals within households. In the NTA, assets are assumed to be held by the household head; hence, asset income and savings are assigned to the age group of the head. Second, all estimates presented here are cross-sectional. Cross-sectional differences will reflect basic influences on behavior over the life cycle but also great variations in the experiences of different age groups. Rapid economic growth and radical economic reform are examples of phenomena that can greatly influence the cross-sectional age pattern of assets and asset income. Third, asset-based reallocations and savings are balancing items in the NTA. Estimates are influenced by errors in estimating other NTA components, so asset-based reallocations and savings tend to be relatively noisy measures. For this reason we emphasize broad patterns more than details. Note that the age profiles of asset income are based directly on household survey data on property income and flows from owner-occupied housing. They are not calculated as a residual. The extent to which the elderly rely on assets therefore varies quite widely across countries.

As shown in Figure 4, the elderly in India, Indonesia, the Philippines, and Thailand rely very heavily on assets to support their consumption. In East Asia, assets play a more important role for the elderly in Japan and the Republic of Korea and are somewhat less important to the elderly in the PRC and Taipei, China. The situation in Asia is in stark contrast with that in countries like Austria, Hungary, Slovenia, and Sweden where the elderly rely almost exclusively on public transfers and very little on assets to fund consumption. Although the mix between public and private transfers is very different in East Asia and South America, the share of consumption funded by asset-based reallocations is similar. Mexico is quite distinctive among Latin American countries with its heavy emphasis on assets and low reliance on public transfers to support its elderly.

Another important feature of asset-based reallocations is that in Asian economies, the older elderly rely less on them and more on familial transfers than do the younger elderly (Figure 5). This is a very consistent finding across all Asian economies and is true of most of Latin America as well. We see a similar pattern to some extent in rich economies with the older elderly relying more on public transfers instead of assets primarily because of the rise in the importance of publicly funded health care for the very old. This does not explain the phenomenon in developing Asian countries, however. One possible explanation is that the very old are outliving their resources and are forced to rely on family members. A second possibility is that the elderly may choose to live with their children because health problems increase dependency. A third possibility is that the very old were not able to accumulate wealth because wages were so much lower during their working years so they depend more on their children and less on their own personal resources. This may be particularly true of the very old in the PRC as they would have been unable to accumulate assets because their working lives preceded economic reforms.

Figure 6 shows per capita private income from assets in seven Asian economies. The level relative to the mean labor income of persons 30–49 varies considerably from economy to economy. Private asset income is quite high in India and the Philippines and relatively low in the PRC and is intermediate in the other four economies shown. By definition, private asset income is determined by both the value of assets held and the rates of return. The high asset income in the Philippines is similar to that in other low- and middle-income economies and may reflect high rates of return that incorporate risk premiums (Mason et al. 2011).

Figure 6: Per Capita Private Asset Income by Age in Seven Asian Economies

Note: Expressed as a ratio of average labor income at 30–49 years of age. Years for data are the same as those in Figure 4.

Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

The age profiles of asset income will also reflect age variations in assets and rates of return in each economy. Rates of return could decline with age if older adults opt for low-risk, low-return investments, but there is little empirical evidence on this point. To the extent that asset owners expect to bequeath rather than consume their assets, rates of return would not be expected to decline with age. Our own view is that the age profiles of private asset income primarily reflect age variations in private assets rather than age variations in rates of return.

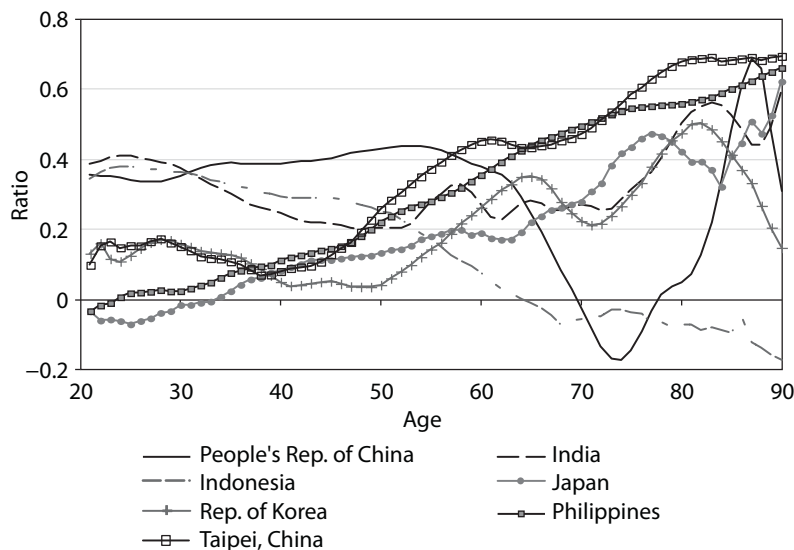
The age pattern of asset income follows the same general pattern in all countries rising from very low levels for young adults, reaching a peak, and then declining. The age at which the peak occurs, however, varies enormously. The earliest peaks are found in the PRC; Indonesia; and Taipei, China while the Republic of Korea and the Philippines have somewhat later peaks. There is a very late peak in Japan.

The rise in asset income is part of the normal accumulation in the life cycle. Working-age adults save, receive bequests and other capital transfers, and consequently accumulate assets as they age. Obviously, if the rate of accumulation is higher, asset income will rise more steeply as any cohort ages. Because age profiles consist of different age groups at a point in time, the shape of the profile also depends on differences in the income histories of those different age groups. In rapidly growing economies, younger adults will experience much higher earnings at each age than older adults did. Given accumulation rates, younger cohorts will have higher asset profiles than older cohorts. The result is a cross-sectional asset income profile that rises more slowly, peaks at a younger age, and declines more steeply. The early peak found in a country like the PRC surely reflects the high rate of income growth over the last 3 decades.

The decline in asset income could reflect two factors already discussed: rates of return that decline with age or cohort differences in the lifetime earnings. Such a sharp decline could not, however, be explained by these factors. Drawing down on assets in some form must be occurring, but we found little evidence of dissaving. Another form of draw down is through capital transfers. In some societies there are substantial *inter vivos* intergenerational asset transfers, often at marriage. They tend to be poorly measured or not measured at all. To the extent that these transfers occur within households, they will generally not be measured in standard surveys. Substantial asset transfers may also occur with aging. Within households, ownership or control of economic assets may pass from one generation to the next; the exact timing of such transfers may be very difficult to pinpoint, but they occur when the position of household head transfers to a subsequent generation. The decline in assets in old age due to this mechanism may be real, or it may be an artifact of the estimation method. There is no clear way to know given the information available.

In the life cycle savings model, the age pattern of savings rates forms a hump, gradually rising until retirement and then falling. To observe the consistency of the evidence, we constructed private saving rates in Figure 7 calculated as private savings divided by private primary income. Private primary income was calculated as labor income plus private asset income. In general, labor income dominates primary income at younger ages while private asset income dominates at older ages.

Figure 7: Private Savings as a Proportion of Private Primary Income for Persons Aged 21 to 90 and Older in Seven Asian Economies



Note: Years for data are the same as those in Figure 4.

Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

The age profile of savings rates during the working ages varies considerably from economy to economy. In India, private savings rates are very high and do not vary much with age. In the PRC, private savings rates are quite high except for people in their late 60s and 70s. In the Republic of Korea and Taipei, China, savings rates are much lower than in the PRC and India until people are in their 40s. In Taipei, China, the savings rate declines for people in their 30s and then rises steeply beginning in the early 40s. The pattern is similar in the Republic of Korea, but the rise does not begin until around age 50. In Japan and the Philippines, savings rates are very low and even negative during the 20s and then rise throughout the working ages though more steeply in the Philippines than in Japan. The Indonesian pattern is distinctive showing a gradual and then a relatively steep decline during the older working ages.

In only two instances do we see a steep decline in savings at old ages: the PRC and Indonesia. In Indonesia, the savings rate is negative at old ages while in the PRC it is negative during most of the 70s. In the other Asian economies, savings rates are generally quite high among the elderly and are consistently higher than the savings rates during the working ages. This is true of Japan; the Philippines; and Taipei, China. In the Republic of Korea, we see fluctuations in savings rates with a significant decline after age 80; nevertheless, savings rates are higher at older ages than at working ages.

The age profiles of savings rates shown here are surprising given the commonly accepted view that the rates decline and even turn negative at older ages. There are

actually relatively few estimates of the age profiles of savings, and those available do not support the conventional wisdom. Attanasio and Szekely (2000) constructed age profiles of household savings for four developing economies including Taipei, China and Thailand. Only in Taipei, China did they find any evidence of a hump in savings with the decline coming at a later age than that predicted by the life cycle savings model. Deaton and Paxson (2000) also estimated the age profile of savings for Taipei, China and found that the rate rose steadily with age until the early 60s and then remained at a high level.⁵

The age pattern found for most Latin American economies for which we have estimates is similar to what we find in Asia. In Brazil, Chile, Costa Rica, and Mexico, savings rates are higher at older ages than they are during working ages. The picture is a bit more mixed among rich countries. In a number of European countries for which estimates are available, private savings rates are quite high at older ages. The US is something of an exception in that savings rates decline from a peak at age 55 and are quite low after age 70 nearing zero or negative numbers at some ages.⁶

V. Fiscal Effect of Population Age Structure

Changes in age structure have a strong effect on public finances due to the age patterns of public transfer inflows and outflows apparent from the figures presented above. Miller (2011) calculated the fiscal support ratio to assess the pressures on fiscal sustainability arising from public transfers. They held age-specific public transfer inflows and outflows constant while allowing the population age structure to change in accordance with historical estimates and projections. Table 2 shows the evolution of the fiscal support ratio for eight Asian economies and the US using the age profiles of public transfers in the 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 to 100 in the base year of 2010 so that all values are expressed relative to the fiscal position in 2010. As the population age distribution changes, the fiscal support ratio increases if the effective number of taxpayers rises relative to the effective number of beneficiaries and declines if the effective number of taxpayers declines relative to the effective number of public transfer beneficiaries. The change in the fiscal support ratio indicates the relative size of the tax hikes or benefit cuts needed to return to the initial fiscal position.

⁵ These two studies are not entirely comparable to the analysis presented here because they estimate age effects using panel data to control for cohort effects and because they analyze household rather than private savings.

⁶ Authors' calculations based on NTA database accessed July 1 2011.

Table 2: Fiscal Support Ratios: 1950–2050 in Eight Asian Economies and the United States (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, accessed 1 July 2011.

It is not surprising that the fiscal impact of population aging is projected to be bigger in Japan than in the other Asian economies. Population aging combined with the current tax and benefit policies would lead to a 26% decline in the fiscal support ratio by 2050 in Japan. Thus, either taxes must increase, benefits must decrease, 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 18%–22% reductions in the fiscal support ratio by 2050. India, Indonesia, the Philippines, and Thailand are projected to experience an increase in their fiscal support ratios because net transfers to the elderly are modest or in some cases negative, and because changes in age structure are partially concentrated at ages where net transfers are generally negative. For these four economies, changes in age structure will relax public sector budget constraints. The danger, of course, is that economies with favorable demographics will implement generous transfer systems that ultimately prove to be unsustainable.

Similar projections can be made for each component of public transfer inflows. Table 3 projects publicly funded health expenditures. The assumptions underlying these calculations are similar to the assumptions made for Table 2. The shapes of the age profiles of benefits are fixed over time with their levels increasing at the same rate as the gross domestic product (GDP). The values for 2008 are the actual expenditures as a percentage of GDP for each economy. We use only two sets of profiles to project the estimates: low-income Asia and high-income Asia. Since the information on publicly funded expenditures on health is available, we can derive the benefits as shares of GDP resulting from the change in population age structure. Since the age profiles of publicly funded health transfer inflows sharply increase as the population ages, publicly funded health expenditures increase as the share of elderly in the population rises. Again, while data on health care expenditures are available for most Asian economies, a direct comparison is not feasible in large part due to different definitions of expenditures for health. The overall levels and trends within each economy are, however, comparable.

Table 3: Actual and Projected Publicly Funded Health Care Expenditure as Percentage of Gross Domestic Product, 1995–2050

	Actual				Projected							
	1995	2000	2005	2008	1995	2000	2005	2008	2020	2030	2040	2050
Central and West Asia												
Afghanistan	..	2.29	2.12	1.58	1.61	1.60	1.59	1.58	1.58	1.59	1.61	1.67
Armenia	2.00	1.14	1.48	1.68	1.54	1.58	1.63	1.68	1.75	1.88	1.97	2.03
Azerbaijan	1.39	0.87	0.88	0.82	0.78	0.78	0.80	0.82	0.89	0.96	1.04	1.08
Georgia	0.27	1.20	1.92	2.68	2.49	2.55	2.60	2.68	2.84	3.01	3.13	3.19
Kazakhstan	2.95	2.12	2.52	2.26	2.18	2.18	2.21	2.26	2.35	2.48	2.62	2.74
Kyrgyz Republic	3.96	2.07	2.38	2.76	2.71	2.70	2.72	2.76	2.90	3.13	3.38	3.61
Pakistan	0.84	0.64	0.70	0.85	0.85	0.84	0.85	0.85	0.88	0.92	0.98	1.05
Tajikistan	1.29	0.95	1.14	1.37	1.39	1.36	1.36	1.37	1.43	1.52	1.64	1.77
Turkmenistan	1.86	3.21	2.02	1.07	1.05	1.04	1.06	1.07	1.15	1.24	1.35	1.44
Uzbekistan	3.60	2.52	2.28	2.47	2.44	2.41	2.43	2.47	2.67	2.91	3.16	3.39
East Asia												
China, People's Rep. of	1.79	1.77	1.82	2.05	1.87	1.92	1.99	2.05	2.27	2.47	2.65	2.73
Hong Kong, China	2.10	2.90	2.60	2.65	2.50	2.51	2.56	2.60	2.84	3.09	3.36	3.62
Korea, Rep. of	1.42	2.18	2.93	3.51	3.33	3.39	3.45	3.51	3.81	4.08	4.29	4.43
Mongolia	2.52	3.92	3.01	3.06	2.97	2.92	2.98	3.06	3.40	3.72	4.09	4.40
Taipei, China	3.33	3.43	3.76	3.84	3.42	3.56	3.72	3.84	4.55	5.28	6.01	6.61
South Asia												
Bangladesh	1.28	1.10	1.12	1.04	1.01	1.02	1.03	1.04	1.13	1.23	1.34	1.45
Bhutan	2.27	5.32	3.60	4.56	4.58	4.51	4.52	4.56	4.90	5.28	5.78	6.29
India	1.22	1.27	0.93	1.35	1.31	1.32	1.34	1.35	1.43	1.52	1.64	1.75
Maldives	3.35	4.07	6.14	8.38	8.33	8.18	8.22	8.38	9.30	10.23	11.42	12.52
Nepal	1.31	1.26	1.41	2.25	2.25	2.25	2.25	2.25	2.35	2.48	2.66	2.86
Sri Lanka	1.63	1.80	1.88	1.78	1.63	1.66	1.74	1.78	1.95	2.08	2.20	2.25
Southeast Asia												
Brunei Darussalam	2.29	2.60	2.18	1.96	1.86	1.88	1.93	1.96	2.15	2.35	2.51	2.64
Cambodia	1.08	1.29	1.53	1.25	1.26	1.24	1.24	1.25	1.34	1.41	1.51	1.62
Indonesia	0.64	0.72	1.00	1.23	1.15	1.18	1.21	1.23	1.33	1.45	1.57	1.66
Lao People's Democratic Republic	1.41	1.09	0.77	0.70	0.71	0.71	0.70	0.70	0.73	0.77	0.82	0.88
Malaysia	1.43	1.67	1.85	1.81	1.59	1.65	1.74	1.81	2.21	2.55	2.78	2.89
Myanmar	0.41	0.28	0.19	0.18	0.17	0.17	0.17	0.18	0.19	0.21	0.22	0.23
Philippines	1.36	1.63	1.43	1.27	1.23	1.24	1.26	1.27	1.35	1.43	1.53	1.63
Singapore	1.52	1.26	1.02	1.14	1.07	1.09	1.12	1.14	1.23	1.31	1.37	1.41
Thailand	1.66	1.91	2.29	3.01	2.72	2.85	2.94	3.01	3.30	3.57	3.75	3.82
Viet Nam	1.76	1.63	1.55	2.79	2.62	2.63	2.73	2.79	3.06	3.38	3.68	3.87
The Pacific												
Fiji, Rep. of	2.41	3.16	2.91	2.61	2.46	2.51	2.57	2.61	2.80	2.96	3.13	3.33
Micronesia, Fed. States of	8.82	7.68	11.80	12.02	11.87	11.85	11.98	12.02	12.51	13.22	14.02	15.21
Papua	2.74	3.26	3.68	2.57	2.52	2.54	2.55	2.57	2.64	2.75	2.89	3.05
Samoa	3.53	4.00	4.61	4.97	4.94	5.02	5.00	4.97	5.11	5.42	5.65	5.96
Solomon Islands	3.62	4.76	4.60	4.70	4.66	4.67	4.68	4.70	4.86	5.13	5.45	5.83
Timor-Leste	8.47	6.28	12.37	10.12	10.13	10.38	10.11	10.12	10.20	10.16	10.35	10.85
Tonga	2.60	3.30	3.02	3.22	3.12	3.14	3.20	3.22	3.22	3.35	3.51	3.66
Vanuatu	1.88	2.65	2.31	2.97	2.97	2.95	2.95	2.97	3.07	3.22	3.42	3.63
Developed Countries												
Japan	5.71	6.25	6.56	6.68	5.57	5.98	6.42	6.68	7.62	8.30	8.70	9.00
New Zealand	5.52	6.03	6.83	7.81	7.41	7.54	7.68	7.81	8.47	9.07	9.54	9.85
Australia	4.75	5.37	5.64	5.96	5.58	5.73	5.85	5.96	6.46	6.86	7.18	7.36

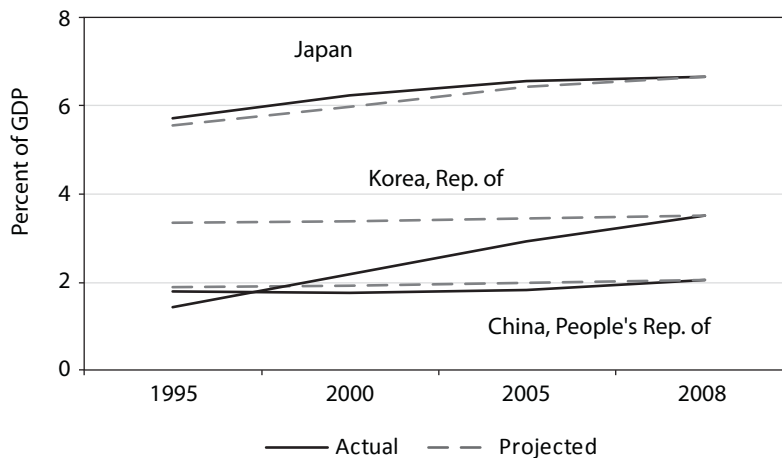
Note: The base year is 2008, hence, the projected values for 2008 are the actual expenditures as a percent of GDP for each economy. For Hong Kong, China and Taipei, China, recent data from the ministries of health were used and 2006 values were used instead of 2008 values. These were calculated based on the assumption that the shapes of the age profiles of public health consumption do not change over time.

Sources: NTA database, available: www.ntaccounts.org, accessed 1 July 2011; World Health Organization (2011); United Nations (2009); and Council for Economic Planning and Development Statistics Database (2009), accessed 1 July 2011.

The tables assume that the shapes of the age profiles of publicly funded health care expenditures do not change over time, but as is evident in the Republic of Korea, it is possible that the profile can shift upward. It is also possible that it can shift downward as Chile and some other Latin American and European countries are attempting to do through pension reforms (An et al. 2011).

Figure 8 documents the projected and actual expenditures on health care in the PRC, Japan, and the Republic of Korea from 1995 to 2008. The projections present the effects of demographic change; hence, the difference between actual and projected spending can be attributed to factors other than population change such as an increase in the level of benefits holding GDP constant. In other words, GDP growth alone should not affect the results because the level of benefits is assumed to be constant regardless of changes in GDP or other macroeconomic factors. The results show that the actual and projected expenditures in Japan were very similar suggesting that the increase in publicly funded health care spending during the period can be almost entirely explained by the change in population structure. In contrast, the projected and actual changes for the Republic of Korea were quite different in that actual spending increased much more rapidly. For example, about 90% of the change in publicly funded health expenditures between 1995 (5.7% of GDP) and 2008 (6.7%) in Japan is explained by change in population structure while the increase in the Republic of Korea for the same period (from 1.4% to 3.5%) is unrelated to changes in population age structure.

Figure 8: Projected and Actual Publicly Funded Health Expenditures for the PRC, Japan, and the Republic of Korea, 1995–2008



Source: Authors' calculation.

The rapid growth in government expenditures for the elderly in the Republic of Korea is confirmed by other sources of information as medical insurance benefits rose 15.3% per annum between 2000 and 2005 and public pension benefits grew by 9% annually during the same period. This sharp rise during a short time span is somewhat exceptional. One might argue this change in the Republic of Korea could be due to year-specific macroeconomic swings that might have affected specific government expenditures; however, given that health and pension transfers are much less affected by short-run macroeconomic swings, the effect is likely due to a more fundamental change in the scope of public sector programs. Again, this is confirmed by other sources of information by age for the Republic of Korea. Specifically, there was a sharp increase in benefits for those over age 55 owing to increases in public pension and medical insurance benefits. The sharp rise in public pension benefits for those aged 60–64 reflects a rise in the number of newly entitled national pension benefit recipients. Higher benefits for those aged 65 and older were mainly due to an increase in benefits paid out by occupational pensions. Recent changes in medical insurance policies also substantially raised the medical insurance benefits for the older age groups (An et al. 2011).

Changes in the Republic of Korea mirror a growing concern in many Asian countries that transfer programs will grow extremely rapidly due to increases in the number of elderly and due to changing patterns of public consumption that are mainly due to the rapid increase in per capita public transfers to the elderly. In other words, countries increase public transfers to their elderly populations as they get richer. Recently, some low-income countries have expanded public transfers as well. For example, in 2006, Indonesia expanded its social security system to include a national pension scheme for workers in both the formal and informal sectors (Maliki 2011). The PRC is another example. In 2009, the government committed itself to building a universal public pension system in rural areas funded by individual premiums and government subsidies. Also in the PRC, public health insurance was available to urban employees in 1998, to rural citizens in 2003, and to urban citizens in 2007 (Li et al. 2011).

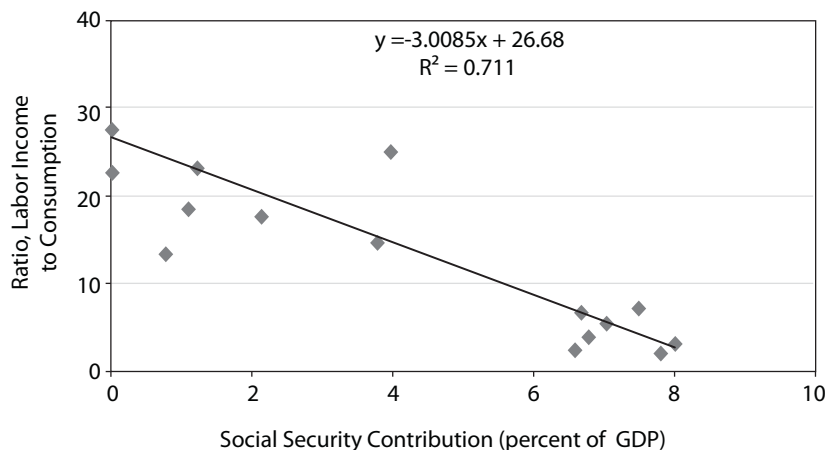
VI. Support Systems and the Response to Population Aging

There are many important issues regarding the support systems in Asia that are closely related to rapid population aging in the region. Some of the issues are addressed by Mason and Lee (2011) in more detail. For example, transfers of wealth are closely related to intergenerational equity because they measure the shift of resources between current generations and future generations. They also address the emphasis on capital accumulation as a strategy for responding to population aging.

Another important issue is the future of support systems. Of particular concern in Asia is whether the decline in the familial transfer system will place greater demands on the public transfer system. Public pension programs definitely offer some advantages. They represent a politically acceptable means of providing an economic safety net for those older people who might otherwise experience substantial decreases in their standards of living. Public programs also allow pooling against investment risk and longevity risks.

On the other hand, public transfers potentially put pressure on budgets and may encourage early retirement or reduced savings. The NTA provide relevant evidence on these issues. The labor income for people 65 and older appears to strongly correlate with the amount of social contributions of employees, employers, self-employed individuals, and other unidentified sources as a percentage of GDP (Figure 9). Although these contributions are defined more broadly than are pay-as-you-go social security contributions, this result is somewhat consistent with what Gruber and Wise (1999) suggest about the trade-off between social security schemes and labor income.

Figure 9: Social Security Contributions as a Percent of GDP, and Labor Income as a Percent of Consumption for People 65 and Older



GDP = gross domestic product.

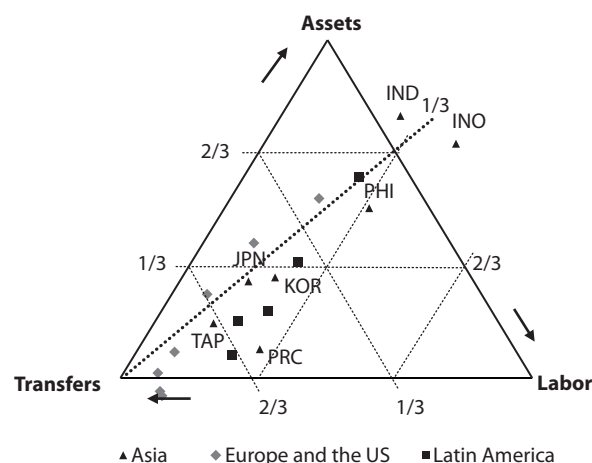
Note: Social contributions also include actual or imputed contributions to social insurance schemes operated by governments.

Source: Lee and Ogawa (2011).

The trade-offs among old-age support systems can be better explained by examining the sources of financing the consumption of the elderly (Figure 10) using the NTA. The figure compares transfers, asset-based reallocations, and labor income. These cross-sectional calculations are treated as a synthetic cohort that is calculated using recent data on survival weights in the US. As virtually all consumption by children is financed by transfers, children are not represented. The figure shows that labor income is still an important source of funding consumption for people aged 65 and older in Indonesia (40%). In the Philippines, 29% of consumption for the elderly is supported by labor

income, and in the PRC and India, the figure is 23%. Note that the results are not direct consequences of different mortality rates because these results are conditional on survival. Work plays a small role in providing income for the elderly in Japan and Taipei, China contributing about 10% in the former and 8% in the latter. Work plays a much less important role for the elderly in all European countries, contributing less than 10% of consumption.

Figure 10: Sources of Funding Consumption for People 65 and Older in Recent Years for 18 National Transfer Accounts Economies



IND = India, INO = Indonesia; JPN = Japan; KOR = Republic of Korea; PHI = Philippines; PRC = People's Republic of China; TAP = Taipei, China.

Source: NTA database, available: www.ntaccounts.org, accessed 1 July 2011.

Transfers are more important in the PRC; Japan; the Republic of Korea; and Taipei, China than in Indonesia and the Philippines and are, in fact, the most important source of funding consumption in Taipei, China, contributing 70%. Approximately 50% of consumption by the elderly is supported by transfers in Japan and the Republic of Korea while they play a very small role in the Philippines and are not a factor in India and Indonesia. Asset-based reallocations also vary significantly in Asia. They account for about 75% of consumption by the elderly in India and Indonesia, 56% in the Philippines, and about 35% in Japan and the Republic of Korea. In the PRC and Taipei, China asset-based reallocations account for only about 20% of funding. In the PRC in particular, high rates of savings offset asset income to some extent.

Regarding trade-offs, a change in one source should be offset by a change in another. This suggests two things. First, as the dotted line shows, the major trade-off would be between relying on transfers and relying on assets. Second, relying more on assets is positively related with more labor income in old age although the effect is not large.

VII. Conclusions

Important changes are occurring in support systems in Asia. The elderly are relying less on support from their families than they did in the past, and a diminishing role for labor income will be inevitable in the region as well. Whether countries rely on transfers or assets to fund the needs of a growing elderly population will depend on policies, culture, and institutions. Compared with Europe and Latin America, Asia has relied less on public pension programs, but health care for the elderly is increasingly costly and is often heavily subsidized by the public sector. 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.⁷

Heavy reliance on public support systems has disadvantages. In developed countries, public pension programs appear to have had a substantially negative effect on retirement. Pension programs have undermined work incentives by cutting the link between work effort and standards of living among the elderly. In addition, providing wide coverage may entail enormous administrative difficulties, particularly in low-income countries with large numbers of agricultural, self-employed, and casual workers. It is very difficult to collect pension payments in sectors where labor turnover is high and documentation is weak. On the other hand, given the importance of the family support system in Asia, some of the extra burden imposed by such policies could be shouldered by the families of the elderly.

Strengthening financial-sector infrastructure is crucial. This is not only a prerequisite for developing a public pension system, it will also allow and encourage workers to save more for retirement. The accumulation of capital is a somewhat longer-term phenomenon. Governments in developing Asia may have to respond to their citizens' needs as standards of living rise, so while public pension programs have been very modest to date, the demand for them will probably grow. In particular, the demand for health care will surely increase as economies develop and per capita incomes rise. Thus, governments will be increasingly faced with decisions about what types of pension and health care to provide and for whom and about how to provide them efficiently. The policies that are formulated and implemented now will influence the well-being of people in Asia for decades to come.

⁷ A comparison of Asian countries under different scenarios was done by Mason et al. (2010).

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About the Paper

Sang-Hyop Lee and Andrew Mason find that family transfers remain a significant source of old-age income support in many Asian economies. Since public transfers are still relatively underdeveloped, the region has an opportunity to build sound transfer systems free from unsustainable obligations. A healthy degree of reliance on asset accumulation can also support living standards via capital deepening.


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Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics
ISSN: 1655-5252
Publication Stock No. WPS114130

October 2011

 Printed on recycled paper



Printed in the Philippines