Support System over the Lifecycle: A Cross-Country Comparison

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생애주기별 지원체계에 관한 국가 간 비교연구

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ABSTRACT

I describe the complex support systems around the world, focusing on their importance for economic growth and fiscal sustainability. Familial transfers for old age support are somewhat significant in some Asian economies including Korea, although they deteriorate quite rapidly. Public transfer systems are less significant in Korea compared with most OECD member countries. This is important because Korea has had the opportunity to develop sustainable systems less encumbered by obligations made to current and future generations. Relying on accumulated assets rather than transfers helped countries create capital-intensive economies that can maintain standards of living. This is true for Korea, but the question of how the labor and capital market will respond to the rapidly changing social welfare system remains as a critical question.

본 논문의 목적은 생애별 지원체계를 국가별로 비교하고, 거기서 경제성장과 정부재정의 지속성에 대한 함의를 도출해 내는 데 있다. 가족지원체계는 점차 그 중요성이 줄어듦에도 불구, 한국을 비롯한 몇몇 아시아 국가에서 유의하게 나타났다. 공공지원체계(사회보장)의 경우 한국은 OECD 국가 내에서 매우 낮은 수준을 보였는데, 이러한 낮은 사회보장이 높은 저축률과 자본축적에 기여한 긍정적인 측면은 인정된다. 하지만 지난 10년 동안 한국에서의 사회보장은 매우 빠른 속도로 변화하였다. 한국의 자본시장과 노동시장이 이러한 변화에 어떻게 반응하는가가 향후 정부의 정책방향을 결정하는 데 중요한 요인이 될 것이다.

I. Introduction

In most societies children and elderly consume much more than they produce through labor. The pattern of the lifecycle deficit varies a lot across countries because countries vary greatly in per capita economic lifecycles as well as population age structure. Hence the gaps between consumption and labor income, lifecycle deficit, should be filled by reallocations from working adults. Both public and private sectors mediate the resource reallocation. The public sector reallocates resources relying on social mandates and implemented by governments. Education, public pensions, and healthcare programs are important examples of public reallocations. Private sector reallocations are usually governed by voluntary contracts and behavior patterns that are mediated mostly by families. The reallocation system also varies greatly across countries. An understanding of the pattern of economic lifecycle and reallocations is of great interest to both academics and policy makers in large part due to a huge policy challenge; countries need to develop social systems and institutions that can provide economic security to their citizens and sustain strong economic growth.

The purpose of this paper is to examine the current state of support system around the world, with a special reference to public support for the children and elderly. Protecting the children and elderly is a high and growing priority for all countries since their limited participation in the labor market makes them particularly vulnerable to poverty, lack of access to health care, and other risks. In particular, I highlight the results for Korea with respect to the results for other countries. From the results, I emphasize the difference of reallocation systems for economic growth, fiscal sustainability, and other policy issues.

This study will utilize the data set of national transfer accounts (NTA). The accounts system measure how people at each age in the lifecycle acquire and use economic resources.[1] The NTA represent a significant advance compared with previous studies because they provide a comprehensive set of measures of production, consumption, savings, and transfers in a manner consistent with national income and product accounts.[2] The NTA also consider the public and private

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1 NTA were developed as an international project led by Ronald Lee of the University of California at Berkeley and Andrew Mason of the East-West Center.
2 NTA are estimated relying on a variety of data sources. In addition to national income and product accounts, government financial statistics and government administrative records are used to

sectors, both of which mediate economic flows across ages, which in turn can be used to study the implications of demographic change. I use the data from 32 countries, which range from very poor countries to most advanced countries. More detailed information on the NTA and methodology for calculating NTA is available from Mason, Lee *et al*. (2009); from Lee, Lee, and Mason (2008); or on the project website, www.ntaccounts.org.

II. Consumption

Consumption in NTA is a broad measure that includes the value of all goods and services consumed by individuals and by governments on their behalf. This measure is generally consistent with the notion that consumption is a critical measure of economic wellbeing. Consumption varies by age due to individual need, behaviors, institutions, and market forces. It also depends on many other historical, cultural, political, social, and economic factors. For the purpose of this paper, it is important to examine how children and elderly differ across countries in terms of their consumption. In particular, it is important how both families and government support the education, healthcare, and other consumption needs of children and the elderly.

The NTA project builds on these estimates by providing comprehensive estimates of consumption by one year age groups. NTA disaggregates consumption into three components—education, healthcare, and other consumption—and distinguishes two forms of consumption: private consumption, the goods and services purchased by individuals and families; and public consumption, goods and services provided directly by the government. Public expenditures on education and healthcare are allocated by age, primarily from administrative records. Education consumption is based on budget data to construct estimates of spending per student at each level of schooling. These estimates are combined with school enrollment records to estimate public education consumption for one-year age groups. The sources of information used to allocate public spending on healthcare are more varied and more subject to error. In some economies, government agencies or provider surveys give detailed estimates of public spending on healthcare by age. In

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estimate economy-wide aggregates. Age profiles are estimated by making extensive use of administrative records and nationally representative income and expenditure surveys, labor force surveys, health expenditure surveys, and special-purpose household surveys.

other economies, the number of patients at each age is combined with records of costs per patient. Estimates of private consumption are constructed from income and expenditure surveys, health expenditure surveys, and special-purpose household surveys. Private consumption of education and healthcare by households is allocated to household members of different ages based on regression analysis of survey data.[3]
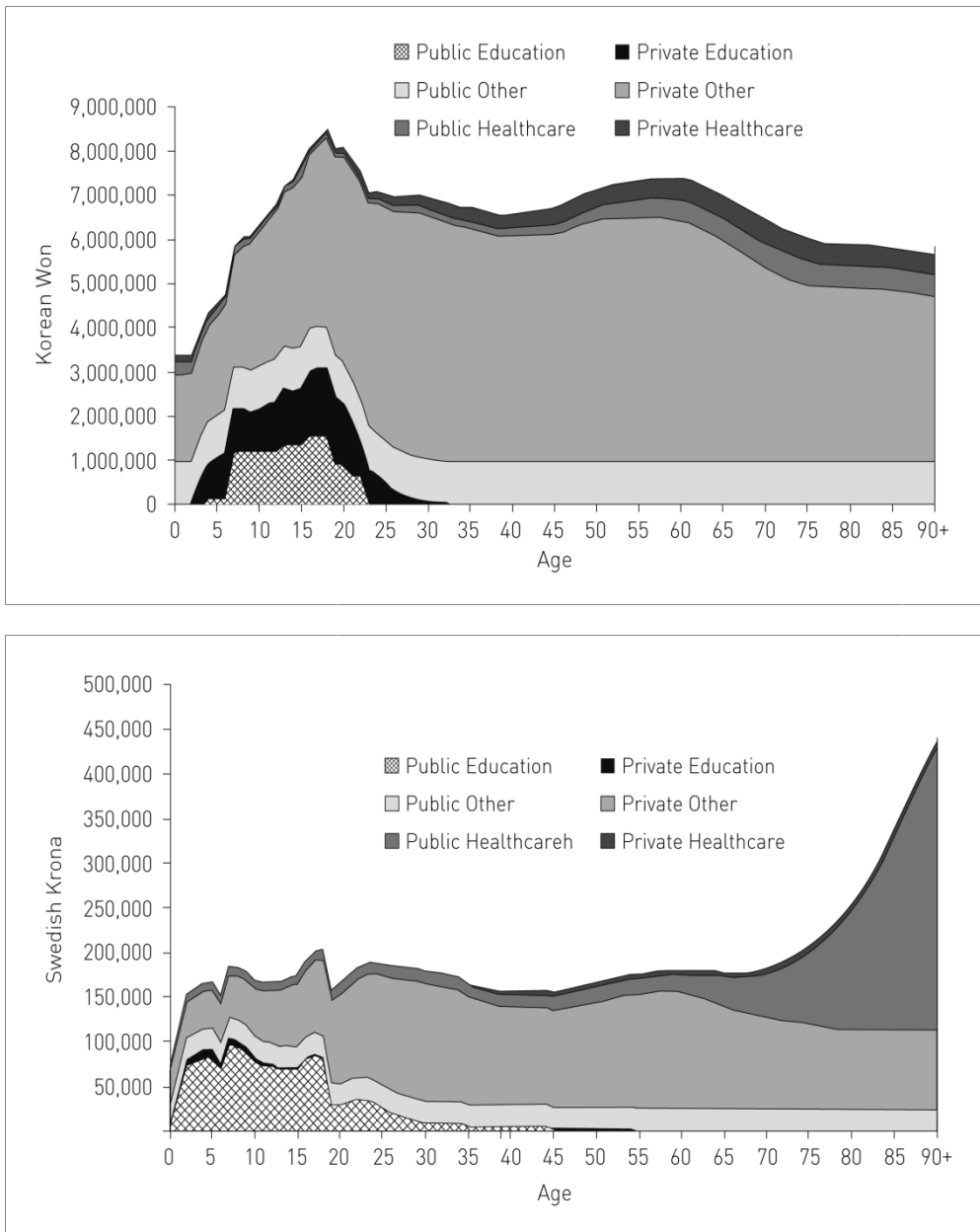
[Figure 1] illustrates the component of consumption for two countries, Korea and the Sweden by age. In both countries, per capita consumption increases steadily until it reaches peak between ages 17 and 18. The consumption decreases thereafter until age 40. However, the major difference between two countries starts around age 60. In Korea, the consumption start to decline around age 60 while in Sweden it increases very rapidly until the end of lifecycle. Another major difference between Korea and Sweden is whether the resource is provided by family or government. For example, the education is mainly provided by Swedish government, while in Korea, a great deal of the cost of education is borne by families. In particular, the Swedish government provides considerable support for daycare and hence the consumption increases at very early ages. This is true for healthcare consumption. In Sweden, the rapid increase in healthcare consumption for the old is entirely due to the provision of publicly provided healthcare. The steep rise in consumption among the oldest age groups in Sweden is also evident in the US, Japan, and other developed countries, while Korea does not show this pattern.

<Table 1> summarizes the measure of consumption by component for children and elderly. To compare across countries, consumption at each age is normalized by the consumption of working-age population aged 20 to 64. In almost all 32 NTA member countries children ages 0~19 consume less than working age adults and the elderly ages. However, there is considerable variation in children's consumption levels, especially compared with that of the elderly. [Figure 2] presents the average values for consumption by children and the elderly in all 32 economies, divided into four quadrants. In developing economies, per capita consumption is low for children, which might be due to their high fertility. This contrast between the four African economies and the four East Asian economies is especially striking, where data points for the four African economies lie well to the left of the overall average,

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3 Other public consumption—such as defense, infrastructure, and the operating costs of government—is divided evenly among all individuals. Other private consumption—the largest category—includes food, clothing, housing, transportation, recreation, and consumer durables. This is allocated among household members using a scale that ranges from 0.4 for children under age five to 1.0 for adults age 20 and above. Again, for more detailed information on the methodology for calculating per capita consumption is available from Mason, Lee *et al*. (2009); from Lee, Lee, and Mason (2008); or on the project website, www.ntaccounts.org.

[Figure 1] Age Consumption Profiles by Component (Korea, 2000 and Sweden, 2003)

Source: National Transfer Accounts Database.

<Table 1> Per Capita Consumption by Children and the Elderly

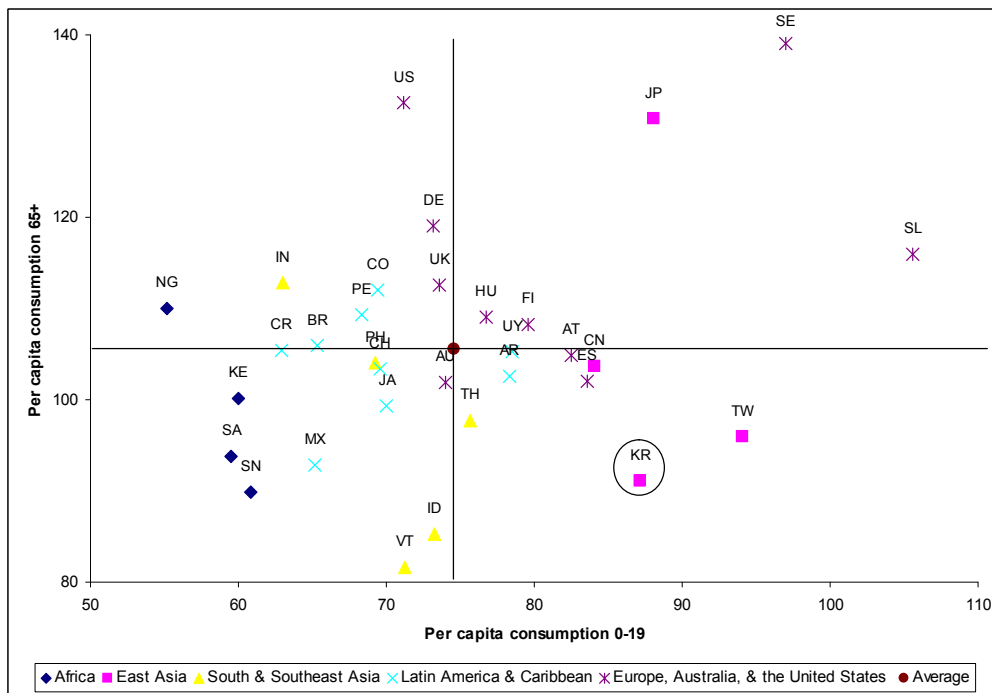| | Per Capita Consumption by Children and the Elderly (% per capita consumption of 20–64) | | | | | | | | Per Capita Human-Capital Spending (% average annual labor income of age 30–49) | | | Importance of Per Capita Healthcare Consumption Age 65+ (% all per capita consumption age 65+) | | |
| | Private | | Public | | Combined | | Percent public | | Private | Public | Combined | Private | Public | Combined |
	Age 0~19	Age 65+	Age 0~19	Age 65+	Age 0~19	Age 65+	Age 0~19	Age 65+						
Africa	**49**	**98**	**124**	**99**	**59**	**98**	**71**	**50**	**86**	**86**	**171**	**8**	**3**	**10**
Kenya, 1994 (KE)	50	101	140	95	60	100	74	49	17	60	78	1	2	3
Nigeria, 2004 (NG)	52	111	95	95	55	110	65	46	191	21	212	15	1	15
Senegal, 2005 (SN)	54	89	120	97	61	90	69	52	46	65	111	5	2	6
South Africa, 2005 (ZA)	40	90	140	110	59	94	78	55	89	196	285	10	7	17
East Asia	**68**	**94**	**168**	**152**	**88**	**105**	**71**	**61**	**210**	**240**	**450**	**8**	**14**	**22**
China, 2002 (CN)	64	94	148	136	84	104	70	59	166	156	322	15	13	28
Japan, 2004 (JP)	58	109	219	227	88	131	79	68	140	389	529	5	23	27
South Korea, 2000 (KR)	**71**	**85**	**160**	**121**	**87**	**91**	**69**	**59**	**225**	**202**	**427**	**8**	**9**	**16**
Taiwan, 1998 (TW)	80	87	143	126	94	96	64	59	307	213	520	6	11	17
South & Southeast Asia	59	94	171	114	70	96	74	55	108	132	240	9	3	**12**
India, 2004 (IN)	54	109	135	141	63	113	72	56	68	107	175	11	8	18
Indonesia, 2005 (ID)	62	82	214	120	73	85	78	59	84	137	221	3	3	5
Philippines, 1999 (PH)	58	104	155	107	69	104	73	51	124	111	235	6	2	8
Thailand, 2004 (TH)	56	97	206	105	76	98	79	52	80	251	331	18	4	22
Vietnam, 2008 (VN)	65	80	144	99	71	82	69	55	186	52	239	6	1	7
Latin America & Caribbean	**54**	**101**	**161**	**124**	**70**	**104**	**75**	**55**	**123**	**215**	**338**	**8**	**8**	**16**
Argentina, 1997 (AR)	56	96	153	125	78	103	73	57	98	229	327	6	13	19
Brazil, 2002 (BR)	47	105	128	110	65	106	73	51	82	218	300	9	8	17
Chile, 1997 (CH)	55	99	184	139	70	103	77	58	99	193	292	8	7	15

<Table 1> Continued

| | Per Capita Consumption by Children and the Elderly (% per capita consumption of 20–64) | | | | | | | | Per Capita Human-Capital Spending (% average annual labor income of age 30–49) | | | Importance of Per Capita Healthcare Consumption Age 65+ (% all per capita consumption age 65+) | | |
| | Private | | Public | | Combined | | Percent public | | | | | | | |
	Age 0~19	Age 65+	Age 0~19	Age 65+	Age 0~19	Age 65+	Age 0~19	Age 65+	Private	Public	Combined	Private	Public	Combined
Colombia, 2008 (CO)	50	106	171	144	69	112	77	58	139	248	388	7	10	17
Costa Rica, 2004 (CR)	50	99	136	144	63	105	73	59	72	252	324	4	15	19
Jamaica, 2002 (JM)	57	95	166	130	70	99	74	58	180	169	349	6	7	12
Mexico, 2004 (MX)	54	90	164	118	65	93	75	57	100	232	333	2	7	9
Peru, 2007 (PE)	54	112	175	92	68	109	76	45	139	194	334	8	2	11
Uruguay, 2006 (UY)	63	104	176	114	79	105	74	52	201	196	397	19	6	25
Europe, Australia, & the United States	**53**	**93**	**178**	**187**	**82**	**115**	**77**	**66**	**51**	**350**	**401**	**5**	**24**	**29**
Australia, 2004 (AU)	56	87	165	173	74	102	75	66	108	247	355	7	18	25
Austria, 2005 (AT)	52	90	193	158	83	105	79	64	23	360	384	4	18	22
Finland, 2004 (FI)	51	91	155	153	80	108	75	63	17	344	361	4	17	21
Germany, 2003 (DE)	52	105	149	168	73	119	74	61	37	290	327	5	18	23
Hungary, 2005 (HU)	46	97	149	139	77	109	76	59	33	361	394	7	19	26
Slovenia, 2004 (SI)	64	90	252	206	106	116	80	70	45	460	505	5	30	35
Spain, 2000 (ES)	60	89	181	158	84	102	75	64	61	333	395	3	20	23
Sweden, 2003 (SW)	49	84	219	280	97	139	82	77	17	525	542	2	47	49
United Kingdom, 2007 UK	55	86	142	209	74	113	72	71	63	295	359	1	30	31
United States, 2003 (US)	49	112	174	227	71	133	78	67	100	287	387	12	21	33
Grand Mean	**56**	**96**	**164**	**143**	**75**	**106**	**74**	**59**	**104**	**231**	**336**	**7**	**12**	**19**

Source: NTA Bulletin #4 (forthcoming). Originally calculated using the National Transfer Accounts database.

[Figure 2] Per Capita Consumption for Children (ages 0~19) vs. for the Elderly
(ages 65 and older)

Note: Measured as % of per capita consumption of aged 20 to 64.
* Africa: Kenya 1994 (KE), Nigeria 2004 (NG), Senegal 2005 (SN), South Africa 2005 (ZA)
  East Asia: China 2002 (CN), Japan 2004 (JP), South Korea 2000 (KR), Taiwan 1998 (TW)
  South & Southeast Asia: India 2004 (IN), Indonesia 2005 (ID), Philippines 1999 (PH), Thailand 2004 (TH), Vietnam 2008 (VN)
  Latin America & Caribbean: Argentina 1997 (AR), Brazil 2002 (BR), Chile 1997 (CH), Colombia 2008 (CO), Costa Rica 2004 (CR), Jamaica, 2002 (JM), Mexico 2004 (MX), Peru 2007 (PE), Uruguay 2006 (UY)
  Europe, Australia, & the United States: Australia 2004 (AU), Austria 2005 (AT), Finland 2004 (FI), Germany 2003 (DE), Hungary 2005 (HU), Slovenia, 2004 (SI), Spain 2000 (ES), Sweden 2003 (SW), United Kingdom 2007 (UK), United States 2003 (US)
Source: National Transfer Accounts Database.

while data points for the four East Asian economies lie well to the right. A child in Africa consumes about 60 percent of consumption by a prime-age adult, while a child in East Asia consumes 88 percent of a prime-age adult's consumption on average. Since this consumption includes consumption for human capital, such as education and health, the low consumption by children may also inhibit their development into fully productive members of these countries. Per capita consumption for people aged 65 and older is higher than per capita consumption for

working-age adult. It is particularly high in Japan, Sweden, and the US. It is particularly low in South Asia and Latin America.
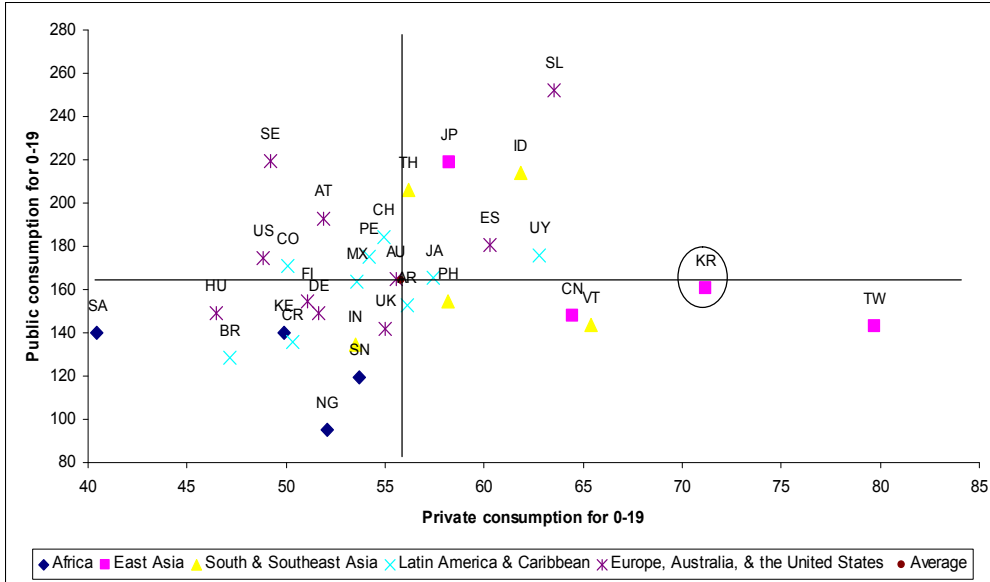
The role of the government vs. family varies substantially too. [Figure 3] present the per capita consumption for children and elderly by public vs. private provision, again divided into four quadrants. Korea and Taiwan stand out with particularly high private consumption by children because of high education spending. By contrast, children's public consumption is particularly high in Slovenia, Japan, Indonesia, Sweden, and Thailand. Thus, it does not appear to be the level of development which leads to higher level of public consumption for children, while all East-Asian countries have higher private consumption for children, again due to high education spending. Private consumption for children tends to be low for children in many European countries, but these are balanced by their high public consumption. Per capita consumption for elderly tends to be higher than that by working-age adults. Public consumption for elderly is high in all European countries and US while it is low in Africa, Asia, and Latin American countries. On the other hand, private consumption is particularly low in Vietnam, Indonesia, and Korea. Again, the level of private consumption for elderly is low in many European countries compared with the working population, but these are balanced by their high public consumption.

[Figure 4] shows the share of public consumption for children and the elderly. In all European countries and in the US and Japan, their governments provides more than 60 percent of the consumption for elderly. It is particularly high in Sweden where the government provides over 75 of the consumption of the elderly. Governments of Korea, China, and Taiwan provide about 60 percent of consumption for the elderly. In almost every African and Latin American countries, the public sector provides a much smaller proportion of elderly consumption. For children the picture is a little bit more mixed. In most European countries and in the US and Japan, government consumption is still the dominant form of consumption for children, accounting over 73 percent of the children's consumption. However, in Asia, public consumption accounts for over 77 percent of children's consumption for Thailand and Indonesia, while it is lower than 70 percent in Korea, Taiwan, and China. It might be that the private education consumption is too high in these three economies. This is also closely related with the low fertility in the region. As fertility comes down and the number of children diminishes, families and governments have an opportunity to invest more in each child, trying to enhancing the productivity of future workers.
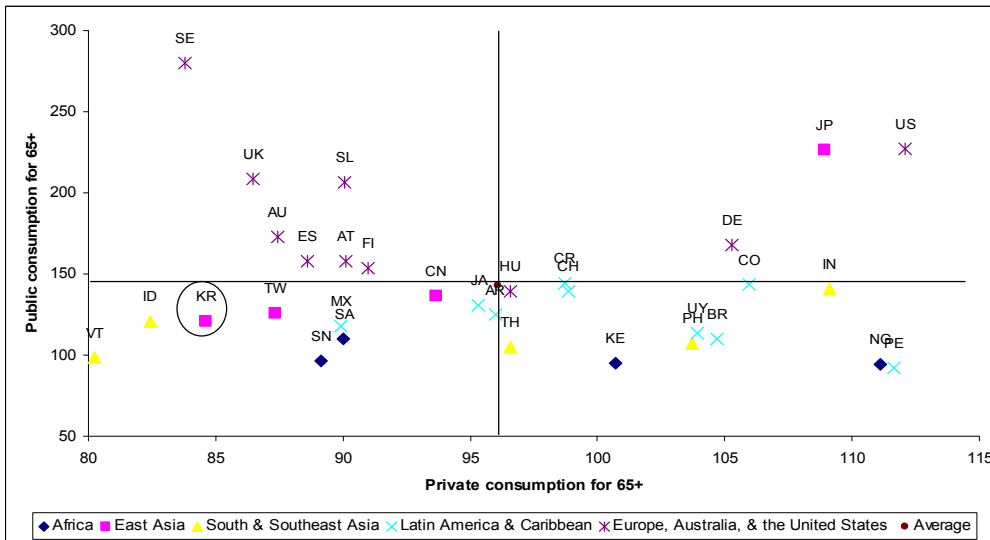
Needless to say, these cross country results should be interpreted with caution in part because the public consumption includes other public consumption such as

[Figure 3] Per Capita Private Consumption vs. Public Consumption for Children and the Elderly
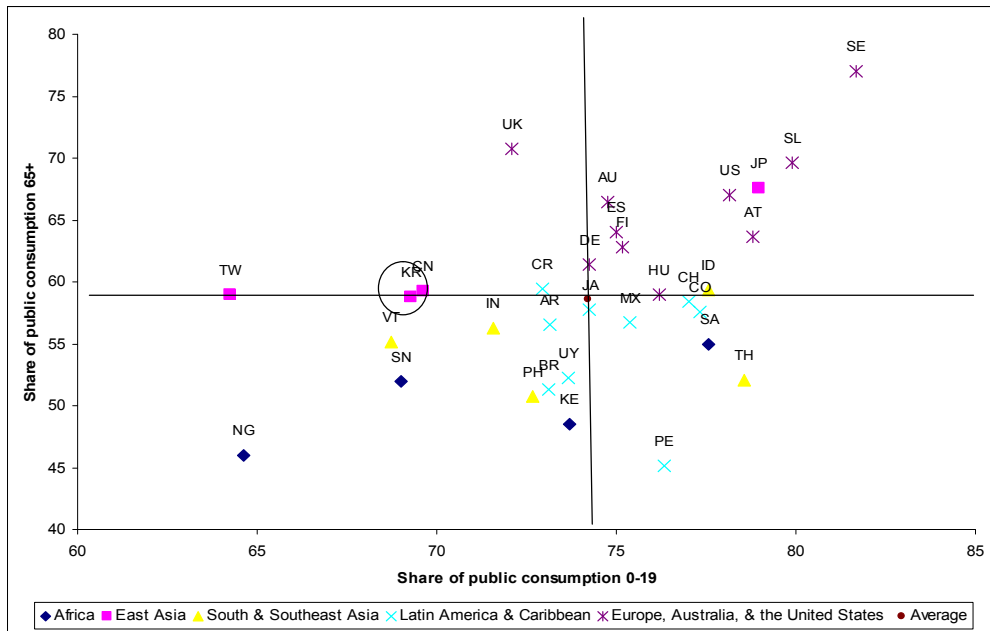
A. Children Aged 0~19

B. Elderly Aged 65 and Older

Note: The units of y-axis are % of per capita public consumption of aged 20 to 64, and the units of x-axis are % of per capita private consumption of aged 20 to 64.

Source: National Transfer Accounts Database.

[Figure 4] Per Capita Share of Public Consumption for Children and the Elderly
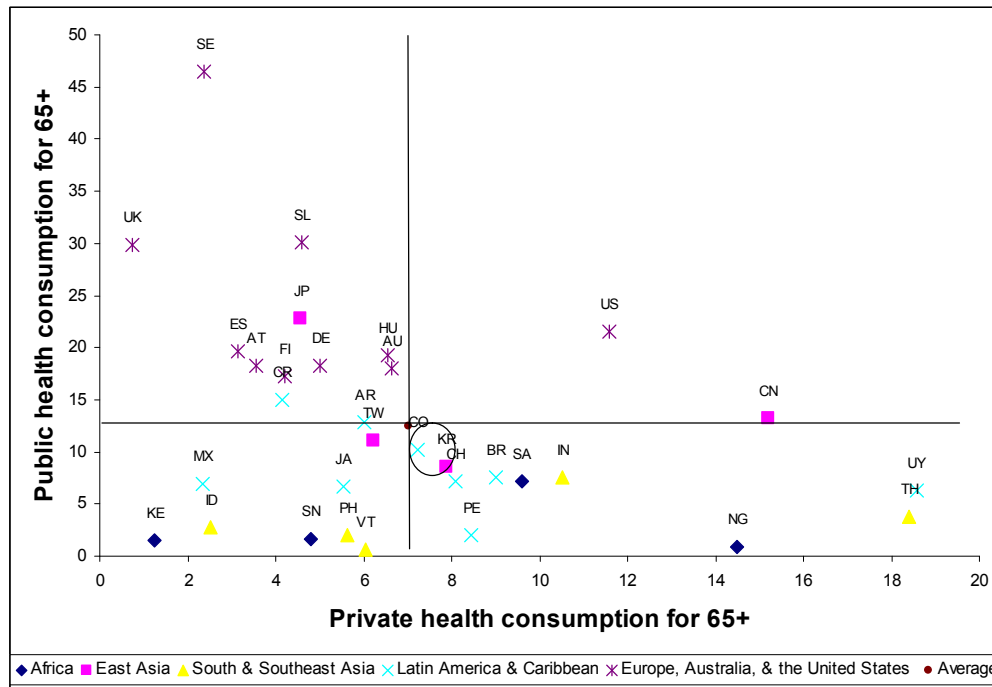

Note: Measured as % of per capita public consumption out of per capita total consumption for each age group.
Source: National Transfer Accounts Database.

defense, which also varies a lot across countries. Since the NTA allocates the other consumption evenly amongst population, it may bias the true measure of individual wellbeing. But it should be also noted that the other consumption is actually a very small share of consumption especially for developed economies. [Figure 5] presents the private vs. public health consumption for the elderly which is measured as the percentage of per capita consumption for people aged 65 and older. The figure shows the enormous public healthcare consumption for the elderly in many European countries as well as in Japan and the US, largely due to their long-term healthcare. Sweden is an extreme case where the publicly provided healthcare consumption accounts for almost 50 percent of all consumption for people aged 65 and older. In general, the elderly tend to consume much more for publicly provided healthcare in high-income economies. However, there is wide variation too. For example, Korea and Brazil are close to India in terms of its importance of publicly provided healthcare spending for the elderly, but importance of private health consumption for Korea and Brazil are much less than India.[4] The same variation

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4 The year is 2000 for Korea and 1998 for Taiwan. The healthcare spending has increased very

[Figure 5] Importance of per Capita Healthcare Consumption for Ages 65 and Older

Note: Measured as % of per capita consumption of aged 65 and older.
Source: National Transfer Accounts Database.

could be found amongst countries in the same region. An elderly Nigerian consumes much more healthcare than an elderly Kenyan, provided more by the private sector.

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. Countries differ considerably in the ways that they deal with age reallocations with important implications on their economies. The next section describes this in detail.
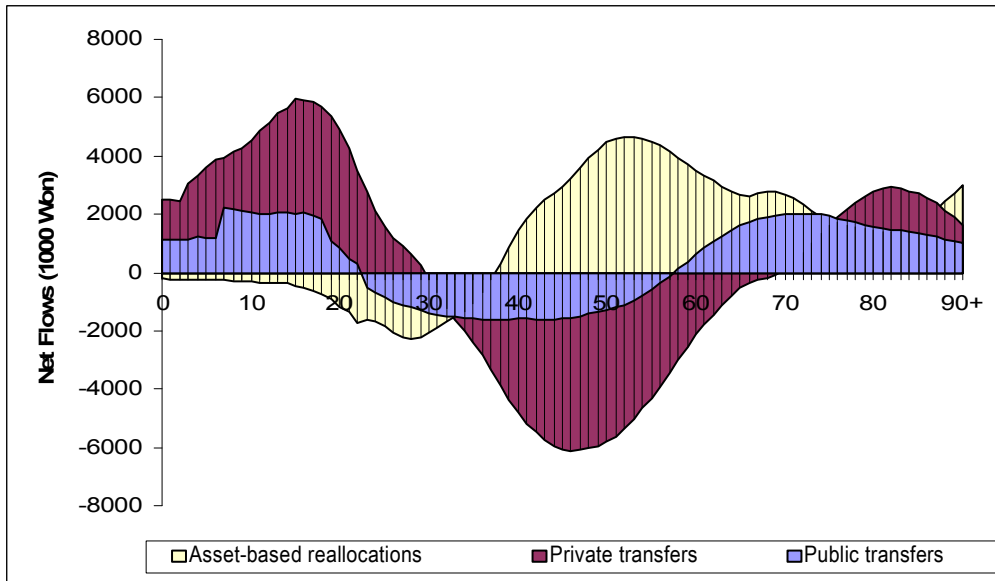
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rapidly for both economies, and hence the picture will be somewhat different now. This issue is addressed in the next session.

III. Economic Resources to Fund Consumption

There are three ways to fund the consumption needs. First the consumption needs can be met through their own labor income. Second, the consumption needs can be met through transfers, which involve no explicit *quid pro quo*. Resources flow from one party to another either voluntarily in the case of most private transfers or involuntarily in the case of public transfers. Third, the consumption needs can be met through asset-based reallocation which rely on inter-temporal exchanges. Individuals can accumulate personal savings during their working years and rely on income from it or dispose those assets or savings during retirement. Likewise, if individuals can borrow to finance their consumption needs, they are relying on asset-based reallocations to consume more than their current labor income. Governments play an important role by taxing working-age adults and providing benefits to the young and the old. Families perform a similar role by using their resources to support children and often the elderly too.

The main features of the age reallocation system are illustrated in [Figure 6] which reports per capita net economic flows by age in Korea in 2000. 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 Korea as it does in most countries. Those 60 and older rely primarily on assets while private transfers are more important for the very old. Public transfers increase until early 70s but decreases thereafter. Both private and public transfers are negative for prime age adults suggesting that they provide more to children and the elderly by paying tax or through familial transfers. Two features of [Figure 6] 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, both private and public transfers are important. The second feature is the importance of assets for the very old people. As we shall see in the next, however, support systems vary considerably from country to country.

[Figure 6] Per Capita Net Flows by Age in Korea in 2000

Source: National Transfer Accounts Database.

Labor Income

Labor income in NTA is a broad measure consisting of earnings and benefits received by employees and the estimated value of the labor of the self-employed, including unpaid family workers. Individuals younger than 20 do not support themselves through their labor to any significant degree. However, it is more important source to meet the consumption needs of the young in poor countries. In more developed countries, the young tend to invest more in human capital and realize greater incomes in the future. 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 20~24 fund mostly between 50 percent 80 of their consumption through their labor income. 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 China. Austria is an exception perhaps due to well spread apprentice systems (Lee and Ogawa 2011). The low percentage in Nigeria is also surprising which might be in part related with the low productivity of young workers.

Labor income drops below consumption around age 55. Labor income accounts

<Table 2> Ratio of Labor Income to per Capita Consumption of Children and Elderly

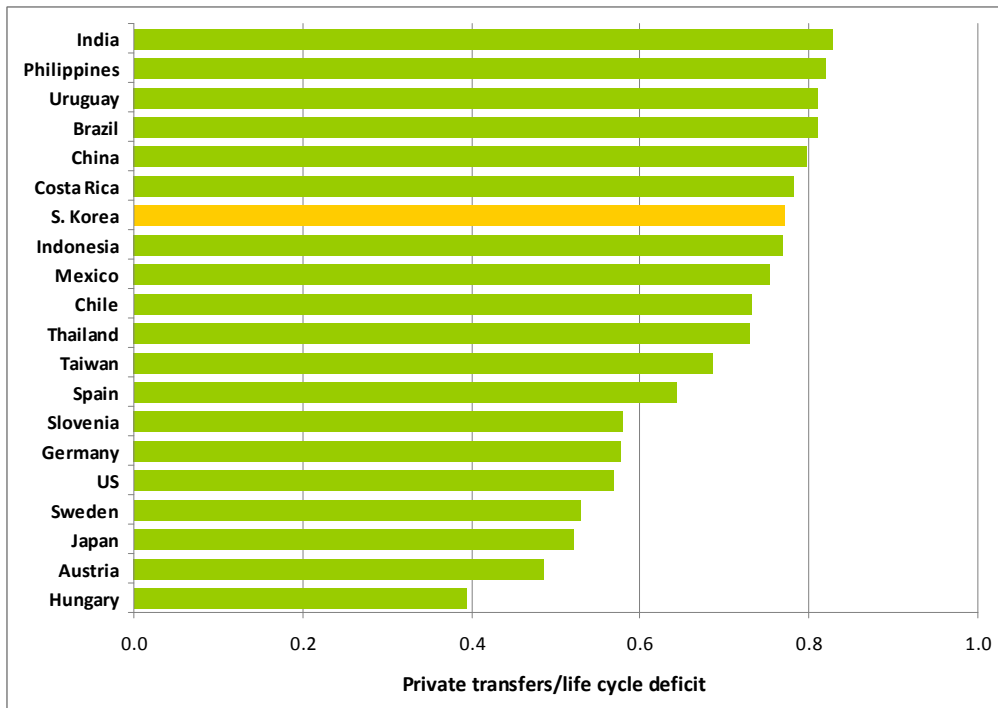| Labor/Consumption	0~19	20~24	65+	65~74
Austria (2000)	11.79	119.9	2.0	3.4
Brazil (1996)	5.5	46.8	14.7	23.6
Chile (1997)	5.5	59.3	18.5	29.3
China (2002)	10.7	95.6	23.0	26.7
Costa Rica (2004)	6.2	62.0	21.1	33.9
Finland (2004)	3.3	59.1	3.9	6.4
Germany (2003)	3.2	59.3	2.4	4.1
Hungary (2005)	0.5	46.7	5.4	9.8
India (2004)	9.5	62.9	22.7	31.1
Indonesia (2005)	9.0	65.3	41.1	46.9
Japan (2004)	1.0	50.0	11.2	18.5
Kenya (1994)	4.9	78.7	27.6	43.6
Mexico (2004)	7.3	50.3	23.2	35.5
Nigeria (2004)	1.3	19.1	44.8	62.4
Philippines (1999)	6.9	59.0	30.8	46.8
Slovenia (2004)	2.3	60.8	3.1	5.8
S. Korea (2000)	4.8	72.7	17.7	29.6
Spain (2000)	3.2	52.9	6.7	12.4
Sweden (2003)	3.7	75.2	7.2	16.1
Taiwan (1998)	3.0	64.7	8.7	14.6
Thailand (2004)	6.9	65.5	13.4	21.7
Uruguay (2006)	6.0	85.2	21.1	35.1
US (2003)	2.5	60.7	25.1	37.4

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: National Transfer Accounts database accessed 1 May 2012.

for mostly 10 to 30 percent of their consumption for the elderly ages 65 and older. Note that this is not due to their difference in survival rate since this is a synthetic cohort measure. That is the numbers presented in <Table 2> are free from the different survival rates across countries. In Korea, they are somewhat high, compared with other advanced countries. This is not surprising given the very high labor force participation rates of the elderly in Korea. As Lee and Ogawa (2011) argue the problem of Korea is that the productivity of the elderly is low in general, because they are employed in low-productivity sectors, or because they have less

[Figure 7] Private Transfers as a Proportion of the Lifecycle Deficit for Ages 0~19

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

Source: Lee and Mason (2011). Originally calculated using the National Transfer Accounts Database.

education than young workers, or because they are forced into low-productivity jobs by mandatory retirement provisions.

Public vs. Private Transfers for Children

In most countries, the gap between consumption and labor income for children is filled almost entirely by a combination of public and private transfers since children do not accumulate a lot of assets. [Figure 7] shows the varying importance of public transfers across countries. Although public transfers to children are high in European economies, the same is not true in Latin America. This is quite interesting since public transfers for the elderly are very high in Latin American countries as we will see in the next section. 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 families do. Two examples are Hungary and

Austria.[5] In most rich economies, however, private transfers to children fund more than half of their lifecycle deficit. In Japan, for example, private transfers cover 52 percent of the cost of raising a child.[6] In the six European economies in [Figure 7], private transfers as a percentage of the lifecycle deficit over the childhood years vary from a low of 40 percent in Hungary to a high of 64 percent in Spain. 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 Taiwan, private transfers to children are just under 70 percent of the total resources they require. In India, the private share is the highest at 83 percent of the total, followed by the Philippines.

Clearly there is a close relationship between development level and the importance of private transfers. The simple correlation between purchasing power parity adjusted per capita income and the private transfer share is -0.79. That is, 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 points. Korea and the US have high private transfers relative to the predicted level. 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 China, Korea, and Taiwan 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, which is intuitive. However, a 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, it appears that families bear more the burden of raising children in a country with high fertility.

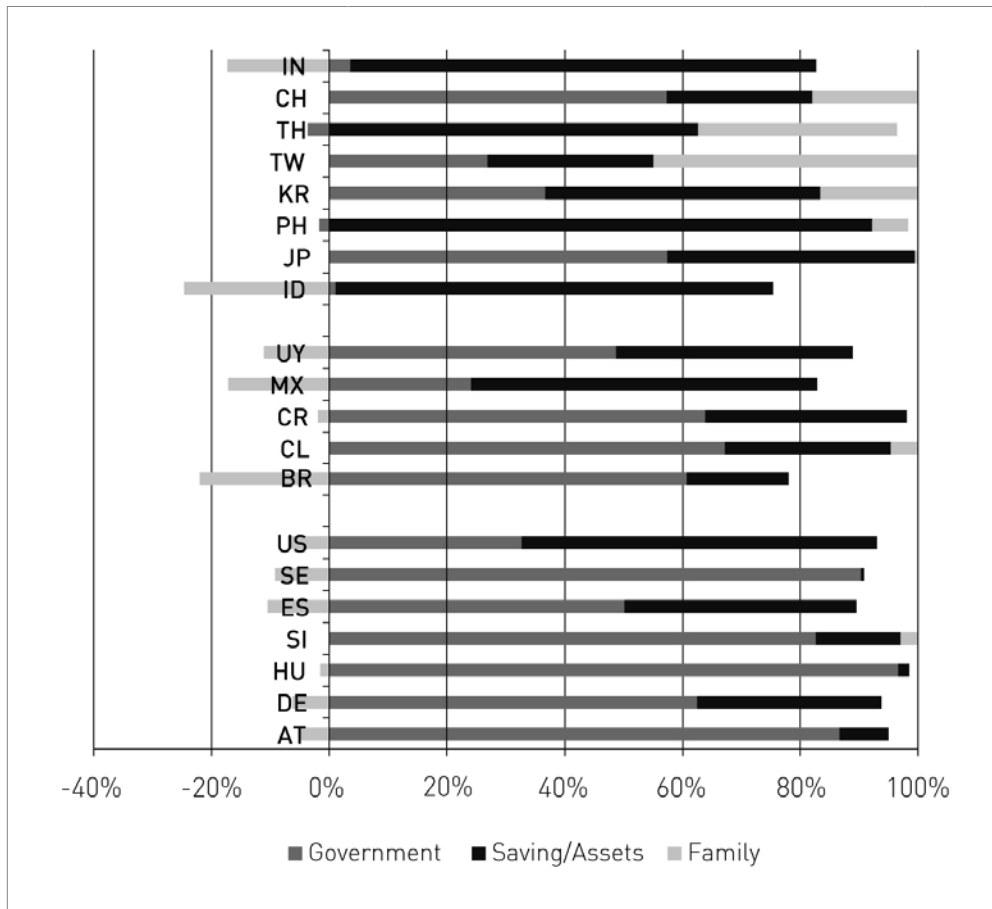### Economic Resources for the Old

[Figure 8] shows the relative importance of the three sources of old-age support—assets, private transfers and public transfers—in Asian, Latin American,

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5 Public transfers are broadly measured here and include children's pro rata share of all public consumption in addition to education and healthcare spending that is more directly consumed by children.
6 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 lifecycle deficit, i.e., consumption less labor income, from ages 0 to 19.

[Figure 8] Support Systems for Population Aged 65 and Older

Note: See [Figure 2].
Source: National Transfer Accounts database accessed 1 July 2011.

and European economies and the US. All indicators are measured as net; transfers received less transfers made and asset income less savings relative to consumption in excess of labor income for those 65 and older. The lifecycle 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 100 percent.

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 percent of the lifecycle deficit for the elderly in

Taiwan, one thirds in Thailand, and slightly below 20 percent in China and 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. Net familial transfers are quite small or negative in Europe, Latin America, and the US. 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, i.e., 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 healthcare systems that target the elderly. In Korea and Taiwan, net public transfers are funding nearly one third of the lifecycle deficits of the elderly.[7] Social programs for the elderly are also similar in their net effect to those found in Mexico or the US, but they are relatively small in comparison with programs in Europe and South America. Assets are an important source of support in all Asian economies except China and Taiwan. 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 lifecycle deficit. Thailand's elderly also rely heavily on assets.

How support systems are likely to change in the future is a very important question about which there is relatively limited information. Korea and Taiwan 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 Korea and Taiwan. This issue will be discussed in more detail in the next section.

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7 It should be noted, however, age profiles of Korean public pension transfers based on 2000 data show very small inflows of pension transfers to the elderly (ages 60+) simply because 2008 was the first year of normal benefit disbursement from the National Pension Scheme. Current public transfers may be different from those in 2000 because the system has changed substantially during the last few years.

IV. Public Support

Fiscal Support Ratio

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. He 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 3> shows the

<Table 3> Fiscal Support Ratios: 1950~2050

(unit: %)

	1950	2000	2020	2030	2040	2050
Austria	106	100	95	87	82	78
Brazil	100	100	94	86	77	69
Chile	95	100	95	86	81	77
China	89	100	97	89	84	82
Costa Rica	89	100	97	91	83	76
Germany	111	100	94	84	79	75
Hungary	106	100	97	93	83	77
India	97	100	102	103	103	102
Indonesia	79	100	106	110	109	108
Japan	91	100	92	87	79	74
Mexico	86	100	102	99	92	86
Philippines	87	100	106	111	114	116
S. Korea	76	100	97	89	83	80
Spain	94	100	96	87	78	73
Sweden	115	100	96	90	88	86
Thailand	66	100	104	104	104	104
Uruguay	108	100	100	98	95	90
US	99	100	96	92	90	89
Slovenia	100	100	90	81	75	72
Taiwan	68	100	100	94	85	78

Note: Recalculated based on Miller (2011).
Source: NTA database accessed 1 May 2012

evolution of the fiscal support ratio for the NTA member countries 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.
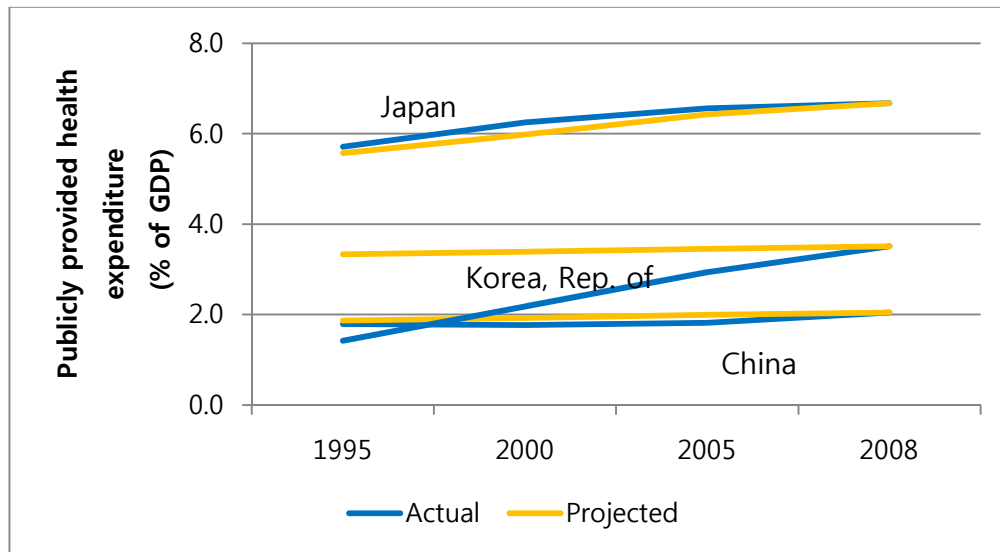
It is not surprising that the fiscal impact of population aging is projected to be biggest in Japan. Population aging combined with the current tax and benefit policies would lead to a 26 percent decline in the fiscal support ratio by 2050 in Japan. Thus, either taxes must increase, benefits must decrease, deficits must increase, or some combination of the three must occur. Korea also shows somewhat smaller but big fiscal impacts with 22 reductions in the fiscal support ratio by 2050. The danger, of course, is that economies with favorable demographics or a lot of political pressure will implement generous transfer systems that ultimately prove to be unsustainable.

Recent Trends in Public Support System of Korea

The problem of using the snapshot for year 2000 Korean data has limited validity in portraying the current status of the Korean public support system simply because the system has been changing rapidly. It may therefore be helpful to describe the recent changes for some public-sector accounts.

Lee and Mason (2012) project the healthcare expenditure for Asian countries. The assumptions underlying these calculations are such that the shapes of the age profiles of benefits are fixed over time with their levels but population change over time and consumption increases at the same rate as the gross domestic product (GDP). The values for 2008 were the actual expenditures as a percentage of GDP for each economy. [Figure 9] documents the projected and actual expenditures on healthcare in China, Japan and 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

[Figure 9] Projected and Actual Publicly Funded Health Expenditures for China, Japan, and Korea from 1995 to 2008

Note: See the manuscript for methodology.
Source: Lee and Mason (2012).

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 healthcare spending during the period can be almost entirely explained by the change in population structure.   In contrast, the projected and actual changes for 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 Korea for the same period (from 1.4% to 3.5%) is almost unrelated to changes in population age structure.

The rapid growth in government expenditures for the elderly in Korea is surprising. According to An *et al*. (2011), the 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 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. Also I do not see the political regime is particularly related with this change. Again, this is confirmed by other sources of information by age for 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. Changes in Korea mirror a growing concern in many 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.

Some other countries increase public transfers to their elderly populations as they get richer. For example, in 2009, the Chinese government committed itself to building a universal public pension system in rural areas funded by individual premiums and government subsidies. Also in China, public health insurance was available to urban employees in 1998, to rural citizens in 2003, and to urban citizens in 2007 (Li, Chen, and Jiang 2011). This seems to work so far, given the high growth of China, but as we can see from recent slowdown of the Chinese economy, it is quite uncertain if this rapid expansion of public transfers will be feasible in the future China.

V. Implication for Korea's Sustained Growth

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

One strategy emphasizes capital accumulation. Many of the fundamental insights were established by Modigliani and Brumberg (1954) and Tobin (1967) who explored the implications of the economic lifecycle for savings and investment. The lifecycle has implications for both because the old-age deficit is funded in part by

asset-based reallocations. Population aging will lead to an increase in the demand for assets for three reasons. First, to the extent that longer life expectancy leads to longer retirements, the incentive to accumulate more during the working years will increase. Second, because fertility is lower, fewer resources may be devoted to childrearing and more to saving for retirement. The third reason is simply due to age composition. Older individuals are wealthier than before because they have had longer to accumulate wealth; hence, a population composed of more old people will have greater wealth per capita. The strength of the relationship between age structure and savings depends, however, on the nature of the old-age income support system. This idea has been explored in many industrialized countries and to a more limited extent in developing countries. The primary focus has been the possibility that public transfers will crowd out savings (Feldstein 1974, 1998; Gale 1998; and Munnell 1974). These and similar studies inform efforts to evaluate existing transfer systems, to guide the development of new systems, and to anticipate the implications of alternative reform proposals. Social security reform, in particular, has been the subject of an enormous amount of research (Feldstein and Samwick 2001, Feldstein 1998, and Krueger and Kubler 2002). Previous studies and the following analysis show that through this mechanism, changes in age structure can lead to the second demographic dividend (Mason and Lee 2007), i.e., to higher standards of living that persist long after the favorable effects of the first dividend have ended. Of course, the big question of whether increase in savings necessarily leads to productive investment remains.

Healthcare for the elderly is a large and increasing cost that is often heavily subsidized by the public sector. Korea has had some advantage so far since the cost has been kept low. However, this may not be sustainable as the cost of healthcare will rise due to aging. People may live longer, but there is little evidence that they live healthier for the extended life. The huge long term care cost observed in many developed countries might be inevitable. Thus, aging in Korea will eventually lead to large implicit debts that are shared by taxpayers and the adult children of the elderly.

A recent analysis by Lee and Mason (2010) showed that the impact of spending on human capital, such as education, is strong enough to offset the adverse effects of population aging, but this conclusion depends on the effectiveness of the investment. The investment response to population aging naturally integrates sustaining economic growth and providing economic security to the elderly. This is because the high rate of investment is a consequence of workers saving more for their retirement. The situation is very different with human capital. Retirees do not own the human capital in which they have invested; instead it is owned by the children who received

it. The only way to recoup the investment is through expanded public transfers. Given current trends in private transfers, it seems unlikely that parents who invest more in their children will be compensated by old-age support directly from their children. The compensation is more likely to take the form of public transfers intermediated by the government. Smaller cohorts of workers would thus pay higher taxes to support the elderly as compensation for the higher levels of human capital investment they received. The question is whether the huge education investment is effective in Korea, leading to an increase in productivity of the economy, which in turn can cancel out the negative effect of population aging.

The two paths, investing in physical capital and human capital, are not actually mutually exclusive. Ideally, an approach to sustaining economic growth *and* providing economic security would strike the right balance between assets and public transfers while promoting high rates of human capital investment. Finally, although this discussion has centered on economic growth and average standards of living, poverty and inequality are also inextricably linked each other. Although studies are limited, enriched microeconomic data will shed light on this issue.

VI. Conclusion

Korea is facing fundamental challenges in social policy. The first hurdle is the challenge of population aging. The second hurdle is the imbalance in the labor market. The third hurdle is that the traditional familial support for the old has been rapidly deteriorating. Impacts of changing support systems on other means of support will be significant. If labor income and familial transfers play a limited role in the future, Koreans have to rely on accumulating assets or public transfers. Thus, without any doubt there will a growing demand for more public protection either due to economic downturn, population aging, or due to political pressure. It is important to design the public support over the lifecycle effectively and efficiently. How well Korea tackles these challenges will determine whether the country will be able to continue to grow.

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