Generational Accounting in Korea

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Abstract

This paper reassesses the long-term fiscal position of Korea using Generational Accounting, modified to reflect special features of the Korean fiscal situation, notably prospective changes in public pension benefits due to the pension system's maturation and increasing expenditure on social welfare programs consistent with convergence to levels in other OECD countries. Our findings suggest that unless policy toward existing generations is substantially altered, future generations will face a heavy fiscal burden. For reasonable growth and interest rate assumptions, the difference between 2000 newborns and those born after 2000 ranges from 60% to 180%. We also find that a substantial part of the fiscal burden on future generations is explained by the long-run budgetary imbalances of public pensions and Medical Insurance.

1. Introduction

The government budget in Korea has been viewed as sound relative to those of other OECD countries, based on positive government net wealth and consolidated budget surpluses in recent years. For Korea, however, both government net wealth and consolidated budget balance suffer from some conceptual problems. First, the consolidated budget's coverage is not wide enough to include all relevant fiscal policies, omitting local government and important government activities such as Medical Insurance. Second, government budget balance and net wealth are the results of past and present government activities. Therefore, they cannot be used to evaluate the effects of future changes in the economic environment, future cash flows of the government budget, or future fiscal policies. For example, population aging will raise Medical Insurance benefits and the Medical Insurance budget deficit unless the Medical Insurance contribution rate is substantially raised. The budget of the National Pension system, currently in surplus, will soon shift into a rapidly growing deficit. Increasing demand for social welfare programs likely will increase government expenditure in the future.

Generational Accounting (GA) provides a useful tool for the investigation of the sustainability of fiscal policies in Korea. GA covers all relevant government fiscal policies. Moreover, its forward-looking properties allow us to explore how the sustainability of the public finances is affected by various future developments such as maturing of the National Pension, increase in social welfare expenditure and population aging.

The purpose of this paper is to assess Korea's long-term fiscal position using Generational Accounting. In order to take into account the special features of Korea's fiscal situation, we extend the traditional GA calculation in two ways. First, we incorporate prospective changes in age profiles and aggregate benefits and contributions of public pensions. Maturation of the National Pension, whose benefit amounts are currently small, will increase benefit payments to older age groups in the future, which will substantially change the age profile of transfer payments. A second extension of the standard method is that we incorporate expected changes in social welfare expenditures in the future. Even though its aggregate amount was limited in the past, social welfare spending has been increasing rapidly and this increasing trend is expected to continue for the time being, as Korea's standard of living rapidly rises.

Our findings suggest a much larger fiscal burden on future generations than on 2000 newborns under current policy. For reasonable growth and interest rate assumptions, the difference between the two cohorts ranges from 60% to 180%. We also find that a substantial part of fiscal burden on future generations is explained by the long-run budgetary imbalance of public pensions and Medical Insurance. The generational accounts of public pensions and Medical Insurance explain about 34% and 12%, respectively, of the net payments (defined as

the present value of tax payments minus transfer income from the government) for future generations. The magnitude of the adjustment of tax and social insurance contributions required to attain long-run government budget balance is substantial. A 56-59% increase in tax burden will be needed if the adjustment is just on the tax side and applies only for the generations born after 2000. If the adjustment is made to all cohorts alive in 2004 and later, the required adjustment is a 19-20% increase in the tax burden. If we delay the tax adjustment until 2030, the required tax increase reaches 37-39%. All these findings suggest that unless policy toward existing generations in Korea is substantially altered, future generations will face very heavy fiscal burdens

The rest of the paper is organized as follows. Section 2 briefly describes the fiscal situation in Korea. Section 3 explains the GA calculation procedure, including our extensions of the standard methodology and data used to construct the accounts. Section 4 presents the accounts and discusses their implications. Section 5 summarizes findings and draws conclusions.

2. The Fiscal Situation in Korea

Table 1 shows some recent developments of the Korean fiscal situation. The first remarkable change is the rapid increase in government expenditure and debt, even though their levels are not high compared with other OECD countries. The expenditure of the consolidated budget (CB), whose coverage includes the central government (general account, special account, and public trust funds) and non-financial public enterprises, has increased from 19.0% of GDP in 1995 to 25.1% in 2001. Government debt has increased from 9.4% of GDP to 20.8% during the same period. Despite these recent changes, the government budget in Korea has been judged sound in comparison with other OECD countries. Except for the (IMF bailout) period 1997-1999, a period of financial crisis triggered by the shortage of foreign currencies in 1997, the consolidated budget was in surplus, and government net wealth (gross wealth less debt) is still positive.

However, the surplus of the CB and positive net wealth do not necessarily imply that current fiscal policies in Korea are sustainable. Excluding the National Pension (NPS) budget transforms the consolidated budget balance from surplus to deficit. Excluding the NPS fund (75.6 trillion won as of December 2001) eliminates government net wealth (75.2 trillion won as of December 2001). The NPS budget surplus will be maintained for the time being, because the number of current pension benefit recipients is limited; it will take a considerable time for the majority of current NPS participants to acquire entitlement to NPS benefits because of its short history[1]. However, the budget will eventually turn to deficit, since

[1] The NPS, which covers the largest proportion of the Korean population, was introduced in 1988. The minimum requirement for entitlement to a "full-old-age pension," which will eventually account for the largest

promised pension benefits are quite generous relative to contributions. According to the projection of the National Pension Corporation, the administrative organization of the NPS, the NPS budget will turn to deficit in 2034 and its fund will be exhausted in 2049.

Another important trend in Korean budget structure is the rapid increase in social welfare expenditure. The rate of increase in social welfare expenditure for the period 1995-2001 (25%) is much higher than that of total central government expenditure (12.4%). Until the mid-1990s, social welfare expenditure was limited, as the Korean government placed a higher priority on other sectors, including economic development and national defense. The government restricted Medical Insurance benefits and maintained fees for services at low levels. Eligibility for the benefits of low-income public aid programs was very restrictive and benefit levels were quite low. Coverage of other social insurance programs was also limited. However, since the mid 1990s social welfare expenditure has been increasing rapidly. This reflects structural change in social welfare policies. Government has expanded the coverage of social insurance programs such as the NPS, Medical Insurance, Employment Insurance[2], and Industrial Accident Compensation Insurance[3]. Public aid programs are also experiencing a structural change. In 2000, the Livelihood Protection System, which restricted eligibility by age and working ability, was replaced by the Minimum Living Standards Security System, which guarantees a minimum living standard to everyone who passes an income-and-asset-based means test, regardless of one's working ability. Therefore, we can expect a substantial increase in social welfare expenditure, one that will be accelerated by population aging.

While the current proportion of old-age population is smaller than other OECD countries (see Table 2), the speed of population aging is very high, because of a low fertility rate and prolonged life expectancy. In particular, the fertility rate of Korea is lower than many other OECD countries[4]. Moreover, National Statistics Office of Korea projects that the total fertility rate will decrease from 1.47 (2000) to 1.40 (2040), which will accelerate the process of population aging. A United Nations (1998) projection shows that the proportion of the population aged 65 and older will increase from 7.2% (as of 2000), much lower than the average of developed countries (14.4%), to 23.1% (2030), almost the same as the projected average (22.6%). The time required for the old-age population proportion to increase from 7%

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share of NPS benefit expenditure, is 20-year participation, which implies that this benefit has not yet been paid. Therefore, the NPS benefit payment at present is limited.

[2] Employment Insurance activities include the provision of unemployment insurance, employment stability promotion, and vocational ability development activities.

[3] This program is the Korean version of workers' compensation, i.e., it insures the risks of accidents in the workplace.

[4] The fertility rate of Korea (as of 2000) is 1.47. The rates for other OECD countries are 1.36 (Germany), 1.88 (France), 1.41 (Japan), 2.06 (U.S.), 1.64 (U.K.).

(14%) to 14% (20%) is 19 years (7 years), which is much shorter than in other developed countries (France (115 years (41 years)), U.S. (71 years (15 years)), Japan (24 years (12 years))). Thus, Korea will age much faster than any other OECD country (see Figure 1). Therefore, social welfare expenditure, the level of which is crucially dependent upon the old age population share, will drastically increase in the future. We project that aggregate public pension benefits will increase from 1.1% of GDP currently to 16% in 2080. Benefits of Medical Insurance and public aid programs are projected to increase from 1.7% and 1.1% of GDP, respectively, to 5.1%, 2.1%[5] during the same period.

Unfortunately, social insurance contributions are not projected to increase fast enough to match the increase in social welfare expenditure. With population aging further contributing to a decrease in tax bases, a substantial increase in rates of tax and social insurance contributions would be needed. Absent this unpopular move, the Korean government will eventually face large fiscal deficits. For example, we project that the deficit of NPS and Medical Insurance will amount to 12.6% and 3% of GDP in 2080 if current levels of benefits and contribution rates are maintained.

These prospective changes in the government budget indicate that the current consolidated budget and government net wealth are poor indices of Korea's fiscal sustainability. A better assessment of Korea's fiscal position requires a method, such as Generational Accounting, that incorporates prospective changes in the economic environment, government budget flows, and fiscal policies.

3. GA Calculation Procedures

3.1. The Basic Framework[6]

Generational Accounts are calculated in two steps. The first step involves calculation of the net tax payment of current generations (i.e. the generations that are currently alive). This is done on the basis of current fiscal rules without being constrained by the intertemporal budget constraint of the government. In the second step, the fiscal burdens on future generations (i.e. the generations that are not yet born) are computed as a residual from the intertemporal budget constraint, rather than on the basis of current fiscal rules. Accordingly, whereas the fiscal burdens for current generations are based entirely on current fiscal rules, the government budget constraint fully determines the fiscal burdens for future generations.

[5] This projection is explained below, in Section 3.3.3.

[6] See Auerbach, Gokhale, and Kotlikoff (1991, 1992a, 1992b, 1994) and Kotlikoff (1992) for further discussion and development of the method of generational accounting.

Future generations are thus assumed to absorb the entire adjustment that is required to make the claims of various generations consistent with the intertemporal budget constraint.

Based on the collective amount required of future generations, we determine the average present value of lifetime net tax payments for each member of each future generation under the assumption that the average lifetime tax payment of successive generations rises at the economy's rate of productivity growth. Leaving out this growth adjustment, the lifetime net tax payments of future generations are directly comparable with those of current newborns, since the generational accounts of both newborns and future generations take into account net tax payments over these generations' entire lifetimes. Measuring the generational imbalances as the difference between two lifetime tax burdens provides a measure for the sustainability of the public finances. Under the standard methodology, if future generations bear a heavier tax burden than the newly born do, current fiscal rules will have to be adjusted in the future to meet the budget constraint.

3.2. Extending the Standard Method

The standard method used to project the average values of particular taxes and transfer payments by age and sex starts with government forecasts of the aggregate amounts of each type of tax and transfer payment in future years. These aggregate amounts are then distributed by age and sex based on cross-sectional relative age-sex-tax and age-sex-transfer profiles derived from cross-sectional micro-data sets. For years beyond those for which government forecasts are available, age- and sex-specific average tax and transfer amounts are set equal to those for the latest year for which forecasts are available, with an adjustment for growth.

This procedure is based on the assumption that the age-sex-profiles of transfer payments and tax burden do not change over time. The standard procedure also assumes that government purchases, transfer payments and tax revenues grow at the same rate as GDP, although in some cases they are broken down into age-specific components, with the assumption that each component remains constant per member of the relevant population, adjusted for the overall growth of GDP per capita.

We extend this standard method in two ways. First, we incorporate the prospective changes in age profiles and aggregate benefits and contributions of public pensions[7]. At present, the average National Pension benefit per member of cohorts aged 70 and older is low compared with that for the aged between 55 and 70, since the NPS does not cover a large proportion of the older age groups. In addition, the number of beneficiaries and the aggregate benefit

[7] Similar adjustments have been applied in previous Generational Accounting studies. For example, Bovenberg and ter Rele (2000) incorporated prospective changes in the future age profiles due to maturing pension schemes and rising health care costs in the Netherlands.

amount are limited, since most of those covered by the NPS, in older age cohorts, have not acquired the entitlement to full benefits because of its short history. However, maturation of the system will increase the average amount of benefit payments to the old-age groups, which will flatten the age profile of benefits and increase the number of the pension recipients and aggregate pension benefit amount. The proportions of the participants of the Pension for Civil Servants and Pension for Private School Employees are expected to change, since population aging is likely to change the demand for government service and education. Therefore, it is inevitable that the age profiles of benefits and contributions will change.

Another extension of the standard method is that we incorporate expected future changes in social welfare expenditures. Even though the aggregate amount of transfer payments by Medical Insurance and social welfare services and public assistance was limited in the past, its amount has been increasing rapidly for the past decade due to the recent structural changes in social welfare policies. Despite its increase in recent years, however, the level of social welfare expenditure in Korea remains much lower than OECD average. Therefore, it is reasonable to assume that social welfare expenditure will continue to increase more rapidly than other components of government expenditure for a considerable period. Based on this expectation, we assume that the per capita amount of social welfare expenditure will increase more rapidly than per capita GDP until it reaches the OECD average[8].

3.3. Calculation Procedure and Underlying Assumptions

To produce generational accounts for Korea, we require projections of population, taxes, transfers, and government expenditures, initial government wealth, and a discount rate. We consider the impact of total, not national, government. The fiscal policies in Korea are classified into the following groups: social welfare policies, tax system, seigniorage, and government consumption (see Table 5). Social welfare policies are composed of public pensions, Medical Insurance (MI), Employment Insurance (EI), Industrial Accident Compensation Insurance (IACI), and social welfare services and public assistance (Minimum Living Standards Security System, MLSS, and other social transfer programs, OSTP). Taxes are classified as labor income taxes, capital income taxes, consumption taxes, taxes on asset-holdings, taxes on asset transactions, and other taxes. Government consumption is broken down into expenditure on education and other government consumption.

We follow the standard procedure, mentioned in section 3.2, to produce the generational accounts for most fiscal policy components, except for public pensions, MI, MLSS and OSTP. To project contributions and benefits of public pensions, we construct projection models for

[8] For detailed information about the future path of social welfare expenditure, see section 3.3.

each public pension scheme. The aggregate benefits of MI, MLSS and OSTP are assumed to increase more rapidly than the GDP growth rate, until they reach the OECD average.

3.3.1. Population Projections

The population projections used to compute generational accounts are based on the 2001 population projection model of the National Statistics Office (NSO). The 2001 NSO population projection covers the period 2001-2050. We extend the population projection up to 2110 using fertility rates, mortality rates[9], and international mobility rates[10]. Baseline calculations are conducted under the assumption that the total fertility rate and age-sex mortality rates will remain constant at their 2050 levels until 2110.

3.3.2. Projecting Contributions and Benefits of Public Pensions[11]

Public pensions in Korea consist of 2 different plans: National Pension (NPS) and Occupational Pensions. Occupational Pensions consists of three different plans: Pension for Civil Servants (PCS), Pension for Private School Employees (PPS), and Pension for Military Personnel (PMP). PMP is excluded from the GA calculation, as the necessary data are not published. Instead, we treat the PMP budget deficit as government consumption[12].

We project the contributions and benefit payments of the NPS by year-sex-age, using the long-term projections of the National Pension Corporation (NPC) and data published in the *National Pension Statistical Yearbook*. We adjust the projection of the NPC in two ways: we recalculate the distributions of NPS insurants and pension benefit recipients based on the 2001 population projection, since the projection of the NPC is based on the 1996 population projection; we also recalculate the average income of pension participants and the average benefit amount, since our assumptions about macroeconomic variables, such as growth and inflation rates, are different from projected values of the NPC.

We construct a projection model for benefits and contributions of the PCS and the PPS, since their administrative organizations do not provide long-term projections. The distribution of participants and benefit recipients and their aggregates, and the profiles of average levels of contributions and benefits by year-sex-age are imputed based on the

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[9] The average life expectancy is projected to rise from currently 76 years to 83 years in 2050.

[10] International movement of population is limited in Korea. For example, net immigration in 2000 was 11 thousand (emigration 43 thousand, immigration 54 thousand). We assume that the international movement rates remain constant at their 2050 levels until 2110.

[11] For detained information of the structure of projection models for the NPS and Occupational Pensions, see Section 3.4.2 of Auerbach and Chun (2003).

[12] The total PMP expenditure in recent years is about 20-30% of that of the PCS. Since the ratio of expenditure for the former to that for the latter is declining, ignoring the PMP will not produce highly biased results.

statistical yearbooks published by their administrative organizations, such as *Statistical Yearbook for the PCS*, *Statistical Yearbook for the PPS,* and *Statistical Yearbook of Ministry of Government Administration and Home Affairs*, and some assumptions about their joint distributions and macroeconomic variables.

Income tax is newly imposed on pension benefits from 2002. Since data on taxation of pension income are not available, we project the tax burden on pension benefits under the assumption that the average effective tax rates across income levels (adjusted for overall growth of GDP per capita) remain constant at current levels.

The resulting age-sex profiles of public pension benefits and contributions are shown in Figures 2 and 3, which show substantial changes in the profiles over time.

3.3.3. Projections of Other Fiscal Components

Determining Generational Profiles

The profiles of taxes and transfers are estimated in two steps. The first step involves the calculation of profiles of the components belonging to each program. In the second step, we compute the weighted average of profiles of components for each program, where the weight is the tax revenue (benefit amount) proportion of each tax (benefit). In order to estimate tax and transfer profiles we use various micro-data sets and statistical yearbooks published by the government (see Table 5). The micro-data sets include Daewoo Panel[13], Korea Labor Panel[14], Family Income and Expenditure Survey[15], and National Survey of Income and Expenditure[16].

We use the Daewoo Panel to estimate the profiles of most taxes and social insurance contributions and some components of social welfare programs such as the Minimum Living Standards Security System. The profiles for consumption taxes and seigniorage are estimated using the Family Income and Expenditure Survey, since more detailed information about consumption and cash-holdings is contained in this data set. The Korea Labor Panel Survey contains the information needed to estimate the age-sex profiles of net wealth. We use this to estimate the profiles of taxes on asset holdings, and also some capital income tax components

[13] This data set is a PSID-type micro-data set constructed by the private Daewoo Economic Research Institute. The data set covers the whole population and the period 1993-1998.

[14] This data set is a PSID-type micro-data set constructed by the state-run Korea Institute of Labor. This data set covers the whole population and the period since 1998.

[15] This data set is annually constructed by the National Statistics Office. Unlike the Daewoo Panel and the Korea Labor Panel, this data set is not panel data. The sample is renewed every five years. The Family Income and Expenditure Survey covers families in urban areas with two or more members. It contains detailed information about consumption expenditures.

[16] This data set is constructed by the National Statistics Office every five years. It covers the whole population and contains detailed information about income, consumption, asset holdings and asset transactions.

such as corporation tax and Inhabitant Tax, since the standard method attributes the corporation tax burden to asset holders and the Inhabitant Tax burden is dependent upon the corporation tax burden. The National Survey of Family Income and Expenditure is used to estimate the profiles of Taxes on Asset Transactions, since it surveys the transactions in financial assets and real estate. Tax bases of the Education Tax and the Special Tax for Rural Development consist of: (1) the amounts of some components of labor income taxes, capital income taxes, consumption taxes, and taxes on asset holding and transactions; (2) receipts of banks and insurance companies; and (3) some tax expenditures. Therefore, we use various data sources, containing information about the burdens of different taxes, financial asset holdings and tax expenditures, to estimate profiles for these taxes.

For the components that are not covered by the micro-data sets, we use statistical yearbooks published by the government. In the case of Medical Insurance and Expenditure on Education, the statistical yearbooks report age-sex profiles of the benefits and contributions. For the case of components such as Employment Insurance, Industrial Accident Compensation Insurance, and social transfer programs other than the MLSS, we impute profiles in two steps. In the first step, we decompose the benefits of each social welfare program into age-specific benefits and non-age-specific benefits. The age-specific benefits and the non-age-specific benefits are assumed to be distributed equally among the relevant age-sex groups and the whole population, respectively. In the next step, we compute the weighted average of the benefits for each age-sex group, with the weight for each benefit being its proportion of total benefits, and compute relative age-sex profiles, with the level for the representative male aged 40 being normalized to be 1. Figures 2-17 show the age-sex profiles of benefits and tax burdens.

Projection of Aggregates

We follow the definition of the National Income and Product Account (NIPA) of Korea, with some adjustment for Occupational Pensions[17], to define the scope of government. The total expenditure of the government defined in Korean NIPA as of 2000 amounts to 119 trillion won (23% of GDP). This amount includes government final consumption expenditure, subsidies, social security benefits and assistance grants, current transfers, gross fixed capital formation and capital transfers. We define government consumption expenditure as total expenditure on these items[18] less social insurance benefits and benefits of social welfare services and public assistance, such as those by NPS, MI, EI, IACI, MLSS and OSTP.

[17] The Occupational Pensions, such as the PCS, the PPS and the PMP, are not defined as government organizations but as financial corporations in Korean NIPA, since they do not cover the whole population. We include the Occupational Pensions in the scope of the government program since the government controls them though various fiscal policies and guarantees their benefit payments.

[18] As pointed out by Auerbach et al. (1991), an important issue that arises in considering government as well as

Our procedure for projecting the future path of total government consumption begins with decomposing 2000 government consumption expenditure into (1) age-specific expenditures and (2) non-age-specific expenditures. Government consumption on education, health, and social security and welfare services are defined as age-specific expenditures[19], and other groups are defined as non-age-specific. All government transfer programs, including social insurance and social welfare programs such as the MLSS and OSTP, are age-specific, since the distribution of participants and benefit recipients depends on the demographic structure. The per capita level of government consumption and social insurance benefits of relevant age-sex groups is assumed to increase at the rate of productivity growth, assumed to be 1.5% per annum, except for government consumption on health care, social security and welfare services, and some transfer payments such as MI, MLSS, and OSTP. We assume that government consumption on health, social security and welfare services, and the benefits of MI, the MLSS and the OSTP will increase more rapidly than per capita GDP until they reach the OECD average, since current levels of these expenditures are much lower than those of other OECD countries. Per capita levels of health and MI benefits (government consumption on social security and welfare services and the MLSS and OSTP benefits) of relevant age-sex groups are assumed to increase at the rate of per capita GDP growth multiplied by an income elasticity (1.2)[20], until the total amount of government consumption on health care and MI benefits (or on government consumption on social welfare and MLSS and OSTP benefits) reaches the OECD average as of 1995, 5.94% (or 4.12%) of GDP.

Social insurance contributions are classified as age-specific, since the bases for the contributions are labor income and business income that are associated with the economically active population. We assume that per capita contributions of relevant age groups will increase at the productivity growth rate except for the case of MI. The MI contributions are

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private consumption is the treatment of durables. The proper economic treatment involves imputing rent on private and government durables and including this rent (and excluding expenditures on durables) in private and government consumption, respectively. However, the Korean NIPA does not compute and report the imputed rent. The government capital income reported in NIPA is mainly composed of interest income from financial assets. Therefore, we include capital expenditures such as gross fixed capital formation and capital transfers in government consumption expenditure. This simplification affects the annual estimates of government consumption expenditures, but not their present value and hence our estimates of generational imbalance.

[19] Government consumption on education is assumed proportional to the population aged 0-24. Government consumption on health care, social security and welfare services are assumed as dependent upon the sex-age distribution of MI benefits and government social transfers (the MLSS and the OSTP) respectively.

[20] The income elasticity of government expenditure on health care is based on estimates by Newhouse (1997), Leu (1983, 1986), Gertham et al. (1998, 1992) and the OECD (1993), whose values range between 1.2 and 1.4. Exceptionally low or high estimates are produced by Gerdtham (1991, 1992) (0.74), Moon (2000) (1.75) and the OECD (1993) (1.6). In the case of government expenditure on social security and welfare services, Moon (2000) produced a high income elasticity estimate (1.54). We make a very conservative assumption about the income elasticity (1.2) in order to avoid over-projection of government expenditure in these sectors. We also conduct sensitivity analyses using Moon's estimates and lower values for the elasticities (see section 4.4).

treated separately in order to take into account the tendency of per capita MI benefits to increase more rapidly than productivity growth, and the structural problem of the MI budget in Korea. In recent years, MI contribution revenues have fallen far short of MI benefits. As of 2000, revenues were 80% of benefits; the difference between them is financed by government subsidy. We assume that the difference between the contribution revenue and the benefit expenditure per participant of each age-sex group remain constant at the level of 2000, since there is strong resistance to increases in the MI contribution rate.

Aggregate labor income tax and capital income tax revenues are projected under the assumption that per capita values depend on productivity growth and the size of the economically active population, i.e., labor income tax and capital income tax revenues are assumed to be proportional to the product of the economically active population (aged 18-65) and average productivity of those belonging to these age groups, and average productivity is assumed to increase at the rate of productivity growth. Other taxes are treated as non-age-specific, i.e. the total tax revenue increases at the rate of GDP growth.

3.5. Government Net Wealth and Discount Rate

We take net capital income (6.3 trillion won as of 2000), including net interest income and rents, divided by the sum of our assumed real interest rate (3.5%) and an assumed inflation rate (3%)[21] as our measure of 2000 government net wealth, as in Auerbach et al. (1991). The resulting value of government net wealth as of 2000 is 97.1 trillion won. We assume that the value is 100 trillion won at the end of 2000.

The nominal discount rate for the evaluation of GA is assumed 6.5%, based on the values of the assumed real interest rate and the assumed inflation rate. We also try sensitivity analysis using higher discount rate (7.5%), since in the presence of uncertainty the discount rate should probably be higher than the government's borrowing rate[22].

4. Findings

The benchmark year in the GA calculation is 2000. We regard generations alive in the benchmark year as current generations and classify cohorts by the age. We treat cohorts born in 2001 and after as future generations. We compute net payments (or net taxes) across generations under alternative assumptions regarding corporation taxes and educational expenditure. Net Payment I includes an infra-marginal corporation tax adjustment, which

[21] The assumed real interest rate and inflation rate are based on the values of interest rates for government bonds and inflation rates realized in recent years.

[22] For further discussion, see Auerbach, Gokhale and Kotlikoff (1991).

assigns to existing asset owners future taxes that should be capitalized into asset values[23]. Net Payment II is the account without consideration of this tax adjustment. Net Payment III starts with Net Payment I, but also treats educational expenditure as a transfer.

4.1. The Burden on Future Generations

Table 6 reports the generational accounts for male, female and sex-combined cohorts, under base case assumptions for productivity growth (1.5%), nominal discount (6.5%) and fertility (medium) rates.[24] The table shows positive values of the net payments for most cohorts alive in 2000 except for cohorts aged 90 or older, indicating that most generations will, on balance, pay more in present value than receive. This result is robust under the alternative assumptions regarding the treatment of intra-marginal capital income taxes and educational expenditure. One reason for positive burdens even among the elderly is the high taxes on consumption, capital income and assets, relative to taxes on labor income[25]. The age profile of the average tax burden on capital is more skewed to older age groups than that of labor income taxes, and the average consumption tax burden for older age groups is quite high (see Figures 10-15).

The more important reason for the result is the small size in 2000 of benefits from public pensions, Medical Insurance (MI), Minimum Living Standards Security (MLSS), and other social welfare services (OSTP) (see Figures 18-21). Aggregate public pension and MI benefits are 1.1% and 1.7% of GDP respectively as of 2000 and those for MLSS and OSTP are 0.5% and 0.6% of GDP respectively. However, maturation of the public pension system[26] and the projected increase in social welfare expenditures will increase transfer payments to old-age groups. As a result, the accounts for a wider range of old-age groups will turn to negative. For example, net taxes for groups aged 65 or more as of 2050 are negative (see Figure 18).

There are some differences among the three measures of net payment. Net Payment I is larger than Net Payment II for older generations. This is mainly due to the fact that older cohorts hold much larger proportions of net wealth, whose values are reduced by the assumed capitalization of some capital income taxes. Treating all capital income taxes as marginal taxes on new capital income lowers the fiscal burden on older living generations, since these groups are no longer being assigned the reduction in capital values associated with the infra-marginal taxation on old capital. The difference between the two measures is larger for males,

[23] The process of infra-marginal corporation tax adjustment is explained in Auerbach and Chun (2003).

[24] The accounts are expressed in thousands of won, the domestic currency. As of March, 2004, 1,000 won were worth about US$0.85.

[25] Revenues from consumption tax, capital income tax, taxes on asset holding, and labor income tax as of 2000 were 9.1%, 5.1%, 1.3%, and 2.2% of GDP respectively.

[26] Figure 2 shows that the maturing of public pensions will increase benefit levels of the aged groups and flatten the age profile of public pension benefits.

since the proportion of net wealth owned by males is larger than that owned by females. The importance of the special treatment of capital income taxes is also demonstrated in the changes of net payments for younger living cohorts. Net payment II for younger generations is larger than net payment I, since these groups hold little capital and will face many years of somewhat higher marginal tax rates. Treating expenditure on education as a transfer to the relevant age groups decreases net payments, especially for younger age groups.

A common feature of the three measures of the net payment is that the net payments for younger cohorts are much larger than those for older generations. This primarily reflects the fact that older generations, whose members typically expect a shorter period until retirement than younger generations, can expect to pay relatively small amounts of taxes and social insurance contributions over the rest of their lives, while receiving MI benefits, public pensions benefits and other social welfare benefits, even though their amount is not very large as of 2000. In addition, the net payments for males are larger than for females for most cohorts. This is because of lower female economic participation rates and the fact that many women receive social insurance survivor's benefits as dependents and tend to receive more MI benefits and social transfer payments than men.

Net payments are largest around age 20, when people tend to join the labor market. Therefore, they expect the longest economic participation periods from this age. For example, the age-20 account (Net Payment I and Net Payment II) is at least 25% higher than the age-0 account, for both males and females. In the case of Net Payment III, the difference is larger. The age-20 account is at least 100% higher than the age-0 account. Net payments decline from age 20 onward. In particular, there is a sharp decrease in net payments between ages 50 and 60, since many workers retire around age 55 and acquire eligibility for social welfare benefits, including public pension benefits. However, the net payments of many older age groups are still positive because they pay substantial amounts of consumption tax and taxes on capital and the amount of social welfare benefits in 2000 is small.

The row labeled "Future" indicates the present value of amounts that those born in 2001 will, on average, pay, assuming that subsequent generations pay this same amount except for an adjustment for growth. The accounts (Net Payment I and Net Payment II) for future generations for males, females, and combined cohorts are about 115% larger than those for those aged 0. In the case of the Net Payment III, the accounts for future generations are about 195% higher than those for the aged 0[27]. This finding implies that the current fiscal policies

[27] The difference in accounts between age-0 and future generations is much larger in the case of Net Payment (III) since education services are concentrated among age groups below 20 (see Figure 17).

are not sustainable and that a substantial fiscal burden is shifted to future generations. This generational imbalance is comparable to that of other countries, and higher than many[28].

4.2. Composition of Generational Accounts

Tables 7-9 break down the generational accounts into tax and transfer components. For social insurance programs, the figures reflect present values of net payments. The accounts for public pensions across age groups show irregular patterns, since public pensions consist of two different systems: National Pension (NPS) and Occupational Pensions.

In the case of the National Pension, net payments are most negative for those aged 35 to 55. This means that these groups benefit the most from the NPS, and simply reflects the fact that age groups 35-55 are the main participants of the system at this early stage of its introduction. For older age groups, the net benefits are smaller, since the number of them covered by the system is limited and thus the average level of benefits is low. Net benefits are smaller for younger age groups, since they expect longer economic participation periods and have to pay larger amounts of contributions for the rest of their lives, while benefits are more heavily discounted than for older age groups. The lower values of net benefits also reflect the fact that the replacement ratio has been lowered[29] since the introduction of the system in order to decrease the system's implicit debt. The male generational accounts for the NPS are more negative than the female accounts, since the NPS mainly covers income-earners and economic participation rates for males are higher than for females. Because of generous benefits compared with contributions, the budgetary burden will be shifted to the future generations. For future generations, the generational account of the NPS represents about 25% of Net Payment I or Net Payment II, and accounts for 31% of Net Payment III.

The PCS turns out to be much more generous than the NPS. The combined account of the PCS for those aged 0 is about 15.3% of the NPS for the same age group while the number covered is only about 5.6% of the latter[30]. This means that the average per capita lifetime net benefit of participants to the PCS is about 2.7 times as large as that of participants in the NPS.

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[28] Kotlikoff and Leibfritz (1999) compared the generational imbalances of 17 countries. The generational imbalances based on Net Payment I (comparable imbalances were reported for Net Payment III) were U.S, 51%, Japan, 169%, Germany, 92%, Italy, 132%, Canada, 0%, Thailand, -88%, Australia, 32%, Denmark, 47%, Netherlands, 76%, New Zealand, -3.4%, France, 47%, Norway, 63%, Portugal, 60%, Sweden, -22.2%, Argentina, 59%, Belgium, 58%, and Brazil, 13%.

[29] The 1998 revision of the NPS Act lowered the replacement ratio from 70% to 60% for benefit recipients with a 40-year participation period. To implement the NPS revisions, the government adopted the following phase-out scheme: for the period before the revision, the replacement ratio under the old system is applied, while for the period after the revision, the new pension benefit formula is employed for the calculation of benefits.

[30] There were 16.2 million NPS participants as of December 2000, while the PCS had just 909 thousand.

The difference in the magnitude of net benefits is primarily due to the difference in the replacement ratio, the base income for benefits and contributions, the benefit entitlement age, and the indexation method for benefits. The replacement ratio of the NPS for an average income earner with 20 years of contributions is 30%, while that of the PCS is about 50%. The base income for the NPS benefits is the average income during participation period (henceforth, lifetime average income), while the base income for the PCS (and other Occupational Pension schemes) is the average wage income for the last three years before the recipient's retirement. The wage level around retirement is much higher than the lifetime average income, since the wage structure of government employees specifies a higher level for one with a longer period of service. Furthermore, in the case of the NPS, an upper bound for base income is specified, in order to limit benefits for high-income workers, while the PCS places no such limit on high-income workers. Another difference is that the PCS benefits are totally income-related while the NPS benefit formula has a strong redistributive element. Finally, the differences in the benefit entitlement age[31] and indexing method further widen the gap of benefits between the two pension plans. The entitlement age for the NPS is currently 60, while pension benefits of the Occupational Pension schemes are paid immediately after retirement. For government employees, private school employees and military personnel who joined the Occupational Pensions after 1995, the pension benefit entitlement age is 60, but those who joined before 1995 will receive pension benefits immediately after retirement. The method for maintaining the real value of benefits is based on inflation indexing for the NPS while the Occupational Pension schemes are indexed to wage growth. Thus, PCS benefits grow faster than prices, given normal productivity growth.

Compared with the NPS, the per capita net benefits of the PCS for older age groups are larger. Unlike the NPS, which has limited coverage for those above age 60, the PCS covered most of the older age groups owing to its earlier introduction (in 1960). For future generations, the generational account of the PCS represents 31.6% of that of the NPS, which is equivalent to 7.9% of Net Payment I or Net Payment II (or 9.8% of Net Payment III). This means that the fiscal burden shifted to future generations per participant of the PCS is about 5.6 times as large as the value for the NPS[32].

Comparing net benefits across sexes, we find that males benefit much more from the PCS than females, since the proportion of male government employees is much higher than female employees. The proportion of male government employees is about 70% as of 2000 and was

[31] The difference in entitlement age further widens the gap of the benefit level between the two public pension schemes, since the participants in the PCS expect a longer benefit-receiving period.

[32] In addition to more generous benefits of the PCS and larger net benefit of older age groups, a smaller pension fund is another reason for the heavier fiscal burden of future generations caused by the PCS. The funds of the NPS and the PCS as of 2000 are 60.6 trillion won and 1.8 trillion won, respectively.

much higher before 2000. For groups aged more than 70 the net benefits for females are much smaller than for males, and the age groups whose accounts are most negative are younger for females[33]. This reflects the facts that the PCS has not covered many females in the past and that female government employees tend to retire earlier than their males counterparts.

The net benefit per participant of the Pension for Private School employees (PPS) is smaller than that of the PCS, even though these two pension plans share the same formula for contributions and benefits. The lifetime net benefit from the PPS under the current policy regime, which is represented by the accounts for age 0, is about 7.9% that of the PCS, while the number of participants of the former is 23.2% of the latter[34]. This is primarily due to the expected future decrease in the number of students due to population aging and the shorter duration of service of private school employees. In the financial projection models of the PCS and the PPS, the numbers of new entrants of the two plans are assumed proportional to the whole population and the population aged 0-24, respectively. The decline in fertility rates and death rates will decrease the proportion of younger age groups, and this will reduce the ratio of those covered by the PPS to those covered by the PCS. As of 2000, the average lengths of continuous service of government employees and private school employees are 14.8 years and 11.3 years, respectively. In particular, the average expected duration of service of female private school employees is only 8.0 years, while that of males is 13.2 years. The shorter expected period of participation for the PPS caused by shorter duration of service will lower benefit levels. The fiscal burden shifted to future generations by the PPS is much smaller than that of the PCS. The generational account of PPS for future generations is only 12.9% of that of PCS, as opposed to the ratio of the number of participants (23.2%). This implies that the fiscal burden per participant shifted to future generations by PPS is about 55.6% of the value for PCS. This is primarily due to the shorter history[35] and larger magnitude of pension funds (4.0 trillion won as of 2000) as well as the shorter duration of service. Because of the shorter history of PPS, its coverage of older age groups is narrower than that of PCS and, as a result, the net benefits of older age groups from PPS are relatively small. Even though the number of new female entrants to PPS is larger than that of new male entrants[36], males benefit much more from PPS than females, given their much longer expected duration of service.

[33] The accounts are most negative between ages 45 and 70 for males, and between ages 30 and 65 for females.

[34] There were 211 thousand PPS participants as of December 2000, compared to about 909 thousand in the PCS.

[35] The PPS was introduced in 1975.

[36] In 2002, there were 5,448 newly-hired male private school employees, and 11,965 new female employees.

The fiscal burden of future generations caused by public pensions is substantial. For future generations, the account of the whole public pension system explains 34% of Net Payment I or Net Payment II, and accounts for 42% of Net Payment III.

The accounts of Medical Insurance (MI) for all sex-age cohorts alive in 2000 show negative values. This simply reflects the fact that Medical Insurance contributions fall short of benefit expenditures. As of 2000, MI contribution revenue is about 80% of MI benefits. The current gap is explained primarily by the fact that government provides subsidies to the self-employed in the form of contribution discounts[37]. The magnitude of the gap will not be easily reduced. There are increasing pressures on MI expenditure because of the current low level[38]: a pressure to widen the scope of medical treatments covered by MI to more expensive medical conditions, a pressure to increase fees for medical services[39], and population aging. Experience over the past few years shows the difficulty of substantially increasing contribution rates. Labor unions and non-governmental organizations have proposed increased government subsidies to restore MI budget balance, which has deteriorated recently due to a recent rapid increase in MI expenditure.

Generational accounts of the MI component indicate that its fiscal burden on future generations is quite heavy. MI explains about 11.7% of Net Payment I or Net Payment II, and about 14.5% of Net Payment III for future generations. In contrast to the heavy burden on future generations, all age groups currently alive benefit from MI. For example, the net benefit from MI for age-0 individuals is about 65.6% of the value for NPS. Net MI benefits are quite large for older age cohorts, since older people are more susceptible to illness. Comparing net benefits across the sexes, females benefit much more from the MI than males.

The accounts for Employment Insurance (EI) and Industrial Accident Compensation Insurance (IACI) indicate a relatively sound financial situation. These accounts for future generations are relatively small compared with those of public pensions or Medical Insurance. This reflects the fact that the unemployment rate in Korea is relatively low and the coverage of accidental events by the IACI is considered quite narrow. However, we cannot preclude the possibility that expenditures on EI and IACI will increase rapidly, since the unemployment rate is expected to rise in the future and the coverage of accidental events by IACI is being extended. Note that the accounts of age groups classified as economically inactive are not balanced, since the EI and the IACI also provide survivors' benefits and some annuity-type

[37] The government also pays for the administrative cost of MI, which is counted as government consumption.

[38] The level of government expenditure for health is relatively low compared with that of other OECD countries. The ratio of the expenditure to GDP for Korea is 2.98% as opposed to 5.94% for the OECD average.

[39] Fees for medical treatment are quite low. This is the outcome of the government's "small contribution plus small expenditure" policy.

benefits. Comparing the accounts across sexes, the IACI accounts for females are smaller than for males, and the accounts are negative for all female age groups. This is mainly due to the fact that survivor's benefits go more to females.

The projected fiscal burden of the Minimum Living Standards Security (MLSS) system and other social welfare services and public assistance (OSTP) will not be very heavy, since in the projection of their aggregates we make a very conservative assumption about the income elasticity of social welfare expenditure (1.2), which is applied until the ratio of the sum of expenditure on MLSS, OSTP, and social welfare to GDP reaches the OECD average (4.12% of GDP). The present value of benefits from these programs at age 0 is about 80.7% of that for labor income taxes. However, we cannot preclude the possibility that MLSS expenditures will increase more rapidly than we project, given the reduction of work incentives presented by the MLSS, which effectively imposes a 100% tax rate on beneficiaries' labor income.

Another important feature of these programs is that, considering the age structure of MLSS and OSTP benefits, they redistribute resources from the young to the old[40]. Thus, population aging can impose an extra burden on future generations. The benefits of these programs go more to females than to males, since females are a large proportion of those in poverty.

Tables 7-9 also report the present value, rest-of-life tax burdens by category. The largest present value (for ages 0 and 30) is the consumption tax, followed by the capital income tax, the tax on asset transactions, labor income tax, other taxes, and taxes on asset holdings. Three important characteristics of the Korean tax system are: (i) the large share of consumption taxes; (ii) the relative unimportance of labor income taxes; and (iii) the large proportion accounted for by taxes on asset transactions. Among consumption taxes, Value Added Tax (VAT) raises the largest revenue of all the taxes, and Special Excise Tax and Transportation Tax also contribute substantially to tax revenue. Although labor-tax progressivity is quite high, the average effective labor income tax rate is quite low, primarily due to the large proportion of tax-exempt workers, about 46% in 2000. The large share of taxes on asset transactions is due to the high frequency of asset transactions rather than high tax rates. The circulation rate of equities in Korea is the highest in the world[41], and the frequency of real estate transactions is also very high[42]. Compared to revenues from taxes on asset transactions, revenues from taxes on asset holding are very small. Taxing asset transactions, rather than asset holding, relatively heavily illustrates one of the inefficiencies of Korea's tax system.

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[40] Figures 8 and 9 show that the average per capita benefits of the MLSS and the OSTP are larger for old age groups, which implies that the poverty ratio is much higher for old age groups.

[41] The rate is about 400% per year as of 2000.

[42] The frequency of real estate transactions is due primarily to expectations of appreciation. The rate of return on real estate was much higher than that from financial assets for the past several decades. Therefore, speculation in real estate markets was considered an effective way of accumulating wealth.

The present value tax burden on older age groups, relative to that on younger age groups, is heaviest in the case of consumption taxes, followed by capital income taxes, taxes on asset holding, taxes on asset transactions, and labor income taxes. The age profile of accounts of the capital income tax is similar to that of the tax on asset holding, since the age profile of corporation tax burden, which comprises a large proportion of the capital income tax burden, is assumed to be the same as that of net wealth. It is remarkable that the accounts for the tax on asset transactions are relatively high for the younger age groups. This reflects the fact that securities (and owner-occupied housing) transactions are performed by relatively young age groups (see Figure 14).

4.3. Establishing Generational Balance

Tables 10 and 11 show that the magnitude of the adjustment of tax and social insurance contributions (henceforth, tax) and transfer payments required to attain long-run government budget balance is substantial[43]. Under the base case assumptions (g=1.5%, r=6.5%, medium fertility), the required increase is 56-59% of the tax burden, if the adjustment is made only for generations born in 2001 and thereafter. If the adjustment is made to all cohorts alive in 2004 and later, the required adjustment represents a 19-20% increase in tax burden. Delay in the tax adjustment raises its magnitude. For example, if we delay the required tax adjustment until 2030, it reaches 37-39%. If the increase in tax burden is accompanied by the same percentage decrease in transfer payments to attain long-run government budget balance, the magnitude of the required adjustment decreases to 34-39% (if the adjustment is made only for the generations born after 2000), 12-13% (if the adjustment is made to all the cohorts alive in 2004 and later) and 21-22% (if we delay the adjustment until 2030).

4.4. Sensitivity Analysis

Tables 12 reports the results of sensitivity analyses under alternative assumptions about the fertility rate, the growth rate of labor productivity (g), the discount rate (r), and the income elasticity of the per capita level of MI benefits and social welfare expenditures (the MLSS and the OSTP). The alternative assumptions do not change the qualitative results given above, even though the absolute magnitudes of generational imbalance are substantially affected by changes in assumptions.

Perhaps contrary to initial intuition, an increase in the rate of labor productivity growth increases the ratio of accounts for future generations to those for current generations; that is, a

[43] Long-run budget balance is defined as the situation where the summation of current government net wealth and the present value of present and future flows of taxes and social insurance contributions is equal to that of transfer payments and government consumption.

higher growth rate worsens the intergenerational imbalance. This is due to the fact that the budgetary imbalance of public pensions and MI is worsened as the growth rate increases. Our calculation shows that the present value of public pension benefits is more than double that of future contribution revenues[44]. Therefore, the gap between benefits and contributions will increase faster than contributions with productivity growth, since the benefits and contributions are proportionally related to the income level of participants. The budgetary imbalance of MI is primarily due to population aging. Population aging increases the ratio of benefits to contributions, if the ratio of per capita contributions to benefits of the relevant age groups remains constant, since the ratio of the number of benefit recipients to the number of contributors increases with population aging. Therefore, the gap between benefits and contributions will increase with productivity growth, since the benefits and contributions are assumed exponentially related to the level of GDP. Figures 19 and 20 show that the public pension and MI budgetary gaps become larger than corresponding contribution revenues around 2040 and grow thereafter.

The measure of generational imbalance is quite sensitive to assumptions about the income elasticity of MI benefits and social welfare expenditures, which implies that future social welfare policies might substantially affect the long-run fiscal position of the Korean government. Under the high elasticity assumption where the elasticities of MI benefits and social welfare expenditure are 1.73 and 1.53, respectively, the generational imbalance (for Net Payment I) is about 165%, while under the low elasticity assumptions, where the elasticity for both benefits is 1, the ratio is about 85%.

5. Conclusion

This paper has evaluated Korea's long-term fiscal position using Generational Accounting, modified to reflect special features of Korea's fiscal situation, notably prospective changes in public pension benefit profiles and expected increases in social welfare expenditure. Our findings suggest that unless policy toward existing generations in Korea is substantially altered, future generations will face quite heavy fiscal burdens. The magnitude of the adjustment of taxes and social insurance contributions required to attain long-run government budget balance is substantial, and delays of the adjustment sharply increase its required magnitude. A major part of the estimated fiscal burden on future generations is explained by the long-run budgetary imbalance of public pensions and Medical Insurance.

[44] The required adjustment to attain long-run budget balance of public pensions is estimated at about a 120% increase in contributions if the adjustment is made beginning in 2004. If the adjustment is delayed until 2010 (2020), the required adjustment will increase to 135% (175%).

Establishing generational balance is likely to require major reform of public pensions. However, combining benefit decreases and contribution increases raises a new potential problem, associated with large government ownership of financial assets. The NPS fund is a single fund operated by the government that, under current projections, will reach 40% of GDP in the early 2030's under current NPS policy. Adjusting benefits and contributions would raise this balance substantially. Another issue related to public pensions is the imbalance of net transfers between NPS and occupational pensions. Therefore, a more structural approach to public pension reform is needed, which confronts the issue of public ownership and addresses the inequity between NPS and occupational pension participants.

The imbalance of Medical Insurance benefits and contributions must be addressed, possibly through increases in contribution rates or a revision of the compensation method for medical services, to provide incentives to insurants and medical service providers to economize on medical expenses. Revision of the MLSS is also needed. Even though current MLSS expenditures are not large, its work disincentives may cause a rapid increase in expenditures.

In addition to structural reforms of social welfare policies, efforts to decrease government consumption are likely necessary, as there will be many factors that will push in the opposite direction, such as early reunification with North Korea and a potential default of government guaranteed bonds, which amounted to 106.8 trillion won (19.6% of GDP), as of 2001.

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Table 1. Consolidated Budget and Net Wealth of the Korean Government

(Unit: 1 trillion won (current prices), %)

	1995	1996	1997	1998	1999	2000	2001	Growth Rate (1995-2000)
Consolidated Budget (CB)[1)]								
Expenditure	71.6 (19.0)[2)]	84.4 (20.2)	100.3 (22.1)	115.4 (26.0)	121.0 (25.1)	129.3 (24.8)	136.8 (25.1)	12.7
Revenue	72.8	85.5	93.4	96.7	107.9	135.8	144.0	13.5
Balance	1.2 (0.3)[2)]	1.1 (0.3)	-7.0 (-1.5)	-18.8 (-4.2)	-13.1 (-2.7)	6.5 (1.3)	7.3 (1.3)	-
NPS Balance	3.5	4.5	4.7	6.0	7.0	11.2	13.4	-
CB excluding NPS	-2.2 (-0.6)[2)]	-3.4 (-0.8)	-11.7 (-2.6)	-24.7 (-5.6)	-20.0 (-4.1)	-4.7 (-0.9)	-6.1 (-1.1)	-
Composition of Central Government Expenditure								
Total	71.0	83.8	99.1	112.4	118.2	126.8	132.2[3)]	12.4
General Public Service	3.0	3.4	4.2	5.0	4.4	6.7	-	19.1
Defense	11.1	12.6	13.2	13.6	13.2	14.4	-	5.4
Public Order and Safety	3.9	4.5	4.8	5.4	5.9	5.8	-	8.2
Education	12.8	14.4	16.2	16.7	17.7	19.4	-	8.8
Health Care	0.5	0.7	0.8	1.0	1.1	0.9	-	13.9
Social Security and Welfare	6.4	7.9	9.6	12.3	14.7	19.3	-	25.0
Housing and Community Amenities	5.7	7.1	6.7	7.0	9.6	6.8	-	6.2
Recreational, Cultural, Religious Activities	0.4	0.5	0.7	0.8	0.9	1.0	-	20.0
Fuel and Energy	0.5	1.2	1.4	2.5	1.9	0.8	-	27.4
Economic Development	11.1	14.3	12.6	16.1	19.0	18.5	-	12.1
Transportation and Communication	6.1	6.5	10.3	11.7	11.7	12.6	-	17.4
Other expenditure	9.5	10.9	18.6	20.4	18.3	20.5	-	19.3
Government Wealth and Debt								
Wealth	124.4	131.2	139.7	150.4	163.1	175.9	188.3	-
Debt	35.6 (9.4)[2)]	36.8 (8.8)	50.5 (11.1)	71.4 (16.1)	89.7 (18.6)	100.9 (19.3)	113.1 (20.8)	-
Net Wealth	88.7 (23.5)[2)]	94.4 (22.6)	89.2 (19.7)	79.0 (17.8)	73.4 (15.2)	75.0 (14.4)	75.2 (13.8)	-

Note: 1) Includes the central government budget (general account, special account, public trust funds) and non-financial public enterprises.

2) Ratio to GDP (%)

3) The composition of government expenditure by function is not reported, since the composition is not comparable between 2000 and 2001. Government expenditure for each functional category in 2001 GFS of Korea is defined as the sum of government purchases and "lending", while that reported in GFS of 2000 and earlier includes "net lending" rather than "lending". The total government expenditure reported here is based on the 2000 definition.

Table 2. Demographic Structure and Dependency Ratios of Selected Countries (%)

Country	Demographic Structure						Total Dependency Ratio	
	2000			2030			2000	2030
	0-14	15-64	65+	0-14	15-64	65+		
World	29.7	63.4	6.9	22.4	65.8	11.8	57.7	52.0
Developed Countries	18.2	67.4	14.4	15.4	62.0	22.6	48.4	61.3
Developing Countries	32.5	62.4	5.1	23.6	66.5	9.9	60.3	50.4
Japan	14.7	68.1	17.2	12.7	59.3	28.0	46.8	68.6
U.S.A	21.5	66.0	12.5	17.8	61.6	20.6	51.5	62.3
Italy	14.3	67.5	18.2	11.6	59.3	29.1	48.1	68.6
France	18.7	65.4	15.9	16.9	59.9	23.2	52.9	66.9
China	24.9	68.3	6.8	17.3	67.0	15.7	46.4	49.3
India	33.3	61.7	5.0	22.3	68.0	9.7	62.1	47.1
Korea	**21.1**	**71.7**	**7.2**	**12.4**	**64.6**	**23.1**	**39.5**	**54.9**

Source: United Nations, *World Population Projections*, 1998

Table 3. Speed of Population Aging of Selected Countries

	Year Attained			Number of Years Required for Transition	
Proportion of Old Population[1)]	7%	14%	20%	7%→14%	14%→20%
Japan	1970	1994	2006	24	12
France	1864	1979	2020	115	41
Germany	1932	1972	2012	40	40
U.K.	1929	1976	2021	47	45
Italy	1927	1988	2007	61	19
U.S.A	1942	2013	2028	71	15
Korea	**2000**	**2019**	**2026**	**19**	**7**

Source: United Nations, *The Sex and Age distribution of World Population*, each year
Note: 1) Proportion of the population aged 65 and older.

Table 4. Fertility Assumptions (unit: persons / 1,000 women)

Year	Low Fertility	Medium Fertility (base case)	High Fertility
2000	1.47	1.47	1.47
2005	1.35	1.38	1.43
2010	1.32	1.37	1.45
2015	1.31	1.37	1.50
2020	1.27	1.37	1.54
2025	1.21	1.38	1.61
2030	1.15	1.39	1.69
2040-	1.10	1.40	1.80

Table 5. Data Sources for Generational Profile Calculation

Classification	Programs	Components	Data Sources
Social Welfare System	Public Pensions	National Pension (NPS)	- Long-Term Projection by National Pension Corporation (NPC) - *National Pension Statistical Yearbook*
		Pensions for Civil Servants (PCS)	- *Statistical Yearbook for Pension for Civil Servants*
		Pension for Government Employees (PPS)	- *Statistical Yearbook for Private School Employees* - *Statistical Yearbook of Ministry of Government Administration and Home Affairs*
		Pension for Military Personnel (PMP)	- Net transfer (= pension benefit – contribution) treated as government consumption
	Medical Insurance (MI)	-	- *Medical Insurance Statistical Yearbook*
	Employment Insurance (EI)	-	- *Yearly Statistics of Employment Insurance* - *Annual Report on Economically Active Population Survey* - *Survey Report on Wage Structure* - *Survey Report on Labor Conditions at Small Size Establishments*
	Industrial Accident Compensation Insurance (IACI)	-	- *Statistical Yearbook of Industrial Accident Compensation Insurance* - *Annual Report on Economically Active Population Survey* - *Survey Report on Wage Structure* - *Survey Report on Labor Conditions at Small Size Establishments*
	Social Welfare Services and Public Assistance	Minimum Living Standards Security System (MLSS)	- Daewoo Panel
		Other Social Transfer Programs (OSTP)	- *Summary for Budget of Fiscal Year (each year)* - *Yearbook of Health and Welfare Statistics* - *Annual Report on Economically Active Population Survey*

Table 5, Continued

Classification	Programs	Components	Data Sources
Tax System	Labor Income Tax	Wage and Salary Income Tax, Retirement Income Tax, 60% of Global Income Tax, 60% of Inhabitant Tax, Farmland Tax, 60% of Business Place Tax	- Daewoo Panel - Korea Labor Panel Survey
	Capital Income Tax	40% of Global Income Tax, Timber Income Tax, Interest and Dividend Tax, Corporation Tax, 40% of Inhabitant Tax	- Daewoo Panel - Korea Labor Panel Survey - *Analysis of Private Enterprise Management*
	Consumption Tax	Value Added Tax (VAT), Special Excise Tax, Liquor Tax, Stamp Tax, Transportation Tax, Local Transportation Tax, Race-Pari-Mutuel Tax, Tobacco Consumption Tax	- Family Income and Expenditure Survey
	Tax on Asset-Holdings	Inheritance Tax, Gift Tax, License Tax, Community Facility Tax, Property Tax, Automobile Tax, Aggregate Land Tax, Urban Planning Tax, 40% of Business Place Tax	- Daewoo Panel - Korea Labor Panel Survey
	Tax on Asset-Transactions	Capital Gains Tax, Security Transactions Tax	- Daewoo Panel - National Survey of Family Income and Expenditure
	Other Taxes	Excess Profit Tax, Education Tax, Local Education Tax, Special Tax for Rural Development, Regional Development Tax, Butchery Tax	- Daewoo Panel - Family Income and Expenditure Survey - *Statistical Yearbook of National Tax* - *Annual Local Tax Statistical Report* - *2000 Tax Expenditure Report*
Monetary Policy	Seigniorage	-	- Family Income and Expenditure Survey
Government Consumption	Expenditure on Education	-	- *Statistical Yearbook of Educational Expenditure* - *Financial Yearbook of Local Government*
	Other Government Consumption	-	- *National Income and Product Account* (NIPA) - *Summary of Budget for Fiscal Year* - *Government Finance Statistics in Korea*

Table 6. Generational Accounts (base case)

(unit: 1,000 won, %)

Age	Total			Male			Female		
	Net payment I[1]	Net payment II[2]	Net payment III[3]	Net payment I[1]	Net payment II[2]	Net payment III[3]	Net payment I[1]	Net payment II[2]	Net payment III[3]
0	56,355	57,376	33,476	72,097	73,504	49,205	39,038	39,636	16,175
5	62,733	63,830	37,260	80,530	82,023	55,046	42,409	43,053	16,948
10	67,695	68,868	48,202	88,709	90,302	69,212	43,902	44,600	24,414
15	67,811	69,080	56,936	89,255	90,983	78,376	44,507	45,277	33,635
20	77,244	77,912	74,977	103,187	104,358	100,917	49,891	50,030	47,627
25	73,719	74,100	73,655	101,526	102,320	101,463	43,721	43,656	43,657
30	64,716	64,849	64,683	91,376	92,042	91,345	37,346	36,932	37,312
35	39,299	39,566	39,268	54,361	54,683	54,332	23,264	23,472	23,232
40	36,728	36,982	36,699	54,144	54,319	54,117	18,920	19,256	18,890
45	32,384	32,195	32,357	43,905	43,807	43,881	20,718	20,439	20,690
50	22,158	21,935	22,134	34,341	33,750	34,319	9,755	9,907	9,729
55	12,705	12,180	12,684	18,920	18,382	18,901	6,320	5,809	6,298
60	14,277	13,819	14,259	20,132	19,476	20,116	8,868	8,592	8,848
65	8,374	8,015	8,359	11,962	11,114	11,949	5,465	5,501	5,448
70	6,356	5,786	6,344	7,434	6,462	7,423	5,644	5,340	5,631
75	5,813	5,218	5,803	7,622	6,680	7,613	4,749	4,358	4,738
180	2,831	2,451	2,823	3,661	3,005	3,654	2,415	2,174	2,407
85	569	309	563	219	-142	214	695	472	689
90	-2,491	-2,530	-2,494	-2,408	-2,594	-2,411	-2,513	-2,513	-2,517
95	-1,281	-1,297	-1,284	-1,273	-1,388	-1,275	-1,283	-1,283	-1,285
99	-486	-502	-487	-453	-575	-454	-491	-491	-492
Future	122,280	121,289	98,899	157,048	155,992	146,322	85,037	84,117	48,100
Generational Imbalance(%)	117	111	195	-	-	-	-	-	-
Required Tax Adjustment[4] for Long-Term Government Budgetary Balance (unit: %)									
Current[3]	26.4	25.3	26.4	-	-	-	-	-	-
Future[4]	58.7	56.4	58.7						
2004[5]	19.8	19.0	19.8						
2010[5]	22.8	21.9	22.8						
2020[5]	29.4	28.2	29.4						
2030[5]	38.6	37.1	38.6						
Required Tax and Benefit Adjustment[5] for Long-Term Government Budgetary Balance (unit: %)									
Current[3]	17.5	16.8	16.9	-	-	-	-	-	-
Future[4]	38.8	37.3	34.3						
2004[5]	12.9	12.4	12.1						
2010[5]	14.4	13.8	13.6						
2020[5]	17.6	16.9	16.7						
2030[5]	21.9	21.1	21.0						

Notes: 1) Net Payment with infra-marginal capital income tax adjustment
2) Net Payment without infra-marginal capital income tax adjustment
3) Net Payment with infra-marginal capital income tax adjustment (regarding educational expenditure as transfer)
4) Percentage increase in tax burden to attain long-run budgetary balance
5) Percentage increase in tax burden and (the same) percentage decrease in benefits to attain long-run budgetary balance
6) Tax burden and benefits of current generations (as of 2000) are adjusted
7) Tax burden and benefits of future generations are adjusted
8) Adjust tax burden and benefits for all the age groups from the respective year.

Table 7. Composition of Generational Accounts (Male and Female, 1,000 won)

	Net payment I	Public Pensions				Medical Ins.	Employ. Ins.	IACI	MLSS
		subtotal	NPS	PCS	PPS				
0	56,355	-9,216	-7,908	-1,212	-96	-5,187	-608	217	-2,542
5	62,733	-8,819	-7,546	-1,169	-104	-4,167	-696	254	-2,490
10	67,695	-9,072	-7,516	-1,425	-131	-3,748	-786	278	-2,419
15	67,811	-14,461	-12,804	-1,503	-153	-3,614	-885	295	-2,353
20	77,244	-11,311	-9,829	-1,325	-157	-3,659	-920	295	-2,268
25	73,719	-15,128	-13,389	-1,531	-208	-4,335	-791	271	-2,169
30	64,716	-17,993	-14,444	-3,154	-396	-5,145	-685	198	-2,131
35	39,299	-35,155	-29,544	-4,780	-832	-5,828	-611	174	-2,089
40	36,728	-27,779	-20,810	-5,860	-1,109	-6,723	-580	43	-2,083
45	32,384	-23,461	-15,055	-7,009	-1,397	-7,399	-504	11	-2,060
50	22,158	-22,865	-12,274	-9,091	-1,501	-7,914	-443	-6	-1,978
55	12,705	-21,361	-14,090	-5,802	-1,469	-8,097	-404	99	-1,939
60	14,277	-8,367	-1,977	-5,735	-655	-7,647	-318	18	-1,876
65	8,374	-6,314	-367	-5,892	-55	-6,753	-239	21	-1,724
70	6,356	-3,754	-325	-3,386	-42	-5,374	-228	-52	-1,452
75	5,813	-1,367	-296	-1,052	-19	-4,098	-176	-41	-966
80	2,831	-991	-243	-742	-6	-3,174	-132	-32	-656
85	569	-647	-159	-486	-2	-2,323	-95	-24	-335
90	-2,491	-341	-40	-300	-1	-1,579	-64	-17	-257
95	-1,281	-33	-24	-8	-1	-985	-40	-11	0
99	-486	-10	-9	0	0	-381	-15	-4	0
future	122,280	41,676	30,708	9,718	1,250	14,316	1,478	-487	-

	OSTP	Labor Income Tax	Capital Income Tax	Con-sump-tion Tax	Tax on Asset Holding	Tax on Asset Transact	Other Taxes	Seign-iorage	Edu. Exp
0	-3,342	7,288	12,806	37,755	3,926	8,727	6,224	172	-22,878
5	-3,334	8,168	14,778	38,382	4,378	9,488	6,522	193	-25,473
10	-3,215	8,975	16,839	38,830	4,829	10,148	6,785	216	-19,493
15	-3,146	9,810	19,155	39,481	5,342	10,846	7,087	244	-10,875
20	-3,118	10,610	22,389	40,010	5,922	11,632	7,387	274	-2,268
25	-3,085	10,777	23,464	38,951	6,177	11,860	7,465	262	-64
30	-3,034	9,941	23,022	36,284	6,156	10,802	7,046	256	-33
35	-2,904	9,527	21,937	32,915	5,910	8,873	6,314	237	-31
40	-2,807	7,756	20,814	29,451	5,541	7,253	5,609	234	-29
45	-2,690	6,165	19,963	25,987	5,291	5,909	4,962	209	-26
50	-2,564	4,031	17,185	22,701	4,662	4,883	4,271	196	-24
55	-2,445	1,983	15,111	19,115	3,803	3,235	3,432	173	-21
60	-2,351	587	11,226	15,681	2,934	1,597	2,630	161	-18
65	-2,257	54	8,523	12,538	2,062	392	1,941	128	-15
70	-1,860	0	6,276	9,767	1,502	38	1,386	107	-13
75	-1,465	0	4,069	7,878	898	0	1,009	73	-10
80	-1,122	0	2,223	5,395	560	0	698	61	-8
85	-846	0	969	3,179	231	0	417	41	-6
90	-593	0	126	51	31	0	121	32	-4
95	-383	0	42	33	3	0	74	18	-3
99	-150	0	25	13	1	0	29	6	-1

Table 8. Composition of Generational Accounts (Male, 1,000 won)

	Net payment I	Public Pensions				Medical Ins.	Employ. Ins.	IACI	MLSS
		subtotal	NPS	PCS	PPS				
0	72,097	-11,451	-9,831	-1,524	-96	-3,423	-689	772	-2,459
5	80,530	-10,542	-8,994	-1,444	-104	-2,218	-789	858	-2,420
10	88,709	-9,652	-7,754	-1,765	-133	-1,618	-892	950	-2,363
15	89,255	-17,495	-15,452	-1,898	-145	-1,239	-1,009	1,056	-2,310
20	103,187	-12,874	-11,034	-1,689	-151	-960	-1,052	1,168	-2,238
25	101,526	-16,578	-14,568	-1,907	-103	-1,507	-913	1,210	-2,134
30	91,376	-21,584	-17,086	-4,138	-359	-2,411	-727	1,168	-2,040
35	54,361	-49,449	-42,209	-6,271	-970	-3,344	-571	1,110	-1,968
40	54,144	-36,901	-27,572	-7,751	-1,578	-4,435	-517	925	-1,916
45	43,905	-33,451	-21,944	-9,376	-2,131	-5,534	-474	747	-1,897
50	34,341	-29,510	-15,193	-11,997	-2,320	-6,506	-439	546	-1,822
55	18,920	-28,144	-18,226	-7,515	-2,403	-7,179	-420	448	-1,732
60	20,132	-12,420	-3,210	-8,081	-1,130	-7,216	-357	178	-1,714
65	11,962	-9,719	-614	-9,006	-99	-6,608	-289	64	-1,605
70	7,434	-6,385	-589	-5,710	-86	-5,467	-285	-40	-1,414
75	7,622	-2,582	-566	-1,983	-34	-4,332	-223	-32	-967
80	3,661	-2,032	-518	-1,502	-11	-3,322	-171	-24	-641
85	219	-1,488	-414	-1,073	-1	-2,540	-130	-19	-173
90	-2,408	-911	-109	-801	-1	-1,792	-93	-13	0
95	-1,273	-84	-83	0	-1	-1,243	-65	-9	0
99	-453	-34	-34	0	0	-501	-26	-4	0
future	157,048	51,959	38,306	12,264	1,248	9,403	1,678	-1,791	
	OSTP	Labor Income Tax	Capital Income Tax	Con-sump-tion Tax	Tax on Asset Holding	Tax on Asset Transact.	Other Taxes	Seign-iorage	Edu. Exp
0	-3,122	11,266	17,278	37,605	5,367	13,413	7,245	174	-22,892
5	-3,095	12,496	19,770	38,239	5,935	14,419	7,618	195	-25,483
10	-2,940	13,773	22,532	38,684	6,546	15,460	7,985	218	-19,497
15	-2,833	15,235	25,815	39,336	7,286	16,729	8,433	245	-10,879
20	-2,766	16,722	30,006	39,821	8,093	18,112	8,879	276	-2,271
25	-2,698	17,570	32,086	38,544	8,504	18,194	8,994	254	-63
30	-2,616	17,198	32,385	36,026	8,519	16,644	8,565	250	-31
35	-2,507	16,539	32,683	32,233	8,441	13,342	7,623	228	-29
40	-2,393	14,033	31,328	28,617	8,014	10,476	6,692	222	-27
45	-2,253	11,302	29,067	25,003	7,449	7,976	5,773	196	-24
50	-2,103	7,462	25,699	21,622	6,633	7,523	5,047	188	-22
55	-1,968	3,857	21,801	17,826	5,544	4,736	3,995	156	-19
60	-1,840	1,200	17,654	14,638	4,463	2,337	3,064	146	-16
65	-1,721	109	14,373	11,190	3,149	736	2,184	99	-13
70	-1,376	0	9,644	8,697	2,316	96	1,541	109	-11
75	-1,071	0	6,553	7,492	1,531	0	1,187	65	-8
80	-817	0	3,881	4,816	1,097	0	806	70	-6
85	-615	0	1,401	2,878	439	0	433	33	-5
90	-436	0	600	45	47	0	103	44	-3
95	-304	0	300	31	21	0	70	10	-2
99	-123	0	198	13	9	0	29	-11	-1

Table 9. Composition of Generational Accounts (Female, 1,000 won)

	Net payment I	Public Pensions				Medical Ins.	Employ. Ins.	IACI	MLSS
		subtotal	NPS	PCS	PPS				
0	39,038	-6,757	-5,792	-869	-96	-7,127	-519	-392	-2,633
5	42,409	-6,851	-5,892	-856	-103	-6,394	-590	-436	-2,569
10	43,902	-8,415	-7,246	-1,040	-128	-6,160	-665	-481	-2,484
15	44,507	-11,164	-9,927	-1,075	-162	-6,196	-751	-532	-2,399
20	49,891	-9,664	-8,559	-941	-164	-6,505	-782	-624	-2,300
25	43,721	-13,563	-12,117	-1,126	-320	-7,385	-659	-742	-2,208
30	37,346	-14,308	-11,731	-2,143	-433	-7,952	-643	-798	-2,224
35	23,264	-19,937	-16,060	-3,193	-685	-8,474	-654	-823	-2,219
40	18,920	-18,453	-13,897	-3,926	-630	-9,064	-645	-859	-2,254
45	20,718	-13,347	-8,081	-4,614	-653	-9,287	-535	-734	-2,224
50	9,755	-16,100	-9,302	-6,132	-666	-9,347	-448	-569	-2,136
55	6,320	-14,393	-9,841	-4,042	-509	-9,040	-388	-259	-2,152
60	8,868	-4,622	-838	-3,567	-217	-8,046	-282	-129	-2,024
65	5,465	-3,554	-167	-3,367	-20	-6,870	-198	-13	-1,820
70	5,644	-2,015	-151	-1,851	-12	-5,313	-190	-59	-1,477
75	4,749	-651	-138	-503	-11	-3,960	-149	-46	-966
80	2,415	-469	-105	-362	-3	-3,100	-113	-35	-664
85	695	-343	-67	-274	-2	-2,244	-83	-26	-393
90	-2,513	-189	-21	-166	-1	-1,523	-57	-18	-325
95	-1,283	-24	-14	-9	-1	-943	-36	-11	0
99	-491	-6	-6	0	0	-364	-14	-4	0
future	85,037	30,660	22,569	6,991	1,251	19,579	1,263	911	-

	OSTP	Labor Income Tax	Capital Income Tax	Con-sump-tion Tax	Tax on Asset Holding	Tax on Asset Transact	Other Taxes	Seign-iorage	Edu. Exp
0	-3,585	2,911	7,886	37,919	2,340	3,573	5,101	170	-22,863
5	-3,607	3,226	9,077	38,545	2,599	3,857	5,271	191	-25,462
10	-3,525	3,542	10,393	38,995	2,884	4,134	5,427	214	-19,488
15	-3,487	3,914	11,918	39,638	3,231	4,452	5,625	241	-10,871
20	-3,489	4,167	14,358	40,208	3,633	4,800	5,814	272	-2,265
25	-3,503	3,449	14,164	39,391	3,667	5,026	5,814	271	-65
30	-3,463	2,491	13,410	36,549	3,730	4,804	5,488	262	-34
35	-3,326	2,062	10,496	33,640	3,215	4,115	4,921	247	-32
40	-3,231	1,338	10,064	30,304	3,013	3,958	4,502	246	-30
45	-3,132	964	10,746	26,983	3,107	3,817	4,140	223	-28
50	-3,034	537	8,517	23,799	2,656	2,196	3,481	204	-26
55	-2,935	58	8,237	20,439	2,015	1,693	2,854	190	-23
60	-2,823	21	5,288	16,645	1,521	914	2,229	175	-20
65	-2,692	8	3,780	13,632	1,182	114	1,744	151	-17
70	-2,179	0	4,051	10,474	965	0	1,283	105	-14
75	-1,697	0	2,607	8,105	525	0	904	77	-11
80	-1,275	0	1,393	5,686	291	0	644	57	-8
85	-929	0	813	3,288	156	0	412	44	-6
90	-635	0	0	52	26	0	126	29	-4
95	-396	0	0	33	0	0	75	20	-3
99	-154	0	0	13	0	0	29	9	-1

Table 10. Required Tax Adjustment[1)] for Long-Term Government Budgetary Balance (unit: %)

	Labor productivity	$g = 0\%$			$g = 1.5\%$							$g = 3.0\%$	
	Discount rate	$r = 5.5\%$	$r = 6.5\%$	$r = 7.5\%$	$r = 5.5\%$	$r = 6.5\%$					$r = 7.5\%$	$r = 6.5\%$	$r = 7.5\%$
	Fertility[2)] Welfare expenditure[2)]	MF MW	MF MW	MF MW	MF MW	MF LW	LF MW	MF MW	HF MW	MF, HW	MF MW	MF MW	MF MW
Net Payment I	Current[3)]	26.1	13.5	5.6	61.7	35.0	24.6	26.4	29.3	35.0	12.8	100.7	29.7
	Future[4)]	75.8	59.7	35.5	66.3	77.7	65.2	58.7	51.4	77.7	45.9	54.2	48.3
	2004[5)]	21.4	12.5	5.7	33.7	26.2	19.6	19.8	20.2	26.2	11.2	36.4	19.7
	2010[5)]	25.2	15.5	7.4	36.7	30.0	22.7	22.8	22.9	30.0	13.5	38.3	22.1
	2020[5)]	34.1	22.8	12.0	42.8	38.6	29.8	29.4	28.7	38.6	19.1	42.0	27.2
	2030[5)]	47.3	34.7	19.9	50.5	51.0	40.3	38.6	36.5	51.0	27.6	46.2	33.9
Net Payment II	Current	25.4	13.1	5.6	59.4	33.9	23.5	25.3	28.3	33.9	12.2	95.7	28.1
	Future	73.6	58.1	35.0	63.8	75.4	62.4	56.4	49.6	75.4	43.9	51.5	45.7
	2004	20.8	12.2	5.6	32.4	25.4	18.7	19.0	19.5	25.4	10.7	34.6	18.7
	2010	24.5	15.1	7.3	35.3	29.1	21.7	21.9	22.1	29.1	13.0	36.4	20.9
	2020	33.2	22.2	11.8	41.2	37.5	28.5	28.2	27.7	37.5	18.3	39.9	25.7
	2030	45.9	33.8	19.6	48.6	49.5	38.6	37.1	35.1	49.5	26.4	43.9	32.1
Net Payment III	Current	26.1	13.5	5.6	61.7	35.0	24.6	26.4	29.3	35.0	12.8	100.7	29.7
	Future	75.8	59.7	35.5	66.3	77.7	65.2	58.7	51.4	77.7	45.9	54.2	48.3
	2004	21.4	12.5	5.7	33.7	26.2	19.6	19.8	20.2	26.2	11.6	36.4	19.7
	2010	25.2	15.5	7.4	36.7	30.0	22.7	22.8	22.9	30.0	13.5	38.3	22.1
	2020	34.1	22.8	12.0	42.8	38.6	29.8	29.4	28.7	38.6	19.1	42.0	27.2
	2030	47.3	34.7	19.9	50.5	51.0	40.3	38.6	36.5	51.0	27.6	46.2	33.9

Notes: 1) Percentage increase in tax burden to attain long-run budgetary balance
2) LF: low fertility, MF: medium fertility, HF: high fertility
LW: low welfare expenditure, MW: medium welfare expenditure, HW: high welfare expenditure
3) Tax burden and benefits of current generations (as of 2000) are adjusted, while those of future generations not changed.
4) Tax burden and benefits of future generations are adjusted, while those of current generations not changed.
5) Adjust tax burden and benefits for all age groups from the respective year.

Table 11. Required Tax and Benefit Adjustment[1)] for Long-Term Government Budgetary Balance (unit: %)

	Labor productivity	$g = 0\%$			$g = 1.5\%$							$g = 3.0\%$	
	Discount rate	$r = 5.5\%$	$r = 6.5\%$	$r = 7.5\%$	$r = 5.5\%$	$r = 6.5\%$					$r = 7.5\%$	$r = 6.5\%$	$r = 7.5\%$
	Fertility[2)] Welfare expenditure[2)]	MF MW	MF MW	MF MW	MF MW	MF LW	LF MW	MF MW	HF MW	MF, HW	MF MW	MF MW	MF MW
Net Payment I	Current[3)]	16.8	9.1	4.0	38.9	13.2	16.3	17.5	19.5	22.3	8.8	65.9	20.3
	Future[4)]	49.9	42.3	26.4	39.7	30.7	42.8	38.8	34.4	49.7	32.5	32.7	32.1
	2004[5)]	13.5	8.3	3.9	20.4	9.9	12.7	12.9	13.2	16.4	7.6	22.4	13.2
	2010[5)]	15.3	9.8	4.9	21.7	11.1	14.2	14.4	14.6	18.2	8.9	23.2	14.4
	2020[5)]	19.2	13.3	7.2	24.3	13.6	17.6	17.6	17.5	22.1	11.8	24.9	17.0
	2030[5)]	24.8	18.7	10.9	27.7	17.2	22.4	21.9	21.3	27.7	16.1	26.9	20.5
Net Payment II	Current	16.3	8.8	3.9	37.4	12.4	15.6	16.8	18.8	21.7	8.4	62.6	19.2
	Future	48.5	41.1	26.0	38.2	29.0	40.9	37.3	33.1	48.2	31.1	31.1	30.4
	2004	13.2	8.1	3.9	19.6	9.3	12.1	12.4	12.8	15.9	7.3	21.3	12.5
	2010	14.9	9.5	4.8	20.9	10.5	13.6	13.8	14.1	17.6	8.5	22.1	13.7
	2020	18.7	12.9	7.1	23.4	12.9	16.8	16.9	16.9	21.4	11.3	23.7	16.1
	2030	24.1	18.2	10.7	26.6	16.2	21.4	21.1	20.6	26.9	15.3	25.6	19.4
Net Payment III	Current	16.2	8.7	3.8	37.8	12.7	15.8	16.9	18.8	21.6	8.5	64.0	19.6
	Future	43.4	35.0	20.9	36.6	26.8	37.7	34.3	30.2	44.1	27.4	30.6	28.7
	2004	12.8	7.8	3.7	19.4	9.3	12.0	12.1	12.4	15.5	7.2	21.2	12.4
	2010	14.5	9.3	4.6	20.7	10.4	13.5	13.6	13.7	17.3	8.4	22.1	13.6
	2020	18.4	12.7	6.8	23.3	12.9	16.9	16.7	16.5	21.1	11.2	23.7	16.2
	2030	23.8	17.9	10.5	26.5	16.4	21.6	21.0	20.2	26.6	15.3	25.7	19.5

Notes: 1) Percentage increase in tax burden and (the same) percentage decrease in benefits to attain long-run budgetary balance
2) LF: low fertility, MF: medium fertility, HF: high fertility
LW: low welfare expenditure, MW: medium welfare expenditure, HW: high welfare expenditure
3) Tax burden and benefits of current generations (as of 2000) are adjusted, while those of future generations not changed.
4) Tax burden and benefits of future generations are adjusted, while those of current generations not changed.
5) Adjust tax burden and benefits for all age groups from the respective year.

Table 12. Generational Imbalance (future account / 2000 newborn, %)

Labor productivity (*g*)	0%			1.5%							3.0%	
Discount rate (*r*)	5.5%	6.5%	7.5%	5.5%	6.5%					7.5%	6.5%	7.5%
Fertility[1)] Welfare expenditure[1)]	MF MW	MF MW	MF MW	MF MW	MF LW	LF MW	MF MW	HF MW	MF, HW	MF MW	MF MW	MF MW
Net Payment I	151	102	55	178	85	128	117	102	165	78	172	100
Net Payment II	145	98	54	169	80	122	111	97	159	74	165	95
Net Payment III	279	202	123	283	136	216	195	168	288	141	245	153

Notes:

1) LF: low fertility, MF: medium fertility, HF: high fertility
LW: low welfare expenditure, MW: medium welfare expenditure, HW: high welfare expenditure

Fig.1 Age Distribution of Population

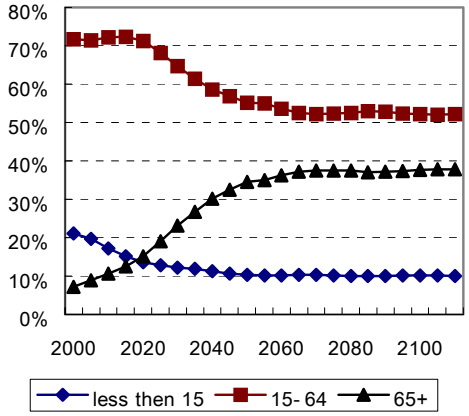

Fig.2 Public Pension Benefit Profile

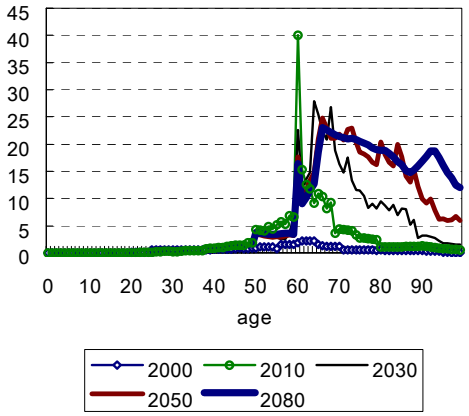

Fig.3 Public Pension Contribution Profile

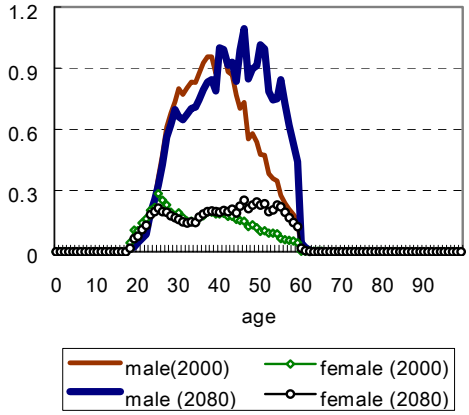

Fig.4 MI Benefit (2000)
(1,000 won)

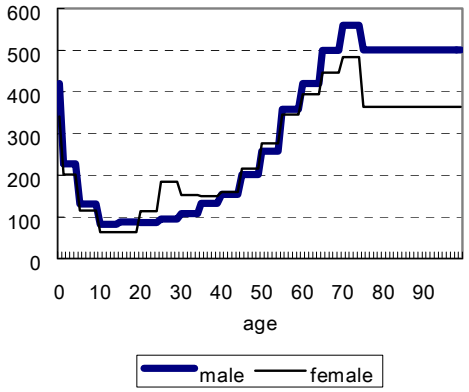

Fig.5 EI Benefit (2000)
(1,000 won)

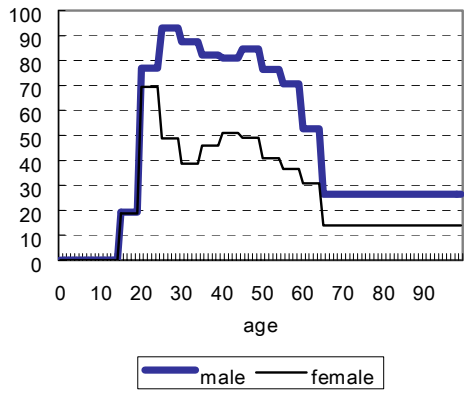

Fig.6 IACI Benefit (2000)
(1,000 won)

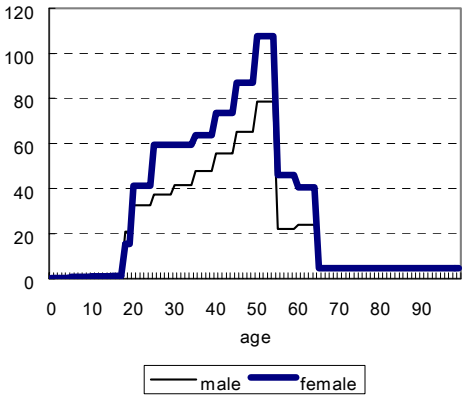

Fig.7 MI, EI, IACI Contribution (2000)
(1,000 won)

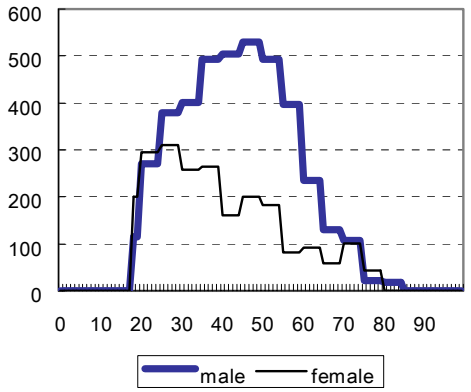

Fig.8 MLSS Benefit (2000)
(1,000 won)

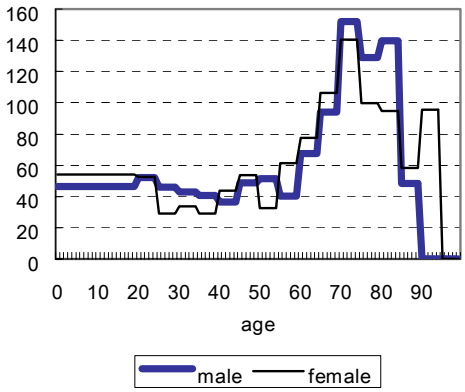

Fig.9 OSTP Benefit (2000)
(1,000 won)

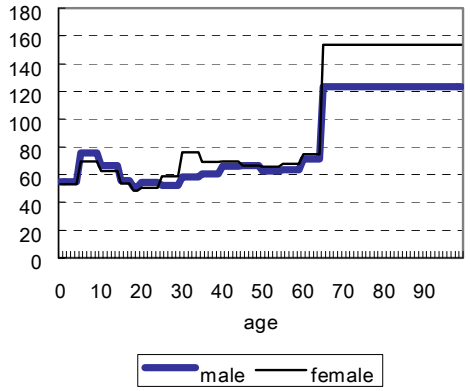

Fig.10 Labor Income Tax (2000)
(1,000 won)

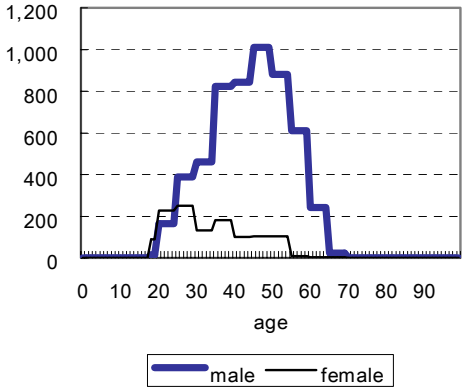

Fig.11 Capital Income Tax (1) (2000)
(1,000 won)

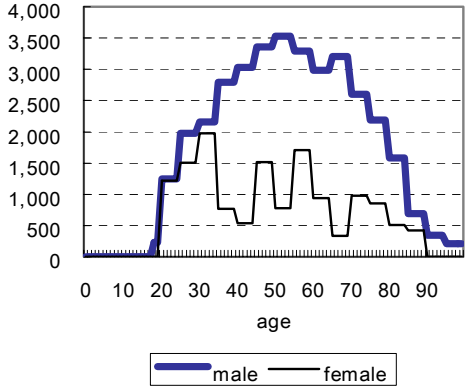

Fig.12 Consumption Tax (2000)
(1,000 won)

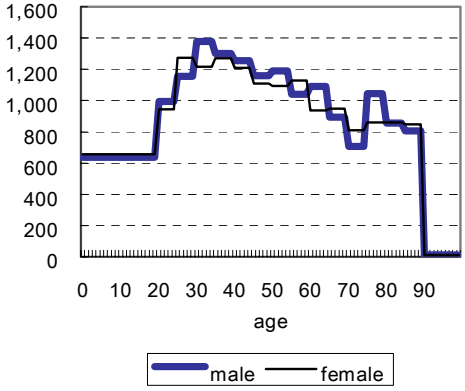

Fig.13 Tax on Asset- Holding (2000)
(1,000 won)

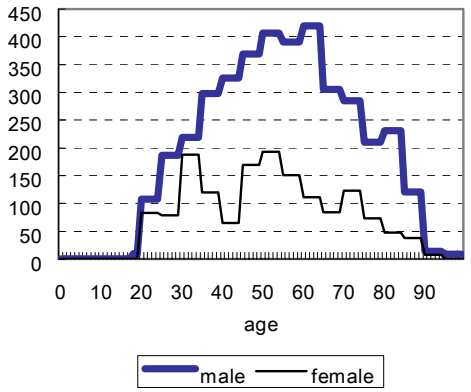

Fig.14 Tax on Asset Transactions (2000)
(1,000 won)

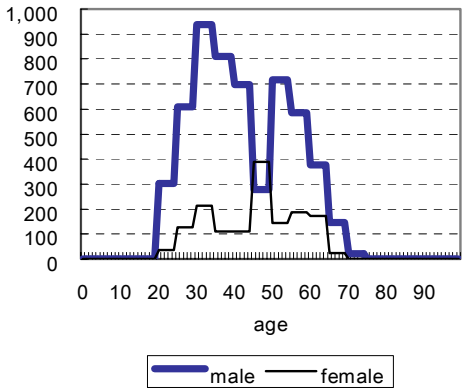

Fig.15 Other Taxes (2000)
(1,000 won)

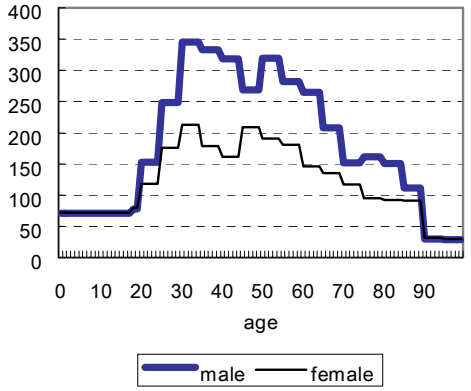

Fig.16 Seigniorage (2000)
(1,000 won)

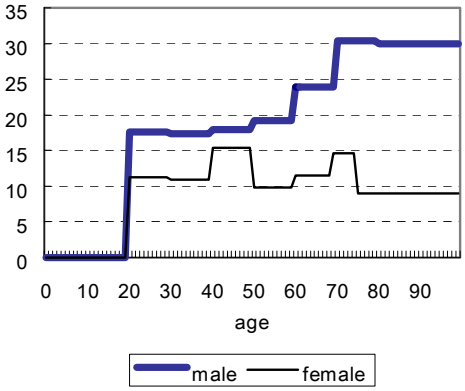

Fig.17 Educational Benefits (2000)
(1,000 won)

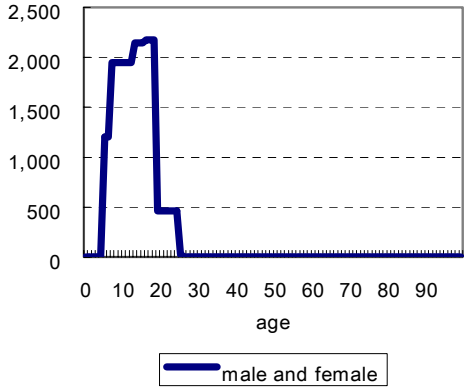

Fig.18 Net Tax I Profile of selected years

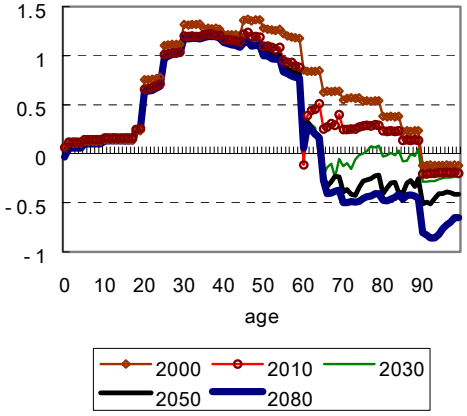

Fig.19 Aggregate Public Pension Benefits and Contributions (% of GDP)

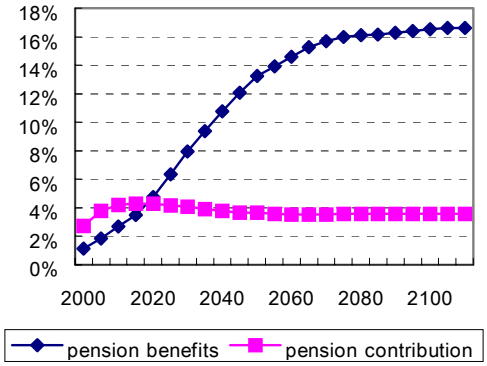

Fig.20 Aggregate MI Benefits and Contributions (% of GDP)

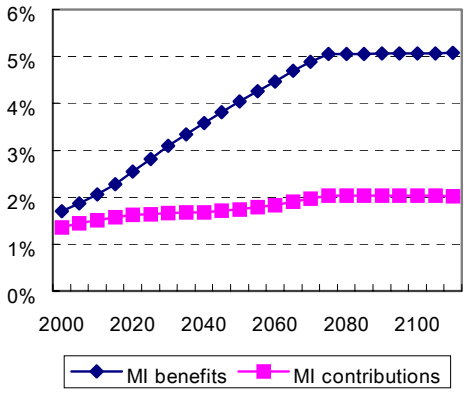

Fig.21 Aggregatge MLSS, OSTP Expenditure(% of GDP)

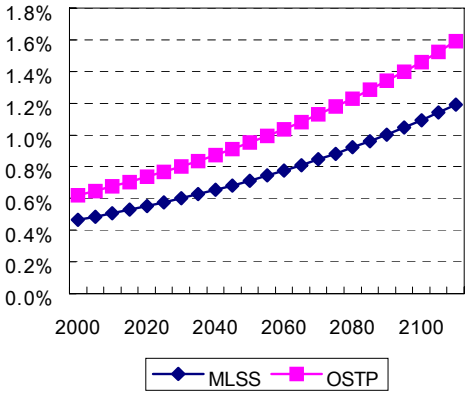

Fig.22 Aggregate Tax Revenue (% of GDP)

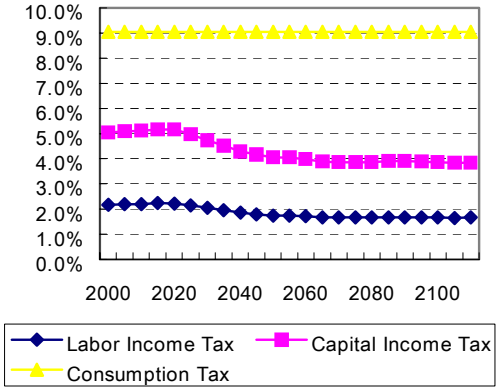

Fig.23 Aggregate Tax Revenue (% of GDP)

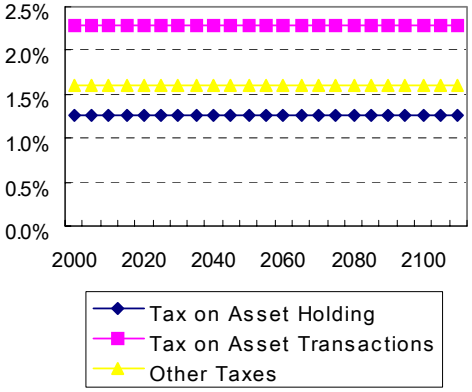

Fig.24 Aggregate Government Expenditure (% of GDP)