RONALD LEE AND ANDREW MASON

Population Aging and the Generational Economy

A Global Perspective

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Preface

The project directors and lead authors, Lee and Mason, have long been interested in the role of age in economic growth and development, contributing papers on the role of age distribution in saving, economic growth and development, externalities to childbearing, fiscal consequences of immigration, and stochastic forecasts of government budgets. In the early 1990s Lee developed a framework for constructing intergenerational transfer accounts and applied it to the United States. This was followed by an application to Taiwan by Mason working with Tung and Lai.

In 2003 we decided to develop our methods more fully and to see if we could interest other researchers in working with us to construct accounts for additional industrial and Third World economies. This project was conceived as a relatively modest effort involving seven economies, including the original two. Its potential value seemed far-reaching for many reasons. Many countries, rich and poor, are experiencing rapid changes in age structure. Although fertility decline initially leads to beneficial increases in economic support ratios, this phase is inevitably followed by population aging and painful declines in support ratios. These changes strain the existing structures governing intergenerational flows with potentially critical implications for economic growth, generational equity, the sustainability of public programs, and other macroeconomic issues. Many important studies have provided insights about these issues. The theoretical foundations had been developed through pathbreaking work by Samuelson, Diamond, Tobin, Arthur and McNicoll, and many others. Extensions and elaborations by Willis and Lee are the more direct antecedents of this research effort.

Moreover, national statistical agencies, international organizations, and university-based research institutions have collected and organized a vast amount of statistical data on which to draw. Population censuses document changes in population age structure. The United Nations System of National Accounts provides both a conceptual framework and the macroeconomic data that serve as the starting point for any effort to describe national economies. Household survey data on wages, labor force, consumption, transfers, household composition, and other variables provide the information necessary to estimate economic flows across ages. In some instances these data have been harmonized and collected into readily available statistical data bases maintained by the United Nations Population Division, the United Nations Statistical Division, the World Bank, the International Monetary Fund, and the Organisation for Economic Co-operation and Development. We have relied on these sources of information, but we have also found it essential to rely directly on national statistical agencies and survey organizations for the detailed information necessary to carry out this work.

After work started on the initial seven economies, researchers in a number of other countries became interested, and the project grew rapidly. At the same time, some of the original members obtained funding to bring in important additional economies. Currently the accounts are being constructed by research teams in more than 30 countries on six continents.

The accounts have been constructed in a decentralized fashion by research teams drawn from universities, research institutes, national statistical offices, and other government agencies in each country. This approach has important advantages. First, each of the research teams has extensive knowledge of the local institutions, policies, culture, statistical systems, and so forth. This knowledge is essential both to constructing reliable accounts and to interpreting distinctive features of each country's generational economy. Second, the decentralized structure has greatly enhanced the human resources devoted to this effort. Although funding agencies acknowledged below have provided critical support for the project, much of the work has been done by researchers who have generously contributed their time. Third, the decentralized approach provides an ideal way to disseminate the results and to gather critical feedback in the countries studied.

Coordination is essential for a decentralized approach, and we have relied on a regional structure to facilitate implementation of the project. Regional groups have raised funds, convened meetings, encouraged collaboration among countries, and facilitated the project in many other ways. The Africa project is based at the African Economic Research Consortium and is led by Olu Ajakaiye, Doyin Soyibo, and Germano Mwabu. The Asia project is based at the Nihon University Population Research Institute (Tokyo) under the direction of Naohiro Ogawa and with important contributions by Hirofumi Ando and Rikiya Matsukura. The European project is led by Thomas Lindh of the Institute for Future Studies (Stockholm) and Alexia Fuernkranz-Prskawetz of the Vienna Institute of Demography. The Latin American project is based at the Centro Latinoamericano de Demografía (CELADE)/United Nations Comisión Económica para América Latina (CEPAL) in Santiago and is led by Dirk Jaspers, Paulo Saad, and Tim Miller. Core infrastructure for the global project is maintained at the University of California – Berkeley, and the East-West Center, Honolulu.

Although the organization is decentralized, from the start great efforts have been made to ensure that methods and measures have been uniform across the many economies, so that results are fully comparable. In the few cases in which country teams have used a different method for some aspect of the accounts, those economies are not included in comparative analyses for that aspect. Methods were refined and applied through a series of meetings and training workshops that varied in length from two days to four weeks. Seven meetings of the entire research network have been held: two at the East-West Center, four at the Center for the Economics and Demography of Aging, University of California – Berkeley, and one at both Nihon University Population Research Institute (Tokyo) and Sungkyunkwan University (Seoul). Three training workshops have been held at the East-West Center. Regional meetings have been held in Mombasa, Kenya, and Cape Town, South Africa, under the auspices of the African Economic Research Consortium. Meetings for the Latin American region have been held at CELADE (Santiago) and the Universidad de Costa Rica (San Pedro). European meetings have been held at the Institute for Future Studies (Stockholm) and the Max Planck Institute for Demographic Research (Rostock). In addition, there have been national seminars organized by research teams in Brazil, Chile, Costa Rica, Mexico, and Uruguay in Latin America and in China, India, Indonesia, the Philippines, and Thailand in Asia. Attending those seminars were representatives of academia, statistical organizations, and other government agencies.

All National Transfer Account estimates have been subject to a rigorous review process that involved multiple reviewers. Each of the NTA components was reviewed by a subject-matter specialist. In addition, the complete set of accounts for each economy was subject to a second review. Estimates were checked for internal consistency. Results were compared with related research in previous studies and to statistical databases published by international agencies.

A complete set of accounts cannot be constructed for every economy at this time because of gaps in the available statistical data. Researchers in some countries are relatively new to the project and are continuing to work on the construction of accounts. The NTA website (www.ntaccounts.org) provides new estimates that were not available for this book.

Countries vary in the reliability and comprehensiveness of their statistical information. All of the countries have nationally representative household surveys of income and expenditure, and some countries have multiple household surveys. In the great majority of cases, however, information about the institutionalized population is limited, although the costs of long-term care are reflected in the accounts. The US accounts do include the institutionalized population.

All governments in the study have National Income and Product Accounts, but countries vary in the completeness of their accounts and the extent to which they conform to the UN System of National Accounts. Estimates of depreciation, mixed income, or saving are not reported in one or more countries. In some cases, economic aggregates have been estimated by researchers using information available from international organizations or based on unpublished information provided by national statistical offices. Documentation and statistical issues are identified in country chapters and in information available on the NTA website.

We gratefully acknowledge support from the National Institutes of Health through grants to Lee (NIA R37 AG025247 and NIA P30 AG-012839) and Mason (NIA R01 AG025488). The International Development Research Centre (IDRC) gave early and generous support to the project through grants to the African Economic Research Consortium, CELADE, the East-West Center, and Nihon University Population Research Institute. The Ministry of Education, Culture, Sports, Science and Technology of Japan supported the project through a grant to Nihon University Population Research Institute (MEXT.ACADEMIC FRONTIER). The European Science Foundation has supported work in Europe. The United Nations Population Fund (UNFPA) and the MacArthur Foundation have supported project activities through grants to the East-West Center. The United Nations Population Division has provided invaluable support to the project in many ways.

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Ronald Lee
Andrew Mason

PART I

Fundamental principles and concepts

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1. Population aging and the generational economy: key findings

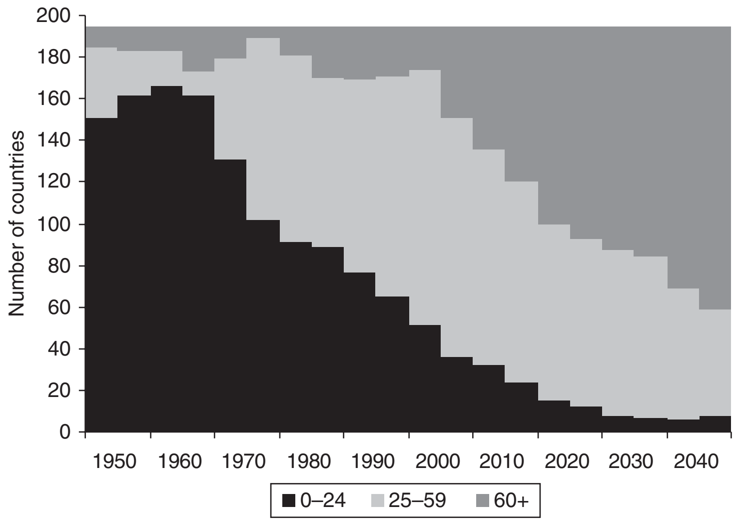
Andrew Mason and Ronald Lee

The goal of this study is to improve our understanding of how changes in population age structure are influencing national economies. Until recently changes in age structure were favorable for most countries as populations became increasingly concentrated in the working ages. For some countries in Asia and most in Africa, this trend continues today. But elsewhere – in the West, East Asia, and Latin America – the share of the working-age population is in decline or soon will be, as the share of the elderly population grows. Many concerns have been raised: bankruptcy for publicly funded health care and pensions systems, slower economic growth and possibly decline, unfair treatment of children vis-à-vis the elderly, the collapse of financial markets, and the burdening of future generations, to name a few.

Effectively addressing the economic challenges of population aging is especially difficult, for two reasons. The first is that countries cannot rely exclusively on their own experience because in any given country changes in population age structure are occurring for the first time. Hence it is essential to learn from societies that have been the first to experience the age transition. The second problem is that many issues are addressed in piecemeal fashion, relying on partial and incomplete data. This study addresses this problem by relying on a newly developed system of accounts, National Transfer Accounts. Of course, there are many outstanding studies of these issues, and we draw upon them; but many questions remain, and myths and misunderstandings persist about the economic implications of changes in population age structure.

THE GLOBAL AGE TRANSITION

On a global scale the age transition began around 1950. Although some Western countries experienced fertility transitions and population aging in the nineteenth and early twentieth centuries, the population age



Source: Calculated by authors using UN population estimates and projections (UN Population Division 2009).

Figure 1.1 Distribution of 195 countries according to age group (0–24, 25–59, or 60+) with the largest absolute increase in population: 1950–2050 (projected)

distribution hardly changed at the global level (Lee 2003b, p. 168). At mid-century, couples in many industrialized countries increased their child-bearing, producing the so-called baby boom. In the developing world, couples also had larger families – not because fertility rose but because infant and child mortality declined (Figure 1.1). The share of children in the world's population increased substantially, reaching a peak in 1975, when there were 125 children under the age of 25 for every 100 adults 25 or older.

Beginning in the mid-1970s in many countries, working-age populations, those 25–59,[1] began to increase more in absolute numbers than the child population. This change was driven by two factors: women reduced their childbearing, and large cohorts of youth born during the 1950s reached the working ages. After 35 years, the second phase of the age transition has had a profound effect on population age structure. In many countries the working-age population outnumbers the combined populations of children and elderly. In China, for example, the working-age population is currently about 700 million as compared with a combined child and elderly population of 650 million (UN Population Division 2009).[2]

In many countries the boom in the working-age population is drawing to a close and the future will be dominated by growth in the 60+ population. For the world as a whole, those in the working ages currently outnumber those 60+ by 4 to 1. By 2050 the ratio is projected to drop to 2 to 1. This third phase of the global age transition is without precedent. Populations in the future will be much older than ever before in human experience.

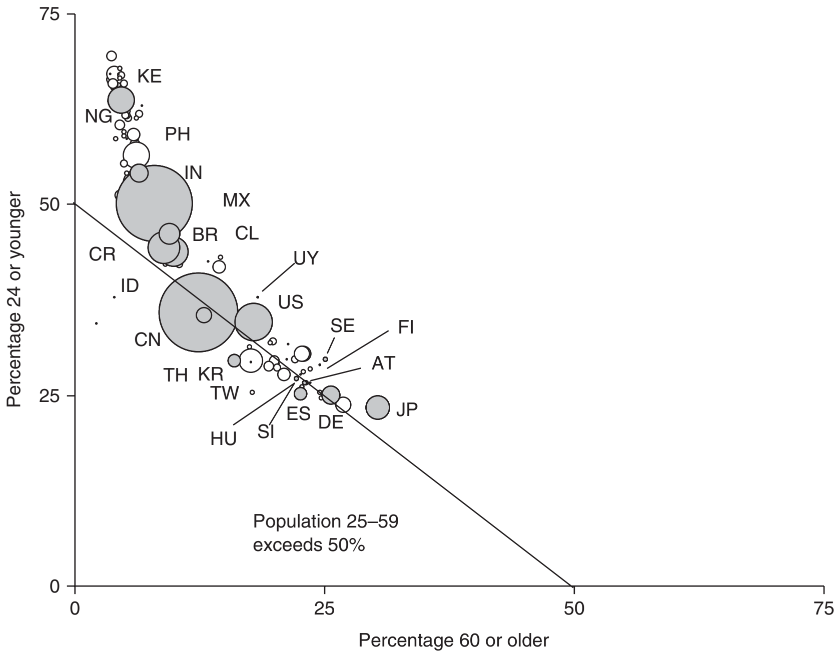
The third phase of the global age transition is being driven primarily by the historical swings in fertility outlined above. Members of the large 1950 birth cohort experienced their 60th birthday in 2010. They and the large cohorts that follow will fuel the growth of the 60+ population. Because fertility has declined to low levels, cohorts entering the working ages will be smaller than those that are departing. Growth in the 60+ population is also being fueled by gains in life expectancy. People in their 60s and 70s are much more likely than in the past to survive into their 80s, 90s, and even into their 100s.

Important national and regional details cannot be neglected. Countries are at very different stages of the age transition because of differences in the timing and speed of fertility and mortality decline. The industrialized countries and several East Asian societies are furthest along in the transition, followed by those in Latin America (Figure 1.2). Many South Asian countries still have relatively young populations, and most African countries are in the earliest stages of the age transition.

Population aging is expected to occur first and to be particularly severe in some higher-income societies, mostly in East Asia and Southern and Eastern Europe, because they have very low fertility rates. Population aging is expected to be more gradual in the US and Northern Europe, but growth in their older populations will be substantial nonetheless. Lower-income countries will also experience significant population aging in the coming decades and will be confronting the same kinds of challenges faced earlier in higher-income countries.

THE GENERATIONAL ECONOMY

Population age structure influences an economy for a simple reason. The economic behavior of individuals varies in systematic ways as they proceed through life. School attendance, childbearing, labor force participation and productivity, saving, and consumption all vary with age. Thus the transition in population age structure influences the shares of the population that are in school, or working, or retired. Other things being equal, populations concentrated at ages with higher saving rates or



Notes:
The area of a bubble is proportional to a population's size.
Study populations are highlighted and labeled.
See Figure 1.5 for the names associated with the abbreviations.

Source: UN Population Division (2009).

Figure 1.2 Population age structure: 23 populations, 2010 (projected)

greater wealth will have higher average saving rates or higher per capita wealth. Of particular importance in recent decades has been the increase in the share of the population in the working ages and thus productively employed. China, the Republic of Korea (South Korea), and Spain all benefit because more than half of their populations are concentrated in the working ages. In stark contrast, only one third of Kenya's population falls in the working ages, contributing to the low standard of living prevailing there (Figure 1.2). In the coming decades, however, economies will be increasingly influenced by the economic behavior of the elderly – whether they work, whether they spend down their wealth, and whether they make large demands on health care systems.

To fully understand the implications of population age structure, it is essential to look beyond these compositional effects. Changes in the number and behavior of one age group influence the economic circumstances and behavior of other age groups. Some of these effects are mediated by the marketplace. Rapid growth in the number entering the workforce may depress general wage levels. An increase in the older population, those most likely to own assets, may depress interest rates.

Many of the interdependencies across age groups or generations, however, are not mediated by the marketplace. Vast quantities of economic resources flow from one generation to another outside the marketplace. Within families, resources flow from parents to their dependent children or from adult children to their elderly parents. Governments tax prime-age adults to provide schooling to children, pensions to the elderly, and health care to everyone, especially the elderly. Age structure influences the size of the populations giving and receiving these flows, and thus changes in age structure have the potential for disrupting these economic structures.

The goal of this research effort is to provide a systematic and comprehensive approach to measuring and analyzing economic flows from a generational perspective. We begin by defining the generational economy:

> **Generational economy** *n* (1) the social institutions and economic mechanisms used by each generation or age group to produce, consume, share, and save resources; (2) the economic flows across generations or age groups that characterize the generational economy; (3) explicit and implicit contracts that govern intergenerational flows; (4) the intergenerational distribution of income or consumption that results from the foregoing.

Four economic activities are central to the generational economy: working, consuming, sharing, and saving. Work and its product vary over the lifetime of individuals in ways that depend on biology, culture, and institutions as well as on the desire or the need to consume. This gives rise to the economic lifecycle with extended periods at the beginning and the end of life when people consume more than they produce. These periods are balanced, to an extent, by the working ages, during which people produce more than they consume.

Sharing and saving are essential counterparts to the economic lifecycle. These two economic mechanisms – and only these two – provide the means for filling the gaps between production and consumption for the young and the old. Sharing gives rise to intergenerational transfers that come in many forms. Taxpayers, who are heavily concentrated in the working ages, fund schools for children, pensions for the elderly, and health care programs, which often provide services to the oldest members of our populations. Parents provide for their children, often with substantial assistance from grandparents. In many societies the elderly rely on their adult children for their material needs.

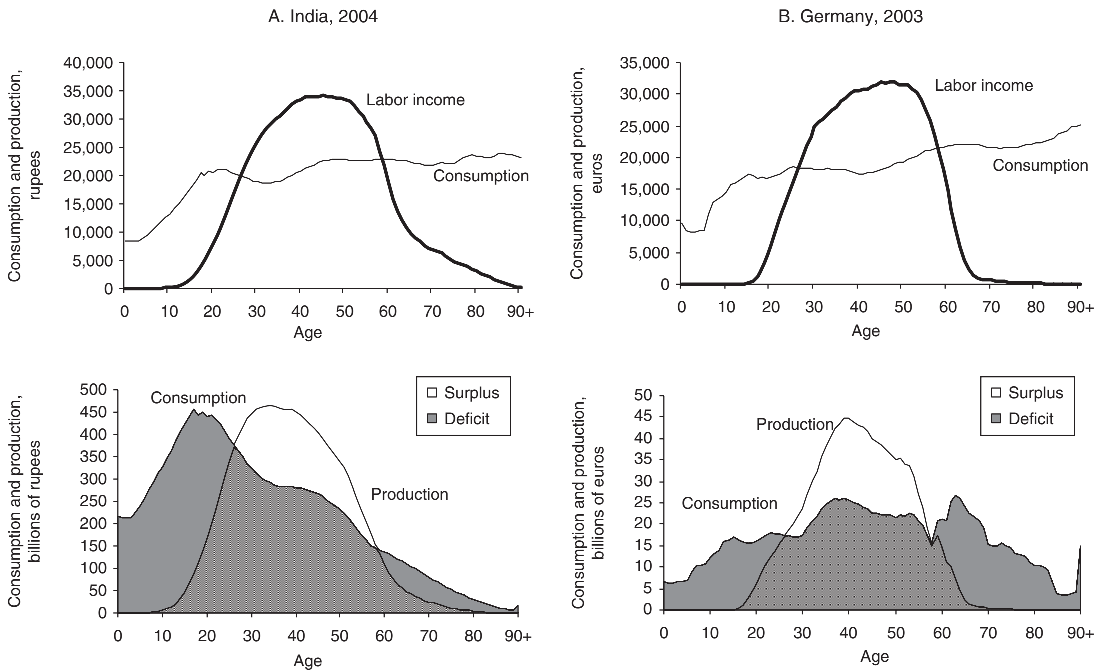
Saving is the means by which resources available at one age at one point in time become available at a later age at a later point in time. One kind of saving is lifecycle saving. Individuals can accumulate assets during their working ages and rely on those assets in retirement – using asset income and spending down their assets to fund their lifecycle deficit, the gap between consumption and labor income. By participating in employment-based pension plans, acquiring a home, building a business, and accumulating personal savings, workers accumulate lifecycle savings. Young adults can also use savings and the assets they generate to deal with lifecycle problems. They can borrow from older adults who have already accumulated assets. Examples of such behavior include the use of credit cards and student loans.

A more complex response to the lifecycle problem involves both sharing and saving. For many in the working ages, labor income is insufficient to fund their own consumption plus the transfers they make to children and the elderly. Asset income may fill the gap by funding transfers to others. In this way, both sharing and saving are used to meet the lifecycle needs of children and the elderly.

Producing and Consuming: the Economic Lifecycle

An important objective of this research is to measure the four elements of the generational economy. We begin with the economic lifecycle, showing how producing and consuming vary over our lives. Many important details are discussed by Sang-Hyop Lee and Naohiro Ogawa in Chapter 5 on labor income and by An-Chi Tung in Chapter 6 on consumption. The per capita consumption and labor income profiles for each economy are shown in Chapter 6, Figure 6.1. Many chapters in Part III provide a richer explanation of the economic lifecycle and how it varies among the individual economies. Chapter 3 provides a more detailed discussion of the methods used to construct the profiles.

Important features of the economic lifecycle are illustrated in Figure 1.3 by comparing two countries: India (Chapter 26) and Germany (Chapter 16). The values in the upper two panels are per capita estimates of consumption and labor income measured in a comprehensive fashion. Consumption includes all public and private consumption. Labor income includes the earnings of employees who work in the formal sector plus the returns to labor of those who are self-employed or unpaid family workers. The labor income profiles reflect labor force participation, unemployment, hours worked, and wages. Consumption and labor income are both valued prior to the assessment of any taxes.



Note: Per capita values are shown in the upper two panels, aggregate values in the lower two panels. India is shown on the left, Germany on the right.

Figure 1.3 Economic lifecycles: per capita and aggregate consumption and production (labor income) by age for India (2004) and Germany (2003)

India and Germany have broadly similar per capita labor income profiles. However, child labor is much greater in India, the India profile peaks at a somewhat younger age, and labor income at old ages is more salient in India than in Germany. The per capita consumption profiles are also similar. Young children consume less than adults in both countries, primarily because the material needs of young children are less than those of adults. Consumption rises sharply as children age, driven in part by their consumption of public and private education. Consumption by adults is relatively flat in India whereas in Germany adult consumption increases significantly with age. The increase in Germany is primarily a consequence of health care spending. (Even sharper increases in consumption late in life are found in Japan, Sweden, and the US.) A surprising feature of the lifecycle profiles is that the ages that mark the deficit and surplus periods are so similar in India and Germany. In both countries those who are 26 or younger have a lifecycle deficit: their consumption exceeds their labor income. Those who are 58 or older are in deficit in Germany, whereas those 59 or older are in deficit in India.

The two lower panels in Figure 1.3 show the aggregate values for consumption and labor income by all individuals at each age. The dominant influence of population age structure is apparent in the aggregate lifecycle graphs. In the country with the young population, India, the child deficit dominates, while in the country with the old population, Germany, the old-age deficit is much more prominent. Germany's population is also more heavily concentrated in the surplus ages than is India's, producing a larger aggregate surplus in Germany.

Sharing and Saving: Economic Flows across Age

The lifecycle problem is quantified by comparing production and consumption at each age. Its solution is captured in two inter-age flows that arise from sharing and saving. First, countries can rely on net transfers to fund the lifecycle deficits of the young and the old. The surpluses shown in the lower panel of Figure 1.3 can be given to children and the elderly through either private or public institutions. Even a cursory examination of India or Germany reveals, however, that the total surplus is substantially less than the sum of the young and old deficits. In some countries, such as Mexico, Nigeria, and the Philippines, net transfers from the rest of the world augment transfers from those in the working ages; but in most countries these flows are modest. Relying on assets generates the additional resources required to fund lifecycle deficits.

The richer detail on inter-age flows provided by National Transfer Accounts is illustrated in Figure 1.4, using estimates for the US in 2003

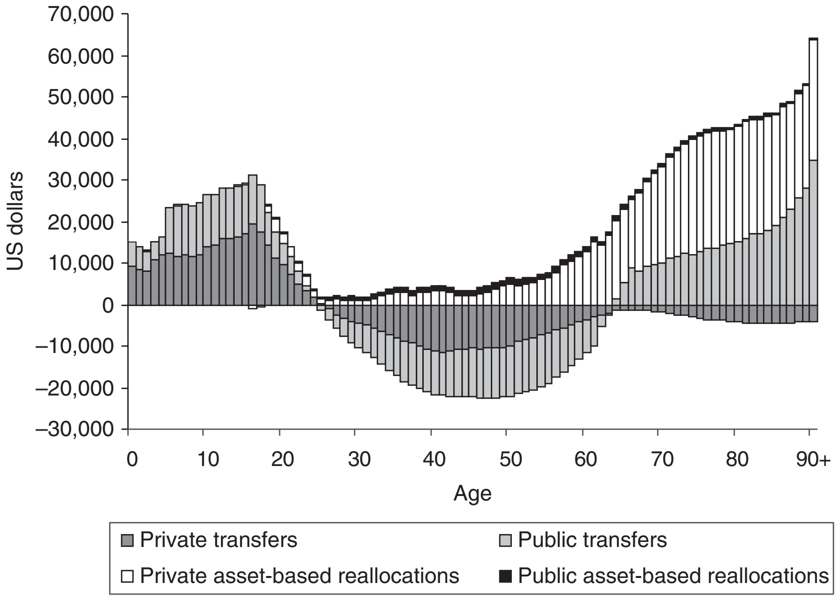


Figure 1.4 Funding the lifecycle deficit: United States, 2003 (per capita values)

(Chapter 15). Four inter-age net flows are documented: public and private transfers and public and private asset-based reallocations. Asset-based reallocations are equal to asset income (an inflow) less saving (an outflow). Asset income will be negative and generate an outflow if individuals are in debt. Dissaving (spending savings) will generate an inflow. Net transfers plus asset-based reallocations must equal the lifecycle deficit for each age group. This is an accounting identity that must hold (see Chapter 3).

Transfers are very important in the US. The lifecycle deficits of the young are funded by a combination of public and private transfers, with public transfers of greater importance for school-age children. Persons over the age of 65 (the age of eligibility for public pension and health care programs for the elderly) have positive net public transfers. These transfers rise very steeply at older ages in the US because of heavy spending on health care late in life. Net private transfers to the elderly are negative at all ages, including those who are 90 and older, because the elderly give more to their children and grandchildren than they receive. These values do not include bequests, for which reliable estimates are not yet available. If they were included, private downward transfers, those from the elderly to their children and grandchildren, would be much greater than shown here. Those who fall in the surplus ages (26–58) in the US have net transfer outflows, and public transfers are slightly larger in magnitude than private transfers.

Asset-based reallocations are close to zero for minors, who by definition cannot 'own' assets, save or dissave, or have asset income.[3] At all adult ages in the US, asset-based reallocations are positive. Young adults in the US generate asset-based inflows by accumulating private debt. Other asset-based inflows are generated by relying on asset income. For adults between the ages of 24 and 70 inclusive, private saving is positive although less than asset income.

How transfers and assets are used to meet lifecycle needs is one of the important topics addressed in this book. We describe the principles and methods of constructing estimates of public and private transfers by age in Chapter 3. In Chapter 7 Tim Miller presents and discusses comparative estimates of public transfers, and in Chapter 8 Ronald Lee and Gretchen Donehower examine private transfers. In Chapter 9 Andrew Mason, Naohiro Ogawa, Amonthep Chawla, and Rikiya Matsukura discuss how assets are used in the generational economy. Important findings are highlighted in the following sections; but before we proceed, a few words of caution are needed.

First, the results presented here are descriptive. They are not based on any particular causal model, nor can they be readily interpreted as supporting a particular causal model. Undoubtedly any of the patterns highlighted here are due to a variety of factors. The value of these results is in identifying important patterns that warrant further analysis and, in some cases, patterns that seem inconsistent with prevailing thinking.

Second, the results are cross-sectional, comparing different age groups at a single point in time rather than tracking cohorts as they proceed through life. The patterns we observe in the data reflect the effects of age as well as cohort differences. Thus considerable care must be exercised in interpreting the patterns we see.

Third, the estimates are approximations. Their reliability is affected by the accuracy of the national income and product accounts, administrative records, and survey data on which they are based. Moreover, some of the methods employed are simple and yield only rough approximations. Hence, it is important to focus on broad patterns rather than on minor details.

That said, some interesting and surprising patterns emerge from the analysis. In the rest of this chapter we highlight some of the key findings, noting that many important issues are treated more fully in the following chapters.

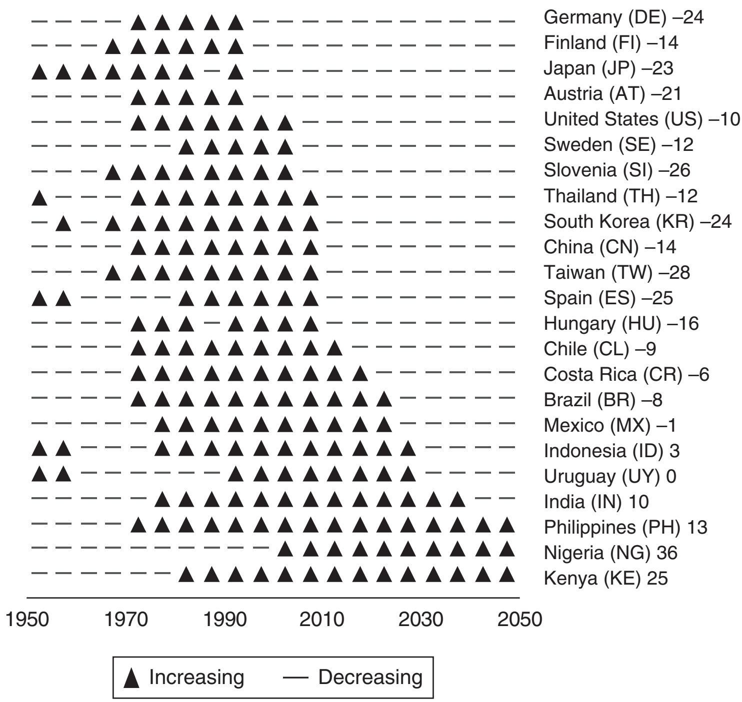
THE SUPPORT RATIO AND THE CHALLENGE FOR THE WORKING-AGE POPULATION

If standards of living are to be sustained, the working-age population must generate sufficient resources to fulfill three important responsibilities. The first is to provide for its own material needs, the second is to fund public and private transfers to children and the elderly, and the third is to save enough to fund its own future retirement needs. The transition in population age structure described above bears directly on the challenges that working-age adults face in meeting these economic responsibilities. The standards of living of all depend on the success with which the working-age population meets these challenges.

The effects of changing age structure depend on features of the economic lifecycle, because the ages at which people are productive and the ages at which consumption demands are greatest vary from setting to setting. The support ratio (SR) – that is, the ratio of the effective number of producers to the effective number of consumers – is a summary measure of population age structure that incorporates how production and consumption vary by age. The effective number of producers weights the population at each age by multiplying by the normalized labor income at each age using the profile for that economy. In a similar fashion, the number of consumers weights the population at each age using the consumption profile to adjust for age-related differences in 'needs' or 'tastes'. More details about the construction of the support ratio are provided in Chapter 3 and on the NTA website (www.ntaccounts.org).

An intuitive interpretation of the support ratio is that it measures the effect on consumption of changes in population age structure while holding constant other factors – work effort, interest rates, assets, saving, and net transfers from the rest of the world. Each percentage-point increase in the support ratio allows a percentage-point increase in consumption at every age, all other things being equal. An increase in the support ratio is often referred to as a demographic dividend. In the same way, however, a decrease in the support ratio leads to a decrease in consumption, all other things being equal.

The support ratios for the NTA economies are reported for 1950 to 2050 in Appendix Table A.1 at the end of this volume. Figure 1.5 depicts the trends in the support ratio. The economies are ordered with those having early demographic transitions at the top. Changes in the SR over five-year periods beginning in the indicated years are indicated by — for declines and by ▲ for increases. In every economy except Japan, the SR declined for at least 15 years between 1950 and 1975. The SR began to increase at different times and for varying durations, but every economy



Notes:
The symbols representing increasing and decreasing trends correspond to the change during the five-year period following the indicated year.
The economies are ordered from earliest to latest on the basis of the year in which the SR peaked.
The percentage decline in SR between 2010 and 2050 is reported to the right of each name and abbreviation.

Figure 1.5 Recorded and projected trends in the support ratio (SR): 23 economies, 1950–2050 (projected)

has experienced or is experiencing a prolonged increase in its SR. The industrialized economies have all peaked – most of them during the 1990s and some, such as the US and Spain, more recently. Most East and Southeast Asian economies, Japan aside, have just reached their peak or will soon do so. Many Latin American economies will peak within the next ten or 15 years. India's SR will not peak until 2040; and the Philippines, Nigeria, and Kenya will have rising support ratios through 2050.

The African economies are projected to experience very substantial gains in their support ratios, with increases of 36% in Nigeria and 25% in Kenya between 2010 and 2050. Declines will be most precipitous, exceeding 20%, in three Asian economies (South Korea, Taiwan, and Japan) and four European economies (Spain, Austria, Germany, and Slovenia). In comparison with them, changes elsewhere appear to be modest. In the US, for example, the SR is projected to decline by 10%. A change of this magnitude is serious, substantially exceeding the decline in per capita consumption in the United States during the current economic crisis. Moreover, low SR levels are expected to persist for many years.[4]

One of the main objectives of this study is to delve more deeply into how changes in population age structure influence an economy. Changes in the support ratio indicate the considerable importance of population age structure, but they are not the entire story. Population age structure also influences other features of the economy that may enhance the favorable effects of a rise in the support ratio and mitigate the adverse effects of a decline in the support ratio. This is a topic to which we shall return repeatedly in the chapters that follow. Chapter 2 provides the conceptual foundation needed for a more comprehensive understanding of the influences of population age structure. Chapter 4 draws lessons by using NTA estimates to compare the diverse ways in which societies are responding to population aging, described in much greater detail in the comparative chapters in Section II and the chapters about individual societies in Section III. Two general issues of particular importance are summarized in the next two sections of this chapter: how the age transition is affecting spending on children and how it is influencing support systems for the elderly.

CHILDREN: CONSUMPTION AND HUMAN CAPITAL

Children are costly, but they are also valuable. The future of any society depends on its children and whether they are educated, healthy, and prepared to compete in an increasingly globalized world. In this section we summarize evidence presented in later chapters about how children's consumption varies across economies, the extent to which that spending is concentrated on human capital (health and education), and the roles of the state and the family in channeling economic resources to children.

Consumption by children is discussed in a comprehensive fashion by An-Chi Tung in Chapter 6, but some important features of their consumption are summarized in Table 1.1. The table is based on synthetic cohort estimates constructed by cumulating per capita values for single years from age 0 through age 24. The synthetic value of consumption can be interpreted as the total consumption by an individual from birth

Table 1.1 Consumption by children (ages 0–24), synthetic cohort values: 23 economies around 2000

Economy or region	Consumption (0–24)			Health and education (0–24)		
	Total	Public share	Private share	Total	Public share	Private share
Kenya	7.4	26.0	74.0	2.5	13.2	5.5
China	8.6	33.3	66.7	4.4	6.6	18.3
Uruguay	10.5	27.6	72.4	10.6	16.2	17.8
Nigeria	10.7	10.8	89.2	9.4	2.0	21.0
India	11.8	20.5	79.5	6.4	3.4	3.4
Germany	12.0	40.7	59.3	12.1	25.4	3.2
Hungary	12.0	54.2	45.8	9.6	30.3	2.8
Austria	12.3	44.1	55.9	12.4	29.6	2.5
Slovenia	12.7	48.8	51.2	14.2	38.0	4.2
Spain	12.8	39.0	61.0	10.7	26.8	4.7
US	12.9	39.0	61.0	17.8	22.9	10.3
Costa Rica	12.9	28.3	71.7	11.1	20.3	5.7
Finland	12.9	50.8	49.2	11.3	27.1	1.7
Sweden	13.0	58.3	41.7	20.1	43.9	1.8
Philippines	13.4	21.7	78.3	4.9	8.5	9.7
Thailand	13.4	31.1	68.9	10.0	19.0	7.0
Brazil	13.8	34.6	65.4	12.3	14.6	11.7
South Korea	13.9	30.2	69.8	9.0	14.9	16.2
Chile	14.0	25.6	74.4	9.1	14.5	7.4
Indonesia	14.1	18.3	81.7	4.0	9.9	6.0
Japan	14.7	41.0	59.0	13.1	27.1	9.7
Taiwan	16.1	32.4	67.6	10.8	13.9	19.3
Mexico	16.3	23.4	76.6	7.5	14.9	6.1
All economies (23)	12.7	33.9	66.1	10.2	19.3	8.5
Africa (2)	9.1	18.4	81.6	5.9	7.6	13.3
E. Asia excl. China (3)	14.9	34.5	65.5	11.0	18.6	15.1
S. and S.E. Asia (4)	13.2	22.9	77.1	6.3	10.2	6.5
Latin America (5)	13.5	27.9	72.1	10.1	16.1	9.7
Europe & US (8)	12.6	46.9	53.1	13.5	30.5	3.9

Note: Health and education consumption are normalized on the per capita labor income of persons aged 30–49. Shares are expressed as a percentage.

to age 25, given consumption at the prevailing average age-specific rates. Comparing across economies is facilitated by normalizing on labor income; consumption is divided by the average annual labor income of individuals in the 30–49 age range in each economy. A value of 10 means that raising a child from birth to age 25 requires 10 times the annual labor income of a prime-age adult.

The choice of age 25 as the cut-off for childhood is dictated primarily by the substantial amount of education spending on those in their early 20s. Moreover, the typical age at which individuals are producing as much as they are consuming is around age 25 in all economies, although labor income of those under age 25 is substantial (Chapter 5). If we average their income across all economies, we find that children can fund a little less than 20% of their consumption. There is some tendency for labor income among the young to be more salient in lower-income countries (China, Kenya, and Indonesia) than elsewhere, but the tendency is not strong. In Nigeria, however, labor income is very low for young adults because of poor employment opportunities (Chapter 25); and in high-income Austria, labor income among young adults is very high because the educational system is closely integrated into occupational training and employment (Chapter 11). In general, labor income among the young is lower in economies with high human capital spending than in those where such spending is low.[5]

The economies in Table 1.1 are arrayed from those with the lowest child consumption to those with the highest. The variation is substantial and driven by multiple factors. Consumption per child is low in high-fertility economies (Kenya, Nigeria, India, and the Philippines) and high in low-fertility economies (South Korea, Japan, and Taiwan). But there are a few very anomalous cases that require some explanation. China, for example, has relatively low fertility but low child consumption as well (Chapter 22). This reflects the very low levels of consumption at all ages, not just consumption by children. Consumption at all ages is very high in Mexico relative to labor income of those aged 30–49 because of the substantial remittances from family members working in the United States (Chapter 13).

Children's consumption in all the European economies falls near the average value of 12.5, below the US, the economies of East Asia, and Brazil and Chile. This is interesting, given that at least some of the European countries have fertility rates that are quite low and the widely accepted view that spending per child will be higher in low-fertility countries (Becker 1960). Austria, Germany, and Spain all have total fertility rates that are significantly below those in the US, Brazil, or Chile. Within Europe, the highest child consumption is found in the highest-fertility societies of Sweden and Finland, not the low-fertility societies. The economies of East Asia, China excluded, stand out for their high levels of child consumption. Of course, fertility is very low in Japan, Taiwan, and South Korea, slightly less than in the low-fertility European countries. The contrast between Japan and Germany is quite interesting. Both have total fertility rates of 1.3 and have the oldest populations of the societies analyzed. Yet children's consumption in Japan is 22% greater than in Germany.

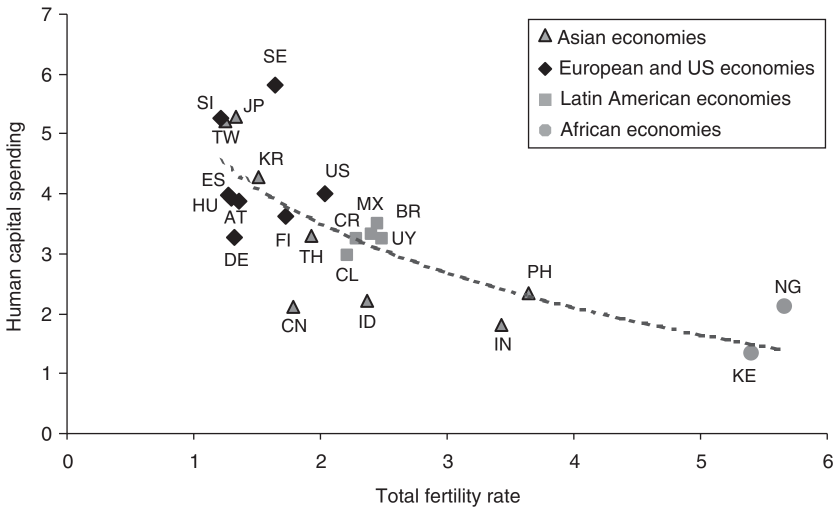
On average, one third of child consumption consists of public consumption. Some of these goods and services, especially public education and health care, are unambiguously targeted at children. Other public goods and services, such as public diplomacy, benefit children but are not particularly targeted at them. There is considerable variation in the level of public consumption, ranging from a low of 11% of total child consumption in Nigeria to a high of 58% in Sweden. Apart from Sweden, the public share exceeds half of total child consumption in Hungary and Finland. In general, the public role is greatest in high-income, industrialized societies. The public role is least important in lower-income countries, with no obvious regional effects other than what might be explained by differences in income levels.

The variation in human capital consumption is very substantial. A particularly striking comparison is between China and Taiwan. Total child consumption in China is about one half of that in Taiwan, but China's per child human capital consumption is only 20% of Taiwan's. Keep in mind that we have directly controlled for differences in labor productivity between the two economies. In general, however, the societies with high rates of human capital spending are those with low fertility and high income. Spending on human capital is high in Europe, the US, and especially East Asia (excluding China).

Europe relies heavily on the public sector to fund human capital spending. The public share ranges from 85% in Spain to 96% in Sweden. The public sector is less important in the US, at 71% of total human capital spending. In East Asia (excluding China), however, the public share is only 53% of total human capital consumption. Human capital spending is high in East Asia, except China, because families there spend so much on the education of their children. In low-fertility Europe, governments spend a great deal on human capital.

The close relationship between human capital and fertility – and hence between human capital and population age structure – is one of the most important findings to emerge from this study (Figure 1.6). The finding is discussed in more detail in Chapter 2, but it deserves highlighting here. There is a strong trade-off between human capital spending and fertility. Societies with low fertility are spending much more on health and education per child than other societies. This holds for cross-sectional data of the form presented here, but also for time-series data that are available for Japan, Taiwan, and South Korea (Ogawa et al. 2010) and the US (Lee and Mason 2010).

The trade-off is important because it implies that, although low-fertility countries will have fewer workers in the future, those workers will have



Note: See Figure 1.5 for the names associated with the abbreviations.

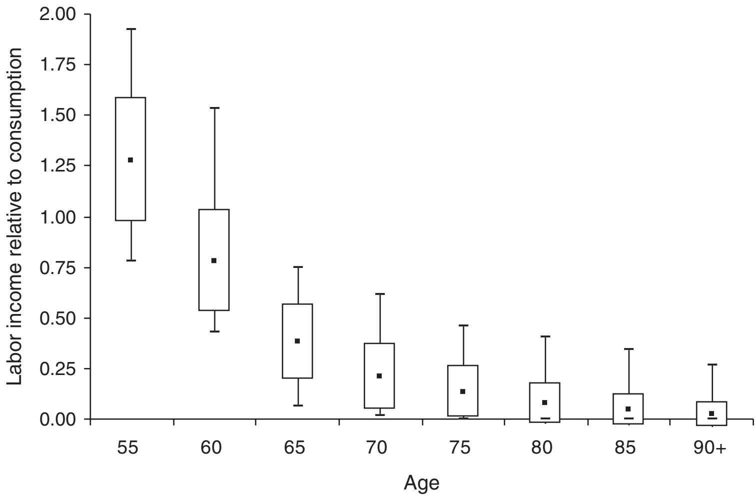
Figure 1.6 Trade-off between human capital spending and fertility: 23 economies around 2000

benefited from greater investment in their human capital. This phenomenon is widely ignored in discussions about the implications of population aging for economic growth. That is unfortunate because what matters is not the number of workers but what they can produce, which is determined by both the number of workers and their productivity.

THE ELDERLY, TRANSFER SYSTEMS, AND WEALTH

Despite great differences among countries in health care, income, financial systems, and public programs, the elderly consume much more than they produce in every society that we have studied. Historically, this has not always been the case. In traditional, hunter-gatherer societies, adults consumed more than they produced into their 60s and 70s – if they managed to live that long (Lee 2003a). But in contemporary societies – whether we are talking about Sweden or Kenya, Japan or Indonesia – the elderly maintain their standard of living by drawing on resources well beyond what they earn.

The labor income and consumption profiles for each of the 23 NTA economies, presented in Chapters 5 and 6, support this generalization and

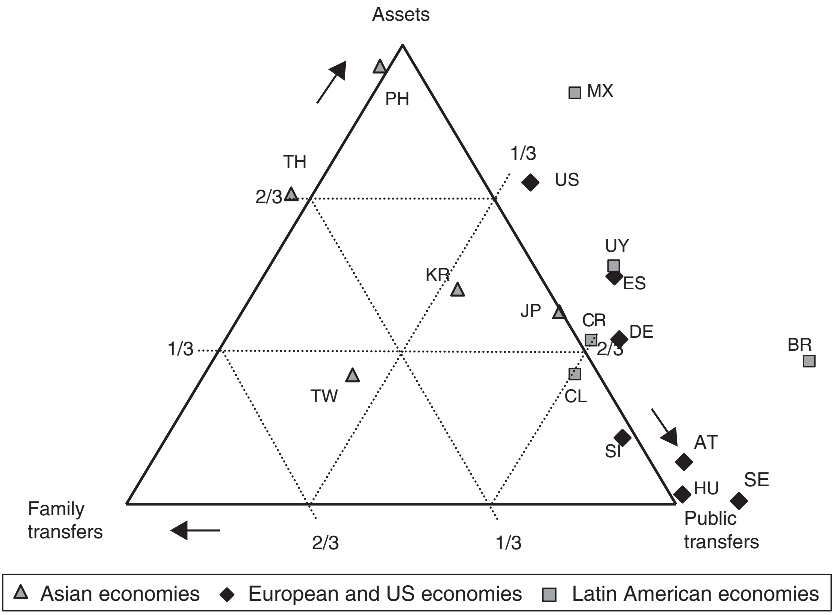


Note: Boxes mark +/− one standard deviation around the mean. Whiskers mark maximum and minimum values.

Figure 1.7 Labor income as a proportion of consumption at exact ages 55 to 90+: 23 economies around 2000

provide details about variations among individual societies. The diminished role of labor income at old ages is documented in Figure 1.7, which shows labor income as a percentage of consumption at key benchmark ages (55, 60, 65, and so on). At age 55 labor income exceeds consumption in 17 (almost 75%) of the 23 economies. The change between ages 55 and 60 is dramatic. Sixty-year-olds are producing as much as they are consuming in only two (less than 10%) of the 23 economies. By age 65 a lifecycle deficit is universal, and in many economies it is large. In most, labor income is less than 40% of consumption.

The existence and size of the old-age deficit can be explained by many factors. Failing health and disability play a role by driving down productivity, encouraging withdrawal from the labor force, and, in some high-income economies, raising spending on health and long-term care. Features of public pensions and tax systems can greatly undermine work incentives at older ages (Gruber and Wise 1999, 2001). Older workers may have relatively low earnings because they are employed in low-productivity sectors and because they have lower educational attainment than young workers. In the final analysis, however, significant lifecycle deficits at old ages are possible only because the elderly can depend on transfers and asset-based reallocations to support their consumption.



Note: See Figure 1.5 for the names associated with the abbreviations.

Figure 1.8 Funding sources for persons 65 and older, measured as shares of the lifecycle deficit: 17 economies around 2000

The support system for the elderly, the means by which their lifecycle deficit is funded, can be effectively described as consisting of three components: public transfers, private transfers, and asset-based reallocations. Depending on the country, the elderly benefit from public pension programs, publicly funded health care and long-term care, and other cash and in-kind transfer programs. Of course, depending upon the particulars of the tax system, the elderly help fund these programs. Private transfers are dominated by intra-household flows between the elderly and co-resident family members. The third source of support for the elderly is their assets: personal savings, stocks and bonds, a business or farm, and owner-occupied housing, to name important examples.

To document how the old-age support system varies across societies, we compare public transfers, private transfers, and asset-based reallocations as a 'share' of the lifecycle deficit of those 65 and older.[6] The shares are conveniently represented by a triangle graph that nevertheless requires some explanation (Figure 1.8). Each of the three vertices of the triangle represents exclusive reliance on one of the three funding sources, with the other two being zero. Any movement toward one of these vertices represents an increase in the share of that source. Along the sides of the triangle, one source is zero while the other two vary. Movement along one of the gridlines implies that one source is constant at one third or two thirds of the lifecycle deficit while the other two vary. Points lying outside the triangle indicate that one or more of the components are negative. This occurs frequently because net private transfers to the elderly are often negative; that is, the elderly provide more to their descendants than they receive from them.

Net familial transfers are an important source of support for the elderly in only a few Asian economies: South Korea, Taiwan, and Thailand. In Taiwan and Thailand, net family transfers represent about one third of the lifecycle deficit of the elderly, and in South Korea net family transfers account for roughly 20%. In many countries (Chile, Costa Rica, Japan, the Philippines, Slovenia, Spain, and Sweden), net familial transfers are close to zero or negative. In a few countries (Brazil, Mexico, the US, and Uruguay) the elderly provide substantially more support to their descendants than they receive.

Net public transfers vary widely in importance. In the Philippines and Thailand, net public transfers are essentially zero, with the elderly paying as much in taxes as they receive in benefits. Net public transfers fund roughly one third of the old-age deficit in Mexico, South Korea, Taiwan, and the US; one half in Uruguay; and two thirds in Costa Rica, Japan, and Spain. Well over two thirds of the old-age deficits are funded by public transfers in Austria, Chile, Slovenia, and Sweden. In Brazil, net public transfers are about one third larger than the lifecycle deficit, and the excess is transferred to younger family members.

The elderly in Mexico, the Philippines, Thailand, and the US rely most heavily on assets. In Taiwan, where familial transfers are dominant, the elderly rely on assets to a much smaller degree. In Austria, Brazil, Chile, Slovenia, and Sweden, where public transfers dominate, assets play a very limited role.

There are interesting regional patterns in the support system. Public transfer systems are most important in Europe and Latin America and least important in developing Asia. Among industrialized economies, public transfers to the elderly are less important in Japan and the US than in European economies.

The values in Figure 1.8 are averaged across all persons 65 and older and conceal important differences between younger and older elderly. The elderly in almost every economy rely less on assets at older than at younger ages. They fill this resource gap with public transfers in the US and European economies, but with familial transfers in Asia and Latin

America. Among the oldest old in both Latin America and Asia, familial transfers are very important, but at no age are they important in the US or Europe.

An inviting interpretation of the declining reliance on assets is that the elderly spend down their assets as they age, but this interpretation appears to be wrong in almost every society. With rare exceptions, the elderly are not dissaving (Chapter 9). The older elderly have less wealth because they had low labor income during their working years, which they earned further in the past, and they were never able to accumulate as much wealth as younger elderly. This cohort effect is particularly strong in the rapidly growing economies of East Asia. In some countries, such as the US, the relative importance of asset-based reallocations is declining because of large increases in in-kind transfers for health and long-term care late in life.

One of the most important policy issues in aging societies is whether support for the elderly through transfer systems should be reduced or, in the case of public pay-as-you-go (PAYGO) pension programs, phased out entirely. Many governments have implemented significant pension reform and others are considering similar measures. Chile reformed its pension system in the early 1980s, moving to a system that mandates the accumulation of pension assets and phases out reliance on public transfers. The transition process is very long for pension reform, but in the absence of further reform Chile will move from its current position in Figure 1.8 toward asset-based reallocations and away from reliance on public transfers. An alternative approach has emphasized maintaining existing reliance on public transfer systems while adjusting taxes and benefits in response to the fiscal strains from population aging and other forces. In the US, for example, public transfers to the elderly through the health care system are increasingly significant, in part because of population aging and in part because of rising health care costs.

The policy discussion emphasizes public transfers, but in some societies the role of private transfers is also part of the policy debate. Of particular concern is that the decline in the familial transfer system will place greater demands on the public transfer system or undermine standards of living for the elderly. The cross-sectional evidence presented here supports the view that familial transfers will become less important as a consequence of development and related factors. We see that in Japan, for example, net private transfers to the elderly are essentially zero. Time-series estimates (not presented here) confirm that net familial transfers to the elderly in Taiwan, South Korea, and Japan have declined quite substantially during the last 20 to 30 years.

The debate about the reform of transfer systems is particularly heated because of disagreement about its likely effects. Those who favor reduced reliance on transfers believe that people will respond by postponing retirement or saving more, or both. This would result in stronger economic growth and higher standards of living for all. Those who favor continued reliance on transfer systems believe that the benefits of delayed retirement are illusory because they undervalue the benefits of leisure in old age. They believe that reduced reliance on transfer systems will lead to lower standards of living and greater poverty among the elderly. There are many other aspects of the policy debate besides these particular issues, but they figure prominently in many discussions.

These issues are not easily resolved, and the data currently available from National Transfer Accounts cannot resolve them. Nonetheless, it is instructive to compare economies that differ in their reliance on net transfers to the elderly, drawing on the analysis described in more detail in Chapter 9. We use a simple approach that is intended as a descriptive device, not as a structural or causal model. First, we construct synthetic cohort estimates of consumption, labor income, transfers, and asset-based reallocations to the elderly for each economy for which complete estimates are available. The method for constructing synthetic cohorts is described in Chapter 3. The basic idea, however, is to control for the effects of societal differences in age structure. We combine the age-specific economic variables with a common population age distribution to calculate, for example, the average lifetime consumption by those 65 and older. Second, we regress each component of the generational economy – consumption, labor income, and asset-based reallocations – on net transfers to the elderly. The results have a ready interpretation, because an increase in net transfers to the elderly must lead to an equal increase in consumption, or an offsetting and equal decline in labor income, or an offsetting and equal decline in asset-based reallocations, or a combination of the responses that total to the change in net transfers.

Regression coefficients and standard errors are presented in Table 1.2. The analysis is based on only 17 observations, and as a consequence the coefficients are estimated with a low degree of accuracy. The results indicate that, on average, for the economies covered in our study, an additional dollar in net transfers to the elderly is associated with elderly consumption being raised by 15 cents (not statistically significant), labor income being lowered by 23 cents, and asset-based reallocations being lowered by 62 cents. The largest trade-off is between transfers and asset-based reallocations, although the trade-off between transfers and labor income is substantial.

Table 1.2 Coefficients from regression of lifecycle components of adults 65 and older on net transfers to adults 65 and older: 17 economies around 2000

Lifecycle component	Coefficient	Standard error
Consumption	0.15	0.15
Labor income	−0.23	0.06
Asset-based reallocations	−0.62	0.12
Asset income	−0.24	0.46
Saving	0.38	0.41

Notes:
All variables are synthetic cohort estimates.
The 17 economies are Austria, Brazil, Chile, Costa Rica, Germany, Hungary, Indonesia, Japan, Mexico, Philippines, Slovenia, South Korea, Spain, Sweden, Taiwan, United States, and Uruguay.

If we take these results at face value, two important points must still be addressed. The first is that the decline in asset-based reallocations can be realized in two ways with very different implications. One possibility is that the elderly have lower asset income in high-transfer economies. This would be the case if saving incentives during the working years were undermined by large transfer programs, as postulated by Feldstein (1974). In that case the elderly would have lower assets and lower asset income. Another possibility, however, is that the elderly save more in high-transfer economies. In this instance, the effect of greater transfers would be to increase bequests (Barro 1974).

The final two rows in Table 1.2 extend the analysis to show that, on average, the asset income of the elderly is lower in societies with larger transfer systems and that their saving is greater, but neither coefficient is estimated with sufficient accuracy to reach any conclusions about the consistency of the cross-societal pattern with alternative theories. Even if the coefficients were significant, the results are purely descriptive. Many other factors could account for the patterns.

A second point that must be considered is that all of the comparisons across economies control for level of development by normalizing on the labor income of prime-age adults. This is a partial analysis and does not address the effects of capital on the productivity of labor. If high-transfer economies have lower capital, labor productivity will be lower and standards of living will be depressed beyond the effect captured in Table 1.2. To consider these kinds of issues requires a more comprehensive approach, as discussed in Chapters 2 and 4.

MYTHS, REALITIES, AND POLICY

For the last four decades, changes in population age structure have been broadly favorable. In many countries declining birth rates have pushed down the share of the child population and pushed up the share concentrated in the working ages. Rising support ratios can add 0.5% to 1% per year to the growth rate of per capita income or consumption per equivalent consumer in developing countries over a period of four to six decades. At the end of this process, standards of living can be boosted by as much as 40%. Countries in the industrialized world experienced similar, but more modest, demographic dividends reflecting lower fertility following their post–World War II baby booms.

The favorable changes in age structure have spilled over into many economic realms. They have eased public finances because the resources of taxpayers have increased in relation to the needs of beneficiaries. Public programs have grown under favorable terms. Changes in age structure have had similarly favorable effects on family finances. With the exception of a few rich industrialized countries, families bear most of the cost of childrearing, and these costs have declined in many countries as birth rates have fallen.

For about half of the countries in the world, changes in population age structure continued to be favorable during the first decade of the twenty-first century. This phase of the age transition will soon end in Indonesia, Brazil, Mexico, Chile, and other Latin American countries. In India, the Philippines, and the countries of Africa, the trends in population age structure will be favorable for several more decades. For these countries, two broad sets of policy issues are important.

The first is how to capture the potential benefits that arise from the demographic dividend. In this context, the low level of labor income among young adults in many countries is an important factor (Chapter 5). The transition into the labor force is especially difficult in Nigeria, for example, but many other countries face this problem. The gains from the demographic dividend can be substantially delayed and diminished if young people lack job skills or if good employment opportunities are not available. Austria is an example of an industrial nation with an early transition from school to work through its apprenticeship system, but this advantage comes at the cost of low rates of tertiary education.

The second issue for young countries is how to lay the groundwork for sustaining high standards of living when changes in age structure are no longer favorable – that is, how to realize what we have described elsewhere as a second demographic dividend (Chapter 2; Mason and Lee 2007). A common misunderstanding is that young countries can postpone addressing aging issues, but nothing could be further from the truth. We return to this point below.

For about half of the world – the US and the countries of Europe and East Asia – the economic support ratio has peaked and is beginning to decline as the share in the working ages drops and the share of the older population rises. The pace and extent of population aging will vary greatly, depending on the history of fertility change and its current levels, with severe aging expected in East Asia (China, Taiwan, Japan, and South Korea), in Germany, and in Southern and Eastern Europe (Spain, Austria, Slovenia, and Hungary in our study).

Another common misunderstanding is that population aging is primarily a consequence of longer life expectancy. Longer life expectancy is playing a role, but low fertility is the primary factor. This misunderstanding inevitably leads to emphasis on policies that address growth in the number of elderly and the burden that they impose on others. The most widely discussed solution to population aging is that, because the elderly are living longer, they should work longer. Pushing back the age of retirement is undeniably an important possibility to consider. As we see in our study, labor income among the elderly is low in the developing world and very low throughout the rich, industrialized world (Chapter 5). Other studies have shown that poorly designed pension and tax systems create strong incentives to retire early. Many countries have mandatory retirement provisions. Policies that remove barriers to employment and enhance the productivity of older men and women are an essential part of any effective response to population aging.

However, understanding the dominant role of low fertility in population aging points us toward three other possible solutions. The first and most obvious is that we can encourage couples to have more children. If low fertility continues and countries begin to experience substantial depopulation in addition to severe population aging, we believe that raising birth rates will become a centerpiece for public policy. Up to this point such policies have had limited effect in many countries, but there are some indications that childbearing will respond to policy. The second possible approach is to relax policies restricting immigration. This helps in two ways. Immigrants themselves tend to be young adults who will work and pay taxes for many years. Moreover, many immigrants are in the reproductive ages and often have higher birth rates than the native population. Immigration can reduce the severity of population aging, but its role is limited. To offset the effects of population aging would require immigration on a scale that is both impractical and politically unacceptable. Given that population aging is a global phenomenon, immigration policy is a short-term solution at best.

A third approach is to enhance the productivity of smaller cohorts of children by investing in their human capital. We show here that there is a very strong trade-off between the number of children and investment in their human capital, a quantity–quality trade-off (Chapter 8). Thus future cohorts of taxpayers will have fewer members, but they will be more educated and more productive. Under plausible conditions, enhanced human capital can totally offset the decline in the support ratio (Lee and Mason 2010).

Whether population aging will undermine economic growth depends, as well, on the responses of saving, investment, and capital. Countries vary greatly in the extent to which the elderly rely on assets to fund their consumption. Population aging will lead to an increase in assets and capital per worker in countries that rely on assets to fund old-age consumption (Chapter 2). Reinforcing this finding is evidence that the elderly have relatively high asset income and continue to save throughout their lives in most countries (Chapter 9). The idea that population aging is anathema to the accumulation of capital and other assets is a myth.

The view that population aging will bankrupt public programs for the elderly is an oversimplification. Population aging will unquestionably lead to an increase in the number of beneficiaries relative to the number of taxpayers. Hence, per capita benefits must decline or per capita contributions must increase – or both. Aging will mean significant adjustments to, but not the elimination of, public programs for the elderly (Chapter 7).

The family is an important support system in much of the world, but it is not a solution to the pressures of population aging on public transfer systems. The elderly in Asia rely most heavily on the family for financial support. But population aging will place great strains on any transfer system; and the family support system is as vulnerable as the public support system, and in some ways even more vulnerable (Chapter 8).

An important feature of our study is the comprehensive approach that incorporates, with the exception of bequests, all intergenerational transfers – both public and private, and to children as well as to the elderly. Policy-makers and the public focus far too much on public transfers to the elderly. Relatively little attention is given to how support for the elderly compares with spending on public education and health care for children. By comparison, private transfers to children on the part of parents and others are virtually ignored. Our calculations of total transfers combine all of these. Taking this comprehensive approach reveals a fundamental change across all societies (Chapter 4). Throughout history, transfers have flowed downward on net, from older to younger. Transfer systems were used by current generations to pass their own economic resources on to future generations. Population aging, reinforced by changes in the economic lifecycle and transfer systems, has led to a steady decrease in the strength of this downward pattern. The direction of transfers has reversed direction in the rich nations with the oldest populations, including Japan, Germany, Austria, Slovenia, and Hungary. In these societies, transfer systems are used by current generations to claim the resources of future generations. In the absence of significant reform, the direction of transfer flows will be reversed in many other countries as well by 2050.

The direction of transfers provides an important measure for judging whether fertility is too low and population aging too severe. When transfers flow downward, under the conditions described in Chapter 2, lower fertility and older populations enhance standards of living. When transfers flow upward, higher fertility and younger populations are beneficial. When the direction of transfer flows is balanced, variations in fertility and population aging make little difference to standards of living.

This broad trend in transfers encompasses wide variation across aging societies, with the most extreme changes in the direction of transfers occurring in Europe and Latin America and more modest changes taking place in the US and East Asia. In addition to identifying countries most affected by population aging, calculations of transfer wealth point to programs that will experience the most pressure from population aging (Chapter 4). The results are not always obvious beforehand. Some countries have very small public programs. Some programs, such as health care, may on net transfer either upward or downward, depending on the population age distribution of the country and on the focus of the government programs. Combined government programs in the US, for example, on net transfer downward, not upward, as one would expect, given the focus of policy concern.

Among the most striking results from National Transfer Accounts are the clear signs of cooperation across generations. The economic flows through both the public and the private sectors are enormous (Chapters 7 and 8). Generational differences in per capita consumption are much smaller than would be the case in the absence of these transfers. The consumption age profiles for most Third World countries are quite constant across adult ages, indicating that on average the elderly are not suffering as a group. In most rich industrial nations, the elderly consume far more than younger adults, although much of their consumption is in the form of health care and long-term care for the very old. So, overall, the NTA suggest that in both rich and poor countries average consumption by elderly people is not too low in relation to that of other age groups.

In some countries the concern is that the elderly are consuming too much and that, as a consequence, children are consuming too little. The evidence on this point is mixed. Per capita spending on health and education for children is much higher than in the past (Chapter 8). Total consumption by children as compared with that by the elderly is quite low in some countries – for example, in Brazil, Nigeria, and the US (Chapter 6).

Although many of these issues seem most salient in rich, aging societies, countries in the developing world will soon face population aging and at relatively low levels of development. The difficulties this will raise have less to do with income, per se, and more to do with the development of institutions that are essential in aging societies. Good governance is critical because governments are often heavily involved in providing essential support to the elderly, but also very important in providing the human capital investments that fuel future increases in productivity. Well-functioning, transparent financial systems are essential to the accumulation and management of assets on which the elderly depend. Poor financial literacy is a serious problem in rich countries, but even more so in countries where general literacy is still low. Countries that fail to anticipate population aging, for example, may adopt large-scale public pensions and other transfer programs that are unsustainable and difficult to reform. All policy responses to population aging that involve advance saving and prefunding are most effectively implemented decades before population aging actually begins, while the future elderly are still in their early working years.

Many important general lessons are to be learned from the comparative analysis presented in the next two sections of this book. Designing effective policy, however, is a complex, detailed, and inherently country-level task that is best carried out one country at a time. Many of the country chapters in Part III provide important insights about policy issues in each setting.

NOTES

1. We refer to those under age 25 as the child population, those 25–59 as the working-age population, and those 60+ as the elderly population. The choice of these age categories is based on age profiles of consumption and labor income described below.
2. All the demographic data in this chapter are drawn from UN Population Division (2009) unless otherwise indicated.
3. Public asset-based reallocations for children are possible in countries in which children pay taxes. This occurs most frequently in countries that rely on consumption taxes. Chapters 3 and 9 provide more details.
4. In some economies the overall change between 2010 and 2050 is projected to be relatively small because increases over the next few decades will be cancelled by declines that follow. The importance of the support ratios for individual economies is best judged by consulting economy-specific estimates presented in the appendix tables.
5. The correlation between the two series is −0.51.

6. The shares must sum to 1 by definition, but they need not be positive. Negative transfer shares indicate that the elderly are giving more than they are receiving. If the elderly are saving all of their asset income plus some of their labor income, the share for asset-based reallocations will be negative; but we do not observe this outcome for any country.

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2. Theoretical aspects of National Transfer Accounts

Ronald Lee and Andrew Mason

Whereas Chapter 1 highlights NTA findings, the goal of this chapter is to provide a theoretical foundation for National Transfer Accounts and their use for understanding how changes in population growth and age structure are related to intergenerational transfers, saving and wealth, standards of living, and other macroeconomic variables.

Most concern about population aging understandably focuses on rising old-age dependency and declining support ratios, their implications for standards of living, generational equity, the sustainability of public programs, and the growing burden on the working ages. These issues are discussed in Chapter 1. Population aging has other economic consequences, however, related to deeper processes of investment in human and physical capital that are far from apparent. A full understanding of these effects is essential to understanding how population aging will affect standards of living and intergenerational transmission of well-being.

We begin by discussing some macroeconomic implications of intergenerational transfers and demographic change, illustrating them with selected NTA estimates and taking the observed patterns of transfers as given. We shall then discuss theories about why private and public transfers are made. Finally, we shall integrate these two topics in a brief discussion of fertility, transfers, and economic growth. Three important points emerge from this analysis. First, rising old-age dependency and deteriorating support ratios will place painful budgetary pressures on the working-age population. Second, there are also positive concomitants of population aging that will likely outweigh increased dependency: rising capital per worker and rising human capital per child will raise the productivity of labor. Third, we can best understand the consequences of population aging within a broad framework that encompasses the causes of population aging, rooted in choices about fertility and lifetime labor supply, which are made in the context of declining mortality.

AGE PROFILES OF CONSUMPTION AND LABOR INCOME

Age profiles of consumption and labor income are the starting point for National Transfer Accounts. The shapes of these profiles are influenced by biology. Young children are not capable of serious work, and older adults experience declining vigor and increasing disability. Young children have lower calorific and other needs than adults, and older adults have greater needs for health care and perhaps long-term care. But choices and decisions, made in specific economic, cultural, institutional and policy contexts, are also important. Actual and expected future interest rates, labor productivity, returns to education, public and private transfers, and institutional incentive structures all influence these decisions. The economic lifecycle is descriptive and cannot be thought of as an exogenously determined feature of the economy. Causality runs in both directions, since the shapes of desired consumption trajectories and planned labor supply over the lifecycle influence saving and asset accumulation, and these influence capital stocks, interest rates, and labor productivity. Starting with age profiles of consumption and labor income is a useful way to organize the discussion.

In standard theory, with perfect credit markets, perfect foresight, no bequest motive, and complete annuitization of wealth,[1] adult consumption trajectories are expected to rise until death at an exponential rate determined by the interest rate, the subjective discount rate, and the elasticity of intertemporal substitution.[2] In practice, however, people are not effective long-run planners, credit markets are imperfect, and there are many unanticipated shocks and policy changes. Consumption takes place in households in which numbers of dependents and earners vary across age and time in ways that cannot be fully predicted, and unexpected variations may lead to fluctuations in consumption. Interest rates, investment returns, and productivity growth are also difficult to foresee. Likewise, individuals cannot fully anticipate the introduction, scale, and incentive structures of public pension programs and public provision of health care and long-term care. Wealth is annuitized to some degree, if only because public pensions and family support arrangements typically provide support until death, but private market annuities are not widely used. Furthermore, consumption by children is governed by their parents' decisions, not their own. During working ages, individuals do make their own consumption decisions; but in old age, in much of the world, they are subject to the economic fortunes and consumption decisions of the adult child with whom they co-reside. The upshot is that actual age trajectories of consumption vary cross-sectionally and over the lifecycle in complex ways, and we have much to learn simply by estimating them.

Now consider labor income. Standard theory suggests that an individual chooses to work an amount of time at each age that equates the marginal utility gained from labor income to the marginal utility lost from reduced leisure time, balancing these also against expected returns to investment in education and work experience. Many factors, such as education, experience, health, and vitality, affect productivity and vary over the lifecycle. Some studies suggest that productivity follows an inverse U-shape with significant declines in productivity after age 50 (Skirbekk 2008). Rapid technological progress has an uneven influence on skills and competencies by age (Autor et al. 2003). Rapid changes in education may give younger workers an advantage over older ones. The utility of leisure also varies over the lifecycle because of changing health and vitality and also because of competing demands on time at home, for example those due to childrearing.

As with consumption, the real world introduces further complexities. Credit markets are imperfect. Workers lack flexibility in choosing their hours. Seniority systems may raise wages with age. The availability, generosity, and incentive structures of public pension programs may vary in unexpected ways. Tax policies alter the trade-off between work and leisure. Unemployment thwarts individual plans, and age discrimination may prevent older people from working. Key differences across countries in cross-sectional age profiles of income reflect differing educational enrollments of the young, different patterns of participation by women due in part to their levels of fertility, and differing ages at retirement due in part to public pension systems.

FROM CONSUMPTION AND LABOR INCOME TO LIFECYCLE WEALTH

Our NTA age profiles of consumption and labor income reveal substantial differences between the two, particularly in childhood and old age. In some sense, these differences must average out; but to understand how, we must take due account of savings, assets, and intergenerational transfers. The concept of lifecycle wealth is fundamental in this regard.

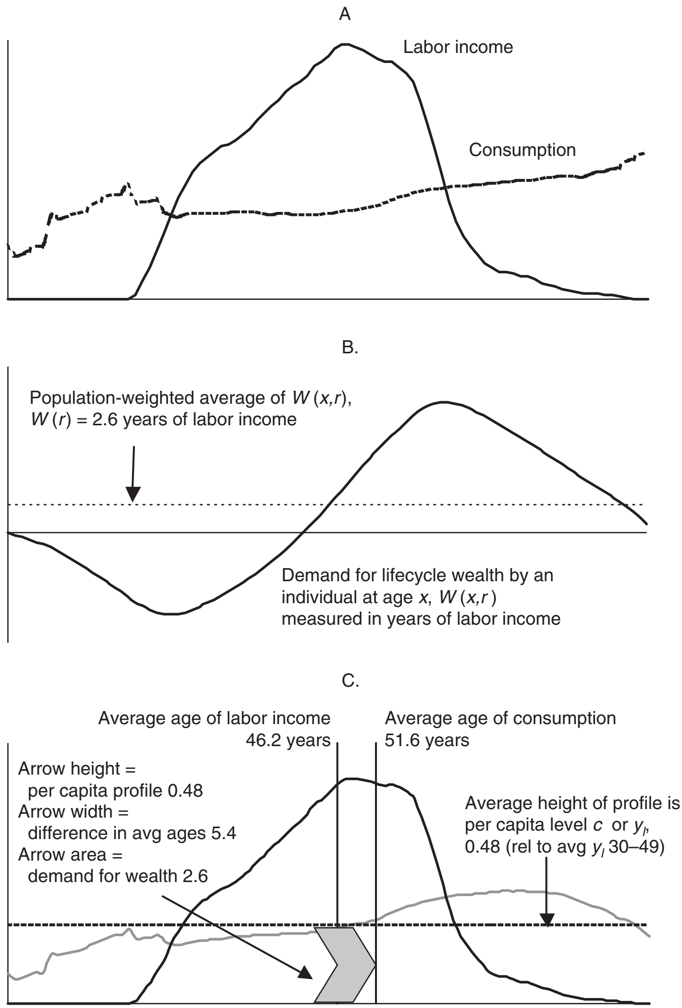
NTA typically estimates cross-sectional age profiles for a single survey year, averaged across all individuals at a given age, rather than the longitudinal profiles discussed above. For present conceptual purposes, we assume that an economy is in stationary steady state in the sense that the per capita economic and demographic age profiles are fixed over time. In this case the longitudinal and cross-sectional age profiles are identical. The population may be growing, but we assume it is closed to migration and that its age distribution is stable (the proportionate population age distribution is constant over time). The implications of relaxing these strong assumptions are discussed below.

Net worth, the value of physical and financial assets, is a familiar concept. Lifecycle needs are met, however, by relying on transfers as well as assets. Thus a more comprehensive measure of wealth is needed that includes both assets and transfer wealth. Transfer wealth is the present value of expected transfers to be received in the future, minus the expected value of transfers to be made in the future. Under steady-state conditions, patterns of transfers will be repeated generation after generation – Arrondel and Masson (2006) refer to 'endless intergenerational chains of transfers' – and so these average expectations for age groups are well-defined, even though no one is obligated to leave a bequest of a particular size, for example.[3] We call this extended concept of net worth 'lifecycle wealth', denoted as $W(x, r, t)$ for per capita wealth at age x and time t when the discount rate is r (in what follows, we shall suppress t for simplicity).

$$W(x,r) = \int_x^{\omega} e^{-r(a-x)}[l(a)/l(x)][y_l(a) - c(a)]da. \tag{2.1}$$

Here ω is the oldest age to which any member of a generation survives, and $l(a)$ is the probability of surviving from birth to age a, so that $l(a)/l(x)$ is the probability of surviving from age x to age a. $W(x,r)$ is the amount of wealth needed by a person of age x in order to consume $c(a)$ with probability $l(a)/l(x)$ at each future age ($a>x$), given that she will earn an amount $y_l(a)$, discounted back to age x. With wealth $W(x,r)$, an individual could buy an annuity that would enable her to consume $c(a)$ at each age $a>x$ until her death, given her expected labor income. $W(x,r)$ can be negative, which means that a person of age x expects to consume less than she would earn over her remaining lifetime. This is typical of children and young adults, because they can expect to make large net private and public transfers during their remaining years. We call $W(x,r)$ 'lifecycle wealth' because it is the amount of wealth that would be needed solely to balance planned or average consumption and planned or average labor income over a person's remaining life after age x. If all holdings of wealth were of this sort, then every generation would die out with exactly zero wealth, leaving none for bequests. Obviously, this does not happen, but it is nonetheless a useful theoretical construct.

Panel A of Figure 2.1 displays NTA estimates of consumption and labor income for Japan in 2004 from Chapter 27 by Ogawa, Matsukura, and Chawla. On the basis of these, Japan's period life table for 2004, and our assumption of stationary steady state, we can calculate the per capita



Notes: Age schedules are calculated from data in the source, assuming a stable population age distribution based on the sexes-combined life table of Japan in 2004 and assuming a stable population growth rate of −.01. The level of the consumption profile shown in panel A has been adjusted so that the implied level of aggregate consumption equals the implied level of labor income. Lifecycle wealth in panel B is calculated from these adjusted profiles using equation (2.1). The horizontal line gives per capita aggregate lifecycle wealth based on the stable population. In panel C the age profiles in panel A have been weighted by population size at each age and rescaled. Other elements are calculated as described in the text.

Source: Figure 27.1 in Chapter 27 of this volume.

Figure 2.1 Consumption, labor income, and lifecycle wealth: Japan, 2004 lifecycle wealth for each age x, as shown in panel B. This figure looks very different from standard plots of wealth by age for several reasons. First, it is negative for children and young adults who expect to consume much less than they earn in the future, in present value terms, because of the transfers they must make in future years to balance the transfers they have received in earlier years. Second, it declines steeply with age after the early 60s because wealth is fully annuitized by assumption. Third, under the golden rule assumption and full annuitization, the average person dies with zero wealth.[4] Fourth, and consistent with the golden rule assumption, it includes only wealth held for purposes of spreading consumption over the lifecycle, not wealth held for other reasons such as to leave a bequest at end of life, pure greed, or precautionary motives.

Viewed *ex post*, the age profiles of consumption and labor income in panel A identically imply the corresponding age profile of lifecycle wealth in panel B. When interpreted longitudinally, the average individual at age x by definition had claims on future output in excess of labor income for ages with positive lifecycle wealth. Viewed *ex ante* as a plan by an individual at age x to consume and earn along these two trajectories, these plans also imply a demand for lifecycle wealth, $W(x,r)$, at age x, without which the plans would be unattainable and inconsistent. We refer to $W(x,r)$ as the demand for lifecycle wealth.

Even if the only fundamental motive for saving and holding wealth were lifecycle smoothing, most people would not in fact fully annuitize their wealth. They would tend to hold more wealth than $W(x,r)$ in order to have a precautionary cushion in case of longer survival. If for no other reason than this, generations may die out leaving substantial unintended bequests to younger generations. Sánchez-Romero (2009) describes a dynamic optimization model of this sort, with NTA-like features. By construction, wealth holdings beyond the fully annuitized lifecycle wealth, $W(x,r)$, will result in bequests at death, either intended or unintended, and these will appear as downward transfers.

AGGREGATE LIFECYCLE WEALTH

Now consider these age profiles weighted by the population age distribution to produce aggregate age profiles of consumption, labor income, and lifecycle wealth. If we add up these aggregate profiles across ages, we get macro-level aggregates for consumption, labor income, and the demand for lifecycle wealth (Tobin 1967). These in turn can be expressed as averages for the whole population, equal to per capita consumption, c, per capita labor income, y_l, and the per capita demand for wealth, $W(r)$.

$$W(r) = \int_0^{\omega} W(x,r)\,Pop(x)\,dx \Big/ Pop. \qquad (2.2)$$

Note that $W(r)$, the per capita demand for life wealth in the population as a whole, is determined both by the shapes of the age profiles of consumption and labor income that give rise to $W(x,r)$ and by the population age distribution that is used to weight these age-specific amounts. At young ages $W(x,r)$ is negative, as shown in panel B of Figure 2.1, and at old ages it is positive. Consequently, for the same age profiles and same $W(x,r)$, in young populations, child dependency dominates, resulting in a negative demand for lifecycle wealth. In old populations, old-age dependency dominates, resulting in a positive aggregate demand for lifecycle wealth.

The relationship between the demand for lifecycle wealth and the economic lifecycle takes a very simple and convenient form in a special case: golden rule growth with $r = n$ and the productivity growth rate still assumed to be zero. A striking theorem due to Willis (1988) shows that

$$W(n) = c(A_c - A_{yl}), \qquad (2.3)$$

where A_c and A_{yl} are the average ages of consumption and of labor income for the population. That is, the per capita demand for lifecycle wealth equals per capita consumption times the difference between the average ages at which income is consumed and income is produced. (See also Lee 1994a and 1994b for this result with mortality and continuous age distribution.)

If the average age of consuming is greater than the average age of producing, then resources are being reallocated in an upward direction, and the demand for lifecycle wealth is positive. If the average age of consuming is less than that of producing, then resources are being reallocated in a downward direction, and the demand for lifecycle wealth is negative. The value of wealth is the product of the annual flow (consumption) and the number of years by which consumption lags earning. These quantities are easily estimated from NTA and can be graphically displayed as an arrow with its tail at the average age of labor income and its head at the average age of consumption, with thickness equal to *c*.

The arrow and its calculation are illustrated for Japan in panel C of Figure 2.1, using a hypothetical stable population with survival taken from the Japanese life table of 2004 and an assumed stable growth rate of −1% per year (−.01). The aggregate profiles have been rescaled and divided by average labor income for ages 30–49, so that per capita consumption and lifecycle wealth $W(-.01)$ are also expressed in these units. Per capita consumption is 0.48 years of prime-age labor income, and lifecycle wealth is 2.6 years of labor income.

Similar calculations have been done for many of the NTA economies. Some of the rich countries with old populations – Austria, Germany, Hungary, Japan, and Slovenia – have upward-pointing arrows and a positive demand for lifecycle wealth. All of the low- and middle-income economies with young populations have arrows pointing downward and negative lifecycle wealth; these include China, India, Indonesia, Kenya, Mexico, Republic of Korea (South Korea), and Taiwan. (See Lee and Mason 2010 for details.)

POPULATION AGING AND THE DEMAND FOR WEALTH

These wealth calculations were based on equation (2.3), which requires strong assumptions (golden rule steady state and stable population). But we can also calculate the demand for lifecycle wealth for any actual population age distribution and for any assumed productivity growth rate and interest rate. We project the age profiles forward from age x to age $a>x$, based on an assumed rate of productivity growth, ρ. We then weight this projected age profile at age a by the survival probability from x to a, and discount this quantity back to age x at rate r:

$$W(x,r) = \int_x^{\omega} e^{-(r-\rho)(a-x)}[l(a)/l(x)][y_l(a) - c(a)]da. \tag{2.4}$$

For example, if we assume that productivity growth is at 2% per year and that the interest rate is 3% per year, and if we use the actual population age distribution in the base year, then we can calculate $W(x,r)$ for each year and find the population weighted average, $W(r)$. For assumptions like these, held constant across economies, our calculations based on equation (2.4) yield results that are quite similar to those based on the average age differences in equation (2.3), using actual rather than stable population age distributions.

As noted above, an older population puts more weight on the lifecycle stage in which there is a positive demand for lifecycle wealth, and less weight on the childhood ages in which there is a demand for negative lifecycle wealth. In this way, population aging raises the aggregate demand for lifecycle wealth and tends to shorten the wealth arrow or to reverse its direction. Population aging is the main reason why a number of the rich countries with old populations have a positive demand for wealth.

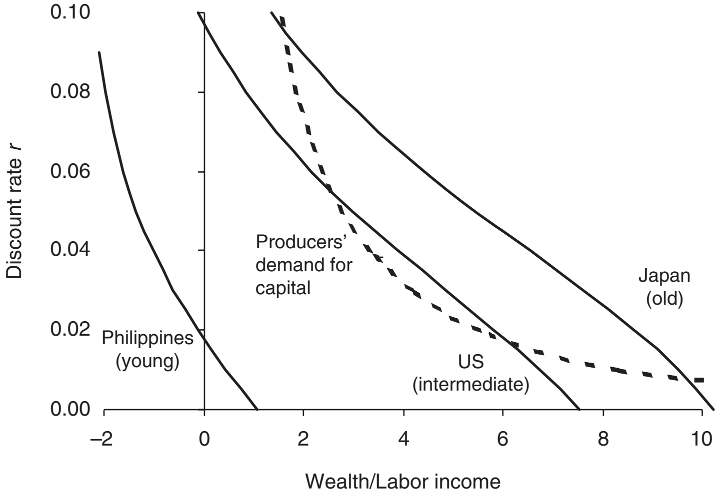


Figure 2.2 Population aging and the aggregate demand for lifecycle wealth: Philippines, US, and Japan around 2000

Figure 2.2 illustrates this effect of population aging by presenting calculations of demand for lifecycle wealth from three countries, assuming a productivity growth rate of 2% per year and different discount rates, shown on the vertical axis. The Philippines is a young country; the US has an intermediate age distribution; Japan is an old country. Older populations have demand for wealth curves shifted toward the right, indicating a greater demand for lifecycle wealth at any given interest rate. For example, at a discount rate of 3% the Philippines has $W(.03) = -0.5$, the US has $W(.03) = +2.5$, and Japan has $W(r) = +4.5$, where the demand for lifecycle wealth is measured in years of prime-age labor income. These are huge differences, driven largely by their different population age distributions, but also by the different shapes of the age profiles.

FORMS OF WEALTH

The concept of wealth that is implicit in equations (2.2) and (2.3) is broad, because it includes any claim on future income that can be used to make up the gap between future consumption and labor income. (The material in this section is discussed in more detail in Lee 1994a and 1994b and in Bommier and Lee 2003.) Saving is a familiar way to create claims on future output. To claim the output, one need only sell the asset or use asset income to purchase output when desired, or to consume the services rendered by the asset, for example, by living in an owned home or driving a car. For this purpose, the assets could be capital, such as a home, a farm, an ox, or close substitutes, such as land. Alternatively, financial assets, such as loans, can be made now, to be repaid later. We shall call the average value of capital and other real assets held at age x $K(x,r)$ and the value of financial assets, for example credit, $M(x,r)$, where K cannot be negative but M can be either positive or negative.

Expected net future transfers are a different kind of claim on future resources. It might be a parent's expectation of living, when old, in the home of an adult child or of receiving financial support from him, which would be a form of private or familial transfer wealth. Public transfer programs also generate transfer wealth, as in the expectation of receiving a public pension benefit, or publicly provided health care, in excess of expected future taxes or contributions to support these public programs. In general, transfer wealth is the survival-weighted discounted difference between the expected future transfers received and transfers to others. As with lifecycle wealth in general, we can calculate it at each age x, call it $T(x, r)$, and we can calculate the population-weighted average transfer wealth per person, $T(r)$, analogous to $W(r)$.

In a closed economy, a transfer received by one person is a transfer given by another, so that in aggregate the positive and negative transfer *flows* must balance out and add to zero. For example, private transfers received by children exactly equal private transfers made to them by parents or other relatives. Similarly, in a pure pay-as-you-go pension program, the benefits received would just equal the taxes paid.[5] But while the *flows* of transfers made and received must add to zero at any instant for the country as a whole, this is not true for the *stock* of transfer wealth, which can take any value, positive or negative.

For example, some young adults expect to support their own parents when they are old, which is a negative component of transfer wealth, but they expect to be supported in turn by their children, which is positive, and these cancel out and add to zero. But somewhat older children have already supported their elderly parents for a number of years, so that the remaining years are diminished, and so their expected future costs are less than their expected future benefit of being supported themselves; thus they have positive transfer wealth. Finally, the elderly have already completed their support obligations and their parents are dead, and therefore they also have positive transfer wealth. Overall, there is positive transfer wealth through the familial old-age support system, just as there is through a public pension system.[6]

Now consider borrowing and lending. Once again, the sum of flows in the country as a whole must be zero for a closed economy. But now it is also true that positive and negative financial assets must be exactly equal and offsetting, because every debt corresponds to a credit to someone else, so that they sum to zero across the population.

Finally, consider saving and dissaving. In this case the sums need not sum to zero. Indeed, the weighted sum of these flows is the aggregate saving rate, which can be positive or negative. The stock of capital, however, must be positive. Thus the three forms of individual wealth – capital, credit, and transfer wealth – have quite different properties (see Bommier and Lee 2003). Capital and transfer wealth are both stores of wealth at the level of the nation or society, one real and the other (transfer wealth) purely a social construct. Financial assets serve as stores of wealth for individuals or generations but not for societies, because at the societal level these sum to zero in a closed economy. In a closed economy, therefore, we have

$$W(r) = T(r) + K(r). \tag{2.5}$$

Aggregate wealth, W, is the sum of transfer wealth, T, and capital, K. We can also say that the demand for capital equals the demand for lifecycle wealth (for pure annuitized consumption smoothing) plus the demand for capital to make downward transfers to children or grandchildren, where in NTA all other motives for accumulating K are folded into unintended bequests at death, also a component of T.

In open populations these principles do not apply exactly. Transfer flows sum to the balance of transfer flows with the rest of the world (ROW). For Mexico or the Philippines this sum is positive, because net transfers are received as private remittances from migrants to the US and elsewhere. Similarly, financial assets owned by residents do not need to add to zero, because individuals and the government may borrow from foreigners or lend to them. In the US more than 4 trillion dollars of public debt is held by foreigners or foreign institutions. But financial assets, including domestic assets owned by the ROW, will sum to zero.

POPULATION AGING, TRANSFER WEALTH, AND CONSUMPTION IN GOLDEN RULE ECONOMIES

There is widespread concern in both developed and developing countries that population aging will lead to lower lifetime consumption. Building on the analysis of the previous section, we shall see that the consequences of population aging depend on patterns of intergenerational transfers and transfer wealth. The golden rule case is of some interest, because the saving rate, capital stock, and interest rate are those that maximize per capita consumption for a given population growth rate and age structure.

For given mortality, more rapid population growth leads to a younger population (Lee 1994a). To study the effects of population aging, we can compare populations with the same mortality but different growth rates, analyzing the effects on lifetime consumption across golden rule growth paths. It is well known that across golden rule paths in a Solow model (Solow 1956), more rapid population growth requires that a higher proportion of output be set aside to equip the new workers of each generation – thus higher savings rates and lower per capita consumption. The net outcome across golden rule paths is

$$dc/dn = -K, \tag{2.6}$$

where c is per capita aggregate consumption and K is capital per capita. This equation describes the 'capital-dilution effect': more rapid population growth dilutes the capital per person. But a given level of per capita consumption can go with any number of different age patterns of consumption, supported by different patterns of intergenerational transfers and lifecycle saving. We shall see that lifetime consumption can *rise* across steady states even when simple per capita consumption, c, *falls*.

Let $C(n)$ be the present value of survival-weighted lifecycle consumption. More rapid population growth (and a younger population) can either raise C or reduce it, depending upon the specific age patterns of consumption and intergenerational transfers. Arthur and McNicoll (1978) showed that across golden rule paths

$$\begin{gathered} dC(n)/dn = C(n)\,(A_c - A_{yl}) - K \text{ or} \\ \frac{dC(n)/dn}{C(n)} = A_c - A_{yl} - \frac{K}{C(n)}. \end{gathered} \tag{2.7}$$

That is, there are two effects on lifecycle consumption when the population growth rate differs. First, there is the standard capital dilution effect, $-K$. Second, there is an effect arising from the age structure of consumption and labor income, and the age structure of the population, as these shape the average ages. This is the 'reallocation' effect, describing the way in which income is reallocated between its original receipt as labor income and its consumption. This reallocation takes place through some combination of lifecycle saving and dissaving, on the one hand, and private and public intergenerational transfers on the other.

Willis (1988), building on Arthur and McNicoll (1978) and generalized by Lee (1994a and 1994b), has used equations (2.5) and (2.7) to show that

$$\begin{aligned} dC(n)/dn &= T(n), \text{ or} \\ d\ln(C(n))/dn &= T(n)/C(n). \end{aligned} \tag{2.8}$$

That is, if intergenerational transfers are on average upward to the elderly, then transfer wealth, $T(n)$, is positive and members of a younger population, arising from more rapid growth, will enjoy higher lifetime consumption, C, even though simple per capita income in the population will be lower. If transfers are instead downward to children, on net, then a younger population will be more costly, and lifetime consumption will be lower. If the lifecycle demand for wealth is exactly right to achieve golden rule growth with $T = 0$ (perfectly offsetting upward and downward transfers, or no transfers at all), then small changes in population aging and growth rate have no effect on lifetime consumption. This result in equation (2.8) combines the capital-dilution effect and the lifecycle-reallocation effect.

The result also sheds light on Samuelson's (1975) thesis, which sought the optimal population growth rate at which the advantages of more rapid growth from reduced old-age support would be just offset by the disadvantages of capital dilution. We see from equation (2.8) that this occurs when aggregate transfer wealth is zero. If a country initially had positive T due to strong transfers to the elderly, then higher fertility and faster growth would reduce the dependency burden of the elderly, leading to higher lifetime consumption, $C(n)$, even as simple consumption per capita fell – contingent on maintaining golden rule growth. $C(n)$ would continue to rise with fertility until rising child dependency and declining old-age dependency brought T to zero at the optimal level of fertility and the population growth rate.

Although it is unlikely that real-world economies are close to the golden rule case, this special case gives valuable insights into the importance of transfers and age patterns of consumption and labor income for understanding the economic consequences of population aging. We see that increased fertility may lead both to lower per capita consumption through capital dilution and at the same time to higher lifetime consumption by reducing the dependency burden of transfers to the elderly.

In NTA economies, we have found that T_f is universally and strongly negative: transfers within families always flow downward on average, even when there is strong familial support for the elderly, as in much of Asia (see Chapter 4 by Lee and Mason). Public transfer wealth, T_g, varies from strongly negative to strongly positive across NTA economies. When we sum the two to get $T = T_f + T_g$, the total is almost always negative, suggesting that lower fertility and slower population growth would almost always raise both per capita consumption and lifecycle consumption – at least in this somewhat artificial golden rule scenario. Austria is the sole exception, with very slightly positive T and slightly upward transfers. However, comparative steady states based on current vital rates do not reflect the full concern for the effects of population aging, which will be more severe by 2050.

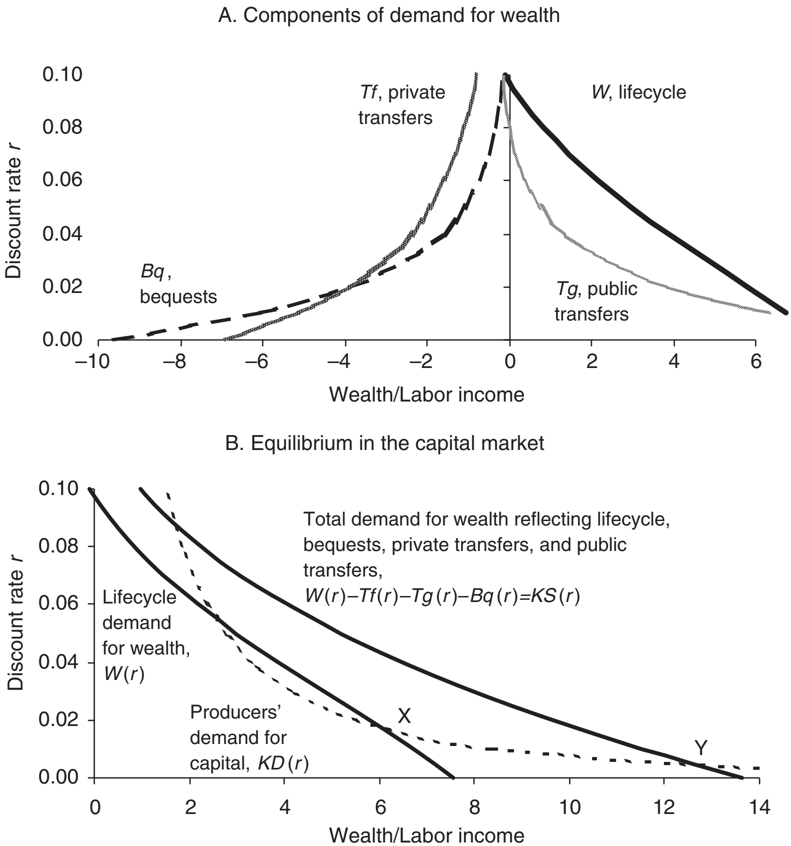
As Weil (1997) has shown, the transitional effects of demographic change are typically much greater than effects estimated by comparisons of steady states. The best way to study these transitional effects is through simulation and analytic projection, which we will not take up here. For this approach from the NTA perspective, see Mason and Lee (2007).

EQUILIBRIUM IN THE CAPITAL MARKET

We have seen how differences in the timing of consumption and labor income over the lifecycle generate a demand for lifecycle wealth, a demand that depends upon the interest rate, r, and on the population age distribution. This demand for lifecycle wealth by individuals and households can be satisfied by holding private or public transfer wealth, T, or by holding capital, K: $W(r) = T_f(r) + T_g(r) + K(r)$. From this we see that the aggregate lifecycle demand for capital by households is $K(r) = W(r) - T_f(r) - T_g(r)$, which is the demand for lifecycle wealth less the part of that demand that is satisfied by private and public transfers. This can be viewed equivalently as a supply of funds for investment by households; call it $K_S(r)$.

The funds that profit-maximizing firms will choose to borrow from households in order to buy capital will depend on the interest rate, r. Given an aggregate production function, we can derive the demand for capital on the part of producers as a function of the interest rate, $K_D(r)$. The market-clearing condition is $K_S(r) = K_D(r)$, which determines the equilibrium interest rate, r, and the equilibrium capital intensity of the economy.

Figure 2.3 is based on NTA data for the US in 2003 and the actual population data. Panel A plots the aggregate demand for lifecycle wealth, $W(r)$, family transfer wealth, $T_f(r)$, government transfer wealth, $T_g(r)$, and bequest wealth, $T_B(r)$. Recall that 'bequest wealth' in NTA is actually a catch-all category for all wealth holdings in excess of what is needed for lifecycle smoothing.[7] It is striking that these three forms of transfer wealth are all similar in size to overall lifecycle wealth. Restricting attention to lifecycle wealth would miss important parts of the story. Government



Notes: Panel A depicts demand for aggregate wealth in the US arising from various mechanisms for reallocation: lifecycle (*W*), family transfers (*Tf*), public transfers (*Tg*), and bequests (*Bq*). Our calculations assume that individuals discount at 3% and anticipate productivity growth of 2%. In panel B, equilibrium in the capital market assumes a closed economy, Cobb–Douglas production, and an equity premium of 1%. X denotes equilibrium for pure lifecycle wealth; Y shows equilibrium when transfer wealth from panel A is also taken into account.

Figure 2.3 Components of the demand for wealth and equilibrium in the capital market, based on US data in 2003

transfer wealth $T_g(r)$ is strongly positive, due to pensions, health care, and long-term care, so it greatly reduces the demand for capital. However, bequest wealth and familial transfer wealth are both strongly negative, since they result from downward transfers, and they strongly raise the demand for capital. The net effect is shown as a supply of investible funds for capital in panel B that substantially exceeds the lifecycle demand for wealth.

Panel B plots the demand for lifecycle wealth, $W(r)$, and also the residual demand for capital (supply of funds for capital), $K_S(r)$, after taking transfer wealth into account. The demand for capital by firms, $K_D(r)$, is plotted for a Cobb–Douglas production function with a 1% equity risk premium.[8] There are two intersections of $K_D(r)$ and $K_S(r)$. Inspection reveals that the upper equilibrium is unstable and the lower one, labeled Y, is stable. If we were to ignore transfer wealth, including bequest wealth, we would find a stable equilibrium at point X, which has only half the capital intensity of Y and an interest rate three times as high. Note that the units on the horizontal axis are ratios of K to total labor income, wL.

Why Transfers?

Now we consider why individuals and the public sector make transfers to others. Parents derive satisfaction from bearing and rearing children through a long period of dependent childhood, which in hunter-gatherer settings continued until around age 20 (Kaplan 1994; Howell 2010; Kaplan et al. 2010). Transfers to their children are motivated by evolved altruistic feelings. This evolved altruism is limited, however, because parents also care about their own future reproduction and their future ability to assist their children and grandchildren.

In hunter-gatherer societies, the net flow of transfers is downward from adults of all ages, including those in their 60s and perhaps 70s, to children (Kaplan 1994; Howell 2010; Kaplan et al. 2010). Over the course of economic development, long after most of humanity practiced settled agriculture or industrial production, parental investments in the health and education of their children began to yield higher returns, and the opportunities for such investment increased, raising the incentives for parents to invest in the human capital of their children.

These ideas provide the background for a line of theory developed by Becker, Willis, and others. In Becker's formulation, parents derive utility from their own consumption, but also from their children's utility. (For a more comprehensive discussion of this topic, see Arrondel and Masson 2006 and Laferrere and Wolff 2006.) Their children's utility in turn derives in part from these children's own consumption and in part from the utility of their own children. In this way, parental utility depends on the expected future success of an unending succession of generations, a whole dynastic family line. Parents can influence their descendants' future success by investing in their children's human capital, by making *inter vivos* transfers to them (and perhaps to their grandchildren), and by leaving them bequests.

Consider the parent's allocation decision. Investments in physical capital and in human capital each yield some expected rate of return. Efficient allocation requires that investment funds be shifted between the two forms of capital until the rates of return become equal. Let the market rate of return to capital in an economy be r. We shall call the corresponding level of investment in the human capital of a child the 'optimal' investment in human capital, $E^*(r)$. Children do not have the funds to invest in their own human capital. For a high-income parent the desired total lifetime net transfer, B, to each child (beyond basic consumption) may exceed $E^*(r)$. In this case a rational parent will invest $E^*(r)$ in the child's human capital, and then transfer the remainder, $B - E^*(r)$, to the child as an *inter vivos* transfer or bequest. For this reason the occurrence of an end-of-life bequest to a child signals that an optimal investment has been made in that child's human capital.

Low-income parents, in contrast, may intend a total transfer, B, that is less than $E^*(r)$. The child then receives a suboptimal investment in human capital. Each child would like to borrow the money $E^*(r) - B$ to fund additional education, which would earn a higher rate of return than r; but children do not have access to credit markets. In some cases, parents might be willing to lend money to a child to fund this additional education, with the expectation of being repaid.[9] Human capital would then be financed in part through altruistic transfers, and in part by non-altruistic loans from parent to child. In this case, some familial support of elderly parents would in fact be a repayment of the earlier loan rather than, or in addition to, altruistic transfers to the parents; and allocations within the family, both upward and downward, would be a mixture of altruistic transfers and exchange.

However, unless inculcated family values, culture, law, or other institutions ensure repayment of such a loan, these low-income parents might decline to lend for fear that they never would be repaid. In this case, children would receive less than the optimal amount of education and have lower future incomes. If poor parents were numerous, a society as a whole might be stuck at a low level of income as well, particularly if there were positive externalities to education. For similar reasons, poor parents might put their children to work at an early age to an extent that interfered with their future development.

Becker and Murphy (1988) suggest that in this case there is a Pareto improving role for the public sector, which can introduce public education, taxing the parents to pay for investment in the human capital of their children. That would improve the situation of the children, but it also would leave the parental generations worse off, since they could have invested more heavily in their children's human capital to begin with, had they chosen to. The public sector could then introduce a pay-as-you-go (PAYGO) pension program, taxing the educated children in their adult years to pay a benefit to their parents in old age. In this way the parental generation could be made better-off as well. The windfall loss incurred by the initial parental generation at the start-up of public education is offset by the windfall gain they receive with the start-up of the public pension program. In this way the inefficiency due to underinvestment in human capital is overcome, and subsequent generations enjoy higher income (Bommier et al. 2010).

The theory should not be taken too literally, but it illustrates a range of possibilities. Familial reallocations to children may be partly altruistic transfers and partly parental loans. Familial reallocations to the elderly may be partly altruistic transfers and partly repayment of earlier parental loans. The relative mix of transfer and exchange may vary with level of income, rate of return to human capital, and cultural values and institutions.

Asia is known as a region of the world where culture mandates familial support of the elderly. All NTA instances of net familial support for the 65+ elderly occur in Asia and none in Latin America.[10] Such support is consistent with the idea that cultural institutions in Asia enforce child repayment of parental loans. We might, then, expect that public education and public pensions would be less necessary in this part of the world to achieve efficient outcomes. In fact, NTA finds that private expenditure on education is substantially more important in Asian societies relative to public expenditure, and also that public pension programs tend to be weaker in Asia than elsewhere.

Becker's altruistic theory of fertility shares important features with Barro's (1974) approach. Both imply that public transfers may engender private transfers that neutralize their effects. For example, if parents have saved to provide for their old age, but an unanticipated new public pension instead provides what they need, then the parents may pass part or all of their new pension benefit to their children via increased *inter vivos* transfers or bequests, instead of consuming it themselves. Alternatively, if the elderly parents were expecting to be supported by their children but instead receive an unexpected pension, then their children would likely not make the expected private transfers to their parents. The NTA data provide suggestive evidence of both these patterns (in Chapters 1 and 4). If, however, these reallocations are motivated by exchange, then these private offsetting changes in transfers would not occur. The debt would still remain to be paid.

Following the seminal study by Cox (1987), a substantial body of literature has addressed the question whether intergenerational 'transfers' are motivated by altruism or by exchange (see Arrondel and Masson 2006 for a survey). We put 'transfers' in quotes because in NTA terminology transfers are defined as reallocations that involve no quid pro quo, so by definition they cannot be motivated by exchange. Reallocations motivated by exchange are instead viewed as borrowing or lending. But terminology aside, the question is real, and the answer has important implications for public policy, as we saw earlier.

Arrondel and Masson (2006) suggest 'indirect reciprocity' as an alternative to altruism or exchange, an idea closely related to Cigno's (2000) 'family constitution'. A child observes her parents supporting their own elderly parents. Later, as an adult, she in turn supports her own parents in their old age, with the expectation that her children will reciprocate indirectly by supporting her, and so on. Similarly, a child who is reared and educated by his parents reciprocates not by repaying them, but by doing the same for his own children in turn. Indirect reciprocity combines elements of altruism and exchange. Each generation sees it as an advantage to continue this familial practice. Alternatively, a generation (or individual) may decide to opt out, and instead to go it alone, saving for its own retirement.

FERTILITY, TRANSFERS, AND ECONOMIC GROWTH

The net private transfers that a parent intends to make to each of her children over the child's entire lifetime, including any intended bequests, is the (shadow) price of the child to that parent (Willis 1987 and 1994; Becker and Barro 1988; Razin and Sadka 1995). The intended level of net transfers is chosen by the parents jointly with their decision about numbers of children. This is one version of the quantity–quality trade-off theory of fertility. Willis (1994) develops a rich theory of parental decisions about reallocations to children (human capital, child labor, bequests, exchange for old-age support), and how these are related to the changing economic environment over the course of a society's economic development. There is not space to discuss this here, but there are many points of contact with the NTA measures. In Lee and Mason (2010) we provide a simple model of fertility, investments in human capital, and economic growth across the demographic transition, and show how investments in human capital per child are negatively related to fertility across the NTA societies and over time within several of them. Theories of fertility, investment in children's human capital, and transmission of wealth across generations link naturally to theories of economic growth. Becker et al. (1990) develop this approach explicitly.

A different line of research seeks an optimal societal growth path of saving and consumption, taking the population trajectory and initial capital stock as given, in a tradition going back to Ramsey. One approach is to analyze the decisions of an omniscient social planner in an age-structured economy. It has been shown, as in Becker and Barro (1988) or Willis (1987), that the planner's problem is similar to that faced by the altruistic head of a dynastic family, whose utility depends on that of an unending sequence of descendant generations and who must decide how much to consume himself, how much to invest in the human capital of his children, and how much physical capital to bequeath to them.

Thus the discussions in the first half of this chapter and in the second are closely interrelated. We are deeply worried about the costs of population aging, but population aging itself is the consequence of decisions and choices that current and recent generations have made about fertility and investment per child. To some degree the costs of supporting the elderly population, which will be borne by a relatively small number of workers, will be lightened by the heavy investments made earlier in these workers by their parents. The quantity–quality trade-off for fertility carries over to the labor force. We can understand these issues only by taking a broad view of the economic changes that systematically accompany the declining support ratios that characterize population aging. National Transfer Accounts and the studies in this volume should help in this endeavor. In Chapter 4 we return to many of the issues raised here, drawing on the empirical estimates available from NTA.

ACKNOWLEDGMENTS

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NOTES

1. An annuity pays an income that is conditional on the recipient's survival. Payments end early for a short life and continue for a very long time for someone who survives to extreme old age. The annuity spreads the risk of the timing of death across a whole generation, so that individuals need plan only for the average survival probabilities and not worry about their particular chances. When wealth is fully annuitized, then there is none left at death, and therefore no bequest to leave to heirs. Pensions are typically annuities.

2. Without complete annuitization, consumption would rise more slowly at old ages or might eventually decline for those who lived long lives and depleted their assets, owing to uncertainty about time of death (Yaari 1965). Even with complete annuitization, if there is an equity premium then consumption may decline at older ages.
3. Steady state, in this context, could include a constant rate of increased productivity and lifetime earnings, in which case transfer behavior would be defined relative to lifetime earnings.
4. That is, the consumption age profile is adjusted proportionately so that, at birth, the present value of expected lifetime consumption equals the present value of lifetime labor income if we assume a discount rate of 3% and a productivity growth rate of 2%. This adjustment also sets lifecycle wealth at birth equal to zero, which is another special feature of the golden rule case.
5. If taxes exceed benefits plus administrative costs, then the excess is counted in NTA as public saving, not a transfer, and similarly for a deficit.
6. If the discount rate is greater than the population growth rate, then young people may have negative transfer wealth through the familial old-age support system or through a public-sector pension system.
7. The NTA project has not yet established a method for estimating bequests. The estimate reported here is based on age distribution of asset holdings as reported in the US Survey of Consumer Finance, and on the assumption that mortality risks are independent of asset holdings, and that bequests go first to a surviving spouse, and then to surviving children. Since richer people have lower mortality, on average, than poorer people, this procedure will overestimate the actual flow of bequests. Future work will take into account the co-variation of mortality and asset holdings.
8. The 1% equity premium was chosen for convenience, so that there would be four equilibria. Panel B should be viewed as illustrative only.
9. If children are altruistic toward their parents, then parents may invest in their children's human capital to increase expected future transfers to them by their children, leading to greater investment in human capital than parental altruism alone would bring about.
10. Estimates of net private transfers to the elderly were not available for African countries at the time of publication.

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3. Introducing age into national accounts

Andrew Mason and Ronald Lee

This chapter describes the concepts underlying National Transfer Accounts, the methods used to construct them, and problems encountered in their construction. Many of the technical details are discussed in the NTA manual (Mason, Lee, Donehower et al. 2009), available on the NTA website: www.ntaccounts.org. Issues discussed here are also treated in more depth in Lee et al. (2008) and Mason, Lee, Tung et al. (2009). The methods build on earlier work by Lee (1980, 1994a, 1994b), Lee and Miller (1997), and Mason (1981, 1987).

National Transfer Accounts (NTA) have been developed to describe, illuminate, and improve our understanding of the generational economy. The definition given in the introductory chapter is sufficiently important to be repeated here:

> **Generational economy** *n* (1) the social institutions and economic mechanisms used by each generation or age group to produce, consume, share, and save resources; (2) the economic flows across generations or age groups that characterize the generational economy; (3) explicit and implicit contracts that govern intergenerational flows.

National Transfer Accounts quantify the economic flows for members of each age group or generation. The flows are important, first, because they reflect a fundamental feature of all societies: the economic lifecycle. What it means to be young and to be old varies across societies and changes over time. In part, this is a consequence of improvements in health and mortality. In most countries people are living longer and healthier lives today than ever before. In part, it is a consequence of changing educational needs and expectations. Children are spending longer in school and entering the labor force at a later age than ever before. And many other forces – income, culture, tastes, policy, and so on – influence what we consume and what we produce at each age. Our understanding of and responses to changes in population age structure can be improved by measuring the basic features of the economic lifecycle.

A complete picture, however, requires measuring the economic mechanisms and institutions that meet lifecycle needs. Children in all countries rely heavily on transfers, but there is important variation in the role of the state as compared with that of the family in providing for children. Moreover, in some societies familial responsibilities fall heavily on parents, while in others grandparents and other relatives play an important economic role. In some countries young adults depend on credit markets to fund their schooling and meet material needs, while in other countries this is unheard of.

In all countries the elderly fund their lifecycle deficits by relying on some combination of public transfer systems, familial support, and personal assets held in the form of housing, pension funds, family businesses, and other assets. But as is discussed throughout this book, the mix varies greatly from country to country. It depends on the age of the elderly and it is changing over time.

Other chapters in this book explore these important features of the generational economy and discuss their significance. This chapter describes the methods used to construct National Transfer Accounts.

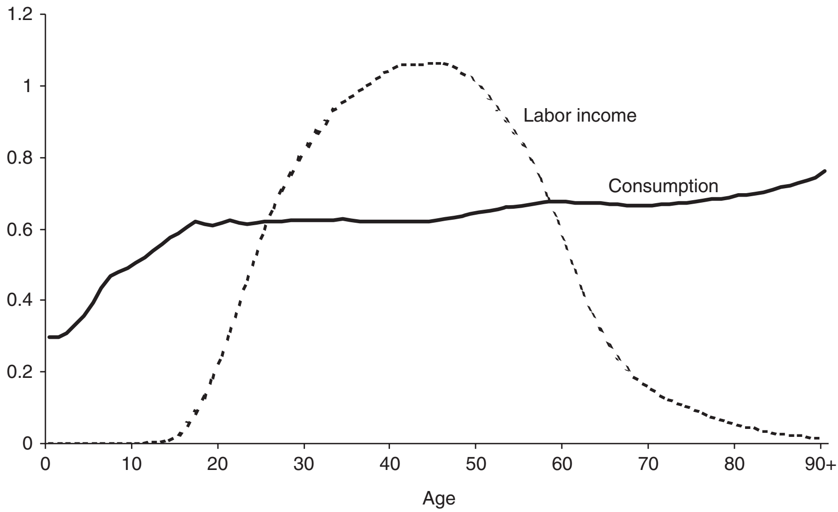
THE NATIONAL TRANSFER ACCOUNT

The National Transfer Account is governed by the flow identity (see Lee 1994a):

$$\underbrace{C(x) - Y^l(x)}_{\text{Lifecycle deficit}} = \underbrace{\underbrace{\tau^+(x) - \tau^-(x)}_{\text{Net transfers}} + \underbrace{Y^A(x) - S(x)}_{\substack{\text{Asset-based}\\ \text{reallocations}}}}_{\text{Age reallocations}} \qquad (3.1)$$

The economic lifecycle is represented by consumption, $C(x)$, and by labor income, $Y^l(x)$, at each age. The per capita economic lifecycle averaged over the 23 economies covered in this study is shown in Figure 3.1. To facilitate comparison across economies with greatly different levels of income, we have normalized values by dividing by the annual per capita labor income of persons aged 30–49. (The age range was selected to minimize the influence of the ages at entry into and departure from the labor force.) The lifecycle deficit is the excess of consumption over labor income, $[C(x) - Y^l(x)]$, at each age x. We refer to the excess of labor income over consumption for prime-age adults as the lifecycle surplus.

The lifecycle deficit necessarily equals reallocations at each age as



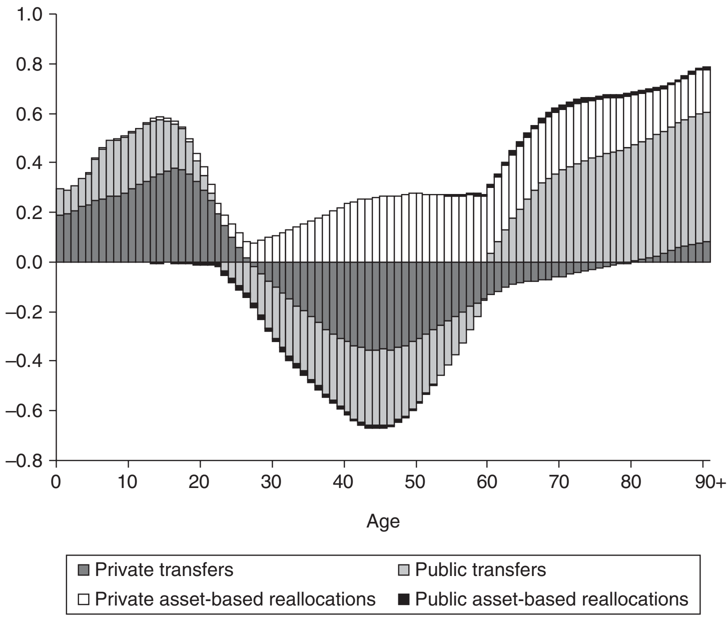
Note: All values are simple averages of country values, normalized on per capita labor income of persons 30–49 years old.

Figure 3.1 Economic lifecycle, per capita values: average of 23 economies around 2000

shown in equation (3.1). Age reallocations come in two economic forms. Net transfers, $\tau(x)$, are defined as transfer inflows less transfer outflows, $\tau^{+}(x) - \tau^{-}(x)$. Asset-based reallocations are equal to asset income less saving, $[Y^{A}(x) - S(x)]$, for age group x. The equation or constraint holds for both aggregate and per capita values. Although the flow constraint as written emphasizes the connection between the economic lifecycle and age reallocations, it holds irrespective of the motives or purpose governing any of its elements. The constraint is an *ex post* accounting identity that follows from a simple principle that for any age group, inflows (labor income, transfer inflows, and asset income) must be matched by outflows (consumption, transfer outflows, and saving).

Flows are further disaggregated by sector, distinguishing those mediated by the private sector from those mediated by the public sector. Public transfers consist of two flows: the inflows to each age group that arise from publicly funded health, education, pensions, and other public programs; and outflows from each age group, typically in the form of taxes, that fund these programs. Private transfers include both the flows between households and those that occur within households.

Asset-based reallocations are also distinguished by public and private



Note: Values are a simple average of country values, normalized on per capita labor income of persons 30–49 years old.

Figure 3.2 Per capita age reallocations: average of 17 economies around 2000

sector. Private asset income includes the returns to capital, dividends, interest, rent, and the imputed return from owner-occupied housing. Public asset income includes the income earned from publicly owned assets and interest paid on public debt (a negative value). Public and private saving generate outflows, while dissaving (or increasing debt) generates inflows. The average values for the four main components – net public and private transfers and public and private asset-based flows – are charted by age for the 17 economies for which the estimates are available (Figure 3.2).

Per capita values are useful for comparing economic lifecycles and reallocation systems of different countries. Aggregate flows are important for understanding the macroeconomic consequences of population age structure and features of the generational economy. The NTA flow constraint holds for both per capita and aggregate flows. Aggregate flows for each age are calculated as the product of the per capita flows at each age and the population at each age. The aggregate NTA for the United States are shown in highly summarized form in Table 3.1.

Table 3.1 National Transfer Flow Account, US, 2003 (aggregate nominal values by age group, US$ billions)

Item	All ages	0–19	20–29	30–49	50–64	65+
LIFECYCLE DEFICIT	2120	1825	220	−1109	−116	1301
Consumption	8989	1871	1097	2708	1778	1536
Public	2288	819	248	458	291	472
Private	6701	1052	848	2250	1487	1063
Less: Labor income	6869	46	877	3817	1894	235
AGE REALLOCATIONS	2120	1825	220	−1109	−116	1301
Transfers	−70	1809	93	−1611	−744	384
Public	−18	792	−3	−856	−447	495
Private	−52	1016	95	−755	−297	−111
Asset-based reallocations	2189	16	128	502	627	917
Public	190	6	19	89	54	23
Asset income	−203	−6	−20	−95	−57	-24
Less: Public saving	−393	−12	−39	−184	−111	-47
Private	2000	11	109	413	574	894
Asset income	2515	3	51	522	887	1052
Less: Private saving	515	−7	−58	110	313	158

The Relationship between NTA and SNA

National Transfer Accounts are broadly consistent with and complementary to National Income and Product Accounts as codified in the System of National Accounts (SNA) of the United Nations (United Nations 1993). This has important advantages because SNA provides the most widely available and frequently used source of aggregate economic data. The conceptual foundations are based on years of experience, and the methods are thoroughly documented.

In NTA, labor income plus asset income – that is, primary income, summed over all ages – is equivalent to net national income in SNA. Income on foreign investment or from temporary employment abroad is included in the primary income of residents. Income on assets owned by non-residents and labor income of non-residents is excluded from net national income. (Asset income and saving in NTA are net of depreciation.) Net transfers in NTA accumulated across all ages are equivalent to net transfers to the rest of the world (ROW) in SNA. NTA saving summed over all ages is equivalent to net national saving. NTA also relies on the SNA sectoral breakdown. ‘Public’ in NTA is equivalent to ‘general government’; private is equivalent to combined flows to corporate, household, and non-profit institutions serving households (NPISH) sectors; and 'rest of the world' is defined the same way in SNA and NTA.

Four important features of NTA distinguish it from SNA. First, in NTA all economic flows are classified by age groups (or ROW) and reported from the perspective of the individuals belonging to the age group. For example, tax payments are classified as public outflows for the age group. A separate account from the perspective of the government is not constructed. Second, NTA treats all private sectors in a consolidated fashion. The asset income for each age group comprises all asset income, including the operating surplus of corporations, whether distributed through dividends or not. Moreover, private saving in NTA includes both household and corporate saving. Third, NTA separates primary income into returns to labor and returns to assets. In SNA, primary income of the household sector or mixed income combines labor and asset income. Mixed income is divided between asset and labor income to yield an estimate of labor and asset income in NTA. Fourth, NTA estimates of consumption, labor income, and asset income are measured using basic prices; that is, income and consumption are valued prior to the assessment of taxes on production and products, also known as indirect taxes. Public transfer outflows thus include all taxes, including taxes on production and products.

NTA is subject to the same limitations as SNA. One problem is the treatment of environmental resources (green accounting). Economic growth and saving are overstated to the extent that the degradation of the environment is excluded from the accounts. A second important limitation is that non-market time is not valued. Currently, the value of services provided within the household, mostly by women, is not included in SNA's measures of production, consumption, or transfers. As a consequence, production by women is undervalued, and transfers to children and to the elderly are understated, as is consumption by children and the elderly to the extent that they are differentially the beneficiaries of unmeasured non-market production. The implications of incorporating non-market time into NTA are considered by Mathana Phananiramai in Chapter 31.

An important feature of NTA is that the individual and not the household is the basic unit of analysis. This is an advantage because it allows us to explore many important issues, but it comes at a cost. With rare exceptions, no direct information is available about the allocation of resources within households. Instead we must rely on a variety of rules and assumptions to allocate the reported consumption of the household among its members, to assign asset income and saving to a member (the head), and to estimate intra-household transfers. The methods used are based on our reading of the literature and discussions with many colleagues. They have been consistently applied across all economies. Appropriate use of NTA, however, requires a clear understanding of its underlying assumptions and its limitations. These are discussed in more detail below.

Overview of Estimation

National Transfer Accounts are estimated by relying on a variety of data sources. National Income and Product Accounts, government financial statistics, and government administrative records are used to estimate economy-wide aggregates, for example public and private consumption, labor income, public transfers, asset income, saving, and their components.

Broadly speaking, the estimation strategy is, first, to obtain initial estimates of an age profile, perhaps from a survey; second, to use the national population age distribution to calculate an implied aggregate value based on that age profile; and, third, to multiplicatively adjust the level of the age profile so that the implied aggregate value exactly equals the national aggregate 'control total' obtained from National Income and Product Accounts. We shall now flesh out this basic approach, focusing on estimating the age profiles and on choosing the appropriate control totals from National Income and Product Accounts.

Age profiles are estimated by making extensive use of administrative records and nationally representative income and expenditure surveys, labor force surveys, health expenditure surveys, and special-purpose household surveys. Of course, countries vary greatly in the quality and the comprehensiveness of their economic data, but many countries have nationally representative income and expenditure surveys that provide data needed to estimate age profiles required for NTA.

THE ECONOMIC LIFECYCLE

The economic lifecycle is composed of consumption, labor income, and the lifecycle deficit (consumption less labor income). The methods employed here are described in detail and compared with alternative approaches in Lee et al. (2008) and Mason, Lee, Tung et al. (2009). Sang-Hyop Lee and Naohiro Ogawa provide a comparative analysis of labor income in Chapter 5; An-Chi Tung discusses consumption patterns in a comparative context in Chapter 6.

Consumption

Consumption in NTA consists of both public and private consumption. The aggregate counterpart in SNA is final consumption expenditure evaluated using basic prices – in other words, prior to the assessment of value-added tax and other consumption taxes. Separate estimates of public and private consumption of education, health, and other goods and services are constructed for every NTA economy.

Public expenditures on health and education are allocated by age, relying primarily on administrative records. Education estimates use budget data to construct estimates of per student education spending by educational level. These data are then combined with age- and level-specific enrollment data to estimate public education consumption by age. The methods used to allocate public spending on health are more varied and more subject to error. In some countries, for example, age profiles of in-patient and out-patient service use are combined with estimates of per patient costs for in-patients and out-patients. In others, very detailed estimates of public spending on health by age are available from government agencies or surveys of providers. The per capita age profile of public consumption of other goods and services, such as military forces, roads, or sewers, is assumed to be constant across ages.[1]

Private consumption is allocated by age, using a household expenditure survey with a complete household roster (reporting the number of members and their ages) and spending on education, health, and other goods and services. Allocation rules are used to assign consumption to each household member. The age profile for each consumption type is obtained by averaging consumption by age across all members of all households. The age profile is then adjusted proportionately to match aggregate controls for each consumption category, given the national population age distribution.[2]

The rules used for allocating private consumption among household members vary by consumption category: health, education, and other. An equivalence scale is used for allocating other private consumption. Children under the age of 5 are assigned a value of 0.4. The equivalence scale increases linearly from age 5 to reach 1.0 at age 20. Thereafter, the equivalence scale is held constant at 1.0. For a detailed discussion of this approach and alternatives, for example Engel's method or the Rothbarth method, see Deaton (1997) and Lee et al. (2008).

The allocation rules for education and for health care are based on regression estimates that rely on survey data to estimate the relative consumption of members at different ages. Education scales are estimated by regressing education spending on the number of non-enrolled and enrolled household members at each age. These scales are used to assign the reported household spending on education to individual household members. The age profiles are then obtained by tabulating and averaging education spending by age and scaling to match the aggregate control total. The methods have been evaluated using data for which health and education spending is reported for individuals rather than for households. In societies where long-term care spending is important, it is included with health spending, as in the US, or is reported separately, as in Japan.

Age profiles are selectively smoothed using local regression (lowess) to reduce noise, but without masking key features of the series. Age profiles of education consumption are not smoothed because they rise and fall quite sharply. For similar reasons, the health profile of consumption is smoothed starting at age 1 so as not to mask the relatively high consumption by newborns in most societies.

Labor Income

Labor income is an estimate of the market value of the labor supplied by the average person in each age group. Labor income is composed of earnings; benefits, including employer contributions to public entitlement programs (e.g., pensions and health care); and self-employment income. Taxes on products and production (indirect taxes) paid by labor are included in labor income. The value of time spent in home production of market goods and services is included in NTA as it is in SNA; however, the value of time spent in producing non-market goods and services is not included. For example, time spent maintaining a personal residence or caring for one's own children is not measured in NTA (or in SNA).

Labor income is a composite measure that combines values for males and females and reflects variation in hourly wages, hours worked, unemployment, and labor force participation. Hence labor income profiles reflect age variation in productivity, age at entry and retirement from the labor force, female labor force participation, and economy-specific features of labor markets – for example, child labor and mandatory retirement laws, policies regarding family leave, and wage systems.

The age profile of labor income is estimated by using nationally representative surveys. An important issue in some countries is the treatment of unpaid family workers in households with a family business. The approach followed in NTA is to treat two thirds of reported mixed income as accruing to labor (Gollin 2002) and to allocate this unpaid family labor income to reported unpaid family workers in proportion to the average labor income of employees of the same age.[3] Sang-Hyop Lee and Naohiro Ogawa provide a detailed discussion of labor income profiles and their variation across economies in Chapter 5.

The Lifecycle Deficit

The lifecycle deficit is defined as consumption less labor income. (The surplus of labor income over consumption among working-age adults is called the lifecycle surplus and is equivalent to a negative lifecycle deficit.) The lifecycle deficit measures the gap between what the young and the old consume and what they produce through their labor. Although it is tempting to treat the lifecycle deficit as a measure of dependency, applying the term 'dependency' in this way may fundamentally misrepresent the economic status of the elderly in particular, and the young to a lesser extent. Older adults with a lifecycle deficit may support their consumption by relying on assets accumulated during their working years. Young adults may fund their consumption by relying on student loans and credit card debt, which they are obligated to repay in the future.

The lifecycle deficits measure the 'demand' for age reallocations.[4] Labor income, to the extent that it is consumed, is distinctive among all economic resources because it is used directly and immediately to support consumption. Other economic mechanisms used to fund consumption, described in more detail below, involve inter-age flows.

The aggregate lifecycle deficit is an important feature of any economy. In a dynamically efficient economy consumption will equal or exceed labor income.[5]

In golden rule growth, aggregate consumption and labor income are equal and the aggregate lifecycle deficit is zero. Among the NTA economies, China is the only one with an aggregate lifecycle surplus; that is, aggregate consumption is less than aggregate labor income.

An-Chi Tung (Chapter 6) provides a comparative discussion of the economic lifecycle and lifecycle deficits.

ECONOMIC FLOWS ACROSS AGES

Differences between consumption and labor income must be matched by economic flows across ages identified in the flow identity (see equation 3.1). Two economic mechanisms are available: transfers and asset-based reallocations. Public flows (those mediated by government) are distinguished from private flows (those mediated by families, non-profit institutions, and firms). Important forms of asset-based reallocations are identified in Table 3.2.

Table 3.2 A classification of National Transfer Accounts reallocations

Type of flow	Asset-based flows		Transfers
	Capital and natural resources	Financial assets	
Public	Publicly owned land and subsoil minerals	Public debt Sovereign wealth funds Currency stabilization funds	Public education Public health care Unfunded pension plans
Private	Land Subsoil minerals Equipment Structures Owner-occupied housing	Consumer debt and credit Mutual funds Private pension funds Personal savings	Familial support of children and parents Bequests Charitable contributions

Source: Adapted from Lee (1994a).

Public Flows

A quantitative overview of the public sector is provided by the *structure of public flow account*. We present an example, Table 3.3, with values reported for Taiwan in 1998 for illustrative purposes.

Net public transfers must be zero by definition. Any transfer inflow must be matched by a transfer outflow. Public transfer inflows to residents differ from public transfer outflows from residents by the value of net public transfers to ROW. *Public transfer inflows to residents* equal the value of in-kind and cash transfers received by the beneficiaries of public programs, whereas *Public transfer outflows from residents* measure the value of residents' economic resources used to fund public transfers. One source is *taxes and grants*, which include, besides taxes, social contributions, current grants from foreign governments, and a portion of other revenues of the government.

The *transfer surplus* (+)/*deficit* (−) is a balancing item for public transfers. A surplus is generated if taxes and grants are more than sufficient to fund public transfer inflows. A public transfer deficit is generated if taxes and grants are insufficient to fund public transfer inflows.

Public asset-based inflows arise from asset income or through public dissaving. The net flow, *public asset-based reallocations*, is equal to public

Table 3.3 Structure of Public Flow Account: Taiwan, 1998 (NT$ millions)

Type of flow	Value	% of labor income
PUBLIC TRANSFERS		
Net public transfers	0	0.0
Public transfer inflows to residents	1,997,684	41.7
In-kind transfer inflows	1,665,536	34.8
Cash transfer inflows	332,148	6.9
Public transfer outflows from residents	−1,995,878	−41.6
Taxes and grants	−1,881,751	−39.3
Transfer surplus(+)/deficit(–)	−114,128	−2.4
Net public transfers to ROW	−1,806	0.0
PUBLIC ASSET-BASED FLOWS		
Public asset-based reallocations	114,128	2.4
Asset income	267,008	5.6
Less: Public saving	152,881	3.2

Source: Communication from An-Chi Tung.

asset income less public saving. The public transfer surplus/deficit and public asset-based reallocations must sum to zero. If asset income is sufficient to cover the transfer deficit, the residual is saved. If asset income is insufficient to cover the transfer deficit, public dissaving is required. In many countries, public asset income is negative because interest on public debt exceeds other public asset income.

Public transfers

Public transfers in NTA also are identified by purpose, emphasizing age-related programs in a manner consistent with but simpler than the United Nations Classification of Functions of Government. Public transfers for education, health, and pensions are estimated for all economies. Other programs may have distinctive and important age profiles – for example, unemployment benefits and long-term care programs. The particular programs for which estimates are constructed will vary with the particular public programs and policies of the country in question.

In most instances there is no ambiguity as to whether inflows should be classified as in-kind or as cash. In general, in-kind public transfer inflows are goods and services received directly from government agencies as opposed to goods and services that are purchased with the benefit of a publicly provided cash subsidy. Hence public (state-run) schooling is an in-kind transfer whereas a scholarship is a cash transfer. An exception to this approach is health. National health insurance payments and similar reimbursement programs – for example, Medicare and Medicaid in the US – are classified as in-kind transfer inflows (and as public consumption) in NTA. This approach is intended to facilitate comparisons across economies. Note that in-kind public transfers and public consumption as calculated in NTA are equivalent.

Classification of public spending on pensions is sometimes a source of confusion. Pensions paid to public workers as part of their compensation are not transfers. They are a component of the labor income of public workers and a cost of producing public goods or services. Retirement benefits for state school teachers, for example, are part of the cost of education and captured in the value of in-kind transfers of education to students of state-run schools. Pensions paid to public workers are treated in the same fashion as pensions paid to private workers by their employers.

The principle followed for estimating the age profile of inflows to residents is that the inflow is assigned to the age groups of the intended beneficiaries of the public program. The value of school lunch programs, for example, is assigned to students. Prenatal health care is assigned to the mother. Some cases are difficult to assign. Maternity costs and the normal expenses associated with a birth are assigned to the mother. In the case of a US transfer program called Temporary Assistance for Needy Families, only families with children qualify, but the amount received is based on family size, including any adults. Benefits are assigned equally to all household members. Many public transfers do not accrue to particular individuals at all. These inflows are assumed to be divided equally among all members of the population.

Methods for constructing age profiles of public consumption and, hence, in-kind public transfer inflows are discussed in the section on the economic lifecycle and are not repeated here. Cash transfers are estimated using administrative records or household surveys that provide information about the amount of public cash transfers and characteristics of the recipients.

Transfer outflows must equal transfer inflows, and hence their total value as well as the value for specific programs is given. The age profile of public transfer outflows depends on the tax source, the age distribution of the tax source, and age variation in tax rates, if any. Social contributions are not distinguished from taxes in NTA, which distinguishes seven tax sources: labor income, asset income, consumption, asset holding, asset transactions, ROW, and other. The tax source, that is, tax incidence, is determined in the same fashion as in Generational Accounting. The source of taxes is classified according to the party, resource, or activity assessed. Taxes on wages and earnings are paid out of labor income, taxes on profits out of profits (asset income), taxes on consumption out of consumption, and so on. Second-order and general equilibrium effects are not considered, and this limits the ability to draw inferences about welfare directly from NTA measures. To assess effects on welfare, we would additionally need estimates of the indirect effects of transfers arising from behavioral responses, externalities, and distortions (see Fehr and Kotlikoff 1999); we would also need a measure of individual welfare. We have chosen to estimate only the financial flows.

In the simplest tax systems, all public revenues are pooled into a general fund used to support all public programs. In this case the distribution of outflows by tax source and the relative age profiles of public transfer outflows will be the same for all programs. In some countries, however, the funding sources vary across public programs. This may occur because programs have earmarked or committed sources of funding. Pension programs are often funded through payroll taxes, for example. Grants from foreign governments may target health or education programs. The source of outflows may vary by purpose because various levels of government, with different tax systems, may be responsible for specific government programs. Education may be funded at the local level from property taxes while national defense is funded at the central level out of value-added taxes, for example.

The age profile of some tax sources is already computed because the sources are NTA components. Examples are the age profiles of earnings, asset income, and consumption. Additional analysis is required in other cases. Examples are taxes on the consumption of alcohol or tobacco.

Some tax rates – for example, sales tax rates and value-added tax rates – do not vary with age. Taxes paid by each age group depend only on how much they consume of each type of good and service. Other tax rates vary by age for a variety of reasons: explicit provisions that favor age groups (e.g., exemptions for older individuals), ceilings on the value of the resource subject to taxation, taxes imposed only on resources above a floor, the use of graduated tax schedules, and so on. Two general approaches can be used to estimate age-specific variation in tax rates. Administrative records may provide information about the age of those who paid taxes. Or household surveys may contain information about tax payments by households. If so, methods for allocating household variables to individual members may be used to estimate age-specific taxes and tax rates.

Tim Miller (Chapter 7) discusses public transfers in a comparative and more detailed fashion.

Public asset-based reallocations

Public asset-based reallocations quantify the inflows to and outflows from age groups that are a consequence of public asset transactions. Asset-based reallocations consist of two distinct flows: public asset income and public saving. Public asset income (if positive) is an inflow for 'taxpayers' whereas public saving (if positive) is an outflow for 'taxpayers'. The combined flow that arises from public assets, public asset-based reallocations, is equal to public asset income less public saving.

Public assets serve a variety of purposes. Some of these are explicitly intended to satisfy the reallocation of economic resources across age groups. Many, however, have other purposes, but nonetheless result in inter-age flows. A funded or partially funded public pension program is an important example of an asset-based program with age reallocations as its objective. Governments can fund pension programs by taxing workers and accumulating public assets. In subsequent periods, income from the assets or dissaving of the assets can be used to fund pensions of retirees. Fully funded public pension programs are unusual, but many countries have partially funded public pension programs.[6] Some public pension programs maintain individual accounts; hence the assets can be readily assigned to individuals and to ages. Chile's pension system (Chapter 12) and Singapore's Central Provident Fund are examples. Most public asset-based reallocation systems do not share this feature. Rather, public assets are collectively owned. Whether the assets of public pension programs are held in individual accounts or collectively held, they provide an economic mechanism for reallocating resources across ages, as well as over time. If the social contributions or taxes of workers exceed current benefit payments (transfers), the surplus is accumulated as an asset. In subsequent periods, retirees can be supported, for example, using income earned on the asset and by drawing down the public fund.

Two other important forms of public financial assets are *currency stabilization funds* and *sovereign wealth funds*. Currency stabilization funds do not have an explicit intergenerational or age reallocation rationale. Rather, these funds are maintained to smooth exchange-rate fluctuations. Sovereign wealth funds, on the other hand, are often used by countries with substantial revenues generated by the depletion of natural resources, the explicit objective being intergenerational equity. Norway and the United Arab Emirates, for example, both have large sovereign wealth funds generated from oil revenues. A few countries are running fiscal surpluses and accumulating funds as a response to anticipated future fiscal needs of their aging populations. Australia's Future Fund is an example.

Public debt is another important example of an asset involved in asset-based reallocations. Increasing public debt – that is, dissaving – generates an inflow to current taxpayers. Existing public debt generates an outflow, or interest expense, from current taxpayers. Some countries have large publicly owned natural resources that generate substantial public asset income. By convention, public capital (e.g., highways and public parks) does not yield asset income.

Following SNA, *public asset income* is equivalent to the net operating surplus plus property income of the government. The net operating surplus for the government is generally quite small because public capital does not generate an operating surplus. In SNA, property income consists of five components: interest (income and expense), distributed income of corporations, reinvested earnings on direct foreign investment, property income attributed to insurance policyholders, and rent (i.e., the return to land and subsoil assets). Public saving in NTA is equivalent to net saving by general government in SNA.

In NTA, public asset-based flows are assigned to age groups in proportion to the general (non-earmarked) tax payments of each age group. The basis for this approach is clear for public asset-based outflows: interest expense and the acquisition of public assets. Public interest expense is paid by taxpayers and allocated across age groups by means of the same procedures followed for allocating public transfer outflows. Likewise, the acquisition of public assets is funded from taxes that are assigned to age groups by means of the same procedures that are used to assign public transfer outflows.

The conceptual foundation for treating public asset income and public borrowing in this way relies on a counterfactual. In the absence of public asset income or public borrowing, general tax revenues would have been greater (given public spending). Thus the asset-based inflow is allocated to age groups in proportion to the general taxes they pay.

Social security funds are often classified as separate institutional units within general government. If funds are significant in size, it may be advisable to calculate asset-based reallocations separately from other units of general government. In these cases the age profile of taxes used to fund the independent program provides the basis for determining the age profile of asset income or program surpluses or deficits.

Chapter 9, by Andrew Mason, Naohiro Ogawa, Amonthep Chawla, and Rikiya Matsukura, provides comparative information about public asset-based reallocations.

Private Flows

A quantitative overview of private age reallocations is provided in Table 3.4 by the Structure of Private Flow Account illustrated with values for Japan in 2004. Private transfers and private asset-based reallocations are distinguished as well as their key components. In Japan, private transfers are very substantial. Private transfer inflows or private transfer

Table 3.4 Structure of Private Flow Account: Japan, 2004 (billions of yen, current prices)

Type of private flow	Value	% of labor income
Net private transfers	0	0.0
Private transfer inflows	138,004	51.2
Intra-household transfer inflows	137,476	51.0
Inter-household transfer inflows	528	0.2
Private transfer outflows	–138,044	51.2
Intra-household transfer outflows	–137,476	51.0
Inter-household transfer outflows	–568	0.2
Net private transfers to ROW	41	0.0
Private asset-based flows		
Private asset-based reallocations	46,555	17.2
Private asset income	98,228	36.4
Less: Private saving	51,673	19.2

Source: Ogawa et al. (2008). Additional data at http://www.ntaccounts.org.

outflows exceed half of total labor income. Net transfers to ROW are very small and positive. In other words, Japanese residents transfer more to non-residents than they receive. Intra-household transfers dominate private transfers. This is consistently the case among NTA economies. Asset-based reallocations are positive in Japan. Asset income was 36% of labor income in 2004, while net private saving was 19% of labor income. This produced a net asset-based inflow equal to 17% of total labor income.

Private transfers

Private transfers consist of intra-household transfers and inter-household transfers. Inter-household transfer inflows consist of all private transfers received by residents irrespective of the source of those inflows (domestic or ROW). Likewise, inter-household transfer outflows consist of private transfers made by residents irrespective of the destination of those inflows (domestic or ROW). The difference between the two flows equals net private transfers to ROW. Interhousehold transfers include direct transfers between households and indirect transfers mediated by non-profit institutions serving households (NPISHs).

Only current transfers are reported in the national transfer flow account. Capital transfers such as bequests, dowries, and similar large transfers of assets are not included; they are the subject of ongoing NTA research. Private transfers also do not include the value of time transfers and, hence, understate the value of transfers to children and elderly parents provided by family caregivers.[7]

Inter-household transfers are assumed to flow only to and from household heads. The age profiles of inter-household transfers are estimated directly from household surveys of income and expenditure. Aggregate controls for transfer inflows and outflows to the household sector are available from national income and product accounts for some countries, but in other cases the aggregate levels are based on survey estimates. For these countries, inflows and outflows are both adjusted, by an equal percentage but of opposite sign, so that net domestic transfers and net transfers sum to zero.

In most countries, private transfers from ROW are small, but remittances are substantial in some countries (e.g., the Philippines and Mexico). The treatment of remittances from foreign workers in SNA and NTA depends on the status of the workers and whether or not they are considered to be residents. Remittances from guest workers who are temporarily abroad are considered to be labor income for the resident household to which they belong rather than a transfer from ROW. Remittances from those who are not guest workers but who have emigrated are treated as transfer inflows from ROW. Measuring these flows is particularly difficult, and often the range of estimates is very wide. Two countries for which the treatment of remittances is important are Mexico (Chapter 13) and the Philippines (Chapter 18).

While inter-household transfers are estimated directly from survey data, intra-household transfers are estimated indirectly as the balancing item between private consumption and disposable income (labor income plus net private transfers plus public cash transfer inflows less taxes paid) for each household member. Household members with a deficit (disposable income less than current private consumption) receive transfers from household members with a surplus (disposable income greater than current private consumption). If disposable income is insufficient to fund household consumption, the household head makes additional intra-household transfers out of asset income and, if necessary, by dissaving. If disposable income is more than sufficient to fund household consumption, the residual is transferred to the household head and saved.

The consumption of durables, including the services from owner-occupied housing, is treated in a distinct fashion because, by assumption, the household head owns all household assets and all income generated by those assets flows to the head. The consumption of durables by any non-head household member is *funded* by an intra-household transfer from the head to the member equal to the value of that member's durable consumption. For most countries only owner-occupied housing is treated in this fashion because of data limitations.

Any errors in the estimates of private consumption and disposable income will lead to corresponding errors in the estimates of net intra-household transfers. Moreover, assigning assets and asset income to the household head has important implications for the calculation of net transfers. Non-head members with a deficit draw on the assets of the head, not on their own assets, to support their current needs. Non-head members with a surplus cannot save, but rather transfer their surplus to the head to be saved.

Net intra-household transfers can be computed, given estimates of consumption and disposable income for each individual. Estimates of additional features of intra-household transfers require additional assumptions.

First, intra-household transfer inflows and outflows are constructed by assuming that no individual within the household has both inflows and outflows, with one exception: a household member may have current transfer outflows and a transfer inflow associated with the consumption of durable services (e.g., housing). To the extent that household members actually have both current transfer inflows and outflows, NTA estimates will understate inflows or outflows, but not net inflows.

Second, we construct estimates of intra-household transfers by purpose (education, health, etc.) To do so, we assume that the size of the purpose-specific intra-household transfer inflow is proportional to purpose-specific consumption by the individual receiving the transfer. In these calculations, therefore, we do not allow for the possibility that intra-household transfers are targeted at particular purposes. No information is available, for example, to determine that a college student pays for his or her education while relying on transfers for food and housing. Hence we assume that an equal percentage of all purposes is funded through intra-household transfers.

Third, we construct estimates of the joint age distribution of intra-household flows by assuming that the proportion of flows received from any age group depends only on the contribution of that age group to the total flow. In other words, there is no age targeting within the household. The estimates do not allow for the possibility, for example, that in a three-generation household, children receive more support from co-resident siblings while the co-resident elderly receive more support from their adult children.

Ronald Lee and Gretchen Donehower (Chapter 8) provide an extensive comparative discussion of private transfers.

Private asset-based reallocations

The use of private assets is an important mechanism for shifting economic resources across age. Young adults may generate resources by accumulating debt. In some countries this is a common means by which students pay for part of their college education. Young adults also may use consumer debt to pay for material needs that they cannot fund out of current earnings. In both cases, asset-based reallocations are used to shift resources to younger ages from older ages. In the conventional life-cycle saving model, asset-based reallocations are used to shift resources from younger ages to older ages. The patterns observed may result from a variety of motives. Individuals accumulate wealth to protect themselves from unforeseen events, to leave a bequest to their children, to smooth consumption over the lifecycle, and for other reasons. Asset income at each age reflects previous saving behavior; but it also reflects changes in asset prices, inheritances, and other capital transfers received. Although the motives that lead to the accumulation of assets are an important research issue, the methods for measuring the flows in NTA are entirely independent of motive.

Asset-based reallocations are the composite of two flows: asset income and saving. In NTA, two kinds of asset income are distinguished: capital income and property income. Private capital income is the return to capital held by corporations and households, consisting of the operating surplus of corporations and households and capital's share of mixed income. Property income is a flow generated by financial assets (e.g., debt instruments and corporate shares). Important forms of property income are interest, dividends, and rent (payments to owners of land, fossil fuels, and other subsoil minerals). For any form of property income, inflows and outflows must always balance. Interest paid by debtors must equal interest received by creditors, dividends paid by corporations must equal dividends received by shareholders, and so forth.

Property income will not produce an age reallocation if the parties on either side of the transaction have the same age profile. If Corporation A pays interest on debt to Corporation B, the owners of Corporation A have negative interest income and the owners of Corporation B have positive interest income. But if the age distribution of the owners of Corporation A and B are the same, net interest income will be zero for the members of each age group. In NTA we use a single age profile to characterize the property income of corporations. Hence flows of property income between corporations are included in the outflow and inflow measures, but the net flows are zero and they do not generate age reallocations. Property income between the household and the corporate sector does result in age reallocations. An example would be interest paid on credit card debt, a home mortgage, or a student loan.

The age profiles of asset income are based on household survey data. Asset income and saving are, by assumption, assigned to the household head. The age profile of capital income is approximated by the age profile of property income. For this to hold exactly, the age profiles of asset income from interest, dividends, and rent must be identical and the age profile of earnings retained by corporations must be identical to the age profile of earning distributed by corporations. Likewise, the age profile of property income inflows is estimated by using the age profiles of household survey data on property income. The age profile of the operating surplus of households (asset income from owner-occupied housing) is estimated by using the rental value of owner-occupied housing reported in household surveys. The age profile of non-corporate capital income is approximated by estimates of mixed income from household surveys. The age profile of interest outflows from consumer debt is estimated by using household interest expense. All other property income outflows are approximated by the age profile of property income.

The second major component of asset-based reallocations is saving. Individuals can acquire debt or dispose of existing assets to generate inflows. Or they can dispose of debt or acquire assets, thus generating outflows. Private saving is the balancing item in NTA as it is in SNA. It is calculated for each age group as the difference between the lifecycle deficit and age reallocations other than saving. Summed across all ages, saving is equivalent to net private saving.

In Chapter 9, Mason et al. discuss asset-based reallocations in more detail, comparing NTA economies for which estimates are available.

SUMMARY MEASURES

NTA is very detailed, providing estimates of each variable for single years of age, typically from 0 to 90+. For purposes of analysis and description we use a variety of summary measures, some of which are described here.

The *support ratio* is a measure of population age structure that explicitly incorporates age variation in productivity and consumption needs. The support ratio is calculated by using age profiles of per capita consumption [$c(a,t_0)$] and labor income [$y_l(a,t_0)$] from a base year t_0 to weight historical and projected population data [$N(a,t)$]:

$$SR_t = \frac{\sum_a y_l(a,t_0)\,N(a,t)}{\sum_a c(a,t_0)\,N(a,t)} \tag{3.2}$$

The labor income profile is scaled to equal 1 for those, on average, in the 30–49 age range. Consumption is scaled to equal 0.6 for those, on average, in the 30–49 age range. Thus the *SR* reflects variation in the shape but not the level of the labor income and consumption profiles.

Mean ages provide a useful summary of the age at which the inflow or outflow is experienced. The mean age of consumption (A_C), for example, is calculated as:

$$A_C = \frac{\sum_a ac(a,t)N(a,t)}{\sum_a c(a,t_0)N(a,t)} \tag{3.3}$$

Transfers and some other economic flows (e.g., property income) always have an inflow and an outflow with corresponding mean ages of inflows and outflows. The difference between the mean ages of an inflow and those of an outflow summarizes the extent to which the transfer system shifts resources across ages. Under the special circumstances of golden rule growth, the present value of flows will equal the product of the annual flow and the difference between the mean age of the inflow and the outflow (see Chapter 2).

Synthetic cohort estimates are used to construct a measure that is unaffected by the population age distribution. In that respect they are similar to a total fertility rate, net reproduction ratio, or period life expectancy in demography. The measure is constructed using a per capita age profile of a flow and (in some cases) age-specific survival weights [$s(a)$]. For example, a measure of consumption by children is $\Sigma_{a=0}^{24} s(a)c(a)$. The measure can be interpreted as the total expected consumption during childhood given current age-specific survival rates and consumption flows.

To facilitate comparisons among societies we rely frequently on *normalization*. Comparing societies at different levels of development is difficult. In many instances we facilitate comparison by expressing age profiles in relation to the average of per capita labor income over the 30–49 age range. A simple average of single-year-of-age values of labor income is used for this purpose. Labor income is pre-tax income. The 30–49 age range is used because it is unaffected by departure from school or retirement.

CONCLUSIONS

Constructing National Transfer Accounts is a complex and demanding task. The data requirements are considerable, drawing on national income and product accounts; comprehensive and nationally representative surveys of income, expenditure, wages, labor supply, and so on; detailed administrative records maintained by a variety of public institutions; and demographic data. These data vary in their quality and completeness. The quality of data is particularly problematic in lower-income countries where literacy rates are low, statistical agencies are underfunded, and many people work in informal, partially monetized sectors of the economy. Despite these challenges, many low- and middle-income countries conduct censuses and surveys and maintain account systems that provide important information about the generational economy. NTA provides a systematic way of organizing these data in a way that can shed light on an important set of issues.

NOTES

1. For some countries the authors of this volume estimate more detailed categories of public consumption.
2. This procedure is based on the assumption that proportional errors in the original age profile are equal at all ages. The data necessary to relax this assumption are rarely available.
3. That is, we assume that the relative labor contributions of listed unpaid family workers by age are the same as the relative contributions of listed employed workers by age. These relative contributions by age are then adjusted proportionately to match two thirds of the reported total household mixed income. The remaining one third is assumed to be return on assets. See Lee et al. (2008) for further details.
4. The accounts are measured *ex post*, and so the lifecycle deficit must equal the age reallocations as in equation (3.1). An individual who *ex ante* planned to have labor income and consumption described by these profiles would need to have (would demand) age reallocations in this amount.
5. If an economy is not dynamically efficient, saving and investment are excessive. Consumption in all periods can be increased by reducing saving and investment.
6. Estimates of publicly managed pension asset pools for 23 economies range from 0.2% to 69.6% of Gross Domestic Product as reported by Mitchell et al. (2008, p. 347).
7. See Mathana Phananiramai (Chapter 31) for estimates of the value of time transfers in Thailand and an analysis of the implication for NTA of including time transfers.

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4. Lifecycles, support systems, and generational flows: patterns and change

Ronald Lee and Andrew Mason

Generations are linked by a complex network of private and public transfers. National Transfer Accounts (NTA) and anthropological studies give us a view of these intergenerational transfers in populations spanning the range from hunter-gatherers to rich industrial nations. Using arrow diagrams, introduced in Chapter 2, to map the direction and size of these resource flows, we shall show that across this range there is a fundamental reversal in the direction of net intergenerational transfers from downward (from older to younger ages) to upward, with much of the change driven by population aging in countries that are farthest along in the demographic transition.

When individuals expect the pattern of these flows to be repeated from generation to generation (Masson 2007), their expectations generate a form of wealth – transfer wealth – that plays an important role in shaping lifecycle behavior and the economy itself. The arrow diagrams represent transfer wealth. Positive transfer wealth results from upward net transfers, indicating that the current population has somehow obligated future populations to give it net support through transfers. Negative transfer wealth results from downward net transfers, indicating that the current population is somehow obliged to make net transfers to the future. Transfer wealth exists if these transfer patterns and the institutions in which they are embedded continue unchanged into the future in the face of massive population aging.

As countries move through the demographic transition, their population age distributions change dramatically, leading inevitably to population aging. These changing age distributions challenge the continuity of transfer practices by stressing some systems and relaxing others. If a transfer system generates positive transfer wealth (e.g., through public pensions or familial old-age support) then lower fertility, slower population growth, and population aging raise the transfer dependency burden and reduce lifetime consumption, other things being equal. If a transfer system generates negative transfer wealth (with parents raising children or a system of public education), then lower fertility, slower population growth, and population aging reduce the transfer dependency burden and raise lifetime consumption.

In recent years a great deal of attention has been focused on the fiscal problems of public transfer programs for the elderly, particularly pensions. But pensions are only one piece, often a small piece, of the larger picture. Here, using the comprehensive measures of transfer flows provided by NTA, we shall draw a more balanced and textured picture that includes both public and private transfers and the full range of ages: young, working age, and elderly.

We summarize the chapter's findings as follows:

1. Consumption in hunter-gatherer groups and Third World countries is relatively constant across all adult ages. In modern industrial countries, however, consumption typically rises strongly with age, mainly because of publicly funded health care and long-term care.
2. Children's labor income starts early in hunter-gatherer groups, several years later in poor Third World countries, and later still in rich industrial states. Labor income peaks later in rich countries than in poor, and declines precipitously to nearly zero in rich countries, while continuing at low levels throughout old age in poor countries. In hunter-gatherer groups, adults remain net producers even in old age, whereas in rich countries the elderly are big net consumers.
3. In hunter-gatherer societies and Third World countries, the flow of resources is downward from older to younger persons, driven by the costs of rearing children and generating negative transfer wealth. In some rich and demographically old industrial countries, this direction of net flows is reversed, with resources flowing upward from young to old. The main force behind this reversal is population aging.
4. In most countries, customs, institutions, and a young age structure oblige current populations to make net transfers to future populations. Now, some aging industrial nations with generous public transfers to the elderly obligate future populations to make net transfers to the current population.
5. *Private* transfers flow strongly downward in every society, whereas the net direction of *public* transfers is downward (old to young) in some societies and upward in others (mostly rich).
6. Total transfers, the sum of public and private, flow downward in almost all countries, implying that modestly older age structures would be economically advantageous. However, the low fertility that

prevails in many rich countries today will lead to much older age structures and a reversal in the direction of total transfers. For them, higher fertility and younger age structures will be advantageous.

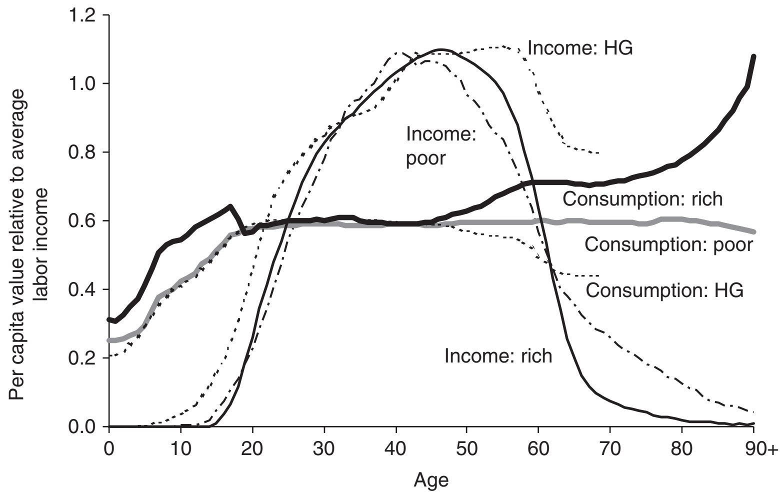
We first consider the shape of the economic lifecycle in different settings. Combining age profiles with corresponding population age distributions, we generate the aggregate flows and describe them using arrow diagrams that show the direction and magnitude of flows and the corresponding transfer wealth. Setting aside the role of assets in reallocating resources over the lifecycle (see Chapter 9), we focus here on public and private transfers. We end by considering how population aging in coming decades will alter the patterns we see now.

The chapter presents an overview of the patterns we find in the NTA, which combine labor income, consumption, and private and public transfers. Later chapters provide detailed comparative analyses and studies of individual countries, including rich age detail that is only summarized here.

AGE PROFILES OF LABOR INCOME AND CONSUMPTION

Human life history is distinguished from that of other species by children's exceptionally long nutritional dependency, lasting until around age 20 in the hunter-gatherer groups that have been studied in recent decades (Kaplan 1994; Hill and Hurtado 2009; Howell 2010). This long stage of dependent development is made possible by the contributions of adults of all ages who help provide for the young (Hrdy 2009). Heavy net consumption by the young remains a feature of the human lifecycle in both agricultural and industrial settings. In the US, the net private cost of raising a child from birth to age 21 is six years of prime-age labor income, and in Taiwan this total is nine years of labor income (see Chapter 8, Table 8.1). Public costs add more.

Low fertility has brought welcome relief from the dependency pressures of the young, with fewer needy children and more adults to provide for them. But as the global age transition proceeds, youth dependency is being replaced by old-age dependency. As we shall see, the elderly in both low- and high-income countries are consuming far more than they produce through their labor. Whereas in hunter-gatherer populations, only children depended on adults, in contemporary societies both children and the elderly are dependent. Compounding the problem in some countries, consumption by the elderly has risen dramatically in relation to that



Note: Data for hunter-gatherer profiles are from Kaplan (1994) and Howell (2010); for method of construction, see text. The profiles for the bottom and top quartile of 23 NTA economies are unweighted averages of the profiles for the six poorest and six richest economies. The bottom quartile group consists of China, India, Indonesia, Kenya, Nigeria, and the Philippines. The top quartile group comprises Austria, Finland, Germany, Japan, Spain, and the US. Values are scaled by average labor income for ages 30–49.

Figure 4.1 The economic lifecycles of rich and poor countries and hunter-gatherers: consumption and labor income

by younger adults. The elderly have become increasingly dependent and, at the same time, more numerous – a trend that is justifiably viewed with alarm.

The per capita age profiles of consumption and labor income at three very different levels of development are compared in Figure 4.1. For hunter-gatherer populations, anthropologists measure labor income as average food calories produced or acquired at each age (Kaplan 1994; Howell 2010). Consumption by age is inferred, on the assumption that food calories are allocated within a family, household, or sharing group in proportion to physiological needs, depending on age and sex and sometimes on body size and activity levels. Figure 4.1 shows an unweighted average of Kaplan's (1994) estimates of the three Amazon Basin groups (Ache, Piro, and Macheguenga), as adjusted in Lee (2000), on the one hand, and Howell's (2010) estimates for the !Kung on the other. We standardize these estimated curves by dividing by average labor income for ages 30–49 as we do for all profiles throughout this chapter.

Consumption and labor income for poor and rich economies are calculated as the unweighted averages of both consumption and labor income by age in the bottom and top per capita income quartiles of the NTA economies. The six poorest economies are Kenya, Nigeria, Indonesia, Philippines, India, and China. The six richest economies are Germany, Japan, Austria, Finland, Sweden, and the US.

The consumption age schedules for hunter-gatherers and the six low-income economies are very similar until age 50. Consumption above age 50 declines for hunter-gatherers but not in the poor economies. This difference may have substantive meaning, but it may reflect only differences between the anthropologists' calorific-need weights and the weights used in NTA to allocate consumption within households.

The rich-economy consumption profile is distinctive in two ways. First, it is elevated below age 20, reflecting human capital investment, particularly spending on education. Second, it rises strongly after age 45, continuing upward until, by age 80, it is about two thirds higher than in poor economies, after which costs of long-term care drive it higher still. Some, but not all, of this consumption increase is due to publicly provided health care. The high consumption of the elderly in the rich economies may also be due to their living in separate households, in contrast to the co-residence of the elderly in poor economies. The independent living arrangements of the elderly in rich economies are in turn fostered by generous public pension programs.

The labor income profiles indicate that hunter-gatherers become productive when they are three or four years younger than their poor-economy counterparts. In rich economies productive work is delayed another year or two. The contrast in the early working years between poor and rich economies is surprisingly small and would be greater were it not that in two of the poor economies, Kenya and Nigeria, youth contribute very little income. Labor income in poor economies peaks earlier than in rich, perhaps because work there is more physical. Soon after its peak, the labor profile for the rich drops precipitously to near zero. The differences in labor income at older ages are striking. Hunter-gatherers produce more than they consume until age 70, when the numbers observed become small. Howell (2010) reports that the !Kung continue to produce about what they consume up to age 80. Hunter-gatherer retirement does not exist, perhaps because some groups practice geronticide if elders become less productive (Hill and Hurtado 1996). Those 60 and older in poor economies and 61 and older in rich economies produce less than they consume. However, the elderly in poor economies continue to work and produce many times more than those in rich economies. These averages for poor and rich conceal fascinating variations among economies that are explored in Chapters 5 and 6.

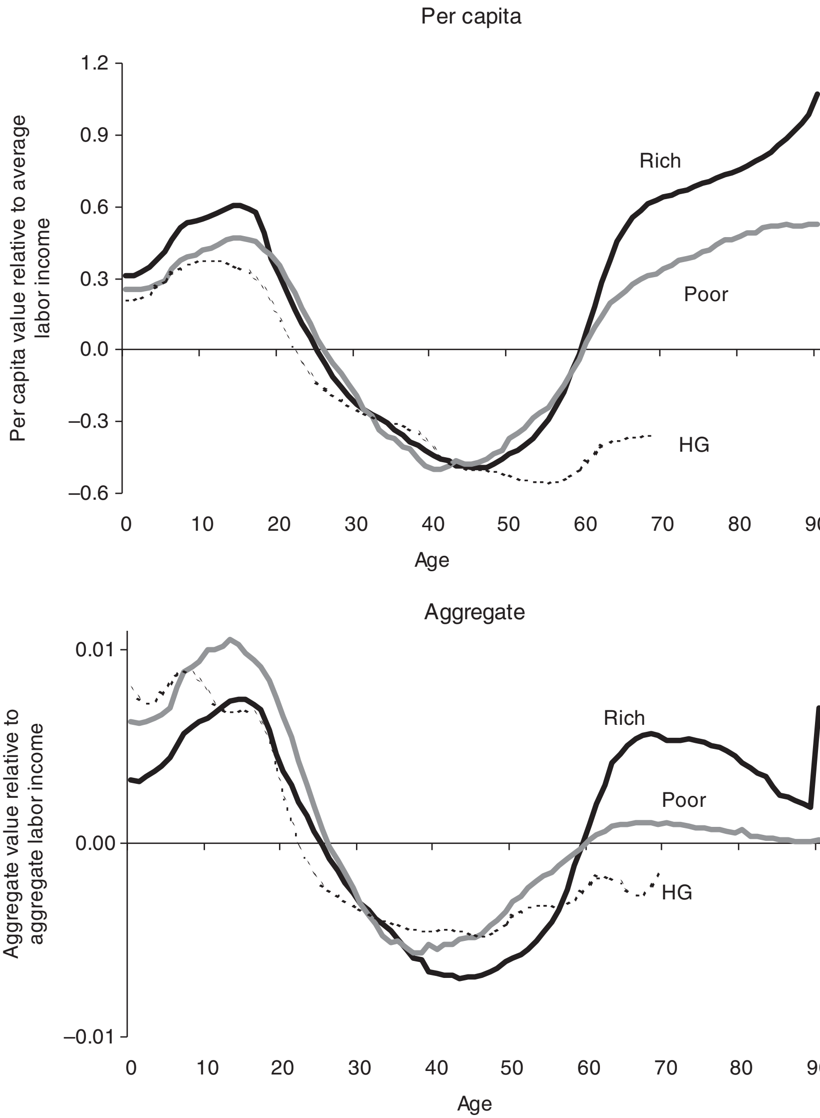
The per capita lifecycle deficit, the excess of consumption over labor income, is plotted for the three groups in the upper panel of Figure 4.2. The childhood deficit is greatest in rich economies, next largest in poor, and smallest among the hunter-gatherers, where children produce more early in life. The lifecycle surpluses during the working years are similar until age 45 and then diverge as hunter-gatherers maintain a high surplus and old-age dependency emerges in both poor and rich economies. Once labor income falls below consumption, however, the lifecycle deficit for rich economies is substantially higher than for poor.

The dependency burdens that confronted these different societies depend on population age structure as well as the per capita profiles of consumption and labor income. Poor NTA economies have very young populations because of high fertility combined with low infant and child mortality. Hence, the aggregate lifecycle deficit for children in those economies is very high, higher than in the hunter-gatherer populations and substantially higher than in the high-income group (lower panel of Figure 4.2). Old-age dependency is much less prominent in the low-income group because there are relatively few elderly. In contrast, the aggregate deficit for the high-income group is large, and it will grow.

Two caveats are needed before we proceed. First, these age profiles are cross-sectional, whereas true lifecycles are longitudinal. During periods of little economic change, cross-sectional and longitudinal age profiles may be quite similar; but during periods of rapid economic growth they will differ dramatically. Second, these profiles do not reflect the value of time devoted to home production or to care for children or the elderly. This omission undoubtedly distorts the intergenerational picture that emerges. It is also the reason why the accounts are done on a single-sex basis: accounts by sex would require a better accounting of the economic activities of women than we can currently provide.

LIFECYCLE WEALTH AND INTERGENERATIONAL FLOWS

Consider a typical 50-year-old woman living in either a rich or a poor country as described above. That woman would expect to consume more in the future than she would earn from labor income – but only if she has some additional claim on future output. This claim could come in the form of assets accumulated earlier in life or from a public pension or expected financial help from her family. The claims on future output required to meet lifecycle needs constitute lifecycle wealth, a concept introduced and discussed in detail in Chapter 2.



Note: Constructed from the profiles shown in Figure 4.1.

Figure 4.2 The lifecycle deficit (consumption minus labor income) of rich and poor countries and hunter-gatherers

Lifecycle wealth is not always positive. Indeed, as shown in Figure 2.1, lifecycle wealth is negative early in life. The young receive support from their parents. They accumulate a debt, in a sense, that they will pay by supporting the next generation of children. In contemporary societies, lifecycle wealth turns positive later in life; but lifecycle wealth is negative for hunter-gatherers throughout their lives. They receive when they are young, accumulating debt, and they pay during their entire adult lives.

According to an elegant theorem by Willis (1988; also see Lee 1994 and Bommier and Lee 2003), under certain conditions per capita lifecycle wealth equals the average age of consumption in the population minus the average age of labor income, times per capita consumption.[1] Per capita lifecycle wealth will be negative if consumption occurs earlier in the lifecycle than it is produced through labor. Resources must flow downward in such a world, from adults to children and from current to future generations. This, as we shall see, is the normal state of affairs.

We use arrow diagrams to describe the way resources are shifted across the lifecycle and forward and backward over time. Each arrow is plotted with its tail at the population-weighted average age of earning labor income (or making a transfer) and its head at the average age of consuming (or receiving a transfer).[2] The width of the arrow equals the size of the relevant per capita flow – for example, consumption or transfers received. The arrow diagram has age on the horizontal axis, so that an arrow pointing to the right means that the average unit of output is earned at a younger age than it is consumed and is reallocated from younger to older. In this case, the average person expects to consume more in the future than she will earn through her future labor, since on average she earns before she consumes. If the arrow points to the left, then output is consumed at a younger age than it is earned, and reallocations go from older to younger. The area of the arrow is an approximation to lifecycle wealth under real-world circumstances.

Arrows can also be used to describe components of per capita lifecycle wealth: assets, public transfer wealth, and private transfer wealth. When used to depict transfers, an upward- or right-pointing arrow means that the average person expects to receive larger transfers in the future than she expects to transfer to others. One might say that she is owed the difference, to be paid her through net transfers she will receive in the future. Since this is true for the average person in a population, it must also be true that, on average, future populations will make net transfers to the current population. In the opposite case, when the arrow points to the left or downward, the average member of the current population will make net transfers to future populations.

An upward-pointing arrow does not mean that current transfer systems are unsustainable, or that current generations are exploiting future ones. In Samuelson's (1958) famous story, a social contract makes it possible to establish a pattern of upward transfers (an upward-pointing arrow), which enables a society to raise the lifecycle welfare of all individuals.

More precise calculations of transfer wealth that incorporate the transitional dynamics of population aging and economic growth can be constructed through projection and simulation. An example that builds on NTA is provided by us in Mason and Lee (2007). The Trustees of the US Social Security Administration numerically calculate the implicit debt of the system, which corresponds to the pension wealth held by the general population, an example of public transfer wealth (Board of Trustees 2004, table IV.B8). The Swedish pension system, however, uses an arrow approximation based on average ages of contributing to the system and of drawing benefits from it. It chooses this approach rather than numerical calculation because the system is based on observables that need not be projected, and the accounts are therefore thought to be less subject to possible political manipulation (Settergren 2007).

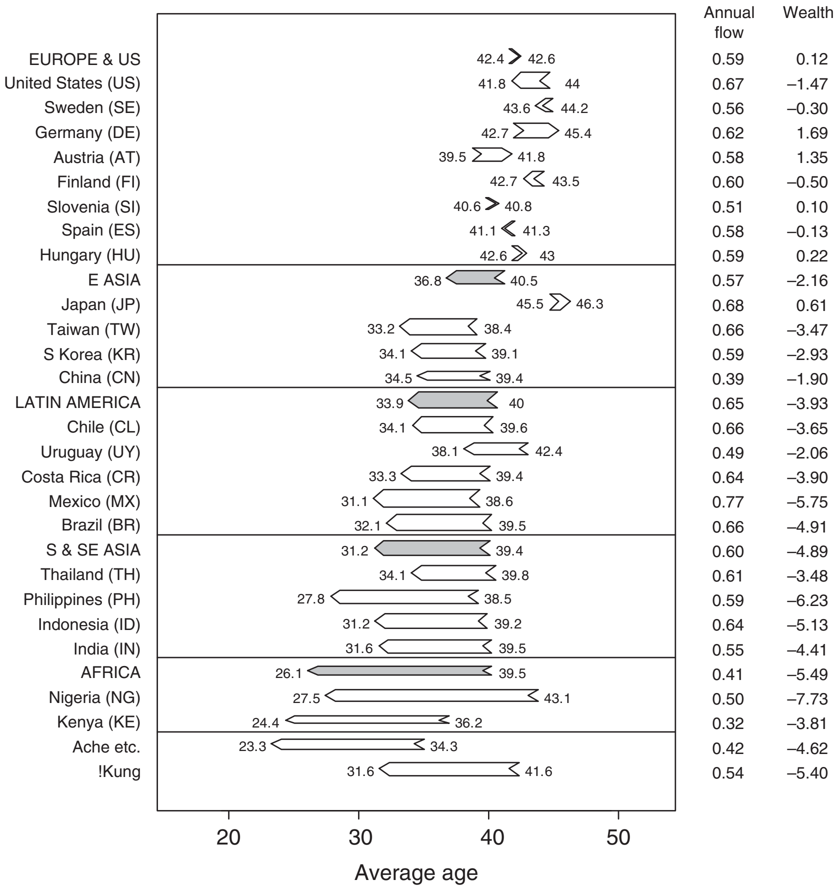
Reallocations can be achieved using asset-based reallocations, discussed in detail in Chapter 9, or through private and public transfers, the focus of this chapter.

THE DIRECTIONS OF INTERGENERATIONAL FLOWS

Figure 4.3 plots arrows for 23 economies[3] plus two hunter-gatherer groups. We group the economies into five regions: East Asia, South and Southeast Asia, Latin America, Africa, and Europe and the US. The regions are ranked by regional per capita Gross Domestic Product, and within each region economies are ranked by per capita GDP.[4] Regional arrows are calculated as simple averages of the arrows of the economies within the regions and are shaded gray. The average age is given next to each arrow, while the width of the arrow (the per capita flow) and its area (wealth) are shown to the right of the frame. The per capita flow and wealth are both standardized on the average labor income of 30–49-year-olds.

The annual flows, the widths of the arrows, differ for various reasons: high dependency ratios (Kenya), heavy use of non-labor income (Nigeria), remittances (Philippines and Mexico), international borrowing, or high national saving rates (China).

The direction of intergenerational flows for individual countries is quite consistent with the broad development patterns identified above. Lower-income societies at the bottom of the figure have arrows that are



Notes: The tail of an arrow is placed at the average age of the outflow, in this case labor income, and the head is placed at the average age of the inflow, in this case consumption. The width of an arrow represents the annual per capita inflow, in this case consumption ('annual flow'); its area represents wealth, in this case lifecycle wealth ('wealth'). Both are expressed relative to average labor income for ages 30–49 in each economy. Each regional entry (shaded gray) gives the unweighted average of the economies with available data shown below it. Regions are ranked by per capita GDP (World Bank 2010), ppp-adjusted (Heston et al. 2009) with the highest income at the top. Within regions the economies are ranked by per capita GDP in the same way. The year for NTA data varies from economy to economy, but the years are close to 2000. Data for Ache, Piro, and Macheguenga are from Kaplan (1994) as adjusted by Lee (2000); data for !Kung are adjusted from Howell (2010).

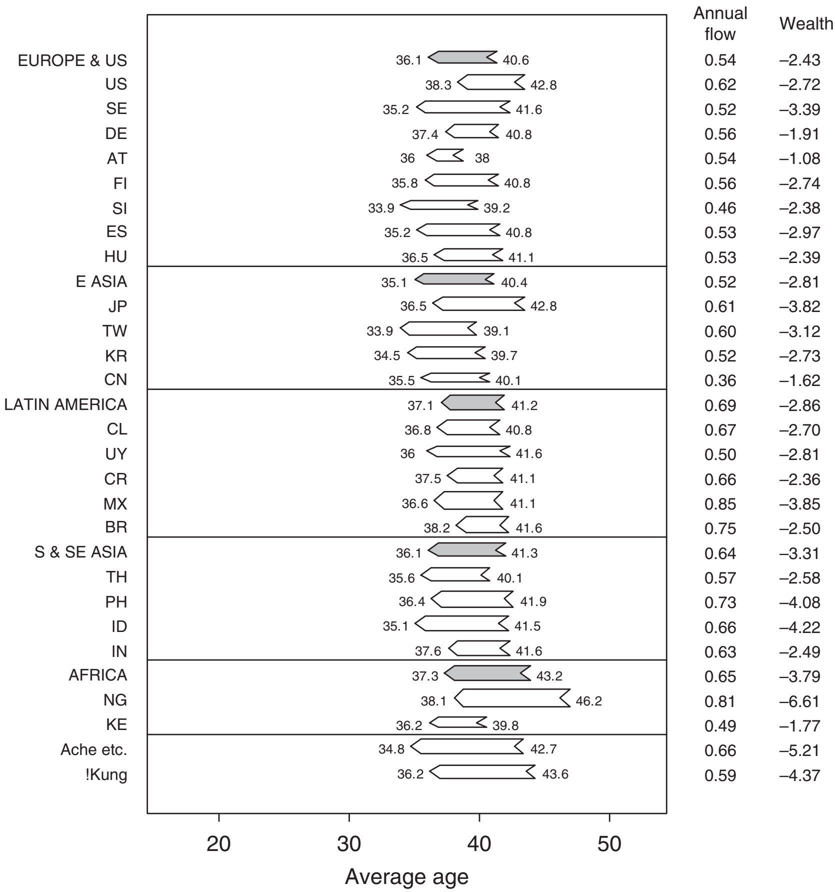
Figure 4.3 Lifecycle wealth arrows for NTA economies and hunter-gatherer societies long and point to the left, indicating that output flows downward from older to younger ages. As we move up the stack to economies with higher incomes, the arrows tend to get shorter. At the top, most arrows are either very short or actually point to the right, indicating net reallocations from younger to older ages. The regional arrows show the same patterns.

Five countries – Germany, Austria, Slovenia, Hungary, and Japan – have right-pointing arrows; and three more – Sweden, Finland, and Spain – have arrows pointing leftward by less than a year. The populations of these eight countries are among the nine oldest in our study, suggesting that population age distribution may strongly influence the direction of the arrows. To assess its role, we recalculated the arrows, this time using the average population age distribution for the 23 economies as a standard (Figure 4.4). Now all differences in the arrows derive solely from differences in the age profiles of labor income and consumption.

Most of the variation in the arrows in Figure 4.3 has vanished in Figure 4.4 owing to the standardized age distribution. All the arrows point to the left, and they look much more similar than before. The difference between the directional lengths of the most left-pointing and most right-pointing arrows has declined from 18.3 years in Figure 4.3 to only 6.2 years in Figure 4.4. On the basis of these and other comparisons, the population age distribution accounts for roughly two thirds of the variation in the arrows in Figure 4.3. Although changes in economic behavior do play a role, the driving force behind the shortening and reversal of the arrows is population aging.

Population aging has not run its course. Even in a very old population like Japan's, the old-age dependency ratio is projected to more than double between 2007 and 2050 (UN Population Division 2007), and many younger countries can expect even more dramatic increases. If we assume that consumption and labor income profiles keep the same shape and the same ratio of aggregate consumption to aggregate labor income, we can construct arrows for the projected population age distributions of 2050 (not shown). All the arrows shift strongly to the right, as ages of both consuming and earning rise. In Europe, East Asia, and Latin America, arrows point strongly to the right in 2050, while all the arrows in South and Southeast Asia (except for Thailand) and in Africa continue to point to the left. Barring major changes in the age profiles of labor and consumption, a major reversal of intergenerational flows will take place between now and 2050.

The consequence of the anticipated change in intergenerational flows is a massive increase in lifecycle wealth. In the Europe–US region the increase in lifecycle wealth is +3.6 years of labor income per person; in East Asia, +5.4; in Latin America, +5.2; in South and Southeast Asia,



Notes: The standard age distribution is the unweighted average of the age distributions of the 23 NTA economies shown in the figure; the average does not include the hunter-gatherer groups. The arrows are explained in the note to Figure 4.3.

Figure 4.4 Lifecycle wealth arrows using a standard population age distribution for NTA economies and hunter-gatherer societies

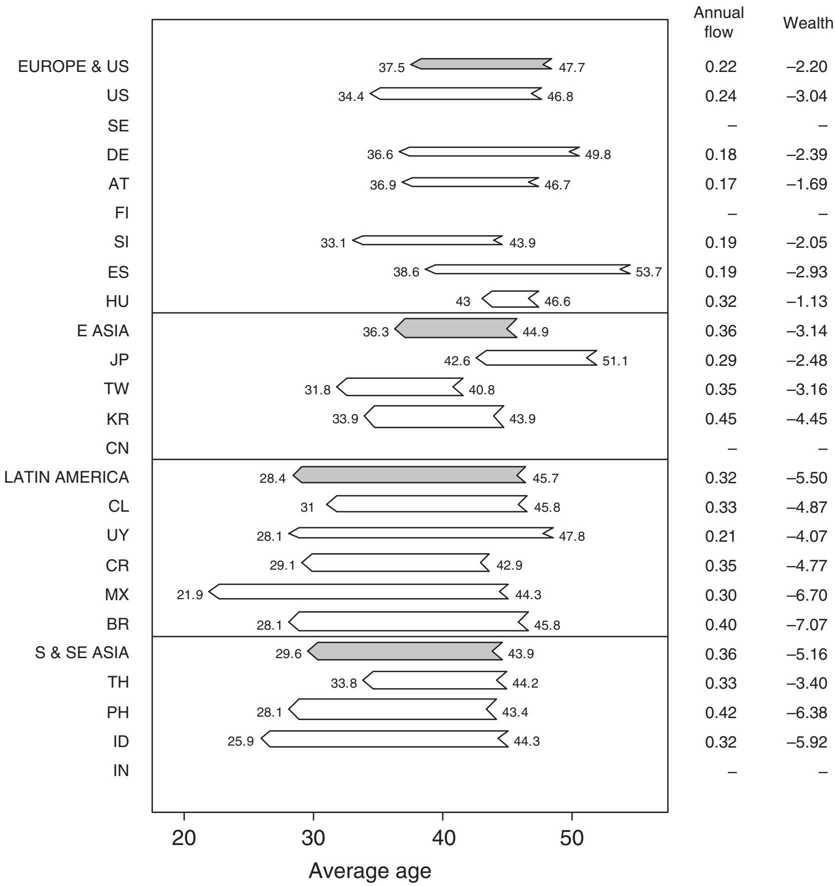
+3.7; and in Africa, +1.8. The economies with the greatest increases are Japan, Taiwan, the Republic of Korea (South Korea), and Mexico – all between +6 and +7 years of labor income – and Brazil at +7.9. Will this new wealth be held in the form of assets, perhaps accumulated in pre-funded pension plans, public or private? If so, then population aging will drive an accumulation of capital invested at home or abroad that will raise labor productivity and spur economic growth. The rate of return to capital may also decline, particularly in the home country, leading to increased investment abroad. But if this vast increase in wealth is instead held as transfer wealth – expectations of net future transfers from the government or from families – it will not stimulate economic growth, but rather add to the financial burden on those of working ages and have potentially adverse implications for work incentives. There is, of course, another possibility: that new policies and altered behaviors will change the age profiles themselves, for example by delaying retirement until older ages (Sanderson and Sherbov 2010), by curbing health care costs, or by finding alternatives to costly institutionalization for disabled elderly.

Downward Flows of Private Transfers, from Older to Younger

The arrows in Figures 4.3 and 4.4 describe the reallocations through all channels combined: asset-based flows, private transfers, and public transfers. Each of these components is important in its own right. When old-age consumption is funded through assets, the adverse effects of population aging are much diminished. When it is funded through transfers, population aging imposes a heavier support burden on the population as a whole and on the working ages in particular. However, public transfers go not only to the elderly but also to children for state education and other programs, and private transfers go largely to children. The net effect of population aging will depend on all these factors. Chapter 2 reported that under certain assumptions, the net effect of population aging on the present value of lifetime consumption depends entirely on whether transfer wealth is positive or negative.[5] Transfer wealth summarizes the combined effects of shifting support ratios and the capital dilution or intensification[6] that results from faster or slower population growth.

The basic data used to construct private transfer arrows are population age distributions and the cross-sectional age profiles of transfers received (inflows) and transfers made (outflows), combining intra-household and inter-household transfers. The profiles, which we constructed using methods described in Chapter 3, are available for 17 economies and are discussed in detail in Chapter 8.

Private transfers are strongly downward from older to younger in every economy examined (Figure 4.5). Downward transfers to children dominate even in Taiwan, Thailand, China, and South Korea, where familial support for the elderly is strong. These robust downward transfers generate substantial negative transfer wealth, ranging up to seven years of labor income in Brazil and nearly that much in Mexico. That is, the average person in those countries expects to make transfers in the future that exceed transfers received in the future by seven years of labor income. This



Note: The arrows are explained in the note to Figure 4.3.

Figure 4.5 Private transfer wealth arrows for NTA economies for which estimates are available

result reflects a simple point. People go through life first receiving major familial transfers as children and perhaps young adults. In turn, later in life, they support their own children until the children are established. The large private transfer 'debt' expresses this universal nature of family life: first we receive, and later we give.

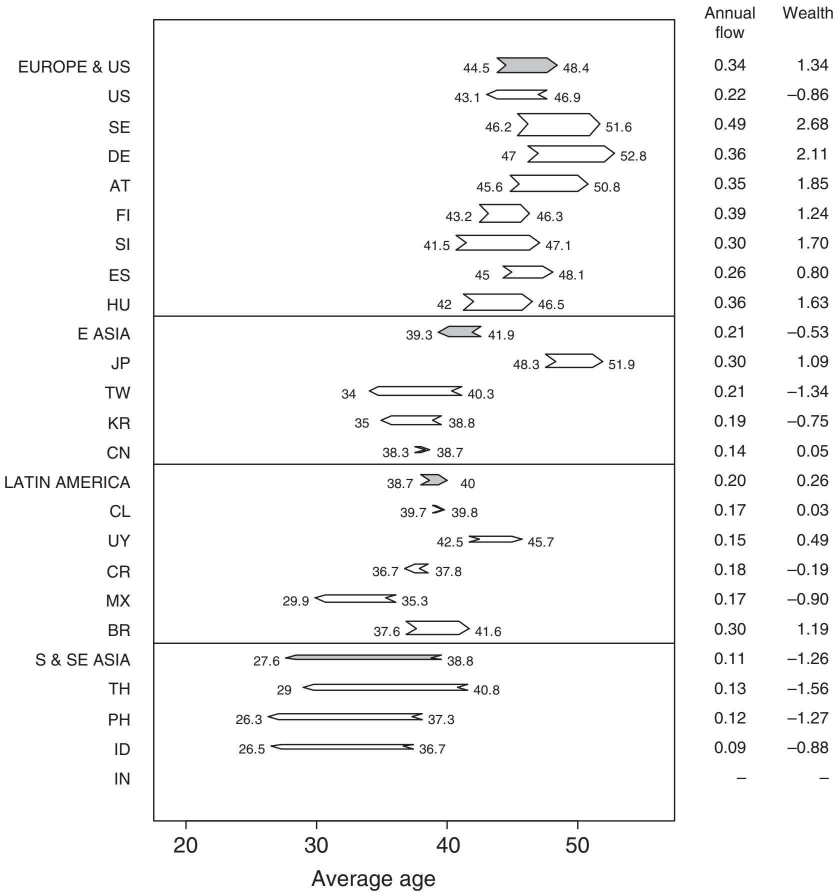
In some societies, such as Taiwan, Thailand, China, and South Korea, this pattern is reversed later in family life. Support is provided to the elderly at first, and then later in life is received. If these old-age transfers were big enough and if the population age distribution were old enough, then the net flow of private transfers could go upward. This is not currently the case in any economy in our study. Moreover, population aging would lead to a reversal in the direction of private transfers only in Taiwan, and only if the age profiles of private transfers there remained unchanged.

The arrows for East Asia, Latin America, and South and Southeast Asia are relatively thick in Figure 4.5, indicating large private-transfer flows, while those for Europe and the US are thinner, indicating smaller private-transfer flows. Many factors may account for this difference, but one of particular interest is that strong public transfers both to children and to the elderly crowd out private transfers. We must keep in mind, however, that overly generous public transfers to the elderly may lead them to increase their private transfers to younger family members, as Barro (1974) has suggested. Brazil may be a case in point. It has the greatest negative private-transfer wealth and, as we shall show below, the greatest positive public-transfer wealth of any NTA economy. The two are probably linked. Induced private transfers of this sort may affect family relationships in various ways (Masson 2007).

Variations in the Flows of Public Transfers

Whereas private transfers are strongly downward in every NTA economy, public transfers vary greatly in their direction, as well as in their flow and their volume, that is, transfer wealth (Figure 4.6). There are distinctive patterns related to the level of development, region, and age structure; but individual economies also exhibit their own distinctive features. The annual per capita public transfer flows, the widths of the arrows, vary clearly, with the level of per capita income rising from 11% of the labor income of a prime-age adult in South and Southeast Asia to 34% of the labor income of a prime-age adult in the Europe and US group. The annual flow in the US departs most strikingly from the pattern for the wealthy economies: its value of 22% is well below the values found in the European economies and Japan.

The direction of public transfers is strongly related to the level of economic development, but with strong regional influences. In South and Southeast Asia, the lowest income group, public transfers are rather skimpy (thin arrows) and all arrows point ten or 12 years downward, reflecting young age distributions in these countries and their public-sector emphasis on transfers to children. All the European nations, in the highest income group, have thick upward-pointing arrows. Of the rich Western nations only the US has a downward-pointing arrow, partly because its



Note: The arrows are explained in the note to Figure 4.3.

Figure 4.6 Public transfer wealth arrows for NTA economies for which estimates are available

population is young for a rich country, and also because its public pension program has low benefits.

Latin America and the East Asian economies fall between these two extremes. Latin America has a mixture of upward and downward arrows, and the regional average is slightly upward. Uruguay, which has an older age distribution than the other countries in the region, has a long upward-pointing arrow. Brazil, which is still fairly young, has a thicker but shorter upward-pointing arrow. Mexico's arrow is strongly downward because it has a relatively weak public pension program. However, most Latin American NTA economies have surprisingly strong public transfer programs for the elderly, given their low national incomes. East Asian public transfers are also mixed. South Korea and Taiwan have strong downward transfers, similar to what we find in other Asian economies. China's transfers are age-neutral, and Japan's are strongly upward, similar to but smaller than the European countries at similar income levels.

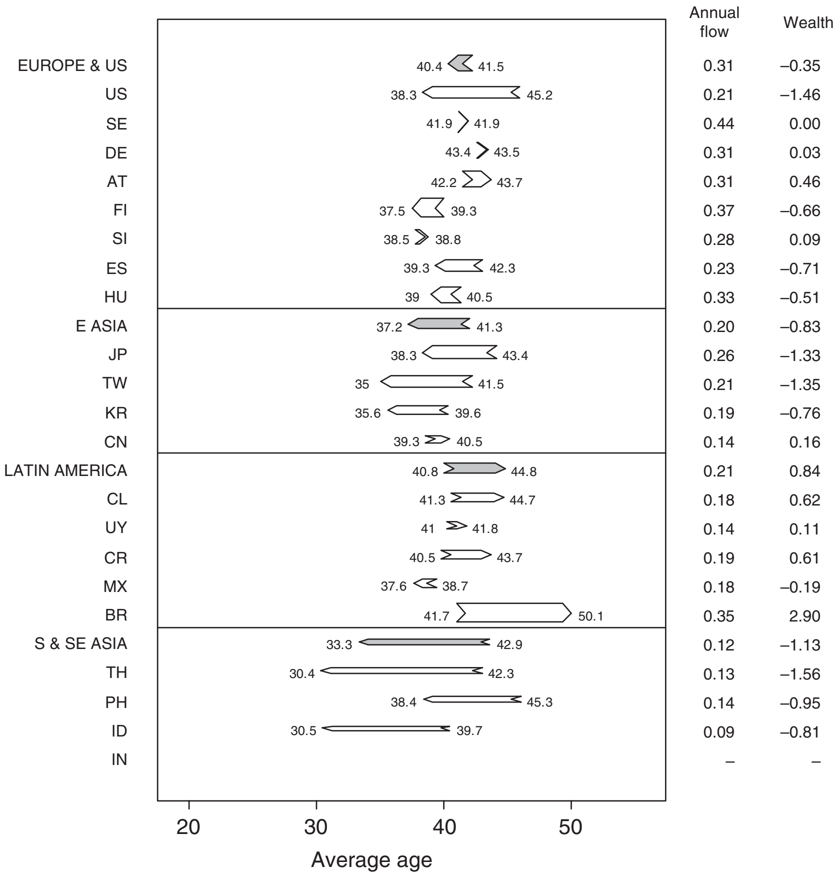
In all the regions other than South and Southeast Asia, the arrows are short because transfers to children for health and education are offset by transfers to the elderly for pensions and health care. Even when the arrows are thick, as they are in all the rich economies including Japan, the positive transfer wealth is not very large because these populations are still young as compared with the age structures they will have at mid-century after four more decades of aging. The average public-transfer wealth in Europe is currently +1.8 years of labor income. This means that the average person in the population can expect to receive 1.8 years of labor income through future public transfers in excess of the future tax payments he makes. Germany and Sweden have public-transfer wealth of +2.1 and +2.7 years of labor income. In the US, public transfer wealth is −0.9.

These measures are artificial in the sense that they are based on current transfer patterns and the current population age distribution. Changes will occur because the populations of Europe and East Asia, in particular, are in transition to a much older age distribution. They also are currently making efforts to reform their public pension programs; and some, like Sweden, have succeeded.

Public Transfers Weighted by the Standard Population Age Distribution

To what degree do differences in public transfers result from differences in population age distribution, rather than from differences in public transfer systems? Figure 4.7 graphs public transfers recalculated using the standard population age distribution. The Europe–US region switches from a right-pointing arrow to a left-pointing one, confirming that the strong upward flow of public transfers is primarily a consequence of aging and not a particular bias in the public transfer system toward the elderly. Among the European countries, three arrows become left-pointing and four are right-pointing, with only Austria exhibiting a strong orientation toward the elderly.

Once we control for population age structure, an Asian pattern is clear. Public transfers in Japan are strongly upward because it has the oldest population in the world. If it had the average age distribution, its public transfers would be strongly downward and similar to those of Taiwan,



Note: The arrows are explained in the note to Figure 4.3. The standard population age distribution is explained in the note to Figure 4.4.

Figure 4.7 Public transfer wealth arrows using a standard population age distribution for NTA economies for which estimates are available

South Korea, and the countries of Southeast Asia. China is clearly an anomaly in the context of Asia because of its upward public-transfer flows.

Latin America and Brazil in particular stand out for their strongly upward public-transfer systems. Brazil's public-transfer wealth is 2.9 years of labor income, which is several times greater than in any other country and an average age of receiving a public benefit (location of head of arrow) that is five years older than in any other country. The next strongest upward transfers are also in Latin America – in Uruguay and Costa Rica. Only Mexico, with downward public transfers, stands out from the Latin American pattern.

The Effect of Population Aging on Public-Transfer Systems

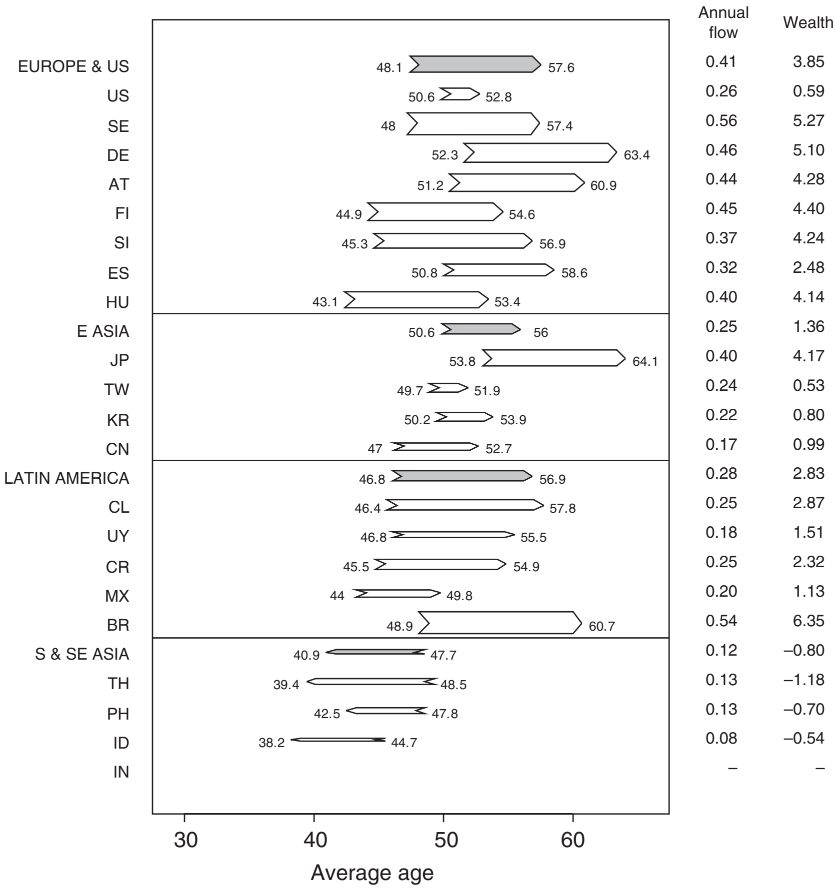
Population aging is rapid and will continue if fertility remains low. Many public programs are fiscally unsustainable and must be restructured in one way or another in the coming decades. The exact nature of any reform is unknown, and the projections presented here assume that the age distribution of the tax and benefit profiles remains unchanged, while the benefits paid, the taxes assessed, or both, are adjusted by the same proportion at every age to achieve fiscal balance. The adjusted base public-transfer profiles are applied to the projected population for 2050 (UN Population Division 2009). An arrow's width and the implied wealth will be somewhat wrong for each economy, but the projections should nonetheless be interesting.

Under these conditions public transfers would be downward in South and Southeast Asia (Figure 4.8) and probably in Africa, although estimates for Africa have not been constructed. Public-transfer arrows for all other economies would point rightward in 2050, with those for the US, Taiwan, South Korea, Costa Rica, and Mexico all changing direction. The countries that stand out for their large public transfers to the elderly in 2050 are Brazil (+6.4 years of labor income), Japan (+4.2), and all the European countries except Spain, with Sweden (+5.3) leading the way in Europe. The US would have only weak upward transfers (+0.6).

The extent of reform that is required in response to fertility decline can be assessed using a simple rule-of-thumb. In the neighborhood of replacement-level fertility, a change of half a child in either direction corresponds roughly to a change of 1% in the steady-state population growth rate.[7] To maintain fiscal balance would require an adjustment in the level of benefits (downward) or of taxes (upward) equal to 0.01 times transfer wealth. For Brazil, for example, benefits would have to be reduced by 6% or taxes raised by 6% to maintain fiscal balance if the total fertility rate were to decline from 2.0 to 1.5 births per woman. For an accounting of the way different generations in the US fared under changing public policies and changing population age distributions over two and a half centuries see Bommier et al. (2010).

A CLOSER LOOK AT THE COMPOSITION OF PUBLIC TRANSFERS

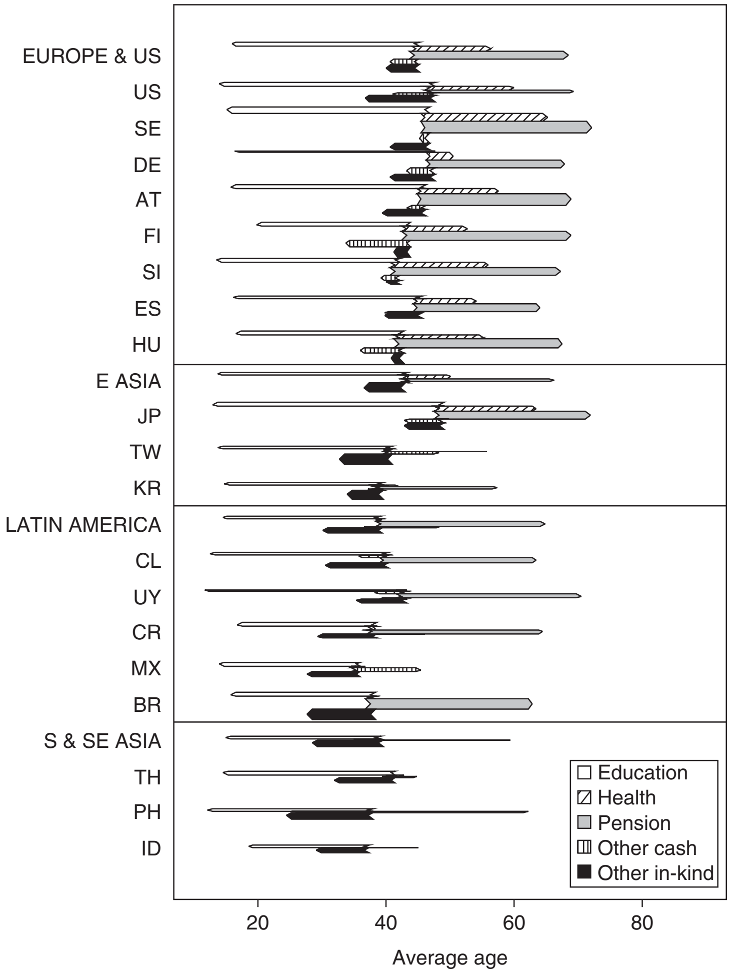
Public-sector transfer programs include education, health care, pensions, other cash transfers (family allowances and need-based transfers), and



Note: The arrows are explained in the note to Figure 4.3. Population projections to 2050 are from UN Population Division (2009). See text for treatment of fiscal balance.

Figure 4.8 Public transfer wealth arrows using the projected population age distribution for 2050 for NTA economies for which estimates are available

other in-kind transfers (mainly public goods that are not targeted to specific individuals).[8] Other in-kind spending is allocated equally to all individuals in NTA, but tax payments to fund it vary by age from country to country. In Figure 4.9, for simplicity, the tails of all arrows are placed at the overall average age of paying taxes in each economy, although in many cases specific taxes pay for particular programs, such as pensions or education.



Notes: Other cash transfers include family allowances and need-based transfers. Other in-kind transfers include mainly public goods that are not targeted to specific individuals. See also the notes to Figure 4.3.

Figure 4.9 Public transfer wealth arrows by sector for NTA economies for which estimates are available

Pension programs vary widely. European countries, Japan, and Brazil have substantial pension programs as indicated by the width of their pension arrows, with Chile close behind. It is remarkable that pensions are so stingy in the US, the richest NTA economy, and are so generous in Brazil, the fourth poorest NTA economy. With a standard population age distribution (not shown; see Lee and Mason 2011), Brazil has by far the greatest pension wealth, greater even than Sweden or Germany. In general, aside from Mexico, the Latin American pensions are larger than those in East Asia, aside from Japan.

Arrows showing public expenditure for health care are large enough to be visible only in the US, the European economies, and Japan. Relatively rich Taiwan and South Korea have surprisingly low public expenditures on health. Health expenditures are too small to be visible in Costa Rica, which nevertheless has a higher life expectancy than the US.

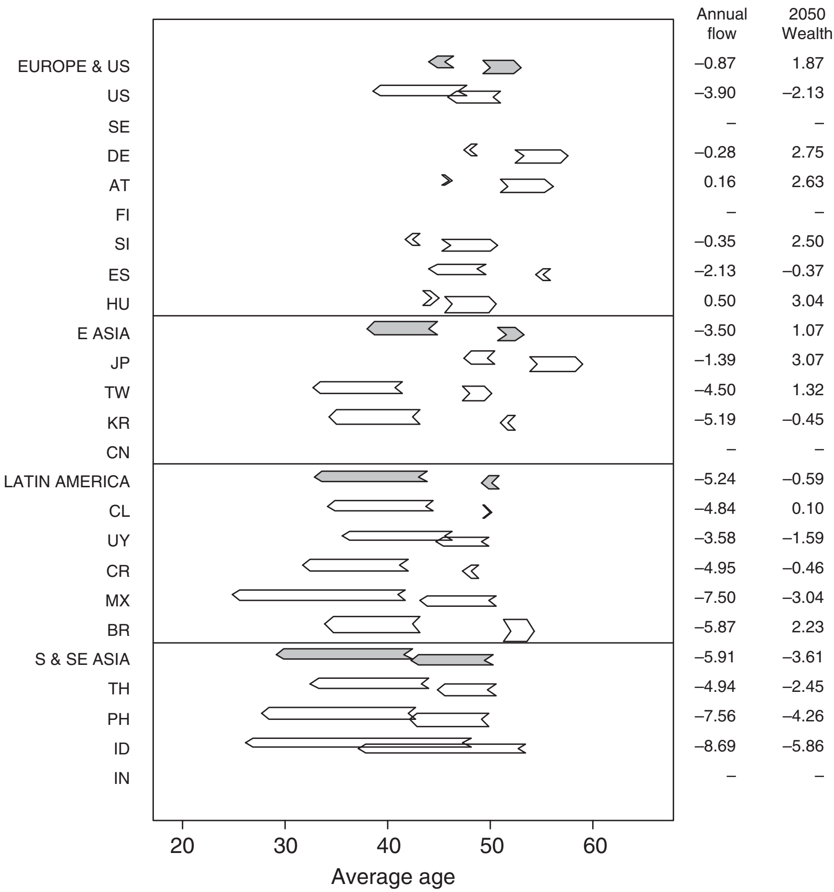
Countries with noticeably high spending on public education include Sweden, Austria, Finland, Brazil, and Mexico. Public spending on education is relatively weak in East Asia, but these economies augment public spending with complementary private expenditures (Chapter 8; Lee and Mason 2010). The education arrows reflect aggregate public spending, and so expenditure per child also depends on the proportion of children in the population and the level of fertility over the 20 years before the baseline date. The thick education arrows in Europe go with very low fertility and thus imply high spending per child. The thick arrows in Brazil and Mexico go with relatively high past fertility and many children, and so they imply lower spending per child.[9]

PUBLIC AND PRIVATE TRANSFERS COMBINED

In many ways, public and private transfers are distinctive; but they are essentially identical in one respect. All intergenerational transfers are a means by which members of one generation contribute to or draw on the resources of another generation. Intergenerational transfers are one of the two economic systems that support the existence of the distinctive economic lifecycle of human society, the other being asset-based reallocations.

At lower levels of income, total transfers are dominated by private transfers. The annual private-transfer flows in South and Southeast Asia are three times the public-transfer flows. In Latin America and East Asia, the gap is smaller but still substantial. Only among European countries are annual flows through the public sector larger than private-sector flows. At all levels of development, private transfers are overwhelmingly downward. Currently public transfers are upward and as large as or larger than private transfers only in Japan and European countries.

Figure 4.10 shows that total transfer flows are downward in almost all NTA economies. The arrows cover the range from strongly downward with substantial negative transfer wealth, to age neutrality or pointing



Notes:
Raised arrow for each economy based on actual population, lower arrow based on population projected to 2050.
Population projections are from UN Population Division (2009). The annual flow for the 2050 population is the per capita value of total transfer inflows. See also notes to Figure 4.3 and further explanation in the text.

Figure 4.10 Combined public and private transfer wealth arrows for NTA economies for which estimates are available

slightly upward in the case of Austria and more strongly in the case of Hungary. The regional arrows all point downward. Even some of the rich industrial economies are still oriented somewhat more toward children than toward the elderly.

Population aging continues, however. If we combine the projected populations for 2050 with the current transfer profiles, then six of the 17 arrows for economies change direction. The arrows for eight of the 17 economies then point to the right, and the regional arrows for both Europe–US and East Asia point rightward. The associated positive transfer wealth could be fairly substantial, with six economies having transfer wealth worth between two and three years of labor income.

The importance of transfer wealth to an understanding of the economic implications of low fertility and population aging is discussed in detail and from a theoretical perspective in Chapter 2. The point is made there that countries with negative transfer wealth would benefit from lower fertility, slower population growth, and older populations. A naive application of this condition relying only on current transfer wealth is misleading, however, because many countries are in the midst of a transition to older age distributions. If we instead consider transfer wealth under the 2050 population projections, half a dozen countries would apparently benefit from higher fertility and more rapid population growth, even after we take into account capital dilution. Those countries are Brazil, Japan, Hungary, Slovenia, Austria, and Germany. Reform of transfer systems is, of course, an alternative to pronatalist policies. Again, these matters are better explored through actual economic projections that incorporate detailed institutional features of each country.

CONCLUSIONS AND DISCUSSION

In our distant hunter-gatherer past, adults produced surplus throughout their lives, including old age, transferring it to younger people. In rich industrial nations, older people largely cease work in their early 60s, while their consumption soars, largely because of the costs of publicly provided health care and long-term care, and to the generosity of public pensions, which help to fund higher consumption. Third World countries lie somewhere between these two extremes.

In all countries, rich or poor, net private transfers flow downward from older to younger people. Public transfers are a different story, however. In some countries they flow strongly downward and in others they flow strongly upward. As populations age in rich countries, the focus of concern is on public transfers, particularly pensions, to the elderly. But there are also public transfers to children, particularly for education, and these are less frequently taken into account. An even bigger problem is that private transfers tend to be ignored in rich industrial countries. National Transfer Accounts provide a more comprehensive and balanced view of the situation. We get the broadest view by combining public and private transfers in a measure of total intergenerational transfers. Here we see that in almost all economies studied here (Hungary is the main exception) total net transfers are downward. This tells us that, compared with the current situation in these economies, somewhat older populations would permit higher lifetime consumption by raising the number of those making transfers relative to those receiving them. But that does not mean that lower fertility would be beneficial for most countries, because the long-term effects of low fertility are not yet fully expressed in the population age distributions. Even in the oldest region today, Europe, the old-age dependency ratio is projected to double from 23 to 48 by 2050; and in Japan it is projected to rise from 32 to 70 (UN Population Division 2007).[10] With the population age distributions projected for 2050, together with the current-transfer age profiles, half of the NTA economies will have total transfers flowing upward. For them, higher fertility would be beneficial; but we would need a much more complicated analytical apparatus to address adequately the dynamic issues involved (see, for example, Mason and Lee 2007). When total transfers are upward from young to old, then the average person will receive more transfers in the future than she will make to others; or equivalently we might say that the future is obligated to make net transfers to those alive today.

Despite the important roles of private and public transfers to children, it is clear that the great increase in public transfers to the elderly has played a key role in transforming the economic lifecycle in many countries and is reshaping the landscape of transfers overall. It is not clear whether these changes in public transfer programs have been thoughtfully and purposively chosen or instead have resulted from institutional inertia and historical accident. We do know, however, that once benefits have been granted, it is exceedingly difficult to reduce them in order to accommodate fiscal and demographic realities – difficult, but not impossible, as countries like Chile and Sweden have demonstrated by deeply restructuring their public pension programs.

ACKNOWLEDGMENTS

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NOTES

1. For further details see Chapter 2 and Lee (1994).
2. More accurately, these are the age at which the average unit of labor income is earned and the age at which the average unit of output is consumed.
3. The figures in this chapter use estimates from 17 to 23 economies, depending on the topic, because governments differ in the data they provide.
4. This method of ranking by per capita GDP preserves order within regions but means that some economies (e.g., Japan or Hungary) are out of order between regions.
5. This comparative result holds across golden rule steady states. See Willis (1988) and Lee (1994). If transfer wealth were zero in a golden rule steady state, then lifecycle saving would generate exactly the optimal amount of capital, and small variations in the population growth rate would have no effect on lifetime consumption, even though they would alter per capita consumption.
6. 'Capital dilution' usually refers to a change in the capital/labor ratio when the saving rate remains constant and the population growth rate rises. Here we use it to mean a change in the optimal capital/labor ratio, which is lower when the population growth rate is higher.
7. This experiment is loosely formulated, but the idea is that a long-term change in fertility now, close to the year 2000, would have steady-state effects that might be approximated by looking at the public-sector transfer system under the demographic conditions of 2050. More precise results could be found through fiscal projections based on demographic projections and the NTA public-sector profiles.
8. The detail with which public transfers are estimated varies, but all governments distinguish health, education, and pensions.
9. Both Brazil and Mexico have fertility near replacement level in 2010, but the NTA year for Brazil is 1996 and prior fertility was fairly high. The NTA year for Mexico is 2004, and prior fertility was high there as well.
10. The old-age dependency ratio is defined by the UN Population Division (2007) as the population of ages 65+ per 100 persons aged 15–64.

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PART II

Comparative analyses of age and the macroeconomy

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5. Labor income over the lifecycle

Sang-Hyop Lee and Naohiro Ogawa

The economic lifecycle can be summarized as the amount consumed and the amount produced through labor at each age. Reallocations occur because at some ages individuals produce more than they consume, whereas at other ages they consume more than they produce. Hence, measuring the amount produced through labor over the lifecycle is basic to the construction of the economic lifecycle.

This chapter attempts to provide a comprehensive measure of the market value of labor provided by all members of a population and to show how that varies by age. The measure reflects many factors – individuals' behavior, market forces, institutions, and age-related characteristics of individuals such as education, health, and disability. It tells us the extent to which individuals provide for their material needs through their labor and how the lifecycle of production varies among economies. We compare the age profiles of per capita labor income constructed by research teams in 23 economies and describe the factors that shape those age profiles.

Our approach differs in important ways from the conventional measure of labor income. The major difference between our measure and the usual concept of the labor earnings profile is that whereas the usual profile is typically estimated only for the employed or even for full-time employees, we estimate it by using the entire population. Thus our measure includes non-workers in the denominator. Moreover, most of the literature focuses on the age profiles of the labor force participation rate. That approach is appropriate when the model seeks to explain a particular behavioral question, such as what determines the age at which men retire or how earnings change over a person's working life. The conventional approach, however, has limited implications for some important policy issues. For example, in countries where substantial portions of the elderly population participate in the labor market at low productivity levels or work part-time, looking at either the age at retirement or the wage of full-time workers misses an important aspect of the economic lifecycle. Delaying retirement may not solve the problem of financing old-age consumption in those countries.

The labor force participation rates of children and their labor productivity also vary greatly even among the most developed countries.

This chapter follows the methodology developed for the National Transfer Accounts. Labor income in the NTA framework provides a comprehensive measure of production. Labor income here is defined as all compensation to workers, including labor income of employees (earnings), the portion of entrepreneurial income (self-employment income) that is a return to labor, employer-provided benefits (fringe benefits), and taxes paid to the government by employers on behalf of employees.[1] Here we focus on the estimation and description of the per capita labor income profile throughout the lifecycle and compare how this differs across economies. Our measures are averaged across the two genders.

After discussing the theoretical background and explaining the factors that affect the shape of the labor income profile, we discuss the methodology used to construct estimates of labor income. Next we present the actual estimates of labor income profiles for 23 economies and discuss the forces that shape the profiles. In the final section we summarize the main results and suggest some policy implications of the findings.

THEORETICAL BACKGROUND OF LABOR INCOME OVER THE LIFECYCLE

The aggregate age profiles of labor income reflect many factors. An obvious and major one is the age structure of a population because the per capita age profile is weighted by the number of people in each age. By contrast, the per capita profile of labor income over the lifecycle largely reflects individuals' behavior. Modern economic theory suggests two behavioral factors that influence the shape of the profile: individuals' provision of labor and their human capital investment over the lifecycle. Although these two behaviors are closely related, especially at young ages, it is useful to discuss them separately.

Total labor income in a certain year is determined by the level of productivity and the total number of producers; that is,

$$Y = \sum_{a} Y_a, \tag{5.1}$$

where $Y_a = \bar{y}_a L_a$. Y represents total labor income, $\bar{y}_a$ represents labor productivity index at age a, and L_a is the number of producers at age a. Per capita labor income at age a (ya) can be similarly formulated as

$$y_a = \bar{y}_a l_a, \tag{5.2}$$

where l_a represents the proportion of working population at age *a*.

Because working hours vary by age, either the working population or the productivity index should be weighted by working hours of the workforce. It is clear from equation 5.2 how our definition of labor income differs from the usual concept of labor earnings, which is equivalent to $\bar{y}_a$. The usual concept is often conditioned on working full time, whereas ours (y_a) is weighted by the proportion of the population that is working at each age. Because the decision to participate in the labor force changes over the lifecycle and varies by gender, our measure of labor income is influenced by the decision making made by different demographic groups.

Several factors affect the labor force participation rate at each age (l_a). A typical economic theory characterizes it as an individual's behavioral choice between leisure and working. An individual at each age chooses to work for a certain number of hours during which his gain of marginal utility in the form of earnings is equal to his loss of marginal utility in the form of reduced leisure time. Decisions made by three demographic groups have perhaps the greatest effect on the shape of labor income profiles.

The first group consists of older men, who tend to retire earlier in developed economies than in developing economies. It appears that individuals' decisions to retire are governed by complex forces that reflect the influence of government policy, firms, and labor unions. The prominent explanation has been that high income and pay-as-you-go retirement pension benefits encourage workers to retire early (e.g., Anderson et al. 1999; Clark et al. 1999; Gruber and Wise 1999; Börsch-Supan 2000). Rigidities in the labor market often discourage continued employment by older workers, too. Employers appear to be reluctant to employ or even to retain older workers on grounds that aging reduces productivity, and seniority-based remuneration raises the cost of employing older workers. Hence people living in countries with high percentages of agricultural or informal-sector workers tend to retire later because those sectors are not subject to the rigidities of the labor market that exist in urban settings.

The second demographic group having a strong effect on the labor income profile of a population comprises adolescents and young adults, who (prompted by their parents and government) choose between joining the labor force and investing in their human capital by continuing their education. According to the theory of quality–quantity trade-off formulated by Becker and Lewis (1973), children from small families receive more resources and care from parents to be used for their human capital investment than do children from large families, and this in turn leads to higher earnings for them in the future. In developing countries the high and increasing returns to education provide a powerful incentive for young adults to remain in school and delay their entry into the workforce. Countries have also been adopting policies that make education compulsory, which in turn result in a decrease in child labor (e.g., Duryea et al. 2003).

The third demographic group is women. Today many women are choosing between working outside the home and home production. Their opportunity cost of labor force participation is low in developed countries with low fertility, since less of their time is required for childbearing and childrearing. Labor market opportunities for women also tend to be high in developed countries, and social and familial barriers to their labor force participation tend to be low. On the other hand, greater educational opportunities for women may delay their entry into the labor force.

Once working, individuals may have to devote time and money to learning-by-doing or formal training, thereby increasing their future productivity ($\bar{y}_a$). Human capital theory (Becker 1962; Mincer 1962) states that an individual's decision to invest in learning or training depends on the net present value of that investment. As an individual ages, the marginal benefit of investment in learning decreases because the amount of time until retirement decreases. Conversely, the marginal cost of learning increases as an individual's physical and mental condition depreciates. Combined with the decrease in marginal benefit, this makes an individual's productivity profile concave. Productivity eventually decreases as the net investment in human capital becomes negative; that is, gross investment in human capital falls below the depreciation of human capital. Skirbekk (2003) reviews dozens of studies and points to an inverse U-shaped individual productivity profile, with significant decreases taking place from around 40 years of age. A large body of literature supports the view that mental and physical abilities decline during adulthood. Changes in technology have an uneven influence on competencies for different age groups (Autor et al. 2003). Rapid changes in educational systems may also give younger workers a competitive advantage over their older counterparts, especially in settings where there is not much emphasis on training or retraining of older workers.

These two behavioral factors – the decision to work or not to work and the decision to invest or not to invest in human capital – are interdependent because the productivity of labor depends in part on the individuals' decision to work or to continue working. For example, declining labor productivity due to poor health or reduced stamina eventually leads a person to retire (Quinn et al. 1990; Bound 1991; Dwyer and Mitchell 1999). And those who are going to retire soon are less likely than others to invest in their human capital. Because of this interdependence, the productivity of labor on the part of those who work may not appear to decrease as workers age, especially around retirement age, if only those with high productivity tend to remain in the labor market. The choices made by older workers with high productivity may depend on several factors, such as their pension benefits if they retire, the types of tasks they perform, and labor market conditions.

The real world is much more complex than theory. Most older workers, for example, retire completely from full-time work instead of reducing their hours for a period of time before retiring. That they do so is incompatible with a model of labor supply or labor force participation in which individuals can freely choose their working hours as their taste for work gradually shifts with age toward a preference for leisure. A US survey of institutional arrangements (Hurd 1993) suggests that many older workers face a limited choice between a well-paying year-round job and low-paying part-time work. Therefore someone approaching retirement who wants to retire gradually from a career-type job may have to resign and compete for low-paying, entry-level jobs.

Seniority systems may force wages to rise with age, regardless of workers' productivity. Pension programs may be unexpectedly created or terminated, altering employees' lifecycle budget constraint and perhaps introducing strong incentives either to retire from the labor force or to return to work. Changes in tax policies may also alter the trade-off between work and leisure. Unemployment may thwart individuals' plans, and age discrimination or mandatory retirement may prevent older people from finding employment even if they want to work.

It is difficult to identify all the factors that influence labor productivity or to examine labor theories using real-world data sets. Even basic information, such as working hours by age, is not readily available for many countries. Labor force characteristics vary among countries, creating significant differences in how per capita labor income varies with age.

METHODS FOR ESTIMATING LABOR INCOME BY AGE

We compare individual labor income profiles constructed by research teams in 23 economies. Although it would be desirable to depict a longitudinal profile of lifecycle labor income, data limitations often do not allow researchers to employ those measures. Thus, like the usual labor earnings profiles, our approach is cross-sectional, measuring labor income among different age groups at one point in time.

As is discussed elsewhere in this book, National Transfer Accounts are designed to be consistent, when weighted by population and summed, with National Income and Product Accounts (NIPA) totals. The portion of self-employment income that is a return to labor is not reported separately in the NIPA. While the NIPA contains information on the mixed income of unincorporated households, it includes returns both to capital and workers who are both paid and unpaid. Gollin (2002) considers three methods for estimating the portion of mixed income that is a return to labor: (1) attributing all mixed income to labor; (2) attributing a share to labor equal to the share of labor income for the rest of the economy; and (3) imputing the labor income of employees to the self-employed. He finds that the first of these methods overstates the labor income of the self-employed. The other methods yield an average labor share that varies from 0.654 to 0.686, depending upon the method and sample used. The labor shares in high- and low-income economies are very similar. Thus the simple method of allocating two thirds of mixed income to labor is consistent with the best available evidence on this issue. We carried out a sensitivity analysis using various sharing rules, such as 0.85 instead of two thirds. This did not affect the labor income profile substantially, suggesting that errors in the estimates of total labor income due to the two-thirds rule are not important.

A complicated issue in estimating the age profile of labor income is the estimation of self-employment income, especially for labor markets in lower-income countries (Deaton 1997). As labor markets in many developing countries are characterized by large proportions of labor in the agricultural sector or in family enterprises, estimating labor income for these economies often results in serious errors and other difficulties, especially when the estimates are of the value of unpaid family workers' productivity. For most economies in our study, available household surveys report mixed or self-employment income for a household, whereas the NTA method requires estimates for individuals. But these surveys do report which individuals in the household engage in unpaid family labor. We combine these two sources of information to estimate self-employment labor income for individuals in each household. We assume that within a household the value of labor for unpaid family workers by age is proportional to the labor income by age of employed workers in the total sample. For each household we then calculate the constant proportion that implies a total of self-employment labor income for the household matching two thirds of reported self-employment income. This provides an estimate of self-employment labor income by age for each individual in each household in the survey. This age profile is then adjusted proportionately, so that, in combination with the age distribution of the total population, it implies a number equal to two thirds of the NIPA total for self-employment income.

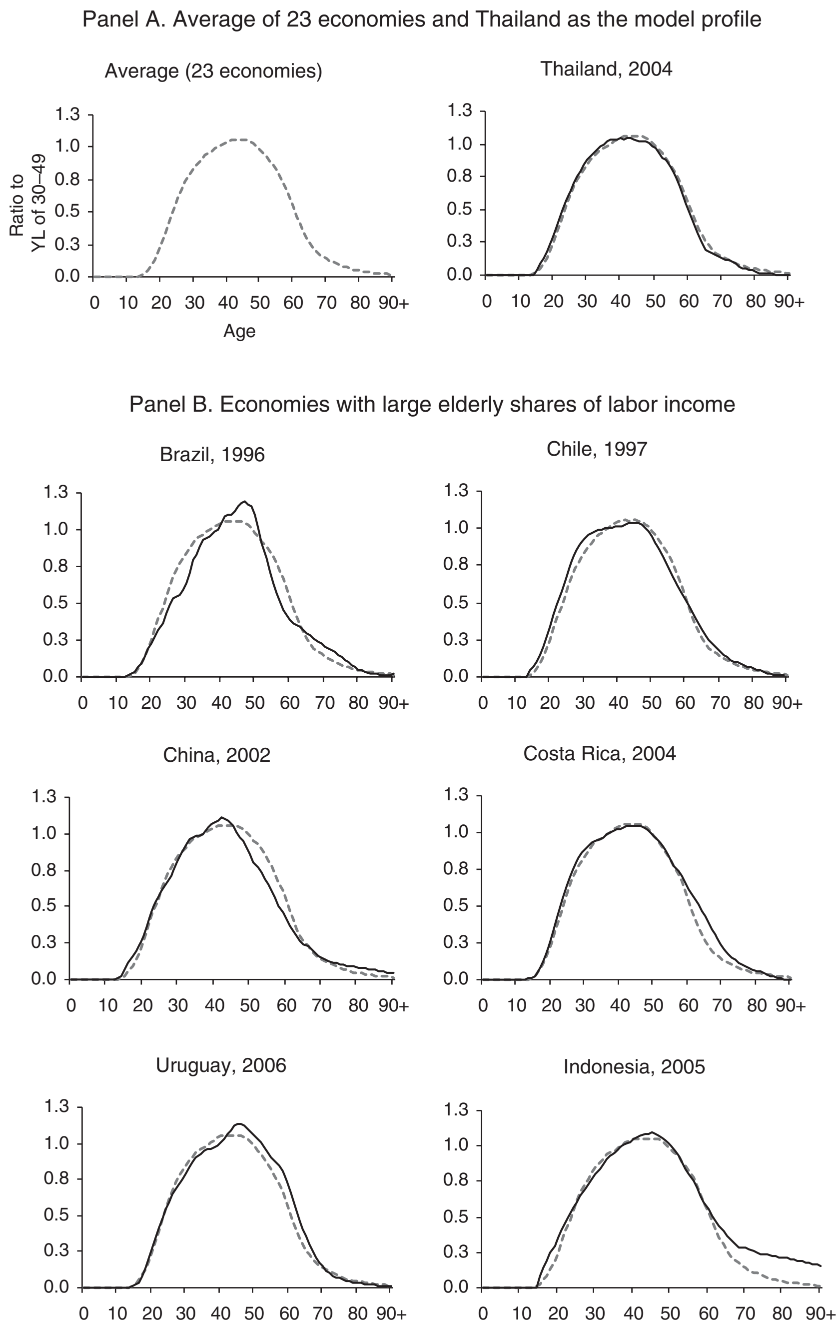
For purposes of comparison, we normalized each curve by dividing it by the unweighted average labor income for ages 30–49. This age range was chosen to exclude younger ages that may be affected by educational enrollments and older ages that may be affected by retirement. We also smoothed the raw age profiles for graphical presentation.[2] More detailed information on similar issues and the methodology is available from Mason et al. (2009), Lee et al. (2008), and at the project website, www.ntaccounts.org.

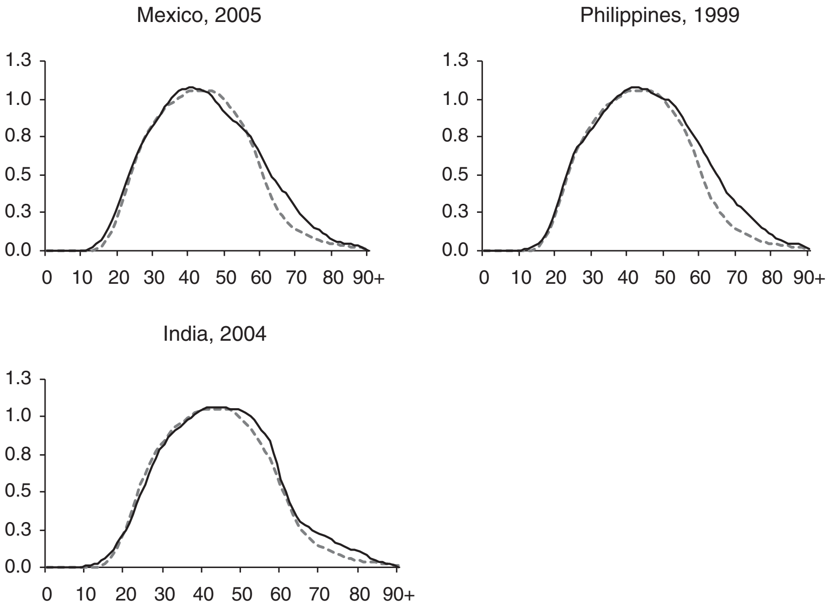
ESTIMATION RESULTS

The shapes of the age profiles of labor income for the 23 economies considered here are strikingly similar, broadly speaking, and familiar. An inverse U-shape predominates. There are important differences, however, in the age earnings profile across economies. To highlight the differences, we averaged the normalized labor income profile of the 23 economies and compared the average labor income for the group of economies as a whole with that of each economy. We categorized the economies into four groups. Figure 5.1 presents the results.

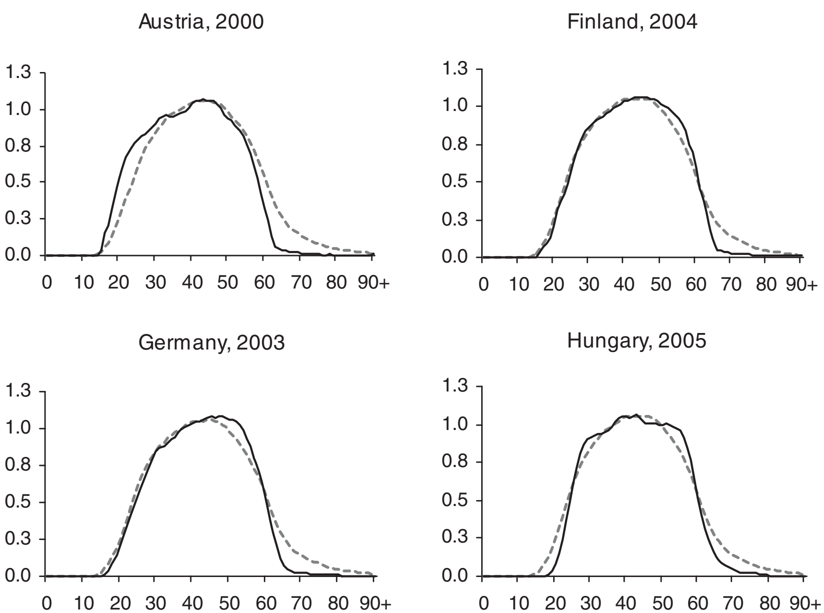
The two most distinctive features of all the groups are the shape of the profiles at which earnings peak and decline substantially and the prominence of earnings in old age. These features are related to the level of the economies' development. The profile of Thailand is the closest to the average shape (Panel A); but other developing economies – Brazil, Chile, China, Costa Rica, India, Indonesia, Mexico, Uruguay, and the Philippines – have labor income profiles with larger elderly shares of labor income (Panel B). In addition, the children's share of labor income, especially for ages 15–19, tends to be greater for these economies than the average profile.

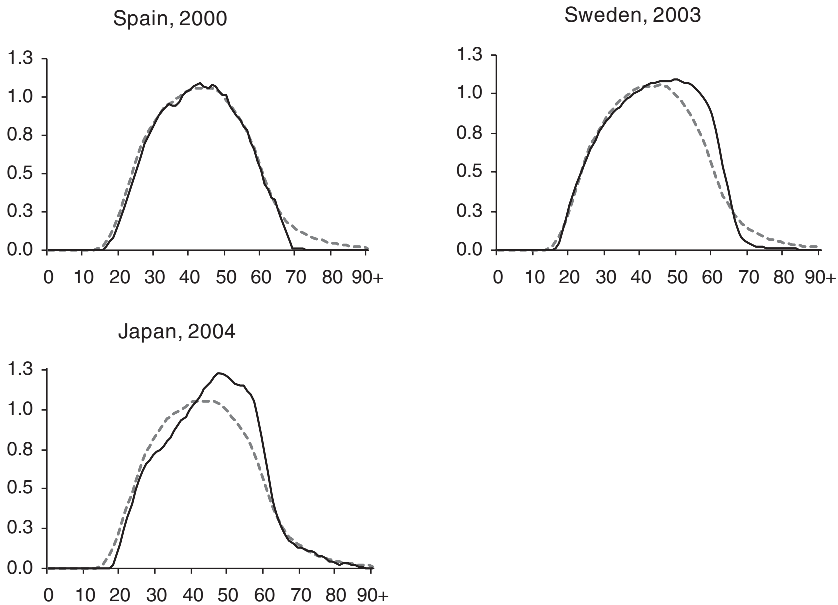
In stark contrast to the labor income profiles for lower-income economies, those for European economies, namely Austria, Finland, Germany, Hungary, Spain, and Sweden, show a steep decrease in old age (Panel C). Among high-income economies, it appears that labor income drops substantially at earlier ages in Austria and Finland than in Japan and Sweden. Thus the share of labor income for persons aged 65 and above appears to be higher in Japan and Sweden than in Austria and Finland. Japan in particular shows a much higher share for the late 40s and the 50s than other economies. Children's share of labor income in these advanced economies also tends to be lower than it is in the developing economies, with the notable exception of Austria. In Austria, the share of labor income for young people of ages 15–25 appears to be highest among the 23 economies.


Panel A. Average of 23 economies and Thailand as the model profile
Average (23 economies)
Thailand, 2004
Ratio to YL of 30–49
Age
1.3
1.0
0.8
0.5
0.3
0.0
0 10 20 30 40 50 60 70 80 90+
Panel B. Economies with large elderly shares of labor income
Brazil, 1996
Chile, 1997
China, 2002
Costa Rica, 2004
Uruguay, 2006
Indonesia, 2005

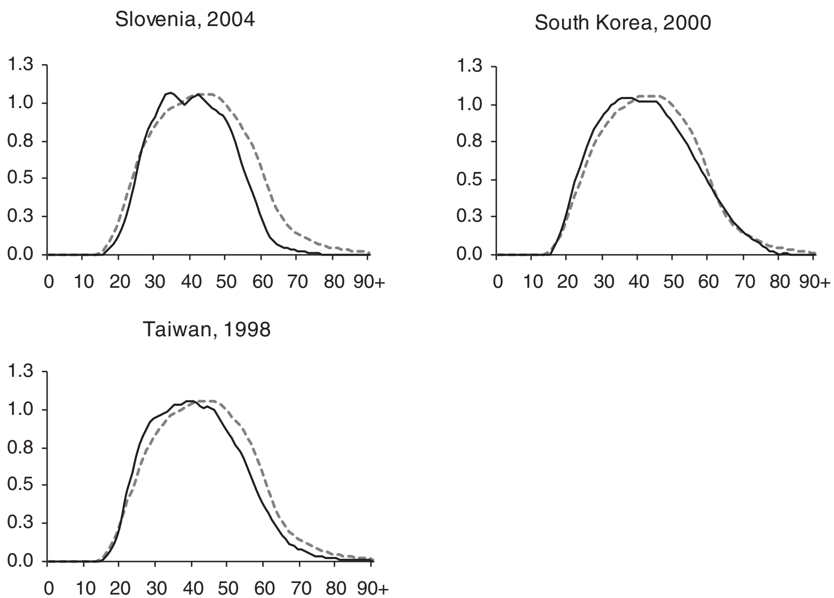


Panel C. Economies with small elderly shares of labor income

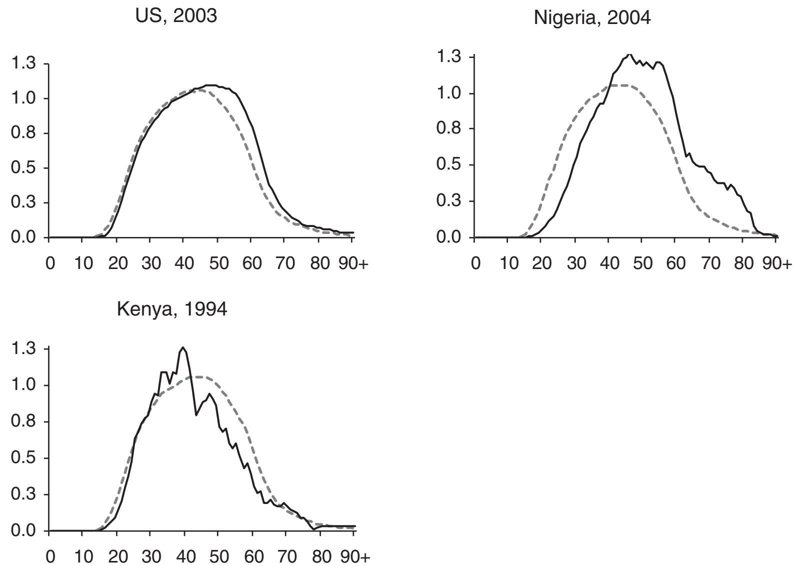




Panel D. Economies with early peaks and declines in labor income



Panel E. Outliers



Notes:
The profiles of the individual economies are superimposed over the average profile of the 23 economies for comparison.
YL = Labor income.

Figure 5.1 Per capita labor income profiles: average of 23 economies around 2000 and individual economies arranged by group

In Slovenia, South Korea, and Taiwan, the share of labor income for children is low, but labor income increases rapidly among the young as they age (Panel D). Thus labor income shows a pattern that peaks at a relatively young age and decreases substantially around the late 40s. These economies differ from the other lower-income economies depicted in Panel B in the share of labor income for children. They are also distinguished from the advanced economies depicted in Panel C in the age at which labor income peaks.

The US, Kenya, and Nigeria are interesting cases (Panel E) because they are not similar to any of the other economies and therefore do not belong to the other three groups described above. The US profile shows a lower share of labor income for young people than does that of Slovenia, South Korea, or Taiwan. It is also different from the profiles of most European economies and Japan in that it does not decline as steeply in old age. Nigeria differs from other low-income economies in having little labor income for young people. In contrast, Kenya is different from other low-income economies because its labor income profile does not show substantial income in old age.

To quantify and compare the various profiles, we calculated several measures using the data shown in Figure 5.1. The measures include the mean and the median ages of labor income, the mean age at which labor income peaks, the share of lifetime earnings for children and old people, and labor income as a share of consumption for children and old people. The results are presented in Table 5.1. These cross-sectional per capita calculations are treated as a synthetic cohort assumed to survive until age 90. They were calculated with survival weights of the US in 1984–89.

The mean age of labor income varies from 39.6 to 48.8 years – a difference of 8.8 years. It is highest in Nigeria (48.8), followed by the US (46.2), Japan (44.8), Uruguay (44.7), and the Philippines (44.6). It ranges from 42 to 44 for most economies. Only in five economies – Austria, Slovenia, Kenya, South Korea, and Taiwan – is it below 42. The age at which earnings peak is highest, at 47, in the US, Japan, India, Nigeria, and Brazil. It is lowest in Slovenia (34), followed by South Korea (35), Uruguay (38), and Mexico (38).[3]

Surprisingly, the share of lifetime earnings attributed to children (defined as persons under age 20) is very modest. In no developed economies except Austria is it more than 1%. Even in Indonesia, where it is highest among our study economies except for Austria, the share of labor income for children is only 2.5%. The share of lifetime earnings for persons aged 65 and above is also modest in most economies. Even in Nigeria, where incomes are low and agricultural employment dominates, the contribution of work after age 65 to lifetime earnings is only 11.2%. This is the largest contribution among the study economies. It is not a direct consequence of mortality, because these results are based on survivors. Elders' share of labor income in all the European economies is very small – less than 2%. Most of the European economies – Finland, Germany, Hungary, and Slovenia – have not only the lowest shares of labor income for people aged 65 and above, but also the lowest shares for children (ages 20 and below) among our sample. Outside Europe, elders' share of labor income is at least 2%. Among the economically most advanced economies, only in Japan and the US is the share of labor income for old people above 3%. The variation in elders' share of labor income among the 23 economies, however, is small. Over 90% of lifetime earnings is concentrated in the 20–64 age range almost everywhere, particularly in the European economies.

The NTA system yields a more complete measure than other methods of the sources of support for dependent populations because it includes

Table 5.1 Summary statistics of per capita labor income profile and labor income as a source of income-funding consumption, by age group: 23 economies around 2000

Region, country, and year	Mean age	Peak age	Median age	Share 0–19	Share 20–64	Share 65+	% funding consumption, 0–19	% funding consumption, 65+
EUROPE								
Austria, 2000	39.6	41	38	3.2	96.4	0.5	11.8	2.0
Finland, 2004	42.6	43	41	0.9	98.3	1.0	3.3	3.9
Germany, 2003	42.5	45	41	0.8	98.6	0.7	3.2	2.4
Hungary, 2005	42.8	39	41	0.1	98.8	1.4	0.5	5.4
Slovenia, 2004	40.5	34	39	0.8	98.6	0.8	2.3	3.1
Spain, 2000	42.6	43	41	0.9	98.1	1.6	3.2	6.7
Sweden, 2003	43.7	46	42	1.0	97.7	1.9	3.7	7.2
AFRICA								
Kenya, 1994	41.9	39	39	0.8	95.3	4.4	4.9	27.6
Nigeria, 2004	48.8	47	43	0.2	89.7	11.2	1.3	44.8
ASIA								
China, 2002	42.3	44	40	2.3	93.3	4.9	10.7	23.0
India, 2004	44.0	47	43	2.0	92.7	5.9	9.5	22.7
Indonesia, 2005	44.5	45	41	2.5	89.5	8.8	9.0	41.1
Japan, 2004	44.8	47	44	0.3	96.7	3.5	1.1	11.2

Table 5.1 (continued)

Region, country, and year	Mean age	Peak age	Median age	Share 0–19	Share 20–64	Share 65+	% funding consumption, 0–19	% funding consumption, 65+
Philippines, 1999	44.6	41	42	1.7	91.5	7.7	6.9	30.8
South Korea, 2000	41.8	35	39	1.4	95.5	3.7	4.8	17.7
Taiwan, 1998	40.9	39	39	1.1	97.0	2.3	3.0	8.7
Thailand, 2004	42.2	40	40	1.9	95.2	3.3	6.9	13.4
LATIN AMERICA								
Brazil, 1996	43.8	47	42	1.7	93.2	5.8	5.5	14.7
Chile, 1997	43.2	45	41	1.6	93.9	5.3	5.5	18.5
Costa Rica, 2004	43.5	43	41	1.5	93.4	6.0	6.2	21.1
Mexico, 2004	43.7	38	41	2.3	91.6	7.0	7.3	23.2
Uruguay, 2006	44.7	38	40	1.2	94.0	5.7	6.0	21.1
NORTH AMERICA								
US, 2003	46.2	47	43	0.6	92.9	7.5	2.5	25.1
AVERAGE	43.3	42.3	40.9	1.3	94.9	4.4	5.2	17.2

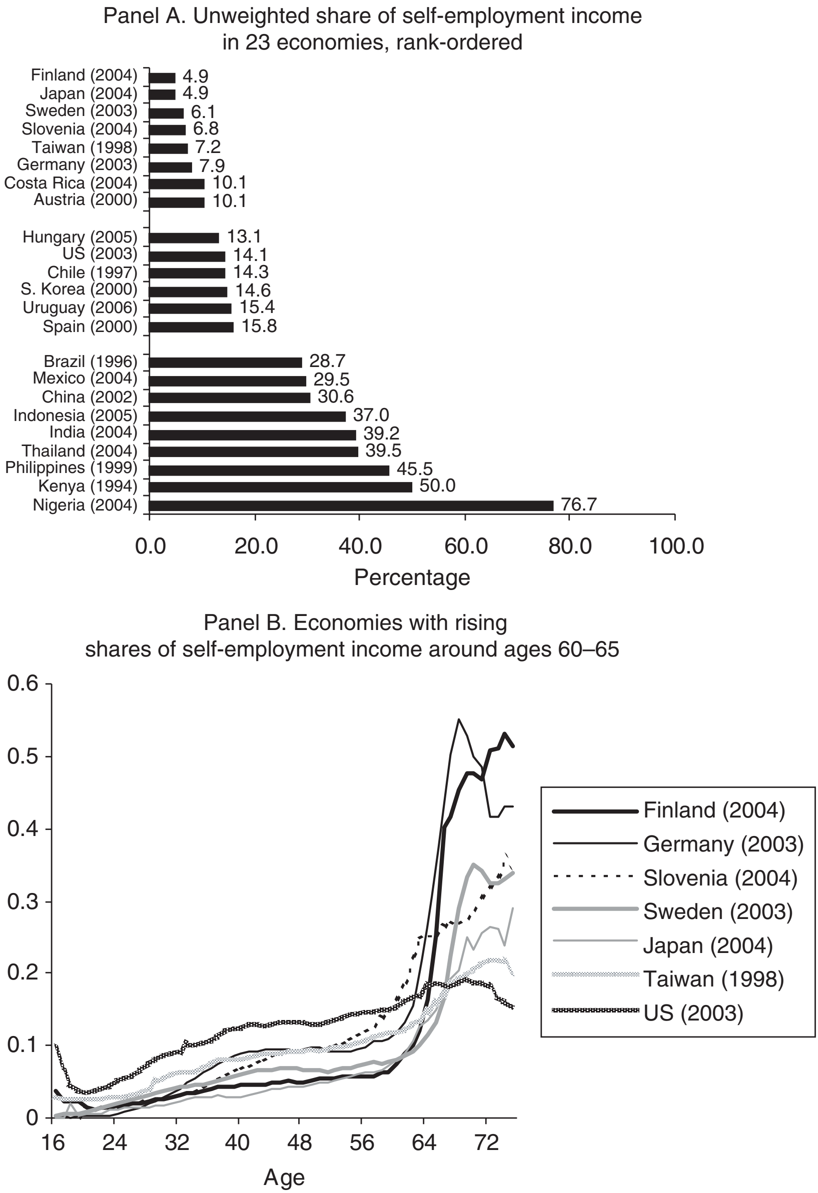
familial support, intra-household transfers, and dissaving. In this chapter we compare only the labor incomes of the 23 economies as a source of funding consumption, presented in the last two columns of Table 5.1. The percentage of income used to fund children's consumption is modest. With the exception of two economies – Austria and China – labor income accounts for no more than 10% of their consumption funding. Because asset-based reallocation is not a major source of children's consumption funding, this result implies that most of their consumption is funded by transfers. Results for labor income as a source of funding consumption by the elderly vary considerably across the economies, ranging from 2.0% in Austria to 44.8% in Nigeria. Work plays a small role for the elderly in all the European and economically advanced economies, contributing less than 8% of consumption for this age group, whereas it accounts for substantial portions in Asia and Latin America.

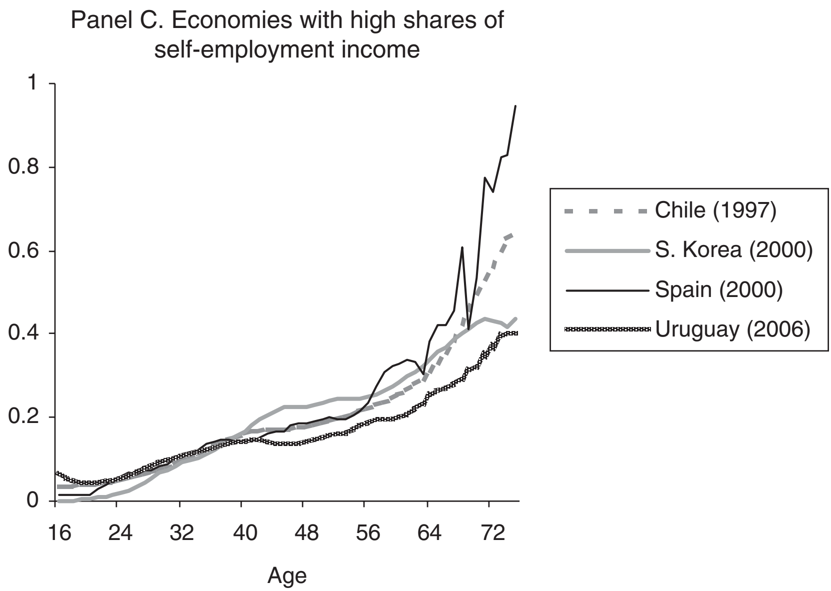
FACTORS SHAPING THE AGE PROFILES OF LABOR INCOME

Why do age profiles of labor income vary among economies? Numerous explanations are possible, and the patterns are intriguing. To some extent the labor incomes of older people in our sample economies are broadly consistent with those reported in studies of the effects of pension and tax systems on labor incentives (e.g., Gruber and Wise 1999). In Japan, for example, labor income increases slowly for young people and peaks at late ages, a finding that is consistent with Japan's seniority-based wage system. Children's share of labor income appears to be inversely related to the level of development of an economy, which is consistent with ample evidence from the literature on quantity–quality trade-offs.

On the other hand, the NTA measure of labor income, which includes labor income for the self-employed, may provide a new perspective as compared with more narrowly prescribed analyses that emphasize the earnings profiles of employees. To examine this possibility, we plotted the ratio of self-employment income to labor income by age for each of the economies. This time we categorized the economies into three groups, based on their share of self-employment income. Panel A of Figure 5.2 shows the unweighted share of self-employment income over the individual lifecycle in the 23 economies; the other panels present the group results by age.

We see wide variation across the economies in the share of self-employment income. It should come as no surprise that that share is very large for poor and developing economies. It is highest for Nigeria (76.7%),


Panel A. Unweighted share of self-employment income
in 23 economies, rank-ordered
Finland (2004) 4.9
Japan (2004) 4.9
Sweden (2003) 6.1
Slovenia (2004) 6.8
Taiwan (1998) 7.2
Germany (2003) 7.9
Costa Rica (2004) 10.1
Austria (2000) 10.1
Hungary (2005) 13.1
US (2003) 14.1
Chile (1997) 14.3
S. Korea (2000) 14.6
Uruguay (2006) 15.4
Spain (2000) 15.8
Brazil (1996) 28.7
Mexico (2004) 29.5
China (2002) 30.6
Indonesia (2005) 37.0
India (2004) 39.2
Thailand (2004) 39.5
Philippines (1999) 45.5
Kenya (1994) 50.0
Nigeria (2004) 76.7
0.0
20.0
40.0
60.0
80.0
100.0
Percentage
Panel B. Economies with rising
shares of self-employment income around ages 60–65
0.6
0.5
0.4
0.3
0.2
0.1
0
16
24
32
40
48
56
64
72
Age
Finland (2004)
Germany (2003)
Slovenia (2004)
Sweden (2003)
Japan (2004)
Taiwan (1998)
US (2003)



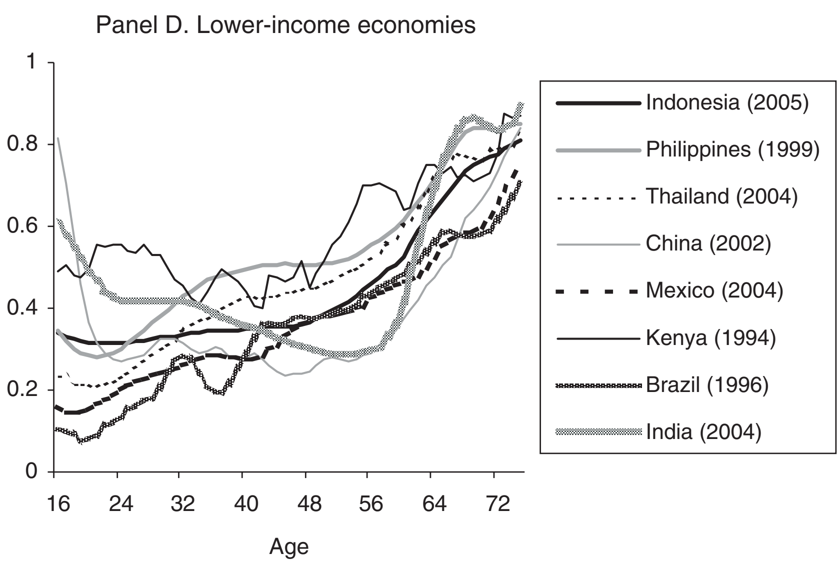


Figure 5.2 Ratios of self-employment incomes to labor income by age: specified economies around 2000

Kenya (50.0%), and the Philippines (45.5%). It is about 25%–40% for Thailand, Indonesia, India, China, Mexico, and Brazil. By contrast, it is low in advanced economies. Finland (4.9%), Japan (4.9%), and Sweden (6.1%) have the lowest shares of self-employment income over the life-cycle. Chile, Uruguay, South Korea, Hungary, Spain, and the US have intermediate shares.

The shape of the labor income profile is related to the share of self-employment income because age profiles of self-employment income are different from age profiles of wages for employees. Because returns to human capital investment are high for the young and also for employees as compared with the self-employed, wages peak at younger ages than self-employment income does. In addition, older people are more likely to work as self-employed or in the agricultural or service sector, whereas young people are more likely to be employed in the formal sector. The formal sector is growing and hiring young workers, whereas older workers are continuing in the jobs that they have held for years. Because mandatory retirement and age discrimination in the formal sector often discourage or, in some instances, prohibit continued employment by older workers, older workers are more likely to find new jobs in the informal sector as self-employed workers.

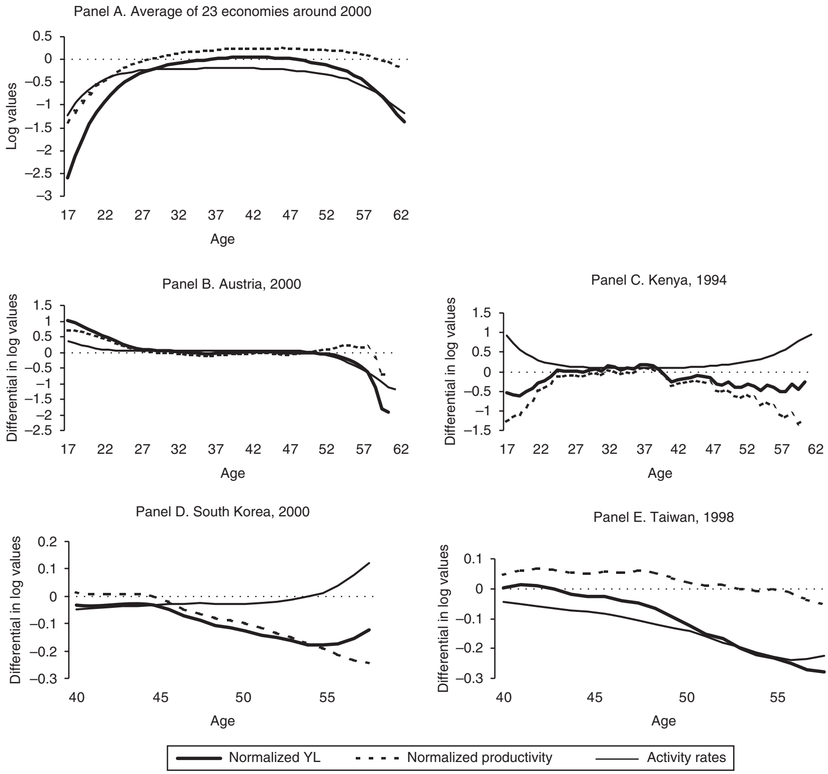
The share of self-employment income rises substantially at certain ages, especially in the European economies. For example, Panel B of Figure 5.2 shows a rapid increase in the share of self-employment income around ages 60–65 for most of the European economies, which is consistent with the retirement behavior of employees in those economies. The share of self-employment income for ages 65 and older tends to be lower for Japan, Taiwan, and the US. Much higher shares of self-employment are seen in Chile, Uruguay, South Korea, and Spain (Panel C) than in most of the European economies or the US, especially for ages 45–54. Spain, however, shows the typical European pattern with a rapid increase in the share of self-employment income around ages 60–65, whereas the other economies in Panel C do not. The share of self-employment income also rises with age in lower-income economies, namely China, India, Indonesia, the Philippines, Thailand, Brazil, Mexico, and Kenya (Panel D). The share of self-employment income for children is also quite high in these economies. In the case of Kenya, India, and China, the share of self-employment income for children is actually higher than that for age 50. This may be due to the fact that children are more likely than older people to work as unpaid family workers in low-income economies. Thus our imputation for the value of unpaid family labor results in a substantial change in the self-employment income profile for these economies.

Why is the share of lifetime earnings for children so high in Austria but low in Kenya? Which factor is more important in shaping the labor income profile, the age profile of productivity ($\bar{y}_a$) or the proportion of producers at each age (l_a)? As discussed at the outset of this chapter, per capita labor income (y_a) can be decomposed into two components: the proportion of producers at each age (l_a), as measured by the proportion of the working population at each age, and the productivity index of each age ($\bar{y}_a$), as measured by the labor income of those who are working. Two issues need to be considered, however. First, the NTA methodology does not estimate separately the proportion of the population at each age that is working and the labor income of that working population. But labor force participation rates by age are available for most study economies from various sources, and hence it is possible to measure the productivity of the working population by dividing the per capita labor income by labor force participation rates for each age group. While this may not provide very accurate decomposition results, it may provide some useful insights. Second, labor force participation rates are also available by five-year age groups for most economies. To derive the average productivity profile by single year of age, we smoothed the labor force participation rates profile, using the population age structure as a weight. For three of the economies in our sample – Kenya, China, and India – the years of two survey data sets (one for labor force participation rates, the other for per capita labor income) did not match. For these economies, we used the year of data on labor force participation rates, which was closer to the year in which the other NTA data were collected.[4]

For purposes of comparison, we first took a log on normalized labor income by age, which is the sum of the log of normalized productivity by age and the log of labor force participation rate by age. To visualize the differences, we averaged the log value for the 23 economies by age and compared the average profiles with that of each economy. Figure 5.3 provides the decomposition results. We report the results for four economies to examine some specific issues.

For the sample as a whole, both the productivity profile and the labor force participation rate profile peak around the mid-40s, remain quite flat until the late 50s, and then decline (Panel A). While the age profiles of labor force participation show a uniform picture, an inverse U-shape, the age profiles of average productivity of the working population vary widely across economies. The results for the four economies shown in Panels B to E are particularly interesting.

For example, the labor force participation rate for young people aged 15–19 in Austria is 41%, which is not only higher than in any other European country, but also higher than in Indonesia, Mexico, or the Philippines. Austria's high labor force participation rate at early ages may



Note: YL = Labor income.

Figure 5.3 Decomposition of labor income (average productivity versus activity rate): average of 23 economies around 2000 and Austria, Kenya, South Korea, and Taiwan

be due to its widespread custom of apprenticeships. As Panel B indicates, however, young people's productivity is also much higher in Austria than in the other economies. This suggests that the high per capita income of young people in Austria is due not only to their higher labor force participation rates, but also to the high productivity (or long working hours) of apprentices.

Kenya (Panel C) is quite different from Austria. According to Kenya's 1999 census, the labor force participation rate was 34% for children of ages 5–14, 87% for adults aged 60–64, and 72% for adults aged 65–69 – which are the highest rates among our study economies. But labor income for Kenyan children and the elderly are not as high as in other developing economies, suggesting that their low per capita income is due not to low labor force participation rates, but almost entirely to their extremely low productivity. This pattern also implies that the older workers who remain in the Kenyan labor force are not selected on the basis of high productivity.

Another interesting contrast is between South Korea (Panel D) and Taiwan (Panel E). South Korea has a higher labor force participation rate for people aged 55 and older than Taiwan, but their productivity is low. The effect of low productivity dominates the effect of elders' high labor force participation in shaping South Korea's labor income profile for people in this age group. Taiwan is the opposite case. There, workers in this age group have relatively high productivity, but this effect is overshadowed by their low labor force participation rates. Thus, although the labor income profiles for the elderly in South Korea and Taiwan are similar, the reasons are quite different. It appears that more of the Korean elderly work, but their productivity is lower than that of the elderly in Taiwan.

The insight from these results is clear. Some governments have considered policies to mitigate the economic effects of population aging by modifying the age patterns of consumption and labor income in ways that raise support ratios for a given demographic pattern. The incentive structure created by a public policy can have a significant effect in this regard. Suppose people delay their retirement in response to an increase in the normal (full) retirement age. In the US, for example, for many years the normal retirement age was 65, but beginning with the birth cohort of 1938, it has been gradually increased, reaching 67 for persons born after 1959.

As people live longer, raising the full retirement age is one option for keeping a country's social security system on a sound financial footing. We modeled the effect of delaying the full retirement age by two years, stretching the labor force participation profile by adding more years of labor force participation at the peak (during which workers pay into the system) and stretching the profile after the peak to the right, weighted by the productivity of each age group. We present the results in Figure 5.4 for persons of ages 65–74.[5]

The delay has a substantial effect on labor incomes for the elderly, but the effect varies greatly, depending on the economy. Labor income still plays a smaller role in supporting consumption for the elderly than for other working age groups in all the economically advanced economies, but the increase in the labor income of the elderly is quite substantial. The effect is greatest for Spain. It is also quite large for Sweden, Finland, Germany, and Hungary, where labor productivity for older workers is high. On the other hand, the effect is quite small for economies such as Mexico, Thailand, and South Korea because a relatively large proportion of old people in these economies are working, but their productivity is low.

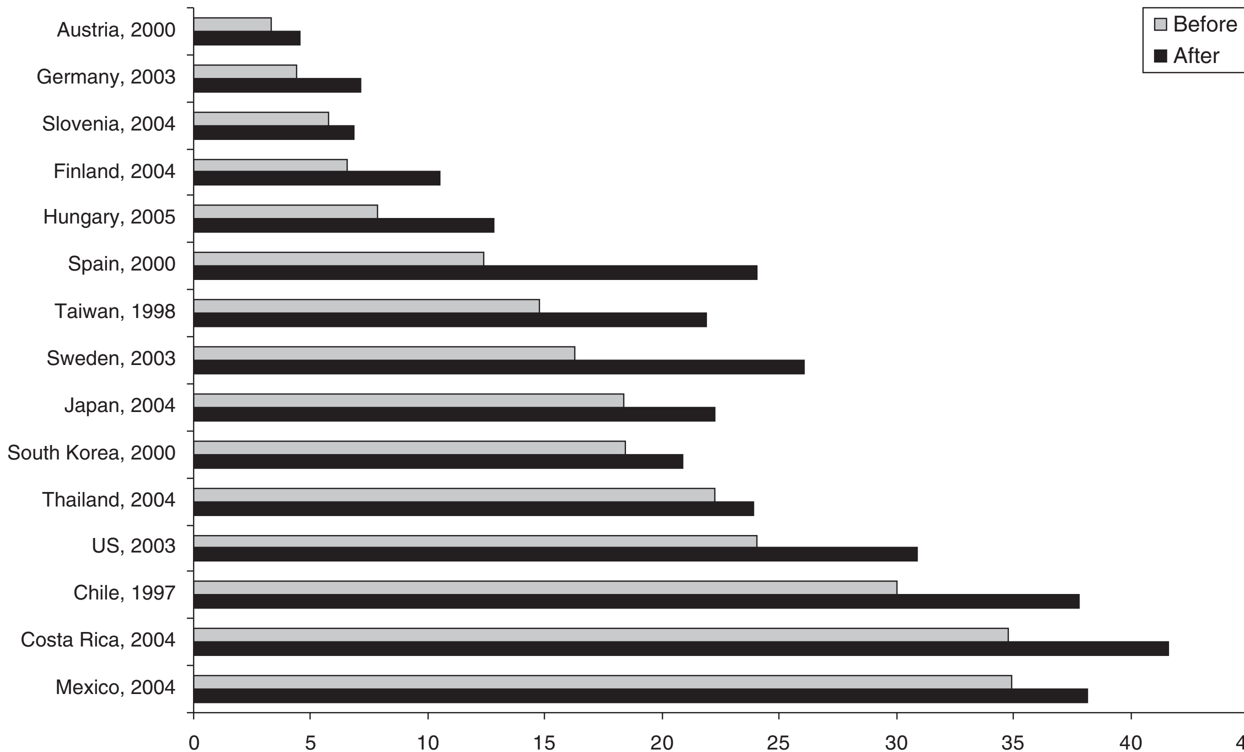


Figure 5.4 *Labor income as a source of funding consumption for ages 65–74 (percentages) before and after delaying retirement by two years: 15 rank-ordered economies around 2000*

Increasing the number of elderly who are working for these economies will not have a large impact. Hence the effect of reducing unused productive capacity should be small in those economies. This may also be true for Kenya, the Philippines, and Indonesia, although we could not construct profiles for these economies owing to the lack of information on labor force participation rates for older people.

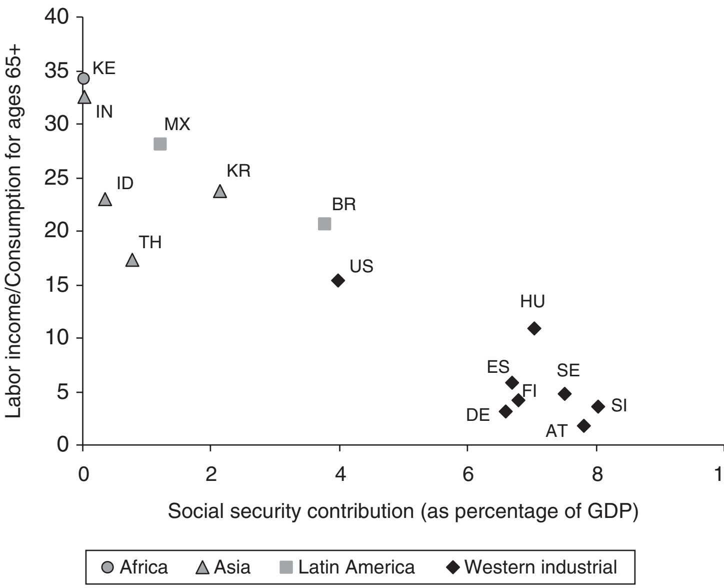
Numerous studies show that labor income for specific age groups is related to a country's institutions, demographic characteristics, and level of economic development. The literature includes, but is not limited to, examinations of the trade-off between child labor and schooling, the trade-off between social security and age at retirement, and the relationship between human resources accumulation and economic development. Here, we relate quantitative measures of labor income profiles to demographic and macroeconomic indicators. In some cases macroeconomic indicators are not available for the survey year of the labor income profile. We therefore use the macroeconomic data from the year that is closest to the survey year of the labor income profiles.

Perhaps the most interesting finding is that labor income as a source of funding consumption for the elderly appears to be strongly correlated with the amount of social contributions – made by employees, employers, self-employed individuals, and other unidentified sources – as a percentage of Gross Domestic Product. Although these contributions are defined more broadly than are pay-as-you-go social security contributions,[6] this result is somewhat consistent with what Gruber and Wise (1999) suggest about the relationship between social security provision and retirement (Figure 5.5).

CONCLUSIONS AND IMPLICATIONS

We have presented a broad measure of production by age for a wide range of economies, providing a basis for constructing the economic lifecycle. All our results are snapshots of a single year and are not based on longitudinal data. In the absence of more extensive data covering many years, we cannot track cohorts over time. Our inability to do so limits the extent to which we can explain the cross-sectional patterns that we observe. Nonetheless, the analysis reveals several intriguing results.

First, the estimated cross-sectional age profiles of labor income are broadly similar. Although there are interesting contrasts in the mean age of production, in the timing of the earnings peak over the lifecycle, in the share of self-employment income within labor income, in the lifetime earnings share of the young and old, and in the importance of labor income as



Note: Social contributions include social security contributions by employees, employers, and self-employed individuals, and other contributions whose sources cannot be determined. They also include actual or imputed contributions to social insurance schemes operated by governments.

Source: World Bank (2009).

Figure 5.5 Social contribution as a percentage of GDP and labor income as a percentage of consumption for persons aged 65+: 15 economies around 2000

a source of financing consumption, differences among the 23 economies are in general small.

For example, we would expect labor income at young ages to be relatively high in lower-income economies where entry into the labor force occurs at an earlier age. We see this to some extent, but in general the differences between the lower- and higher-income economies are very small. This indicates that although more children are working in lower-income economies, their labor income tends to be small. This is an important issue because a relatively large portion of the working-age population is young in these economies. Labor income at older ages is less important as a source of lifecycle support in rich than in low- and middle-income economies, primarily because of low labor participation rates. In wealthier economies, people live longer and are healthier, but they are not willing to work longer because they can afford to have more leisure in their later years and rely on their assets or on public resources to fund their consumption. This can be a serious problem for the viability of social security systems because increasing portions of wealthy countries' populations are retirees.

The fact that some elderly are earning less than other workers, even though they have high labor force participation rates, is an important finding. In some of the study economies, young people also have relatively high labor force participation rates, but their labor income is low. With low labor income, young people and old people will still have problems supporting their consumption, even though they remain in the labor market for longer periods.

Our results suggest that the conventional way of looking at either labor force participation rates or earnings of workers separately does not provide a comprehensive picture of the economic lifecycle. In addition to boosting labor force participation, it is important to develop policies that increase the productivity of workers in younger and older age groups.

The labor force behavior of young and older people will become increasingly important as labor force growth slows and labor shortages emerge. Older workers will be more important, simply because a larger share of the population and of the workforce will be old. Particularly in less developed countries, the increasing returns to education will provide a powerful incentive for young adults to continue their education and delay their entry into the workforce.

ACKNOWLEDGMENTS

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NOTES

1. The value of other activities, such as childrearing and other in-home activities that do not produce market goods or services, is also excluded from labor income calculations.

2. Smoothing was performed on case-weighted age-specific averages using SUPSMU in the R statistical package. Smoothing spans were determined on an ad hoc basis. Any ages with a profile value of zero, because of a survey assumption, were left out of the calculation and added to the series after smoothing. For example, if a survey covered only ages 14 and above, we set all values below age 14 identically to zero.
3. The result for the mean age at which labor income peaks should be interpreted with caution for some countries. The labor income profile of Slovenia, for example, peaks at age 34, but it drops only a little until the early 40s. The difference in labor income between ages 34 and 42 is only 3.3%. This is also true for South Korea.
4. The labor force participation rates by age group and gender, the year of the survey, and the original source of information for these labor force participation rates are available upon request.
5. This analysis is possible for countries that have information on labor force participation rates at least until age 74. No country provides information on labor force participation rates up to age 90.
6. For example, social contributions include actual or imputed contributions to all social insurance schemes operated by governments.

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6. Consumption over the lifecycle: an international comparison

An-Chi Tung

Although consumption is not equivalent to utility and welfare, it is a major determinant of them and is therefore of the utmost research interest and policy relevance. One of the most influential models of consumption is the lifecycle hypothesis (e.g., Modigliani and Brumberg 1954), which postulates that people smooth consumption over the lifecycle to maximize expected intertemporal utility. Specifically, people borrow against future earnings in the early stages of life when their income is low or zero, save during their productive working years, and consume accumulated assets after retirement.

Observed age profiles of household consumption often exhibit a hump shape, rather than staying flat as predicted by the simplest textbook example of the pure lifecycle theory. Classical explanations for the discrepancy begin with the notions of liquidity constraint and precautionary saving, and extend to myopia, a bequest motive, leisure choice, and so on (Deaton 1992). Further refinements include considerations of family size and structure, a cohort effect, and heterogeneity of commodities (such as durable versus non-durable, and work-related versus non-work-related, expenses) (Attanasio 1999). Thus the retirement puzzle (Hamermesh 1984) and other observed oddities seem to have been demystified (Battistin et al. 2009).

Yet some important aspects of consumption remain little understood. A critical issue is that the age profile of individual consumption has hardly been estimated. Most studies, except that of Lee (1994) and a few others, construct measures of household consumption, rather than individual consumption, by the age of the household head. One conceptual difficulty of attributing consumption to individuals is that some consumption is of public goods or is joint consumption, and there may be scale economies within the household. Moreover, surveys of family expenditure, which are the main sources of microdata, usually do not report individual consumption.

Related to the problem is that little is known about the consumption pattern of the very old and the very young. Most studies, including those on retirement puzzles, look at households in the middle of the household head's lifecycle, say from age 20 until retirement. Very few studies in this area (e.g., Borsch-Supan 1992) focus on the elderly. The literature on children has been rich, but most of it discusses the cost of children to parents (Deaton and Muellbauer 1986), rather than consumption by children, although the latter is more relevant to the analysis of children's welfare (Bradbury 2004). Additional work is needed in the estimation of consumption by both children and elders.

The NTA methodology is an effective and powerful tool for addressing these issues. It isolates the consumption by each member within the household and constructs age profiles from age 0 to age 90+. This new information opens up opportunities for re-examining the allocation of consumption across all age groups over the lifecycle and for reassessing the associated policy implications.

This chapter presents the evidence from 23 developed and developing economies, from the most populous (China and India) to the very small (e.g., Slovenia). Although each reports the results of only one year, the international comparison sheds light on a host of important policy issues, ranging from equity between age groups to the adequacy of human capital investment.

The following sections highlight the special features of the NTA methodology for analyzing consumption and examine the similarity and dissimilarity of the consumption age profiles across economies. Both public and private consumption and their various components are considered. The chapter concludes with a summary of the main findings and a discussion of what can be done next.

CONSUMPTION IN THE NTA FRAMEWORK

In the NTA framework the consumption of an individual is defined as the sum of private and public consumption, each of which is further disaggregated into education, health care, and other consumption. Leaving the details of the methodology to Chapter 3 and a manual on the NTA website, www.ntaccounts.org, this section focuses on two special features of the NTA method regarding consumption.

The first feature is that the NTA framework adds public consumption, including social insurance, to private consumption, whereas the literature ordinarily treats these two expenditures separately. There are essentially two types of public consumption (Musgrave 1959): merit goods (health care and education) and public goods (e.g., defense, public order, justice).

The inclusion of merit goods, which could have been provided privately, is particularly important. For example, while 8.5% of private consumption was allocated to education in Mexico in 2004, the ratio was merely 0.7% in Sweden in 2003. Yet public education spending in Sweden is so large that the percentage share of education in total consumption (12.7%), public and private combined, is almost the same as in Mexico (12.9%). Simultaneous consideration of public and private consumption is therefore necessary. As for public goods and services, they can be either substitutes for or complements to private goods (Ni 1995; Fiorito and Kollintzas 2004). By *ex-post* accounting, the NTA framework adds public goods and merit goods to private consumption to arrive at total consumption.

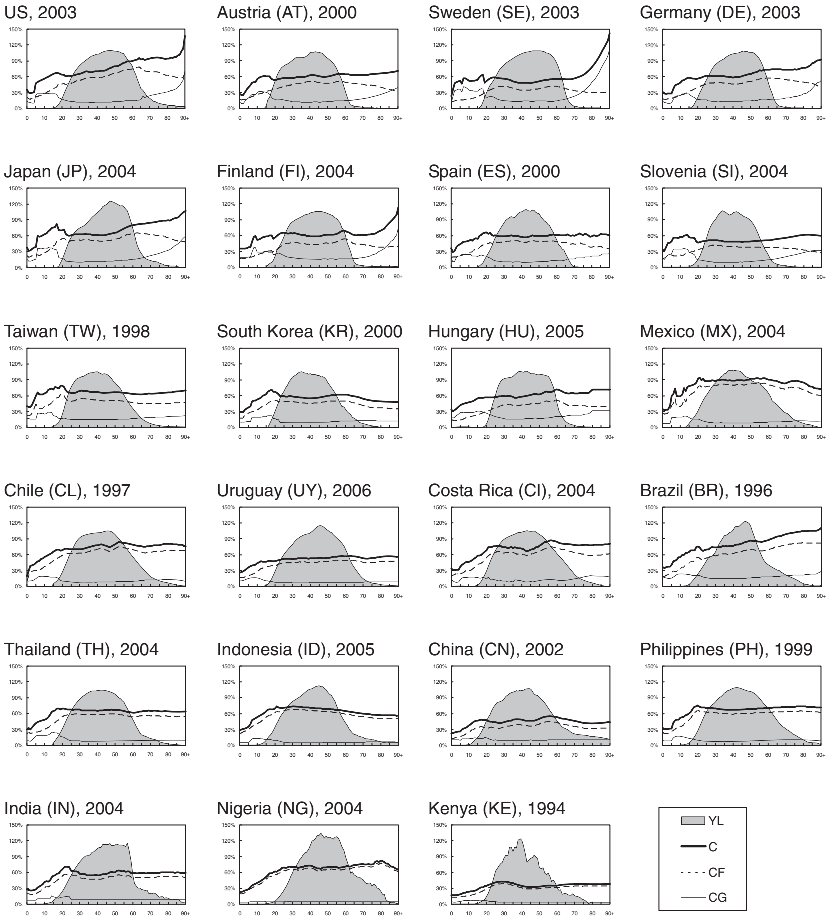
The second feature of the NTA method is its emphasis on education and health care, both being major determinants of human capital and thus having great policy significance for future growth potential (Schultz 1962; Grossman 1972). Education consumption is concentrated mostly in children and young adults. Health expenditure is usually high for babies, moderate for older children and prime-age adults, and very high for the elderly, especially in rich economies and when spending on long-term care is considered. Given their distinct age patterns, education and health care spending is estimated separately from other spending.

23 ECONOMIES COMPARED

Figure 6.1 presents the age profiles of mean labor income and consumption for the 23 economies on four continents that are included in this volume. Illustrated in the center of each panel is mean labor income (YL), which is the subject of Chapter 5. Three curves cross through the labor income hump. The solid line along the bottom represents mean public consumption (CG), the broken line in the middle is mean private consumption (CF), and the thick line on top is mean total consumption (C). The economies are ranked by the PPP-adjusted Gross Domestic Product per capita in 2005 international dollars and are listed from left to right and from top to bottom. All panels are presented in the same scale, and all series are normalized by mean labor income of ages 30–49 in each economy.

The 23 economies exhibit an interesting variety in the shapes and heights of their curves. The mean private consumption curve, for example, does not always show the classic single, and more or less centered, hump (Jappelli and Modigliani 2005). Some economies have multiple humps, and some humps are rather skewed. We shall come back to the shape of the consumption age profile after reviewing each of the components.

The relative height of consumption to labor income is quite different



Note: Values are normalized by mean labor income of ages 30–49 in each economy.

Figure 6.1 Per capita labor income and consumption: 23 economies around 2000

across the economies, and the ratio between aggregate consumption and labor income varies widely from 78.29% (China) to 168.90% (Mexico). Factors that could account for a high consumption-to-labor income ratio include high non-labor income from natural resources (e.g., Mexico) or remittances from the rest of the world (e.g., the Philippines and Mexico), a low savings rate (e.g., Brazil), an unfavorable age structure with heavy concentration of children (e.g., Nigeria), or a combination of these factors. Nigeria, for example, has both large non-labor income from oil exports and a high dependency ratio. Consequently, its aggregate total consumption is 167.84% as high as labor income. In contrast, the ratio is merely 101.52% in Kenya, which has a population age structure similar to Nigeria's, but without the large oil income.

Figure 6.2 shows both the 'average' ages of consumption and labor income, and the age groups with positive or negative lifecycle deficits (LCDs). The average ages of consumption and labor income are denoted by squares and crosses, respectively, and the economies are arranged by the average age of consumption. In high-income economies these two average ages are rather close, but in lower-income economies the average consumption age is much younger than the labor income age. This difference is due mainly to a younger population structure in the latter economies, although labor market conditions and other social and economic factors also matter. Not surprisingly, both ages are lowest in Kenya (age 24.8 for consumption and age 36.3 for labor income) and highest in Japan (age 46.3 for consumption and age 45.5 for labor income), which happen to be the two countries with the youngest and oldest populations in our sample.

The lifecycle deficit can be seen as a measure of dependency. The age groups when LCD has a negative value (shown by the white area in Figure 6.2) are sandwiched between the age groups when LCD is positive (the light and dark gray areas). The first age when LCD turns negative is usually around 24–27, and the last age is around 53–59. Exceptions include Austria and China, where the LCD turns to a surplus early, at age 21, probably because of an apprentice system in the former and a high savings rate in the latter. In Mexico and Brazil the LCD turns to a surplus latest of all the economies (age 29), and becomes a deficit again earliest (age 49 and age 52, respectively), echoing the high consumption-to-labor income ratio in both countries. In Sweden the lifecycle surplus lasts between ages 25 and 62, the longest age span of all the economies.

Public and Private Consumption

At the aggregate level the percentage share of public spending in total consumption ranges from 9.08% (Nigeria) to 42.33% (Sweden), with a simple average of 23.60%. The richer economies tend to have a higher public share in total consumption (Figure 6.3). A simple regression of the public consumption share on real per capita income yields a coefficient of 0.19.[1] Among all economies, given real per capita income, Brazil, China, Hungary, and Sweden have disproportionately high public expenditures; and Indonesia, Nigeria, and the United States have disproportionately high private spending.

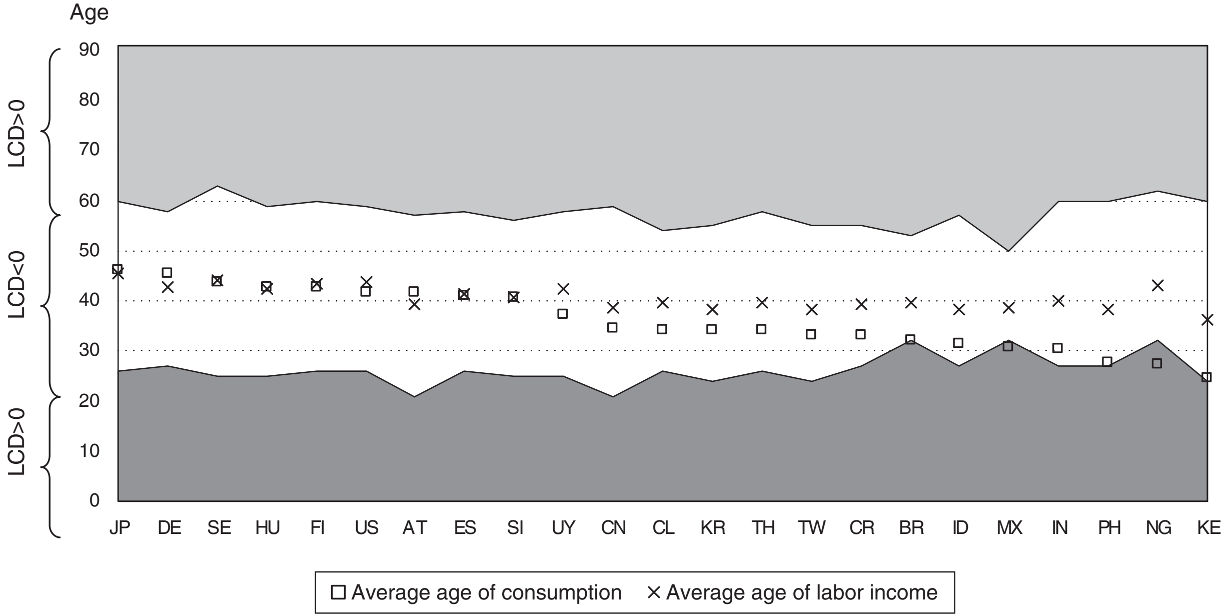


Figure 6.2 Average ages of consumption and labor income: 23 economies around 2000

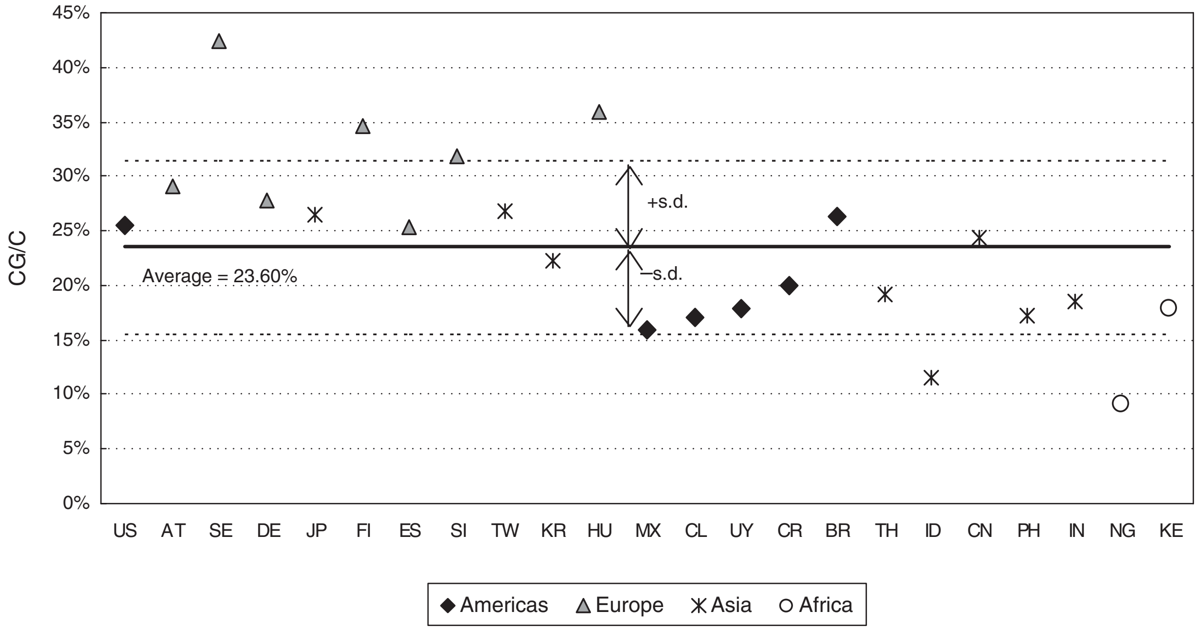


Figure 6.3 Percentage share of aggregate public consumption in total consumption: 23 economies around 2000

To facilitate analysis, the mean private, public, and total consumption of three broad age groups – children (0–19), working-age adults (20–64), and the elderly (65+) have been calculated. For private consumption, for example, the three variables are denoted respectively as $CF_{0\text{–}19}$, $CF_{20\text{–}64}$, and CF_{65+}. In Figure 6.4 the ratio $CF_{0\text{–}19}/CF_{20\text{–}64}$ is plotted against $CF_{65+}/CF_{20\text{–}64}$ to show the relative size of these three variables. Three thick broken lines are drawn for reference, each representing $CF_{0\text{–}19} = CF_{65+}$ (a 45-degree line), $CF_{20\text{–}64} = CF_{0\text{–}19}$ (a vertical line), and $CF_{20\text{–}64} = CF_{65+}$ (a horizontal line). A solid circle indicates the perfect equality point.

In all 23 economies, child consumption is the lowest of the three age groups, as all points lie above the 45-degree line and to the left of the vertical reference line in Figure 6.4. In eight economies that are also located above the horizontal reference line (Brazil, Germany, Japan, Kenya, Nigeria, the Philippines, Uruguay, and the US), an average elderly person consumes the most, so that $CF_{0\text{–}19} < CF_{20\text{–}64} < CF_{65+}$. In the other 15 economies a person aged 20–64 has the highest spending, and $CF_{0\text{–}19} < CF_{65+} < CF_{20\text{–}64}$.

Two additional thin broken lines are drawn to single out the extreme cases. In Brazil per capita elderly consumption is high and is 1.30 times that of a working-age adult and is 2.36 times that of a child. In Kenya, Hungary, and the US, average child consumption is very low and is less than one half of the level of both an elderly and a working-age adult. At the other extreme is Taiwan, which is located the closest to the perfect-equality point. There, child consumption is 0.80 times that of a working-age adult and 0.91 times that of an elderly adult.

The case for public consumption depicts a very different picture (Figure 6.5). Public spending on a child is the highest of the three age groups in all economies except Nigeria, where the three age groups have similar levels. Public spending on an elder is also greater than on a working-age person in most economies and is just slightly below the level of spending on a working-age person in India, Kenya, and Nigeria. These results are to be expected, because spending on public education concentrates on children, and publicly funded health expenditures are higher for the elderly than for other ages, especially in richer economies, but hardly any public spending targets middle-age persons.

The redistribution function of the public sector is most pronounced in Japan, Slovenia, and Sweden, where public consumption by both the elderly and children is more than twice as high as it is by working-age adults. Mean public consumption by children is by far the highest in Thailand, whereas average public consumption by the elderly is the highest in the US. Between children and the elderly, an elderly person receives more in Brazil, Costa Rica, Germany, Japan, Sweden, and the US, but a child receives more in the other 17 economies.

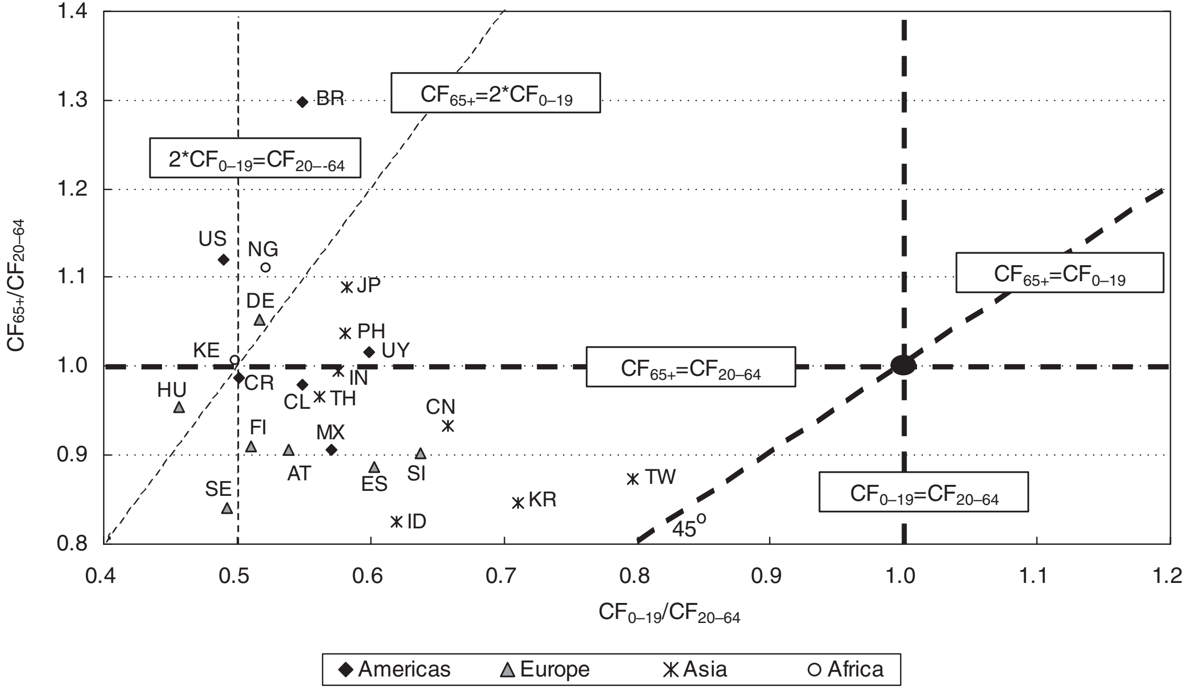


Figure 6.4 Per capita private consumption by broad age group: 23 economies around 2000

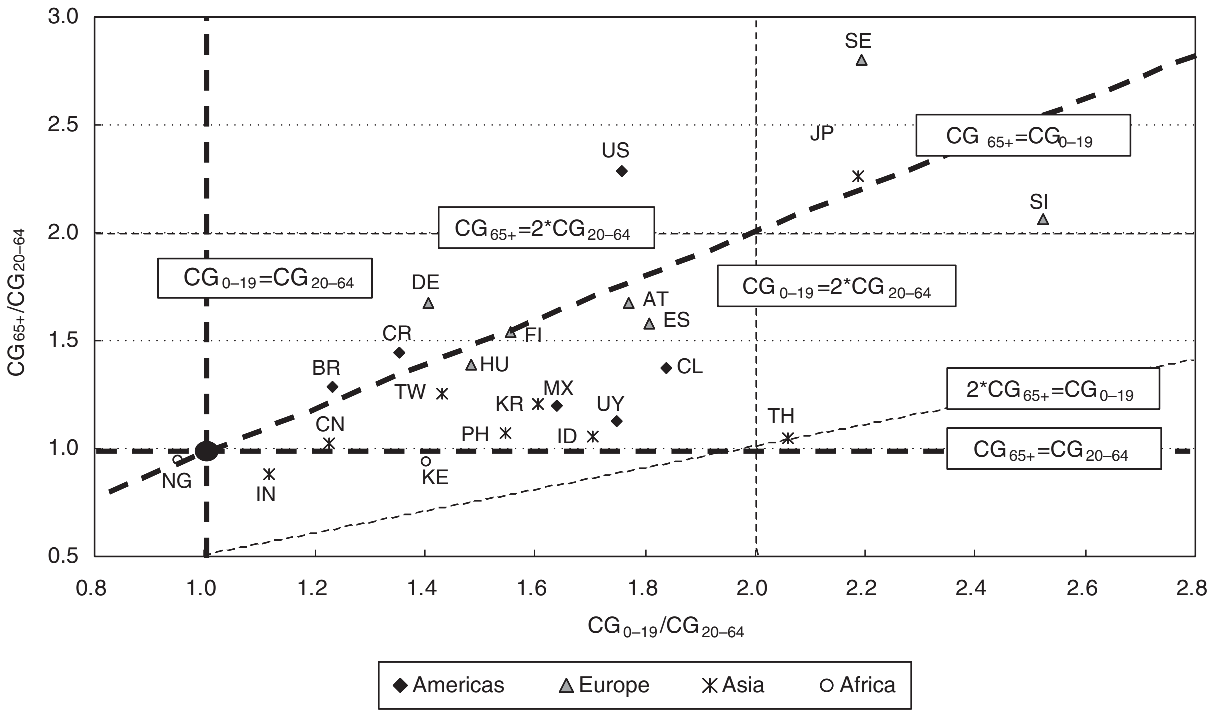


Figure 6.5 Per capita public consumption by broad age group: 23 economies around 2000

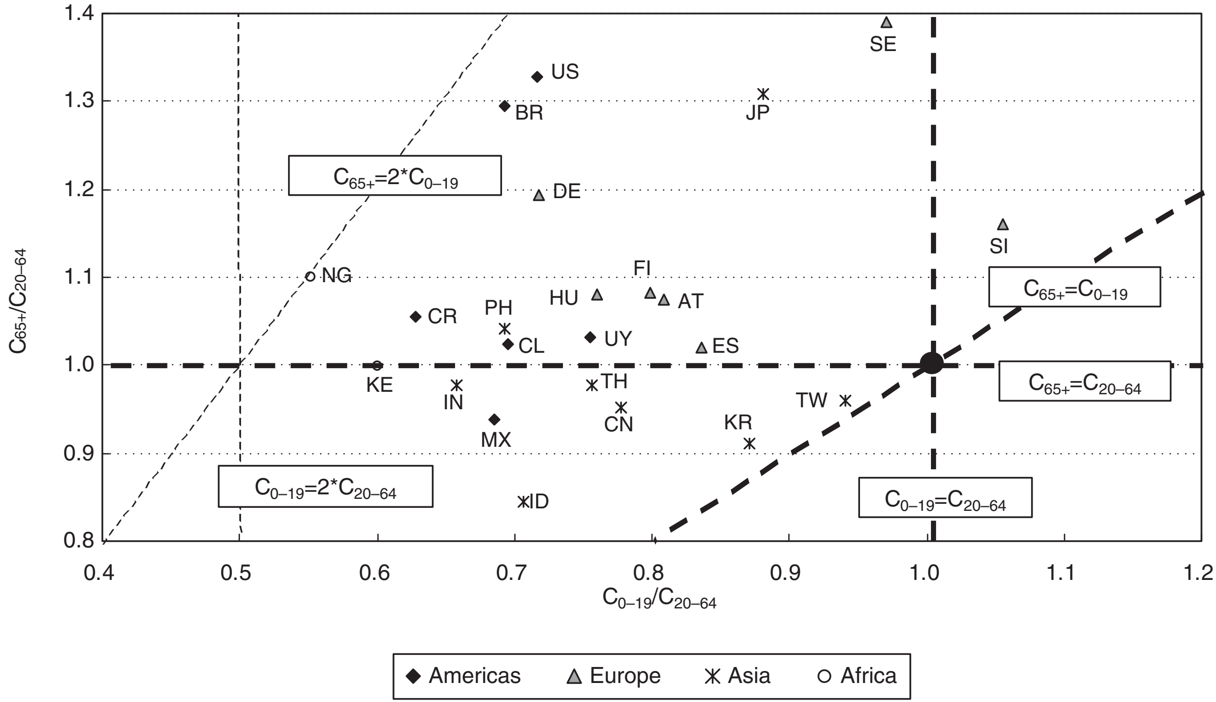


Figure 6.6 Per capita consumption by broad age group: 23 economies around 2000

Figure 6.6 shows the case for total consumption, presented in the same scale as for private consumption in Figure 6.4. In all 23 economies a child's consumption relative to that of a working-age adult is increased with the inclusion of public consumption. Elderly consumption relative to that of ages 20–64 also improves in most economies, but to a lesser extent than children's consumption. In Slovenia both children's consumption and elders' consumption rise so much that they become higher than that of a working-age adult.

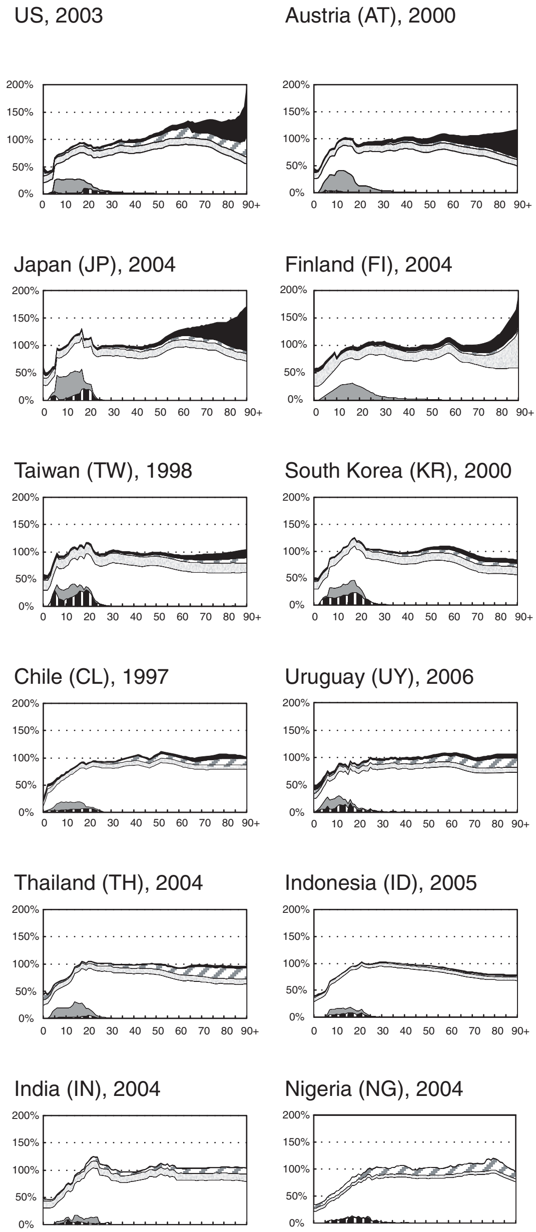
Consumption of Education and Health Care

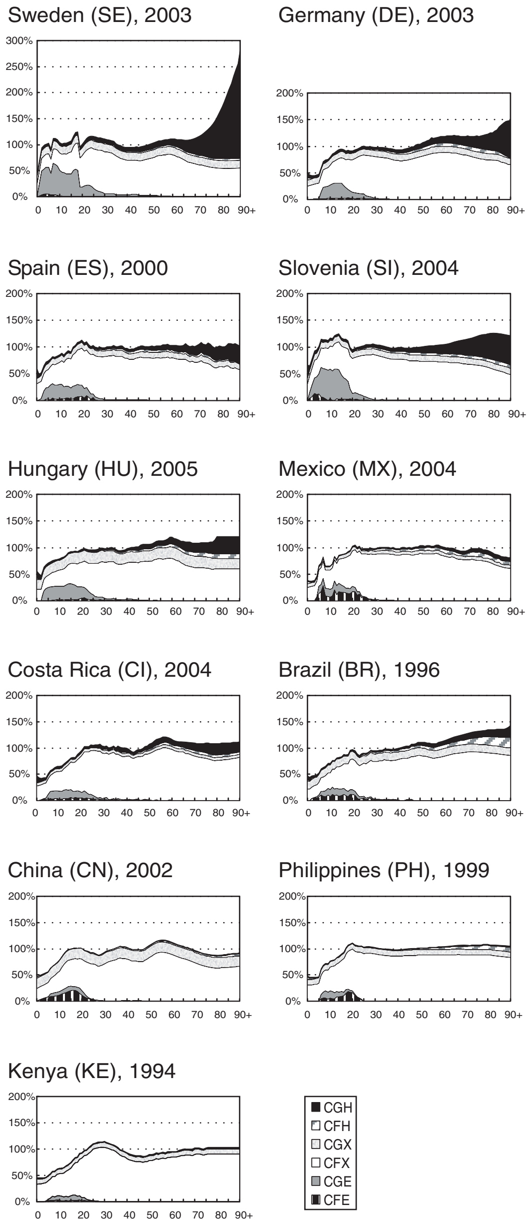
The composition of mean consumption in each country is shown in Figure 6.7. All series are normalized by the mean consumption of ages 30–49, and all panels are presented in the same scale. Public (CGH) and private (CFH) health consumption are drawn on top, public (CGE) and private (CFE) education spending on the bottom, and public (CGX) and private (CFX) other consumption in the middle section.

Several points deserve mention. First, education spending in East Asian and some European economies is so high that there appears to be an 'education peak' in them. Second, while there is a phenomenally tall tail in Sweden, resulting from high consumption of publicly funded health care by the elderly, a similar rising tail can be observed in the US, Japan, Germany, and other European economies. Third, spending on either education or health care is small in lower-income economies. In Kenya the combined share of education and health care in total consumption is only 7.99%, as compared with 31.12% in Sweden.

Education is the major channel of human capital investment; hence it is both a consumption and an investment good. Figure 6.8 summarizes the education share in total consumption at the aggregate level. The simple average of all economies is 8.09% (5.42% in public spending and 2.67% in private spending).

It is striking that, besides Austria and Sweden, six of the eight economies with an education share higher than the overall average are middle-income economies or at the lower end of the high-income group (Brazil, Costa Rica, Mexico, Slovenia, South Korea, and Taiwan). For Brazil and Costa Rica this result is due largely to a sizable young population; but for the other four economies, education accounts for a substantial share (22.31%–28.12%) of the consumption of a young person (ages 0–29), and the ratio is comparable to or higher than that in most high-income economies. Sweden stands out in our sample, with education spending accounting for 33.94% of the mean consumption of those aged 0–29. The ratio is rather low in Germany (17.86%), which does not even reach the level


US, 2003
Austria (AT), 2000
Japan (JP), 2004
Finland (FI), 2004
Taiwan (TW), 1998
South Korea (KR), 2000
Chile (CL), 1997
Uruguay (UY), 2006
Thailand (TH), 2004
Indonesia (ID), 2005
India (IN), 2004
Nigeria (NG), 2004
200%
150%
100%
50%
0%
0 10 20 30 40 50 60 70 80 90+



Note: Values are normalized by mean consumption of ages 30–49 in each economy.

Figure 6.7 Composition of per capita consumption: 23 economies around 2000

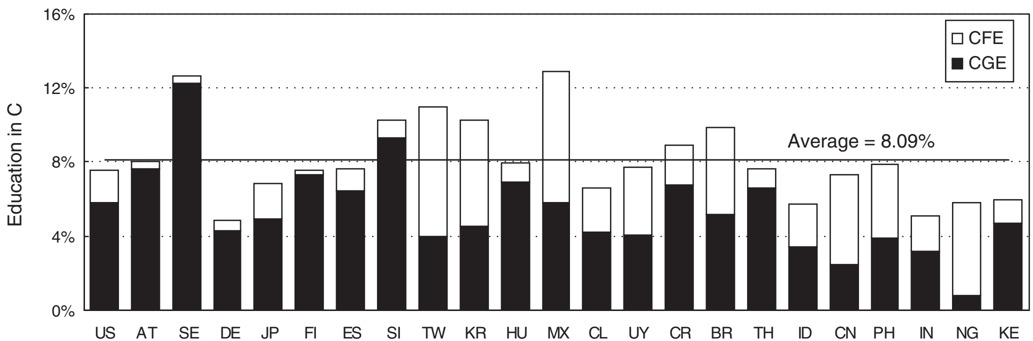
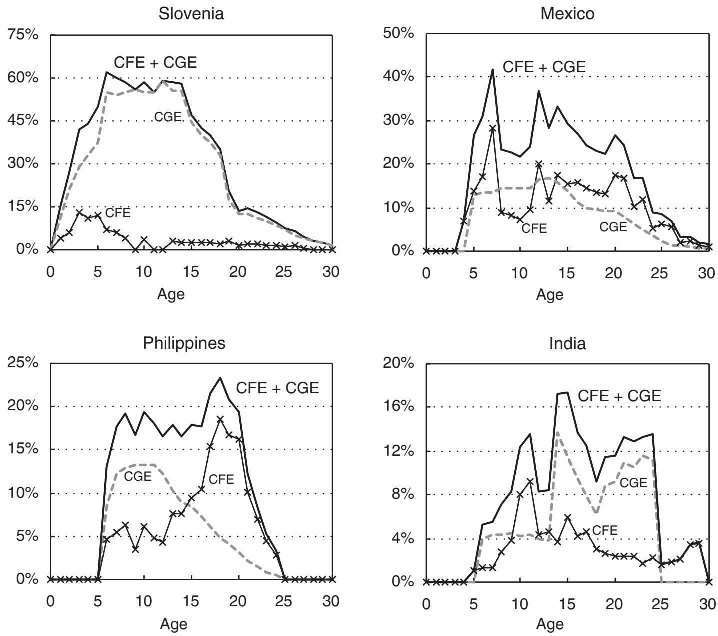


Figure 6.8 Percentage of education in total consumption: 23 economies around 2000



Note: Values are normalized by mean consumption of ages 30–49 in each economy.

Figure 6.9 Per capita education consumption: four selected economies around 2000

of the overall average (18.52%). For lower-income economies, education consumption is low on either an aggregate or a per capita basis. In Kenya, education represents only 8.76% of the consumption of a person below age 30.

The allocation of expenditures between school levels and the mix of public and private expenditures vary widely across economies, conceivably reflecting different social choices. Two pairs of economies are illustrated in Figure 6.9. The first pair is Mexico and Slovenia, both of which have high education spending. Yet the public share in education consumption is extremely large in Slovenia (90.83%), whereas it is just 44.67% in Mexico. The second pair is India and the Philippines. They both record a lower than average education share in total consumption at the aggregate level (5.06% for India and 7.92% for the Philippines), and both give more emphasis to university education than to primary or secondary schooling on a per capita basis. In the Philippines, however, as in many other economies, the public sector allocates more resources to primary schools, and the private sector spends more on the tertiary level, whereas it is the opposite case in India.

Health care is another major determinant of human capital (Becker 2007). Figure 6.10 summarizes the percentage share of health care spending in total consumption. In contrast to spending on education, richer economies tend to spend proportionately more on health than do poorer economies, although Nigeria, a low-income country, also spends a relatively high percentage on health. The simple average across economies is 9.39% for health care in total consumption (5.58% from public spending, and 3.80% from private spending) and ranges from 2.01% (Kenya) to 18.46% (Sweden).

The age distribution and the private–public mix of health care consumption are far from uniform across economies. Figure 6.11 shows the simple averages of eight rich economies, nine middle-income economies, and six low-income economies, normalized by mean consumption of ages 30–49. The similarity of private consumption on health care (CFH) among the three income groups makes a sharp contrast to public health care consumption (CGH), both in its relative size and its age pattern. In rich economies public health care consumption is not only much greater than private health care consumption, but also much more concentrated in the older age groups. For a person aged 65 or older in the rich economies, public spending and private spending on health care represent 25.19% and 4.86% of total consumption, respectively; they account respectively for 9.74% and 8.99% of total consumption in the middle-income economies, but for only 1.67% and 5.94% in the lower-income economies.

Figure 6.12 presents the age distribution by the three broad age groups. In all the economies, mean health care consumption by the elderly is the highest, and child consumption is the lowest. An elderly person in the richer economies tends to have a higher consumption level than a working-age adult. The CH_{65+}/CH_{20-64} ratio is 6.14 in Sweden, 3.84 in Japan, but only 1.30 in Nigeria. Mean health care consumption by a child relative to that by a working-age person (CH_{0-19}/CH_{20-64}) is normally low (0.40–0.65). It is the lowest in Austria (0.28) and highest in Kenya, the Philippines, and Taiwan (0.88–0.99).

Public and Private Consumption Revisited

In public consumption, what is not spent on health care and education is classified as 'other' public consumption (CGX), which accounts for 6.40%–21.17% of total consumption. As public expenditures on defense and other public goods and services are seldom age-targeted, they are allocated uniformly to every resident in the NTA framework, unless there

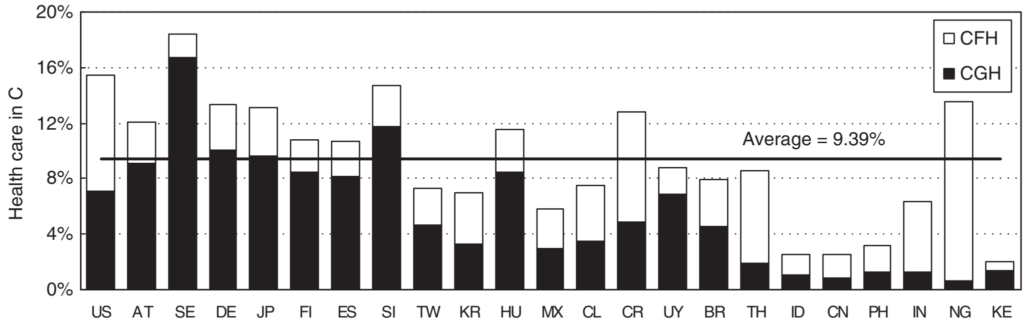
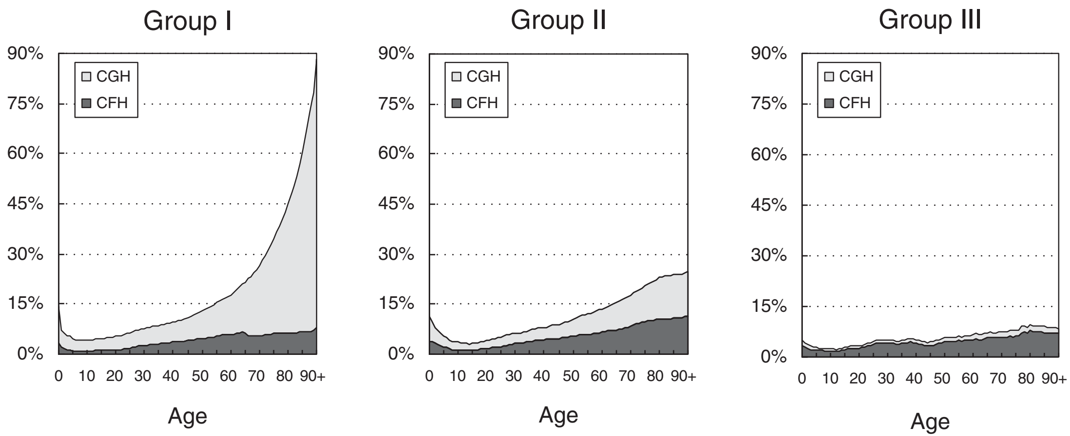


Figure 6.10 Percentage of health care in total consumption: 23 economies around 2000



Notes:
Values are normalized by mean consumption of ages 30–49 in each economy.
Group I: Austria, Finland, Germany, Japan, Slovenia, Spain, Sweden, and US.
Group II: Brazil, Chile, Costa Rica, Hungary, Mexico, South Korea, Taiwan, Thailand, and Uruguay.
Group III: China, India, Indonesia, Kenya, Nigeria, and Philippines.

Figure 6.11 Per capita health consumption in 23 high-, middle-, and low-income economies around 2000

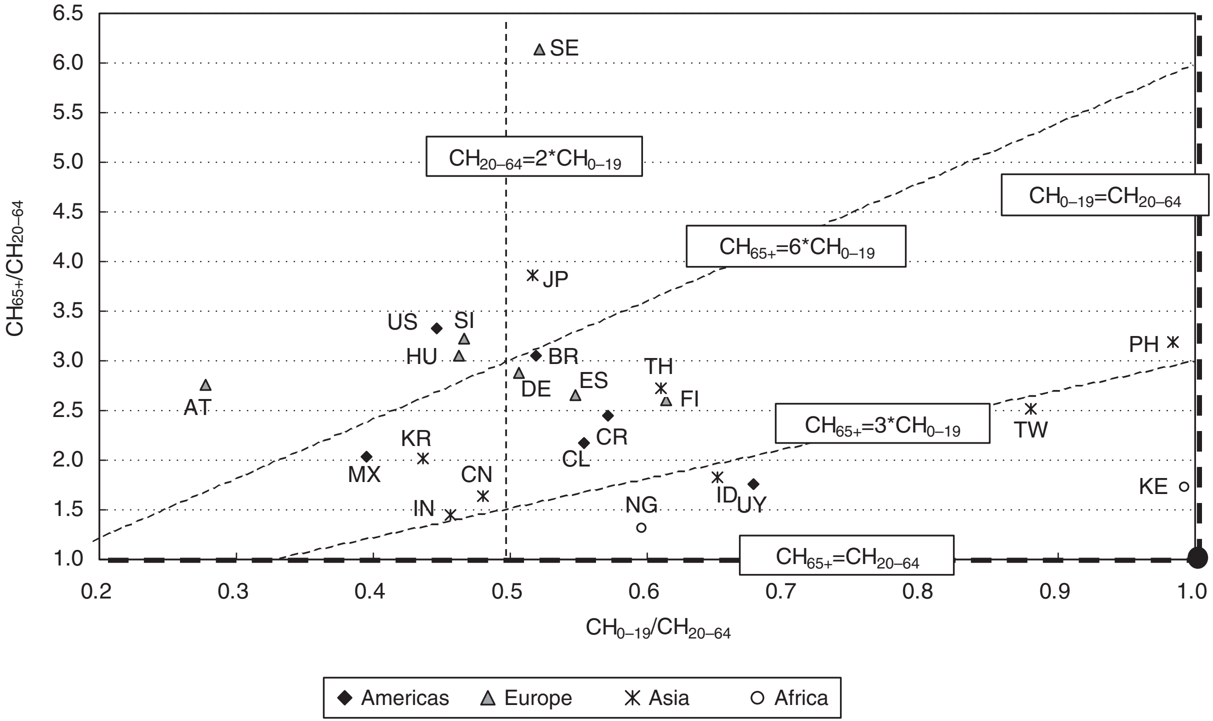


Figure 6.12   Per capita health consumption by broad age group: 23 economies around 2000

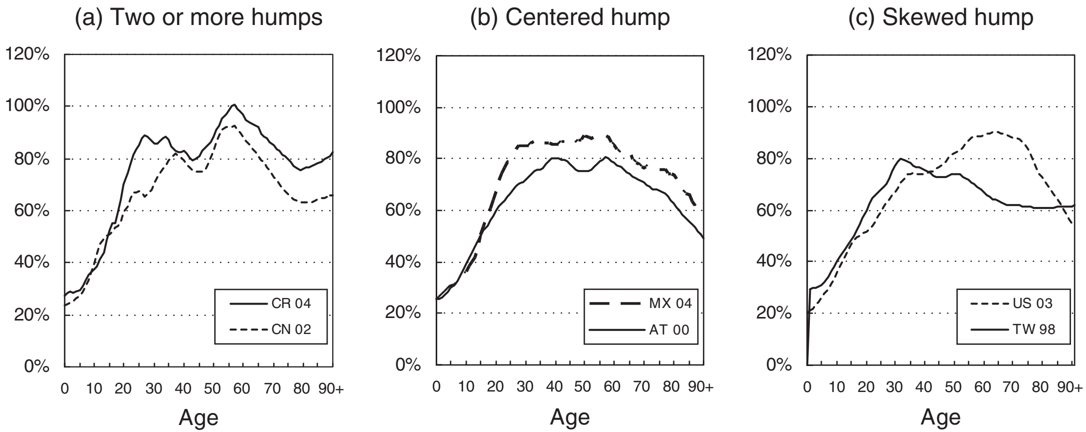
exist age-varying data of specific public services. In Finland, for instance, daycare services for children and home care of the elderly are allocated by age.

Although 'other' public consumption is flat across age groups, public education consumption and public health care consumption are not. Therefore, total public consumption commonly shows a hump at the children's end, and a rising tail at the end of that for the elderly population, though the end tail is indistinct in the seven economies with the least real per capita income (Thailand, Indonesia, China, the Philippines, India, Nigeria, and Kenya).

Private 'other' consumption (CFX) comprises 55.53%–84.66% of total consumption at the aggregate level. Included in this category is the consumption of food, clothing, housing rent, transportation, and recreation; the service flow of durables; and so on. CFX always starts low, mainly because an equivalence scale is applied to children below age 20 in the NTA method. Over the entire age range, CFX usually shows a hump shape of some sort, mirroring the changing needs and means of each age group. Quite a few economies exhibit a double-hump pattern, and in most of them it peaks around ages 30 and 60 (e.g., Costa Rica and Japan). China has multiple humps and a visible trough at age 45 for the year 2002, which probably reflects the impact of the Cultural Revolution on that age cohort. Many other economies have just one hump, either left-skewed (as in the Philippines, where the peak appears at age 27), right-skewed (as in the US, where the peak is at age 64), or very fat (as in Mexico and Spain, where the hump extends from age 25 to age 60). Figure 6.13 illustrates the case of selected economies.

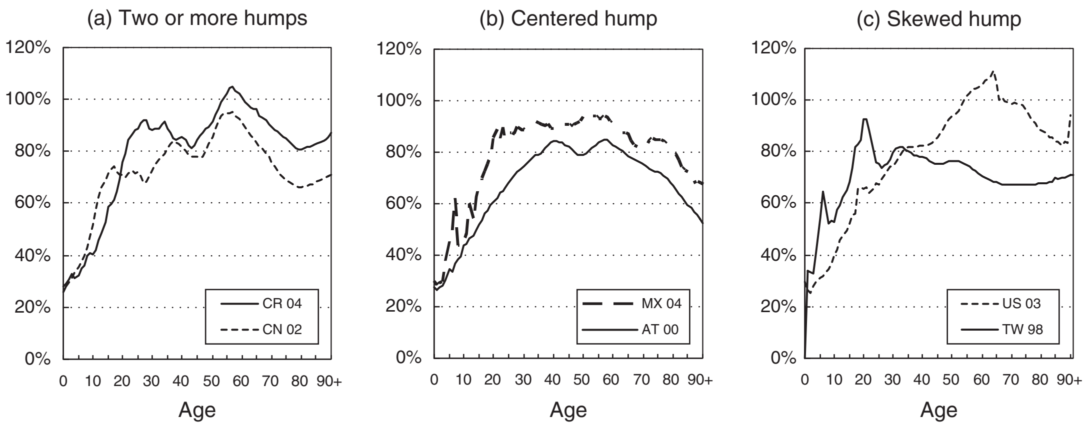
The shape of the age profile of total private consumption bears a strong resemblance to that of private other consumption. Figure 6.14 presents the total private consumption of the same set of economies as in Figure 6.13. A couple of observations can be made. First, in China, Mexico, and Taiwan there is an additional peak at a young age, due to large spending on private education. Second, in the US the declining portion of private other consumption after age 65 is substantially compensated for by large private spending on health care.

There are other patterns that are not shown in Figure 6.14. Most economies do not exhibit the classic centered hump as found in the existing literature (e.g., Attanasio 1999), even if we focus on the middle part of the age spectrum. In Taiwan private other consumption mostly decreases between ages 20 and 70, and in the Philippines it shows a U-shape over that age range. Although the results are not directly comparable to earlier findings because the NTA is conducted on an individual basis, the differences warrant reflection.



Note: Values are normalized by mean consumption of ages 30–49 in each economy.

Figure 6.13 Per capita private 'other' consumption: six selected economies around 2000



Note: Values are normalized by mean consumption of ages 30–49 in each economy.

Figure 6.14 Per capita private consumption: six selected economies around 2000

CONCLUDING REMARKS

To recapitulate, this chapter has summarized the consumption patterns of 23 economies as computed by means of the NTA method. A comparison of the economies indicates several interrelated points.

First, public spending plays an important redistributive role between age groups. In all the economies, mean private consumption by a child is lower than that of a working-age adult or an elderly person. In many economies the mean private consumption of an elder is also lower than that of a working-age adult. Yet the public sector usually spends more on children and the elderly than on working-age people, so that the relative level of consumption is improved for both the young and the old.

Second, the consumption-equalization function of public spending tends to be stronger in the richer economies. The public share of total consumption is generally greater in higher-income economies, and a larger portion of public consumption is spent on education and health care in those economies.

Third, in higher-income economies, education tends to represent a larger percentage share of total consumption than it does in other economies, and also a much larger public portion. In some middle-income economies, however (e.g., Taiwan and Mexico), a person under age 30 spends a larger share of total consumption on education than in some high-income economies (e.g., the US and Germany).

Fourth, the percentage share of health care in aggregate consumption is the highest in high-income economies, and so is the public share of health consumption. This is particularly true for the elderly, who spend more on health care than do other age groups.

Fifth, the age profile of public consumption usually exhibits a hump at the young ages and a rising tail at the old ages, whereas the age profile of private consumption shows more heterogeneity and differs from conventional wisdom.

There are more aspects of the NTA data to be explored. Chapters 5 and 7–9 in this volume elaborate the financing of consumption. Other issues, such as the level and age distribution of consumption across economies, the estimation of time effects or cohort patterns, the interpretation of the differences between the NTA findings and those of previous studies, and the policy implications of the NTA findings, are worthy topics for serious scrutiny.

NOTE

1. A linear regression can be modeled as follows: $GC/C = 0.1632 + 0.1854$ gdp, adj $R^2 = 0.4725$. Standard error of coefficient of GDP is 0.0407.

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7. The rise of the intergenerational state: aging and development

Tim Miller

States currently transfer sizable shares of resources, within and across generational groups. The degree of involvement of the public sector in resource reallocation varies widely among countries and regions and has evolved substantially over time. Among the economies participating in the National Transfer Accounts project, public transfers represent 21% to 80% of all transfers. Although there have been short- and medium-term movements in different directions, two broad long-term trends are apparent: the state has generally expanded its weight in the economy, and it has become an increasingly important player in reallocating resources across generations.

THE ROLE OF THE STATE IN THE ECONOMY OVER TIME

The expansion of the public sector over the twentieth century is closely linked to its changing role. Its primordial function of provider of essential public works and the maintenance of law, order, and national defense has expanded to include the development of infrastructure, intervention in preventing or moderating large cyclical fluctuations in the macroeconomy, and the regulation of the financial and productive sectors (Tanzi 1997; Tanzi and Schuknecht 2000). Significantly, the public sector has also greatly expanded its role by using taxes and other revenues to finance expanded spending in social programs such as education, health, and pensions, programs that clearly have age-specific targets.

There are various ways to measure the weight and the evolution of the government's role in the economy and in the transfer of resources across generations. Looking at aggregate figures, I first examine general government expenditures, a broad measure of public spending that includes all levels of government and is available for long periods of time for the more-developed economies.

Table 7.1 Evolution of government expenditure as a percentage of GDP: industrialized countries, 1870–1995

Item	ca. 1870	1913	1920	1937	1960	1980	1990	ca. 1995	2005
General government expenditure	10.7	12.7	18.7	22.8	27.9	43.1	44.8	45.6	43.8
Government real expenditure	4.6			11.4	12.6	17.9	17.4	17.3	
Subsidies and transfers	1.1			4.5	9.7	21.4		23.2	
Public spending on selected sectors and programs[a]									
Defense		4.0	2.4	3.7	3.4	2.5		2.0	
Education	0.6	1.3		2.1	3.5	5.8		6.1	5.3
Health		0.3		0.4	2.4	5.8		6.4	6.2
Pensions		0.4	1.2	1.9	4.5	8.4	8.9	9.6	
Unemployment				1.3	0.3	0.9		1.6	

Note: [a] Spending in these programs can be in-kind or provided in cash.

Source: Data for 1870–1995 are from Tanzi and Schuknecht (2000, last row of tables I.1, II.1, II.3, II.4, II.5, II.7, II.9 and II.10); data for 2005 are from OECD (2009).

Table 7.1 shows that in industrialized countries, general government expenditures represented a little over 10% of Gross Domestic Product at the end of the nineteenth century. They more than doubled, rising to 22.8% of GDP, before World War II, and almost doubled again, reaching 43.1% of GDP by 1980. The growth of government spending in countries belonging to the Organisation for Economic Co-operation and Development has decelerated since then and in some countries has even declined during the last few decades (OECD 2009).

Within general government expenditures, government real expenditure (i.e., spending in wages, salaries, and goods) increased steadily and vigorously during the twentieth century; but the main driver of the expansion of the public sector was the growth of cash subsidies and transfers, from one or two percentage points of GDP in the early part of that century, to almost a quarter of GDP toward the end of it. As can be inferred from Table 7.1, subsidies and transfers in the industrialized countries surpassed real expenditure before 1980; and by the end of the twentieth century they represented more than one half of general government expenditures.

To some extent these subsidies and transfers reflect increases in producer subsidies; but more importantly they reflect the expansion of welfare spending and the public provision of education, health, and social security, including pensions – all of which are major programs that effectively reallocate resources across generational groups. The growth of public spending has been evidenced most markedly in the more-developed countries, but it has also been apparent in many developing countries in different regions of the world over the last several decades.

Government spending can change significantly even over the course of a few years as a result of short-term national budgetary priorities and policies or international macroeconomic swings. For example, in recent years government spending as a percentage of GDP has increased in many countries because of the global financial and economic crisis that unfolded in 2007, which slowed the world economy between 2008 and 2010. The crisis led to a contraction of GDP or slower growth, while government spending either increased after stimulus plans were implemented in some countries, or remained stable or fell less than did GDP in others. Table 7.2 shows that, during the 1980s and 1990s before the crisis struck, OECD countries were taking different paths that reflected mostly purposeful short- and medium-term economic policies. Countries such as Belgium, Ireland, New Zealand, the Netherlands, Sweden, and the United Kingdom reduced government expenditure as a percentage of GDP, whereas others, such as France, Greece, Iceland, and Portugal, progressively increased it, in some cases to high and unsustainable levels, as evidenced by their recent debt crises.

As for the future of public spending, views differ widely on likely levels and trends, from a limited role for the state in total spending and in reallocating resources across generations, to increased or at least stable public spending in proportion to the economy. It is certain, however, that population aging will bring about increased political pressure to expand public-sector spending over the next few decades.

The Expansion of Social Programs

As was pointed out earlier, spending in all major social programs, including education, health, and pensions, has expanded substantially in industrialized countries over recent decades. Some specialists (e.g., Sanz and Velázquez 2001; Castles 2010) have noted that government spending is showing signs of international convergence, in particular as regards the composition of expenditure. Total social expenditure in OECD countries rose from 18.5% of GDP in 1980 to 22.4% of GDP in 2003 and has come

Table 7.2 Evolution of general government expenditure as a percentage of GDP: OECD countries, 1980–2005

Country	Year						Change during specified period		
	1980	1985	1990	1995	2000	2005	1980–1990	1990–2000	1980–2005
Australia	33.9	39.5	36.4	37.4	35.6	34.7	2.5	−0.8	0.8
Austria	49.7	53.2	51.5	56.1	50.8	49.7	1.8	−0.7	0.0
Belgium	55.9	58.4	52.3	52.1	49.2	52.1	−3.6	−3.1	−3.8
Canada	41.8	48.1	49.7	48.0	41.8		7.9	−7.9	
Czech Republic				54.5	44.5	44.9			
Denmark	53.6	55.8	55.9	59.2	54.2	52.7	2.3	−1.7	−1.0
Finland	40.1	46.3	47.9	61.6	47.7	50.5	7.8	−0.2	10.4
France	45.7	51.8	49.5	54.4	51.6	53.6	3.8	2.1	7.9
Germany				54.8	47.6	46.8			
Greece	29.2	41.1	44.9	45.7	45.3	43.1	15.6	0.5	13.9
Hungary					47.3	50.0			
Iceland	35.7	38.0	41.5	42.7	42.7	42.4	5.8	1.2	6.7
Ireland	54.2	53.8	42.8	41.1	33.3	33.8	−11.4	−9.5	−20.4
Italy	40.8	49.8	52.9	52.5	48.0	48.2	12.1	−4.9	7.4
Japan	34.7	33.9	32.1	36.5	38.6		−2.6	6.5	
Korea	21.2	20.0	20.0	20.8	25.0	28.9	−1.2	5.0	7.7
Luxembourg			37.7	39.7	38.1	41.9		0.4	
Netherlands	55.2	57.3	54.9	56.4	45.4	45.2	−0.3	−9.6	−10.0
New Zealand			53.5	41.4	37.7	39.9		−15.8	
Norway	46.1	43.6	53.3	50.9	44.1	42.1	7.2	−9.2	−4.0
Poland				47.7	43.8	43.3			
Portugal	34.3	39.4	40.5	43.4	44.4	47.6	6.3	3.9	13.3
Slovak Republic				48.0	44.3	38.4			
Spain	33.9	42.7	42.8	44.4	38.6	38.5	9.0	−4.2	4.6
Sweden	63.5	64.2	60.7	65.1	55.5	55.2	−2.8	−5.2	−8.3
Switzerland			30.3	35.0	34.8	35.3		4.5	
United Kingdom	46.5	46.3	42.2	44.1	41.1		−4.3	−1.1	
United States	33.6	36.6	36.9	37.0	35.0	36.5	3.2	−1.8	2.9
Average (unweighted)	42.5	46.0	44.8	47.1	43.1	43.8	2.3	−1.7	1.3

Source: Based on OECD (2009, table 11).

to represent nearly one half (48%) of general government expenditures (Castles 2010, tables 2 and 4).

Public social spending began with relief for the poor in the late nineteenth century and grew with investments in state-run schooling, which expanded to represent more than 1% of GDP by the early twentieth century. Health and pension programs started to absorb an increasing fraction of public spending, and by mid-century they outpaced education. In the second half of the century, health and pension expenditures continued to rise as these programs greatly expanded their coverage and population aging became more significant (Lindert 2004).

Government Spending in Richer and Poorer Nations

Central government expenditures do not cover all levels of government and thus provide information that is more limited in scope than general government expenditures, especially for federal states. But data on central government expenditures are available for many more nations in most regions of the world. These expenditures include public consumption and investment, as well as cash transfers and subsidies to individuals provided by central governments.

The data show a rather weak correlation of central government expenditures with levels of income (UN DESA 2001). For example, in 1997, average central government spending ranged from nearly 38% of GDP in developed countries to 32% in transitional economies, 27% in Africa, and 20%–23% in Asia and Latin America. The same appears to be true of general government expenditures; within OECD (see Table 7.2) government expenditure is highest in Austria, Belgium, Denmark, France, and Sweden – all countries with per capita GDP at or above the OECD average. But most of the countries with the lowest levels of general government spending (Australia, Ireland, Japan, South Korea, Switzerland, and the US) have per capita income as high or higher than those countries with high general government spending; the exception is South Korea, which has relatively low government expenditure (less than 30% of GDP) and lower than OECD average per capita GDP. Among Latin American countries, there is no clear correlation between government spending and per capita income either.

Regional Differences in Public Consumption

Another measure of the weight of the government sector in the economy that affects resource reallocations is public consumption (also called government consumption expenditure), a key component of the NTA framework that is taken from the United Nations' System of National Accounts (SNA). Data on public consumption are available for more countries than either general government expenditures or central government expenditures, and since these figures are produced annually by means of a common conceptual and accounting framework, they are also better suited for comparing a wide spectrum of countries and regions.

Public consumption includes the value of goods and services provided by a government to the population as a whole or to groups of individuals. It encompasses all in-kind transfers from the government to individuals, such as health care, education, or defense, but not cash transfers (United Nations et al. 2009; IMF 2009).

The most recent figures on public consumption (for 2005, at current prices) indicate that the majority of countries where public consumption is less than 10% of GDP are in Asia, Latin America, and Africa, although Luxembourg and Ukraine are also in this category (IMF 2009). The countries where public consumption represents between 10% and 15% of GDP are a mixed group. They include China, South Korea, and Thailand in Asia; Argentina, Chile, and Mexico in Latin America; and Benin, Senegal, and Mali in Africa. One European country, Ireland, is also in this group. The majority of European and developed countries have a level of public consumption that is 15%–20% of their GDP, but so do some less-developed countries in Asia and Africa. Among the countries that spend more than 20% of their GDP on public consumption, there seem to be two kinds: those characterized as welfare states, such as Sweden, France, Denmark, and Belgium, and those that devote a large share of public consumption to defense, such as Israel and Iraq.

Average public consumption by region did not change substantially between 1970 and 2005 (Table 7.3). It changed the most in Europe, rising from nearly 15% of GDP in 1970 to about 20% in 1995–2005. In all the other regions, average government consumption for the most part rose until the 1980s and then fell in varying degrees, most pronouncedly in Africa and Northern America.

The overall levels and trends of public consumption by economy and region are roughly in line with the data on general government expenditures and central government expenditures. Asia has the lowest government consumption as a percentage of GDP (about 15%); Latin America comes next, followed closely by Africa. In 1970 Australia and New Zealand had very low shares of public consumption, but those shares increased considerably in the 1980s, to levels similar to those of Europe and Northern America, currently at 19.3% and 17.5% of GDP respectively. These data also show that public consumption constitutes a little

Table 7.3 Public consumption as a percentage of GDP: eight regions, 1970–2005

Region	1970	1975	1980	1985	1990	1995	2000	2005
Public consumption as a percentage of GDP								
Asia	12.7	13.8	13.2	16.1	15.9	14.4	14.9	15.0
Europe	14.8	16.9	17.6	18.2	19.2	20.8	19.7	19.3
EU	15.6	18.1	18.5	19.0	18.5	20.2	19.4	19.9
Africa	17.2	17.7	18.1	18.8	17.2	17.6	17.0	16.6
Latin America	15.9	16.3	16.7	18.4	16.5	15.6	16.3	16.3
Northern America	19.5	19.9	19.0	19.7	19.6	18.3	16.5	17.5
Australia/New Zealand	14.9	18.2	19.3	19.1	18.8	17.9	17.8	18.0
Oceania minus Australia & New Zealand	28.1	27.3	35.2	37.9	37.4	34.2	33.3	35.1

Source: UN DESA (2009a, table 3.1).

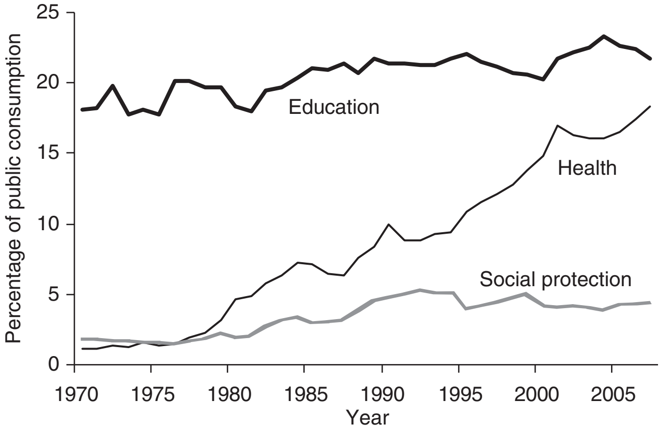
over one quarter of total consumption in Northern America and more than one third in the European Union, while the other regions fall between these two values.

'Social' Public Consumption and Transfers

Data on social expenditures by governments on health, education, and social protection, are available from the OECD (2009), UN ECLAC (2006), and the SNA of the United Nations (UN DESA 2009a). Despite the somewhat different expenditure concepts embodied in those data sources, some broad differences between countries can be discerned.

The data from OECD and ECLAC show that: (a) a majority of countries with a young age structure, many of them less developed, devote a large part of their government expenditure to education; (b) these younger, less-developed countries spend more on education than on health, with the exceptions of Argentina and Uruguay, two countries at an intermediate level of development that have relatively older populations; and (c) the more-developed countries of OECD typically spend more on health than on education, with the clear exception of South Korea, which spends more on education than on health, and Finland and Sweden, which have high levels of spending on both public health and education.

Next I focus on public consumption in the 19 NTA economies for which I found reliable SNA data. The SNA data corroborate my observations



Source: UN DESA (2009).

Figure 7.1 Health, education, and social protection expenditures as a percentage of public consumption: Republic of Korea, 1970–2005

based on OECD and ECLAC data, that economies with younger populations and lower per capita income spend more on public education than on public health. Other economies, including Argentina, Austria, Costa Rica, Finland, and Sweden, spend about equal amounts on public health and education, although their overall levels of public consumption are quite different. For all the other developed economies, public expenditure on health is notably higher than on education.

A particularly interesting case is that of South Korea (Figure 7.1), which is fairly representative of the broad patterns of change in government expenditure in response to changing population age structure. Until 1980 the Korean government devoted a very small proportion of its budget to social protection and health, while devoting the lion's share to education. Over time, as the Korean population continued to age, consumption of social protection and especially health increased progressively, to the point that, by 2007, health consumption had nearly caught up with education consumption.

The trend of increasing health expenditures, in absolute and relative terms, has been pervasive over the last few decades; even in more-developed economies with older populations such as France, Finland, and Germany, which already had high levels of public spending on health. This increased spending is due partly to continued population aging. Projections for the

US indicate that about one half of the forecasted increase in the share of health expenditures in GDP stems from population aging (Lee and Miller 2002, p. 1384). In most OECD countries, aging plays a significant role in rising public consumption, although recent increases are due mostly to increasing costs of health care (Hagist and Kotlikoff 2005; OECD 2006). But some international differences are more clearly aligned along regional, demographic, and development groupings: in the three aforementioned European countries, health represents about 30% of public consumption (education about 20%); conversely, in countries such as India, Kenya, Mexico, or Thailand, which have lower per capita income and younger populations, health expenditures represent less than 10% of total public consumption.

In sum, in most of the documented national cases, public transfers have become larger over time in relation to GDP and general government spending, although in some developed economies total government spending declined toward the end of the twentieth century and has fluctuated during the recent global economic crisis. Public transfers in industrialized economies, which represented about 1% of GDP at the beginning of the twentieth century, had expanded by the end of the 1990s to nearly one quarter of GDP and more than one half of total government budgets. Public transfers within the social sectors tend to be heavily concentrated in programs that finance education, health services, and public pensions, all of which have defined age profiles. Indeed, population aging has accompanied and affected the level and composition of public spending, and it will probably continue to influence policy decisions on these sectors in the future.

A rather weak association was found between the level of development of an economy (indexed by per capita GDP) and general or central government spending. Despite substantial international variation, regional differences are slightly better defined, most countries in Asia, Latin America, and Africa having low levels of public consumption and most European countries having high levels. Among the NTA economies, there appears to be a fairly consistent relationship between the degree of aging, the level of income, and the level of social public consumption and transfers. With a few exceptions, less-developed countries with younger populations devote larger shares of their public budgets to education than do other countries, and those shares are almost always substantially larger than spending on health. In the great majority of older, richer nations, expenditures on social security, in particular on public health, are notably higher than those on education. Bearing these generalizations in mind, in the following sections I examine the age dimension of public transfers as revealed by the NTA data.

THE MEASUREMENT OF PUBLIC TRANSFERS IN THE NTA FRAMEWORK

National Transfer Accounts define three mechanisms by which economic resources are reallocated over the lifecycle: public transfers, private transfers, and asset-based reallocations. Governments use two of these reallocation mechanisms: public transfers, by which they tax and transfer resources across age groups, and asset-based operations, including borrowing and lending, by which they transfer resources over time and between generations. The focus of this chapter is on public transfers; governments' asset-based operations are discussed in Chapter 9.

There are four important conceptual features of public transfers. First, public transfers include in-kind as well as cash transfers. In most of the economic literature, public transfers are defined more narrowly to include only cash transfers, typically social welfare payments and social insurance payments. Public transfers in the NTA are much more comprehensive, as they include spending on public education, public health, and other public goods and services such as defense, transportation, general government administration, and operating costs.

Second, in NTA, the receipt of public transfers is always assigned to specific individuals. For example, students attending state-run schools receive public education benefits. Some public benefits, however, are difficult to assign to specific individuals – either because good data sources are lacking on the users of public transfers such as public transportation subsidies or because the transfers (e.g., operations of the government or defense) arguably serve the public at large. In these cases spending is assigned equally to all individuals on a per capita basis.

Third, as with private transfers, the total amount of public transfers received must equal the total amount of transfers given. For every recipient, there is a giver. With public-sector transfers, however, these transactions are impersonal, as the transfers flow from taxpayers to beneficiaries. Public-transfer outflows include all taxes and contributions from current taxpayers as well as a public-transfer deficit, which is discussed in Chapter 3, focusing on the NTA methodology. This public-transfer deficit is assigned to current taxpayers as part of the public-transfer outflows, and the asset-based transactions that fund this deficit are accounted for as public asset-based reallocations, as discussed in Chapter 9. Ultimately, these public-transfer deficits are financed either by past generations of taxpayers (via accumulations reflected in public-asset income) or are passed on to future taxpayers in the form of public debt.

Fourth, contributions for social insurance are considered to be functionally equivalent to taxes and are included as public-sector outflows.

In particular, in pay-as-you-go pension systems, the contributions from current workers are used to fund retirement payments to current retirees, and thus NTA treats them the same way it treats taxes used to pay for state-run education. Indeed, a strength of the NTA system is that it views social-insurance contributions and payouts as part of the overall public transfer system, taking a neutral view of the competing demands of health care, education, and pensions. In sorting out competing demands, governments may decide, for example, that claims of the elderly for retirement benefits should have more weight than claims for education or health care; but the NTA accounting system is policy-neutral.

AGE PATTERNS OF PUBLIC TRANSFERS

The typical age profiles of public-transfer inflows and outflows, presented in Figure 7.2, are based on an unweighted average of 20 NTA economies. The black line represents average taxes paid by age. Most taxes are paid by working-age adults, the peak age of tax payments being in the early 50s. Payments decline sharply thereafter, mainly as a reflection of workers' withdrawal from the labor market and the cessation of their social insurance contributions for public retirement programs. Tax payments increase sharply around the 20s as individuals enter the labor market and begin paying social insurance contributions from their labor earnings. Children,

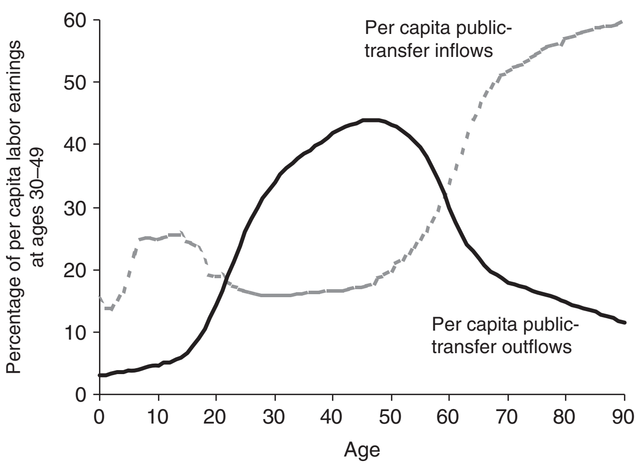


Figure 7.2 Per capita public-transfer inflows and outflows by age: 20 economies around 2000

like persons of other ages in a population, are assumed to pay sales taxes because they consume taxed goods.

In summary, public-transfer outflows are lowest for children, low for the elderly, and highest for working-age adults. This pattern is a reflection of the degree to which specific economic activities are taxed. Reliance on taxes on labor earnings leads to higher public-transfer outflows from working-age adults, whereas taxes on property tend to increase public-transfer outflows from the elderly (who generally own more assets than other age groups) and taxes on consumption tend to be spread more or less equally across age groups. The mixture of revenue sources differs among economies, and therefore the public-transfer outflows from different age groups also vary from economy to economy. But the general pattern is that public-transfer outflows are drawn primarily from the population in the main working ages.

The gray line in Figure 7.2 represents per capita public-transfer inflows at each age. It is an almost mirror image of public-transfer outflows by age. Working-age adults pay the most taxes and also receive the least amount of government benefits. Children receive public transfers mainly in the form of public education, which accounts for about 45% of public transfers to children in the NTA economies. Accordingly, a high plateau is seen in public-transfer inflows in Figure 7.2, extending from ages 6 to 18 and corresponding to the ages of primary and secondary schooling. Public benefits begin to decline at age 18, reflecting the decline in per capita public education benefits that is due to the fact that not everyone attends college and, in some economies, many tertiary-level students attend private schools. Thereafter, a long plateau in per capita benefits in the early working years is evident. It reflects the per capita share of general government spending (on the administration of public services, defense, transportation, etc.) that is distributed equally to all members of the population. In the later working years, public-transfer inflows begin to rise as public health benefits and disability payments increase. Sharp increases are seen in the late 50s and early 60s, reflecting the increasing receipt of retirement benefits and elders' increasing use of public health services. These age patterns differ among economies depending on the role of the public sector in providing for education, health care, and pensions. Nevertheless, the typical pattern is for low levels of benefits to go to the working ages and high levels of benefits to be directed to children and the elderly.

Net public transfers, shown in Figure 7.3, are calculated as the difference between public-transfer inflows and public-transfer outflows across the 20 NTA economies. In early life, until age 22, individuals receive more in benefits than they pay in taxes. Thereafter follows an average period of

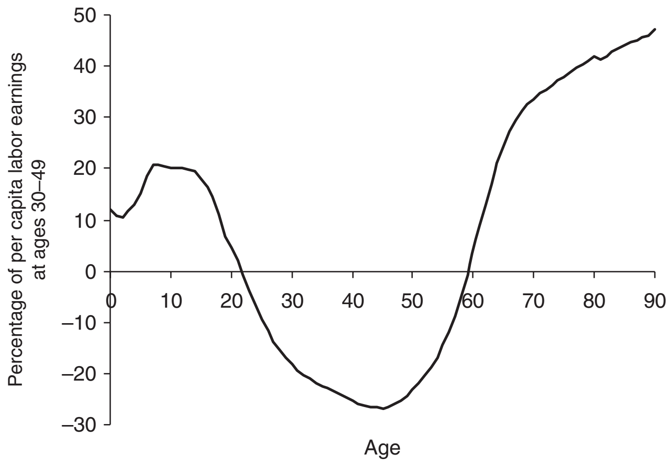


Figure 7.3 Per capita net public transfers by age: 20 economies around 2000

38 years during which individuals pay more in taxes than they collect in benefits. In later life, starting at age 60, individuals begin again to receive more in benefits than they pay in taxes. Given this average pattern across the economies, the most costly age group for governments is 90 years and older, mainly because it receives a large amount of pension and health benefits but pays little in taxes.

The likely fiscal impact of population aging is readily apparent in Figure 7.3. In the stage of population aging called the period of the 'demographic dividend', the working-age population grows faster than the youth population. This demographic change reduces the fiscal burden on governments. In federal systems such as those of Brazil and the US, this reduced burden is more noticeable in state and local governments, which have traditionally provided the main source of funding for public education. That is not to say that the easing of a government's fiscal burden results in an actual reduction of taxes. Indeed, in many economies that have experienced a demographic dividend, funding of public education has been maintained or increased, allowing expanded enrollment and increased investment per student. As populations continue to age and the share of elderly persons begins to grow more quickly than the share of working ages, the period of the demographic dividend draws to a close. Governments then face decades of continuously increasing fiscal pressures from population aging.

To begin assessing such pressures, one can use the age profiles of public transfers to calculate a 'fiscal support ratio', defined as the ratio of aggregate taxes to aggregate benefits. In the absence of governmental

Table 7.4 Fiscal support ratios: 20 economies, 1950–2050

Economy	Fiscal support ratio					Year of most favorable age structure	
	1950	2010	2020	2030	2050	Year	Support ratio
Brazil	1.00	1.00	0.94	0.86	0.69	2000	1.02
Chile	0.94	1.00	0.93	0.83	0.72	2004	1.01
Slovenia	1.01	1.00	0.91	0.81	0.72	2002	1.04
Spain	0.94	1.00	0.96	0.87	0.73	2010	1.00
Austria	1.08	1.00	0.93	0.83	0.74	1950	1.08
Japan	0.91	1.00	0.92	0.87	0.74	1976	1.15
Germany	1.11	1.00	0.94	0.84	0.75	1950	1.11
Costa Rica	0.89	1.00	0.97	0.91	0.76	2012	1.00
Hungary	1.06	1.00	0.97	0.93	0.77	1950	1.06
Taiwan	0.68	1.00	0.99	0.92	0.79	2014	1.01
China	0.93	1.00	0.94	0.87	0.80	2007	1.00
South Korea	0.76	1.00	0.97	0.89	0.80	2008	1.00
Finland	1.08	1.00	0.92	0.87	0.83	1991	1.11
Mexico	0.85	1.00	1.02	0.99	0.86	2019	1.02
Sweden	1.15	1.00	0.96	0.90	0.86	1950	1.15
US	0.99	1.00	0.96	0.92	0.89	2006	1.00
Uruguay	1.08	1.00	1.00	0.98	0.90	1959	1.09
Thailand	0.66	1.00	1.04	1.04	1.04	2039	1.04
Indonesia	0.79	1.00	1.06	1.10	1.08	2033	1.10
Philippines	0.87	1.00	1.06	1.11	1.16	2050	1.16

Note: Economies are ordered by the severity of projected fiscal impact in 2050.

Source: Author's calculations based on population estimates and projections from the UN DESA (2009b) and age profiles of public transfers from NTA.

asset-based reallocations such as borrowing and debt repayment, this ratio would be 1.00, with aggregate taxes equal to aggregate benefit payments. As a population ages and the number of taxpayers declines in relation to the number of beneficiaries of public transfers, the fiscal support ratio declines. Changes in the fiscal support ratio indicate the relative size of the tax increases or benefit cuts needed to return to the initial fiscal position.

Changes calculated in the fiscal support ratios of the 20 NTA economies over a 100-year period (1950–2050) are shown in Table 7.4. The estimates are based on the age profiles of public-transfer inflows and outflows observed in each economy for a recent year with estimates and projections of the population by age from 1950 to 2050. The fiscal support ratio in the base year of 2010 is set to 1.00, corresponding to a situation in which aggregate taxes equal aggregate benefits. Economies are ranked in the table according to the size of the fiscal adjustment needed by 2050 as a result of changes in the age structure of the population brought about by population aging.

Of all the NTA economies, the fiscal impact of population aging is projected to be most severe in Brazil. Population aging there combined with the current tax and benefit policies would lead to a 31% decline in the fiscal support ratio by 2050. Either transfer benefits would need to be cut by 31% before 2050 or taxes would need to increase by 45%, or some combination of the two. Brazil is by no means alone in facing these mounting fiscal pressures; in Europe, declines in fiscal support range from 28% in Slovenia to 14% in Sweden. Declines in the fiscal support ratio among other Latin American countries range from 28% in Chile to 10% in Uruguay. These figures underscore the point that population aging is a worldwide phenomenon and not restricted to Europe. Therefore it should not be surprising that some of the most severe fiscal impacts of aging are projected to occur outside of Europe. The fiscal support ratio in the US is projected to decline by 11% by 2050 – slightly less than Sweden and slightly more than Uruguay. In Asia the three economies with the most severe projected fiscal impacts are Japan (a decline of 26%) and China and South Korea (declines of 20%). Equally significant for several of these economies is that not only will the fiscal support ratio deteriorate rapidly in the future, but also the decline represents a distinct break from past decades, when fiscal support ratios were stable or improving. For example, Brazil, Chile, Slovenia, Spain, China, South Korea, and the US all reached the point of minimal fiscal pressure from demographic change during the first decade of the twenty-first century.

A final group of economies shows *increases* in the fiscal support ratio, reflecting the fact that under their current tax and spending programs, the elderly are net taxpayers or have only moderate net fiscal costs. Those economies are Thailand, Indonesia, and the Philippines. Underlying these calculations is the assumption that the age profiles of benefits and taxes remain fixed over time, with their absolute levels increasing at the same rate as economic growth. In this way the need for fiscal adjustments of benefits or taxes can be derived directly from the changes in the fiscal support ratio.

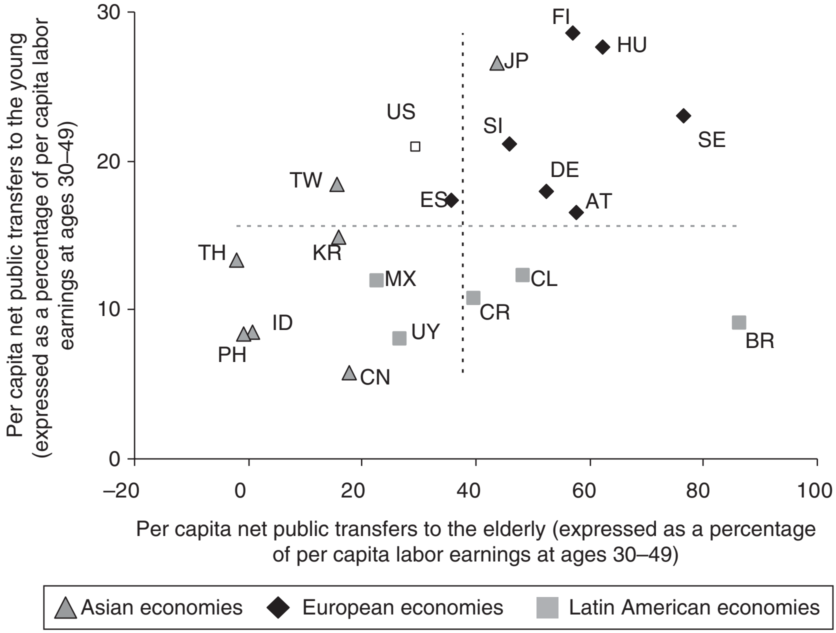
More realistically, one can expect the age profile of public benefits to shift over time – for example, with increased investment in education for youth and increased investment in health care for the elderly. In addition, reforms of public pensions toward funded programs, such as those undertaken in Chile, Germany, and other Latin American and European countries, will lead to a significant shift in the burden of population aging away from public transfers toward private transfers and asset-based reallocations. The NTA data can be readily combined with these more realistic assumptions about changing public benefits to produce medium- and long-term fiscal forecasts for governments. (See, for example, Miller et al. 2009 for fiscal forecasts for ten Latin American countries; Miller and Castanheira 2010 for a fiscal forecast for Brazil.)

In addition to projections, NTA public-transfer data can be used to develop historical accounts. When these are combined with projected data, it is possible to estimate net public transfers received and taxes paid by generations. These in turn make it possible to analyze how different generations fare over the course of economic development as public-transfer systems are expanded. (For an analysis and projection of US generations born between 1850 and 2090, see Bommier et al. 2010.)

NET PUBLIC TRANSFERS TO THE ELDERLY AND THE YOUNG

Having seen the typical pattern of net transfers based on the simple average of 20 economies, we can now examine the effect of each government's tax and spending policies on average benefits received by young people as compared with those received by the elderly. As is evident in Figure 7.4, those policies have great diversity. Average net transfers received by the young (ages 0–19) range from 6% of the average labor earnings of adults of prime working ages (30–49) in China to 29% in Finland. Similarly, average net transfers received by the elderly (ages 65+) range from −2% of average labor earnings of adults 30–49 in Thailand, where the elderly pay more in taxes than they receive in benefits, to 87% in Brazil, which has a generous government pension program.

The median values of net public transfers to the young (16% of per capita labor earnings of adults 30–49) and to the elderly (38%) divide Figure 7.4 into four quadrants. The European countries, with the exception of Spain, all lie in the upper-right quadrant of the graph, displaying high net transfers received by children (state-run education) and by the elderly (public pensions and public health). Among the Asian economies, Japan shares the characteristics of the European economies. But most Asian economies are found in the lower-left quadrant, exhibiting low levels of transfers to both children and the elderly. Taiwan lies in the upper-left quadrant, where high levels of transfers to children are combined with low levels of transfers to the elderly. The US is similarly characterized by high levels of



Note: The economies are Austria (AT), Brazil (BR), Chile (CL), China (CN), Costa Rica (CR), Germany (DE), Spain (ES), Finland (FI), Hungary (HU), Indonesia (ID), Japan (JP), South Korea (KR), Mexico (MX), Philippines (PH), Sweden (SE), Slovenia (SI), Thailand (TH), Taiwan (TW), United States (US), and Uruguay (UY).

Figure 7.4 Per capita net public transfers to the young and the elderly: 20 economies around 2000

per capita transfers to children and public transfers to the elderly slightly below the median value among the NTA economies. All Latin American economies have levels of public investment in children below the median for the NTA economies. Three of them – Chile, Costa Rica, and Brazil – stand out for having low levels of public transfers to children coupled with high levels of public transfers to the elderly. Brazil is a clear outlier among the NTA economies; per capita public transfers to the elderly there amount to 86% of per capita labor earnings of adults 30–49, or more than nine times the per capita public transfers to the young.

The general pattern that emerges in Figure 7.4 is a strong positive correlation between public transfers to the young and those to the elderly. The simple correlation between the two transfers is +0.46, rising to +0.67 when Brazil is excluded. This cross-sectional evidence is consistent with a view of government transfers as the outcome of cooperation between generations. It is generally consistent with the view of Becker and Murphy (1988) that generations cooperate via the public sector to overcome low levels of income security in old age and low levels of private educational investment in children. That is, generations cooperate by voting for higher taxation to provide for both public education and public pensions.

An alternative view was put forward by Preston (1984) when describing public transfers in the US. According to this view, generations compete for scarce public-sector resources; and as population aging increases the voting power of the elderly, public transfers shift toward the elderly at the expense of children. In Figure 7.4, however, we see that those societies in the lower-left quadrant, where per capita transfers to the elderly people are high and those to children are low, are Latin American economies with low percentages of elderly people in their populations. In Costa Rica and Chile, net public transfers to the average elderly person are about four times greater than those to children; and in Brazil they are nine times greater. The tax and spending patterns of those societies that favor the elderly may have more to do with high levels of income inequality and the political power of the wealthy than with the political power of the elderly, as suggested by Turra and Queiroz (2006).

We can also rank governments by the aggregate amount of net public transfers to the elderly versus the young as shown in Table 7.5. Germany ranks first, with aggregate net public transfers to elders 2.56 times greater than those to children. This is a product of both the relative generosity of Germany's per capita net transfers to the elderly (2.9 times the per capita public transfers to children) and its large population of elders (88% of the youth population). Japan, which has the largest elderly population among the NTA economies (102% of its youth population), also ranks high in net public transfers to the elderly, at 1.7 times those to the young. Governments in all European NTA economies spend more on elders than on children. Brazil is an interesting case in that it ranks with European countries by spending more in the aggregate on the elderly than on the young; but it does so despite the small size of its elderly population (13% of its young population). This anomaly is due to Brazil's generous public pension programs and its low levels of investment in state-run education, which (as already noted) result in per capita net public transfers to the elderly more than nine times those to the young. Chile and Costa Rica are also notable in this regard: their per capita net public transfers to the elderly are nearly four times those to the young, leading to large aggregate public transfers devoted to the elderly despite the relative small size of the elderly population in these societies (20% and 15% of the youth populations, respectively).

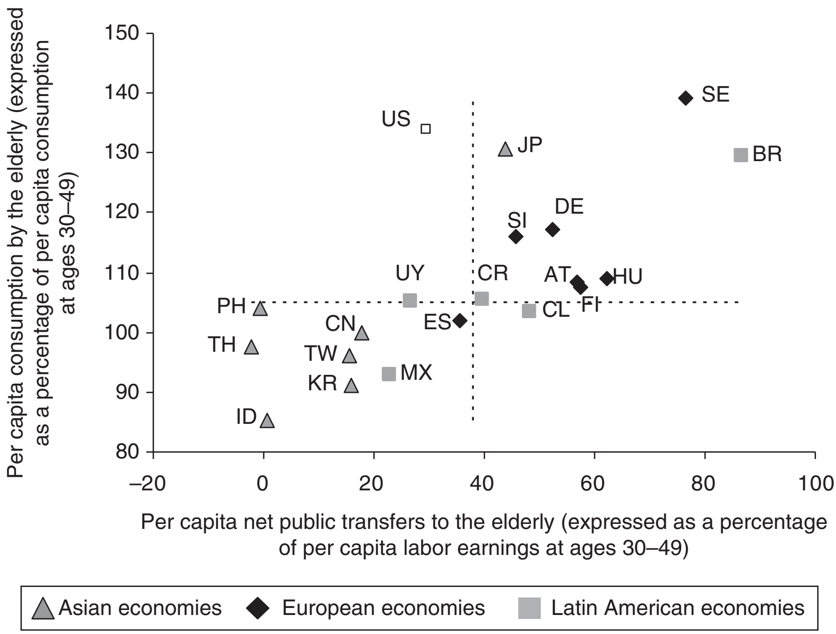
Table 7.5 Age orientation of public-sector transfers: 20 economies around 2000

Economy	Aggregate net public transfers to the elderly relative to the young	Elderly population relative to young population	Per capita net public transfers to the elderly relative to the young
Germany	2.56	0.88	2.91
Sweden	2.38	0.72	3.33
Austria	2.32	0.67	3.48
Japan	1.67	1.02	1.65
Hungary	1.65	0.73	2.26
Spain	1.62	0.79	2.05
Slovenia	1.58	0.73	2.16
Uruguay	1.39	0.42	3.29
Finland	1.34	0.67	1.99
Brazil	1.21	0.13	9.53
Chile	0.79	0.20	3.93
China	0.73	0.23	3.11
US	0.63	0.44	1.42
Costa Rica	0.55	0.15	3.67
South Korea	0.26	0.25	1.07
Mexico	0.23	0.12	1.90
Taiwan	0.22	0.27	0.84
Indonesia	0.01	0.15	0.08
Philippines	−0.01	0.07	−0.09
Thailand	−0.03	0.21	−0.16

Source: Author's calculations based on population estimates from the UN DESA (2009b) and age profiles of public transfers from NTA.

NET PUBLIC TRANSFERS AND CONSUMPTION

Per capita consumption by elders and by children relative to working-age adults varies greatly among countries. Here we can examine the relationship between per capita private and public consumption and public transfers. Figure 7.5 shows a strong positive correlation ($r = +0.69$) between per capita consumption by the elderly (relative to working-age adults) and per capita net public transfers to the elderly. Countries in which the elderly consume much more than working-age adults also tend to be those in which the elderly receive high levels of net public transfers. Two notable countries in this regard are Sweden and Brazil. In Sweden the average

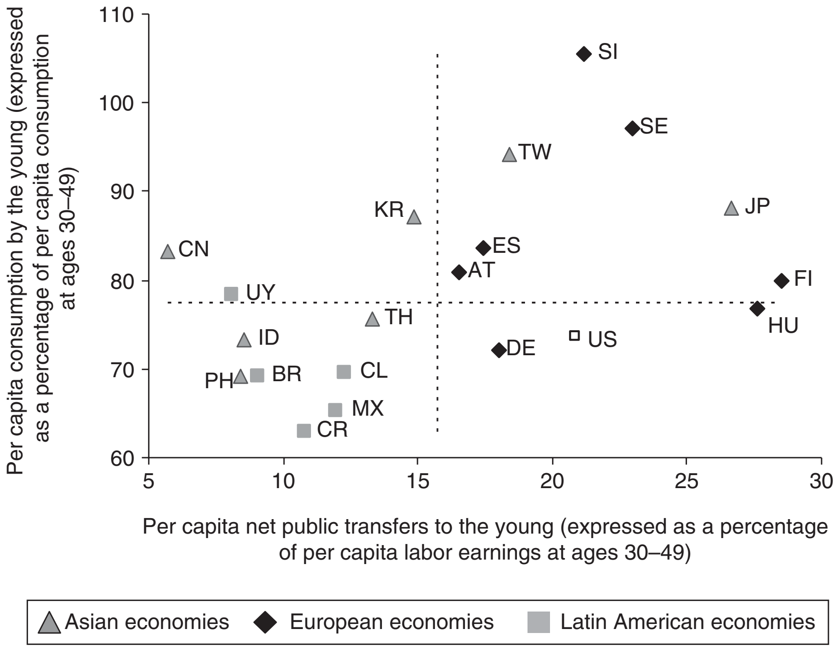


Note: See the note for Figure 7.4 for the names of the economies abbreviated here.

Figure 7.5 Net public transfers to the elderly and per capita consumption: 20 economies around 2000

elder consumes 39% more than the average working-age adult and receives annually net public transfers equivalent to 77% of average labor earnings of adults of prime working ages (30–49). Much of this transfer is in the form of public health. In Brazil the average elder consumes 30% more than the average working-age adult and receives annually net public transfers equivalent to 87% of per capita labor earnings of prime working-age adults.

Among the young, we also see a strong positive correlation ($r = +0.47$) between per capita consumption relative to working-age adults and per capita net public transfers received (Figure 7.6). Those economies with high per capita net public transfers to the young also tend to have high average levels of per capita consumption by them. In the European economies, which are clustered in the upper-right quadrant of the figure, the average youth consumes just 15% less than the average working-age adult while receiving, on average, net public transfers equivalent to 22% of the per capita labor earnings of adults 30–49 years old. Latin American economies lie at the opposite extreme: there, the average youth consumes



Note: See the note for Figure 7.4 for the names of the economies abbreviated here.

Figure 7.6 Per capita net transfers to youth and consumption: 20 economies around 2000

30% less than the average working-age adult while receiving net public transfers equivalent to 10% of the per capita labor earnings of adults 30–49. Clearly, many factors contribute to these low levels of consumption among young Latin Americans relative to the young in other NTA economies, but low levels of public investment in education are certainly a major factor.

CONCLUDING REMARKS

We began this chapter by reviewing the historical evidence of the expansion of the role of government in national economies and in particular its increasing role in reallocating resources across generations. Examining NTA data on public transfers, I reported on the typical role of the state in transferring resources from the working ages to the young and the elderly. Using population projections, I forecasted the likely fiscal impact of population aging, given the unique tax and benefit structure of each economy. Half of those economies facing severe fiscal impacts are in Latin America, a finding that underscores how widespread is population aging in today's world. Significant differences among governments were observed in their treatment of the young and the elderly, as well as significant differences in well-being as measured by relative consumption levels. At higher levels of economic development, the consumption levels of the young and the elderly are also higher; and so too are public transfers to them, with the state playing an increasingly prominent role in the lives of these two population subgroups.

The National Transfer Accounts are an important tool for informing public policy choices. They provide a comprehensive and coherent measure of the expanding role of the state. They enable governments to monitor the full scope of their policy actions by accounting for the effects of all government spending programs and all taxation. They allow governments to perceive the roles played by other economic actors (financial markets, families, civil society) in providing support for the dependent age groups. Furthermore, because the NTA project has assembled a diverse group of economies, governments can compare their policies, and the effects of those policies on the well-being of the young and the elderly, with the experiences of other societies.

NTAs also provide the basis for long-term fiscal forecasts for governments. These forecasts readily reveal the major economic transformations caused by slow but inexorable social forces such as population aging, the epidemiological transition, and shifts in the educational distribution. The use of long-term forecasts by governments is advisable for two reasons. First, some of the policy choices with the largest pay-offs, such as investment in state-run education, have very long delays between investment and pay-off. A short-term policy focus will bias decisions by failing to measure the full extent of the return on long-term investments. Second, a long-term policy focus promotes marginal changes in policy (i.e., 'course corrections') that are politically more feasible to implement than major policy changes and provide smooth transitions in spending and tax policies that are less likely to unfairly burden any particular generation, thus avoiding the need for draconian policy responses to avert fiscal crises.

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DISCLAIMER

The views expressed in this chapter are mine and do not necessarily reflect those of the United Nations.

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8. Private transfers in comparative perspective

Ronald Lee and Gretchen Donehower

When there are limited credit markets, no public sector, and very little property, only private transfers enable individuals and generations to consume more than the fruits of their labor. Hunter-gatherer groups (Kaplan 1994) and some subsistence farming groups (Lee and Kramer 2002) come close to meeting these conditions, and in a seminal theoretical article Samuelson (1958) analyzed an economy of just this sort. The role of private transfers, however, is drastically altered by a series of basic changes: property rights are established, productive capital grows in importance, technological and structural changes raise the importance of children's education, the elderly retire at younger ages, older people increasingly live apart from their adult children, and the growing public sector provides education, health care, and pensions. The NTA countries differ along each of these dimensions, allowing us to observe corresponding differences in private transfers. Although our data are cross-sectional, the patterns in them often suggest how transfers may have changed over time and with rising income.

Below we summarize some of our principal findings. The term 'private transfers' refers to *inter vivos* transfers, excluding bequests and other capital transfers (see Chapter 3).

1. Total and private transfers are an important part of the national economy. Aggregate transfers received (public and private combined) make up between 23% and 60% of Gross Domestic Product (GDP) in every economy and region; the mean is 55%. Private transfers range from 25% of GDP in the rich Western countries to 40% in Southeast Asia; the median is 31%.
2. Private transfers flow downward from old to young on average. In each society, average net private transfers are strongly downward, from older to younger persons (Chapter 4). Children receive large net private transfers, typically until their early 20s. In most societies the elderly continue to make net transfers to younger family members, at least into their 70s, although in some Asian countries they *receive*

substantial net transfers starting in their 50s or 60s. The share of all net private transfers going to children is high in all countries, ranging from 84% to 100% (the median is 99%), and this share is unrelated to national per capita income.

3. Private transfers occur overwhelmingly within households. Intra-household transfers represent about 90% of total private transfers in each region (the median is 93%), with inter-household transfers (excluding bequests) accounting for about 10% of the total. In some cases, migrant remittances strongly affect inter-household transfers.
4. Substitution of public and private transfers? Aggregate net private transfers tend to be lower where public net transfers are higher. This also holds separately for transfers to children and, more weakly, to the elderly. The private share of total transfers also declines as income rises.
5. Do parents raise children for old-age support? The implicit rate of return that parents earn, on average, on their childrearing expenditures is non-existent in many countries, because they receive no net transfers from children in old age. Even in countries where familial support of the elderly is strong, the implicit rate of return ranges from −6% to −12% per year if parents anticipate 2% productivity growth. When there is very rapid economic growth, however, the rate of return can approach zero. Typically, children are a very bad investment when viewed in this way.
6. Is there a quantity–quality trade-off and investment in human capital? Investment in human capital per child (relative to labor income) is inversely related to the level of fertility, a finding that is consistent with the quantity–quality theory. This holds for public expenditures on human capital as well. For private human-capital spending per child the situation is more complex, but within Asia and Europe there is a strong inverse association with fertility level.
7. Private transfers have strong regional patterns. These regional patterns may reflect differences in public transfers, but the direction of causality is unclear. In some Asian countries there exists strong familial support for the elderly, but in most countries the elderly make net transfers to younger family members, rather than the reverse. Private human-capital spending is high in East Asia and very low in Europe. Private transfers to the elderly are low in Latin America.

We discuss these and other points in more detail in the remainder of this chapter. The theory of private transfers was discussed in Chapter 2, and the methods used to estimate private transfers were described in Chapter 3. Chapter 4 discussed patterns in private transfers using arrow diagrams. We shall not repeat those discussions here.

This chapter relies heavily on scatter plots that show bivariate associations between particular aspects of transfers and another variable such as GDP per capita, the level of fertility, or some other aspect of transfers. Often we graphically distinguish the different regions of the world. We have refrained from presenting multivariate analyses because our collection of countries is small. In any event, for the most part we are not able to make any causal claims.

TRANSFERS ARE AN IMPORTANT PART OF THE NATIONAL ECONOMY

Aggregate transfers received, public and private combined, average 55% of GDP. Aggregate private transfers received average 31% of GDP, ranging from 17% to 54% in the set of NTA countries (Table 8.1). This ratio declines slightly as GDP per capita rises. It is 25% in the Western industrial nations, 36% in East Asia, 32% in Latin America, and 40% in Southeast Asia.

Of total aggregate transfers received, private and public combined, private transfers make up 57% on average. In the poorest region with data on private transfers, Southeast Asia, public transfers are only 31% as large as private; but in the rich Western nations public transfers are substantially larger than private ones on average, with Latin America and East Asia falling in between. As Figure 8.1 shows, the private share of total transfers is generally lower in higher-income countries, which have much larger public transfer programs.

We are not able to analyze the causal relations between the levels of public and private transfers, but we are able to look at the association between the two for a subset of the NTA countries having the necessary data. Figure 8.2 plots private transfers as a share of GDP against the share of public transfers. Costa Rica deviates from the general pattern, with remarkably low levels of both public and private transfers relative to GDP. The association of private and public spending on children (not shown) is more clearly negatively sloped, and that for the elderly (not shown) is somewhat less clearly negatively sloped.

PRIVATE INTER-HOUSEHOLD TRANSFERS VERSUS PRIVATE INTRA-HOUSEHOLD TRANSFERS

Private transfers occur both *within* households (intra-household) and *between* them (inter-household). We can assess the relative importance of

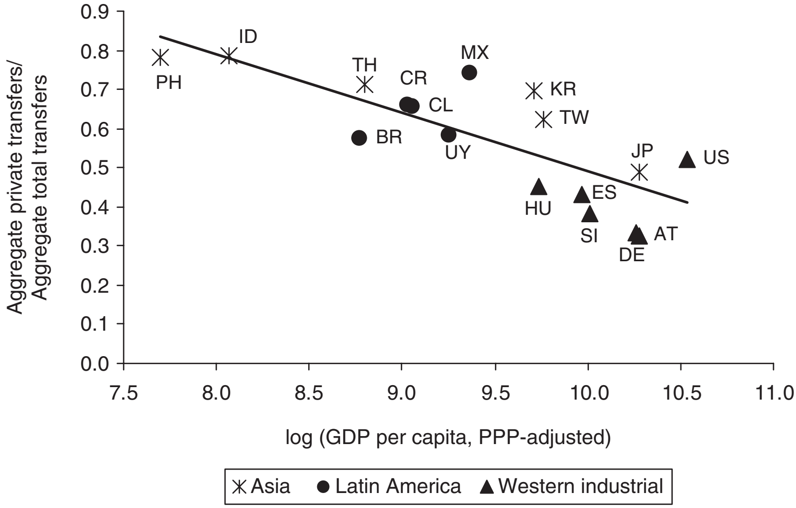
Table 8.1 Patterns and contrasts in aggregate transfers: 17 economies around 2000

Region, economy, and year	GDP per capita (ppp-adj)	Aggregate transfer statistics					Positive net transfers to young/ Total positive net transfers				Survival-weighted net private transfers	
		Total/ GDP	Private/ GDP	Public/ GDP	% private of total	% intra-HH of private	Own population		Standard population		Ages 0–25	Ages 60–90+
							Private	Public	Private	Public		
WESTERN INDUSTRIAL AVG	25,954	0.60	0.25	0.36	0.41	0.93	0.99	0.41	0.99	0.55	5.50	−0.93
US 2003	37,556	0.59	0.30	0.28	0.52	0.98	1.00	0.63	1.00	0.70	6.12	−1.17
Austria (AT) 2000	29,133	0.57	0.19	0.38	0.33	0.97	1.00	0.39	1.00	0.49	4.36	−0.63
Germany (DE) 2003	28,572	0.62	0.21	0.41	0.33	0.93	1.00	0.27	1.00	0.48	6.01	−1.00
Slovenia (SI) 2004	22,212	0.57	0.22	0.35	0.38	0.97	0.97	0.33	0.98	0.50	6.79	0.22
Spain (ES) 2000	21,296	0.53	0.23	0.30	0.43	0.99	0.97	0.49	0.98	0.56	7.34	−0.96
Hungary (HU) 2005	16,958	0.75	0.34	0.41	0.45	0.76	0.99	0.36	0.99	0.58	3.87	−0.08
EAST ASIA AVG	20,964	0.59	0.36	0.23	0.60	0.91	0.90	0.64	0.90	0.70	8.65	1.87
Japan (JP) 2004	29,039	0.59	0.29	0.30	0.49	0.95	0.91	0.37	0.97	0.63	7.45	−0.02
Taiwan (TW) 1998	17,416	0.60	0.37	0.22	0.62	0.92	0.84	0.82	0.79	0.77	9.07	4.68
South (KR) Korea 2000	16,439	0.59	0.41	0.18	0.70	0.85	0.96	0.75	0.93	0.70	9.42	0.94

LATIN AMERICA AVG	9,099	0.50	0.32	0.18	0.64	0.91	0.99	0.57	0.98	0.44	8.52	−1.81
Mexico (MX) 2004	11,638	0.56	0.41	0.14	0.74	0.92	1.00	0.87	0.99	0.70	9.64	−3.68
Uruguay (UY) 2006	10,431	0.50	0.29	0.21	0.58	0.98	1.00	0.51	1.00	0.55	7.15	−1.37
Chile (CL) 1997	8,587	0.49	0.32	0.17	0.65	0.81	0.97	0.53	0.96	0.38	8.78	−0.37
Costa Rica (CR) 2004	8,381	0.25	0.17	0.09	0.66	0.93	0.99	0.60	0.98	0.40	7.83	−0.74
Brazil (BR) 1996	6,456	0.68	0.39	0.29	0.57	0.92	1.00	0.35	0.99	0.17	9.16	−5.18
SOUTHEAST ASIA AVG	3,998	0.52	0.40	0.12	0.76	0.88	0.96	0.98	0.91	0.95	8.33	−0.24
Thailand (TH) 2004	6,597	0.44	0.31	0.13	0.71	0.89	0.89	1.00	0.82	0.99	7.64	2.67
Indonesia (ID) 2005	3,197	0.42	0.33	0.09	0.79	0.94	1.00	0.96	0.99	0.90	8.76	−2.96
Philippines (PH) 1999	2,201	0.69	0.54	0.15	0.78	0.81	0.99	1.00	0.92	0.97	8.58	−0.45

Notes: Aggregate transfer statistics are the sum of transfers received in the total population. Positive net transfers are the sum of the population-weighted portion of the net transfer curve where the value is above zero. Standard population is the average of 23 NTA economies.

Sources: GDP data from World Bank (2010), except Taiwan, for which the source is Heston et al. (2009).

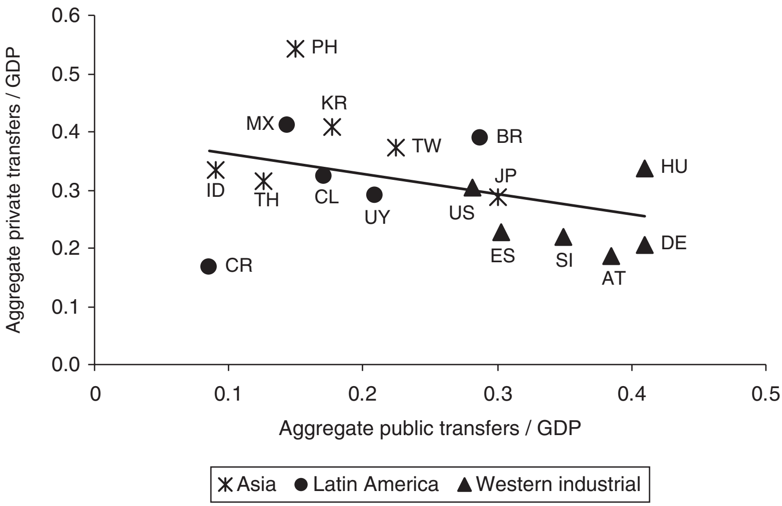


Notes: See Table 8.1 for the names of the economies abbreviated here. Aggregate transfers are the sum of transfers received in the total population. The OLS regression line is $y = -0.15x + 1.98$, $R^2 = 0.62$, $t = -4.95$.

Figure 8.1 Private transfers as a share of total transfers, by per capita GDP and region: 17 economies, by region, around 2000

inter- and intra-household transfers across countries using the information in Table 8.1. On average, intra-household transfers make up 91% of total private transfers, and in no country are they less than 75%; in some richer countries, such as the US, Austria, Slovenia, and Spain, they represent 97% to 99%.[1] The low share for the Philippines and Chile reflects the importance of remittance income received in these countries, which counts as an inter-household transfer from the Rest of the World (ROW). From these figures we see that private transfers are overwhelmingly intra-household. This is true in both rich industrial nations and in poor nations. In the case of the US, we are able to calculate the shares for private transfers, including bequest flows.[2] Intra-household transfers account for 79% of total private transfers, inter-household (other than bequests and capital transfers) for only 2%, and bequests for 19%.

Although intra-household transfers are far more important quantitatively, most previous research on private transfers has focused on inter-household transfers, for which direct survey measures are available. The empirical literature on the motivation for transfers, deriving from a seminal article by Cox (1987), has focused on inter-household transfers and bequests, which we see are only a small fraction of total private



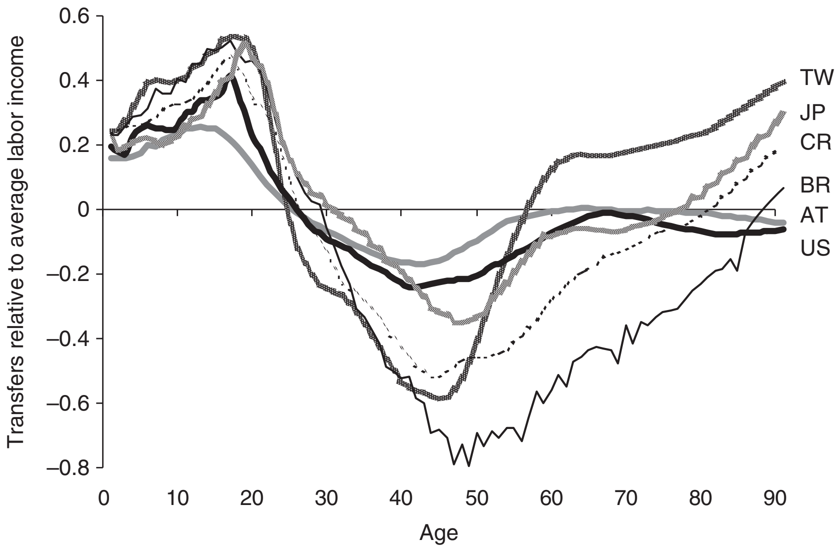
Notes: Data are from Table 8.1. See Table 8.1 for the names of the economies abbreviated here. Aggregate transfers are the sum of transfers received in the total population. OLS regression line: $y = -0.34x + 0.40$, $R^2 = 0.15$, $t = -1.61$.

Figure 8.2 Private versus public transfers as a share of GDP: 17 economies, by region, around 2000

transfers. To the best of our knowledge, no surveys attempt to measure intra-family transfers directly – how could one? – which probably accounts for this exclusive emphasis in the research. We should be cautious about generalizing to private transfers in general from studies of inter-household transfers. Recall from Chapter 2 that we expect mixed motives for apparent transfers to children: altruistic motives may hold up to some level of transfers, but beyond that level parents may facilitate their children's progress with loans to them rather than outright gifts (Becker and Murphy 1988; Arrondel and Masson 2006). It seems likely that inter-household apparent transfers between parents and children, which occur after the children have reached maturity and established their own households, are more likely to be for exchange purposes than are intra-household transfers.

AGE PROFILES OF PER CAPITA NET TRANSFERS WITHIN HOUSEHOLDS

We turn next to the rich NTA data on the age distributions of transfers. Many of the individual country chapters contain charts showing the



Notes: Age-specific average intra-household inflow minus age-specific average intra-household outflow. Scaled by average labor income for ages 30–49. See Table 8.1 for the names of the economies abbreviated here.

Figure 8.3 Per capita net private intra-household transfers by age: six economies around 2000

private transfer inflows and outflows, both intra- and inter-household. Here we concentrate on the net flows because they are more simply shown graphically for cross-national comparison. However, the profiles of gross transfer flows convey information about the heterogeneity of the population, since at a given age many people receive transfers while others make them. This richness is lost in the net transfer data.

Charts with 18 age profiles would be far too cluttered, and so we consider the profiles for six countries that represent the range of experience. The reader is encouraged to inspect the age profiles presented in the chapters focusing on individual countries, and to browse the project website, where full detail is available.

Figure 8.3 shows the age distribution of per capita net intra-household transfers. Transfer levels are measured relative to average annual labor income for ages 30–49, and this scaling is repeated in many of the subsequent figures. Numbers expressed in this way can be interpreted as years of prime-age labor income. In all six economies children receive net transfers while the working ages make net transfers, as expected. Austria stands out for its low net private transfers received per child and the low net private transfers made by those in the working ages, reflecting that country's strong and unusual institution of apprenticeships, which engages many teenagers in relatively well-paid work at early ages. Turning to older people, we see great diversity in net transfers. At age 60, for example, the Taiwanese receive annual net transfers of nearly 0.2 years of labor income, whereas the average Brazilian at age 60 makes very large net transfers to others, amounting to 0.50 years of labor income. The Taiwanese begin to receive net transfers at age 55, whereas elderly Brazilians do not become net recipients until age 85. The Japanese and Costa Ricans begin to receive net transfers in their early and late 70s, respectively. In Austria and the US the elderly never receive net transfers at any age. Rather, they make modest net transfers to younger people, which is typical of rich industrial nations.

The high net transfers made by the elderly in Brazil, the Philippines, Mexico, and Indonesia may reflect country-specific factors. For example, older household heads who receive remittances may redistribute them within the household. Unanticipated increases in the generosity of public pension coverage and benefits may lead elderly parents to make net transfers to their older children, who may also move in with them, as appears to have happened in Brazil. In some countries (e.g., Indonesia and the Philippines) older people continue to work and earn labor income, which they share with other household members. Older people own assets, such as farms, accumulated during their working lives, and these assets generate income that may be shared. All of these countries have had high fertility and large child deficits. During their 50s, adults in the four countries appear to transfer an amount equal to 60% to 80% of average labor income each year, on net. It is difficult to see how such large transfers could be sustained without remittances, pension income, or asset income.

At the other end of the spectrum, Taiwan, Thailand, and, to a lesser extent, South Korea, Japan, and Costa Rica feature substantial net transfers to the elderly from younger household members, although sometimes not until the elderly reach quite advanced ages. Most of these economies are in East Asia. Taiwan has the strongest transfers to children and the elderly from those between ages 25 and 56, with almost 60% of labor income transferred at the peak, and the average elder receives large transfers of up to 40% of annual labor income (Figure 8.3). While following the broad East Asian pattern, Japanese elders do not begin to receive net transfers until their early 70s. The pattern in Japan reflects a generous pension benefit for the elderly. Although data on Chinese transfers are still preliminary, it appears that China follows the East Asian pattern, in which large private transfers are made to the elderly.

Turning to younger ages, we see that teenagers in most countries receive net intra-household transfers of around 40% to 55% of average labor income at the peak. The US, Austria, and Slovenia (not included in the figure) are all similar in having relatively low private transfers to children. In the case of the rich countries, low private transfers to children probably reflect the availability of high-quality state-run education.

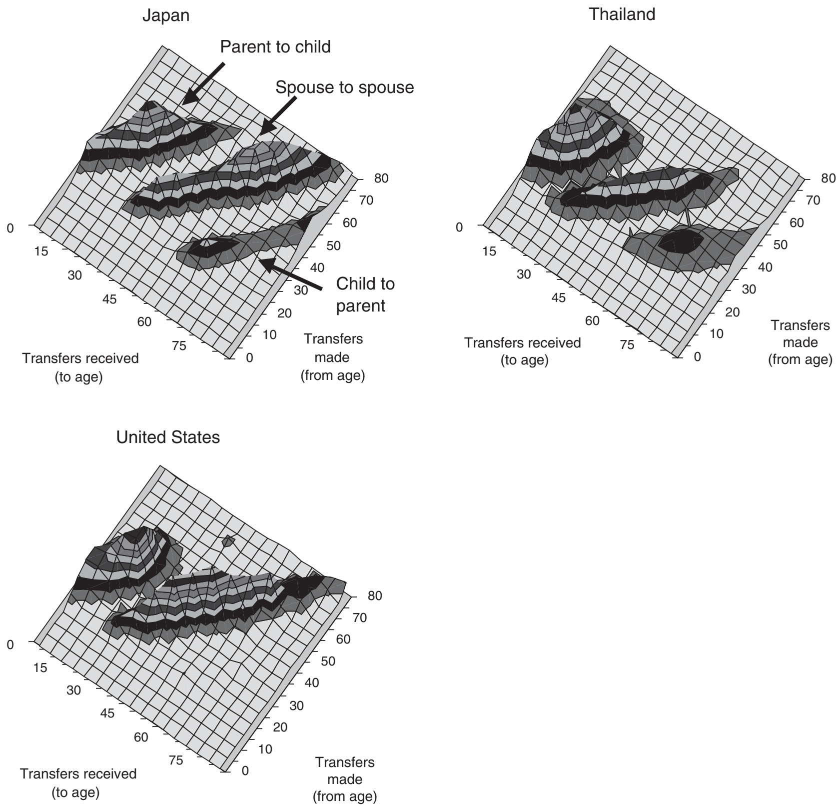
Countries differ dramatically in the net intra-household transfers made by working-age people. At the low end, we see that in the US and similarly in Austria and Slovenia, even at the age of peak transfers they amount to only about 20% of average labor income. At the other extreme, transfers reach 80% to 90% of labor income in Brazil and the Philippines. This large range is the result of different numbers of dependents in the household due to different levels of fertility and co-residence, as well as different levels of public transfers, which decrease the need for transfers from the family.

TRANSFER FLOWS FROM AGE TO AGE WITHIN HOUSEHOLDS

The net transfer flows shown in Figure 8.3 are the difference at each age between the transfers made (outflows) and received (inflows) at each age within the household. Using our intra-household transfer model (see Chapter 3), we can also estimate the total transfers given and received between each pair of ages. Flows take place between any two persons in a household – from parent to child or vice versa, from spouse to spouse, and so on – and households may have multiple flows. Combining these directional flows by age across all households, we form a matrix of aggregate intra-household flows to and from each age group.

We have estimated these age-to-age intra-household flows for the US, Japan, and Thailand, as shown in Figure 8.4. These are three-dimensional surfaces with the age of giving on one axis, the age of receiving on the other, and the height of the corresponding point representing the volume of transfers, expressed as a proportion of GDP. We do not plot these on a per capita basis because each flow involves both a giver and a receiver, and it would be arbitrary to put one in the denominator.

The figures for Japan and Thailand have three diagonal ridges, labeled 'spouse to spouse', 'parent to child', and 'child to parent'. Spouse-to-spouse transfers are between individuals close in age, who may occasionally not be spouses. The interspousal transfer flows likely reflect an informal exchange of domestic labor for market work and perhaps are not truly transfers, let alone intergenerational transfers. Interspousal 'transfers' account for 33% of the total gross intra-household transfers in Thailand, 46% in Japan, and 52% in the US. As *net* transfers by five-year



Notes: For construction see text. Each vertical contour line represents 0.001 units of GDP.

Figure 8.4 Aggregate intra-household transfer flows to and from age groups, relative to GDP: Japan, Thailand, and the US around 2000

age group, most of these cancel out, but as *gross* transfers they are very prominent.

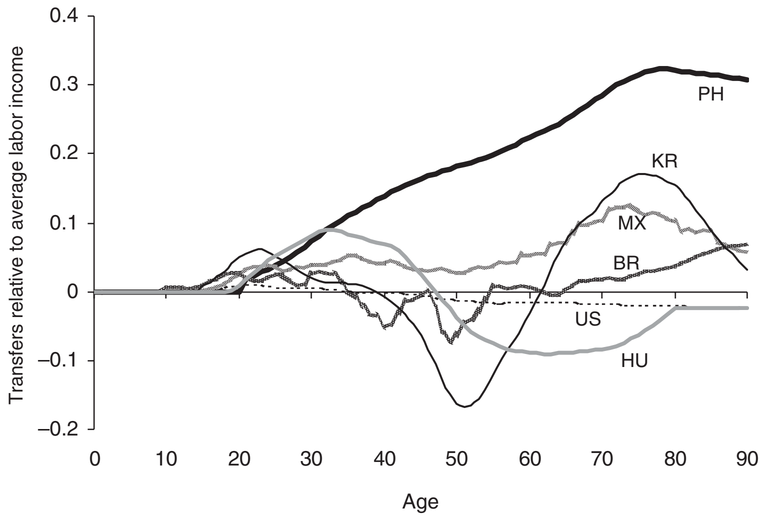
The parent-to-child ridge can be quite wide because women give birth between ages 15 and 45, so that children 0–4 years old, for example, may receive transfers from parents in their teens or in their 40s. In Thailand, a peak occurs for child recipients at ages 10–14, who receive transfers from parents 35–45 years old. In the US and Japan a similar peak occurs for children of ages 15–19, who receive transfers from parents who are 40–50 in the US, and 45–55 in Japan. These differences reflect differences in the mean age at childbearing, the amount of private educational expenditures on children of different ages, the prominence of asset income, and doubtless many other factors. Close inspection also reveals that in Thailand and the US, transfers to children fall off sharply about five years earlier for children than in Japan. We also see in Figure 8.4 that in Thailand and the US, parents stop giving transfers to their children at age 55, but that in Japan they continue giving transfers until reaching age 70.

There can also be downward transfers from grandparents to grandchildren. We do not see a ridge of this sort in the US data. For Japan, a ridge is discernible in the data matrix, although at a level too low to appear in the figure. Thailand has transfers of this sort, but they are not distinguishable as a separate ridge in the figure because the age ranges of support from parents and grandparents overlap.

Finally, consider the child-to-parent ridge, which depicts intra-household familial support of the elderly. This ridge is not visible in the US figure because elder co-residence is low, but it is prominent in Japan and Thailand. In Thailand the ridge for recipients peaks at ages 60–64 and then declines. In Japan, however, there are two recipient peaks: one at ages 55–59, for transfers received from 25–29-year-olds, presumably due to the large number of 55–59-year-olds; and a second at ages 80–84, for transfers received from 55–59-year-olds, presumably reflecting rapidly rising need in that age range. The timing of transfers to children and to the elderly in Japan and Thailand means that these countries have 'sandwich' generations that make private transfers both to their children and to their elderly parents at the same time. In Japan these sandwich generations are ages 30–65, and in Thailand, where there is earlier marriage and childbearing, they are ages 20–55.

AGE PATTERNS OF PRIVATE TRANSFERS BETWEEN HOUSEHOLDS

Transfers occur between households as well as within them. While transfers *within* households must be estimated indirectly from household budget data on the basis of assumptions about allocation rules within the household, transfers *between* households are reported directly in some surveys.[3] In a closed economy the sum of all inter-household transfers received (positive) and given (negative) would in principle be zero. In open economies, however, the sum may be far from zero if households in one country make important net transfers to households in other countries or if households receive transfers from foreign governments. This happens particularly when migrants remit income to their families in their country



Notes: Average inter-household inflow minus outflow by age of household head, weighted by the proportion of household heads at each age. Units scaled by average labor income for ages 30–49. See Table 8.1 for the names of the economies abbreviated here. The NTA methodology assumes that only household heads make and receive transfers. For each age on the horizontal axis the quantity of transfers plotted indicates the probability that a person of that age is a household head, times the average size of transfer made or received by a head.

Figure 8.5 Per capita net private inter-household transfers by age: six economies around 2000

of origin, or when pensioners in one country receive their benefits in another.

Figure 8.5 plots age profiles of net per capita transfers between households for six countries. High remittance income for the Philippines is reflected here in the very high levels of net inter-household transfers received and in the consistently positive values, particularly in old age. The average elderly person in the Philippines will receive up to a third of a year's worth of labor income as an inter-household transfer. Mexican elders receive up to 13% and Thai elders up to 10%. The US, by contrast, has negative net inter-household transfers at all but the youngest adult ages, reflecting the remittance income sent back by immigrants to their countries of origin, such as Mexico and the Philippines. Austria and Slovenia (not shown in Figure 8.5) likewise have negative net transfers much like the US (that is, most ages make net transfers to other ages) even in old age, whereas in Japan (also not shown) transfers are close to zero at all ages. South Korea shows a strong pattern of inter-household transfers from adults of ages 40–60 to older adults (60+), the transfers presumably reflecting financial support for elderly parents living on their own. We also see transfers from the older adults to younger adults up to age 38, presumably their adult children living in independent households. Hungary, interestingly, shows adults of ages 47–80 making substantial transfers to younger adults (ages 20–46), presumably their children.

PRIVATE TRANSFERS TO THE ELDERLY

We can form a synthetic cohort measure of net transfers received per elder by summing per capita net private transfers (intra- and inter-household combined) above age 60 shown in Table 8.1. In many countries net private transfers to the elderly are negative; that is, the average elder makes net transfers to younger people, even if we do not take account of end-of-life bequests. Of 17 NTA economies with sufficient data, in only four do elders of ages 60+ receive positive private net transfers: Taiwan, Thailand, South Korea, and Slovenia (last column of Table 8.1). If we start calculating instead at age 65, four more countries are positive: Philippines, Japan, Costa Rica, and Chile. In many countries, younger old people make net private transfers to others, while older old people receive net transfers; and these tend to cancel each other on average. This pattern can be seen in Figure 8.3 for Japan and Costa Rica, for example. (Although Figure 8.3 shows net private transfers, they are not weighted by survival probabilities as in the synthetic cohort calculations presented in Table 8.1.)

Focusing on the results for 60 and over, Taiwanese elders *receive* cumulative net transfers of 4.7 years of labor income, and Thais receive 2.7. Amounts in South Korea and Slovenia are far less at 0.9 and 0.2. By contrast, elders in Brazil *make* net private transfers to younger people of 5.2 years of labor income, by far the largest in our set of countries. We strongly suspect that these large downward private net transfers are causally linked to the very large upward public net transfers to the elderly through the pension system. However, that is certainly not the case for the two countries with the next largest downward private net transfers, Mexico (3.7 years of labor income) and Indonesia (3.0 years), since both countries have relatively weak public pension systems.

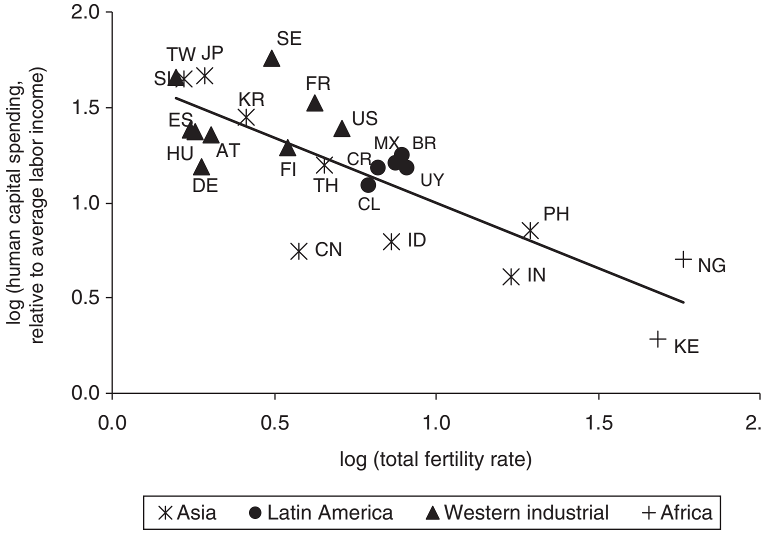
The levels of net private transfers to the elderly are inversely associated with the levels of public net transfers, but the association is not strong (not shown). In some countries with weak public support of the elderly such as Indonesia, elders continue to work until very old age and may additionally receive asset income, for example from ownership of a farm, enabling them to make net transfers to younger family members.

A United Nations (2005) report provides data on the living arrangements of the elderly. We use these to calculate the proportion of elders 60+ who live alone or with only a spouse, which is a measure of the proportion who do not co-reside with an adult child. In countries with relatively high proportions of elderly co-residing with adult children, intra-household transfers to the elderly are greater, and intra-household transfers from the elderly are also greater, as we would expect. We also find, however, that in these same countries with high co-residence, inter-household transfers to and from the elderly are also greater. Evidently, the dominant influence on such transfers comes from factors other than simple co-residence, such as cultural values that are expressed both through higher co-residence with intra-household support for the elderly and through higher inter-household support for those elders who live apart.

PUBLIC AND PRIVATE INVESTMENT IN HUMAN CAPITAL

Investment in the human capital of the next generation is critically important for societal well-being and for economic growth. In standard economic theories of fertility, a couple chooses both how many children to have (quantity) and how much to spend on each child (quality) (Becker and Lewis 1973; Willis 1973; Becker and Barro 1988; Razin and Sadka 1995; see also Chapter 2). Total expenditure on children is the product of the quantity and quality of children. The 'price' of quantity depends on the quality chosen, and the 'price' of quality depends on the quantity chosen. Assume, for simplicity, that a couple first chooses what share of its lifetime resources to devote to its own consumption and what share to spend on children, and then chooses how to divide the child expenditures between quantity and quality of the children. In this case the couple faces a quantity–quality trade-off such that having three children instead of two (raising quantity by 50%) would entail reducing quality by a third, so as to keep their product constant. This quantity–quality budget constraint has an elasticity of −1. To the extent that the couple reduces the expenditure share for its own consumption if it chooses to have more children or higher-quality children, this elasticity will be closer to zero (i.e., greater than −1). Here we follow Lee and Mason (2010a) in investigating these ideas in the context of NTA.

We distinguish between ordinary consumption by children on the one hand, such as housing, clothing, and food, and human capital investment on the other, which we limit to health care and education. We measure human capital spending per child as the sum of all spending, public and



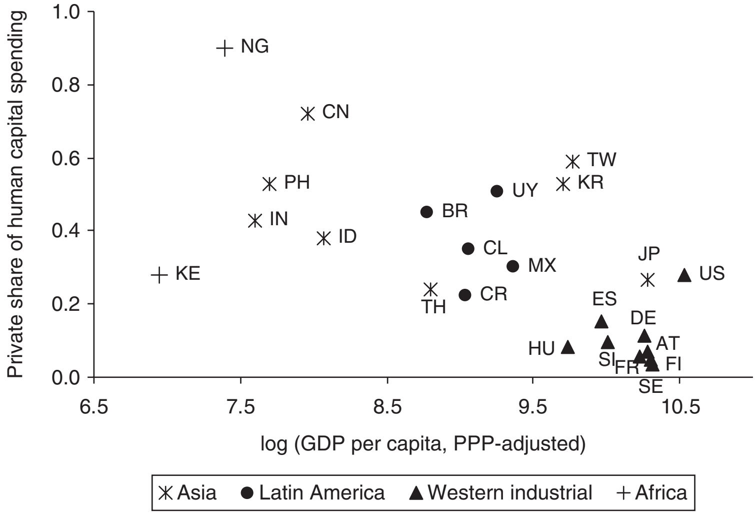
Notes: For construction, see text. Total fertility rates come from the United Nations Population Division and cover the five-year period closest to the date of the NTA estimate. See Table 8.1 for the names of most of the economies abbreviated here; FR represents France. The OLS regression line shown for 24 economies is $y = -0.68x + 1.68$, $R^2 = 0.65$, $t = -6.41$.

Figure 8.6 Human capital spending per child versus fertility: 24 economies, by region, around 2000

private, on both health and education, from age 0 to 18 for health and from age 0 to 26 for education. This gives us a synthetic cohort measure of total investment (direct cost) in children's human capital, which we standardize by dividing by average labor income for ages 30–49.[4] Our premise is that spending on health care and education has a greater impact on labor income later in life than does ordinary consumption.

We plot the logarithms of human capital spending per child against the UN Population Division's (2009) total fertility rate (TFR) for 24 countries in the five-year period closest to the NTA date (Figure 8.6). The plot reveals a strong negative association, with an elasticity of −0.76. Closer inspection of the figure shows that the association is particularly strong within Asia, but not within either the Western industrial countries or Latin America, where the points are very closely clustered. Kenya fits the pattern well at the far right.

We expect that a couple will take as given the level of public spending on human capital in its country and decide on the additional amount

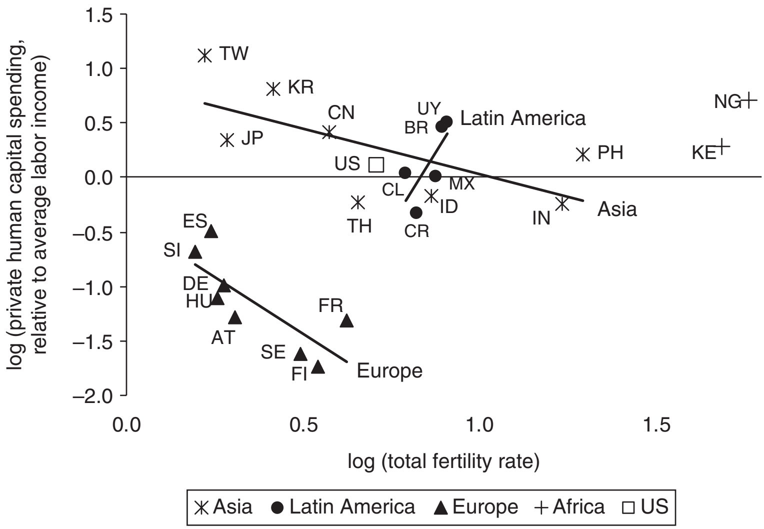


Notes: For definitions and construction, see text. See Table 8.1 for the names of most of the economies abbreviated here; FR represents France.

Figure 8.7 Private share of human capital spending per child versus per capita GDP: 24 economies, by region, around 2000

of private human capital investment needed to bring the total up to the optimal level of health care and education.[5] At this optimal level the rate of return to further human capital investment would drop below the market rate of interest. But what determines the level of public investment in human capital? Becker and Murphy's (1988) theory is a start, but we suspect that the variations observed across countries in public spending are also related to cultural differences and, in some cases, to the political economy of nations that have deep income inequality. Figure 8.7 shows that the private share of total human capital spending is negatively associated with the level of per capita income over most of the income range – except for Kenya, which does not fit the pattern. Regionally, the private share of human capital spending is high in Asia (the unweighted average is 46%), intermediate in Latin America (36%), and very low in the Western industrial countries (10%).

On the basis of this discussion, we would expect that private spending on human capital per child (relative to labor income) would depend on both the level of public spending and the fertility level. Figure 8.8 plots the logarithm of private human capital spending against the logarithm of the total fertility rate. There is no strong pattern overall, but we do see strong



Notes: For definitions and the construction of measures, see text. See Table 8.1 for the names of most of the economies abbreviated here; FR represents France. Total fertility rates come from the United Nations Population Division and cover the five-year period closest to the date of the NTA estimate. The OLS regression line shown for eight Asian economies is $y = -0.83x + 0.86$, $R^2 = 0.45$, $t = -2.23$. The OLS regression line shown for five Latin American economies is $y = 5.16x - 4.31$, $R^2 = 0.55$, $t = 1.91$. The OLS regression line shown for eight European economies is $y = -2.10x - 0.38$, $R^2 = 0.62$, $t = -3.10$.

Figure 8.8 Private human capital spending per child versus fertility: 24 economies, by region, around 2000

negative associations separately within Asia and within Europe, highlighted in the figure with descriptive regression lines. The European line is substantially below the Asian line, which we suggest reflects the greater public spending on human capital in Europe. The Latin American countries are similar in fertility level and in human capital spending, and we therefore attach no importance to the positive association observed there.

These explorations are descriptive and offer no evidence on whether declining fertility has caused rising investment in human capital, whether instead the desire to invest more in human capital has led to fertility decline, or whether some other factor, such as rising incomes, has caused both fertility to fall and human capital spending to rise. But the patterns observed do point to trade-offs along a quantity–quality budget constraint, and they also suggest that for whatever reason, declining fertility is likely to be accompanied by rising investment in human capital. Indeed, we have observed similar patterns over time in the US, Japan, and Taiwan

(Lee and Mason 2010b). This point is very important because low fertility is the primary cause of population aging, and if low fertility is also associated with greater investment in human capital, then the smaller labor force available to help support the dependent elderly may be more productive and therefore better able to bear the cost of this support (Lee and Mason 2010a).

PRIVATE TRANSFERS TO CHILDREN IN RELATION TO PRIVATE TRANSFERS TO THE ELDERLY

It is of interest to consider the proportion of private transfers that goes to children or to the elderly. The proportion may be strongly influenced by the population age distribution, and so to abstract from that effect we calculate the net transfers received per child and per elder in a population with the average age distribution across all 23 NTA economies analyzed in this book. We combine the positive net intra-household transfers shown in Figure 8.3[6] with the corresponding inter-household transfers shown in Figure 8.5 and weight these by the standard population age distribution. We then calculate the share of total transfers that goes to children. This calculation, shown for private and public transfers separately in Table 8.1, tells us that private transfers to children are far more prominent than private transfers to the elderly. In all but four of the 17 economies at least 96% of net private transfers go to children, with a median of 98%. The four exceptions are South Korea (93%), Taiwan (79%), Thailand (82%), and the Philippines (92%), all in Asia, consistent with the strong practice of familial support of the elderly in that region.

CHILDREN ARE NOT A GOOD INVESTMENT FOR OLD-AGE SUPPORT

The private cost of raising a child can be calculated as a synthetic cohort measure: the sum of the survival-weighted net private transfers to a child from birth to economic independence, which in the calculations reported in Table 8.1 we take to be age 25. As usual, the cost is scaled to average labor income. This cost is net of all the labor income earned by a young person while co-residing with parents. The measure gives the expected private cost per birth.[7] In Table 8.1 we see that this cost varies considerably across countries and regions. In the Western industrialized nations, the average cost is 5.5 years of labor income. In the other regions this cost is close to 8.5 years. The lower cost in Europe and the US likely reflects the high quality of state education, including higher education, in those countries.

It is sometimes suggested that couples, particularly in poorer countries, have children as a form of investment to provide for themselves in old age or to provide material services in earlier periods.[8] Our data do not provide any direct evidence on this point, but they do give some relevant indirect evidence. We can use our data to calculate, at least roughly, the economic return that an average couple might earn by rearing a child.

Parents raise their children through private intra-household transfers, and they may continue to support them as their children form their own households and begin to raise children themselves. Once the parents become old, these same children may in turn help to support them. One may wonder whether childrearing could then be viewed in some cultural contexts as a form of investment by adults to provide for their old-age support. If so, then childrearing could be viewed not as an altruistic act but rather as part of an exchange guided by self-interest. To explore this possibility, we begin by forming the synthetic cohort sum of all net private transfers, either inter-household or intra-household, positive or negative, that occur during ages 65 and above, weighted by survival probabilities. Because all children contribute to paying this old-age benefit, and we are interested in the benefit per child, we divide it by the total fertility rate 35 years prior to the base year.[9] Of 17 countries with sufficient data, we find eight in which this simple sum for ages 65 and above is positive and ten in which it is negative. If we instead start at age 60, the sum is positive for only four countries.

Another approach is to view the costs and benefits from the perspective of a couple deciding whether to have an incremental birth. Since our data are cross-sectional, we must use them to project forward the expected costs of raising a child (up to the first age at which net private transfers cease to be positive) and the expected return in old age, after age 60 or age 65. We do this on the assumption that labor income will grow in the future at 2% per year, and that mortality will continue at its base period level. We assume that the costs of private transfers to a child and the returns in old age will both rise at this 2% rate.[10] We then calculate two measures. The first is the simple ratio of benefits to costs. The second is the implicit rate of return that the parents would earn by raising a child – that is, the discount rate at which the present value of the expected costs exactly equals the present value of the expected benefits. Doing the calculation for ages 65 and above gives the results most favorable to the old-age support hypothesis. In this case, eight of the 17 economies have a positive benefit/cost ratio. The greatest ratio, however, that for Taiwan, is only 0.15. That is, for each unit of resources expended on a child, only 0.15, or one seventh, is returned in old age. The benefit/cost ratio for Thailand is 0.10. The others are 0.06 or less.

It is not surprising, then, that the rates of return are all negative (meaning that parents get back less than they put in). For Taiwan and Thailand the rates of return are −3.5% and −4.6% per year, and for the other countries for which they can be calculated they are around −6% to −12% per year. Similar calculations were done by Lee (2000) and by Stecklov (1999).

Rapid economic growth can dramatically change the economic returns to childbearing. In Taiwan, for example, wages rose for several decades at 5% per year. With continuing productivity growth at 5%, the benefit/cost ratio for Taiwan would rise from 0.15 to 0.84 and the rate of return to raising a child from −3.5% (assuming 2% productivity growth) to −0.5%. Such rates of productivity growth are unlikely to continue for many decades at a stretch, and it is questionable whether parents would anticipate them or expect them to last; but for the generations affected there is a definite boost to rates of return to childbearing. For an analysis of the Taiwanese case, see Lai (2006).

In all 17 economies analyzed here, the fertility transition has already begun. For truly pretransitional populations we must turn to other studies using a similar approach. Lee and Kramer (2002) study a traditional Maya village in the Yucatan with a TFR of 8; Lee (2000) draws on Mueller's (1976) data based on surveys from India and Egypt in the 1960s, when fertility in those countries was high; and Stecklov (1999) estimated returns of −6% to −11% for Côte d'Ivoire in the 1980s when the TFR was near 7.

The evidence from those studies and from our cross-national data argues strongly against the idea that parents bear and rear children mainly to provide for themselves in old age. But questions remain. First, these calculations are based on the average experience, and there may be subgroups for whom the results would be quite different. Second, even these highly negative rates of return and very low benefit–cost ratios may be better than the alternative of starving in old age. Third, children may provide other valuable services that are not captured in our data – for example, risk sharing, physical security, a hedge against the risk of other arrangements, and political influence (Lee 2000; Caldwell 2005).

DISCUSSION

While there has been extensive theoretical and empirical work on public transfers and on private inter-household transfers, the NTA provide the first comprehensive look at the economic links among the generations, both between and within private households and across many different countries. We find that lower-income countries rely more heavily on private transfers, while higher-income countries rely more heavily on public-sector transfers, particularly for old-age support. Private transfers are large relative to GDP. They occur within households on a much larger scale than between households, and they go mostly to children. Investments in human capital, which is one aspect of transfers to children, vary inversely with the level of fertility, for total human capital investments and public education and, within the Asian and European regions, for private investments. Except for some Asian countries, the elderly do not receive net transfers from their adult children but instead make net transfers to them. Indeed, the overall flow of private transfers is strongly downward in the population, from older to younger. We estimate that from a financial point of view, rearing children for the old-age support they may provide later in life is a losing proposition, not least because in most countries even elderly people continue to help support their children, on average. Even when the elderly in some Asian countries do receive net support from their families, that support is small compared with earlier expenditures on childrearing. The one exception is that when very rapid economic growth continues for several decades as in Taiwan, rates of return may reach close to zero.

Many questions remain for the future. Will East Asian countries lose their distinctive pattern of private old-age support as they grow richer? Will generous public transfer systems to the elderly in Latin America and Western industrial nations survive in the face of increasing population aging; and, if not, will familial support of the elderly increase? Will poor, high-fertility nations be able to escape the low-growth trap of low investment in children's human capital? And will the role of private human capital spending diminish in the countries of Latin America and Asia as their incomes continue to rise? While this chapter has relied entirely on cross-country comparison, these larger questions are all about change over time. As NTA are estimated for multiple time periods in an increasing number of countries, we will be able to deepen our understanding of the role of private transfers in economic growth and social welfare.

ACKNOWLEDGMENTS

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NOTES

1. The calculations are based on transfers received, which by definition are always positive. These are gross rather than net transfer flows.
2. The bequest flows are estimated on the assumption that mortality risk is independent of wealth, which leads to an underestimate. The estimated bequest-flow share should therefore be viewed as a lower boundary.
3. Some surveys, such as the US Health and Retirement Survey (HRS), make a special effort to elicit information on transfers. We have compared our estimates of inter-household transfers in the US based on the Consumer Expenditure Survey to those derived from the HRS (Hurd et al. 2007) and, after adjustment to make the estimates comparable, found the results to be quite similar.
4. Most of the literature in labor economics focuses on students' opportunity cost of staying in school for an incremental year of education, while ignoring the direct expenditures on education. Here we do the opposite, focusing on the direct expenditures while ignoring the value of the students' time. (See Lee and Mason 2010a.)
5. Our assumption holds unless this optimal amount would require a greater expenditure than the parents are prepared to make, given their limited altruism, in which case they will choose some level of human capital less than the optimal level.
6. These are net transfers rather than gross. For children this may make little difference; but for the elderly, substantial transfer outflows are subtracted from the inflows received.
7. Alternatively, we could have calculated the private cost of raising one child to age 25, including the cost of children lost to mortality.
8. Caldwell (1976) can be interpreted to say this, although Caldwell (2005) takes a different position.
9. As we are trying to calculate the costs and benefits per birth, not per survivor, it is appropriate to divide by all births, not by surviving children.
10. To illustrate, if the couple is now aged 30 and if a 70-year-old receives a net private transfer of $\tau(70)$ in the base period, then the couple assumes that each parent will receive an incremental future transfer of $e^{40*.02}\tau(70)$.

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9. Asset-based flows from a generational perspective

Andrew Mason, Naohiro Ogawa, Amonthep Chawla, and Rikiya Matsukura

Assets – their accumulation and their use – are of considerable interest in economics because of their multiple roles. They are used to shift economic resources across age. This is an economic function that assets share with public and private transfers, but whereas transfers are used to shift resources to either younger or older ages, assets are used primarily to shift resources to older ages. Assets are also productive. They generate income on the part of the owner of the asset, and they also raise the returns to complementary factors of production, notably labor. In short, assets are important to maintaining standards of living among older adults and an important engine of economic growth.

Assets serve other important functions. They provide a means for enriching descendants through bequests and other capital transfers, for example, dowries. Holders of assets can bribe their descendants to follow some desired course of action. Assets serve as shock absorbers to deal with an uncertain world. And as we shall see below, they can be used to fund transfers and, hence, to support children.

This chapter describes how assets are used as a complement to the economic lifecycle and how that use varies across countries. Although the analysis considers all flows that arise from assets, the emphasis is on private flows. Only flows to adults are considered because, by assumption, children do not own assets. Documenting asset-based flows, combined with transfers, provides a full accounting of the means by which societies fund the enormous lifecycle deficits found at young and old ages.

Details about asset-based flows are presented in Chapter 3, but a brief summary is useful here. Asset-based flows are any current flows that arise from the existence of assets. The combined net flow is called asset-based reallocations and is equal to asset income less saving. If asset income is positive (interest income, profits, dividends, imputed rent from owner-occupied housing, for example), it is an inflow from the perspective of the owner of the asset. Asset income can be negative (interest expense, losses, dividend paid, for example), and in this instance is an outflow from the perspective of the owner of the liability and hence a negative asset. Saving is an outflow, while dissaving, whether it involves the sale of an asset or the acquisition of debt, is an inflow.

There are several important issues that we do not address in this chapter. First, the results presented here are cross-sectional. We estimate how current flows vary by age for a particular year, not how cohorts accumulate and decumulate assets over an extended portion of their lives. This is an important point to keep in mind when interpreting any of the results. Second, of the two important mechanisms for accumulating or decumulating assets, we consider only saving. We do not include estimates of bequests and other capital transfers, although we hope to do so in the future. Third, as is true of other studies of age variation in assets, we do not attempt to estimate which household members are accumulating assets or receiving asset income. We assume that the household member designated as the head owns all of the household's assets. Within-household behavior with regard to assets is an important topic that we intend to explore in detail in the future.

Despite these and other limitations, the estimates of asset-based flows presented here provide an interesting and new perspective on the economic role of assets. Six key findings stand out.

First, the extent to which the elderly rely on assets to support themselves varies widely from country to country. Asset-based reallocations fund as much as two thirds and as little as 1% of the consumption by those 65 and older.

Second, the elderly in many middle-income countries rely heavily on assets to fund their consumption.

Third, there is a strong trade-off between transfers on the one hand and asset-based reallocations and labor income on the other. In countries where the elderly receive large net transfers – predominantly public transfers – asset-based reallocations and labor income of the elderly are much smaller than in countries where they do not receive large net transfers.

Fourth, in all but a few countries included in this study the elderly do not fund consumption by dissaving. Except in countries with very large transfer systems, the elderly rely heavily on asset income while they continue to save. Saving rates tend to be lower for the oldest elderly.

Fifth, working-age adults also rely heavily on assets to fund their own consumption and transfers to dependent generations. This phenomenon is very pronounced in high-fertility countries, where transfers to children are especially large, but it is also true of low-fertility countries.

Sixth, except for young adults in a few countries, working-age adults save. Their asset income is much greater than can be attributed to their observed saving, however. Working-age adults appear to rely more heavily on bequests and other asset transfers than on assets they have accumulated.

The chapter is organized as follows. After briefly discussing conceptual foundations, we provide an empirical basis for comparative analysis by presenting global age profiles for several key series. Next we consider the role of asset-based flows for working-age adults and then for the elderly. We conclude by discussing reservations and areas for future exploration.

CONCEPTUAL FOUNDATIONS

The theories developed to address the economic lifecycle, public and private transfers, and asset-based flows are discussed in a comprehensive fashion in Chapter 2. In this section we consider in more detail theories related to assets and their use. We discuss the main theories and also some important factors that may influence asset-based reallocations and their components.

Assets provide a store of value that can be acquired in one period and held during subsequent periods, yielding asset income and, if sold, additional resources. Assets allow individuals or age groups to use resources available to them at one age to fund uses (consumption, transfers, or saving) at other ages. Thus reliance on assets is one of two economic mechanisms, transfers being the other, that can be used to fund the lifecycle deficit.

Physical assets, for example, capital and land, can be used only to reallocate resources from the present to the future and, hence, from younger to older ages. This notion embodies the classic lifecycle motive – accumulating assets during the working ages to fund retirement. But assets have other possible uses. Parents may accumulate them while young to fund the costs of higher education for their children. Credit can be used to generate upward or downward flows. Young people, for example, can accumulate credit card debt or take out student loans, thereby consuming more in the present at young ages and less in the future at older ages.

Unlike capital, credit always involves a counterpart. An increase in debt on the part of one age group must be matched by a decrease in debt or an increase in credit by another age group or by the rest of the world (ROW). Likewise, interest income for one age group must be matched by interest expense for another age group or ROW. This feature of credit limits its use for reallocating resources across age groups, as noted by Samuelson (1958). In addition, legal and other constraints on indebtedness limit the extent to which children and young adults can rely on debt to fund their lifecycle deficit. These inherent features of assets mean that asset-based flows are primarily upward and limited almost exclusively to adults.

Assets can be acquired in two ways. Individuals or age groups can save or they can receive capital transfers, for example, bequests or *inter vivos* capital transfers. The value of assets held is also affected by changes in asset prices.[1]

NTA is an accounting framework and not governed by any particular behavioral theory. Nonetheless, theoretical models are of interest because they facilitate interpretation of the observed empirical patterns. Moreover, NTA estimates shed light on whether current experience is consistent or not with particular theories. The importance of lifecycle saving versus saving for bequests has been extensively debated in the literature. Here we briefly discuss the theories behind these motives and other factors that may play a role in interpreting the observed asset-based flows.

Lifecycle Saving Model

In the conventional lifecycle model, consumers meet their retirement needs by relying on asset-based reallocations. Adults in their working ages save some portion of their labor income, and hence their asset-based reallocations are negative, whereas retirees fund their consumption by relying on positive asset-based reallocations. The anticipated behaviors of the components of asset-based reallocations are clearly spelled out in the standard lifecycle model: individuals save during the working ages and dissave during retirement. Assets and asset income increase during the working ages and then decline during retirement (Modigliani and Brumberg 1954; Ando and Modigliani 1963).

A complexity that has been widely researched arises because asset-based reallocations are not the only means of funding the old-age lifecycle deficit. Transfers are an alternative. The lifecycle flow constraint implies that, *given the lifecycle deficit*, there is a one-for-one trade-off between transfers and asset-based reallocations. Economic accounting is silent, however, as to whether the trade-off is realized by a change in asset income, a change in saving, or some combination of the two. If we adhere to the lifecycle saving model, however, an increase in transfers leads to a decline in the lifecycle demand for assets. Workers will accumulate less. The elderly will have lower asset income and higher saving (lower dissaving). For the economy as a whole, transfers crowd out lifecycle saving.[2] The literature mostly addresses the impact of public transfers on saving (Feldstein 1974; Kotlikoff and Summers 1981; Diamond 2004; Hurd et al. 2009), but the concept is equally applicable to the impact of private transfers on saving

(Lee et al. 2003). The unambiguous implications of transfers for saving follow from the strong assumptions of the simple lifecycle model. If bequests are introduced into the model, entirely different responses are possible, as discussed below.

The trade-off between transfers and asset-based reallocations will not be one-for-one if shifts in the reallocation system influence the lifecycle deficit. A one-unit increase in transfers can be matched not only by a one-unit reduction in asset-based reallocations, but also by a one-unit reduction in labor income, a one-unit increase in consumption, or some combination of the three. There is a persuasive and influential body of literature suggesting that large-scale public transfer programs, depending on details of the tax and benefit structure, will undermine work incentives, thereby reducing labor income (Gruber and Wise 1999, 2001). There is no comparable literature on the effects of private transfers on work incentives; but given that these transfers occur primarily within families, the disincentive effects are surely smaller than those of public transfers.

Clearly, transfers are introduced or increased in the belief that they will raise standards of living – consumption – by the elderly. If working-age adults are poor lifecycle planners, they may not save enough for retirement and hence an increase in transfers may lead to greater old-age consumption. An additional consideration is that many transfers, both public and private, are in-kind transfers. Unlike cash transfers, they are not readily converted into consumption of another type at a different age.

Bequest Motive

The possibility of a bequest motive is particularly important when the relationship between transfers and asset-based flows is taken into consideration. If the elderly are altruistic toward future generations, they may compensate their descendants by increasing bequests in response to an increase in net public transfers. Thus an increase in net transfers to retirees would lead to an increase in saving and a larger intended bequest rather than a reduction in saving during the working ages and lower asset income for retirees. This is the type of response envisioned by Barro (1974) in his classic work on the impact of increased public debt and also in much of the work on altruism by Becker and others (Becker and Barro 1988; Becker 1991). Also see Chapter 2 for a much more extensive discussion of the theory of intergenerational transfers.

Bequests may be accidental rather than a consequence of altruism. Annuity markets are underdeveloped and costly. Thus individuals may accumulate additional wealth to protect themselves against longevity risk. Those who die prematurely will leave unintended bequests. Bequests may be a form of intergenerational risk-sharing, enabling adult children to receive bequests in the event of parents' premature death and providing support to parents in the event of unusual longevity (Kotlikoff and Spivak 1981).

Although the literature on bequests generally conceptualizes large transfers of wealth as occurring at the time of death, capital transfers may occur much earlier. Marriage or the birth of children may induce large capital transfers. Capital transfers may occur at or near the time of retirement.

If bequests and other capital transfers are large, this will have important implications for the lifecycle patterns of asset-based flows. In the simple lifecycle model, assets and asset income will reflect only the saving in previous periods of each cohort. But if bequests and other capital transfers are significant, assets and asset income will reflect both saving and intergenerational capital transfers. Hence asset income will be high as compared with saving.

Other Factors

Four sets of factors have important effects on asset-based flows. These are demographic change, economic growth, changing support systems, and cohort and time effects.

Demographic change

Changes in age structure have predictable compositional effects if per capita age profiles are relatively insensitive to changes in age structure or their underlying causes – primarily fertility and mortality decline. The analysis presented in the previous chapters on consumption and labor income have shown that many of the broad features of these per capita age profiles hold across very different circumstances, but changes in fertility, mortality, and age structure may influence consumption, labor income, and, thereby, saving and asset income (Mason 1987, 1988; Attanasio et al. 1999).

Changes in fertility and the number of children will influence the cost of children and net transfers to children, depending on the quantity–quality trade-off (Willis 1973; Becker and Tomes 1976; Becker 1991). If a decline in the number of children is accompanied by a substantial increase in consumption per child, net downward transfers to children per adult will decline by less than if the quantity–quality trade-off is weak.

The decline in mortality will influence the expected duration of retirement and hence the expected size of the old-age lifecycle deficit. This will lead to an increase in the demand for lifecycle wealth at all ages that may be satisfied either by an increase in expected net transfers or lifecycle saving and asset income (Bloom et al. 2003; Kinugasa and Mason 2007).

Changes in mortality, health, age-specific rates of disability, and age at death may influence the age profile of both public and private consumption (Yaari 1965). Changes in age structure may influence relative wages of different age groups and hence the age profile of labor income if workers of different ages are not perfectly substitutable. Fertility decline may lead to changes in female labor force participation, labor income profiles, and saving, although the causality may flow in the reverse direction.

Economic growth

Countries vary substantially in their historical rates of economic growth, and this has obvious implications for the intergenerational distribution of income and possibly saving behavior. Some East Asian economies experienced real per capita income growth of around 6% per annum for two to three decades. With wages doubling almost every decade, the lifetime earnings of cohorts who are currently in the labor force will greatly exceed the lifetime earnings of cohorts who are currently retired.

If age-specific saving rates were independent of the rate of economic growth, more recently born cohorts would have substantially higher assets and asset income, with age controlled, than earlier born cohorts. For some models of saving, however, economic growth has a strong positive effect on saving. If these models are correct, the rate of growth will have a smaller effect on the cross-sectional profiles of assets and asset income.

Changing support systems

Political change in transitional economies, for example, China and Hungary, and pension and health finance reform, for example, in Chile and some European economies, may influence the extent to which successive cohorts rely on asset-based flows for old-age support. In many East Asian countries, the elderly are much more likely to live independently of their adult children today than in the past (Lee et al. 2003). Expectations among young adults about the extent to which they can rely on their children for old-age support have declined dramatically in Japan and undoubtedly in other countries (Ogawa et al. 2009).

Cohort and time effects

The results presented here are cross-sectional and describe economic flows in a recent year for each age group. Theories about economic behavior over the lifecycle are most directly informed by using cohort rather than cross-sectional data. Considerable caution must be exercised in interpreting cross-sectional estimates, because of cohort effects. Lifetime income, assets, demographic experience, public and private support systems, and expectations about the future for all of these variables vary across cohorts. Asset-based reallocations will also reflect financial crises, recessions, wars, natural disasters, and other year-to-year fluctuations.

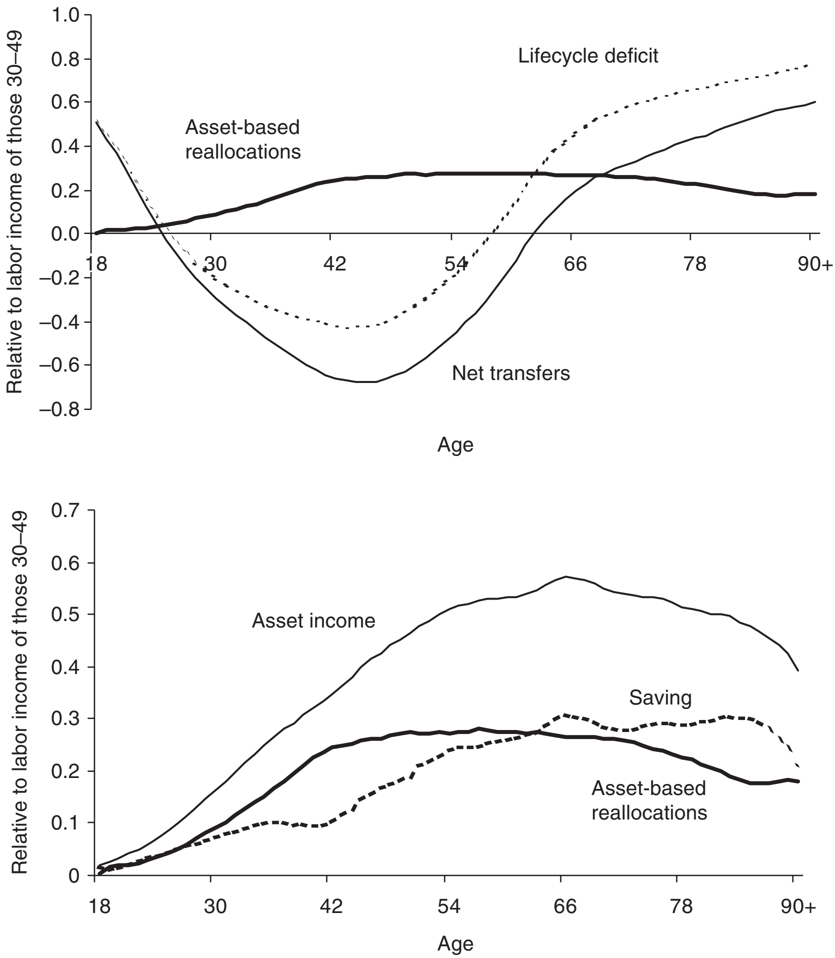
GLOBAL PROFILES

We begin our analysis by considering age profiles averaged over all countries combined. These are calculated as simple averages across the 17 countries for which estimates are available.[3] Although we refer to these as global profiles, they are not representative of the world in any formal way. We have not weighted them by national population or national income. The sample does include a broad range of countries including those with lower- and upper-middle incomes, but estimates for low-income countries are not yet available. Asset-based reallocation estimates are available for fewer countries than are other components of NTA because asset-based reallocations can be calculated only for countries with complete estimates of other NTA components. In some countries, aggregate controls are not available and in others age profiles may not be estimated with sufficient accuracy to be included in the analysis.

In this section we provide an empirical introduction to asset-based flows. The 'global' profiles provide a useful basis for comparative analysis, and they also highlight several important features that command more careful consideration. Many of the broad features of asset-based reallocations are common among the NTA countries, but there are also important differences between countries that are discussed in the comparative analysis section below.

Asset-based Reallocations, Asset Income, and Saving

The relative contribution of asset-based reallocations and transfers in funding the lifecycle deficit at each age can be assessed from the profiles charted in the upper panel of Figure 9.1. Several features warrant emphasis. First, children cannot rely directly on assets to fund their lifecycle deficit, and therefore private asset-based flows are zero and net transfers and the lifecycle deficit are nearly equal for children.[4] Hence values are not reported for those under the age of 18. Second, during the working ages asset-based reallocations are positive, because people use some of their asset income to fund their own consumption and some to fund transfers to other age groups. During the working ages labor income is less than consumption and net transfers to the young and the old. The gap is filled



Note: The 17 economies are Austria, Brazil, Chile, Costa Rica, Germany, Hungary, Indonesia, Japan, Mexico, Philippines, Slovenia, South Korea, Spain, Sweden, Taiwan, Uruguay, and US.

Figure 9.1 Asset-based flows, standard profiles, persons 18 and older, simple average of values: 17 economies around 2000

by relying on assets. This is qualitatively different from simple versions of the lifecycle saving model, in which asset-income and some labor income are saved toward retirement. Third, assets play an important role for older adults in a manner that is consistent with the lifecycle saving model. Asset-based flows are relatively constant, declining gradually with age, but the lifecycle deficit increases sharply as labor income declines and, in some countries, as consumption rises. People in their mid-60s rely about equally on transfers and assets, but at older ages asset-based flows decline substantially as a percentage of the lifecycle deficit. Finally, there is an important transitional period from the working ages to the non-working ages. The lifecycle surplus turns into a deficit at age 58, but net transfers do not turn positive for another four years. During this transitional period, people fund the gap between their consumption and labor income by relying entirely on assets.

The two components of asset-based reallocations, asset income and saving, are charted in the lower panel of Figure 9.1. Asset income rises steadily with age and reaches a peak in the late 60s. Thereafter, asset income declines at a moderate pace. The decline in asset income could be a consequence of dissaving, but more likely it reflects cohort differences in wealth. One would expect older adults to have fewer assets because they earned lower wages than younger cohorts. Other factors may well influence the age pattern, but we see no evidence of dissaving among the elderly.

Per capita saving turns positive for those in their mid-20s and rises steadily throughout the working age span. By age 60, saving equals about 30% of prime-age adult labor income. Saving continues at this relatively high level, declining moderately at older ages. This pattern is at odds with conventional wisdom and the standard lifecycle model. The elderly save about as much as younger adults at the peak of their earning power and rely heavily on assets to fund their retirement. Their saving represents somewhat more than half of their asset income, the other portion being used to fund consumption.

Saving and Asset Transfers

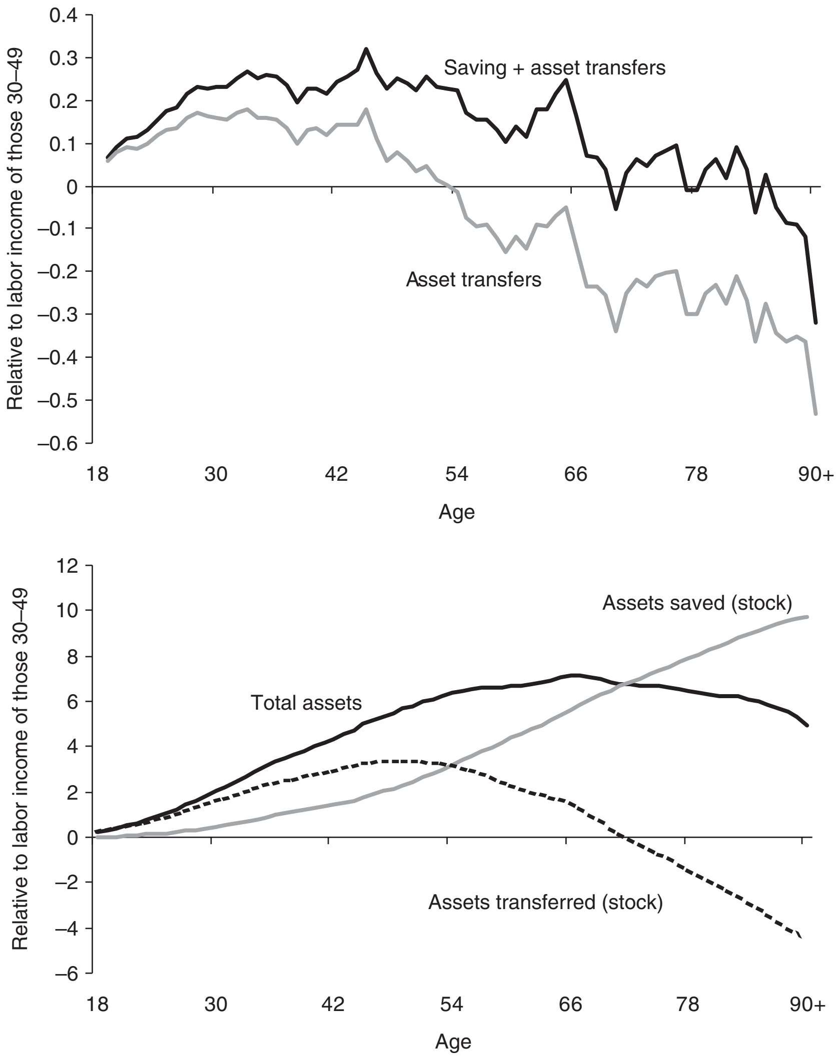
A puzzling feature of the age profiles of asset income and saving is that asset income is so much greater than saving among young adults. Given normal rates of return, asset income would fall short of annual savings until individuals were able to accumulate assets over a period of many years. When we consider those in their 20s and 30s, and perhaps those in their 40s, asset income seems improbably high as compared with saving.

One possible explanation is that saving among younger adults and others was much higher in the past than in the year for which the estimates were constructed. For example, an economic downturn might depress contemporaneous saving rates relative to asset income. This does not appear to be a plausible explanation, however. To the extent possible, the profiles were constructed for years that were not in the midst of unusual macroeconomic conditions. The patterns we observe appear to be quite general, holding for different years and different countries. Moreover, for the few cases in which time-series estimates are available the patterns persist from one year to the next.

The most plausible explanation is that the assets of young and also working-age adults reflect capital transfers that are as important to asset accumulation as saving. The difference between saving and asset transfers is an important one. Bequests are one form of asset transfers, but there are others. Young adults often receive capital transfers from their parents and other family members at the time of marriage. These transfers may come in the form of a dowry or bride price in traditional societies; but even in countries that do not follow this tradition, large capital transfers may be common at the time of marriage. These transfers can be difficult to detect and may not be measured in many surveys. In some instances the reason is that they occur within the household, where they escape measurement. For example, a young couple may live in the household of parents, and doing so allows them to accumulate assets sufficient to establish an independent household. The saving within the household is assigned to the household head. When the young couple establish their own household, the assets they take with them are counted as an asset transfer. A similar asset transfer occurs when the headship of a household passes from one generation to the next. Again the assets are transferred from the older to the younger generation.

We explore these patterns further by making use of a simple analytic model. Suppose that the asset income and saving profiles shown in Figure 9.1 do not vary over time, that the rate of interest r is constant, and that the rate at which the average labor income of persons 30–49 grows is a constant g. The normalized per capita assets of persons of age x are given by $A(x)/\bar{y}^l = y^A(x)/r = y^A(x-1)/r(1+g) + s(x) + \tau^k(x)$, where $s(x)$ is saving normalized on labor income of persons 30–49, $y^A(x)$ is asset income normalized on labor income, and $\tau^k(x)$ is asset transfers normalized on labor income of persons 30–49.

Capital transfers are readily calculated and plotted in the upper panel of Figure 9.2. The lower panel reports the calculated value of the per capita normalized assets and the per capita normalized assets accumulated through saving and through capital transfers. The calculated per capita asset transfer for adults under the age of 23 is between 10% and 15% of the mean per capita income of a prime-age adult. The asset transfer increases to a level of between 15% and 20% for those between the ages of 24 and 45 inclusive. Thereafter, the per capita transfer falls quickly and turns negative for those who are 55 and older. For those 70 and older the average asset transfer is a net outflow equal to 20% of the labor income of a prime-age adult. Combining saving and asset transfers, we see that the growth



Note: The profiles are based on global age profiles of saving and asset income (Figure 9.1), a rate of return to capital of 8% per year, and a rate of growth of labor income of 30–49-year-olds of 2.5% per year.

Figure 9.2 Simulated assets, assets accumulated through saving, and assets received as transfers: 17 economies around 2000 in assets is concentrated in the working ages to a much greater extent than implied by the saving rate. Although the elderly have relatively high saving, they also make substantial downward transfers.

The lower panel of Figure 9.2 charts the estimated asset profile. The shape of the profile is determined by the shape of the asset-income profile, but of greater interest here are the estimates of its two components. Below age 55, half or more of assets are cumulated asset transfers. After age 55 more than half of assets are cumulated saving. By age 75, assets given exceed assets received, and assets cumulated through saving exceed total assets.

As a summary we calculate the share of total assets that were saved rather than received as net asset transfers. Using the average age distribution for the NTA countries, we find that the value of per capita assets relative to the labor income of prime-age adults is 4.1. The percentage accumulated through saving is 52%, and the percentage received as a capital transfer is equal to 48%. The results are sensitive to assumptions about the rate of return to capital and the rate of economic growth. Assuming a rate of return to capital of 10% increases the share of assets accumulated through saving to 65%. Reducing the rate of economic growth to 1.5% while holding r constant at 0.08 increases the shares of assets accumulated through saving to 59%.

COMPARATIVE ANALYSIS

We briefly consider asset-based inflows aggregated over all ages in order to determine differences by level of development and region. Then we compare age profiles of private asset-based flows during the working ages and during old age.

Aggregate Asset-based Flows

In a closed economy, net private and net public transfers must sum to zero and aggregate asset-based reallocations will equal the aggregate lifecycle deficit. Net transfers from ROW allow for some divergence from this constraint, but for most countries transfer inflows and outflows are similar in magnitude. Asset-based reallocations would be zero in the special case in which asset income and total saving were equal. In most instances, however, asset income exceeds saving, often by a substantial amount.[5]

Asset-based reallocations are no more important in high-income economies than in the middle-income economies in our study. In fact, the highest asset-based reallocations are found in upper-middle-income countries (Table 9.1). In both lower-and upper-middle-income countries, asset

Table 9.1 Asset-based reallocations and components relative to total factor income: 20 economies and averages for income groups around 2000

Economies by level of income (number)	Total			Public			Private		
	Asset-based inflows	Asset income	Saving	Asset-based inflows	Asset income	Saving	Asset-based inflows	Asset income	Saving
LOWER-MIDDLE-INCOME (5)	0.12	0.39	0.27	0.02	0.05	0.02	0.10	0.35	0.25
China	−0.18	0.27	0.45	−0.08	0.00	0.08	−0.11	0.26	0.37
India	0.15	0.41	0.26	0.05	0.00	−0.04	0.10	0.40	0.30
Indonesia	0.16	0.43	0.26	0.09	0.12	0.02	0.07	0.31	0.24
Nigeria	0.30	0.51	0.22	0.08	0.13	0.05	0.21	0.38	0.17
Philippines	0.19	0.35	0.16	−0.03	−0.03	0.00	0.22	0.38	0.16
UPPER-MIDDLE-INCOME (5)	0.23	0.34	0.11	−0.02	−0.01	0.02	0.25	0.35	0.10
Brazil	0.36	0.45	0.09	−0.02	−0.04	−0.02	0.38	0.49	0.11
Chile	0.23	0.37	0.14	−0.04	0.01	0.04	0.27	0.36	0.09
Costa Rica	0.20	0.33	0.13	−0.04	−0.03	0.01	0.25	0.37	0.12
Mexico	0.34	0.47	0.13	0.02	0.05	0.03	0.32	0.42	0.10
Uruguay	0.02	0.08	0.07	−0.03	−0.03	0.01	0.05	0.11	0.06
HIGH-INCOME (10)	0.12	0.23	0.11	−0.01	−0.02	−0.01	0.13	0.25	0.12
Austria	0.08	0.22	0.14	−0.05	−0.04	0.00	0.13	0.26	0.13
Germany	0.16	0.22	0.05	0.01	−0.03	−0.04	0.16	0.25	0.09
Hungary	0.13	0.15	0.02	0.04	−0.05	−0.10	0.09	0.20	0.12
Japan	0.19	0.26	0.06	0.06	−0.02	−0.08	0.13	0.27	0.14
Korea, South	0.05	0.31	0.26	−0.11	0.02	0.14	0.17	0.29	0.12
Slovenia	0.05	0.17	0.12	−0.03	−0.01	0.01	0.08	0.19	0.11
Spain	0.12	0.23	0.11	−0.05	−0.03	0.02	0.17	0.26	0.09
Sweden	0.05	0.18	0.13	0.00	0.00	0.00	0.05	0.19	0.14
Taiwan	0.17	0.36	0.18	0.01	0.03	0.02	0.16	0.33	0.16
US	0.20	0.22	0.02	0.02	−0.02	−0.04	0.17	0.24	0.07

Note: Total factor income is asset income plus labor income.

income is generally higher than in high-income economies. The pattern is more mixed with saving levels.

Private asset-based flows are generally much larger and dominate public asset-based flows. Public asset-based reallocations are negative in many countries. This is mostly a consequence of negative asset income – that is, interest on public debt. Income from public capital is zero by construction in National Income and Product Accounts and therefore in NTA. Some countries, for example, Finland and South Korea, have significant public asset income that arises from sovereign wealth funds or currency stabilization funds; others, for example, Indonesia and Nigeria, have substantial public asset income from publicly owned natural resources. Public asset-based flows can also be negative as a consequence of high rates of public saving, as is the case in South Korea.

The important finding here is that countries rely heavily on assets to meet their lifecycle needs. Saving is substantially less than asset income or, equivalently, aggregate consumption is substantially greater than aggregate labor income. This generalization holds irrespective of the level of income; and, if anything, the middle-income countries rely more on assets than do the upper-income countries.

There are fairly strong regional patterns. Total asset-based inflows are largest, at 20% or more of total factor income, in Africa, the US, and Latin America. In East Asia and Southeast Asia and in Europe asset-based inflows are smaller (Table 9.2).

Asset-based Flows during the Working Ages

In the global profile, working-age adults rely heavily on asset income, in addition to labor income, to meet current need. Working-age adults save, but they save only about half of their asset income.

This pattern is common in the NTA countries irrespective of age structure or level of development. To compare countries we have constructed synthetic cohort estimates of asset-based flows for the 25–59 age range. The estimates are normalized on average labor income of those in the 30–49 age range (Table 9.3). The average over all countries of normalized asset-based reallocations over the working ages is 7.7 years of prime-age labor income. In comparison, the average normalized flow of labor income over the 25–59 age range is about 31 years of prime-age labor income. Thus labor income funds about 80% of current needs (consumption and net transfers), and asset-based reallocations fund about 20% of current needs.

The importance of asset-based reallocations during the working ages varies enormously from country to country. Asset-based reallocations for

Table 9.2 Asset-based reallocations and components relative to total factor income: regional averages around 2000

Region (number of countries)	Total			Public			Private		
	Asset-based inflows	Asset income	Saving	Asset-based inflows	Asset income	Saving	Asset-based inflows	Asset income	Saving
AFRICA (1)	0.30	0.51	0.22	0.08	0.13	0.05	0.21	0.38	0.17
AMERICAS									
Latin America (5)	0.23	0.34	0.11	−0.02	−0.01	0.02	0.25	0.35	0.10
North America (1)	0.20	0.22	0.02	0.02	−0.02	−0.04	0.17	0.24	0.07
ASIA (7)									
East Asia (4)	0.06	0.30	0.24	−0.03	0.01	0.04	0.09	0.29	0.20
East Asia excl. China (3)	0.14	0.31	0.17	−0.01	0.01	0.03	0.15	0.30	0.14
South and SE Asia (3)	0.17	0.40	0.23	0.04	0.03	−0.01	0.13	0.37	0.23
EUROPE (6)	0.10	0.20	0.10	−0.01	−0.03	−0.02	0.11	0.23	0.11

Note: Total factor income is asset income plus labor income.

Uruguay are 0.0, but for all other countries the flow is positive. Uruguay aside, the range varies from a low of 1.3 in Japan to a high of 20.9 in Brazil and 19.3 in Mexico. In Brazil and Mexico asset-based reallocations fund about 40% of consumption and net transfers. Asset-based reallocations have a strong ‘regional’ pattern, with an average value of 2.8 among Western countries, 6.9 among Asian countries, and 13.5 among Latin American countries.

Variation across countries in asset-based reallocations is a consequence of variation in asset income to a much greater extent than is variation in saving. The simple correlation between asset-based reallocations and asset income is 0.87 while the simple correlation between asset-based reallocations and saving is only −0.15.

Asset income is highest in Latin America, at 16.2 times the labor income of an adult 30–49, but also high in Asia, at 14.7. In the West asset income is only 6.3 times the annual labor income of an adult in the 30–49 age

Table 9.3 Private asset-based flows, normalized, synthetic cohort values for the 25–59 age range: 17 economies around 2000

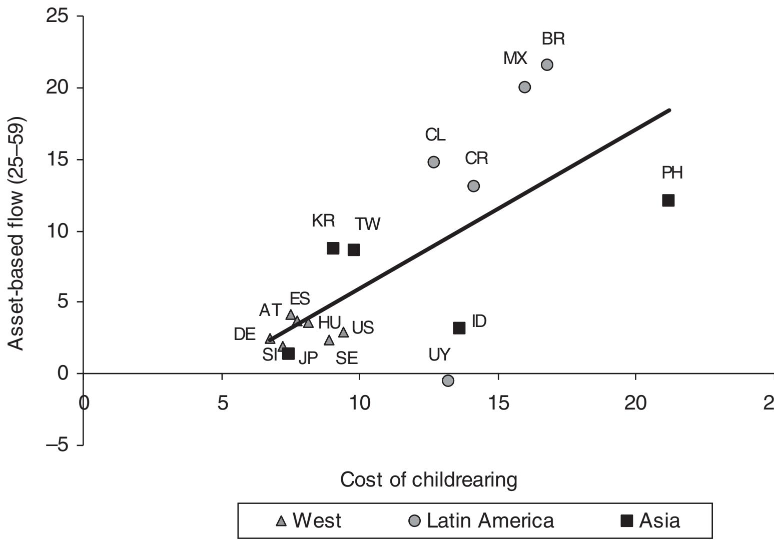
Region and country	Asset-based flow	Asset income	Saving	Saving / Asset income
ASIA	6.9	14.7	7.8	0.56
Indonesia	3.7	17.2	13.5	0.78
Japan	1.3	5.0	3.8	0.75
Philippines	11.8	20.3	8.5	0.42
South Korea	9.0	13.5	4.5	0.34
Taiwan	8.7	17.5	8.8	0.50
LATIN AMERICA	13.5	16.2	2.8	0.30
Brazil	20.9	19.6	−1.3	−0.06
Chile	14.6	15.7	1.1	0.07
Costa Rica	12.5	16.6	4.1	0.25
Mexico	19.3	26.1	6.8	0.26
Uruguay	0.0	3.2	3.2	1.01
WEST	2.8	6.3	3.5	0.57
Austria	4.2	8.0	3.8	0.48
Germany	2.3	6.1	3.8	0.62
Hungary	3.1	6.8	3.7	0.55
Slovenia	1.7	5.7	4.0	0.70
Spain	3.7	6.8	3.1	0.46
Sweden	1.8	4.9	3.2	0.64
US	2.7	5.9	3.2	0.55

range. In all countries except Brazil those in their working ages save, with values ranging from a low of 1.1 in Chile to a high of 13.5 in Indonesia. Again there is a strong regional pattern to saving, with high saving in Asia (7.8) and low saving in Latin America (2.8) and Western countries (3.5). Saving represents about half of asset income in Asia and the West, but only about one quarter of asset income in Latin America.

Why are asset-based reallocations to the working ages so large in some countries? From the flow constraint (described in Chapter 3), we know that asset-based flows occur at any age when labor income is less than the resources needed to fund current consumption and net transfers, which are generally negative during the working ages. This is accounting, not a causal statement, but it helps to identify potentially significant factors that influence asset-based flows during the working ages. If per capita consumption and labor income were given, for example, an increase in the number of children or the number of elderly, or both, would lead to an increase in net transfer outflows from those in the working ages. But given consumption and labor income during the working ages, an increase in net transfer outflows must be accommodated through an increase in asset-based inflows. This suggests that variation in age structure, measured by the economic support ratio, may induce changes in asset-based flows to the working ages. Simply put, working-age adults in Brazil, Mexico, and the Philippines may have such high asset-based reallocations at the working ages because they support so many dependents.

The effect of age structure on asset-based reallocations will be attenuated, however, if (a) workers in high-dependency countries generate larger lifecycle surpluses by reducing their consumption or increasing their labor income; or (b) the young or old in high-dependency populations rely more on their own asset-based reallocations rather than on greater transfers from working-age adults. We do not anticipate that children in high-dependency countries will increase their reliance on asset-based flows, but it is certainly possible that the elderly will do so. The intercountry differences in asset-based flows to the working ages are not explained by the economic support ratio, however. The simple correlation between the two series is only 0.02. There is a strong connection, however, between asset-based flows to the working ages and child dependency. To explore this connection we construct a synthetic cohort measure of child dependency that varies across countries only because of variation in population age structure. First, we use the value of the lifecycle deficit for the young averaged over all countries to measure the age-specific resource needs of children. Second, we construct a measure of the number of children per 'parent' in each country by dividing the population at each age by the population aged 30–49.[6] The product of the lifecycle deficit and the number of children per person summed over the childhood ages yields an estimate of the lifetime childrearing cost per person. The lowest value is for Germany, where the 'lifetime cost' of childrearing is 6.8 times the average labor income of a prime-age adult. The highest value (21.2) is found in the Philippines. In the Philippines, then, the cost of children is about two thirds of the labor income earned over the working ages.

The normalized asset-based flows for those 25–59 are plotted against the cost of childrearing in Figure 9.3. The simple correlation between the two series is 0.67. The regression line has an estimated slope of 1.09. Taken literally, this implies that the additional cost of children is absorbed entirely by higher asset-based reallocations to parents in high-child-dependency societies; that is, they either have higher asset income or they save less. For such a strong relationship between asset-based reallocations and child dependency to hold, parents must not be absorbing the extra cost of children through their lifecycle deficit – in other words, by reducing their consumption or increasing their labor income. This seems to be the



Note: The economies are Austria (AT), Brazil (BR), Chile (CL), Spain (ES), Costa Rica (CR), Germany (DE), Hungary (HU), Indonesia (ID), Japan (JP), South Korea (KR), Mexico (MX), Philippines (PH), Sweden (SE), Slovenia (SI), Taiwan (TW), United States (US), and Uruguay (UY). Units are years of prime-age adult labor income.

Figure 9.3 Asset-based flows for persons 25–59 versus the cost of childrearing: synthetic cohort estimates, normalized on labor income of persons 30–49: three regions and 17 economies around 2000

case as the correlation between the child deficit and the lifecycle surplus of 25–59-year-olds is only −0.11.

The child-deficit measure in Figure 9.3 is constructed by using the average lifecycle for all countries to avoid simultaneity problems, because the consumption and labor income of children could be influenced by economic flows to those in the working ages even though we have controlled directly for income differences by normalizing all variables on labor income of those 30–49. However, the results are unaffected if the cost-of-childrearing measure is constructed for each country by using its own economic lifecycle. The estimated effect on asset-based reallocations of an increase in the cost of childrearing is 1.07 rather than 1.09.

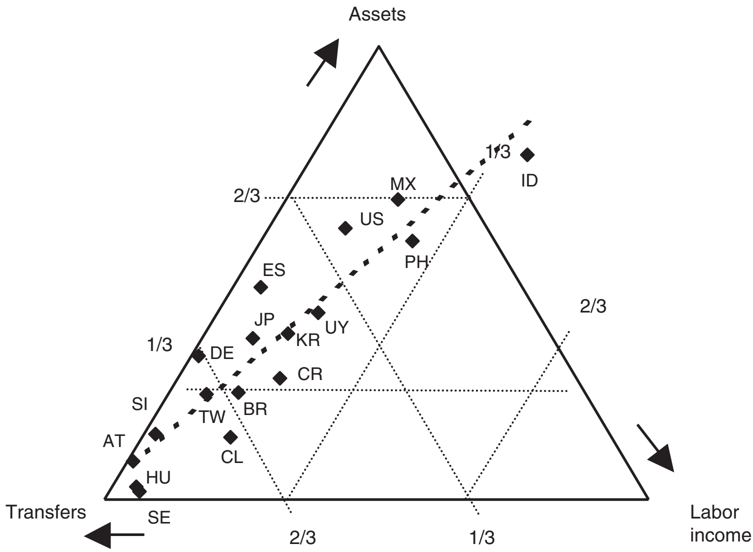
The Western countries are tightly grouped, exhibiting low asset-based reallocations and low costs of childrearing. For countries with high childrearing costs there is considerable variation in asset-based reallocations. Brazil and Mexico have very high asset-based flows, whereas Indonesia and the Philippines have low asset-based flows, given their childrearing cost. Uruguay is clearly an outlier.[7]

The strength of the connection between asset-based reallocations to the working ages and childrearing costs is a surprising result. Even more surprising is that the connection of childrearing costs is to asset income, not saving. We do not find that working-age adults in populations with high levels of child dependency have lower savings. The simple correlation between the child-cost variable and saving is only about 0.2, and it is a positive rather than a negative relationship. Thus the data do not support the hypothesis that high childrearing costs lead to lower saving. Asset income is substantially higher in countries where the child-cost variable is large. The correlation between child cost and asset-based income is 0.74, and an increase in child cost of 1 is associated with an increase in asset income of 1.3.

What can account for this phenomenon? Many possibilities should be explored. One is that working-age adults have higher asset income in countries with high child dependency because they have received greater capital transfers. This might occur, for example, if elders pool assets with their adult children through co-residence. A second possibility is that differences in asset income reflect differences in rates of return, higher rates of return to assets occurring in lower-income countries because of a premium associated with higher risk. A third possibility is that differences in rates of economic growth are responsible. Given the saving rate and the rate of return, the ratio of assets to labor income at any age will be higher in an economy where labor income is growing more slowly than where it is not. The high ratio of asset income to saving in Latin America as compared with Asia, for example, could be explained in part by the lower rate of economic growth in Latin America. We leave this as an interesting puzzle to be explored further in the future.

Asset-based Flows in Old Age

The extent to which the elderly rely on assets to support themselves is one of the most important issues addressed in this study. The elderly must rely on one of three economic mechanisms to fund their consumption: continued work, public and private transfers, and asset-based reallocations. Figure 9.4 compares the importance of asset-based flows to labor income and net transfers to the elderly. Synthetic cohort values, constructed using single-year-of-age estimates for those 65 and older, are used. Survival rates for the US in 2000 are used to weight the age-specific economic flows.[8] The synthetic cohort values can be interpreted as the expected value over the remaining life of a cohort of 65-year-olds. A key advantage of the



Note: Synthetic cohort values were constructed using a recent US life table. See the note in Figure 9.3 for the names of the economies abbreviated here.

Figure 9.4 Funding consumption: synthetic cohorts 65 and older: 17 economies around 2000

synthetic cohort values is that they are unaffected by the age distribution of the individual economy's population.

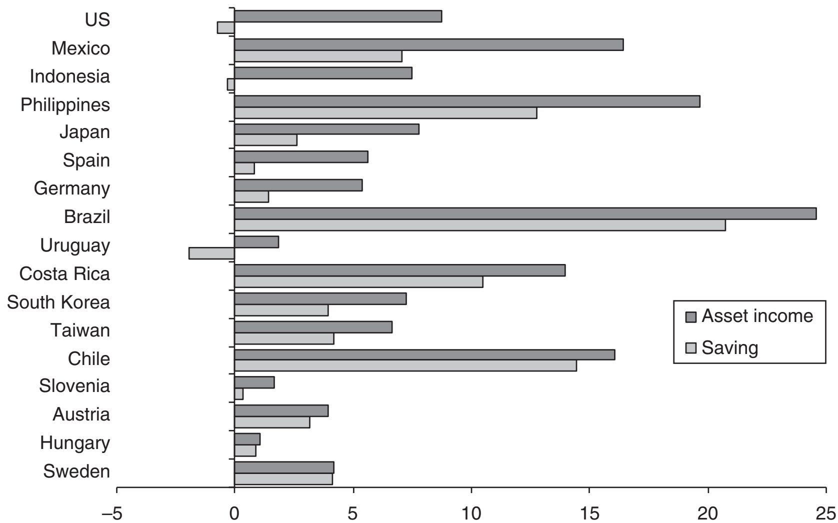
For each economy the plotted point represents three funding components – labor income, net transfers, and asset-based economy reallocations – as a share of consumption. Because the three components must sum to 1, the shares can be represented with a triangle plot, although some explanation is required.[9] Were any observation to fall on one of the triangle's vertices, all consumption would be funded from the source indicated by the corresponding label. Consumption by the elderly in Austria (AT) and Sweden (SE), for example, is funded almost entirely from transfers. Along any gridline the share of one component is constant, while the other components vary. Along the major gridlines, the triangle sides, one component is zero. The extent to which the elderly depend on assets to fund their consumption varies quite substantially around the world. At one extreme we find that the elderly in Mexico and Indonesia rely on assets to fund two thirds of their consumption, whereas the elderly in Sweden, Austria, Slovenia, and Chile rely very little on assets to fund their consumption. Chile is an interesting case because its public system was the subject of a fundamental reform in the early 1980s. The public transfer system is being phased out while a funded pension system is being phased in. Eventually transfers will fund a much smaller share of consumption and asset-based inflows a much larger share than is true at this point. But those who were 65 and older in 1997 were still relying overwhelmingly on the public transfer system (see Chapter 12).

It is clear from Figure 9.4 that the key trade-off for the elderly is between relying on assets and relying on transfers. Labor income plays a subsidiary role, funding less than one third of consumption – often much less – except in the case of Indonesia.

The elderly who depend the least on asset-based flows live in countries that support the elderly through large public transfer systems. These include high-income, European welfare states, but also middle-income Latin American countries. The elderly depend most on asset-based flows in countries that have less expansive public transfer systems – Japan and the US among industrialized countries, Mexico, and Asian middle-income countries. The elderly in the countries with low public transfers may depend more on private, familial transfers, but private transfers substitute only partially for public transfers.

Asset-based reallocations are positive for the elderly, vary greatly from country to country, and are inversely related to net transfers. How are these features of asset-based reallocations reflected in the two components of saving and asset income? The synthetic cohort values of asset income and saving for those 65 and older are presented for each country in Figure 9.5. As is standard, the values are normalized on the per capita labor income of 30–49 year olds. The data are arranged by the normalized value of asset-based reallocations, which is the difference between the two bars representing asset income and saving displayed for each country. With the exception of Indonesia, the US, and Uruguay, saving by those 65 and older is positive. In other countries the elderly do not fund their retirement needs by dissaving. Although age detail is concealed by summarizing across all ages, saving does not turn negative at older ages in most countries. Saving often declines at older ages, however. Asset-based reallocations are positive because the elderly save only a portion, not all, of their asset income. This was also a feature of the global profile presented above, in which about half of asset income was saved. Saving by the elderly represents 45% of asset income averaged across all economies shown in Figure 9.5, but there is considerable variation. Saving exceeds 75% of asset income in Sweden, Austria, Chile, and Costa Rica, for example.

Variation in asset-based reallocations is not primarily a consequence of variation in saving. It is a consequence of variation in asset income. The simple correlation between saving and asset-based reallocations is −0.07,



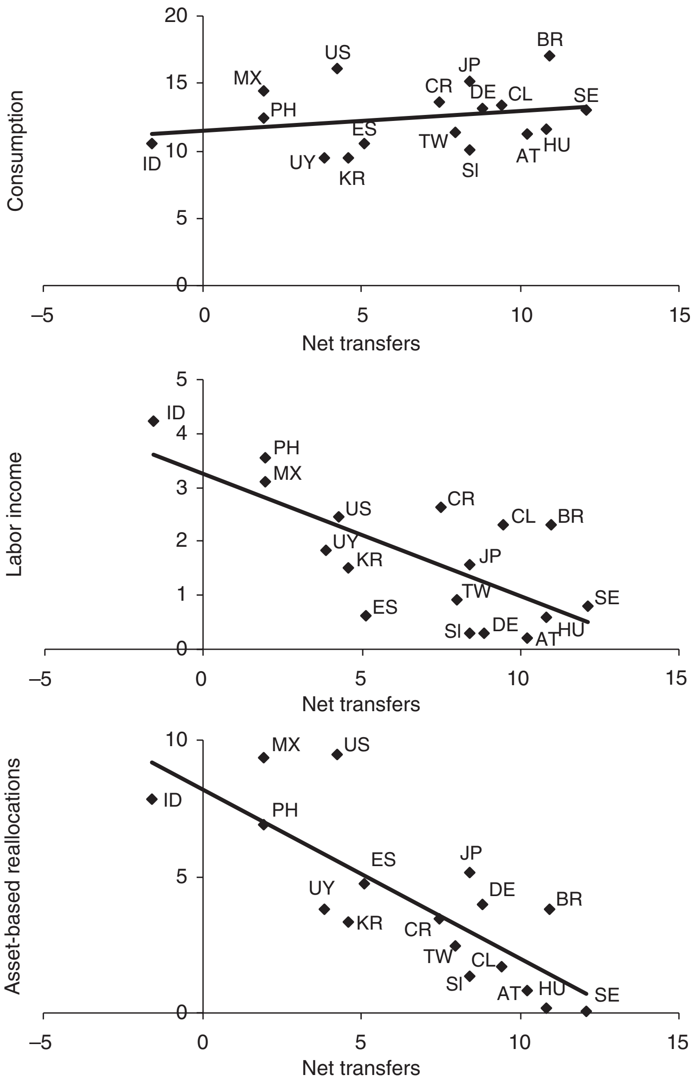
Note: Values are normalized on mean labor income of those 30–49. Units are years of prime-age adult labor income.

Figure 9.5 Asset income and saving: synthetic cohort values for those 65 and older: 17 economies around 2000

whereas the simple correlation between asset income and asset-based reallocations is 0.54. In countries where the elderly rely heavily on asset-based flows, they do so primarily because they have high asset income, not because they dissave or even because their saving is low. Of course, there are exceptions to this generalization. In the US, asset-based reallocations are high both because asset income is high and saving is low. In Chile, asset-based reallocations are low even though asset income is high, because saving is also high.

In Figure 9.6 the synthetic cohort values of consumption, labor income, and asset-based reallocations are plotted against net transfers. The flow constraint requires that consumption equal the sum of the three sources of funding. Thus an increase in net transfers must be matched by an equivalent increase in consumption, an equivalent decrease in asset-based reallocations, an equivalent decrease in labor income, or some combination of the three.

On average, countries with net transfers greater by one unit have asset-based flows that are lower by 0.62 units and labor income that is lower by 0.23 units. Consumption is higher by 0.15 units, but the relationship between net transfers and consumption is very weak. In countries where



Note: See the note in Figure 9.3 for the names of the economies abbreviated here. Units are years of prime-age adult labor income.

Figure 9.6 Consumption, labor income, and asset-based reallocations versus net transfers: synthetic cohort values for persons 65 and older: 17 economies around 2000 transfers to the elderly are more prevalent, the elderly have lower labor income and asset-based reallocations.

An important question is whether the asset-based reallocations are higher because of differences in asset income or differences in saving. The elderly may respond to receiving large net transfers by accumulating more wealth so as to leave larger bequests to their descendants, compensating them for the burden of larger transfer programs. This is the kind of response one would expect if intergenerational altruism were very strong, as envisioned by Barro (1974). In this case, an increase in net transfers should lead to greater saving. An alternative hypothesis is that workers in countries with large transfer systems will accumulate less toward their retirement than they would if transfer systems were smaller (Feldstein 1974). If so, the elderly will have fewer assets and lower asset income in countries where they have high net transfers.

On average, in countries where net transfers to the elderly are higher by one unit, saving is higher by 0.38 units and asset income is lower by 0.24 units. Neither of the estimates is statistically significant, however. Hence the aggregate data provide no guidance about why the elderly rely less on assets in countries where net transfers to the elderly are large than they do elsewhere. Moreover, interpreting the results in Figure 9.6 is fraught with problems because of uncertainty of causal direction, the possibility of spurious correlation, and so forth. The important point is that in the aggregate data we see strong trade-offs between net transfers to the elderly on the one hand and labor income and asset-based flows on the other. Why this occurs cannot be settled using these data.

CONCLUSIONS

Understanding how assets are accumulated, used, and conveyed to subsequent generations is important but complex. The estimates presented here are subject to the same caveats that apply to other parts of National Transfer Accounts, but there are also issues that are particularly salient with asset-based flows. Many important pieces of the puzzle must be inferred from partial and indirect information. In an ideal world we would follow individuals (or households) over time and have complete information about their assets and changes in the value of those assets due to saving, asset price changes, bequests, and other capital transfers. For a few countries this kind of information is available and can be used to explore some of the patterns that have been uncovered here. One issue that is particularly vexing is that so much economic activity occurs within households, where it is exceedingly difficult to assign assets and their associated flows. Despite these complexities, features of asset-based flows shown here are revealing.

Assets play two essential lifecycle roles. The first, emphasized in the lifecycle saving literature, is that the elderly rely on assets to meet their material needs when labor income is no longer sufficient and where transfer systems are modest in scale. The elderly rely heavily on transfers and little on assets in Europe and parts of Latin America, but less so in Asia and the United States. In Asian countries other than Japan, the elderly depend to some extent on familial transfers rather than on public transfer systems. Nevertheless, public and private transfers combined in Asia do not reach the level of net transfers in many European and some Latin American countries. Assets are more important than transfers for the elderly in Asia. Perhaps in some low-income countries with small public sectors, the elderly rely primarily on their families for old-age support; but in the lower- and upper-middle income countries in our study the elderly rely heavily on assets rather than on familial support. We find this to be especially the case in Indonesia, the Philippines, and Mexico.

In almost every country the elderly rely on asset income, not dissaving, to support themselves in old age. This point is critical to an understanding of the macroeconomic implications of population aging. The widely held view that population aging will lead to a decline in wealth is not supported by the evidence at hand.

The second role of assets has gone largely unrecognized. Working-age adults rely on assets to fund the heavy financial burden they face. They must provide for their own consumption, support their children, and in many countries support the elderly. In almost every country, working-age adults rely on asset income to fill the gap between their labor income on the one hand and consumption and transfers on the other. This phenomenon is characteristic of nearly every country in our study, but it is particularly pronounced in countries where working-age adults face high childrearing costs due to high levels of child dependency.

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NOTES

1. The quantity of assets held can also be affected by wars, natural disasters, and other non-economic events. These changes, referred to as holding gains or losses in the System of National Accounts, are not included in the National Transfer Flow Account.
2. General equilibrium effects, for example, changes in economic growth rates and rates of return, add considerable complexity to the response.
3. The economies for which estimates are available are reported in Figure 9.1.
4. Public asset-based reallocations are not zero for children in economies that tax consumption.
5. An important special case is golden rule growth. One of its features is that asset income and saving are equal; hence total asset-based reallocations are zero. In dynamically efficient economies, asset income exceeds or equals saving, and hence total asset-based reallocations are greater than or equal to zero. If saving exceeds asset income, the economy is dynamically inefficient, which means that consumption can be raised in every period by reducing the aggregate saving rate. Among the economies in this study, saving exceeds asset income only in China.
6. This age span is selected on the basis of a typical average age of childbearing of 30 and a 20-year childrearing span. Given these conditions, parents of dependent children would be in the 30–49 age span. (But if 30 is the average, and the span is, say, 20–40, then this range would be 20–60, with a hump in the middle. But probably this would not have much effect on the calculation.)
7. The residuals exhibit a great deal of heteroskedasticity in this figure, but we are not presenting standard errors or conducting hypothesis testing and, hence, have not corrected for it.
8. US survival rates are mid-range among the economies being analyzed.
9. A triangle plot is used in Chapter 1 to document the three components of the lifecycle deficit: asset-based reallocations, private transfers, and public transfers. Here, public and private transfers are combined to emphasize the components of consumption.

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PART III

Country studies of age and the macroeconomy

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A. Overviews of the generational economy

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10. How intergenerational transfers finance the lifecycle deficit in Spain

Concepció Patxot, Elisenda Rentería, Miguel Sánchez-Romero, and Guadalupe Souto

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Spain has experienced rapid economic development and demographic change in recent decades. In 1986 it joined the European Economic Community (the predecessor of the European Union), and it has belonged to the European Monetary Union since 2002. The country is undergoing one of the fastest aging processes in Europe. In recent years it has also experienced a huge inflow of immigrants. There is growing concern about how all these demographic changes are going to affect Spain's welfare system and its policies for supporting the elderly and investing in human capital, particularly children.

Our estimates of the national transfers among age groups refer to Spain in the year 2000 and are based on the methodology proposed by Lee and Mason (2004) and Mason et al. (2009). They indicate a lifecycle surplus for ages 27–57, while other ages are dependent. During childhood and youth, private transfers finance two thirds of individual consumption, whereas public transfers finance only a third, through education and health systems. Older people finance their lifecycle deficit mainly through asset-based reallocations, followed by public transfers in the form of pensions and health benefits. Surprisingly, the elderly are net payers of private transfers, which implies that they transfer money or housing services to young family members. This result could be explained by the high proportion of co-resident elderly. Together with the finding that all individuals over age 16 pay and receive private transfers, it indicates that intergenerational sharing tends to be mutual in Spain.

DEMOGRAPHIC CHARACTERISTICS AND TRENDS

Compared with its neighbors, Spain has experienced a late demographic transition and with very different characteristics (Perez 2001). As a result, its aging process started later. In 1970 Spain had the second highest fertility rate in Europe (only behind that of Ireland), but the pace of its fertility decline during recent decades has been very rapid and the degree of the decline has been extreme. Currently Spain has one of the world's lowest fertility rates (Grant et al. 2004). It fell to 1.16 births per woman in 1996, although by 2006 it had risen again to 1.38. Moreover, Spain has one of the highest life expectancies in the world – for women in 2005 it was 83.5 years – something that reinforces aging trends.

The combination of rapid fertility decline and greater longevity has caused one of the fastest aging processes among European countries. In Spain it took only 45 years for the proportion of the population aged 65 and over to rise from 7% to 14%, whereas in France it took 115 years to reach that proportion (Kinsella and Velkoff 2001, p. 13). By 2000 the proportion of people older than 65 was already greater than the proportion of people younger than 15. This was happening in just five other countries – Bulgaria, Germany, Greece, Italy, and Japan (Kinsella and Velkoff 2001, p. 10).

This aging process has been slowed by recent migration trends. The stock of immigrants in Spain jumped from fewer than 1 million in 1997 to more than 5 million in 2006 and now represents more than 10% of the total population. Hence, in less than a decade Spain received a share of immigrants in its population close to that held by traditional immigrant-receiving European countries such as Germany. Although immigration can help to overcome the effects of the aging process by reducing the share of elderly individuals in a population and by increasing the fertility rate, most of Spain's immigrants are close to baby boomers in age. This means that in the near future those individuals of working age will become part of the growing share of elderly in the population, thus accelerating the aging process.

ECONOMIC SETTING

Spain's economic evolution has been quite positive in recent years. Between 1995 and 2006, its Gross Domestic Product grew by about 50% in real terms, while the mean GDP for the EU15 grew by less than 30%. Other economic indicators improved considerably as well: the unemployment rate went from 22% in 1995 to 8% in 2007, and the participation rate rose to 59% from 50% in the same period. The increase in employment was driven mainly by increases in women's and foreign workers' participation. Nevertheless, female employment rates remain among the lowest of the European Union.

Spain's GDP per capita is close to the European Union average. By 2007 it was more than 95% of the EU15 average, whereas in 1986 it had been only 75% of the average for those countries. Similarly, it is close to the average for OECD countries.

Social Insurance

The Spanish welfare state is based on a variety of expenditure programs, which effect a major redistribution of resources among individuals. The public pension system is the largest of these, entailing an annual expenditure of about 10% of GDP. It is organized on a pay-as-you-go basis under a defined-benefit scheme. It has a contributory part, in which benefits depend on years contributed and past contributions. It also has a non-contributory part, which provides a means-tested minimum income for people without earnings-related pension benefits. The general pension scheme is mandatory for all employees and the self-employed; it covers retirement pensions, disability, survivors, and risks such as maternity leave and temporary disability. There are additional supplementary pension plans, such as occupational schemes and individual pension plans, but their coverage is quite limited. Currently the public contributory system provides a high replacement rate – over 90% – for low and average wages, but not for high wages because there are ceilings on benefits. The living standard of people aged 65 and over is about 78% of that for the population aged 0–64, while their risk of poverty is more than 25%, considerably higher than the 20% for the general population.

Health care, the second major component of the Spanish welfare state, is basically publicly financed: only 30% of total health care expenditure is private. The public system is organized as a National Health Service; that is, it provides assistance to the whole population and is financed through general public revenues. Public expenditure on health represents over 6% of GDP, whereas in 1970 it accounted for only 2.4%. This is a common trend in most developed countries, where health care spending has been rising steadily; this growth is expected to continue not only because of demographic trends, but also because of other factors such as technological advances and the demand for better health care.[1]

The education system can be considered as the third pillar of the Spanish welfare system. It is mainly publicly financed, representing 10% of total public expenditure (5% of GDP). Compulsory education in Spain starts at age 6 and ends at age 16, covering primary and lower-secondary education. Pre-primary education for children of ages 3–5 is also publicly financed, although voluntary, as is upper-secondary education. Tertiary education is only partly publicly financed because students who attend public institutions of higher learning assume some of the cost. Enrollment rates are practically 100% for the compulsory stages, and high also for the voluntary ones. For example, enrollment rates for tertiary education are above 40%, similar to those of France or Germany, but below those of Sweden, Denmark, and Norway, which are above 60%.

Other social programs, such as unemployment protection, subsidies for families, and long-term care, complete the Spanish welfare state. Long-term care began to be regulated only in 2007, and no clear financial counterpart has been assigned to it.[2] Probably the welfare state is not as generous in Spain as in other European countries, but it certainly will face challenges posed by aging in the near future. Possibly some potential savings in education expenditure and other expenditure programs directed to the young could help to overcome the increase in other expenditures due to aging. But these savings would never be sufficient to compensate for the huge increases expected in pension and health care programs. Furthermore, the low level of expenditure on the young in Spain – the share of GDP devoted to family programs is around 0.5%, compared with the EU average of more than 2% – demands an additional effort, especially if there is an attempt to foster a recovery of Spain's extremely low fertility rate.[3]

The Tax System

The Spanish tax and contribution system has not had major changes in recent years. Workers' and employees' contributions to the Social Security System are the main source of fiscal revenues, representing more than 37% of the total in 2000 (nearly 13% of GDP). The total contribution rate, which has not changed in recent decades, is 28.6% of the gross wage.[4] Contributions are assigned to finance contributory pensions and unemployment subsidies. Taxes on production and imports are the second source of public revenues, representing one third of total fiscal revenue. Value-added tax (VAT), introduced in 1986, is the major figure in this category. Finally, taxes on income and wealth contribute nearly 30% of fiscal revenues; personal income tax is the largest, approximately double the corporate income tax rate.

NATIONAL TRANSFER ACCOUNTS FOR SPAIN IN 2000

The NTA estimation for Spain starts from the macro-aggregates published by the National Statistical Office (INE 2000a) and the government's accounting office (IGAE 2003), reclassified in the standard way to meet the available microprofiles. Several microdata sets are used to construct age profiles.

For computing age profiles, we started with the generational accounting age profiles obtained by Abío et al. (2003, 2005). We also needed to obtain profiles for the private economic lifecycle, and therefore some of the tax and transfer profiles were recalculated in accordance with it. We tried to use microdata close to the base year of our computation, 2000. Spain has no single household survey that includes both reliable income and consumption data. Hence we combined information from the two main Spanish household surveys conducted in that year, the Encuesta Continua de Presupuestos Familiares (Continuous Survey of Family Budgets, or ECPF), a household consumption survey, and the EU Household Panel, which focused more on income data.[5] We used official data based on the whole population when they were available. Details on the estimation procedure in each case are given in Patxot et al. (2010).

Economic Lifecycle Deficit

Consumption

Consumption profiles by age were divided into public and private consumption. We further broke down both categories into more detailed categories, depending on data availability.

For private consumption, we estimated profiles of expenditure on health, education, housing, and other consumption.[6] For all profiles, our data base was the ECPF household consumption survey of 2000 (INE 2000b).

We divided public consumption into health, education, and other public expenses. We further divided information on public health consumption into four items, three of which allow for an age allocation. Hospital use and specialist assistance, primary health care, and pharmaceutical products together represent more than 90% of total health expenditure – 54%, 22%, and 15%, respectively. The rest is for general services and other general expenditure. The Ministry of Health and Consumption provides this information, and we followed Ahn et al. (2005) in allocating health expenditures by age. For the long-term care age profile we followed Costa and Patxot (2004, 2005), Pickard et al. (2007), and Comas-Herrera et al. (2006). For public expenditures on education we used information published by the Ministry of Education and Culture about public expenditures on state-run and private schools by level of education, combined with information on the number of students enrolled by school type (private, state-subsidized, and state-funded) and information about

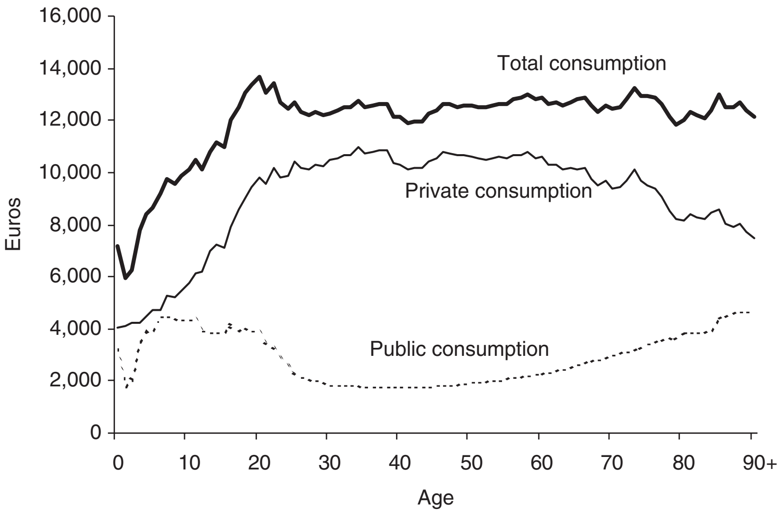

Figure 10.1 Per capita profiles of consumption: Spain, 2000

cost per enrolled university student. Finally, we computed the per capita amount of 'other' public consumption by dividing the aggregate public consumption, which was not allocated by age in the above-mentioned categories, among the total population.

Figure 10.1 presents the per capita age profiles obtained for consumption. Within the category of private consumption, other consumption has the biggest share, compared with health, education, and private capital consumption. Children's private consumption is low because of the equivalence scale used, assigning less consumption to children and youths than to adults. A peculiar result is that private consumption begins to decline from age 58. We would expect continuity or even a rise in private consumption because at older ages people demand more health care and other types of services. Two possible explanations are that a large share of health consumption in Spain is still public and that the care for the elderly is done inside the family.

In the case of public consumption, not surprisingly, the working-age group consumes less than other age groups. This is because children consume more state-run education and the elderly consume more health services and goods. It cannot be seen in this graphic, but there is a peak in health consumption during the first year of life due to birth-related services, and health care expenditures grow smoothly with age, whereas education consumption is more concentrated at certain ages and falls drastically after age 20. This result contrasts with the finding that private

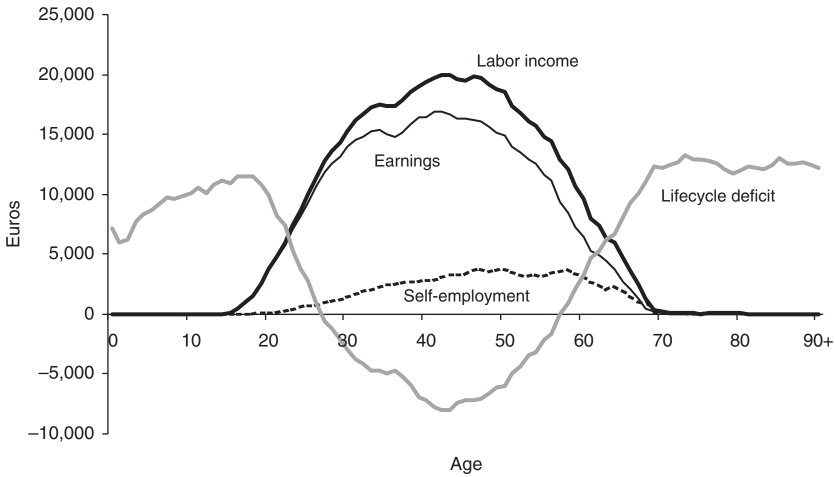

Figure 10.2 Per capita profiles of labor income: Spain, 2000

education consumption remains high until age 25. Values are also higher for state-funded than for private health and education consumption.

Labor income

There is no reliable information about individual income in the ECPF,[7] and so we used the 2000 round of the EU Household Panel. This survey collects information about all kinds of income on an individual and household level, although it does not have any information about consumption. Using NTA methodology, we divided labor income into earnings and self-employment income.

Figure 10.2, which shows the labor income age profile, indicates that the earnings profile starts at age 14 and rises quickly with age. The peak of earnings is at age 43. Self-employment income starts at 20 and rises slowly with age, having its peak at 58. Both age profiles end at 70. That may be due to Spain's legislation on retirement, which used to prohibit receiving a retirement benefit while continuing to work. The share of self-employment income in total labor income is higher in Spain (17% for ages 30–50) than in Northern and Central European countries, where it is usually less than 10%.

The lifecycle deficit resulting from the consumption and labor income profiles obtained above is also shown in Figure 10.2. As expected, we see a surplus for working-age adults and a deficit for dependent age groups – children and the elderly. The lifecycle deficit is greater among the elderly than among children. The surplus starts at age 27 and ends at age 57, spanning a period of 30 years. In other words, during 30 years people in Spain earn more income than they consume.

Net Public Transfers

Public transfers are composed of in-kind and cash transfers. The former show the same age profile as consumption of publicly provided education, health, and other items, as explained above. We divided cash transfers into several items, following Abío et al. (2005), as explained below.

Public transfers received

Profiles of average pension receipts classified by age and sex are available for 2000 from administrative data compiled by the Ministry of Work and Social Affairs for various pension categories, contributory and non-contributory, including retirement, disability, and survivors (widows, orphans, and other economically dependent relatives). Similarly, we used data provided by the Instituto Nacional de Empleo (INEM) on average monthly gross unemployment income by age and sex in 2000 to construct profiles of persons receiving unemployment benefits. With respect to maternity benefits, given the absence of information about recipients by age, our imputation procedure relied on observed age-specific fertility rates.[8] Similarly, as direct evidence on sickness benefits was unavailable, we assigned transfers using age-related data on industrial accidents during the working day and the average period of discharge reported in 2002 by the Ministry of Work and Social Affairs. Finally, child benefits combine contributory and non-contributory payments. We imputed them using the total amount given to those below and above 18 years of age, the latter group consisting of handicapped persons.

Figure 10.3 shows the age profiles obtained for public cash inflows by category. Retirement benefits predominate, going to people over age 55, and especially to those over 65. Survivor pensions are the second source of public transfers for people over 60, and we can see a pattern of substitution among retirement and survivor pensions, due mainly to the fact that, on average, men die before their wives, who then start receiving a survivor's pension. Unemployment and disability benefits are received by working-age individuals. Other types of public benefits, such as non-contributory pensions, family aid, or maternity benefits, are not salient in the Spanish system.

Public taxes paid

In the case of outflows to the government, the control aggregates are the aggregate values from National Accounts published by the INE (2000a).

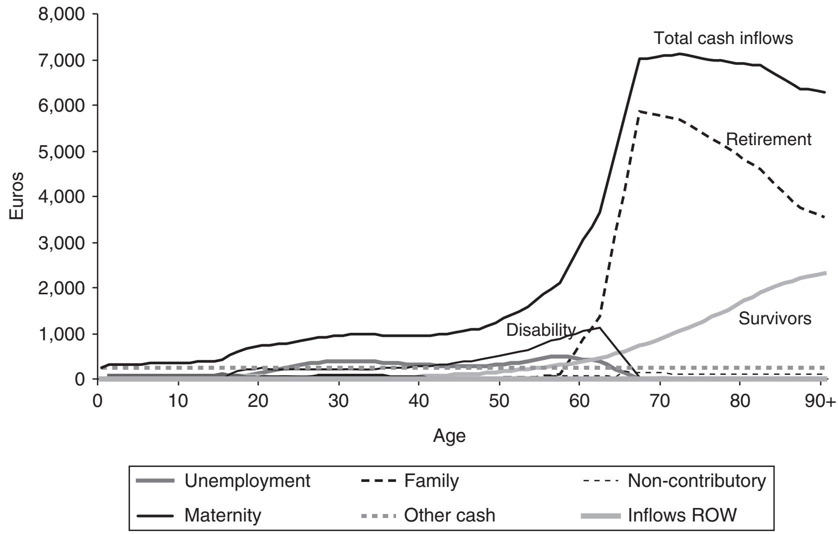

Figure 10.3 Per capita public cash inflows (transfers): Spain, 2000

Because the System of National Accounts of the United Nations does not have complete information for Spain on public taxes paid by age of taxpayers, we extracted the age profiles from either the ECPF or the EU Household Panel, as explained below. For the valued-added tax, we based the allocation procedure on the consumption profiles derived from the ECPF. We separated excise taxes (on tobacco, beer, other alcoholic drinks, and petroleum) because they had both an identifiable separate aggregate profile and an individual-level age profile. Our personal income tax profiles came from Abío et al. (2005), who aimed to reproduce the 1998 individual personal income tax return using data from the EU Household Panel. The remaining taxes were derived from the other profiles described.

Figure 10.4 shows the per capita profiles obtained for the various taxes. As expected, they are concentrated in working ages, when individuals contribute to the Social Security System and have assets and labor income.

Net Private Transfers

We decomposed private transfers into those occurring within and between households. Following NTA standards, we first estimated inter-household transfers, as they are necessary for estimating intra-household transfers. For this we turned to the EU Household Panel, the sole source for information on inflows, and to the ECPF, the sole source for information on outflows.

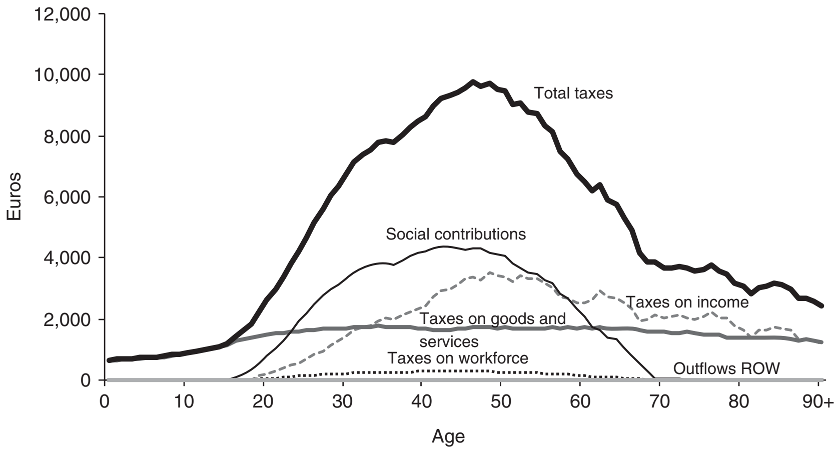

Figure 10.4 Per capita public transfer outflows (taxes): Spain, 2000

The limited data available constrain the estimation of intra-household transfers in Spain to a greater extent than elsewhere in Europe, as for this purpose it is crucial to have a single survey that provides both income and consumption data as established in the standard NTA method. We therefore combined consumption information from ECPF with income and public inflows information from the EU Household Panel. Our reference survey was the EU Household Panel, and we imputed consumption information to each household member using ECPF profiles.[9]

The resulting profile for private transfers (Figure 10.5) indicates that the only net recipients of family transfers are children and people younger than 28. The elderly, especially those over age 80, give more transfers to other family members than they receive, despite not having labor income. This negative net transfer flow for the elderly can possibly be explained by the fact that elderly household arrangements in Spain include a high share of cohabitation (40% of individuals of age 65+ lived with two or more other people in the early 1990s, according to Kinsella and Velkoff 2001, p. 67) as compared with other European countries.

Asset-based Reallocations

The computation of asset-based reallocations requires as an input an age profile for private capital income, while the profile for savings is then obtained as a residual. Nevertheless, the whole ABR profile can also be obtained as a residual of the lifecycle surplus/deficit profile and the

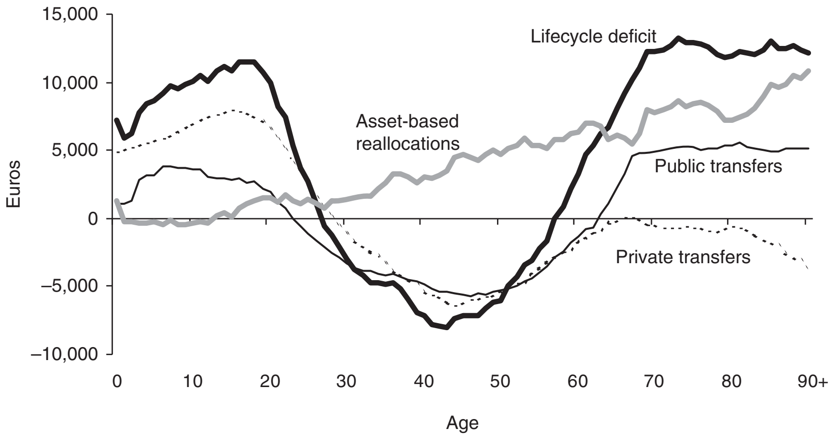

Figure 10.5 Per capita National Transfer Accounts: Spain, 2000

transfer profiles (both public and private). In the present study we have taken this approach.

National Transfer Accounts Summarized

Figure 10.5 shows the complete National Transfer Accounts obtained for Spain. It plots the lifecycle deficit together with the three possible ways of reallocating resources between age groups: public transfers, private transfers, or asset-based reallocations. The figure is quite illustrative. First, as seen above, the lifecycle deficit is a surplus only from age 27 to 57. Second, as a consequence of this dependence, the young and the old receive net transfers from the government, whereas they contribute during the productive ages. Nevertheless, the cutting ages for the lifecycle deficit and public transfers are quite different, owing to the role of the other age-reallocation devices, that is, asset-based reallocations and private transfers.

If we consider strictly lifecycle savings, the natural age shape of asset-based reallocations is at first negative, as there are no assets or asset income, while savings start being positive. Later, as wealth increases and asset income starts being positive, asset-based reallocations can continue being negative as long as savings exceed asset income – meaning that a share of labor income is used to save – or they can be nil if all asset income is saved. The absence of a negative initial asset-based reallocation can be due either to a bequest received that generates asset income higher than savings or to the fact that adults become indebted to finance their consumption and transfers to their children. Intergenerational transfers can interact in many more ways as, together with bequests, *inter vivos* transfers can occur from grandparents to children or grandchildren, or from children to parents. In our case the asset-based reallocation is for the moment obtained as a residual; hence we cannot be sure about the reason for its monotonically increasing shape. Probably the co-resident elderly play a role, as suggested by the positive transfers given by the elderly shown in the private transfer profile.

Information given in Figure 10.5 can be further summarized as follows: during childhood, private family transfers are the main source of consumption, representing 69% of the total lifecycle deficit at these ages. Public transfers, mainly in the form of health and education services for children, represent 32% of the lifecycle deficit, and asset-based reallocation is practically non-existent. However, asset-based reallocation is the main source of financing the lifecycle deficit of the elderly, representing two thirds of it. Public transfers are the second source of finance, amounting to 41%, whereas private transfers are negative; that is, the elderly make more transfers than they receive.

CONCLUDING REMARKS

The NTA estimation for Spain in 2000 leads to several interesting conclusions. First, only for ages 27–57 is labor income higher than consumption expenditure, allowing for a surplus. This surplus is in part transferred to the government in the form of taxes, while the rest can be transferred to other family members or saved. The characteristics of young and old dependents, however, are quite different. During childhood and youth, individual consumption is financed mainly by private transfers from the adult family members. The private transfers received are highest for individuals of ages 13–18. Public transfers are substantially less important, and they are mainly in-kind, through education and health systems, because in 2000 direct aid to families had not yet been developed. In contrast, older people finance their lifecycle deficit mainly through asset-based reallocations. In fact, the asset-based reallocation age profile is practically zero until age 20; but it grows continuously afterward, showing no decrease at the end. Public transfers are also a major source of support to the elderly because the cash public transfers especially benefit older people through the retirement and survivor pension system. Besides, the elderly are the main beneficiaries of substantial in-kind transfers, such as health care and long-term care.

Nevertheless, we find that the elderly are net payers of private transfers, implying that they transfer money or housing services to the young members of their families. As mentioned before, this surprising result could be due to the high proportion of people 65 years old or older who live in households with more than two people and are usually the homeowners. It is surprising, as we noted in the introduction, given that the living standard of people aged 65 and older is only about 78% of that of the population aged 0–64, and their risk of poverty is more than 25%.

We also observe that all individuals older than 16 both pay and receive private transfers. Although the balance is always negative from age 28 on, when they pay more than they receive, it seems clear that private support tends to be mutual. This is a typical situation in Latin American countries, indicating that Spain lies midway between the Northern European countries and Latin America in this regard.

ACKNOWLEDGMENTS

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NOTES

1. See Abío (2006) for an analysis of future perspectives on Spanish health care expenditure.
2. The coverage of the public LTC system was very limited in the base year, 2000, while most dependent elderly relied on informal care. Costa and Patxot (2004) estimate, in a generational accounting framework, that the effect of extending the public coverage to all dependents almost triples intertemporal debt.
3. See Patxot and Farré (2007) for a generational accounting simulation of the effects of converging to European standards in education, family programs, and long-term care.
4. Contribution rates differ in some special cases.
5. The ECPF, conducted by the INE (2000b), started in 1985, was revised in 1997, and ended in 2005. It followed a family for eight quarters. We selected only those families that had participated during the four quarters of 2000, so that our sample comprises 3766 households and 11 842 individuals. Data from the EU Household Panel, conducted by the European Commission's Eurostat, are available for the period 1996–2001. Abío et al. (2005) used the 1998 data set from the EU Household Panel, whereas we used the 2000 data set.
6. The last includes the estimated consumption flow of owner-occupied housing, while the actual rent paid is considered as other private consumption, in accordance with NTA methodology.
7. Only total household labor income is collected, and it seems to be seriously underreported.

8. We followed the standard NTA assumption. Alternatively, one could consider newborns as the ultimate beneficiaries.
9. As a consequence, all variables are taken from the EU Household Panel to avoid further distortions.

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11. National Transfer Accounts for Austria: low levels of education and the generosity of the social security system

Jože Sambt and Alexia Prskawetz

Population aging implies a pronounced increase of dependent elderly (persons older than 65 years) in Austria, rising from 17.6% in 2010 to 28% by 2050. Since most of the lifecycle deficit of the elderly is currently covered by public transfers, the sustainability of Austria's generous welfare system is under pressure. Low levels of education and early exits from the labor market are peculiarities shaping the age profiles of the National Transfer Accounts of Austria.

Persistent low fertility (Prskawetz et al. 2008), together with low mortality and moderate migration, implies pronounced population aging during the next decades in Austria. Given a generous social security system that builds on the contributions of those in the workforce, the projected shrinkage of the working-age population and the continued increase in the proportion of dependent elderly will exert pronounced pressures on Austria's welfare system. Early exits from the labor market further reduce the potential base of contributors and increase the pool of dependents.

We highlight the components of the NTA for Austria resulting from the current demographic situation and the prevailing institutional setting, focusing in particular on the low labor force participation and low levels of education still prevailing in Austria. We first summarize the demographic situation and briefly describe the insurance system. Then we present our estimations of the age profiles.

THE DEMOGRAPHIC SITUATION

After World War II the population of Austria stagnated at slightly below 7 million until the end of the 1950s. Ever since, Austria has been a country of net in-migration. The total population size reached 8.38 million in January 2010.

With the exception of migration, main population trends in Austria have remained unchanged since the mid-1980s. After the baby boom peaked in the early 1960s, a substantial fertility decline took place, which lasted until the mid-1980s. Since then Austria has recorded low and relatively stable fertility, with the period total fertility rate hovering around 1.3 to 1.5 births per woman. Austria has a long history of sub-replacement fertility; completed fertility fell well below two children per woman during the first years of the twentieth century and rose only temporarily above that level among the 1917–46 birth cohorts. Since 1970, life expectancy at birth has risen annually, reaching 77.4 for males and 82.9 years for females in 2009. The number of years a person may still expect to live at the retirement age of 65 increased as well, reaching 17.5 years for men and 20.8 years for women in 2009.

According to the most recent official projections for the years 2009–50 by Statistics Austria (2009), the population will grow, with decreasing increments, to 9.47 million in 2050 – that is, by about 12.7% as compared with the population of 2010. As the number of persons older than 65 will increase by 80% over the same period, demographic aging is inevitable. The proportion of elderly (65+) people will rise from 17.6% in 2010 to 28% by 2050. The share of the working-age population (20–64 years) will increase slightly until 2012 and then decrease by 7.7% until 2050 (from 61.9% to 57.1%), whereas the share of the population below age 20 has already started to decline.

THE AUSTRIAN INSURANCE SYSTEM

Social security in Austria is a public welfare system that comprises health insurance (health services are provided for illness, invalidism, maternity, unemployment, old age, and death), accident insurance, and pension insurance. Social insurance is compulsory and linked to gainful employment. Contributions are based on income, with a top threshold in 2010 of 4110 euros of gross monthly income for employed workers and 4795 euros for the self-employed and farmers. In addition, there are special regulations for old-age pensioners and the unemployed. For those who do not work, self-insurance is possible (FMOHW 2005). Funding social security by taxing fringe benefits (i.e., non-wage labor costs or associated employer outlays) raises the price of labor. Higher unemployment rates and lower labor force participation rates are often associated with these institutional frameworks.

The generosity of the Austrian welfare system led to an acceleration of social expenditures during recent decades, in particular through an increase in eligibility and new entitlements due to population aging and increasing unemployment. In this regard the low labor force participation of the elderly in Austria is of great concern, and it is attributed to the disincentives generated by the Austrian pension system (Hofer and Koman 2006; Keuschnigg et al. 2000). Although the statutory retirement age is 65 years for men and 60 years for women, the actual average retirement age (excluding civil servants) fell from 61.9 to 58.4 for men and from 60.4 to 56.7 for women between 1970 and 1999. The shares of disability pensions, early retirement, and survivor benefits for spouses and children are high as compared with other European countries.

Government spending amounted to 2.9% of Gross Domestic Product in 2005 for family benefits in cash, services, and tax measures; 5% of GDP in 2005 for expenditures on education; 8.1% of GDP in 2008 for health care; and 13.3% of GDP in 2008 for pensions. A growing part of spending must be covered out of general taxes rather than contributions. The sustainability gap of the pension system has become the major source of fiscal imbalance in Austria (Hofer and Koman 2006). Currently several reforms of the social insurance system are under way. The pension reforms initiated since the late 1990s aim to create a closer link between contributions and benefits, make earlier retirement less attractive, and harmonize pension systems. In particular the pension system for civil servants was changed to conform to the general system.

On the public transfer outflow side, the main taxes in Austria in 2009 were the value-added tax and the wage tax, which respectively accounted for 29% and 27.5% of all tax receipts, or 8% and 7.6% of GDP. The corporation tax (*Körperschaftsteuer*) and individual income tax (*Einkommensteuer*) accounted respectively for 5.5% and 4% of all tax receipts, or 1.5% and 1.1% of GDP. Government revenues reached 42.3% of GDP in 2009, of which 27.5% of GDP were taxes and 14.8% social contributions. Austria's tax system is characterized by a high tax burden on labor and a low tax charge on assets, donations, inheritance, and estates; these sources contribute with only 1% to the total tax receipts.

ESTIMATING AGE PROFILES

In constructing NTA age profiles for Austria, we based most of our estimates on the Consumer Expenditure Survey (CES) of 1999–2000. It contains information on outflows (expenditures) of households and inflows

Figure 11.1 Per capita lifecycle deficit, labor income, and total consumption: Austria, 2000

(income) of household members. The CES data base contains 7098 observations for households and 20028 observations for individuals. Besides the CES, we used data from National Accounts and various other data sources – for example, health insurance files and data on education from Statistics Austria.

Lifecycle Deficit

The key outcome of the NTA accounts – the lifecycle deficit – is displayed along with labor income and total consumption in Figure 11.1. Surprisingly, already at age 21 the age profiles of consumption and income cross and the lifecycle deficit turns negative. This age is much lower than in the US (27); and it is also lower than in Taiwan (24) or Costa Rica (24), economies that are less developed. On the other hand, the age at which individuals in Austria become net consumers again (57) is to be expected, given the low labor force participation among the elderly. Austria's lifecycle surplus thus lasts about 36 years and has earlier than typical crossover ages among the economies analyzed so far.

The steep profile of labor income shown in Figure 11.1 reflects the profile of labor force participation among Austrians quite well. The age profile of consumption first increases and then flattens out during adult ages before it increases again for older ages.

Earnings Profiles and Labor Force Participation Rates

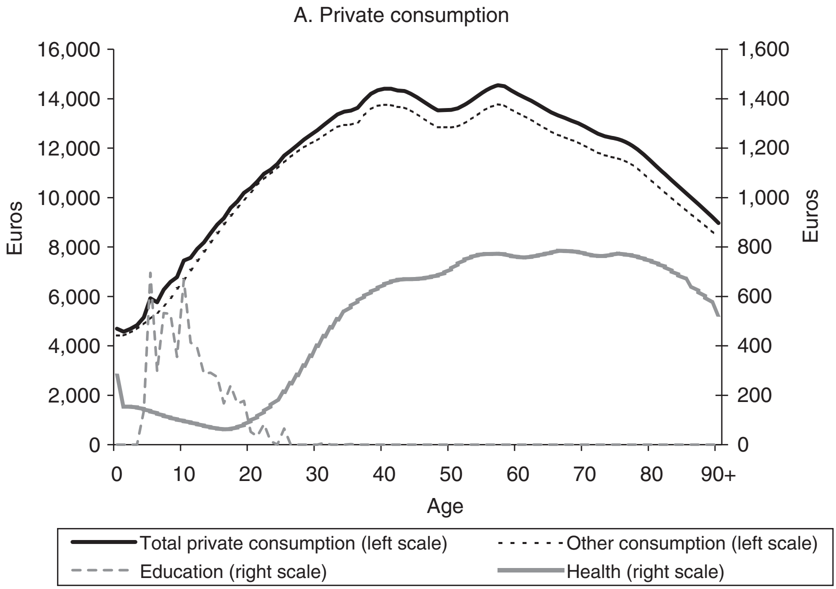
Peculiar to the Austrian case is the steep and early rise of earnings profiles at young ages. A closer look at the activity status by age reveals the rather low enrollment in higher education in Austria. From age 19 onward the share of persons earning income exceeds the share of persons in school. In contrast, labor force participation at older ages is rather low in Austria. From age 57 onward the share of pensioners exceeds the share of persons in employment. The already low overall labor force participation at age 55 can be partly explained by the low labor force participation of women in that cohort. (For more detailed information on labor income and the Austrian educational system, see the NTA Working Paper series on the NTA website.)

Components of Consumption

The components of the consumption profile (Figure 11.2) follow the age profiles commonly found in the literature: an inverse U-shaped profile for private consumption (Panel A) as opposed to the U-shaped age profile for public consumption (Panel B). Hence private and public consumption are good complements, implying a smoothing of consumption over the lifecycle. Only for young and older ages do public consumption expenses exceed private consumption outlays. Those expenses are mainly for education and health services.

The NTA distinguishes three components of private consumption: education, health, and other private consumption. Private educational consumption is concentrated mainly at primary school ages (6–10 years) and falls off thereafter, reaching low values from age 20 onward. Private health expenditures follow a U-shaped age profile, being high during the infant phase, decreasing during childhood, and starting to rise again in the early 20s. 'Other consumption', which uses the left scale of the figure, represents by far the largest category of total private consumption, determining the shape of that curve.

Public consumption is driven mainly by educational expenses in childhood and early adulthood, whereas health expenditures account for most public consumption at older ages. Public educational expenditures show an early peak between ages 10 and 15 and drop off sharply afterward. Public expenditures on education and health exceed private consumption for these categories at all ages. In the case of health expenditures the difference between public and private expenditures starts to increase in the early 40s.



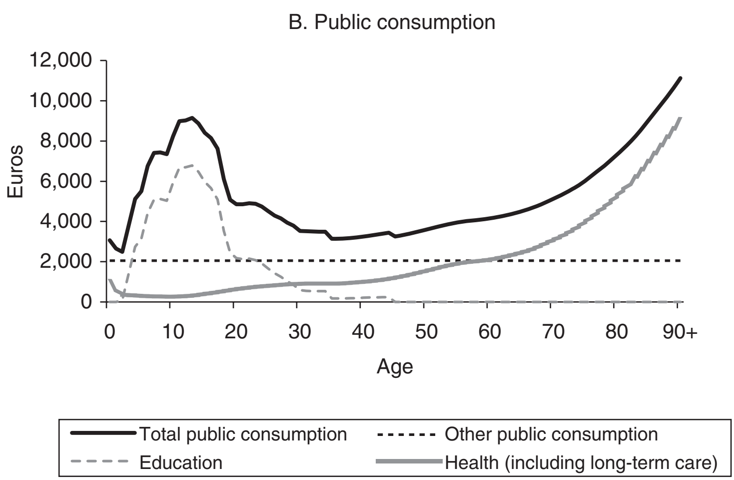


Figure 11.2 Per capita public and private consumption by age and component: Austria, 2000

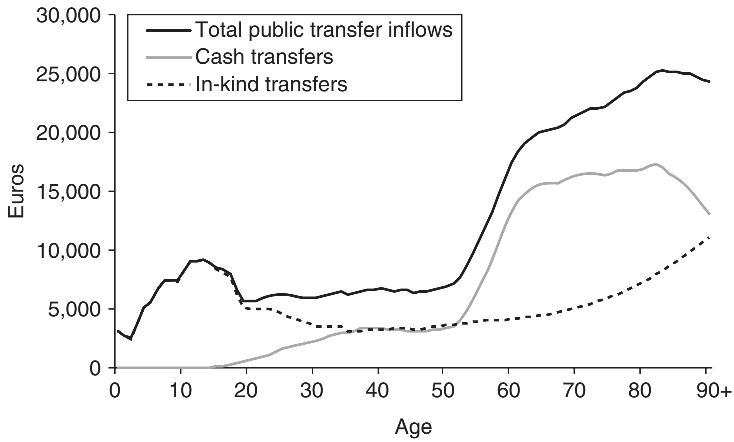


Figure 11.3 Per capita public inflows by age and component: Austria, 2000

Public Transfers

Public transfer inflows (Figure 11.3) are categorized as either cash or in-kind. Austrians retire early, many during their 50s, taking disability pensions or reduced pensions. Before retirement, in-kind transfers dominate; thereafter, cash transfers dominate because of large pensions and survivors' benefits.

The components of cash transfers are further decomposed in Figure 11.4. In billions of euros (calculated by multiplying the per capita values in Figure 11.4 by the population in each age group), the biggest share is public pensions and survivors' benefits (30.268), followed by family and children's allowances (5.389), sickness and disability benefits (3.333), unemployment benefits (2.868), and, lastly, other social protection inflows (0.268). Pension benefits strongly dominate other categories of cash transfers, although at higher ages their aggregate effect is diminished by the small number of people in those age groups.

Per capita total outflows (Figure 11.5) are concentrated in the working age group in the form of social contributions and taxes on income, profits, and capital gains. To estimate property income, we referred to surveys that included questions on 'income from rent and lease' and 'income from property/assets'. Taxes on property are negligible in Austria and are therefore included in the category of other revenues in Figure 11.5.

Figure 11.6, which charts the difference between public transfer outflows and inflows as net public transfers per capita, shows which age

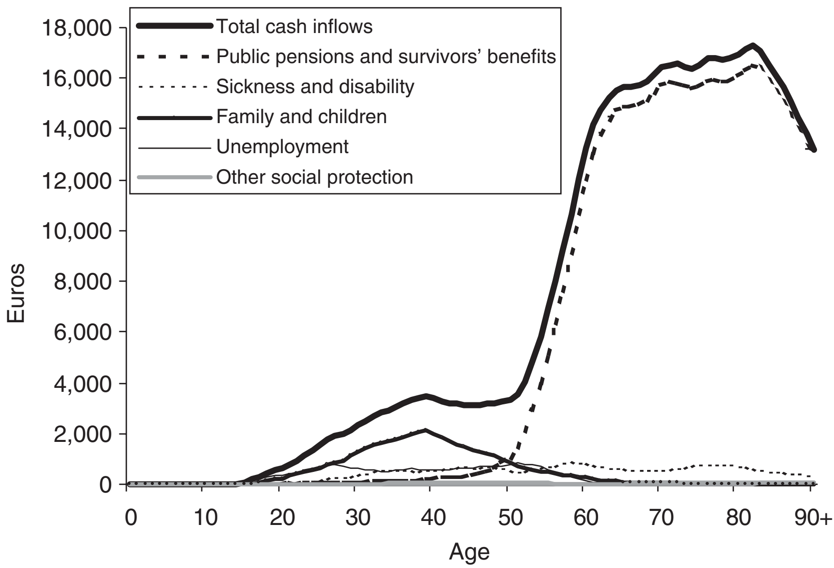


Figure 11.4 Per capita cash transfers by age and component: Austria, 2000

groups are taking (net) advantage of the public sector (both in-kind and cash benefits) and which age groups are (net) financers. This age profile resembles the age profile of the lifecycle deficit shown in Figure 11.1, but at different levels – especially for children, for whom a large share of consumption is financed through intra-household transfers and hence not included in Figure 11.6.

Private Transfers

Without having aggregate controls for transfers between households, we had to rely on survey data (CES). Outflows are heavily underreported in the CES since respondents were not required to report outflows because they do not constitute consumption expenditures. However, some of the respondents did report them, and those outflows were recorded as separate variables. Hence our inter-household outflow variable is greatly and systematically underreported. Nevertheless, we used its age profile, adjusting it to the aggregate amount of 2.586 billion euros, which we have derived as explained below. On the outflow side are the variables of 'money gifts' and 'donations' available and used, while on the inflow side are 'remaining private transfers from persons not living in the household'.

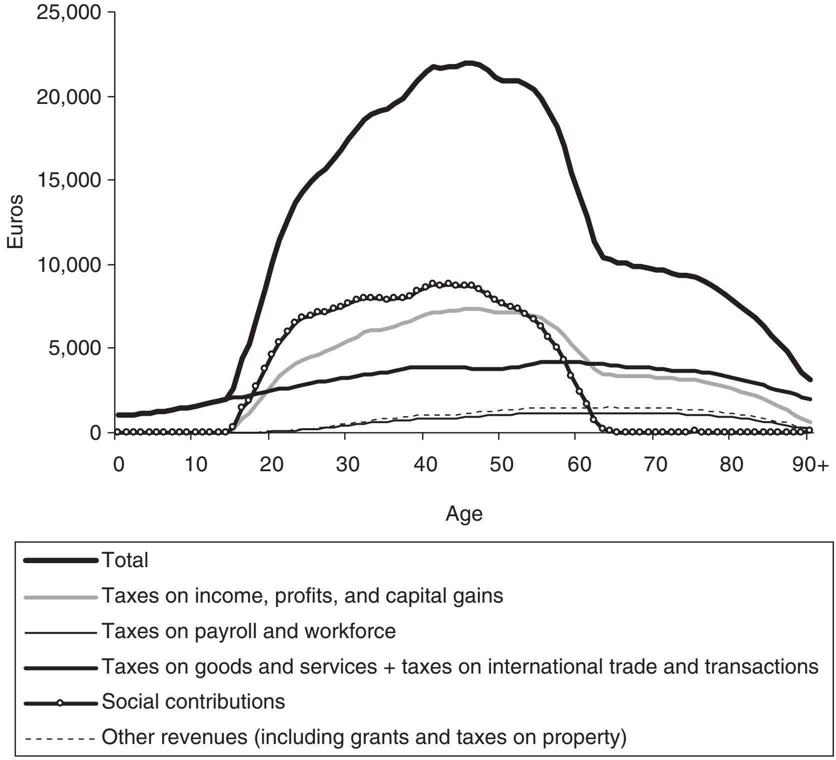


Figure 11.5 Per capita public transfer outflows by age and component: Austria, 2000

Because this selection of variables is somewhat arbitrary and it was necessary to estimate aggregate categories on the basis of survey data and corresponding survey weights, serious overestimation or underestimation is possible. Nevertheless, we estimate aggregate interhousehold inflows for the year 2000 at 1.169 billion euros. Net inter-household transfers, by definition, equal net private transfers from the rest of the world (ROW), for which the aggregate data are available in the National Accounts. For the year 2000 they amounted to −1.417 billion euros, the negative value meaning that outflows to ROW exceeded inflows from abroad. We know, however, that inter-household outflows should cover these net outflows to ROW (1.417 billion euros) and also domestic inter-household inflows (1.169 billion euros); thus together they are estimated to equal 2.586 billion euros, as already mentioned. We have used this value in the analysis, whereas the aggregate value of inter-household outflows that we

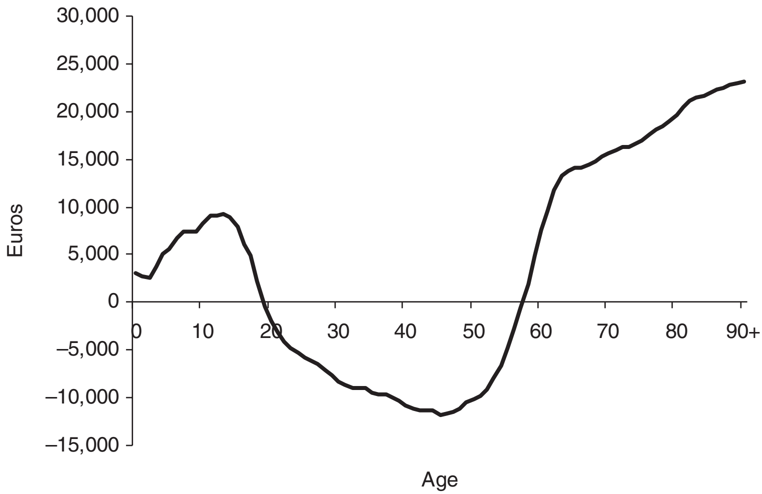


Figure 11.6 Per capita net public transfers by age: Austria, 2000

estimated directly from the survey resulted in a negligible amount (0.027 billion euros).

As shown in Figure 11.7, inter-household transfers are directed downward and represent only a minor part of private transfers. Compared with less developed countries, where transfers between households are much more common, in Austria these results may suggest no need for substantial transfers between households since the standard of living is rather high and the state takes care of those most in need. Other explanations could be weak relations and lack of solidarity between households and problems with capturing those transfers through the CES because of underreporting or respondents' not understanding the question.

Consumption by children of ages 0–14 is covered through public (51%) and private transfers (47%). Note that the smoothing procedure generates a small share of asset-based reallocation. In the results presented in Figure 11.8 we assign child allowances to the household head. About half (51%) of the consumption in the age group 0–14 is provided through public transfers, whereas nearly all of the balance (47%) is provided through private transfers.

For adults in the main productive ages (15–64), labor income is about 29% higher than consumption. Only 9% of net private outflows from this age group, together with 5% from the age group 65+, is enough to sustain almost half of the consumption of the 0–14 age group (the remaining part being covered through public transfers). This is possible because of the age structure of the population. Although there were approximately

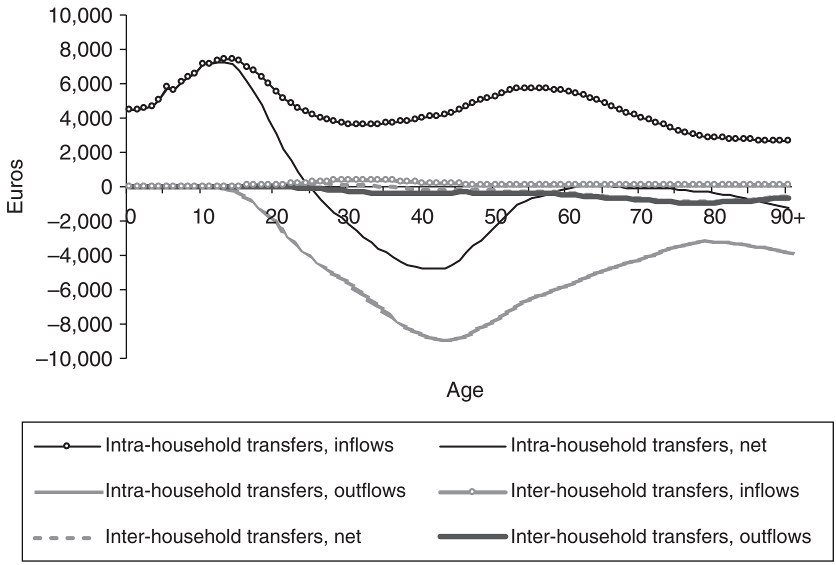


Figure 11.7 Per capita disaggregated private transfers by age and component: Austria, 2000

140 000 persons per single year of age around ages 32–38 in 2000, the number of newborns was less than 80 000. It is noteworthy that consumption by persons aged 65+ is almost completely (94%) covered by public transfers and that not much other reallocation takes place in this age group.

Asset-based Reallocation

If consumption is not covered through labor income or through transfers (public or private), it has to be covered through asset-based reallocation, which represents the difference between asset income and saving. Private and public transfer outflows are the highest during the 40s, being driven by high labor income and high asset-based income. Figure 11.8 presents both positive and negative values by one-year age groups that may be consolidated within broad age groups described earlier. Net private and public outflows for the 15–64 age group are low not only because of the population age structure, but also because they are partly 'neutralized' by the private and public inflows in the 15–19 age group. Figure 11.8 further reveals that until about age 80 the elderly use asset-based income to finance their consumption, although in the oldest age groups this source

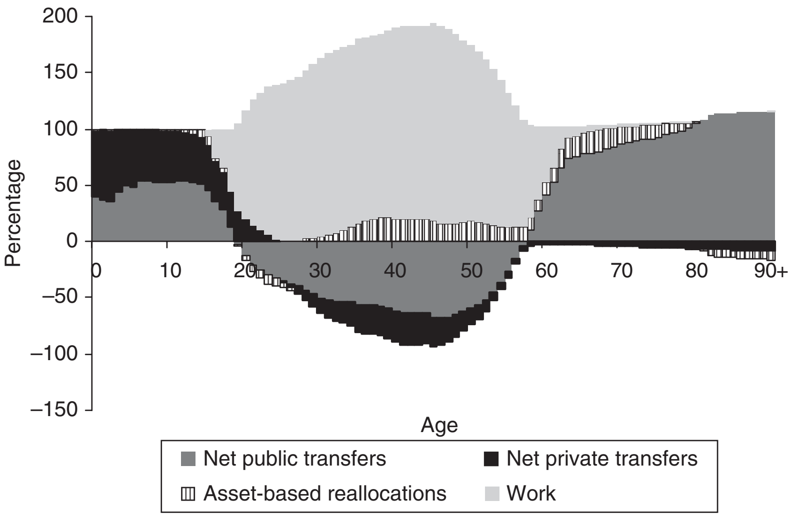


Figure 11.8 Sources of funding consumption by age: Austria, 2000

turns negative. Large public transfers enable them to have (net) savings instead of having to use their assets as an income source to finance their consumption.

SUMMARY

Low levels of education and the generosity of the social security system in Austria clearly shape the age profiles of the NTA. Rather, high labor force participation at young adult ages and early retirement imply a mean lifecycle surplus of about 36 years. Reallocation of transfers to finance the lifecycle deficit at young and old ages is concentrated mainly on public transfers for old age and about equally shared between public and private transfers for young ages. The biggest share of cash transfers occurs through public pensions, including survivor benefits, followed by family and children allowances. Asset reallocation is modest in Austria.

Population aging implies a pronounced increase of dependent elderly as compared with dependent young people and at the same time an aging and shrinking of the productive age group. Since public transfers cover most of the lifecycle deficit of the elderly, the sustainability of the current welfare state is in question. Pension reforms are called for that encourage higher participation rates of older workers, and additional educational investments are needed to sustain the productivity growth of the economy.

ACKNOWLEDGMENTS

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12. The significance of inter-age economic transfers in Chile

Jorge Bravo and Mauricio Holz

This chapter examines the mechanisms by which the Chilean population is able to satisfy its consumption needs over the stages of the lifecycle. In doing so, it explores the extent of economic dependency in different age groups, the means of financing their consumption, and some of the effects that inter-age resource reallocations have on the living conditions of each generation of the population. The analysis is based on estimates for the year 1997 of the Chilean National Transfer Accounts (NTA), which allow for a systematic and detailed examination of some important aspects of the economic lifecycle.

We find that children and young people under age 26 and adults of age 54 or older are, on average, economically dependent as they consume more than they produce, but they differ markedly in the sources of financial support of their consumption. While children and young people benefit mainly from in-kind public transfers in education and health, net per capita public transfers for the elderly, mainly pensions paid in cash, are several times larger than those received by children or young adults. However, since there are still more young than old persons in the population, the aggregate public spending on children and teenagers is roughly comparable to that on the elderly.

Cash public transfers have had a large effect in reducing poverty among the elderly but a lesser effect in reducing poverty rates of children, which remain a concern. Although asset reallocations financed just over 11% of elders' consumption in Chile in 1997, we expect their share to increase over time, especially for the generations reaching retirement age after 2020.

ECONOMIC SETTING

Chile ranks high within the Latin American region with respect to many socioeconomic indicators, including a per capita income of about

USD $14 341 PPP in 2009, the second highest in the region after that of Argentina (IMF 2010). Annual growth of per capita Gross Domestic Product accelerated from averages of a little over 2% during the 1980s to 5% during the 1990s (Loayza and Soto 2002, p. 5) and has decelerated since, averaging 3.3% per year from 2000 to 2008. Since 1990 Chile has maintained a fairly stable macroeconomy and sustainable external accounts. In 2000 the government introduced a fiscal rule of 'structural balance' (Marcel et al. 2001), setting spending in accordance with the estimated medium-term trend in Gross National Product, a policy that has effective countercyclical effects. Fiscal discipline has contributed to a greatly reduced public and external debt, resulting in record low-risk premiums for the nation (Marcel 2006), and has helped to buffer the effects of the global financial and economic crisis.

National saving rose from average levels of about 12% of GDP during the 1960s and 1970s (Bennett et al. 1999, annex table 1), to over 20% of GDP by the end of the 1980s. Saving rates stayed above 20% of GDP during the 1990s, and by 1997, the main year examined in this chapter, national savings were at 23.1% of GDP, while investment was at 27.7%. This performance is better than average within Latin America, but it lags behind that of many countries in Asia.

Another area in which Chile has made substantial progress is the reduction of poverty (Larrañaga 1999), which was very high during the 1980s, the last decade of the military government. Poverty rates have fallen sharply since then, from 38.6% in 1990 to 13.7% in 2006 (ECLAC 2006), and the population has benefited from better protection against economic cycles due to the aforementioned macro stability and policy of structural balance, as well as targeted public transfers (Leiva 2006).

DEMOGRAPHIC CHARACTERISTICS AND TRENDS

Chile's population, nearly 17 million in 2009, is undergoing a significant demographic transition, which began with declining mortality in the 1930s and was followed by a fertility decline that started in the 1960s. By the beginning of the 1980s, a decade when important reforms were introduced to the pension system and to the health and education sectors, fertility had dropped to nearly 2.5 births per woman and life expectancy had surpassed the 70-year mark. In more recent years, important policy changes have been introduced in the health sector, and in 2007 a comprehensive reform of the pension system was approved that stimulates contributions and expands benefits, especially for lower-income workers. All this has occurred at a time when the demographic transition has advanced to below-replacement fertility of about 1.9 births per woman, and to a life expectancy for both sexes combined of 78 years.

These changes are causing significant demographic aging and imply that an increasing fraction of the lifecycle of individuals is spent in retirement. The process of demographic aging has converse expression in the number of children, whose proportion in the population has decreased continuously since the 1960s and whose absolute numbers have started to decline during the last few years. The current and projected changes in the population age structure translate into a demographic dependency ratio that is still low and falling but is projected to cease falling in less than ten years, when it will reach its historical lowest level of about 45 persons in the conventionally dependent age groups (younger than 15 years and 65 years or older) per 100 persons in the main productive ages (15–64). This indicates that there is little time left to reap the benefits of the 'demographic dividend' associated with low demographic pressure on the consumption and distribution of national production.

These economic and demographic trends have direct implications for inter-age transfers and the different ways in which individuals, families, and the public sector reallocate production and economic resources to satisfy the consumption needs of the population in different stages of the lifecycle.

NATIONAL TRANSFER ACCOUNTS FOR CHILE IN 1997

We review next the first set of National Transfer Accounts for Chile, following the methodology developed by Mason et al. (2009). The results refer to the year 1997 and include public and private transfers and asset reallocations – that is, all the major components of the transfer accounts.

Two key micro-level databases for the NTA estimates for Chile are the national Budget and Expenditures Survey (BES) of 1996–97, and the Socioeconomic Characterization Survey (*Encuesta de Caracterización Socioeconómica*, hereafter CASEN) of 1998. The BES is the main data source for the estimation of private consumption, as it reports in great detail on 726 categories of expenditures on goods and services in the household. Although both surveys contain information on the sources of income (labor income, income from assets, transfers) for each individual household member, we prefer the CASEN survey for the estimation of labor income because it contains greater detail on the categories of income and because the individuals are classified in single ages (whereas in the BES they are categorized in five-year age groups). The CASEN is also the official source for the statistics and analysis of income distribution, poverty, and the impact of government transfer programs on living conditions of the population (Mideplan 1999).

We use the aggregate figures on public expenditures by program reported annually by the Budget Directorate of the Ministry of Finance (Ministerio de Hacienda 2006), and on the age profiles of income taxes provided by the National Tax Service (*Servicio de Impuestos Internos*, SII), which together allow for the estimation of net public transfers. All the age profiles have been scaled to match the appropriate aggregates of the national and income accounts published by the Central Bank of Chile (2005).

Lifecycle Deficit

The age pattern of labor income in Chile is intermediate between that of the more developed countries, where labor income peaks at later ages and falls sharply afterward, and that of the lower-income countries, whose labor income falls off more gradually toward the older ages (see Bravo and Holz 2008). The per capita consumption profile has a dampened humped shape, commonly observed in developing countries. Private consumption is dominant, as it represents 86% of total consumption.[1] Public consumption accounts for the other 14%, a number between the lowest registered values to date in developing countries and the much higher values observed in developed countries.

An interesting aspect of the lifecycle deficit is the age at which individuals become net producers and net consumers. In Chile we find that the first transition occurs at about age 26 and the second at age 54 (Bravo 2006). The implied length of the net producing period of 28 years is somewhat below the average for NTA countries but in line with the average of the Latin American countries that have comparable estimates.

Public Transfers

In the NTA framework, public transfer inflows to individuals refer to all expenditures in the public budget (provided that all government benefits, revenue, and debt are held domestically), not just to specific cash programs, as generally understood in the public-finance use of the term. Public transfer inflows are categorized as cash or in-kind, and by social sector – for example, health, education, social security. Public transfer outflows consist mostly of direct and indirect taxes – namely, income and property taxes on the one hand and consumption and excise taxes on the other.[2]

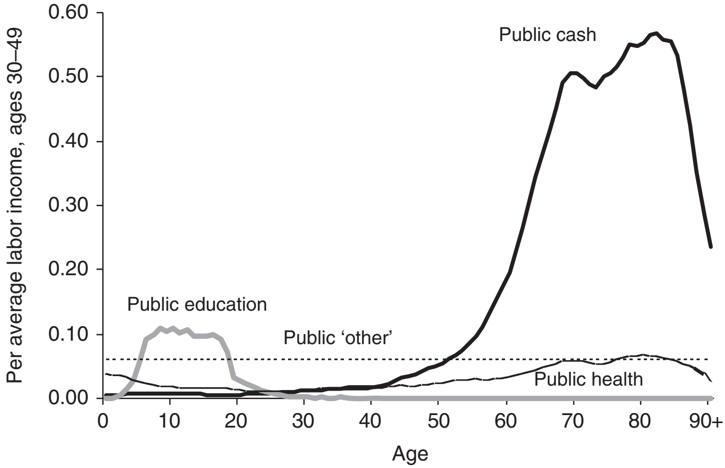

Figure 12.1 Per capita public inflows, Chile 1997

Transfer inflows

In 1997, aggregate in-kind public transfers represented 11% of Chile's GDP, more than half of which (6% of GDP) was consumption of collective goods; health and education programs accounted for the remaining 5%. Cash transfers represented 4.8% of GDP, virtually all of which was accounted for by public pensions, together with a small proportion of spending in training and unemployment subsidies.

As shown in Figure 12.1, in-kind transfers are concentrated on children and adolescents through public education expenditures and on the elderly through public health programs. Compared with public education and health transfers of other countries in the NTA project, Chile's transfers are in an intermediate range, close to those of other developing countries but much lower than those of developed countries. As expected, education expenditures are high for children, teenagers, and young adults, whereas health expenditures benefit mainly older adults and to a lesser degree young children. Other public consumption expenditures have no specific age orientation.

Cash transfers consist basically of old-age and survivors' pensions, both of which are geared mostly to the elderly and constitute the lion's share of public transfers to them. Figure 12.1 also shows that per capita public benefits for the elderly dwarf those received by children; but because the population age structure is still heavily tilted toward the younger ages, the public expenditure on children and the elderly are of comparable aggregate magnitude.

Using an estimation procedure developed by Uthoff and Ruedi (2005), and applied to several Latin American countries by Bravo (2007), we have calculated the impact of government cash transfers on poverty rates by age in Chile in 1997, assuming other things equal. The results show that the poverty-reducing effect of cash transfers is much greater for the elderly in Chile than for other age groups – roughly a 30 percentage point reduction for ages 75 to 84, for example. Although the government cash transfers help to reduce the prevalence of poverty among younger adults and children by 5 to 10 percentage points, the young still end up with much higher poverty rates than the other generational groups. This result should be a cause for concern from the viewpoint of intergenerational equity and from an intertemporal economic perspective, to the extent that it can be read as a sign of underinvestment in the future productivity of the younger generations.

For the analysis of the distributional effects of transfers one should also consider in-kind transfers and public transfer outflows in order to have a complete view of the generational effect of public policies. The series of NTAs that we are constructing will provide the basic data with which to make these more integrated, comprehensive assessments.[3]

Public outflows

Chile's tax structure, which concentrates three quarters of tax proceeds on indirect taxes, results in an age profile of public outflows different from that of developed countries, where direct taxes on income and assets play a much more prominent role. Figure 12.2 shows that income taxes have an older age distribution than the value-added tax, a result of the tax structure and the allocation rules that imply that indirect taxes are more evenly distributed across different ages, whereas direct taxes are concentrated in the highest-earning adult ages.

Graphing both inflows and outflows of public transfers, Figure 12.3 summarizes the results of net aggregate public transfers, which may be more relevant to public finance policy as they reflect the net amounts of government transfers to and from the population by age group. The results indicate that individuals under the age of 20 and over age 60 receive net public inflows from the government, whereas those in between, especially those in their late 30s and early 50s, are net taxpayers. The absolute value of public transfers for the population aged 70 or older falls with age, mostly because of their reduced population numbers.

Private Transfers

In Chile, household surveys ask only about transfers received, not about transfers given, and therefore no information exists about those making

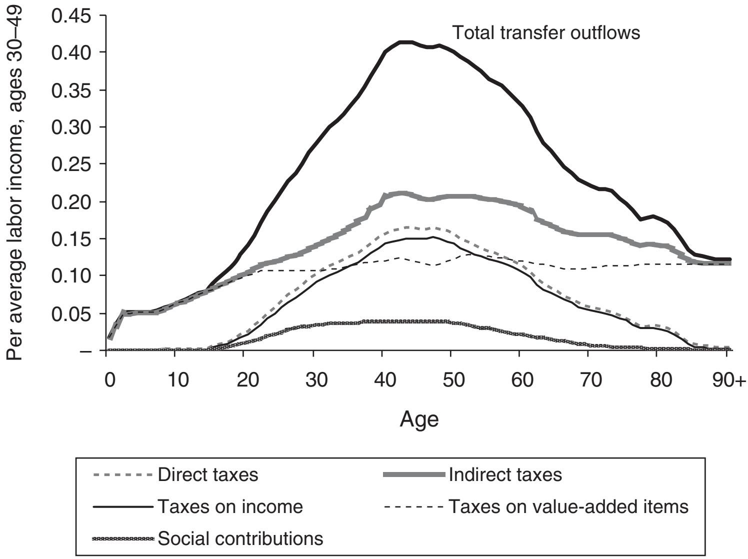

Figure 12.2 Per capita public transfer outflows (taxes): Chile, 1997

Figure 12.3 Net aggregate public transfers: Chile, 1997

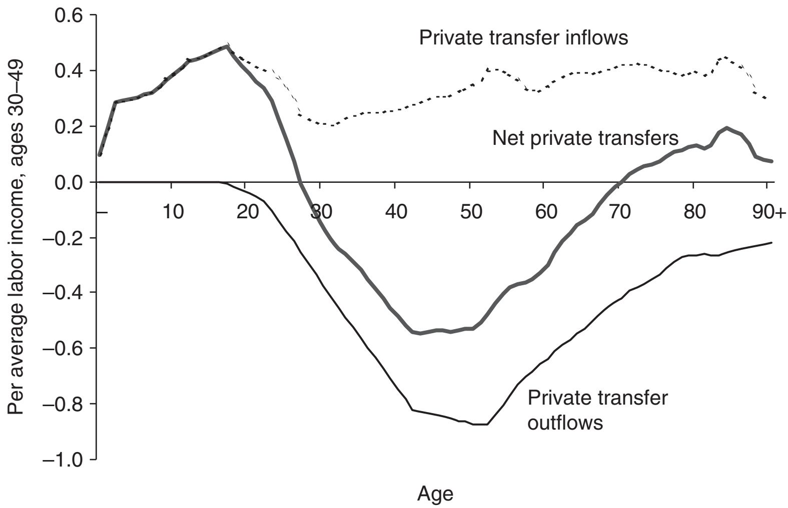

Figure 12.4 Per capita private transfers: Chile, 1997

the transfers. Consequently, armed with the information on transfers received for each individual household member, we had to make assumptions about the givers vis-à-vis the receivers to estimate net private inter-household transfers.[4]

We found that inter-household transfers are more common in Chile than in other developing countries with NTA data, but that, as in virtually all the other countries, by far the largest part of private transfers takes place within households. Figure 12.4 shows the estimates of private transfers based on the standard NTA methodology.

The results show that for all ages above 18, individuals are both givers and receivers of private transfers. This result is consistent with findings from surveys of health, well-being, and aging known as SABE surveys (Palloni and Peláez 2002), which sample populations of selected Latin American cities and report extensive evidence of mutual support (Saad 2005). If we consider *net* flows, however, we see that children and young adults are net receivers of substantial private transfers, whereas older adults receive much smaller net private transfers, and then only after the age of 70.

Asset Reallocations

Individuals who do not generate substantial labor income or receive much from transfers may resort to inter-age asset-based reallocations to finance their consumption. Recall that asset-based reallocations are the difference

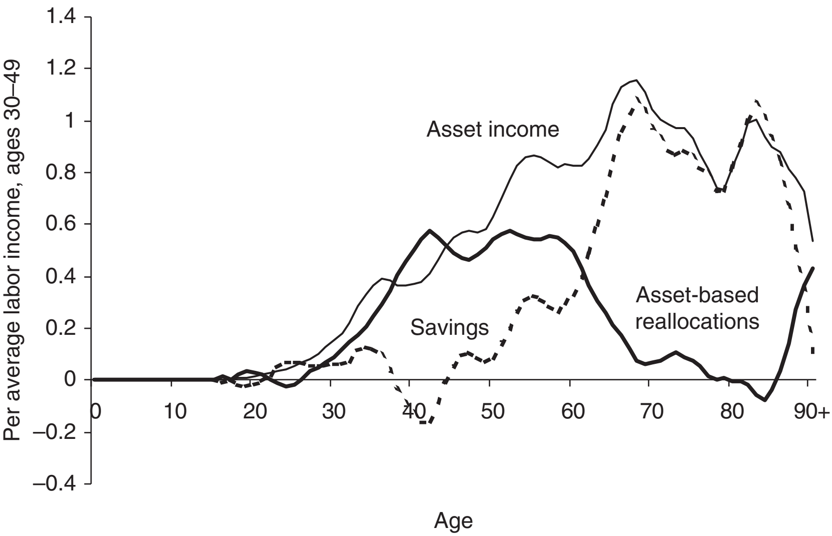

Figure 12.5 Per capita asset reallocations: Chile, 1997

between asset income and saving at each age. As Figure 12.5 shows, in Chile per capita net asset reallocations rise from the early 20s onward, leveling off with small variations between the ages of 42 and 60. They then fall almost continuously until the age of 85, after which we observe a sharp upturn to the ages of 90 and above. The estimates at the older ages are less reliable owing to the small population size; but taken at face value, they seem to suggest that after the age of 85, individuals begin to obtain more liquidity by reducing their savings, which is not an unreasonable behavior.

Asset income rises gradually from the mid-20s, reaching a maximum just past the age of 65 that may be associated with a large drawing on assets around the time of retirement. They then fall, except for a brief upsurge around ages 82–83, resuming their decline thereafter.

Viewed from a lifecycle perspective, these age patterns seem roughly consistent with economic theory and prior expectations. The implied lifecycle behavior of savings, however, is a bit more intriguing. Savings become clearly positive only after the age of 45, generally increasing and remaining high as late as age 85. Savings fall sharply thereafter, but remain positive throughout. The variations in savings virtually mirror those of asset income between the ages of 65 and 85, as if within this age range all asset income is saved, thus remaining available for withdrawal at the oldest ages.

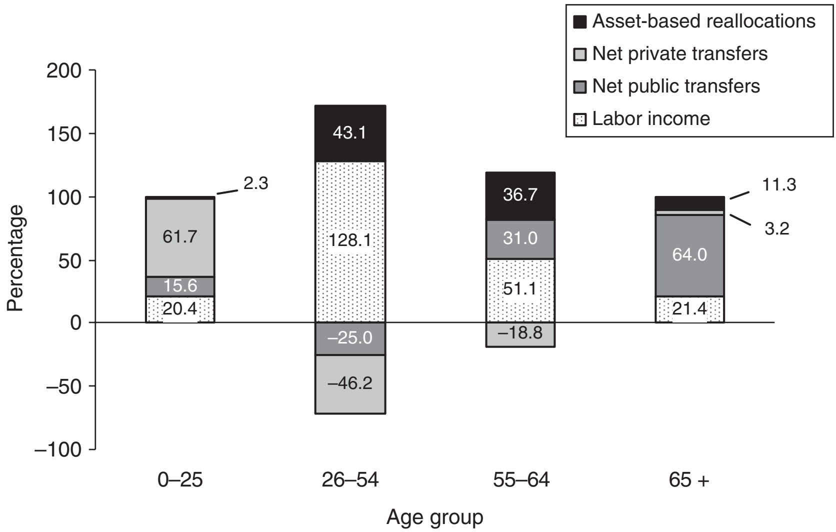

Figure 12.6 Finance of consumption: Chile, 1997

Financing Consumption at Different Stages of the Lifecycle

A useful way to summarize the foregoing results is to examine the sources of financing the lifecycle deficit for different broad age groups of 'dependents' and 'net producers'. Figure 12.6 confirms that middle-aged adults, between the ages of 26 and 54, are substantial net producers; their labor income is 28% higher than their consumption. They also obtain important positive net asset reallocations, equivalent to 43% of their consumption. This provides them with sufficient resources to be net givers of both private and public transfers, in amounts that represent 46% and 25%, respectively, of their average consumption.

Children and young people below the age of 26 and adults 55 and older are net consumers ('dependents'), but their sources of support and degree of dependence are radically different. More than three fifths of the consumption of the younger dependents is funded by private (mostly intra-household) transfers, and another fifth is funded by labor income. The remainder is composed of net public transfers (15%) and asset reallocations (2%).[5] In contrast, the older dependents (55 or older) finance more than one half of their consumption with their own labor and count on asset reallocations to finance another 37% of their consumption. Together with public transfers, which represent 31% of their consumption, they command sufficient resources to still be net providers of private transfers amounting to 18% of their consumption. We also used the conventional cut-off age of 65 or older (results not shown), which revealed the expected larger reliance on public transfers (almost two thirds of their consumption) and smaller contribution of their own labor (about one fifth of their consumption) for this older age group. Asset reallocations account for 11% of their consumption; and, as indicated earlier, the elderly do not rely greatly on private transfers for their support, being modest net recipients (3% of their consumption) of private transfers from younger adults.

CONCLUSION

Our analysis of intergenerational reallocations for Chile in 1997 leads us to conclude that labor income is an important source of support for the great majority of adults, even for the elderly, in a greater proportion than in some countries of similar levels of development. Consumption displays a smooth, somewhat dampened age profile that falls between the more pronounced inverted U-shape found in the lowest-income countries and the upward-sloping consumption curve observed in today's more developed countries.

Those younger than age 26 and those older than 54 are, on average, economically dependent in the sense that individuals in both groups produce less through their work than they consume. But there are clear differences in their economic status and degree of economic dependency. Older adults are much less dependent than children and young adults on sources other than their own labor income and asset reallocations. In 1997, our main year of analysis, this result was probably influenced by the privatization reforms initiated in the 1980s, especially that of the pension system, which has increased private saving for old age. Still, government pensions comprise the bulk of public transfers to the elderly and provide the bulk of their means of sustenance.

Public inflows to individuals are mostly health care, education, and collective goods received in different degrees by all population age groups. Cash transfers, basically pensions, represent by far the largest public transfer received by the elderly, who enjoy total net per capita public transfers several times larger than children or young adults. However, since there are still more young than old persons in the population, the aggregate public spending on children and teenagers is roughly comparable to that on the elderly. Cash public transfers have a major effect in reducing poverty among the elderly, but there is a legitimate concern that per capita government transfers to children and young people are much more modest and that poverty is still heavily concentrated among children.

Private transfers are the main source of financing consumption for children, but not for other age groups. The elderly rely to a large extent on net public transfers, but they are not substantial receivers of net private transfers. Interestingly, persons in all the adult age groups both give and receive private transfers, thus confirming previous evidence from Chile and other Latin American countries that private support tends to be mutual.

Asset reallocations financed just over 11% of consumption by the elderly in Chile in 1997, but we expect their share to increase over time, as the age cohorts affiliated in greater proportion with the privatized pension system begin to retire. The full extent of this effect will be felt after 2020, when the first cohorts fully covered by the private system instituted in the 1980s begin to retire.

ACKNOWLEDGMENTS

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DISCLAIMER

The views expressed in this chapter are those of the authors and do not necessarily reflect those of the United Nations.

NOTES

1. We discuss in detail the various components of the lifecycle deficit, including private consumption, in Bravo and Holz (2008).
2. In addition to taxes, public transfer outflows include mandatory contributions, fees, and bond purchases benefiting the government (see details in http://www.ntaccounts.org, under public transfers).
3. Ideally, one would like to examine the incidence intertemporally, allowing for a true generational analysis. Doing so requires a long series of NTAs, which are not yet available for Chile. See Bommier et al. (2004) for an interesting analysis of long lifecycle deficit series for the US and France.

4. We considered two possibilities: (1) that all private transfers were made only among household heads, which is the standard NTA method, and (2) that the recipient was the person identified in the survey and the givers were the household heads only. In both cases we assumed that giving was proportional to household total factor ('autonomous') income.
5. Asset reallocations in this age group result from a combination of very small asset income and some debt (negative saving), plausibly including student loans.

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13. The economic lifecycle and intergenerational redistribution in Mexico

Iván Mejía-Guevara

In Mexico net transfers are the major means of addressing the deficit among young people, whereas asset-based reallocations are the main mechanism for overcoming the deficit among the elderly. In fact, the deficit in old age can be overcome mostly via asset-based reallocations, since the negative effect of private transfers from the elderly to the younger population nullifies much of the positive support of public transfers. These are the conclusions drawn from an analysis of Mexico's economic lifecycle deficit, based on the National Transfer Accounts (NTA) methodology and data from 2004. This chapter also examines the role of oil revenues within the intergenerational framework.

Mexico, a middle-income country, is in an advanced stage of demographic transition that is playing an important role in the society's development, offering not only opportunities but challenges as well. This chapter uses the NTA methodology to study the relationship between the economy and demographic changes in a framework that allows for intergenerational reallocation among different age groups while being consistent at the aggregate level (Mason et al. 2009). Previously other methodologies were used to study the economic impact of Mexico's demographic transition (Mojarro and Mejía-Guevara 2005), but recently the NTA framework has been used for the same purpose (Mejía-Guevara et al. 2010).

Data from 2004 are used to estimate the lifecycle deficit and the intergenerational redistribution of economic flows that has occurred through transfers and asset-based reallocations. The reallocation methods and macroeconomic adjustment are discussed in the context of Mexico's economic situation. In analyzing the results, I note the relative importance of net private and public transfers in supporting the lifecycle deficit and the role of asset-based reallocations.

The next two sections of the chapter describe salient characteristics of Mexico's demographic evolution and notable aspects of the Mexican economy that are related to the results of the analysis. Then it presents the principal results from the estimation of the NTA components for 2004, focusing on the most relevant elements of the components. It concludes with some observations about the implications of the findings.

MEXICO'S DEMOGRAPHIC TRANSITION

According to the United Nations (UN ECLAC 2008), Mexico is one of seven Latin American countries that are undergoing an advanced stage of demographic transition.[1] The main characteristic of this stage is the achievement of both low fertility and low mortality rates. Partida (2008) estimates that Mexico's total fertility rate (TFR) reached the replacement level in 2008. In the same year its mortality rate was 4.9 deaths per 1000 inhabitants and life expectancy at birth was 72.7 years for men and 77.5 for women. These indices, when compared with those just a few decades earlier, reveal how rapid Mexico's transition has been.[2] The main reason is the impressive decrease in fertility since the late 1960s, when the TFR was around 6.8 births per woman. By 2005 it had declined to 2.2. Projections for 2050 indicate that Mexico will experience only a modest additional reduction in fertility, reaching a TFR of 1.85 in that year, but that the mortality rate will rise to 9.8 as a result of the aging of the population (Partida 2008).

Mexico's estimated population in 2008 was 106.7 million, or 8.2 million (8.4%) more than in 2000 (Partida 2008). The estimated age composition of the population in that year – 29.3% in the 0–14 age group, 65.0% in the 15–64 age group, and 5.6% in the 65+ age group – will change dramatically by 2050, when the total population is projected to be 121.9 million and the shares of the young, working-age and elderly age groups are projected at 16.8%, 61.9%, and 21.2%, respectively. In other words, although the total population will increase by 14%, the young age group will shrink in relative terms by 35%, whereas the 65+ age group will more than quadruple. Meanwhile, the working-age group is expected to increase by only 9%.

THE ECONOMY

Mexico's per capita GDP in 2007 was approximately US$14 133 PPP, the highest per capita GDP among the NTA Latin American country members. Its estimated per capita GDP for 2009, US$13 628, was projected to be less than that of Chile, however (IMF 2010).

US dollars play an important role in the Mexican economy, and the three major sources of dollars are direct foreign investment, remittances, and oil exports. Between 2002 and the first semester of 2007, the cumulative value of direct foreign investments reached US$110 920.2 million, averaging about 2.8% of GDP. The first semester of 2007 saw the historically highest value of such investment, probably reflecting the confidence of foreign investors in the evolution of the Mexican economy (SHCP 2007). In early 2006, remittances were US$23 053.7 million, or 2.7% of GDP; this was three times the amount registered in 2000. Since the second semester of 2006, however, the rate of growth of remittances has declined, mainly because of the deceleration of the US economy (SHCP 2007).

Because the extraction and commercialization of oil resources are such important sources of revenue for Mexico's public sector, fluctuation of international oil prices is an issue that the government considers when making projections of its annual revenues. The tremendous increase in oil prices in recent years has provided the government with a significant amount of revenue, but various factors have prevented it from taking full advantage of the favorable fluctuations. These include bad management of the national enterprise Petróleos Mexicanos (PEMEX), overdependence of the federal government on oil revenues to compensate for low tax revenues, the necessity of importing value-added products derived from oil (such as gasoline) because of the Mexican industry's incapacity to produce a sufficient amount of them to satisfy local demand, and the lack of transparency in the allocation and expenditure of these extra revenues. Moreover, the global economic crisis in 2008 was followed by substantial drops in international oil prices.

NATIONAL TRANSFER ACCOUNTS FOR MEXICO

Using the methodology described by Lee et al. (2008), Mason et al. (2009), and the NTA website (NTA 2008), I estimated National Transfer Accounts for Mexico in 2004. The main source of information at the microlevel was the Household Income and Expenditure Survey for 2004, called ENIGH-2004 (INEGI 2008b). For macroeconomic adjustments of the profiles, the main source was the System of National Accounts of Mexico, which the Ministry of Statistics administers (INEGI 2006). For 2004, this source is consistent with the 1993 National System of Accounts of the United Nations (UN Statistics Division 2008). I also used some information from administrative records provided by the Ministry of Finance (SHCP 2008) and the Ministry of Statistics (INEGI 2008a). The principal NTA components described here are lifecycle deficit, public and private transfers, and asset-based reallocations.

Lifecycle Deficit

The lifecycle deficit is defined as the difference between consumption and labor income. I estimated labor income by using information from ENIGH-2004 at the individual level; therefore, no age-allocation method was necessary to derive earnings, fringe benefits, or entrepreneurial income profiles, the components of labor income. Following Mejía-Guevara (2008), I imputed part of entrepreneurial income to take into account people who work as unpaid family workers in family-based enterprises. This adjustment was implemented as indicated in Lee et al. (2008). An important assumption of the adjustment is that two thirds of entrepreneurial income is a return to labor.

Figure 13.1, which displays the income profile and its components, indicates that the earnings profile consistently increases from age 8 to age 41, when it reaches its maximum level. The rate of growth is highest between ages 8 and 24. After age 41, earnings decline almost consistently but moderately until age 61, after which the decline is more rapid. Earnings drop lower than entrepreneurial income after age 63. In the absence of data, I assume that fringe benefits are a constant proportion of wages and salaries.

Entrepreneurial income is evident from age 11, reflecting the fact that many Mexican children participate in labor activities, as reported in the ENIGH-2004. The maximum level observed for the entrepreneurial profile is at age 47, six years after the earnings profile peaks. The decline among entrepreneurs after age 48 is slower than that observed for the earnings profile and is reflected in the slow decline of the total labor income. Many people continue working after the official retirement age of 65, or 60 in the case of severance (SEGOB DOF 2009), since many of them do not receive benefits from the social security system or their benefits may be insufficient to meet their needs. In the past many people retired early, taking advantage of the social security law's earlier flexibility, and this could help to explain why the earnings profile starts to decline so early.

Figure 13.1 also shows separate profiles for public and private consumption. Details of the estimation methods used to construct the profiles can be found in Mejía-Guevara (2008). Private consumption accounts for most of total consumption since, in aggregate terms, public consumption represents only about 16% of the total. Some peaks can be observed in total consumption at young ages, due to the enormous influence that both private and state-run education consumption have on the profile. For productive ages, the total consumption profile exhibits small variations and looks practically flat until around age 59, when it starts declining for all subsequent ages, with small variations at the oldest ages.

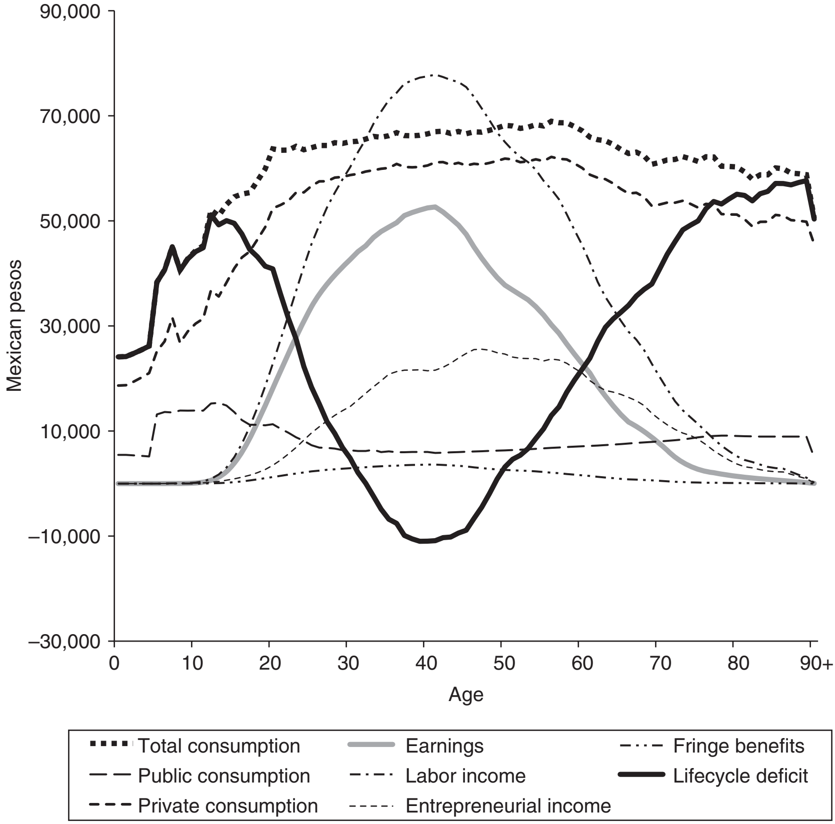

Figure 13.1 Per capita consumption, labor income, and lifecycle deficit: Mexico, 2004

The average period during which labor income exceeds consumption is only 16 years, which is probably the shortest period among NTA country members. It begins at age 33 and ends at age 48. In aggregate terms, the lifecycle deficit for young people is much greater than it is for older groups, among whom it is only 14.6% of the total. As Figure 13.1 shows, however, the per capita deficit is very similar for both groups. The total deficit is also much greater than the surplus for those of ages 33–48, the surplus being only about 6.6% of the deficit in absolute terms. Therefore, working age groups could support only about 45.1% of the deficit of older groups with their labor income. However, the short surplus span in Mexico is not attributable to the shape of the profiles per se but rather to the fact that aggregate consumption is much higher than total labor income; that is, the ratio of consumption to labor income is around 1.7 (estimate based on macrocontrols). A surplus period of 22 years was reported in Mejía-Guevara (2008), but the difference can be explained by the government's treatment of oil revenues, discussed below.

By disaggregating the lifecycle deficit we can observe that in Mexico young dependents (ages 0–19) produce approximately 7% of their total consumption, whereas older dependents (ages 60+) produce around 37%. Older dependents thus support their consumption to a greater extent through their labor income, as compared with other sources of support, than do younger dependents.

Public Transfers

Using the NTA methodology, I divided public transfers into inflows and outflows, treating in-kind and cash transfers as inflows, and taxes and social security contributions as outflows. The procedure used for the estimation of the respective profiles was as follows.

In-kind transfers are defined in the same way as public consumption, their components being education, health care, and 'other' (for example, public administration and defense). Education transfers benefit mostly young groups whereas health care transfers benefit mostly the elderly. Other public in-kind transfers were assigned on a per capita basis since there is no distinction by age in their allocation. Details about the estimation of the profiles can be found in Mejía-Guevara (2008).

Cash transfers from the government to the public include public programs designed to alleviate poverty, such as the so-called *Oportunidades* and *Procampo* programs of the Ministry of Social Development. Data for the age allocation are from ENIGH-2004, which specifies the amount of resources that the families received from this type of program.

Public outflows include taxes and social security contributions. I used the Mexican government's fiscal rules in 2004 to construct the age profiles of public outflows.

Taxes

Income taxes were the major tax in 2004, providing about 45% of the government's total fiscal revenues (SHCP 2008). They are assessed on individuals, mostly through payroll taxes, and on corporations, a category that also includes self-employed individuals, earned interest, and property income. The age allocation of income taxes was made proportional to the distribution of income from which this tax is obtained.

Value-added tax (VAT) was the second major source of tax revenue in Mexico in 2004, contributing about 37% of the total fiscal income (SHCP

2008). I obtained the age allocation of this outflow source by considering the specific goods to which the tax is applied (SEGOB DOF 2007b) and using the same allocation methods as for the private consumption profiles. The estimation excludes merchandise sold in informal markets, which do not contribute to this tax and thus represent a big source of fiscal evasion. The estimation also takes into consideration the fact that the VAT rate structure varies according to geographic zone and type of merchandise. Four rates are considered accordingly: a 'zero' rate, a 'frontier' rate, a 'general' rate, and an 'exempt' rate. The rate of 0% applies only to merchandise specified by the law, such as nearly all types of food and medicines (SEGOB DOF 2007b); a rate of 10% applies in frontier zones bordering the United States, Belize, and Guatemala; the general rate of 15% applies elsewhere in the country; and the exempt rate is an implicit rate ranging between zero and the general rate, which applies to specific merchandise. I applied the first three rates to the appropriate zones and items. In the case of the exempt rate I applied a 7.5% VAT rate for the goods identified in the survey because, although those items were not subject to this tax, the value added to the inputs used for their production implied its application.

Excise taxes are levied on tobacco, alcohol, and gasoline (SEGOB DOF 2007a). The three taxes considered thus far – excise, income, and value-added – account for more than 90% of the government's total tax revenues (SHCP 2008). To construct the age profiles of excise taxes, I simply used a flat proportion of the consumption of goods identified in the ENIGH-2004 survey. I adjusted the level of consumption of those goods by removing the implicit VAT included in the expenditures reported by respondents. I assumed the same rate structure for the excise tax as for VAT in making the adjustment. The age allocation relied on the same methods that were applied to private consumption profiles; that is, regression was applied to tobacco and alcohol, but an equivalence scale was applied to the use of gasoline.

Owing to a lack of information on Mexico's import tax in ENIGH-2004, I applied the age distribution of VAT to imports. I included several local taxes, such as a tax on new cars and a homeowners' tax. The age allocation was based on the sample information reported for those taxes. A tax on automobile ownership was included in the aggregate control, but not in the age distribution, because information about this tax was not available in the survey. These miscellaneous taxes amount to less than 10% of total fiscal revenues (SHCP 2008).

Social security contributions

To allocate social security contributions per individual, I applied to individuals the same distribution of income as was used for the income tax.

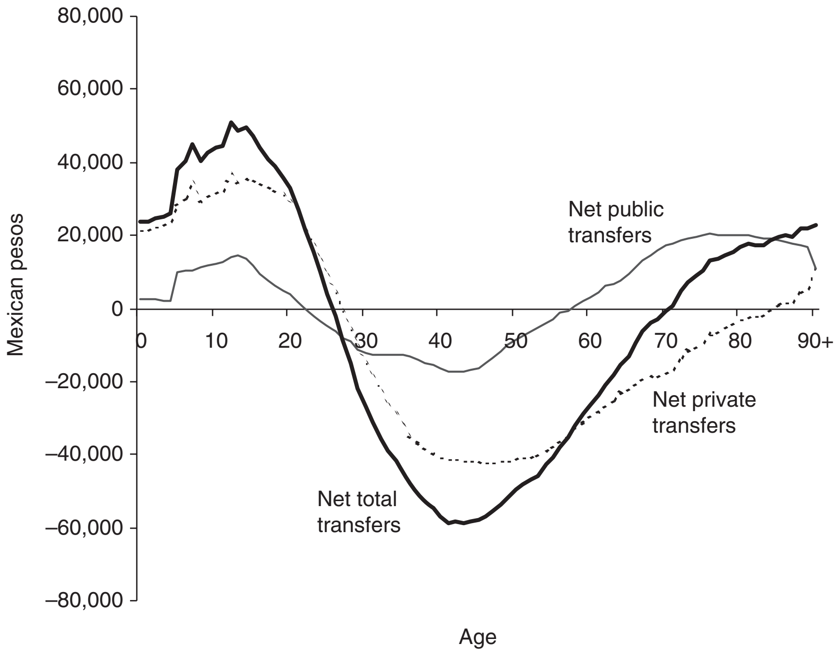

Figure 13.2 Per capita public and private transfers: Mexico, 2004

I followed the social security law (SEGOB DOF 2009) to select income categories on which the contributions were levied.

I used information from government reports to adjust aggregate values for income, VAT, and excise taxes, and from the UN Statistics Division (2008) to adjust the other taxes. The aggregate control for total outflows was from the UN Statistics Division's classification, for consistency with the rest of the macroeconomic controls used in the analysis. The aggregate control incorporates other current transfers, which are allocated by age as a constant proportion of other taxes. By summing all the taxes, social security contributions, and other current transfers, I obtained the general tax profile, an important concept for NTA estimation, since it is used in the definition of private intra-household transfers and for the distribution of public asset-based reallocations, as will be explained later.

Net public transfers

Figure 13.2 shows net public transfers (inflows less outflows) in 2004. Although children and the elderly received, on average, similar amounts of public transfers, the much larger number of young people in the population means that the amount of resources transferred to this group was substantially greater than the amount transferred to older people in aggregate terms. For example, the net positive transfers made to young people (between ages 0 and 19) were four times those made to the elderly (ages 65+). Much of the support for the young was in the form of state-run education.

Familial Transfers

Virtually all private transfers in Mexico take place among family members, whether they are transfers within the same household or between households separated by international borders. Transfers between households within Mexico represent only a small fraction of the total private transfers.

Inter-household transfers

I used information on gifts or transfers reported in ENIGH-2004 to construct profiles of transfers between households. The transfers are assumed to have taken place between household heads, as identified by survey respondents. The macro-level adjustment for net inter-household transfers (inflows minus outflows) was performed by using information from the household survey, and the macro-level control for net current transfers from the rest of the world (ROW) came from the System of National Accounts of Mexico (*Miscellaneous current transfers* in the United Nations System of National Accounts classification). As residents of Mexico are net recipients of transfers from ROW, inter-household transfer inflows were adjusted to ensure that net private transfers from ROW plus inter-household transfer inflows equaled inter-household private transfer outflows (NTA 2008).

The fact that Mexico is a net recipient of transfers from ROW is explained mainly by remittances, which amounted to US$18.3 billion in 2004.[3] They represent almost the total net current transfers from ROW. To construct the age profile for those transfers I used responses to a question in ENIGH-2004 about money received from outside Mexico and took the net current transfers from ROW as the macro-level by means of the UN System of National Accounts. The results indicate that people aged 20–49 received 73% of all remittances and those 20–59 received 83% of the total.

Intra-household transfers

I used NTA methodology to construct intra-household transfers, estimated indirectly as the balancing item between household private consumption and disposable income (labor income plus net private transfers plus public cash transfer inflows less taxes paid). All possible sources for the construction of disposable income and consumption were considered: labor income, net public cash transfers, taxes and social security contributions paid, net inter-household transfers, private education consumption, health care, other non-durable consumption, housing, and other durable consumption.

Compared with inter-household transfers, intra-household transfers were much larger, accounting for nearly all net private transfers. For young ages, net private transfers were positive until age 26; afterward, they turned negative until age 85, when they became positive again (see Figure 13.2). For those of ages 0–26 the intra-household transfers represented 96% of the total, and for the age group 85+ they represented 40% of the total; but total net transfers for this latter group were negligible because few households had members of such advanced age. For ages 27–84 net inter-household transfers were positive, whereas net intra-household were negative, but the proportion of inter-household/intra-household transfers was only −9%, the negative sign of intra-household transfers being dominant. This result indicates that children and young adults receive substantial support not only from working-age family members, but also from the elderly.

Net Public and Familial Transfers

As Figure 13.2 indicates, more resources are allocated to young people from private (familial) than from public transfers, but the contrary is the case for older people. For working ages, familial transfers clearly dominate, representing the majority of net transfers.

Figure 13.3, which compares age profiles of per capita lifecycle deficit, net transfers, and asset-based reallocations, indicates how the deficit is supported for young and old people. Almost all the deficit for young people (ages 0–19) is covered through transfers, whereas for older age groups (60+), asset-based reallocations are the main source of sustaining them. In fact, asset-based reallocations indirectly support children, since the lifecycle surplus of parents is far too small to fund transfers to children. The population structure has a major effect on the magnitude of transfers because net total transfers to young people constitute 97% of their lifecycle deficit whereas for older groups their net contribution to the support of the lifecycle deficit is 11%. Asset-based reallocations compensate for the fact that the net transfers for younger groups come from the working and elderly population.

Asset-based reallocations

Once the lifecycle deficit and net transfers are estimated, the computation of total asset-based reallocations is straightforward, calculated by means

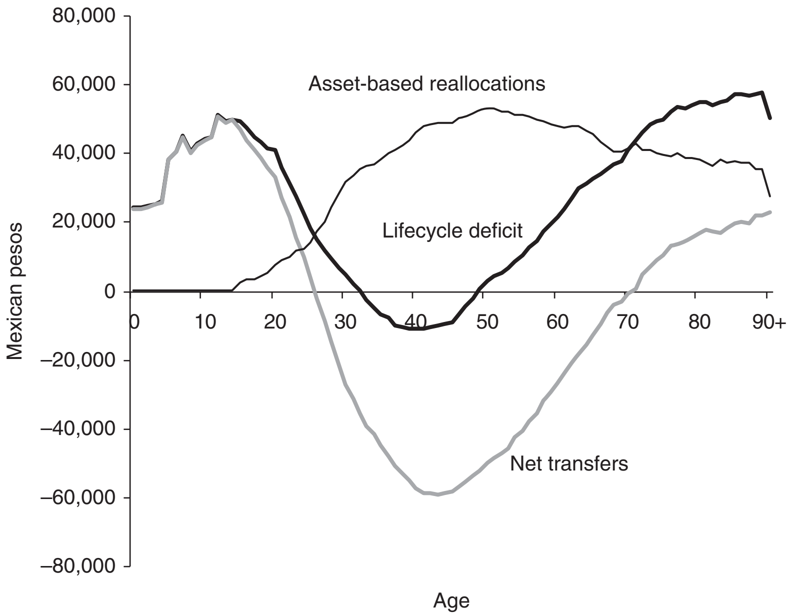

Figure 13.3 Per capita lifecycle deficit, net transfers, and asset-based reallocations: Mexico, 2004

of the national transfer flow account identity (Mason et al. 2009). The proportions by which asset-based reallocations and public and private transfers contribute to the support of the lifecycle deficit for those of ages 65+ are an important research question. In Mexico the total old-age lifecycle deficit can be supported mostly by asset-based reallocations. Almost two fifths of the total deficit could be sustained by public transfers, but private transfers from the elderly to younger age groups annul a big portion of this positive fraction. That result reinforces the finding that, overall, older people transfer significant resources to younger groups and vice versa, although the net effect is positive for the elderly. That is, 89% of the support for the lifecycle deficit comes from asset-based reallocations, whereas 11% comes from transfers. The last percentage is positive because the positive contribution of public transfers (37%) dominates the negative contribution of private ones (−26%).

Another methodology developed by the NTA project can be used to compute the components – public and private – of asset-based reallocations. I employed it to estimate age profiles for Mexico. For public reallocations I used the general tax profile to distribute public components proportionally. Those components are property income (including interest, distributed income from corporations, reinvested earnings on direct foreign investment, property income assigned to insurance policyholders, and rent), capital income, and public saving. For private reallocations some profiles needed to be estimated; they were interest, property income, mixed income, and operating surplus. I constructed the age profiles using information from ENIGH-2004, considering the age of the household head when making the age allocation. I then distributed the components of private asset-based reallocations using those profiles. Macrocontrols for public and private asset-based reallocations came from Mexico's System of National Accounts.

The treatment of oil revenues is a critical issue for Mexico since these resources represent about one third of the federal government's total revenues. PEMEX is obligated by law to transfer to the government a large amount of its revenues from the extraction and commercialization of oil. Those profits are transmitted through various mechanisms specified in the law. Some of them take the form of rights and royalties that constitute nearly all the operating surplus of PEMEX and that, in the end, are transferred in almost their entirety to the government (Mejía-Guevara and Vélez Fernández-Varela 2009). These payments are classified as public property income inflows and as private property outflows – specifically as rent in both cases.

With regard to asset-based reallocations, I found that 83% of the total were concentrated on the age group 20–59 and 15% in the 60+ age group. In the public sector the distribution for young and old is different because ages 0–19 contributed 15%, whereas ages 60+ contributed 5%. The biggest share, almost 95%, of net asset-based reallocations came from the private sector. Finally, the contribution of oil revenues to public property represented 75% of total property inflows; but their contribution to private property outflows was lower (14%), though also substantial.

CONCLUSIONS

NTA estimates for 2004 in Mexico reveal a large lifecycle deficit for the two dependent age groups and only a modest surplus for the working age group. Moreover, the surplus was found only among ages 33–48, possibly the narrowest surplus span for NTA country members.

Support for the lifecycle deficit comes from high levels of per capita public transfers for children and the elderly. However, private transfers dominate net total transfers and are greater to the young than to the elderly. Intra-household transfers constitute the majority of private transfers. Asset reallocations can support most of the old-age deficit, since a big proportion of the positive public transfers that this group receives is nullified by the net familial transfers that elders distribute to the other age groups.

The results presented here were derived from a cross-sectional analysis and might be different for other years. It would be instructive to perform NTA estimations for other periods for comparison and to incorporate additional aspects of the Mexican economy in the analysis. For instance, the treatment of pensions and the reforms of the social security system in Mexico deserve careful analysis.

NOTES

1. The other countries are Argentina, Uruguay, Chile, Colombia, Brazil, and Costa Rica.
2. During 1970–75, the TFR was 6.5, the crude mortality rate was 9.1, and life expectancy at birth was 60.1 for men and 65.2 for women (UN Population Division 2009).
3. Remittances represent about 2.5% of GDP according to my estimates based on aggregate controls and reports from the Central Bank of Mexico.

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14. National Transfer Accounts for Finland

Risto Vaittinen and Reijo Vanne

Our focus in this chapter is on the National Transfer Accounts (NTA) for Finland in 2004. We divide them into public and private transfers and asset reallocations by age, following the approach described by Mason et al. (2009). Finland's public sector has a substantial role in the distribution of resources among age groups. About two thirds of public expenditures can be regarded as age-related spending, which is roughly 30% of the GDP. Unlike the case in most countries, in Finland the public sector has positive net financial wealth because of partially funded statutory employment pension insurance.

A distinguishing feature of Finnish society is that the baby-boom generations are exceptionally large compared with those of other countries. The largest generation is entering the old-age stage of lifecycle deficits during the years 2008–13. Large public asset reallocations and the large size of the baby-boom generations make the structure of Finnish NTAs somewhat unusual.

We begin by presenting stylized facts for the Finnish population and economy. Next, we present the aggregate lifecycle deficit, describe Finland's private and public reallocation systems, and describe the main data sources used in our research. In the following section we present the per capita lifecycle deficit and its components by age, labor income, and private and public consumption. Then, after presenting aggregate public transfers and taxes, the corresponding per capita age profiles, and the data sources, we discuss our results for private and public reallocation by age.

THE FINNISH ECONOMY

Finland had a population of 5.3 million at the end of 2007. The total fertility rate has remained in the range of 1.70–1.85 births per woman for the past 25 years. Net migration has been increasing in recent years. During 2005–07 it was at the level of 2 per 1000 annually.

Annual GDP per capita was 33 970 euros in 2007. The average annual real growth rate of the GDP was 3.6% from 1997 to 2007. Owing to the deep recession in the early 1990s, unemployment was at an all-time high, 16.6% of the workforce in 1994; but it has declined monotonically since then and was 6.9% in 2007.

Finland has had high economic growth, high variability of the growth rate, high unemployment, and relatively low inflation since 1993. Since 1995 the current account has been permanently in surplus, although a deficit was common earlier.

Finland has also run a public surplus for decades, almost without exception. In 2007 the surplus was 5.2% of GDP, of which 3.0% was net property income. Because of the history of surpluses, the general government holds net financial wealth. The public sector is also large in other respects, although not as large as in other Nordic countries. The tax rate has been more than 40% of GDP since 1986. Despite declining since 1999, it was 43.0% of GDP in 2007, which is the sixth highest rate among the OECD countries.

Pensions, health and social services, and education services are the largest items on the expenditure side of the public budget. Pension expenditure is approximately 11% of GDP, and health and social services expenditure 8%. Education services plus student allowances are approximately 6% of GDP.

AGGREGATE LIFECYCLE DEFICIT, THE INSTITUTIONAL SETTING, AND DATA SOURCES

The public sector has a substantial role in the intergenerational resource distribution. In 2004, age-related public consumption totaled almost 22 billion euros, which was about 14% of GDP. Education and health care are provided mainly by the public sector. Responsibility for the provision of most of these services rests with municipalities. They have the authority to collect taxes to fund the services, but also receive state subsidies.

In the Finnish education system there are no tuition fees for full-time students. The municipalities finance both primary and secondary education. All Finnish universities, on the other hand, are owned by the state. Extensive public health care services are offered to all residents. Responsibility for the provision of primary health services rests with the municipalities. Private-sector services complement those provided publicly. Expenditures for the private health services are reimbursed by the compulsory and universal National Health Insurance, which is run by the Social Insurance Institution. All residents are covered by social security

Table 14.1 Aggregate lifecycle deficit: Finland, 2004

Item	Million euros
Lifecycle deficit	14,801
Consumption	96,167
Private	62,853
Public	33,314
Less labor income	81,366
Age reallocations	14,801
Asset-based reallocations	16,295
Public asset-based reallocations	−1,578
Public income on assets	2,736
Less public saving	4,314
Private asset-based reallocations	17,873
Private income on assets	33,494
Less private saving	15,621
Transfers	−1,494
Private	−114
Public	−1,380

schemes that govern basic (national) pensions and sickness, parenthood, and unemployment benefits. In addition, all employed persons are entitled to benefits based on employment, such as earnings-related pensions and benefits for employment-related injuries. The National Health Insurance compensates for income lost due to temporary incapacity for work, in proportion to applicants' earnings.

Table 14.1 displays the composition of the aggregate lifecycle deficit that is derived from the national accounts data. Consumption consists of public and private consumption net of taxes. Public services account for 35% of total consumption. Wage income is composed of wages, salaries, and employers' social contributions, together with a 67% share of the household sector's mixed income. In asset-based reallocation, public savings and incomes are straightforwardly extracted from the national accounts.

Finland's public sector holds positive net financial wealth. This is mainly because statutory employment pension insurance, compulsory for all employers, is part of the general government and classified as a subsector under social security funds. The pension insurance providers hold funds that are about 1.7 times the wage sum of the Finnish economy. Public asset-based reallocations of −1578 million euros include both a primary balance surplus and the part of financial investment income that is included in the national accounts. In calculating private income from assets, we take into account indirect taxes on capital formation as well as production subsidies, which are related mostly to agriculture. Net transfers are mainly public-sector payments abroad that consist predominantly of the EU membership fee and payments to international organizations. Individual collective services form two thirds of total public consumption. The most important of these are education, health care, and social services with respective shares of public consumption of 21%, 25%, and 14% (Vaittinen and Vanne, 2008).

CONSUMPTION AND LABOR INCOME BY AGE

We used two sources of data to allocate private consumption to different cohorts. Statistics Finland's Household Budget Survey for 2004 provides data on private consumption expenditure. We used the Household Wealth Survey of 2004 to estimate the stock of durables and interpreted depreciation of that stock as consumption.

The data on public consumption by age are from statistics on the total population, which we used to estimate per capita consumption of public services. In Vaittinen and Vanne (2006) we include more information on the sources and manipulation of the data. Use of state-funded education services by age is based on enrollment data for different education levels by age and the respective unit production costs. The data were provided by the education authorities. The Ministry of Health and Social Affairs supplied the corresponding data on health and social services. We assumed the relative age profile for users of cultural and recreational services to be equal to the respective age profile for private consumption. The Social Insurance Institution publishes statistics on health insurance and rehabilitation costs by age. We assumed collective public consumption to be constant per capita across ages.

Figure 14.1 presents age profiles of total per capita consumption and labor income by age. The maximum labor income is reached at the age of 43. The crossover ages for lifecycle deficits, when labor income exceeds consumption, are 26 and 59. The decline in private consumption at the later crossover year reflects the fact that people are curtailing their expenditures to fit their pensions. The average age at retirement is about 58.

Dividing total consumption into private and public consumption by age (Figure 14.1), we show that private consumption grows rather steadily after birth until peaking at age 31, peaks again at age 59, and declines gradually after the second peak, but never substantially below average consumption. Total consumption is rather flat across the broad 50-year age bracket from 20 to 70. Public consumption, the difference between

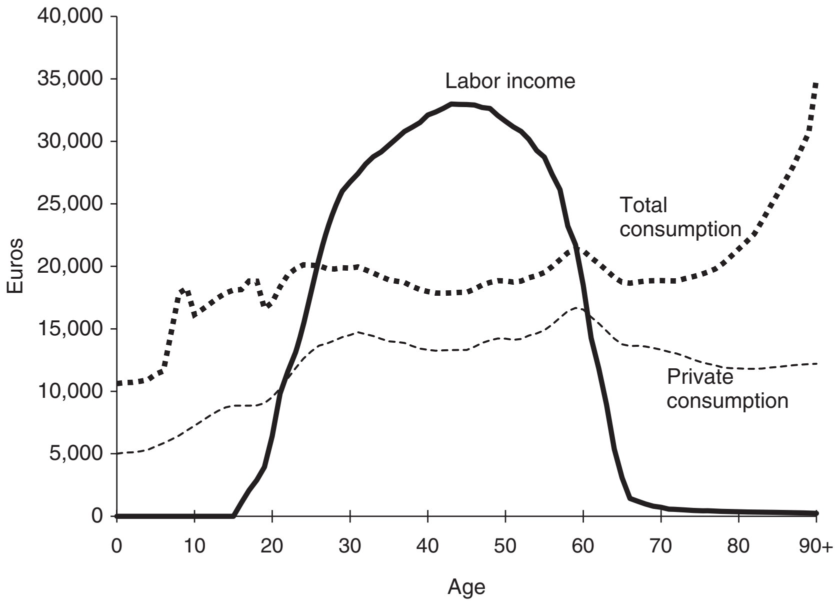

Figure 14.1 Consumption and labor income per capita by age: Finland, 2004

total and private consumption, rises sharply around age 80; and at ages 90 and above, total consumption is almost twice as high as at ages 20–70.

The decline in private consumption after age 31 is due partly to the fact that people then are in their childrearing stage. In this case, however, there is a specific cohort effect. Finland experienced a severe recession at the beginning of the 1990s. Riihelä (2006) has studied the consumption and income development of individual cohorts with five-year frequencies using a sequence of household surveys conducted from 1985 to 2001. She found that for the cohorts that were ages 25 and 30 in 1985, both their income and their consumption growth from 1985 to 2001 were significantly slower than were those of the cohorts that were 20, 35, or 40 years old at the time of the same survey. These two cohorts were 30 and 35 years old – typically at a strong career-forming phase in the labor market – during the time of the prolonged recession. In fact, the lowest per capita consumption of middle-aged cohorts in our study was that of respondents who were 41 years old at the time of the 2004 survey.

The distribution of labor income by age is taken from statistics on income and property provided annually by Statistics Finland. Those statistics describe the income subject to taxation, property taxes, and taxation of private persons. The basic data for the statistics are drawn from the Tax Administration's data base and are based on total population data.

PUBLIC REALLOCATION AND DATA SOURCES

Public reallocation consists of public transfers plus public services less taxes and investment income on public financial assets. Here, we focus on public cash transfers and taxes.

Public Cash Transfers

In 2004 the total volume of public cash transfers was about 30 billion euros, or 20% of GDP. We are able to assign 24 billion euros, or nearly 80% of the transfers, to specific ages. The distribution by age of the rest is not known, and we assumed that these transfers were the same for all age groups. Pensions are the most important category of age-related cash transfers, forming 56% of the total (Vaittinen and Vanne 2008).

The public pension expenditure represented more than half of the total volume of public transfers. The Finnish statutory pensions are made up of earnings-related pensions and national pensions; voluntary pensions play a minor role in the total pension provision. The pension acts strive to secure a reasonable income for the insured and their families in relation to their earnings while the insured are working and cover old age, disability, and death. The earnings-related pensions are partly funded but have defined benefits, so that pension expenditure, together with returns on assets, determines the contribution level. A pension recipient is entitled to a national pension if the earnings-related pension is small.

The benefit rules of the earnings-related pension plan include some features of defined-contribution systems. Benefits are not based on a worker's final salary, but before 2005 they were based on the last ten-year average salary of every period of employment. Since 2005 the benefits have been based on a worker's wages over his or her whole career.

When calculating the initial amount of a pension, the pension institutions adjust earnings for different years in line with the wage coefficient, giving a weight of 80% to the change in the earnings level and a weight of 20% to the change in consumer prices. Pensions are then adjusted in line with an index according to which the weighting of the change in the earnings level is 20% and the weighting of the change in prices is 80%. After 2009 the initial amount of old-age pensions was adjusted to account for the change in longevity for 62-year-olds through the life expectancy coefficient. It is determined to maintain the net present value of the expected old-age pension. The Finnish Centre for Pensions publishes age-related statistics on statutory pension benefits.

Finland has three types of unemployment benefits. Persons who have paid a voluntary contribution to an unemployment insurance fund when working receive an earnings-related unemployment daily allowance from that fund. Others receive a basic daily allowance from the Social Insurance Institution. Statistics on the age profiles of all unemployment benefits are published annually by the Insurance Supervisory Authority and the Social Insurance Institution.

Health insurance daily allowances and parenthood allowances are earnings-related and paid by the Social Insurance Institution. Other family policy benefits are child allowances paid until a child is 17 years old, a child daycare subsidy, and some minor benefits. The Social Insurance Institution pays these transfers as well.

Among other age-related transfers are a student allowance, a housing allowance, and social assistance for poor households. The Social Insurance Institution provides the first two benefits, and local governments pay social assistance benefits. The Social Insurance Institution publishes annual statistics on age profiles of recipients of the benefits it pays.

Taxation

Taxes are collected by the state and other institutions. In 2004 the total tax revenue was about 66 billion euros, or 43.4% of GDP. The state receives over half of the total tax revenues. Local governments (municipalities) and statutory pension insurance providers each collect one fifth of the tax revenues. The Social Insurance Institution and unemployment insurance funds are minor tax collectors. The central government gives financial support to all other tax-collecting sectors.

Labor income is the main source of taxes. It is the main source of state income and local government taxes, as well as social insurance contributions, and it is the only source of pension and unemployment insurance contributions.

Almost all public social transfers of cash are taxable income. In the state income taxation, the sum of earned income and social transfers is taxed by means of a progressive tax schedule. The local tax schedule is proportional, but the earned-income tax credit and other deductions make local taxes also slightly progressive with respect to gross income.

Profits are taxed at a flat rate of 26%. Investors' capital income, including capital gains, is taxed at the rate of 28% of taxable income. In the case of dividends, the calculation of taxable income is rather complicated. In the end, the effective tax rate is below 28% and depends partly on whether the dividend is based on private equity or on shares of a listed company.

The main consumption tax is the value-added tax (VAT). The general VAT rate is 22%. Food products are taxed at the rate of 17%, and some cultural products and services at the rate of 8%. There are also excise taxes levied on some products, for example, alcoholic beverages, tobacco, energy products, and cars.

Two points have to be considered when compiling data on indirect taxes. In the case of excise taxes, final consumers do not always pay these taxes. Excise taxes may be a burden on producers when they purchase intermediate inputs, which is the case, for example, with energy. With VAT, exemption rules create a similar complication.

In addition, age-specific consumption patterns have implications for the tax burden of different age groups. Younger and middle-aged people tend to consume more alcohol, tobacco, and goods related to transportation than do older people. Excise duties tax these items heavily. Moreover, the relative amount of consumed goods that are taxed at lower than average value-added rates, such as food and health care, increases with age. This is true as well for the consumption of owner-occupied housing, which is subject to only moderate real estate taxes. Changing consumption patterns are reflected in changing average tax rates at different ages, as discussed in Vaittinen and Vanne (2008).

REALLOCATION AGE PROFILES

We consider the intergenerational distribution of consumption and income by comparing the difference between consumption and labor income by age. Lifecycle deficits have to be covered by a reallocation of resources from generations that produce surpluses. The Finnish public sector has a predominant role in age-related expenditures. Age-related transfers are also sizable. We pay particular attention to the public sector's role in mediating intergenerational transfers.

Figure 14.2 plots the main constituents of lifecycle deficits. People consume more than they earn until age 25. They produce surpluses between ages 26 and 59. Currently the aggregate deficit is larger at the younger end of the distribution, but this pattern is expected to be reversed in the coming years as the population ages. Those aged 48 earn most in absolute terms. Those aged 43 contribute most to the surplus. This age group has the highest per capita earnings and nearly the lowest per capita consumption among the middle-aged cohorts. The reason why infants have negative familial transfers is that all public family policy transfers

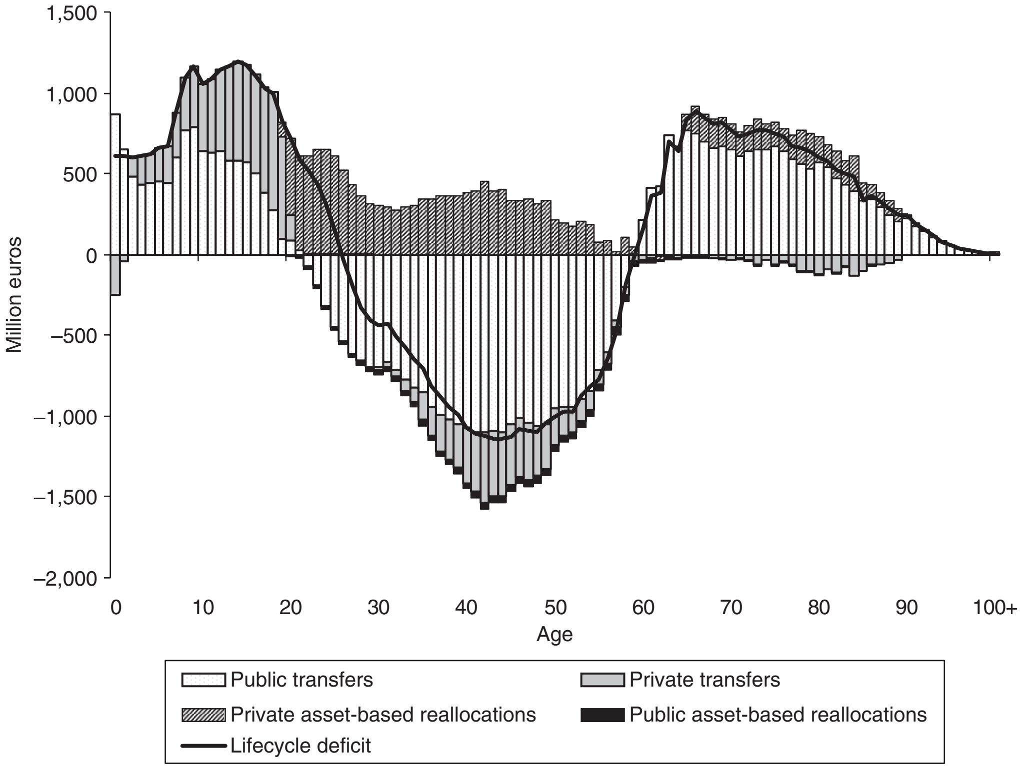

Figure 14.2 Aggregate LCD finance and its components: Finland, 2004

are allocated to children. The population-weighted average age of earning labor income is 43.0, and for consumption it is 42.2. The average ages for private and public consumption are 43.9 and 38.9, respectively.

Figure 14.2 also shows the division of lifecycle reallocation into private and public components. There are considerable differences in the patterns of private and public reallocations. Public savings exceed public asset income at every age and therefore make a negative contribution to financing the lifecycle deficit. In strong contrast, private asset-based reallocations are in surplus at almost every age. Asset-based reallocations are positive and large at young ages, when net wealth is close to zero. The explanation appears to be that the young borrow and dissave, and that leads to positive asset-based reallocations.

Public-sector transfers turn from deficit to surplus at age 24. About 40% of the lifecycle deficit for younger cohorts is financed by private reallocation, whereas for retired cohorts it is almost completely financed by public transfers.

Table 14.2 summarizes the aggregate lifecycle deficit by age for five broad age groups. Two dependent groups receive intergenerational transfers: the population under age 20 and that above age 65. Labor income is practically zero among the dependent groups, and lifecycle deficits, which have to be covered by intergenerational transfers, are large. The middle-aged population generating lifecycle surplus and providing intergenerational transfers is divided into 15-year age groups.

Public and private components have almost equal weights in young dependents' consumption. Public transfers cover more than half of their consumption, but the young also receive significant familial transfers. Interestingly, young dependents have the largest share of all intergenerational transfers. They receive as net transfers about 18 billion euros compared with roughly 11 billion going to retirees.

Retired people have a significantly lower share of total consumption than any other age group in our classification. Overall, this finding reflects the currently moderate size of this age category. Private consumption declines significantly when people retire; but overall consumption remains at the average level because of the increasing role of publicly provided goods, which constitute more than 40% of total consumer expenditures for retired people. Despite their declining private consumption, retired people still save roughly the same amount that they give up in downward transfers.

The largest contributors to the lifecycle surplus are people of ages 35–49. They generate by far the largest share of labor income and make the biggest contributions to both private and public transfers. They consume considerably less than their share of labor income, mainly because they contribute to public transfers. They are also the largest net contributors

Table 14.2 Population and lifecycle deficit by broad age group: Finland, 2004

Item	Age group					
	Total	0–19	20–34	35–49	50–64	65+
Population (1000s)	5,237	1,233	971	1,120	1,083	831
Lifecycle deficit (million €)	14,801	18,152	–666	–14,928	–4,238	16,482
Consumption	96,167	18,773	18,741	20,281	21,269	17,103
Private	62,853	8,682	12,507	15,037	16,202	10,426
Public	33,314	10,092	6,234	5,245	5,067	6,677
Less labor income	81,366	621	19,407	35,210	25,507	621
Lifecycle reallocations	14,801	18,021	–605	–12,264	–4,756	14,404
Asset reallocation	16,295	45	5,032	6,447	1,028	3,743
Private	17,873	94	5,211	7,167	1,526	3,874
Public	–1,578	–49	–179	–720	–498	–131
Income on assets	36,230	180	1,598	13,777	15,015	5,660
Private	33,494	95	1,288	12,528	14,151	5,432
Public	2,736	86	310	1,249	864	227
Less saving	19,935	136	–3,434	7,330	13,987	1,916
Private	15,621	1	–3,923	5,361	12,625	1,558
Public	4,314	135	488	1,969	1,362	359
All transfers (net)	–1,494	17,977	–5,637	–18,711	–5,784	10,661
Private (net)	–114	7,464	–72	–4,749	–1,232	–1,526
Public (net)	–1,380	10,512	–5,565	–13,962	–4,552	12,187

of private transfers and consume relatively few publicly provided goods. Saving is positive in this group; but income from assets is higher, and consequently private asset-based reallocations are positive.

Although still positive, the lifecycle surplus diminishes significantly for those aged 50–64. These people have the highest proportion of consumption, with a relatively small share coming from public services. The oldest group that is still active generates significantly less labor income than the next younger age group but earns more private asset income per capita. This age group saves a significant part of its income, but its intergenerational transfers are not even close to the magnitudes of the next younger age group. Private asset reallocation is also positive in this age group, but much lower than in the previous group.

The 20–34 age group is much smaller than the one aged 35–49. During the 15 years between 2004 and 2019 the bigger cohort will be replaced by the smaller as the 'prime age' group, and, *ceteris paribus*, the capacity of the Finnish economy to generate lifecycle surplus will be diminished.

CONCLUDING REMARKS

Our conclusions are drawn from the analysis of a single one-year set of cross-sectional accounts. It is possible that accounts for years slightly earlier or later would look somewhat different, and there are also dangers in attempting to draw inferences about true longitudinal lifecycles from cross-sectional observations. With these caveats in mind, we can still draw some plausible inferences.

Finnish generations run lifecycle surpluses in the middle of their lives for the 33 years between ages 26 and 59. The notable feature in the pattern of reallocation is in the relative roles that public and private allocations have in smoothing consumption over time at younger and older ages. There are substantial private lifecycle deficits for the younger cohorts but no private dissaving among the older cohorts.

The public sector has a substantial role in Finland's intergenerational redistribution. It predominates in the provision of education and health care. It also provides for conspicuously high consumption at very old ages. Lifecycle reallocations at old ages are almost completely due to public reallocations.

The public sector is typically in surplus according to national accounting standards. In addition, there are remarkable changes in positive public financial wealth due to market-price changes in assets held and capital gains and losses. On average these changes are positive. The question could be raised: should we allocate the wealth accumulation by age?

Over the next 10 to 15 years, the large cohorts in the prime age for generating lifecycle surplus will be replaced by smaller ones, putting pressure on the reallocation systems. It would be worth further research to estimate the lifecycle deficits in the future, given, for example, present public and private wealth.

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B. The economic lifecycle

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15. The changing shape of the economic lifecycle in the United States, 1960 to 2003

Ronald Lee, Gretchen Donehower, and Tim Miller

The US age pattern of economic activity is unusual among NTA economies in several ways. Consumption by older persons relative to younger ones is higher in the United States than in any other economy, but the labor income of older persons is also higher in the US than in other developed economies. It is striking that only a few decades ago, in 1960, consumption at older ages was lower than that of younger adults, in stark contrast to 1981 and in even more contrast to 2003. The development of Medicare and Medicaid apparently played an important role in this change. This increase in old-age consumption compounds the costly effects of population aging. At the same time, the relative labor income of older people has risen, primarily as a result of the rapidly rising wage rates of the elderly, which reflect earlier increases in their education. The remainder of this chapter will discuss these observations in more detail.

We saw in earlier chapters that in most rich nations consumption tilts toward the older ages, in contrast to most non-rich countries, in which consumption tends to be flatter across the entire adult life span.[1] This tilt exacerbates the cost of population aging since it raises the consumption of the older dependent population. Nowhere is this general tilt stronger than in the US. Has this tilt been a permanent and enduring feature of the societies that are now rich and industrial, or has it developed in recent years? We shall address this question here by considering some cross-sectional age profiles from earlier decades in the US.

The labor income of the elderly also affects the size of their lifecycle deficit. Labor supply at older ages has plummeted in the industrial world as rising incomes and growing public transfer programs have facilitated and sometimes encouraged earlier retirement. The US also experienced a substantial decline in work at older ages during the twentieth century, with the median age at retirement for men dropping from over 80 during the late nineteenth century to 63 toward the end of the twentieth. More recently, however, there has been a remarkable rise in labor income at older ages, rapidly increasing the average age at which labor income is earned and making the US the NTA economy with the oldest average age of labor income when weighted by a standard population age distribution. We shall examine these changes in labor income as well, and attempt to learn what has been driving them.

Thus the US provides an opportunity to examine the distinctive age patterns of consumption and labor supply that characterize industrial nations, and to determine whether they emerged in recent decades or are longer standing.

THE DEMOGRAPHIC, CULTURAL, AND ECONOMIC SETTING

The demographic profile of the US stands out among industrial nations by virtue of its relatively high fertility and young population age distribution. The total fertility rate (TFR) has been close to 2.0 births per woman since the early 1980s, about a half birth higher than in the rest of the industrial world (UN Population Division 2008). The TFR has also been comparatively high throughout the past century, particularly during the US baby boom, when it rose above 3.7 births. This generally high fertility has kept the population relatively young, and the large baby-boom cohorts, now entering old age, have profoundly shaped the population age distribution. While the US is home to far more immigrants than any other country, it also has a large native population, so that, at 12.9% in 2005, the proportion of foreign-born is not striking (UN Population Division 2009, p. 322).

The US is a pluralistic society, reflecting the substantial share of recent immigrants with different traditions and values from those of the dominant native culture. The native culture, however, is individualistic as manifested in both private and public life. In private life, although extended families that included the elderly were common in the nineteenth century, their prevalence declined throughout the twentieth century. Now elder co-residence is rare, and when it occurs it is more frequently for the benefit of the grown children than for that of their elders (Ruggles 2007). Children, once finished with their education, are expected to establish their own households rather than continue to live in the parental home. The elderly are expected to live independently, and they prefer this arrangement.

In the public sphere there is an emphasis on self-reliance and a fear of undermining it through need-based transfer programs. The notion of a social contract, which is widespread in Europe, is largely absent in the

US. The tolerance for taxes and for income redistribution is much lower in the US than elsewhere (Wills 1999). The specters of 'Big Government' and European-style socialism are seen as threats, particularly by political conservatives. These concerns have not, however, kept the US from accumulating a large public debt.

The US public pension system is called Social Security, and it includes survivors' benefits and disability insurance as well as pensions. More than 90% of the labor force is covered by Social Security. The average replacement rate is about 0.40 (value of benefit received divided by wage near retirement), with a progressive benefit formula. The benefit is adjusted for cost-of-living changes but not for wage or productivity growth after retirement, so that it is flat for a cohort in real terms. The replacement rate is lower than in Europe. For elderly people who do not qualify for Social Security and who live in poverty, a need-based program, Supplementary Social Insurance (SSI), provides a minimal stipend.

Unlike other industrial countries, the US has no universal public health care program, although legislation passed in 2010 moves in that direction. Medicaid provides health insurance for the poor of all ages, but it is increasingly used to pay for nursing-home care for poor elderly people. Otherwise, publicly funded health care is provided through Medicare, which covers a portion of the health care costs of the disabled and those 65 and older. It includes hospital insurance and coverage for doctor visits outside the hospital. Some coverage for the purchase of drugs began in 2006, but this was after our baseline year of 2003. Medicare is distinctive in two respects, that it covers mainly the elderly population and that it provides health insurance but does not provide services. It is an entitlement program with no caps or rationing.

The US also differs from most other industrial nations in that it has no program of family allowances for households with children. Any support for families with children is strictly need-based or is a form of implicit support through the tax structure.

State-run education in the US is similar to that in many other countries through the secondary level, but is unusual in its broad array of public colleges, universities, junior colleges, and community colleges, which provide subsidized opportunities for higher education to people with a wide range of abilities and backgrounds. Unlike some countries in Asia, the US has no system of supplementing the state-run schools with a layer of private schooling. Instead, parents choose either the state-run or the private school system at each stage of their children's education. Currently about 11% of all elementary and secondary enrollments are at private institutions, while about 22% of all college and university undergraduates attend private institutions (Snyder et al. 2009, p. 297).

In recent years the US government has run a large budget deficit. This has resulted in a rapidly growing national debt, which was about 37% of Gross Domestic Product in 2007, net of interagency government borrowing (US OMB 2008, p. 127). This level of debt is in the middle of the range observed among the OECD countries (OECD 2008).

DATA

Our data for the estimates in this chapter come from standard public-access sources: the decennial US census; the Current Population Survey (CPS), a household survey conducted annually with an emphasis on labor and income; and the Current Expenditure Survey (CEX). These basic data sources are supplemented by other special surveys on medical expenditures, nursing-home use, consumer finances, and so on. In addition, we use administrative data from Social Security and Medicare.

We are fortunate that some of these data sources have substantial historical depth. The CPS has provided continuous coverage since 1962. The CEX or similar surveys with varying coverage are available for some dates all the way back to 1888, with annual coverage starting in 1980. With these data and a willingness to make assumptions, it is possible to construct historical accounts over the twentieth century and earlier. Here we focus on the most recent estimates (2003) while providing some comparative estimates for 1960 and 1981.

For labor income the relevant data are available at the individual level from surveys. On the consumption side, most private expenditures are observed at the household level and are allocated to individuals as discussed in Chapter 3, on the NTA methods. We used regression methods to allocate private household expenditures on education. We used administrative data for state-run education and public expenditures on health care. Specialized health consumption surveys provided supplemental data on the public and private consumption of health care.

CONSUMPTION AND LABOR INCOME IN 2003

Figure 15.1 plots total consumption, the sum of private expenditures and in-kind public transfers and services received, together with labor income, including self-employment income and fringe benefits, before taxes. Two striking features stand out. First is the strong rise in consumption with age from the early 20s to the early 80s, at which point it is 50% higher; the rise accelerates rapidly after age 85, so that by age 90 consumption is more

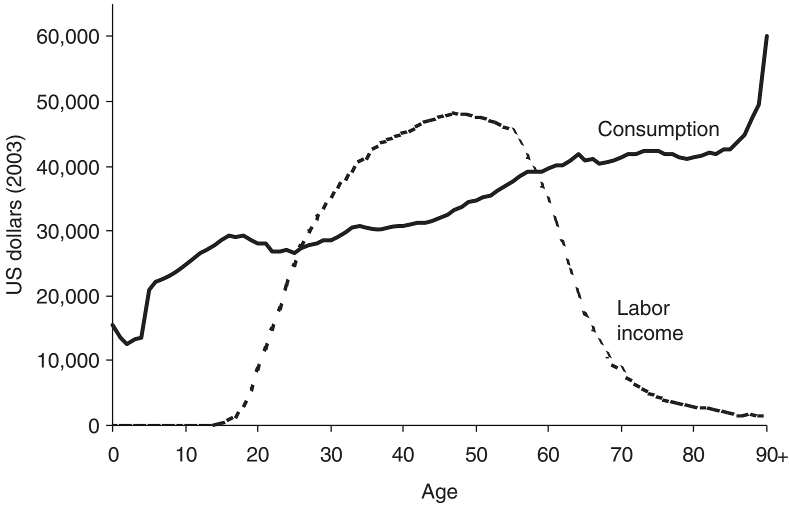
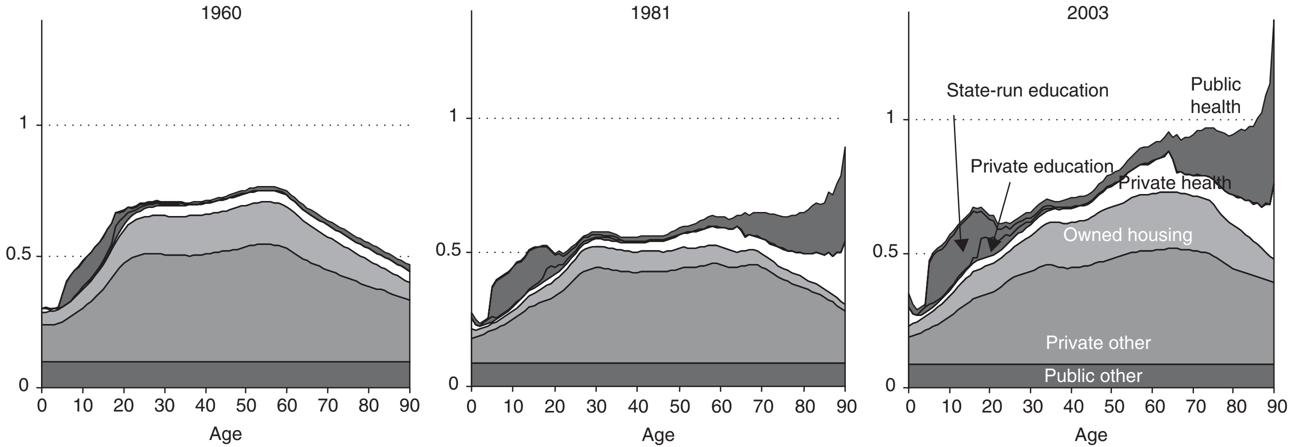


Figure 15.1 Total consumption (private plus public) and labor income: United States, 2003

than double its level at age 25. This pattern contrasts with that in most low-income and some middle-income economies, including Taiwan and South Korea, where consumption remains relatively flat across ages. The second striking feature is the short span of 33 years during which labor income exceeds consumption, between ages 26 and 58. A surplus is produced during only 42% of the current life expectancy at birth of 78 years. This second feature of the age profiles is shared to varying degrees by all the NTA economies, regardless of educational enrollment and old-age support systems.

In Figure 15.1 the age profile for labor income appears somewhat irregular and tilted toward the older ages as compared with a symmetric bell curve. One might be tempted to view this shape as reflecting sampling variation, but a comparison with adjacent years shows that indeed real cross-sectional earnings do not peak until around age 50. Recall that this curve is an average for men and women, and for those in the labor force and those out of it, so that it reflects participation, hours worked, and hourly earnings. We shall consider this shape further below. This kind of labor-income curve, resembling a bell curve pushed to the right, is also seen in some other industrial countries.

Figure 15.1 shows only the silhouette of the age profiles of consumption and labor income. The right-hand panel of Figure 15.2 looks behind this silhouette at its various components in 2003. (We shall consider the figures for 1960 and 1981 later.)



Note: Amounts are shown relative to the average labor income of 30–49-year-olds for each year.

Figure 15.2 The changing shape and composition of US consumption: 1960, 1981, and 2003

At the bottom of the plot we see a horizontal band showing the equal allocation of public expenditures that are not targeted by age, including such items as military spending, government-funded research, roads, public buildings, and the operating costs of government. Next we see ‘private other’ consumption, which represents all private spending except for health, education, and owned housing. While other consumption rises until age 63 and then declines, owned housing rises until the mid-70s and then declines. Owned housing is estimated as the rental value of owner-occupied housing. We might expect this to decline steadily with age as older persons move into smaller dwellings or into institutions, but there are countervailing influences: greater rates of home ownership by the elderly and increasing widowhood characterized by widowed persons living alone in their own housing. (Note that rent paid for rental housing is included in ‘private other’ consumption and may also be affected by the increasing chance of widowhood at older ages.)

Private health expenditures rise gradually until age 65, when government-provided Medicare insurance becomes available. There is a sharp decrease in private medical spending at that age, but then it rises again to cover out-of-pocket costs not chargeable to Medicare. Overall, private consumption declines after age 65, picking up again only at the oldest ages because of medical spending. Future work may find that the expansion of public Medicare in 2006 to cover some prescription drug costs has reduced private health spending at older ages.

The last component of private consumption is private education, and this appears in the right-hand panel as a thin wedge that is thickest for the pre-school years up to age 5 and for elementary school, and again for the years of higher education after age 17. Overall, private educational expenditures are much smaller in the US than in some other economies such as Japan, Taiwan, South Korea, or Brazil, but are in line with those in European countries.

Only in-kind public transfers appear on Figure 15.2. Any effect of income transfers such as pensions would be indirect. Public education looks as one would expect: a substantial quantity stretching from ages 5 to 21, and then tapering off but continuing to reflect publicly funded graduate education as well as returnees to the educational system at later ages. The most striking feature of these public in-kind transfers is health care, including long-term care. Starting at age 65 with Medicare eligibility, expenditures grow rapidly and then exponentially after age 80, when long-term care costs rise rapidly throughout the remaining elder years.

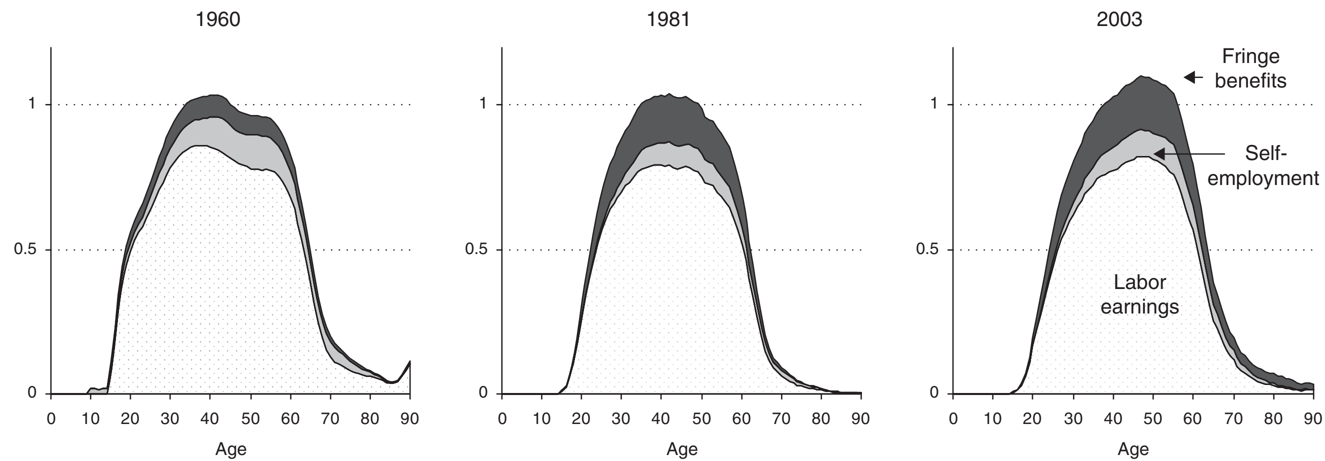
The unusual and perhaps unique age pattern of consumption in the US results from a combination of public and private components. Although private consumption does decline at the oldest ages, it remains above that of prime-working-age adults. This may reflect low levels of elder co-residence, following the decline throughout the twentieth century, a decline shared by other industrial nations, including Japan. Older people have accumulated wealth over their lifetimes in the form of both assets and pension wealth, including anticipated Social Security pension benefits. When they live apart from their children and grandchildren, it is perhaps easier for them to consume this wealth than to share it. The dramatic rise of stock prices in the 1990s and the inflation of housing prices boosted the wealth of the elderly in particular, since they own the most equities and have the highest share of home ownership. The individualism to which we alluded earlier could explain why US elders share less than their counterparts in other industrial nations, if indeed they do share less. On the public side, the US public's suspicion of the welfare state may have made it difficult to achieve national health programs for groups other than the elderly. In any event, the skew of public-sector health expenditures toward the elderly certainly contributes strongly to the US consumption pattern (Preston 1984; Fuchs 1999).

Figure 15.3 decomposes labor income into earnings, benefits, and self-employment income. We focus here on the right-hand panel, showing labor income in 2003. Benefits, including the employer's share of payroll tax, are an important component of the total, but they make up a bigger portion of older workers' total labor income than of young workers'. Self-employment income contributes a smaller share to the total but is greater at older than at younger ages.

CHANGES SINCE 1960

How did consumption by elderly Americans come to be so much greater than that of younger cohorts, and than the average income of prime-working-age adults? Figure 15.2 compares the shapes of the age profiles for 1960, 1981, and 2003. Consumption in 1960, predating both Medicare and Medicaid, was fairly flat between ages 20 and 60 and then declined strongly. This pattern looks much more like that in Third World countries today, although the decline after age 60 is unusually strong. By 1981 the age pattern had changed, and consumption was almost 40% higher at age 70 than at age 20. The pattern is flat to about age 80 and then rises with steep expenditures on long-term care.

When we look more closely at the changing components, what stands out most strongly is the growing consumption of both privately and publicly funded health care at the older ages. To a lesser degree one sees that the decline with age of private other consumption diminishes between



Note: Amounts are shown relative to the average labor income of 30–49-year-olds for each year.

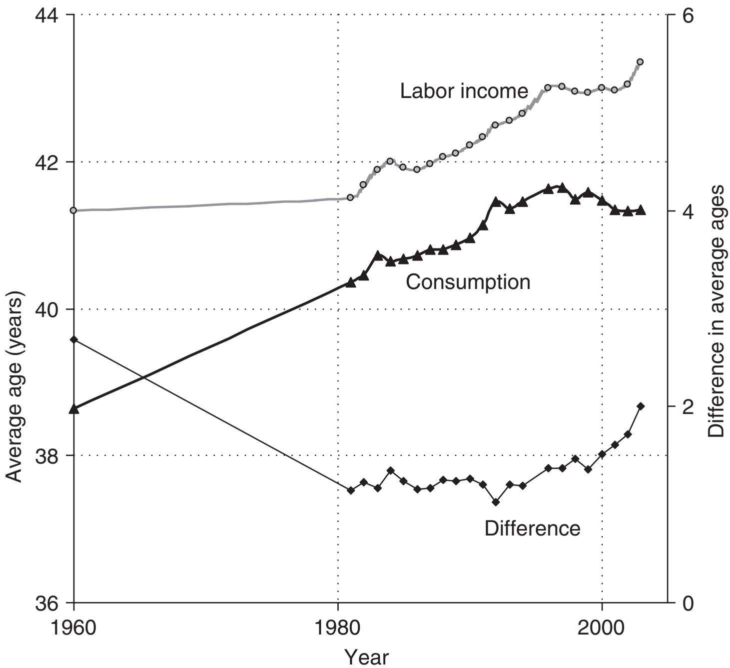
Figure 15.3 The changing shape of labor income: United States, 1960, 1981, and 2003

1960 and 2003: 80-year-olds consume only 67% as much as 60-year-olds in 1960, 77% as much in 1981, and 84% as much in 2003. We also see that private consumption in 1981 does not rise as high at any age as in 1960 or 2003, and in particular is lower around age 60. We suspect the reason is that the baby-boom children were still living with their parents in 1981, but in 1960 were fewer and younger. These children raised the household dependency ratios and depressed the level of the consumption profile relative to labor income for all those who co-resided with them. By 2003 most of them had moved out of their parents' homes. This 'empty nest' effect, along with the steep rise in housing prices, also meant more consumption of owner-occupied housing for older persons by 2003, contributing to the aging of the consumption profile over time.

The changes in labor income shown in Figure 15.3 are also interesting. There has been a clear decline in the proportion of self-employment income since 1960, and an equally clear increase in the proportion of benefits that accrue particularly to older workers. The decline in retirement age is also apparent. In 1960 there were much more substantial earnings after age 60 than in 2003. Less obviously, the income of older workers has increased relative to that of younger workers. One of the most striking changes is the decline in the amount of labor income earned at younger ages, particularly from 1960 to 1981, when enrollments in high school and college were rising rapidly. Real labor income declined strongly at almost all ages under 26. Labor income also declined sharply above age 80, but from 1981 to 2003 it rose at rates that were strikingly higher at older ages. We shall explore some of these changes in labor income in more detail in the next section.

CHANGING AVERAGE AGES OF CONSUMING AND OF RECEIVING LABOR INCOME

The average age at which a dollar is consumed or received as labor income is a convenient summary measure of age-specific activity. This average age depends both on the shapes of the age profiles and on the population age distribution used to weight them. For present purposes we hold constant the population age distribution so that we can isolate the effects of changing shapes of the age profiles. Figure 15.4 plots the result from 1960 to 2003, using observed age profiles of consumption and labor income combined with the population of 2003. We see that the average age of consumption rose considerably, which was expected, since we know that the skew of consumption toward older ages greatly increased during this period. The pace of increase notably slowed in the late 1990s and



Note: Average ages were computed using the 2003 population for all years.

Figure 15.4 Trends in average age of labor income and consumption, with population weights held constant: United States, 1960, 1981, and 2003

then appears to have reversed direction, which is a surprising result and requires investigation. The average age of labor income also leveled off a bit in the late 1990s but rose again in the most recent years, widening the difference in average ages.

What could account for the rising average age of labor income? The increasing prominence of fringe benefits has already been mentioned as one factor. However, the average age of labor earnings rose as well. To explore this phenomenon further, we did a decomposition analysis of the change in the average age of labor earnings for each year-to-year time segment, considering the following factors: the population age and sex distribution, sex-specific labor force participation, and sex-specific earnings per participant. The results showed that the earnings of men in the labor force accounted for almost all of the increase in the average age of labor earnings. Although older men's labor force participation initially fell and then rose during the period, there was a consistent upward trend in the *earnings* of older men in the labor force, relative to younger men. Further investigation suggests that these older workers benefited from a flattening out of the age–education gradient. That is, younger workers no longer had large education advantages over older workers. Even within education groups, however, the age profile of earnings was becoming older with time, so that education is not the whole story. The impact of women's rising earnings and labor force participation was less pronounced because it was less concentrated in a particular age range.

Decomposition analysis also sheds light on the increases in the average age of consumption. Increases in public and private health consumption at older ages were the biggest factors, but the rise in other private consumption for older relative to younger persons was also salient. While both state-run and private education increased in share at the aggregate level, pushing the average age of consumption down, these effects were swamped by the increases at older ages just mentioned. As for the decline in the average age of consumption from 1997 to 2003, it seems to have been driven by decreases in the average age of public and private health care profiles. These were in turn caused by a slight downward trend in the rates of institutionalization and thus long-term care costs, consistent with studies of trends in old-age disability and functional status.

CERTAIN CHANGE IN THE FUTURE

The figures discussed in this chapter show the US economic experience during a period of steady increase in consumption relative to labor income. Aggregate consumption was about 17% higher than labor income in 1960, but 31% higher than labor income in 2003. Here we have shown the age-specific nature of that increase, as well as the large role that health care consumption played in the rise in spending.

What do these trends mean for the US as its population ages? Although the population did age from 1960 to 2003, rising from an average age of 31 to 36, the major impact of aging is still to come when the large baby-boom cohorts become old and retire. In fact, if the age profile of 1960 had remained unchanged through 2003, aggregate consumption would have fallen relative to labor income over the period, other things being equal, because of the favorable age distribution changes caused by the baby-boom generation moving into the labor force. Instead, aggregate consumption grew relative to labor income in part because of changes in the age profile of consumption, particularly its tilt toward the older ages, or 'consumption aging'. Any further consumption aging would magnify the impact of future population aging on aggregate consumption relative to aggregate labor income. Trends in two key factors will influence the future age pattern of US consumption. The first factor is the future functional status of the elderly, which strongly influences nursing-home use. The second is health care reform, which may alter the age profile and trend in both public and private health care costs and consumption.

As reported earlier, we also found that the labor income profile was aging; that is, labor income at older ages was rising more rapidly over time than it was at younger ages. If the recent reversal in the aging of consumption continues, and if the longer-standing aging of labor income also continues, aggregate consumption might return toward historical levels of balance with labor income, even as the US population grows older.

ACKNOWLEDGMENTS

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NOTE

1. Spain is an exception among the rich countries, with a horizontal consumption profile. Brazil and Uruguay are exceptions among the non-rich countries, with upward-sloping consumption profiles.

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16. Labor income and consumption profiles: the case of Germany

Fanny A. Kluge

Germany's lifecycle deficit is shaped by long periods spent in education, early retirement, and low labor force participation rates among the older workforce, which result in a rather short surplus period. Moreover, Germany faces challenges as a quickly aging welfare state. During the long dependent periods of childhood and old age, the main expenditures – including education for younger people and pensions and health care for older people – are publicly financed. Private consumption is low for these items.

Germany is the oldest welfare state in the world, having had social insurance since the 1890s. This institutional setting has also shaped the lifecycle deficit. Education is free of charge, and long periods are spent in education, despite the availability of apprenticeships and the low rate of enrollment in tertiary education. The unemployment provisions for the elderly and the early retirement options introduced in the 1970s tend to encourage an early exit from the labor market. The needs of the dependent age groups are mainly publicly financed and amount to a considerable share of the GDP for health, education, and pensions. After outlining Germany's demographic situation and institutional setting, this chapter presents the consumption and labor-income profiles, and the corresponding lifecycle deficit, for 2003.

DEMOGRAPHY

With its 82 million inhabitants (38.1 million households), Germany is the most populous country in Europe and the largest economy in the European Union. Some 65 million people (31.0 million households) live in the Western part of Germany, and 17 million (7.1 million households, including those in Berlin) live in the Eastern part. After the baby boom of the 1950s and 1960s, the total fertility rate (TFR) dropped below replacement level in the early 1970s. The current rate of around 1.3 births per woman has remained stable for the past several years. During the period immediately following reunification in 1990, the TFR in Eastern Germany dropped to 0.77, and it has recently reached Western German values. Mean age at childbearing is 29.1 years. The low fertility rates are coupled with a rising life expectancy at birth: 76.2 years for men and 81.8 years for women in 2003. The rising life expectancy and low fertility levels have resulted in an old-age dependency ratio of 25.9 per 100 inhabitants of ages 20–64. This is among the highest in Europe, and it is expected to increase to slightly over 50 by 2050.[1]

The issue of population aging is more pronounced in the East. This is due to the low TFR, as well as the high migration rates of younger skilled workers from the East to more prosperous regions of the former West Germany following reunification. Since the 1970s the number of deaths has been greater than the number of births, and since 2004 these losses have not been compensated for by immigration. The shrinkage of the German population is expected to be accompanied by a contraction of the workforce (ages 20–64) from about 50.1 million in 2003 to about 39.1 million in 2050. The projection corresponds to a 22% decrease in population from that of the scenario with high migration. The number of oldest old inhabitants (ages 80+) will triple until 2050.

SOCIAL SECURITY

The German social security system is the oldest in the world. The first components (health care, insurance against accidents at work, disability, and old-age insurance) were introduced in the 1890s in response to pressure from the working class. The provision was significantly expanded over the twentieth century. Today, the system provides a wide range of benefits, including support for the unemployed, health care and long-term care, old-age and disability benefits, survivor pensions, child allowances, and monetary support for maternity leave. Contributions are financed equally by employers and employees. These contributions, which are subject to a monthly ceiling, pay for pensions (19.9% of gross wages), unemployment (3.3%), health care (about 14%),[2] and long-term care (1.95% + 0.25% for the childless). Social security contributions amounted to 17.3% of GDP in 2006 and are among the highest in Europe (Eurostat 2008). Total government expenditures on social security make up 48.5% of GDP.

The German pension system began in 1889 as a capital funded system, with a waiting period of 30 years and a retirement age of 70 (Frerich and Frey 1996, p. 100). It was reorganized as a pay-as-you-go pension scheme in 1957, when the capital stock was almost exhausted after the Great

Depression and two world wars. The reforms that followed, especially in the 1970s, resulted in more generous arrangements. High replacement rates of about 70% of pre-retirement net earnings were introduced for workers with a 45-year earnings history and average lifetime earnings. Moreover, the mandatory retirement age of 65 for those with long working lives was abolished, enabling workers to retire earlier. As a result of these changes, pensions are now the single largest item in the social budget, amounting to 11% of GDP in 2003. A very large number of workers drop out of the labor force early, entering unemployment or early retirement programs. In the 1990s reforms were introduced that were intended to eliminate certain generous features of the system and postpone effective retirement age, which is currently around 61. For a thorough overview of the development of the German pension system, see Börsch-Supan and Wilke (2003). Today, the system covers 85% of the workforce, and pensioners rely heavily on the public sector. Around 80% of the total income of pensioners comes from public pension transfer payments (Reil-Held 2002, pp. 34f).

The German health care system is mainly publicly financed, and its coverage is almost universal. About 88% of all Germans are insured by statutory health insurance, and just fewer than 12% are insured in private insurance schemes. Contributions vary among the more than 200 public insurance companies. Government health expenditures amount to 136 billion euros, not including cash transfers and long-term care. Long-term care has its own budget of 17 billion euros in social security, which includes cash payments and in-kind transfers, depending on the degree of disability. About 12% of individuals aged 80 and over are in need of the services.

The German social security system also provides unemployment benefits that are based on compensation and years of employment. In 2003 the unemployed received up to 67% of their most recent net income (60% if childless) for at least six months, provided that they had been employed for at least 12 months. This period gradually increases to up to 32 months for people who were employed for at least six years. After the period of eligibility is over, people receive basic welfare benefits. The total unemployment rate in 2003 was 9.3% (8.4% in 2007). A particular problem is the high long-term unemployment rate of 4.6%. Additionally, the unemployment rate among older people is extremely high. The employment rate of persons in the 55–64 age group was quite low in 2003, around 40%. The rate increased, however, by 10 percentage points between 2003 and 2008. Female employment rates amounted to only 59% in 2003, but by 2008 were 64%. More than 40% of women work part-time.

THE EDUCATION SYSTEM

The German education system is complex, with different policies applying in different parts of the country. In general, schools are publicly financed and free for everybody. Education is the responsibility of the individual German state, or *Länder*. The education system is composed of 16 systems that vary in the number of mandatory years of schooling (usually around ten), ages for entry to primary and secondary school, and the types of schools offered. The total enrollment rate of children of ages 7–16 in state-run schools is about 98%. Only a negligible percentage of children are enrolled in private schools.[3] All children attend the same type of primary school, usually starting at age 6 or 7. After four or six years, depending on the school and their place of residence, children are enrolled in different types of schools according to their performance in primary school. The main categories for schooling up to age 16 are *Gymnasium* (which provides the most advanced level of education), *Realschule*, *Hauptschule*, and other hybrid forms. After completing the mandatory years of schooling, many students between the ages of 17 and 20 choose to attend a *Berufsschule*, or vocational school. Because students graduate from their *Gymnasium* or *Berufsschule* at relatively advanced ages, they tend to start tertiary education and complete their studies later than students in most other countries.

The system is often criticized for being inflexible, resulting in too much time spent in education. Moreover, students who attend *Hauptschule* often face discrimination, as it represents the lowest level of education. The education system is undergoing change, however, especially at the tertiary level. Seven of the country's 16 states have started charging moderate tuition fees (about 500 euros per semester). Among those who must pay the fees are new students, almost all students enrolled for longer than ten semesters, and people who are studying for the second time.

AGE PROFILES FOR CONSUMPTION AND LABOR INCOME

The age profiles of consumption and labor income and the corresponding lifecycle deficit for Germany presented here are based on National Accounts and population estimates for 2003, both provided by the Federal Statistical Office (FSO) and the German Income and Expenditure Survey (*Einkommens und Verbrauchsstichprobe*, or EVS); see Statistisches Bundesamt (2005). For a detailed overview of the data sources see Kluge (2009).

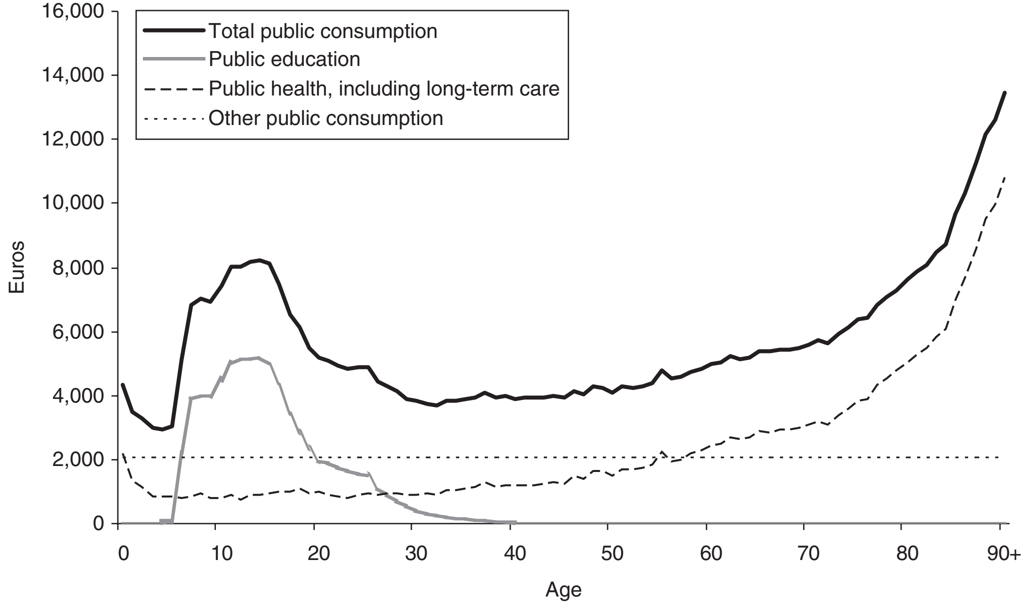
Public Consumption

Figure 16.1 presents the age profiles of public consumption. Consumption is broken down into three broad categories: education, health, and other. The 'other' category includes general public services, such as defense, public safety, environmental protection, and community amenities. Public expenditures for items in that category are assumed to be non-age-specific and are therefore allocated equally to each of the 82 million individuals. Expenditures for education are costs related to schools and universities, excluding childcare facilities. The exclusion of childcare expenditures reduces the calculated cost of education by about 13 billion euros. The costs for each student enrolled in a particular school type are published by the FSO. For example, the annual cost of education is 3900 euros for a child enrolled in primary school, 5400 euros for a student attending *Gymnasium*, and 4400 euros for a student in *Realschule* (Statistisches Bundesamt 2006b, table 5). The costs are used as weighting factors for each school type and student.

The age profile for public health expenditures is based on the costs of diseases published by the *Gesundheitsberichterstattung des Bundes* (Statistisches Bundesamt 2007). As the publications are available only for 2002 or 2004, I used the profile of 2004 for the year 2003. The two profiles do not vary much, and therefore the 2004 profile is assumed to be a good estimate for 2003. Because the costs of illnesses would add up to substantially higher expenditures on health, I adjusted the profile to the 136 billion euro figure for public health consumption that appears in the National Accounts.

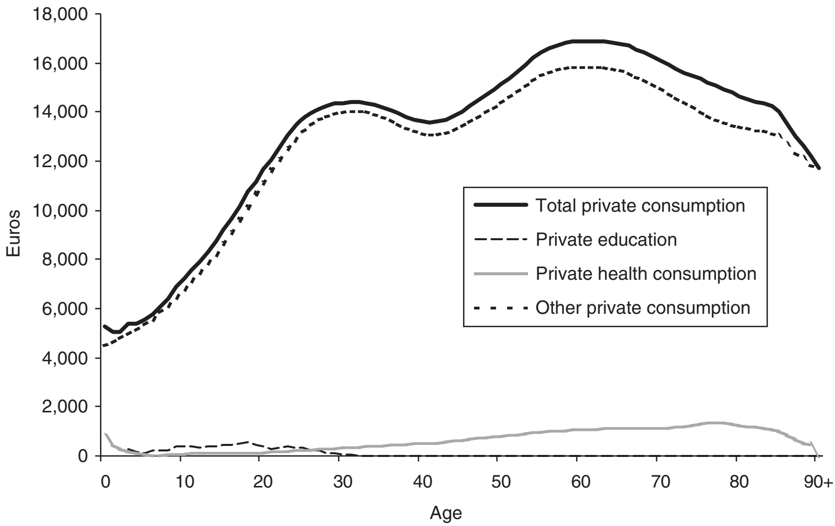
Long-term care is also included in the picture, resulting in a steep rise in costs per capita above age 80. Long-term care is not considered part of health expenditures in Germany, but rather as part of social security. A distinction must also be made between long-term care in-kind transfers and cash transfers. Figure 16.1 includes only the 11 billion euros in long-term care in-kind transfers. The remaining part will be allocated to cash transfers that are not part of the lifecycle deficit.

The combined age profiles show that individuals during childhood and old age consume higher levels of public benefits than do those at the ages in between. The high levels at younger ages are of course driven by education expenditures. Expenditures reach a peak at ages 12–15, when almost all German children are enrolled in secondary education, which is slightly more expensive than primary education. After age 16, expenditures start to decline. No age-specific data on education are available after age 39. This simplification ignores a number of students; but, as the profiles are shown per capita, it would not make much difference. The relatively smooth



Sources: Statistisches Bundesamt (2006b, 2007, 2008b) and author's calculations.

Figure 16.1 Per capita public consumption and its components by age: Germany, 2003



Sources: EVS 2003; Statistisches Bundesamt (2008b); and author's calculations.

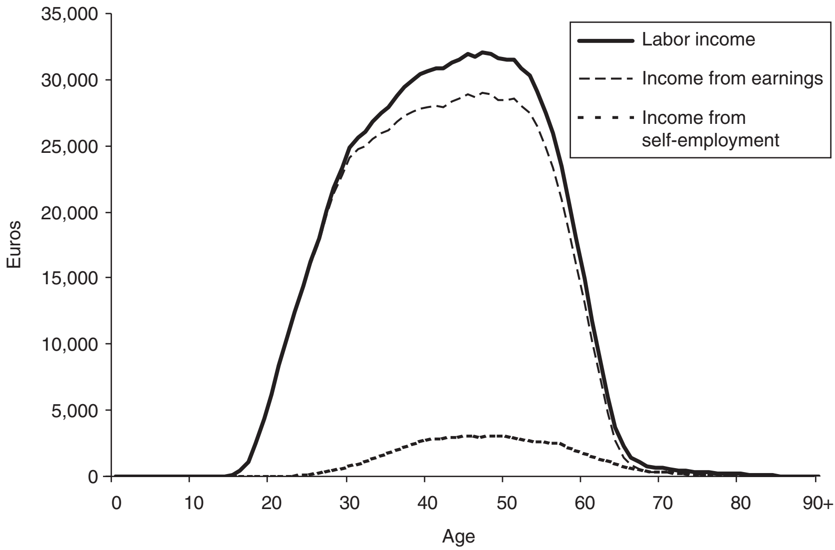
Figure 16.2 Per capita private consumption and its components: Germany, 2003

state-run education profile is due to the overlapping of school types in Germany, as explained above. The increase in consumption during old age can be attributed to health care and long-term care expenditures.

Private Consumption

I estimated private consumption by using the EVS survey data. Household expenditures on education, health, imputed rental value of owner-occupied housing, durables, and other consumption are distinguished in the NTA framework. I used the age distribution of the household members and the usual NTA project methodology in assigning household expenditures to individuals. The aggregate total, excluding indirect taxes, adjusts the micro-data.

Expenditures for private education are low in Germany (Figure 16.2). When we exclude costs for childcare from education costs, outlays for private education amount to only 0.7% of household expenditures.[4] Because schools are free and publicly financed, education consumption is almost entirely included in public expenditures. The peak of the unsmoothed profile occurs at age 18; most other ages fluctuate at a lower



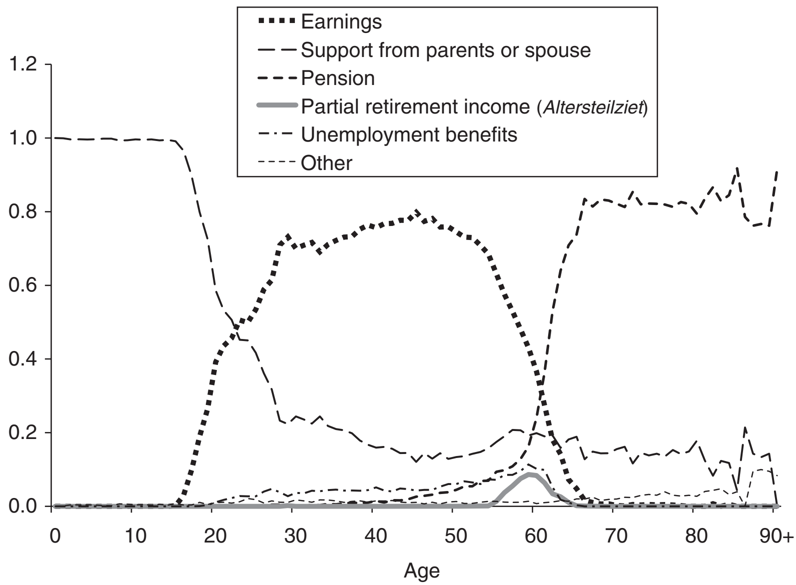
Sources: EVS 2003; Statistisches Bundesamt (2008b); and author's calculations.

Figure 16.3 Per capita labor income by type: Germany, 2003

level. This picture could change in the future as universities introduce tuition fees and schools begin requiring parents to pay for books and other resources.

On average, private health care expenditures amount to 4% of household expenditures but rise with age. The peak is reached at age 77 and declines thereafter. The main expenditures for health care are again publicly financed; for the most part, the system provides free health care.

The imputed rental value of owner-occupied housing is modest in Germany. The homeownership rate is only about 40%, much lower than in other countries (Börsch-Supan et al. 2001, p. 22). Household imputed rent is allocated to individuals in the same way that other private consumption is. Durables are allocated in the same way and treated as final consumption. As Figure 16.2 indicates, total private consumption has a double hump-shaped pattern over the lifecycle. It is dominated mainly by other consumption, which is allocated by means of an equivalence scale.[5] As stated above, most expenditure that is age-specific (education and health) is low in Germany. All other expenditures – including food, clothes, and water – dominate the picture.



Note: Values are expressed in relation to mean labor income of the 30–49 age group.

Source: EVS 2003.

Figure 16.4 Main income sources by age: Germany, 2003

Labor Income

Labor income consists of income from earnings and from self-employment. As shown in Figure 16.3, most labor income results from earnings; income from self-employment is much lower. After age 55, the profile decreases quickly. This is probably due to Germany's generous early retirement provisions and the lack of incentives to stay in the labor force (Börsch-Supan and Jürges 2007).

Figure 16.4 shows the main income sources in Germany over the life-cycle. During childhood, until about age 16, consumption is financed by parents. The percentage of persons dependent on a spouse or parents remains at about 15% after age 35. The employed status follows the same pattern as the labor income profile. Noteworthy are persons receiving unemployment benefits and on partial retirement (*Altersteilzeit*). A relatively high percentage of people of ages 55 and over have left the labor market and must bridge the gap to pension income.

An interesting picture emerges when estimates for Eastern and Western

Germany are plotted separately. It can be shown that the reliance on transfer income is much higher in the East, where almost 100% of the pensioners' income comes from public pensions and about 20% of people around age 60 receive unemployment benefits. By contrast, in the West, 80% of income comes from public pensions and only 8% of older workers collect unemployment benefits. This indicates an interesting potential for the separate NTA estimates for the Eastern and Western areas of the country.

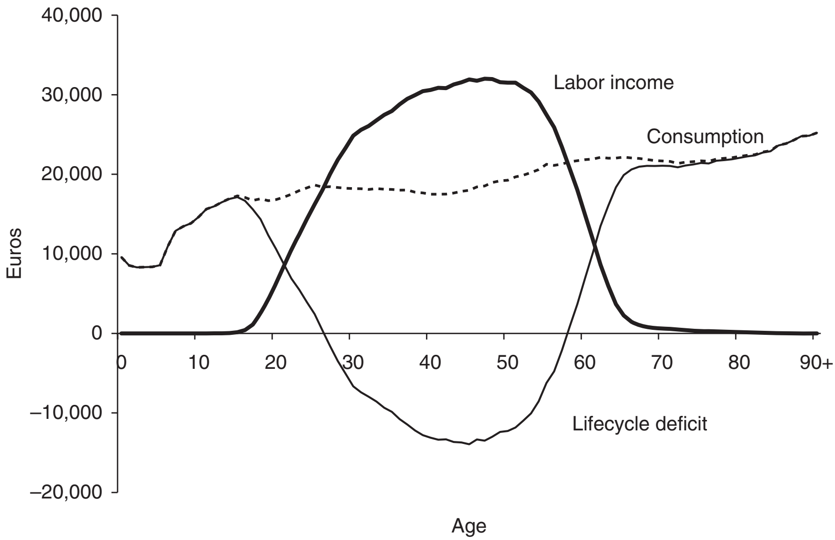
THE LIFECYCLE DEFICIT

By combining consumption and labor income profiles, one obtains the lifecycle deficit. The lifecycle deficit for Germany in 2003, shown in Figure 16.5, reveals turning points at age 27, when the productive period begins, and at age 57, which marks an early exit from that period (productivity in this case referring to the time when labor earnings exceed consumption). At just 30 years, the German economic lifecycle has a rather short period of surplus. The brevity of this productive period may be attributed to the late departure from childhood dependency that is probably due to long periods spent in education, the early exit from the labor force due to early retirement provisions, and the high unemployment rates for people of ages 50 and over.

Figure 16.6, which contrasts the normalized lifecycle deficit for Germany with that of Austria and Finland, shows that, especially at younger ages, the countries are very much alike. Although they follow comparable patterns, there is a divergence at the end of life due to differing institutional provisions for old age. In particular, the inclusion of long-term care provisions alters the picture. The lifecycle deficit in Germany after age 57 develops rather steeply and quickly reaches a deficit of 70% of a prime-age adult income – a level first reached about ten or more years later in other developed countries. The aging of the population makes this an issue of particular concern. With the life expectancy of the population at more than 80 years and its productive period at only 30 years, the German welfare state, with its generous provisions, will quickly face bigger sustainability problems than it does today, as all leading economists point out. The government has undertaken initial steps to lengthen the working life of individuals, which in turn will help reform the system by lengthening the surplus period.

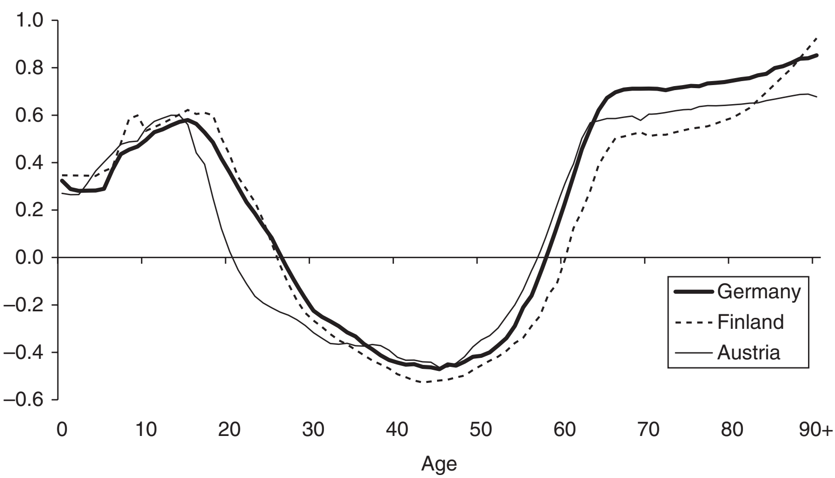
CONCLUDING REMARKS AND OUTLOOK

The labor income profile for Germany in 2003 follows the usual pattern, with a slightly more pronounced decrease at older ages. Total consumption



Sources: Various sources described above and author's calculations.

Figure 16.5 Per capita labor income, consumption, and the lifecycle deficit: Germany, 2003



Sources: National Transfer Accounts project and author's calculations.

Figure 16.6 The normalized per capita lifecycle deficit: Germany, Finland, and Austria is smooth, and it increases over the lifecycle. Private consumption of health and education amounts to low percentages of household expenditures, whereas the public sector bears nearly all of the associated costs. The German lifecycle deficit for 2003 shows a period of surplus of about 30 years (from age 27 to age 57). Because of the German education system, the productive period starts late, and high unemployment rates among older workers and incentives to retire early result in an early end to the productive period. Initial estimates for public transfers show large in-kind public transfer inflows at both ends of life, whereas cash transfers are skewed to the elderly, dominated by expenditures on pensions. Completing these estimates will be the next step, and it could lead to important insights about contrasting financial sources at different dependent stages in life. The main resources – education, health care, and pensions – are reallocated to the dependent age groups through the public sector. Once the analysis of public transfers is completed, therefore, an important part of the story can be told.

NOTES

1. All projections are based on the Federal Statistical Office data, middle scenario, upper limit (Statistisches Bundesamt 2006a).
2. The percentage depends on the health insurance company. Details are described below.
3. The same is true for tertiary education. About 96% of all tertiary students are enrolled in state-funded universities.
4. Including costs of childcare would not result in a big difference. Total education expenditure including childcare would, according to the EVS, amount to 1% of household expenditure.
5. An equivalence scale is used to allocate individual consumption for other as well as for capital consumption and durables. It follows the calculation $\{1-0.6*\mathrm{I}(4 < x < 20)*[(20-x)/16]-0.6*\mathrm{I}(x \leq 4)\}$ where I(.) is the indicator function.

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17. Slovenia: independence and the return to the family of European market economies

Jože Sambt and Janez Malačič

Since gaining independence in 1991, Slovenia has experienced major changes, including a transition from socialism to a democratic and pluralistic society with a capitalist market economy. In 2004 it joined the European Union. Some features from the past are still present in the current system. After a long period of having an egalitarian income distribution, Slovenes are sensitive to increased inequality. The decomposition of consumption into public and private expenditures reveals a high level of state involvement in economic processes typical of European welfare systems. That involvement is also a legacy of socialism, whereby the state provided free education and health care to everyone and private institutions were not allowed in those industries. In general, private and public expenditures add up to relatively stable consumption over the lifecycle, indicating their complementary function.

At the beginning of the 1990s early retirement was used as a tool to reduce unemployment and buy social peace. Early retirement is still present, being the most distinctive NTA result for the Slovenian case. On the other side of the labor-income age profile, entry into employment is late and in our opinion related to the many benefits that Slovenian students receive. A surplus of labor income over consumption is thus limited to the ages from 25 to 55. Demographic projections forecasting severe population aging and a declining share of population in the working ages indicate that such an arrangement will not be sustainable over the long run.

BACKGROUND

During 1945–91 Slovenia was one of the six republics of the Socialist Federal Republic of Yugoslavia. In the late 1940s Yugoslavia separated from other European communist countries politically and ideologically. From the beginning of the 1950s until the country's break-up in the early 1990s, it experimented with a type of market socialism called self-management socialism. Private property and entrepreneurship were prohibited, with the exception of certain small and marginal activities (e.g., small farming and handicrafts). Consequently, social ownership led to an egalitarian income distribution. For various political and economic reasons Yugoslavia suffered a deep crisis in the 1980s and fell apart in the early 1990s.

Slovenia declared its independence in 1991 and a year later became an internationally recognized state. The transition from socialism to a democratic and pluralistic society with a capitalist market economy was a real revolution, reversing the socialist revolution that had taken place after World War II.

During the 1990s the formerly socialist countries of Europe had lively discussions about whether 'shock' or 'gradualism' was the better way of transforming their regimes into normal pluralistic and capitalist systems. Slovenia leaned toward a gradual transition, which turned out to be the better choice. Nevertheless, its favorable starting position and its solid progress in the 1994–2004 period delayed necessary economic reforms. After Slovenia joined the EU in 2004, there were high expectations. Those expectations were based on promises of greater efficiency, growth, and international competitiveness through further privatization of state enterprises, lowering the tax burden (on labor income in particular), and other measures. Subsequently, the ambitious reforms promised during the electoral campaign have been diluted and further dampened during confrontations with unions and other interest groups.

The transitional period, with its restructuring of the economy and the society, has brought about more inequalities in Slovenia. Differences in personal income have grown as a consequence of higher returns on human capital investments and have temporarily increased unemployment. Privatization and denationalization have reestablished the country's capitalist elite. Some privileged individuals have taken advantage of their connections along with legislative deficiencies to become quite wealthy, thereby arousing people's ire about the legitimacy of their businesses.

These cases have contributed to the public's impression of rapidly increasing economic inequality and its nostalgia for the 'good old days' of socialism. The social norms of equality are strong in Slovenian society, and people are very sensitive to any increase in inequality. According to available data, however, the big differences in income distribution that occurred during the first half of the 1990s have since leveled off and there has been little further increase (Stanovnik and Verbič 2005). In 2008 the

Gini coefficient for Slovenia was 0.234, the lowest value among EU countries, lower even than Sweden's (0.240) or Denmark's (0.251) (Eurostat 2010). Moreover, increased inequality of gross income has been considerably offset by progressive taxes and social contributions having no ceiling. These have been coupled with implicit social transfers through public benefits, with the price of services depending on recipients' material status. Kindergarten, for example, is practically free for children whose parents have low incomes but expensive for those with high incomes.

Slovenia's return from socialism to a capitalist market economy is reflected in the current economic and social setting, which we describe in the rest of this section, together with the demographic situation and trends. In the following section we present the main results of the NTA methodology. What is most distinctive is the labor income age profile, which starts to rise late, but falls earlier than in other countries. We next focus on explaining the unusual profile and then present our conclusions.

Economic Setting

When Slovenia joined the European Union in 2004, it ranked second behind Cyprus in development among the ten new member states at that time. GDP per capita amounted to 18 900 euros and represented 80.8% of the EU25 average in 2005 (EC 2006b, p. 15). The average yearly growth rate of GDP during 1994–2006 was 4%.

The implicit tax rate[1] on labor in 2004 was about 2 percentage points higher than the average of the EU25 countries – 37.8 versus 35.6% (EC 2006c, p. 58). This tax comprises three categories: personal income tax (10%), employees' social contributions (about 14%), and employers' social contributions and payroll taxes (also about 14%). The share of employees' social contributions is higher than the average of the EU25 countries. The tax reform that started in 2007 reduced the number of personal income tax categories from five to three, and the highest tax rate was lowered from 50 to 41%. The intention of the reform has been to alleviate the level and progressiveness of the labor tax burden so as to increase incentives to work and thus improve the supply side of the labor market.

As a legacy of the socialist system many older people still expect the state to take care of almost all their needs, rather than leaving them to fend for themselves. The generous welfare arrangements they received in the past are similar to those provided in some highly developed countries. With the current employment rates and increasingly unfavorable demographic situation in Slovenia, such provisions are hard to support and will be even harder in the future.

Expenditures by the Institute for Pension and Disability Insurance amounted in 2006 to 12.7% of GDP. Old-age, disability, and survivors' pensions, however, represented only about 9.4%. The difference comprises other categories having a partially or exclusively social-protection function. State pensions are a clear social category, being paid to practically every citizen who is at least 65 years old and not eligible for any other form of pension. This is another example of hidden social progressivity in public subsystems. Only 72% of pension expenditures in 2006 were covered by social contributions from the workforce or some other minor categories of income, while the remaining 28% had to be covered directly by the central government through taxes (IPDI 2007, p. 72).

Demographic Situation and Trends

According to the population register, Slovenia surpassed the 2 million population mark in 2005. Its population belongs to the modern demographic regime, with low levels of fertility and mortality. This is a consequence of its demographic transition, which Slovenia completed at the end of the 1950s.

Recently Slovenia entered a critical phase of its demographic development. In the 1997–2007 period the natural population growth rate was positive in only two years and negative in the other nine years. Overall population growth was positive as a result of positive net migration. In the near future, however, we can expect a population decline in Slovenia. It will be a consequence of the low fertility seen since 1980. Population decline is expected to gain momentum in the next few decades as a consequence of the ever smaller number of women in the reproductive ages.

The total fertility rate (TFR) began a steep decline in the early 1980s, however, falling from 2.1 births per woman in 1980 to 1.20 in 2003. It remained below 1.3 until 2006, when it began to rise again, reaching 1.53 in 2008 (SORS 2010, *Statistical Yearbook 2009*, p. 85). A model population with Slovenian fertility at its lowest level of 1.20 would have an intrinsic growth rate of −1.9%. Such a population would shrink to half its original size in just 37 years.

Slovenian mortality has also been declining since the 1960s. Life expectancy at birth rose in the 1960/61–2008 period from 66.1 to 75.4 years for males and from 72.0 to 82.3 years for females. Improvements in life expectancy have been steady and substantial, unlike the situation in many other formerly socialist countries of Europe. In 2008 the infant mortality rate was an impressively low 2.4 deaths per 1000 live births.

Slovenia's migration pattern changed in the 1960s from one of net emigration to a modern European immigration model. For Slovenia the most important migration stream was from the Balkan Southeast to the Northwest. In the period between 1970 and 1990 all net migration flows between Slovenian and other federal parts of Yugoslavia were positive for the developed northwestern Yugoslav Republic (Malačič 2000, p. 589). Although the new Balkan state borders have slowed this immigration stream since 1991, it is still dominant in spite of the fact that new immigrants from Balkan regions need residence and work permits.

With the exception of immigration, the demographic processes under way in Slovenia are contributing to considerable population aging. Projections suggest that by 2040 the share of the 65+ age groups will rise to 29.1% of the population as a consequence of those processes, combined with the baby boomers who will start to enter this age group in the current decade (Eurostat 2010).

AGE PROFILES FOR SLOVENIA

The key micro-level data base used in the analysis is the Consumer Expenditure Survey (CES) from 2004. The data consist of values for three consecutive years (in our case 2003–05), calculated to mid-year. Providing this 'big CES'[2] is a standard approach of the Statistical Office of the Republic of Slovenia to enlarge the number of observations. In 2004 the CES covered 11 303 individuals in 3725 households. Besides data about expenditures at the household level, it contains fairly detailed income data, mostly at the individual level. Having income and expenditure data for the same individuals enables more accurate calculations of intra-household transfers.

The key macro-level data source is the National Transfer Accounts. We also used various other sources provided by competent institutions – for example, the Institute for Pension and Disability Insurance, the Ministry of Finance, and the Health Insurance Institute of Slovenia.

Public Consumption

Figure 17.1 reveals the familiar profile indicating large transfers to the younger population in the form of education and to the elderly population in the form of health and long-term care. Although the separation of the latter two categories is difficult and often arbitrary in practice, we present them separately since the separation has been made recently in Slovenia for the purpose of constructing health accounts. Unfortunately, the data on long-term care were available for only very broad age groups, but by applying a smoothing procedure we transformed them into one-year age

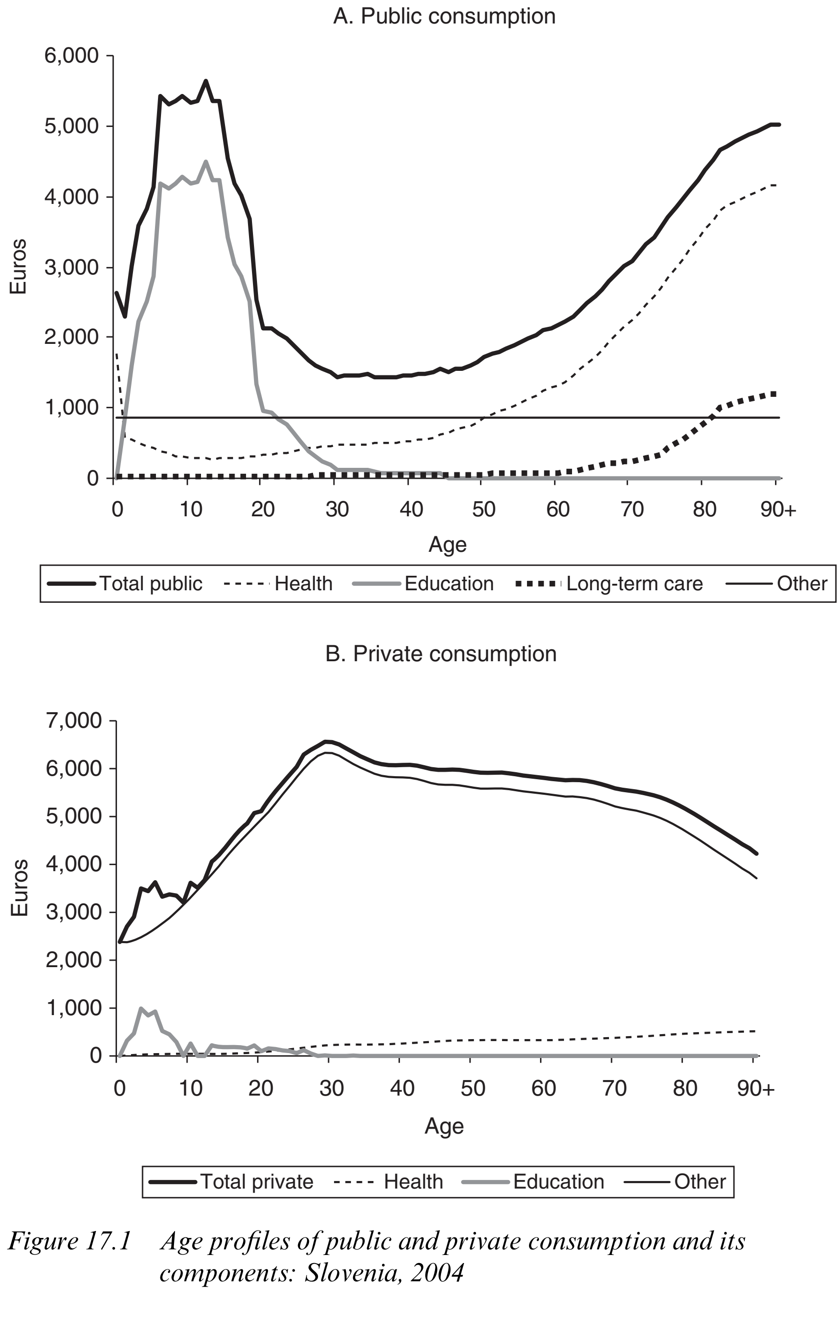


Figure 17.1 *Age profiles of public and private consumption and its components: Slovenia, 2004*

group profiles. We have used the same approach for health expenditures, for which data by five-year age groups were available.

Private Consumption

Comparing the components of public consumption presented in Panel A of Figure 17.1 and the components of private consumption presented in Panel B reveals that private sources finance education only to a small extent. The share of private financing is somewhat larger for health expenditures, although public sources predominately finance health care as well.

Thus the category of other private expenditures represents the majority of private consumption expenditures. Consumption is less in the lower age groups (until 20 years of age because of the equivalence scale) and after retirement than at intermediate ages. During the late 20s there is an interesting spike in the consumption age profile. Further analysis of consumption subcategories reveals that the spike represents expenditure on vehicles and apartments (including furniture, etc.), with the former subcategory peaking somewhat earlier than the latter. This pattern could be due to our assumption that expenditures on durables are not an investment, but rather immediate consumption. It is noteworthy, however, that the spike does not appear in other countries whose investigators use the same assumptions. Further study and more data are needed to ascertain whether this is a consequence of a random effect or a Slovenian peculiarity. It is also noteworthy that after this spike, private consumption slopes downward, unlike the situation in most other countries, where it increases or remains flat.

Figure 17.2 summarizes public and private consumption together and also adds the labor income profile. We can observe that private and public expenditures add up to fairly stable consumption over the lifecycle. The exception is the childhood period, during which there is high consumption in the form of education. The high consumption during the early years prevails despite the lower private consumption than in other age groups according to the equivalence scale. Compared with the results for other countries, private consumption in Slovenia is low and public consumption is high. This indicates the high level of state involvement in economic processes typical of European welfare systems and is in part a legacy of the country's socialism.

Turning to Slovenia's labor income profile, we see that it is a most distinctive one. Compared with other countries, it starts to rise late and falls early. The difference between consumption and labor income, defined as the lifecycle deficit, is negative for a relatively short period of time,

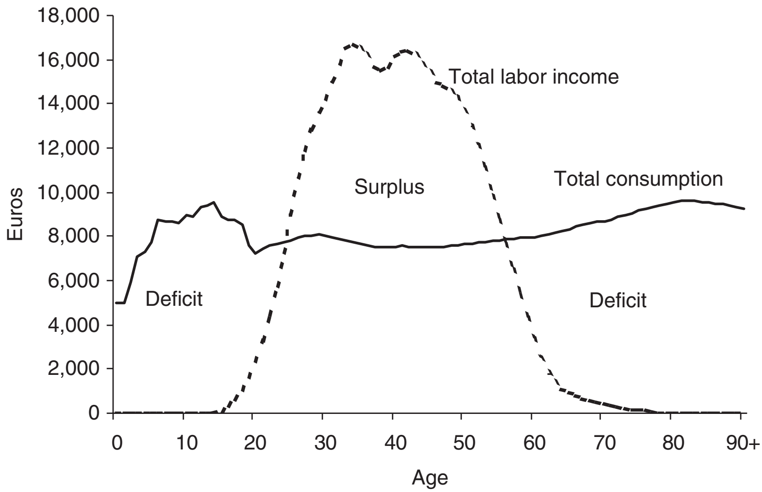


Figure 17.2 Age profile of the lifecycle deficit components (labor income and expenditures): Slovenia, 2004

between ages 25 and 55 (Figure 17.2). We next consider the reasons for Slovenia's unusual labor income profile.

LATE ENTRY TO EMPLOYMENT, EARLY ESCAPE TO RETIREMENT

After Slovenia gained its independence in 1991, the important Yugoslav market almost completely disappeared overnight and Slovenian enterprises could not quickly redirect their exports to new markets. This led to a strong decline in industrial production in the early 1990s. In addition, the existing socialist economic structure had to be radically restructured and adapted to the new conditions. Under socialism, unemployment in Slovenia had been low. Practically everybody willing to work could get a job. Some workers did not have much to do in their workplaces, however, and the term the 'unemployment of the employed' was applied to them. After Slovenia adopted a market economy, this 'hidden unemployment', which was no longer tolerated under the private system, assumed a visible form.

Early Retirement

The change in the socioeconomic system led to a strong rise in unemployment. The number of registered unemployed rose from 34000 in 1989 to

Table 17.1 Selected parameters influencing the pension system: Slovenia, 1989–2006

Year	Insured persons per pensioner	Average age at retirement		Life expectancy at birth (years)[a]		Pension expenditure (% of GDP)	Active insured persons (000's)	All pensioners (000's)	Old-age pensioners (000's)
		Males	Females	Males	Females				
(1)	(2) [=8/9]	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1989	2.52	58.3	55.2	68.86	76.72	9.57	921.5	365.1	180.4
1990	2.30	57.7	53.6	69.38	77.19	10.79	884.6	384.1	197.3
1991	1.95	56.1	52.3	69.54	77.38	10.92	816.9	418.9	227.5
1992	1.70	56.2	52.5	69.45	77.25	13.76	764.9	448.8	249.0
1993	1.71	56.2	53.3	69.40	77.29	14.05	782.6	457.5	256.0
1994	1.69	57.6	53.2	69.58	77.38	14.42	772.5	458.1	257.3
1995	1.67	57.5	53.1	70.27	77.76	13.55	769.0	460.3	259.3
1996	1.65	57.5	54.0	70.79	78.25	13.34	765.7	463.3	262.1
1997	1.67	58.3	54.9	71.01	78.62	13.31	783.2	468.2	266.9
1998	1.66	58.4	55.3	71.05	78.68	13.35	784.2	472.4	271.5
1999	1.68	58.2	54.8	71.34	78.75	13.43	800.5	476.4	276.3
2000	1.74[b]	59.2	55.4	71.94	79.10	13.47	839.4[b]	482.2	282.0
2001	1.71[b]	59.3	55.4	72.13	79.57	13.41	841.5[b]	492.5	287.9
2002	1.64[b]	59.9	55.5	72.33	79.87	13.44	836.5[b]	509.1	295.3
2003	1.61[b]	59.9	55.7	73.15	80.70	13.23	834.0[b]	517.8	302.4
2004	1.60[b]	60.6	56.6	73.48	81.08	13.03	836.7[b]	523.9	308.4
2005	1.59[b]	60.4	57.1	74.08	81.30	12.96	845.6[b]	531.1	315.1
2006	1.60[b]	60.3	57.2	74.84	81.89	12.65	857.9[b]	536.9	322.8

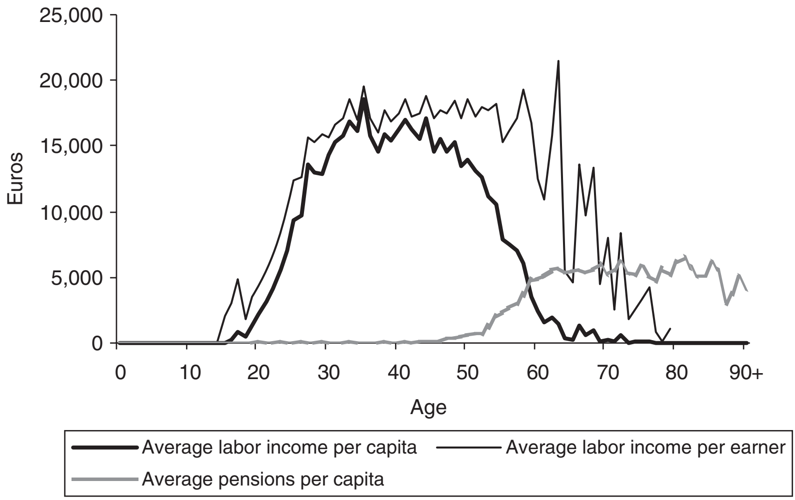
Notes:

a. The Statistical Office of the Republic of Slovenia calculates and publishes data on life expectancy as the average for the previous year. For example, for 2006 the values represent data for 2005–06.

b. Higher values due to a change in the methodology (including additional groups); without this change the values for 2000 would be 807.0 (active insured persons) and 1.67 (insured persons per pensioner).

Sources: IPDI (various years), *Annual Report* and internal data; SORS (2005), *Statistical Yearbook* and homepage (http://www.stat.si).

137 000 by 1993. That increase would have been even greater had early retirement not been used as a tool to reduce unemployment and buy social peace. This was an elegant solution at the time, but it led to strong negative long-term consequences. As seen in Table 17.1, the average age at retirement and the number of insured persons declined considerably in



Note: The labor income profile is decomposed into average labor income per capita and average labor income per earner.

Figure 17.3 Unsmoothed labor income profile and pension profile: Slovenia, 2004

that period, while the number of pensioners rose steeply. Consequently, the ratio between the number of insured persons and the number of pensioners worsened dramatically.

Retirement age before the Pension Act of 1992 was set at 55 years for men and 50 years for women. Since then it has increased by six months each year, reaching 58 years for men and 53 years for women in 1998 – deemed 'too little, too late' (Stanovnik 2002, p. 26). In 1999 the parliament enacted the new Pension and Disability Insurance Act (PDIA-1999), which came into effect in 2000. It began tightening retirement conditions and decreasing benefits derived from the mandatory pension system. The changes introduced by PDIA-1999 are being phased in gradually and will not be fully applied until 2024, although the Act has already yielded results. Consequently, the share of pensions measured as a percentage of GDP has temporarily stabilized, but given the age structure of the population and increasing longevity, it is expected to grow with the rising number of retired people in another decade or so.

Figure 17.3 shows unsmoothed age profiles of labor income and pensions. From the age of 50 onward they are mirror images of each other, since people have been gradually retiring. The age profile shown is for 2004, when the situation had already improved considerably over that in the years before passage of the PDIA-1999. Thus the distinction would be even greater if the analysis were to refer to an earlier time period. The age profile of labor income per capita starts to decrease during the late 40s, and by age 60 it amounts to only about 20% of the labor income per capita of the 30–49 age group.

Theoretically, the reason for the early and sharp decline in per capita labor income could be decreasing labor income per earner, but this is not the case. If we decompose average labor income per capita into earning rates[3] and average labor income per earner, the latter does not decrease at higher ages (see Figure 17.3). Interestingly, the actual age profile of labor income per earner is flat. We would expect an increasing age profile since in Slovenia employees receive a seniority bonus[4] that is spent during employment. It seems that the hypothesis about a flattening earnings profile in formerly socialist countries, reported for some other countries (Kézdi and Köllő 2000; also Chapter 32 of this volume), might also be relevant to the Slovenian case. According to this hypothesis, some new industries, such as the financial sector, are becoming dominated by a younger, more educated labor force that receives higher wages. This segregation of jobs by education level, which correlates with age, counterbalances the seniority payment regime. Figure 17.3 indicates that pensions are very low compared with labor income. This is because labor income is expressed in gross terms, whereas pensions are expressed in net terms.

Students as Cheap Labor

The left side of the Slovenian age profile is also unusual. For ages up to the mid-20s Slovenia has one of the lowest values of labor income among the countries analyzed. Increasing enrollment in tertiary education is one of the factors here, but this is a general trend throughout the region and is not specific to Slovenia. The expansion of Slovenian tertiary education has been very strong since the beginning of the 1990s (Malačič 2003). The number of students enrolled in tertiary education rose from 33 600 in 1990/91 to 115 900 in 2006/07. The net enrollment ratio grew from 23.1% in 1990/91 to 44.9% in 2006/2007, while the gross enrollment ratio increased in that period from 22.2% to 54.6% (SORS, *Results of Surveys*, various years; SORS, *Statistical Yearbook*, various years; authors' calculations).[5]

Recently the number of postgraduate students has also been rising: from 2600 in 1997/98 to 8700 in 2006/07. On the assumption that students spend too much of their highly productive years in the educational process instead of in the labor market, the government has introduced new programs based on the Bologna guidelines for shorter and more effective graduate and postgraduate study.

Also contributing to the postponement of employment are the generous benefits that students receive in Slovenia. Among them is an advantageous tax status. Until earning a certain amount of labor income, they pay practically no taxes or social contributions. Their tax advantage also makes student labor attractive to employers. Consider, for example, an employer who had a regularly employed worker and a student worker, both of whom were receiving the average monthly net payment equal to the net wage in 2004. In our hypothetical case, the student worker cost the employer 40% less than a regularly employed worker (9754 euros versus 16 210 euros). Employers are therefore highly motivated to hire students. Students are also easier to fire when an employer no longer needs or wants a worker. This is a big advantage since it can be very difficult to fire a regularly employed worker in Slovenia. Hiring students is also a convenient way of testing candidates for eventual regular employment.

Good pay and the hope of improving their future employment chances lure many students to this kind of work, tempting them to work practically full time and to protract their studies or even not to complete them. However, this turns out to be a shortsighted decision. Their studies often suffer as a result, and student employment does not bring them credit years for their retirement.

Finally, this kind of work is definitely not advantageous to the public budget, which finances student benefits during their prolonged study instead of receiving their social contributions and labor taxes. For all these reasons, beginning in 2005 the government introduced measures to reduce the extent of student work; but it is still widespread.

The negative economic indicators (high student employment, early retirement) on both sides of the age profile confront the country's changing age structure. As we indicated earlier, life expectancy in Slovenia is already high and rapidly increasing; at the same time, its fertility is one of the lowest in the world. A study by Sambt (2004) using the generational accounting method, data from the public system in 2001, and projected demographic changes has revealed serious intertemporal budget imbalances in the Slovenian public system. That study ignored future positive effects of the complex PDIA-1999, which does not take full effect until 2024; but later studies (Majcen et al. 2005; EC 2006a; Verbič et al. 2006; Verbič 2007; Čok et al. 2008; Sambt and Čok 2008) have simulated its effects. Despite improvements due to the PDIA-1999, the share of pension expenditures in GDP is expected to grow sharply.

CONCLUSION

Slovenia is distinctive among other countries for its labor income profile. Until the mid-20s age group, labor income is one of the lowest of the countries analyzed here. However, the right-hand side of the labor-income age profile is even more distinctive. It drops noticeably already at age 50 and is the consequence of an unusually early effective retirement age.

The NTA analysis has also revealed a high level of state involvement in consumption and the tendency toward equalization. As a result, inequality in Slovenia is one of the lowest in Europe. In the absence of stronger incentives to work, the generous Slovenian public system will soon be challenged by the country's rapidly aging population and forced to make appropriate adjustments.

NOTES

1. The implicit tax rate for a given economic category is defined as the ratio of aggregate tax revenues to the corresponding income in the economy or the kind of economic activity that could potentially be taxed. Thus it illustrates the average effective tax burden on the economic category.
2. Compared with the 'small CES', which contains data for one year only.
3. We used the non-standardized term 'earning rates' because we do not refer only to employed persons (in which case we would use the standard term 'employment rates'), but rather to everyone who reported labor income.
4. Until the end of 2002 the bonus was 0.5 of a percentage point per working year. In 2003 deregulation of collective agreements occurred at the industry level, but most industries have preserved the bonus of 0.5 of a percentage point per year.
5. The net enrollment ratio is '[the] enrolment of the official age group for a given level of education, expressed as a percentage of the population in that age group' (UNESCO 2008). The gross enrollment ratio represents 'total enrolment in a specific level of education, regardless of age, expressed as a percentage of the population in the official age group corresponding to this level of education. For the tertiary level, the population used is that of the five-year age group following on from the secondary school leaving age. It can exceed 100% due to early or late entry and/or grade repetition' (UNESCO 2008).

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18. Changes in patterns of Philippine lifecycle consumption and labor income between 1994 and 2002

Rachel H. Racelis and J.M. Ian Salas

This chapter examines and explains changes in individual lifecycle patterns of current consumption, labor income, and lifecycle deficit in the Philippines during 1994, 1999, and 2002.[1] A key finding is that aggregate lifecycle surplus has increased substantially, from covering about 41% of the aggregate deficit in 1994 to covering 72% in 2002. How did this happen? While the age profile for per capita current consumption and the population age distribution changed very slightly, the age profile for per capita labor income changed significantly between 1994 and 2002. The deficit age cut-offs increased at younger and older ages, and the span of productive ages – the ages at which lifecycle surplus accrues – widened, thereby increasing the aggregate surplus. Moreover, per capita mean consumption declined in relation to per capita mean labor income.

PREVIOUS STUDIES

Data on consumption expenditures and labor income have been available in the Philippines since the 1970s in the Family Income and Expenditure Surveys conducted routinely by the National Statistics Office, and since the late 1990s in the Annual Poverty Indicator Surveys, also conducted by the National Statistics Office. Numerous studies have been done over the years using these data. But so far the study of the patterns of consumption and labor income earned over the lifecycle has been limited. Previous studies have examined income and the age factor, but mostly in the course of analyzing income inequality, wage differentials, and poverty (Encarnacion 1978; Estarillo and Ilagan 1988; Estudillo 1995; Alba 1998). The studies presenting age profiles of income profiled household income versus the age of the household head. Similarly, previous studies of household consumption profiled household expenditures against the age of the household head (Figueroa and Bernal 1992; Mason and Tirol 1992; Alba and See 2006). Some attempt at estimating consumption age profiles at the individual level has been done but only for health expenditures (Racelis et al. 2004, 2006, 2007). There still continue to be very limited individual-level data on consumption expenditures in the Philippines, which may explain the general lack of studies on the lifecycle patterns of consumption. Now various methodologies for assigning household consumption expenditures to household members are available, specifically those that have been developed in the National Transfer Accounts, or NTA (Lee et al. 2008).

APPLICATION OF NTA AND DATA SOURCES

The data and NTA methodologies used to construct the current consumption and labor income per capita means by age for the Philippines are described in Racelis and Salas (2007). The methods described are those used to produce the age profiles of 1999 consumption and labor income in particular, but practically the same procedures were followed to produce the corresponding age profiles for the years 1994 and 2002.

The main sources of data for the estimation of the per capita age profiles include the National Income Accounts (NSCB 2003), specifically the breakdown of income and outlays; National Health Accounts; National Education Expenditure Accounts; household income and expenditure surveys (the 1991 Labor Force Survey, the 1994 Family Income and Expenditure Survey/Labor Force Survey, the 1999 Annual Poverty Indicator Survey, and the 2002 Annual Poverty Indicator Survey); and the UN population database (UN Population Division 2007). The household surveys were also used to generate other information such as the distribution of employed persons, labor force participation by age, and educational attainment of workers in paid employment and self-employment.

CONSUMPTION, LABOR INCOME, AND LIFECYCLE DEFICIT

Figures 18.1 and 18.2 show aggregate current consumption, labor income, and lifecycle deficit by age. At the young ages the deficit age cut-offs, or the points where the consumption and income profiles cross in Figure 18.1, changed slightly, from 22 years in 1994 to 24 years in 1999 and 2002. At the older ages the deficit age cut-offs noticeably increased, from 58 years in 1994 to 61 years in 1999 and to 64 years in 2002. The population incurring

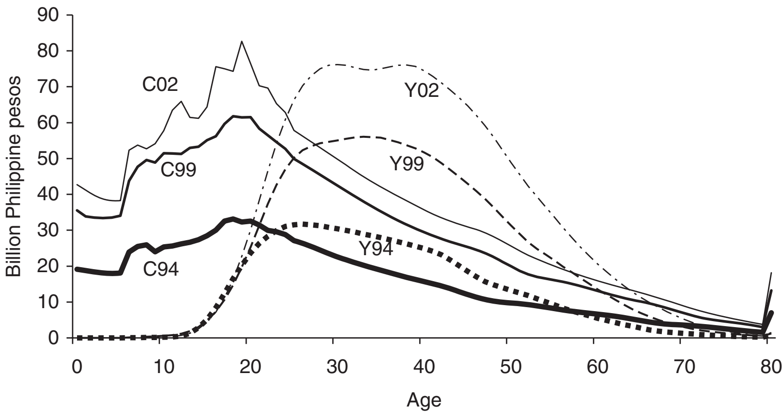


Figure 18.1 Age profiles of aggregate consumption (C) and labor income (Y): Philippines, 1994, 1999, and 2002 (current prices)

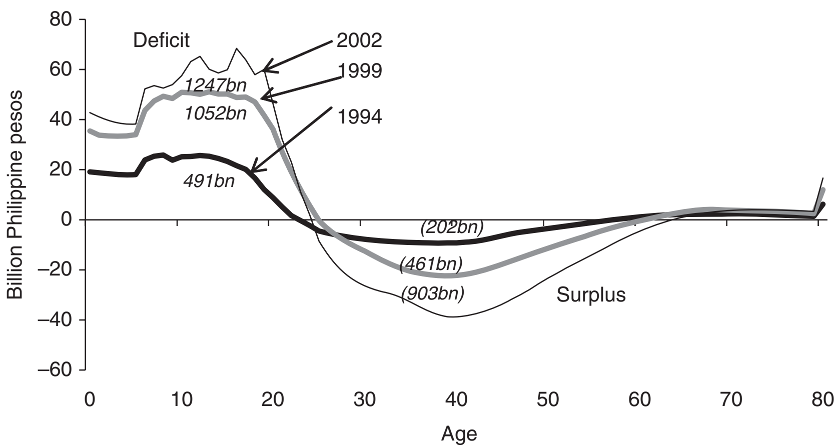


Figure 18.2 Age profiles of aggregate lifecycle deficit: Philippines, 1994, 1999, and 2002 (current prices)

lifecycle deficits thus became generally younger between 1994 and 2002 with the reduction in the proportion of persons in the deficit elderly age groups. The span of the ages accruing a surplus increased from 34 years in 1994 to 36 years in 1999 and to 39 years in 2002.

In Figure 18.2 the estimated sizes of total lifecycle deficits and surpluses (i.e., negative deficits) are entered into the relevant portions of the lifecycle deficit graphs for each year. For example, the estimated total lifecycle deficit in 1999 was 1052 billion Philippine pesos, while the total surpluses generated that same year were estimated to be 461 billion pesos. As the crossover points and estimated total values in Figure 18.2 show, the increase in the span of the ages accruing a surplus between 1994 and 2002 resulted in an increase in the ratio of aggregate surplus to aggregate deficit from 0.41 in 1994 to 0.44 in 1999 and to 0.72 in 2002. An important implication of this finding for Philippine economic development is that other household resources, such as asset income, that are usually used to fill lifecycle deficits of young and elderly members can be shifted toward productive uses and saving.

A closer examination of the changes at the younger ages (under 24 years) shows that the proportion of the aggregate current consumption supported by own labor income fell from 32% in 1994 to 20% in 1999 and 2002. Conversely, the ratio of aggregate current consumption to aggregate labor income for the young increased from 3.12 in 1994 to 5.0 in 2002. For the older ages (60+ years), on the other hand, income rose as a result of continuing labor, with labor income covering 46% of current consumption in 1994, 58% in 1999, and 73% in 2002. Conversely, the ratio of aggregate consumption to aggregate labor income decreased, from 2.17 in 1994 to 1.37 in 2002. Moreover, the contribution of older persons to aggregate surplus increased as the deficit age shifted from 58 years in 1994 to 64 years in 2002. If the above patterns persist, the elderly will be competing less with the young for transfer resources.

But what brought about the increase in aggregate surplus relative to aggregate deficit between 1994 and 2002? The following sections discuss the changes in control totals for aggregate consumption and aggregate labor income (as reflected in national per capita mean consumption and labor income), population age distribution, per capita current consumption age profiles, and per capita labor income age profiles as the possible factors of change in aggregate lifecycle surplus and deficit – those being the basic components used to compute the aggregate lifecycle deficit age profiles.

Before presenting our findings about the four factors that could possibly change the lifecycle deficit, we offer a quick assessment of the relative importance of the various factors based on changes in simulated values of the ratio of aggregate consumption relative to aggregate labor income (simulated for 2002 for a specific age group) and assuming alternative hypothetical changes in the factors. As mentioned previously, the ratio of mean consumption to mean labor income for the 60+ age group declined from 2.17 to 1.37 between 1994 and 2002 – the actual observed decline in the ratio when all four factors varied. But how much would the ratio have changed if, keeping other factors constant, (1) only the control totals had varied (effectively allowing only a shift in overall mean consumption relative to mean labor income from 1.3 in 1994 to 1.13 in 2002); (2) only the population age distribution had varied; (3) only the consumption profile had varied; or (4) only the labor income profile had varied? To answer that question, we keep the constant factors in the simulations at the 1994 values or profiles and allow those factors that vary to take on the actual 2002 values or profiles.

The simulated values for the ratio of aggregate consumption to aggregate labor income for the 60+ age group in the year 2002 are 1.9 for case (1), 2.24 for case (2), 2.12 for case (3), and 1.54 for case (4). Compared with the actual change in the ratio of 0.8 (2.17 minus 1.37) between 1994 and 2002, the change between the 2002 simulated ratio and the 1994 ratio is highest at 0.63 (2.17 minus 1.54, or about 79% of the actual ratio change), for case (4), in which the labor income profile is allowed to vary. The second highest change in the simulated ratio is at 0.27 (2.17 minus 1.9), or about 33% of the actual ratio change, for case (1), in which control totals or the per capita means for consumption and labor income are allowed to vary. For case (2), in which the population distribution varies, and case (3), in which the consumption profile varies, the changes in the simulated ratios are only -7% and +5%, respectively, of the actual 1994–2002 ratio change. Thus the change in the labor income profile is the major source of change in the lifecycle deficit, with shifts in mean consumption relative to mean labor income, the population age distribution, and the consumption age profile playing minor roles.

NATIONAL PER CAPITA MEANS, THE POPULATION AGE STRUCTURE, AND THE AGE PROFILE OF CURRENT CONSUMPTION

For a given year we compute national per capita mean values for current consumption and labor income by dividing the control totals (taken from the National Income Accounts) for the indicated items by total population. Per capita mean consumption increased from 18 700 pesos in 1994 to 32 200 pesos in 1999 and to 35 500 pesos in 2002. Per capita mean labor income, on the other hand, increased from 14 500 pesos in 1994 to 24 300 pesos in 1999 and to 32 200 pesos in 2002. Thus the ratio of per capita mean consumption to per capita mean labor income declined from 1.30 in 1994 to 1.13 in 2002.

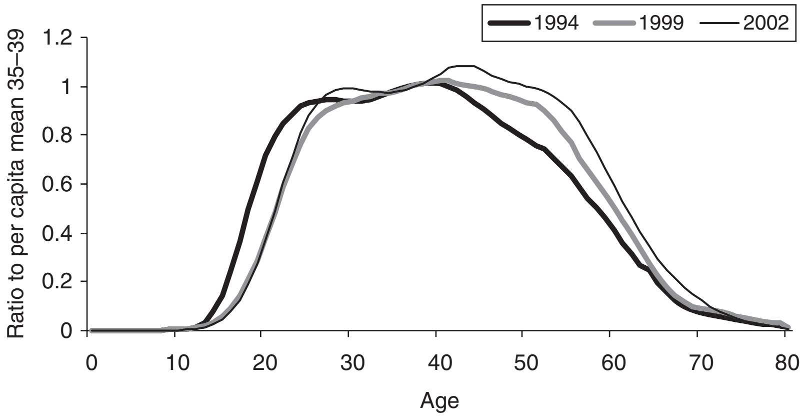
Population data in single ages for the years 1994, 1999, and 2002 were obtained for the Philippines from the UN Population Division (2007). As expected of a rapidly growing population, in the Philippines the young represent the largest, and the elderly still a very small part, of the total population. Those under 1 year of age accounted for about 3.0% in 1994 and about 2.7% in 1999 and 2002. The 75-year-olds, on the other hand, accounted for about 0.2% of the population in all three years. Except for the very young, the overall population distribution by age can be said to have changed very slightly from 1994 to 2002.

Current consumption consists of public and private consumption, private consumption accounting for roughly 85% of total consumption. In turn, private 'other' consumption accounts for more than 90% of private current consumption, private health and education expenditures accounting for the remaining less than 10%. Private 'other' consumption thus strongly influences the shape of the age profile and the pattern of mean per capita current consumption by age. The typical shape of the age profile of current consumption starts out at about 40% (relative to the mean per capita consumption of the 35–39 age group) at age −1 year, rising to 100% at around age 16, continuing to increase to about 110–120% at around age 18, declining to and staying at 100% from age 30 to age 45, and then rising again to about 120% by age 80. The pronounced sharp rise in per capita means observed up to age 18 and the subsequent decline are due to the age pattern of public and private education spending. The gradual increase in per capita current consumption after age 45 may be attributed to the increasing per capita public and private spending for health care as age increases. For more detail on the age profiles of specific consumption components, see Racelis and Salas (2008).

The per capita age profiles of current consumption did not change significantly in the years 1994, 1999, and 2002, as determined by an examination of standardized age profiles, with the mean age of consumption staying at about 27 years in all three years. Since no remarkable changes were observed in the mean per capita profiles of current consumption or in the population age distribution over the three years, it follows that the distribution of aggregate current consumption by age also did not change significantly over those years.

AGE PROFILES OF LABOR INCOME

We applied a standardization procedure to the per capita labor income age profiles to allow for comparison across the years. Standardization removes the unit of measurement of profiles and introduces a common reference, the age group 35–39 years, to all the profiles. The standardized per capita mean income of, say, the 25–29 age group is computed by dividing the per capita mean income of the age group 25–29 by the per capita mean income of the reference group, ages 35–39.



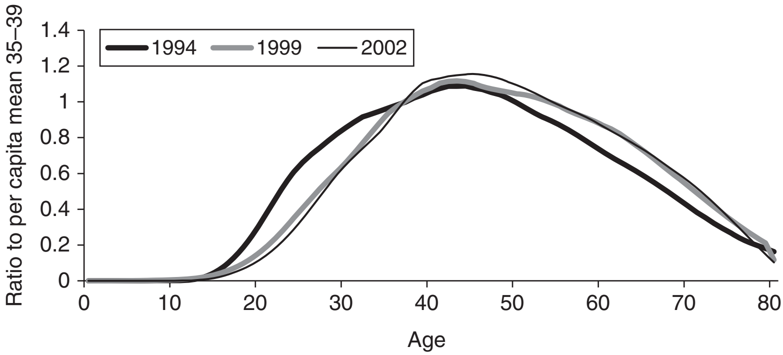
Note: Profiles are standardized relative to the mean income of the 35–39 age group.

Figure 18.3 Age profiles of per capita earnings from employment: Philippines, 1994, 1999, and 2002

Labor income consists of paid employment earnings and self-employment income. Paid employment earnings account for about 55% of labor income in the Philippines.

Figures 18.3 and 18.4 present the age profiles of standardized per capita means for paid employment earnings and self-employment income for the three years. The earnings or wage profile (Figure 18.3) shows standardized per capita means rising sharply between ages 15 and 25, staying at around 1.0 for about 20 years, and then declining sharply thereafter. In contrast, the age profile for self-employment income (Figure 18.4) shows standardized per capita means rising more gradually, starting at age 15, reaching a peak slightly above 1.0 at around age 45, and then gradually declining thereafter.

Schooling and worker retirement patterns are two important factors that explain the difference between the two age–income profiles. Individuals who have completed a college education usually enter formal-sector paid employment and do so between the ages of 20 and 25; hence the sharp increase in the per capita mean earnings at these ages. Furthermore, paid employment is governed by provisions in the 1974 Philippine Labor Code regarding retirement age, and this explains the sharp decline in mean per capita earnings as workers approach the compulsory retirement age of 65 years. These two factors have less impact on self-employment income because the compulsory retirement age is generally not observed and because a much lower proportion of the self-employed population



Note: Profiles are standardized relative to the mean income of the 35–39 age group.

Figure 18.4 Age profiles of per capita self-employment: Philippines, 1994, 1999, and 2002

has a college education, about 14% compared with about 30% of those with formal-sector paid employment (according to the Annual Poverty Indicator Survey).

Although the overall shapes of the age profiles of both per capita mean earnings and self-employment income remained nearly the same from 1994 to 2002, the position of the profiles for both types of income gradually shifted toward the right over the period. Mean per capita incomes were rising later at young ages, with the mean income reaching 60% of the mean of the reference age group 35–39 as follows: for earnings, increasing from age 19 in 1994 to age 22 in 2002; and for self-employment income, increasing from age 24 in 1994 to age 29 in 2002. Similarly, at the older ages mean per capita incomes were declining later, with the mean income falling to 60% of the mean of the reference age group as follows: for earnings, increasing from age 56 in 1994 to age 60 in 2002; and for self-employment income, increasing from age 64 in 1994 to age 69 in 2002. The shifts in the age–income profiles to the right are also indicated by increases in the mean age of income, which is a weighted average computed by using aggregate wages or income earned at each age as weights. For earnings from paid employment, the mean age of earnings was 33 in 1994, 35 in 1999, and 36 in 2002. For self-employment income, the mean age of income was 38 in 1994, 41 in 1999, and 42 in 2002.

Another way of interpreting Figures 18.3 and 18.4 is that mean per capita income became lower for young workers and higher for older workers in 2002 than in 1994. For example, the per capita self-employment income of the 20-year-olds relative to that of the reference age group was

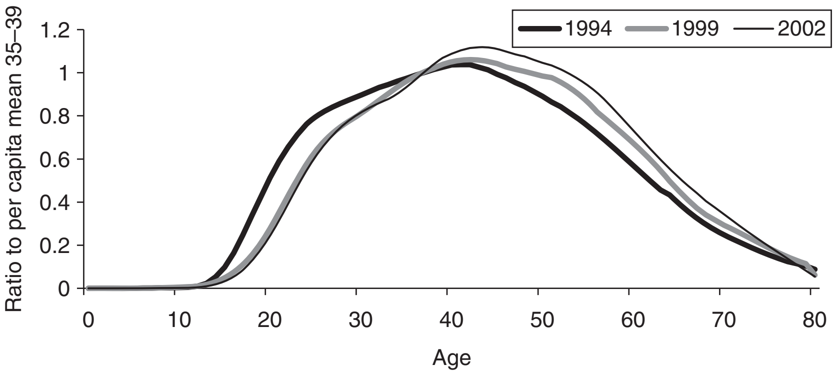


Figure 18.5 Age profiles of per capita labor income: Philippines, 1994, 1999, and 2002

about 30% in 1994 and less than one half of that, or 13%, in 2002. The per capita income of the 60-year-olds was about 70% of that of the reference group in 1994 and about one quarter more, or 86% of that of the reference group, in 2002.

When the two types of labor income are combined (Figure 18.5), the age profiles of standardized per capita means show, as expected, a distinct shift to the right from 1994 to 2002, reflecting the patterns observed in the two component profiles. The mean age of total labor income was 35 in 1994, 38 in 1999, and 39 in 2002.

The changes in the younger and the older workers' mean per capita labor income between 1994 and 2002 (i.e., the relative decline for younger workers and the relative increase for older workers) may be attributed to possible changes in the wage rate per worker and in the number of workers at each age. Owing to data constraints, this chapter looks only at the latter factor. The distribution of employment and labor force participation by age are shown in Figures 18.6 and 18.7.

A similar pattern of shifting to the right between 1994 and 2002 can be observed in the distribution of employed persons by age (Figure 18.6). The proportion of employed workers under age 35 decreased, while the proportion of workers over age 45 increased. The young are entering the workforce at later ages, and the middle-aged and older workers are staying in the workforce longer. The median ages of the employed were 35, 36, and 38 for the years 1994, 1999, and 2002, respectively.

The changes in the patterns of labor force participation at each age reflect the findings about the age distribution of the employed population. Figure 18.7 shows a decline in the labor force participation of the young

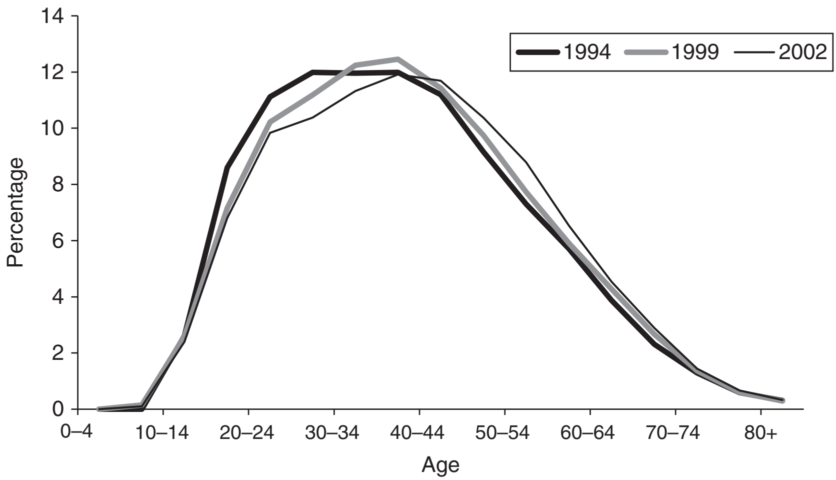


Figure 18.6 Distribution of employed persons by age: Philippines, 1994, 1999, and 2002

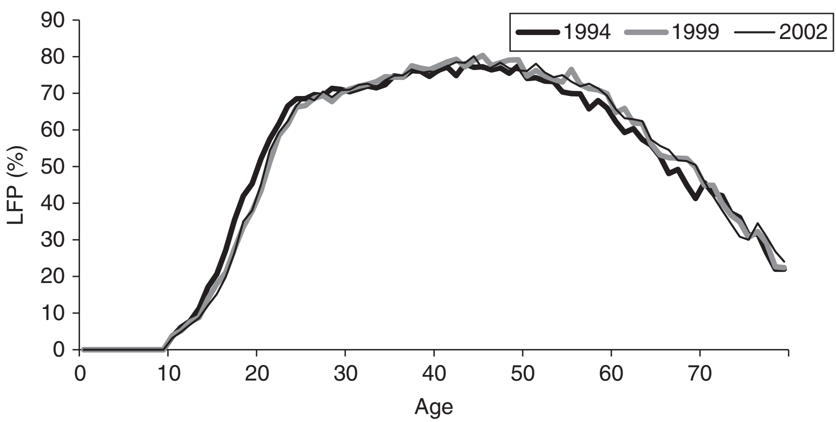


Figure 18.7 Labor force participation by age: Philippines, 1994, 1999, and 2002

(ages 10–20) and an increase in the participation of the population aged 45–70 over the period examined.

These findings have two implications for Philippine economic development. First, the labor force participation of the young went down because they are staying in school longer, and this change implies a better-educated Filipino workforce in the future. The ratio of total school enrollment to the total school-age population (the 6–21 age group) increased from 69% in 1994 to 75% in 1999 and to 77% in 2002. Second, the increase in the labor force participation of the older population came about voluntarily, and that suggests that national policies promoting extended working years would be acceptable if implemented by the Philippine government. As we have already seen, extended working years increase the aggregate lifecycle surplus in relation to the aggregate deficit.

SUMMARY AND CONCLUSION

Very slight changes can be observed in the population age distribution and in the shape and position of the Philippines' mean per capita age profile of current consumption from 1994 to 2002. In contrast, while the overall shape of the age–income profile generally remained the same over that period, a gradual shift toward older ages took place in the position of the profiles. The mean age of labor income increased from 35 in 1994 to 38 in 1999 and to 39 in 2002. Moreover, national per capita mean consumption declined in relation to per capita mean labor income.

The rightward shift in the position of per capita age profiles for labor income, with the unchanged shape and position of the consumption age profile, plus the shift in mean consumption relative to mean labor income, resulted in an increase in the deficit cut-off age from 22 to 24 years at younger ages and from 58 to 64 years at older ages, extending the span of productive ages from 34 to 39 years. More importantly, these changes caused an increase in the ratio of aggregate lifecycle surplus to aggregate deficit from 41% to 72%.

The observed changes have positive implications for economic development in the Philippines. The increase in aggregate lifecycle surplus relative to aggregate deficit means that the use of other household resources (i.e., non-labor income) can be shifted from current consumption to productive uses and saving. The increasing labor income received by the older population from working longer implies reduced competition for transfer resources between children and the elderly, and in turn more resources for investing in children.

NOTE

1. The results presented here are drawn from Racelis and Salas (2008), which is available at the Philippine Institute for Development Studies (PIDS) website, http://www.pids.gov.ph.

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19. National Transfer Accounts for Kenya: the economic lifecycle in 1994

Germano Mwabu, Moses K. Muriithi, and Reuben G. Mutegi

The analysis of National Transfer Accounts for Kenya indicates that because a large fraction of the population is engaged in unregulated informal-sector activities, many people work throughout most of their lives, often starting in childhood, without the option of retiring. As a result, the labor income profile for Kenya reveals an early entry of workers into the labor force, their participation into old age, and a long period of surplus income, which starts at age 23, peaks at age 40, and ends at age 60.

Expenditure on private health care displays a horizontal J-curve, which begins to rise at age 45. The profiles for education consumption show that both private and public investments in education are substantial and are used mainly to finance the schooling of youth. The education consumption expenditure mimics enrollment profiles for primary and higher education. The profile for other consumption has a pronounced hump between ages 30 and 40, perhaps due to the acquisition of household durables during this period and spending on social events such as marriages and familial ceremonies.

National Transfer Accounts (NTA), which comprise an accounting system for measuring intergenerational reallocation of resources across ages at the individual level, are consistent with the National Income and Product Accounts (NIPA) in that aggregate totals for the two systems for any given year are the same. The NTA system adds age profiles of economic variables to the NIPA, a system of national income accounting pioneered by Simon Kuznets and Richard Stone in the 1930s and 1940s (Kuznets 1973; Stone 1986; Pesaran 1991; Fogel 2001).

The NIPA was developed because policy-makers lacked complete information on the economy, particularly the data required to assess its performance, such as consumption and investment expenditures (Pesaran 1991). The NTA in turn was developed because the NIPA lacked demographic information needed by policy-makers to assess economic performance in relation to changes in population structure (Lee et al. 2008). Moreover, the development of the NTA made available precisely the kind of information that policy-makers need to design and implement social welfare programs such as old-age pensions, educational loan facilities, health insurance plans, and cash-transfer schemes for households with wholly dependent members. (See the publications on the NTA website.)

THE SETTING

Kenya is at the early stage of its demographic transition and has a large proportion of young people. About 53% of the population, estimated at 37 million in 2007, is under 20 years of age (KIPPRA 2009). Over the past three decades the total fertility rate declined substantially, from 8.1 births per woman in 1979 to around 5 in 2009. The decline has stagnated, however, and health indicators are worsening, mainly because of the HIV/AIDS pandemic. The dependency ratio is 84% and remains among the highest in Africa; it is a constraint on saving and investment in human capital.

One of the major challenges facing the economy is the lack of employment opportunities for the rapidly growing labor force. The informal sector, comprising mainly small farmers and informal urban operators, remains the major employer, accounting for over 75% of total employment (KIPPRA 2009). However, much of the income derived from that sector is below the poverty line. The extent to which further demographic transition can improve this situation is an important policy issue, which we hope to address in the future.

DATA

To generate the Kenya NTA estimates, we used data from the Welfare Monitoring Survey II of 1994 (WMS II). This was a nationally representative household survey conducted by the Kenya National Bureau of Statistics (MOPND 1996). The survey gathered information on 10 857 households and 59 000 individuals.

Household-level data were collected on household size, household headship, and relationships within households. The individual-level data included age in years, wages, sector of employment, area of residence, level and cost of schooling, health status, number of visits to health facilities, and costs of treatment. The survey questionnaires and the raw data collected are available on the NTA website.

Apart from the WMS II, data on NIPA variables were obtained from National Systems of National Accounts from the Kenya National Bureau of Statistics and from the websites and documents of international organizations such as the International Monetary Fund and the World Bank. These data sets were used to construct macro controls (Mason et al. 2009).

DERIVING THE NTA ESTIMATES

We present age profiles for labor income and consumption that we used to estimate lifecycle deficits. As constructed, a lifecycle deficit can be negative or positive at each age. It can illuminate how changes in population age structure affect saving, investment, consumption, and economic growth.

Labor Income Profile

Labor income includes employee compensation such as wages and salaries, fringe benefits, deferred payments for labor, and labor's share of mixed income, that is, income from self-employment. We derived our estimates of the wage income from data on employees in both the formal and informal sectors. Since the WMS II reported the age structure of employees, it was possible to construct age wage profiles, reflecting total wage income at each age. We divided the total wage at each age by the number of individuals at each age in the survey to get the mean wage income for each age. Self-employment income came from survey records of individuals operating their own businesses. Of total business income, one third was allocated to capital while the remaining two thirds were allocated to labor. We assigned business income to the owner(s) of the businesses surveyed and not to unpaid family workers, if any. Thus we constructed an alternative labor income profile by imputing self-employment income to unpaid family workers. Computation details for these labor income profiles are found in the NTA website and in Chapter 5.

Consumption Profile

The private consumption profile was estimated from a household expenditure survey, whereas the public consumption profile was estimated from administrative records. We combined them to provide an age profile of total consumption expenditure. Public and private consumption were further classified into health, education, and other consumption. Profiles of private education consumption expenditure and health consumption expenditure were constructed using allocation rules described on the NTA website. Prominent among these are regression-based allocation procedures that we used to apportion household-level education and health consumption expenditures to individuals.

The WMS II has information on private education costs for each individual by age and school level. We therefore calculated private education consumption by adding up all costs related to education for individuals receiving instruction in public and private institutions. Age profiles for private consumption are a summation of age profiles for private education consumption, private health consumption, and other private consumption.

Macro Controls

We used macro controls to make micro-level survey data consistent with macro-level data in the NIPA. To achieve this consistency, an adjustment factor is computed by dividing the NIPA figure with the NTA estimate. This adjustment factor, or β, is multiplied by the survey mean for each age for variables of interest, such as health or education. To derive per capita age profiles, the national population census at each age is multiplied by the product of β and the mean for the relevant variable at each age. Typically, sample means of variables are smoothed before multiplication. The formula for converting survey means to per capita means consistent with NIPA are available on the NTA website. In our case, the macro controls for self-employment labor income and imputed self-employment labor income were not available in the NIPA; that is, we do not have mixed income from the NIPA. We estimated the macro control for self-employment labor income assuming that the ratio of self-employment income to wages in the survey was the same as the ratio of two thirds of mixed income to compensation of employees in NIPA.

NTA ESTIMATES AND DISCUSSION

Labor Income Profiles

Figure 19.1 charts income profiles for wage earners and non-wage earners in Kenya in 1994. Four labor income profiles are shown: a wage-income profile; a profile of imputed self-employment labor income; a profile of non-imputed self-employment labor income; and a total labor income profile computed as the sum of wage income and imputed self-employment labor income. Imputed self-employment labor income allocates a portion of self-employment labor income to unpaid family workers using the methods described on the NTA website. The effect of this is to reduce the

Figure 19.1 Per capita labor income profiles: Kenya, 1994

labor income of older household members, typically the household head, and to increase the labor income of younger household members.

On average, labor income in Kenya is positive but low for young teenagers, but begins to increase sharply at around age 18, indicating that young adults enter the informal sector at an early age. The income reported for ages below 18 reflects the prevalence of child labor in the country.

The cross-sectional estimates of non-imputed self-employment income suggest that there is no retirement from work in the informal sector. Average self-employment labor income is nearly as high for older individuals as for those under the age of 60. The relatively high level of labor income for those over age 60 is realized, to a great extent, through the efforts of unpaid family workers. Once we impute labor income to them, the self-employment labor income of older individuals is much lower. Even after this adjustment, however, average wage income drops much more sharply than self-employment labor income. There are a number of possible explanations for the differences in the age profiles. One possibility is that labor income in the wage sector starts dropping sharply at around age 55 because of retirement laws. The profiles also reflect wage differences as well as differences in labor force participation. Moreover, young workers are more heavily concentrated in the formal, wage sector while older workers tend to be more concentrated in the informal sector. This also leads to a difference in the shapes of the cross-sectional age profiles.

Public Consumption

Figure 19.2 shows consumption age profiles for public consumption of education, health care, and other public goods and services. As expected, education expenditure is pronounced between ages 3 and 35, with peaks at ages 6 and 19. This pattern of expenditure tracks government spending for primary, secondary, and tertiary education. The expenditure pattern for ages 7 to 13 corresponds to primary education, whereas the expenditure for ages 14–20 corresponds to secondary and tertiary schooling. The pattern for ages 21–25 shows a declining trend in state-run education expenditure, which corresponds to the period for university education.

The public health consumption age profile follows the typical J-shape for health care spending to some extent. Health consumption is relatively high for very young children, drops sharply as people mature, and then begins to increase slowly. From age 40 consumption of public health care starts to grow somewhat more rapidly, owing perhaps to ailments associated with old age. Other public consumption has a horizontal age profile because by assumption, this type of spending benefits all individuals equally irrespective of age.

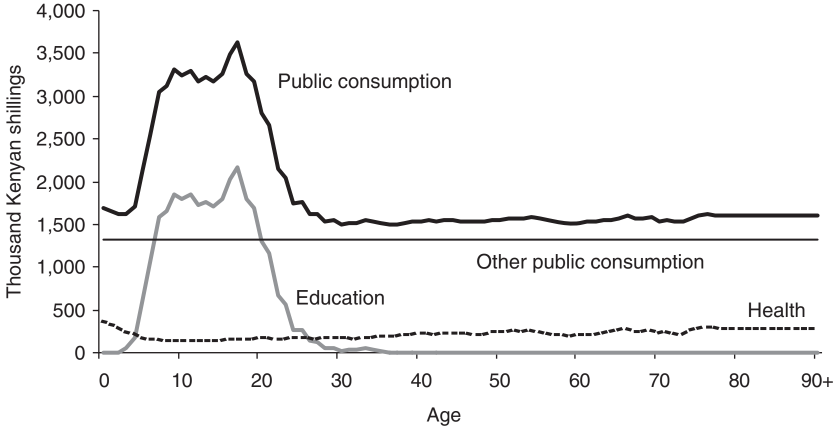

Figure 19.2 Per capita public consumption: Kenya, 1994

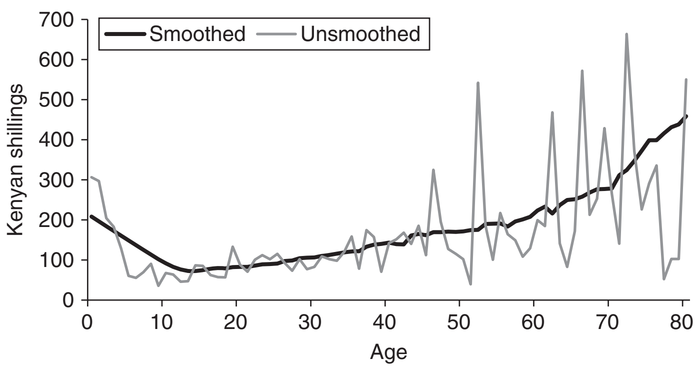

Figure 19.3 Per capita private health consumption: Kenya, 1994

Private Consumption

As shown in Figure 19.3, private health consumption has a horizontal J-shape, suggesting that children below age 10 are more likely than older children to be sick and to seek medical care. Unlike public health consumption, private health consumption increases sharply from age 45 onward. The difference in the slopes of profiles for public and private health consumption patterns could be due to the mushrooming of private clinics as a result of the poor quality of government health facilities.

Private education consumption has a different profile from that of

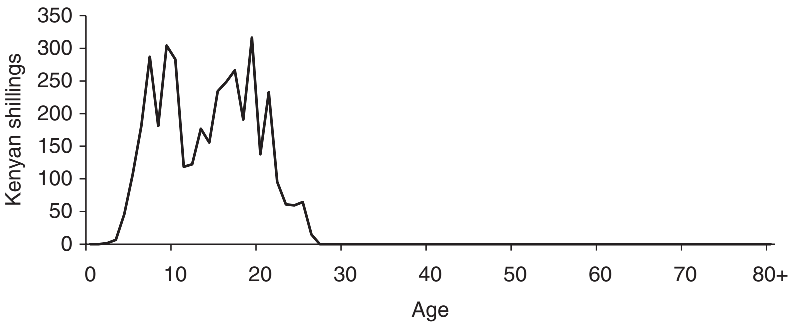

Figure 19.4 Per capita private education consumption: Kenya, 1994

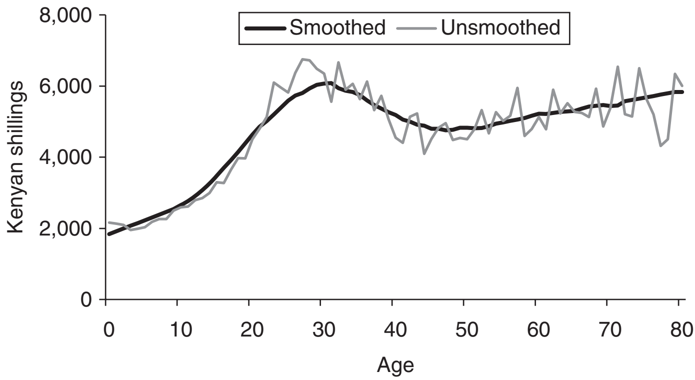

Figure 19.5 Per capita other private consumption: Kenya, 1994

state-run education consumption owing to different enrollment rates at the secondary school level after age 13. The saddle point at age 13 in Figure 19.4 could be associated with an influx of students from private primary schools to government secondary schools after they complete standard eight, the last grade in the primary cycle. The upward trend after age 13 is possibly associated with spending on private secondary schools and colleges. There is no private education consumption after age 29, an expenditure pattern that may be unique to 1994.

Other private consumption, shown in Figure 19.5, has a pronounced hump at ages 25–39, but after age 40 the smoothed profile becomes nearly flat. By the mid-20s, formal schooling has generally been completed, and most individuals are in wage or mixed employment. Demand for durable goods and food is likely to be higher as young adults establish households

Figure 19.6 Per capita consumption and per capita labor income: Kenya, 1994

and families than it is at other periods. Moreover, social expenditures associated with marriage are frequent in this age group.

In short, Figures 19.3–19.5 show that private consumption between ages 10 and 23 is driven by private education and by other consumption because health expenditures are negligible. After age 23, total private consumption consists of health and other consumption, as private education expenditure becomes minimal.

Labor Income and Total Consumption

Comparing per capita labor income with per capita total consumption reveals the age brackets in the lifecycle when labor income falls short of consumption. Figure 19.6 depicts the income–consumption age profiles derived from estimates of the age profiles shown in Figures 19.1–19.5. It shows the difference between the labor income of individuals and their corresponding consumption by age. If labor income at each age is greater than consumption at the same age, it means that there is income surplus at that age.

The Lifecycle Deficit

The lifecycle deficit – the difference between consumption and labor income – is estimated by subtracting mean labor income from mean

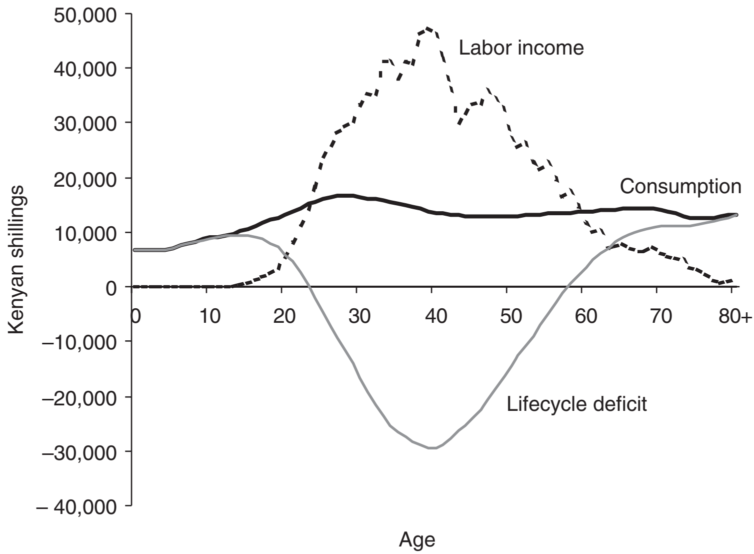

Figure 19.7 Lifecycle deficit: Kenya, 1994

consumption at each age. Naturally, very young children and the elderly have low or no labor income, so that their lifecycle deficits are positive. The positive lifecycle deficit measures the magnitude of economic resources that these age groups must receive in the form of transfers from other age groups or by relying on asset income and dissaving.

In Figure 19.7 (derived from Figure 19.6), per capita total consumption exceeds per capita labor income below age 23 and above age 60, but the reverse is true for ages 23–60. At ages 23 and 60, mean income and mean consumption are equal. From ages 24 to 59, mean labor income is greater than the mean consumption at the same age. Figure 19.7 shows that child dependency ends at age 23 while old-age dependency starts at age 60. The estimates in Figure 19.7 further suggest that the period of economic surplus in Kenya is about 37 years.

It is important to note four general points about the lifecycle deficit of every country. First, whenever the mean labor income is zero, the deficit is equal to mean consumption. Second, at the point where lifecycle deficit crosses the income on either tail of the distribution, mean consumption is twice the size of mean labor income. Third, at the point where the mean labor income crosses mean consumption on either side of the profile, the lifecycle deficit is equal to zero. Fourth, the lifecycle deficit is at its minimum when the difference between mean labor income and consumption is largest. Based on the 1994 per capita estimates for consumption and labor income, the lifecycle deficit in Kenya reaches its minimum – that is, the lifecycle surplus is at its maximum – at age 40.

At the point where mean consumption is twice mean labor income, the relevant age group is beginning to transition from a state of overwhelming dependency or to re-enter that state. At the instant when the lifecycle deficit crosses the labor income profile from above, the relevant age group is financing half of its consumption from its own labor income, with the balance being met primarily from transfers. From that point on, the age group relies progressively more on its own labor income for consumption until it becomes self-sufficient at the point where consumption and income are equal, that is, at age 23. However, when the lifecycle deficit crosses the labor income profile from below, previously independent individuals (68-year-olds in this case) are transitioning to a state of substantial dependency because half of their consumption is now being financed by transfers and asset reallocations. The metaphor of a glass that is half-full at the point of the first crossing and half-empty at the point of the second best describes these situations. The second crossing can be viewed as an early warning signal to policy-makers that the elderly will soon require significant support from the public in the form of pensions or from their families through transfers, dissaving, or asset income. The age at which this signal occurs in a society depends on the nature of the labor market and the size of the informal economy, among many other factors.

SUMMARY AND CONCLUSION

This chapter has constructed National Transfer Accounts for Kenya and documented the data sources used for estimation. The estimates rely on the Welfare Monitoring Survey II of 1994, conducted by the Kenya National Bureau of Statistics, and on macro controls derived generally from National Income and Product Accounts documents of the same year. A household survey permits derivations of age-specific profiles of economic variables such as consumption and labor income, which are essential in constructing NTA. However, for NTA to be consistent with National Income and Product Accounts, it must be anchored on macro controls. The information generated by NTA on lifecycle deficits shows how the welfare of different age groups in society can be affected by various forms of transfers and asset-based reallocations. It can be a useful tool for designing social protection programs and for projecting resource needs for human capital investments.

ACKNOWLEDGMENTS

We are indebted to Professors Andrew Mason, Karen O. Mason, and the other resource persons who trained us in NTA methodology at the Summer Seminars of the East-West Center, Honolulu, in 2007 and 2008. We gratefully acknowledge financial support from the International Development Research Centre (IDRC) and the MacArthur Foundation. We are also grateful for comments on an earlier draft of this chapter by Andy Mason. Any errors that remain are ours alone.

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C. Systems of intergenerational flows

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20. Intergenerational resource allocation in the Republic of Korea

Chong-Bum An, Young-Jun Chun, Eul-Sik Gim, Namhui Hwang, and Sang-Hyop Lee

The challenges resulting from rapid aging and extremely low fertility are of great concern to the Republic of Korea (South Korea) simply because no other society has faced so dramatic a demographic transition. This chapter provides some important features of the country's intergenerational resource allocation, highlighting its unique features of old-age support. The results, based on 2000 data, show that, on the one hand, the lifecycle deficit for the elderly is smaller than in many other countries included in this book. On the other hand, the productivity of elderly Korean workers is low, although their labor force participation rates are high. The results also suggest that Korean households provide for consumption adequately around the time of retirement, even without sufficient pension benefits. Whatever worked for Korean retirees in the past, however, will not work in the future, largely because of the rapidly changing population structure and fiscal and pension policies.

This chapter explores the extent of intergenerational resource allocation in South Korea, using the NTA methodology. Along with presenting our estimates based on this new method, we highlight two unique features of the Korean economy: the saving patterns of Korean elderly and the recent trend in South Korea's public-sector accounts.

BACKGROUND

South Korea's population is aging very rapidly. The total fertility rate (TFR) decreased from 4.53 children per woman in 1970 to 1.08 in 2005, reaching the world's lowest level. As of 2005, the share of the population aged 0–14 was 19.1%, while the share of population aged 65 and older was 7.2%. According to the most recent UN projections (medium scenario), the elderly share in South Korea will grow very rapidly, surpassing that of the US and many European countries in less than two decades. About 19.6% of the Korean population will be 65 or older in 2025, and this share is projected to exceed 37% by 2050.

South Korea has had an extraordinary development experience, but it is now moving to a slow and stable stage of economic growth. Until the 1960s it was a poor and predominantly agricultural country. It then rapidly transformed itself into a modern, industrialized country, owing to the success of an export-oriented industrialization strategy. Between 1962 and 1996, real GDP per capita grew at an annual rate of 6.6%. At present, the country is focusing on maintaining stable growth while continuing its structural reform.

Although the familial support system is eroding in South Korea, the public support system has been expanding rapidly since the late 1980s. The current social security system consists of three parts: social insurance, public assistance, and social welfare services. Social insurance comprises Industrial Accident Compensation Insurance, the National Health Insurance Scheme, the National Pension Scheme, and Employment Insurance. Depending upon their type of occupation, employees join the National Pension, Government Employees Pension, Military Personnel Pension, or Private School Teachers' Pension plan.

The number of people insured through the National Pension Scheme has steadily increased, and by 2002 the scheme was covering more than 16 million people. There were 0.9 million beneficiaries in 2002, but the number has been growing by about a quarter of a million people annually and was expected to increase to 3 million by 2010. The National Health Insurance Scheme and its supplementary program covered almost all citizens as of 2002.

Public assistance comprises the National Basic Livelihood Security System, medical aid, veterans' relief, and disaster relief. Public assistance has changed the paradigm of social policies for fighting poverty. All people who live under the poverty line are provided with financial benefits regardless of their working ability. At the same time, the government provides a self-support program for those in the lower-income bracket who are able to work.

INTERGENERATIONAL RESOURCE ALLOCATION

This chapter closely follows the NTA methodology described in Mason et al. (2009), and Lee et al. (2008). The primary sources of microdata sets used in our analysis are the National Survey of Household Income and Expenditure (NSHIE) and the Korean Labor and Income Panel Study

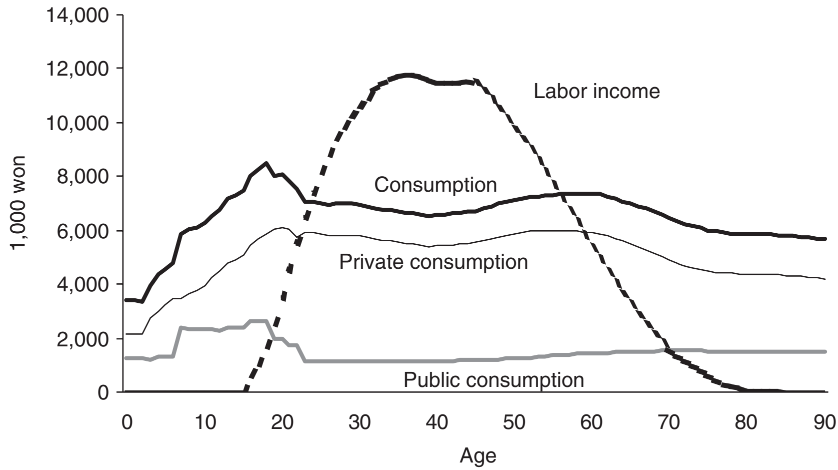

Figure 20.1 Per capita consumption and labor income: Republic of Korea, 2000

(KLIPS) of 2000. We also used the Household Income and Expenditure Survey (HIES) to collect up-to-date information on asset income. In addition to the microdata, we used various sources to construct the aggregates. These included the National Income and Product Accounts, the *National Pension Statistical Yearbook,* and the *National Health Insurance Statistical Yearbook*.

The Economic Lifecycle

Figure 20.1, which presents the lifecycle profile of per capita production and consumption in South Korea, indicates that the lifecycle surplus extends for a period of 32 years, from age 24 to age 55. As in all economies, the production profile has a typical inverse U-shape.

However, there are important differences between South Korea and the other economies. One of them is that production in South Korea appears to decrease from the late 40s, which is much earlier than in many other advanced economies. This is interesting because labor force participation rates for people in their 50s and 60s in South Korea are not lower than in other advanced economies. The difference reflects the lower productivity (or fewer working hours) of older workers in relation to younger workers in South Korea. It may be due to rapid changes in technological progress and educational attainment, which have put older workers at a disadvantage as compared with those in many other advanced economies

(Mason et al. 2005). This is a striking result, especially given that Korean companies used to rely on a seniority-based wage system. That system has deteriorated, however, especially since the 1997 financial crisis. How the financial crisis may have affected our results is an interesting question, but it is beyond the scope of this chapter.

There are also important differences between South Korea and other countries in their consumption patterns. In South Korea, consumption peaks in the late teens and decreases until the 40s. Such a decline in consumption was also found in other countries as a result of decreasing expenditure on education (see Chapter 6). However, the decline seems to come earlier in South Korea, immediately after high school graduation. This result may be related to the high level of private education consumption among Korean high school students. Private education in the form of tutoring is very common because of the difficulty of college entrance examinations.

Another difference between South Korea and other countries participating in the NTA study is that consumption by the elderly appears to be much lower in South Korea. This outcome is due in large part to very low consumption of private heath care by elderly Koreans. To investigate whether this finding was due to a measurement error or a data problem, we compared our results with other publicly available sources of information; but the results were not qualitatively different. The literature on health systems identifies several factors that explain why some groups of people in a society have low medical expenditure. The factors include limited access to health care, low income, or physical difficulty in visiting health care institutions. In South Korea, a non-trivial portion of very old people also still die at home, requiring low medical expenditure (Kwon 2008). The low spending may be peculiar to this cohort and their life experience rather than characteristic of Koreans in general or Korean institutions. If so, then spending late in life may be much higher in the future.

Transfers

Public transfers accounted for 27% of all transfers to children in South Korea in 2000 (Figure 20.2). Although this figure is somewhat lower than in more developed countries – for example, it is 40% in the US – most of the difference between the US and South Korea is due to the difference in state education spending. Children's pro rata share of other public goods in South Korea was roughly equal to that in the other countries. Public transfers were also an important component of the reallocation system for the elderly in South Korea. Although they were far less prominent than in

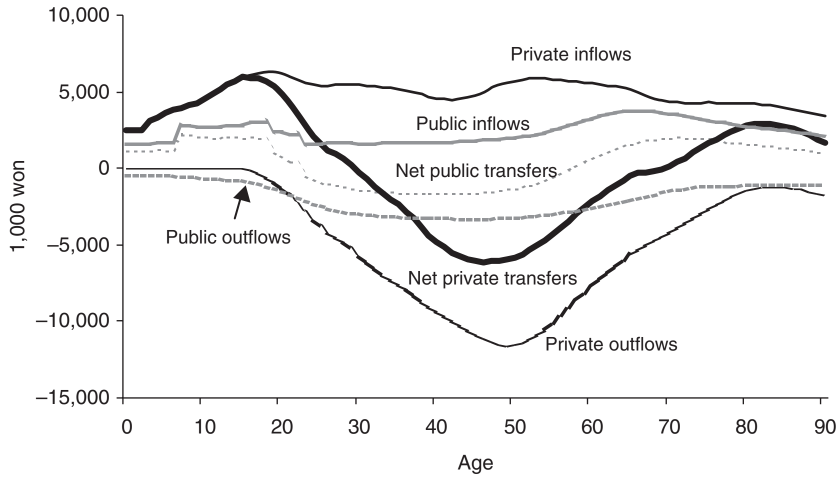

Figure 20.2 Per capita private and public transfers: Republic of Korea, 2000

most advanced economies, public transfers still accounted for 37% of age reallocations for the elderly.

The pattern of public health care transfers was similar to that in other countries, whereas the pattern of public pension transfers was not (not shown in Figure 20.2). Because 2008 was the first year of normal benefit disbursement from the National Pension Scheme, our age profiles of public pension transfers based on 2000 data show very small inflows of pension transfers to the elderly (ages 60+).

Asset-based Reallocations

Because asset income was negligible in the public sector, the age profile of public asset-based reallocations was similar to that of general taxes (Figure 20.3) and almost a mirror image of the public savings profiles (not shown in the figure).

Private asset-based reallocations were positive at most ages except for ages 15–32. At those ages, asset income was smaller than saving. Private asset income was rising steeply among people in their 40s and 50s, but their private savings were quite low compared with their asset income. Perhaps the reason for their low savings is that people in this age group were financing much of the consumption of children and the elderly.[1] A striking result was the increase in asset income as well as savings among people in their mid-70s and older. This increase was due in part to the net

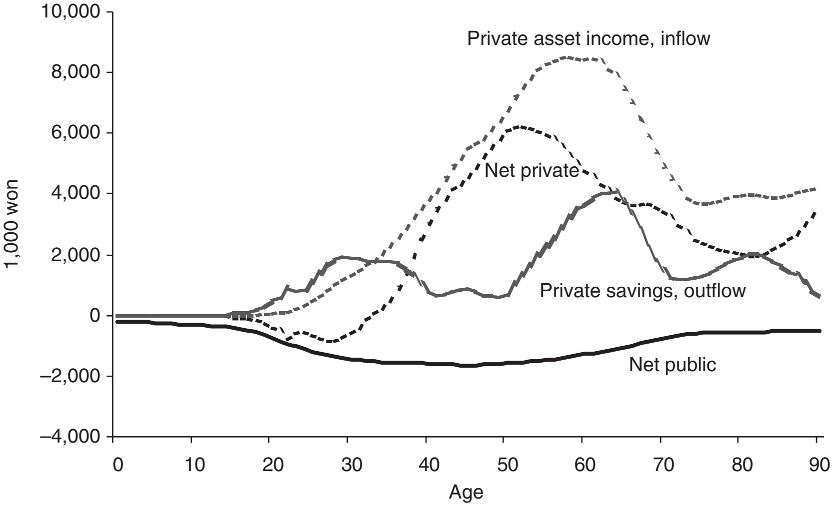

Figure 20.3 Per capita asset-based reallocations: Republic of Korea, 2000

inflow of interest income for those age groups, while capital income was still a dominant form of asset income for Koreans of all age groups.

It is far from clear why the asset-based reallocations in South Korea show these age profiles. However, it is worth mentioning that the Korean housing system has several unusual features that may have a significant effect on the private sector through private transfers and private asset-based reallocations. A house is the major asset for Korean homeowners, accounting for 50% of total assets held by all households, significantly more than the 30% in the US (Cho 2005). But it is not easy to liquidate housing assets by taking out a reverse mortgage or selling a home, which often leads homeowners to transfer expensive property to other family members as a bequest when they die.[2]

A popular alternative to homeownership is to rent a house or an apartment under a system unique to South Korea, called the key money system (*chonsei*). The tenant pays a deposit up front (without having to make any subsequent payments of rent) 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 South Korea have a portion of their assets tied up in housing and thus cannot diversify them. This system is likely to have affected the income profiles of the elderly. Many elderly Koreans do not have income sources other than their houses. For these individuals the source of interest income could be the key money from renting their houses. Estimating the extent of how this system affects

Table 20.1 National Transfer Accounts: Republic of Korea, 2000 (billion won)

Item	Total	Domestic accounts by age group				
		0–19	20–29	30–49	50–64	65+
Lifecycle deficit	23,690	78,910	–2,038	–71,627	1,842	16,602
Consumption	313,660	83,679	59,364	103,988	45,038	21,591
Less: labor income	289,971	4,769	61,402	175,614	43,196	4,989
Age reallocations	23,690	78,910	–2,038	–71,627	1,842	16,602
Asset reallocations	23,046	–5,392	–15,074	10,907	24,848	7,757
Net asset income	134,035	914	5,622	58,778	51,072	17,649
Less: net saving	110,990	6,306	20,696	47,871	26,224	9,892
Transfers	644	84,302	13,037	–82,534	–23,006	8,845
Public	0	23,125	–4,422	–23,907	–886	6,090
Private	644	61,178	17,459	–58,627	–22,121	2,755

the intergenerational economy in South Korea is an interesting research question but is left for future research.

National Transfer Flow Accounts and Sources of Funding

Table 20.1 presents the national transfer flow account for South Korea in a highly summarized form, reporting aggregate lifecycle deficits and aggregate age reallocations by age in billions of won. Total age reallocations and their major components are shown in the bottom panel, with positive values representing inflows and negative values representing outflows. As a group, people under the age of 20 and those over the age of 65 were consuming more than they were producing in 2000. The lifecycle deficit of young children was 7.9 trillion won, about 25% of total national consumption. The lifecycle deficit of people 65 and older was 1.7 trillion won, about 5.3% of total national consumption. The lifecycle surplus among prime-age adults (ages 20–49) was 7.4 trillion won, or 23% of total national consumption. Clearly, the resources being shifted across age groups are enormous relative to the size of the Korean economy.

Korean children under the age of 20 were depending almost entirely on transfers to meet their lifecycle deficit. Of those age reallocations, about 73% were private transfers. Transfers provided about 53% of the lifecycle deficit of the elderly and asset-based reallocations about 47%. The elderly relied heavily on asset income, but they did not dissave. Rather, they had modest savings.

TWO UNIQUELY KOREAN PHENOMENA

Two unique features of the Korean data that are related to the economic lifecycle and old-age support system are the saving patterns of the Korean elderly and the recent trend in South Korea's public-sector accounts. The first offers clues to understanding South Korea's retirement–consumption puzzle. An examination of the second can partially compensate for the snapshot feature of the Korean NTA, at least for the public sector.

The Retirement–Consumption Puzzle

According to the lifecycle hypothesis, which predicts consumption smoothing by people in the workforce, there is no reason for consumers to reduce consumption suddenly at retirement if the time of retirement is fully anticipated. Thus researchers find it puzzling when consumption declines after retirement, as is the case in South Korea. There may be factors such as pensions that contribute to this anomaly. Although the Korean social security program has been in effect since 1988, pension benefits for normal retirees have not been paid yet because the required 20 years of coverage were reached only in 2008, the first year of normal pension benefit disbursement. Thus Korean retirees have not benefited from the public pension as much as retirees in other countries. Moreover, many Korean elderly are still living in extended households, and for them the public pension may be less important as a source of support than it is for retirees in many Western countries.

Empirical studies have attempted to explain the puzzle. Banks et al. (1998) found that British households significantly curtailed their consumption around age 60. Reduced work-related expenses could not explain the observed fall in consumption at retirement. In the US, researchers found that individuals decreased their consumption by 7% to 20% at the time of retirement (Bernheim et al. 2001; Hurd and Rohwedder 2003). Several studies have offered alternatives to the lifecycle hypothesis to explain the consumption decline, such as the unknown timing of death (Hamermesh 1984), the uncertainty of retirement timing (Carroll 1994), or a decrease in the bargaining power of husbands at retirement (Lundberg et al. 2003).

We tested the puzzle for South Korea, using the KLIPS data from 1998 to 2003 and the 2003 special module (the survey of elderly Koreans).[3] The results show that only unexpected retirement supported the retirement–consumption puzzle, whereas planned retirement did not decrease consumption at retirement. In fact, the results show that consumption

Table 20.2 Trend in social welfare expenditure by type: Republic of Korea, 1997–2005 (billion won)

Expenditure	1997	2000	2002	2003	2004	2005	Annual growth	
							(00–05)	(97–05)
Public pensions	7,827	10,453	11,017	12,332	13,799	16,079	9.0	9.4
Health care	5,904	9,041	13,669	15,027	16,429	18,393	15.3	15.3
NBLSS	962	2,471	3,430	3,540	3,928	4,626	13.4	21.7
Social service	1,757	2,155	3,043	3,637	4,128	4,415	15.4	12.2
Total	16,451	24,121	31,159	34,536	38,285	43,513	12.5	12.9

Note: NBLSS – National Basic Livelihood Security System.

Source: National Tax Service (2006).

actually increased slightly at retirement in the case of planned retirement. Thus we found no evidence to explain the retirement–consumption puzzle in South Korea in cases where the timing of retirement was anticipated.

Recent Trends in Social Welfare Expenditure

Another feature of the Korean cross-sectional data is that there have been recent changes in public transfers. The snapshot for year 2000 has limited validity in portraying the current status of the Korean public support system simply because the system has been changing rapidly.

The most striking feature of government expenditure in the past decade was the rapid increase in social welfare expenditure (Table 20.2). Public pension benefits grew by 9% per annum between 2000 and 2005, while medical insurance benefits rose 15.3% annually during the same period. The National Basic Livelihood Security System (NBLSS) benefits consist of cash and in-kind benefits to households with incomes below the poverty line. It had the highest growth rate, 21.7% per annum, between 1997 and 2005, but the rate of growth slowed somewhat after 2000. Social service expenditure also rose dramatically, growing 15.4% per annum between 2000 and 2005.

Figure 20.4 shows a large increase in social welfare benefits for the elderly during that short time span.[4] The upward shift of the age profile is most conspicuous for those over age 55, owing to the increases in public pension and medical insurance benefits. The sharp increase in public pension benefits for those in the 60–64 age group reflects the increase in the

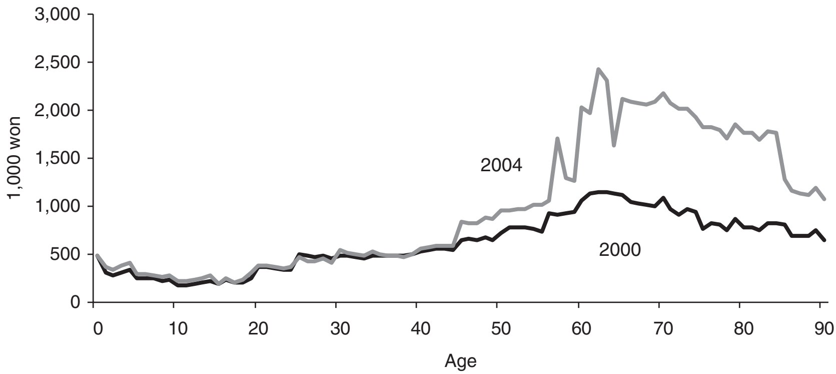

Figure 20.4 Age profiles of per capita social welfare benefits: Republic of Korea, 2000 and 2004 (thousand won, 2000 constant prices)

number of newly entitled national pension recipients. The upward shift of the benefits for those aged 65 and older was due mainly to the increase in the benefits from occupational pensions.

The increase in medical insurance benefits reflects the government's expansion of the scope of medical treatments covered by National Health Insurance. The medical treatment fee rose by about 14.2% during the period 2000–2004, and the ratio of the medical insurance benefit to the total medical treatment fee rose from 68.1% in 2000 to 72.4% in 2004. Recent changes in medical insurance policies substantially raised the medical insurance benefits for the older age groups.

The net benefits for the elderly will increase substantially in the future, in large part because the distribution of regulatory pensions from the National Pension Scheme began in 2008. The propensity to consume will increase by age, which in turn will lead to lower national savings. Chun (2006) projected the national savings rate based on two economic models, a lifecycle model and an altruistic family model. The results of both projections showed a sharp decrease in Korean saving rates with rapid population aging.

The increase in public pension wealth is also projected to negatively affect future non-pension saving. According to Chun (2006), the degree to which the accumulation of public pension wealth will offset non-pension saving will be about 20% and will result in an increase in consumption by up to 3% or, equivalently, a decrease in non-pension wealth by 12%. Overall, this implies that the recent change in fiscal policy will substantially and adversely affect private accounts. This is another important agenda for future research.

CONCLUSION

Along with continued improvements in life expectancy, South Korea's steep fertility decline has led to extremely rapid population aging. The challenges resulting from this are of great concern to the nation simply because no other society has faced so dramatic a demographic transition. Complicating the response are signs of deteriorating traditional familial support for the elderly and slower economic growth. The NTA estimates for South Korea should shed light on issues affecting the intergenerational reallocation of economic resources among Koreans.

Some of the Korean results are quite interesting and merit further investigation. First, the lifecycle deficit for the elderly, based on 2000 data, is smaller than in other NTA countries, in part because of the low level of consumption by the elderly. This is good news for South Korea because a smaller reallocation of resources toward the elderly will be required and that in turn will ease the financial burden due to rapid population aging. Nevertheless, as the recent changes in the public-sector accounts imply, the net benefit for the elderly is growing rapidly. This trend will be reinforced in the future, since the regulatory, and more generous, old-age pension of the National Pension Scheme has begun to be implemented, starting in 2008. The fiscal impact of population aging will be much greater due to this change.

Second, the fact that working elderly are earning less in South Korea than in most developed countries, even though elderly Koreans have a relatively high labor force participation rate, is a striking result. The lesson from this is the need for policies that maintain the productivity of Korean workers as they age.

Lastly, the finding that Korean households seem to have an adequate degree of consumption smoothing around the time of retirement, even without sufficient pension benefits, is surprising. However, whatever worked for Korean retirees in the past will not work in the future. Without further reforms, public pension funds cannot be a major source of financing consumption for the Korean elderly. Higher labor income will help, but increased reliance on asset accumulation is critical and appears to be happening.

Again, we caution that the results reported here are based on figures for a single year. Lack of longitudinal data limits the extent to which we can explain the cross-sectional patterns that we have observed. In particular, we can only speculate about the extent to which these results reflect distinctive features of the year for which the accounts were constructed – that is, whether or not they represent significant cohort effects. The full value of the accounts will be realized when we can construct estimates for other years. This issue remains for future research.

ACKNOWLEDGMENT

We thank the project's principal investigators, Ronald Lee and Andrew Mason, for their support and comments.

NOTES

1. Or it could be simply due to the fact that our results are based on cross-sectional rather than longitudinal data. See Mason et al. (2009) regarding this issue.
2. In the US the mortgage-to-GDP ratio is usually more than 50%, but for South Korea it is only 10% (Lam 2002, p. 131).
3. This result draws heavily on An and Choi (2005).
4. Given that the 2004 estimates are preliminary, the estimates shown in the figure may not be completely accurate. Nevertheless, they indicate a dramatically changing pattern.

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21. Idiosyncrasies of intergenerational transfers in Brazil

Cassio M. Turra, Bernardo L. Queiroz, and Eduardo L.G. Rios-Neto

In contemporary economies intergenerational transfers play a major role in redistributing resources from people of working ages to children and the elderly (Lee 2003). Whereas the elderly generally receive substantial support through social insurance programs, family transfers are the main support for children (Lee 1997, 2003). Despite unabated interest among researchers in issues pertaining to intergenerational transfers in developed countries, surprisingly little is known about these issues in emerging economies. With few exceptions (e.g., Stecklov 1997; Lee 2000; Turra 2000), until the inception of the National Transfer Accounts project, research on intergenerational transfers in emerging economies had failed to consider specific institutional and socioeconomic settings that eventually affect the volume and direction of resources in those settings.

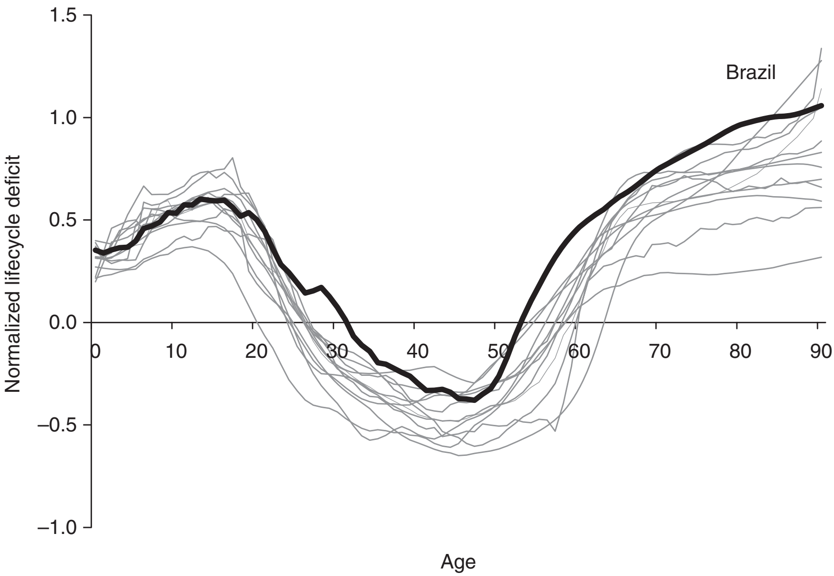
Brazil provides an intriguing context for examining the role played by intergenerational transfers in more recently industrialized economies. Compared with other emerging economies, it is distinct for combining a large public sector with a rapidly aging population (Turra and Queiroz 2005) and doing so despite having one of the most extreme income inequalities in the world (Barros and Mendonça 1995; Ferreira and Barros 1999). Numerous studies document how resources are allocated among socioeconomic groups in Brazil (e.g., Camargo and Ferreira 2002; Camargo 2004); but most of those studies are limited to public cash transfers, and only a few have looked at reallocations by age. One exception is a comprehensive study by Turra (2000) that combines several age schedules of public and family transfers to estimate both public and private transfers in Brazil based on the accounting system developed by Lee (1980, 1994, 2000). Using survey and administrative data, Turra shows that, as in Western developed countries, social programs to the elderly dominate public transfers in Brazil, while children's well-being depends largely on familial (private) allocations of resources. The results were surprising because policy-makers and others expected to find larger flows of public transfers directed to children in developing countries with young age structures (Caldwell 1976; Goldani 1999). Over the last few years other studies have reported on how Brazil's public policies favor the elderly, but most of them have relied on partial analyses of the intergenerational transfer systems (Barros and Carvalho 2003; Camargo 2004).

In this chapter we take advantage of the estimates produced under the NTA project to briefly describe the main features of intergenerational transfers in Brazil and draw attention to two idiosyncrasies that, in our view, make Brazil a special case among the other countries involved in the project. First, we discuss how intergenerational public transfers have favored the elderly in Brazil. Second, we stress the importance of looking at intergenerational flows simultaneously by age and socioeconomic groups, given the extreme inequality that has driven most decisions about resource allocations in the country. We conclude by discussing the implications of these findings for a future research agenda.

GENERAL FEATURES OF THE ECONOMIC LIFECYCLE IN BRAZIL

In assessing the idiosyncrasies of intergenerational transfers in Brazil, it is helpful to start by examining broad features of the economic lifecycle. As in most industrialized populations today (see Mason et al. 2009), the Brazilian economic lifecycle is characterized by three stages: two periods of economic dependency interrupted by a surplus stage. Figure 21.1 shows the normalized lifecycle deficit in Brazil (i.e., the difference between labor income and consumption at each age divided by the average labor income at ages 30–49) as compared with that in the other NTA economies. The Brazilian surplus stage lasts about 20 years, starting between ages 30 and 35 and ending between ages 50 and 55. As Mason et al. (2009) point out when describing the lifecycle model, the age profiles imply a gradation of dependency. In Brazil, for example, persons aged 70 and over are economically more dependent than those aged 60–69, and young people aged 10–19 are more dependent than young adults aged 20–29.

Moreover, as in most developed nations today, old-age dependency stands out as a long stage of the Brazilian lifecycle. In contrast with other NTA economies however, the old-age lifecycle deficit turns negative at an early age and is very large in Brazil. Four phenomena explain this distinct pattern. First is the lack of a minimum retirement age in 1996 for certain types of retirement benefits, combined with the absence of strict rules linking benefits to contributions, which creates incentives to withdraw



Note: Normalized lifecycle deficit is the difference between labor income and consumption at each age per average labor income at ages 30–49.

Figure 21.1 Normalized lifecycle deficit in Brazil (1996) compared with other NTA economies around 2000

early from the labor force, thus reducing labor income very fast at older ages (Queiroz 2008). For example, per capita labor income reaches its maximum at age 47 and is already reduced by half at age 56. At age 68 it represents only 20% of the amount received 20 years earlier (details available upon request). Second, there is a steady increase of consumption with age, which is driven mainly by the consumption of private health care and owner-occupied housing. Although universal public health care is available in Brazil, the consumption of private health care increases by about four times between the ages of 40 and 80. Third, because the near-elderly and elderly own most of the available real estate in the country, the flow of services from housing also increases rapidly with age: by 2.4 times between ages 40 and 80. Fourth, the elderly are beneficiaries of very generous public pension programs.

Net public and net private transfers finance most consumption by children and the elderly (Figure 21.2). Among children, private transfers account for a large proportion of the consumption – between 66% and 88%, depending upon their age – whereas public transfers represent, on

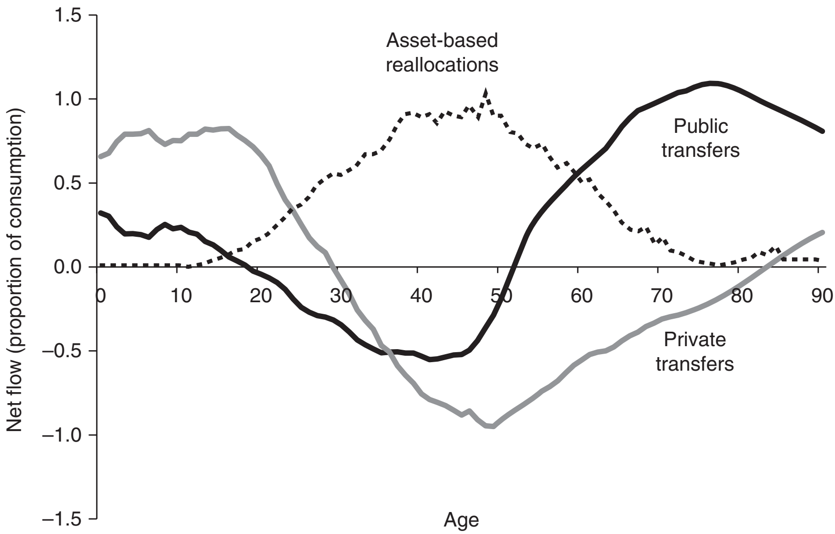


Figure 21.2 Net public and private transfers and asset reallocations as a proportion of consumption, by age: Brazil, 1996

average, less than one quarter of the total consumed. On the other hand, net public transfers account for more than 90% of the consumption of people aged 65 and above in Brazil. Except for the very old, net private transfers are negative for the elderly. In other words, the elderly make private transfers to their adult children. The net flow of private transfers is small as compared with public transfers at older ages, but it is very large as compared with other NTA economies. Previous studies have suggested that this pattern represents transfers flowing downward from older parents to adult offspring and that it may be an indirect effect of the substantial support that the elderly receive from the public sector in Brazil (Camarano 2003; Saad 2004).

Figure 21.3 depicts the distribution of public transfers received over the lifecycle on a per capita basis. Not surprisingly, among age-related transfers at ages below 5, publicly funded health care is the largest source of consumption, accounting for about a quarter of all public transfers received. Between ages 5 and 15, public education becomes the largest age-related component, representing about 40% of public expenditures. As mentioned before, the lack of a minimum retirement age creates incentives to early retirement, with the result that pension benefits paid to both private workers and public servants begin to rise steeply around age 40 and reach a high plateau by age 75, when they represent 86% of the total public inflows.

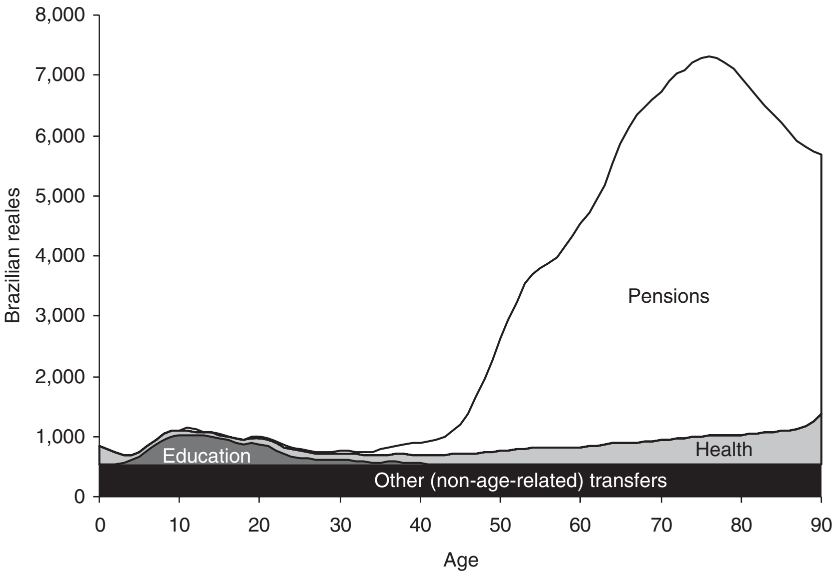


Figure 21.3 Distribution of public transfers received, by age and purpose: Brazil, 1996

As we have seen in Figure 21.2, prime-age adults rely on asset-based reallocations in a major way to support their own consumption and to make private transfers to the dependent age groups. At the same time, in order to finance public transfers, prime-age adults have the largest tax burden (Figure 21.4). They are not alone in paying for public transfers, however. About 46% of the national fiscal income represents taxes that directly or indirectly fall upon consumption and thus burden consumers of all ages. In addition, taxes on property and capital income are concentrated among the elderly because the elderly are typically asset owners in Brazil.

ELDERLY-BIASED PUBLIC TRANSFERS IN BRAZIL

In general terms the reallocation system in Brazil is very similar to that of other economies represented in the NTA project. But the elderly in Brazil receive much higher per capita public transfers than do children. Figure 21.5, which compares the ratio of net per capita public transfers for the elderly (ages 65+) to net per capita public transfers for children (ages 0–15), shows that the ratio in Brazil of 9.96 is more than seven times that

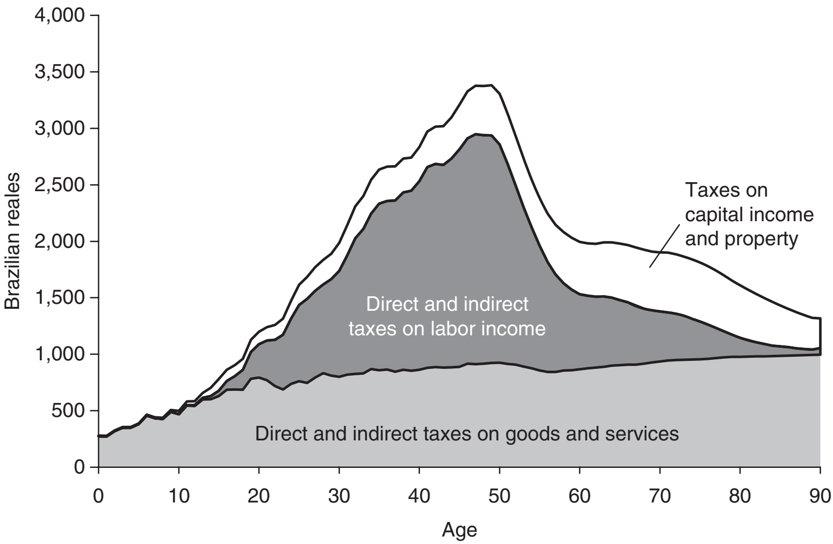
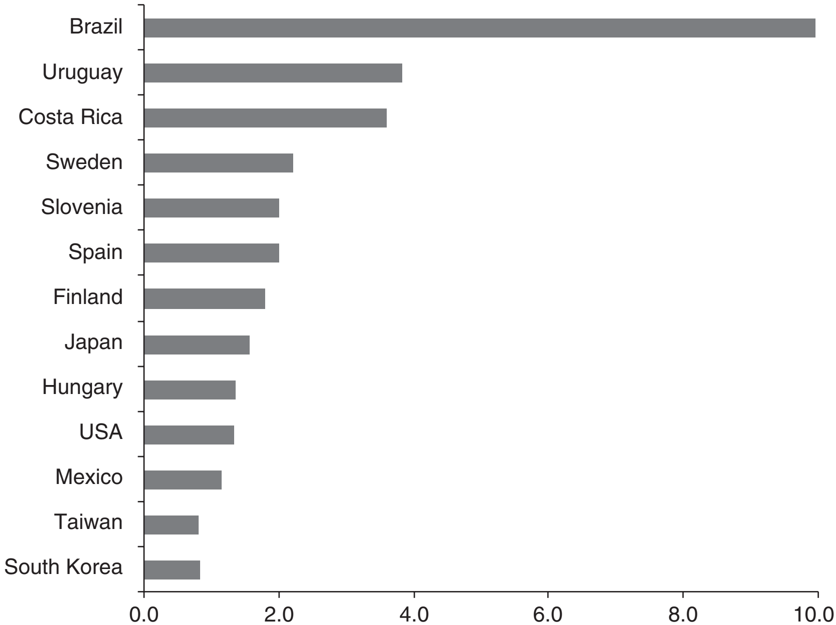


Figure 21.4 Distribution of public transfers made, by age and main component: Brazil, 1996

in the US, about six and a half times that in Japan, and between 4.5 and 7.5 times larger than the ratios in selected European countries. It is also 2.6 times larger than the ratio in Uruguay and 2.78 times larger than the one in Costa Rica – both Latin American countries that share social, economic, and institutional arrangements similar to those in Brazil.

The Brazilian population is aging rapidly. The economic well-being of future elderly generations will therefore depend increasingly on massive investments in children, particularly in children from poorer families that have scarce resources of their own to invest in human capital. It is imperative to understand why the public sector has favored older age groups in Brazil if ways are to be found of avoiding a dead-end path for economic growth and a soaring tax burden on future generations.

The literature provides a few theoretical models that may help us understand why a developing economy with such a young age structure has such large public transfer flows to the elderly as compared with similar economies. Preston (1984) has argued that in the US the increasing relative share of the elderly population, combined with its political power, helped to increase public expenditures on programs benefiting the elderly. Becker and Murphy (1988) developed a theoretical model based on intergenerational equity, arguing that the state should intervene in private relations to create a more efficient allocation of resources. The model hypothesizes



Note: The ratio is the weighted average net public transfers to adults aged 65+ divided by the weighted average net public transfers to children aged 0–15.

Figure 21.5 Ratio of net per capita public transfers for the elderly to net per capita public transfers for children: selected economies around 2000

that current public expenditures directed to the elderly compensate for their contributions during prime working ages to the development of public education systems and the accumulation of human capital for future generations.

Historical evidence, however, indicates that the rise of public expenditures on education in Brazil started much later than in nations at similar or higher levels of development. For instance, Bommier et al. (2004) show that in the US, public expenditures on education started by the end of the nineteenth century and that the public pension system emerged around the 1930s. The expansion of the Brazilian public pension system occurred after World War II (Queiroz 2008) and has accelerated over the last 20 years, but the consolidation of primary state-run education did not occur before most of the elderly population had begun receiving retirement benefits (Rios-Neto 2005). Brazil's example disconfirms Becker and Murphy's argument that there is a lag of at least one generation between the

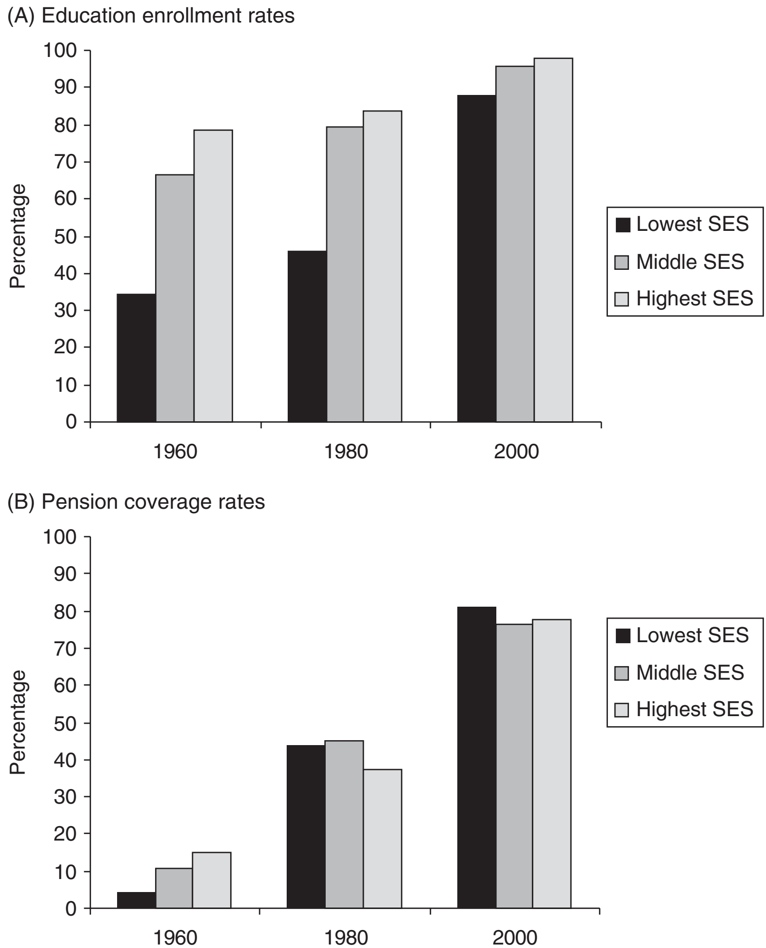


Figure 21.6 Basic-education enrollment rates and pension coverage rates by socioeconomic status (SES): Brazil, 1960, 1980 and 2000

expansion of public education and the expansion of public pension programs. This point is illustrated in Figure 21.6, which shows the evolution of Brazil's total (state and private) education enrollment rates (ages 7–14) and pension coverage rates (ages 60+) from 1960 to 2000 by socioeconomic status.[1] Both programs have expanded substantially since 1980 and reached high coverage levels (above 85%) in 2000. Historically, however, coverage rates have been much better distributed among socioeconomic groups for pensions than for the basic education program, a situation that reinforces the idea that a large proportion of the youth population has been excluded from state-run education.

The development of public transfer systems is closely related to the model of economic development adopted in Brazil during the second half of the twentieth century. Filgueira (2005) and Draibe (2007) have argued that the expansion of the Brazilian social welfare system occurred with the industrialization process and that both were coordinated by the federal government. Thus the evolution of the social protection system has mainly concerned the relations between capital and labor. In the first stages, social policy in Brazil was biased in favor of the urban areas and the formal labor market (Filgueira 2005).[2] Filgueira (2005) argues that this helps to explain why social protection existed only for civil servants and workers in the modern industrial sector. According to Draibe (2007), the expansion of the social welfare system depended on the productive structure and political influence of the professional class. Moreover, the predominance of Brazil's industrialization goals has limited the social protection system to urban salaried workers. Rural workers were excluded from labor and union regulations, as well as from the pension system, until the 1970s (Draibe 2007). Lastly, Draibe (2007) argues that economic development based on import substitution (an industrial bias) has increased the importance of the social security system in the Brazilian welfare state, while allowing investments in education and health to be neglected. In this sense the consolidation of social public expenditures in Brazil has been essential to the economic development of the country during a period of rapid transformation, but has also acted as a form of social control and political legitimization (Draibe 2007; Rios-Neto 2005).

None of these authors, however, has discussed why the social security system became virtually universal in recent decades as the coverage of contributory benefits expanded and non-contributory benefits for workers in the informal sector became available, while a large proportion of the young population remained out of school until very recently. This issue still needs further examination and can be addressed only with historical evidence.

THE ROLE PLAYED BY SOCIOECONOMIC INEQUALITY

Despite structural changes, socioeconomic inequality has persisted in Brazil over the decades and remains higher than the average level in Latin America (Barros et al. 2000). Recent research has pointed to several factors that might help explain this pattern: inequalities in the availability of education, increases in unemployment and informal-sector employment (Ferreira and Barros 1999), high rates of return to education, and high variability in educational quality (Lam and Levison 1992; Menezes-Filho 2001). Although the labor market is not per se a generator of income inequality, it plays an important role by transforming workers' differences in education and experience into income inequality (Barros and Mendonça 1995).

Therefore, in contrast with other countries where the degree of heterogeneity within age groups may be much less significant, in Brazil the mean intergenerational flows by age may hide some important peculiarities of resource allocations. Turra and Queiroz (2005) have provided strong evidence of intergenerational inequity in Brazil. They analyzed Brazil's intergenerational transfer systems by socioeconomic status and found distinct patterns of private and public transfers for different subgroups defined by the educational attainment of the household head. Their analysis shows that private transfers are very important for children from wealthier families, whereas children from less well-off families rely more on public transfers, mainly state-run education. In contrast, consumption by elders, regardless of their socioeconomic level, is heavily financed by public transfers, mainly social security and health care.

The implications are clear: large amounts of public resources are transferred to the elderly every year, severely constraining transfers to children, especially to poor children. Why have the intergenerational transfers in Brazil evolved in this way? Turra and Queiroz (2005) speculate that this is the result of the unequal political power held by the elderly and the wealthy. On the one hand, high-status adults, who decide how to spend most of the public resources, regard spending them on children as a waste. This is true not only because the wealthy do not benefit themselves from large transfers to young age groups, but also because their own children depend largely on private transfers and thus do not need enhanced public transfers to become successful adults. On the other hand, while low-status adults benefit from sharing the same social insurance programs with high-status adults (albeit receiving lower payments), low-status children are too young to have a voice in the political arena. In addition, since low-status children do not share the consumption of public resources with higher-status children, they are less likely to be of concern to wealthy adults and thus more likely to remain in poverty.

There is still a lot to be learned from examining socioeconomic status along with age in studies of intergenerational transfers in Brazil. As Rios-Neto (2005) and Turra and Queiroz (2005) have noted, one cannot reach definitive conclusions about the allocation of resources across ages and socioeconomic groups without making use of historical estimates and accounting for social mobility during the lifecycle.

DISCUSSION

Our findings indicate that intergenerational transfers, both private and public, are the main source of consumption for children and the elderly in Brazil. Private (intra-household) transfers fund most of the consumption by children and young people, whereas public transfers (pensions and health care) fund the consumption needs of the elderly.

We have stressed two main idiosyncrasies of intergenerational transfers in Brazil. The first is that per capita public transfers to the elderly are much larger than those to children, and those transfers finance consumption by the elderly of all socioeconomic levels. This pattern has no parallel in other NTA economies. The second is that, within age groups, private and public transfers are unevenly distributed across socioeconomic levels.

The macroeconomic aspects of Brazil's private and public intergenerational transfers need further study. Analyses of historical and longitudinal data should provide further insights into how intergenerational transfers in Brazil have evolved. It would also be useful to examine the relationship between intergenerational transfers and other measures of well-being, including poverty rates and income inequality. Revealing the historical pattern of these measures might help policy-makers to improve investments in children's human capital through better-designed intergenerational transfer programs. Determining to what extent the socioeconomic inequality within and between age groups explains the unequal distribution of public resources could also help guide public policies. Given the country's rapidly aging population, it seems evident that the currently high concentration of expenditures on the elderly is not sustainable.

Finally, the broad picture of intergenerational transfers in Brazil raises questions about how those transfers affect individuals' behavior. How, for example, do the large transfers to the elderly through the public pension system affect individuals' savings behavior during their earning years, and what is the effect on the labor supply? The current system of public transfers reinforces elders' dependence on the public sector to finance their consumption needs, thus hampering economic growth, increasing the tax burden on younger cohorts, and jeopardizing the sustainability of the pension program for future generations.

ACKNOWLEDGMENTS

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NOTES

1. We measured socioeconomic status (SES) according to the educational level of the household head: lowest SES = illiterate; middle SES = primary completed; highest SES = at least secondary completed.
2. Brazil's welfare state developed and matured under what has traditionally been considered to be a populist model of development and political administration.

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22. The changing patterns of China's public services

Ling Li, Qiulin Chen, and Yu Jiang

Market-oriented reform in China since the early 1980s has led to dramatic economic growth but also to significant reductions in public services. Since the beginning of this century, public service reform – aimed at building a 'harmonious society' through a more balanced distribution of wealth and improvements in education, health care, and social security – has become a government priority. Our results from the National Transfer Accounts, based on data for the period 1995–2002, provide a new perspective for understanding the transformations under way in China, the world's largest transitional economy.

Reform from a planned to a market economy began in 1978 and has led to a 'China economic miracle' (Lin et al. 1994). The real Gross Domestic Product growth rate has averaged 9.8% per year (NBS 2008b) during the last three decades. Some observers (e.g., Wang 2003, 2008; World Bank 2004) have argued that China's market reforms have gone too far. They cite, for example, the decentralization and deregulation of the public sector, fiscal decentralization to the local governments, the reduction in public services provided by the state, the privatization of most public service units, and the increased charging of fees for basic services that were previously free.

Some believe that these reforms have caused the collapse of the public sector and given rise to such social problems as income inequality, environmental degradation, and an inadequate social security system, thus exposing many households to macroeconomic fluctuations as they struggle to pay for such basic needs as health care and education.

In an effort to encourage a more balanced development, the Chinese government has made strengthening and restructuring the public service system a top priority and has put greater emphasis on public health and education. Using the NTA framework and survey data from 1995 to 2002, we found recent changes in lifecycle patterns between the public and private sectors. More resources are being allocated to the public sector.

DATA

We used nationally representative cross-sectional survey data – the China Household Income Project (CHIP) data for 1995 and 2002 – to construct age profiles for the private components of the NTA. CHIP1995 and CHIP2002 were conducted by the Chinese Academy for Social Sciences in rural and urban areas. The sampled households were representative subsamples from official household surveys conducted by the National Bureau of Statistics (Li et al. 2008), which collected data on general household and individual characteristics, individual income, household saving and assets, and household expenditures. We constructed public-sector age profiles using administrative data and specialized surveys.

To generate the age profile of health expenditures, we used the National Health Service Survey (NHSS) data for 1998 and 2003. NHSS1998 and NHSS2003 were administered by the Center for Health Statistics and Information of the Ministry of Health and covered representative households across all 31 provinces (except Tibet and Taiwan, data for which were not available). The surveys used a multistage stratified random sampling strategy (CHSI 2004; Wagstaff et al. 2009). We relied on enrollment and expenditure data from 1995 to 2002 to construct public education profiles (MOE DDP 1996, 2003).

All estimates were adjusted to conform to National Income and Product Account estimates (NBS 1996, 2003). To analyze the data we used the standard NTA methodology (Lee et al. 2008; Mason et al. 2009).

THE CHINA CONTEXT

Public Services

Before the market-oriented reforms began in the 1980s, China's public sector, whether measured by revenues or by expenditure, accounted for 31% of GDP. Gross government expenditure has grown much more slowly than GDP since 1978. Its share of GDP decreased from 31% in 1978 to only 10% in 1995 before recovering to 15% in 2002. Moreover, a large proportion of government expenditure has been on economic investment rather than on public services and income redistribution. Spending on health, education, and social development as a percentage of total government expenditure has not increased significantly since 1995, remaining between 27% and 28% (Table 22.1). Public services, such as health care and education, tend to have rising costs that translate into increased user fees, which impose a heavy burden on families.

Table 22.1 Government revenues and expenditures: China, selected years, 1978–2008

Year	GDP (100 million yuan)	Gross expenditure (100 million yuan)	Expenditure on government adminis-tration (%)	Expenditure on economic construction (%)	Expenditure on culture, education, and social development combined[a] (%)	Including: Expenditure on health care (%)	Including: Expenditure on education (%)
1978	3,645	1,122	4.7	64.1	13.1	3.2	6.7
1980	4,546	1,229	6.2	58.2	16.2	4.2	9.3
1985	9,016	2,004	8.5	56.3	20.4	5.4	11.3
1990	18,668	3,084	13.4	44.4	23.9	6.1	15.0
1995	60,794	6,824	14.6	41.9	25.7	5.7	17.5
2000	99,215	15,886	17.4	36.2	27.6	4.5	13.7
2005	183,217	33,930	19.2	27.5	26.4	4.6	13.3
2008	300,670	62,592	[b]	[b]	[b]	4.4	14.3

Notes:

[a] Includes health care.

[b] Data for 2008 unavailable because of changes in the statistical system.

Sources: NBS (2008a, 2009).

The trend is changing, however. Gross government expenditure has been increasing with the share of GDP, rising from 16% in 2000 to 21% in 2008. Government expenditures on education, health care, and pensions were 71.22 million Yuan, 19.90 million Yuan, and 54.47 million Yuan in 2008, accounting for 14.3%, 4.36%, and 10.9% respectively of total public expenditures.

Pensions, Health Care, and Education

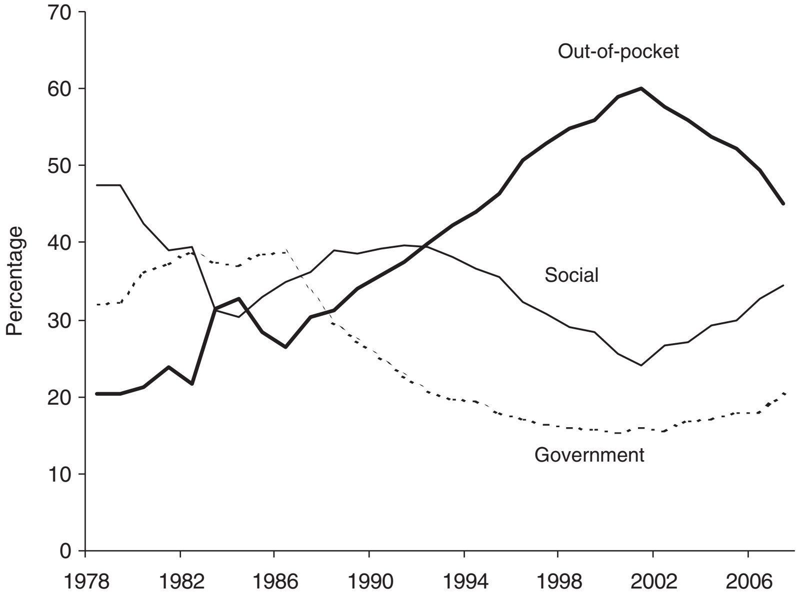
China has a public pension program for employees of urban enterprises that is funded by both the employers and employees. In 2009 China committed to building a universal public pension system in rural areas, funded by individual premiums and government subsidies.

Improvements in health status have slowed since 1978, although total health expenditure has increased nearly 90 times over the last three decades – much faster than GDP growth – and accounts for 5% of GDP now. China made public health insurance available to urban employees in 1998, to rural citizens in 2003, and to urban citizens in 2007. By the end of 2008 the three programs covered 200.5 million employees and retirees, 116.5 million urban unemployed citizens and students, and 814 million farmers (who represent 91.5% of the rural population).

The Chinese education system consists of nine years of compulsory education followed by optional education at the upper secondary and tertiary levels. The enrollment rates for elementary school and junior high school are 99% and 95% respectively. Compulsory education is provided mainly by state-run schools, government subsidies covering most of the cost. In 2001 the Chinese government promised to eliminate tuition and book fees, and to subsidize living costs for the poorest students by 2007 and for all students in compulsory education by 2010. College tuition has risen 25 to 50 times since 1989 and is one of the largest burdens on households.

Changes in Government Incentives for Public Services

The shortage of rural public goods has been a longstanding problem in China. Mountfield and Wong (2005) report that in most countries, especially developed countries, the central and provincial governments bear major responsibility for financing or delivering such basic public goods. In China, local governments play an essential role in providing such social services as education, health care, social security, and housing. Especially since the 1980s, China's subnational governments together have financed over 90% of public spending on education and over 95%



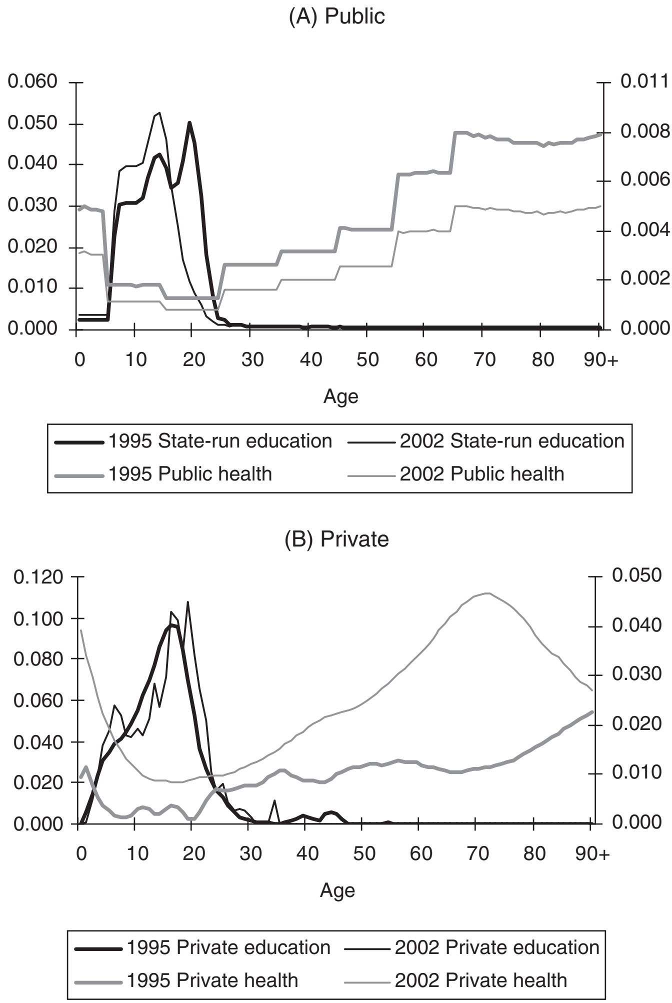
Source: MOH (2008, table 5.1).

Figure 22.1 Composition of health care expenditures: China, selected years, 1978–2006

of public spending on health care. The local governments, which have less tax income than the central government, either pass the burden on to farmers or fail to supply enough public services. As a result, such public services as health care and education have had rising user fees (Lanjouw et al. 2004).

Consequently, between 1995 and 2002 public expenditures on health decreased while private expenditures rose. This was part of a trend that began in the late 1980s, when responsibility for paying for public services started to shift from the government to individuals. Since 1986, government expenditures on health programs have risen at a much slower pace than have gross government expenditures and GDP. From 1990 to 2001 the GDP increased 5.87 times and government expenditures increased 6.13 times, while government expenditures on health programs rose only 4.27 times (see Table 22.1). The proportion of out-of-pocket expenditures increased very quickly accordingly, from a fifth of the total health care expenditure in 1980 to three fifths in the early 2000s (Figure 22.1).

The age profiles of health expenditures reflect the decrease in government



Note: All age profiles are normalized on the average labor income for ages 30–49.

Figure 22.2 Age profiles of public and private health and education expenditures: China, 1995 and 2002

expenditures and the increase in out-of-pocket expenditures on health care during the 1995–2002 period (Figure 22.2). Figure 22.2 also shows how public and private education consumption changed from 1995 to 2002. The relative scales of public and private education remained almost stable from 1995 to 2002, while the peaks moved. The peak for public education expenditures moved to the younger ages, whereas the peak for private education expenditures moved to the older ages. This result is consistent with China's education policy adjustment. Since the 1990s the Chinese government has subsidized primary education to a greater degree than advanced education. Public universities also began to charge tuition in the mid-1990s. In the late 1990s China promulgated National Guidelines for the Reform and Development of Education, a national plan for education development intended to strengthen the government's support to primary education.

Realizing that economic development was not sustainable without social development, during the first decade of this century the Chinese government decided to construct a 'harmonious society' that would shift the focus of development from economic growth to a broader vision of sustainable human development. One feature of this transition has been the rapid increase of government expenditures on the public sector, which will influence the National Transfer Accounts and the lifecycle deficit.

HUMAN CAPITAL INVESTMENT IN COMPARATIVE PERSPECTIVE

In most countries fertility decline is accompanied by an increase in human capital investment. The investment is important because low fertility leads to a decline in the number of workers relative to the number of elderly. If human capital investment is sufficient, small cohorts of well-educated workers may be more productive than large cohorts of poorly educated ones (Lee and Mason 2009). This is particularly salient in China, where fertility decline and, as a consequence, population aging have been so rapid.

Unfortunately, human capital investment in China has lagged behind that of other countries with low fertility (Figure 22.3). We measured human capital investment using synthetic cohort estimates for 1995 and 2002 by summing per capita public and private spending on health (ages 0–17) and education (ages 0–26). The values are normalized on the average labor income of persons aged 30–49, thereby controlling for income differences across countries. In China, 'lifetime' spending on human capital per child was equal to 2.0 times the average labor income of a person in the 30–49 age group in 1995 and 2.2 times that person's average labor income in 2002. *Public* spending on human capital was only 0.67 in 1995, and even lower, 0.59, in 2002. Human capital spending in other low-fertility countries, those with a total fertility rate below the replacement level of 2.1 births per woman, was twice as much as in China, and public spending was more than five times that in China. Public human capital spending in China is at about the same level as in Kenya.

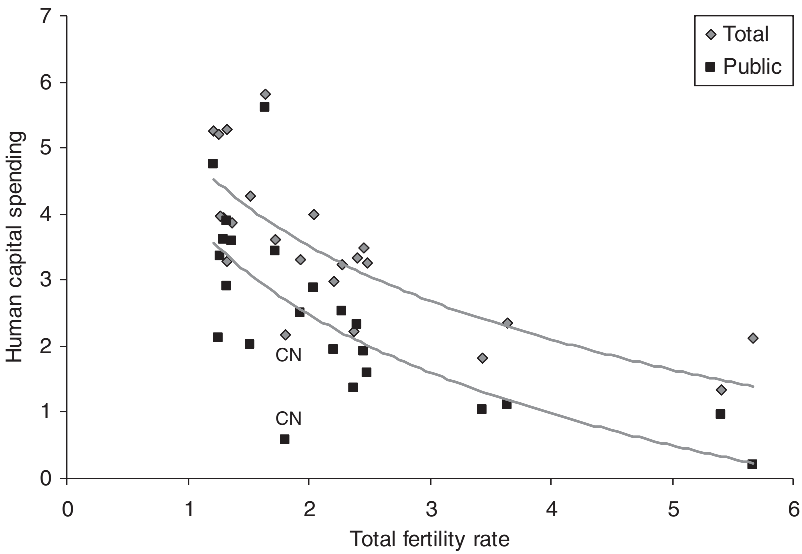


Figure 22.3 Human capital spending and fertility in NTA economies: synthetic cohort estimates for 1995 and 2002

Private human capital spending in China is about 75% higher than the average for other low-fertility societies. China's level of private spending is similar to Japan's but is much lower than that of Taiwan or South Korea. Private spending does not begin to make up for low public spending on human capital.

Our composite measure of human capital spending conceals important details that are much clearer in the age profiles of per capita health and education spending (Figures 22.4 and 22.5). Between 1995 and 2002 there was virtually no change in the age profile of education spending. Per capita health spending increased quite substantially during that period, however. In absolute terms the biggest winners were people in their 60s and 70s. In percentage terms, children were also big winners. As impressive as these health improvements were, they still left China among a group of countries spending relatively little on health and education.

THE RURAL–URBAN GAP IN PUBLIC SERVICES

China can be divided into two different worlds: urban and rural. People living in urban areas have income growth rates, public services, and life-styles sharply contrasting with those living in rural areas. The urban–rural

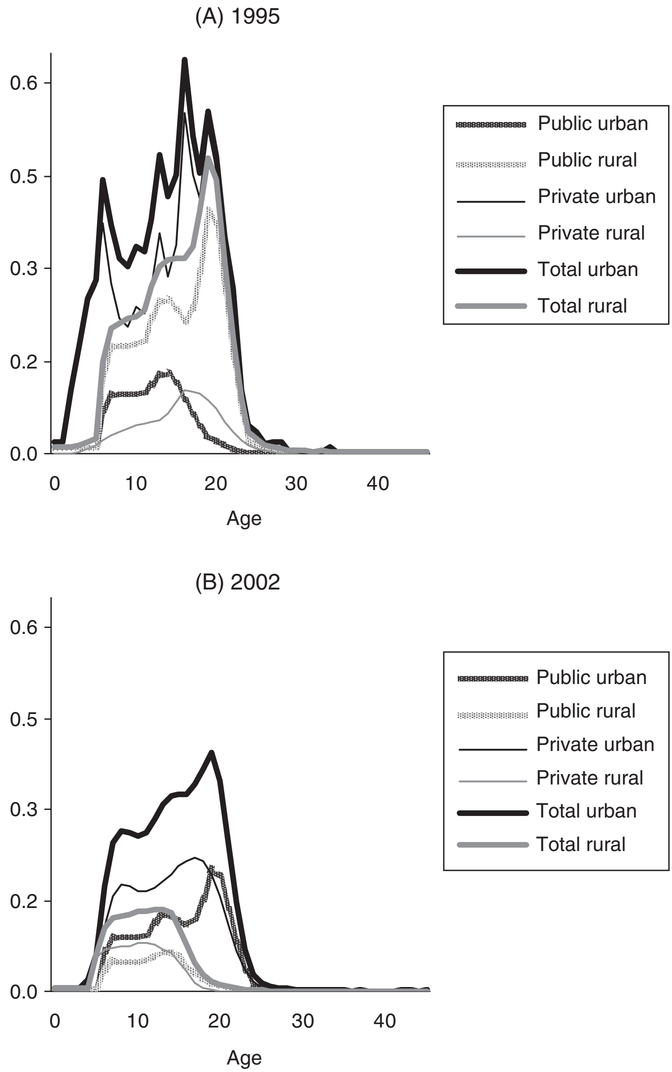


Figure 22.4 Age profiles of public and private education expenditures in urban and rural areas: China, 1995 and 2002

gap is a common feature of most developing countries, but in China the gap is especially striking because some public policies since the 1990s have widened the differences rather than narrowed them. For example, over-emphasis on economic growth led to an increasing urban–rural gap in

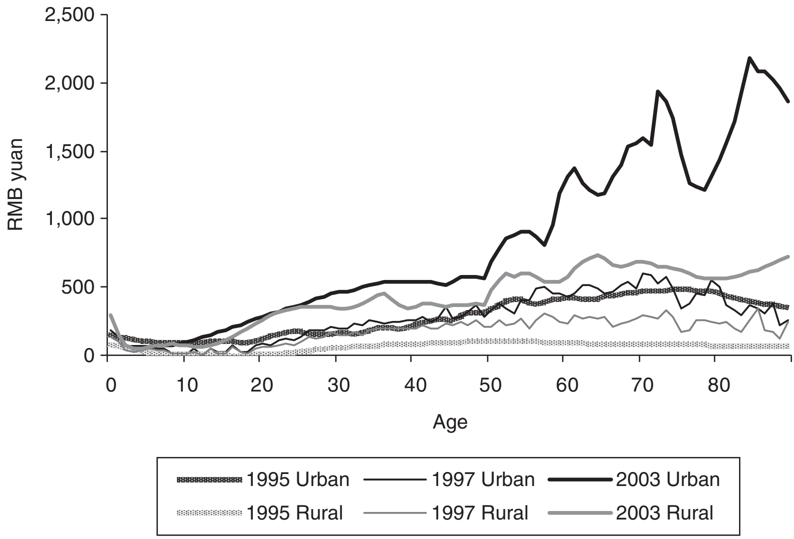


Figure 22.5 Age profiles of health expenditures in urban and rural areas: China, 1995, 1997, and 2002

public services, as evidenced by the age profiles of expenditure on health care and education in China's National Transfer Accounts (see Figures 22.3 and 22.4).

Health Care

In 1995 private health care expenditures per capita in urban areas were 125.4 yuan, 2.4 times those in rural areas. The ratio decreased to 1.6 in 1997 but returned to 1.9 in 2002 (authors' calculations). Reinhardt (2003) has pointed out that health care expenditures on the elderly are normally three to five times the average. In rural China, however, the shape of the health-expenditure curve slopes downward, rather than upward, after about age 50 (Figure 22.5). This was especially the case in 1995 and 1997. The anomaly can be attributed to shortages in health care insurance and pensions among rural Chinese. In the 1990s China's public health insurance and pension system covered only urban employees. In 2003, 79% of rural residents (as compared with 45% of the urban population) had no health insurance.

It seems plausible that families' economic constraints have the greatest effect on those who most need health care – the very young and the old – because households tend to allocate scarce resources to members of working ages when they become ill. To test this hypothesis, we estimated the income elasticity of health care consumption by the economically active age group (those 25–50 years old in any given household) and the health care consumption of the old (those 50+ years old). The income elasticity of health care consumption of the economically active was 0.35, whereas that of the elderly was 0.25. This result supports the hypothesis that Chinese households favor the economically active age groups in allocating health resources.

The rural–urban gap in health care was smaller among the youngest age groups than among the elderly. One reason is that young children have less health coverage in both urban and the rural areas because even for urban employees covered by health insurance, their families are not covered.

Education

The gap in education expenditures between the urban and rural areas is also large, and it grew during the period from 1995 to 2002 (Figure 22.4). Educational facilities in rural areas lag behind those of urban areas, their campuses are tattered, and teachers are scarce – deficiences that cannot satisfy rural students' demand for even compulsory education, not to mention more advanced education. Especially striking is the contrast between urban and rural areas in *public* spending on education. According to the National Bureau of Statistics (NBS 2009), rural residents' education level averages 7.6 years and only 75% of rural residents have attended primary and junior high school. Seventy percent of urban children enter high school, but fewer than 10% of rural children do. Among high school graduates, urban students are three to four times more likely than rural students to enter college.

SUMMARY

During three decades of market-oriented reforms and remarkable economic growth, the Chinese government neglected to supply public services to its citizens. Recently, however, it has begun to shift its focus from economic development to the improvement of public services. The NTA offers a new perspective for evaluating the performance of the transition, particularly in the areas of health care and education, and for observing the responses to it by individuals. In the future China is expected to invest more in health, education, pensions, and other public services. Future NTA research should examine these changes and their effects.

ACKNOWLEDGMENTS

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23. Intergenerational redistribution in Sweden's public and private sectors

Daniel Hallberg, Thomas Lindh, Gustav Öberg, and Charlotte Thulstrup

Intergenerational redistribution in Sweden is mediated through the public sector to an unusually large extent. The universal character of the benefit systems, health care, and education results in a tax rate of around 50–60% of Gross Domestic Product per capita, making many economists (in Sweden as well as elsewhere) wonder how the economy can work under such a heavy tax burden (Thakur et al. 2003). Part of the answer is probably that virtually every individual gets a lot back in public transfers, both in-kind and cash (see, for example, Pettersson et al. 2006). Another part may be that most public cash transfers are taxed. This taxation alleviates some otherwise troublesome marginal income effects but also effectively double-counts some tax payments.

Using the NTA methodology, we correct the age profile of net income tax payment for the transfer taxation effects and compare the net profiles to the gross profiles. We find that the mean age of taxpayers of all kinds drops from 47 years (gross) to 45 years (net) and that the aggregate net taxes paid are 128 billion Swedish krona (SEK) lower than gross tax revenue – that is, about 13% lower. Public cash net transfer inflow, of course, drops by the same amount. Another consequence is that the ownership of public debt is shifted down to younger ages as the older population pays less tax when this circular flow is removed.

We begin by presenting the Swedish age patterns of private and public consumption. The sum of private and public consumption results in a rather smooth life consumption up to 70 years of age. In Sweden the public consumption transfers dominate consumption in dependent ages, for both the young and the old. For older people there is by international comparisons a dramatic increase in public expenditure due mostly to elderly care. The age profile for labor incomes in Sweden in 2003, the year used for our study, remained quite high at older working ages in comparison with many other continental European countries. Thus the lifecycle deficit has a relatively late crossover in Sweden at age 63. In the following section we give a brief overview of the Swedish tax and transfer system to prepare for the main section, in which we net out the transfer taxes and show the consequences for the inter-age resource flows.

AGE PROFILES OF INCOME AND CONSUMPTION

To set the stage for our main purpose we present here the income and consumption profiles according to NTA conventions. We first describe the data details and estimation procedures and then report and comment on the age profiles.

Private and Public Consumption

The estimated age profiles of private consumption are obtained from the Swedish expenditure data (henceforth referred to as HUT 2003), which are household-level expenditure data collected in a survey of 4000 randomly drawn individuals of ages 0–79 from the Total Population Register; thus the 80+ population is not covered. We assume the level of age 79 to hold for older persons as well. The sample person and the persons belonging to his or her household (defined as persons having their main meals together) constitute the survey unit. All household expenses were noted in writing by the sample person during a two-week period in 2003. In a later telephone interview questions were posed about less frequent or irregular expenditures. The data were then complemented by tax-register data on land leases, fees for unemployment insurance, and union membership.[1]

There are some difficulties in adapting the HUT data to the standard NTA classifications.[2] For Sweden we make a few exemptions to the general NTA rules. First, we include pre-school fees and tutoring expenditures in private education consumption, which may not be standard in other countries. An important component of childcare in Sweden is education, not least social learning. Most personnel at daycare centers have tertiary pedagogical education; that is, they are pre-school teachers. Second, durable consumption is ideally supposed to represent the flow of services from consumer durables. In our analysis we make the simplifying assumption that private durable consumption equals the full current net investments in durables. Third, in Sweden the public sector heavily or totally subsidizes some consumption of goods or services, especially in the health and education sectors. The part that is subsidized should be considered as public consumption, but we cannot estimate the subsidy from the expenditure data.

HUT data, like most household surveys, report total household private consumption (expenditure) but not the individual counterpart. We therefore estimated the per capita age profile of consumption using the age distribution of the household members and the framework of the NTA project.[3] Public consumption is classified into three broad categories: *education*, consisting of childcare and schooling; *health*, comprising health care, elderly care, and assistance or aid to the handicapped; and *other* public consumption, comprising general public administration, defense, police and the administration of justice, trade and industry affairs, environmental protection affairs, supply of housing affairs and social progress, recreational activities, and culture and religion. For all but the last category, we allocated public consumption to specific age groups. The age profiles have been estimated from diverse public data sources and adjusted to fit to national levels.

Private education consumption is due almost entirely to childcare fees, including fees for after-school recreation centers for junior school children. The amounts are very low on average. Private health consumption is more substantial, mainly because of dental care and medicine.[4]

The age profiles for private other consumption and to some extent private housing and capital consumption show the familiar two-hump pattern over the lifecycle, the downturn in individual consumption in midlife of course being due to intra-household transfers to children. Other consumption and housing consumption totally dominate the private consumption pattern.

According to our estimates, however, durables also represent a substantial part of private consumption for Swedes. Initially in adult life a high share of income will be spent on durables, indicating that families with children allocate some extra resources to meet the demands of family members. Some of these resources are invested in such durables as cars, washing machines, and furniture, investments that we know take place between the 30s and the 50s. Later, somewhere around age 65, the age pattern of private consumption drops because other consumption and the consumption of durables diminish.

In childhood and in old age, individuals consume relatively high levels of public resources. In youth, public consumption is mainly in the form of childcare and education, whereas in old age it is elderly assistance and health care. Note that only a few people reach the high ages at which public health consumption per capita becomes very costly (reaching levels close to half a million SEK), so that the aggregate expenditure for this component is much less dramatic. Instead, aggregate public education consumption is actually more salient because young cohorts are larger.

There are some gaps in the (unsmoothed) age profile for public education consumption. These arise from institutional facts; for example, childcare services for many children end or are substantially diminished around age 5. When children turn 6, they begin a compulsory year of preschool. School resources per child fall from about 130 000 SEK to about 100 000 SEK from age 7 to age 15, which is when compulsory schooling ends. In upper secondary school (between ages 16 and 19) public consumption again rises. We assume that the cost per pupil at a given school is constant, which is not really true. Compulsory schools are integrated units with rather large fixed costs. When those costs are shared among all relevant age groups, our per capita measure will be sensitive to fluctuations in cohort size.

Adding total public consumption to total private consumption shows, interestingly, that the total per capita consumption profile looks rather constant for age groups below 75 (at about 180 000 SEK, or US$24 000 per year).[5] This supports theories stating that individuals prefer to smooth consumption over their lives and also will adapt to publicly provided consumption possibilities by adjusting their private consumption. The Swedish age profile hints that these views hold only until you happen to outlive your expected length of life.

Lifecycle Deficits

By deducting labor income from the consumption profile, we obtain the lifecycle deficit. Per capita measures are shown in Figure 23.1, and in Figure 23.2 they can be compared with measures weighted by population size, all of them adjusted to aggregate control totals in the National Accounts and normalized by the average labor income of age group 30–49.

These figures show a positive deficit during childhood and young adulthood (before age 25) and old age (63+). In the comparatively long middle period (ages 25–63) there is a negative deficit. The Swedish demographic structure, reflected in the aggregate, is favorable in 2003 with regard to labor incomes because the 1940s baby-boom cohorts are concentrated in their high-earning years from 50 to retirement. The large cohorts born in the 1960s also contribute to high earnings in the 30–40 age groups. In this respect Sweden has for a time been fortunate, and that has also been reflected in consistently high budget surpluses.

Net Private and Public Transfers

In Sweden, as elsewhere, the lifecycle deficit must be supported by transfers, either private or public. Sweden, however, stands out in two ways: public transfers are much greater than private transfers, and private

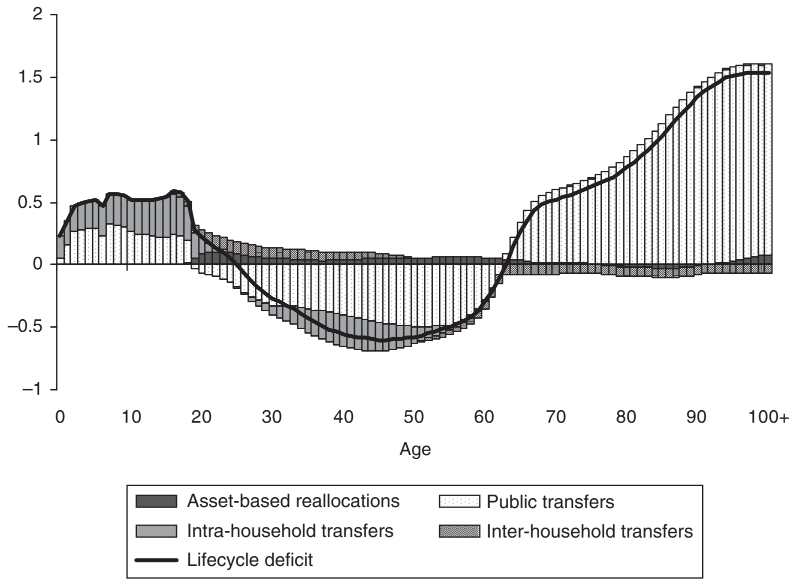


Figure 23.1 Per capita net transfers and lifecycle deficit, normalized to labor income of the age group 30–49: Sweden, 2003

transfers take place mostly within the nuclear family and much less via inter-household transfers or asset-based reallocation.

Apart from the lifecycle deficit, in Figure 23.1 we also compare the per capita net transfers made within households, between households, through the public sector, and through the market as asset-based transfers by age group (all normalized by the average labor income of the 30–49 age group). Figure 23.2 depicts the aggregate population-weighted age profiles of the same net transfers.

These data suggest that deficits are financed by a combination of private intra-household transfers and public transfers. Whereas for young dependents intra-household transfers and public transfers are about equal on a per capita basis, public transfers finance almost all of the lifecycle deficits for older dependents. For children with no income of their own the intra-household transfers must cover not only private consumption but also public transfers out (i.e., indirect taxes). The net private intra-household transfers increase by age until around the early teens, when they are about one third of the income of the 30–49 age group. At around age 26 they turn negative, on average being given rather than received; and around age 43 we detect the largest net outflow, of about one quarter of the average labor income.

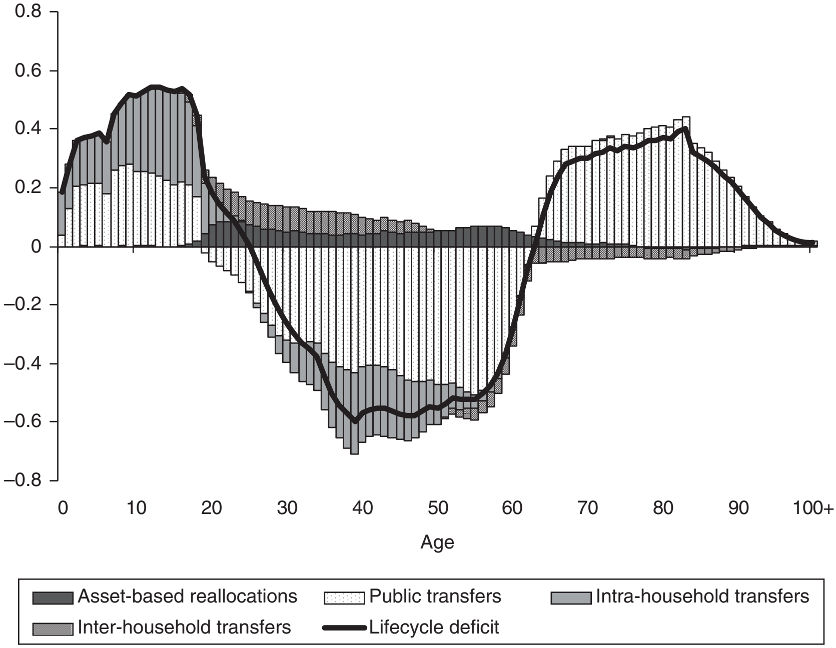


Figure 23.2 Aggregate net transfers and lifecycle deficit, population weighted and normalized to labor income of the age group 30–49: Sweden, 2003

Multigenerational households are rare in Sweden as compared with, say, Mediterranean countries. One would therefore expect that the sharing of resources across more than two generations should show up as inter-household rather than intra-household transfers. Our estimate of inter-household net transfers is positive before age 50 and turns negative afterward, suggesting a downward, although small, shift of resources, with an inflow of, at most, 10% of the 30–49 age group's average labor income in ages around 24 and an outflow of, at most, 7% of the 30–49 age group's labor income after retirement ages. The representative retiree will leave his wealth as a downward transfer through *inter vivo* gifts or bequests, of which some may also be captured by asset-based reallocations.

Net asset-based reallocations are also small in relation to public and intra-household transfers. But over the life course there seems to be a concentration of positive net transfers in the working ages up to age 70 and negative net transfers after that until age 90.

According to the NTA methodology, only heads of households can own assets. Thus these flows are restricted to ages 16 and older. The aggregate macrocontrol for the net asset-based reallocation is, however, substantial (+100 billion SEK), suggesting that assets generate a positive net for most parts of the life course but, as is evident from Figure 23.2, with little redistribution across ages.

Data on bequest flows that we currently lack would, needless to say, help us to understand more. Yet it is obvious that in any case the major part of intergenerational transfers in Sweden goes through the public sector. Particularly at older ages the public sector enables very high consumption of care services.

INSTITUTIONAL BACKGROUND

The Swedish welfare state is based upon an extensive redistribution of resources across age cohorts, not only in the form of public consumption but also in direct transfers. Social policy is deliberately designed to promote dual-earner families rather than breadwinner households. Most transfer systems are tied to the individual's labor force participation and provide extensive income insurance to most of the population. A major part of public consumption and tax collection is organized through local municipalities, which provide education at primary and secondary levels as well as comprehensive public childcare facilities and elder care. The health care system is organized at the regional county level.

Social Insurance

The social insurance systems are administered by the Swedish Social Insurance Agency. The state provides parental income insurance both at childbirth[6] and in the event of children falling ill. Illness insurance is compulsory, and coverage is provided by the employer for the first two weeks and only thereafter by public transfers. Unemployment insurance is provided through a number of unemployment funds, most of which are connected with the trade unions but are financed mainly through the government, fees accounting for only some 5% of benefits. Health care at nominal fees (with a low annual cap) is available to all. Privately provided health care is financed mostly by the government on the same terms, except for dental care for adults.

Schools, public and private, including tertiary education, are free. Admission to tertiary education institutions is rationed, however. The government also finances private schools. Daycare for small children is provided with heavily subsidized and, in general, means-tested fees. All parents receive child allowances of approximately 12 000 SEK (US$1600) per child per year until the children are 16. Provided the children go to upper secondary school (and more than 90% do), these allowances are extended as a study allowance until children reach age 19. A study loan system with a large subsidy is available to all students. Almost one half of a birth cohort enrolls in tertiary education.

Tax System

All labor income earners pay most or all of their income taxes to the municipality and county. Municipality and county taxes vary within a few percentage points around 30% as a flat rate on labor income. On top of this tax, income earners above an indexed ceiling pay another 20–25% as state tax. The ceiling in 2003 corresponded to about 300 000 SEK, or about US$40 000 in annual income.

In addition to this directly visible income tax system, there are substantial payroll taxes and social insurance fees as well as occupational insurance systems, so that actual wage costs tend to be 45–55% higher than nominal gross wages. Capital income, on the other hand, is taxed at a flat rate of 30%, against which interest payments and capital losses are deductible. Substantial value-added taxes on consumption at 6%, 12%, or 25%, depending on the type of consumption, and some other indirect taxes provide another layer to the tax system.

AGE PROFILES OF TAXES AND TRANSFERS

The taxation of many public transfers, including pensions, illness allowances, and unemployment benefits creates a significant within-year feedback – that is, a circular flow through the tax and transfer system that tends to inflate the gross intergenerational flows between individuals. For example, an official government report on a longitudinal survey (Pettersson and Pettersson 2003) has calculated that the annual feedback over an individual's lifetime amounts to 45% of his redistributed resources.

The micro-data used here are from the Longitudinal INdividual DAta set (LINDA), a large microdata set drawn from income registers and population censuses. It consists of a statistically representative panel of individuals, about 300 000 annually (approximately 3% of the population), sampled from 1968 to 2007 and is annually updated. The data base also contains information on all family members of a sampled individual, as long as they remain in the household.[7]

Sweden also has important *semi-public* taxable transfers arising from collective agreements between unions and employers' associations, which include occupational pensions paid out at old age and also give extra income coverage in case of unemployment, parental leave, or illness. These semi-public transfers are especially vital to high-income earners in those income segments in which the public system does not replace incomes. Their importance in the case of early retirement is indicated by the fact that, at age 63, these transfers on average amount to 40 000 SEK per capita, whereas public transfers average 67 000 SEK per capita for the same age group.

These types of semi-public transfers could be considered to be public transfers, as almost everyone is covered by them and the individual employee has no possibility of opting out. That is the assumption we make for this analysis.

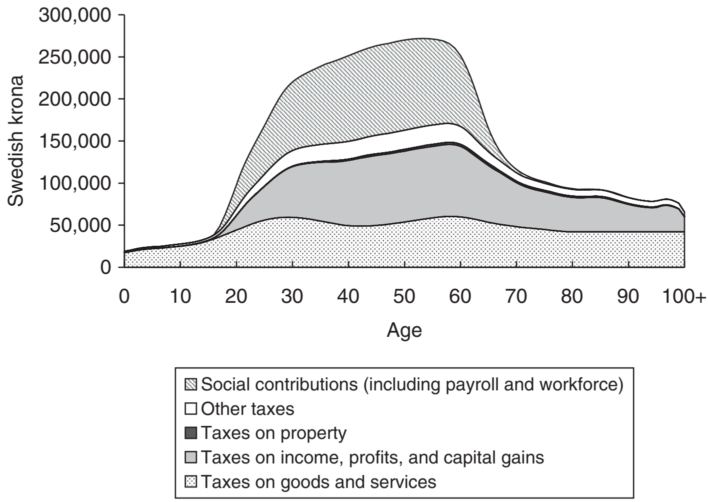
For the purpose of calculating the present tax rate, we include income tax, capital tax, and tax on real estate, net of deductions; social insurance contributions, including fees for occupational insurance systems; and indirect taxes on consumption. Following standard NTA methodology, we calculate such social insurance contributions as a constant proportion of labor earnings and adjust them proportionally to the appropriate aggregate control in the National Accounts.[8]

For 2003 we find that about 30% of the aggregate labor income is attributed to such social insurance contributions. The major part of this, 75%, is paid by employers on behalf of employees. Self-employment income is a minor part, 6.4%, of the value of goods and services produced. The social contributions made by self-employed (and non-employed) persons are proportionally less than for employed persons since coverage is more restricted and replacement rates are usually much lower. For the self-employed, coverage is also to some extent voluntary.

Labor incomes, which are set to zero before age 15, increase from age 16 to age 50. Income associated with work then decreases dramatically at normal retirement age and is replaced by public cash transfers, mainly pensions but also a housing allowance for the older pensioners. Non-taxable transfers are a significant part of income only during early adulthood and then slowly decrease as children move out of the household; they increase somewhat again toward the end of life. As for taxes (Figure 23.3), the three major sources of revenue are consumption taxes on goods and services, income taxes, and the social contributions, each yielding roughly 400 billion SEK in total annual revenue.

Net Tax and Transfer Profiles

To calculate the net tax rate we must decompose total tax payments (or, using the NTA terminology, public transfer outflow) into the part that



Note: Taxes on property are negligible in Sweden and therefore barely visible in this figure.

Figure 23.3 Age profile of taxes: Sweden, 2003

flows to the individual (public cash-transfer inflow) and the part that consists of other income. It is the sum of all annual income that determines the final income tax rate that an individual has to pay during one year. This poses a methodological difficulty since the tax component of the public cash-transfer inflow depends on the amount of other income. The method used to decompose income taxes here is deliberately simple and chosen more to initiate a discussion than to provide a conclusive solution. We employ an *average method*, estimating the tax on public cash-transfer inflow by first computing the taxable public cash-transfer inflow share of total income. Then we apply this share to total income taxes to estimate the part of income tax that is due to the inflow of public cash transfers. Hence, this method ignores marginal tax effects from the receipt of taxable transfers. Our tax rate measure, however, includes both consumption tax and social insurance contributions.

Separating out the inflow of taxable and non-taxable public cash transfers, and the outflow of public transfers (taxes), with and without the 'feedback', results in an age profile of net tax contributions that is more concentrated in the working ages than is the observed gross tax age profile. After retirement age, taxes on public cash-transfer inflows become a substantial part of gross taxes.

This can be seen in the gross and net tax rate measures, depicted in

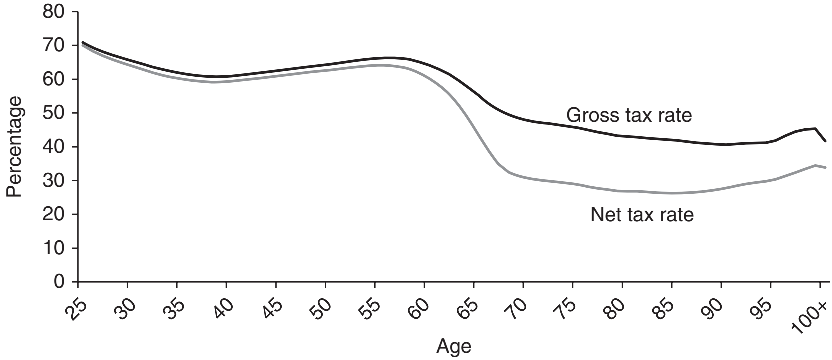


Figure 23.4 Average gross and net tax rates per capita: Sweden, 2003

Figure 23.4. The main result is that, in age groups 65 and older, where a substantial share of total income is public cash-transfer inflows, the net tax rates are substantially smaller than the gross tax rates. For instance, for individuals aged 80 the gross tax rate is about 43% while the net tax rate is only around 27%. This low number is a result of the fact that only small shares of their net income are taxed when the circular flow is removed. We take into account both taxes on consumption and the added effects of social insurance contributions and payroll taxes that are paid by the employer. These are hardly visible to the average person.

When using net tax rates instead of gross ones, we find, on an aggregate level, that the mean age of taxpayers drops from 47 to 45. The mean age of receiving taxable public cash transfers remains at about 59 in both cases. In the aggregate the taxes paid are reduced by 185 billion SEK, or 13%. Public cash transfers received drop by the same amount. The implications are twofold. First, the redistribution over age through the public sector is greatly overstated by this circular flow. Second, the net redistribution is made over a wider age span than one finds using gross public transfers.

The taxation of public benefits may serve a redistributional purpose within an age group. If we were to actually implement net taxes and net cash, this might of course have repercussions for such intentions.

CONCLUDING REMARKS

As we can see from looking at the whole age structure, total per capita consumption, both private and public, is rather flat in Sweden until around age 75. Our data suggest that private spending on education, health, and elderly assistance is negligible. The average Swede counts on public consumption to complement private consumption of these services.

A deficit in net private intra-household transfers during dependency corresponds to an equal surplus at other ages in the cross-section. Over the whole population these flows must balance (sometimes through exchanges with the rest of the world). One should keep in mind, however, that there is a mixture of both age and cohort effects in incomes as well as in consumption in our data. From the data and measurement methods we use here, an adult below retirement age pays a gross tax rate (which includes social insurance contributions and payroll taxes paid by the employer) of around 60%, whereas a retiree aged 80 pays around 43%. When we net out the circular flow of taxed transfers, the 80-year-old has a net tax rate of only about 27% on average. The net tax in our sense is thus paid by a younger population than implied by the gross tax and also substantially shifts the ownership of public debt toward younger ages.

We have not considered here another source of double counting. The dominant part of public consumption is labor cost, which is of course also taxed. This is the case in other countries, too. Since public employment is a higher share of total employment in Sweden than in most countries, this difference may nevertheless affect comparisons.

It would be interesting to perform additional such analyses using the NTA methodology and actually compute the net tax rates over the life-cycle of a cohort, but that would require substantially more data, as large changes in the tax and transfer systems have taken place over time.

ACKNOWLEDGMENT

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NOTES

1. The sample non-response rate was 42%, which is quite high. Sample weights compensating for non-response and calculated by Statistics Sweden were therefore used.
2. Insurance expenditures are included in the category of private other consumption. Indirect taxes were excluded from all private expenditure measures by removing them at the micro-level and also by adjusting total private consumption in the National Accounts to a macrocontrol net of these taxes.
3. For private education consumption and private health consumption we used the regression method to estimate age profiles. Private housing and capital consumption, private durable consumption, and private other consumption were estimated using an ad hoc allocation rule (equivalence scale).

4. More illustrations of the age profiles are available in Forsell et al. (2008).
5. We consistently use an exchange rate of 7.50 SEK to US$1 throughout this text.
6. Conditional on labor force participation and income eight months before delivery, the benefit received is 80% of income for 13 months after delivery (one month being reserved for each parent). Occupational agreements often add 10–20% to this benefit.
7. For more information about LINDA, see Edin and Fredriksson (2000).
8. Fringe benefits, or non-salary compensation, are equal here to social contributions.

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24. Public transfer flows between generations in Uruguay

Marisa Bucheli and Cecilia González

The main interest of this chapter is the age reallocations that occur through public transfers. Unsurprisingly, the overall picture indicates that taxpayers are concentrated in the working ages but the public inflows are disproportionately allocated to the youngest and the oldest members of the population. Thus net public transfers imply a reallocation from middle-aged people to children and to the elderly. The mean age allocations to the elderly are considerably greater than to children. The elderly, however, contribute to the support of younger generations through intra- and inter-household transfers.

Uruguay is one of the smallest (176 220 km^2) and least densely populated countries in Latin America, with a comparatively low population growth rate. In 2006 it had a population of about 3.3 million, 93.5% of whom lived in urban areas and 41% resided in the capital city of Montevideo. For a Latin American country, another distinguishing characteristic is its high proportion of elderly: 18% of the population is over 60 years old.

Compared with Latin American standards, Uruguay boasts a long tradition of publicly provided services and benefits. In 2006 social public expenditure amounted to 21% of GDP, and the performance of education, health, and social indicators ranked among the highest in Latin America (ECLAC 2008). Compulsory primary education was introduced in 1877 and full enforcement was achieved in the mid-twentieth century. Today the literacy rate is 97% for men and 98% for women. Health indicators are also better than those for the region. The infant mortality rate is 14 per thousand and life expectancy is 76 years. Coverage by the social security system has been extended since the first program was created at the end of the nineteenth century. Current legislation seeks to insure the whole labor force, but the informal sector is still quite large. In recent decades between 30% and 40% of workers did not contribute to the system. Nevertheless, 88% of people over age 65 receive a pension from the social security system.

The process of population aging has become a concern of policy-makers because of its impact on the social security system, which mainly benefits the elderly. Since 1999, spending on pensions has represented around 17% of GDP. In contrast, many indicators show some deterioration in the living standard of children. Thus recent debates and decisions about allocating social expenditures reflect tensions due to intergenerational differences in well-being.

This chapter presents estimations of the National Transfer Accounts (NTA) for Uruguay, focusing on public transfers in 2006. The methodology is explained in Mason et al. (2009) and on the NTA project website. In the next two sections we describe changes in Uruguay's demographic characteristics and the main elements of its system of taxes and benefits. Then we present the results and conclude by contrasting the patterns of deficit support for children and the elderly in Uruguay. The available data used to build the NTA estimations are presented in Bucheli et al. (2009).

DEMOGRAPHIC CHANGES

At the beginning of the twentieth century Uruguay already had low fertility and high life expectancy by Latin American standards. By 1990–95 its birth rate was 2.5 per thousand, compared with 3.0 per thousand for the region (Paredes and Varela 2005, p. 3). Life expectancy at birth was 73.0 years in Uruguay and 68.7 years in Latin America. Today it is 76 years in Uruguay.

Uruguay is now in an advanced stage of demographic transition. The total fertility rate declined from 2.8 to 2.04 births per woman between 1963 and 2006. Fertility behavior has been heterogeneous, however: women with low levels of education, labor force participation, and resources have higher fertility than other women (Varela 2007). This differentiated pattern helps to explain why the incidence of poverty is much greater among children than among the elderly. According to official estimations made in 2006 by the Instituto Nacional de Estadística (INE 2009), 8% of the population 64+ years old was poor, compared with 48% of children under age 13.

Since the 1970s large numbers of Uruguayans of working age have emigrated from the country. According to Cabella and Pellegrino (2005, p. 16), around 13% of Uruguayans live overseas. As a result of emigration combined with the low fertility and the long life expectancy of the resident population, Uruguay has a low population growth rate and one of the oldest populations in Latin America. According to the last two censuses, between 1996 and 2004 the population increased by only 2.2%, the lowest intercensal growth rate yet recorded. The age structure remained essentially unchanged over the period; people older than 60 years represented 18% of the population, whereas children younger than 14 accounted for 22%.

THE PUBLIC SYSTEM OF TAXES AND BENEFITS

In 2006, 76% of government revenues came from taxes, most of them not assigned to specific programs, and 24% came from contributions to the social security system. Most of the tax revenues were in the form of indirect taxes (53% of government revenues), in particular value-added taxes, or VAT (38%). Among the direct taxes (24%), taxation on labor earnings and pensions accounted for 6% of government revenues.

Contributions to the social security system are compulsory for both employees and the self-employed. There are two social security funds, the IVS (Invalidez, Vejez y Sobrevivencia) Fund and the DISSE (Dirección Nacional del Seguro Social por Enfermedad) Fund. The more important is the IVS Fund (representing 17% of government revenues), which covers the risks of retirement, death, unemployment, maternity, and disability, and manages a contributive family allowances program. The old-age, disability, and survivors pension is the major component of the program.

Until 1995 the IVS Fund was organized in a pay-as-you-go regime that financed both contributory and assistance programs. A long-run structural deficit, however, led to a reform in 1996 that introduced a mixed regime combining personal savings accounts and a social insurance pillar. As expected, the system is currently in a transitional stage in which the deficit has deepened because contributions to the savings accounts have reduced the contributions to the IVS Fund.

Evasion of the IVS program is a serious problem. For the past 20 years or so, 30–40% of the labor force has not contributed to the IVS Fund. The practice of awarding a contributory pension even to non-contributors has been quite extensive, however (Rius 2003). It has been possible because until 1996 the system did not register the labor history of workers. The retirement procedure required only the declaration of a witness that a worker was entitled to receive the benefit. It is believed that this lax rule led to widespread exaggeration of contribution years and underreporting of earnings. Camacho (1997) estimates that in the mid-1990s, 23% of the spending on contributory pensions was not supported by past contributions. Although the government created a register of workers' labor histories in 1996, 35% of the labor force did not contribute to the IVS Fund in 2006.

The social security system also manages assistance programs, but the assistance programs represent a low share of social security spending. The main programs are a means-tested pension program and a means-tested family allowance program.

The DISSE Fund pays insurance premiums for the private medical care of the labor force and low-income retirees. In 2006 this program covered 20% of the population. Additionally, the DISSE Fund pays sickness benefits to contributors.

Non-contributors may have access to health care in the private or public system. In 2006 around 25% of the population used the private system and 55% used the public system. The public system offers health care without charge to poor people. Traditionally, the vast majority of the population that receives health care in public institutions has not paid any premium.

As for Uruguay's education system, the public sector has traditionally been much larger than the private sector. In 2006 it accounted for 87% of students at the elementary level, 85% of those at the high school level, and 88% of university students. In a study of students' performance, ANEP (2005) suggests that a private system would provide better quality than the state system.

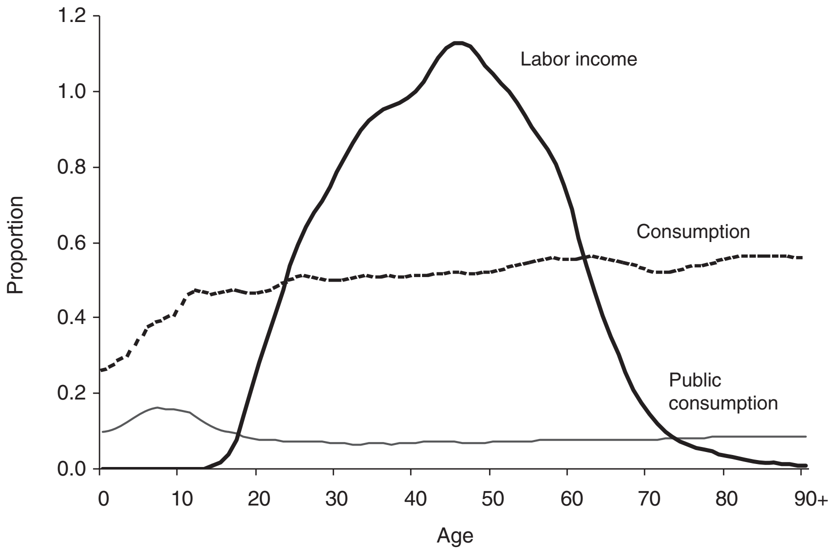
Elementary and junior high school education are compulsory. High rates of repetition and dropping-out among teenagers, however, have resulted in low coverage of tertiary education in Uruguay. Thus in 2006 the attendance rate was 98% for children of ages 7–13, 78% for teenagers of ages 14–17, and 40% for young people 18–22 years old; but only 20% of 18–22-year-olds were attending tertiary-level institutions.

RESULTS

In the figures that follow, we present age profiles in relation to the average labor income of ages 30–49.

The Overall Picture

Figure 24.1, which presents the profile of per capita labor income and consumption, shows the smoothed per capita value for each age. Labor income is zero before age 14 and increases with age up to age 45. Child labor is almost non-existent, and teenagers' participation rate is quite small for a developing country (16% in 2006). In fact, the legal minimum working age is 14 and special labor norms regulate work for young people between ages 14 and 17. After reaching a peak at age 45, labor income decreases slightly; and after age 60 the widespread incidence of retirement causes a sharp decline.



Note: In this and the subsequent figures, values are expressed in relation to mean labor income of the 30–49 age group.

Figure 24.1 Age profile of labor income and consumption: Uruguay, 2006

At all ages, private consumption is greater than public consumption. Figure 24.1 shows that consumption increases with age for people younger than 60. After age 60, consumption levels are similar among the elderly.

A 37-year span of lifecycle surplus occurs between ages 25 and 61. Table 24.1 shows the support of consumption by age group. (For each age group the figures are the average of the mean-age values.) Not surprisingly, the sources of support for the lifecycle deficit vary among age groups. Public and private transfers strongly support the consumption by children under age 15. For people over age 59, public transfers are positive and private transfers are negative. Moreover, part of their lifecycle deficit is supported by private asset-based reallocations.

Public Transfers

Figure 24.2, which charts total public inflows and outflows by age, shows two bumps for the inflows profile. The first corresponds to childhood ages, and its highest values are observed for children between ages 6 and 10. The second corresponds to the elder ages; their highest values are almost three times the highest values in childhood.

Table 24.1 National transfer flows in per capita values by age group: Uruguay, 2006 (Uruguayan pesos)

Item	Age group				
	0–14	15–29	30–44	45–59	60+
Lifecycle deficit	77,634	18,902	–92,049	–91,095	79,474
Consumption	77,723	99,520	104,371	109,654	112,514
Public	27,805	16,452	13,986	14,862	16,785
Private	49,918	83,068	90,385	94,793	95,730
Less: labor income	90	80,618	196,420	200,750	33,041
Age reallocations	77,634	18,902	–92,049	–91,095	79,474
Asset-based reallocations	–66	–16,633	–9,888	–1,086	41,455
Transfers	77,700	35,535	–82,161	–90,009	38,018
Public	20,269	–7,571	–30,134	–27,865	51,383
Private	57,430	43,105	–52,027	–62,143	–13,364

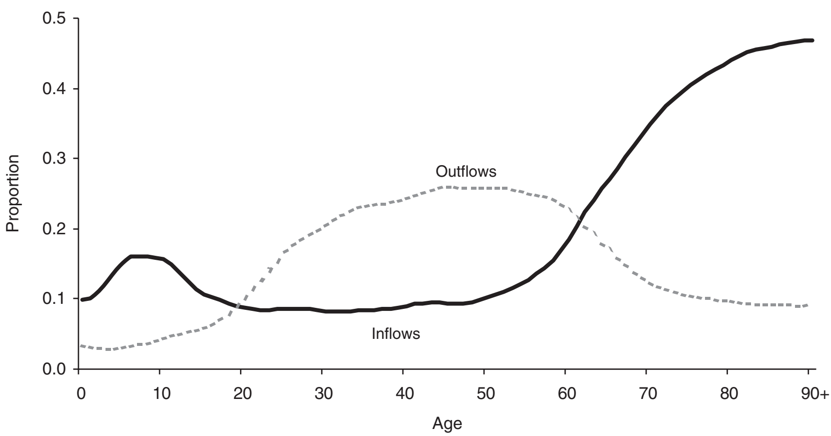


Figure 24.2 Age profile of public transfer inflows and outflows: Uruguay, 2006

The amount of inflows differs not only by age but also by composition. As shown in Table 24.2, for early ages the main component is education, which accounts for 46% of public transfers among the population under age 15. For the elderly, pensions are the major channel of transfer: they represent 76% of public transfers for people of aged 60 and older.

The age profile of public consumption can be seen more clearly in Figure 24.3, which shows that per capita public consumption increases

Table 24.2 Share of inflow public transfers in NTA aggregate totals by age group (%): Uruguay, 2006

Transfers	Age group					Total
	0–14	15–29	30–44	45–59	60+	
Public education	46	19	2	0	0	13
Public health	19	18	22	21	10	16
Collective goods and services	35	53	55	41	14	32
Pensions	0	4	8	31	76	36
Other social protection	0	6	13	5	0	3
Transfers to rest of world	1	1	1	1	1	1
Total public transfer inflows	100	100	100	100	100	100

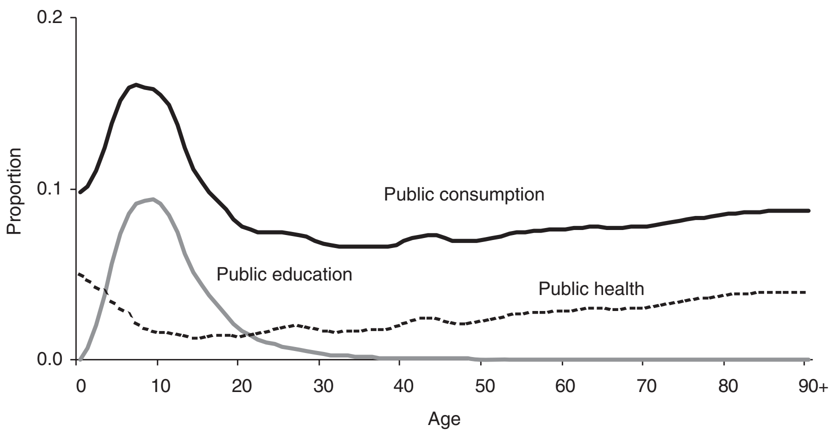


Figure 24.3 Age profile of public consumption: Uruguay, 2006

with age during childhood and, after reaching a peak at age 7, declines until age 40. The steep bump in childhood is explained by the education profile. It is worth noting that private education consumption presents a similar age profile, but the peak is reached later, at age 12. In fact, state education consumption is greater than private education consumption for children between ages 2 and 12, but lower for teenagers.

The health profile has a U-shape that reflects the morbidity pattern. From a high level at birth, consumption of health care declines until the teen years and then gradually increases with age for people above age 16. It is the positive relation between health care consumption and age that explains the positive slope of the public consumption curve for people over age 40.

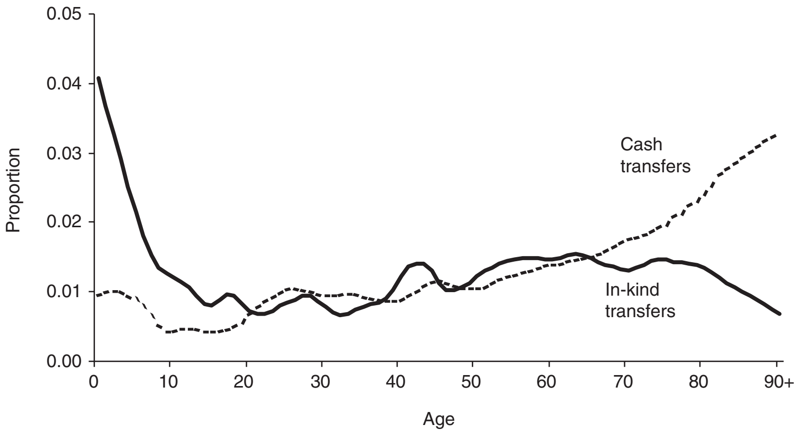


Figure 24.4 Age profile of public health transfers: Uruguay, 2006

Figure 24.4 shows the profiles of the two components of public health care consumption: the direct provision offered by public establishments (in-kind transfers) and the DISSE Fund's support of health care in private institutions (cash transfers). In-kind transfers are more prominent for children and teens, especially at the first stages of childhood. In contrast, cash support from the DISSE Fund is especially high for the population older than 50. Notice that this profile of cash transfers does not reflect the beneficiaries' profile but rather intergenerational transfers within the private health care system. Indeed, as the morbidity profile is U-shaped but the fee is flat, the DISSE program provides a health care subsidy for children and the elderly although it targets the population of working ages.

Public inflows from the social security system are shown in Figure 24.5. Pensions (contributive and assistance) are by far the major component. The per capita pension increases with age, and for the 80–89 age group it represents around 37% of the average labor income of the 30–49 age group. The other benefits (family allowances, maternity, unemployment benefits, sickness subsidy) peak at 1.2% of the average 30–49 labor income. Notice that the highest values of per capita pensions are considerably greater than the highest values of per capita public consumption (shown in Figure 24.3), which at age 7 are around 16% of the average 30–49 labor income.

The public outflows illustrated in Figure 24.2 are concentrated in the working ages. The profiles of their components are depicted in Figure 24.6. Indirect taxes are the main outflow for all ages, and they decline slightly in old age. The profile of direct taxes (on income and property)

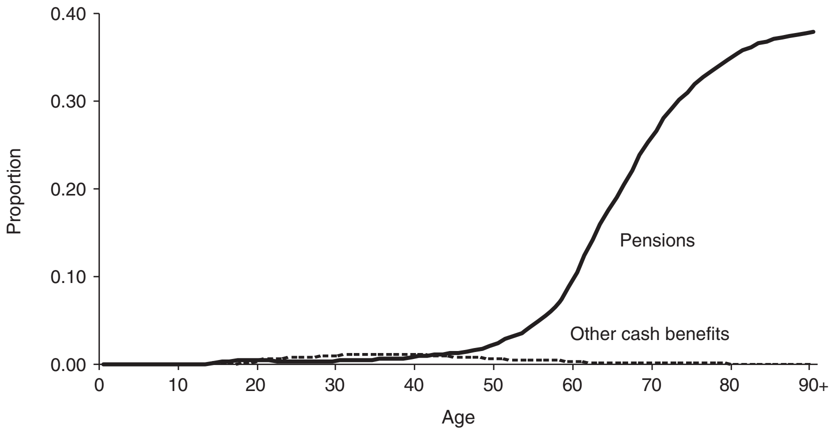


Figure 24.5 Age profile of benefits from the social security system: Uruguay, 2006

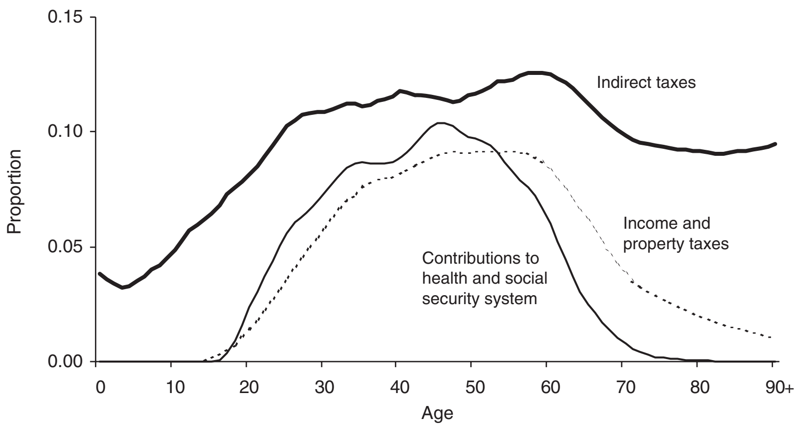


Figure 24.6 Age profile of taxes and contributions: Uruguay, 2006

has an inverse U-shape, and at older ages those taxes decline more steeply than indirect taxes. The profile of contributions to the health and social security systems is quite similar to the labor income profile, and the values are essentially zero after age 70.

Finally, in Figure 24.7 we show age profiles of the lifecycle deficit and net public transfers. Public transfers do not support the whole deficit, but they play a prominent role. The share of support is higher for elders than for children and teenagers. As mentioned earlier, elderly people

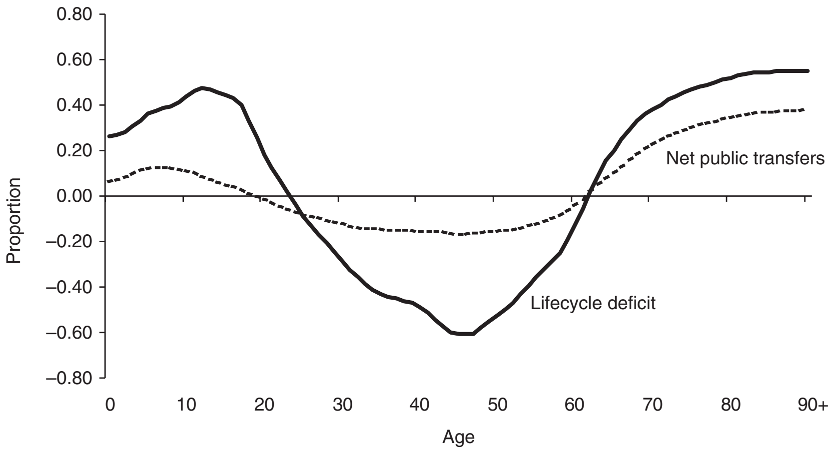


Figure 24.7 Age profile of the lifecycle deficit and the net public transfers: Uruguay, 2006

depend also on asset-based reallocations whereas children rely on private transfers.

CONCLUDING REMARKS

Consumption is higher than labor income for those younger than age 25 and older than age 61. The patterns of deficit support for the youngest and the oldest members of the population are quite different. One of the main differences is that the reallocation of assets plays an important role among the elderly. Another difference is that elderly people are net receivers through public channels and net givers through private channels. They receive cash public transfers through the social security system, and they contribute to the support of younger generations through intra- and inter-household transfers. In contrast, it is mainly private transfers that support the childhood deficit. We can assume that those private transfers are based on family relationships and that children are highly dependent on family support. This pattern is likely to have some effect on income distribution and mobility.

Another age difference is related to the types of public transfers received. In-kind transfers (especially education) are more common among children, whereas elderly people benefit mostly from cash transfers. This distinction is found even with public health care transfers. Public health programs targeting children offer health care itself, whereas public health programs for the elderly consist of a monetary subsidy for health care within the private system.

Finally, taxes and contributions are paid mainly by people in the working ages between 26 and 65. In particular, the tax system relies heavily on indirect (VAT) taxes.

ACKNOWLEDGMENTS

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25. The structure of generational public transfer flows in Nigeria

Adedoyin Soyibo, Olanrewaju Olaniyan, and Akanni O. Lawanson

This chapter reports that only children are net receivers of public transfers in Nigeria, mainly in the form of health care and education. Net public transfers are negative for the elderly owing to Nigeria's limited public pension programs and its lack of health care for degenerative diseases. Public cash transfers to all age groups are non-existent, and this has several negative implications for social protection. For children it places a heavy burden on families to provide quality health care and education, while for the elderly it means they must rely on asset-based reallocations and support from their families to make up for their lifecycle deficit.

Nigeria is blessed with many natural resources. It produces 2 million barrels of oil per day and is the sixth largest producer among the Organization of Petroleum Exporting Countries (OPEC). According to the US Energy Information Administration, Nigeria had an estimated 36.2 billion barrels of proven oil reserves as of January 2009 (EIA 2009). The economy's dependence on the performance of oil in the international oil market has led to a series of booms and busts over the years. The oil shocks of the 1980s were so severe that Nigeria, formerly a middle-income country, was reclassified as a low-income country. The situation has not changed since.

Nevertheless, after experiencing negative growth for a substantial part of the 1980s, Nigeria introduced structural adjustment reforms in the late 1980s that led to positive growth in GDP. During that period the military ruled the country. Since the return of civilian rule in 1999, Nigeria's economy has shown strong improvement. Real GDP growth averaged 5.7% between 2000 and 2005 and was driven mostly by non-oil growth (World Bank 2006, p. 1). In fact, the GDP growth of 6.51% in 2005 exceeded the government's forecast of 6% for that year in the country's NEEDS document.[1] The growth rate declined to 5.63% in 2006, mainly as a result of disruptions in oil production (World Bank 2006, p. 1).

Despite positive economic growth in the last decade, poverty is still widespread in Nigeria. According to the National Bureau of Statistics (NBS 2004, p. 12), 54.6% of Nigerians live below the poverty line. Although the government has adopted numerous economic policies and programs to ensure continued economic growth and stability, they have not significantly reduced poverty. Economists and demographers have argued that Nigeria's economic and social problems cannot be separated from its rapid population growth and young age structure. Yet there has been little research on this relationship.

Each tier of Nigeria's federal system of government – federal, state, and local – has specific fiscal responsibilities dictated by the country's 1999 Constitution. Moreover, each tier has its own procedure for appropriating funds for public spending. Appropriations depend on the various state houses of assembly, whose policy directions for any particular year may differ. This process has implications for economic management, poverty alleviation, and social protection, as well as for public transfers.

The 2006 national census put the population of Nigeria at 140 million, making it Africa's most populous country (UNDP 2008). Nigeria is in the early stage of demographic transition, and the population is expected to reach 175.7 million by 2015. The total fertility rate, which was 6.8 births per woman between 1970 and 1975, fell to 5.9 in 2000–05. The population is young, with 44.3% under age 15 in 2005, but the relative size of that age group is expected to decline marginally to 41.3% by 2015. The proportion of the population aged 65 years and older is still small, at 2.9% in 2005, and is expected to increase only marginally, to 3.0%, by 2015.

Many studies have made the economic case for public investments in the dependent age groups. For example, Mason et al. (2009) have argued that investments in children's health and education at early ages can have significant multiplier effects. Developing countries face many challenges in making such investments, however. Parents have few resources or are not fully aware of the benefits of formal education and improved health. Accordingly, they may not use those resources optimally for the benefit of their children. Governments therefore have a duty to finance education and health care for children. Most societies also help care for those who have contributed to the general welfare during their productive lives, especially if the elderly can no longer support themselves. Many governments have designed social security programs for those citizens.

In describing the government's social protection role in Nigeria, we focus on the structure of intergenerational public transfers. We examine the mechanisms used by the government to satisfy the consumption needs of the population over the lifecycle through its reallocation of resources from productive to dependent groups. We have applied the National

Transfer Accounts (NTA) methodology to data from the 2004 National Transfer Flows Accounts of Nigeria to analyze the public transfer flows.

The NTA framework defines a transfer as 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 (Mason et al. 2009). These transfers can be made by both the private and the public sectors, but here we focus on public transfers.

In the next section we present a brief profile of the revenue and expenditure system of Nigeria. Then, after describing the methodology and data used for the study, we analyze Nigeria's lifecycle deficit in 2004 and discuss how public transfer flows are used by the government to meet the needs of the dependent population. In the concluding section we discuss the implications of the government's approach.

NIGERIA'S PUBLIC REVENUE AND EXPENDITURE SYSTEM

Most of the revenues to the various tiers of government come from Nigeria's mineral resources. Between 2003 and 2006 tax revenue accounted for less than half of total government revenue (NBS 2008, p. 38). The federal government collects most revenues before sharing them with state and local governments. Besides the federally collected taxes and other revenues, each tier of government has its own internally generated revenues, but they represent less than 10% of all revenues collected.

The National Assembly, comprising the Senate and House of Representatives, determines expenditures for the federal government. In the states the respective state houses of assembly determine the budget, and for local areas the legislative councils have this responsibility. All the tiers of government have allocated large sums of money for economic and social development, yet the results have tended to be extremely disappointing.

Education and Health Systems

Formal education and modern health care were pioneered by Christian missionaries. Since the 1970s the government has assumed most of the responsibility for those services. The social indicators for Nigeria are still below average, however. Only 42% of adults are literate in some language. In 2006 only 76% of primary-school-age children had access to formal schools, and only 55% of the population had access to medical services (NBS 2006, p. 28).

Education

Nigeria's education system consists of six years of primary school, three years of junior secondary school, three years of senior secondary school, and four years of tertiary education. The government developed a national policy on education in 1981 and has since revised it several times, most recently in 2007. The policy stresses the importance of achieving universal access to basic education, providing publicly financed secondary and tertiary education to those who want it, achieving universal fluency in English (Nigeria's official national language), and building national capacity in science and technology. Education is the responsibility of all levels of government. The private sector is also involved in its provision at all levels; its schools are subject to registration and recognition by the government.

To increase Nigerians' access to basic education, a program called Universal Basic Education (UBE) was established in 1999, which seeks to make primary and junior secondary education universal, free, and compulsory. In 2004 UBE was approved by the National Assembly and the state houses of assembly. As a result, by 2007 the net enrollment rate in primary schools had risen to 64.4% and the completion rate in the primary schools was 36% (NBS 2007, p. 4).

Federal spending on education fell from 8.7% of the total federal budget in 2000 to 7.9% in 2002 (CBN 2005, p. 165). Between 2004 and 2007, however, federal spending on education grew by more than 158% in nominal values, from ₦79.5 billion (US$562 million) to ₦205.1 billion (US$1.44 billion) (CBN 2007, pp. 202–203). The introduction of a UBE Intervention Fund in 2005 and a Virtual Poverty Fund in 2006 contributed to this sharp rise. In 2006 the federal education budget represented 13.2% of the total federal budget. Nevertheless, federal education allocations have not kept pace with GDP growth, declining from 1.8% of GDP in 2001 to 1.4% in 2007.

Health

Local governments have major responsibility for primary health care. State governments provide secondary care in hospitals, which also serve as referrals for primary health centers. Tertiary care is provided mostly by the federal government in teaching and specialist hospitals and federal medical centers. Besides the government, many private for-profit and not-for-profit organizations own health institutions.

Households paid 67% of total health costs in 2005 (Soyibo et al. 2009, p. 17). Although the proportion is about the same as in some other African countries, it was far higher than the world average of 18% in 2006 (WHO 2006). The Nigerian government's share of total health expenditure was 26% in 2005 (Soyibo et al. 2009, p. 17). The balance of 7% was paid by firms and development partners. Although government funding on health care rose between 1998 and 2005, it did so at less than 1% per year.

The federal government established a National Health Insurance Scheme in 2005 to improve access to health care by all Nigerians at affordable cost. The number of participants has grown over the years, especially with the registration of all federal workers and their dependents, numbering 1.5 million by the end of 2006. The program is currently limited to workers in the formal sector, although efforts are under way to include the informal sector through a community-based health insurance program.

METHODOLOGY AND DATA

We used the NTA methodology described in Chapter 3 and Mason et al. (2009) to focus on governmental transfers as a way of financing the lifecycle deficit. Details of the estimation procedure are provided elsewhere in this volume.

The macrodata used for the estimation of the National Transfer Accounts came from the National Income and Product Accounts (NIPA) of Nigeria (NBS 2007). As the NIPA do not provide information by age group, we used data from the 2004 National Living Standard Survey, conducted by the National Bureau of Statistics, to estimate the age profiles of the relevant variables. The survey is the most comprehensive household survey in Nigeria. It contains information on consumption and expenditure by individuals and households.

For public expenditures and transfers we used information on Nigeria's tax structure. Since the government revenue profile contains all sources of revenue, we reclassified those sources into three categories: direct tax income, indirect tax income, and asset income. Taxes collected by the three tiers of government were added together to derive total government revenue. We thus included all the sources of revenue for all three tiers. To avoid double counting we deducted the federally collected revenues from the revenues of the individual tiers of government and added the internally generated revenues of the tiers on the basis of their classification. The calculated public-sector revenues for all tiers of government are presented in Table 25.1. It reveals that 52% of federal revenue comes from asset income, thus confirming the government's dependence on its oil assets. Direct taxes account for 33%, and indirect taxes for 15%, of total government revenue.

Table 25.1 Government revenues by source: Nigeria, 2004 (all tiers of government)

Source	Amount (N million)
Direct taxes	*956.05*
Firms' income tax	113.00
Individual income tax	134.20
Education tax	17.10
Property tax (tenement rates)	4.85
Petroleum profit tax (PPT)	686.90
Indirect taxes	*417.10*
Custom and excise	217.20
Value-added tax	159.50
Customs levies	40.40
Asset income	*1,481.15*
Crude oil/gas export	1,043.50
Domestic crude sales	358.20
Other oil revenue	3.00
Independent non-tax revenue of federal government	58.90
State government non-tax	17.55
All revenues	*2,854.30*

Source: Computed from CBN (2008, tables B1.1, 2.1, and 3.1).

LIFECYCLE DEFICIT AND PUBLIC TRANSFER FLOWS

The age profiles of lifecycle consumption and labor income for Nigeria in 2004, presented in Figure 25.1, reflect the young age structure of the population: dependent children and youths have a much greater lifecycle deficit than the elderly. The 30-year lifecycle surplus starts at age 33 and ends at age 63. Within the surplus age group the surplus is greatest at age 46.

Public Transfers

The government serves as a key agent in reallocating resources from the surplus age group to the deficit age groups. Working individuals make public transfers, called outflows, to the government in the form of taxes and receive in-kind transfers and other general-purpose transfers (inflows). Public transfer inflows are the activities and associated spending of the public sector on services that are of direct and indirect benefit

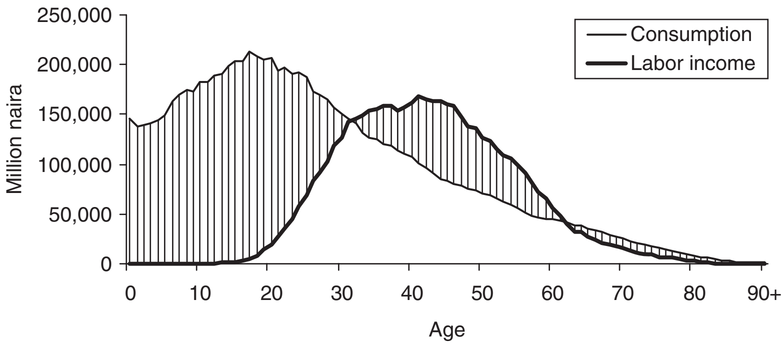

Figure 25.1 Age profiles of consumption and labor income: Nigeria, 2004

to the population. Some of the benefits, such as education and pensions, accrue to certain ages, whereas others, such as security and public infrastructure, accrue to the entire population. We focus here on two in-kind public transfers to individuals – education and health care – as well as on general-purpose transfers. We do so because of the importance of education and health care as investments in human capital. We have not dealt with transfers to older people because there was no public pension for the elderly in 2004.[2]

Public transfer inflows

For all age groups, in-kind transfers for education and health combined represented about 16% of public transfer inflows in 2004. There were no cash transfers by the public sector, either to the young or to the elderly, in that year.

Furthermore, the results as shown by the age profiles of public transfer inflows show that, general transfers aside, in-kind transfers of education dominated for ages 8–28, and that in-kind transfers of health provisions dominated for the other age groups. Total in-kind public transfers were tilted toward ages 20–24. As we have shown elsewhere (Soyibo et al. 2008, p. 16), the proportion of in-kind public transfers to ages 30–49 was less than 5% of the mean values of labor income for that age group. Thus public transfers beneficial to investment in the human capital of younger generations seem to have low priority in Nigeria.

Table 25.2, which presents the public transfer inflows in NTA aggregate percentages by broad age group in 2004, indicates that 8.8% and 7.3% of all public transfer inflows were spent on education and health, respectively. The remaining 83.9% was spent on other forms of consumption. Most of the inflows on education were spent on children and youth 25

Table 25.2 Percentage distribution of public transfer inflows, NTA aggregate totals by age group: Nigeria, 2004

Inflow	0–17	18–25	26–55	56–69	70+	All age groups
Education	9.2	21.1	3.1	0.0	0.0	8.8
Health	5.2	6.7	10.5	12.8	14.0	7.3
Other	85.6	72.2	86.4	87.2	86.0	83.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

years old and younger. For example, among the 18–25 age group, 21.1% of public transfer inflows were in the form of education. In contrast, health inflows increased with age: whereas only 5.2% of public inflows to children under age 17 years were for health care, for the oldest age group (70+), 14% of all public inflows were for health consumption.

Nigeria's social security system is minimal. No social cash transfer program existed until a defined-contribution system called the Pension Reform Act was established for the formal sector in 2004. Retirees from the public sector, who represent less than 15% of the elderly, have been incorporated into the new social security system (Olaniyan 2007). The proportion of the federal government's total expenditure on the social sector grew from 12.9% of total expenditures in 2003 to 16.1% in 2007. The absolute amount of fiscal spending on education and health also witnessed increases over the period from 2001 to 2007 (CBN 2007, pp. 202–203). In-kind public transfers for health increased with age, from 5.2% of all public transfer inflows for those under age 17 to 14% for individuals aged 70 and older.

Public transfer outflows

Public transfer outflows to the government in Nigeria comprise taxes on income, taxes on capital, and indirect taxes. The results indicate that the personal income tax burden falls mainly on individuals aged 20 and above, peaking at around age 47. Younger individuals are taxed indirectly because the goods they consume have taxes embedded in them. Tax on capital income continues to rise with age until nearly age 80, as older individuals tend to have more property than younger ones, even than those in the prime working ages. But as we have already noted, the elderly (ages 65+) represented only 2.9% of the population in 2005.

Public transfer inflows (cash and in-kind transfers received) are equal by definition to public transfer outflows. Public transfer outflows can be funded by tax revenues, public asset income, public dissaving, and net transfers to the government from the rest of the world. In Nigeria's

Table 25.3 Structure of public flow account by broad age group: Nigeria, 2004 (in thousand naira)

Item	0–17	18–25	26–55	56–69	70+	All ages
Net public transfers	221,920	42,824	−184,966	−60,572	−19,206	0
Public in-kind transfer inflows	390,378	136,665	211,145	34,964	12,665	785,819
Education	31,719	28,732	8,824	0	0	69,276
Health	19,932	9,071	21,987	4,419	1,757	57,168
Other	338,726	98,861	180,332	30,545	10,907	659,374
Public transfer outflows	168,458	93,841	396,111	95,536	31,871	785,819
Personal income tax	293	5,292	79,357	12,082	1,796	98,821
Corporate income tax	24	1,858	51,573	26,767	10,402	90,624
Net indirect tax	78,584	43,001	97,118	17,046	6,398	242,150
Transfer surplus (+)/deficit (–)	51,055	32,452	147,564	36,168	12,034	279,275
Duties on exports	38,501	11,237	20,497	3,471	1,239	74,947

case in 2004, tax revenues were much less than public transfer outflows because of the government's heavy reliance on asset income. The Nigerian government relies on public asset-based flows to generate resources for its transfer programs. As the sixth largest oil exporter among OPEC nations, Nigeria receives most of its income from oil royalties (shown in Table 25.1). Thus, in addition to the government's income from taxes, transfer outflows are funded by revenues from oil-import earnings. Table 25.3 presents the structure of public transfer flows with all age groups above 25 years having net public transfer outflows.

Figure 25.2 presents the per capita age profiles of public transfers in 2004. Whereas transfer inflows were stable from age 33 onward, the burden of outflows increased from the teenage years and reached its maximum at about age 55.

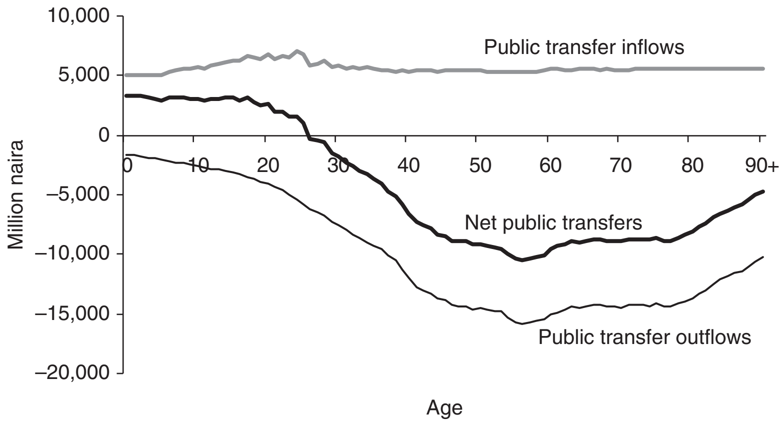

Figure 25.2 Per capita age profiles of public transfer flows: Nigeria, 2004

Per capita net public transfers, inflows less outflows, were negative for all adults over the age of 26, including the elderly. The reason is that social protection programs for adults do not exist. Children and young people below age 26 were the only group with positive net public transfers, because they had small outflows and somewhat larger inflows that were almost entirely in-kind. There were essentially no cash transfers to any group, whether children or adults.

Nigeria has no significant scholarships or grants for students. Neither are there cash transfers to vulnerable groups such as the poor, disabled, or elderly. There are no significant cash subsidies for health care either. Although public transfer inflows and outflows should be equal, Nigeria has a public transfer deficit because the government's tax revenues are less than the public transfer flows to the people. A balance is achieved by the flows generated from asset-based reallocations and the payments from foreign sources.

Furthermore, the peak net public transfer flow of about ₦10 000 shown in Figure 25.2 was almost three times the net inflow to children. This pattern reflects Nigeria's young age structure, which is also a peculiar feature of labor income in Nigeria: labor income is low for young adults but remains at a relatively high level in later years, declining only slowly in old age (Mason et al. 2010). Our analysis thus reveals how age structure can work against spending on children. The high proportion of children and young adults in the population, coupled with low labor income for those age groups, helps to explain why public spending and human capital investment are low in Nigeria. The study just cited (Mason et al. 2010, p. 24) estimates that the lifetime normalized human capital investment in

Nigeria in 2004 was 2.0 years' worth of labor income, with only a small portion coming from the public sector. A comparison of human capital spending per child in the economies included in this volume, presented in Mason et al. (2010), shows how low public human capital investment is in Nigeria as compared with other countries.

CONCLUSION

As in many other low-income countries, public transfers are made mainly to younger cohorts in Nigeria. Our findings indicate that only children are net receivers of public transfers and that the transfers are mainly services in the form of health care and education. Although it is common for the working population to have negative net public transfers, this is also the case for the elderly in Nigeria. This is due largely to Nigeria's limited public pension programs and its lack of health care for degenerative diseases. The elderly must fund their lifecycle deficit from private transfers and asset reallocations.

Net public transfers are positive until age 33 – that is, Nigerians consume more than they produce through their labor for the first 33 years of their lives – whereas net outflows are concentrated in the 50–80 age span. Taxes paid by young Nigerians of working age are low because of high unemployment and underemployment in that group. The underemployment situation is captured by the low level of factor income (labor income and asset income) earned by those in their 20s and early 30s. In addition, the small proportion of elderly in the population and the low incomes of young Nigerians, combined with the tax system's emphasis on asset income from oil royalties and consumption taxes rather than on taxes from labor income, tilt the proportion of public transfer outflows toward the middle-aged and elderly population groups.

The lack of cash transfers to all age groups has several implications for social protection. The lack of scholarships and bursaries to school-age children puts a heavy burden on households trying to provide quality education to their children. The lack of direct cash support from the government for health care, particularly for the poor, also inhibits human capital development. Finally, the lack of cash transfers to the elderly means that the elderly must rely on asset-based reallocations and support from their families to make up for their lifecycle deficits. This is probably why poverty remains high among the elderly. Nigeria needs to learn from other countries on how to improve its social protection.

ACKNOWLEDGMENTS

We gratefully acknowledge the financial support of the International Development Research Centre, Canada and the John D. and Catherine T. MacArthur Foundation for estimating the National Transfer Accounts of Nigeria, on which the analysis in this chapter is based.

NOTES

1. The National Economic Empowerment and Development Strategy (NEEDS) document is Nigeria's strategy paper on poverty reduction; see NPC (2004).
2. Although public-sector retirees were paid a gratuity after completing their service, it was not regarded as a transfer because it was part of their total package for being public-sector workers.

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26. The role of familial transfers in supporting the lifecycle deficit in India

Laishram Ladusingh and M.R. Narayana

This chapter estimates the nature and magnitude of familial transfers to support the lifecycle deficit of economic dependents (persons below age 20 and above age 60) in India in 2004–05, using the analytical framework of National Transfer Accounts (NTA). Young and elderly dependents respectively account for 3% and 5% of aggregate labor income and 34% and 9% of aggregate consumption. In other words, the lifecycle deficit of young dependents is about 6.9 times that of the elderly. For young dependents education is the major form of consumption, whereas for elderly dependents it is health care.

Familial transfers are estimated by net inter- and intra-household transfers and are classified by education, health care, and other forms of consumption. The results offer evidence of a remarkable role for familial transfers in India. The respective mean ages of beneficiaries and donors are 14.5 and 50.1 for education, 55.1 and 53.4 for health care, and 32.6 and 50.9 for other forms of consumption. Most importantly, total intra-household transfers support about 51% of the deficit of younger dependents, but fall short of the deficit for elderly dependents. This surprising finding is contrary to the general assumption that elderly dependents are supported by their families, given the poor public social security arrangements for the elderly.

During the economically unproductive stages of life individuals are supported by familial and public transfers and, in the latter dependent stage, by asset-based reallocations. Public policies regulate the goods and services provided to dependent individuals of different ages, their monetary value varying from economy to economy. At the household level, the kinds of goods and services transferred to dependent children and elders are governed by social norms and social contracts between household members. A growing concern in developing economies as a consequence of longer life expectancy and declining family size is the ability of families to support elder members (Mason 1992). Few studies, however, have focused on the role of intergenerational monetary transfers for supporting dependent children and elders in developing countries where generational co-residence continues to be a general social norm and practice. This chapter is an attempt to provide empirical evidence of the magnitude of familial transfers in the Indian economy.

Several studies of intergenerational transfers in Asia focus primarily on parent–child transfers (e.g., Ofstedal et al. 1999; Zimmer and Kwong 2003). In the Philippines, Thailand, Taiwan, and Singapore, transfers from adult children are the main source of income for elder persons (Hermalin et al. 2002). In mainland China between 30% and 50% of elders receive financial support from adult children (Chen and Silverstein 2000). In their study of intergenerational transfers in Taiwan and the Philippines, Agree et al. (2005) report that in both societies the elderly rely on kin but that in Taiwan transfers are concentrated among lineal kin, whereas in the Philippines transfers are more broadly distributed among family relations, particularly siblings. Lillard and Willis (2002) have found that parents in Southeast Asia give loans to children that are later repaid and that, in Indonesia, transfers within families serve as insurance for family members.

The aforementioned studies of familial transfers in East and Southeast Asia are limited to a few countries and focus on *inter*-household transfers. *Intra*-household transfers, emphasized in this chapter, are much greater in their magnitude. The NTA methodology provides a framework for determining the nature and magnitude of familial transfers consistent with National Income and Product Accounts (NIPA). Using the NTA framework (Mason et al. 2009), we attempt in this chapter to discern age patterns of consumption of public and private monetary resources for education, health, and other needs and the role of intra-household transfers in supporting the lifecycle deficit of economic dependents in India in 2004–05. To provide a background for understanding the age patterns of lifecycle consumption of education, health care, and other goods and services in India, we begin by discussing the factors that have a bearing on lifecycle consumption and intra-household transfers.

FACTORS AFFECTING THE LIFECYCLE DEFICIT AND FAMILIAL TRANSFERS

The ability of individuals to pay for essential goods and services during their lives depends on their earning potential, which in turn depends on their education and skills as well as on the availability of jobs. At the same time, labor income depends on macroeconomic conditions that cannot be controlled by individuals. Employment growth in India has improved considerably, doubling the 1.3% pace of growth during the 1990s over the first five years of the current century (OECD 2007, p. 120). This represents an unprecedented improvement in India's labor market performance (Anant et al. 2006; MOF 2006; Nagaraj 2004). The average daily wages of workers in the formal sector are biased in favor of urban workers and males, although the gap between urban and rural workers and between men and women has been narrowing over time.

No economy can afford to risk underinvesting in human resource development through education. The Constitution of India established the goal of universal and free basic education for all children to the age of 14. Today nearly four out of five children in the 6–14 age group are in school and two out of three are functionally literate (Govinda 2002, p. 1). Between academic years 1950–51 and 1999–2000, enrollment increased about six times at the primary level, 13.5 times at the upper primary level, and 17 times at the secondary and senior secondary levels combined. Enrollment of girls has registered an even faster growth, increasing 9 times, 34 times, and 52 times respectively at these three stages (NCERT 2003, p. 115). Public expenditure on education and private transfers are closely linked with enrollment rates and educational attainment. Private spending on education is strongly correlated with a family's income level.

Public health expenditure was merely 0.94% of GDP in 2001–02 (as against 0.04% in 1970–71), still too meager to meet the demand for health care of a huge population with a pronounced burden of disease. In contrast with education expenditures, most spending on health is in the private sector, which accounts for 77% of total health expenditures in India (MOHFW 2005, p. 1). Most household expenditure on health care is out-of-pocket. As a percentage of per capita income it has doubled, rising from 2.71% to 5.53%, between 1960–70 and 2001–03 (Bhat and Jain 2006, p. 67).

India's social security measures are many, and divided between the central and state governments on the one hand, and the private sector on the other. The National Social Security Program transfers public goods, such as health services and education, to the population. It has three parts. The first consists of programs intended for the entire population, the second comprises targeted programs for beneficiaries in specified income categories, and the third includes spatial and social categories. The program thus coincides with the poverty-alleviation program in providing in-kind transfers of public goods and services for consumption.

In addition, social security schemes exist for organized workers in both the public sector (the government and quasi-governmental agencies) and the private sector (registered factories and companies). The schemes are implemented through various labor laws. Their benefits include medical care, sickness and maternity leave with pay, a retrenchment benefit, old-age benefits (e.g., a pension or a provident fund with gratuity), and compensation for injury. For specified industrial workers (e.g., miners), welfare funds provide housing benefits, medical care, and education for their children, all of which are financed by taxes on exported items. Organized workers further benefit from voluntary and tax-exempted schemes, such as small savings schemes and pensions offered by life insurance companies.

SOURCES OF DATA

The data for this study are drawn from multiple sources. Macroeconomic controls for the fiscal year 2004–05 as regards salaries and wages of employees, mixed income (i.e., income from household enterprises), and private expenditures on education, health, and other goods and services were extracted from the National Accounts Statistics (CSO 2006). The India Human Development Survey (IHDS), conducted in 2004–05, was the source of microdata on income from wages and salaries and from self-employment; on household expenditures on food, non-food items, health care, education, and housing rent; on money borrowed and household credit; on the enrollment status of children in state-run and private educational institutions; and on the treatment status of individuals for minor and major illnesses (Desai et al. 2008). The IHDS was a nationally representative survey covering more than 200 000 individuals from 41 554 households in 1503 villages and 971 urban neighborhoods.

INCOME, CONSUMPTION, AND THE LIFECYCLE DEFICIT

Age patterns of consumption for education and health by sector and income were obtained directly from individual-level data. We derived the age pattern of other private consumption by using an empirical equivalent scale discussed in Mason et al. (2009), whereas we calculated the age pattern of other public consumption on a per capita basis. By applying the NTA framework we derived aggregate labor income, private and public consumption by sector, and the lifecycle deficit for broad age groups, all of which are consistent with the NIPA for the fiscal year 2004–05. At a nominal price, aggregate consumption was 17 505 billion rupees as against the aggregate labor income of 15 845 billion rupees, leading to a lifecycle deficit of 1660 billion rupees in that fiscal year. We found that the prime working age group, 20–59, contributed 92% of the total labor income, whereas the share of the age group below 20 years was 3% and that of the elderly age group (60 years and older) was 5%. The respective contributions to aggregate labor income by the three broad age groups reflect the sizable population of children and the moderate size of the aged population in the country's age distribution.

While contributing 3% of the total aggregate labor income, the population under age 20 accounted for 34% of the total aggregate (public and private) consumption. In contrast, the elder population enjoyed just 9% of aggregate consumption. The remaining 57% of public and private consumption belonged to the prime working age group. The investment in children and young people is about 3.5 times greater than that in the population over age 60. This result signals a near-absence of public policies to provide social security and health care for India's elders. Private consumption of health care and other goods and services is much greater than public consumption; only education receives major public support.

The discussion so far indicates that young and aged populations consume far more than their share of labor income and thus experience a lifecycle deficit. For the prime working-age population, however, aggregate labor income exceeds aggregate consumption, producing a monetary surplus. As a consequence of their greater consumption of both private and public resources in relation to their share of aggregate labor income, the young and the elderly together produce a lifecycle deficit 1.4 times the monetary surplus of the prime working-age population. Figure 26.1 shows the age patterns of aggregate labor income, consumption, and lifecycle deficit in 2004–05.

The age profile of aggregate consumption indicates that India's population has a large proportion of children and a much smaller, but increasing, proportion of elders. This age distribution translates into a larger lifecycle deficit for the under-20 population and a smaller deficit for the 60+ population. The age profile of labor income shows a larger share of aggregate labor income in the prime working age group of 20–59 years and a concentration of surplus due to the excess of income over consumption.

Next we look at consumption patterns. Per capita consumption profiles can be more relevant to policy than aggregated consumption profiles. To reveal the Indian age patterns of education, health, and other consumption by sector, Figure 26.2 shows per capita consumption profiles consistent with the NIPA. It indicates that the surplus of the prime working age group supports the deficit of the under-20 and 60+ age groups overwhelmingly through familial transfers.

Moreover, the public and private age profiles of consumption have

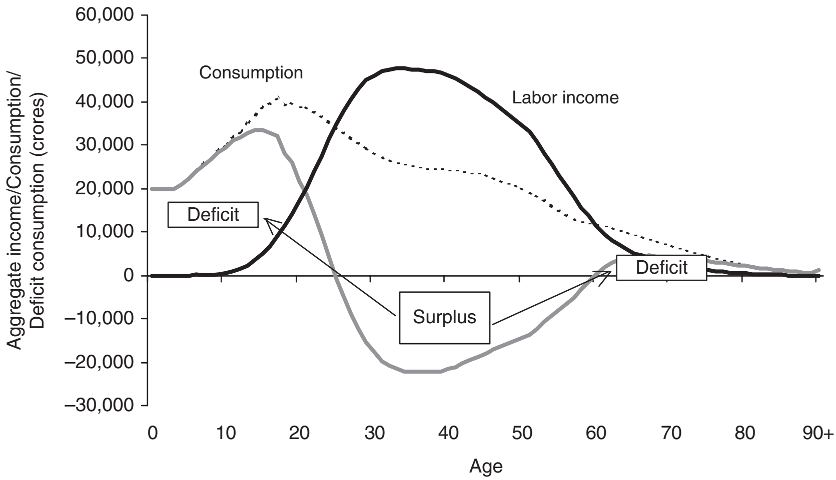


Figure 26.1 Aggregate labor income, consumption, and the lifecycle deficit: India, 2004–05

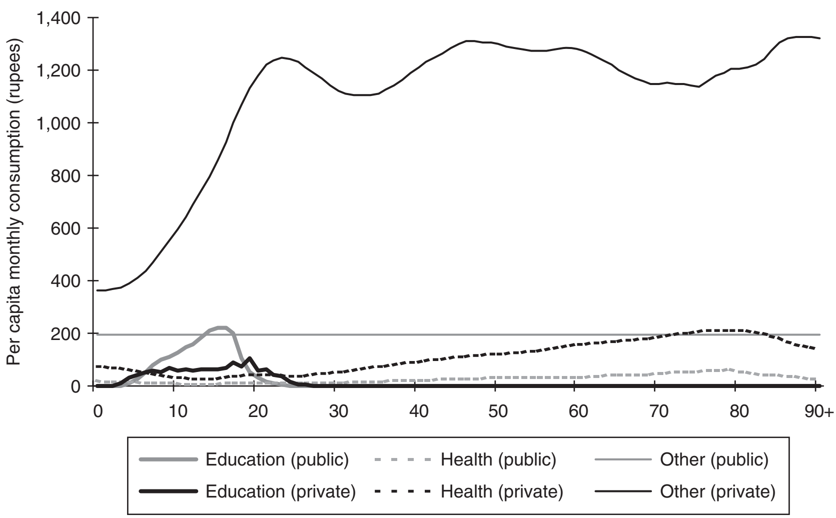


Figure 26.2 Age patterns of per capita consumption by sector: India, 2004–05

Table 26.1 Summary of per capita consumption: India, 2004–05

Sector	Share (%)	Mean age
All sectors	100.0	41.0
Public	17.6	35.5
Health	1.6	49.6
Education	2.1	13.7
Other	13.9	37.1
Private	82.4	42.2
Health	6.6	49.5
Education	1.2	14.7
Other	74.7	42.0

Note: Per capita values are weighted using $L(x)$ from India's life table to calculate the shares and the mean ages.

sharply contrasting features. In the private sector, consumption of goods and services other than education and health care constitute 74.7% of total consumption (Table 26.1). Per capita private other consumption (consumption excluding health and education) is low during the first five years of life, increases sharply with age until the mid-20s, and thereafter remains more or less flat. Per capita private education is concentrated in the 4–25 age range, showing a slight peak in the late teens, the stage of higher secondary education; but its share of total consumption is only 1.2%. The per capita private health care profile is more or less trough-shaped up to age 30 and steadily rises until about age 80; it constitutes 6.6% of total consumption in the fiscal year 2004–05. The age pattern of public per capita consumption contrasts with that of private consumption mostly because of the much lower (and flat) public investment in services other than education and health. In the school-going age group, however, there is significantly greater public than private investment in education. The per capita public consumption profile for health care shows a slight rise at advanced ages. The shares of public consumption on education, health, and other are 2.1%, 1.6%, and 13.9%, respectively, making up only 17.6% of total consumption.

The mean age for total consumption is 41 years. In the public sector the mean age for consumption is 35.5 years, and in the private sector it is 42.2 years. For health consumption in the public and private sectors, the mean ages are nearly identical (49.6 and 49.5 years, respectively). The high mean age for private health consumption reflects the fact that individuals incur out-of-pocket expenditures for health care at advanced ages in the near absence of social security and India's inadequate public health care

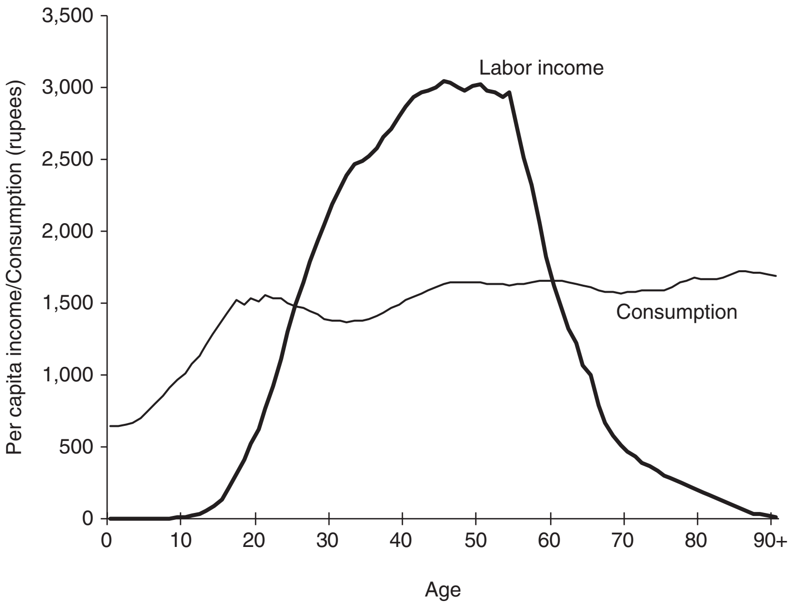


Figure 26.3 Per capita labor income and consumption: India, 2004–05

expenditure. As for education, the mean ages for public and private consumption are 13.7 and 14.7 years, once again signaling a longer period of private support for education. The mean age for other public consumption (infrastructure, defense, etc.) is 37.1 years. In the private sector other consumption relates to housing, food, clothing, social needs, and so on, and the corresponding mean age is 42.0 years.

The lifecycle-deficit implication of consumption at young and old ages is better understood when the per capita labor income and the per capita age-specific consumption patterns are plotted together, as in Figure 26.3. The age profile of per capita labor income reflects several distinctive features. It is an inverse broad U-shaped curve that starts in the early teens, gradually increases with age, peaks in the mid-40s, remains high until the mid-50s, and thereafter declines rapidly, tapering off with advancing age.

The existence of child labor is evident in the early age of entry into economic work and young persons' marginal share of labor income. The age profile of per capita consumption also exhibits interesting features, particularly during the school-going ages and at older ages. Per capita monthly consumption increases sharply from about age 4 until it attains an early peak at about 19 years, reflecting some investment in education and at the same time a sharp increase in consumption other than education and health. The consumption profile crosses the income profile at ages 25 and 60, the average ages of entry into the labor force and retirement respectively. During the 35 years of economically gainful activities the per capita consumption profile is more or less stable, rising marginally after retirement age owing to health care costs.

For individuals below age 25 and above age 60 the gap between the per capita labor income and consumption profiles is the magnitude of the lifecycle deficit. The NTA framework recognizes the role of public and private asset reallocations and transfers as a means to support the lifecycle deficit, depending on the structure of the underlying economy. In a welfare state the lifecycle deficit is funded mostly by public intervention. In many other societies it is funded by a combination of private asset-based reallocations and transfers. In India the family plays a major role in such transactions.

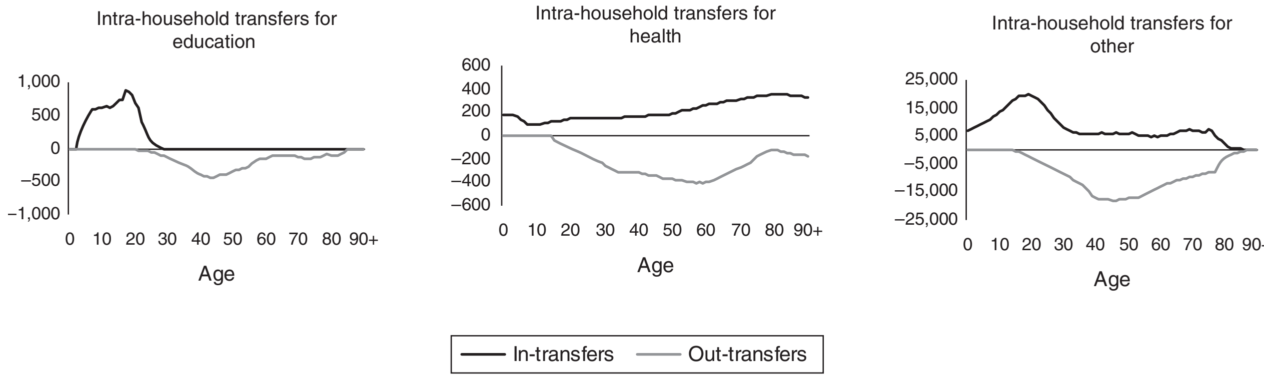
FAMILIAL TRANSFERS TO SUPPORT THE LIFECYCLE DEFICIT

Intra-household and inter-household transfers are the two forms of familial transfer considered in the NTA framework. Household members with a surplus fund the consumption of members having a deficit through intra-household transfers. Familial transfers as a means of supporting the lifecycle deficit of current consumption are important in India because of the large number of joint families living under the poverty line in rural areas.

Figure 26.4, which shows age profiles of the beneficiaries and donors of aggregate intra-household transfers for education, health, and other types of expenditure, reveals that monetary transfers are larger for education than for health. A distinctive feature of the transfers is that although most donors are in the working age groups, a sizable proportion are elders, whose support includes education for grandchildren. The main consumption need for household members below age 20 is for schooling, whereas for those above age 60 it is for health care, in addition to other essential goods and services.

Figure 26.5 depicts the age profiles of the per capita lifecycle deficit, net intra-household transfers, inter-household inflows, and familial transfers, which constitute the totality of net intra- and inter-household inflows. It is evident that familial transfers are heavily biased toward children, whereas elders scarcely benefit from them. This suggests that although elders help fund the education of their grandchildren, they are left to care for themselves from their own past saving and assets in the absence of a robust public social security program.

The mean ages of beneficiaries and donors and the magnitude of



Note: 1 crore = 10 million rupees.

Figure 26.4 Aggregate intra-household transfers (crores) for education, health, and other: India, 2004–05

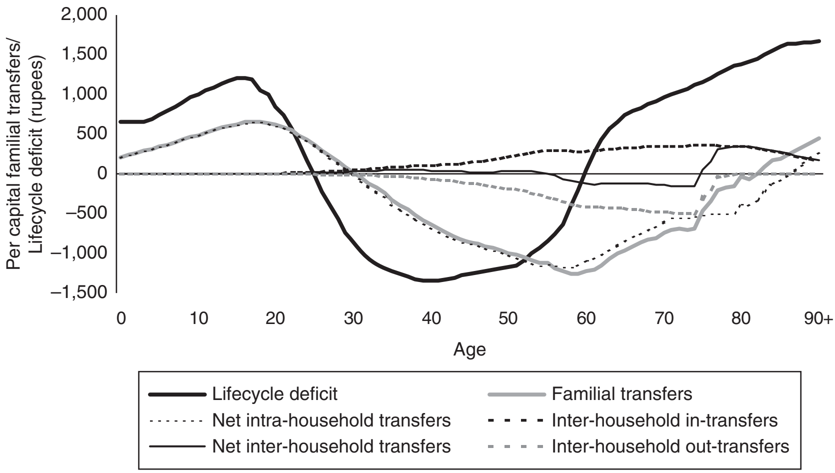


Figure 26.5 Per capita familial transfers and the lifecycle deficit: India, 2004–05

intra-household transfers for education, health care, and other consumption are summarized in Figure 26.6. In this figure the direction of each arrow indicates the direction of the flow of intra-household transfers – that is, from older to younger or from younger to older ages; the head and the tail represent the mean ages of beneficiaries and donors respectively; and the thickness of the arrows represents the magnitude of the transfer. The numerical values shown along with each arrow are the monetary values of intra-household transfers in crores. The mean ages of beneficiaries and donors are based on aggregate age profiles of those groups.

Total intra-household transfers make up 51% of the lifecycle deficit of the population below age 20, whereas intra-household transfers to the population of ages 60+ fall short of their lifecycle deficit. Most of the intra-household transfers are for current consumption of goods and services other than health care and education. The respective mean ages of beneficiaries and donors are 32.6 and 50.9 for the residual (other) category of consumption. The mean age of children who receive familial financial support for education is 14.5 years, and that of household members who support them is 50.1 years. The mean age of family members who support health care for other members is 53.4 years, and that of the recipients is 55.1 years. All mean ages were calculated using the value of transfers to and from each age group.

Indian children below age 20 receive familial support from other household members, whereas elders are not supported by familial transfers at

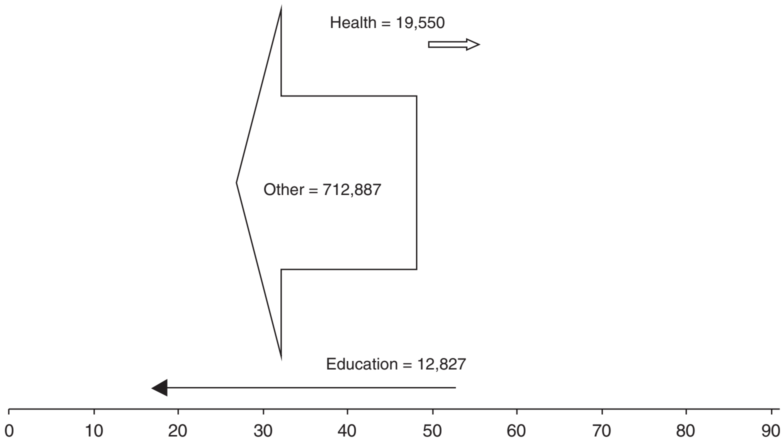


Figure 26.6 Aggregate intra-household transfers by sector (crores): India, 2004–05

all. This finding is contrary to the widespread belief that in the absence of a viable public social security safety net Indian elders depend on their kin, particularly on sons, for their well-being.

SUMMARY AND CONCLUSION

This chapter has examined age patterns of per capita consumption in India by sector, emphasizing the sociocultural significance of intra-household transfers to support the lifecycle deficit. As in any developing economy with a large population of children and a smaller but increasing aged population, at the aggregate level the lifecycle deficit of the Indian population under age 20 is 6.5 times than that of 60+ population. At the per capita level, however, the lifecycle deficit of the 60+ population is more pronounced and comparable to that of the under-20 population. Education and health care are the main forms of consumption that produce a lifecycle deficit among the young and elderly individuals. Familial transfers from household members with disposable income go mostly to members below age 20, accounting for 51% of the lifecycle deficit of this age group, whereas intra-household transfers to members of ages 60+ fall far short of their lifecycle deficit. The main conclusions we draw from this study are that India has a shortage of public funding to meet the lifecycle deficit of its population, and that children and the elderly would not be able to consume essential goods and services were it not for the existence of familial transfers in general and intra-household transfers in particular.

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D. Issues related to the generational economy

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27. The elderly as latent assets in aging Japan

Naohiro Ogawa, Rikiya Matsukura, and Amonthep Chawla

In this chapter we describe the impact of Japan's unprecedented population aging upon intergenerational transfers in the postwar period. To achieve this objective, we have applied the NTA methodology to both micro-level and macro-level data covering the period 1984–2004. Given the limitation of space, we confine our discussion mainly to Japan's first demographic dividend and its relationship to Japan's phenomenal economic growth in the 1960s, and to the rapidly changing pattern of familial transfers between various age groups in Japanese society over the past two decades. One of the main findings is that although Japanese family organization has been changing rapidly over the past few decades, the elderly Japanese still play a significant role in supporting their offspring when the latter encounter economic hardships.

JAPAN'S RECENT DEMOGRAPHICS: ENTERING UNCHARTED TERRITORY

Japan's rapid fertility decline subsequent to a short-lived baby boom (1947–49) was one of the first of its kind to occur in the non-Western world and was the greatest in magnitude among all the industrialized countries (Hodge and Ogawa 1991; Ogawa and Retherford 1993). Since the late 1950s there had been only minor fluctuations around the replacement level until the first oil crisis occurred in 1973. Thereafter, Japan's total fertility rate (TFR) started to fall again, and by the mid-1990s it had declined below 1.5 children per woman. In 2005 the TFR plummeted to 1.26, the lowest level in the postwar period, before rebounding slightly to 1.37 in 2008.

Although Japan's recent very low fertility has been attracting a great deal of attention both domestically and internationally (Retherford and

Ogawa 2006), much less attention has been paid to the unprecedented rapidity with which its mortality transition has been under way. During 1947–65, Japan's life expectancy at birth rose from 50.1 to 67.7 years for men and from 54.0 to 72.9 years for women. In 2007, male life expectancy at birth reached 79.2 years and female life expectancy rose to 86.0 years.

As a consequence of the long-term transformations in both fertility and mortality, the age structure of the Japanese population has been shifting markedly. The proportion of those aged 65 and over increased from 4.9% in 1950 to 20.2% in 2005, making Japan's population the oldest national population in the world – a position that Japan is projected to retain for the next several decades (UN Population Division 2009). Furthermore, the overall size of Japan's population began declining from the end of 2005.

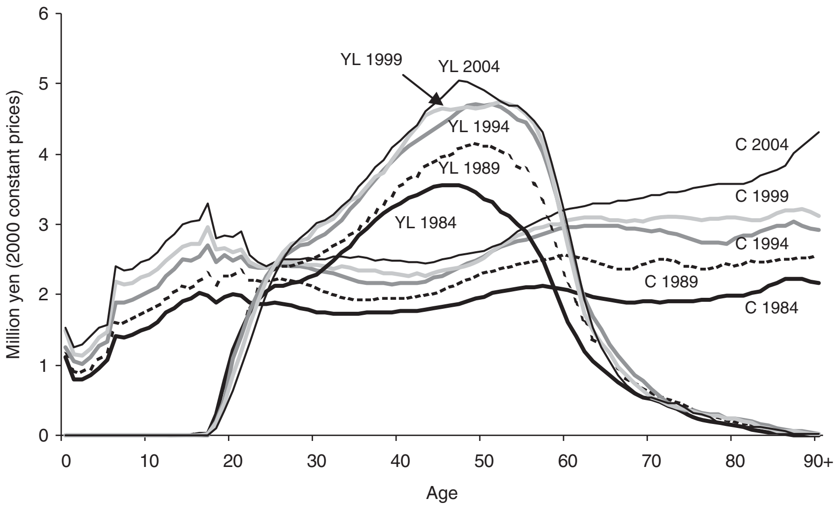
CHANGING ECONOMIC GROWTH PERFORMANCE

During World War II, Japanese productive capacity was utterly shattered. By the end of the 1950s, however, Japan's real per capita income had recovered to prewar levels. During the 1960s Japan's real GDP grew at a phenomenal rate of about 11% per annum. This rapid economic growth was facilitated by such factors as the use of abundant labor, the borrowing of advanced technology from developed countries, and the favorable international trade market (Ogawa et al. 1993).

The 1973 oil crisis triggered a series of changes in the structure of the Japanese economy, making Japan's economic growth performance significantly less impressive than in the 1960s. In the mid-1980s, however, Japan entered the bubble economy phase. This investment boom ended abruptly in the first half of 1990, causing a number of leading banks and other financial institutions to go into bankruptcy. Moreover, in the 1990s Japan's public debt accumulated at an unprecedented rate, and its international competitiveness deteriorated very quickly. Some economists call the 1990s 'Japan's lost decade' (Yoshikawa 2001).

TRANSFORMATIONS IN AGE STRUCTURES AND THE FIRST DEMOGRAPHIC DIVIDEND

Japan's postwar demographic trends, particularly the change in age composition, have been closely intertwined with the changes in its economic growth performance (Ogawa 2005; Ogawa et al. 2005). As has been recently discussed extensively elsewhere (Mason 2001, 2007; Mason and Lee 2006), one of the important linkages between demographic transformations and



Note: YL – Labor income; C – Consumption.

Figure 27.1 Age-specific profiles of per capita consumption and production: Japan, 1984–2004

economic growth is the role of demographic dividends in the process of economic development.

Figure 27.1 shows estimates of age-specific profiles of per capita consumption, private and public sectors combined, and per capita production (labor income) in five selected years, namely, 1984, 1989, 1994, 1999, and 2004. These profiles have been estimated by drawing upon private-sector information from the five rounds of the National Survey of Family Income and Expenditure (NSFIE) from 1984 to 2004, undertaken by the Statistics Bureau of Japan, and public-sector information for the corresponding five years, gleaned from various data sources published by the government. Both age-specific profiles have been adjusted by using data from the National Income Product Account (NIPA). These estimated results are expressed in 2000 constant prices.

A few points of interest emerge from this graphical exposition. First, the age at which an average individual shifts from being a net consumer to being a net producer gradually increased from 24 years during 1984–89 to 25 years in 1994 and to 26 years during 1999–2004. Factors contributing to this upward trend in the crossing age were (1) changing earnings profiles; (2) shortened hours worked; (3) rising female labor force participation; (4) higher enrollment rates in tertiary education; and (5) marked increases in *freeters* (persons aged 15–34 who lack full-time employment or are unemployed) and in NEETs (those not currently engaged in employment, education, or training). At the other end of the lifecycle the age transition from a net producer to a net consumer was postponed only marginally, from age 58 over the period 1984–89 to age 59 over the period 1994–2004. The stability of the crossing age at the later stage of the lifecycle is attributable to the existence of mandatory retirement at age 60 in contemporary Japan. These results indicate that the length of time when an average individual is financially self-sufficient ranges from 33 to 34 years, a relatively short period, corresponding to only two fifths of the average life span.

Second, the estimated age-specific profiles of per capita production over the period from 1994 to 2004 are fairly similar. This seems to reflect the influence of 'Japan's lost decade'. In addition, the upward shift in the profiles from 1984 to 1994 captures the effect on labor income of substantial economic growth during the 'bubble economy' phase.

Third, unlike the case of per capita production, the age-profiles of per capita consumption rose almost continuously over time, particularly at young and older ages. The rise in per capita consumption was distinctive among those aged 65 and over in 2004. This seems to be due to the implementation of long-term care insurance starting in 2000. In-home care for the frail elderly, which had until then been informally provided by their family members, became formalized as a part of the market economy. As a result, Japan's per capita consumption profiles have been increasingly similar to those for the United States, Sweden, and Costa Rica among the NTA member countries.

To facilitate the computation and discussion of the first demographic dividend, we have averaged the five sets of per capita consumption and production age-specific profiles observed over the 20-year period. By applying the computed age-specific results as statistical weights to adjust the entire population over the period 1920–2025, we have calculated the effective number of producers, the effective number of consumers, and the economic support ratio – that is, the effective number of producers divided by the effective number of consumers. The annual growth rate of the economic support ratio reflects the change in output per effective consumer due solely to changes in age structure projected over the period 1920–2025, as indicated in Figure 27.2. For 34 consecutive years from 1946 to 1980, the effective number of producers grew more rapidly than the effective number of consumers in Japan. As can be seen from this graph, the magnitude of the positive first demographic dividend was extremely large during the rapid economic growth of the 1960s and the early 1970s, as discussed in the previous section. This result provides

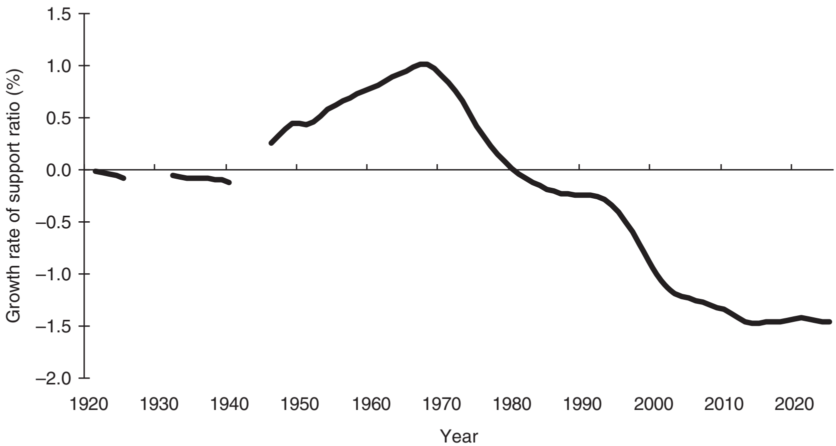


Figure 27.2 First demographic dividend: Japan, 1920–2025

a piece of cogent empirical evidence pointing to the high likelihood that the unprecedented fertility reduction following the baby boom of 1947–49 played an important role in boosting the growth of per capita income at a phenomenal rate during that period of high economic growth.

As has been the case with other developed countries, Japan's first demographic dividend was inherently transitory in nature, lasting only for a few decades. Since the early 1980s the effective number of producers has been growing more slowly than the effective number of consumers, the economic support ratio has been declining, and the first demographic dividend has turned decidedly negative. This change is a direct consequence of population aging.

EXPANDED PUBLIC TRANSFERS AND NEWLY EMERGING LIMITS

As a result of the extraordinary economic recovery from the mid-1950s to the early 1960s, which was partly induced by the first demographic dividend, Japan managed to establish universal pension and medical care schemes in 1961. Since then, Japan's social security system has grown remarkably.

When Japanese pension schemes were initially established, they were organized on the principle of reserve financing, and a large amount of reserved funds was accumulated to cover the payment of old-age benefits for future retirees. With the passage of time, however, the financing method was steadily shifted toward pay-as-you-go, thus making Japan's public pension schemes increasingly of the transfer nature. Consequently, as the proportion of the elderly population has increased over time, the tempo of growth of the accumulated reserve funds has been slowing down markedly over the past decade or so.

The financial solvency of the Japanese pension schemes has been assessed on a periodic basis, and amended accordingly. Over the 20-year period under review in this chapter, two drastic pension reforms were carried out, one in 1985 and the other in 2004. In the 1985 reform the concept of a basic pension was introduced as a base for integrating the fragmented, occupation-specific pension schemes (Ogawa 2005). In the 2004 reform it was decided that the schedule for future contributions be fixed, and the level of future benefits adjusted downward, if necessary. The main objective of the 2004 reform was to restore the younger generation's trust in government pension schemes. This may be regarded as a paradigm shift in Japan's social security provisions (Sakamoto 2005). Putting it differently, Japan's public pension schemes are now sustainable from a financial point of view, although the adequacy of benefits to be paid out may become a more serious issue in the years to come.

The second major component of social security benefits is medical benefits. Subject to Japan's economic growth performance, the coverage of the medical insurance plans has been revised on a periodic basis. Despite these changes in the medical care plans over the past few decades, the absolute amount of financial resources allotted to medical care services has been continuously rising. It is worth noting that to curb the upward spiral of the medical care costs, the government of Japan implemented long-term care insurance in 2000 with a view to reducing the average duration of hospitalization for inpatient care by facilitating in-home care. The long-term care insurance is expected to alleviate the care-giving burden placed on family members, many of whom are middle-aged women (Ogawa and Retherford 1997).

DETERIORATING FAMILIAL SUPPORT

As distinct from other developed countries, in Japan multigenerational households are still fairly common (Ogawa and Ermisch 1996). According to the International Survey of Lifestyles and Attitudes of the Elderly (Japan Cabinet Office, various years), the proportion of the elderly at ages 65 and over living in three-generation households in

Japan was 21% in 2005. By contrast, the corresponding figure was only 3% in the US and 1% in Germany and France. It should be stressed, however, that the figure for Japan has been steadily declining over the past two decades as a result of rapid demographic shifts and changing lifestyles; in 1981 it was 42%, twice as high as the level in 2005. Similarly, census data show that the proportion of those aged 65 and older co-residing with their adult children declined from 70% in 1980 to 43% in 2005.

In parallel with these changes in multigenerational living arrangements over time, the magnitude of the intergenerational financial support from adult children to their elderly parents has also declined. The income sources of persons aged 65 and older have changed considerably (Japan Cabinet Office, various years). The proportion receiving financial support from children decreased substantially, from 35% in 1981 to 11% in 2005. In contrast, over the same time period the proportion of Japanese respondents aged 65 and older receiving public pension benefits increased from 74% to 95%, and the proportion of the elderly relying on their own savings increased from 11% to 25%. These intertemporal changes in the sources of income for the elderly are closely connected with the remarkable improvement of old-age pension benefits and considerable economic growth over the period under review.

Moreover, there have been dramatic value shifts among Japanese women of reproductive age with regard to their children. The value changes are captured well in the time-series data of the National Survey on Family Planning. The proportion of mothers under age 50 expecting to depend on their children for old-age security declined from 65% to 11% between 1950 and 2004. This time-series result suggests that Japanese children's utility as a source of old-age security for their parents had almost disappeared by the beginning of the twenty-first century (Ogawa et al. 2010).

In the same survey series, a question on the attitude of married women toward taking care of their aged parents has been asked in successive rounds since 1963. The precoded response categories are as follows: (i) 'good custom'; (ii) 'natural duty as children'; (iii) 'unavoidable due to inadequacy of public support resources'; and (iv) 'not a good custom'. The proportion of those who chose one of the first two response categories ('good custom' or 'natural duty as children') was stable over the period 1963–86. However, a sudden decline occurred in this proportion between 1986 and 1988, when the government of Japan began to shift the costs of caring for the elderly back to families. In subsequent years the corresponding proportion has been, by and large, on a downward trend.

THE IMPACT OF POPULATION AGING ON PUBLIC AND FAMILIAL TRANSFERS

These demographic and socioeconomic transformations in postwar Japan have been affecting the pattern and mode of intergenerational transfers over time. Figure 27.3 compares the changing pattern of three components of reallocation of the per capita lifecycle deficits in Japan during 1984–2004. The three components include net reallocations through assets, net public transfers, and net private transfers, measured in terms of 2000 constant prices on a per capita and annual basis. Panels A, B, and C illustrate the annual reallocation of the per capita lifecycle deficits observed in 1984, 1994, and 2004, respectively.

A brief comparison of these three panels reveals the following two points of interest. First, the composition of per capita net transfers to the elderly population changed dramatically over the 20-year period. As can be easily seen by comparing the three panels of Figure 27.3, the amount of per capita net public transfers to the elderly population increased significantly. Similarly, the amount of per capita net asset-based reallocations grew considerably over time. In contrast, the relative importance of per capita net familial transfers from the young to the elderly declined to an appreciable extent. These results seem to indicate that the Japanese elderly have been increasingly dependent upon public transfers (predominantly old-age pensions and medical care services) and upon asset-based reallocations for supporting themselves during retirement.

Second and more importantly, as marked by two circles in Figure 27.3 (one in Panel B and the other in Panel C), the amount of per capita net familial transfers to relatively young elderly persons (roughly in their 60s and early 70s) was negative both in 1994 and 2004, implying that the amount of financial assistance that relatively young elderly persons provided to their adult children or grandchildren exceeded monetary assistance from the latter to the former.

It is also noteworthy that the amount of such negative per capita net familial transfers from the relatively young elderly to other age groups rose during the period of Japan's lost decade in which the unemployment rate remained at a very high level by Japanese standards (ranging from 4% to 5%) and labor income hardly grew in nominal or real terms. Moreover, per capita net public pension transfers received by the elderly increased steadily over time, as shown in Figure 27.4. The values plotted in Figure 27.4, which are measured in 2000 constant prices, indicate that the per capita benefit level rose owing to the maturity of public pension schemes. The data displayed in Figure 27.5 further substantiate the validity of these empirical results: the younger age groups received

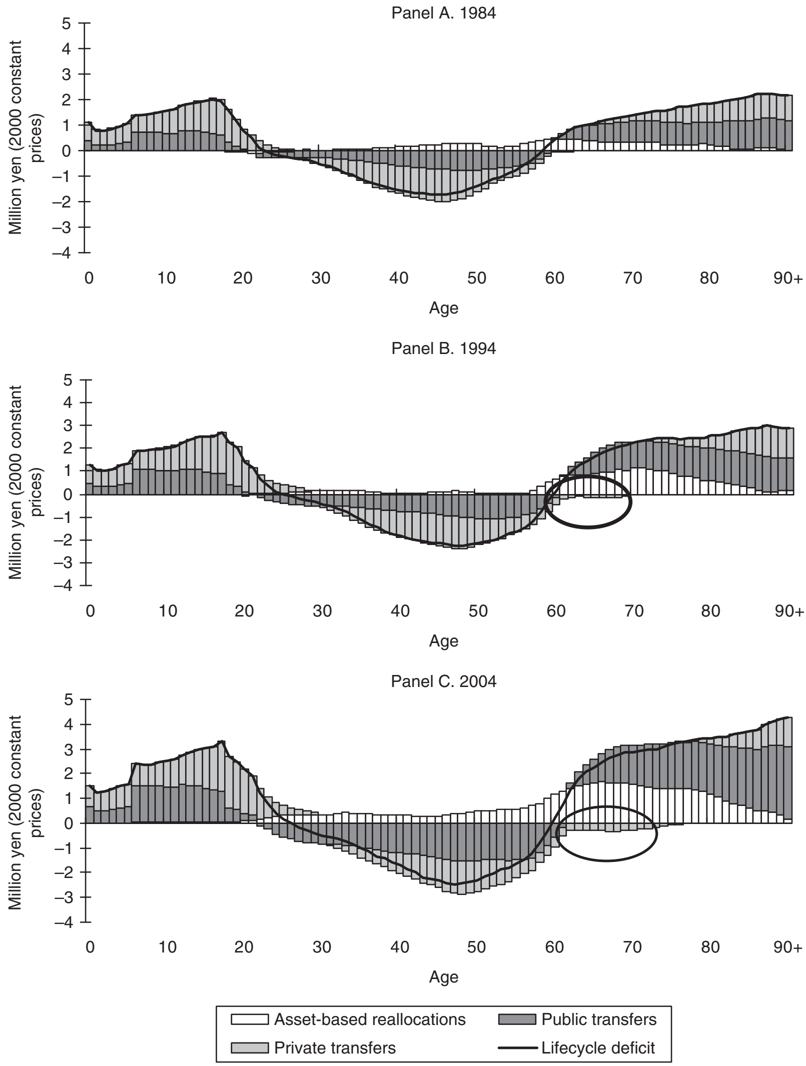


Figure 27.3 Three components of per capita reallocation of lifecycle deficits: Japan, 1984, 1994, and 2004

positive per capita net intra-household transfers from the age group 60–74.

To shed further light on the changing pattern of per capita net familial transfers over time, we have computed changes in the ages at which

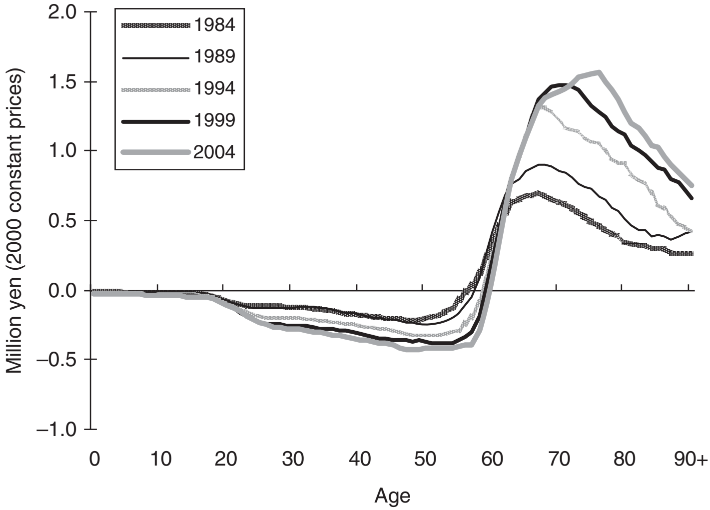


Figure 27.4 Per capita net public pension transfers: Japan, selected years, 1984–2004

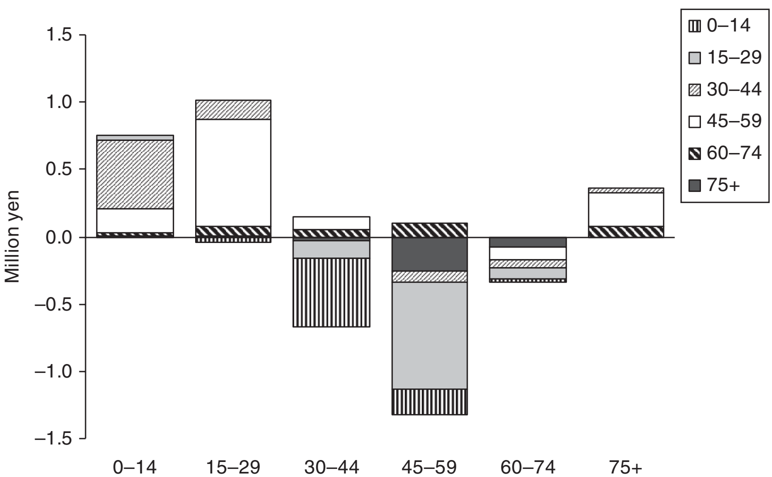


Figure 27.5 Per capita net intra-household transfers, by age: Japan, 2004

an average individual shifted from being a net consumer to being a net producer and from being a net producer to again being a net consumer, over the period between 1984 and 2004. We contrast these changes in the crossing ages in per capita net familial transfers with corresponding changes in per capita net public transfers over the same period. A careful examination of the numerical results indicates that the crossing ages in per capita net familial transfers changed substantially for both the young and the elderly, particularly the latter. In the case of per capita net public transfers, however, the crossing ages changed only to a slight extent among the elderly, while they remained unchanged among the young. (Two institutional factors account for the stability of the ages at which individuals shift their economic status in the per capita net public transfers: tertiary education, which ends at age 22 or its vicinity, and the slow adjustment of retirement age over the 20-year period under review.) These results appear to suggest that in contemporary Japanese society, familial transfers are considerably more flexible and responsive than public transfers in coping with such large-scale economic shocks as the bursting of the bubble economy and the prolonged recession of the 1990s.

CONCLUDING REMARKS

Drawing heavily upon the NTA approach, this chapter has reviewed selected evidence supporting the impact of Japan's fertility decline and age compositional shifts upon various sectors of Japanese society. Despite the fact that multigenerational co-residence has been deteriorating over the past few decades, the Japanese elderly, who have been increasingly dependent upon their steadily expanding public pension benefits, have played a vital role in providing financial support for their offspring when the latter have encountered economic difficulties. Although older persons in Japan are often considered liabilities for the country, they are actually playing a key role as a social safety net. For this reason, they should be considered latent assets in contemporary Japanese society.

ACKNOWLEDGMENTS

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28. Living arrangements and support for the elderly in Taiwan

An-Chi Tung and Nicole Mun Sim Lai

This chapter examines how Taiwanese elders support themselves and are supported by the productive members of the society. Given that the living arrangements of the elderly are usually a significant determinant of their economic welfare, we examine how the composition of income sources of the elders varies by household type. Using the NTA data for 1998, we have found that Taiwanese elders residing with their children relied primarily upon intra-familial transfers, elders living with only their spouses or grandchildren relied on their own resources, and the elders living alone relied heavily on government support.

We first consider the issue of living arrangements of the elderly and their economic security. Next we review Taiwan's rapid economic growth and demographic transition in recent decades and examine the changing pattern of living arrangements and economic support for the elderly. Then, after discussing the data and the methodology used in the analysis, we describe how elders finance their consumption in various living arrangements and report our results under alternative assumptions. In the last section we summarize the findings and suggest topics for future research.

LIVING ARRANGEMENTS FOR THE ELDERLY

The living arrangements of the elderly are usually a significant determinant of their economic security and welfare. The issue is critical for poor elders in the developing world, where formal welfare systems are less extensive than in more developed countries. It is also of major concern for any economy undergoing rapid dissolution of traditional co-residence patterns. Although co-residence benefits the younger as well as the older generation, in many societies living together with adult children has been 'a fundamental means of ensuring that the day-to-day needs of the older population would be met' (UN Population Division 2005, p. 75).

In Taiwan the proportion of elders (persons aged 65 or older) co-residing with their offspring dropped from 70.2% to 60.4% between 1986 and 2005, while the ratio of elders relying on children as their main income source plunged from 65.8% to 46.5%, according to the Elderly Condition Survey conducted by the Ministry of Interior (2005). The elderly rely on three major sources to finance their consumption: personal resources (labor income, asset income, and past savings), private transfers, and public transfers. As financial support from adult children has become less reliable as the major source of income, the elderly in Taiwan have depended increasingly on public or personal sources to fund their consumption. Between 1986 and 2005 their consumption of public sources rose from 1.2% to 16.0%, and their consumption of private sources rose from 30.9% to 40.8% (MOI 2005).

A vast literature on the theory of co-residence examines the motivation, benefits and costs, and underlying constraints and preferences of individuals, families, and societies with respect to various living arrangements (Kinsella 1990). Old-age support has been an important focus of this literature, and researchers have sought to identify the determinants of living arrangements of the elders, as well as the direction of support flows within families (Hermalin 2002). Given the paucity of systematic quantitative data, however, these studies usually rely on survey data on attitudes toward co-residence or on the frequency and intensity of various types of support. The results provide useful guidelines but no precise answers to basic questions about the magnitude of and changes in old-age support. One would need more systematic data to address such issues as how personal income complements or substitutes for familial and public transfers, or whether the composition of income sources affects the consumption level of the elderly.

ECONOMIC AND DEMOGRAPHIC BACKGROUND

Taiwan has experienced tremendous economic growth in the six decades since World War II. Per capita Gross Domestic Product rose from US$137 in 1951 to US$17 536 in 2007, with an annual compound rate of 8.6%, although growth has stagnated since 2000. Measured in current international dollars, the per capita income of Taiwan relative to the United States grew from 8.0% in 1951 to 54.2% in 2004 (calculated from Heston et al. 2006).

Fertility reached the replacement level in the early 1980s. By 2007 the total fertility rate had declined to 1.10 births per woman, as compared with 7.04 in 1951 and 2.05 in 1984. For females, life expectancy at birth lengthened from 56.3 years to 81.4 years between 1951 and 2007, and the median age of first marriage rose from 25.7 to 27.5 between 1991 and 2006.

Table 28.1 Social benefits for the elderly: Taiwan, 2005

Program	Social benefit (NT$ million)	
	Cash	In-kind
Social insurance programs		
National Health Insurance (since 1995)		367,397
Labor Insurance (since 1950)	176,313	10,211
Farmers' Insurance (since 1988)	4,267	4,576
Servicemen's Insurance (since 1953)	7,598	
Employment Insurance (since 1999)	5,282	
Government Employee Insurance (since 1958) and Retired Employee Insurance (since 1965)	2,563	1,546
Pension and old-age benefits		
Government Employee Pension and Servicemen's Pension (revised in 1995)	274,625	
Labor Pension, old system (since 1985)	42,425	
Labor Pension, new system (since 2005)	1	
Pension for Private School Teachers (since 2005)	2,097	
Social welfare		
Old-age Farmer Allowance (1995–2008)	33,199	
Old-age Citizen Allowance (2002–2008)	25,973	
Veteran Care	17,588	
Assistance for Low-Income Elderly (since 1993)	8,929	
Aborigine Allowance (ages 55–64, 2002–2008)	689	
Other welfare service and social assistance	11,781	54,224
Other	34,443	101,631

Source: DGBAS (2007, p. 10).

Taiwan's total population was about 23 million by the middle of 2010. It is projected to rise to 23.2 million by 2018 and decline afterward, according to the government's medium projection. The dependency ratio of the older population (ages 65+) to the working-age population (ages 15–64) is projected to rise from 13.9% in 2005 to 67.0% in 2051, while the dependency ratio of young people (ages 0–14) is projected to decline from 25.2% to 14.2%.

Social insurance and welfare programs focusing on the older population have greatly expanded since the 1990s (Table 28.1). The National Health Insurance Program, begun in 1995, covers 98% of the population by extending health benefits to those previously uninsured – for example, young people, housewives, the unemployed, and the elderly.

Government Employee Insurance and Labor Insurance are the two major occupational insurance programs. Both continued to offer non-medical cash benefits after 1995, such as maternity and disability benefits. With respect to old-age benefits, both programs provide a lump-sum retirement payment, and the related Government Employee Pension and Labor Pension offer additional one-time or monthly pension benefits. A National Pension Program was started in 2008, integrating a number of existing social welfare programs, as well as Labor Insurance and Farmers' Insurance, but not yet Government Employee Insurance or Servicemen's Insurance. However, the monthly payment available to pensioners through either the previous welfare programs or the new National Pension Program, in its initial stage, has been only a meager NT 3000–6000 (about US$85–$170), as compared with per capita private consumption at NT 25 834 in 2005.

DATA AND MEASURING SCHEME

Following the NTA methodology as described in Mason et al. (2009) and other chapters of this volume, we draw upon a variety of data sources, including the Family Income and Expenditure Survey (FIES), National Income, and public administrative records on health, education, social insurance, and public assistance in Taiwan. The FIES, the major data source, is a nationally representative survey that has been conducted annually since 1970 and contains income and expenditure information at both individual and household levels. Sampled households are interviewed annually, and selected households are requested to maintain daily diaries of household income and expenditures to serve as a form of quality control. In 1998 the sample size of 14 031 households represented 0.22% of all households in the population.

We classified the basic NTA results by living arrangement. Although the standard NTA data reported are smoothed across ages, our discussion of various living arrangements is based on unsmoothed data by broad age group so as to preserve maximum information. We have applied the same aggregate controls across household types to ensure consistency with National Income data.

In accordance with the classification system used by the United Nations (UN Population Division 2005), modified slightly according to the Taiwan context, the basic comparative scheme used here encompasses five mutually exclusive categories of living arrangement for the non-institutionalized population: (A) living alone; (B) living with spouse only; (C) living with a grandchild but not a child or with a grandparent but not a parent; (D) living with a child or child-in-law or with a parent or parent-in-law (this category includes the possibility of also living with other relatives or non-relatives); and (E) living with others (other relatives or unrelated people only). Category (D) includes two subcategories: (D1) living with a younger generation (ages 19 or younger) in the household, and (D2) living with adults (ages 20 or older) only.

One feature of this scheme is that the classification is based on familial relationships rather than on marital status. Older persons living alone (household category A) constitute a group that is naturally of social and policy concern, as they are more likely than others to be poor, even in developed economies (Casey and Yamada 2002). In addition to these one-person households, couple households (category B) also represent an independent style of living, with most private transfers taking place between the spouses. In skipped-generation households (category C), the support flow within the household usually goes downward from grandparent to grandchild. Category D is by far the largest group, consisting of both nuclear and extended families, by conventional definition. For those households with at least one young member (category D1), the direction of support may go from the working-age adult to the young dependent and possibly also to elderly parents, whereas for those households with no young members (category D2), the support flow within the family is expected to go upward.

Table 28.2 summarizes the distribution of these five types of household in Taiwan in 1998. Among those elderly living by themselves, 57.2% were male, a much higher percentage than the average ratio for the total population (50.5% according to the FIES 1998). This is probably because many of these elderly males were mainlander soldiers who had come to Taiwan around 1949 with the Nationalist Party government. It may also explain why only 5.9% of elders living in type A households were farmers, whereas a larger portion (19.8%) lived in rural areas than the average of 16.0% for the elderly and 12.5% for the total population. The elderly-couple households also had a greater tendency to live in rural areas (22.3%). As for educational level, elders living alone, with a spouse, or with grandchildren tended to have fewer years of schooling than other elders. Among those elder subgroups, 79.5% of those living alone, 72.4% of those living with a spouse, and 61.5% of those living with grandchildren had only an elementary education or no schooling at all, whereas the average ratio for all elders with only elementary or no schooling was 52.3%. (It was 41.7% for the total population.) Among elders living with only their adult children (type D2), 19.7% had a university degree, whereas the average ratio for the elderly was 12.9% (22.5% for the total adult population).

Table 28.2 Household types: Taiwan, 1998

Type	Percentage of households (1)	Percentage of total population (2)	Percentage of elderly households[a] (3)	Percentage of elderly population[b] (4)	Elderly heads among all elders (%)[c] (5)
(A) Alone	9.63	2.37	3.64	11.29	100.00
(B) Couple	10.96	5.17	9.79	24.83	57.12
(C) Skipped generation	0.90	0.67	1.79	2.18	49.59
(D) Living with children	77.59	91.12	84.35	61.00	8.41
(D1) Young children	(57.80)	(72.50)	(59.25)	(34.55)	(4.92)
(D2) Adult children only	(19.80)	(18.62)	(24.79)	(26.44)	(12.98)
(E) Other	0.92	0.67	0.43	0.71	57.69
Subtotal	100.00	100.00	100.00	100.00	
Total no.	6,273,056	21,887,030	5,597,613	1,803,191	203,537

Notes:

a. The third column shows the relative population size of the elderly households, defined as households with at least one elderly member. Younger households are not listed here.

b. Column (4) reports the relative size of the elderly population by household type. The differences between columns (2) and (4) indicate that more elderly were living independently (type A and type B), or with grandchildren (type C) than the average, and that fewer than average were living with young family members (type D1).

c. The final column shows the percentage of elders who were the economic head of the household. The head, being defined as the main breadwinner of the family, was likely to be a net provider of resources to other family members. The low ratios of elderly heads in D1 and D2 households suggest that the elderly were likely to be net receivers of intra-household transfers if they were not household heads.

Sources: Total population is directly from the Council of Economic Planning and Development; the percentage shares are calculated from the FIES, 1998.

FINANCING ELDERS' CONSUMPTION

As shown in Figure 28.1, the per capita labor earnings curve exhibits the characteristic inverted U-shape, with most earnings coming from employee compensation (light gray area) and only 7.2% coming from self-employment (dark area). Total per capita labor income peaks at age 39

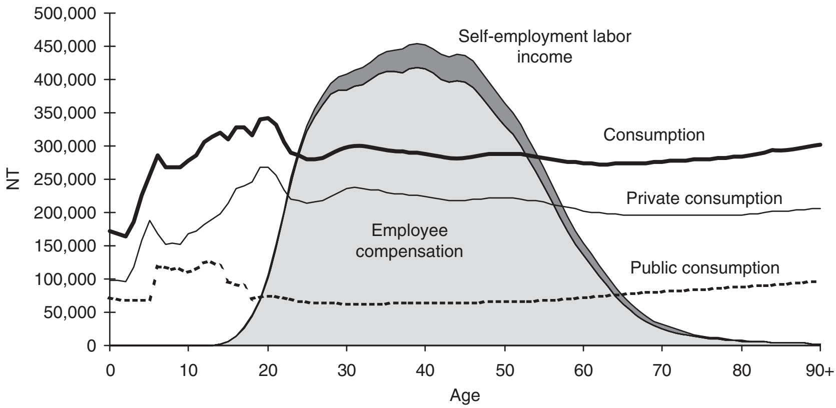


Figure 28.1 Mean consumption and labor income: Taiwan, 1998

and becomes very low after age 65, the official retirement age in the public sector. For those between ages 25 and 54, mean labor income exceeds total consumption.

The age pattern of consumption (thick line) has a much more dampened shape. Private consumption (thin line) represents 73.2% of total consumption, and public consumption (broken line) accounts for the other 26.8%. Total consumption, which is affected by high education expenses at younger ages, peaks at age 20. The consumption age profile rises at older ages because of rising health care consumption, both private and public.

The level of consumption is a good indicator of welfare level, although it does not translate directly into welfare level because of scale economies within the household and the nature of certain kinds of consumption, such as health care. Figure 28.2 compares the average consumption of elders by household type, omitting type E, which had too few observations to be of significance. The elderly living with grandchildren but without adult children (type C) are seen to have fared the worst, as such elders usually have to support their grandchildren. Those elders living in households with young members (type D1) also had a low consumption level because some of the resources of the family, either from working-age adults or the elderly, were going to the young dependents. The consumption level of the elderly living with only a spouse (type B) was higher, and it was even higher for those living with adult children (type D2). What is somewhat surprising is that the solitary-living group (type A) had the highest level of consumption, in contrast to conventional wisdom (UN Population Division 2005). We examine this phenomenon next.

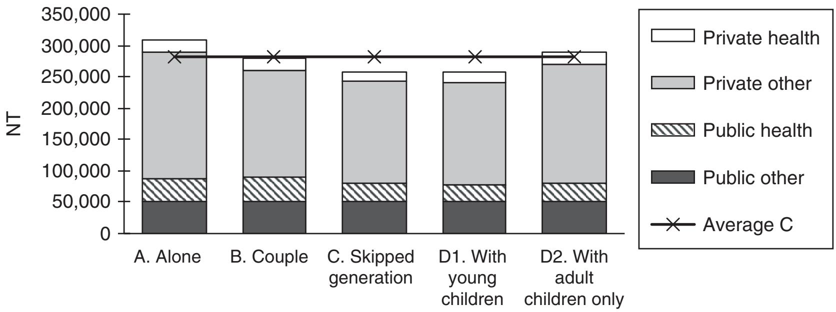
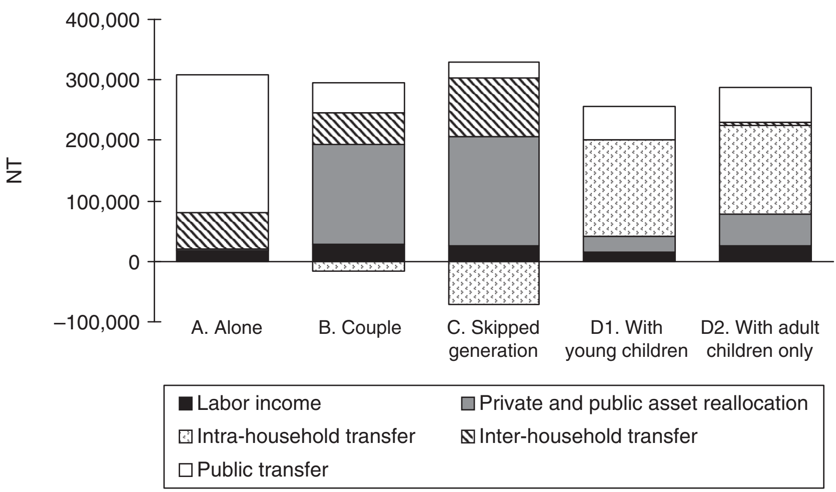


Figure 28.2 Mean consumption level of the elderly by household type: Taiwan, 1998



Note: Public asset reallocation is trivial, and here is combined with private asset reallocation for completeness.

Figure 28.3 Financing elderly consumption under usual NTA assumptions: Taiwan, 1998

Figure 28.3 illustrates six income sources used to finance elderly consumption. All sources are in net terms. We divided private transfers into inter- and intra-household transfers. Private asset reallocation is composed of net private asset income and dissaving. We found that, on average, elders in all five categories were still saving, although their net asset reallocation was small for household types A, D1, and D2. Public asset reallocation was insignificant, and therefore we combined it with private asset reallocation in the figure.

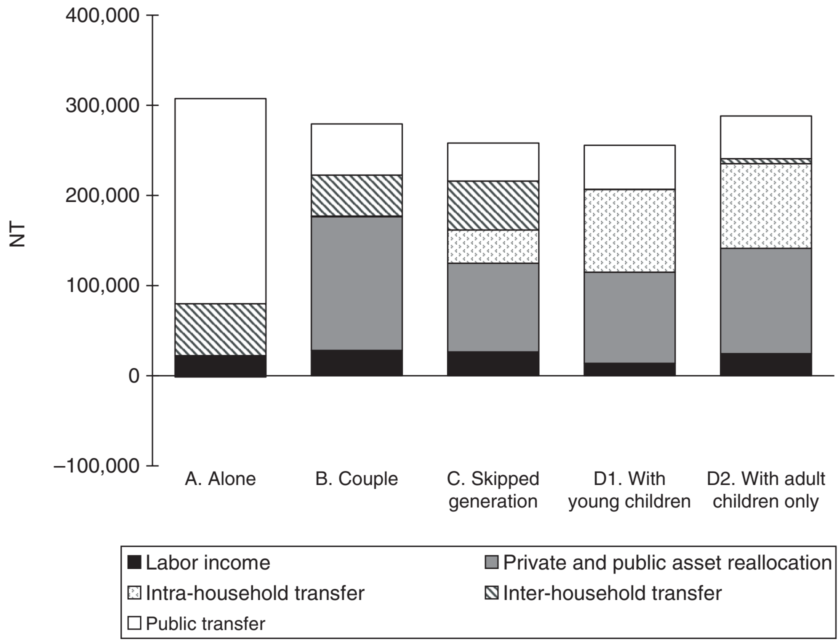
Several interesting points stand out. For elders living alone (type A), public transfer was by far the most important source for financing consumption, and they received far more social assistance than elders in other living arrangements. A likely explanation is that some kinds of welfare assistance, in particular the assistance for low-income elderly, are based on the level of household income and are therefore more favorable to those who live alone. For those living with a spouse (household type B) or only with grandchildren (type C), private asset income (net of savings) was the major source. Although this result may suggest that these elders owned more assets, it could as well be a statistical artifact. Specifically, elders in types D1 and D2 were less likely to be household heads than were those in type B or C, while household assets were owned by household heads under the usual NTA assumption.

Net inter-household transfers were positive in household types A, B, and C, and a substantial portion of them is likely to have come from family members living separately (Tung et al. 2006). But for elders living with children, the amount of inter-household transfers was negligible.

Intra-household transfers were negative for elders in household type B but positive and large in types D1 and D2. In the skipped-generation elderly households, about 50% of the elderly population were economic heads of household (Table 28.2), another 20% were their spouses, and only 30% were dependents. That means most grandparents in this category had to support their grandchildren through intra-household transfers. It follows that their consumption level was the lowest among all elderly. By contrast, intra-household transfers were the dominant income source for those elders who were residing with children, as only a small portion of them (8.4%) were the economic heads.

In sum, our findings indicate that the major source of income to support elderly consumption in Taiwan is intra-household transfers for those elders living with their children, who accounted for 61.0% of all elderly in 1998. Those with no children living in the same household and living with spouses or grandchildren (27.0% of the elderly population in 1998) must resort to their own asset income or dissavings. The elders living alone (11.3% of the elder population) have few personal resources and receive modest inter-household transfers. Government transfers are their major source of income.

The composition of sources to finance consumption depends on the preferences and constraints of the elderly in each living arrangement. The underlying causal relation is beyond the scope of this study, but some of the differences may be related to assumptions about transfers between



Note: Public asset reallocation is trivial, and here is combined with private asset reallocation for completeness

Figure 28.4 Financing elderly consumption under alternative assumptions: Taiwan, 1998

households and asset ownership within households. In the basic NTA methodology, it is assumed that only the household head owns (private) assets, and the head also receives all inter-household transfer flows. As a sensitivity test, we make an alternative assumption: that all household members had equal shares in asset ownership and inter-household transfers.

The disparity between the new results, as illustrated in Figure 28.4, and the original ones is not very large. We see no difference for the older population living alone and little difference for the couple households, because in most cases the spouses were also elders. For elders in the skipped-generation households, private asset reallocation became smaller but was still the major income source. Yet these elders were no longer the net providers of resources to other family members, but rather net receivers, shifting the burden to working-age grandchildren in the household, if any. Finally, for elders living in household types D1 and D2, the importance of private asset reallocation increased considerably; nevertheless, intra-household transfers remained an importance source.

The true situation may lie either between, or outside, these two sets of assumptions. For example, if most of the household assets come with the elders when they join a type D2 household (in their old age), then both assumptions may understate the role of private assets in funding consumption by the elderly. In any case, the type of living arrangement does seem to be relevant to the composition of income sources.

CONCLUDING REMARKS

We found that most Taiwanese elders resided with their children in 1998, and they relied primarily upon intra-familial transfers. Elders who lived with only a spouse or grandchildren relied on their own resources, mainly asset income net of savings. Elders living alone relied mostly on government support. Although the results seem to follow naturally from the structure of the household, several points deserve further thought.

First, given that family nuclearization is continuing and population aging is accelerating, the government will have to assume more responsibility for supporting the elderly. The elderly themselves may also need to save more during their working ages or to delay retirement so as to finance their own consumption in old age.

Second, the issue is complicated by the potential substitutability among financing sources. For example, it is likely that an increase in inter-household resource flows compensates for the decrease in intra-household transfers when adult children continue to send money to their parents after forming their own households (Tung et al. 2006). And when national income increases in Taiwan and the government plays a larger role in supporting the elderly, as is often observed in richer countries, it is plausible that public transfers may crowd out either private transfers (Lai 2006; Lai and Orsuwan 2009) or personal savings (Hu et al. 2000). Moreover, public provision of health care or other services may reduce private consumption of such items (Hsieh 2008).

An even more intriguing question is whether the differences observed in the funding of consumption are a result or a determinant of living arrangements. That is, do Taiwanese elders live alone because they have large public transfers, or do they receive large public transfers because they live alone? Do elders living with children rely on intra-familial transfers because they themselves do not have enough assets to spend? Is there some selectivity into other household types? These are issues inviting future investigation.

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29. Transfer accounts in Costa Rica's mixed economy under rapidly changing demographic conditions

Luis Rosero-Bixby, Paola Zúñiga-Brenes, and Andrea Collado

In Costa Rica government transfers to the elderly population are exceptionally high in per capita terms. In contrast, net transfers from adult children to elderly parents are negligible until the parents reach very advanced ages. Intragenerational reallocations are also a surprisingly large source of funding of consumption at old ages. The narrow age span with a labor income surplus, combined with the early age (55 years) at which Costa Ricans start having a labor income deficit, is another peculiarity of this country.

THE SETTING

Costa Rica has a population of about 4.5 million inhabitants in a territory of 51 000 square kilometers. It is distinguished by racial and cultural homogeneity, political stability, and a constitution that abolished its armed forces in 1949.

Economy

Costa Rica's 'mixed' economy is considered a Latin American textbook case, halfway between Chile's market economy and Cuba's socialist economy (Mesa-Lago 2000). The government owns important sectors of the economy, including banking, telecommunications, insurance, petroleum, and even alcohol production, although in the last two decades the prominence of government in the economy has declined. Government revenue depends upon indirect taxes, but these are not very regressive because of exemptions in sales and consumer taxes (Zúñiga-Brenes 2008).

According to the World Bank (2008), per capita income in Costa

Rica (US$5600 or $10 700 PPP in 2007) is similar to the Latin American average. The Costa Rican economy is more oriented toward the external sector, with exports representing 51% of GDP, than is the Latin American region as a whole (25%). After a severe economic crisis in 1981, the country reduced the size of the government and diversified its economy from exports of a few agricultural products (mostly coffee and bananas) to the production of a variety of goods and services, including microchips and tourism, now the two most important sources of hard currency.

The Gross National Product has grown at about 5% per year since 1990 (population growth is about 2%). Unemployment is low: 4.6% in 2007 (INEC 2008), lower than the Latin American average of 8.7% (UN DESA 2007). The share of people working in the informal sector was 39% in 2003, below the Latin American average, but above that of Chile or Brazil (ILO 2007). The participation of women in the labor force has risen rapidly in recent decades, from 22% (ages 20–29) in the 1963 census to 54% in the 2005 National Household Survey.

Historically, income distribution has been more equal in Costa Rica than in much of Latin America, with a Gini index of 0.484 in 2007 (CEPAL 2009). Inequality has increased, however, in the last two decades.

Social Development

Costa Rica has been more successful in achieving social development than economic development. The United Nations Development Programme ranks Costa Rica 48th in the world (fourth in Latin America) in its Human Development Index (UNDP 2008). It ranks Costa Rica 60th in the economic component of the index, in contrast with a ranking of 25 worldwide (first in Latin America) in the life expectancy component of the index. Costa Rican achievements in health, education, and social security are in part the result of its welfare state and zero expenditures on weapons (Mata and Rosero-Bixby 1988).

Since 1941 the country has had a quasi-universal public health insurance and care system provided by the government's Social Security Fund (Caja Costarricense del Seguro Social, or CCSS). Health insurance, which is mandatory for all workers, covers all health care needs of workers and their families, including prescription drugs. CCSS health care units provide services free of charge; there are no co-payments. Mandatory payroll-based deductions from employees' wages, employers, and the government fund the system. Those working in the informal sector, including peasants, farmers, petty merchants, and artisans, and those without jobs can obtain public health care either by buying insurance from the CCSS or by being insured by the government, which pays premiums for the poor to the CCSS from a special fund (FODESAF), established in the 1970s as a means-tested program (Barahona Montero 1999; Durán-Valverde 2002; Martínez-Franzoni and Mesa-Lago 2003; PAHO 2004). The public health insurance covers about 90% of the population (OPS 2004, p. 48). The few uninsured individuals (a self-selected healthier group) can obtain health care from the CCSS units for a fee, or no fee if social workers verify that a patient has no means of paying.

In addition to the CCSS, there is a private health sector that includes a few hospitals and a large number of physicians, dentists, laboratories, and pharmacies. People who use these services usually pay out-of-pocket for them. Private health insurance plans are rare and cater to high-income households and employees of transnational companies.

Costa Rica has also been a success story in education. By the end of the nineteenth century the country had greatly expanded its primary education coverage (PEN 2008, p. 48), and the illiteracy rate decreased by 74% between 1864 and 1927, reaching a literacy level of 60%, 40 percentage points higher than its neighbors (Seligson et al. 1996, pp. 46–7). Today primary education is universal, and illiteracy among the population aged 15 and older is only about 4% (UNESCO 2008). Costa Rica also has the highest secondary education enrollment rate in Central America (64% in 2007), although this rate is below the Latin American average (CEPAL 2009). In contrast to the health care system, the Costa Rican education system includes a strong private sector at all educational levels (PEN 2008, p. 45).

A third leg of Costa Rica's social welfare state is its generous pension system. Among the population aged 65 and older, 64% receive a pension and an additional 12% are married to or co-reside with a pensioner. The percentage of those not covered directly or indirectly (e.g., spouses) by the pension system (24% nationally) is higher in rural areas (30%), but lower among the oldest old (18%) and in the lowest income quartile (22%). Elderly or disabled individuals are entitled to a pension accrued through contributions they made to the system when employed; through inheritance on the part of a worker's surviving spouse or children, whether the worker was retired or not upon his death; or from a basic, non-contributive system for persons living below the poverty line. Close to one third of old-age pensions are provided by the non-contributive system. All salaried workers and employers are required to contribute to a Social Security Pension Fund. Self-employed workers also participate in this fund with subsidized contributions. The statutory retirement age is 62 years for women and 65 years for men; special public funds such as those for teachers often have younger retirement ages. By age 60, 32% of men and 27% of women receive a pension. An independent fund (FODESAF) created with a 5.5%

salary tax paid by employers pays for non-contributive pensions. All these are typical pay-as-you-go systems that operate as intergenerational transfers: young generations support current pensions with the understanding that in the future their pensions will be paid by younger generations. Since 2000 there have also been complementary pension funds administered for private or public operators that function as individual saving accounts (Mesa-Lago and Bertranou 1998; Fernández and Robles 2008).

Demography and Living Arrangements

Costa Rican life expectancy of 79 years at birth is the second highest in the Americas (after Canada's) and is higher than that of the US (World Bank 2008). Costa Rica had essentially completed its demographic transition by 2002, when fertility reached replacement levels (INEC and CCP 2008). The total fertility rate of 2.00 births per woman in 2005 was lower than in the US (2.04 births) and second lowest in Latin America after Cuba. Costa Rica is also one of the few Latin American countries with a substantial stock (10%) of international immigrants (UNPD 2009, table 1c). Because the demographic transition was so rapid and recent, a population aging process has not yet occurred: only 5.6% of Costa Ricans are aged 65 and over.

Nevertheless, the age structure has changed substantially since fertility started to decline in the 1960s. The change so far has inflated the center of the age pyramid and narrowed its base. Children and young people under 20 years of age, who represented 57% of the population in 1965, accounted for only 38% by 2005, whereas adults of ages 20–64, who represented 39% of the 1965 population, comprised 56% of the 2005 population. By the year 2050 the percentage of working-age adults will not change, but the proportion of children and young people will have declined to 23%, and the elderly population will have increased from the current 5.6% to 21% (INEC and CCP 2008, pp. 26, 64, and 65). The dependency ratios shown in Figure 29.1 summarize these recorded and projected changes in the age structure. Two features are worth noting: (1) the sharp decline in the ratio from 153% in 1965 to a projected floor of 60% in 2020 and a partial rebound to 89% in 2060; and (2) the substantial change in the composition of the age-dependent population: more than 50% of the dependent population will be elderly individuals by 2050, compared with 6% in 1970 and 13% in 2005.

Intergenerational transfers in Costa Rica are framed by living arrangements in households where elderly adults often co-reside with their grown children. Only 10% of Costa Rican elders live alone, while 57% live with an offspring. In a developed country such as England the corresponding

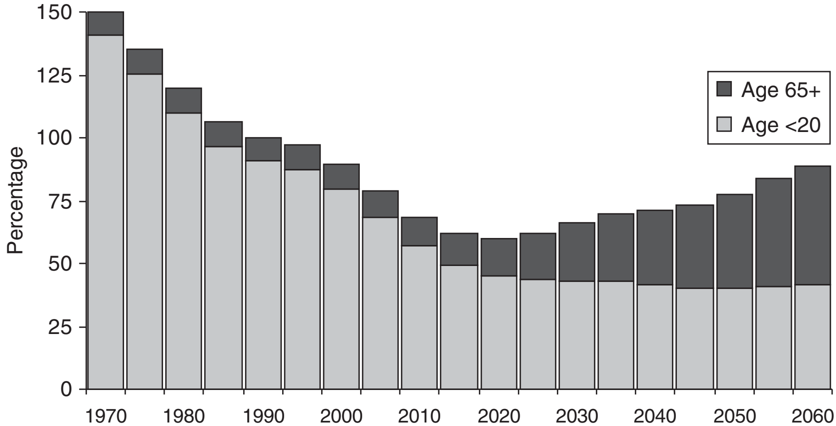


Figure 29.1 The demographic dependency ratio: Costa Rica, 1970–2060

figures are 33% and 11% (Puga et al. 2007). An important feature of co-residence of parents with grown children in Costa Rica is that children are the ones who overwhelmingly (96%) live with their parents (that is, who never left the parental household or returned to it), rather than vice versa. These patterns are partly dictated by high fertility in the recent Costa Rican past.

DATA AND METHODS

Data Sources

Calculating transfer accounts requires having estimates of the totals of income and product accounts and age profiles. We used microdata from the most recent Costa Rican Household Income and Expenditure Survey (ENIGH), conducted by the National Census and Statistics Institute (INEC), to estimate the age profiles and adjusted the totals to the National Income and Product Accounts (NIPA) as estimated by the Costa Rican Central Bank. The ENIGH is a nationally representative survey of 4200 households and 15 600 individuals that was conducted by INEC from March 2004 to April 2005 (INEC 2006). It provides detailed information about individuals' income, including transfers and earnings from assets; use of selected services such as health and education; and household consumption. The data from the NIPA on public transfers were for the year 2004 and are available on the Web (BCCR 2007). The Central Bank provided unpublished estimates of mixed income, public transfers, asset income, and taxes.

Adapting the Available Data to the NTA Methodology

We modified the original weighting factors of the ENIGH to replicate the Costa Rican population by single-year ages in December 2004 (INEC and CCP 2008). We treated the individual with the highest income in the household as the household head, not the person self-reported as the head. Given that the self-reported head tends to be older than the highest income earner, this change tends to reduce the age of asset income earners and to reduce the intra-familial transfers from the old to the young. We estimated the operating surplus of an incorporated business as the reported total operating surplus minus mixed income and the household's operating surplus. We allocated education and health expenditures by sector (public and private) within the family, using a regression method. Durable goods (except the respondent's own house) were included as if they were completely consumed at the time of purchase. Public transfers from the government to households included transfers in kind (public consumption) and cash transfers. Transfers-in-kind profiles for health and education required additional information about per capita costs of health services (CCSS 2007) and education (MEP 2007). The aggregate transfers in cash came from unpublished data from the Central Bank, following codes used in the System of National Accounts (SNA). We reclassified those transfers according to NTA groups.

Workers' contributions to the social security pension and health insurance systems were considered transfers to the government – that is, taxes on wages. Workers' contributions to individual pension funds were considered to be savings. Employers' contribution to the social security system and other employer-paid fringe benefits were included as a proportion of the salary in the labor income estimates.

Public asset reallocations follow tax age profiles, and private asset reallocations follow mixed income, plus property income, plus household operating-surplus age profiles, as reported in the ENIGH. Age profiles for private interest expenditures are based on what people reported to pay for loans. The expenditures include interest plus pay-offs; there is no information about interest expenses alone. We used the same profile for public and private expenses.

The Mixed Income Estimate

A critical issue for Costa Rican estimates of labor income and other accounts was the lack of data at the aggregated level of 'mixed income', a component of the operating surplus that is not reported by Costa Rican National Accounts. The SNA defines mixed income as the 'surplus or deficit accruing from production by unincorporated enterprises owned by households' (UN 1993). It is therefore a mixture of returns to labor and capital that in part should be allocated to labor income estimates in the NTA methodology.

Central Bank officers in charge of the National Accounts gave us a preliminary, unofficial estimate of mixed income representing a 15% share of the total net operating surplus – that is, the sum of household operating surplus, corporate business surplus, and mixed income. This figure, however, seemed too low as compared with other countries in the Americas, except Brazil; the share was 28% in Chile, 39% in Mexico, 37% in Uruguay, and 25% in the US (estimates provided by the NTA country teams in August 2008).

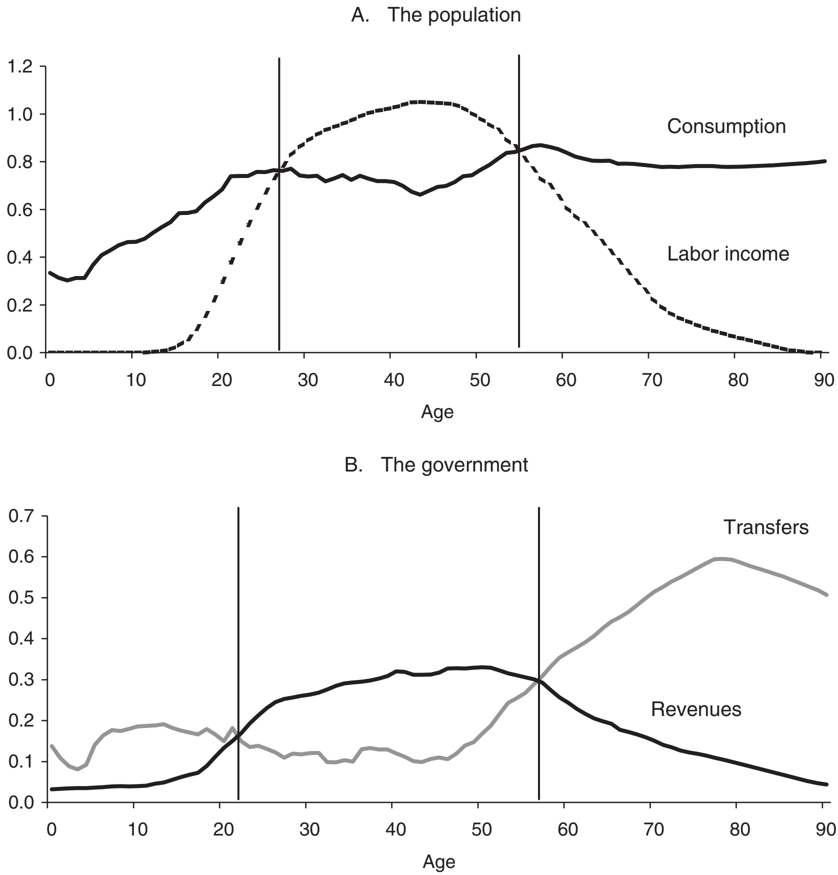
We generated several estimates of mixed income from the ENIGH data under selected scenarios, which combine four definitions of unincorporated business and two allocations of imputed wages, as well as an estimate that considers all independent income in the survey as mixed income. We kept as the best estimate of mixed income the one from the ENIGH that considers firms with fewer than ten workers as unincorporated businesses and allocates imputed wages in these firms to only wages (instead of assuming that it is mixed income). This estimate results in a 22% share of the operating surplus – that is, still below that of the US or Chile.

The amount of lifecycle deficit, as well as other transfer accounts, and the surplus age span are sensitive to this choice of a mixed-income estimate. For example, with the Central Bank estimate, the lifecycle deficit would be 9% larger and the surplus age span of 27–54 years would be the same. With the highest estimate of mixed income (34% share of operating surplus), the lifecycle deficit would be 18% lower and the surplus age span would be one year earlier and one year later. An earlier estimate that assumed a substantially larger mixed income share resulted in a 43% lower lifecycle deficit and a surplus age span of 24–57 years (Rosero-Bixby and Robles 2008, pp. 20 and 17).

SELECTED RESULTS

The Costa Rican economy operates with a lifecycle deficit of US$3.1 billion or $740 per capita per year, about 24% of consumption. Asset reallocations (asset income and debt, public and private) are the main funding source of the deficit.

The age span with a surplus is from 27 to 55 years (Figure 29.2, panel A). The deficit for the population under age 30 is almost $4 billion, or five times the deficit of $800 million for people over age 50. In per capita



Note: Values are expressed in relation to mean labor income of the 30–49 age group. Average annual income at ages 30–49 = US$4124.

Figure 29.2 The lifecycle deficit for the population and the government: Costa Rica, 2004

terms, however, the reverse is true: the deficit of elderly (65+) individuals is 37% higher than of individuals under age 20. The young Costa Rican age structure is the driving force that makes the lower per capita deficits of young people result in substantially higher total deficit at early ages: there are almost seven persons under age 20 for each person over age 65. As shown in Figure 29.1, however, this ratio is quickly changing, and by the year 2050 it will be 1 to 1.

Private intergenerational transfers, mostly within the family from parents to children, fund most (73%) of the consumption at young ages. That is not the case at old ages; direct transfers from children to parents are almost non-existent. Public transfers from a generous pension and health care system pay half the consumption (two thirds of the deficit) of the elderly. This reliance on public transfers by elderly Costa Ricans has been possible until now because of the relatively small size of the elderly population. One wonders whether this transfer pattern can be sustained as the population continues to age.

Asset reallocations are surprisingly important in Costa Rica. Even among relatively young adults, net asset income adds substantially to labor income (29% among ages 30–49 and 49% among ages 50–64). The highest per capita values occur at pre-retirement ages. About one quarter of consumption by the elderly is funded by returns from savings and investments made earlier in life or by inherited assets. This high figure suggests that asset accumulation is substantial in Costa Rica and might become an important force for economic growth as the population ages, in what Mason and Lee (2007) call the 'second demographic dividend'.

The age span over which average Costa Ricans earn from labor more than they consume is surprisingly narrow, only 28 years from age 27 to age 55 (Figure 29.2, panel A), which is in part the result of Costa Rica's welfare-state model of development. Generational effects may also influence it; the earning potential of older generations was limited by their low educational levels and by the low labor force participation of women as compared with younger cohorts.

Generational effects (as opposed to aging effects) may be the explanation for the peculiar shape of the consumption curve at middle ages. The depression in per capita consumption among individuals in their late 30s and 40s may be an echo of the economic crisis of the early 1980s that shaped their consumer behavior when they were adolescents or young adults. Some of these cohorts have substantially lower than expected educational levels. The depression of per capita consumption at middle ages can also result from the presence of teenage children at that time of the lifecycle.

Panel B of Figure 29.2 shows the government's equivalent of the lifecycle deficit. Surplus ages, in which individuals pay more in taxes than the public transfers they receive, range from 22 to 57. The ending surplus age is low because of generous government transfers to older individuals and also because the taxation of wealth is limited in Costa Rica. These two elements cause large per capita deficits at old ages. In contrast, the government deficit at young ages is small, a reflection of limited expenditures on state-run education and the big role of families in meeting consumption needs of the young. Because of this smaller deficit, the sharp decline in the demographic dependency ratio that has taken place in Costa Rica (Figure 29.1) has probably benefited the government less than families in what is known as the 'first demographic dividend'. By the same token, the big deficits at old ages will result in negative demographic dividends for the government sooner than for families (Rosero-Bixby and Robles 2008).

CONCLUSIONS

The most striking findings from the Costa Rican National Transfer Accounts are: (1) the important role of government transfers to support the consumption and deficits of the elderly population; (2) correspondingly, the lack of net transfers from grown children to elderly parents; (3) the substantial intragenerational income reallocations, especially as a source of income at pre-retirement ages; (4) the narrow age span having a surplus, especially the early age (55 years) at which Costa Ricans start having a labor income deficit; (5) the peculiar depression in the consumption curve at the middle adult ages, which could be a reflection of generational effects of the 1980s economic crisis; and (6) the large absolute deficit at young ages, driven by a population age structure that is still young.

Some of these results are manifestations of a welfare-oriented government in this middle-income country with a mixed economy, which has been able to achieve some outstanding levels of social development, especially in the health and social security safety net of its elderly population. The sustainability of some of the Costa Rican achievements and practices is challenged, however, by a rapid process of population aging that will occur in the next few decades.

Demographic transformations in the age structure and generational balances also offer windows of opportunity for Costa Rica. The precipitous reduction in the young component of the dependency ratio has probably improved the well-being of Costa Ricans, especially within families in which most transfers take place to fund the deficit of the young. This is known as the first demographic dividend, which could be amplified if government and families take advantage of it by investing in human capital. A second demographic dividend may also occur with the inflation of the population in pre-retirement ages and some older ages, whose accumulated assets could be invested in the formation of physical capital to improve labor productivity.

Although the international and longitudinal comparisons in this book show that the age profiles of the lifecycle deficit, intergenerational transfers, and intragenerational reallocations are rather stable over time, they are not immutable. Policy-makers can modify them, particularly public transfers and taxes. For example, they can increase taxation on wealth, which is mostly owned by elderly persons, to take advantage of opportunities and ameliorate risks brought about by the rapid aging of the population. Moreover, these age profiles reflect not only pure aging effects but also generational changes that by definition will modify cross-sectional age profiles at several time points.

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30. The support system for Indonesian elders: moving toward a sustainable national pension system

Maliki

This chapter investigates how, in the absence of a comprehensive pension program, Indonesian elders finance their retirement period, and does so by analyzing how the support system is differentiated by income level and rural/urban residence. It discusses the extent to which existing government support reaches the elderly poor and meets their consumption needs. The results show that how the elderly finance their retirement differs by income level, that the elderly poor in both rural and urban areas rely heavily on public transfers, and that they use public cash transfers to support other household members as well as themselves.

BACKGROUND

By 2050 the proportion of elders in the Indonesian population is projected to reach 25%, making Indonesia's elderly population the largest in Southeast Asia (BPS 2005a; Bapepam-LK 2006). Recognizing the importance of a guaranteed support system for the aging population, in 2006 the government of Indonesia issued Law No. 40/2004 expanding the social security system (*Jamsosnas*) to include a national pension system for workers in both the formal and informal sectors.

The planned program consists of two major parts. The first, intended to protect the vulnerable, will provide them with minimal basic social services, such as access to health care, credit and skill training for establishing small businesses, and employment insurance. The second provides health insurance and a pension plan for the non-poor. Rather than depending solely upon the government's pension program, working individuals are expected to contribute to their retirement support through mandatory pension savings.

Indonesia's social security system was begun in 1965 with the goal of providing universal medical and pension coverage. Despite amendments to the law expanding coverage in 1974, 1992, and 1998, the pension program covered only about 2.6% of the total workforce during 2000–05 (Bapepam-LK 2006). The social security program for workers (*Jamsostek*) currently covers only formal-sector workers, of whom the majority of enrollees are government employees and army personnel. It does not provide much incentive for formal-sector workers to save through the program for their retirement because it offers limited benefits (Leechor 1996). For example, after working 35 years, a retiree receives only about 7% of his final base salary. Employees' and private employers' lack of understanding of the importance of the pension program has been another reason for the low enrollment rate.

In the absence of pensions, elders need other means of support during their retirement period. Their income level is often a major determinant of such support. The elderly in low-income families can hardly accumulate assets and need to find other means to fund their consumption, such as extending their working period, relying upon government support, receiving support from other family members, borrowing money, or spending assets accumulated earlier.

The study reported here analyzes the support system for elderly Indonesians by household income level and place of residence, focusing on three issues that bear on the development of a comprehensive and sustainable social security system. These issues are: (1) how the elderly in the lowest income quartile finance their consumption; (2) how important is self-employment income among other sources of income for supporting the retirement period; and (3) how accumulated assets contribute to retirement support. The analysis reveals that public cash transfers are an important source of income for elders in poor households and that better-off elders, particularly in urban areas, rely mainly on asset accumulation.

METHODOLOGY AND DATA SOURCES

The study applies the National Transfer Accounts (NTA) methodology, introduced by Mason et al. (2009), to data from the 2005 Socioeconomic Survey (Susenas) published by the Central Statistical Bureau of Indonesia. Susenas is an annual, nationally representative survey containing information on the socioeconomic status of both individuals and households. The survey had a sample size of approximately 1 million individuals, or about 250 000 households, in 2005. Information on health, employment status, and educational status was obtained for each household member, while data on housing and sanitation access were collected for households.

Information about health service utilization is used for estimating the benefits of the public health budget (Maliki 2008a); information about school enrollment is used to estimate spending on public education; and household information on the receipt of public assistance, such as scholarships, health cards, and the subsidized rice program, is valuable for estimating the benefits of cash transfers.

In addition to the core information on households collected annually, every three years Susenas collects detailed information from households and individuals on such topics as consumption, income, education, and health. The three-year-cycle Susenas is called the Susenas-Module. In 2005 the Susenas-Module obtained detailed information on household consumption, household income, and individual members' earnings. These data were important sources for constructing the NTA.

To adjust the data to a national aggregate by type of household income, I used the financial social accounting matrix called *Sistem Neraca Sosio-Ekonomi dan Finansial* (SNSEF), compiled by the Central Bank and the Central Statistical Bureau (2008). SNSEF 2005, published in 2008, had four categories of household income and place of residence: poor urban, poor rural, non-poor urban, and non-poor rural. It included information on consumption, production, and transfers. The categories of poor and non-poor in this analysis are based on the standard used in Susenas and by SNSEF 2005 from the Central Statistical Bureau.

Table 30.1, based on data from the SNSEF 2005, shows aggregate and per capita income from three sources – labor, assets, and transfers – and aggregate and per capita savings for the four household types. As shown there, labor income was the most important income source for poor and non-poor households in both urban and rural areas, accounting for nearly 63% of total income, followed in order by income from assets and from transfers.

Labor income of urban households was the largest, representing 62% of total national labor income. Per capita labor income of poor urban areas was smaller than that of poor rural areas, whereas per capita labor income of non-poor urban areas was twice that of non-poor rural areas.

Households receive transfers from other households or from the government. Table 30.1 shows transfers received by households but not transfers given by them. Total transfers received by poor households in urban and rural areas accounted for 23–25% of their total income in 2005. Although aggregate transfers to poor rural households were larger than those to poor urban households, per capita transfers received by poor rural households were smaller than those of poor urban households owing to the much larger population of poor families in rural areas. Poor rural households depended slightly more on transfers than on income from

Table 30.1 Sources of household income by income level and place of residence: Indonesia, 2005

Population and type of income	Urban		Rural		Total
	Poor	Non-poor	Poor	Non-poor	
Population					
Number	14,490,825	84,973,980	28,629,102	97,969,137	226,063,044
Percentage	6.4	37.6	12.7	43.3	100.0
Annual income in billion rupiah[a]					
Labor income	10,978	923,236	23,508	526,301	1,484,024
Income from assets[b]	10,804	393,920	10,489	199,583	614,796
Transfers[c]	6,478	200,760	11,431	52,661	271,330
Total income	28,260	1,517,916	45,428	778,545	2,370,150
Savings	203	145,821	173	45,571	191,768
Annual per capita income in rupiah[a]					
Labor income	757,552	10,864,931	821,127	5,372,115	6,564,645
Income from assets[b]	745,550	4,635,773	366,361	2,037,206	2,719,576
Transfers[c]	447,063	2,362,606	399,266	537,531	1,200,242
Total income	1,950,165	17,863,310	1,586,754	7,946,852	10,484,463
Savings	14,015	1,716,064	6,057	465,155	848,295

Notes:
a. 1 rupiah = US 0.0105 cents in 2005.
b. Income from assets = returns to assets in the form of transfers from financial and non-financial institutions, government bonds and obligations, and part of non-labor income.
c. Include net transfers from/to other households, the government, and rest of the world (ROW).

assets, but the reverse was the case for poor urban households. Non-poor urban households depended on transfers more than did non-poor rural households.

Asset income, which consists of returns on assets and the capital share of mixed income, was the second largest source of income for non-poor households in both rural and urban areas, contributing about 26% to their total income. Assets were an even more important source of income for poor urban households, accounting for 38% of their total income.

Table 30.2 shows detailed transfers, both inflows and outflows, from various sources. Households receive transfers from the government in the form of services and cash. Government services are considered to be in-kind transfers, whereas government assistance in the form of scholarships is a cash transfer like any other direct cash transfer. In 2005 the amounts of in-kind services and cash transfers received by the non-poor population were much larger than those received by the poor population because the non-poor population was larger. On a per capita basis, all four types of households received similar in-kind services but different amounts of per capita cash transfers (bottom panel of Table 30.2).

The government provides cash transfers to both poor and non-poor households. The amount of food consumed and the amount of non-food consumption per capita per day in the households were the criteria used by SNSEF 2005. For the distribution of cash transfers or social assistance, additional criteria are commonly used. Thus government cash transfers, for example scholarships, go not only to the poor identified in this analysis but also to those considered vulnerable to poverty who cannot be distinguished from the non-poor with our method. As the government focuses on targeting poor rural households for its social safety-net programs and gasoline subsidy, poor households in urban areas receive less government cash than do poor rural households, a fact that is reflected in the per capita net cash transfers.

The government gave scholarships and direct cash transfers to the poor in compensation for the increased price of gasoline in 2005. Whereas it gave scholarships to enrolled students at every level from elementary school to higher education, it gave direct cash transfers directly to eligible households. I estimated an age profile of cash-transfer recipients based on the Susenas 2005 household survey. For this purpose I assumed the household head was the recipient and redistributed the cash to support other household members' consumption through intra-household transfers.

Not only do households receive transfers, they also give cash or in-kind transfers to other households and pay income, consumption, and property

Table 30.2 Summary of transfers from and to households by income level and place of residence: Indonesia, 2005

Type of transfer	Urban		Rural		Total
	Poor	Non-poor	Poor	Non-poor	
Household transfers in billion rupiah[a]					
Total					
Received	16,386	125,898	35,699	114,580	292,563
Given	2,297	186,845	2,845	79,953	271,941
Government transfers					
In-kind received	15,037	85,070	29,160	95,714	224,981
Cash received[b]	2,589	5,293	6,194	10,827	24,904
Given[c]	2,138	167,736	2,721	77,289	249,884
Inter-household transfers					
Received	414	5,933	1,043	2,966	10,356
Given	159	7,702	124	2,370	10,356
Transfers from ROW					
Received	935	34,896	5,496	15,900	57,227
Given	0	11,408	0	293	11,701
Per capita transfers in rupiah					
Total					
Received	1,152,517	1,510,060	1,270,888	1,192,005	1,319,016
Given	158,543	2,198,854	99,387	816,100	1,202,942
Government transfers					
In-kind received	1,057,628	1,020,349	1,038,108	995,737	1,014,322
Cash received	31,056	63,482	74,297	129,865	298,700
Given	150,370	2,011,871	96,871	804,063	1,126,599
Inter-household transfers					
Received	29,126	71,162	37,121	30,856	46,689
Given	11,217	92,375	4,424	24,660	46,689
Transfers from ROW					
Received	65,763	418,549	195,659	165,412	258,006
Given	0	136,831	0	3,048	52,754

Notes:
ROW – rest of world.
a. 1 rupiah = US 0.0105 cents in 2005.
b. Estimated from cash transfers program and Susenas.
c. Income tax and estimated consumption tax.

taxes to the government. As shown in Table 30.2, non-poor households in urban areas were net givers of government transfers, whereas non-poor households in rural areas as well as poor households in both areas were net receivers of government transfers. In rural areas per capita net government transfers received by poor households were larger than those received by the non-poor households.

Similar patterns were observed for the inter-household transfers: non-poor urban households were net givers of the transfers, while the other types of households were net receivers. Only non-poor urban households made transfers to recipients overseas, and the amounts given were small. Poor households, whether in rural or urban areas, barely transferred anything to overseas recipients, and they received only small amounts of cash from overseas.

NATIONAL TRANSFER ACCOUNTS FOR INDONESIA

Table 30.3 reports the main components of Indonesia's NTA separately by income and residence level. The values are the per capita counterparts of aggregate controls used to construct the accounts. *SNSEF Flow of Funds* (BPS 2005b), *National Account 2005* (BPS 2005c), and government financial statistics (MOF 2005) were the main sources for constructing the aggregate controls.

The NTA framework is quite different from the conventional framework presented in Tables 30.1 and 30.2. The conventional approach emphasizes sources of income, while NTA places more emphasis on consumption and how it is funded. Labor, transfers, and assets are both income sources and consumption sources. Consumption can also be funded by dissaving or by accumulating debt. NTA captures this source by introducing the concept of asset-based reallocations, which consist of the combined flows of asset income and saving. A second distinctive feature of NTA is that the basic unit of analysis is the individual rather than the household. Within households private transfers are often unimportant, but for individuals private transfers have enormous importance. Children depend heavily upon intra-household transfers, and in some societies the elderly may also depend heavily upon them.

Table 30.3 provides useful background information about how average values vary by residence and income. The emphasis in this chapter, however, is not on averages but rather on how economic flows vary by age and on the support system for the elderly.

Table 30.3 Aggregate controls for NTA by income level and place of residence: Indonesia, 2005 (in billion rupiah)

Type of transfer	Urban		Rural		
	Poor	Non-poor	Poor	Non-poor	Total
Lifecycle deficits	12,834	188,202	21,951	167,628	390,615
Consumption	23,811	1,111,438	45,459	693,930	1,874,638
Private	8,774	1,026,369	16,299	598,216	1,649,658
Public	15,037	85,070	29,160	95,714	224,981
Education and health	6,196	33,226	11,693	35,942	87,058
Other	8,841	51,843	17,467	59,772	137,923
Labor income	10,978	923,236	23,508	526,301	1,484,024
Reallocations	12,834	188,202	21,951	167,628	390,615
Asset reallocations	(19,333)	321,230	(49,730)	93,215	345,382
Transfers	32,167	(133,028)	71,681	74,413	45,233
Private	255	(1,769)	918	303	(293)
Public	15,488	(77,373)	32,633	29,252	(0)
In-kind: education & health	1,488	6,736	2,697	9,149	20,070
In-kind: Other	11,505	(89,285)	23,924	9,660	(44,195)
Cash	2,496	5,175	6,012	10,442	24,125
Rest of world	935	23,488	5,496	15,607	45,526

Public Transfers

Net public transfers are in-kind services and cash transfers received, less taxes paid by households. I estimated the inflow of public transfers by sector and proxied the tax age profile, as transfer outflow, by using labor income and consumption profiles. Figure 30.1 shows per capita net public transfers by household income level and place of residence and also shows net total government transfers. As shown for aggregate transfers in Table 30.2, non-poor households were net givers and poor households were net receivers in 2005. Figure 30.1 distinguishes in-kind from cash transfers. In-kind transfers comprise health, education, and other sectors. Estimates of education transfers to recipients are based on school enrollment as reported in Susenas 2005, and estimates of health care transfers are based on the use of public health services reported by the same source. The detailed estimation methods are described in Maliki (2008b). The other sectors are estimated by means of the methods described in Mason et al. (2009).

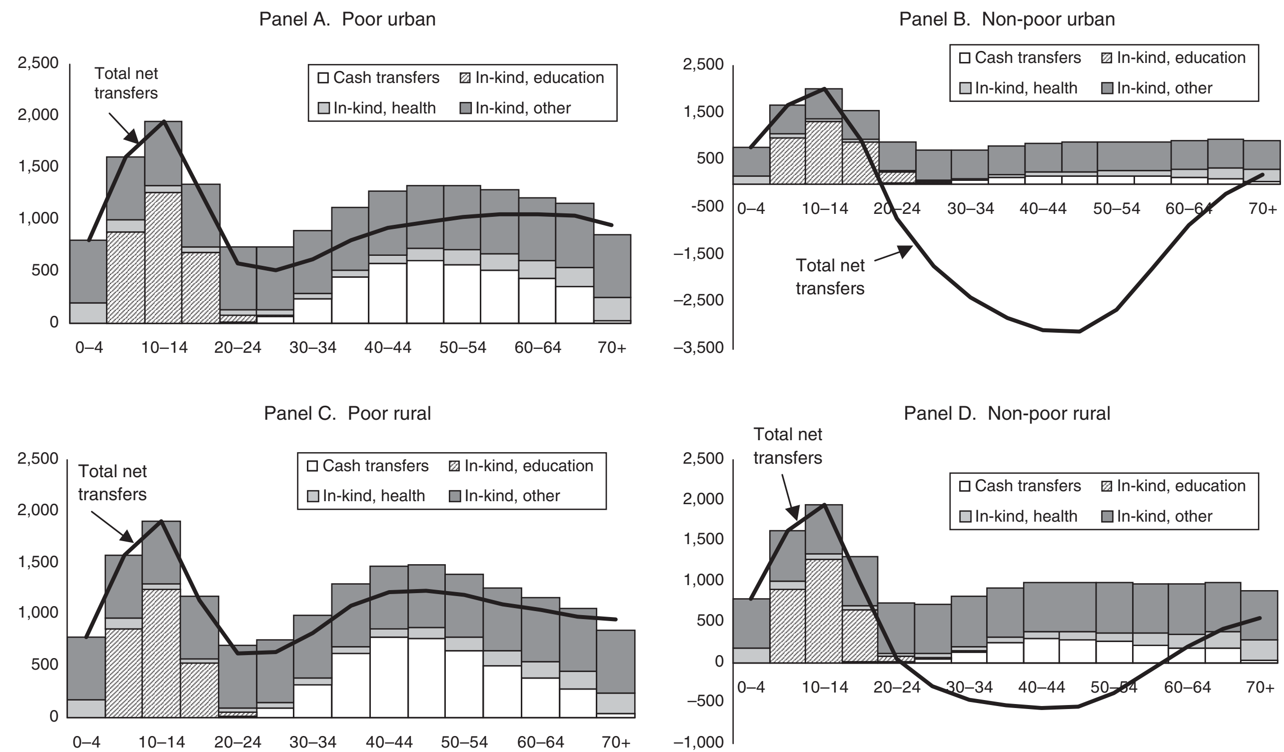

Figure 30.1 Per capita public transfer inflows and per capita net total public transfers, by income level, place of residence, and age group: Indonesia, 2005 (thousand rupiah)

School-age groups received most of the government benefits in 2005. According to government financial statistics for 2005 (MOF 2005), spending on education was greater for both in-kind services and cash transfers than was spending on health. Figure 30.1 shows two spending peaks. The first peak was due to educational services received by school-age children, and the amount of the transfers was similar for all four types of household. Health and other transfers did not significantly shape the profile of any household type. The second peak occurred only in poor households and was due to cash transfers received by them. Poor rural households received larger cash transfers than all other household types, making its second peak more pronounced than that of poor urban households. The positive amounts of net public transfers flowing to poor households indicate that the poor were using public cash transfers as an important source of income.

Non-poor households in both urban and rural areas received much smaller cash transfers than the poor. Within those households, ages 20–64 had negative net public transfers, meaning that they paid more taxes than they received in public benefits.

Labor Income

In Figure 30.2 labor income is normalized on the average labor income of the prime age group (30–49) for each of the four residence–income subpopulations. The normalization makes it possible to readily compare the shapes of the age profiles purged of differences in the average values across the four subpopulations. Figure 30.2 also shows the national average profiles of labor income relative to average labor income of ages 30–49 for comparison purposes. The labor income profiles of all household types were similar, except for the profile of poor rural households. With that exception, labor income in relation to the labor income of the prime working ages was similar. The peaks varied only from 1.08 to 1.10 times average production for the prime age group. The ages at which the profiles peaked, however, were slightly different for urban and rural households. Labor income of non-poor rural households peaked between ages 42 and 45, whereas that of urban households peaked one year later and tended to have a shorter span. Overall, the labor income profiles were similar to the profile for the national average labor income.

Labor income of poor rural households peaked at age 45 with a magnitude of about 1.18 times average production of the prime age group of labor income of the same type of households. This made the profile significantly different from the national average. At ages 20–39 the profile of poor rural households was slightly lower in magnitude but rose more

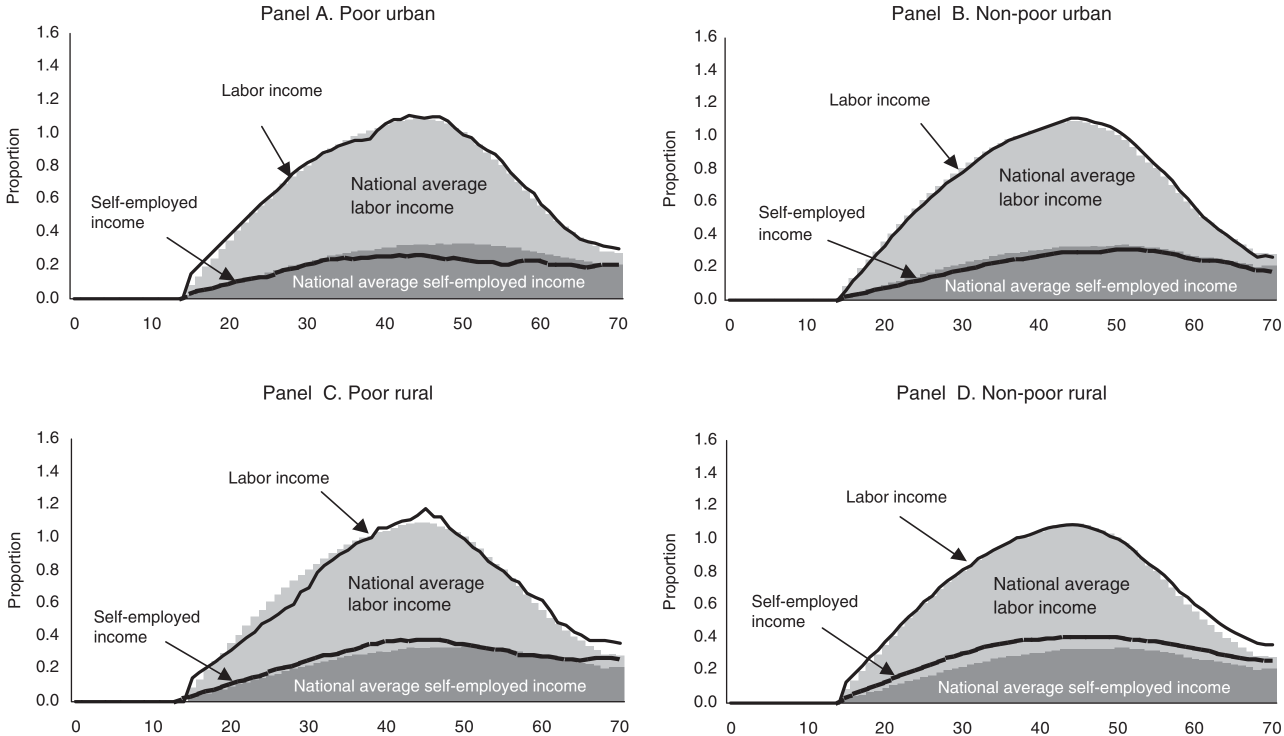

Figure 30.2 Per capita labor income relative to respective average production, by income level, place of residence, and age: Indonesia, 2005 (thousand rupiah)

steeply than the other profiles for the same age group. The profile then deviated again, rising above the national average starting at age 55. The reason for this anomaly is that poor rural households had lower earnings than the national average at early working ages, but higher self-employment income at later working ages. Poor young people in rural areas have fewer job opportunities than other young people, but they have almost the same opportunities for self-employment. The profiles also show that the elderly in poor rural households depended on self-employment income more than did the elderly in other types of households.

Figure 30.2 shows the differences in self-employment profiles between urban and rural households. Those living in rural areas had higher self-employment income than the national average, whereas among those living in urban areas, self-employment income was below the national average. The self-employment income of the poor was consistently lower than that of the non-poor, regardless of rural or urban residence. This result indicates that opportunities for self-employment are greater for those with investment assets, who are the non-poor. The poor, particularly in rural areas, work mainly as contract agricultural workers on land owned by the non-poor.

At any given age more elders living in rural areas, whether poor or not, were working than were non-poor elders living in urban households. The average labor income of workers at age 60 was only about 45% of that of workers aged 30–49, and for those still working at age 70 it was only about 20–30%. In urban areas the labor income of poor elders (relative to their respective prime age groups) was close to that of non-poor elders. Although the difference was not significant, poor elders had to work longer than their non-poor counterparts.

The Support System for the Elderly

Consumption can be funded in three ways – by labor income, transfers, and asset reallocation. Focusing on the support system of the Indonesian elderly in 2005, Figure 30.3 illustrates how much each of the three income sources funded consumption by the elderly (those aged 50 and older), by household income level and place of residence. Each funding source is expressed as a percentage of consumption.

Panel A shows that labor income was the main source for all four subpopulations of the elderly. At ages 50–54, labor income was still the main source of support for both poor and non-poor elderly. The role of income declined substantially as the elderly became older, however. At ages 70 and older, labor income, on average, funded about 20% of elders' consumption.

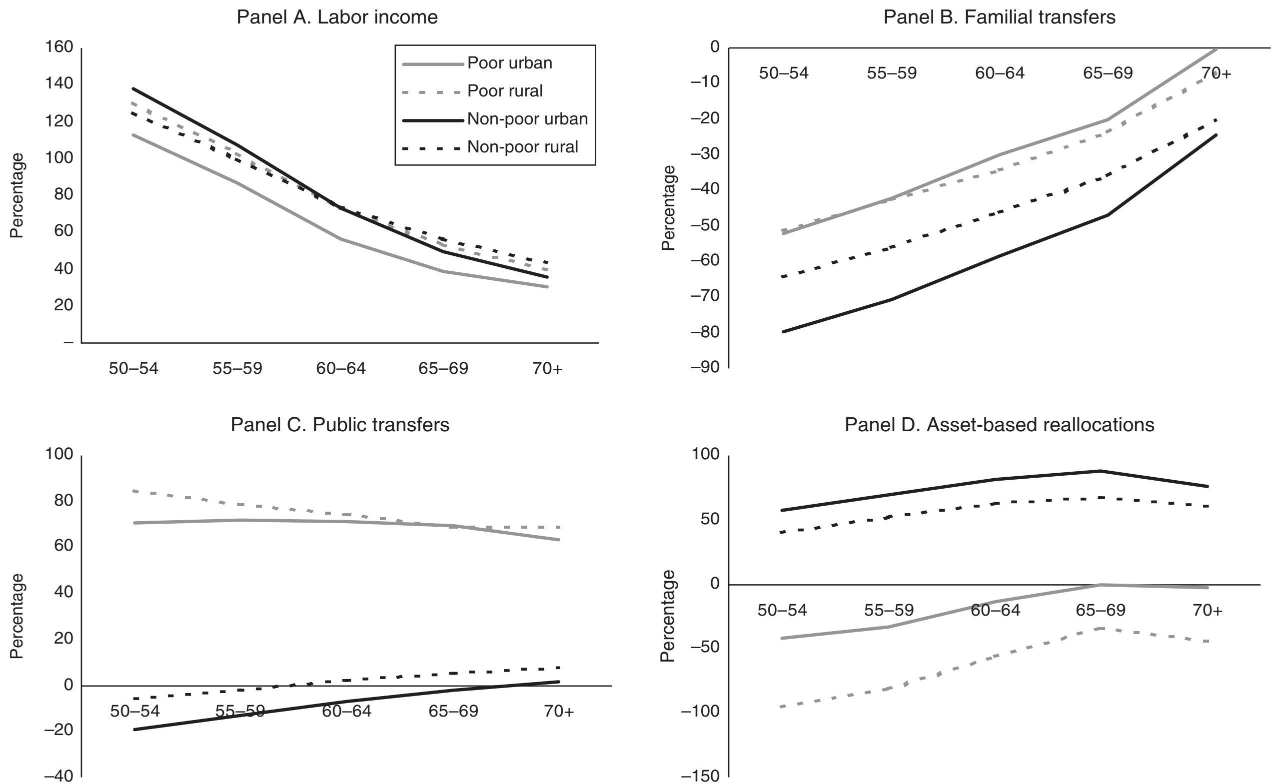

Figure 30.3 Support system of the elderly by source, income level, place of residence, and age group: Indonesia, 2005

In addition to their labor income, poor elders count on familial and public transfers as important sources of income (Panels B and C). Panel C reveals that poor elders of ages 50–54 in rural areas funded approximately 90% of their own consumption through public transfers, whereas for poor elders in urban areas transfers provided about 70%. Although still substantially large, net public transfers declined as a proportion of elders' consumption as the elders continued to age. The role of public transfers for poor rural elders was gradually replaced by small amounts of familial transfers (Panel B). Non-poor elderly at ages 50–59 years in both rural and urban areas were net givers of public transfers. Non-poor urban elders remained net public givers until reaching the ages of 65–69.

Non-poor elders reallocated their assets by dissaving to finance their consumption, pay taxes to the government, and support other members through familial transfers. Poor elders, in contrast, either used assets from their labor income surplus, along with public transfers, to support their family members and pay off other obligations such as debt, or saved the surplus. Their specific use of accumulated assets cannot be determined easily from Panel D of Figure 30.3 because the asset reallocations were calculated as residuals, and detailed components are not available at this time.

SUMMARY AND DISCUSSION

The analysis of data from 2005 indicates that poor and non-poor elders in Indonesia support their consumption in different ways. Public transfers are negative for non-poor households in urban areas, and the non-poor elderly dissave to fund their consumption. Familial transfers to the non-poor are hardly positive. Thus labor income and assets are the main sources of support for elders living in non-poor households in both urban and rural areas.

Whereas non-poor households in urban areas are net givers of government transfers, poor elders in rural and urban areas use government transfers as an important source of income. They even use the accumulated income from public transfers to support other household members. Public transfers are therefore important not only for the poor elderly, but also for other members of their families.

Several findings deserve emphasis. First, public support is vital to poor households. Second, self-employment income is essential, particularly in rural areas. Third, accumulating assets is an alternative way for high-income earners to support their retirement. The high dependency level of poor elders – and even to a certain degree of non-poor elders in rural areas – on public transfers indicates the importance of Indonesia's social security program to the poor. Public transfers are even more necessary when the poor elderly transfer their surplus assets to support consumption by other family members or to pay back accumulated debt.

Self-employment income supports many elders' consumption at least until they reach age 65. It is a major source of income for middle- and lower-income households, particularly for families working in agriculture. To accommodate the variety of self-employed workers, the pension system needs to be flexible. For example, private institutions such as agriculture and fisheries associations could manage the pension system for self-employed workers who work in the same field. As in the health insurance system, those in charge of the compulsory pension program need to have a thorough understanding of organizational issues that affect self-employment industries as well as formal industries.

Indonesians urgently need financial education so that they can optimize their assets and channel them into productive and safe investments. The government should provide guidelines and support for financial education programs that will teach workers how to manage their finances and prepare themselves for their retirement.

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31. Incorporating time into the National Transfer Accounts: the case of Thailand

Mathana Phananiramai

This chapter extends the National Transfer Accounts construction to incorporate the age profiles of time transfers into the NTA. The value of time transfers is estimated from the value of time spent in activities that have transferable outcomes, namely housework, caring for others, and providing community services. The results, based on time-use survey data from Thailand in 2001 and the NTA estimation, indicate that most cash, in-kind, and time transfers occurred within households. As expected, Thai women are net providers of household time during most of their lives, from age 15 to age 81. According to the specialist replacement method for evaluating time, over a woman's lifetime the average net value of time she provided to others in 2004 was about 467 038 baht; and the amount peaked at around age 31, when an average woman provided household time worth 14 548 baht per year.[1]

When the value of time spent on childcare is calculated to derive the full cost (net of a child's own labor income) of raising the child from birth until age 24, it turns out that the cost in 2004 was about 1.156 million baht, of which three quarters were private cost and one quarter was public cost. About 98% of the private cost was in the form of intra-household transfers, of which 76% were cash transfers and 24% were time transfers.

BACKGROUND

One of the issues repeatedly raised by researchers involved in the NTA project has been the importance of time transfers within households. Like cash transfers, in which income earned by one person can benefit another person, the time spent by one person can also benefit another. Since time is a valuable resource, merely looking at cash transfers may not reveal the whole picture of resource transfers between generations. This chapter therefore incorporates time transfers into the National Transfer Accounts by considering the results of Thailand's Time Use Survey. It begins with a brief description of the data and patterns of time use in Thailand. It then describes the criterion used to define transferable time and explores the age profiles of outflow, inflow, and net transfer of time. Finally, it presents a method of time evaluation and compares the estimated value of time transfer to the value of cash transfer as estimated in the NTA.

THE DATA

This study uses data from Thailand's first Time Use Survey, conducted by the National Statistical Office (NSO) in August 2001. The sample consisted of persons 10 years old and older who lived in 26 058 statistically representative households. During the interviews, enumerators asked about and recorded the starting and ending time of all activities performed by the respondents during the past 24 hours. The respondents' activities were classified by means of two-digit coding, according to the International Classification of Activities for Time Use Statistics used by the NSO (NSO 2001).

According to this classification, time use could be broadly grouped into the following ten categories: (1) employment in an establishment; (2) primary production activities not conducted for an establishment; (3) services for income and other production of goods not for an establishment; (4) household maintenance, management, and shopping for one's own household; (5) care for children, the sick, the elderly, and the disabled for one's own household; (6) community services and help to other households; (7) learning; (8) social, cultural, and recreational activities; (9) mass media use; (10) personal care and self-maintenance.

The first three categories entail time use for production that earns income directly. The respondent's work status can be employee, as in category 1, or self-employed, as in categories 2 and 3. Time use in these three categories is often referred to as 'contracted time'. Categories 4–6 also entail time use for production, but mainly for the consumption of the respondent's own household or own community; they are referred to as 'committed time'. Category 7 is time use for investment in human capital. Categories 8 and 9 are time use for acquiring utility or pleasure directly and are referred to as 'free time'. Lastly, time use for personal care and self-maintenance is referred to as 'own time'. It includes time spent sleeping, eating, or drinking and time used for personal hygiene and health.

Table 31.1, which shows the average number of hours used in each main activity classified by age group, reveals that time spent for self-maintenance

Table 31.1 Average time use, in hours per day, classified by activity and age group: Thailand, 2001

Activity	Average	Number of hours, by age group					
		10–19	20–34	35–49	50–64	65–79	80+
Own time	11.93	11.75	11.40	11.36	12.48	15.07	18.30
Contracted time	5.55	1.58	6.99	7.51	5.86	2.85	0.87
Employment for establishments	1.67	0.44	2.75	2.14	0.95	0.11	0.05
Primary production not for establishments	2.38	0.71	2.52	3.28	3.22	1.64	0.41
Other home production	1.50	0.43	1.73	2.09	1.70	1.09	0.41
Committed time	1.78	0.85	2.00	2.02	2.15	1.91	0.88
Household maintenance	1.35	0.74	1.37	1.62	1.68	1.49	0.59
Care for children, the sick, elderly	0.42	0.11	0.63	0.40	0.47	0.43	0.28
Community services	0.03	0.01	0.02	0.04	0.05	0.08	0.06
Learning time	1.27	5.75	0.34	0.02	0.00	0.01	0.00
Free time	3.45	4.06	3.25	3.05	3.45	4.08	3.88
Social, cultural, and recreational activities	0.89	1.31	0.71	0.66	0.89	1.35	1.56
Mass media use	2.55	2.75	2.54	2.39	2.56	2.73	2.32

Source: Author's calculation from Time Use Survey 2001 (NSO 2001).

(own time) was lower among adults than among children and adolescents, and highest among the elderly. The age profile of contracted time had an inverted U-shape, reaching the highest level during ages 35–49. The age profile of committed time also had an inverted U-shape, albeit more shallow, and reached the highest level during ages 50–64. Time use for learning was highest during ages 10–19 and declined markedly thereafter. Free time was high among teenagers, lower among adults in the prime working ages, and higher again among young elderly (ages 65–79) before dropping again among the very old. It is expected that young elderly can afford more free time because they may still be in good health and free from most household responsibilities, whereas health problems among the oldest age group may prevent them from having much free time.

In sum, the results suggest that about 50% of a Thai person's lifetime is spent on personal care and self-maintenance. An average working-age adult uses slightly less than 50% of his or her time for personal care and self-maintenance, about 30% for income earning, 12% for free time, and the remaining 8% for helping other household members. Children and adolescents use their time mainly for self-maintenance, leisure, and learning, whereas the elderly allocate about 67% of their time to self-maintenance, 18% to free time, and the remaining 15% to earning income and helping other household members.

There is no difference in the age profiles of own time and learning time for men and women. For other activities however, the differences between the sexes are quite evident. Women in all age groups spent fewer hours than men in contracted time, but more in committed time. If we regard contracted time, committed time, and learning time as 'working time', females in the age range of 10–50 years worked on average about 1.5 hours longer per day than males, but men aged 80 and over worked slightly more hours than women in the same age group. Altogether, females had less free time than males.

TRANSFERS OF HOUSEHOLD TIME

Everyone has exactly the same amount of time in a day, a week, or a year. Hence, strictly speaking, time that belongs to one person cannot be transferred to another. But time can be used in activities that benefit different parties. The benefits of time used in such activities as personal care, self-maintenance, or recreation go directly only to the person who performs them. However, time used in other activities, such as maintaining a household or caring for others, can benefit others who do not perform the activities. Broadly speaking, time spent in these activities can be transferred in the same manner that income earned by one person is transferred to benefit others. Even so, a line must be drawn between time spent in activities that can benefit only persons who perform them directly and time that is considered to be transferable. Following the method suggested by Arboleda (2000) to evaluate unpaid work, this chapter defines transferable time as that used to satisfy the 'third person criterion'. Three conditions are imposed on this criterion: (1) it must be time used by and for members of one's own family; (2) it must be time used in activities that can benefit other persons besides the person who actually performs the activities; and (3) it must be time used in activities that produce an outcome that can be replaced by market goods or services. By this criterion, time used in activities categorized under items 4 (household maintenance) and 5 (caring for family members) is regarded as two forms of *intra*-household time transfer, whereas time used in activities categorized under item 6 (community service) is regarded as an *inter*-household time transfer.

Intra-household Time Outflows

Intra-household time outflows are measured by the amount of time spent by members of the same household in each category of activity. The age profile of time outflows in each category is the average number of hours spent in that category by an average person of each age. The cross-sectional data suggest that as a person grows from adolescence to adulthood, he or she spends more time on household maintenance. Time use for this category reaches a plateau between ages 35 and 65 before declining. The outflow of time use for childcare reaches a maximum around age 28 and appears to have another, lower peak around age 55. The first and second peaks likely coincide with the time spent caring for one's own children and for one's grandchildren, respectively. The amount of time spent on other kinds of personal care giving, such as caring for the sick, the elderly, and the disabled, is much less than the amount spent on household maintenance or childcare, and the young elderly seem to be the main providers of these types of time transfer. With these three categories of transferable time combined, persons aged 25–70 provided on average more than 700 hours per year (or 1.9 hours per day) for household production in 2001.

Since the amount of time spent in household production is known to differ greatly by gender, the age profiles of these three subcategories of intra-household time outflows by gender are discussed. Although the burden of household maintenance declines for women above age 60, the burden of childcare and other personal care increases substantially for young elderly women – that is, those 60–70 years old. The increase is likely to be due to their caring for grandchildren or an elderly husband. Women aged 55 spent an average of 250 hours per year (41 minutes per day) in caring for children, and women aged 65 spent on average 100 hours per year (16 minutes per day) taking care of other household members according to the survey. Thus the average figures for elderly women understate the magnitude of the burden borne by the young elderly. For men, the average number of hours spent on their own household in all categories increased slightly after their retirement from market work. With all three categories of committed time combined, women in the prime working ages of 25–60 years spent approximately 1200 hours a year (or 3.3 hours per day) on their own household in 2001. In contrast, men in the same age group spent less than 300 hours a year (or less than 50 minutes a day) in similar activities.

Intra-household Time Inflows

Of equal interest is how the benefits of transferable time use in each category of household production are allocated to household members.

Household production is undertaken for the household's consumption only; hence the amount produced must equal the amount demanded in each household. The demand for some categories of household production depends on the age distribution of household members. For example, the presence of children is likely to create a demand for childcare, and the presence of aged members is likely to create a demand for other personal care. For these categories of household production, I have used the estimated coefficients of a regression model as weights for allocation. The regression model uses the total amount of time spent by all household members in each category as the dependent variable and the number of household members by age group as the independent variable. It is unclear, however, whether the benefits of household maintenance depend on the age distribution of members; hence the model allocates the inflow transfer of household maintenance equally among household members. The age profile of the inflow time transfer can be interpreted as the amount of time needed to produce that amount of household goods and services demanded by household members of each particular age.

According to this method of estimation, children's demand for childcare (including parents' teaching and training, and parents' travel time related to childcare activities) is greatest during their first year of life but declines rapidly until age 5, after which it tapers off. The demand for other personal care is also high among young children, adults of ages 25–35, and the elderly. The high demand for other personal care among young adults may be related to pregnancy and childbirth. In the subsequent sections of this chapter, smoothed age profiles will be used except for the inflow age profile of time use for childcare. In that case the unsmoothed age profile will be used because the smoothed pattern is significantly lower among very young children than the unsmoothed one.

The net intra-household time transfers are defined as the difference between inflow and outflow transfers. Women spend quite a long span of their lifetime, between ages 15 and 81, as net suppliers of time transfer. Young children are net receivers who benefit from those time transfers. The elderly above age 81 and men in all ages are also net receivers of time transfers.

Inter-household Time Transfers

Using a method similar to that used to measure time transfers within households, one can obtain the age profile of time outflows between households directly from the use of time in community services and help given to other households. These services may benefit one age group more than another, but I have no information on this. Hence I assumed an equal per capita share. Although there is some uncertainty, men seem to start being net suppliers of inter-household time transfers at the age of 29, and they continue to be so for the rest of their lives. Women begin being net suppliers of inter-household time transfers somewhat later, starting at age 38. The amount of net time supplied by women exceeds that supplied by men at around age 56, and it continues to increase, reaching a peak at ages 68–75, when the amount supplied is more than 20 hours a year.

PLACING A MONETARY VALUE ON TIME TRANSFERS

The value of unpaid work in production for the market, such as that classified under categories 2 and 3 in the data section, is included in the System of National Accounts (SNA), although it is often thought to be underreported (Arboleda and Ericta 1999; Ironmonger 1999). However, the production of domestic and personal services for one's own family's consumption and volunteer work, such as time spent under categories 4–6, are not included in the SNA. Hence the SNA usually underestimates the true value of production in a nation. Since aggregate control in constructing the NTA is taken from the SNA, private transfers through activities under categories 4–6 are also missing. To capture the missing components, the value of these activities should be added to the NTA.

Evaluation Method

Household production is evaluated in studies about unpaid work performed by women (Goldschmidt-Clermont 1982). Two evaluation approaches consider, alternatively, output and input. Thailand's Time Use Survey recorded only the amount of time spent in each activity, not the unit of output, which is required if the output approach is to be used; hence that approach is ruled out automatically. The input approach evaluates the value of unpaid work by considering the product of time use and the wage per unit of time. It can be further divided into two methods: one that assesses the opportunity cost, and the other, the replacement cost. The opportunity-cost, method calculates the expected wage rate of the person who performs a task, whereas the replacement-cost method calculates the market wage of the worker who engages in tasks of a similar nature. The main weakness of the opportunity-cost method is that the imputed value of unpaid work depends on the characteristics of the persons who perform the task, rather than on the characteristics of the task itself. In addition, that method requires subdividing a population by characteristics that affect the expected wage rate, such as educational attainment and residential area. But such a breakdown is not available in official population projections. Hence, I use the replacement method here.

The replacement method can use either of two types of wage rate, that of a generalist or that of a specialist. Replacement by a generalist usually involves using the average wage rate of domestic workers, whereas replacement by a specialist involves using the average wage rate of workers in a specific profession. For example, whereas in the generalist method the value of spending two hours cooking a meal is 2 multiplied by the hourly wage of domestic helpers, in the specialist method it is 2 multiplied by the hourly wage of a professional cook (code# 5122), according to the International Standard Classification of Occupations (ISCO) compiled by the International Labour Office (ILO 1990).

The average hourly wages for selected occupations, by sex, come from the 2001 Labor Force Survey. The wages of domestic helpers and cleaners are used in the generalist replacement method, while the wages of childcare workers, home-based personal care workers, cooks, helpers and cleaners in offices and hotels, and related workers are used in the specialist replacement method. The wages of sweepers and related laborers are used to evaluate time use for community services.

The value of unpaid work as assessed by the specialist replacement method is about 10% higher than that as assessed by the generalist replacement method. But there is almost no difference between the two methods in net value because differences in the value of time inflow and the value of time outflow cancel each other out. Therefore only the figures from the specialist replacement method are presented in the following discussion. As mentioned earlier, women are net providers of household time throughout most of their lives, from age 15 to age 81. At the peak of her output of household time, around age 31, the net value of time provided by an average woman for other household members was around 14 548 baht per year in 2004. Over a woman's lifetime the average net value of time provided for others was about 467 038 baht (US$13 344 in 2004).

Incorporating the Value of Time Transfer into the NTA

I added the value of time transfer to the NTA according to the following calculations. The regular NTA balancing equation for each age x is

$$C(x) - Y^l(x) = LCD(x) = ABR(x) + \tau_g(x) + \tau_p(x).$$

Lifecycle deficit (LCD), which is defined as the difference between consumption (C) and labor income (Y^l), is balanced by asset-based reallocation (ABR) plus public (τ_g) and private (τ_p) transfers. The modified NTA balancing equation with time, dropping the age index for simplicity, is therefore

$$(C + \tau^+) - (Y^l + \tau^-) = LCD + (\tau^+ - \tau^-)$$

$$= ABR + \tau_g + (\tau_p + \tau^+ - \tau^-),$$

where τ^+ and τ^- represent, respectively, the value of inflow and outflow of time transfers (both inter- and intra-household), both measured as positive flows.

The value of inflow time transfer is a proxy of the value of goods or services produced by household or community members that a person consumes without paying for them. If the goods or services are not produced by family or community members, the demand will be met by market goods and the value will be included in the National Income Account. Likewise, those who spend time to provide services for family or community members could have spent that time in the labor market and earned more income. But they provide the services voluntarily without being paid; hence the value of their services is excluded from the National Income Account and should be restored.

NTA IN THAILAND WITH TIME TRANSFER INCLUDED

Per Capita Account

As shown in Table 31.2, consumption of home-produced goods and services constitutes a significant share of total consumption. The share varies by age, is highest among children, and declines to about 12% after a person reaches adulthood. On average, the share is 22% for the population in age group 0–19, 14% in age group 20–34, and about 12% in the other age groups. As for paid versus unpaid work, unpaid work constitutes on average approximately 50% of the value of total labor produced by young people under 20 and the elderly over 65. But during the prime working ages, unpaid work constitutes less than 18% of the value of their total labor.

Among all ages except among young children, intra-household cash transfers are by far the most important means of closing the earning and consumption deficit. But the value of time that household members spend to take care of young children is also an important component of expenditure. In the first year of life the value of transferred time received

Table 31.2 Per capita national transfer flow account with time transfer: Thailand, 2004 (baht)

Item	Economic flow, by age group						
	Average	0–19	20–34	35–49	50–64	65–79	80+
Lifecycle deficit	7,987	57,518	–10,809	–43,942	–11,963	45,348	66,659
Consumption	69,011	63,607	68,504	72,176	74,328	75,602	78,650
Private	57,698	46,311	59,678	64,590	65,976	66,020	68,043
Market goods	47,011	32,371	50,180	55,865	57,094	56,675	58,305
Home-produced goods	10,687	13,940	9,499	8,725	8,882	9,345	9,738
Public	11,312	17,296	8,825	7,586	8,352	9,582	10,607
Less labor income	61,024	6,089	79,313	116,117	86,290	30,253	11,991
Work for income	50,337	2,873	65,583	101,428	70,797	16,620	4,795
Unpaid work	10,687	3,215	13,729	14,689	15,494	13,633	7,196
Age reallocations	7,987	57,518	–10,809	–43,942	–11,963	45,348	66,659
Asset-based reallocations	6,636	4,822	–2,927	5,891	16,754	33,449	27,092
Income on assets	24,717	251	11,710	51,712	58,998	35,328	23,789
Less saving	–18,081	4,571	–14,638	–45,821	–42,245	–1,879	3,303
Transfers	1,350	52,696	–7,882	–49,832	–28,716	11,899	39,567
Public	54	13,646	–2,876	–11,407	–8,551	–465	2,944
Private	1,296	39,050	–5,006	–38,426	–20,166	12,364	36,623
Inter-household	1,296	537	651	–364	3,235	8,934	8,475
Cash	1,296	410	610	–296	3,394	9,164	8,632
Time	0	127	40	–68	–159	–230	–157
Inflow	164	164	164	164	164	164	164
Outflow	–164	–37	–124	–232	–323	–394	–321
Intra-household	0	38,514	–5,656	–38,062	–23,401	3,430	28,148
Cash	0	27,916	–1,385	–32,165	–16,948	7,489	25,449
Time	0	10,597	–4,271	–5,897	–6,453	–4,059	2,699
Inflow	10,523	13,776	9,334	8,561	8,718	9,181	9,574
Outflow	–10,523	–3,178	–13,606	–14,458	–15,171	–13,240	–6,875

Sources: NT flow account is from Phananiramai and Chawla (2007); time transfer calculated by the author.

was 39 216 baht in 2001, which accounted for 67% of total intra-household transfers. The share of transferred time received declined to 33% when children reached age 5 and to 19% when they reached age 10. The net value of time received by children of both sexes declined to 0 at age 18. Thereafter, a family member became a net provider of time until age 72, before becoming time-dependent again. Thus children seem to gain independence in terms of time transfers about six years earlier than they do financially at the age of 24.

Inter-household transfers, both of cash and of time, are negligible in Thai society. High rates of co-residence among parents and their grown children may be one of the reasons; most transfers between parents and those children are already captured in intra-household transfers. Public cash transfers to children through education are substantial. The amounts of time transfers and public cash transfers received by the elderly are much lower and come only quite late in life, after age 75.

The Full Cost of Raising a Child in Thailand

Given the significant amount of time and public transfers to children, it is worth considering the full cost (net of a child's own labor income) of raising a child from birth until age 24, when he or she becomes independent both financially and in time transfers. Table 31.3 presents the transfer figures in more detail. The full cost of raising a child in Thailand amounted to about 1.156 million baht in 2004. Of that total cost, about 75% was private cost and 25% was public cost through transfers. Ninety-eight percent of the private cost was borne by the child's own household, and the remaining 2% was in the form of inter-household transfers.

The cost borne by a child's own household can be further divided into cash transfers (76%) and time transfers (24%). The percentage share of the cost varies according to the child's age. The share of time transfer is 51% for pre-school children. The share is 23% during primary school ages, but it is only 1.2% while a child is receiving secondary and tertiary education.

Aggregate Account

The aggregate NT flow account shows that in 2004 the burden on the working-age population was mainly rearing and caring for children; the burden of caring for the elderly was much less. People between the ages of 30 and 40 were the main net providers of household time, but it was those between ages 50 and 68 who were the main net providers of time spent in community services. When the value of time is included in the calculation, it is confirmed that children are the most demanding, not only of financial resources, but also of household time; and it is the provision of time by the elderly that significantly relieves the working-age population from the burden of household production (Table 31.4).

Table 31.3 Full cost of children, by source of support, until independence: Thailand, 2004 (baht)

Age	Intra-household transfers		Inter-household transfers	Public transfers	All transfers
	Cash	Time			
0	19,411	39,216	164	6,159	64,949
1	20,505	29,009	162	5,835	55,512
2	21,668	23,192	160	5,545	50,565
3	22,906	19,688	160	8,180	50,933
4	24,224	16,386	160	12,234	53,003
5	25,623	11,522	160	15,298	52,603
6	27,077	11,230	178	16,703	55,189
7	28,493	11,364	231	16,941	57,029
8	29,977	10,927	284	16,899	58,087
9	31,518	10,705	339	16,795	59,356
10	32,616	7,563	356	16,761	57,297
11	33,486	6,705	574	16,612	57,376
12	34,310	5,543	815	16,485	57,154
13	34,549	4,518	948	17,869	57,884
14	34,079	3,460	1,034	19,932	58,504
15	33,059	2,682	1,082	18,125	54,948
16	31,485	1,727	1,012	16,118	50,342
17	29,919	865	1,102	15,433	47,319
18	27,689	76	1,001	12,346	41,111
19	25,398	–758	1,002	7,377	33,019
20	22,846	–1,438	977	5,728	28,113
21	19,856	–2,269	970	4,305	22,862
22	16,790	–3,090	1,080	2,266	17,047
23	13,421	–3,420	1,061	–96	10,967
24	9,870	–3,862	1,066	–1,704	5,370
Sum	650,774	201,540	16,077	288,146	1,156,538

CONCLUSION

The 2001 cross-sectional survey data indicate that, as expected, Thai women are net providers of household time during most of their lives, between ages 15 and 81. Their time is spent mainly on household maintenance. Providers of time spent on childcare are concentrated in the ages 20–35, but providers of time for other personal care are concentrated in the ages 60–70. According to the specialist replacement method for evaluating time, over a woman's lifetime the average net value of time she provided to others was

Table 31.4 Aggregate national transfer flow account with time transfer: Thailand, 2004 (billion baht)

Item	Economic flow, by age group						
	All ages	0–19	20–34	35–49	50–64	65–79	80+
Lifecycle deficit	509	1,196	–171	–624	–102	175	34
Consumption	4,396	1,323	1,085	1,025	631	292	40
Private	3,675	963	945	917	561	255	35
Market goods	2,994	673	795	793	485	219	30
Home-produced goods	681	290	150	124	75	36	5
Public	721	360	140	108	71	37	5
Less: labor income	3,887	928	1,166	1,108	534	130	20
Work for income	3,206	60	1,039	1,440	601	64	2
Unpaid work	681	67	217	209	132	53	–4
Age reallocations	509	1,196	–171	–624	–102	175	34
Asset-based reallocations	423	100	–46	84	142	129	14
Income on assets	1,574	5	185	734	501	136	12
Less: saving	–1,152	95	–232	–650	–359	–7	2
Transfer	86	1,096	–125	–707	–244	46	20
Public	3	284	–46	–162	–73	–2	2
Private	83	812	–79	–545	–171	48	19
Inter-household	83	11	10	–5	27	34	4
Cash	83	9	10	–4	29	35	4
Time	0	3	1	–1	–1	–1	0
Inflow	10	3	3	2	1	1	0
Outflow	–10	–1	–2	–3	–3	–2	0
Intra-household	0	801	–90	–540	–199	13	14
Cash	0	581	–22	–457	–144	29	13
Time	0	220	–68	–84	–55	–16	1
Inflow	670	287	148	122	74	35	5
Outflow	–670	–66	–215	–205	–129	–51	–4

Sources: NT flow account is from Phananiramai and Chawla (2007); time transfer calculated by the author.

about 467 038 baht in 2004; and the amount peaked at around age 31, when an average woman provided household time worth 14 548 baht per year. As for community services and help to other households, the main providers are between ages 50 and 68. Thai men start becoming net providers of time to other households sooner than women, at around age 29; but transfers of both cash and time between households are negligible in Thailand.

When the value of time spent on childcare is calculated to derive the full cost (net of a child's own labor income) of raising the child from birth until age 24, it turns out that the cost in 2004 was about 1.156 million baht, of which three quarters were private cost and one quarter was public cost. About 98% of the private cost was in the form of intra-household transfers, of which 76% was cash transfers and 24% was time transfers.

NOTE

1. The NTA in this chapter is estimated from the Socio-Economic Survey in 2004, but the time-use pattern is estimated from the first Time Use Survey in Thailand, conducted in 2001. A second Time Use Survey was conducted by the National Statistical Office in 2004, but at the time this chapter was written the data from the 2004 survey were not available. Hence estimates from the 2001 survey were used to construct the values of time flows that would be expected if there were no change in time-use patterns between 2001 and 2004.

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32. National Transfer Accounts in Hungary: contribution asset and returns in a pay-as-you-go pension scheme

Róbert I. Gál, Vera Gergely, and Márton Medgyesi

Using the Willis result (Willis 1988) and its application to pay-as-you-go pension systems (Settergren and Mikula 2005), which states that the volume of contribution assets is proportional to the time span between the age of accumulating and the age of consuming contributions, we estimate the contribution assets of the Hungarian social security system for each year in the period from 1992 to 2008. Extending this with a parallel estimation on the net liabilities of the system, we produce a time series of period rates of return over those years. With the resulting returns we demonstrate that political turmoil, demographics, and labor market shocks can do more harm to notional assets than capital market shocks to physical assets.

The present value of future contribution flows in a pay-as-you-go pension scheme is an asset. Future pensioners build their expectations of old-age revenues on it. Recent proposals suggest securitizing and trading it (Valdes-Prieto 2005; Robalino and Bodor 2009). Therefore the value of this wealth matters: it is of importance to contributors as well as to financial markets and, given the size of contribution assets, to the entire economy. Drawing from Willis (1988) and Lee (1994, 2000), National Transfer Accounts (NTA) techniques can come to the rescue of these actors by facilitating the calculation of assets (a stock) from current contributions (flows).

A further advantage of such an estimate is the application of contribution assets to the calculation of annual returns in a pay-as-you-go system. Using a method recently developed by the Swedish Pension Agency (Settergren and Mikula 2005), which defines the annual return as the rate at which the value of the individual accounts can be raised so that the amount of net pension liabilities does not exceed the value of the contribution asset, we have calculated the time series of annual returns in the Hungarian public pension system, the single largest inter-age resource reallocation mechanism of the country by far, for the period from 1992 to 2008.

Two developments took place during that period. First, in the early 1990s Hungary suffered a transitional crisis that severely cut the output of the economy and decimated the labor force. As we shall demonstrate below, the generational impact was asymmetric. The most adversely affected cohorts either were in their older active ages, not close enough to the retirement age to use the pension system as an escape route, or were those who could manage to retire in one of the various early retirement programs but had to accept deteriorating entry conditions. The downturn reached its lowest point in 1997. As a consequence, the pension system saw major losses in its contribution assets and seriously negative returns to eligibilities in the early 1990s. These developments forced the government to cut liabilities by raising the retirement age and reducing the generosity of pension indexation. The years since 1997 have shown a strong recovery combined with favorable demographics. Around 2000 the large cohorts of the baby boom of the early 1950s were still in the labor market; and their children, born in the mid-1970s, completed their entry. Starting in 2000, therefore, contribution assets grew briskly and the system produced positive returns.

CONTRIBUTION ASSET

When the average age of consumers is below the average age of producers, those consumers must borrow against their future labor income and build up a debt, or negative wealth. In contrast, when consumers are older than producers, a positive wealth is accumulated. Willis (1988) shows that current consumption and the difference between the weighted average ages of consumers and producers give a reliable estimate of wealth. Applying the same logic to pension contributions, Settergren and Mikula (2005) demonstrate that the contribution asset (*CA*) of a pay-as-you-go (PAYG) scheme can be assessed as the product of current contributions (*C*) and the turnover duration (*TD*). The *TD* is the amount of time that contributions (eligibilities) spend in the pension system before they are translated into pensions.

The *TD* can be calculated only after the life-path of a cohort has been completed, and in this way it can serve only historical interests. In this respect, it is analogous to the average age of a cohort at death, which can also be computed once the last member of the cohort has died. Demographers, however, develop synthetic period indicators that can be applied in mortality analysis, such as the concept of life expectancy at birth (*LEXP*), which is the sum of the period survival probabilities from birth to each age. The *LEXP* is a synthetic indicator useful in the analysis of mortality, yet the probability of the newborn cohort living exactly as long, on average, as predicted by the *LEXP* is practically zero. The *LEXP* is not a predictive indicator, but it can be applied in the analysis of current developments as well as in time-series analysis. It has a special advantage: its calculation does not require predictions.

There exist similar synthetic period indicators in other fields as well. For example, the generational imbalance (*GI*), the key output of generational accounting (Auerbach et al. 1991), or its relatives, the cohort deficit and the sustainability gap (Bonin 2001), are such statistics.[1] These indicators are also based on minimal assumptions about the future, and their usual interpretation is not a prediction about the future but rather an indication of the extent of unsustainability of a current situation.

By analogy, a synthetic period turnover duration, or, as Settergren and Mikula (2005) call it, the *expected turnover duration* (*ETD*), can also be derived from period figures. The *ETD* is the difference between the average age of contributors and that of pensioners in a given year. Both averages are weighted by the corresponding stream of money, contributions, and pensions.

We show the time series of the *ETD* between 1992 and 2008 in three steps.[2] In Figure 32.1, we show the age profiles of contributors for three selected years to portray the drive behind changes in the weighted average age of contributors. The profiles were estimated from samples of personal income tax declaration forms.

We present three age profiles, two from the two ends of the time series and one from the middle. The fact that the curve for 2000 runs below the 1992 curve is due to a decrease in employment as well as to lower wages. This was a consequence of the transitional shock, which severely hit Hungary as well as all other East European countries in their transition from central planning to a market economy. Moreover, the contribution rate changed slightly, and the pension authorities lost some of their ability to collect contributions. But this has not affected the average age of contributors, unlike the rising age of entry into the labor market, which is a consequence of increasing enrollment rates in higher education. Another difference between 1992 and 2000 is the flatter age profile for the latter year. The 1992 curve still reflects a usual seniority of age-earnings profiles and a more uniform employment rate across cohorts. By 2000, the generational impact of the transition is clearly visible. These two effects, the

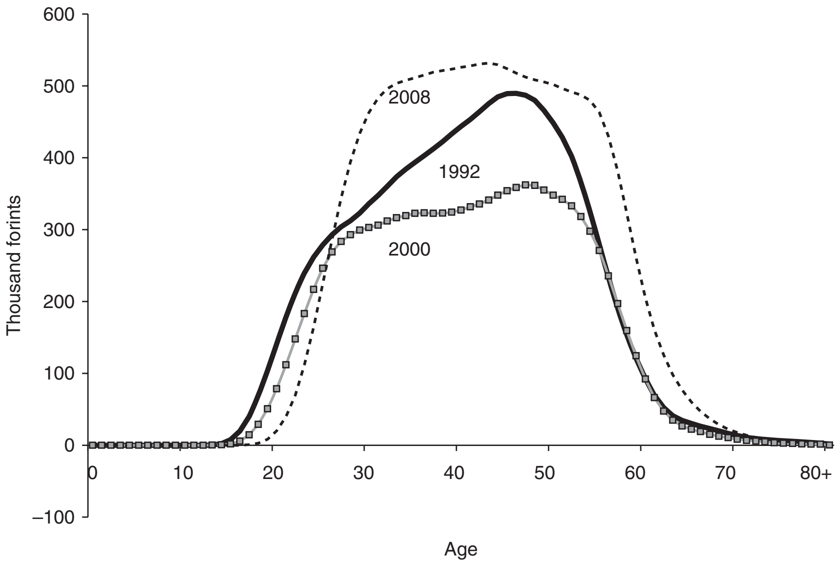


Figure 32.1 Age profiles of pension contributions: Hungary, selected years (2009 prices)

higher entry age and the flattening age profile, have driven the average age of contributors in these years of transition.

Despite the rapid stabilization of the labor market, the age profiles remain flat between 2000 and 2008. The entry age is delayed further and, owing to an increase of the retirement age from 55 for women and 60 for men to 62 for both genders, the exit age is delayed even more.

These tendencies help to explain the trend of the weighted average age of contributors, which we present in Figure 32.2. We also show there the trend of the average age of the 20–59-year-old population to contrast it with the more rapidly rising weighted average age of contributors. In the mid-1990s, the secondary or echo baby boomers, the children of the baby boomers of the early 1950s, reached the age of 20 years and provisionally pushed down the average age of the working-age population. After 1997 the general population became older again. That aging, however, cannot explain the more rapid aging of contributors. Between 2000 and 2008 the average age of contributors grew by nearly two years; the corresponding growth in the general working-age population was only half a year. The age of entry into the labor market increased by more than a year, the exit age by more than a year and a half.

Similarly, in Figure 32.3 we contrast the weighted average age of

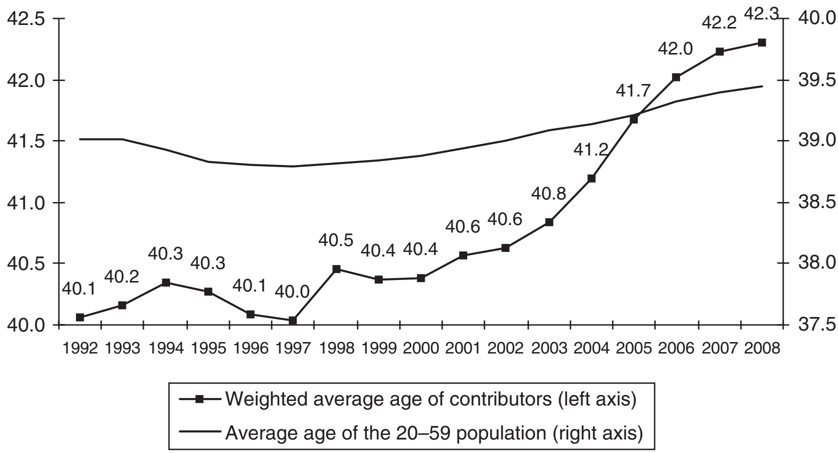


Figure 32.2 Weighted average age of contributors: Hungary, 1992–2008

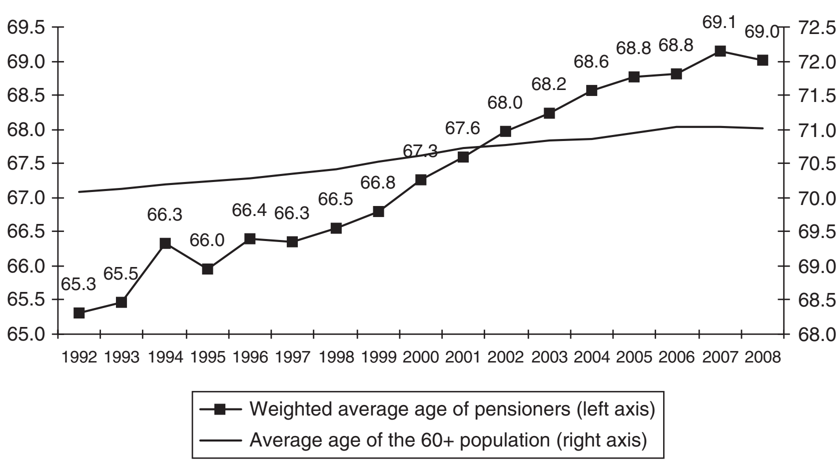
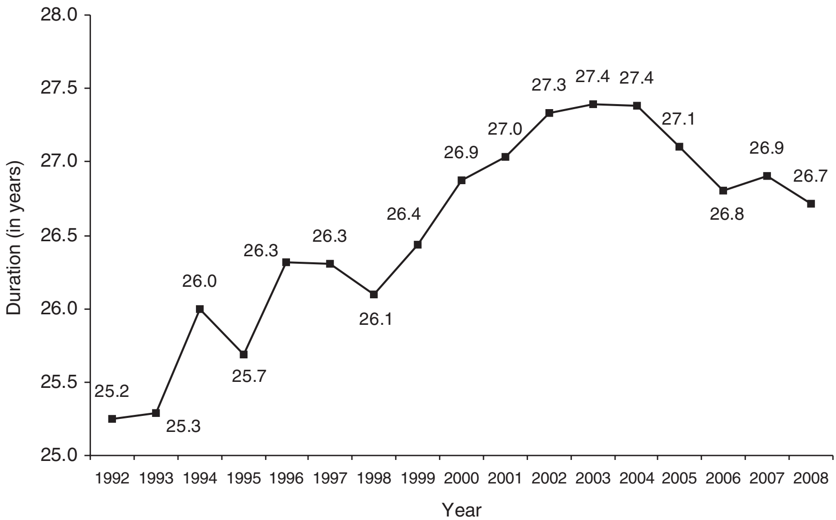


Figure 32.3 Weighted average age of pensioners: Hungary, 1992–2008

pensioners with the average age of the population 60 years old and older.[3] The general population was slowly aging over the period discussed here. The weighted average age of pensioners grew much faster partly as a result of the rising effective retirement age and partly because of the changing pensioner age profile.

The parallel trends of the average ages of contributors and pensioners give the time series of the expected turnover duration, shown in Figure



Note: Expected turnover duration is the time span between the average weighted age of pensioners and that of contributors.

Figure 32.4 Expected turnover duration (ETD) in the public pension system: Hungary, 1992–2008

32.4. The *ETD* grew significantly, by more than two years, between 1992 and 2003, initially because of the flattening of the age profile of contributions and later because of the rising effective retirement age. The latter tendency slowed down the flow from active age to retirement. This made both the active workers and the pensioners older, but the effect was stronger on pensioners. Between 2003 and 2008 the *ETD* decreased more than half a year as a result of the intensive expansion of higher education, which made the active population age faster by slowing the inflow.

The *ETD* multiplied by the current volume of contributions gives the Willis estimate of the contribution asset. In Figure 32.5 we present the *CA* in percentage of Gross Domestic Product (measured on the left axis) and also the share of contributions[4] to the GDP (measured in percentage of GDP on the right axis). The relative volume of contributions decreased rapidly between 1992 and 1997 as a consequence of the employment crisis associated with the transition from a planned to a market economy. For about a decade it oscillated slightly above 7% of GDP before it grew rapidly in the last years in response to a significant increase in the contribution rate and stagnating GDP.

Figure 32.5 reveals that *C* and *CA* correlate strongly. Changes in *CA*

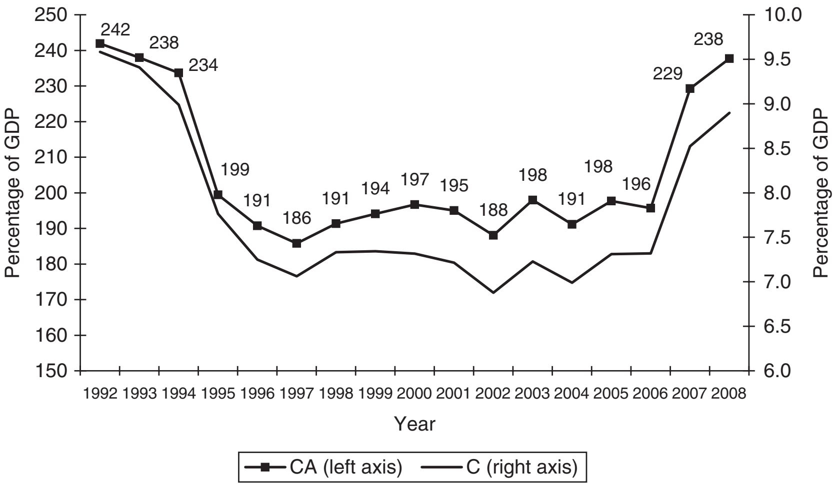


Figure 32.5 The contribution asset (CA) and current contributions (C): Hungary, 1992–2008

were driven mostly by changes in the volume of contributions, whereas the *TD* had only a marginal effect.

The contribution wealth of the public pension system suffered a major blow during the economic transition. From over 240% of the annual GDP in 1992, it fell to 186% by 1997. Such a loss had to be translated to decreasing benefits in one way or another. In 1997 the government introduced a far-reaching pension reform. Its most important effect was to reduce future lifetime pensions of then-active cohorts by raising the retirement age and trimming the indexation of pensions in the payout phase.

RETURNS

Besides providing these insights into the generational consequences of the economic transition, the *CA* can also be used in the calculation of annual returns in a PAYGO scheme. Such returns are the rate at which the value of eligibilities can be raised so that the amount of net pension liabilities (*PL*) does not exceed the value of the contribution asset. That is, the concept of returns is derived from a sustainability condition.

The overlapping-generations (OLG) model of Samuelson (1958), which is the first and simplest version of this family of models, includes two generations and two stages of the lifecycle, active age and old age. It indicates that the rate of return in PAYGO schemes is the growth rate of the contribution base. If the employment rate and working hours do not change and there is no technological change (labor productivity does not increase), the growth rate of the contribution base is equal to the growth rate of the population.

The Aaron theorem (Aaron 1966) states that the internal rate of return of PAYGO schemes is the product of the growth rates of the average wage and the population provided that the population is stable (that is, the relative sizes of cohorts do not change over time), employment and eligibility rates are constant, and the shapes of the age profiles of wages and retirement do not change either. Given the stability of the population and the constant employment rate, the growth rate of the population is equal to the growth rate of the number of the employed. Thus in the end the Aaron theorem also identifies the internal rate of return for PAYGO schemes with the growth rate of the contribution base. In addition, if the growth rate of the average wage corresponds with the growth of labor productivity, the contribution base increases at the same pace as the GDP.

These two classical references left their imprint on actual regulation. Schemes that are based on individual accounts and that tie benefits to contributions, such as the non-financial-defined-contribution (NDC) system, require the calculation of annual returns in order to use them as notional interest rates (NIR) on the notional capital accumulating on the accounts. The problem of finding the optimal NIR is the same as the problem of calculating the rate of return in a PAYGO system.

In Sweden the NIR is tied to the growth rate of earnings per worker. In Kyrgyzstan, notional capital grows with 75% of the growth rate of average wages (Palmer 2005, p. 187). Poland and Latvia apply the growth rate of the covered wage bill (OECD 2009, p. 244, and Palmer 2005, p. 187, respectively). In Italy the NIR is the five-year moving average of the growth rate of nominal GDP (OECD 2009, p. 216).

However, as demonstrated by Valdes-Prieto (2000), Settergren and Mikula (2005), and Auerbach and Lee (2006), the NIRs currently in use in actual NDC schemes lead to redistribution across generations and have the potential to undermine the long-term stability of the system since real-life conditions violate requirements of the classical models. The Swedish wage rate does not reflect changes in the number of the employed (i.e., the employment rate and, in the long run, fertility and immigration) nor in the contribution rate, the contribution collection capacities, or the willingness to pay contributions. That is why the designers of the Swedish reform augmented the system with a balancing mechanism. An alternative solution, based on the growth rate of the contribution base, can handle the problem of changes in the number of employed, but it is still vulnerable to changes in the contribution rate and to tax evasion. In still another method, an NIR based on GDP growth collapses to the growth rate of the contribution rate, as we saw above, if the wage share of GDP in the system of national accounts does not change over time and the contribution rules remain unmodified. If, however, the contribution coverage of the wage bill is not constant because the contribution rate decreases, tax evasion becomes more frequent, or the administrative capacities for contribution collection diminish, then the accumulation of notional capital will be faster than sustainable and the system will need correction.

Such problems can be handled only if the NIR is tied to the growth rate of actual contributions and not to that of the contribution base. This solution was suggested by Valdes-Prieto (2000), although it is not anywhere currently in use. This contribution-sum index still does not reflect changes in contribution age profiles or pensioners' mortality and necessarily amplifies the notional pension capital in a system still in the process of maturation, which deviates from the steady state.

A *CA*-index handles the problems of the changing age profiles by introducing the expected turnover duration. The *ETD*, being derived from summary measures of the age profiles, is able to capture these changes. But there is still one component that can bend the *PL* from the *CA,* and that is the independent changes of liabilities that are unrelated to the contribution base or the contribution asset. For instance, political interventions for the sake of improving living standards among the elderly can raise the *PL* without being reflected in the *CA*.

This leads to an index or NIR or rate of return that ties the annual growth of the *PL* to that of the *CA*, which we shall call the NDC index and denote as I_{NDC}:

$$I_{NDC} = \frac{C_{t_1} \cdot TD_{t_1} - C_{t_0} \cdot TD_{t_0} + F_{t_1} \cdot r_{t_1}}{PL_{t_0}},$$

where C is current contributions, TD is turnover duration, PL is pension liabilities, F is the buffer fund of the pension system (in the Hungarian case, the capital accumulated in the mandatory private funds), r is the market interest rate on capital, and t_0 and t_1 are time indices.[5]

The I_{NDC} tells how much the PL can be increased from year t_0 to year t_1 without disturbing the long-term stability of the pension system. We show its values in Figure 32.6. An important finding revealed by the data is that annual returns in a PAYGO scheme can be negative, and in some years seriously negative. It is not the privilege of funded schemes to lose future pensions. In contrast to the major loss of more than 20% of the mandatory

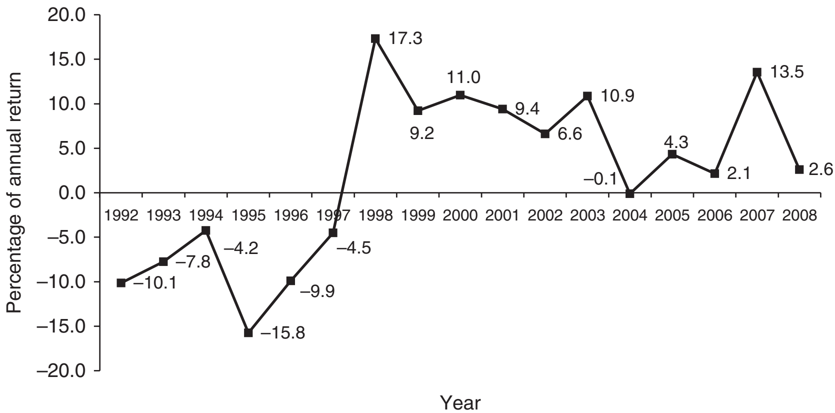


Figure 32.6 Real annual returns (I_{NDC}) in the public pension system: Hungary, 1992–2008

pension funds in one year (2008) were the significantly negative returns in six consecutive years between 1992 and 1997 in the Hungarian PAYGO scheme. These losses were also double-digit in some of those years and lasted as long as the government could cut or, according to the figures, overcut, liabilities, that is, future pensions. The stabilization of the system was continued with neatly positive returns in most of the 2000s owing to growing wages and favorable demographics.

The I_{NDC} offers a promising insight into the functioning of a PAYGO scheme and can be applied in predictions of deficits, surpluses, wealth accumulation, and reforms. But even this return measure has its limits. The I_{NDC} guarantees that in year t_1, PL grows at the same speed as CA, but it does not ensure that the value of PL was equal to the value of CA in year t_0. Therefore it shows how much net liabilities could have grown in a given year provided the system was in balance in the previous year. This limits the interpretation and in particular the accumulation of annual returns in a system, which, as in Hungary, does not start from balance and tends to introduce independent changes in the PL in an ad hoc manner. Had the system been stabilized in 1992, the returns would have been −30.2% instead of the −10.1% shown in Figure 32.6.

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NOTES

1. The *GI* is the difference between the accumulated net taxes of the newborn cohort and those of future generations in their remaining lifetime, provided the newborn follow the current age profile of net taxes, whereas future generations will also pay for the accumulated deficits. The cohort deficit is the difference between the net taxes payable in the remaining lifetime of a cohort and its consumption of public goods. The sustainability gap is the additional government revenues that would make the current cross-sectional age profile of net taxes sustainable in the long run.
2. The time series starts in 1992 when the National Pension Insurance Fund (NPIF) and the National Health Insurance Fund (NHIF) were separated. The NPIF plays an exceptionally important role in the intergenerational resource reallocation system in Hungary. It is the sole income source for a large majority of the elderly and the only vehicle for postponing consumption for a large part of the active population.
3. The benefit age profiles were created from data published by the Central Administration of the National Pension Insurance Fund (CANPI). We received grouped data in five-year age brackets for 1992–93 and for 1999–2008. Between 1994 and 1998 we were provided averages for every age. The conclusions that can be derived from the data are limited by the fact that the CANPI does not publish five-year grouped data for age cohorts but rather for birth cohorts, and updates these birth cohorts every year. For each year we have average benefits for people born between, say, 1940 and 1944 or between 1945 and 1949. So instead of having the 60–64 and the 65–69 age brackets every year, we have the 60–64 and 65–69 age brackets in one year and the 61–65 and the 66–70 age brackets in the next. Consequently, we get fully corresponding age structures every five years. The moving age brackets artificially raise the average ages and distort the results. Nevertheless, we decided to publish our results because the comparison of the identical age structures – that is, the profiles following each other in five-year spells – also reveal a rapid aging over this period.
4. In 1997 the Hungarian public pension scheme went through a comprehensive reform, which included the introduction of partial prefunding in privately managed but publicly supervised funds. In this chapter we cover the entire system so that contributions flowing to the new funds are also taken into account.
5. This expression is a simplified version of the period internal rate of return in Settergren and Mikula (2005, p. 125):

$$PIRR = \frac{ETD \cdot \frac{dC}{dt}}{PL} + \frac{\frac{dETD}{dt} \cdot C}{PL} + \frac{F \cdot r}{PL},$$

where *PIRR* is the period rate of return, *ETD* is the expected turnover duration (see definition in the main text), *C* is total contributions, *PL* is pension liabilities or the pension wealth, *F* is the buffer fund of the pension system, and *r* is the market interest rate. Of these components $ETD \cdot (dC/dt)$ is the value of change in contribution revenue, and $(dETD/dt) \cdot C$ is the value of change in *ETD*. In Sweden the entries of the expression are calculated from three-year moving averages (with the exception of *F* and *r* for some years). For further details, see the Orange Reports of the Swedish pension system (Försäkringskassan, various years).

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PART IV

Appendix tables

Table A.1 General indicators for NTA economies: year of NTA estimate

Region and economy	Year	Population (millions)	Per capita income (US$)	Rate of growth, real per capita income, previous 25 years	Population growth rate (%)	Percentage under age 25	Percentage age 60+	Total fertility rate	Life expectancy at birth
AFRICA									
Kenya (KE)	1994	27	1,033	1.2	2.8	68	4	5.4	55
Nigeria (NG)	2004	138	1,634	0.2	2.0	64	5	5.7	47
ASIA									
China (CN)	2002	1,286	2,861	8.4	0.7	40	10	1.8	72
India (IN)	2004	1,113	3,197	3.7	1.4	53	7	3.4	62
Indonesia (ID)	2005	219	3,217	3.6	1.1	47	8	2.4	69
Japan (JP)	2004	127	29,039	2.0	0.3	25	26	1.3	82
Philippines (PH)	1999	76	2,201	0.6	1.8	58	5	3.6	69
South Korea (KR)	2000	46	16,439	5.9	0.7	37	11	1.5	68
Taiwan (TW)	1998	22	17,416	6.3	0.7	40	12	1.3	77
Thailand (TH)	2004	65	6,597	4.6	1.0	40	10	1.9	68
LATIN AMERICA									
Brazil (BR)	1996	164	6,456	2.2	1.3	51	7	2.5	69
Chile (CL)	1997	15	8,587	3.1	1.3	45	10	2.2	76
Costa Rica (CR)	2004	4	8,381	1.2	1.7	49	8	2.3	78
Mexico (MX)	2004	104	11,638	1.0	1.0	50	8	2.4	75
Uruguay (UY)	2006	3	10,431	1.2	0.1	38	18	2.5	76
EUROPE & US									
Austria (AT)	2000	8	29,133	2.3	0.1	29	21	1.4	77
Finland (FI)	2004	5	29,846	2.2	0.3	30	21	1.7	78

Germany (DE)	2003	82	28,572	1.8	0.1	26	24	1.3	79
Hungary (HU)	2005	10	16,958	1.9	−0.1	29	21	1.3	72
Slovenia (SI)	2004	2	22,212	2.4[a]	0.2	28	20	1.2	77
Spain (ES)	2000	40	21,296	2.2	0.5	29	22	1.3	79
Sweden (SE)	2003	9	30,066	1.8	0.3	30	23	1.6	80
United States (US)	2003	297	37,556	1.9	0.9	35	16	2.0	78

Note: a. Value for Slovenia refers to 1991–2003 only.

Sources:
Population: UN Population Division (2009), 'World population prospects: The 2008 revision', CD-ROM edition.
Per capita income (US$): Table 8.1. Sources cited there are: GDP data from the World Bank (exception for Taiwan, for which the source is Penn World Tables, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania). China, Finland, Indonesia, Kenya, Nigeria, and Sweden figures are directly from World Bank, 'World development indicators', ESDS International, University of Manchester.
Rate of growth, real per capita income, previous 25 years: World Bank, 'World development indicators', ESDS International, University of Manchester (except for Taiwan, for which the source is Penn World Tables).
Population growth rate: UN Population Division (2009), 'World population prospects: The 2008 revision', CD-ROM edition (annual growth rate for the five-year period preceding the year of the survey).
Percentage under age 25: National Transfer Accounts project database.
Percentage age 60+: National Transfer Accounts project database.
Total fertility rate: National Transfer Accounts project database.
Life expectancy at birth: UN Population Division (2009), 'World population prospects: The 2008 revision', CD-ROM edition (except for Taiwan, for which the source is Council for Economic Planning and Development, *Taiwan Statistical Data Book*).

Table A.2 Support ratios, 1950–2050

Region and economy	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
AFRICA											
Kenya (KE)	0.67	0.62	0.56	0.53	0.55	0.60	0.63	0.67	0.71	0.75	0.79
Nigeria (NG)	0.74	0.73	0.72	0.70	0.68	0.68	0.69	0.73	0.79	0.87	0.93
ASIA											
China (CN)	0.79	0.74	0.70	0.73	0.82	0.90	0.94	0.92	0.87	0.83	0.80
India (IN)	0.82	0.80	0.78	0.78	0.80	0.83	0.88	0.92	0.96	0.97	0.96
Indonesia (ID)	0.78	0.80	0.78	0.78	0.82	0.89	0.97	1.01	1.03	1.01	0.99
Japan (JP)	0.67	0.72	0.80	0.84	0.84	0.84	0.78	0.75	0.71	0.64	0.60
Philippines (PH)	0.73	0.70	0.68	0.70	0.74	0.78	0.83	0.88	0.91	0.94	0.94
South Korea (KR)	0.68	0.67	0.66	0.72	0.83	0.92	0.94	0.91	0.84	0.76	0.71
Taiwan (TW)	0.65	0.65	0.65	0.72	0.81	0.88	0.92	0.90	0.82	0.73	0.67
Thailand (TH)	0.71	0.71	0.69	0.71	0.83	0.94	0.97	0.94	0.90	0.87	0.85
LATIN AMERICA											
Brazil (BR)	0.69	0.68	0.66	0.69	0.74	0.80	0.84	0.87	0.87	0.83	0.78
Chile (CL)	0.82	0.78	0.75	0.80	0.88	0.92	0.94	0.94	0.91	0.88	0.85

Costa Rica (CR)	0.81	0.74	0.69	0.74	0.82	0.87	0.93	0.96	0.95	0.91	0.87
Mexico (MX)	0.79	0.76	0.73	0.73	0.79	0.87	0.95	1.00	1.00	0.98	0.94
Uruguay (UY)	0.84	0.86	0.86	0.84	0.82	0.83	0.85	0.87	0.87	0.87	0.85
EUROPE & US											
Austria (AT)	0.90	0.84	0.80	0.83	0.89	0.90	0.90	0.85	0.77	0.73	0.70
Finland (FI)	0.82	0.79	0.79	0.84	0.87	0.87	0.82	0.76	0.73	0.72	0.71
Germany (DE)	0.85	0.81	0.77	0.79	0.84	0.84	0.83	0.78	0.70	0.66	0.63
Hungary (HU)	0.85	0.83	0.81	0.83	0.82	0.84	0.86	0.85	0.82	0.77	0.73
Slovenia (SI)	0.67	0.66	0.67	0.69	0.71	0.75	0.76	0.70	0.64	0.59	0.56
Spain (ES)	0.78	0.80	0.77	0.76	0.78	0.85	0.90	0.87	0.79	0.71	0.67
Sweden (SE)	0.85	0.82	0.79	0.77	0.78	0.80	0.78	0.76	0.72	0.70	0.69
United States (US)	0.89	0.83	0.80	0.83	0.88	0.90	0.89	0.86	0.82	0.81	0.81

Note: The economic support ratio is the ratio of the effective number of producers to the effective number of consumers. The effective number of producers is constructed using the economy's age-specific labor income profile, whereas the effective number of consumers is constructed using the age-specific consumption profiles. For a complete discussion see Chapter 3. The population projection comes from the NTA database.

Table A.3 Fiscal support ratios, 1950–2050

Region and economy	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
AFRICA											
Kenya (KE)	u	u	u	u	u	u	u	u	u	u	u
Nigeria (NG)	u	u	u	u	u	u	u	u	u	u	u
ASIA											
China (CN)	0.93	0.89	0.87	0.89	0.94	0.99	1.00	0.94	0.87	0.83	0.80
India (IN)	u	u	u	u	u	u	u	u	u	u	u
Indonesia (ID)	0.79	0.81	0.77	0.77	0.83	0.92	1.00	1.06	1.10	1.09	1.08
Japan (JP)	0.91	0.98	1.11	1.14	1.13	1.11	1.00	0.92	0.87	0.79	0.74
Philippines (PH)	0.87	0.84	0.83	0.85	0.89	0.93	1.00	1.06	1.11	1.14	1.16
South Korea (KR)	0.76	0.76	0.75	0.81	0.91	0.99	1.00	0.97	0.89	0.83	0.80
Taiwan (TW)	0.68	0.68	0.70	0.76	0.85	0.94	1.00	0.99	0.92	0.84	0.79
Thailand (TH)	0.66	0.66	0.64	0.67	0.79	0.92	1.00	1.04	1.04	1.04	1.04
LATIN AMERICA											
Brazil (BR)	1.00	0.97	0.95	0.97	1.00	1.02	1.00	0.94	0.86	0.77	0.69
Chile (CL)	0.94	0.87	0.84	0.90	0.97	1.00	1.00	0.93	0.83	0.77	0.72

Costa Rica (CR)	0.89	0.82	0.78	0.84	0.92	0.96	1.00	0.97	0.91	0.83	0.76
Mexico (MX)	0.85	0.82	0.79	0.78	0.84	0.93	1.00	1.02	0.99	0.92	0.86
Uruguay (UY)	1.08	1.09	1.07	1.03	1.01	0.99	1.00	1.00	0.98	0.95	0.90
EUROPE & US											
Austria (AT)	1.08	1.00	0.94	0.96	1.02	1.02	1.00	0.93	0.83	0.78	0.74
Finland (FI)	1.08	1.04	1.04	1.09	1.11	1.09	1.00	0.92	0.87	0.85	0.83
Germany (DE)	1.11	1.06	0.99	1.00	1.06	1.04	1.00	0.94	0.84	0.79	0.75
Hungary (HU)	1.06	1.01	0.96	0.99	0.97	0.99	1.00	0.97	0.93	0.83	0.77
Slovenia (SI)	1.01	0.98	0.98	1.00	1.01	1.03	1.00	0.91	0.81	0.75	0.72
Spain (ES)	0.94	0.95	0.91	0.89	0.91	0.96	1.00	0.96	0.87	0.78	0.73
Sweden (SE)	1.15	1.11	1.07	1.02	1.01	1.02	1.00	0.96	0.90	0.88	0.86
United States (US)	0.99	0.91	0.87	0.92	0.97	1.00	1.00	0.96	0.92	0.90	0.89

Notes:
The fiscal support ratio is the ratio of the effective number of taxpayers to the effective number of public program beneficiaries. The effective number of taxpayers is constructed using the economy's age-specific transfer tax profile, whereas the effective number of beneficiaries is constructed using the age-specific transfer outflow profile. For a complete discussion see Chapter 7. The population projection comes from the NTA database.
u – unavailable

Table A.4 Summary of consumption, labor income, and transfer inflows

Region and economy	Consumption		Labor income		Public transfers			Private transfers		
	Mean age	Per capita flow	Mean age	Per capita flow	Mean age, inflow	Mean age, outflow	Per capita inflow	Mean age, inflow	Mean age, outflow	Per capita inflow
AFRICA										
Kenya (KE)	24.4	0.32	36.2	0.29	u	u	u	u	u	u
Nigeria (NG)	27.5	0.50	43.1	0.29	u	u	u	u	u	u
ASIA										
China (CN)	34.5	0.39	39.4	0.51	38.7	38.3	0.14	u	u	u
India (IN)	31.6	0.55	39.5	0.43	u	u	u	u	u	u
Indonesia (ID)	31.2	0.64	39.2	0.49	26.5	36.7	0.09	25.9	44.3	0.32
Japan (JP)	46.4	0.68	45.5	0.55	52.0	48.3	0.30	42.6	51.1	0.29
Philippines (PH)	27.8	0.59	38.5	0.41	26.3	37.3	0.12	28.1	43.4	0.42
South Korea (KR)	34.1	0.59	39.1	0.55	35.0	38.8	0.19	33.9	43.9	0.44
Taiwan (TW)	33.2	0.66	38.4	0.51	34.0	40.3	0.21	31.8	40.8	0.35
Thailand (TH)	34.1	0.61	39.8	0.52	29.0	40.8	0.13	33.8	44.2	0.33
LATIN AMERICA										
Brazil (BR)	32.1	0.66	39.5	0.40	41.7	37.6	0.30	28.1	45.8	0.40
Chile (CL)	34.1	0.66	39.6	0.48	39.4	39.6	0.17	31.0	45.8	0.33

Costa Rica (CR)	33.3	0.64	39.4	0.48	36.8	37.8	0.18	29.1	42.9	0.35
Mexico (MX)	31.1	0.77	38.6	0.46	29.9	35.3	0.17	21.9	44.3	0.30
Uruguay (UY)	38.1	0.49	42.4	0.48	45.7	42.5	0.15	28.1	47.8	0.21
EUROPE & US										
Austria (AT)	41.9	0.58	39.5	0.52	50.8	45.6	0.35	36.9	46.7	0.17
Finland (FI)	42.7	0.60	43.5	0.51	46.4	43.2	0.39	u	u	u
Germany (DE)	45.4	0.62	42.7	0.51	52.8	47.0	0.36	36.7	49.8	0.18
Hungary (HU)	42.9	0.59	42.6	0.52	46.3	42.0	0.36	43.0	46.6	0.32
Slovenia (SI)	40.8	0.51	40.6	0.48	47.1	41.5	0.30	33.1	43.9	0.19
Spain (ES)	41.1	0.58	41.3	0.50	48.1	45.0	0.26	38.7	53.7	0.19
Sweden (SE)	43.7	0.56	44.2	0.53	51.7	46.2	0.49	30.1	49.8	0.15
US	41.8	0.67	44.0	0.54	43.1	46.9	0.22	34.4	46.9	0.24

Notes:
The per capita flow is the annual flow expressed as a proportion of annual mean per capita labor income for persons 30–49. The mean age is the average age for the age distribution of aggregate flow. See Chapter 3 for a complete definition.
u – unavailable

Table A.5 Sources of funding for consumption (%), persons 0–24 and 65+

Age group, region, and economy	Labor income	Public transfers	Private transfers	Public asset-based reallocations	Private asset-based reallocations
Persons 0–24					
AFRICA					
Kenya (KE)	17.0	u	u	u	u
Nigeria (NG)	5.1	u	u	u	u
ASIA					
China (CN)	31.6	12.6	u	u	u
India (IN)	19.9	u	u	u	u
Indonesia (ID)	23.1	10.9	62.9	3.1[a]	
Japan (JP)	13.9	33.1	50.4	2.1	0.6
Philippines (PH)	18.1	12.9	68.5	−1.9	2.3
South Korea (KR)	22.8	20.8	66.4	−7.5	−2.5
Taiwan (TW)	18.0	23.6	57.2	1.0	0.2
Thailand (TH)	22.6	20.7	57.8	−1.2[a]	
LATIN AMERICA					
Brazil (BR)	14.7	11.6	69.5	−1.2	5.3
Chile (CL)	17.1	14.5	64.1	−2.2	6.5
Costa Rica (CR)	21.7	15.8	61.7	−1.8	2.5
Mexico (MX)	17.6	15.3	61.2	1.0	5.0
Uruguay (UY)	23.4	13.8	69.2	−2.4	−3.9
EUROPE & US					
Austria (AT)	36.4	27.5	35.3	−2.2	2.8
Finland (FI)	17.2	40.5	u	u	u
Germany (DE)	18.6	30.1	48.7	0.2	2.4
Hungary (HU)	13.4	48.3	32.2	0.8	5.3
Slovenia (SI)	17.1	29.6	52.2	−1.3	2.3
Spain (ES)	20.0	26.4	55.0	−1.9	0.6
Sweden (SE)	18.5	30.5	46.0	0.0	4.1
United States (US)	14.8	34.4	47.8	0.6	2.4
Persons 65+					
AFRICA					
Kenya (KE)	32.0	u	u	u	u
Nigeria (NG)	55.5	u	u	u	u
ASIA					
China (CN)	35.5	u	u	u	u
India (IN)	27.6	u	u	u	u
Indonesia (ID)	44.4	1.2	−26.9	81.3[a]	

Table A.5 (continued)

Age group, region, and economy	Labor income	Public transfers	Private transfers	Public asset-based reallocations	Private asset-based reallocations
Japan (JP)	11.7	50.6	0.5	4.0	33.1
Philippines (PH)	38.9	−1.1	3.8	−6.5	64.8
South Korea (KR)	23.1	28.2	12.8	−11.7	47.7
Taiwan (TW)	10.8	24.0	40.1	1.1	24.1
Thailand (TH)	17.4	−3.2	30.1	55.8[a]	
LATIN AMERICA					
Brazil (BR)	17.8	89.1	−31.3	−1.7	27.1
Chile (CL)	21.4	52.8	3.7	−3.8	25.9
Costa Rica (CR)	23.9	50.5	−1.4	−1.4	28.5
Mexico (MX)	26.4	27.0	−19.2	0.9	65.0
Uruguay (UY)	21.6	49.1	−11.2	−3.5	43.9
EUROPE & US					
Austria (AT)	2.1	94.2	−5.5	−4.4	13.4
Finland (FI)	4.3	82.9	0.0	−0.8	22.8
Germany (DE)	2.8	69.4	−6.9	0.5	34.2
Hungary (HU)	6.1	93.5	−1.5	0.1	1.7
Slovenia (SI)	3.5	79.8	2.9	−2.0	15.9
Spain (ES)	7.2	58.8	−12.2	−3.8	50.0
Sweden (SE)	7.1	101.3	−10.3	0.1	0.5
United States (US)	16.3	31.8	−6.8	1.7	57.0

Notes:

a. For Indonesia and Thailand the combined share of public and private asset-based flows is reported.

u – unavailable

Source: Calculated by authors.

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Glossary

Age reallocations	Economic flows that shift resources from one age to another. Age reallocations are either transfers or asset-based reallocations.
Asset income	The return to assets, including the operating surplus of corporations, estimates of the return to capital from unincorporated firms, the value of in-kind services flowing from owner-occupied housing and consumer durables, and net property income.
Asset income, private	The operating surplus of corporations, a portion of the income of unincorporated enterprises, the value of in-kind services flowing from owner-occupied housing and consumer durables, and net property income from financial assets owned by the private sector.
Asset income, public	Net income on publicly owned financial assets, including interest paid and received on public debt.
Asset-based reallocations	The net flows to an age group associated with assets, calculated as asset income less saving. Borrowing is a positive asset-based flow, and repayment of debt is a negative asset-based flow.
Assets	Value of capital, land, and subsoil resources, and financial assets and liabilities.
Asset transfers	Bequests and other large transfers, e.g. dowries.
Bequests	End-of-life transfers to descendants and other beneficiaries. Bequests are not included in NTA flow accounts but will be part of wealth accounts, still to be estimated.
Capital	Assets that are produced and serve as a store of value or a factor for producing goods and services.

Cohort	All members of a population born in the same year (birth cohort); those experiencing some other designated event, such as marriage or immigration, in the same year.
Consumption	Goods and services that satisfy the needs and wants of residents.
Consumption, private	Goods and services provided by the private sector (corporations, households, and non-profit institutions serving households).
Consumption, public	Goods and services provided by the public sector, such as publicly provided education and health care. Purely public and quasi-public goods are included.
Dissaving	Spending down of assets or the accumulation of debt that occurs when consumption exceeds disposable income.
Economic lifecycle	The age pattern of consumption and labor income. In principle the concept is longitudinal, but in NTA it is sometimes used to refer to a cross-sectional age pattern.
Fiscal support ratio	Ratio of the number of taxpayers, weighted by age-specific per capita public transfer outflows, to the number of beneficiaries, weighted by age-specific per capita public transfer inflows.
Generational economy	(1) The social institutions and economic mechanisms used by each generation or age group to produce, consume, share, and save resources; (2) the economic flows across generations or age groups that characterize the generational economy; (3) explicit and implicit contracts that govern intergenerational flows; (4) the intergenerational distribution of income or consumption that results from these flows.
Inflows	Flows received by individuals or households, including labor income; cash and in-kind transfers received; asset income, including the value of earnings retained by corporations and services derived from an owner-occupied home and consumer durables; and dissaving.

Labor income	The value of the work effort of employees, the self-employed, and unpaid family workers. Labor income is measured by earnings, the value of employer-provided benefits, and an estimate of labor's share of income from unincorporated business.
Lifecycle deficit	The value of consumption minus labor income.
Lifecycle surplus	The value of labor income minus consumption.
Mean age of consumption, labor income, transfers	The average age at which any economic flow occurs in a population. The mean age is used to summarize the age patterns of consumption, production, transfer inflows, and transfer outflows. The mean age depends both on the per capita age profiles of inflows or outflows and on the age distribution of the population.
National Transfer Accounts (NTA)	A system of macroeconomic accounts that measures current economic flows by age in a manner consistent with the UN System of National Accounts. NTA measures age-specific labor income, asset income, consumption, transfers, and saving, accounting for flows within households, between households, through the public sector, and with the rest of the world.
National Transfer Accounts (NTA) project	A network of research teams working in universities, international organizations, and private and government research institutes in more than 30 countries. Regional centers are based at Nihon University Population Research Institute (Tokyo), the Economic Commission for Latin America and the Caribbean (Santiago), the African Economic Research Consortium (Nairobi), the Institute for Future Studies (Stockholm), and the Vienna Institute of Demography. The Center for the Economics and Demography of Aging at the University of California at Berkeley and the Population and Health Program at

	the East-West Center in Honolulu serve as the lead institutions.
Normalization	To facilitate comparisons across countries with different currencies and standards of living, per capita values for a country are frequently expressed relative to the per capita labor income of persons 30–49 years of age in that country.
Outflows	Payments or expenditures by individuals or households, including consumption, cash, and in-kind transfers made, and interest payments on debt, taxes, and saving.
Primary income	Labor income plus asset income.
Private sector	Individuals, households, and non-profit institutions that serve households and state-owned enterprises.
Private asset-based reallocations	Private asset income less private saving.
Private saving	Private disposable income less private final consumption expenditure.
Property income	Income from financial assets, e.g. interest income and expense, dividends paid and received, rent paid and received.
Public sector	All levels and all sectors of government, including public education, pensions, publicly funded health care, and all other cash and in-kind transfers. The state-owned enterprise sector is considered part of the private sector.
Public asset-based reallocations	Public asset income less public saving.
Public saving	Net public asset income minus net public transfers.
Rent	Rent paid and received on land plus royalties paid and received on subsoil assets.
Rest of the world (ROW)	All non-resident institutional units that enter into transactions with resident units. Flows between the private sector and the rest of the world are classified as private; flows between the public sector and the rest of the world are classified as public.
Saving	The portion of current income used to

	accumulate assets, calculated as primary income plus net transfers less consumption.
Support ratio	The ratio of the number of workers, weighted to incorporate age-variation in labor productivity, to the number of consumers, weighted to incorporate age-variation in 'wants' or 'needs'. Age-variation in labor productivity is measured by means of a standard age schedule of labor income, and age variation in 'wants' or 'needs' is measured by a standard age schedule of consumption.
Synthetic cohort estimate	A cumulative measure of a flow for a hypothetical population over part or all of its lifetime, subject to age-specific flows estimated for a period of time, i.e., based on cross-sectional estimates. Age-specific values may or may not be weighted by age-specific survival.
Taxes	Compulsory, unrequited payments, in cash or in kind, made by the private sector to the public sector, including social contributions.
Total fertility rate	A synthetic cohort measure of childbearing that gives the average number of children born over the reproductive life span of a woman, given age-specific fertility rates at a given time.
Transfer inflows	Transfers received by individuals or households. Must be greater than zero.
Transfer outflows	Transfers made by individuals or households. Must be less than zero.
Transfer wealth	The present value of expected net transfers received in current and future time periods. Transfer wealth may either refer to a particular individual or age group, or it may be an aggregate for the whole economy, calculated as the population-weighted average of the age-specific per capita values.
Transfers	Cash and in-kind flows to and from individuals or age groups that involve no quid pro quo.
Transfers, net	Transfer inflows minus transfer outflows.
Transfers, private	Transfers between co-resident household

	members, between households whether direct or through private institutions, and between households and the rest of the world whether direct or mediated by private institutions.
Transfers, public	Transfers between individuals or households that are mediated by government, including public pensions, public education, publicly funded health programs and compulsory national health insurance, and all other public spending on goods and services.
Wealth	Assets plus transfer wealth.

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