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Population Aging and Intergenerational Transfers: Introducing Age into National Accounts

Andrew Mason, Ronald Lee, An-Chi Tung, Mun-Sim Lai, and Tim Miller

3.1 Introduction

In all societies, intergenerational transfers are large and potentially have an important influence on inequality and economic growth. The development of each generation of youth depends on the resources that it receives from productive members of society for health, education, and sustenance. The well-being of the elderly depends on social programs that provide health care and income support and also on familial systems that dominate in many developing countries.

The importance of intergenerational transfers has not gone unnoticed by the research community. During the last two decades there have been important advances in measuring, modeling, and assessing the implications of intergenerational transfers at both the micro and the macro level.

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Developing the National Transfer Account System is a collaborative international effort supported by NIA, R01-AG025488, and NIA, R37-AG025247. The lead institutions are the Population and Health Studies Program, East-West Center, and the Center for the Economics and Demography of Aging, University of California at Berkeley. Collaborating institutions are the Nihon University Population Research Institute; the Statistics Bureau of Japan; Acadmia Sinica (Taipei); Lembaga Demografi, University of Indonesia; CEDEPLAR (Brazil), and the Economic Commission for Latin America and the Caribbean (ECLAC). Thanks to Alan Auerbach and other participants in the 2nd Meeting of the Working Group on Macroeconomic Aspects of Intergenerational Transfers, January 2005, University of California at Berkeley. Research assistance was provided by Comfort Sumida and Avi Ebenstein.

A comprehensive macro-level intergenerational transfer framework and accounting system, however, has not been developed. In particular, efforts to model and measure familial transfers at the aggregate level have lagged.

One purpose of this chapter is to outline key concepts and methods being used to construct National Transfer Accounts (NTAs), an accounting system for measuring intergenerational transfers at the aggregate level in a manner consistent with National Income and Product Accounts (NIPA). National Transfer Accounts provide estimates of economic flows across age groups that arise primarily because children and the elderly consume more than they produce, relying on reallocations from the working ages. (See Lee, Lee, and Mason 2008 for a more detailed analysis of the economic life cycle.) These flows can be cross-sectional—a transfer from parents to children, for example. Or the flows can be longitudinal—for example, accumulation of wealth during the working years and its disaccumulation during retirement. For want of a better term, we refer to these flows as "reallocations." When complete, NTA accounts will distinguish three forms of these flows: as the accumulation of capital, as transfers, and as credit transactions. Here we consider only two: transfers and asset transactions, combining capital and credit transactions. The accounts distinguish the institutions that mediate the transactions: governments, markets, and families. When complete, NTA accounts will provide estimates with sufficient historical depth to study the evolution of intergenerational transfer systems; the consequences of alternative approaches to age reallocations embodied in public policy with respect to pensions, health care, education, and social institutions (e.g., the extended family); and the social, political, and economic implications of population aging.

A second purpose of this chapter is to compare the life cycles and support systems of Taiwan and the United States. The differences between these two countries are particularly interesting because of the relative importance of their familial support systems—strong in Taiwan and weak in the United States. In the United States, private interhousehold transfers are small and, because few elderly live with their adult children, intrahousehold transfers are small, as well. In Taiwan, private interhousehold transfers are more important and, because many elderly live with their adult children, intrahousehold transfers are substantial. As a general proposition this is well known. The contribution here is to provide estimates of the economic flows that allow direct comparison of alternative forms of support. Our conclusion is that familial transfers from nonelderly adults to those sixty-five and older are large in Taiwan—exceeding U.S. public transfers measured as a percentage of consumption by those sixty-five and older.

There are other features of the reallocation systems in the United States and Taiwan that are explored. We show that income from assets is a very important source of income for the elderly in both countries, but particu-

larly in the United States. This may come as a surprise, given the low saving rates in the United States and the relatively high saving rates in Taiwan. Asset income does play an important direct role in old-age support in Taiwan, but it also plays an indirect role by financing transfers from middle-aged adults to elderly parents.

The support systems for children are very similar in the United States and Taiwan. Almost all of the financial resources available to those under the age of twenty consist of transfers. In the United States, about 60 percent and in Taiwan about 75 percent of all transfers to children are familial transfers. The remainder consists largely of public transfers, of which support for public education is particularly important.

3.2 Background

Research on intergenerational transfers has laid a solid foundation for constructing the NTA system with the historical depth and cross-national perspective envisioned here. Following on the pioneering work of Samuelson (1958) and Willis (1988), a theoretical transfer framework has been developed by Lee and his collaborators (Lee 1994a; Lee 1994b; Bommier and Lee 2003). The Lee transfer framework has been applied to many different settings, but often under a restrictive set of assumptions (steady-state equilibrium and golden-rule growth). At the same time, generational accounting has been used to describe forward-looking public longitudinal data in various countries (Auerbach, Gokhale and Kotlikoff 1991; Auerbach, Kotlikoff and Leibfritz 1999).

Progress in modeling private and familial transfers at the aggregate level has been sporadic, but there have been important advances. The increased availability of surveys and micro-level studies has greatly improved our ability to measure familial transfers and to study why they occur (Lillard and Willis 1997; McGarry and Schoeni 1997; Altonji, Hayashi, and Kotlikoff 2000; Frankenberg, Lillard, and Willis 2002). Progress has been made in estimating and modeling bequests (Attanasio and Hoynes 2000; Poterba 2000; Poterba and Weisbenner 2001; Brown and Weisbenner 2002). There have been important advances in modeling the allocation of resources within households, a step critical to estimating intrahousehold intergenerational transfers (Lazear and Michael 1988; Bourguignon and Chiappori 1992; Deaton 1997; Bourguignon 1999). Innovative surveys provide new opportunities for analyzing intergenerational transfers (Chu 2000; Hermalin 2002). Building on the available theoretical framework and the extensive research on familial transfers, and utilizing the extensive household survey data that are available in many countries makes estimating familial intergenerational transfers and a complete set of National Transfer Accounts a feasible option.

Constructing estimates of familial transfers is important because they

play such a key role around the world. Familial transfers are almost universally the primary source of resources for children. Familial transfers to the elderly can have a profound effect on intergenerational equity (Mason and Miller 2000). Outside the industrialized countries of the West, most elderly coreside with their adult children. In Japan and South Korea, the extent of coresidence has declined very rapidly in the last few decades, but roughly half of the elderly still live with children. In other Asian countries, the great majority of the elderly live with their children, and there is a surprising degree of stability in these arrangements. The situation in Latin America is less thoroughly documented, but data for six Latin American countries show that living in multigeneration households has been the norm there as well (Kinsella 1990).

Extended-living arrangements are less important in the West, but in some European countries the elderly are not living exclusively by themselves nor with their spouse. In Greece and Spain roughly 40 percent of those sixty-five and older were living in households with three or more persons in the early 1990s. At the other extreme, only about 5 percent of the elderly of Sweden and Denmark lived in households with two or more persons. France is in an intermediate position, with 16 percent of the elderly living in households with two or more persons (Kinsella and Velkoff 2001). In the United States, the great majority of elderly do not live with their children, but this has not always been the case. The percentage of sixty-five and older living with children in the United States declined from 64 percent in 1880 to 49 percent in 1940, 30 percent in 1960, and 18 percent in 1980 (Ruggles 1994).

A more comprehensive approach to intergenerational transfers is critical to resolving many important issues. The system of intergenerational transfers bears directly on current research on the demographic dividend. Increases in the share of the working-age population, particularly in East Asia, have contributed to rapid growth in per capita income (Kelley and Schmidt 1995; Bloom and Williamson 1998; Kelley and Schmidt 2001; Mason 2001; Bloom, Canning, and Sevilla 2002). The demographic dividend may dissipate, however, as the share of the elderly population rises and the share of the working-age population declines. If capital accumulation rather than familial or public transfer programs dominates the age reallocation systems for supporting the elderly, population aging may yield a second demographic dividend in the form of higher rates of saving and capital intensification of the economy (Mason 2005; Mason and Lee 2006). If aging is accompanied by a shift away from transfer systems, either public or private, the effects on capital accumulation may be especially pronounced (Lee, Mason, and Miller 2003).

A second area of research concerns an important factual issue—whether there are substantial generational inequities and whether they are

changing over time (Preston 1984; Becker and Murphy 1988). One approach models intergenerational transfers as the outcome of political processes in which the magnitude and direction of transfers reflect the political power of the elderly relative to other demographic groups (Preston 1984; Razin, Sadka, and Swagel 2002). An alternative approach argues that intergenerational transfers are the outcome of cooperative private and social implicit contracts that are guided by altruism and efficiency concerns (Barro 1974; Becker and Tomes 1976; Becker and Murphy 1988).

A third area of research addresses the effects of intergenerational transfers on saving, economic growth, and equity (Feldstein 1974; Munnell 1974; Feldstein 1996; Gale 1998). 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 1998; Feldstein and Samwick 2001; Krueger and Kubler 2002; Diamond 2006).

Operating in the background and providing the impetus for research and reform efforts is population aging. Low levels of fertility and continued improvements in life expectancy in many countries are leading to rapid population aging. The advanced industrialized countries—Japan, European countries, and the United States—are further along in the aging process. Many less developed countries, however, will soon have much older populations. Three aspects of population aging in the developing world are noteworthy. First, many countries are likely to experience population aging at a relatively low level of development. Not only will they have relatively low levels of income, but they may also have relatively underdeveloped political and financial institutions that are playing a prominent role in aging industrial societies. Second, familial support systems are more important in many developing societies than in the West. Third, we have found that population aging causes a large increase in the demand for lifecycle wealth relative to GDP. Population aging interacts with the transfer systems either to generate a major increase in the proportional implicit debt and transfer burden on the working population, or to generate a large deepening of the capital stock. Third World countries are at a crucial juncture, and depending on their policy choices, population aging will have one or the other effect. Hence, understanding how familial support systems operate, how they interact with alternative transfer systems, and how they are affected by population aging is critical.

3.2.1 National Transfer Accounts: An Overview

The purpose of National Transfer Accounts is to measure at the aggregate level the reallocations, across age, of economic resources. These reallocations occur because at some ages, individuals consume more than they

produce.[1] At other ages individuals produce more than they consume. The reallocation system documents the means by which the young and the old—those with lifecycle deficits—draw on the surplus resources generated during the prime working ages.

Age profiles of consumption, production, and reallocations are viewed from an individual, rather than a household, perspective. In economies where formal sector employment dominates, measuring production (or earnings) for individuals is a relatively straightforward task. In traditional settings, where employment is informal and production is often organized within a family enterprise, estimating production by age for individuals is difficult. In any setting, allocating consumption to individuals is challenging, because most expenditure data are collected for households rather than individuals. Moreover, some goods are jointly consumed or involve increasing returns to scale, so that allocating consumption to individuals inevitably involves arbitrary rules.

From the household perspective, production and consumption are attributes of households, varying with age of the household head. Constructing production and consumption profiles is more straightforward, but there are tradeoffs involved. The first is that the effects of coresident children and elderly on household consumption and production profiles must be explicitly modeled or—as is often the case—neglected altogether. Indeed, a large share of all societal income redistribution occurs within households, and would therefore be invisible to accounting on a household basis. The second is the difficulty of translating changes in population-age structure into changes in the age structure of household heads and household membership.

Age reallocations are substantial relative to the economy. Consider the situation in Taiwan as represented in figure 3.1, panel A, which shows estimates of aggregate consumption and labor income by age in 1998. Total net reallocations to those twenty-three and younger, the young age group for which consumption exceeded labor income, amounted to 35 percent of total labor income. Total net reallocations to those who were fifty-seven or older, the old age group for which consumption exceeded labor income, amounted to 9 percent of total labor income. Thus, nearly half of all labor income was reallocated from the surplus ages to the dependent ages.[2]

The age profiles of aggregate consumption and labor income reflect the age distribution of the population (fig. 3.1, panel B), and per capita variation in labor income and consumption (fig. 3.1, panel C). In 1998, Taiwan's population was younger than the United States population. Thirty-one percent were under the age of twenty and 8 percent were sixty-five or older. Hence, the reallocations reflect that age structure—with more going to

1. Detailed methodology and other information can be found at www.ntaccounts.org.
2. Calculation details are discussed in the following.

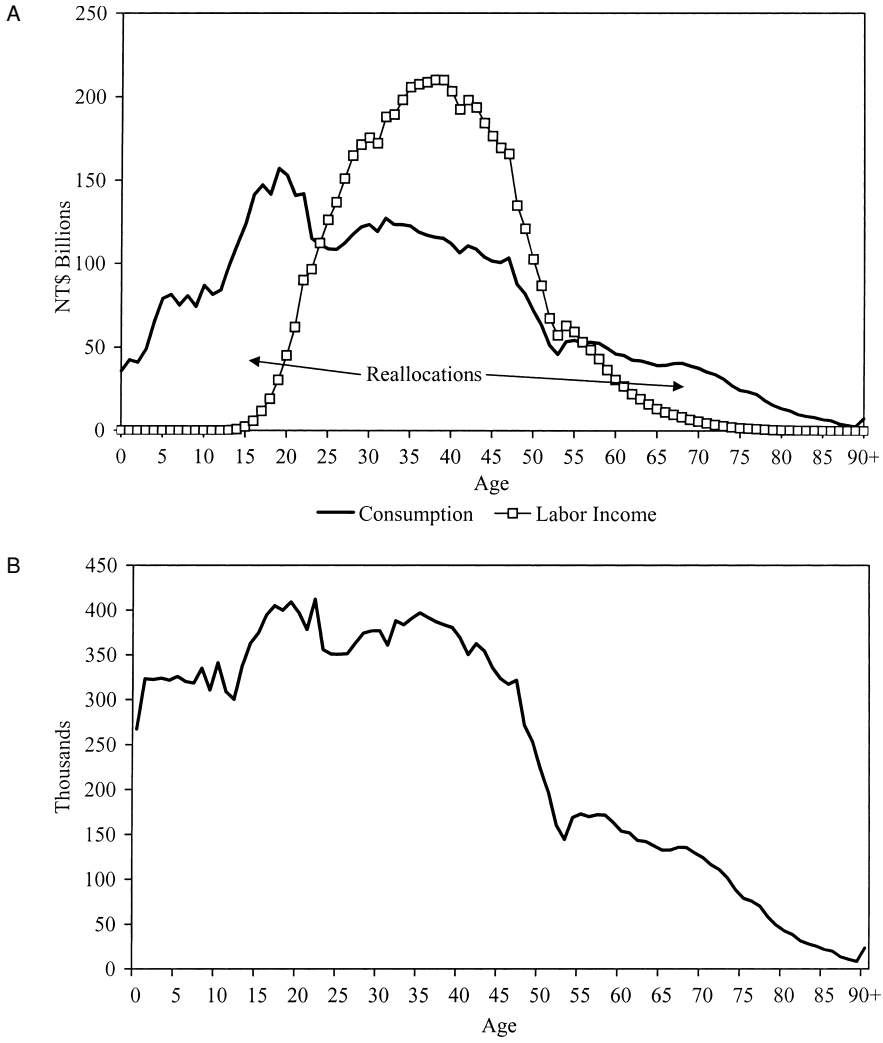

Fig. 3.1 ***A,*** **Aggregate consumption and labor income, Taiwan, 1998, nominal values;** ***B,*** **Population, Taiwan, 1998;** ***C,*** **Per capita consumption and labor income, Taiwan, 1998**

children and less going to seniors than in the United States. As will be seen in the following, Taiwan also has per capita profiles that are distinctive as compared with the United States. Taiwan's consumption profile is very flat and its labor income reaches a peak at a relatively young age as compared with the United States.

Reallocation systems, which bridge the gaps between consumption and labor income, vary along two important dimensions: the governing or me-

C

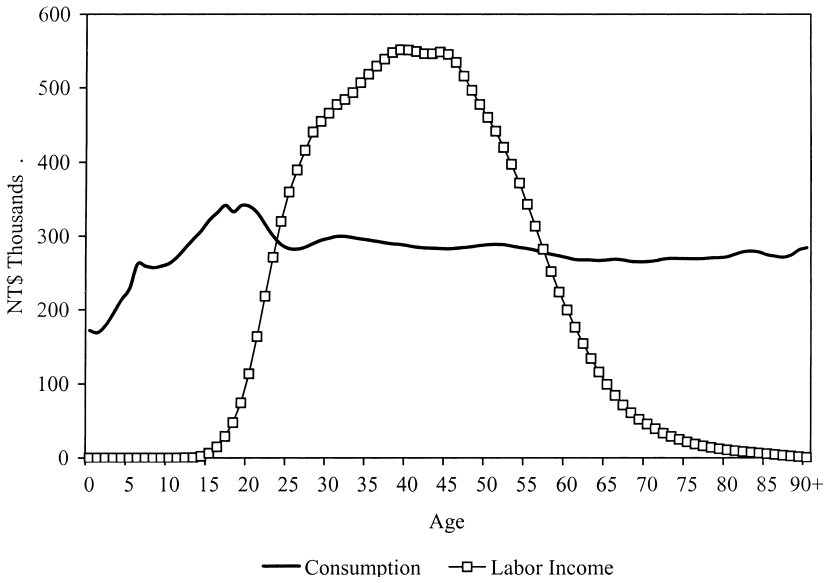

Fig. 3.1 (cont.) ***A,*** **Aggregate consumption and labor income, Taiwan, 1998, nominal values;** ***B,*** **Population, Taiwan, 1998;** ***C,*** **Per capita consumption and labor income, Taiwan, 1998**

diating 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, and so on, 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 3.1).

In this chapter we distinguish two economic forms that reallocations can take: asset-based reallocations and transfers.

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

Capital-based reallocations: Transactions that increase future consumption by foregoing current consumption. They lead to a change in the

Table 3.1 **A classification of National Transfer Account reallocations.**

	Asset-based reallocations		
	Capital and property	Credit	Transfers
Public	Public infrastructure	Public debt Student loan programs Money	Public education Public health care Unfunded pension plans
Private	Housing Consumer durables Factories, farms Inventories Land	Consumer credit	Familial support of children and parents Bequests Charitable contributions

Source: Adapted from Lee 1994a.

stock of reproducible capital, including inventories. Only reallocations from younger ages to older ages are possible. Individuals can accumulate capital when young and dispose of it when old.

Property-based reallocations: Transactions that involve the trade of a nonreproducible asset; for example, land. They yield no change in aggregate wealth. Property acquired in one period can yield rental income in future periods or can be sold in future periods to finance consumption at older ages. At any point in time, property-based reallocations net to zero for all age groups combined. The purchase or rental of property produces an inflow for one individual that is matched by an outflow for another individual.

Credit-based reallocations: Intertemporal transactions based solely on a contractual obligation to trade economic resources in one period in return for compensation in one or more future periods. In a closed economy, credit-based reallocations do not lead to a change in aggregate wealth, because an increase in the wealth of one group is always balanced by the decline in wealth of another age group. The use of credit cards to finance consumption by individuals and the use of domestically held public debt, including the printing of money, to finance government programs are examples. Credit transactions can be used to reallocate resources in either direction.

Transfers: Reallocations from one group to another that involve no explicit quid pro quo.[3] Transfers can flow in either direction—from older to younger (parents and taxpayers to children) or from younger to older (adult children and taxpayers to the elderly).

3. Of course, important models of familial transfers emphasize implicit contracts; for example, risk sharing (Kotlikoff and Spivak 1981) or the exchange of money for time (Cox 1987).

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. This chapter emphasizes the flow account, and the wealth account is not discussed further.

3.2.2 The National Transfer Flow Account

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, household, age group, or economy, stating that for any period inflows are balanced by outflows.

$$(1) \qquad Y_L + Y_K + Y_M + \tau_g^+ + \tau_f^+ = C + I_K + I_M + \tau_g^- + \tau_f^-.$$

Inflows consist of labor income (Y_L), the returns to capital (Y_K) and land and credit (Y_M), and transfer inflows from the public sector (τ_g^+) and the private sector (τ_f^+). Outflows consist of consumption (C), investment in capital (I_K) or credit and land (I_M), and transfer outflows to the government (τ_g^-) and the private sector (τ_f^-). In this chapter, we do not distinguish capital from land and credit. Designating asset income by Y_A, assets by $A = K + M$ and saving by $S = I_K + I_M$, substituting into equation (1) and rearranging terms provides the key elements of the NT Flow Account. The difference between consumption and production, termed the *lifecycle deficit,* must be matched by *age reallocations,* consisting of *asset-based reallocations* and *net transfers:*

$$(2) \qquad \underbrace{C - Y_L}_{\text{Life-cycle deficit}} = \underbrace{Y_A - S}_{\text{Asset-based reallocations}} + \underbrace{\underbrace{\tau_g^+ - \tau_g^-}_{\text{Net public transfers}} + \underbrace{\tau_j^+ - \tau_f^-}_{\text{Net private transfers}}}_{\text{Net transfers}}$$

Age reallocations

Transfers are further subdivided into *net public transfers* and *net private transfers,* consisting of bequests and inter vivos transfers.

The National Transfer Flow Account for Taiwan in 1998 is shown in summary form as table 3.2, to provide a concrete point of reference for further discussion. The totals in the table are based on National Income and Product Account values and thereby ensure consistency with NIPA. Briefly, consumption is equal to total final consumption expenditure.[4]

4. Private final consumption is adjusted to exclude indirect taxes that are assumed to be paid indirectly by consumers. In other words, the value of final consumption is calculated using basic prices that exclude indirect taxes.

Table 3.2 **National Transfer Flow Account, Taiwan, 1998, aggregate values, nominal, (NT$ billion)**

		Domestic by age				
	Total	0–19	20–29	30–49	50–64	65+
Lifecycle deficit	525	1,671	–13	–1,500	–25	391
Consumption	5,855	1,737	1,064	1,939	654	461
Public	1,549	590	246	419	161	133
Private	4,305	1,147	818	1,520	493	328
Less: Labor income	5,330	66	1,076	3,439	678	70
Age reallocations	525	1,671	–13	–1,500	–25	391
Asset-based reallocations	554	–21	–213	362	266	160
Public	–173	1	19	–103	–63	–27
Income on assets	0	0	–1	–5	3	4
Less: Public saving	173	–1	–20	97	66	31
Private	727	–22	–232	464	329	187
Income on assets	2,149	4	182	1,265	490	208
Less: Private saving	1,422	26	413	800	161	21
Transfers	–29	1,692	200	–1,862	–290	231
Public	2	436	–15	–463	–77	121
Private	–31	1,256	215	–1,399	–213	111
Inter vivos transfers	–31	1,256	146	–1,489	–130	186
Bequests	0	0	69	90	–84	–75

Private and public consumption correspond to private final consumption expenditure and government final consumption expenditure. Labor income has no exact NIPA counterpart, because the income of unincorporated firms includes returns to labor and to capital. We allocate two-thirds of this income to labor and one-third to capital, to obtain estimates of labor income and income on assets. Saving is defined as national saving net of depreciation. In a closed economy, net transfers and each of its components would sum to zero. In an open economy, international financial flows lead to net transfer totals that differ from zero. In Taiwan, for example, private transfers to abroad exceeded those received from abroad by NT$31 billion. More detailed information about adjustments is available from the authors.

All aggregates are allocated across age using methods that are briefly described in the following. The values are cumulated into broad age groups to facilitate presentation and discussion, but the underlying values were estimated by single-year of age, with an upper age group of ninety plus, as shown in figure 3.1.

The upper panel of the NT Flow Account (Table 3.2) reports the *lifecycle deficits,* the gaps between labor production and consumption. The lower panel reports the age reallocations and their components. As shown

in the budget identity, equation (2), the lifecycle deficits and reallocations must be equal, in total and for each age group.

Life-Cycle Deficit

The life-cycle deficit is large and positive for children and the elderly, close to zero for young adults and those aged fifty to sixty-four, and large and negative only for adults aged thirty to forty-nine. Taiwan's life-cycle deficit for children was NT$1.7 trillion, 96 percent of their total consumption, and the life-cycle deficit for the elderly was NT$0.4 trillion, 85 percent of their total consumption. Thirty- to forty-nine-year-olds had a life-cycle surplus of $NT1.5 trillion. That those aged thirty to forty-nine had a large life-cycle surplus and that those aged fifty to sixty-four did not runs contrary to the conventional wisdom about the economic lifecycle; that fifty to sixty-four are ages conducive to high rates of saving. Note that the surplus was less than the total life-cycle deficit of the dependent age groups, leading to an overall deficit of NT$525 billion or 9 percent of total consumption. If the economy were on a golden rule steady-state growth path, the total life-cycle deficit would have been zero. A positive total life-cycle deficit occurs when consumption exceeds total labor income.[5]

The life-cycle deficit is a residual—calculated as the difference between consumption and labor income. All consumption—both public and private—is included in the NT Flow Account and all is allocated to individuals. Private consumption includes the rental value of owner-occupied housing. Public consumption includes goods and services that are consumed directly by individuals; for example, health care and education. Public consumption also includes the value of all other government consumption, such as spending on public safety, foreign diplomacy, public infrastructure, and so on.

All consumption is allocated to individuals based on their age, using allocation rules that vary with the type of good being allocated and the availability of data. Consider, first, public programs. The consumption of public education is allocated to students using age- and education-level-specific enrollment rates, assuming that the cost per student varies across education level (primary, secondary, tertiary) but does not vary by age within the educational level. Age profiles of publicly provided or financed health care in the United States (Medicare, Medicaid, and other public programs) are based on age estimates of the U.S. National Health Accounts for 1999 (Keehan et al. 2004). Control totals for these programs are taken from U.S. National Income and Product Account (NIPA) tables for 2000.[6] In

5. Dynamically efficient economies will have zero or positive total lifecycle deficits.

6. http://www.bea.doc.gov/bea/dn/nipaweb/index.asp. In Taiwan, public consumption of health is very small. A National Health Insurance program has been instituted that provides partial reimbursement of the cost of services of private health providers. This is classified as private health expenditure.

Taiwan, the shape of the age profile of consumption financed through National Health Insurance (NHI) is estimated using the variable "benefit income of NHI" reported in the Survey of Family Income and Expenditure (FIES). The aggregate control total is reported in *Health Trends and Vital Statistics Taiwan* (Department of Health, 1998). In the United States, the value of food stamps and public housing are assigned to members of households who report receipt of these benefits on the basis of equivalence scales. All other public consumption is allocated on a per capita basis.

Private consumption is estimated using household surveys that report the number and age of household members and total household consumption, but not the consumption of individual members. Allocation rules are used to distribute consumption to each household member. Per capita age profiles of consumption are then computed by averaging across the consumption estimates for all individuals of a given age in the survey.[7]

Age profiles of labor income are based on individual-level data on compensation and entrepreneurial income. We assume that two-thirds of entrepreneurial income is a return to labor and one-third is a return to capital.

Asset-Based Reallocations

Two broad economic forms by which resources are reallocated across age groups are presented in the lower panel of the NT Flow Account: asset-based reallocations and net transfers. Asset-based reallocation is the response to life-cycle problems captured in the classic life-cycle saving model. Suppose individuals relied exclusively on life-cycle saving to reallocate resources from the working years to old age. Sometime during the working years, individuals would begin to save. This would generate a net outflow in the NT Flow Account. As the individual accumulates assets, he or she would begin to receive asset income, an inflow. The net inflow from asset-based reallocations is measured by asset income less saving ($Y_A - S$). For a classic life-cycle saver, net asset-based reallocations would be negative during life-cycle surplus years. In his or her retirement years, the life-cycle saver generates inflows—positive net asset-based reallocations—sufficient to cover the life-cycle deficit. To do so the individual would rely on asset income (Y_A) and dissaving ($S < 0$).[8]

The NTA framework does not assume that individuals behave as life-cycle consumers, and other forms of behavior are captured by asset-based reallocations. For example, if young individuals go into debt to finance their

7. We have experimented with various methods for estimating the equivalence scales. We have found the Engels' and Rothbarth's methods to yield problematic results. At present, we first use regression methods to allocate expenditures on education and health care by age within households, and then allocate the remainder of household expenditures using equivalence scales. The equivalence scale is 0.4 for children under age five, increasing linearly from 0.5 at age five to 1.0 at age twenty, remaining constant for those older than twenty. See Deaton (1997) for a detailed discussion of allocation rules.

8. A pure lifecycle saver may not dis-save in the initial years of retirement.

education, this would be reflected as a positive asset-based reallocation during school years—as individuals incurred debt beyond necessary debt repayment—and as a negative asset-based reallocation later in life, as ex-students repaid their student loans. Alternatively, parents might accumulate assets in anticipation of the high costs of college. This would be reflected as negative asset-based reallocations for parents with precollege-age children and positive asset-based reallocations for parents with college-age children. If asset accumulation is driven by a bequest motive, we would see negative asset-based reallocations during working years and positive reallocations at the time of death.

Although the role of assets as a reallocation tool is most easily explained by describing the behavior of an individual or a cohort over time, the NT Flow Account reports the flows for a particular year for a cross-section of age groups. Asset-based reallocations at all ages may respond to short-term economic fluctuations. The asset income and disaccumulation of capital at older ages is not tied in any direct way to the accumulation at younger ages, as observed in the cross-section.

Assets are not assigned to individual members of the household. Rather, we assume that all assets are held by a single individual—the household head. Thus, results presented here are consistent with other analyses that report assets or saving by the age of the head. The results also suffer from the same difficulties of interpretation, particularly in societies where multigeneration extended households are common. The influence on our results of gender bias in the choice of head will depend on the age difference between husbands and wives. The mean age of age profiles tied to the age of the head will be greater if husbands are older than wives and more likely to be chosen as the head of the household.

In Taiwan, estimates of age profiles of net asset income are based on household-level data on entrepreneurial income, dividends, rent, and interest income and expense. For the United States, estimates are based on age profiles of net worth. In both countries, saving is estimated as a residual.

Transfers

The second form of reallocations is transfers. A transfer, as measured by the NTA system, is a transaction that transfers a good, service, or cash from an individual belonging to one age group to an individual belonging to another age group with no expectation of compensation or an explicit quid pro quo in any form. Transfers received are called *inflows* $[\tau^{+}(a)]$, transfer payments are called *outflows* $[\tau^{-}(a)]$, and *net transfers* are the difference between the two $[\tau(a) = \tau^{+}(a) - \tau^{-}(a)]$. Public transfers $[\tau_{g}(a)]$ are mediated by governments, which collect taxes from members of one set of age groups $[\tau_{g}^{-}(a)]$ and make transfers to members of other age groups $[\tau_{g}^{+}(a)]$. These two sets of age groups may well overlap. Private transfers are

mediated by the family and nonprofit institutions serving households (NPISHs). Net private transfers are given by $\tau_f(a) = \tau_f^+(a) - \tau_f^-(a)$.

Public transfer inflows can be in the form of cash or in-kind. Cash public transfer inflows are typically targeted and the associated inflows often vary substantially with age. Welfare programs provide cash benefits to children and/or mothers. Unemployment benefits target those in the working ages. Pension benefits target the elderly.

The age pattern of the outflows depends on the mechanisms by which the programs are financed—the age variation of the economic resource being taxed and the age variation in the rate of taxation. The economic resource being taxed depends on the incidence of the tax. Our approach is to follow the methods employed in generational accounting (GA). With a few exceptions, GA assumes that the incidence of the tax falls on the entity that pays the tax: payroll taxes are paid by workers, sales taxes by consumers, property taxes by owners of property, and so forth (Auerbach and Kotlikoff 1999).

Private transfers largely consist of familial transfers. In virtually all societies, familial transfers are the dominant reallocation system through which children are supported. As previously noted, neither capital- nor property-based reallocations can be used to transfer resources in a downward direction; that is, from the working ages to the childhood ages. Credit plays a limited role for legal and institutional reasons. A few instances can be identified where supporting children is a community or a public responsibility rather than a familial responsibility. Examples include some African societies, the kibbutz in Israel, and limited experiments with the collectivization of child care in some Communist economies. But even where familial systems are primarily responsible for supporting children, public transfers can be substantial. In many countries, the public sector plays an important role in education. Also, many low-fertility countries have adopted or are considering policies that increase the importance of the public reallocation system vis-à-vis the familial system. These include family allowances, subsidization of child care, tax benefits, and so forth. Children are also the beneficiaries of a broad set of public goods and services that accrue to members of society at large.

Two forms of private transfers are distinguished in table 3.2 and the results discussed in the following. Inter vivos transfers consist of interhousehold transfer (transfers between two existing households) and intrahousehold transfers (transfers between individuals who belong to the same household). The second form, *bequests,* consists of transfers associated with the "death" of a household that may arise in several ways: the death of the household head, the merger of two preexisting households, or the intergenerational transition in headship as captured by a change in the individual designated as the household head.

Interhousehold Familial Transfers

Measuring interhousehold transfers is a relatively straightforward empirical task that relies directly on survey data from income and expenditure surveys or more specialized surveys of transfer behavior. Income and expenditure surveys typically report both gifts received and made, so that outflows and inflows can be calculated directly from the survey.

The most serious technical difficulty that arises is that transfers received may be seriously underreported in household surveys. Often, reported transfers made exceed reported transfers received. Part of the difference can be explained by remittances to and from abroad, but it is generally believed that differences due to reporting error can be substantial. According to one recent estimate, U.S. households reported giving $64 billion in 1997. They reported receiving $47 billion annually, on average, between 1993 and mid-1998 (Brown and Weisbenner 2002). In Taiwan the differences are smaller. In 1998, transfers received were NT$1.9 billion, while transfers given were NT$ 2.1 billion.

In a closed economy, aggregate outflows and inflows will be equal and should be adjusted to ensure aggregate consistency. In an open economy, outflows and inflows will no longer be equal. A further technical difficulty arises if inflows include capital transfers that arise from bequests. Transfers made by households that no longer exist at the time of the survey are not captured as outflows but may be captured as inflows.

NT Flow Accounts are estimated based on the assumption that all interhousehold transfers are between heads of households. With few exceptions, income and expenditure surveys do not provide information about transfers to and from individuals within households. One exception is the Taiwan FIES, which reports interhousehold transfer inflows to individuals and to the collective household. In 1998, 65.6 percent of the inflows were reported as to the household; 20.5 percent to the head, 1.0 percent to the spouse of the head, and only 1.9 percent to other household members.[9]

Intrahousehold Familial Transfers

Household members who consume more than their disposable income receive intrahousehold transfers from those who consume less than their disposable income. Disposable income is defined as labor income plus net public cash transfers (cash inflows less taxes) plus net interhousehold transfers. In some households, the disposable income of all members combined exceeds the total consumption of all members combined. The surplus is transferred to the household head and saved. In other households, total disposable income is less than total consumption, and they support some part of their consumption using asset income or, if necessary, by dis-

9. Calculated by authors.

saving. This portion of the deficit is financed by additional intrahousehold transfers from the household head to household members.

The consumption of durables, including the services from owner-occupied housing, are treated in a distinct fashion because, by assumption, the household head owns all household assets and thus all income generated by those assets flows to the head. The consumption of durables by any nonhead household member is financed by an intrahousehold transfer from the head to the member equal to the value of durable consumption.

Intrahousehold transfers to support current consumption (nondurable consumption) are financed by imposing a household-specific flat-rate tax on each member's surplus income. Within the household, each member is taxed at the same rate. The tax rate does not vary by age. Moreover, we assume that the household-specific tax rate for any sector (education, health, or other nondurable consumption) is identical for each household member.

Intrahousehold transfers are computed at the micro-level and aggregated to construct age profiles. To calculate the intrahousehold transfers requires estimates for each individual of consumption, labor income, net public cash transfers, and interhousehold transfers.

Bequests

Bequests capture all capital transfers that occur because of headship transitions. If a household head dies, if two independent households merge, or if the headship designation within an existing household shifts from one member to another, a capital transfer is generated. The estimates of bequests presented in table 3.2 are very preliminary and intended only to suggest magnitudes.

The estimates were obtained in the following way. First, the rate of return to assets was assumed to be independent of age. Thus, wealth by age has the same age distribution as asset income by age. Second, the survival rate of heads is assumed to be independent of wealth. If wealthy heads have a higher survival rate—a likely possibility—the mean age of bequests would be greater than those reported in table 3.2. Preliminary analysis suggests that the covariance between wealth and survival in Taiwan is relatively small, however. Third, we assumed that all capital transfers were to direct descendants, assumed to be thirty years younger than the household head. Thirty years is the mean generation length in Taiwan. If there is a parity bias in bequests—that is, if older children receive a larger share of bequests, the inflow would be to older individuals, on average, than assumed here. Given the low fertility and decline in parity bias in Taiwan, this is not likely to have a substantial effect. The use of a single age—thirty—rather than a distribution, also has an effect on the distribution of bequest inflows. In the United States, unlike Taiwan, if a decedent was married, the widower/widow is assumed to inherit the estate. Otherwise, the estate is in-

herited by the children of the decedent, whose ages are estimated using the average age shape of U.S. fertility over the last forty years. Future efforts will improve these estimates, and they are not emphasized here.

3.2.3 Estimation and Data Sources

National Transfer 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 entrepreneurial 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 Taiwan, we make extensive use of the 1998 Family Income and Expenditure Survey of Taiwan (DGBAS various). For the United States, we make extensive use of the Current Population Survey (1998, 1999, and 2000), the Consumer Expenditure Survey (1998, 1999, 2000), the Survey of Consumer Finances (1998 and 2001), and the U.S. National Health Accounts (1999). More information about data sources and methods is available on www.ntaccounts.org.

3.2.4 Preliminary Results

The results presented in the remainder of the paper are snapshots—National Transfer Accounts for a single year in Taiwan (1998) and the United States (2000). The full value of the accounts will be realized only when we have constructed estimates for many years. That work is underway, but the estimates will not be available for some time. In the absence of these more extensive data, we cannot, for example, track cohorts over time. The inability to do so limits the extent to which we can explain the cross-sectional patterns that we observe. In particular, we often can only speculate about the extent to which the results reflect distinctive features of the years for which the accounts were constructed, possibly substantial cohort effects, or the effects of age. Before discussing the results, it is worthwhile to point out some of the key features of Taiwan and the United States that may bear on the results.

First, the fiscal crisis began to strike East Asia beginning in 1997, and Taiwan's economic growth was atypically slow in 1998. The crisis in Taiwan was much less severe than in many other East Asian countries, however. The year 2000 was an interesting year in the United States; the stock market peaked in 2000, and the economy began to slow after an extended period of strong economic growth.

Second, the current demographic situation in Taiwan and the United States is similar in important respects. The total fertility rate is much lower in Taiwan than in the United States. Life expectancy is about one and

a-half to two years higher in the United States than Taiwan. Taiwan's population is younger, with 8.6 percent of its population aged sixty-five or older in 2000 as compared with 12.4 percent in the United States. Both countries experienced very substantial demographic change during the post-World War II era. The total fertility rate (TFR) was much higher and life expectancy at birth was much lower in Taiwan than in the United States in the 1950s, but changed very rapidly. The United States experienced its baby boom from 1946 to 1964. These experiences may bear in important ways on the behavior of those who are now in their sixties and seventies. Migration patterns are also different between the two countries. The United States, of course, has had relatively high rates of net immigration during recent decades. Taiwan has not, but it did experience a huge influx of young adults—heavily male—from the Chinese mainland in 1949 to 1950.

Third, the economies of Taiwan and the United States are very different. Taiwan is a middle-income country with a per capita GDP of a little less than $12,600 in 2001. In the United States, per capita GDP was $35,700 in 2001. But in 1960, real GNP per capita was only $1,000 in Taiwan (in 2001 prices) as compared with over $14,000 in the United States. Between 1960 and 2001, Taiwan's real rate of growth of per capita GNP exceeded 6 percent per annum! This implies extraordinary differences between the lifetime earnings of successive generations. Given a mean generation length of thirty years and an annual growth rate of 6 percent, per capita income increases by six-fold each generation. In contrast, real per capita GNP in the United States grew at an annual rate of 2.2 percent between 1960 and 2001, yielding roughly a doubling of per capita income per generation.

The Lifecycle Deficit

The individual lifecycles in Taiwan and the United States are broadly similar, but with some important differences (Fig. 3.2). In both settings, children and the elderly consume substantially more than they produce. In Taiwan, young adults begin to produce as much as they consume at age twenty-four; in the United States at age twenty-six. In Taiwan, adults no longer produce as much as they consume at age fifty-seven; in the United States, at age fifty-nine. The span of years during which there is a lifecycle surplus is surprisingly short in both countries—thirty-three years both in Taiwan and in the United States.

The shape of the production (labor income) age profiles for Taiwan and the United States are strikingly similar until adults reach their early forties. To facilitate comparison of the United States with Taiwan, the profiles in fig. 3.2 have been scaled by dividing by the simple average of per capita production from ages thirty to forty-nine. Both the level and slope of the age profiles are sensitive to the particular scaling factor chosen. However, the percentage change in labor income associated with an additional year of

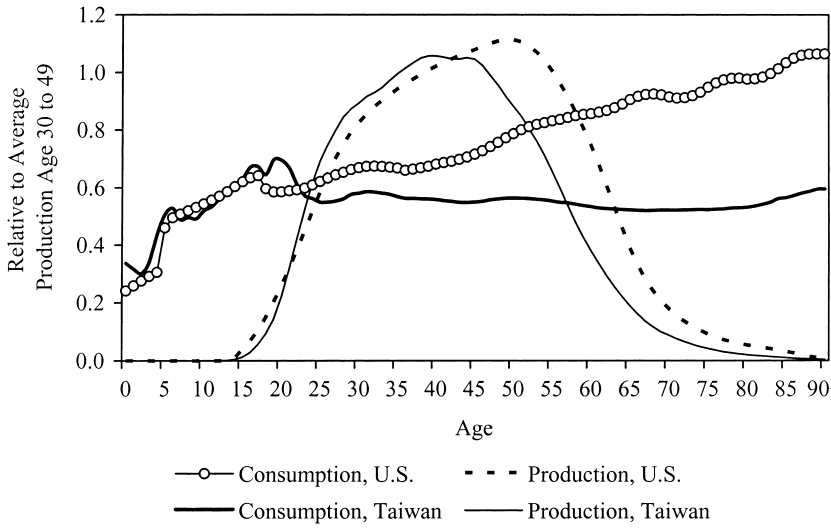

Fig. 3.2 Lifecycle of production and consumption, per capita, United States, 2000 and Taiwan, 1998

age is unaffected by scaling. In the late teens and early twenties, labor income grows somewhat faster in Taiwan, while between the early twenties and early forties, labor income grows somewhat faster in the United States. Between the mid-forties and late fifties, however, the income profiles diverge by as much as 5 percent per single year of age. The gap between the United States and Taiwan persists into the older ages. The differences in per capita labor income reflect differences in labor force participation—a particularly rapid drop in participation rates with age in Taiwan—due entirely to differences in female participation rates.

There are important similarities in the consumption patterns at young ages in Taiwan and the United States. Consumption by children, *relative to consumption by adults in their thirties and forties,* is similar in Taiwan and the United States. In both countries, consumption by young children is substantially less than consumption by older children and prime-age adults. In both settings, consumption by children increases in a large and discrete fashion as children enter school. The subsequent decline is associated with the decline in spending on education as children depart high school in the United States and college in Taiwan.

The differences in the consumption profiles for those in their thirties and older are quite striking, however. In the United States, the consumption profile rises very steadily with age. In Taiwan, the consumption profile is relatively flat, but declines gradually with age. The simple average of per capita consumption by those sixty-five to ninety-plus was 134 percent in

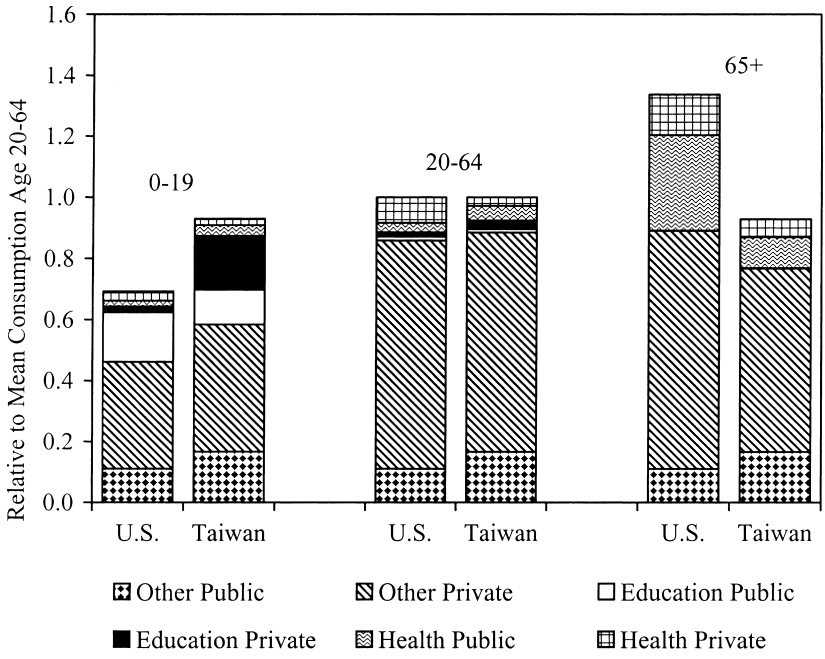

Fig. 3.3 Per capita consumption by age and components, United States, 2000 and Taiwan, 1998

the United States and 96 percent in Taiwan of per capita consumption of those age twenty to sixty-four. A substantial part of the difference can be attributed to the consumption of health (fig. 3.3). If we consider just nonhealth consumption, elderly and nonelderly adults in the United States had virtually identical consumption, while Taiwan elderly had nonhealth consumption equal to about 85 percent of the nonhealth consumption of adults between the ages of twenty and sixty-four. Thus, even controlling for health consumption, U.S. elderly were consuming at a much high rate relative to nonelderly adults than were the elderly in Taiwan.

The differences in consumption are most pronounced for the elderly, but they are not confined to them. In Taiwan, the average consumption by those age fifty to sixty-four was 95 percent of the average consumption of those age twenty to forty-nine, while in the United States the figure was 124 percent.

Why health consumption increased so much more steeply with age in the United States than in Taiwan and why nonhealth consumption declined with age in Taiwan are interesting questions, about which we can only speculate at this point. One possibility is that the lower consumption among older ages in Taiwan is a response to their lower relative current labor in-

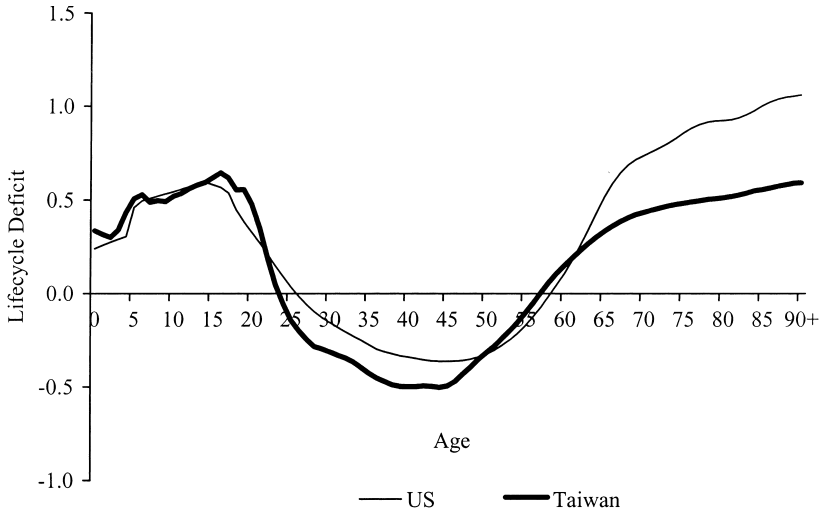

Fig. 3.4 Lifecycle deficits, Taiwan, 1998 and United States, 2000
Note: The lifecycle deficit is expressed relative to the simple mean of average production for those 30 to 49.

come. Another possibility is that the lower consumption of the elderly is a response to their relatively low lifetime labor income. Perhaps institutional differences are playing a role, with U.S. consumption patterns reflecting greater reliance on public transfer programs and Taiwan's greater reliance on familial transfer programs. Familial transfer programs internalize costs of excess consumption to the family.

The per capita deficits (fig. 3.4) are closer than their constituent elements—consumption and labor income. Taiwan's surplus is greater for young working-age adults—those under the age of fifty; the surplus values are similar for adults in their fifties and early sixties. The most striking difference between the two series is the substantially larger lifecycle deficit for U.S. elderly. Given the age distribution of the population, the lifecycle reallocation system of the United States shifts a larger share of resources to older ages than does the Taiwan reallocation system. That the U.S. population is older than the Taiwan population only serves to reinforce this feature of the U.S. reallocation system.

The Reallocation System

The broad features of the reallocation system are presented in figure 3.5 for Taiwan in 1998 and in figure 3.6 for the United States in 2000. Panel A reports the aggregate flows to and from each age group. Panel B reports the per capita flows. Four economic forms used to reallocate resources are distinguished: asset-based reallocations, public transfers, private transfers,

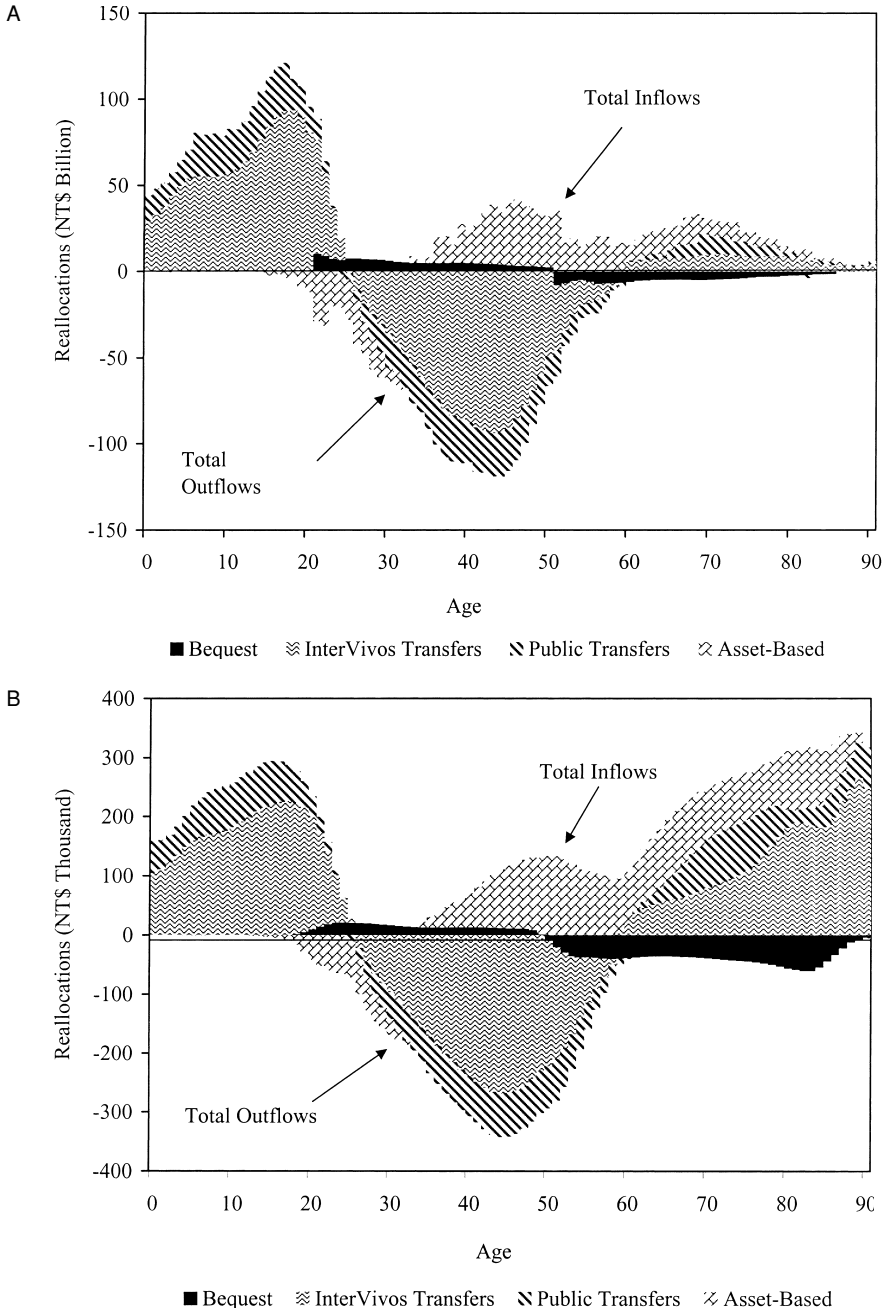

Fig. 3.5 ***A,*** **Components of age reallocations aggregate values, Taiwan, 1998;** ***B,*** **Components of age reallocations per capita values, Taiwan, 1998**

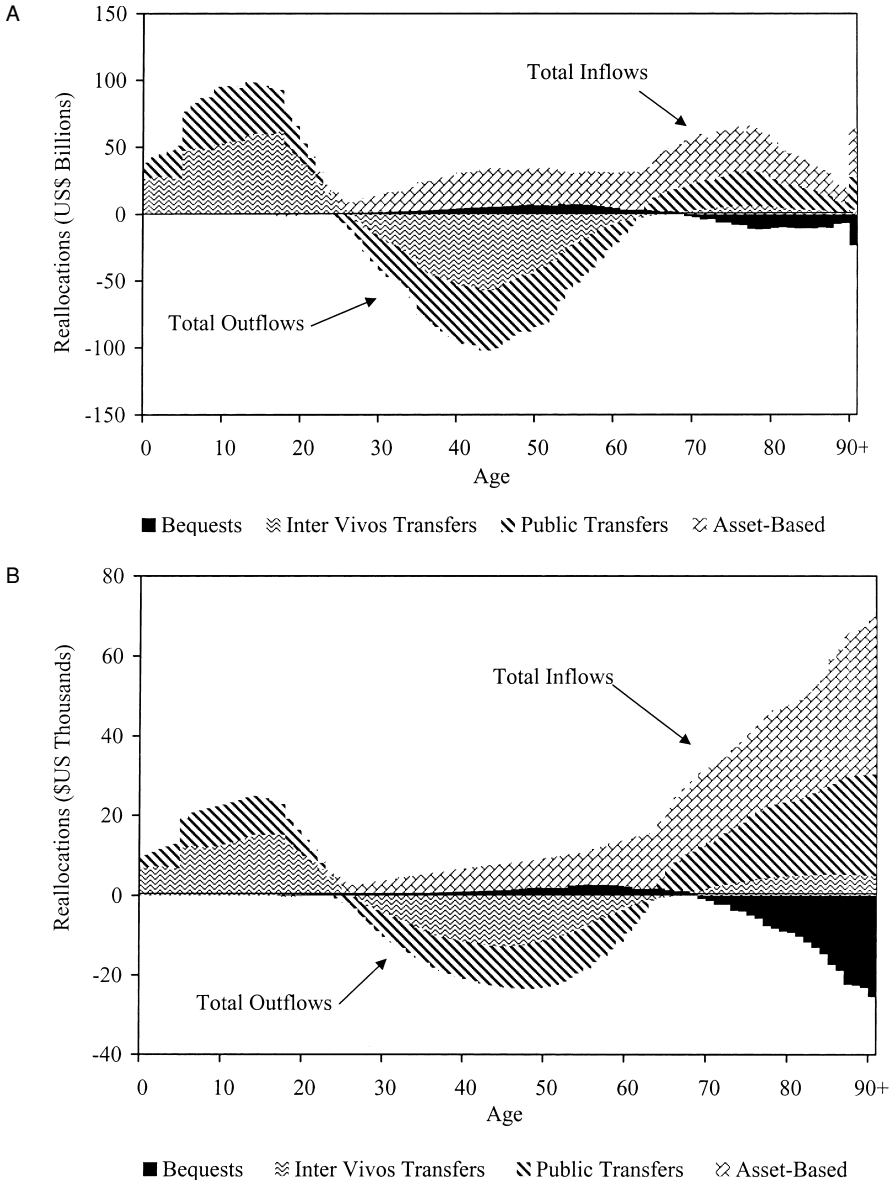

Fig. 3.6 ***A,*** **Components of age reallocations, aggregate values, United States, 2000;** ***B,*** **Components of age reallocations per capita values, United States, 2000**

and bequests. Negative values represent outflows and positive values represent inflows. The values are stacked in the figures. For example, teenagers in Taiwan received net transfers of about $NT 100 billion, of which about one-fourth was public and three-fourths was private. At many ages there are simultaneously inflows from one system and outflows from another system. In both the United States and Taiwan, asset-based reallocations are producing inflows to most working ages while public and private transfers are producing outflows at the same ages. The outflows less the inflows equal the lifecycle deficits for Taiwan and the United States.

The reallocation systems that support children are similar in Taiwan and the United States. In both, transfers dominate the reallocation system for children, with total transfers nearly equal to total reallocations. Familial transfers are particularly important. Private, intrahousehold transfers accounted for 74 percent of all transfers in Taiwan and 57 percent in the United States.[10] The importance of familial transfers should not come as any great surprise. We know that asset-based reallocations are infrequently used 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 both Taiwan and the United States—and no doubt elsewhere.

Public transfers to children are also quite substantial. In Taiwan, 24 percent of all transfers were public transfers, as compared with 38 percent in the United States. As can be seen in figure 3.3, a significant portion of these transfers is public education spending. Of roughly equal importance is children's pro rata share of pure public goods and other goods that cannot be assigned to specific individuals.

In Taiwan and the United States, the old-age reallocation systems are very different than the child reallocation systems. The elderly 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 dissaving 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.

For U.S. elderly, asset reallocations are very important, constituting 65.3 percent of life-cycle reallocations. Of this total, 65.1 percent of total reallocations was net asset income and 0.2 percent was dissaving. At first

10. Dependent children do not receive interhousehold transfers in the accounting system, by assumption.

glance this seems to provide strong support for the life-cycle saving hypothesis and runs contrary to previous empirical research—that U.S. elderly save. However, the saving reported here includes the dissaving that occurs because the death of households generates downward transfers of assets. For the cohort, this is dissaving but is not undertaken for life-cycle purposes. If we confine our attention to surviving households, about half of reallocations were asset reallocations and half were transfers. Income on assets amounted to 65.1 percent of reallocations as before, but 16.9 percent of reallocations were saved and the remainder (48.2 percent) was devoted to the life-cycle deficit. Thus, our estimates imply that the elderly did save, but they also relied heavily on the income generated by assets accumulated during their working years. This provides support in a different form for the life-cycle hypothesis.

For Taiwan's elderly, asset-based reallocations were also important but less so than in the United States. Asset-based reallocations were 40.9 percent of total reallocations; asset income amounted to 54.2 percent of total reallocations, but 13.3 percent of that was saved. Given that bequests were equal to 19.2 percent of total reallocations, total saving by survivors was 32.5 percent of total reallocations. Considering only surviving households, asset-based reallocations were 21.7 percent of total reallocations (54.2 percent in asset income less 32.5 percent that was saved). The surviving elderly in Taiwan had less asset income and saved more than their U.S. counterparts. Asset reallocations were thus less important to surviving elderly households in Taiwan than in the United States.

Transfers were important components of the reallocation systems for the elderly in both countries but, again, a clear picture requires careful attention to the role of bequests. In the United States, public transfers are particularly important. If we ignore bequests, public transfers constituted 37.0 percent and private transfers 7.3 percent of total reallocations to the elderly. Transfers are almost as important as asset-based reallocations, and public transfers dominate. Private transfers to the elderly are small in the United States. Note, however, that private transfers are greater than one would think, based solely on interhousehold transfers, even in the United States. Once bequests are taken into account, however, we see that the direction of the private transfer is from the old to the young rather than the reverse. Bequests were more than twice private transfers to the elderly in 2000.

In Taiwan, public transfers were less important than in the United States, but private transfers far more than compensated for the lower level of public transfers. Public transfers were 31.0 percent of total reallocations for the elderly; private inter vivos transfers were 47.6 percent of life-cycle reallocations. Combined transfers excluding bequests were over three-fourths of life-cycle reallocations, with private transfers playing a particularly important role. Unlike the United States, private transfers are still in

an upward direction—from adult children to elderly parents—even after taking bequests into consideration.

In important respects the reallocations for those with life-cycle surpluses are just the counterpart for 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 U.S. elderly must be matched by large public transfer outflows from those in the working ages. Likewise, the large private transfer inflows to 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 coresidence patterns that, in turn, govern intrahousehold transfers.

In Taiwan, the burden of financing public transfers falls a little more heavily on those age thirty to forty-nine, for whom net public transfers are –13.5 percent of labor income, than on those age fifty to sixty-four, for whom net public transfers are –11.4 percent of labor income. In the United States, the opposite is true: the burden falls slightly more heavily on those age fifty to sixty-four, for whom net public transfers are –22.7 percent of labor income, than on those age thirty to forty-nine, for whom net public transfers are –21.6 percent of labor income. Private transfers in Taiwan, however, are a much heavier burden for those age thirty to forty-nine. Their net private transfers are –40.7 percent of their labor income. Inter vivos transfers are –43.3 percent of labor income. Net private transfers for those age fifty to sixty-four are –31.4 percent of their labor income and inter vivos transfers are only –19.2 percent of labor income. It is tempting to argue that those below fifty are heavily burdened because they are paying for the high consumption of children. The net transfers from those age 30 to 49 are more or less equal in absolute value to the net transfers to those under age thirty. The generation length in Taiwan is about thirty years, however, and it is likely that children are being supported by those over age fifty, and the elderly are being supported by those under age fifty. In the United States, net private transfers are smaller than in Taiwan, at –24.8 percent of labor income for those age thirty to forty-nine and –17.0 percent for those age fifty to sixty-four.

Unlike transfers, asset-based reallocations need not balance.[11] In both Taiwan and the United States, total asset income substantially exceeded total saving. As can be seen in figs. 3.5 and 3.6, asset-based reallocations are positive at most adult ages, not just at old age. In Taiwan, we see some

11. In golden rule steady-state growth, all asset income is saved and total net asset-based reallocations are equal to zero.

negative asset-based reallocations at young adult ages, but these are small. We see even less negative asset-based reallocations for the United States.

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 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 enter old age with a substantial amount of wealth. The key question is "Why is saving so much less than asset income among working adults?"

First, these are cross-sectional data, not longitudinal data. There may be particular features of the years in question—1998 in Taiwan and 2000 in the United States—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. The United States experienced an enormous run-up in the stock market, which peaked in 2000. Housing prices also increased very substantially in the United States. Perhaps working-age Americans responded to the significant increases in their real wealth by increasing their consumption and reducing their saving.[12]

Second, the cross-sectional patterns may reflect longer-run trends. In Taiwan, saving rates declined substantially between the late 1980s and the late 1990s. The United States has experienced a long-run secular decline in saving rates over the last three to four decades. It may be that in both countries, 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-based reallocation inflows at older ages.

A third point to consider is that the asset-based age reallocations are serving a life-cycle purpose other than the accumulation of pension wealth as envisioned in the standard life-cycle saving model. We think it is plausibly the case in Taiwan, where asset-based reallocation inflows are substantial for those in their forties and early fifties. At these ages, people in Taiwan are doubly burdened by dependent children and dependent elderly. This is reflected in the very substantial inter vivos transfer outflows at these ages. In a sense, life cycle saving is indirectly financing the consumption of

12. Net saving rates increased during the 1990s in the United States, but whether this is true at all ages is unknown.

the elderly by financing transfers from middle-aged adults to their elderly parents.

A final point is that the asset-based reallocation pattern will vary, depending on the importance of bequests and behavior regarding bequests.

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 by including familial, intrahousehold transfers, and dissaving. In figs. 3.7 and 3.8 we compare the sources of support; that is, the methods by which consumption was financed, in Taiwan and the United States.

The methods by which the consumption of dependent children—defined as those under the age of twenty—are financed are very similar in Taiwan and the United States. In both countries, earnings by children are relatively unimportant. Virtually all consumption is financed by transfers. Private transfers dominate, totaling 57 percent of consumption in the

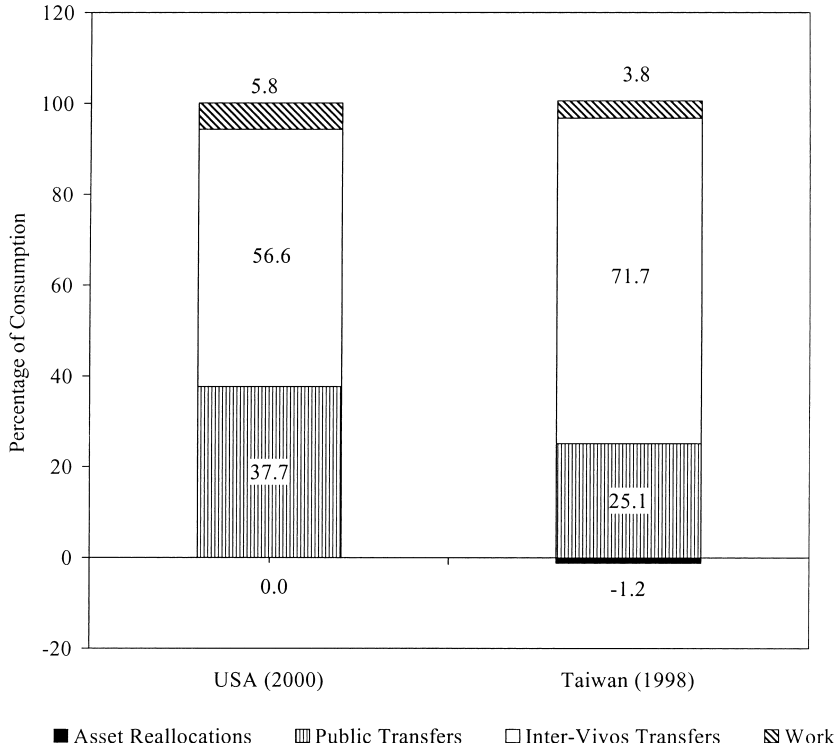

Fig. 3.7 Finance of consumption, young dependents age 0 to 19

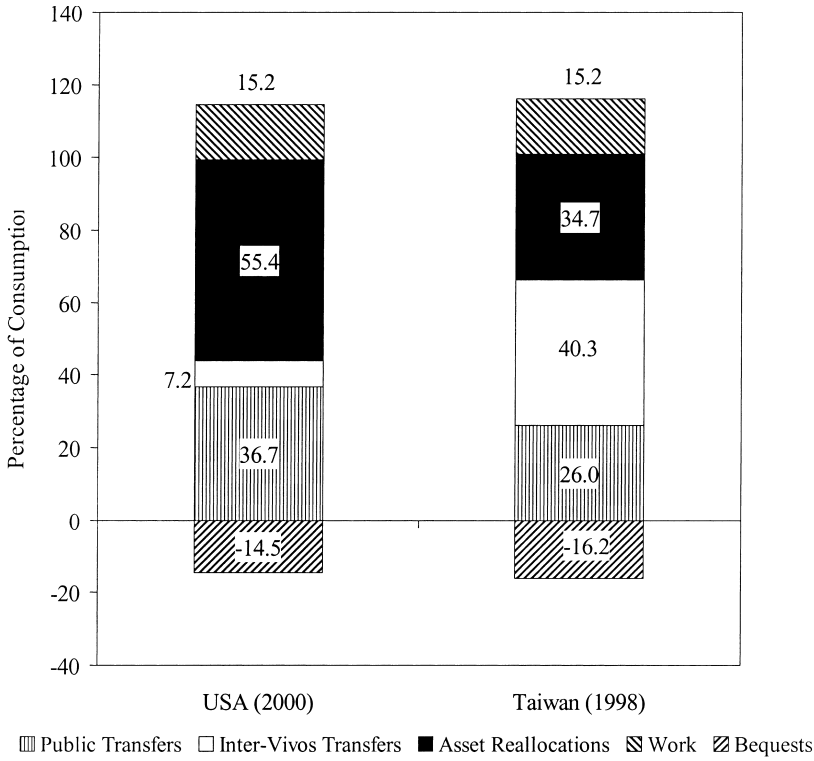

Fig. 3.8 Finance of consumption, persons 65 or older

United States and 72 percent of consumption in Taiwan. The remainder consists of public transfers.

The finance of consumption by the elderly is very different in Taiwan and the United States. Work plays a similar role in both—contributing about 15 percent of consumption in both the United States and Taiwan. Asset-based reallocations and public transfers are more important in the United States. Private, familial transfers are more important in Taiwan. The greater importance of public transfers in the United States and private transfers in Taiwan are consistent with what relatively casual observers might expect. The greater importance of asset-based reallocations in the United States may come as a surprise—perhaps to many. Saving rates are not as high in Taiwan as in other East Asian countries. Moreover, the current consumption by the elderly in Taiwan is very high relative to lifetime earnings. In an economy characterized by such rapid economic growth, the relatively flat consumption profile shown in fig. 3.1 would almost certainly be possible only if the reallocation system relied more on transfers and less on assets.

3.3 Conclusions

The reallocation of resources across age groups is an important feature of any economy, yet it goes largely unmeasured at the aggregate level. The objective of the research described here is to rectify that situation. By doing so we should increase our understanding of generational differences in the command over resources, the institutional mechanisms by which resources are redistributed across generations, and how population aging is likely to influence economic performance.

The research reported here, however, is in an early stage. The estimates are preliminary and many of the methodologies are still being refined. Moreover, there are a number of difficult issues that cannot be addressed in an entirely satisfactory way, given the data and analytic techniques that are currently available. Nonetheless, we believe that the development of the National Transfer Account system will prove useful in the same way that National Income and Product Accounts are useful, despite their flaws. The value will be enhanced, in particular, as estimates for additional years allow us to follow cohorts over their life cycles.

The results reported here provide information about support systems that has not been previously available. We provide detailed information about the asset accumulation process and how it relates to variation in life cycle needs. In both countries, asset income is important to those who are currently retired, but dissaving is not. In Taiwan, asset income indirectly supports the elderly by financing transfers from middle-aged adults to elderly parents. Somewhat surprisingly, the accumulation of assets by working-age adults is modest in both countries. Why this is so and whether it is a persistent or transitory feature is a question that cannot be answered with a single year of data.

One of the most important objectives of this research is to quantify both public and private transfers in a way that allows comparison and analysis. We find that private, familial transfers from adult children to their elderly parents are very important in Taiwan—similar in magnitude to public support to the elderly in the United States. Familial transfers are almost entirely intrahousehold transfers.

Public transfers are also important in Taiwan and, although not documented here, known to be growing. Further analysis will hopefully shed light on whether the growth of public transfers has served to crowd out private transfers or whether the elderly have gained in terms of consumption by being able to rely on a mix of assets, public programs, and familial transfers.

One of the most striking differences between Taiwan and the United States is the age pattern of consumption. In Taiwan, consumption appears to vary little by age. In the United States, however, consumption by the elderly is very high. A large portion of the extra consumption—but by no

means all—is due to high consumption of health care goods and services. This will clearly have important implications for how population aging will influence the economies of Taiwan and the United States.

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Comment Andrew Samwick

This is a very interesting chapter that seeks to evaluate a methodology for apportioning the traditional National Income and Product Account (NIPA) aggregates to persons by age. This methodology allows us to better understand how demographic trends and fiscal policy interact to change lifecycle consumption and income profiles. It expands the usual

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