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Generational Effects of Economic Crises

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Abstract

The research addresses two related issues: the generational effects of economic crises and the capacity of age reallocation systems to spread economic/financial risks across generations. The research is based on three East Asian economies, Japan, Korea, and Taiwan, which experienced economic crises or slowdowns during the 1990s. The analysis makes use of National Transfer Accounts (NTA), an international comparative aggregate data set which provides comprehensive estimates of intergenerational economic flows. The analysis will emphasize the effects of the crisis on consumption and key components of consumption, e.g., health and education, by age and by cohort. A second level of analysis will focus on the economic flows that fund consumption. One group of flows (labor and asset income) are directly affected by economic crises. A second group of flows (public and private transfers and dis-saving) are indirectly influenced and may serve to mitigate the effects of economic crises.

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Introduction

Financial crises are characterized by sharp declines in asset prices (land, housing, and equities) and factor incomes (returns to labor and to capital). These changes are not felt uniformly across age groups because children, prime age adults, and the elderly differ greatly in their ownership of assets, in their attachment to the labor market, in their vulnerability to economic downturns, and in other respects. Changes in factor income, however, do not translate directly into changes in living standards. Public policy may mitigate the generational effects of economic crises. Some government programs, e.g., unemployment insurance and poverty programs, may achieve this outcome in an automatic fashion increasing benefits as income declines. Other public programs may be implemented in an *ad hoc* fashion but in direct response to an economic crisis. Other important public policies, both fiscal policy and monetary policy, are blunt tools that may vary widely in their generational effects. The private sector also plays an important role, as well. Adjusting intergenerational private transfers and private saving offer two important mechanisms for maintaining consumption in the face of economic adversity.

Thus, the impact of economic crises depends, in part, on the functioning of systems that allow us to smooth consumption. The effect of crisis is mitigated if individuals can smooth consumption over their lifecycle relying on assets, including debt, to shift resources from good times (the future) to bad (the present). Dis-saving and the accumulation of debt cannot always be relied on to smooth consumption, however. The current crisis has greatly restricted the availability of credit and limited the extent to which individuals can maintain consumption by accumulating debt. But even when credit markets are functioning smoothly, some individuals cannot rely on debt to smooth their consumption. Obviously this is the case for children who must rely entirely on public and familial transfers. But young adults and the very old also face constraints on indebtedness and, hence, may depend on public and private transfers, in part, to smooth consumption.

Consumption smoothing is not limited to economic transactions that involve living generations. Public debt can be used to increase consumption of current generations at the expense of future generations. Moreover, individuals can vary bequests as an intergenerational risk-sharing tool. During times of crises, consumption can be maintained by reduced intended bequests.

In the presence of well-functioning credit markets and pervasive altruism, the generational effects of economic crisis could be quite limited. Under more realistic conditions, however, the impact of the economic crisis may vary considerably by generation. Living generations (birth cohorts) are at different points in their lifecycle with varying vulnerabilities to economic crises. Those just entering the labor force depend almost entirely on labor income and, hence, they are vulnerable to labor market conditions. Moreover, contractions in the labor force may lead to a much greater reductions in new jobs or recent hires than jobs for established workers. The impact of the crisis on young workers depends to a great extent on the persistence of the effects. Those for whom job markets are bad at entry may experience long-lasting damage to their labor income (citations here or below).

At the other end of the lifecycle, deteriorating labor markets have no direct impact on those who have permanently withdrawn from the labor market. It should not be

overlooked, however, that re-entry to the labor market by retirees may be much more difficult during an economic crisis. Older workers and retirees, however, are much more vulnerable to the collapse in price of assets, both homes and equities. The extent of this vulnerability will vary considerably from country to country. In some countries, the elderly depend heavily on assets to fund their consumption, but in other countries the elderly depend primarily on transfers – predominantly public transfers – to fund their consumption. For these elderly the decline in asset prices will have no direct effect on consumption, although it certainly might have indirect effects.

In economies which rely heavily on assets to fund old-age consumption, the elderly might protect themselves from fluctuations in asset prices in a variety of ways. They might purchase conventional annuities or they might shift their portfolio over time to reduce their exposure to investment risk.

There are many aspects of the current crisis that are still unfolding. There are some aspects of the current crisis that can be addressed, but many others cannot be until data become available. Thus, we will consider the experience of three economies, Japan, Korea, and Taiwan, which have gone through economic crises during the 1990s and early 2000s. This is primarily a descriptive exercise with the objective to understand how consumption and the means by which it is funded has changed as economies have experienced crises.

We begin with a discussion of conceptual issues, follow with a brief description of recent economic crises in Japan, Korea, and Taiwan, and then turn to a more detailed analysis of those crises relying heavily on the conceptual framework employed in the National Transfer Account project (Lee, Lee, and Mason 2008; Mason, Lee, Tung, Lai, and Miller 2009).

Conceptual Framework

Generational issues are inherent in financial crises and policy responses. During economic downturns, current spending (consumption plus investment) and production drop below what is possible in an economy in which all productive factors (capital and labor) are fully employed. A key issue in macro economics is how consumption behaves during economic crises. To the extent that increases in consumption are matched by increases in production of otherwise unemployed economic resources, welfare is clearly enhanced. But also smoothing consumption may be welfare enhancing if current consumption increases during economic downturns at the expense of future consumption.

An important issue in dispute among economists is the extent to which individuals smooth their consumption in the absence of government intervention and whether government intervention can induce individuals to increase current consumption. Suppose that consumers are effective altruists, i.e., that they care about their descendants and they leave bequests to them. When faced with an economic downturn, i.e., a drop in wealth, effective altruists will reduce their current consumption, reduce their future consumption, and also reduce their bequests and, thereby, the consumption of future generations. Given assumptions described more fully by Barro (1974), consumption will be fully smoothed and the adverse effects of an economic crisis will be shared across all generations, current and future. Furthermore, suppose the government attempts to stimulate the economy through fiscal policy. In other words, suppose the government raises current consumption funded by issuing public debt that will be repaid by future

generations. Effective altruists will realize that public debts must be paid by themselves in the future and by their descendants. They will respond by increasing their saving and reducing their private consumption entirely offsetting or neutralizing the effect of the increase in public debt. If Ricardian equivalence, as it is known, holds, financial crises and increases in public debt have limited generational effects.

Although Ricardian equivalence cannot be entirely ruled out, the conventional view among economists is that an increase in public spending financed by an increase in public debt will lead to an increase in total consumption (Elmendorf and Mankiw 1999). Consumers may reduce private consumption to some extent, but the offset will be less than dollar for dollar. There are several reasons why Ricardian equivalence will not hold. Some individuals are debt constrained – they have no liquid assets, consumption can be increased only through borrowing. Constraints on indebtedness may limit this and, indeed, one of the important features of the current financial crisis is the substantial reduction in the availability of credit. This will limit the extent to which individuals can smooth consumption over their own lifetime or reduce net bequests.

A second reason that Ricardian equivalence will not hold is that effective altruism may not hold for many members of the population. Many individuals do not plan to leave bequests and, hence, cannot reduce bequests in order to increase consumption.

A Generational Perspective

Macroeconomic models typically employ highly stylized representations of age structure to explore generational issues. These models can be very useful in capturing key conceptual issues. The analysis here, however, is intended to provide a more detailed and comprehensive picture of how the generational economy responds to economic crisis. We rely on a more detailed representation of age structure along the lines of the pioneering work by Auerbach and Kotlikoff (1987), Willis (1988) and Lee (1994) and recent efforts to develop a macroeconomic data base, National Transfer Accounts, with detailed age information (Lee, Lee, and Mason 2008; Mason et al. 2009).

For every age group economic flows are governed by a flow constraint:¹

$$C(x) = Y^l(x) + Y^A(x) + \tau(x) - S(x) \quad (1.1)$$

where $C(x)$ is current consumption by the cohort age x , $Y^l(x)$ is current labor income, $Y^A(x)$ is asset income, $\tau(x)$ is net transfers, and $S(x)$ is saving. For the economy as a whole,

$$C = Y^l + Y^A + \tau - S \quad (1.2)$$

In a closed economy, net transfers will be zero. In an open economy they need not be, although in most instances net transfers from abroad are relatively small as compared with the other economic aggregates.

The flow constraint does not represent a particular causal model. It is an accounting identity that must hold. Still it provides a useful organizational device for considering the effects of an economic crisis. A recession is marked by a decline in factor income, either absolute or relative to its sustainable growth path. Holding current transfers and saving constant, consumption will also decline in aggregate. The decline for any particular cohort will depend on (1) which form of factor income, labor or asset

¹ Variables are for the current period unless otherwise indicated.

income, is most affected by the crisis; (2) the relative importance of labor and asset income to that cohort; and (3) idiosyncratic changes in the age profiles of factor income related to the economic crisis.

Fundamental features of the economic lifecycle lead to considerable variation in factor income across age. Changes in labor income weigh most directly on those in the prime working age, while changes in asset income have their greatest impact on older cohorts. Children are not directly affected by changes in factor income, at all. The effects of changes in factor income are measured below using labor income and private asset income.

Changes in factor income do not produce dollar-for-dollar changes in consumption because of public and private sector responses. Public sector flows are incorporated into equation (1.1) in three ways: public asset income, public transfers, and public saving. By lowering interest rates during economic crises, monetary policy reduces interest payments on public debt and, thereby, increases public asset income.² Expansionary fiscal policy is realized by reducing public saving (or increasing dis-saving). Other things held constant the result is an increase in consumption in the current period. Intergenerational net public transfers redistribute factor income from one age group to another.

There are private counterparts to both public saving and public transfers that will exert their own independent influences on consumption or may offset, or in the extreme neutralize, the effects of changes in public saving and transfers. As mentioned above an expansionary fiscal policy may lead to an increase in private saving, thereby, reducing its effect on consumption. Changes in net public transfers may crowd out net private transfers. Or net private transfers may respond to changes in factor income in the absence of responses by net public transfers.

The effects of an economic crisis or the accompanying economic policy are not confined to a single period, however, and may influence the economic circumstances of current generations in future periods or future generations. The flow account holds not only in the current period, but in all future periods. Thus, the lifetime behavior of each cohort is governed by a lifetime budget constraint. Let $PV\{\}$ represent the present value operator, i.e.,

$$PV\{Y(x)\} = \int_{z=0}^{\omega-z} e^{-rz} Y(t+z, x+z) dz \quad (1.3)$$

where r is the interest rate or discount rate. Applying the discount operator to both sides of equation (1.1) we have:

$$PV\{C(x)\} = PV\{Y^l(x)\} + PV\{\tau(x)\} + PV\{Y^A(x)\} - PV\{S(x)\} \quad (1.4)$$

With some algebraic manipulation this yields the following:

$$PV\{C(x)\} = PV\{Y^l(x)\} + T(x) + A(x) + B(x) \quad (1.5)$$

where $PV\{C(x)\}$ is the present value of lifetime consumption, $PV\{Y^l(x)\}$ is the present value of lifetime labor income, $T(x) = PV\{\tau(x)\}$ is transfer wealth, $A(x)$ is the value of

² Note this will be matched by a decline in private asset income that will fall on domestic creditors to the extent that they hold public debt and foreign creditors otherwise. If all public debt is owned domestically, any increase in public asset income due to a change in interest rates will be exactly offset by a decline in private asset income and, hence, should have no effect on consumption.

total assets held by age group x , and $B(x)$ is the net present value of bequests, bequests received less bequests made, over the remaining life of the cohort of age x in year t .³ Equation (1.5) holds for each cohort and summing over all living cohorts for the economy as a whole, i.e.,

$$PV_t\{C\} = PV_t\{Y^l\} + T_t + A_t + B_t \quad (1.6)$$

A cohort and the population as a whole can consume more than its lifetime income to the extent that it holds net transfer wealth and assets that will be employed to support own consumption rather than bequests.

Note that both transfer wealth and net bequests have counterparts for future generations. The counterpart of transfer wealth is the implicit debt that must be born by future generations. Similarly, the value of net bequests made to future generations is equal to the value of net bequests received by future generations.

Lifetime consumption by a particular cohort or by the current population is determined by four factors: the value of its current assets, the value of its labor, the value of net transfers, and the value of net bequests. The concept of transfer wealth was introduced and has been analyzed by Willis (1988) and Lee (1994) and Lee (2003) provides a recent overview with empirical evidence on the size and direction of transfers. Transfer wealth consists of two additive components – public transfer wealth and private or familial transfer wealth. Public transfer wealth arises because of the continuing obligations of taxpayers to fund transfers to dependent populations. Upward transfer programs, those that benefit the elderly, generate public transfer wealth for older age groups who can expect to receive benefits substantially in excess of the taxes they will pay over the remainder of their lives. The same programs generate negative transfer wealth for young groups who must pay taxes when young but will received benefits only with a considerable delay. For the population as a whole, upward transfer programs create positive transfer wealth to the extent that future generations will make public transfers to those who are currently alive.

Downward public transfers, such as public funding of education, results in negative transfer wealth for those who are currently alive and positive transfer wealth for future generations.

Private or familial transfer wealth is similar in nature to public transfer wealth. Private transfers differ in that they are governed by to a greater extent by norms, social convention, etc. and to a lesser extent by law.⁴ Downward private transfers, predominantly transfers from parents and grandparents to their children, are substantial in all societies. Adults and the population as a whole have substantial negative private transfer wealth because of the continuing obligation to support children. In some societies, upward familial transfers are also important and to the extent that these are continuing create positive private transfer wealth.

Bequest wealth is another form of transfer wealth. Because bequests are by their very nature downward transfers, i.e., from current to future generations, bequest wealth will be negative for the current population.

³ Current transfers include the use of current income, while bequests are capital transfers.

⁴ Many countries have laws that govern parental support of children and in a few countries, e.g., Singapore and China, adult children are required by statute to provide support to their elderly parents.

With limited exception the analysis presented here emphasized current flows rather than the wealth effects of crises. Data are not yet adequate to consider wealth effects despite their importance.

National Transfer Accounts

Analysis of the generational effects of economic crises is based on National Transfer Account data which provide comprehensive estimates of economic flows by age in a manner consistent with National Income and Product Accounts. The flows include consumption, labor income, asset income, transfers, and saving including detailed components and differentiating public and private sector flows. The estimates are constructed relying on aggregate economic data, detailed household surveys, and public sector administrative records. Methodological details are provided in the NTA website www.ntaccounts.org and Mason, Lee, et al. 2009.

These data are cross-sectional describing the flows in a given year for residents by single year of age. For several countries estimates are available for several years. The estimates used in this paper were prepared under the direction of Naohiro Ogawa for Japan, Sang-Hyop Lee and Chong-Bum An for Korea, and An-Chi Tung and Andrew Mason for Taiwan. Estimates are available for Japan at five-year intervals from 1984 to 2004, for Korea in 1996, 2000, and 2005, and for Taiwan in . . . The years for each country span periods of strong economic growth and periods of economic crisis. The purpose is not to test formal hypotheses but rather to provide a comprehensive description of how members of different age groups fared in economic terms during economic crises as compared with periods of prosperity and to use the NTA accounting framework to determine the economic mechanisms employed to achieve observed outcomes.

We make extensive use of synthetic cohort estimates to describe the experience of three broad age groups: 0-24, 25-59, and 60 and older. These age groups were selected because they generally capture the ages at which net transfers are positive (0-24 and 60 and older) or negative (25-59). Synthetic cohort estimates are constructed by weighting the economic flow in question by expected years lived at each age taken from a period life table for each country. A single life table is used for each country so that the changes reported reflect only changes in the economic flows rather than changes in survival rates. In all cases a life table was selected approximately from the mid-point of the time series: 1994 for Japan, 1991 for Korea, and 19xx for Taiwan. A synthetic cohort value should be interpreted as the average flow over the entire age span, e.g., consumption during childhood, given the assumed survival rates and the current age-specific flows of the variable in question. The main reason for using synthetic cohort values rather than average values for each age group is to eliminate the compositional affects of changes in age structure.

Many of the estimates reported below are normalized on the average labor income of adults in the 30-49 age group in the current period to facilitate comparisons across countries with different currencies and different levels of income. The age group 30-49 is selected because labor income at these ages is unlikely to be affected by endogenous labor force decisions about school leaving or retirement. This age group also serves as a natural control group to the extent that the labor income of its members is less susceptible to the effects of economic crisis than other age groups. Results presented in this fashion

are useful in identifying changes for each age group relative to the control group. This is our main purpose to analyze the economic experience of age groups relative to each other.

Anatomy of Financial Crises

Financial crises are characterized by several important macroeconomic changes: (1) the value of assets decline because of a drop in housing, land, and equity prices; (2) labor income declines primarily but not exclusively because of a rise in unemployment; and (3) asset income declines as profits are squeezed. The first two features of economic crisis listed are summarized by Reinhart and Rogoff (2009) for 21 financial crises, including six that are ongoing and 15 that have come to a close (Table 1).

Table 1. Summary of Financial Crises.		
	Average value for all crises	Duration of Downturn
Decline in real housing prices	-35.5%	6 years
Decline in real equity prices	-55.9%	3.4 years
Percent increase in unemployment	7.0%	4.8 years
Note: Duration of downturn is based on countries that have completed the crisis. Source: Reinhart and Rogoff (2009).		

The three economic crises analyzed here are similar in some respects, asset prices declined and growth in income dropped sharply, but there are also distinctive in important ways.

Japan, . . . {one paragraph briefly describing the crisis; the period; something about asset prices, income, and unemployment}

Korea, . . . {one paragraph briefly describing the crisis; the period; something about asset prices, income, and unemployment}

Taiwan, . . . {one paragraph briefly describing the crisis; the period; something about asset prices, income, and unemployment}

Table 2 uses several NTA variables to characterize the crisis in ways that are useful for analyzing the generational effects of the crisis. Labor income is the return to labor including compensation of employees, self-employment income, employee benefits, and indirect taxes on labor. Private asset income consists of the operating surplus of corporations, a portion of mixed income estimated to be a return to capital, and the operating surplus of households. Income on foreign assets earned by residents is included, while asset income earned by foreigners is excluded. Private asset income also includes interest income earned on public debt earned by residents. Factor income is

defined as the sum of labor income and private asset income.⁵ Consumption includes both public and private consumption excluding indirect taxes on consumption.⁶

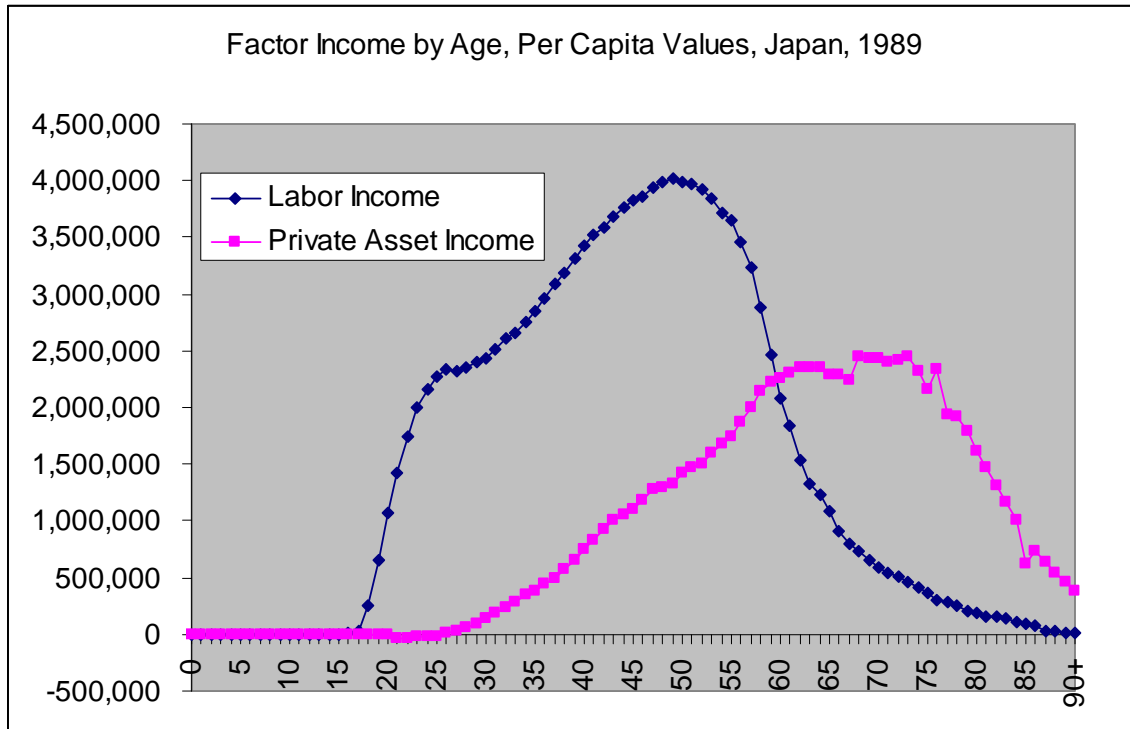
Table 2. Selected aggregate series for Japan, Korea, and Taiwan, real annual growth rates (%)				
	Labor Income	Private Asset Income	Factor Income	Consumption
Japan				
1984-89	2.93	6.52	4.24	3.22
1989-94	2.47	-3.89	0.24	2.79
1994-99	0.04	-1.23	-0.35	1.12
1999-2004	0.24	1.74	0.70	1.90
Korea				
1996-2000	1.49	6.60	2.91	4.40
2000-2005	4.13	6.28	4.80	4.75
Taiwan				

An important feature of the economic crises illustrated by these data is that labor income and private asset income do not move together. Factor income in Japan was much lower in 1989-94 than in 1984-89, but the change was almost entirely due to the decline in private asset income. In 1999-2004, asset income has begun to recover while labor income has not. In Korea, only the growth in labor income was depressed over the 1996-2000 period. Asset income was not. Changes in labor income have their greatest direct impact on prime-age adults while changes in asset income have their greatest direct impact on older adults. Children, however, are not directly affected by changes in assets or factor income. The age profiles of factor income prior to their respective economic crises document this for Japan (Figure 1), with similar patterns in other countries.

⁵ This variable is not exactly factor income as it includes some categories of income that are not returns to economic factors as conventionally defined. It is a close approximation, however.

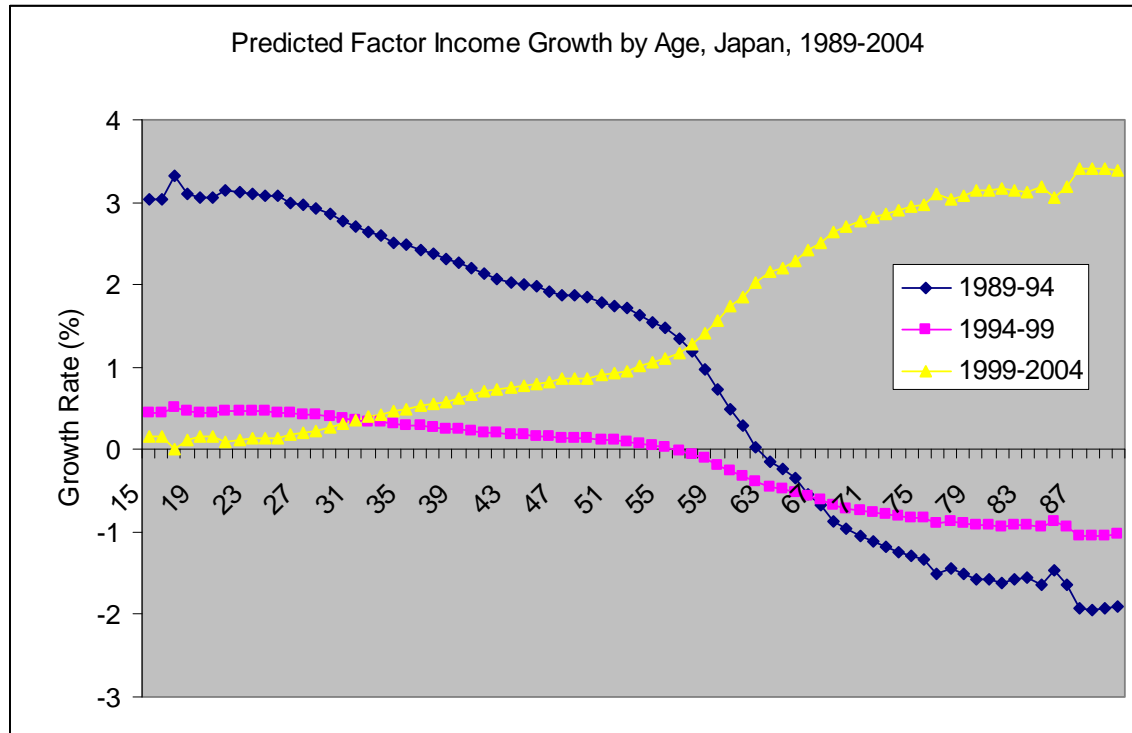
⁶ In SNA consumption is measured after VAT and sales taxes have been assessed. In NTA consumption taxes are excluded from consumption and counted as a public transfer outflow from consumers.

Figure 1



The generational effects of the decline in factor income depend, in part, on the rates of growth of asset and labor income and age-variation in their relative importance. A simple experiment illustrates this effect. Assume that the observed rates of growth of asset and labor income between 1989-94, 1994-99, and 1999-2004 did not vary by age. Using the observed 1989 profile for Japan we can project asset and labor income using the average growth rates for the two forms of factor income. We can calculate the “expected” rate of growth in factor income by age for each period. The results are shown in Figure 2. During 1989-94 factor income for young adults would have increased fairly substantially while for those in their late sixties and older, factor income would have declined. Between 1994 and 1998, factor income was low for all concerned by positive for those below about age 60 and negative for those older than about age 60. While in 1999-2004, factor income would have rebounded significantly for the elderly, but not for young adults who depend on labor rather than asset income.

Figure 2



The compositional effects due to age-specific variation in factor income are only part of the story because of idiosyncratic changes in the age profiles of labor income and asset income. Those just entering the labor market or those towards the end of their career may be differentially affected by employment shocks. Asset portfolios may vary by age with some groups more susceptible to investment risk than others. Also differences in factor income by age will reflect cohort effects as well as time effects.

Table 3 reports the rate of growth of factor income for three synthetic cohorts for Japan and Korea. In Japan, factor income for those 60+ grew very rapidly between 1984 and 1989 reflecting the dramatic growth in asset income during that period. After that factor income growth collapsed for those 60+ with modest recovery in after 1999. For those aged 25-59, factor income grew between 1984 and 1989, but much less rapidly than for those 60+. The downturn after 1989 was less severe, but no recovery has been experienced. Finally the young, those under the age of 25 experienced little growth in factor income even between 1984 and 1989 and a severe downturn after 1994.

The age pattern of factor income growth is quite different in Korea than in Japan. Although the 1996-2000 encompassed Korea's severe, but short-lived financial crisis, asset income grew substantially over the period pushing factor income of those 60 and older much higher. Factor income for those under 60, driven more by growth in labor income, was very stagnant. During the recovery period, 2000-2005, factor income of those under age 25 declined quite substantially while factor income for 25-59 year olds increased at almost 4 percent per year. Factor income of those 60 and older grew very slowly.

Table 3. Growth rates of real factor income and consumption, synthetic cohorts, Japan and Korea.

Factor Income and Consumption, Synthetic Cohorts, Growth Rates, Japan, 1984-2004				Factor income and consumption, synthetic cohorts, growth rates, Korea, 1996-2005.			
	0-24	25-59	60+		0-24	25-59	60+
Growth Rate, Factor Income				Growth Rate, Factor Income			
1984-89	0.36	2.70	8.77	1996-2000	0.70	0.50	8.57
1989-94	-0.52	1.17	-0.68	2000-2005	-4.67	3.88	1.24
1994-99	-2.25	-0.31	-1.62	Growth Rate, Consumption			
1999-2004	-3.83	0.19	1.26	1996-2000	3.20	3.72	2.67
Growth Rate, Consumption				2000-2005	5.45	3.53	3.90
1984-89	3.50	2.83	3.16				
1989-94	2.88	2.85	2.46				
1994-99	0.86	1.36	0.42				
1999-2004	1.35	1.39	0.65				

Did factor income growth translate into consumption growth? Not particularly. In general, consumption and factor income both grew more rapidly during boom periods and more slowly and during bust periods. Consumption smoothing, however, is apparent in the data with consumption growth changing less from period to period than factor income growth (Table 2 and Table 3). There is no apparent connection between the age pattern of factor productivity growth and the age pattern of consumption growth (Table 3). For children this is not surprising given that factor income funds a small share of consumption, but this is also true comparing consumption and factor income of prime age adults and the elderly. In general, the differences in the growth rates between the 25-59 and the 60+ are much smaller than the differences in the factor income growth rates. In 1999-2004, consumption by Japanese elderly grew more than slowly than consumption by prime age adults even though the factor income of the elderly grew more rapidly. In Korea, between 1996 and 2000, those 60 and older experienced the slowest growth in consumption despite having a very high rate of factor income growth. During the 2000-05 period, consumption growth is inversely related to factor income growth in Korea. In both Korea and Japan, economic crisis had very strong generational effects on factor income, but not on consumption. Explaining the respective roles of the public and private sector in realizing this outcome is the topic to which we now turn.

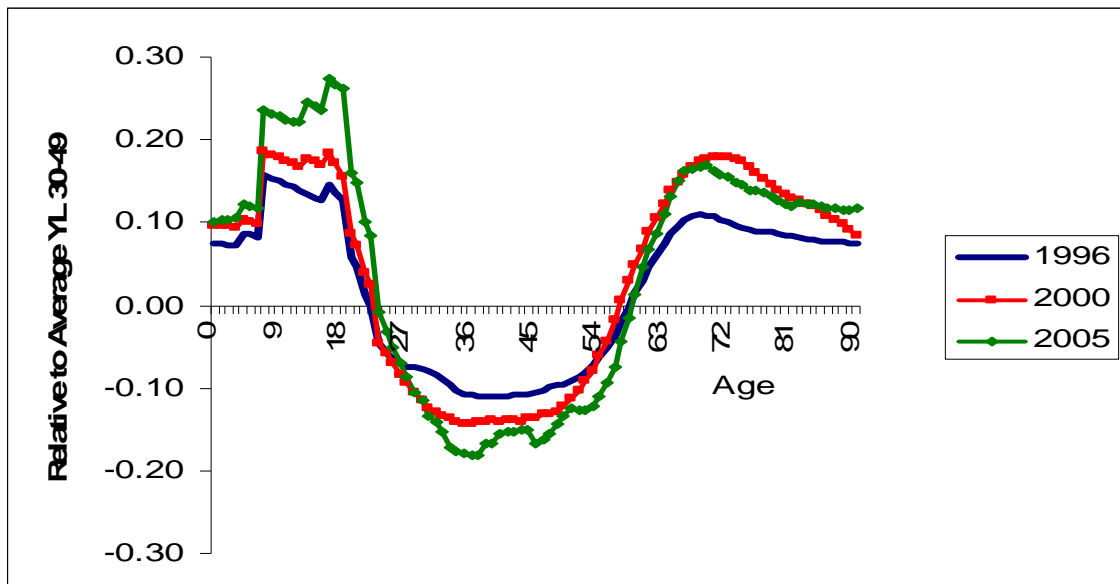
The Public Sector

The flow constraint, equation (1.1), includes two broad mechanisms by which public policy can influence the gap between consumption and factor income. The first is net public transfers. The second, public asset-based reallocations, is discussed below. The government can reallocate factor income by increasing in-kind or cash benefits for one age group funded by taxing another age group. This is a redistributive role that may moderate (or exacerbate) differences in factor income growth. Some programs, e.g., unemployment insurance are explicitly designed to respond to economic fluctuations. Others may be introduced on an ad hoc basis in response to perceived adverse effects of the crisis. Also changes in net public transfers may reflect changes in public policy that

are entirely unrelated to current economic conditions, but would nonetheless lead to a divergence between factor income and consumption.

The role of net public transfers is illustrated with estimates for Korea in Figure 3. The reported values are normalized on per capita labor income of persons aged 30-49. For those who are young and those who are old, net transfers are positive. In Korea, per capita transfers for children and the elderly are of similar magnitude although net transfers for older children exceed net transfers to the elderly in 2005. For prime age adults net transfers are negative.⁷

Figure 3. Per Capita Net Public Transfers Profiles: 1996, 2000, and 2005



In Korea net transfers increased for children between 1996 and 2000 and again between 2000 and 2005 particularly in the school-going ages. Net transfers declined for prime age adults in a monotonic fashion between 1996 and 2005, particularly for those in their 30s and 40s, less so for those in their late 20s and 50s. At older ages net transfers increased very substantially between 1996 and 2000, but not between 2000 and 2005. These patterns and corresponding changes in Japan are summarized using synthetic cohort estimates for three broad age groups as reported in Table 4. Note that the values reported in Table 4 and in other tables presented below are normalized on the average labor income of persons 30-49. Hence, the value of 3.272 for net per capita public transfers in Japan means that individuals received inflows over the first 25 years of their life equal to about 3.3 times the average labor income of a person 30-49.

In Japan, during the economic boom period of 1984-89, normalized net transfers changed very little. In other words, they increased at about the same rate as labor income for the average of the 30-49 age group. But as economic growth slowed, normalized net transfers increased substantially. Between 1989 and 2004, normalized net transfers

⁷ Note that in a closed economy net aggregate transfers must sum to zero. Per capita transfer outflows are low relative to inflows in Korea, because a large share of Korea's population is concentrated in the prime taxpaying ages.

increased by 2.6 percent per year for children and by 3.1 percent per year for those 60 and older. In order to fund this rapid increase, net transfers for those aged 25-59 increased, became more negative, by 3.5% per year. In Korea, net normalized per capita transfers to children increased by 6.4% and 6.8% annually during the two periods. For elderly, net transfers increased by 12.5% annually between 1996 and 2000 and then declined by 1.7% annually between 2000 and 2005. In both countries, public transfers served to maintain consumption growth both for children and the elderly except in Korea after 2000. The cost of doing so, however, would have been to depress consumption of those in the 25-59 age group except for the heavy reliance on public dis-saving to fund the expansion of transfer programs.

Table 4. Net per capita public transfers, Japan, normalized, synthetic cohorts

	0-24	25-59	60+
1984	3.273	-5.633	5.124
1989	3.519	-5.716	4.728
1994	3.860	-6.575	5.728
1999	4.784	-8.058	6.567
2004	5.205	-9.672	7.481

Table 4. Net public transfer, Korea, normalized, synthetic cohort

	0-24	25-59	60+
1996	2.527	-3.158	1.764
2000	3.264	-3.967	2.906
2005	4.584	-4.795	2.668

Public Asset-based Reallocations

The second public sector mechanism is public asset-based reallocations defined as public asset income less public saving. Public asset income is an inflow or resource that consists primarily of interest on public debt (a negative value), income on financial assets owned by the government, and rent and royalties from publicly owned land and other natural resources. Public saving is an outflow or a use of economic resources. Suppose for the moment that public asset income is fixed, economic crisis will influence public saving and asset-based reallocations in several possible ways. First, tax revenues decline with factor income and asset prices depending on the particulars of the tax system. If transfer programs are maintained at their pre-crisis level, government must replace the lost revenue by dis-saving (borrowing). Second, governments may pursue fiscal stimulus by increasing government spending or by cutting taxes. In either case, the gap between taxes collected and expenditures made must be filled by dis-saving. In their analysis of 21 financial crises, Reinhart and Rogoff (2009) find that public debt increased by over 85% within three years from the onset of the crisis.

Public asset-based reallocations provides a mechanism for funding transfers by indebting future generations. By the same token, current generations bear the cost, interest, on public debt accumulated in the past. By combining public asset-based

reallocations and net transfers reported above, we obtain the “net effect” of the public sector on consumption (in the flow account sense).

In Japan, normalized net public sector flows to the young changed very little and to adults declined very substantially between 1984 and 1989. High rates of public saving account for this change (Table 5). After 1989, public sector flows to children increased at an annual rate of 3.9% and to the elderly at an annual rate of 6.3%. Normalized net public sector flows actually declined (became less negative) at 1.5% per year. Through the accumulation of public debt, public sector flows contributed to higher consumption in all age groups. Public sector flows taken in their entirety were particularly favorable to the elderly in Japan.

In Korea public asset transactions had a relatively modest positive effect across all age groups between 1996 and 2000, and a much more expansionary effect between 2000 and 2005. Net flows to children increased substantially during this period, growing at an annual rate of 11% per year. Net flows to the elderly increased modestly – by 1.9% per year, but the growth would have been negative as shown above in the absence of changes in public asset-based reallocations. The impact is also very noticeable for 25-59 year olds for whom normalized net flows changed very little between 2000 and 2005.

Table 5.
Net public sector flows, Japan, normalized, synthetic cohorts

	0-24	25-59	60+
1984	3.016	-7.628	4.487
1989	3.068	-9.284	3.198
1994	3.662	-8.084	5.173
1999	4.875	-7.393	6.802
2004	5.490	-7.405	8.264

Net public sector flows, Korea, normalized, synthetic cohorts

	0-24	25-59	60+
1996	1.659	-6.853	0.694
2000	2.184	-8.845	1.583
2005	3.839	-8.768	1.739

Private Sector: Transfers

During Japan’s boom period of 1984-89 normalized net private transfers changed fairly modestly (Table 6). Net transfers to children increased by 0.4 and net transfers to the elderly declined by 0.2. The decline in transfers to the elderly was dominated by the increase in transfers to children so that net outflows from those 25-59 increased by 0.15. Over the subsequent 15 years, the changes in normalized net private transfers to children were erratic but increased by about 0.5 between 1989 and 2004. Net transfers to the elderly, however, declined steadily and very substantially. By 2004, they were essentially zero. The decline in net transfers to the elderly dominated the small increase

in net transfers to children and, hence, normalized net transfer outflows from those 25-59 declined quite substantially.

When we turn to Korea we see a somewhat similar pattern over the entire period in that net transfers to children increased and net transfers to the elderly changed from a significant net inflow to zero. For adults 25-59 normalized net transfer outflows became smaller. Net transfers changed very little during the crisis period, however. The large changes came in 2000-05 when factor income for prime age adults was growing strongly and factor income for those 60+ was growing slowly. This is puzzling, albeit interesting, result. Neither changes in public sector flows or private transfers responded in an expected fashion to the slow factor income growth experienced by 60+ Koreans.

Table 6.
Net private transfers, Japan, normalized, synthetic cohorts.

	0-24	25-59	60+
1984	6.481	-7.188	2.568
1989	6.879	-7.332	2.326
1994	7.022	-6.457	1.259
1999	6.850	-5.471	0.416
2004	7.365	-5.135	-0.016

Net private transfers, Korea, normalized, synthetic cohorts

	0-24	25-59	60+
1996	8.378	-10.585	3.089
2000	9.493	-10.531	2.829
2005	9.830	-8.081	-0.026

Private Sector: Saving

Private saving is a relatively unimportant flow for those under the age of 25 and our interest is primarily on those 25 and older. During the boom period in Japan the amount saved by those 25-59 decreased substantially supporting a substantial increase in consumption (or transfers to children) while those 60 and older substantially increased their saving and reduced their consumption from the level it would otherwise have reached. During the crisis years the changes in normalized saving for those 25-59 was erratic but generally downward supporting modestly higher consumption. The picture is much more consistent for those 60 and older with saving dropping substantially between 1989 and 1994 and again between 1994 and 1999 accommodating substantial boosts in consumption (and lower net transfers) during that ten year period.

Table 7.

Private saving, Japan, normalized,
synthetic cohorts

	0-24	25-59	60+
1984	-0.050	6.061	5.844
1989	-0.323	4.415	7.246
1994	-0.153	3.713	4.958
1999	-0.117	4.065	3.874
2004	-0.093	3.730	3.940

Private saving, Korea, normalized,
synthetic cohort.

	0-24	25-59	60+
1996	0.066	9.363	2.081
2000	-0.115	5.578	4.991
2005	-0.391	8.374	0.821

The pattern in Korea is quite different. During the crisis saving dropped for prime-age adults supporting higher consumption and then rose again once strong economic growth resumed. But for the elderly saving actually increased during the crisis years and then dropped very substantially during the boom. The changes in saving complement the changes in public sector flows and private transfers. Note in particular, that net transfers to the elderly declined substantially between 2000 and 2005. The elderly reduced their saving while prime age adults, who were transferring less, increased their saving.

Public Debt: Who Pays?

Very clearly changes in saving were an important mechanism for smoothing consumption in the face of substantial economic fluctuations. A complete answer to the generational effects of the crisis requires that we know who ultimately bears the cost of reduced saving rates. One possibility is that current generations increase saving and reduce consumption in subsequent periods restoring assets to pre-crisis levels. But another possibility is that assets do not return to pre-crisis levels. If so, future generations will bear the costs of economic crises by receiving smaller bequests and larger public debt. There is no clear way at the moment to usefully explore the likely impact on bequests, but it is possible to consider public debt because the available evidence indicates that public debt is not paid down after economic crises have ended.

To the extent that public debt is effective in increasing current consumption, that goal is accomplished by reducing the consumption of the current population in future periods and the consumption of future generations. The burden will vary greatly with age depending on expected years of remaining life, tax schedules, interest rates, and debt repayment. In practice, public debt increases substantially as a share of GDP during economic crises and tends to remain at the higher level. In the absence of repayment, debt generated during economic crises is born less by the old and more by the young.

We employ a simple model to explore this issue more fully for Japan. Debt relative to GDP has increased substantially in Japan during its economic crisis. The Japanese economy has not yet recovered, but we assume that economic growth will

resume in 2014. At that point, labor income of those aged 30-49 will begin to grow at 2.1% per year. The labor income of younger and older workers relative to those 30-49 will return to the pre-crisis level. Debt relative to GDP will remain constant at the level observed in 2008. To this point we have not discussed the impact of monetary policy. In Japan, the central bank has pushed interest rates to very low levels. We assume that the interest rate will return to pre-crisis levels in 2014. The shape of the age profiles of public transfers are held fixed and employed to calculate interest payments by age employing the current interest rate. The stream of interest payments is discounted, again using the current interest rate, to calculate the debt of each age group at each point in time.

Figure 4 shows debt by current age for three years, the pre-crisis year of 1989, the crisis year of 2004, and the projected values for the post-crisis year of 2014. Negative ages refer to the debt of the cohort born in period $t - x$ where x is age and t is the current year. Debt is expressed as a fraction of GDP and is the total debt for the cohort. In 1989, total debt was approximately 40% of GDP. For single year cohorts 50 and older debt was less than 0.2 percent of GDP. Likewise the debt of cohorts who would be born twenty years or more in the future was 0.2 percent of GDP. The peak burden fell on young adults at about 0.4 percent of GDP. The heavy burden reflected the relative size of the birth cohort, that these cohorts would be paying interest on the existing public debt for many years, and that they would be paying it in the immediate future rather than in the distant future. The debt was much higher in 2004 than in 1989, in general, because total debt exceeded GDP by that time. The peak had shifted slightly reflecting the shifting age distribution of Japan's population. The most important change in the distribution, however, is that the burden on future generations increased much more than the burden on current generations. This was a consequence of the substantial drop in interest rates. The change between 2004 and 2014 is almost entirely a consequence of the return to pre-crisis interest rates and to a lesser extent the aging of Japan's population.

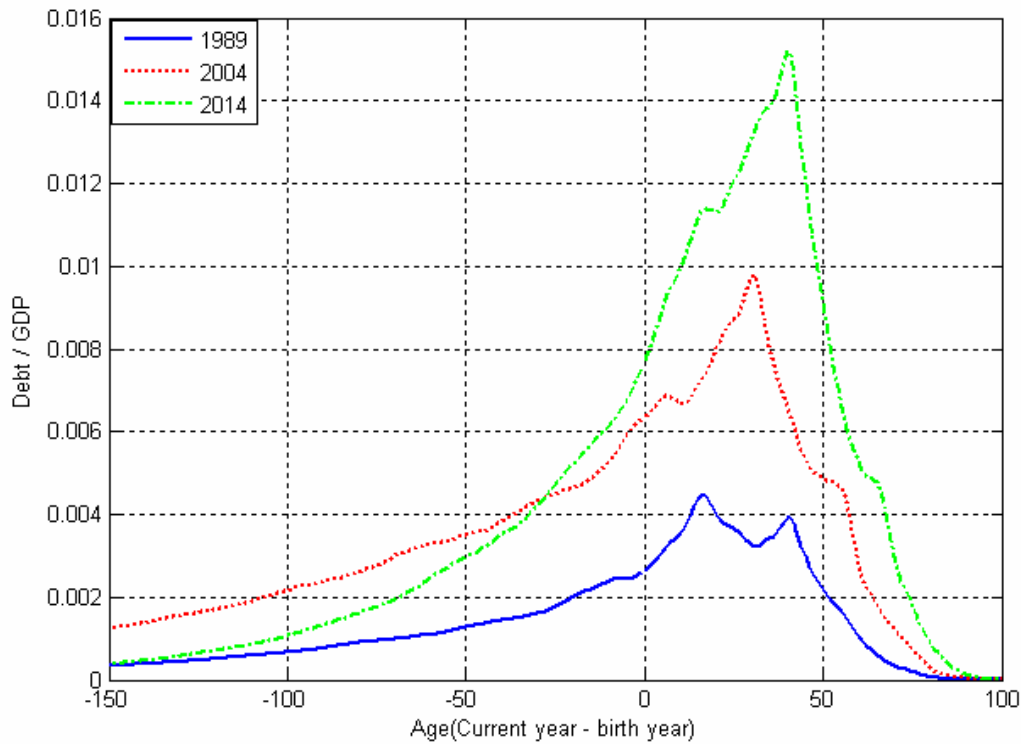


Figure 4. Debt relative to GDP by single years of age, 1989, 2004, and projected to 2014, Japan.

Between 1984 and 1989 the debt of all current generations declined in Japan because the government was running a surplus and because interest rates declined (Figure 5). The debt of future generations increased, however, under the effect of lower interest rates. Debt increased very substantially starting in 1994 but particularly for future generations. By 2009 the debt for future generations was 60% of GDP as compared with 30% for prime age adults, about 15% of GDP for children, and under 5% of GDP for the elderly. A return to pre-crisis interest rates has a dramatic effect on the relative magnitudes of debt with the debt of future generations dropping to 40% of GDP and that of working-age adults increasing to almost 50% of GDP.

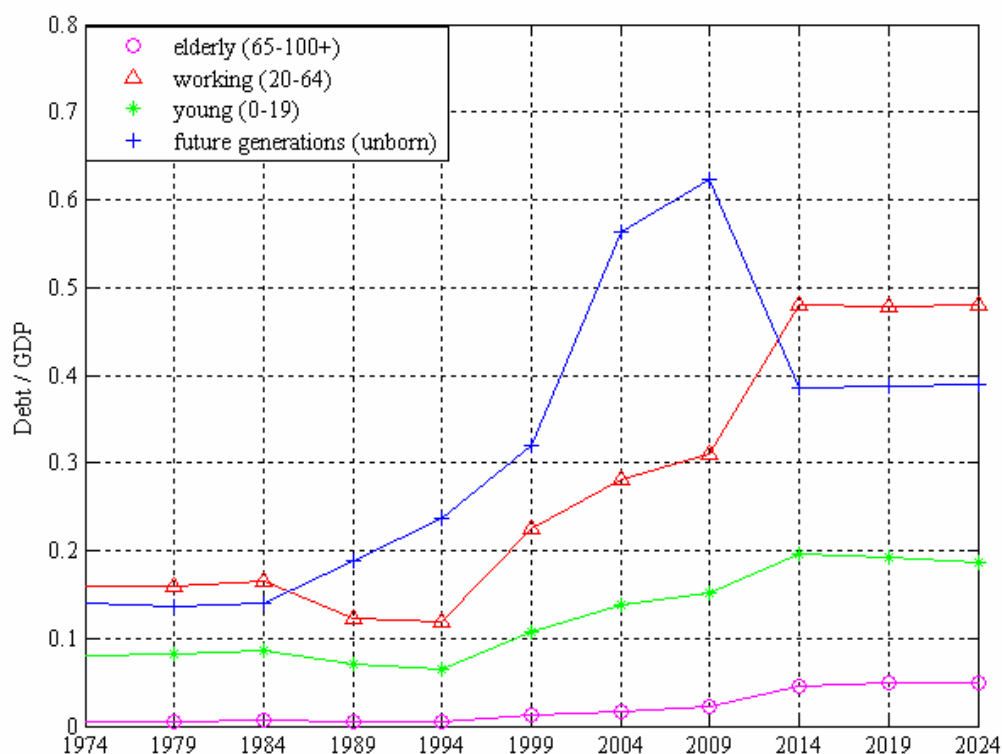


Figure 5. Debt relative to GDP, broad age groups and future generations, Japan, 1974-2024.

Conclusions

Briefly, the evidence compiled to this point indicates that a decline in national income during economic crises affects different generations in very different ways. Economic resources vary substantially over the lifecycle. Young adults are dependent on conditions in the labor market and their ability to find well-paying jobs. Retirees depend on income from assets. Thus, who suffers the greatest loss in factor income depends on whether employment and labor income or asset income suffer the greatest declines. The answer to that question may also be a matter of timing with asset income dropping and recovering relatively early and labor income declining and recovering later.

The differences in factor income growth across generations are relatively large. However, these do not translate into generational differences in consumption growth. That is not to say that consumption for every age group is growing at the same rate. But generational differences in the rates of consumption growth do not appear to be related to factor income growth or to economic crises.

The divergence between consumption growth and factor income growth can be explained by changes in public transfers, public asset income and saving, private transfers, and private saving. These components also change for reasons entirely unrelated to economic fluctuations. Public transfers change as a consequence of reform often driven by political concerns and longer term social objectives. Family transfers are evolving in response to a variety of social and economic forces. These components interact with one

another. Expansion of public transfers may crowd out private transfers, increase public debt may led to an increase in private saving, and so forth. Given these enormous complexities it should not be surprising that the responses were so varied. For the most part, expansion of public transfers played a very important role in supporting consumption for children and the elderly. The role of private transfers seems more puzzling, because net private transfers to the elderly dropped so substantially in both Japan and Korea. Perhaps this was driven by forces unrelated to the crisis. Another possibility is that those 60 and older could support their own consumption and that of younger generations by reducing their saving, relying more on their own resources and less on the resources of their children. The older generation may be the key economic “shock absorber”. Reduced public saving and the increased accumulation of public debt has also proved to be a very important mechanism for maintaining consumption in the face of lower factor income. A key issue to explore further is the generational implications of the drawdown of both public and private assets. Although public debt is often portrayed as a burden on future generations, without a precise explanation of what that means, the burden falls primarily on those who accumulate the debt during the working years. Older members of the population can pass the burden onto future generations, but younger members of the population can do so to a more limited extent.

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