ALM of Social Insurance

Social insurance is generally defined as a universal, mandatory system of insurance administered or supervised by a government authority (Rejda 1994). Most such systems are self-funded, that is, they are not subsidized by the government budget, and run on a pay-as-you-go (PAYGO) basis, meaning that current expenditures (benefit outflows) are exactly matched with current amounts collected in premiums (usually through a payroll tax). Furthermore, a relationship between premiums paid and benefits received exists; however, both premiums and benefits are set by statutes, and such statutes are interpreted by regulatory bodies.

In the United States, the largest social insurance system is the Old-Age, Survivors, and Disability Insurance (OASDI) program, which provides protection against loss of earnings due to retirement, death, or disability. It is also the largest insurance system in the world. In 2000, it provided benefits amounting to $415.1 billion to 45.4 million beneficiaries. In the same year, it collected $492 billion in payroll taxes, $13 billion in income taxes (from benefits subject to income taxes), and its total income amounted to $568.4 billion. OASDI is not currently run on a PAYGO basis, but instead its income exceeds its expenditures substantially. The resulting positive cash flow is borrowed by the U.S. Treasury through special issue bonds paying current market rates of interest on bonds of maturity of at least four years, and putable to the Treasury at OASDI's discretion. The system's payroll tax income is expected to exceed expenditures (under the intermediate set of assumptions) through approximately 2016, and soon after that point OASDI will need to start redeeming assets in its trust fund. Under current projections contained in the 2001 Report of the OASDI Board of Trustees, the Disability Income trust fund assets would be exhausted by the end of 2026 and the Old Age and Survivors Insurance trust fund assets by 2040, after which, if no corrective action is taken, full benefits could not be paid on a timely basis.

This troublesome outlook for OASDI is not unique, when compared to similar systems worldwide. In its important 1994 document, *Averting the Old Age Crisis,* the World Bank describes the current worldwide condition of social insurance, concentrating on systems such as OASDI that are providing similar retirement, disability, and death benefits. The condition is described as the ''Old Age Crisis,'' and is generally attributed to the demographic phenomenon of rapidly increasing population of the elderly, caused by the baby boom following World War II.

This chapter takes a look at social insurance systems, especially retirement provision systems, which will be termed *social security systems*— from the perspective of ALM. One may ask: How can ALM be practiced in a system that has no assets? Indeed, a standard PAYGO system has no assets on its balance sheet. However, in Chapter 5, we have already seen in the discussion of the Panning (1993) model that an insurance firm may have a dramatically different true economic balance sheet than the one provided by the statutory or GAAP balance sheet. In the economic sense, an asset is anything that provides positive cash flows in the future, and a liability is anything that provides negative cash flows in the future. ALM is redefined as the process of managing those cash flows to achieve continuous solvency of the enterprise and maximize the value of the firm to its owners.

As pointed out in Chapter 1, the mission of financial intermediaries lies in effective transformation of cash flows between the household savings and the business demand for savings. Social insurance systems are a major link in the system of such transformation. In this respect, they are not in any form different from the existing systems of private intermediaries.

What is the economic balance sheet of a social insurance system? Superficially, there are no assets. However, the economic balance sheet consists of items very similar to those in the Panning (1993) model. There are, clearly, two balance sheets, as in

that model: the in-force balance sheet and going-concern balance sheet. Considered all items on the present value basis, the in-force economic balance sheet consists of the following:

- Assets:
  Forward commitments of the government to deliver future payroll taxes on persons already employed, and any other taxes as needed;
- Liabilities:
  Benefits already earned by current beneficiaries, and persons currently employed as well as expenses.

Undoubtedly, these items are not fully deterministic, but neither are the assets and liabilities of any insurance firm. It could be, and often is, argued that the system does not have any fixed liabilities because the benefits do not belong to the participants, but are merely statutory rights, and can be changed at any session of the legislature (see a discussion by Rejda 1994). From the economic standpoint, however, this argument is quite fallacious. The question about whether a government entity will or will not pay benefits promised, is, on one hand, similar to corporate bond issuer credit issues and, on the other hand, affected by political factors.

The ability of political entities to reduce benefits may be perceived to be greater than it is in reality. If a social insurance system reduces benefits, this is nearly always a result of a dramatic decline in the ability to generate sufficient cash flow to pay what had been promised, not of a unilateral benefit cutting decision. Such a situation occurs often in a crisis that brings about long-term damage to the economy and sufficiently limits any positive actions by decision makers. Social insurance systems are generally created by governments responsive not just to fiscal realities, but also to their citizens' wishes. In theory, it may seem easy to reduce expenditures but, in practice, the well-being of millions of citizens may depend on the delivery of promised benefits and, short of dictatorial edict, drastic cuts are nearly impossible, especially in the face of a fiscal or economic crisis.

Furthermore, any session of legislature can also impose taxes on benefits payable by private insurance firms, thus also changing their value to the beneficiaries. The economic reality of the social insurance liabilities resembles that of a private insurance system to a much greater degree than implied by mere legalistic reading of the letter of the law.

The going-concern balance sheet of a social insurance system is somewhat enhanced:

- Assets:
  Forward commitments by the government to deliver payroll and other taxes needed.
- Liabilities:
  All future benefits and all future expenses.

The going-concern balance sheet represents the true full economic picture of the system. The U.S. Social Security System, OASDI, is subjected annually to a set of long-term actuarial projections of its cash flows and the balance of the trust fund over the span of the next 75 years. These projections represent the closest existing approximation of the economic picture of the system. Although they do not show the balance sheet of the system, they do provide predictions of cash flows in the review period. Since the economic value of a financial intermediary is determined by the cash flows (positive and negative) produced by it, the actuarial projections allow for an improved understanding of the system.

The actuarial projections of OASDI are based on the anticipated levels of certain components of the economy and the population. These are referred to as *actuarial assumptions.* The economic components include inflation, interest rates (earnings of the trust fund), unemployment rates and wage increases. They are complemented by demographic factors: mortality, fertility, marriage and re-marriage rates, disability, retirement, and immigration rates. The assumptions come in the ''low-cost,'' ''intermediate'' and ''high-cost'' varieties.

It should be stressed that each cost level assumption is produced by combining all of its factors, economic and demographic, as independent inputs. In other words, all of the factors are treated as independent variables, without any correlations among them, without allowing for items such as contemporaneous correlations among variables, autocorrelations of variables, heteroscedascicity within each series, and lead or lag relationships among the series. This is especially troubling in view of the fact that relationships such as those listed are central in ALM of private insurance systems. Let us examine that premise.

When projecting future cash flows of the insurance enterprise, there are positive cash flows from new business, asset dividends, coupons, repayments, and maturities and negative cash flows from claims, lapses, asset purchases, and expenses. The turbulence experienced by the insurance industry, as described in Chapter 3, was affected by:

- Autocorrelations. If lapses of a firm's business increase, for example, it is likely to experience even

higher lapses, especially if the news of increased lapses receives a great deal of publicity.
- Contemporaneous correlations between variables. Sharp decreases in interest rates are accompanied by sharp increases in rates of prepayment of assets, especially home mortgages and mortgage-backed securities.
- Lead or lag effects. Claim and lapse increases following interest rate increases generally follow increases in interest rates, but with a lag effect.
- Conditional heteroscedascicity. This refers to a pattern in the size of deviations of a series. Frees et al. (1997) shows such a pattern in the series of nominal interest rates.

In fact, one of the major premises of ALM is that relationships between factors determining a firm's cash flows have a major effect on the solvency and value of the firm (see, for example, the Short Straddle Model discussed in Chapter 3). Are similar patterns of cash flows exhibited by the social insurance systems? Let us examine the issue.

Frees et al. (1997) conducted a pioneering inquiry into the pattern of dependencies among the economic factors modeled in OASDI actuarial projections. They modeled four economic variables: inflation, interest rates, unemployment rates, and wage increases, as a multivariate random vector. By introducing a single model, they were able to accommodate the four types of patterns of the factors simultaneously. The result was a short-term projection of the trust fund balance. Therefore, the work of Frees et al. (1997) serves as a starting point in a further series of ALM analyses of the OASDI system.

In particular, the essential issue is the incorporation of all economic and actuarial factors dependencies into the long-term projections. To illustrate the need for such an extension, consider a simple model of a social security system. (Note that the full scale model must, in addition to the items considered by Frees et al. (1997), incorporate the effect of the payroll tax, the benefits levels, and actuarial factors on the economic factors already represented. Indeed, correlations between benefit levels and the decrements of disability and retirement are well-known in private insurance as antiselection. Although social insurance can eliminate antiselection in the process of underwriting, antiselection and moral hazard in obtaining benefits are quite significant.) The simple model uses the following notation (t represents time):

- Employed population $P(t)$.
- Individual productivity (gross wages) $W(t)$.
- Individual benefit $B(t)$.
- Beneficiary population $R(t)$.
- Payroll tax rate $T(t)$, set on a PAYGO basis.

As indicated, there are numerous dependencies, or *feedbacks,* among the factors influencing the process of social security evolution. For example:

- There is an inverse relationship between P and T, as payroll taxes hamper employment, and similarly for W and T.
- For small T, B increases simultaneously with T, but for large T, the opposite could be true.
- There is an direct relationship between R and T, as well as between R and B, and an inverse one between P and B.

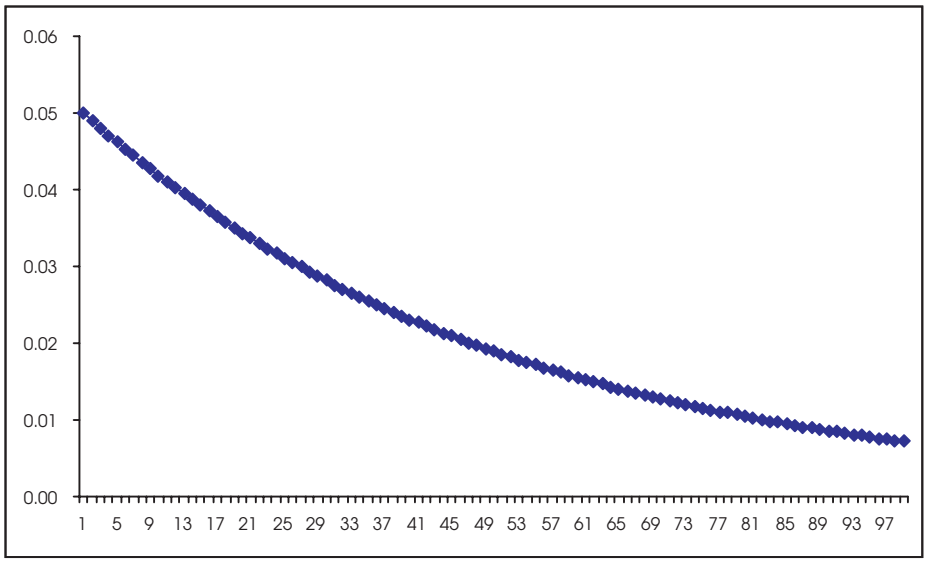
''Feedback'' refers to the fact that the PAYGO tax rate, which is the result of long-term balancing calculation for social security, in turn, has an effect on the values of factors such as unemployment, productivity, benefit levels, and beneficiary population. Given that, let us consider simple deterministic models of evolution over time $T(t)$. If $P(t)$, $W(t)$, $R(t)$ grow at 2%, and $B(t)$ grows at 0%, and there is no feedback of the tax rate on the economic factors, then the graph of $T(t)$ resembles Figure 11.

Figure 12 presents the graph of $T(t)$ under the following assumptions: $P(t)$ grows at 1%, $W(t)$ grows at 1%, $R(t)$ grows at 2%, $B(t)$ grows at 0%, and there is no feedback. Note that these assumptions represent what can fairly be termed the ''old age crisis,'' as the beneficiary population is increasing at twice the rate of that of the working population. The tax rate is still declining over time.

Figure 13 shows the result of the following assumptions: $P(t)$ grows at 1%, $W(t)$ grows at 1%, $R(t)$ grows at 2%, $B(t)$ grows at 0%, and there is a small feedback represented by T decreasing the rate of growth of $W(t)$ by 1% of T, and increasing the rate of growth of $R(t)$ by 1% of T. This represents the ''old age crisis'' combined with behavioral factors represented in the feedback. However, the feedback is relatively small, resulting in small increases in the tax rate over time.

Finally, Figure 14 represents the result of the following assumptions: $P(t)$ grows at 1%, $W(t)$ grows at 1%, $R(t)$ grows at 2%, $B(t)$ grows at 0%, and there is a large feedback represented by T decreasing the rate of growth of $W(t)$ by 10% of T, and increasing the rate of growth of $R(t)$ by 6% of T. The payroll tax rate increases sharply in this figure. These payroll tax rate levels are experienced by various European and Third World economies (World Bank 1994). They are not the result of an ''old age crisis,'' but rather of the

FIGURE 11
PAY-AS-YOU GO TAX RATE IF BENEFITS ARE NOT INCREASED



asset-liability mismanagement practices in many social security systems.

ALM in social security is summarized in the management of cash flows of the system. In traditional insurance systems, actuaries have been traditionally most involved in the projections of liabilities cash flows. But total cash flow management is the central premise of ALM, as this paper defines it. Furthermore, social security systems craft a ''global'' national derivative from the current working population to the beneficiaries' population by restructuring the payroll tax flows into the benefits flow. This is the key starting point in understanding the nature of the social security systems. An individual planning for retirement can do

FIGURE 12
PAY-AS-YOU-GO TAX RATE WITH "OLD AGE CRISIS" WHEN ASSETS AND LIABILITIES DO NOT AFFECT EACH OTHER

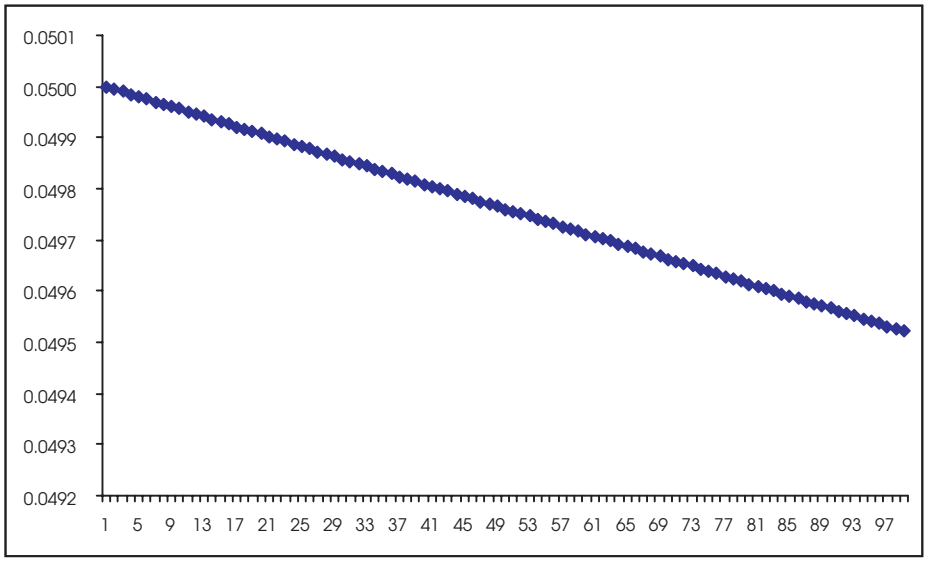
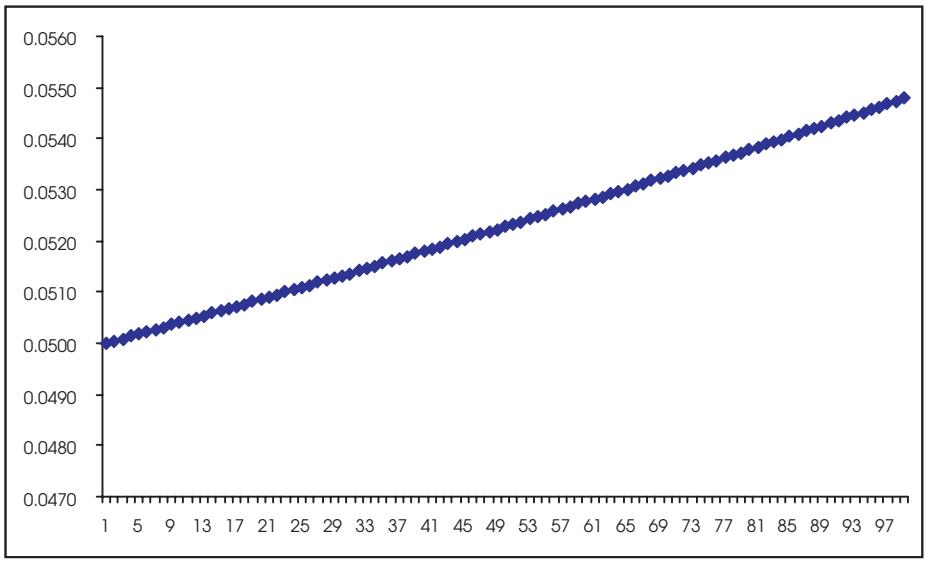
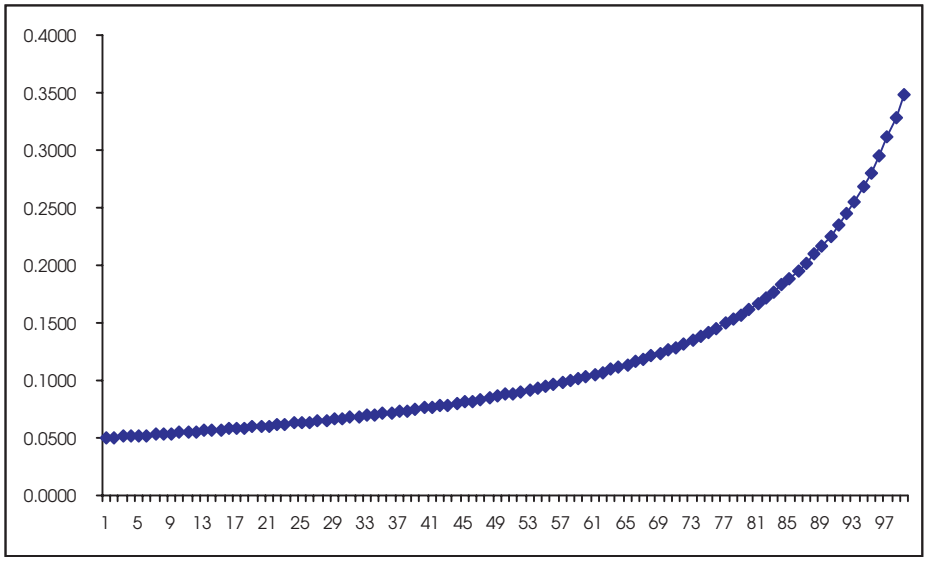


FIGURE 13
PAY-AS-YOU-GO TAX RATE WITH "OLD AGE CRISIS" WHEN PAYROLL TAXES DECREASE EMPLOYMENT SLIGHTLY AND INCREASE BENEFICIARY POPULATION SLIGHTLY



so by saving a portion of his or her income and using the accumulated funds to purchase goods and services at retirement. However, the funds are merely accounting entities, and the person will need to consume real goods and services at retirement, being unable to produce such goods and services himself or herself. Social security systems provide for the creation of claims to such goods and services in the future for its beneficiaries. But social security systems are in no way unique in that respect. There are various other ways to create claims to future production of goods and services, such as:

FIGURE 14
PAY-AS-YOU-GO PAYROLL TAX RATE IF TAXES AFFECT EMPLOYMENT AND BENEFICIARY POPULATION SIGNIFICANTLY



- Private- and public-defined benefit pension plans and annuities, in which individuals trade present cash flows for promises of future cash flows linked in value to the individual's wages or nominal monetary units.
- Individual portfolios of capital assets, held either directly or through defined contribution pension plans (this includes items such as bank accounts, insurance policies, ownership in privately held businesses, etc.).
- Membership in family and other social support groups (family as an incomplete annuity market is discussed by Kotlikoff and Spivak 1981);
- Government social assistance programs (as opposed to social insurance programs).

Indeed, in their economic meaning (i.e., in their cash flows), social security systems are merely combinations of all of the above, except family and social support groups. Kotlikoff (1992b) points out that social security is equivalent to:

- Initial beneficiaries generation receiving welfare transfer payments.
- Government issuing bonds in return for payroll tax contributions.
- Benefits termed ''contributions plus interest.''
- Special tax/transfer payment instituted for beneficiaries in order to achieve the prescribed benefit levels.

The above will be termed the Kotlikoff model of social security in this paper. Just as in the case of national debt, the guarantee of payment of cash flows of the social security systems is backed by statutory forward commitments to deliver future taxes by the government. If GAAP principles were applied to social security systems, every payment of payroll tax to the system would result in an increase of government liabilities by the appropriate accounting value of the future benefits payment promise just created. Were the off-balance-sheet obligations of social security systems included in national debt, the result would be a better economic picture of the national debt. One can easily observe that the accrued liabilities of a PAYGO system are economically equivalent to issued marketable government bonds. Either one is basically a forward commitment to collect taxes.

It is often said that once instituted, a PAYGO system is impossible to evolve out of, because members of any new generation wanting to use the private sector for their retirement will have to pay ''twice'': first, in taxes for the retirement of past generations and, second, in savings to pay for their own retirement. This is clearly a fallacy because accrued liabilities of PAYGO are merely a form of government debt, and having to make a ''double payment'' is equivalent to the necessity faced by any current generation to pay for its government services as well as interest and principal on a national debt accrued by previous generations (which consumed more than their own production justified). This ''double payment'' cannot be avoided by remaining in the PAYGO system, and its existence is entirely independent of the method of financing of retirement provision. Anyone wanting to have an illusion of avoiding their ''second payment'' can simply buy government bonds for their retirement portfolio and receive interest for which the taxes are being collected. This, of course, is precisely what happens in a social security system; the only difference is that the bonds are privately placed and the purchases are mandatory.

Let us note that inclusion of benefit accrual in government accounting of debt would have significant consequences. As reported by the Congressional Budget Office (CBO 1993), for the fiscal year 1992, the U.S. government deficit for congressional budgetary purposes was $290 billion, but this figure included a large positive annual cash flow from the federal social insurance systems; after adjusting for that item and a small deficit in the postal system, the deficit was $340 billion. From the perspective presented here, the last figure should have been actually increased by the excess of the social insurance benefit accrual over the benefit release to produce a result consistent with the way all government expenditures are accounted for. Note that no other position in the government accounting system, except for social insurance, nets future yet uncollected taxes against future yet unpaid benefits. If viewed as other government activities, all social insurance tax receipts would be counted as new bond issuance, and all benefit payments as principal and interest payments on the national debt.

The consequence of the Kotlikoff model is that social security systems must be viewed as an integral part of the fiscal policy of central government. The management of social security is indeed management of national debt and national taxes, as well as their relationship to such macroeconomic variables as productivity growth, transfer payments, standard of living, and gross domestic product and real wages.

Auerbach, Gokhale, and Kotlikoff (1994) discuss the difficulty in labeling payments to and from the government and meaningfully addressing their economic significance. Consider the following cash flows between the government and a citizen, involved in one transaction:

- Jan. 1 (beginning of the year): The citizen transfers $1,000 to the government.
- Dec. 31 (end of the year): The government transfers $1,050 to the citizen.

Given this information, is it possible to determine what the transaction was? The possibilities are endless. Here are some of them:

- $1,000 is a payment of taxes by the citizen, and $1,050 is a transfer payment to the citizen.
- $1,000 is received by the government in return for a Treasury bill purchased by the citizen, and $1,050 represents repayment of principal and interest.
- $1,000 is collected by the social insurance system, and $1,050 represents a benefit payment.
- On Jan. 1, the government actually paid a social insurance benefit of $2,000 to the citizen and borrowed $3,000 from him, while the $1,050 on Dec. 31 was after netting $3,150 of repayment of principal and interest, and $2,100 of taxes due the government from the citizen.

Clearly, the official legal nature of the transaction cannot be determined from the cash flows, while we should never forget that the economic value of the fiscal policy arrangements between the government and its citizens is, just as in the case of any other financial instrument, determined solely by its cash flows.

Auerbach, Gokhale and Kotlikoff (1991, 1994; see also Kotlikoff 1992b) propose a new way to evaluate fiscal policy effects, called *generational accounting.* The government's intertemporal budget constraint at each date requires that current and future generations' net tax payments be sufficient, on a present value basis, to pay for the future government expenditures as well as for the government's initial indebtedness, net any initial government assets. If this constraint is not satisfied, the government will default on its obligations (effectively meeting its constraint by erasing its liabilities). This does not imply that the debt must be paid off. The government can simply roll over its debt; it can pay off interest and maturing debt by issuing new debt.

Before discussing intergenerational accounting, it is essential to note that the strategy of rolling over government debt is equivalent to the PAYGO method of financing social security systems. Social security releases its previously issued liabilities to current beneficiaries by paying them with money collected from future beneficiaries, while issuing new promises of future benefits. Is the strategy of rolling over government debt without paying it off dangerous? It is quite common for the public to fear debt and perceive the national debt as a problem of immense proportions. But, if the gross domestic product (GDP) grows faster than the national debt, the ratio of debt to GDP falls and the ability of the government to service the debt is enhanced. In the United States, the average growth of nominal GDP in the period from 1871 to 1992 was 5.9%, and the average interest rate on debt was 4.0%. As long as new debt creation through deficits did not exceed 1.9% of GDP annually, this situation resulted in a decreasing ratio of debt to GDP. Only since the Vietnam War period has the United States experienced structural budget deficits during peacetime, bringing the issue of deficits and debts to the forefront of public debate. It is possible that the economy can experience a period of subpar growth, resulting in increases in debt exceeding the growth of the GDP. Ball and Mankiw (1995) discuss this possibility and the most severe (probable but not certain) outcome of it: a *hard landing,* which is the term used to describe the situation when the government suddenly has difficulty selling its debt, forcing major painful adjustments in the economy (e.g., Mexico in December 1994, or Eastern Europe after the fall of communism).

In a social security system, when new debt is issued by collecting payroll taxes, its present value is not necessarily equal to the value of taxes collected. Although it would be unreasonable to expect such equality on individual basis, it does not hold on generational basis, either. Myers and Schobel (1992) performed calculations of money's worth for various generations and determined that some previous generations received as much as 10 times their money's worth in OASDI benefits, with no generation yet receiving just their money's worth or less. Everyone was a winner. But this means that, for OASDI, the rate of growth of present value of future benefits promises has exceeded the rate of growth of payroll taxes (affected mainly by the growth in wages and demographic balance), and this scenario is exactly equivalent to what the economists view as the dangerous path towards a hard landing.

Ironically, the OASDI has achieved that situation, not necessarily by collecting too little in taxes, but rather by consistently overpaying in benefits relative to the premium paid and, therefore, creating a social expectation of getting more than one's money's worth forever. Had this expectation of improvement over money's worth exceeded money's worth by a small amount commensurate with the excess in the rate of growth of taxable payroll over the combined rate of growth of population and the cost of living, the system would have stayed within sustainable bounds of debt rolling over. But the Great Depression and World War II created generations that did not have the time or

opportunity to generate large amounts of wealth and contributions into the system, so had to receive more than their money's worth in order to distribute intergenerationally the unique risks faced by those generations.

Unfortunately, this process has built unsustainable expectations of benefits growth into the OASDI system, resulting in the current severe long-term funding problems. Indeed, the practice of issuing benefits whose present value was well in excess of payroll taxes collected (i.e., issuing more debt than the actual amount of cash borrowed) has been common in all social security systems worldwide, motivated mostly by the public policy goal of increasing the standard of living for the elderly. We cannot stress enough that this strategy is unsustainable as long as the rate of growth in total benefits issuance exceeds the rate of growth in taxable payroll (one can increase the payroll tax level, but there is a limit to this process). It creates a ''clear and present danger'' of an economic hard landing (for actual estimates of the probability of hard landing, see Ball, Elmendorf, and Mankiw 1995).

To put it simply, if the social insurance system consistently enters into the following transaction:

Debit: \$100 in premium tax collected;

Credit: \$1,000 in benefits issued (present value of future benefits);

without clearly and visibly debiting future generations for the missing \$900 (the figures correspond to actual money's worth calculations for entire generations in Myers and Schobel 1993), then the growth in effective, although not booked, government debt will be unsustainable.

One possible solution to this long-term fiscal problem would be to account for benefits issued exactly the same way as for explicit government debt. As Mussa and Masson (1995) point out, accrued benefits of the U.S. Social Security system amount to about 113% of GDP. This, of course, far exceeds the explicit national debt figures for the United States, ranging about 75% of GDP.

Let us return to the intergenerational accounting proposed by Auerbach, Gokhale, and Kotlikoff (1991). The account of the generation born in year k is defined as:

$$N_{t,k} = \sum_{s=\max(t,k)}^{\omega} T_{s,k} \cdot P_{s,k} \, (1 + i)^{t-s}, \qquad (6.1)$$

where:

$N_{t,k}$ is the balance in the account of the generation born in year k, calculated in the year t.
ω is the maximum length of life, i.e., limiting age.
$T_{s,k}$ is the net tax payment made in year s by the generation born in year k.
$P_{s,k}$ is the number of members of the cohort born in year k surviving in year s.
i is the appropriate discount rate.

Equation (6.1) represents the value of the tax liability that the generation born in year k is short (negative values of $N_{t,k}$ indicate a net long position, i.e., a government rent provided to the generation, at the expense of other generations). Even though the estimates of other quantities in Equation (6.1) are already quite involved, it is by far most difficult to find the proper discounting rate, given the uncertainties of future cash flows. Note, however, that the problem of valuation in Equation (6.1) is of the same nature as the valuation of other derivative securities discussed in this paper. The theory of such valuation will be studied in Chapter 7.

Following Auerbach, Gokhale, and Kotlikoff (1994), denote:

$C_{s,k}$ consumption in year s by the generation born in year k.
$I_{s,k}$ private net intergenerational transfer paid in year s by the generation born in year k.
$W^p_{t,k}$ year t net wealth of the surviving members of the generation born in year k.
$E_{s,k}$ labor earnings in year s of the surviving members of the generation born in year k.

Then

$$N_{t,k} = W^p_{t,k} + \sum_{s=t}^{k+\omega} E_{s,k} \cdot P_{s,k}(1 + i)^{t-s} - \sum_{s=t}^{k+\omega} (C_{s,k} + I_{s,k}) \cdot P_{s,k}(1 + i)^{t-s}, \qquad (6.2)$$

that is, given human mortality, all wealth owned and produced will eventually be consumed, gifted away, or taxed.

Generational accounting is a tool that allows for consideration of all cash flows of a social insurance system and, thus, provides a comprehensive method for evaluating the economic value of both the securities created within the system (benefits accruals) and the implicit debt implied by their existence. The calculations of Auerbach, Gokhale, and Kotlikoff (1994) show that the average net (taxes paid minus benefits received) tax rate for generations born in the United

States was or is 26.3% for those born in 1920, 30.6% for those born in 1950, and 33.6% for those born in 1990. For future generations, however, the average net tax rate will be 71.1%.

This clearly illustrates the phenomenon of using social insurance as a way to subsidize current consumption at the expense of future consumption. Interestingly, the United States social insurance system was created in the midst of a period of dramatic economic transformation, the Great Depression. The classical Keynesian explanation of the Great Depression was the weakness of the aggregate demand. Stimulation of the aggregate demand was also the Keynesian prescription, and it was provided by government programs such as social insurance. One of the great debates raging about the U.S. Social Security system has been its effect on national savings. Although it has been difficult to prove the case for Social Security lowering the savings rate (see the discussion of this issue by Rejda, 1994), recent work by Kotlikoff (1992a, 1992b, 1995) indicates that of the main effects of social insurance has been to stimulate consumption by the elderly along with a dramatic drop in saving. This is precisely what the public policy of raising the standard of living of the elderly called for, and this is what has been termed the success of social insurance. If the elderly have precautionary savings, it is mostly because of the risks of outliving one's money and of having catastrophic medical expenses. These risks have been nearly eliminated by the social insurance and social assistance in the United States (Rejda 1994). Such precautionary savings tend to become a bequest for the younger generations, shifting the intergenerational fiscal balance away from the elderly. One could argue that, on average, savings would be spent on the risks planned for, yet this is inconsistent with the individual nature of the savings. Social insurance has nearly eliminated those risks precisely because it could spread them over the totality of all risks. Individuals, in contrast, cannot diversify their human capital risks and must overprovide for them. Therefore, one can reasonably expect that the introduction of social insurance would lead to the effects observed in the United States.

In summary, social insurance crafts derivative securities in a manner quite similar to that of private financial intermediaries. The intermediation is between the taxable payroll, the key asset of the system, affected by the level of employment and productivity and the total benefits, which are determined by both the benefit formula and the size of the beneficiary population. ALM of the system expresses itself in the management of cash flows. In the consolidated government budget, given that positive cash flows are typically borrowed and negative cash flows are typically made up by said-budget, one must view cash flow management as the process of comprehensive national debt management. From this point of view, the crucial relationship is that between the long-term rate of growth of taxable payroll and consolidated benefits. Allowing the rate of accrual of benefits to exceed the rate of growth of taxable payroll is equivalent to the national debt growing faster than the national economy, which poses a hard-landing threat, with subsequent dramatic reduction of national wealth resulting from implicit or explicit government default. Addressing these problems will be among the key challenges of our generation.