Aging and Social Policy:

An International Perspective

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Introduction

Changing population age structure is a global phenomenon. In many countries around the world a decline in birth rates has led to a decline in the share of children in the total population. With a delay, a decline in the share of children leads to a decline in the share of the working-age population, because the workers of tomorrow are the children of today. The effects on age structure are reinforced by the decline in death rates at older ages. Thus, the elderly are becoming an increasingly large share of the population.

The speed of this transition from a young to an old population varies considerably. The populations of East Asia – Korea, Taiwan, Japan, and China, for example – are making the transition with unprecedented speed. The United States is also experiencing population aging and a larger share of its population is currently over the age of 65 than in Korea, Taiwan, and China. But the share of the elderly in the US population is not increasing nearly as rapidly as in East Asia or many other industrialized countries. Birth rates are relatively high in the US, life expectancy is low as compared with many high-income countries, and the US is experiencing substantial inflows of relatively young immigrants. None the less, the implications of population aging for social policy in the US is as critical an issue as it is in Korea, Taiwan, or other East Asian populations.

Changes in age structure have profound and fundamental implications for social policy. Many public programs target the young or the old. Public education, public pensions, and public health care are the obvious and important examples. But social policy, in the way we conceptualize it, is broader than those implemented by governments. The private sector – families in particular – play an exceedingly important role in redistributing economic resources across age groups. In every contemporary economy that we have examined to date, familial transfers dominate all other resources available to children. The picture for elderly is more complex. In the US and other Western countries, families provide little financial support the elderly.[1] Thus, the elderly depend primarily public transfer programs, assets accumulated during their working years, and to a lesser extent continued employment. In East Asia, however, adult children provide financial and material support to their parents.

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[1] The time transfers from adult children to elderly parents in the US are substantial, but these are not considered in this paper.

The complex nature of support systems and their variation across societies is not a new idea, but there is no accepted, systematic, comprehensive method for describing the extent to which societies reallocate resources across ages nor the economic and institutional features of the reallocation system. The absence of such a system limits our understanding of how alternative approaches to social policy influence economic performance, equity, and social welfare. This paper briefly describes an accounting system, called National Transfer Accounts, which is intended to fill this gap (Mason, Lee, et al. forthcoming). The methodology is used to compare Korea, Taiwan, and the United States.

The analysis presented is preliminary and further refinement is required, but it points to some important and, in some cases, surprising results. The first empirical objective is to measure the economic lifecycle – the age profiles of consumption and production (labor income). This is basic to our objective because it identifies which age groups within the population are dependent and the extent of that dependency. One of the surprising results found in Lee, Lee, and Mason (2005) and confirmed here is that people begin to produce as much as they consume relatively late in life and they no longer produce as much as they consume relatively early in life. In Korea, for example, only those between the ages of 25 and 59, inclusive, produce more than they consume. Thus, the dependent ages span a much greater portion of life than generally believed. A second important result is that the elderly in the US are consuming a great deal more relative to their production than are the elderly in Korea or Taiwan. Thus, a given amount of aging will have much greater effects in the US than in Korea or Taiwan.

The second objective is measure how the age reallocation systems vary across Korea, Taiwan, and the US. Public transfer programs are larger in the US than they are in Taiwan or Korea. But familial transfers are much larger in Taiwan and Korea than in the US. When transfers are measured in a comprehensive fashion, we find that US elderly are relying less on transfers and more on accumulated assets to support themselves. We suspect that this will surprise many given that saving rates in Taiwan and Korea have been much higher than saving rates in the US in recent decades. Below we will discuss possible explanations for this finding, but as an important prelude it is useful to consider the important ways in which the three economies differ.

First, there are important institutional differences as already emphasized to some extent. Although the family support system in East Asia is, in general, under great pressure from demographic, social, and economic change, extended families are much more important in Korea and Taiwan than in the US. In the 1850s, the great majority of elderly in the US lived with their adult children, but this has long ceased to be the case. The approach to education is also different with a greater emphasis on public education in the US than in Korea or Taiwan. Public programs for the elderly, pensions and health care, were established much earlier in the US and provide greater support for the elderly than do programs in Korea or Taiwan. It should be kept in mind that European countries and many Latin American countries have emphasized public transfer programs to a much greater extent than Korea, Taiwan, or the US.

Second, the three populations have all experienced dramatic demographic change, but the pattern in Korea and Taiwan is very different than in the US. The post-World War II era in Korea and Taiwan was dominated by very rapid fertility decline and significant gains in mortality. In 1955-1960, the total fertility rate (TFR) in Korea and Taiwan was over 6 births per woman. Both populations now have a TFR that is well-below 2 births per woman, the level necessary to achieve long run population stability. In 2005 Korea's TFR reached the world's lowest level – 1.08 births per woman. Korea's population is the youngest of the three with 7.2 percent of the population 65 or older in 2000, but it is aging faster. According to the most recent UN projections (medium scenario) Korea will pass the US in less than two decades. By 2025 19.6 percent of its population will be 65 or older.

Taiwan's demographic situation is similar to Korea's. The TFR was 1.18 births per woman in 2004. The percentage of the population 65 or older was 8.6 percent in 2000. Taiwan has been influenced by an unusual demographic event – immigration from the Chinese mainland in 1949 and 1950. Korea has also experienced large immigrant waves during the same era, but the Taiwan waves were larger and heavily concentrated among young adults. Many of those immigrants are now in their 70s or older and their numbers have created a bulge at the older ages.

Demographic change in the US has been dominated by the baby boom – a period of elevated fertility between 1946 and 1964. The peak fertility rate during this period, 3.7

births per woman for 1955-60, was well below peak fertility in Taiwan or Korea. Currently about 12% of the US population is 65 and older. This will swell as the baby boomers begin to turn 65 in 2011, but the US will age more slowly than Korea, Taiwan, Japan, and European countries. There are several reasons for this: higher fertility – a TFR of 2.0 births per woman; lower life expectancy than in many other countries; and large numbers of immigrants who are younger than the non-immigrant population.

Third, the economies are very different. Korea and Taiwan are middle income countries with a per capita GDP of $11,200 and $12,600 in 2001, respectively. In the US, per capita GDP was $34,400 in 2001. But in 1960, real GDP per capita of Korea and Taiwan was only $1000-$1100 range (in 2000 prices), as compared with over $14,000 in the US. Thus, between 1960 and 2001 the real annual growth rate of per capita GDP was 5.8 percent for Korea and 6.4 percent for Taiwan. This implies extraordinary differences between the lifetime earnings of successive generations. Given a mean generation length of 30 years and an annual growth rate of around 6 percent, per capita income of Korea and Taiwan increased by about six-fold each generation. How these two economies have dealt with such an enormous inter-generational disparity in lifetime income is a great, but largely untold, story.

The paper is organized in the following manner. In the next section, we will briefly describe the concepts and methods that are being developed and used to study the economics of aging. The experience of Korea is compared with that of Taiwan and the US in the third section. The final section provides conclusions.

National Transfer Accounts: An Overview[2]

The purpose of National Transfer Accounts (NTA) is to measure at the aggregate level, in a manner consistent with National Income and Product Accounts, the reallocations across age of economic resources.   These reallocations occur because at some ages individuals consume more than they produce, while at other ages individuals produce more than they consume. The reallocation system consists of a set of complex institutions and practices

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[2] Detailed methodology and other information can be found in Mason et al. forthcoming and at www.ntaccounts.org.

by which the young and the old, those with lifecycle deficits, draw on the surplus resources generated during the prime working ages.

The importance of the age reallocations is illustrated by NTA estimates of production and consumption by age for the Republic of Korea in 2000. Figure 1 reports aggregate consumption and aggregate labor income by age in billions of won (nominal values). As a group those under the age of 25 and those over the age of 59 are consuming more than they are producing. The *lifecycle deficit*, the gap between labor income and consumption, at young ages is 8.3 trillion won, 26.6% of total national consumption. The lifecycle deficit at old ages is 1.6 trillion won, 5.1% of total national consumption. The *lifecycle surplus* for prime-age adults ages 25-49 was 8.9 trillion won or 28.6% of total national consumption. Clearly the resources being shifted across age are enormous relative to the size of Korea's economy.

<Figure 1 about here>

The methodological details are not discussed in this paper, but there are important features of NTA that should be highlighted. First, the age profiles are conceptualized from the perspective of an individual not the household. Second, the measures are comprehensive. All consumption – both public and private – is allocated to individuals. Consumption by children, for example, includes the value of the food, clothing, housing, education, and healthcare they consume irrespective of whether they goods and services are provided by their parents or the government. Moreover, their consumption includes their *pro rata* share of national defense, diplomacy, and public safety. Likewise, labor income includes the wages of employees, contributions by employers on behalf of employees to public programs, and the value of labor provided to family businesses.

The age profiles of consumption and labor income – the economic lifecycle – reflect many factors (Lee et al. 2005). One of the most important is population age structure. Reallocations to children are much more important than reallocations to the elderly in current-day Korea because there are many more children than elderly. But Korea is aging rapidly and, hence, reallocations to the elderly as compared with reallocations to children will increase substantially over the coming decades. The economic lifecycle

also reflects behavior and the factors that influence behavior – prices, taxes, tastes, etc. Consumption profiles, for example, are influenced by the importance of education as compared to health care – and the institutional framework that governs these important sectors. Labor income profiles vary with the wage system, the returns to education, educational attainment, the ages at which children leave school and adults retire, and the labor force decisions made by women – to mention a few obvious factors.

Reallocation systems, which fill the gaps between consumption and labor income, vary along two important dimensions: the governing or mediating institution and the economic form of the reallocation (Lee, 1994a; 1994b). The public sector reallocates resources relying on social mandates embodied in law and regulation and implemented by local, regional, and national governments. Education, public pensions, and health care programs are important examples of public reallocation programs. Private sector reallocations are governed by voluntary contracts, social conventions, etc. that are mediated by households, families, charitable organizations, and other private institutions. Important examples of private reallocations are private saving and credit transactions and familial support to children and the elderly (Table 1).

Table 1. A Classification of NTA Reallocations.			
	Asset-based reallocations		
	Capital and property reallocations	**Credit Reallocations**	**Transfers**
Public	Public infrastructure	Public debt Student loan programs Money	Public education Public health care Unfunded pension plans
Private	Housing Consumer durables Factories Farms Land	Consumer credit	Familial support of children and parents Bequests Charitable contributions
Source: Adapted from Lee 1994a.			

In this paper we distinguish two economic forms that reallocations can take:

Asset-based reallocations: Assets include capital, property, and credit. From the perspective of the individual, these forms are close substitutes as reallocation mechanisms. They can be accumulated and dis-accumulated. They yield income. They are used primarily to reallocate resources from the present to the future and, hence, from younger to older ages. From the perspective of the macro-economy, there are important differences between capital, property, and credit.

Transfers: Reallocations from one group to another which involve no explicit *quid pro quo*.[3] Transfers can flow in a downward direction, from older to younger (parents and taxpayers to children), or in an upward direction, from younger to older (adult children and taxpayers to the elderly).

The core of the NTA system consists of two accounts: the flow account and the wealth account. The flow account measures inflows and outflows between age groups that occur during the accounting period in question. The wealth account measures the value of the stock associated with each flow drawing on formal accounting relationships discussed in Lee (1994a and b). This paper emphasizes the flow account and the wealth account will not be discussed further.

The *National Transfer Flow Account* measures inter-age flows for a prescribed accounting period, typically a calendar or fiscal year. The NT Flow Account is governed by an accounting identity, which must be satisfied for any individual, age group, or economy, stating that for any period inflows are balanced by outflows:

$$y^l + y^A + \tau_g^+ + \tau_f^+ = C + S + \tau_g^- + \tau_f^-. \tag{1}$$

Inflows consist of labor income (y^l), asset income (y^A), and transfer inflows through the public sector (τ_g^+) and the private sector (τ_f^+). Outflows consist of consumption (C), net saving (S), and transfers outflows inflows through the public sector (τ_g^-) and the private

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[3] Important models of familial transfers emphasize implicit contracts, e.g., risk sharing (Kotlikoff and Spivak, 1981) or the exchange of money for time (Cox, 1987). From our conceptual perspective, however, these are not transfers but rather some sort of contemporaneous or intertemporal exchange that involves a quid pro quo. As a practical matter, it is difficult to distinguish familial transfers from familial exchange.

sector (τ_f^-). Rearranging terms provides the key elements of the NT Flow Account. The difference between consumption and labor income, termed the *lifecycle deficit,* must be matched by *age reallocations* consisting of *asset-based reallocations* and *net transfers:*

$$\underbrace{C - y^l}_{\text{Lifecycle deficit}} = \underbrace{y^A - S}_{\text{Asset-based reallocations}} + \underbrace{\underbrace{\tau_g^+ - \tau_g^-}_{\text{Net public transfers}} + \underbrace{\tau_f^+ - \tau_f^-}_{\text{Net private transfers}}}_{\substack{\text{Net transfers} \\ \text{Age reallocations}}} \qquad (2)$$

Asset-based reallocations are the basic elements that compose the lifecycle saving model. During the working years, lifecycle savers generate a net outflow by saving more than their assets are earnings. During their retirement years, they generate a net inflow by using asset income and dis-saving. Intergenerational transfers, consisting of both public and private transfers, are substitutes for lifecycle saving. The accounts do not presuppose any particular motive, however. Saving for any purpose creates an age reallocation. *Net private transfers,* consisting of bequests and *inter vivos* transfers. Net private transfers are dominated by familial transfers and, of these, intra-household familial transfers are especially important for children and, in many countries, for the elderly.

The National Transfer Flow Account for Korea in 2000 is shown in summary form as Table 2 to provide a concrete illustration. The lifecycle deficit summarizes the more detailed values charted in Figure 1. Total age reallocations and its major components are reported in the lower panel with positive values representing inflows – mostly to children and the elderly – and negative values representing outflows. Important features of Korea's system are discussed and compared to the US and Taiwan below.

<Table 2 about here>

Data Sources

NT Flow Accounts are estimated relying on a variety of sources of information. National Income and Product Accounts are used to construct aggregate controls on public and private consumption, labor income (compensation of employees plus a portion of household

entreprencurial income), saving, asset income, public and private transfers, and its components.

Aggregates are allocated across age groups relying on a variety of data sources with extensive use made of administrative records and nationally representative income and expenditure surveys. For the US, we make use of the Current Population Survey (2000), the Consumer Expenditure Survey (2000), the Survey of Consumer Finances (1998 and 2001), and the US National Health Accounts (1999). For Taiwan, we make extensive use of the Family Income and Expenditure Survey of 1998. For Korea, we use the National Survey of Household Income and Expenditure (2000) and Korean Labor and Income Panel Study (KLIPS, 2000).

Preliminary Results

The results presented in the remainder of the paper are snapshots – National Transfer Accounts for a single year in Korea (2000), the US (2000), and Taiwan (1998). The estimates are preliminary and the methodology is still being refined. In addition, there are also a number of difficult data issues that have not yet been addressed in a satisfactory way.[4]

The Economic Lifecycle

The economic lifecycles in the three economies are broadly similar, but with some important differences (Figure 2). In each setting, children and the elderly consume substantially more than they produce. The age at which individuals become net producers is surprisingly late. In Taiwan and Korea, young adults begin to produce as much as they consume at age 25; in the US at age 26. The age at which individuals are no longer net producers comes surprisingly early. In Taiwan, adults no longer produce as much as they consume

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[4]For example, the KLIPS data collects information on urban households only (urbanization rate in 1996 is 85%). In order to avoid the potential measurement bias as much as possible, we adjust the income related variables using the labor force participation rate by place of residence and sex and the level of earnings by place of residence, as a weight, assuming that earnings profile in rural areas is same as in urban areas. However, the age reallocation is adjusted using the aggregate control only. Thus, national age patterns in Korea reflect the urban circumstances for the reallocation variables.

at age 57; in the US 59, and in Korea at age 60.[5] The span of years during which there is a lifecycle surplus is surprisingly short in the three economies – 32 years in Taiwan, 33 years in the US, and 35 years in Korea.

<Figure 2 about here>

The shape of the production (labor income) age profiles for Korea, the US, and Taiwan are strikingly similar until adults reach their early 40s. To facilitate comparison the profiles in Figure 2 have been scaled by dividing by the simple average of per capita production from ages 20-40.[6] After age 40, however, the income profile of the US diverges from Korea and Taiwan by as much as 5 percent per single year of age and the gap persists into the older ages. Differences in labor force participation rates at the older ages explain the divergence only in part. The labor participation rates of people in the 40-59 age group is slightly higher in the US than in Korea and Taiwan, entirely due to higher female participation in the US. However, the participation rate in the US in the 60 and older age group is comparable to the rates in Taiwan and much lower than the rates in Korea. Earnings at older ages are higher in the US, but not because older Americans are working more. The divergence reflects differences in earnings of older workers relative to younger workers. Rapid changes in educational attainment and rapid technological progress in Taiwan and Korea may explain why younger workers earn relatively more and older workers relatively less as compared with the US (Mason, Lee, and Russo 2001).

In contrast, the differences between the Korean and Taiwan profiles reflect differences in labor force participation – female participation rates to be more specific. Two differences are particularly important. First, the participation rate of women 65 and older is much higher in Korea (23%) than in Taiwan (8%), which leads to differences in per capita labor income. Second, the bimodal shape of Korea's income profile is the result of women leaving the work force to marry and raise children and returning later at when their children enters school. The M-shaped women's activity profile is typically found in

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[5] In Korea, however, the lifecycle surplus is very small between ages 55-59. Thus, a refined methodology, such as treatment of indirect taxes, can change this age more likely in Korea than in Taiwan and the US.

[6] Both the level and slope of the age-profiles are sensitive to the particular scaling factor chosen, but the percentage change in labor income associated with an additional year of age is unaffected by scaling.

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Korea and Japan, but it is not characteristic of other countries (see Mason, Lee, and Russo 2001 and Cho's paper in this volume) including Taiwan and the US.

Per capita consumption, expressed relative to average production for adults 20-39, is similar at young ages in all economies. Young children consume substantially less than older children and prime age adults and consumption by children is marked by large and discrete changes associated with entering and leaving school.[7]

The most striking difference amongst the three countries is the much steeper consumption profile in the US that becomes particularly apparent starting in the early 40s. In contrast, the Korea's and Taiwan's consumption profiles are flat with relatively lower consumption for elderly in Korea.

Per capita consumption by those 65 and older was 134 percent of per capita consumption of those 20-64 in the US, 94 percent in Taiwan, and only 83 percent in Korea. A substantial part of the difference can be attributed to the consumption of health (Figure 3). If we consider just non-health consumption, the elderly and non-elderly adults in the US had virtually identical consumption while Taiwan's elderly had non-health consumption equal to about 86 percent of the non-health consumption of non-elderly adults between the ages of 20 and 64. In Korea the figure was 78 percent. Thus, even controlling for health consumption, US elderly were consuming at a much high ratio relative to non-elderly adults than were elderly in Taiwan and Korea.

The detailed examination of the composition of consumption reveals another important distinction between Korea and Taiwan, on the one hand, and the US, on the other. Public spending dominates education in the US, while private spending dominates in Korea and Taiwan. Private education consumption is very high in Taiwan and Korea, in part, because of the high cost of private tutoring that prepares students for college entrance examinations. As is emphasized in the beginning of this section, institutional differences are playing an important role with US consumption patterns reflecting the greater reliance on public transfer programs and Korea and Taiwan's greater reliance on familial transfer programs. The larger US public sector is confined entirely to education and health spend-

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[7] There are some minor differences across countries. For example, there is a local peak in consumption for age 16-19 in Korea, which might reflect the high private tutoring cost for high school students.

ing. Consumption of other publicly provided goods and services are virtually identical in the three economies.

<Figure 3 about here>

The aggregate lifecycle deficits are closer than their constituent elements – consumption and labor income (Figure 4). Korea's and Taiwan's surpluses are greater for young working age adults, those under the age of 40; the US surplus is greater for older working age adults, those in their late 40s and early to mid-50s. The most striking difference between the two series is the substantially large lifecycle deficit for US elderly. Given the age distribution of the population, the lifecycle reallocation system of the US shifts a larger share of resources to older ages than do the reallocation systems of Taiwan and Korea. That the US population is older than is Taiwan and Korea population only serves to reinforce this feature of the US reallocation system. In the future, Korea and Taiwan are expected to age much more rapidly than the US, but the economic effects will be mitigated relative to the US because consumption, health care consumption in particular, is much lower in Korea and Taiwan.

<Figure 4 about here>

The Reallocation System

The per capita flows of the reallocation system are presented in Figure 5 for Korea, the US, and Taiwan, as stacked in the figures. Four economic forms used to reallocate resources are distinguished: asset-based reallocations, public transfers, *inter vivos* transfers, and bequests. Negative values represent outflows and positive values represent inflows. The outflows less the inflows equal the lifecycle deficits. In all countries, asset-based reallocations are producing inflows to most working ages while public and private transfers are producing outflows at the same ages.

<Figure 5 about here>

The reallocation systems that support children are quite similar in Korea, Taiwan and the US. In all three, transfers dominate the reallocation system for children. Familial transfers are particularly important. Intra-household familial transfers to children 0-19 accounted for about 65% of all transfers in Korea; 70% in Taiwan; and 60% in the US.[8] The importance of familial transfers should not come as any great surprise. We know that asset reallocations are used infrequently to support the consumption of children. Of asset-based reallocations, only credit can be used to support consumption by children. Creditors have limited recourse if children default on their debt, limiting the extent to which children can borrow. Thus, transfers dominate the child reallocation system in all countries.

Public transfers to children are also quite substantial. In Korea, 34.8% percent of all transfers were public transfers as compared with 30.3% in Taiwan and 40.0% in the US. As can be seen in Figure 3 above, a significant portion of difference between the US and the other two Asian economies originates from public education spending. Of roughly equal importance is children's *pro rata* share of pure public goods and other goods that cannot be allocated to specific individuals.

The old age reallocation systems are very different than the child reallocation systems. The elderly, those 65 and older, rely both on asset-based reallocations and transfers to generate inflows. The elderly can in principle generate asset-based reallocation inflows in two ways; first, by earning asset income on their accumulated wealth and, second, by dis-saving or liquidating their assets. There are many ways in which this can be accomplished. The elderly can sell off financial assets or a family business or farm, take out a reverse mortgage on a home, or sell their home and rent or buy a less expensive residence.

Asset-based reallocations are important for elderly 65 and older in all three economies. For the US elderly asset-based reallocations are very important constituting 65.3% of total reallocations net of bequests. For Korea's and Taiwan's elderly, asset-based reallocations were also important but much less so than in the US; 35.0% of total reallocations in Taiwan, and 29.7% in Korea. Net saving is positive in Taiwan and Korea, but it is a little negative in the US. At first glance this seems to provide no support for the lifecycle saving hypothesis for Korea and Taiwan, and runs contrary to previous empiri-

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[8] Dependent children do not receive inter-household transfers in the accounting system by assumption.

cal research that the US elderly save. However, the asset-based reallocations measured in this way should be interpreted with caution because the figures include asset-based reallocations by the elderly who have passed away. The assets of the elderly are reduced by bequests, and the assets of those who survived to the end of the year increase substantially. Bequests for Taiwan are 13.3% of total reallocations – a figure very similar to the US figure. Bequests for Korea are much larger, amounting to 34.2% of total reallocations. Thus, it would be useful to compare the asset-based reallocations across countries by taking the bequests out of the picture and adjusting the asset-based reallocation proportionally (e.g. for Taiwan, dividing 35.0% by 1.133). The adjusted asset-based reallocations then account for 55.7% of total reallocations in the US; 30.9% in Taiwan; and 22.2% in Korea.

Transfers were important components of the reallocations systems for the elderly in all of the economies. Public transfers are of particular importance in the US, constituting 43.3% of total reallocations to the elderly. In Korea and Taiwan, public transfers were less important than in the US. Public transfers were 38.6% of total reallocations for the elderly in Korea and 33.5% in Taiwan. Private transfers were most important in Korea, followed by Taiwan, and the US. But, again, a clear picture of private transfer requires careful attention to the role of bequests. If we ignore bequest, private transfer accounted for 8.5% of total reallocations to the elderly in the US, while they were 44.9% in Taiwan and 65.8% in Korea. Thus, private transfers to the elderly are indeed small in the US, while it is very large in Korea. Note, however, that private transfers are greater than one would think based solely on inter-household transfers even in the US. Once bequests are taken into account, we see that the direction of the private transfer is from the old to the young rather than the reverse in the US. However, unlike the US, private transfers in Taiwan and Korea are still in an upward direction – from adult children to elderly parents – even after taking bequests into consideration. When bequests are taken into account private transfers to the elderly account for around 32% of total reallocations in both Korea and Taiwan.

The importance of bequests in Korea in large part stems from the unique housing system. Housing is the predominant form of wealth in Korea, accounting for 50% of total assets held by all households, significantly higher than the US value of 30% (Cho 2005).

The importance of housing in Korea is in large part due to its rapid appreciation; the average rate of return from housing between 1986-2001 is 7.4%, which is almost twice the average real interest rate of 4.0% during the same period. With the lack of a reverse mortgage system in Korea,[9] the homeowner of the house transfers the expensive property to other family members as a bequest, when he passes away. On the other hand, a tenant rents a property based on the unique key money system (*chonsei*) in which the tenant pays deposit upfront (40-80% of the total property value) without periodic payments and receives the nominal value of the deposit from the landlord upon maturation (Cho 2005). Given this unique structure of the rental market system, renters in Korea have a proportion of their assets tied up to housing and thus cannot diversify them. This is in stark contrast with the US system where liquidating housing assets is easier by taking out a reverse mortgage or by selling a home and renting a dwelling.

In important respects the reallocations for those with lifecycle surpluses are just the counterpart of the reallocations for children and elderly as just described. This is true by definition for transfers because inflows and outflows must match, ignoring the relatively modest amounts of international flows. The large public transfer inflows to US elderly must be matched by large public transfer outflows from those in the working, and tax-paying, ages. Likewise, the large private transfer inflows to Korea and Taiwan elderly must be matched by large private transfer outflows from those in the working ages. Exactly which working ages experience the public sector outflows depends on the tax systems, their incidence, and the age distribution of the economic resources being taxed. Exactly which working ages experience the private sector outflows depends to a great extent on the co-residence patterns that in turn govern intra-household transfers.

Unlike transfers, asset reallocations need not balance. In all three economies, total asset income substantially exceeded total saving. As can be seen in Figures 5, asset-based reallocations are positive at most adult ages, not just at old age. In Korea and Taiwan, we see some negative asset reallocations at children or young adult ages, but these are small. This is a puzzling pattern and not what we would expect to see if workers are accumulating pension assets. Suppose workers contributed a fixed percentage of their income to a

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[9] For the US, the mortgage-to-GDP ratio is usually more than 50%, but for Korea the ratio is only 10% (Lam 2002, p.131).

pension fund during their working years and any interest generated by the fund was allowed to accumulate within the fund – a normal practice. Saving by the workers would exceed interest income by the portion of labor income that was contributed to the fund each year. Asset-based reallocations would be negative during the working years and would turn positive only after retirement. Even under very general conditions, as cohorts begin to accumulate wealth saving must exceed asset income. Judging from the substantial asset income of older cohorts, it is clear that they have accumulated a substantial amount of wealth during their lifetimes. The key question is why saving is so low among working adults.

First, these are cross-sectional data and not longitudinal data. There may be particular features of the years in question – 1998 in Taiwan and 2000 in the US and Korea– that led to high consumption and low saving during the working ages. The financial crisis hit East Asia beginning in 1997. Taiwan was influenced less than many other East Asian countries, but economic growth did slow in 1998. Korea had recovered by 2000. The US experienced an enormous run-up in the stock market that peaked in 2000. Housing prices also increased very substantially in the US. Perhaps working-age Americans responded to the significant increases in their real wealth by increasing their consumption and reducing their saving.

Second, the cross-sectional patterns may reflect longer run trends. In Korea and Taiwan, saving rates declined substantially between the late 1980s and the late 1990s. The US has experienced a long-run secular decline in saving rates over the last three to four decades. It may be that asset-based reallocations are becoming less important than they were in the past. Hence, we observe relatively little saving at young ages, but relatively large asset reallocation inflows at older ages.

A third and final point to consider is that the asset reallocations are serving a purpose other than the accumulation of pension wealth as envisioned in the lifecycle saving model. We think it is plausibly the case in both Korea and Taiwan where asset reallocation inflows are substantial for people in their 40s and early 50s. At these ages people in Korea and Taiwan are doubly burdened by dependent children and dependent elderly. This is reflected in the very substantial *inter vivos* transfers at these ages. In a sense, life-

cycle saving is indirectly financing the consumption of the elderly by financing transfers from middle-aged adults to their elderly parents.

Sources of Support

Sources of income are a standard and useful descriptive measure in reports on the economics of aging. The NTA system yields a more complete measure of the sources of support for the dependent populations that includes familial, intra-household transfers and dis-saving. In Figures 6 and 7 we compare the sources of support, i.e., the methods by which consumption was financed in Korea, Taiwan, and the US.

<Figures 6 and 7 here>

The methods by which the consumption of dependent children, defined as those under the age of 20, is financed are very similar in the US, Korea, and Taiwan. Earnings by children is relatively unimportant while virtually all consumption is financed by transfers. Private transfers dominate totaling 57% in the US, 63% in Korea, and 68% in Taiwan. The remainder consists of public transfers.

The finance of consumption by the elderly is very different across countries. Work plays a similar role in the US and Taiwan -- contributing about 15% of consumption in Taiwan and 13% in the US – while it is somewhat more important in Korea, accounting for about 22%. Public transfers are more important in the US than in Korea and Taiwan and private transfers are of much greater importance in Korea and Taiwan. The component of private transfers is, however, somewhat different between Korea and Taiwan; while the majority of private transfers in Taiwan are intra-household transfer, inter-household transfer and bequest play a more important role in Korea.

Reallocation through assets are also very different, accounting for about 62% of consumption of the elderly in the US; 43% in Taiwan; and only 23% in Korea. In the US and Taiwan, it is asset income that produces the big inflow, while in Korea, large saving also offsets the big inflow to some extent. A detailed explanation of "why" asset-based reallocation is small in Taiwan and Korea compared with in the US is not pursued here, but this obviously related with rapid growth in income over the last four decade. That is,

in Taiwan and Korea whose economies are characterized by such rapid economic growth, the relatively flat consumption profile shown in Figure 2 would certainly be possible if the relocation system relies more on transfers and less on assets. This may also in part reflect the unique nature of the housing system and less-developed financial and credit markets for housing in Korea. Whether well-developed financial system in a country facilitates the asset-based reallocation is an interesting research question and left for future research.

Conclusions

Any conclusions must be tempered given the preliminary nature of these results. The analysis is using a relatively new set of methods that are being refined as time passes. Some features of the reallocation system are difficult to estimate. Thus, the results should be viewed as preliminary and subject to change. In light of this, we emphasize important results that we are confident will hold up to further scrutiny.

First, the economic life cycles estimated for Korea and Taiwan are qualitatively different than the economic life cycle for the United States. Of particular importance is the conclusion that the lifecycle deficit for the elderly in Korea and Taiwan is much smaller, in relative terms, than the lifecycle deficit in the US. This is good news for Korea and Taiwan, because it implies that given current consumption patterns population aging will require a smaller reallocation of resources from workers to the elderly. There is a warning here, as well. If publicly-funded health care spending on the elderly in Korea or Taiwan begins to grow rapidly, as has happened in the US, the fiscal impact of population aging will be much greater.

Second, that the elderly are earning relatively more in the US than in Korea even though Korean elderly have higher labor force participation is a striking result. The lesson to be learned from this is the importance of policies that maintain the productivity of workers as they age. The solution to the aging problem is not jobs for the elderly at McDonalds and Mos Burger.

Third, one of the most striking results is the heavy dependence of Korean and Taiwanese elderly on transfers. As compared with many other countries, public transfer programs have been relatively modest in both. What is not appreciate, however, is that

familial transfers have been so large that the total dependence on transfers is much greater than in the US. The reliance on transfers has served both economies very well in the past. Even though the lifetime earnings of today's elderly is a small fraction – perhaps 15% - of the lifetime earnings of their children, the consumption of the elderly is roughly on par with the consumption of their children. One can hardly imagine how this could have been achieved without heavy reliance on familial transfers.

Fourth, what worked in the past in Korea and Taiwan will not work in the future. Economic growth at six percent per year will not persist for the next four decades. And the number of elderly will grow rapidly. If over 60% of the consumption of the elderly were financed by transfers in the future, as is the case today, the burden on younger generations would be impossibly great. Higher labor income will help, but increased reliance on asset accumulation is critical. This appears to be happening. Saving rates are high and the family support system appears to be in rapid decline. Exactly how these changes will play out remains to be seen.

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Figure 1. Consumption and labor Income, Korea 2000, nomial values (Billions of Won)

Labor Income

Consumption

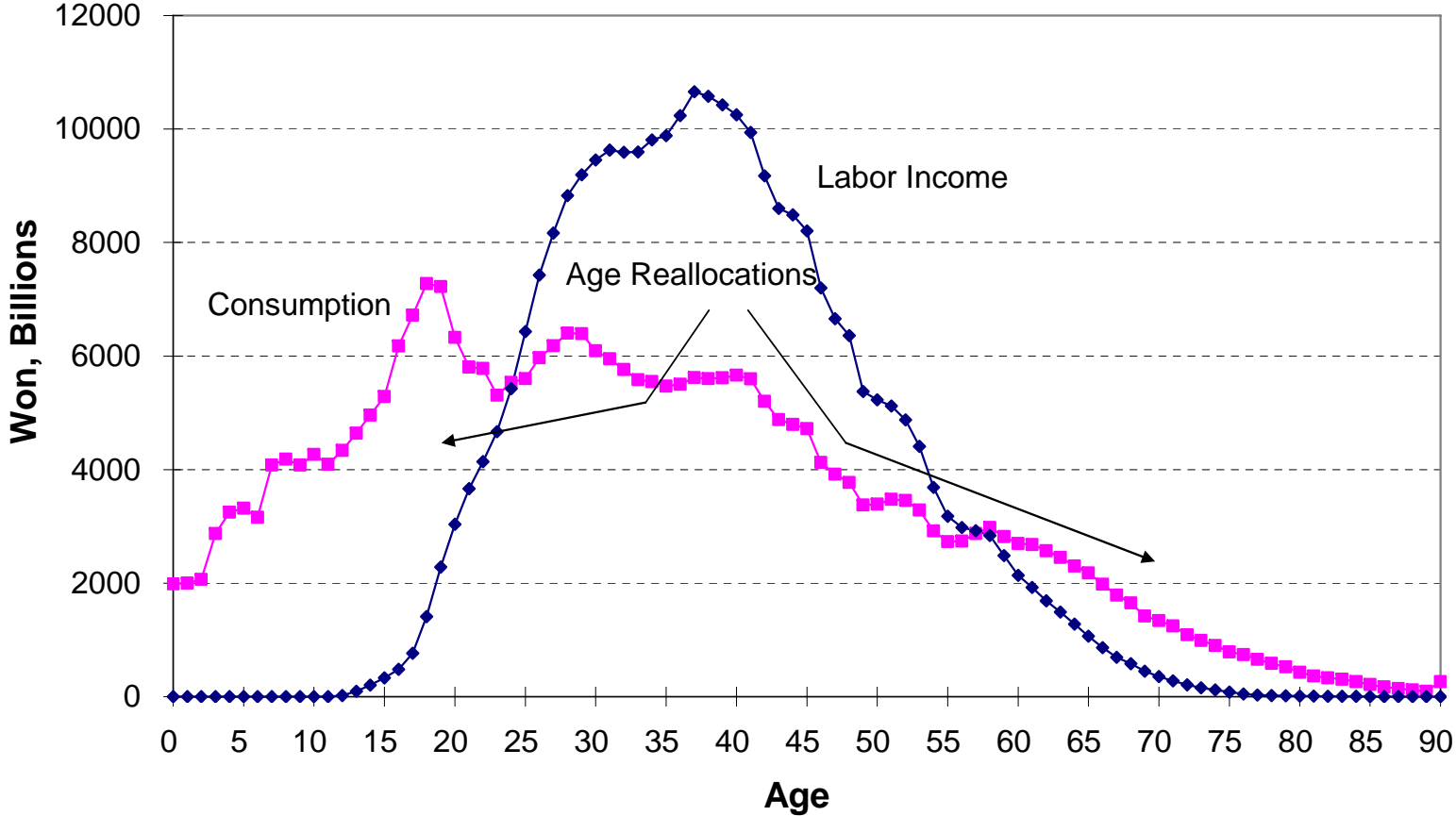Age Reallocations

Won, Billions

Age

Figure 2. Lifecycle of Production and Consumption, Per Capita, US 2000, Taiwan 1998, and Korea 2000
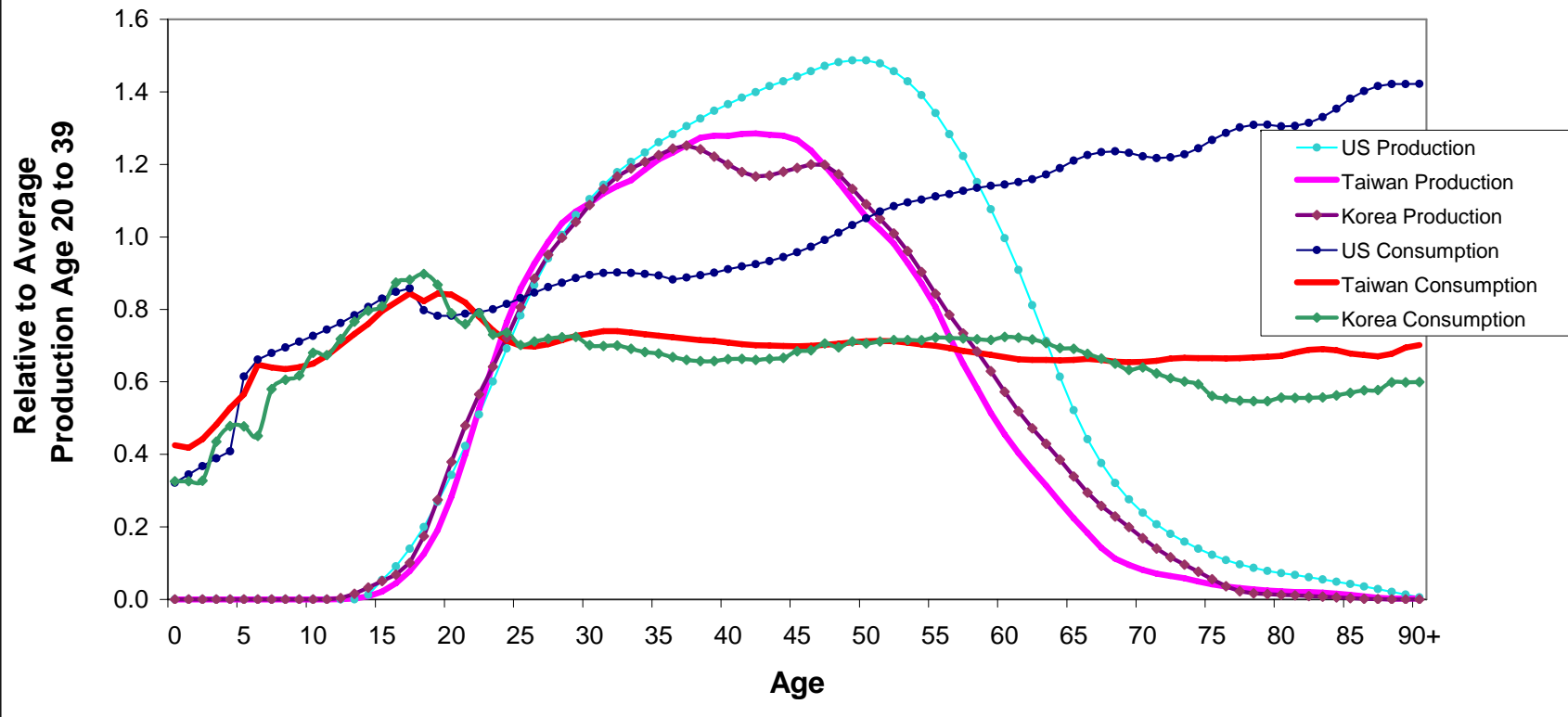
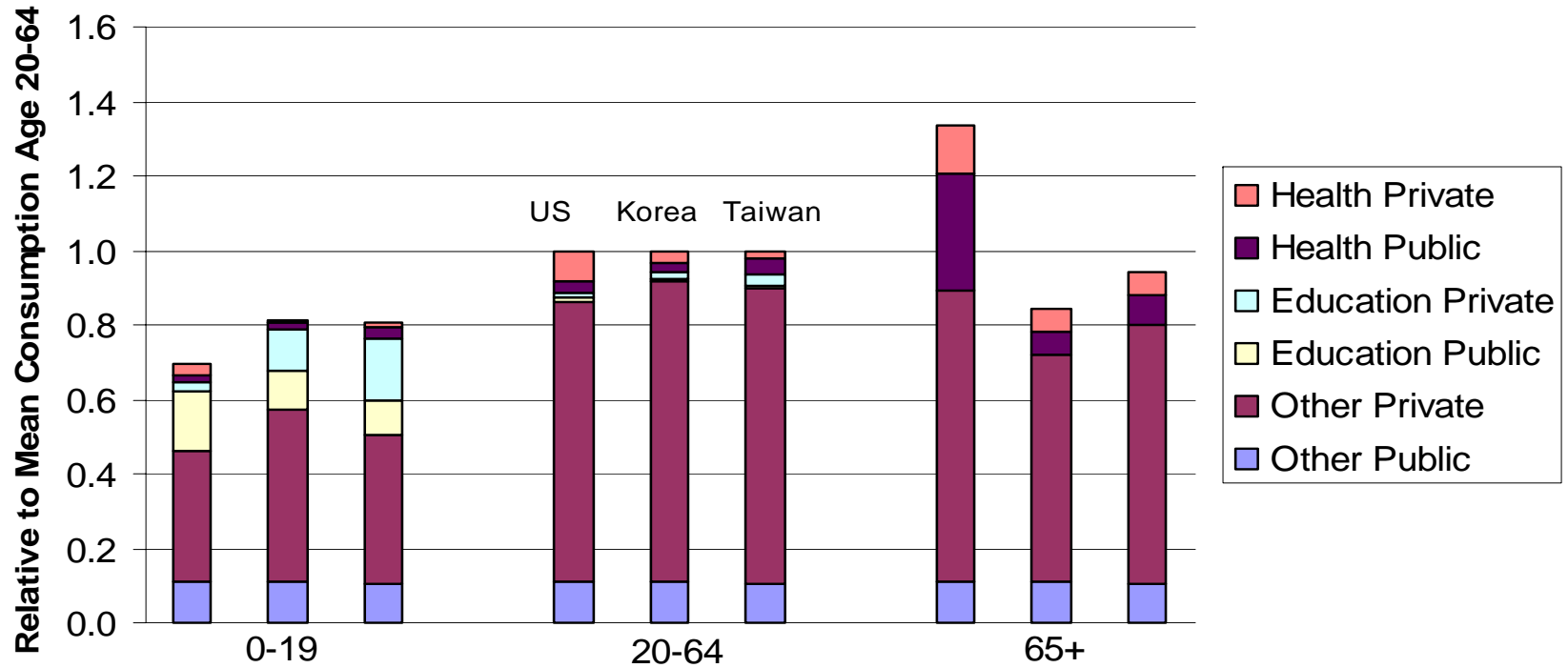Figure 3. Consumption by Age and Components, US (2000), Korea (2000), and Taiwan (1998)

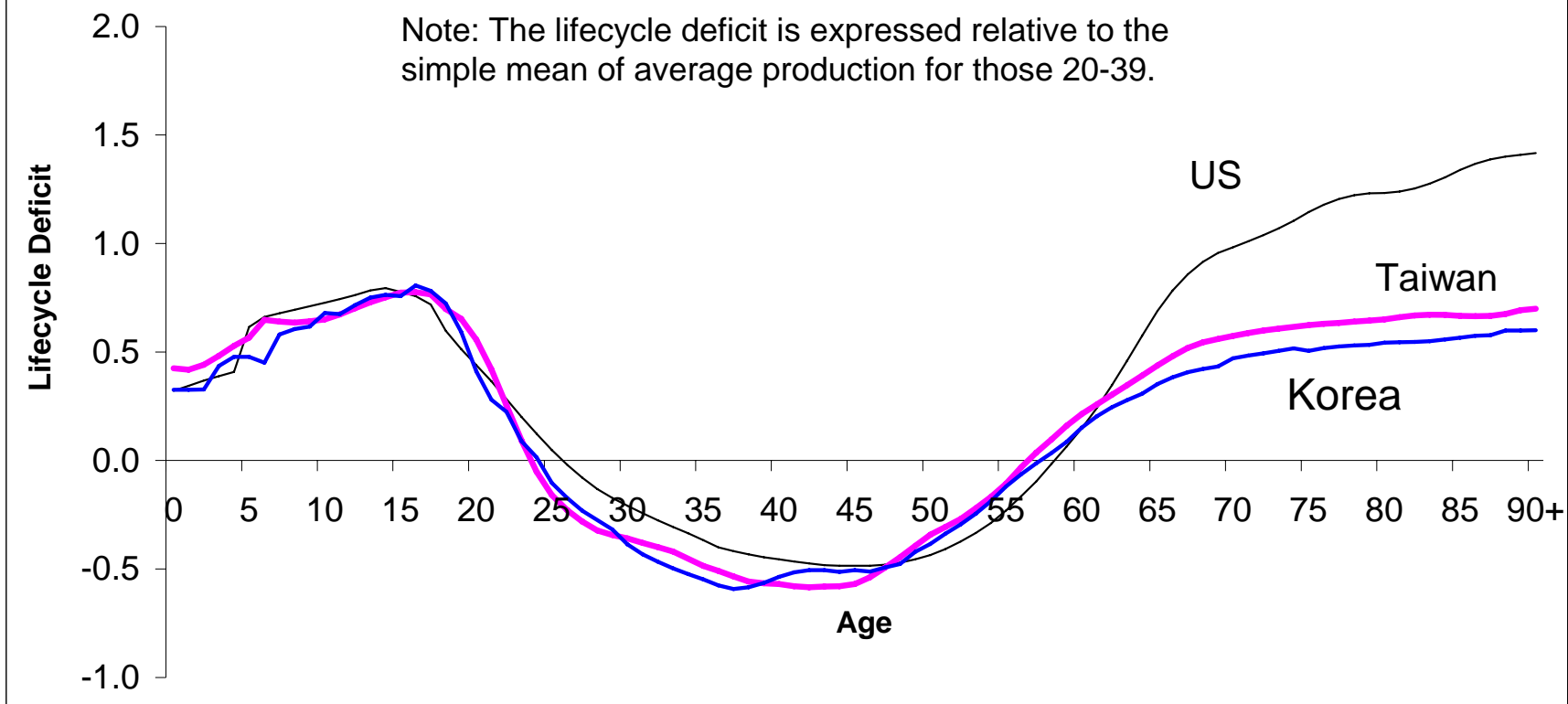**Figure 4. Lifecycle Deficits, US 2000, Korea 2000, and Taiwan 1998**

Note: The lifecycle deficit is expressed relative to the simple mean of average production for those 20-39.

Figure 5a. Components of Age Reallocations, Per Capita Values, Korea, 2000

Legend: Bequests, Inter Vivos Transfers, Public Transfers, Asset Reallocation

Total Inflows
Total Outflows

Figure 5b. Components of Age Reallocations, Per Capita, Taiwan, 1998

Legend: Bequests, Inter Vivos Transfers, Public Transfers, Asset Reallocation

Total Inflows
Total Outflows

Figure 5c. Components of Age Reallocations, Per Capita Values, US, 2000

Legend: Bequests, Inter Vivos Transfers, Public Transfers, Asset Reallocation
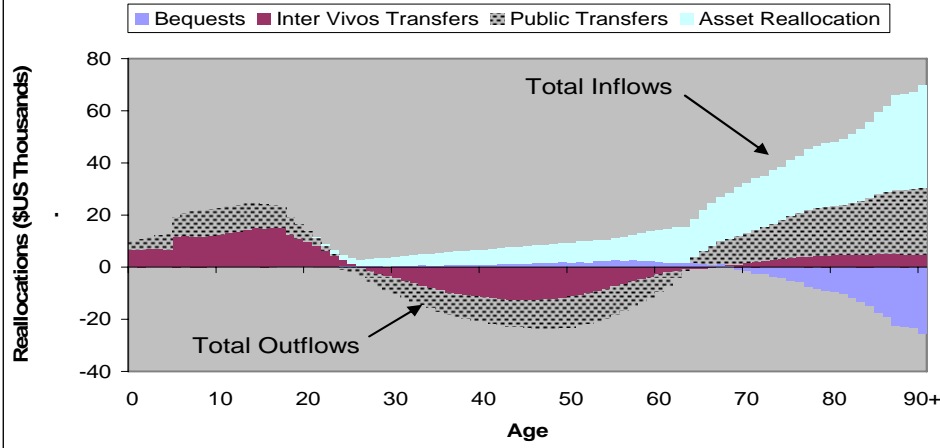
Total Inflows
Total Outflows

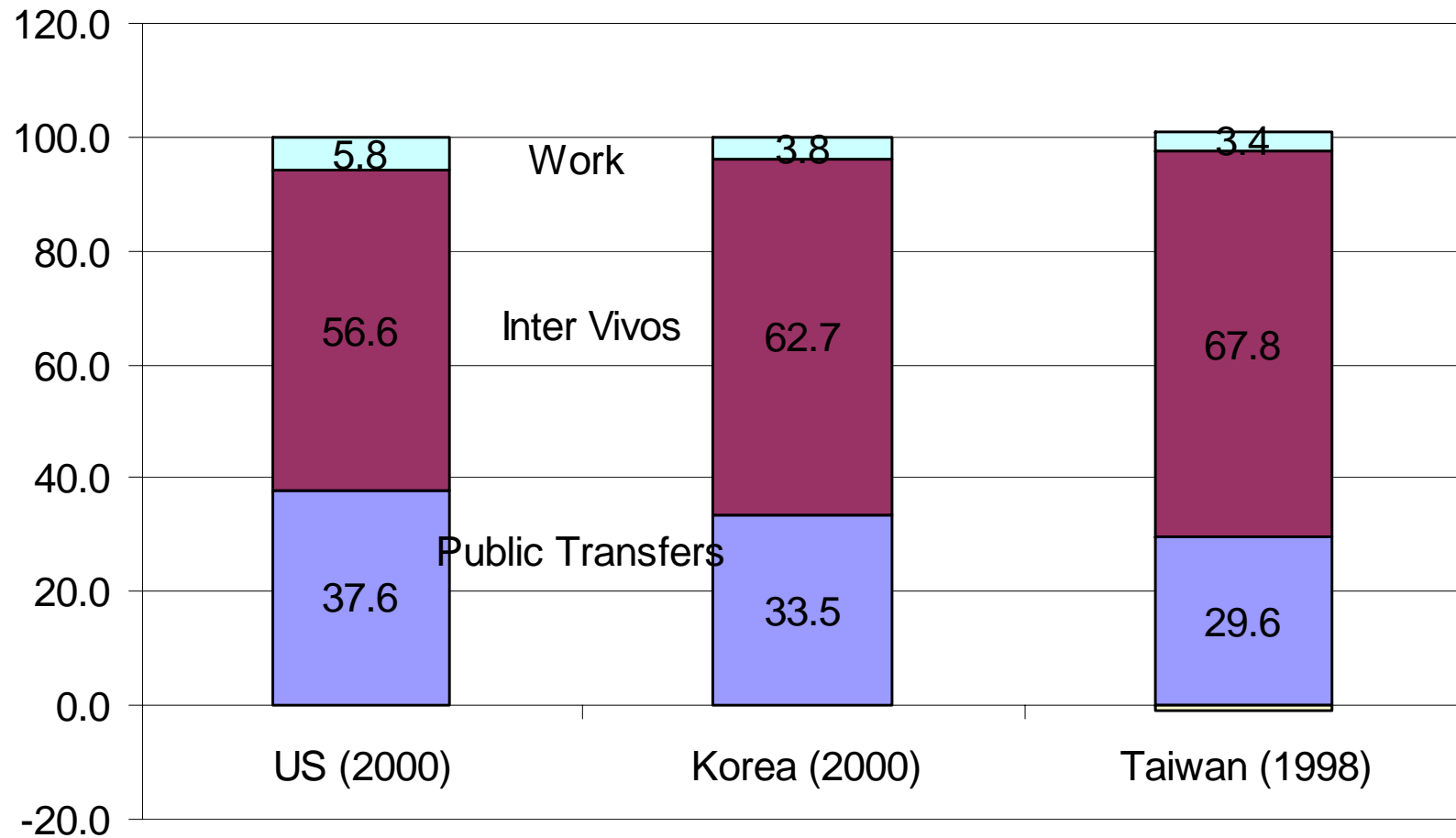**Figure 6. Finance of Consumption, Young Children 0-19**
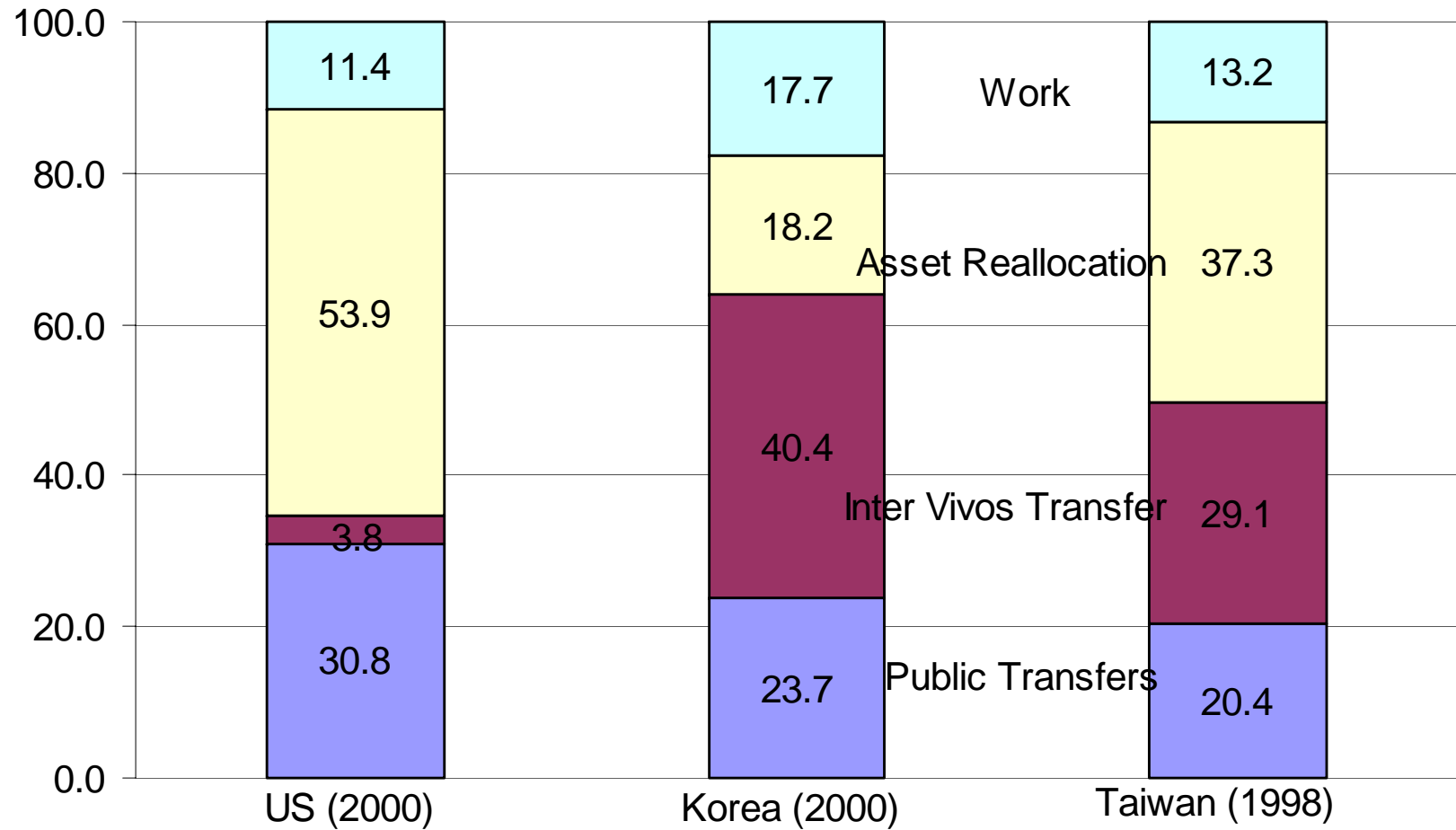
Figure 7. Finance of Consumption, Elderly 65+

Table 2. National Transfer Flow Account, Korea, 2000, Aggregate Values, Nominal, (100 billions of won)

	Total	Domestic by age				
		0-19	20-29	30-49	50-64	65+
Lifecycle Deficit	13,784	82,818	-3,046	-79,043	-2,882	15,937
Consumption	311,970	85,967	59,307	102,785	43,361	20,550
Private	254,767	58,937	52,642	90,126	36,963	16,099
Public	57,203	27,030	6,665	12,660	6,398	4,451
Less: Labor income	298,186	3,149	62,353	181,828	46,244	4,613
Age Reallocations	13,784	82,818	-3,046	-79,043	-2,882	15,937
Asset-Based Reallocations	13,139	2,546	-1,050	1,527	5,375	4,741
Net Asset Income	124,129	-68	1,246	20,674	71,423	30,854
Less: Net Saving	110,990	-2,614	2,296	19,147	66,047	26,113
Transfers	644	80,273	-1,996	-80,570	-8,258	11,196
Public	0	27,973	-3,765	-28,030	-2,327	6,149
Private	644	52,299	1,769	-52,541	-5,931	5,048
Inter Vivos Transfers	644	52,299	-492	-57,956	-3,698	10,491
Bequests	0	0	2,261	5,416	-2,233	-5,443