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7 Modeling Alternative Solutions to the Long-Run Social Security Funding Problem

Michael J. Boskin, Marcy Avrin, and Kenneth Cone

7.1 Introduction

Since its enactment, the Social Security System has enjoyed unique popularity among public income support programs. In the past several years, however, rising payroll taxes, a huge long-term deficit, and concerns over its effects on the economy have led an increasing number of observers to conclude that social security is in urgent need of reform.

This system serves two major goals: to replace income lost at retirement, and to provide minimum income support for the aged. The former, the insurance goal, is based on earned entitlements; the welfare, or transfer, goal aims at social adequacy of support. Each goal enjoys wide public support as well as important policy justifications. For example, imperfections in the private annuities market and imperfect foresight regarding future incomes, inflation, life expectancy, etc., may lead many citizens to “undersave” for retirement, forcing them to become general charges on the public via welfare or other programs in the absence of social security.

Over more than four decades, the Social Security System has helped mitigate these problems in an important way. It has provided substantial income security to the elderly; it has kept many elderly persons out of

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extreme poverty; and it has transferred billions of dollars annually from the younger, wealthier generation of workers to the older, poorer generation of retirees. These are significant achievements indeed. However, the system, which was designed decades ago, has not kept up fully with rapidly changing economic, social, and demographic conditions. It is having several substantial and probably unintended adverse effects on the overall economy; and it faces a long-term funding crisis of substantial proportions.

Social security is thought of in several alternative ways: as an actuarially fair pension fund; as a separable system of taxes and transfer payments; and as a pure consumption loan intergenerational transfer program, where each generation transfers a fraction of its labor income to the retired generation with the expectation that the succeeding generation will treat it similarly. In truth, the existing Old Age Survivors Insurance (OASI) System is none of the above, but has components of each (as well as additional complexities).

The current system differs from the private pension fund analogue in several respects. First, it is unfunded in that current payouts are financed by contemporaneous "contributions," or taxes. This had the advantage of allowing retirement benefits to be initiated immediately, making the initial recipients "windfall" beneficiaries. That is, they received retirement income supplements with little or no previous contributions. Income was similarly transferred from the initial working population to the initial retirement generation. This intergenerational transfer has continued as the system has matured, although the percentage of net transfers (the expected value of a participant's receipts less payments) in total benefits has diminished. One drawback of this system is that while people accumulate future claims against the system, no corresponding wealth accumulation occurs for the system as a whole. Thus, while the working population is being forced to "save," no funds are made available for capital formation in the economy. At any point in time, the system is "bankrupt" in that it has massive future retirement obligations and only a relatively trivial amount of assets. A government can operate such a system because of its powers to tax future income in order to finance its obligations.

There are other major differences between social security and the private annuity or pension fund analogue. The benefits are distinctly tilted in favor of the low-income worker, the worker with a short work history, and the retiree with a spouse with an uncovered work history and those with little retirement income. That is, relative to a system where each participant earned a common rate of return on his or her contributions, the current Social Security System involves a set of taxes and transfers. This redistribution within a generation, in contrast to the intergenerational transfer mentioned above, is accomplished by such

mechanisms as a progressive benefit formula, a minimum benefit, a uniform dependent's benefit, and an earnings test.

7.2 The Major Problems Confronting Social Security

Three major sets of problems plague social security today. The first is the issue of equity, both inter- and intragenerational. A large proportion of benefits received by retired workers is really an intergenerational transfer. Also, different groups in a given generation of the population are treated differently by the Social Security System. Low-income workers receive a higher fraction of their previous earnings in benefits than do high-income workers, married couples usually receive half again as much as single persons with the same earnings history for the primary earner, those with short-covered earnings histories are favored, etc.

A second set of problems plaguing the Social Security System is the potentially adverse effects that it may have on private incentives to work, save, hire workers, etc.

Probably the most overwhelming problem confronting social security as a pay-as-you-go system is the long-term funding crisis. Even after the 1977 social security amendments, the long-term deficit in the OASI System was well over \$600 billion (in 1977 dollars). By 1982 this amount had increased to well over one trillion dollars. This is the amount by which the present value of legislated benefits exceeds the present value of legislated taxes. To put this in perspective, this amount is about the size of the privately held regular national debt. The major cause of this projected deficit is the drastic change in the age structure of the population. Once the post-World War II baby boom retires (around 2010) the ratio of retirees to workers will increase enormously. The best estimate is that the ratio of retirees to workers will increase by over 60%—from slightly less than one to three to about one to two. Given the pay-as-you-go nature of the system, this implies either a huge increase in taxes to maintain the ratio of benefits to before-tax wages or a significant decline in the ratio. Neither prospect is appealing, but there is no avoiding the choice.

In addition to the rapidly changing age structure of the population, the trend to earlier retirement combined with increased life expectancy has increased the average length of retirement considerably. In 1948 one-half of all males over the age of sixty-five were in the labor force; today that figure is only one in five. The average life expectancy of the elderly has increased over two years since 1960. Thus the length of the average retirement period has increased by about one-third since 1950. This has greatly strained the financial resources of the elderly; to achieve any given level of annual consumption, a retiree now needs substantially greater savings, intrafamily transfers, or public support.

What does all this imply for the long-run financial outlook for social

security? Even the large tax increases of the 1977 amendments will prove insufficient to finance the program through the first half of the next century. If the current law is maintained until 2025, payroll tax rates would have to increase by more than 8 percentage points to meet benefit payments.¹ This would imply combined employer and employee tax rates of about 23% of payroll! Given the huge outcry against the large (but much smaller) increases legislated in 1977, it is clear that the time has come to reexamine the future course of social security. The alternative is continued unpopular tax increases, which add to costs and prices, reduce net wage rates, redirect the system further from an earned entitlements or annuity basis, and continually erode public support of the Social Security System.

While several short-run “quick fixes” have been proposed, such as bringing into the system those, such as government employees, not currently included, or eliminating the ceiling on taxable earnings, these cannot produce a reduction in the long-term deficit unless they are accomplished in a manner that is actuarially disadvantageous to the groups concerned.² For example, bringing government employees under social security would increase current tax revenues but add to future obligations. This could reduce the deficit only if government employees were given a “bad” deal. But we could then expect them to resist such a proposal en masse.

7.3 The Transfer and Annuity Components of Social Security

In order to appreciate the relation between the annuity and the intergenerational transfer components of social security, let us begin by examining the most extreme case: the first cohort of retirees under the United States Social Security System. Consider an individual who was age sixty-two in 1937 and retired in 1940 at age sixty-five.

For a worker making average earnings and investing the sum of employer and employee contributions at interest rates then prevailing, the accumulated retirement principal in 1940 would have been only \$68.36, yielding an annuity of \$6.59 per year. Clearly, benefits far in excess of contributions would be required if any substantial benefits were to be paid.

The actual average annual benefit paid in 1940 to a male age sixty-five was \$270.60. Since an annuity would have yielded only \$6.59, \$264.01 of the benefits were a pure transfer, or welfare payment.³ Since the benefits

1. See Robertson (1978). The 8 percentage point increase includes that estimated to fund the deficits in hospital and disability insurance as well as OASI.

2. They might be defensible on other grounds.

3. This example is taken from Parsons and Munro (1977).

may and, in fact, did change over the retirement period, it is more convenient to compare capitalized savings and benefits over the expected time span than to compare annuity payments and annual benefits. For the individual in question, the present value of lifetime benefits was \$2,962.09, of which \$2,893.73 was a transfer. Thus this individual paid for only 2.3% of the benefits received. This percentage has been increasing for individuals over time. Those retiring at age sixty-five in 1970 paid for approximately 32% of the benefits received.

Different individuals receive vastly different “deals” in the sense of the ratio of benefits received to taxes paid plus interest. This occurs for a number of reasons including the progressive benefit formula, the minimum benefit, the spouse’s benefit, the different periods of coverage, etc.

7.4 Separating the Transfer and Insurance Components

Many problems in the Social Security System relate to the conflict between its twin goals of earned benefits and income adequacy. Most critics of the program propose reforming it in the direction of one goal or the other. Separating the transfer and annuity goals would have different effects on individuals depending on their age, income, industry, etc.

The three sets of problems plaguing social security—the long-term funding deficit, the apparent inequities, and the adverse incentives—have generated much interest in reforming the system. One proposed reform is the separation of the transfer and annuity goals of the program. In principle, it may be desirable to separate the financing of these different goals of the system. Separating the transfer and annuity functions of the Social Security System and funding them respectively out of general revenues and earmarked payroll taxes has been recommended for a number of reasons.

First, the current system is so complex as to obscure the relation between contributions and benefits and impede a rationalization by firms and employees of total retirement support, private pension plus social security.

Second, as we shall demonstrate below, many groups in the population are getting a “bad” deal from social security compared to an actuarially fair system. Separating the transfer and annuity goals would provide the *same rate of return for all workers* under social security’s annuity program. The inequities which undermine support of the system would be eliminated in this part of the program.

Third, transfers to the elderly poor (beyond Supplemental Security Income) could be financed from general revenues. Many object to financing an income guarantee for the aged poor from a tax which bears so heavily on the low-income workers. The current income tax exemptions,

deductions, and low-income allowance, which together exempt the first several thousand dollars of earnings from tax, indicate the general belief that those at the very bottom of the income scale should not have to help finance general income support programs.

The same argument applies to any intergenerational transfers providing earnings-related benefits beyond those provided by pure insurance and the minimum income guarantee. Many object to a system in which current unskilled workers surrender income (beyond their *own* insurance) to subsidize retired professionals beyond what is actuarially fair.

In separating the insurance from the transfer goals, general revenue financing would also require the transfer goals to compete openly with other government priorities, including tax cuts. General revenue financing would permit policymakers and the public openly to determine the value of transfers to the elderly in relation to other social priorities and to promote cost-effective measures for doing so. It will permit differential needs assessment to deal with different circumstances (marital status, etc.) in the context of a transfer program, where many precedents for doing so already exist.

7.5 Toward a Solution

As we begin to grapple with the problems of the Social Security System, from the apparent inequities and inefficiencies to the long-term deficit, serious consideration is being given to two major reforms: separating the dual functions of social security and financing them separately, and raising average retirement ages. Separating the transfer component of the system (and funding it out of general revenues) would encourage more cost-effective transfers and enable us to strengthen the earned entitlement functions, which, in turn, would eliminate many inequities and help restore public confidence in the financial integrity of the system. Raising retirement ages would relieve much of the financial pressure on social security and make much sense in view of other labor force and demographic changes.

In what follows we have analyzed a series of long-run policy alternatives along these lines and have calculated the projected costs and benefits of each for workers of different ages. The age cohorts, cohorts 1 through 5, are ages twenty-five through thirty-four, thirty-five through forty-four, forty-five through fifty-four, fifty-five through sixty-four, and sixty-five and older, respectively. Those who are not yet twenty-five constitute cohort *X*. We have also calculated the implications of these alternatives with regard to the social security surplus or deficit to the year 2050. Basically, for each alternative, we ask two questions. First, what is the ratio of the present value of benefits an age cohort can expect to receive at age sixty-five to the accumulated value of its lifetime contribu-

tions to social security? Second, what is the present value of the resulting social security retirement deficit through 2050?

We have investigated these questions in terms of the following alternative plans:

1. The *Base Case* analyzes the Social Security System as it stands today.⁴
2. The *Trans* alternative reduces benefits to eliminate transfers for cohorts 2–5.
3. The *Trans 80* alternative eliminates transfers and adjusts taxes in 1980 to close the future deficit as of 1980. (Taxes were actually lowered by 1.5% of income.)
4. The *Tax 80* alternative raises taxes by 1.7% of income beginning in 1980 to close the future deficit as of that year.
5. The *Tax 2030* alternative raises taxes by 3.9% of income beginning in 2030 to close the future deficit as of that year.
6. The *Ret* alternative increases retirement ages an average of three years.

Thus these alternatives allow us to determine the effects of decreasing benefits by eliminating transfers, increasing taxes, and increasing the retirement age.

In all of these alternatives we consider only the old age insurance portion of the Social Security System. Thus we exclude taxes and benefits paid for disability, health, and part of survivor insurance. (The model *does* include the increased benefits paid to wives when their husbands die.) We will refer to the retirement insurance system as OASI, to distinguish it from OASDHI, which includes health and disability insurance.

In order to understand the basis of these calculations, it is important to consider the data on which they are based, the method of analysis used, and the assumptions upon which they rely.

7.5.1 Data

The data used in the calculations are the 1975 Social Security Exact Match File that merges individual records from the 1973 Current Population Survey (CPS) with OASI earnings and benefit records. With these data, the pattern of actual OASI benefits, as well as lifetime contributions into the system by all individuals, can be found. These data permit redistribution across cohorts to be separated from the annuity aspects and enable us to estimate values for individual households. Since the data used include only a sample of 5,000 individuals in each cohort, sample

4. Sensitivity of the Base Case estimates to various assumptions was also tested.

weights and populations statistics are used to generalize the sample results to the entire population. The weights are present in the file.

The data actually used in the analysis from the social security longitudinal earnings tape include the sum of covered earnings from 1937 to 1950, covered earnings from 1951 to 1975, estimated quarters of coverage from 1937 to 1950, and actual quarters of coverage from 1951 to 1975.

From the 1973 CPS, the following data were used: region, farm residence, age, sex, race, marital status, class of worker, occupation, industry, weeks worked in 1972 as a civilian, industry of longest civilian job in 1972, years of school completed, and wage and salary amount.

7.5.2 Method of Analysis

For cohorts 1–5 we determine the relation between the summation of aggregate contributions and the expected aggregate benefits of all individuals currently in the Social Security System, assuming in all cases but Ret that the retirement age is sixty-five for husbands and singles and that wives retire with their husbands.⁵ For an individual, the value of total contributions into the system at the point of retirement is the summation of actual and expected OASI taxes paid both by himself and by his employer compounded by a real rate of interest (3% in the base case). These calculations use actual and forecasted income, historical and forecasted maximum taxable income limits, and historical and forecasted tax rates.

The expected value of OASI benefits over the worker's remaining life is calculated considering the probability of survival and the wage index from *Social Security Bulletin, Annual Statistical Supplement, 1975*.⁶ Wives receive benefits based on their own or their husbands' benefits, whichever is larger. The entire analysis is converted to 1977 dollars.⁷

In order to determine the expected contributions for individuals who

5. A fraction of each cohort, those in noncovered industries or with insufficient quarters of coverage, are considered to be ineligible for benefits. Wives who do not qualify on their own or on their husbands' behalf receive no benefits. The retirement pattern can also be simulated by a retirement behavior equation, but these initial estimates are used to compare them with typical Social Security Administration assumptions.

6. The year of death for each individual in cohorts 1–5 was predicted using a random number generator and his or her probability of death at each age, conditional on race and sex. Individuals predicted to have died before reaching the age of sixty-five are excluded from the analysis of average net benefits, although their taxes are included in the general financing calculations. For cohort *X*, we used "average" men and women for each year-of-birth cohort, and reduced taxes and benefits in each year to account for the cumulative probability of death. We used an average life expectancy assumption to find the number of years that a wife in cohort *X* will collect widow's benefits. This assumption potentially adds a small bias in our calculations. Year-of-death predictions used *The U.S. Fact Book* (1978) for all ages less than sixty-five and ages sixty-five, seventy, and eighty. For ages not given, year of death was predicted interpolating from the 1969–71 death rates in National Center for Health Statistics (1975).

7. Benefits are increased by 17% for cohort 5 to adjust for the disproportionate number of widows, whose social security entitlements are not captured by the data.

have not yet reached the age of sixty-five, we applied the contribution rates specified in the 1977 amendments to the Social Security Act to known earnings and predicted future earnings for each individual. Earnings were predicted separately for males and females using an estimating equation based on positive 1972 earnings of all individuals in the sample. The predictions, determined from the estimated coefficients of the independent variables in the equation and the characteristics of the individuals, were indexed over time using 7% for inflationary earnings increases and the assumption of a 1.5% per year earnings increase due to productivity for the Base Case.⁸ Female income is adjusted for labor force participation.⁹

More formally, we “age” our survey data so that we know both the past work history and the projected future work history and retirement benefits for the sample population. Having done this we calculate the present value of each household’s total contribution at retirement (PVC_R^i). These are calculated as

$$PVC_R^i = \sum_{t=1}^R C_t^i \frac{1}{(1+r)^{R-t}},$$

where R is a given retirement age and r is the interest rate “credited” to a social security “account” under our pension plan analogue.¹⁰ In fact, all projected contributions and benefits are calculated so that they are the anticipated dollar amount times the probability of the individual surviving to that time.

We calculate the expected retirement benefits at age of retirement (PVB_R^i) as

$$PVB_R^i = \sum_{t=R}^N B_t^i \frac{1}{(1+r)^{R-t}},$$

where N is 100, beyond which the survival probability is taken to be zero.

Given that survival probabilities are already embedded in B_t and C_t , an actuarially fair system would be one where $PVC_R^i = PVB_R^i$. We define

8. The actual dependent variable used was the log of earnings. The independent variables include dummy variables for a southern location, rural location, race, the fact of being married, white collar status, service collar status, blue collar status, employment in an industry, self-employment, weeks worked, and level of education.

9. Female labor force participation was assumed to keep the same age distribution as in 1975, but to slowly increase for each age group until 2005. The rate increases 12.5 percentage points for each age group by 2005. (This is based on assumptions of the *1977 Annual Report of the Trustees of the Social Security System*.) Again, this is for comparison only. Future estimates will incorporate a separate female labor force participation equation.

10. We make the usual assumption that the employer component is borne by employees, and hence include the employer part of the payroll tax in estimating total contributions on behalf of a worker. Alternative incidence assumptions could be used, and the data adjusted accordingly. The result, of course, would be to “credit” less tax payment and to increase the size of transfers, as the share of employer contributions assumed paid by someone other than employees increases.

the expected present value of any transfer received by the participant as $T_R^i = PVB_R^i - PVC_R^i$.

The same type of analysis is performed for cohort X , which involves making several assumptions regarding the future.¹¹

After performing the analysis of taxes and benefits by cohort for various scenarios, we sum the results in order to determine the budget surplus or deficit that results from each scenario.

7.6 An Overall Comparison of Alternative Social Security Situations

Let us begin by examining some general measures of the overall situation for the OASI system under alternative scenarios. In particular, we consider aggregate taxes, benefits, and the deficit under alternative social security situations and, correspondingly, the total transfers and transfers as a percentage of income for alternative social security situations. The situations to be discussed include the Base Case, i.e. current law, including currently legislated but not yet implemented tax increases; the Base Case with a slightly lower rate of productivity growth; two situations in which the transfer component is eliminated and dealt with separately under general revenues, Trans 80 and Trans; and Ret, which increases the retirement age by three years. Table 7.1 presents estimates of the aggregate taxes, benefits, and resulting present value of the long-term deficit under these alternative scenarios. Recall that we are making *very conservative assumptions* with respect to the projected long-term deficit in considering the Base Case in order to try to maintain comparability, roughly speaking, with the assumptions made by the trustees of the Social Security System.

The Base Case is estimated assuming an annual rate of productivity growth of 1.5% per year and an annual inflation rate of 7% per year, and the total taxes and benefit are discounted at a real rate of 3% with all figures being presented in 1977 dollars. Thus, for the Base Case, we note that the total taxes amount to approximately \$3.3 trillion whereas total

11. The assumptions are as follows: (1) In terms of cohort size, actual population statistics are used for individuals born from 1953 to 1977. Estimates of size for 1978 to 2050 were made assuming that birthrates would decline from 1.7 to 1.65 in 1980 and then slowly increase to 2.1 in 2005. (2) Female labor force participation is assumed to keep the same age profile as in 1975 but to slowly increase for each age group until 2005. The rate increases 12.5 percentage points for each group by 2005. (3) Coverage by the Social Security System is assumed constant at 90%. (4) The percentage of women married is assumed constant at 93% on the basis of data from the *Statistical Abstract*. (5) Unemployment is assumed constant at 5%. (6) The mortality rates for each age group are assumed to remain constant. (7) Each couple is assumed to retire together at age sixty-five. (8) The wage is adjusted to account for the fact that *all* income used in the estimates is below the taxable limit since the wage equation and the Social Security Match Tape data are used. The adjustment is based on taxable/total ratio in 1977.

These assumptions are based on those of the *1977 Annual Report of the Trustees of the Social Security Administration*.

Table 7.1 Aggregate Taxes, Benefits, and the Deficit under Alternative Reforms

Case	Total Taxes ^a	Total Benefits ^a	Deficit ^a
Base	3,336.9	3,968.8	632.0
Base with productivity = 1.0%	2,839.6	3,570.5	731.0
Trans 80	2,798.6	2,656.5	-142.1
Trans	3,336.9	2,656.5	-680.3
Ret	3,500.9	3,345.6	-155.3

^aAll figures are in billions of discounted 1977 dollars.

benefits amount to about \$4 trillion. Again, recall that these figures are adjusted for inflation and discounted to 1977. With these assumptions, the estimated long-term deficit amounts to \$632 billion. Recall that this does not include the hospital and disability insurance programs, in which case taxes, benefits, and the deficit would all be substantially larger. This enormous deficit occurs primarily because of the changing age structure of the population, as noted above. When the baby boom generation starts to retire, we face the awkward prospect of an extremely large and rapid increase in the ratio of retirees to workers in our society. Even if the actuarial assumptions of the social security trustees are accurate—and we believe they are optimistic—we will have to raise social security taxes or lower social security benefits, or raise other tax revenues, or some combination of these options, by an enormous amount in the years ahead. This combination would have to amount to \$632 billion (discounted dollars) in 1977; if we wait for the baby boom generation to retire around the year 2030, the combination necessary will be between \$2.5 and \$3 trillion in 1977 dollars.

The estimated taxes, benefits, and deficit for the Base Case are very sensitive to the assumptions incorporated in making projections over the long term. Because of the importance of compounding even small differences in growth rates, even so small a difference as one-half of 1% in the rate of productivity growth increases the long-term deficit—holding other assumptions constant—by almost \$100 billion in present value terms. Table 7.1 demonstrates that, when the productivity growth assumption is lowered from 1.5% to 1% per annum, the Base Case results in a decreased tax revenue, again in present value discounted dollars of almost \$500 billion to \$2.8 trillion, and a reduction in total benefits by about \$400 billion from slightly under \$4 trillion to slightly under \$3.6 trillion. The recent behavior of productivity does not give us much cause for optimism for restoring a rapid rate of economic growth in our economy and does not augur well for the long-term deficit of social security.

Another assumption which is extremely important in the calculation of

taxes, benefits, and the deficit concerns the length of retirement. As noted above, early forecasts drastically underestimated how rapidly life expectancies would increase. In the 1960s and 1970s, the life expectancy increased about three years for women and one and one-half years for men. Simultaneously, there has been a rapid acceleration in the numbers of people taking early retirement. In 1948, one-half of males over age sixty-five were in the labor force; in 1980, only one-fifth of males over sixty-five are working. If life expectancy rises still further, the long-term deficit in social security will increase drastically. As a rough approximation, *increasing life expectancy and eligibility for social security benefits by an extra year would add about \$250 billion to the long-term deficit.* In view of the increased length of retirement periods (because of increased life expectancy and earlier retirement) and in view of the higher fraction of the population attending college and hence which is entering the labor force later and is shifting out of physically demanding and dangerous jobs, one major avenue of reform of social security would be to raise the age at which people could collect social security benefits. We simulated one such scenario: raising the retirement age from sixty-five to sixty-eight, or, more precisely, adding a maximum of three years to work-lives (which is obviously relevant only to those who survive to those ages). Under the assumptions of the Base Case for productivity growth, inflation, etc., such a move would result in a very modest increase in taxes from the additional years of work (about \$170 billion) but would result in a \$620 billion benefit decrease. *Note that this would be accomplished without decreasing the annual benefit received by any worker once retired.* The reduction in total benefits in discounted 1977 dollars would come about solely because people would be retiring later and hence would be collecting benefits for a shorter period of time. Such a reduction would more than offset the impending enormous social security deficit and the impending enormous tax increases that would be necessary under the current system above and beyond those already voted. Indeed, such a program in conjunction with the other assumptions noted above would leave social security with a surplus of over \$150 billion. An alternative scenario, raising the retirement age less rapidly and not quite as high, could still put the Social Security System into long-term balance. This scenario highlights the extreme importance of the length of the retirement period for the total benefits paid out and the long-term deficit of the system.

The long-term benefit payouts and tax collections, especially the former, are also extremely sensitive to the enormous percentage of transfer payments involved in social security benefits, especially for older current workers and retirees. Two other scenarios were simulated to analyze the removal of positive transfer payments: Trans and Trans 80. The Trans alternative removes the transfer component of benefits com-

pletely for cohorts 2-5. The negative transfers for cohorts 1 and X are maintained. The transfers are assumed to be shifted to general revenues in a manner to be decided once a genuine earned entitlement system is set up. We must note, however, that setting up a transfer payment system for the elderly to be funded out of general revenues may involve either increases in general revenue taxes or decreases in other projected government expenditures as well as the sharp reductions in payroll taxes and projected future payroll tax increases we are about to describe. Also, part of the reduced payroll tax revenue (about 20%) would be recouped automatically by increased taxes once the employer component of social security used to finance these transfers was no longer deductible from taxable income for other taxes. Under Trans, taxes will not go down at all, but total benefits will go down about one-third, from slightly under \$4 trillion to about \$2.7 trillion. This totally reverses the deficit picture from a two-thirds of a trillion dollar deficit to a two-thirds of a trillion dollar surplus discounted to 1977. Besides totally eliminating the need for future tax increases, the two-thirds of a trillion dollar surplus obviously could result in further deductions in social security taxes from *present* levels. It could also be used to finance transfer payments if we shifted total transfers into general revenue.

The Trans 80 alternative substantially reduces taxes as well as total benefits. Indeed, the total benefits would be treated exactly as under Trans. The difference is that tax revenues would be reduced substantially from 1980 on, leaving social security itself with a very modest surplus of \$140 billion.

This overall version of the total situation with respect to taxes, benefits, and the long-term deficit highlights not only the current extreme long-term deficit of the Social Security System as presently constituted, and the large tax increases above and beyond the 1977 legislated ones impending in view of the long-term deficit, but also the opportunities and possibilities for deriving a solution by separating the benefits paid to achieve the twin goals of social security: earned entitlement and income adequacy during retirement. It also highlights the extreme sensitivity of the long-term deficit, benefit payments, and tax receipts to such things as slower productivity growth and changes in the length of the retirement period. We might conclude this brief discussion by noting that the long-term future of social security is not something to be left to the long term to deal with. Every year we postpone dealing with the problem gives us one less year to generate a smooth transition to a more rational and cost-effective system of providing adequate income support for our elderly population.

To analyze the transfer component involved in social security at the aggregate level in a little more detail, we present in table 7.2 estimates of the total transfers and transfers as a percentage of total national income,

Table 7.2 Total Transfers and Transfers as Percent of Income under Alternative Reforms

Case	Total Transfers to Cohorts 2-5 ^a	Transfers as % of National Income
Base	1,818.8	4.7%
Base with productivity = 1.0%	1,746.3	5.3
Trans 80	72.3	.2
Trans	0	0
Ret	1,542.0	3.8

^aAll figures are in billions of discounted 1977 dollars.

under the same scenarios discussed above in conjunction with table 7.1. We estimate here that the total transfers to cohorts 2-5. For the Base Case under the standard (if optimistic) assumptions, total transfers to cohorts 2-5 would be \$1.8 trillion and amount to slightly under 5% of total national income! Placed in perspective, this is only slightly less than the share of income being devoted to defense expenditures. Some of the transfers to cohort 5 have been paid; the estimated remaining transfers amount to \$1.3 trillion.¹² Under the standard assumptions of the Base Case with our slightly lower rate of productivity growth, transfers decline slightly to \$1.75 trillion but increase the percentage of the now smaller income (arising from the lower productivity growth) to slightly over 5%. Obviously, under the Trans alternative total transfers have been eliminated completely and hence are zero in both the total and as a percentage of income; the Trans 80 alternative allows transfers to be paid for several additional years before taxes are adjusted (remember we start from a base year of 1977, since that is when our data end), and transfers would be virtually abolished in this case. Finally, we note that the increase in the retirement age for all cohorts after cohort 5 would substantially reduce transfer payments by about \$275 billion to cohorts 2-5 and reduce transfers as a percentage of national income by approximately 1 percentage point. These enormous amounts for total transfers to cohorts 2-5 reveal that fundamental changes in social security toward separating the transfer and annuity goals of the program would allow major changes in the social security tax structure.

7.7 Detailed Results for the Base Case

In order to present disaggregated figures concerning the benefits received, taxes paid, and transfers received by the *average* family of differ-

12. John Wolfe and Joseph Applebaum kindly pointed out our failure to separate out transfers already paid to retirees (from those remaining to be paid) in the earlier versions of this paper.

ent age and income, we will focus on the Base Case assumptions. Recall from the discussion above, however, that these assumptions may be somewhat optimistic and that slower productivity growth or increased retirement periods would add substantially to the taxes necessary to finance "promised" benefits. The Base Case simply ignores the long-term deficit and assumes that, despite the enormous long-term deficit, current workers will not be forced to pay any tax increases above and beyond those already legislated. Were part of the solution to the long-term deficit to *gradually* raise taxes above and beyond those increases already legislated, as discussed in the next section, current workers would have to bear substantially more of the burden than under the Base Case; indeed, younger workers would lose substantially with respect to social security. Under the Base Case, assuming that taxes would not be raised until the baby boom generation retires or later, almost all current workers come out fairly well in terms of their average net benefits above and beyond taxes paid plus interest, but workers under the age of twenty-five will ultimately be forced to finance such benefits.

Table 7.3 analyzes the Base Case for six different age cohorts: for current retirees (for simplicity, persons over sixty-five); for ten-year age groups (twenty-five through thirty-four, thirty-five through forty-four, forty-five through fifty-four, and fifty-five through sixty-four); and for cohort *X*, persons under the age of twenty-five. (Family age is defined as the age of the husband.) The situation of a family of each age category is depicted in terms of the average tax paid per family, the average benefit received per family (the difference between benefits and taxes), and the

Table 7.3 Base Case

	Cohort 5 (65+)	Cohort 4 (64-55)	Cohort 3 (54-45)	Cohort 2 (44-35)	Cohort 1 (34-25)	Cohort <i>X</i> (<25)
Average tax per family	\$7,058	18,345	33,883	53,326	73,843	
Average benefit per family	\$49,400	47,639	56,600	66,321	73,577	
Average net benefit per family	\$42,343	29,294	22,718	12,994	-267	
Average net benefit as % tax per family	600.0	160.0	67.0	24.4	-.36	
Total taxes paid by cohort (billions)	\$172	235	349	389	540	1,500+
Total benefits paid to cohort (billions)	\$1,282	629	570	483	503	
Transfers as % of total benefits	86.6	62.7	38.8	19.4	-7.39	

Notes: Assumes 7% inflation, 1.5% productivity growth, 3% discount. For eligible survivors only. Ages of cohorts are given as of 1977.

average net benefit as a percentage of the taxes the family paid. Also tabulated are the total taxes paid by the cohort and the total benefits paid to the cohort when they ultimately retire under current estimates, as well as the transfers as a percentage of total benefits received by the cohort when they ultimately retire.

There are a variety of important points illustrated by the Base Case. First, the average tax per family, adjusted for inflation and discounted to the husband's year of retirement, will increase markedly as time goes by and hence is much higher for younger workers than older workers or current retirees. This occurs for a number of reasons: some of the retirees will not have paid taxes through their entire lives; the tax rates actually paid and taxable ceiling used for each year have been growing through time and hence the annual taxes paid have been growing through time and will continue under current law. The average tax paid in 1977 dollars adjusted for inflation will be 10 times as high for twenty-five through thirty-four year olds as for people currently retired.

Benefit payments increase much less rapidly through time; hence, as we get to younger ages, net transfers become negative. Current retirees and persons soon to retire will receive benefits based not so much on what they paid in taxes but on an estimate of what the current tax revenue will support. Since current tax revenues are levied at a higher rate and on a larger income base than were taxes collected from the current retirees and those soon to be retired, their benefits are obviously much higher than the taxes paid plus interest. Therefore twenty-five through thirty-four year olds will receive only about one-half again as much in the real 1977 value of benefits once they retire as do current beneficiaries (those sixty-five and older). Again, recall the Base Case ignores possible changes in life expectancies or retirement patterns. Differencing the benefits and taxes reveals the very large net benefits, or transfers, received by current retirees and those about to retire. The average current retiree receives about \$42,000 as a net transfer from the taxes paid to the Social Security System by current workers. This amounts to 6 times what these people on average paid plus interest. An average family in the next cohort, the fifty-five through sixty-four year olds, will receive back as a transfer payment 1.6 times what they paid in plus interest, a total of slightly over \$30,000. The average net benefit, or transfer, declines for progressively younger ages both in absolute amounts and still more rapidly as a percentage of tax paid per family, since the latter will rise rapidly. By the time we get to younger workers (ages twenty-five through thirty-four), they are actually losing in terms of the taxes paid plus interest being less than the average benefits they can expect to receive. Persons under the age of twenty-five will suffer a loss under the current calculation. Because of the untenable state of the long-run deficit, the current calculation is unrealistic for this young cohort and their actual loss will probably be much larger. The total taxes paid and benefits received

by each cohort follow the obvious pattern: taxes rise substantially as we pass through time. Again, these tax amounts *do not include any increases* that must be voted if we are to close the long-run deficit by increasing taxes rather than decreasing benefits or by adopting one of the structural reforms suggested below. Transfers as a percentage of total benefits follow a pattern similar to those for the average family. The overwhelming bulk of benefits are transfers for current retirees; for the next cohort about 60% will be transfers; for the forty-five through fifty-four age cohort slightly under 40% will be transfers; transfers will eventually vanish and become negative as we reach the younger cohorts. Obviously, for ages under twenty-five there will be a large negative transfer. Also, the transfers as a percentage of total benefits will decrease for all age cohorts not currently retired if we start to raise taxes now in anticipation of closing the deficit. The time pattern of such tax increases will be reflected in differential rates of reduction of the transfers as a percentage of total benefits for the different age groups. In the extreme, if we wait until the baby boom generation retires, transfers as a percentage of total benefits will be an extremely large negative number for those currently under the age of twenty-five.

Table 7.4 takes a deeper look at the net transfers from social security

Table 7.4 Net Transfers by Income Class

	Income Class ^a			
	<6,000	6,000–8,000	8,000–10,800	10,800 +
Cohort 1				
Net benefits ^b	5,972	3,505	2,267	–1,923
% break ^c	8.1	4.9	3.1	–2.5
Cohort 2				
Net benefits	15,700	15,586	13,185	11,054
% break	26.7	23.4	20.4	16.3
Cohort 3				
Net benefits	24,519	25,645	24,170	20,733
% break	50.1	46.7	44.5	35.1
Cohort 4				
Net benefits	30,446	30,224	29,432	30,292
% break	69.2	64.3	61.3	57.8
Cohort 5				
Net benefits	39,376	36,587	39,671	42,476
% break	87.6	80.0	81.0	75.3

Note: Base Case with inflation = 7%, productivity = 1.5%, discount rate = 3% net of inflation.

^aIn 1977 dollars, for head of household only.

^bNet benefits = benefits for average family in income class, where both survive to retirement, in 1977 dollars, discounted to year of retirement, less taxes paid computed analogously.

^c% break = net benefits ÷ benefits paid.

received by individuals in the different cohorts. We examine net benefits received and the percentage break (net benefits divided by total benefits) for four different income classes. For each cohort, we note that the percentage break declines rapidly as income increases. For example, for the cohort twenty-five through thirty-four years old the percentage break goes from slightly over 8% for families with incomes under \$6,000 to -2.5% for families with incomes above \$10,800. Again, for cohort 5, the current retirees, the percentage break declines from 87.6% to 75.3% as we move up the income scale. This particular feature of the relation between the percentage break and income reflects primarily the progressivity of the benefit payment formula, which is tilted heavily toward replacing a larger fraction of preretirement income for low-income workers than for higher-income workers. Of course, the total net benefits may be slightly larger for some cohorts for higher-income people, reflecting the interaction of the larger intergenerational transfer and the larger tax payment which higher-income individuals make.

Finally, in examining the Base Case, we take a look at one other type of transfer as a percentage of benefits paid: disaggregating by industry of employment (table 7.5). Transfers as a percentage of benefits paid vary substantially across industries for a number of reasons: the different average income earned by workers of different industries, the slightly different tax treatment in effective payroll tax rates because of differential proportions of workers above and below the taxable ceiling, etc. It is important to note that once again the substantial net transfer to current retirees and expected net transfers to the oldest cohorts of workers will turn negative for the youngest cohorts. These negative transfers will

Table 7.5 Transfers as Percent of Benefits Paid for Selected Industries by Cohort

Industry	Cohort				
	1	2	3	4	5
Agriculture	-1.1	14.9	40.9	57.7	80.0
Mining	-42.1	-10.1	5.1	39.5	NA
Construction	-37.9	-18.5	11.3	43.8	70.2
Manufacturing	-27.3	-6.3	17.3	46.8	64.5
Transportation/ communication	-24.1	-16.4	24.4	48.5	69.0
Wholesale	-31.7	-4.2	17.6	38.1	69.4
Retail	-9.2	14.7	41.4	58.4	82.5
Service	3.8	21.4	41.5	62.8	83.5
Banking, insurance, real estate	-19.4	9.3	28.7	51.3	79.3

Note: Estimates are for average individual in each industry.

occur even without considering the large tax increases necessary to finance the impending long-run deficit.

With these insights into the current social security situation in mind, we turn to a brief discussion of the alternative scenarios mentioned above.

7.8 Disaggregated Estimates for Alternative Reform Possibilities

We have calculated, for a series of potential benefit and tax reforms, disaggregated estimates of average taxes per family, average benefits per family, average net benefits per family, average net benefits as a percentage of taxes per family, total taxes paid and benefits received by each cohort, and transfers as a percentage of total benefits for each cohort.

The first alternative considered is that labeled "Trans" (see table 7.6). Recall that this eliminates all transfers to cohorts 2–5 and sets up a situation where transfers would be treated separately under general revenues if so desired. In this scenario, we note the familiar pattern of the average taxes paid per family rising substantially as we move to younger and younger cohorts. We note the same pattern for average benefits. However, now a different pattern emerges for the average net benefits received per family. In this case the average net benefits are virtually zero for all age cohorts. They differ slightly because we have not constrained the transfer to be zero for each cohort in each case, but have reduced the aggregate benefit payout each year to eliminate the transfer. Once again, the total taxes paid and total benefits received by each cohort increase

Table 7.6 Trans

	Cohort as of 1977					
	5	4	3	2	1	X
Average tax per family ^a	7,058	18,345	33,882	53,326	73,843	
Average benefit per family ^a	6,629	17,793	34,769	53,461	73,576	
Average net benefit per family ^a	-429	-552	886	134.9	-267	
Average net benefit as % tax per family	-6.07	-3.01	2.62	.25	-.36	
Total taxes paid by cohort (billions) ^a	172.1	235.0	349.4	389.0	539.6	1,500+
Total benefits paid to cohort (billions) ^a	172.1	235.0	350.4	389.0	502.5	
Transfers as % of total benefits	.01	-.01	.29	0	-7.39	

^aIn 1977 dollars.

Table 7.7 Trans 80

	Cohort as of 1977					
	5	4	3	2	1	X
Average tax per family ^a	7,045	17,818	31,368	47,729	64,409	
Average benefit per family ^a	6,629	17,793	34,770	53,461	73,577	
Average net benefit per family ^a	-415	-24.6	3,401	5,732	9,168	
Average net benefit as % tax per family	-5.89	-.14	10.84	12.0	14.23	
Total taxes paid by cohort (billions) ^a	171.6	228.8	324.6	349.0	470.0	
Total benefits paid to cohort (billions) ^a	172.1	234.9	350.4	389.0	502.5	
Transfers as % of total benefits	.25	2.60	7.36	10.28	6.46	

^aIn 1977 dollars.

substantially as we go to younger and younger cohorts and net to approximately zero in the aggregate for each cohort.

Moving from Trans to Trans 80 (table 7.7), which you recall involves a tax cut as well as eliminating the transfers, yields a very similar pattern to that discussed above for Trans; indeed, the benefits received by the average family in each cohort are identical to the situation under Trans, as are the total benefits paid out to each cohort. However, now the taxes differ somewhat to take account of the modest surplus that would result by eliminating all the transfers. In this case the average taxes per family are somewhat lower for each cohort, decreasing progressively more in percentage terms for younger and younger age cohorts. The total taxes paid per cohort follow the same pattern.

Table 7.8 presents the same analysis under the Base Case assumptions for the scenario we label "Ret" to indicate retirement ages raised by three years on average. As noted before, Ret results in a situation in which slightly higher taxes will be paid by the younger cohorts because they will be working slightly longer, and the benefits received, while maintainable at the same annual level, will be paid out over a somewhat shorter period.¹³ Therefore the aggregate benefits and the average benefits will decline relative to the Base Case; we present estimates of benefits discounted to the original retirement age and note the decline in absolute

13. A Ret-type reform could be phased in: The retirement age could be increased to sixty-seven or sixty-eight gradually, before the baby boom generation reaches retirement age, by delaying the age of eligibility for benefits a month per year, for example. This would avoid problems of changing the rules abruptly for those soon to retire or just retired.

Table 7.8 Ret

	Cohort as of 1977					X
	5	4	3	2	1	
Average tax per family ^a	6,459	20,582	36,885	57,328	77,680	
Average benefit per family ^a	45,208	43,319	51,087	59,284	64,079	
Average % Reduction relative to Base Case	8.5	9.0	9.7	10.6	12.9	
Average net benefit per family ^a	38,750	22,737	14,202	1,956	-13,601	
Average net benefit as % tax per family	600	109.04	38.50	3.41	-17.51	
Total taxes paid by cohort (billions) ^a	172.1	236.6	355.7	382.3	508.4	
Total benefits paid to cohort (billions) ^a	1,282.2	525.7	465.4	395.3	396.7	
Transfers as % of total benefits	86.58	55.0	27.88	3.29	-28.18	

Note: Values listed here are conditional on our standard assumption of the continuation of current life expectancies.

^aIn 1977 dollars.

and percentage terms. For example, the twenty-five through thirty-four year old cohort loses about \$9,500, or 13% of average family benefits relative to the Base Case estimates presented in table 7.3. Remember, however, that the benefits calculated in the Ret scenario are *feasible* because the long-term funding deficit has been closed. The Base Case benefit calculations ignore the funding problem and hence are *not feasible* without tax changes. We note again that the average net benefit per family declines with age from \$38,000 for current retirees to virtually zero for people now forty to a large negative number for people now around the age of thirty. The same is obviously true of average net benefits as a percentage of taxes per family. We note, however, that the total benefits received by each cohort will decline substantially with the later retirement. This decline becomes progressively more important as we approach younger age cohorts and reflects the importance of doing something about the long-term deficit as soon as possible, before enormous implicit obligations, which are currently unfunded, become cemented in place and we are forced to go to enormous tax increases to fund them.

This point is vividly documented by comparing Ret with the two tax scenarios: Tax 80, a small tax increase now (above those already legislated to take effect in the future), which will totally close the deficit; and Tax 2030, a large tax increase to finance the baby boom generation's

Table 7.9 Tax 80

	Cohort as of 1977				
	5	4	3	2	1
Average tax per family ^a	7,074	18,966	36,839	59,907	84,935
Average benefit per family ^a	49,400	47,640	56,600	63,321	73,576
Average net benefit per family ^a	42,327	28,674	19,761	6,414	-11,358
Average net benefit as % tax per family	598.3	151.2	53.64	10.71	-13.37
Total taxes paid by cohort (billions) ^a	172	237	378	440	605
Total benefits paid to cohort (billions) ^{a,b}	1,297	614	592	485	516
Transfers as % of total benefits	87	61	36	9	-17

^aIn 1977 dollars.

^bThese values differ slightly from the Base Case because a smaller sample size was used in this calculation.

retirement in the year 2030. Estimates for the latter two alternatives are contained in tables 7.9 and 7.10, respectively. Recall that these refer to the increases necessary to cover the OASI deficit only; the Disability Insurance and Health Insurance deficits would add considerably to the totals. The average tax paid and average benefit received per family look rather similar to the Ret case; the average net benefits differ somewhat. What is most important is the large difference in the total benefits received by each cohort as part of the Social Security System and the total social security taxes paid for each cohort. Under Trans, Trans 80, or Ret, the benefits are reduced in the Social Security System either directly or indirectly, and the total benefits paid to each cohort are much lower than if the implicit unfunded obligation involved is paid. The total benefits paid to younger cohorts differ enormously under the Tax 80 and Tax 2030 programs, as do the taxes paid. For example, while the total benefits paid to each cohort are identical under Tax 80 and Tax 2030, the time patterns and hence aggregate amounts of taxes paid by each age cohort differ substantially. The aggregate taxes paid by current retirees and by workers aged fifty-five through sixty-four are virtually identical under these two scenarios. By the time we get to the thirty-five through forty-four year olds, Tax 80 has this cohort paying \$50 billion more in social security taxes than if we wait until after they retire to raise the tax rates in order to finance the unfunded deficit. For those aged twenty-five through thirty-four the difference amounts to \$80 billion! This highlights the importance

Table 7.10 Tax 2030

	Cohort as of 1977				
	5	4	3	2	1
Average tax per family ^a	7,058	18,346	33,883	53,326	73,843
Average benefit per family ^a	49,401	47,640	56,600	66,321	73,576
Average net benefit per family ^a	42,343	29,294	22,717	12,994	-267
Average net benefit as % tax per family	600	159.68	67.05	24.37	-.36
Total taxes paid by cohort (billions) ^a	167	230	349	393	526
Total benefits paid to cohort (billions) ^{a,b}	1,297	614	592	486	516
Transfers as % of total benefits	87	63	41	19	-2

^aIn 1977 dollars.

^bThese values differ slightly from the Base Case because a smaller sample size was used in this calculation.

of choosing a time frame for dealing with the long-term funding problems of social security. Choosing to do nothing about this implies that we are trying to stick younger and younger generations with the bill. Will they be willing to finance future retirement payments at much higher tax rates than now exist?

In summary, we may note the variety of potential strategies for disentangling the severe problems that high and rising social security taxes and dual-purpose unrationalized benefits create. We can simply say that we are going to raise taxes by substantially more than those legislated in the 1977 amendments either currently (Tax 80) or in the distant future (Tax 2030), and try to shift around the burden of paying for these increased social security benefits, which are not currently funded, or we can try to rationalize the benefit payments by separating out the transfer and annuity goals of the system, strengthening the earned entitlement function and having a separate transfer payment program funded by general revenues at whatever level is deemed socially desirable. The latter alternatives exist under Trans and Trans 80, and are easily combined with a slight increase in the retirement age as in Ret. These different scenarios suggest not only that there will be an enormous long-run impact on our overall economy depending upon which of these types of avenues we pursue, but that different groups in the population will be taxed and benefited quite differently depending upon which of these alternatives we select. It is time for a fundamental refocusing of social security to rationalize the

benefit structure and relieve the long-run burden of the much higher payroll taxes implicit in the unfunded deficit. This paper is the first of our social security simulation model projections. Subsequent work will deal with other issues (e.g. alternative indexing possibilities). We hope to stimulate discussion as well as provide some quantitative estimates of the taxes, benefits, and deficit implied by alternative potential solutions to the long-run social security funding problems.

7.9 Further Work Completed

Since the original version of this paper was written, the Social Security Administration 1980 trustees' annual report was issued with considerably altered assumptions in their intermediate and pessimistic Base Case scenarios. Therefore we have recalculated a variety of the aggregate tax, benefit, and deficit totals, and discounted them back to 1980 under the assumptions used by the Social Security Administration 1980 trustees' annual report. These results are summarized in table 7.11. In all cases, "intermediate" refers to the intermediate assumptions of the trustees and "pessimistic" refers to the pessimistic assumptions of the trustees. The major differences between the 1980 assumptions and those made previously are a slower rate of productivity growth, higher inflation in the pessimistic case, lower fertility rates, higher unemployment in the short term, and a lower discount rate.

The general nature of the results conforms closely with those reported earlier in our paper—obviously, however, updated to 1980 from 1977 dollars. For example, the intermediate base projection reveals a deficit of slightly under \$1 trillion in the social security retirement system; the pessimistic assumptions reveal a real 1980 deficit of almost \$1.5 trillion. Because the Social Security Administration trustees have chosen to use lower discount rates in reporting results in their 1980 report, we also present in rows 3 and 4 the same estimates using our earlier 3% real discount rate; this reduces the present values of the deficit to about two-thirds of those just reported. The other major findings remain qualitatively unchanged: Raising the retirement age to sixty-eight runs a modest surplus under the intermediate assumptions and nearly eliminates the deficit under the pessimistic one. Eliminating the transfers runs large surpluses, but such a scenario, of course, would have to be supplemented by an expanded income security program for the elderly, which would probably more than make up for the difference. Raising taxes in 1980 or in 2030 to close the deficit over the entire period 1980–2050 would require, in the four cases considered, tax rate increases above and beyond those already legislated of 1.6 and 2.4%, in the intermediate and pessimistic scenarios beginning in 1980; and 7% and 12% under these two scenarios in the year 2030.

Table 7.11 Aggregate Taxes, Benefits, and the Deficit under Alternative Reforms

Cases	Total Taxes	Total Benefits	Deficit
Base intermediate	5,125	6,045	920
Base pessimistic	5,231	6,700	1,468
Base intermediate, 3% discount	4,293	4,878	584
Base pessimistic, 3% discount	3,998	4,868	866
Retirement at 68, intermediate	5,394	5,032	-363
Retirement at 68, pessimistic	5,526	5,571	46
Eliminate transfer, intermediate	5,125	4,741	-384
Eliminate transfer, pessimistic	5,231	5,168	-63
Taxes raised 1980, intermediate	6,045	6,045	0
Taxes raised 1980, pessimistic	6,692	6,699	7
Taxes raised 2030, intermediate	6,045	6,045	0
Taxes raised 2030, pessimistic	6,698	6,699	1

Note: All figures are in billions of discounted 1980 dollars.

As can be seen, the assumptions of the Social Security Administration trustees are becoming slightly more pessimistic, and hence the problems discussed in this paper are, if anything, becoming more and more acute.

7.10 Induced Retirement

All the estimates made thus far conform in their assumptions to those usually made by the Social Security Administration trustees, for example, those that pertain to labor force participation, retirement behavior, etc. It is possible, and indeed in some cases desirable, to build *behavioral* simulations into the model that will account for econometric evidence on these decisions. Since the real level of social security benefits is scheduled to increase substantially as time goes on through the use of wage, as opposed to price, indexing of the formula calculating the initial benefits, any response of retirement behavior to increases in real social security benefits should be taken into account in analyses of the type performed above. As a first step in this direction, we have overridden the Social Security Administration's retirement assumption with a series of retire-

ment probability equations taken from Hurd and Boskin (1981). These retirement probability equations were estimated from data which merged the Longitudinal Retirement History Survey with social security earnings histories. The reader is referred to that paper for a detailed discussion of the estimates. The only point we wish to make here is that in that paper substantial evidence is presented for the hypothesis that increases in the real level of social security benefits increase the probability of retirement for persons aged sixty to sixty-five. Using the elasticity of estimates of the probability of retirement in combination with the scheduled increases in real social security benefits, we have made some calculations about the reduction in working years that will probably result from the Social Security benefit increases and therefore about the decreases in tax revenue and increases in benefit payments that might ensue. We have arrived at the following estimates of the deficit including the Hurd and Boskin (1981) induced retirement response (in 1980 dollars):

Intermediate assumptions	\$1,051 billion
Pessimistic assumptions	\$1,688 billion

We predict that, in the period 1980–2050, 116 million fewer person years will be worked, an average decline of 1.5 work years between the ages of sixty and sixty-five for a male who becomes sixty in the year 2030. The weighted average elasticity of the *annual* probability of retirement during these age intervals, given that people had not retired previously with respect to real social security wealth (the real present value of expected social security benefits) is slightly over 1. As can be seen from the figures above, the deficit increases by approximately 14% in both the intermediate and pessimistic cases.

While these are not enormous figures, it is clear that substantial increases in social security benefits can lead to substantially earlier retirement, and our figures should really be taken as a lower bound, since they truncate at age sixty. There could also be an induced retirement at still earlier ages, which we have not taken into account.

Our conclusion is simply that behavioral responses for a variety of types of behavior, especially retirement, induced by changes in the social security law, or by intergenerational transfers which are not offset through private means, may well be important enough to include in analyses of social security reform proposals. Certainly, ignoring such induced retirement effects appears to lead to a nontrivial underestimate of the deficit.

Further work, on both retirement and other behavioral decisions, will enrich the model considerably and will be the subject of future research.

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Comment Henry Aaron

The paper by Boskin, Avrin, and Cone contains three distinct themes. First, it provides estimates of the aggregate long-run deficit and examines particular modifications in the structure of social security that would, among other things, close the long-run deficit in the system. Second, it simulates how the social security system affects workers belonging to different cohorts and with different earnings. Third, it simulates the distributional differences among various methods of correcting the long-run deficit in the social security system. In all cases the paper focuses on the long-term financial condition of the system; it wholly lays short-run issues to the side. So shall I.

In my comments I shall try to show that the paper does an admirable job of revealing the large differences in how the various proposed changes to the current system will affect different cohorts, but that it does not deal satisfactorily with the first two issues.

Background

I begin my comments with a description of the elements of the social security system, knowledge of which is necessary for reading this paper.

The system is financially self-contained. Revenues come from a proportional tax on earnings below a legislated maximum in covered employment. With the exception of three recent ad hoc adjustments, this max-

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imum rises at the same rate as do money earnings. The benefit structure is progressive—in the sense that the elasticity of benefits with respect to average earnings at each point in time is less than 1.

As under defined-benefit pensions, workers employed during a period when the system is being liberalized are the beneficiaries of “past service credits” (the Social Security Administration term) or “immaturity benefits” (my term). Boskin, Avrin, and Cone use the term “transfer benefits” to denote any benefits greater than those that could be paid from the accumulation of employee and employer taxes compounded at a real interest rate of 3%. When one is looking at cohorts of workers, transfer benefits are equal to the past service credits or immaturity benefits enjoyed by that cohort. When one is looking at particular workers, transfer benefits include not only immaturity benefits but also additions to or subtractions from benefits attributable to the progressive benefit formula.

The use of the single term “transfer benefits” confuses two distinct analytical and policy questions regarding social security: what to do about the debt resulting from the payment of past service credits to past, present, and future social security beneficiaries, and what to do about the “tilt,” or degree of progressivity, in the social security benefit formula. I believe that this confusion, in the end, detracts from the relevance of the paper to debates about how social security should be changed.

In addition to having a progressive benefit formula and awarding past service credits, social security also bases benefits on family circumstances. Extra benefits are paid to certain relatives of entitled decedent, retired, or disabled workers.

The social security system will be in surplus for the next twenty-five years (counting from 1980), balance for the next fifty years, and deficit for the seventy-five year planning horizon which Congress has stipulated for social security.¹ Over the next twenty-five years, according to the latest estimates of the actuaries, the social security system (OASDI) will be in surplus by 1.27% of payroll against an average cost of 10.67% of payroll, a surplus of 11.9% of cost. Over the next fifty years, the social security system will be in surplus by a smaller amount. Over the seventy-five year horizon, the deficit is 0.93% of payroll or 7.1% of the average cost of 13.17%; this deficit clearly is confined during the third twenty-five year period, running from 2030 to 2054, during which time the deficit is 3.39% of payroll on an average cost of 15.79%, for a deficit of 21.5%.²

1. The authors correctly disregard the short-term financial problems of social security, because the issues are quite unrelated to the long-term issues.

2. The social security trustees, operating on the premise that if projections based on three sets of assumptions (the practice before 1981) are useful, projections based on five should be marvelous (the practice in the 1981 trustees' reports), have provided a confusing array of alternative projections. The text estimates are projections II-A from the 1981

What the Authors Do

Boskin, Arvin, and Cone take as their starting point the fact that currently legislated payroll taxes are insufficient to pay for currently legislated social security benefits throughout the seventy-five year period over which Congress has determined that the calculations of financial soundness of the social security system shall be evaluated. According to estimates described below, the present value of this deficit is large: \$632 billion. The authors note that this deficit can be eliminated by benefit reductions or by increases in taxes dedicated to social security. The bulk of the paper consists of an analysis of the effects on several cohorts of five possible legislative changes in benefits and taxes. The authors calculate the expected present value of taxes and benefits for each of six age cohorts. They use a 3% real interest rate and assume that real wages grow 1.5% per year.³

The technique of the simulation is as follows. The authors generate earnings histories for workers of different ages based historically on the 1975 Exact Match between social security records and the Current Population Survey and prospectively from wage regressions. The methods used in estimating future wages are not clearly presented and could not be even approximated from the description contained in the paper.

Then the authors say that they calculate the payroll taxes that would be paid by a worker with such an earnings history and the benefits that such workers could expect to receive taking account of expected mortality. The authors do not state what tax schedule or benefit formula they use. They make a number of simplifying assumptions about relative ages and labor force behavior of husbands and wives. They accumulate payroll taxes at 3% real interest to age sixty-five, discount expected retirement benefits at the same real rate to age sixty-five, and deflate the difference to 1977 dollars. They sum these differences within and across cohorts. They disregard workers who die before age sixty-five, and they ignore all benefits other than retirement benefits paid to workers and spouses or survivors' benefits paid to the spouses of retirees. In other words, they disregard all benefits paid on behalf of workers decedent before age sixty-five and all benefits paid to children and other relatives of retirees except spouses.

The policy alternatives that the authors explore flow from their belief, stated in congressional testimony that the redistribution that occurs

trustees' report. Projection II-B, which employs more pessimistic but not implausible assumptions, shows a seventy-five year deficit of 1.82% of payroll on a total cost of 14.07%, a 12.9% deficit.

3. The authors assume that inflation proceeds at 7% per year, but because of the indexing features of social security, the results should be quite insensitive to variations in the assumed rate of inflation.

within the social security system is hidden and excessive and that the increase in life expectancy experienced in recent decades justifies increases in the age at which unreduced benefits may be claimed. I shall return to these judgments later.

The first policy alternative—Trans—would pay benefits to workers age thirty-five or older equal in present value only to the accumulated value of payroll taxes paid by them or by their employers, plus interest. Workers younger than thirty-five would be treated as they are under current law. Thus older workers would be denied past service credits or immaturity benefits to which they are entitled under current law, and the benefit formula would be converted from one that is progressive with respect to average covered earnings into one that is proportional with respect to taxes paid.

It is clear to me that such a change has no practical interest whatsoever as a guide to policy. It changes the rules of the game for older workers, inflicting benefit reductions as large as 87% for workers over age sixty-five and 63% for workers age fifty-five to sixty-four, while leaving benefits of workers under thirty-five unaffected. That would mean reducing the average benefit paid to newly retired workers in August 1980 from its actual level of \$361.77 per month to \$47.03 for workers sixty-five or older and to \$133.85 for workers fifty-five to sixty-four.

Having been confronted by a solid phalanx of fourteen bipartisanly hostile congressmen when I testified on behalf of the comparatively tame proposal to tax half of social security benefits, I would relish sitting in the audience when the authors testified on behalf of *this* proposal—but I would not want my children to witness the carnage.

In fact, I trust, the authors do not really regard such a change as sound policy. Rather, it is an effective device to use in a simulation exercise to illustrate the size and distribution of immaturity benefits. They are the dominant portion of benefits for the oldest cohorts, are a diminishing fraction for younger cohorts, and turn negative for the youngest workers, who are assumed to spend their entire working lives under a single system. The negative value of social security for the youngest cohorts is a frequent, but misleading finding, and I shall comment on it below.

The second policy alternative—Trans 80—is similar and tells much the same story. Under this alternative all workers would be paid benefits equal to the accumulated value of taxes plus interest, and taxes would be raised sufficiently—1.5 percentage points in the authors' calculations—to bring the system into long-term balance. This simulation yields essentially the same results as the preceding one because the major difference is that the system is also changed for the youngest cohorts, but that change matters little because they do not receive immaturity benefits of any size anyway.

Two other alternatives—Tax 80 and Tax 2030—leave benefits unchanged but increase taxes sufficiently to eliminate the long-term deficit.

The first increases payroll taxes by 1.7 percentage points in 1980, the second by 3.9 percentage points in 2030.

The final policy change—Ret—adds a maximum of three years to the working lives of every worker. In contrast to the elimination of immaturity benefits for some or all workers, this change reduces benefits for all classes of workers—by 8.5 to 13% for different cohorts.

Critique

The method of analysis used by Boskin, Avrin, and Cone is an entirely appropriate way to answer a particular question. That question is, Will a particular worker, with a particular assumed earnings history and family arrangements, get cash benefits worth more or less in present value terms than the taxes he and his employer pay? This question is frequently asked, and it is of some interest; but I do not believe that it is the right question to ask about the equity of the social security system, and it is not the question that the authors attempt to answer. The authors ask how social security affects particular cohorts of workers, and for this question their methods are inadequate.

Rates of return. In judging whether social security provides particular workers with a fair or an unfair return, it is important to include the value of insurance protection that does not actually lead to cash payments. We all know that private insurance entails selling costs and profits that together form a wedge between the present value of premiums and the present value of cash benefits actually paid, the so-called load factor. The fact that such a load factor exists and often is sizable does not prove that insurance is a bad buy. In fact, people continue to buy fire and health insurance, despite the fact that such load factors assure them that they will get back less, on the average, than they paid in, because insurance provides valuable protection against risk, even when the feared eventuality does not occur. The individual who never makes a claim under his fire insurance may be very well served, although the present expected value of claims by all people so insured is less than the sum of all premiums (because of the load factor). Furthermore, social security, alone among all assets, provides covered workers full protection against inflation risk and capital market risk caused by variations in interest rates. Thus, in order to calculate whether social security is a good buy or not, one should calculate (a) the present expected value of benefits *prospectively* taking account of the probability of various outcomes, and (b) the value of the insurance protection, including certain unique features of social security, such as complete protection against both inflation and capital market risk attributable to variations in interest rates. Thus, for the purpose of deciding whether social security is a good or a bad buy for individual workers, a proper calculation must be done prospectively and it must take account of the utility value of reduced risk.

The authors of this paper take a retrospective look, and they disregard the value of social security as insurance. For this reason, their estimates say little about whether social security is a good or a bad buy for individual workers except in those cases where benefits so clearly exceed taxes that there can be no room for quibble.

The authors, however, do not look at individual workers (except briefly, in tables 7.4 and 7.5). Rather they look at cohorts and at the system as a whole. If one is interested in calculating the value of social security for cohorts, however, the same considerations arise as for individuals. The value of social security to today's twenty-five to thirty-four year olds consists of the expected value of benefits that they will receive as retirees or that their dependents or survivors will receive as a result of their retirement or death, plus the utility gain from reduced risk. As noted above, the authors do not attempt such estimates. The value of social security should include the value of protection against inflation and capital market risk and the insurance protection against various contingencies. It has been estimated, for example, that indexed bonds would sell at real interest rates much below those on ordinary bonds of similar maturity. Until such time as we enable other insurers to provide fully indexed benefits by issuing index bonds or by some other device, this important attribute of social security should figure prominently in evaluating whether it is a good or a bad buy for cohorts.

The negative value of social security for the youngest cohorts reported in this study results (disregarding the crudity of the estimates) from the absence of immaturity benefits and use of a 3% real interest rate. The authors do not justify this rate. The Social Security Administration assumes a real interest rate of 2.1% after 1995 and less before. They do not justify that rate. I suspect that relatively few individual investors have earned real net (or even gross) of tax returns of as much as 3% lately on their portfolios. The old natural constant of 3% may reassert itself, but analysts should tell potential social security beneficiaries how they can earn such rates before they use them to discount streams of benefits and taxes.

If we disregard past service credits, we all know from Samuelson that the steady-state rate of return to pay-as-you-go social insurance is the sum of the rates of growth of population and real wages. We are not in a steady state; but all that the negative present value calculations of the authors show is that 3% exceeds the appropriate weighted implicit rate of growth of population and real wages. It is worth comparing the results of Boskin, Avrin, and Cone with those of my colleague Louise Russell. She finds that if taxes are set at whatever rate is necessary to assure payment of retirement benefits promised under current law, the internal rate of return declines but remains positive for all cohorts. Her calculations also exclude insurance and risk avoidance benefits of social security.

The deficit. The most striking statistic in this paper is the estimate of the overall deficit of the social security system, 632 billion 1977 dollars. Or to bring matters more up-to-date, 987 billion 1981 dollars. What does this mean?

In one sense it means nothing because, as noted above, the system simulated in this paper differs in essential ways from the actual social security system. In fact, the estimated deficit measured as a percent of payroll is close to official estimates, and they indicate that presently promised social security benefits will cost more than the taxes we have legislated will support.

The actual deficit as estimated by the social security actuaries and the similar deficit estimated by the authors may be presented in different ways. The officially estimated deficit is equal to .93% of wages subject to payroll over the next seventy-five years (compared to the 1.7% estimate of the authors). It is equal to 0.4% of gross national product over the next seventy-five years. It is equal to 3.39% of covered payroll during the period 2030–54. It is equal to 1.2% of gross national product over the same twenty-five year period.

Six hundred thirty-two billion dollars is a large number. But so is \$219,600 billion, the present value of gross national product measured over the next seventy-five years under the assumption that nominal GNP is discounted at the same interest rate by which it grows.

One or two percent of GNP is a large number, but it is worth keeping in mind that in 1978 government expenditures claimed 11.4% more of GNP in France than in the United States, 9.2% more in Germany than in the United States, 25% more in Sweden than in the United States, and 9.9% less in Japan than in the United States. Moreover, the proportion of GNP absorbed by government rose during the eight years from 1970 to 1978 by 8.8 percentage points in France, 9.7 percentage points in Germany, 20 percentage points in Sweden, 9 percentage points in Japan, and 1.8 percentage points in the United States.

It may be that the rest of you are prepared to endorse the authors of this paper in describing a deficit that can be removed by an increase in taxes equal to less than one-half of 1% of gross national product over the next seventy-five years, an increase that both the United States and other nations have undertaken in a couple of years, as “large,” “untenable,” “extremely large,” “overwhelming,” “huge,” “massive,” “immense” or just plain “enormous.” One can only admire such rhetorical vigor.

Policy. Instead of argumentation by thesaurus, however, the issue of what changes should be made in the social security system deserves straightforward analysis and discussion, certainly at scholarly meetings. One of the authors of this paper has taken public stands on long-term changes in social security, and the paper endorses some of these posi-

tions. The positions are (a) to divide the social security system into two parts, one of which would return to covered retirees an annuity with the same present value as that of taxes paid by the worker and his employers, and one of which would be a negative income tax for the aged; and (b) to increase the number of years of work by three years. In practice, the working-life proposal would be implemented by an increase from sixty-five to sixty-eight in the age at which unreduced benefits are paid. The first proposal would eliminate both immaturity benefits and the "tilt," or redistributive, component of the benefit formula. I regard the elimination of past service credits as so improbable and as such poor policy as not to deserve serious discussion.

The question of whether redistribution to the low-income aged should be carried out through an entitlement program or an income tested program is more serious. To eliminate such redistribution while preserving past service credits, one would establish a benefit formula that paid retirees a benefit related proportionally rather than progressively to average earnings. Such a modification in the social security benefit formula could be used to accomplish two distinct objectives. The first would be to reduce the amount of redistribution from current workers to retirees with low current income. The second would be to improve the accuracy with which a given amount of redistribution is accomplished. The latter objective would be achieved if one established a negative income tax for the low-income aged that provided this group with the same total resources (or possibly even more) than the present system does. Savings would result because payment of benefits to people with low average past earnings, but adequate current income or wealth, would be curtailed. In previous conversations Michael Boskin has told me that he has no interest in reducing the amount of redistribution to the low-income elderly and indeed would increase it by liberalizing the benefits paid under supplemental security income, the present negative income tax for the elderly.

The motivation for moving to a two-tier system, therefore, is in part to eliminate or to reduce the payment of redistributive benefits to workers who have had low covered earnings but have adequate current resources. Another motive, enunciated in this paper, is the clarification for public debate of the degree of redistribution carried out through public programs. Presumably, such clarification would affect the amount or character of redistribution over time.

The elimination of mistargeted benefits is a real gain; and it may be important. Universal coverage by social security of federal, state, and local employees would end much of the present mistargeting by depriving government employees of the privilege of seeming to be low-wage workers when earnings from brief periods of post-civil service covered employment are averaged over their whole working lives. Nevertheless, a

two-tier system would provide a residual of improved targeting. I do not know how large it would be nor do the authors nor does anyone else, because the analysis of how much targeting would be improved has not been done.

Moving to a two-tier system would also generate costs. The costs would take two forms. The first entails real resources, not misdirected transfers. The reduction of entitlements would increase the number of people who would apply for means-tested benefits. Means-tested programs cost more to administer than do entitlements, about 10% of the amount transferred under the former compared with 2% under the latter. I do not know what the total increase in costs of administration would be nor do the authors nor does anyone else, because the analysis of how much administrative costs would rise has not been done.

The second kind of cost is a transfer cost. The take-up rate on means-tested programs is much lower than that of entitlements. As a result some fraction of those legally entitled to means-tested benefits would not claim them because of stigma or administrative difficulties. I do not know how many people would fall into this category, nor do I know how this loss (or the losses suffered by those who would apply despite filing costs and stigma) should be weighed nor do the authors of this paper nor does anyone else, because the analysis has not been done.

It may be that the benefits would outweigh the costs; I doubt it. But my real point is that no one has done the analysis necessary to justify the radical change to our most important social program advanced by the authors of this paper and by others. Congress should not be expected to overhaul our largest social program just to fulfill the logically sound principle we all learned in graduate school that full achievement of policy goals requires one independent policy for each independent objective.

I cannot resist observing that if one wishes to sort out redistributive and earnings replacement objectives, one can achieve this objective, without incurring either of the costs I have just described, by means of a double-decker plan: a universal demogrant for the aged and disabled, combined with a benefit proportional to earnings and with suitable changes in the positive tax system.

One of the authors of this paper (Boskin) has also endorsed an increase by three years in the age at which unreduced benefits are paid. He does so because life expectancy has increased, is likely to continue to increase, and may in the author's opinion increase more than demographers project. He and his coauthors conclude that an increase in the age at which unreduced benefits are paid is desirable.

I have supported the enactment now of such an increase, to take effect around the turn of the century, but I am far less certain than the authors about the desirability of such an increase. The increase in the costs of social security that will occur early in the twenty-first century are real and

important, even if they do not deserve the rather inflated rhetoric employed by the authors. It is important that decisions be made now that permit the generation that will have to pay those costs to make decisions unencumbered by unbreakable commitments to benefits that will require rising taxes. I strongly suspect that those generations will vote the higher taxes and elect to pay benefits approximating what is promised under current law. All public opinion polls to date support that contention: people of all ages overwhelmingly indicate that they would rather pay higher social security taxes than curtail benefits.

But attitudes do change. And if we want to preserve the option to increase the retirement age at all, it is a political fact that very lengthy notice must be given of such an increase. However, those of us who favor putting on the books an increase in the age of first entitlement for unreduced benefits should keep in mind the comments made by one of our colleagues, William C. Hsaio: "Too frequently those who advocate later retirement policy are armchair theorists. Their jobs require the physical exertion of sitting at a desk, lifting a 3-ounce pencil, in a modern air-conditioned office. The mental exertion consists of reading and writing memorandums and conducting discourse through a telephone line. They have never experienced the exhaustion of lifting 50 pound boxes for 8 hours a day, or continuously operating a pneumatic press. Yet they assume 65-year old workers can continue to lift those weights or operate a heavy machine until they reach age 68."⁴

Unless we are able to design income support to deal with those who retire involuntarily before age sixty-five, who become physically incapable of performing their jobs, or who lose their jobs and cannot find new ones late in their working lives, I submit that no increase in the age at which unreduced benefits are paid will or should come into effect.

I regret that the authors did not choose to analyze the conversion from wage to price indexing of the formula used for computing initial entitlements, a proposal whose immediate adoption Boskin has supported and whose deferred adoption I have supported.

4. Testimony to the Subcommittee on Oversight of the Committee on Ways and Means, House of Representatives, 96th Congress, 2d Session, Serial 96-116, p. 39.