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THE FINANCIAL IMPACT OF SOCIAL SECURITY BY COHORT*

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The Financial Impact of Social Security by Cohort

ABSTRACT

This paper examines the financial impact of the retirement portion of the Social Security system from the perspectives of individual households, entire age cohorts, and aggregate system finances. We present, for typical families and entire cohorts, the expected present value of the transfers likely to accrue under Social Security (the difference between the expected present value of benefits and taxes), the rate of return on Social Security taxes paid, and the aggregate real discounted present value of benefits paid out and taxes received by the system as a whole under alternative economic and demographic assumptions.

The long-run financial status of Social Security is uncertain, partly because future economic and demographic trends heavily affect revenues and outlays. Under the intermediate economic and demographic assumptions, there is a long-run actuarial deficit of about $500 billion. However, under optimistic assumptions this would turn into more than a $3 trillion surplus, and under pessimistic ones, into more than a $2 trillion deficit.

The long-run deficit masks an interesting time pattern of surpluses and deficits. Over the next thirty or forty years, the Social Security retirement fund is expected to accrue a surplus which will grow to almost the size of the regular national debt. Accruing the surplus would spread the burden of paying for the baby-boom generation's retirement benefits more equitably. But we have never been able to run surpluses in the past. It may well be that the surplus is used to raise benefits, lower taxes, bail out Medicare, or finance spending on other programs. The paper explores the implications of each of these scenarios for typical families of different age, entire 10-year birth-age cohorts, and the aggregate system finances. For example, if the surplus is used to raise Social Security benefits, the long-run actuarial deficit under the intermediate assumptions increases to over $3 trillion.

Alternative scenarios concerning the disposition of the expected surplus -- accruing or dissipating it -- not only have substantially different impacts on the overall system finances but affect the taxes, benefits, transfers and rates of return of different cohorts quite differently. Thus, there is a substantial intergenerational equity issue, as well as financial solvency issue, involved in the political response to the expected Social Security retirement surplus over the next few decades.

1. Introduction

For most Americans, anticipated Social Security retirement benefits have a value larger than the total value of their other financial assets.[1] Likewise, more than half of the workers in the United States pay more in Old Age, Survivors, Disability, and Hospital Insurance (OASDHI) "contributions" than they pay in personal income taxes. Because the program looms so large in the financial picture of so many, it is reasonable to assume that there is a significant demand for an investment evaluation of the deal it offers Americans. However, the program is extremely complex, with the expected benefits depending on one's marital status, sex, age-earnings profile, length of career, number of children, and other factors.

In this paper we simplify the analysis by exclusively evaluating the retirement portion of the program. We examine it from the perspectives of the individual household, entire cohorts and aggregate system finances. Our study is partial equilibrium in the sense that we do not tackle the consequences of the program for labor force participation or private saving behavior. In computing present values of taxes and benefits, we use a two percent real discount rate, although some sensitivity analysis to that figure is presented in the Appendix to the paper. We also calculate the present value of transfers offered by Social Security as the difference between the present value of benefits and taxes. The transfer figure is the surplus or gain one receives from

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1. This value may very well be enhanced by the fact that the benefits are paid out as an inflation adjusted life annuity.

participating in the system (if the figure is positive). Finally, we compute the internal rate of return offered by the retirement portion of Social Security. That is, we calculate the rate of discount which equates the expected present value of benefits with the expected present value of taxes. Throughout the analysis, we assume the participant bears the burden or effectively pays both the employer and the employee contributions to the system.

The long-run financial status of Social Security is quite uncertain. First, future economic and demographic trends heavily affect revenues and outlays. Second, except under the Social Security Administration's optimistic scenario, the retirement part of the system is projected to be in long-run actuarial deficit: small under the intermediate assumptions; large, under the pessimistic ones. Hospital Insurance (HI) is projected to run a large deficit beginning in the 1990s. Finally, the OASDI system is projected to accrue (under the intermediate assumptions) a very large surplus over the next thirty years. This surplus is projected to cumulate to almost 30% of GNP, close to the current size of the national debt to GNP ratio. This surplus is "designed" to reduce the need for still larger tax increases or benefit reductions during the baby boom generation's retirement. Figure 1 presents estimates of these average annual (not cumulative) surpluses and deficits in Social Security, including and excluding HI over the next 75 years to highlight this projected movement away from pay-as-you-go finance.

We have never been able to accrue a large surplus in Social Security; the retirement surplus may well be dissipated for other purposes (to bail out HI, fund other programs, raise benefits, cut taxes, etc.) These possibilities involve major inter-cohort transfers relative to the intermediate assumptions, as do, of course, the alternative methods of dealing with the long-run deficit (see Boskin (1986)). We analyze these in detail below.

The emphasis of the paper is to calculate the financial terms of Social Security for households from different birth cohorts, and our results indicate that the "deal" varies substantially by cohort and that trillions of (real discounted) dollars are at stake in the use of the projected OASI surplus.

The remainder of the paper is as follows: the next section contains a brief survey of related literature. Section 3 describes our methodology and data. Section 4 presents the Base Case results for the overall financial status of the system, the situation to be faced by successive ten year birth cohorts (from before 1912 through 1992) and that facing middle income single-earner families born in each of four years: 1945, 1960, 1975 and 1990. Section 5 analyzes the effects of alternative future economic and demographic patterns. In addition to the standard optimistic and pessmistic Social Security Administration packages, we also present marginal changes for fertility, mortality and real wage growth. Section 6 estimates the implication of alternative uses of the large surplus which is projected to accrue in OASI: what difference does it make, in the aggregate and to specific cohorts if the surplus is used to raise benefits or reduce taxes, or is spent on other programs

Section 7 presents a brief conclusion which offers a short summary and repeats some caveats concerning interpretation of the results.

The Appendix presents tables which provide a sensitivity analysis to the choice of discount rate and detailed data on the taxes, benefits, transfers and rates of return by cohort and to a "typical" family for the alternative scenarios considered.

2. Literature Review

Several studies analyze the long-run financial solvency of Social Security under alternative economic and demographic projectsions. The most important, of course, are the Annual Reports of the Board of Trustees of the Old Age and Survivors Insurance and Disability Insurance Trust Funds. These present short- and long-term actuarial projections and are a useful place to start. However, the reports do not consider the implications of alternative scenarios to close actuarial deficits and/or if the "short-run" OASDI surplus is dissipated, prospective retirement age increases abandoned or delayed or the tax-exempt threshold for taxing Social Security benefits indexed. The data are also presented as percentages of taxable payroll (and sometimes GNP), so real discounted dollar figures are unavailable for long-run projections.

Boskin (1986) presents estimates dealing with these issues. He reports, for example, that if the surplus is used to raise benefits and they remain raised, the long-run actuarial deficit will exceed three trillion dollars, almost double the pre-1983 amendments deficit, of which the amendments were designed to eliminate. He also highlights the trillions of dollars transferred among and within cohorts under alternative policies (for given economic and demographic projections). Other less extensive studies point to similar possibilities.

Several studies have attempted to estimate the "deal" various households have received or can expect to receive from Social Security's retirement program. The general conclusion is that the early cohorts of retirees had very large rates of return on their taxes and that future retirees, especially well off ones, are likely to fare poorly, with a rate of return below that available on private assets. Hurd and Shoven (1985) document this pattern of rates of return for various cohorts and earnings levels, but their analysis was made prior to the 1983 amendments and hence does not include consideration of the increased age of eligibility for future reitrees or the partial taxation of benefits. Also, there have been some changes in the economic and demographic assumptions used by the Social Security Administration.

Boskin, Avrin and Cone (1983) report the average transfer per household and for aggregate ten year age cohorts, with transfers defined as the difference in the expected present value of benefits and taxes. They also present estimates of how different cohorts and the system finances as a whole would be affected by various policy changes, such as increases in the retirement age. They conclude that those retiring recently are receiving benefits which are about three times as large as the sum of their employee and employer contributions plus three percent real interest, i.e., about two-thirds of their benefits are transfers.

These results are updated to the post-1983 amendments case in Boskin (1986). The pattern of transfers remains qualitatively similar to that mentioned above, but attention is called to the fact that OASDI is unlikely to be financially solvent over the next 75 years, despite the 1983 amendments. The financial solvency issue is much worse if HI is included. Thus, <u>how</u> and <u>when</u> the financial solvency issue is addressed will affect the Social Security benefits, taxes and transfers of individuals of various ages, income levels, and marital statuses quite differently. For example, changes in the tax rates, benefit formulae, the age of eligibility for full retirement benefits, or the method of financing Social Security could impact various households quite differently.

Pellechio and Goodfellow (1983) examine the net impact of the 1983 amendments on various types of households. Our own analysis of typical households is similar in spirit to theirs.

Boskin, Kotlikoff, Puffert and Shoven (1987) present estimates, ignoring long-run funding issues, for alternative family types and birth cohorts. They conclude that the deal offered by Social Security varies substantially, and has not always been better for poorer persons. The transfers vary by (real discounted) $200,000 per family, amounts which dwarf the redistributions debated in alternative income tax reforms. They also note that the marginal linkage between taxes paid and benefits received is quite low (often zero) and thus Social Security really ought to be viewed as a tax with the concommitant distortions (e.g., in the labor market). They also note that considering previously paid taxes a sunk cost creates a situation where all but very young workers expect to receive back more than they expect to apy for the remainder of their work life.

Finally, Bernheim (1986) notes an inconsistency in actuarial discounting and maintaining the strong form of the life-cycle hypothesis (an average propensity to consume over the lifetime of one). He argues that simple discounting may be a good approximation for such individuals. Since there is considerable evidence that many individuals refuse annuities (e.g., TIA participants are well know to opt for a certain pension of fixed duration rather than an annuity), and numerous other studies suggest that lifecycle behavior cannot explain all -- or perhaps most -- saving, the applicability of this to the current paper is questionable. Certainly, the population is heterogeneous, and for some, perhaps simple discounting is appropriate. We discuss these issues in the caveats in the conclusion.

3. Methodology and Data

The results which we present here are based on computer simulations of present and future American families covered by the Social Security system. Our main simulation package derives aggregate discounted figures for the taxes paid and benefits received by each of nine successive decadal birth cohorts (a cohort is, for example, all those born from 1943 to 1952). It simultaneously derives figures for annual income to and expenditure from the Social Security Administration's retirement trust fund (formally, the Old Age and Survivors Insurance Trust Fund) over the next 75 years.[2]

This simulation begins with earnings records and other data concerning Social Security participants who were surveyed in 1973.[3] For subsequent years we estimate participants' earnings based on demographic characteristics, we derive benefits based on legislated benefit formulas, and we determine years of death through a random process based on mortality tables published by the Social Security Administration.[4]

Cohorts born beginning in 1953 are simulated differently. In

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2. For further information on this simulation, or rather on an earlier version of it, see Boskin et al. (1983)

3. The 1975 Social Security Exact Match File merged individual records from the 1973 Current Population Survey with records of covered earnings.

4. Social Security Administration, Actuarial Study No. 92. (1984).

considering typical male and female wage earners born each year, we derive their expected tax and benefit futures based on mortality probabilites and the proportion that can be expected to marry. We multiply by the number born each year (plus the number who immigrate as children) who will enter covered employment and thus derive figures for entire cohorts. To derive income and expenditure for the trust fund as a whole we make a further adjustment for taxes paid and benefits received by adult immigrants; the totals for cohorts, however, considers only those covered their entire lives.[5]

Our calculation is certainly rougher than that undertaken by the actuarial staff of the Social Security Administration, but we note that we track fairly closely the Social Security Administration's own projections for the financial future of the trust fund. Notably, we project a long-run (75-year) deficit for the trust fund of 0.33% of taxable payroll, while the Social Security Administration's own estimate is 0.29%, out of total expenditures of 11.9% of taxable payroll.[6]

Our simulation goes beyond that of the Social Security

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5. It will be noted that our simulation shows the 1943-1952 cohort faring rather worse than its successor, although the general pattern is that succeeding cohorts until about 1960 do progressively worse. The reason for this is that this cohort is the youngest one for which survey data are used, and many in this cohort are not yet married. It is well known that singles fare rather poorly under Social Security, since they have no option to receive a spouse or survivor benefit rather than a benefit based on their own earings.

6. We do less well in the very short run. Thus we project small annual deficits for the trust fund in 1986 and 1987, while the trust fund is actually now running a small surplus.

Administration in highlighting not only the financial evolution of the trust fund but also the impact on successive cohorts of Old Age and Survivors Insurance, both as currently legislated and as it may have to be changed in the future in order to maintain the solvency of the trust fund.

A second simulation[7] looks at the financial impact of Old Age and Survivors Insurance for a variety of typical families. We use this simulation to derive the expected value (in an ex-ante calculation which recognizes the possiblity of death at any age) of a household's social security taxes and benefits, and thus its net transfer and real rate of return.

In the main simulation we rely on Social Security Administration projections for the proportion of Social Security benefits which are recovered for the trust fund through income taxation. These estimates are that this proportion will rise from less than two percent now to about five percent in the mid-twenty-first century. Because marginal tax rates have just been reduced we assume that, from 1988 on, 20 percent less will be collected in taxes on benefits. In 1987, the transition year, we assume that 10 percent less will be collected.

In the second simulation we calculate income taxation for each case, based on the new tax law and data from the Internal Revenue Service about taxable income of the elderly.[8]

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7. More extensive results from this simulation, but based on the income tax law in effect until 1986, are present in Boskin et al (1986) and Boskin and Puffert (1987). The former article also contains a more extensive description of our methodology.

8. For details, see Boskin et al. (1986).

Both of these simulations are parameterized by economic, demographic, and legal assumptions. The most important economic assumption is future growth of real wages. The chief demographic assumptions are mortality probabilities by age and fertility rates. The legal assumptions are tax rates on payroll and formulas for the calculation of benefits. In the scenarios below we consider the alternative economic and demographic assumptions that the Social Security Administration itself uses for the scenarios in its annual trustees' reports[9] and we consider fixed multiples of the payroll taxes and the benefits currently legislated.

The present values which we derive assume a real discount rate of two percent. This is the rate which the Social Security Administration assumes (in its intermediate assumption) will be realized on its trust fund. We apply this rate not only to the system's finances, however, but also to participants in Social Security. A subsequent section will discuss arguments that this rate is either too low or too high when applied to individuals, but we note here one advantage to this figure. When participants can expect a higher rate of return from Social Security than that received by the trust fund, it must be the case that their participation raises the unfunded liabilities of the trust fund. The amount of a cohort's net transfer (discounted benefits minus discounted taxes) is the amount by which the trust fund's unfunded liabilities rise. Conversely, a cohort real rate of return below two

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9. We do not consider alternative assumptions for unemployment, female labor force participation, or participation.

percent indicates a decrease in the trust fund's unfunded liabilities.

4. Results For Intermediate Assumptions

With this introduction, literature review, and description of the methodology and data in mind, we start out presenting the base case results under the new tax law, financial flows of the old-age and survivor insurance trust fund (OASI) for the fund as a whole and for different birth year cohorts. Our base case refers to the Social Security Administration's Intermediate-IIB assumptions regarding economic and demographic assumptions.

The basic results are presented in Table 1: estimates of the real discounted value of payroll, taxes, benefits, benefit taxes under the new tax law (figures in parentheses are estimates for the old tax law) and the surplus or deficit, and also the surplus or deficit as a percent of taxable payroll, the usual numbers presented in the Social Security Administration's Annual Trustees Report. These results are basically well known by now. The retirement fund is due to run a surplus of about 1.2% of taxable payroll over the next 25 years. It will continue to run a surplus in the early part of the second 25 year period, but eventually, will start to run a deficit, so that it is in slightly negative balance in the next period, then runs a large deficit in the third 25 year period, even with the substantial discounting. The overall projected deficit for the period is approximately one-half percent of taxable payroll, about 500 billion discounted 1986 dollars.

We note that under the old tax law, the only method we have for comparing our results with the Social Security Administration, our results indicate an almost identical deficit (about 0.34% of taxable payroll compared to 0.29% as estimated by the Social Security actuaries). We are within four or five hundredths of a percent of taxable payroll over the period relative to SSA, although as noted above, we are slightly more pessimistic in the short-run, less pessimistic later on.

The financial patterns for birth year cohorts born from 1912 to 1992 are presented in panel b of Table 1. Retiree taxes, net benefits (i.e., net of the income taxation), the transfer received by those who live to retire, and the taxes paid by nonsurvivors, together with the real rates of return are presented. As can be seen, even those due to be born in the immediate future are likely to get a slightly positive transfer, using the 2% real rate of return we have assumed. We use a 2% real rate of return, although in previous work we have argued that 3% may be more reasonable, for comparability with the Social Security Administration. Thus, the rates of return which are about 2% or more for all cohorts indicate the positive transfers for each of the birth cohorts. Were we to use 3%, cohorts born after 1933 would be receiving negative transfers and these would become progressively larger.

Of course, since there is a long-run actuarial deficit of 0.44% of taxable payroll, amounting to approximately 500 billion dollars, someone will have to pay it. The base case assumes that it is paid by persons born after 1992, whose situation will be correspondingly worse. We present information on how this varies for different rates of return.

The system finances are also presented in Figure 1, where the discounted surplus both annually and on a cumulative basis for the system are shown. On a cumulative basis the system starts to run a deficit (assuming the surplus accrues and accrues real interest at 2%)

around 2047, and on an annual basis, around 2020. We present below some hypothetical scenarios of the surplus being dissipated or alternative economic and demographic projections which alter these conclusions substantially. Table 2 presents information for the base case for several types of typical families for the four birth cohorts: 1945, 1960, 1975 and 1990. Presented are three different levels of earnings, two division of earnings between the family members, and the expected present value of taxes, benefits and transfers, and rates of return discounted both to the age the families are 25 and to 1986 for comparison purposes. As can be seen from a cursory examination of Table 2, the discounted present value of transfers (and therefore, taxes and benefits in general) varies markedly within each age cohort for different levels of earnings (reflecting the progressivity of the benefit formulae) and income splits (with respect to the spousal benefit), and to a lesser extent, the taxable maximum ceiling. For example, persons recently entering the system, born in 1960, age of 26 in 1986, have a present value of transfers that ranges from a slight positive transfer for low income earners to a substantial negative transfer for high income earners. The rates of return for taxes paid varies from 3.4% for the low income single earner family to 0.4% for the high income two-earner family. The same pattern is repeated cohort by cohort, and these intragenerational redistributions are explored in much greater detail in Boskin, Kotlikoff, Puffert and Shoven (1987).

Thus, while we will primarily be dealing in the sequel with system totals and aggregates by age cohorts, substantial variation remains within each age cohort, and that variation will vary systematically we change economic and demographic assumptions and consider alternatives scenarios for dissipation of the surplus. In what follows we will present only the situation for a typical middle income family with one earner, a group which systematically earns a rate of return of very close to 2% cohort by cohort (see Table 2), rather than presenting a large string of negative numbers for the well-off two-earner couple or a long string of substantial positive numbers for low income one-earner couples, we will focus on this case to see how one-earner middle income couples will have their situation vary depending on the alternative scenarios. We do this to reduce the system aggregate finances and the aggregate amounts for the cohorts to a per family basis. The heterogeneity that certainly lies behind each of these scenarios should be borne in mind.

5. Financial Impacts of Alternative Future Economic and Demographic Patterns

The Social Security Administration's intermediate economic and demographic assumptions are perhaps as reasonable as any, but we can be sure that they will not be realized with great accuracy.[10] It is thus important to consider the impacts of a range of possible futures both on the Social Security system's finances and on participants.

Tables 3 and 4 summarize the effects of using the Social Security Administration's optimistic and pessimistic assumptions for future wage growth, future mortality (and hence, life expectancy), future fertility and various combinations of these parameters. Table 4 shows the wide

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10. For an analysis of the inaccuracy of the economic and demographic assumptions used in the past, see United States General Accounting Office (1986).

variation in results for the financial solvency of the retirement trust fund. The present (1986) value of the trust fund surplus (deficit) in 2060 ranges from +$3.4 trillion to -$2.6 trillion, for the combined optimistic and pessimistic assumptions respectively.[11] We see in the column headed "year annual deficit begins" that only when the optimistic assumptions are combined do benefit expenditures exceed receipts in each year through 2060; otherwise current-flow deficits begin between 2014 and 2030. In the next column we see that the cumulative surplus suffices, however, to cover benefit expenditures until 2024 in the most pessimistic scenario and beyond 2060 in several of the optimistic scenarios.

Table 4 compares the rates of return realized by each of nine decadal birth cohorts under the alternative scenarios. We note first that, for later cohorts, the derived real rates of return vary among scenarios from about one and one-half percent to over three percent.

In order to understand more closely how taxes, benefits, transfers, and rates of return vary by scenario and cohort, let us now consider in detail how each of our economic and demographic assumptions affects both the finances of the Social Security retirement trust fund and the taxes and benefits of those covered by Social Security. The figures discussed in the remainder of this section are presented in greater detail in Appendix Tables A.2 through A.12.

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11. Undiscounted, but still in 1986 dollars, the respective figures are +$14.7 trillion and -$11.1 trillion. Subsequent figures are also presented in discounted terms. To remove discounting, multiply by 4.33.

The Social Security Administration's intermediate (II-B) assumption for growth in real wages, used in our base case, is that there will be an annual gain of one and one-half percent (with some fluctuation in the very short run). The optimistic assumption considers a gain of two and one-half percent annually, and the pessimistic assumption considers a gain of one percent.

Interestingly, higher wage growth is better both for the system's finances and for participants in the system. An increase in the trust fund's annual surplus (taxes minus benefits) proves consistent with a higher ratio of benefits received to taxes paid for the participants. The reason for this is that increases in taxes, which vary with total wages, precede the increases in benefits to which wage growth leads. The wage index is used in the formula for determining benefits, and so a faster rise in this index provides a higher rate of return for participants. What "balances the books" is a growth in the unfunded liabilities of the retirement trust fund. These liabilities could become quite burdensome if wage growth slows in the future.

We see in Table 3 that variation in wage growth changes taxes and benefits in the same direction, but that taxes change to a greater extent. High wage growth increases the long-run surplus by $1.37 trillion, more than offsetting the long-run deficit expected under the base case. Low wage growth deepens the long-run deficit by about $450 billion.

Appendix Tables A.3 and A.4 show in greater detail what happens under these two scenarios to system finances over time, to financial totals for the nine cohorts, and to a subset of the typical families discussed in the previous section. These figures may be compared to figures resulting from the intermediate assumptions, as simulated in our base case, either in Tables 1 and 2 or else in Appendix Table A.2. The notable pattern in these tables is that, as discussed above, higher (lower) wage growth increases (decreases) both taxes and benefits. It increases (decreases) annual flows of taxes more than benefits but, for a given cohort, increases (decreases) discounted benefits more than discounted taxes. Rates of return for later cohorts (also presented in Table 4) vary from about 2.2 percent under intermediate wage growth to about 2.8 percent under high wage growth and 1.9 percent under low wage growth.

In assumptions about mortality, what is "optimistic" for the solvency of the retirement trust fund is "pessimistic" for participants, and vice versa. The trust fund is more solvent when people die sooner and collect less in benefits. Table 3 shows that under the Social Security Administration's high mortality (low life expectancy) assumption the trust fund is better off by $963 billion over our 75-year horizon, but that under the low mortality assumption the system is worse off by $1.20 trillion. In Table 4 we see that for later cohorts the rates of return are about 1.9 percent for high mortality and 2.7 percent for low mortality. The Appendix Tables A.5 and A.6 show that higher (lower) mortality reduces (raises) benefits much more than taxes for any cohort, as indeed for the trust fund's annual flow as well.

Variant assumptions about fertility matter only for those cohorts not yet born, which are not presented in our tables. However, because Social Security participants begin paying taxes some forty years before they receive benefits, fertility rates will have a big impact on trust fund finances in the next century.[12] Indeed, today's low fertility rates are the most widely cited source of probable future problems in social security finance. Current fertility rates are about 1.8 children per woman over her child-bearing years. The Social Security Adminstration's intermediate assumption is that this will rise within the next two decades to 2.0 children per woman. The optimistic and pessimistic assumptions are 2.3 and 1.6 respectively.[13] The results of our simulation, shown in Table 3, are that high fertility would add $694 billion to the trust fund surplus, more than eliminating what is otherwise a deficit, while low fertility would add $837 billion to the deficit.

We also derived results for scenarios which combine sets of optimistic and pessimistic assumptions. The assumptions which are optimistic for participants are high wage growth and low mortality (fertility being irrelevant), while the assumptions which are optimistic for trust fund finances are high wage growth, high mortality, and high fertility. In the scenarios which are optimistic and pessimistic for participants, rates of return for later cohorts are about 3.3 percent and 1.6 percent respectively. Comparing Appendix Tables A.9 and A.10, we see that under the combined optimistic assumptions today's young children will pay a little more than twice as much in taxes as they

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12. The level of immigration, especially of young people, will have an impact for the same reason. We leave this matter for future investigation.

13. In our simulation we use the Social Security Administration's figures for number of births each calendar year, which are derived from these fertility rates.

would under the combined pessimistic assumptions, but they will recieve nearly four times as much in benefits. The effects on system finances are offsetting and do not differ greatly from the base case.

Under the combined optimistic and pessimistic assumptions for trust fund finances the differences from the intermediate scenario for long-run surplus are +$3.88 trillion and -$2.07 trillion (Table 3). The present value of taxes differs between these two scenarios by a factor of nearly two, while benefits vary by a factor of about 1.3. Tables 4, A.11 and A.12 show that there are offsetting impacts for participants.

Figure 3 shows how the size of the accumulated trust fund varies over the next 75 years for the overall optimistic, intermediate (base case), and pessimistic scenarios. Note that the continuing increase in the trust fund occurs only when the optimistic assumptions occur simultaneously. For any one of the optimistic assumptions alone, interest on the trust fund is insufficient to cover annual deficits, and the principal is exhausted before 2090 (Table 3, last column).

6. Financial Impact of Alternative Uses of the Potential Trust Fund Surplus

We noted in the previous section that only under optimistic assumptions for wage growth, mortality, and fertility all together can we hope that the retirement trust fund will take in at least as much each year in taxes as it pays out in benefits. In all other cases an accumulation in the trust fund is vital in order to forestall the time when taxes must be raised or benefits reduced. Under intermediate assumptions, for example, an annual deficit will begin in 2025 but the accumulated surplus will keep the trust fund solvent until 2048.

Unfortunately it has always proved difficult, for political reasons, to accumulate a trust fund surplus. It is in the interest of each session of Congress, and each administration, to raise benefits (or perhaps to lower taxes, although that has not yet been tried) if possible. Raising benefits conveys transfers to those receiving, or soon to receive, benefits while imposing much of the cost of the action on future generations which do not yet vote. Lowering taxes, similarly, helps a current generation of workers while requiring higher taxes from future generations than would otherwise be necessary.

The situation is now particularly acute for a major demographic reason: in less than 30 years the baby-boom generation will begin to retire. If we do not preserve the accumulation of a trust fund surplus before then, future adjustments in payroll-tax rates or in benefits will have to be much greater than would otherwise be necessary.

Figure 4 depicts the combined (employer and employee) tax rates which would be required each year to fund currently-legislated benefits (given intermediate assumptions) without adding to or drawing upon an accumulated surplus. Until 2025[14] tax rates could be lower than those currently legislated, but thereafter they would rise drastically.

Conversely, Figure 5 shows the level of benefits which could be funded by each year's tax receipts. This level is presented in the form of a ratio to benefits as provided for under current legislation. We see that benefits could be raised intermittently through 2009, to a level 30 percent higher than that now legislated, but that thereafter they must either decline or, perhaps more plausible politically, be

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14. The higher tax rate shown for 2022 is a quirk resulting from the way our simulation handles the rise in retirement age, from 66 to 67, which occurs around that time.

maintained through increases in payroll tax rates. The tax rates required to finance these increased benefits are depicted in the additional line of Figure 4.

Tables 5 and 6 summarize the financial impacts of several ways of losing the trust-fund surplus which is projected to grow over the next 35 to 40 years. "Pay-as-you-go tax rates" considers the scenario in which, beginning in 1990, tax rates are set each year at a level which exactly covers that year's benefit payments. Similarily, "pay-as-you-go benefits" considers, also for 1990 on, the adjustment of benefit levels to match projected tax receipts. The tax rates and benefits levels of these scenarios thus follow the main lines depicted in Figures 4 and 5 respectively.

We consider 1990 a plausible starting date for these scenarios because the party that takes office in 1989 will be glad to endear itself to the voters before the 1990 congressional election. By this time the annual suplus in the trust fund will be an inviting target.

The "benefit ratchet" scenarios consider the cases in which benefits rise to their pay-as-you-go peak in 2009 but do not subsequently decline. The first of these scenarios notes the impossible deficit ($3.69 trillion cummulative by 2060) generated when the higher benefit level is not funded with taxes, while the second considers the case of taxes rising, in a pay-as-you-go fashion, to fund the increased benefits.

The last two of these scenarios consider what will happen if the surplus which would accumulate over the next forty years is dissipated, or directed to other purposes. Two very plausible possibilities for this are that the surplus could be used to cover some of the massive deficit in Social Security Hospital Insurance which will (absent a major reform) develop within a few years or that the surplus will, in the face of federal budget deficits, be used to fund other expenditures. The first of these scenarios raises taxes in a pay-as-you-go fashion beginning in 2025, the first year in which current benefit payments exceed current receipts. The second of these scenarios reduces benefits in a pay-as-you-go fashion from 2025 on. Thus these scenarios are equivalent to the earlier pay-as-you-go scenarios from 2025 on; they only lack the period in which tax or else benefit levels are more favorable for participants than the levels currently legislated.

The chief result for system finances (Table 5) under all these scenarios -- except, of course, the unfunded ratcheting of benefits -- is that the long run surplus is, by construction, essentially zero.[15] The story for the successive cohorts, as we see in Table 6 and more extensively in Appendix Tables A.13 through A.18, is that some gain and some lose as a result of these changes.

Thus under pay-as-you-go tax rates, those born until the 1980's gain; the bulk of their working lives take place before 2025, when tax rates must rise above those currently legislated. The big losers under this scenario are those born in the next century, who will be subject to payroll tax rates of over 13 percent by 2033, rather than the 10.98 percent currently legislated.

Under pay-as-you-go benefits, those who receive benefits mostly before 2025 gain. Those born from the 1950's on, who collect their

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15. A deficit of $8 billion appears for some scenarios due to our simulation showing a slight overall deficit between 1986 and 1989.

benefits after 2025, will do worse than projected under current legislation. Those born today can expect a benefit reduction of 23 percent, for a rate of return of only about 1.5 percent.

With a ratcheting of benefits financed by tax increases, those born until the present decade gain, as their increase in benefits more than offsets the increase in taxes which they pay for only part of their working lives. But later cohorts bear the full brunt of these increased tax rates (17 percent by 2033, compared to 10.98 percent currently legislated) and hence do substantially worse overall.

When the surplus is dissipated, there are no gaining cohorts (although, presumably, other aspects of government finance are temporarily in better shape). But those who pay taxes or collect benefits after 2025 suffer the same losses as in the first two pay-as-you-go scenarios.

7. Conclusion and Caveats

The results reported in this research suggest that Social Security's retirement program offers vastly different terms to households in different circumstances and in different cohorts. More importantly, (net of any private intrafamily intergenerational transfers which offset Social Security benefit payments, which we believe to be a modest fraction of the total benefits) alternative scenarios where Social Security deviates from and/or returns to pay-as-you-go finance dramatically change the taxes, benefits, transfers and real rates of return likely to be available to alternative birth cohorts.

While it appears that the retirement part of Social Security -- but not hospital insurance -- is in sound short-run financial shape and indeed, is scheduled to accummulate a very substantial surplus over the next thirty years under intermediate economic and demographic assumptions, various factors could intervene in this relatively rosy short-run scenario. We have attempted to explore some plausible alternatives to the surplus accruing: tax cuts, benefit increases, etc. We have traced their implications for the overall financial status of the system, the time pattern of taxes, benefits and surpluses or deficits, and therefore, the treatment of different age cohorts. Under the intermediate assumptions, the Social Security surplus is scheduled to become almost as large as the regular national debt. Obviously, well before this occurs, enormous pressure would be placed on financial markets. Since Hospital Insurance is scheduled to be accruing a substantial deficit well before the surplus peaks, one likely scenario is that Social Security will "borrow" from the retirement fund to bail out the hospital insurance fund. The retirement surplus also could be a signal to fiscal authorities that additional spending could be financed on other programs, ignoring the simultaneously accruing future liabilities in Social Security. The surplus could be dissipated if the prospective increase in the retirement age is reduced, eliminated, or postponed; and/or if the tax exempt amount is indexed. In all of these situations, the short-run surplus would be decreased substantially, and the subsequent long-run deficit would worsen. The exact pattern of tax collections and benefit payments might take a variety of forms, but each of these would lead to a much worse deal for retirees in the distant future versus current retirees or those retiring in the near future.

The Social Security retirement system finances are quite sensitive to alternative economic and demographic events. By far the most important is future real wage growth. We have presented estimates based upon the Social Security Administration's pessimistic and optimistic packages, but also "unpackaged" them so that we may examine the marginal effect of changing mortaility, fertility, and wage growth asumptions. Again, the patterns are revealing. Except in the optimistic package, the discounted value of the Social Security retirement system fund over the next 75 years turns negative, and is subject to substantial potential negative shocks for the reasons discussed above.

We have mentioned a number of caveats to our results throughout the paper. First, the new income tax law is certain to change over the time horizon we examine and probably sooner rather than later. Marginal rates may change, Social Security benefits may be taxed fully, some or all of the tax collections from the taxation of Social Security benefits may accrue to general funds to help pay for deficits rather than be credited to Social Security at the time of surplus, etc. Second, we mentioned that the value of Social Security benefits may exceed their expected present value because they are paid as inflation-adjusted joint survivor life annuity. Exactly how to make the adjustments is unclear. Bernheim (1986) argues that a strict adherence to the lifecycle model -- at least the aspect of it that implies an average propensity to consume over one's lifetime of one -- and imperfections in annuity markets imply that actuarial discounting is inappropriate, and argues that simple discounting may be desirable. While we do not hold to this extreme form of the lifecycle model in this paper and there is substantial evidence that if individuals are given the option, they refuse to annuitize their wealth (for example, college professors covered by TIA usually decline annuitization in favor of some years certain in their retirement pension), we do not beleive that simple discounting is a sensible alternative to actuarial discounting for the whole population. However, to the extent that a fraction of the population we consider is appropriately considered as pure lifecycle savers and subject to the imperfections in annuity markets, some method of aggregating heterogeneous individuals within cohorts is desirable and perhaps some convex combination of actuarial and simple discounting would be necessary. Simple discounting would alter the benefits and taxes only a few percentage points, given a real discount rate of 2% or 3%. Again, we would argue that these factors should be applied to some fraction of the population, not the entire fraction. For the system totals, such adjustments are unnecessary; indeed, they only make sense for examining the individual cases rather than the system aggregate totals.

Related questions revolve around comparing taxes paid earlier in life and benefits received later in life. Taxes might be paid at a time in life when households are liquidity constrained; Social Security benefits may be systematically subject to different types of risks than labor earnings or returns from assets. Hence, the taxes may be differentially risky since they are paid on realized earnings during working years relative to Social Security benefits. Again, these issues have been discussed in more detail elsewhere (see Boskin and Shoven (1985)).

Thus, some risk adjustment may be necessary. Some have even suggested that the appropriate discount rate should be zero because Social Security benefits really are a safe asset and that is close to the real return on government securities (safe assets) over the long-term (Henry Aaron, Alicia Munnell and others have made this argument). First, adjusting for differences in risk other than mortality risk by adjusting discount rates is inappropriate. Modern finance theory teaches that a charge for risk should be assigned in the appropriate period and the appropriate measure of net benefits adjusted should then be discounted at the rate of time preference. Second, it is unclear whether Social Security benefits or earnings or the returns to other assets are differentially risky. Indeed, it is not just their inherent risk but their covariance with other components of income for households which would determine the nature of the risk charge to be applied. For persons already retired, one would expect that uncertainty would be relatively modest; for those due to retire in the distant future, there is substantial uncertainty regarding the level of such Social Security payments. This stems from the Social Security system's long-term financial solvency problems as well as the desire of many to means-test the program fully. Thus, well-off individuals may wind up getting nothing in the future as the way to deal with the financial solvency problem. We merely point these issues out for the interested reader and refer them to the other papers mentioned for further discussion, but these caveats should be borne in mind in interpreting the results reported here.

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Figure 1

Projected Social Security Finances

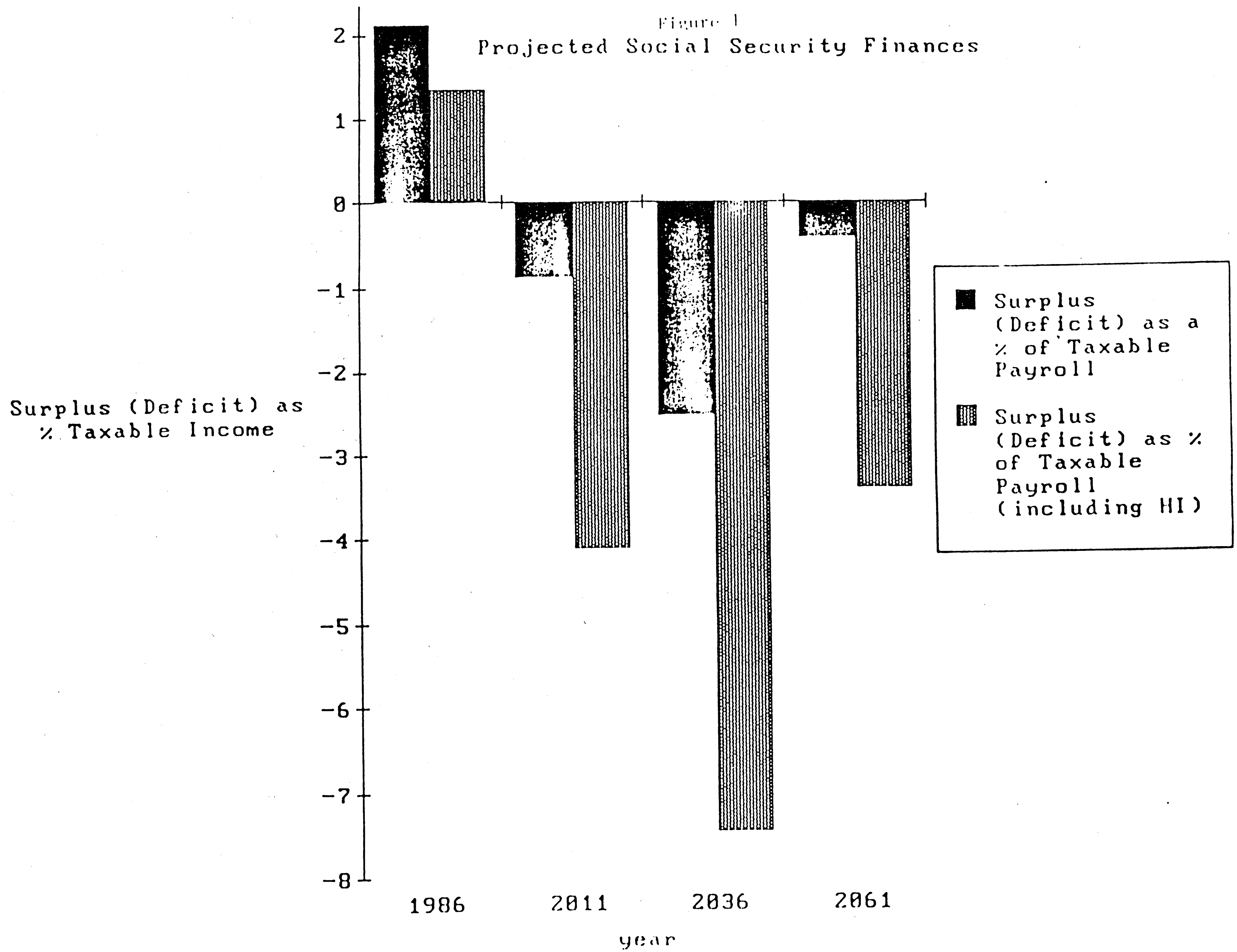


Figure 2

Discounted Surplus - Annual and Cumulative - Base Case

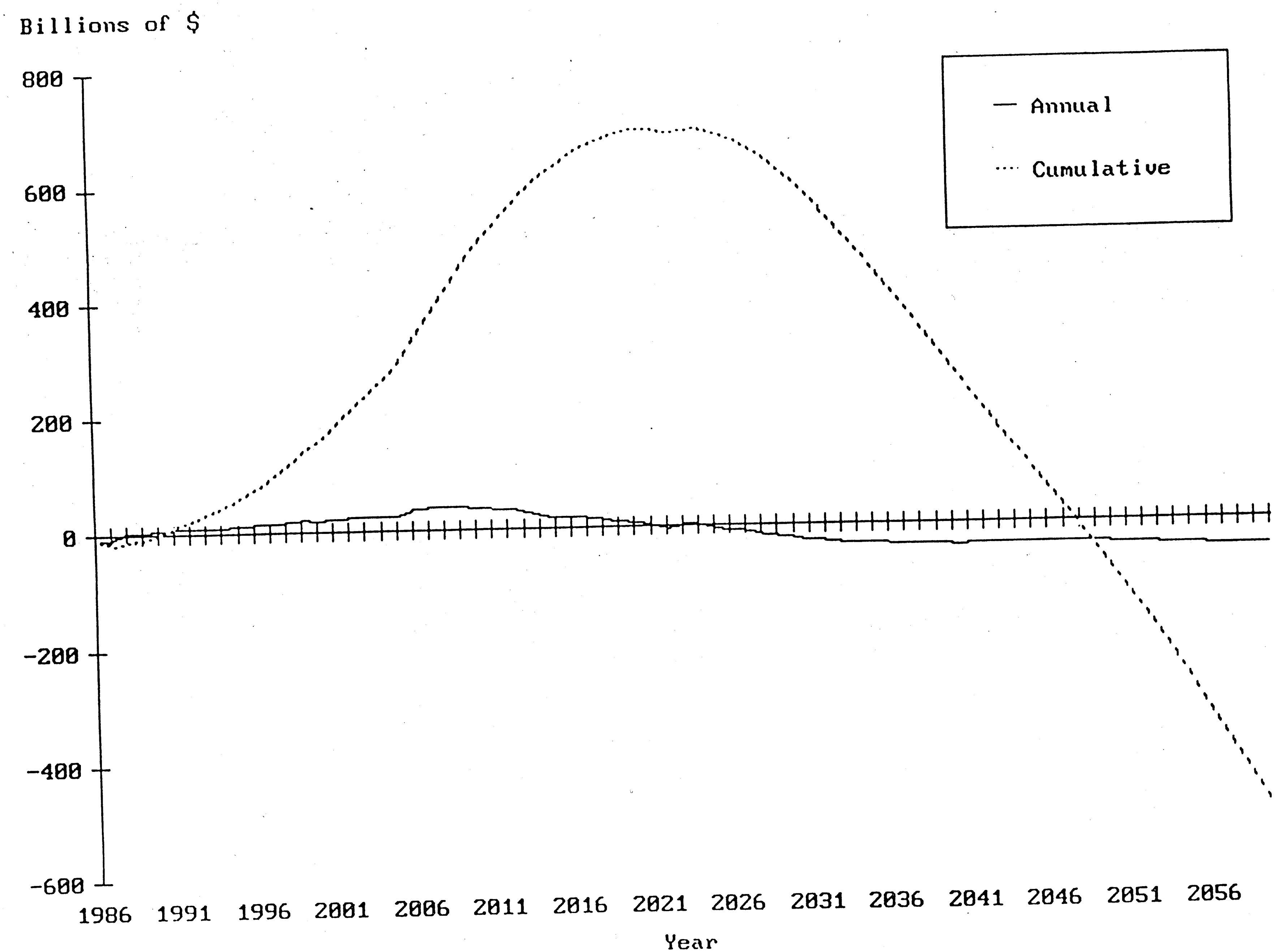
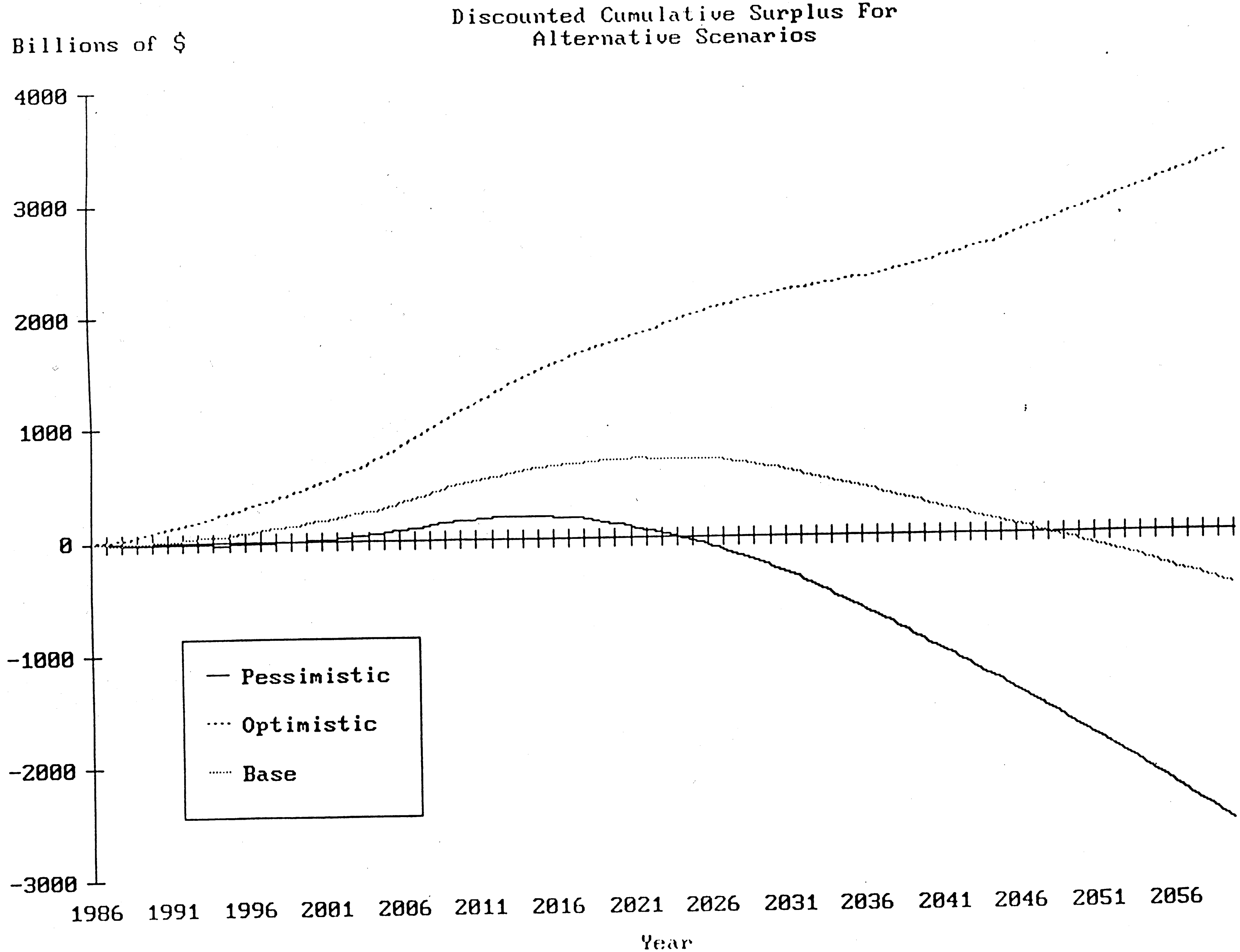


Figure 3



Discounted Cumulative Surplus For
Alternative Scenarios
Billions of $
4000
3000
2000
1000
0
-1000
-2000
-3000
1986
1991
1996
2001
2006
2011
2016
2021
2026
2031
2036
2041
2046
2051
2056
Year
Pessimistic
Optimistic
Base

Figure 4

Tax Rates, Current Law and Pay-As-You-Go

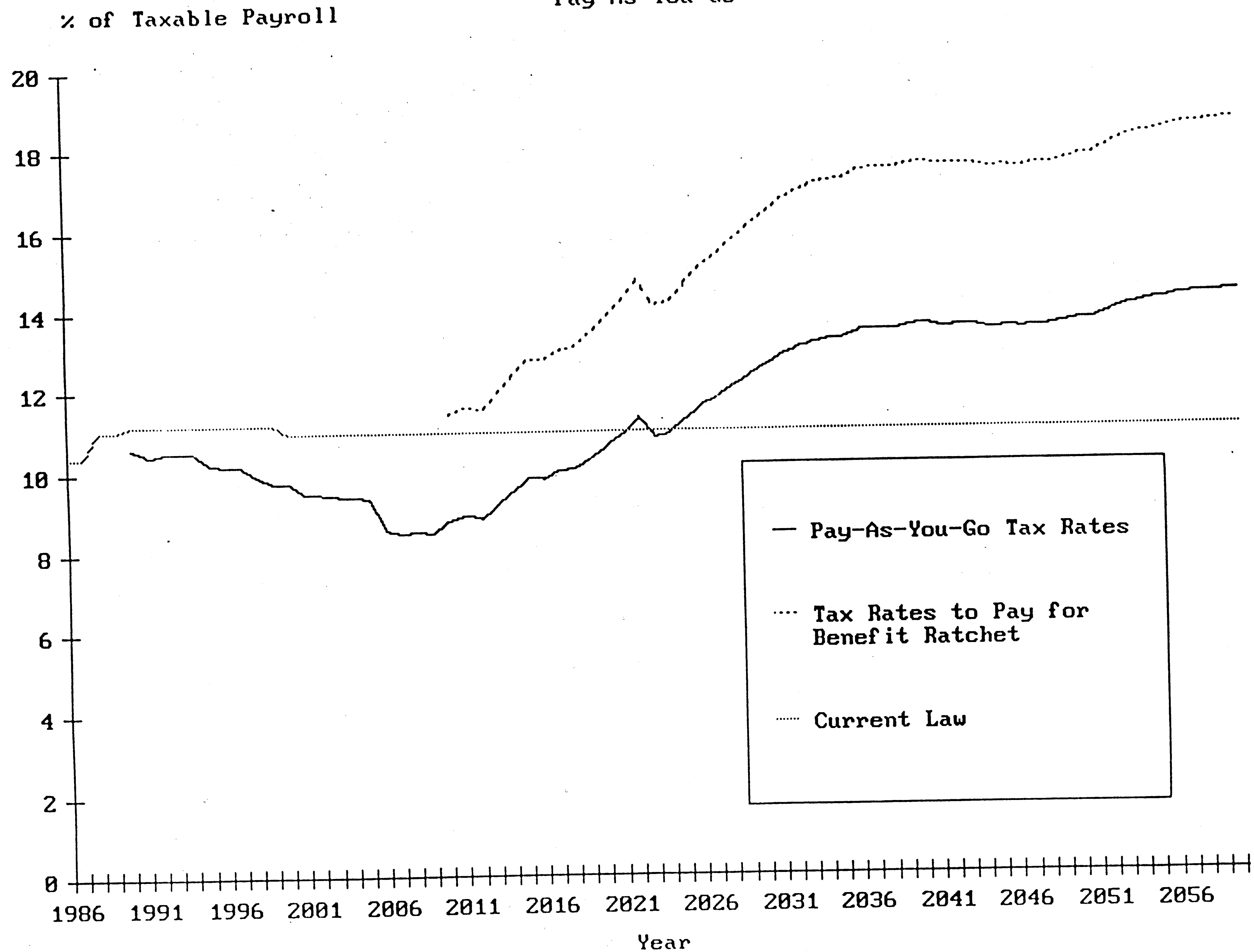


Figure 5

Pay-As-You-Go Benefit Ratio, Given Taxes, To Maintain Annual Balance

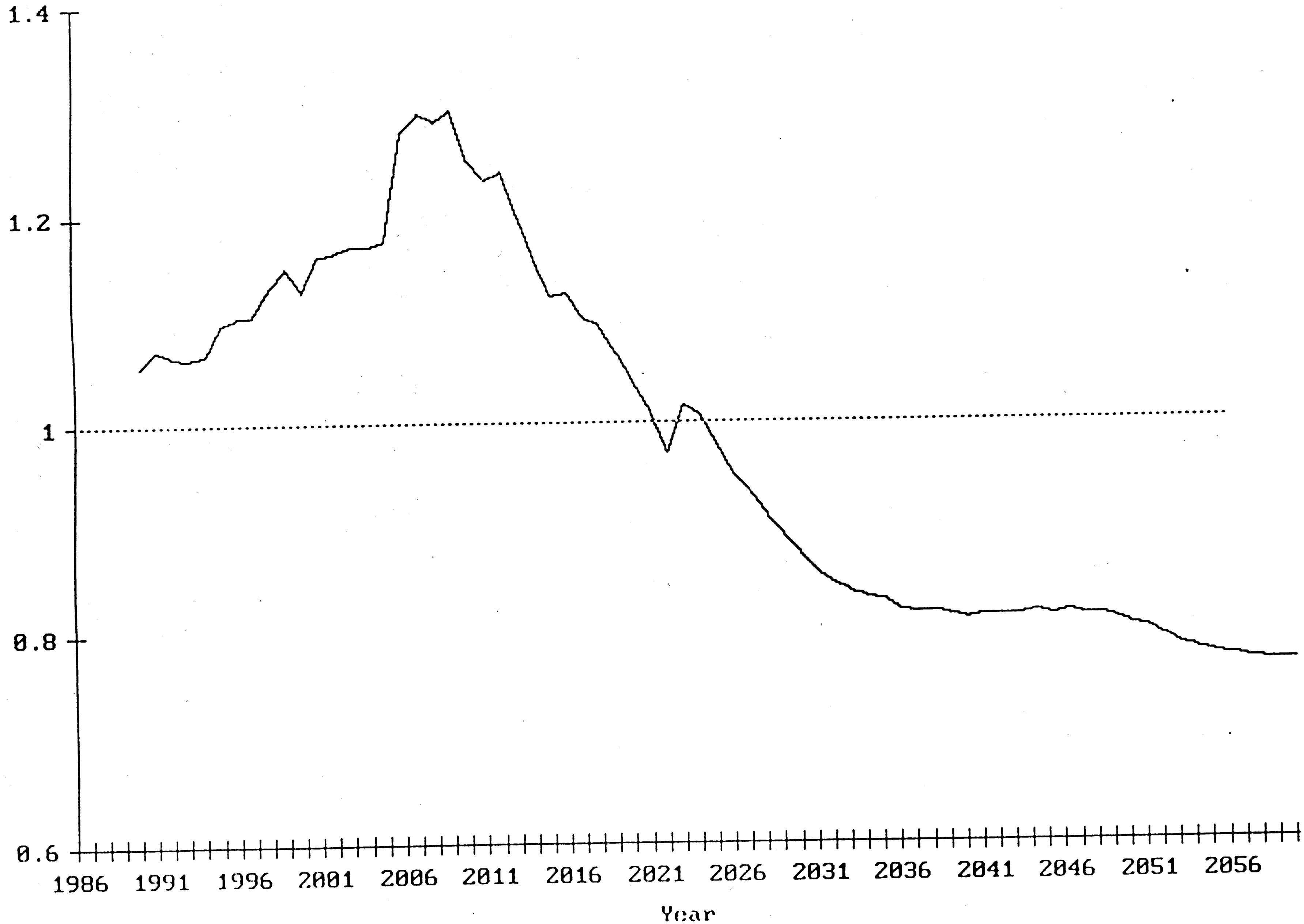


Table 1

Base Case

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]		SURPLUS	SURPLUS/PAYROLL
1986 TO 2010	39584	4366	3997	114	(141)	483	1.22%
2011 TO 2035	38540	4232	4422	158	(198)	-31	-0.08%
2036 TO 2060	34460	3784	4925	196	(244)	-946	-2.74%
1986 TO 2060	112584	12381	13344	468	(584)	-495	-0.44%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3671	3286	186	11.61%
1913 TO 1922	489	1582	1093	121	5.74%
1923 TO 1932	776	1508	732	149	3.72%
1933 TO 1942	952	1446	495	193	2.75%
1943 TO 1952	1378	1695	316	340	1.96%
1953 TO 1962	1525	2040	515	350	2.31%
1963 TO 1972	1414	1809	395	325	2.17%
1973 TO 1982	1287	1660	373	283	2.22%
1983 TO 1992	1337	1751	413	282	2.28%

Notes: a. Income taxation of benefits. Figures in parentheses refer to old tax law.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table 2

Financial Patterns for Various Typical Families - Base Case
(Expected values in 1986 dollars, discounted at real rate of 2%)

I. 1945 Cohort						
Family Earnings Level:	Low ($10,000)		Middle ($30,000		High ($50,000)	
Division of Earnings:	1-0	1/2-1/2	1-0	1/2-1/2	1-0	1/2-1/2
Discounting to 1970:						
Present Value Benefits	65,455	52,881	117,616	96,723	113,314	119,920
Present Value Taxes	37,015	36,171	105,589	108,514	112,421	178,237
Present Value Transfers	28,440	16,710	12,027	-11,791	893	-58,317
Discounting to 1986:						
Present Value Benefits	89,854	72,594	161,460	132,778	155,554	164,624
Present Value Taxes	50,813	49,655	144,950	148,965	154,329	244,679
Present Value Transfers	39,041	22,939	16,510	-16,187	1,225	-80,055
Rate of Return	3.73%	3.17%	2.34%	1.64%	2.03%	0.75%

II. 1960 Cohort						
Discounting to 1985:						
Present Value Benefits	78,403	62,949	137,505	112,811	137,129	141,828
Present Value Taxes	48,963	47,833	146,888	143,499	170,004	239,165
Present Value Transfer	29,440	15,116	-9,383	-30,688	-32,875	-97,337
Discounting to 1986:						
Present Value Benefits	79,971	64,207	140,255	115,067	139,871	144,664
Present Value Taxes	49,942	48,790	149,825	146,369	173,404	243,949
Present Value Transfer	30,029	15,417	-9,570	-31,302	-33,533	-99,285
Rate of Return	3.39%	2.82%	1.80%	1.27%	1.37%	0.40%

cont. of Table 2

Financial Patterns for Various Typical Families - Base Case
(Expected values in 1986 dollars, discounted at real rate of 2%)

III. 1975 Cohort						
Family Earnings Level:	Low ($10,000)		Middle ($30,000		High ($50,000)	
Division of Earnings:	1-0	1/2-1/2	1-0	1/2-1/2	1-0	1/2-1/2
Discounting to 2000:						
Present Value Benefits	96,616	77,388	176,432	144,978	175,842	182,174
Present Value Taxes	61,614	60,078	184,540	180,232	214,567	300,387
Present Value Transfers	35,102	17,310	-8,108	-35,254	-38,725	-118,213
Discounting to 1986:						
Present Value Benefits	73,224	58,651	133,714	109,876	133,267	138,066
Present Value Taxes	46,620	45,532	139,859	136,594	162,616	227,657
Present Value Transfers	26,604	13,119	-6,145	-26,718	-29,349	-89,591
Rate of Return	3.31%	2.75%	1.87%	1.35%	1.43%	0.49%
IV. 1990 Cohort						
Discounting to 2015:						
Present Value Benefits	123,218	98,859	216,823	177,840	221,189	229,261
Present Value Taxes	76,112	74,285	228,337	222,856	265,328	371,427
Present Value Transfer	47,106	24,574	-11,514	-45,016	-44,139	-142,166
Discounting to 1986:						
Present Value Benefits	69,387	55,669	122,097	100,145	124,556	129,102
Present Value Taxes	42,860	41,832	128,581	125,495	149,412	209,158
Present Value Transfer	26,527	13,837	-6,484	-25,350	-24,856	-80,056
Rate of Return	3.40%	2.84%	1.85%	1.33%	1.48%	0.55%

Table 3

System Finances, Various Economic & Demographic Scenarios - 75 Year Totals (1986-2060)
(1986 $billions, discounted to 1986)

Scenarios	Taxes	Benefits	Benefit Taxes	Surplus	Variation of Surplus fr Base Case	Surplus as % of Tax. Payroll	Year Annl Deficit Begins	Year Cumu. Deficit Begins
Base Case	$12,381	$13,344	$468	-$495	0	-0.44%	2025	2048
High Wage Growth	$18,021	$17,781	$639	$878	+$1,373	0.54%	2030	By 2090
Low Wage Growth	$10,170	$11,516	$398	-$948	-$453	-1.03%	2020	2035
High Mortality	$12,306	$12,267	$429	$468	+$963	0.42%	2027	By 2080
Low Mortality	$12,522	$14,743	$521	-$1,700	-$1,205	-1.49%	2018	2035
High Fertility	$13,095	$13,365	$469	$199	+694	0.17%	2026	By 2080
Low Fertility	$11,516	$13,315	$467	-$1,332	-$837	-1.27%	2021	2040
Overall Optimistic for Participants	$18,235	$19,757	$715	-$807	-$312	-0.49%	2025	2051
Overall Pessimistic for Participants	$10,112	$10,590	$365	-$113	+$382	-0.12%	2025	2056
Overall Optimistic for Trust Fund	$19,177	$16,376	$587	$3,389	+$3,884	1.94%	*	*
Overall Pessimistic for Trust Fund	$9,644	$12,653	$441	-$2,567	-$2,072	-2.93%	2014	2024

*Remains Positive Indefinitely.

Table 4

Rates of Return (%) for Various Economic & Demographic Scenarios

Scenario	Year of Birth								
Scenario	Bef.1912	1913-22	1923-32	1933-42	1943-52	1953-62	1963-72	1973-1982	1983-92
Base Case	11.61	5.74	3.72	2.75	1.96	2.31	2.18	2.22	2.28
High Wage Growth	11.61	5.74	3.88	3.14	2.48	2.91	2.79	2.84	2.90
Low Wage Growth	11.61	5.74	3.60	2.48	1.65	2.00	1.87	1.92	1.98
High Mortality	11.50	5.59	3.60	2.59	1.65	2.02	1.86	1.88	1.93
Low Mortality	11.66	5.78	3.81	2.97	2.36	2.69	2.59	2.67	2.76
High Fertility	11.61	5.74	3.72	2.75	1.96	2.31	2.18	2.22	2.28
Low Fertility	11.61	5.74	3.72	2.75	1.96	2.31	2.18	2.22	2.28
Overall Optimistic for Participants	11.66	5.79	3.97	3.35	2.87	3.27	3.21	3.29	3.38
Overall Pessimistic for Participants	11.50	5.59	3.47	2.31	1.35	1.71	1.55	1.58	1.63
Overall Optimistic for Trust Fund	11.50	5.60	3.77	2.98	2.18	2.62	2.48	2.50	2.55
Overall Pessimistic for Trust Fund	11.66	5.78	3.69	2.70	2.06	2.37	2.29	2.37	2.46

Table 5

Various Scenarios for Trust Fund Surplus - 75 Year Totals (1986-2060)
(1986 $billions, discounted to 1986)

Scenarios	Taxes	Benefits	Benefit Taxes	Surplus	Variation of Surplus fr Base Case	Surplus as % of Tax. Payroll	Year Annl Deficit Begins	Year Cumu. Deficit Begins
Base Case	$12,381	$13,344	$468	-$495	0	-0.44%	2025	2048
Pay-As-You-Go Tax Rates	$12,868	$13,344	$468	-$8	+$487	0.00%	n.a.	n.a.
Pay-As-You-Go Benefits	$12,381	$12,832	$443	-$8	+$487	0.00%	n.a.	n.a.
Benefit Ratchet - Unfunded	$12,381	$16,662	$591	-$3,690	-$3195	-3.28%	2010	2010
Benefit Ratchet, Funded by taxes	$16,064	$16,662	$591	-$8	+$487	0.00%	n.a.	n.a.
Surplus Dissipated Funded by taxes	$13,565	$13,344	$468	0[a]	+$495	0.00%	n.a.	n.a.
Surplus Dissipated Adjusted benefits	$12,381	$12,112	$420	0[a]	+$495	0.00%	n.a.	n.a.

[a] $689 billion surplus through 2025 has been dissipated.

Table 6

Rates of Return (%) For Various Trust Fund Surplus Scenarios

Scenario	Year of Birth								
Scenario	Bef.1912	1913-22	1923-32	1933-42	1943-52	1953-62	1963-72	1973-1982	1983-92
Base Case	11.61	5.74	3.72	2.75	1.96	2.31	2.18	2.22	2.28
Pay-As-You-Go Tax Rates	11.61	5.74	3.73	2.84	2.17	2.56	2.37	2.26	2.09
Pay-As-You-Go Benefits	11.62	5.94	4.16	3.18	1.96	1.89	1.56	1.54	1.54
Benefit Ratchet - Unfunded	11.62	5.95	4.25	3.50	2.75	3.07	2.92	2.96	3.02
Benefit Ratchet, Funded by taxes	11.62	5.95	4.25	3.50	2.73	2.95	2.58	2.34	2.09
Surplus Dissipated/ Pay-As-You-Go taxes	11.61	5.74	3.72	2.75	1.96	2.31	2.11	2.04	1.96
Surplus Dissipated/ Pay-As-You-Go benefits	11.61	5.74	3.71	2.71	1.80	1.89	1.56	1.54	1.54

Table A.1

Present Values Under Alternative Discount Rates
For Middle-Income Single-Earner Couples
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Discounting at Rate 0%:				
Present Value Benefits	330,261	391,686	505,092	625,511
Present Value Taxes	158,861	217,528	272,184	337,252
Present Value Transfer	171,400	174,158	232,908	288,259
Discounting at Rate 2%:				
Present Value Benefits	161,460	140,255	133,714	122,097
Present Value Taxes	144,950	149,825	139,859	128,581
Present Value Transfer	16,510	-9,570	-6,145	-6,484
Discounting at Rate 4%:				
Present Value Benefits	82,083	52,493	37,245	25,252
Present Value Taxes	140,223	110,591	77,588	53,229
Present Value Transfer	-58,140	-58,098	-40,343	-27,977
Rate of Return	2.34%	1.80%	1.87%	1.85%

Table A.2

Base Case

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS PAYROLL
1986 TO 2010	39584	4366	3997	114 (141)	483	1.22%
2011 TO 2035	38540	4232	4422	158 (198)	-31	-0.08%
2036 TO 2060	34460	3784	4925	196 (244)	-946	-2.74%
1986 TO 2060	112584	12381	13344	468 (584)	-495	-0.44%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3671	3286	186	11.61%
1913 TO 1922	489	1582	1093	121	5.74%
1923 TO 1932	776	1508	732	149	3.72%
1933 TO 1942	952	1446	495	193	2.75%
1943 TO 1952	1378	1695	316	340	1.96%
1953 TO 1962	1525	2040	515	350	2.31%
1963 TO 1972	1414	1809	395	325	2.17%
1973 TO 1982	1287	1660	373	283	2.22%
1983 TO 1992	1337	1751	413	282	2.28%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	161,460	140,255	133,714	122,097
Present Value Taxes	144,950	149,825	139,859	128,581
Present Value Transfer	16,510	-9,570	-6,145	-6,484
Rate of Return	2.34%	1.80%	1.87%	1.85%

Notes: a. Income taxation of benefits. Figures in parentheses refer to old tax law.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.3

High Wage Growth

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS / PAYROLL
1986 TO 2010	44704	4931	4141	119	908	2.03%
2011 TO 2035	55497	6094	5702	205	596	1.07%
2036 TO 2060	63718	6996	7938	315	-626	-0.98%
1986 TO 2060	163919	18021	17781	639	878	0.54%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	382	3642	3260	185	11.61%
1913 TO 1922	485	1572	1087	120	5.74%
1923 TO 1932	780	1584	804	149	3.88%
1933 TO 1942	988	1682	694	196	3.14%
1943 TO 1952	1506	2170	664	358	2.48%
1953 TO 1962	1789	2876	1087	395	2.91%
1963 TO 1972	1807	2811	1004	398	2.79%
1973 TO 1982	1819	2859	1040	384	2.84%
1983 TO 1992	2087	3328	1241	422	2.90%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	194,307	195,076	212,876	234,851
Present Value Taxes	154,598	178,211	192,179	205,390
Present Value Transfer	37,709	16,865	20,697	29,462
Rate of Return	2.74%	2.28%	2.32%	2.41%

Notes:
a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.4

Low Wage Growth

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS ÷ PAYROLL
1986 TO 2010	36349	4008	3915	111	205	0.56%
2011 TO 2035	31312	3438	3805	136	-231	-0.74%
2036 TO 2060	24803	2723	3796	151	-922	-3.72%
1986 TO 2060	92464	10170	11516	398	-948	-1.03%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	388	3706	3318	188	11.61%
1913 TO 1922	493	1596	1103	122	5.74%
1923 TO 1932	775	1458	684	150	3.60%
1933 TO 1942	928	1301	374	192	2.48%
1943 TO 1952	1304	1455	151	329	1.65%
1953 TO 1962	1387	1672	285	324	2.00%
1963 TO 1972	1226	1414	188	287	1.87%
1973 TO 1982	1061	1235	174	238	1.92%
1983 TO 1992	1051	1241	191	225	1.98%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	140,307	117,407	100,543	88,844
Present Value Taxes	138,610	134,634	116,455	99.532
Present Value Transfer	1,697	-17,227	-15,912	-10.688
Rate of Return	2.04%	1.60%	1.57%	1.67%

Notes: a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.5

High Mortality

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS PAYROLL
1986 TO 2010	39540	4361	3766	108	702	1.78%
2011 TO 2035	38271	4202	4121	148	229	0.60%
2036 TO 2060	34086	3743	4380	174	-463	-1.36%
1986 TO 2060	111897	12306	12267	429	468	0.42%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	392	3504	3112	181	11.50%
1913 TO 1922	496	1507	1011	117	5.59%
1923 TO 1932	747	1440	694	169	3.60%
1933 TO 1942	927	1361	434	211	2.59%
1943 TO 1952	1387	1562	175	357	1.65%
1953 TO 1962	1463	1834	371	400	2.02%
1963 TO 1972	1349	1607	258	377	1.86%
1973 TO 1982	1224	1463	239	334	1.88%
1983 TO 1992	1268	1531	263	337	1.93%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	147,652	126,028	118,557	107,283
Present Value Taxes	144,009	148,582	138,529	127,234
Present Value Transfer	3,643	-22,554	-19,972	-19,951
Rate of Return	2.08%	1.49%	1.53%	1.49%

Notes: a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.6

Low Mortality

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS PAYROLL
1986 TO 2010	39907	4401	4071	116	447	1.12%
2011 TO 2035	39022	4285	4911	176	-450	-1.15%
2036 TO 2060	34934	3836	5762	229	-1697	-4.86%
1986 TO 2060	113863	12522	14743	521	-1700	-1.49%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	397	3694	3297	172	11.66%
1913 TO 1922	518	1631	1113	102	5.78%
1923 TO 1932	750	1561	811	174	3.81%
1933 TO 1942	965	1555	589	181	2.97%
1943 TO 1952	1504	1987	483	260	2.36%
1953 TO 1962	1603	2348	745	285	2.69%
1963 TO 1972	1503	2126	624	251	2.59%
1973 TO 1982	1378	1982	604	208	2.67%
1983 TO 1992	1441	2118	677	196	2.76%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	180,553	161,618	158,119	146,441
Present Value Taxes	145,855	151,144	141,438	130,291
Present Value Transfer	34,698	10,474	16,681	16,120
Rate of Return	2.66%	2.20%	2.32%	2.33%

Notes:
a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.7

<u>High Fertility</u>

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS÷ PAYROLL
1986 TO 2010	39616	4369	3997	114	486	1.23%
2011 TO 2035	39909	4382	4422	158	119	0.30%
2036 TO 2060	39560	4344	4946	196	-406	-1.03%
1986 TO 2060	119085	13095	13365	469	199	0.17%

Notes: a. Income taxation of benefits.
Note: For Parts B and C there is no change from the Base Case.

Table A.8

Low Fertility

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS/ PAYROLL
1986 TO 2010	39540	4361	3997	114	478	1.21%
2011 TO 2035	36762	4036	4422	158	-227	-0.62%
2036 TO 2060	28398	3118	4896	194	-1583	-5.58%
1986 TO 2060	104700	11516	13315	467	-1332	-1.27%

Note: a. Income taxation of benefits.
Note: For Parts B and C there is no change from the Base Case.

Table A.9

Overall Optimistic for Participants

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS% PAYROLL
1986 TO 2010	45089	4973	4219	121	876	1.94%
2011 TO 2035	56187	6169	6315	227	81	0.14%
2036 TO 2060	64598	7093	9223	367	-1764	-2.73%
1986 TO 2060	165874	18235	19757	715	-807	-0.49%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	395	3668	3273	171	11.66%
1913 TO 1922	514	1620	1106	101	5.79%
1923 TO 1932	754	1641	886	173	3.97%
1933 TO 1942	1003	1806	803	184	3.35%
1943 TO 1952	1643	2544	900	274	2.87%
1953 TO 1962	1880	3310	1430	321	3.27%
1963 TO 1972	1921	3305	1384	307	3.20%
1973 TO 1982	1948	3413	1465	282	3.29%
1983 TO 1992	2248	4025	1777	293	3.38%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 Dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	217,856	223,933	250,955	282.302
Present Value Taxes	155,667	180,019	194,687	208.545
Present Value Transfer	62,191	43,914	56,268	73.758
Rate of Return	3.06%	2.66%	2.76%	2.90%

Notes:
a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.10

Overall Pessimistic for Participants

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS/ PAYROLL
1986 TO 2010	36306	4004	3683	105	425	1.17%
2011 TO 2035	31098	3415	3540	127	1	0.00%
2036 TO 2060	24534	2694	3366	134	-539	-2.19%
1986 TO 2060	91938	10112	10590	365	-113	-0.12%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	396	3538	3142	183	11.50%
1913 TO 1922	501	1521	1020	118	5.59%
1923 TO 1932	745	1391	645	170	3.47%
1933 TO 1942	904	1226	322	209	2.31%
1943 TO 1952	1312	1341	28	344	1.35%
1953 TO 1962	1331	1503	172	371	1.70%
1963 TO 1972	1170	1256	86	333	1.55%
1973 TO 1982	1009	1088	79	280	1.58%
1983 TO 1992	996	1085	89	269	1.63%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 Dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	128,307	105,724	89,142	77,829
Present Value Taxes	137,769	133,598	115,423	98,559
Present Value Transfer	-9,462	-27,874	-26,281	-20,729
Rate of Return	1.78%	1.30%	1.23%	1.30%

Notes:
a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.11

Overall Optimistic Scenario

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS/PAYROLL
1986 TO 2010	44698	4930	3909	112	1133	2.54%
2011 TO 2035	57150	6275	5328	191	1139	1.99%
2036 TO 2060	72604	7972	7138	284	1117	1.54%
1986 TO 2060	174452	19177	16376	587	3389	1.94%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	389	3477	3087	180	11.50%
1913 TO 1922	493	1497	1004	116	5.60%
1923 TO 1932	750	1514	764	168	3.77%
1933 TO 1942	963	1580	617	214	2.98%
1943 TO 1952	1517	2001	484	377	2.18%
1953 TO 1962	1716	2585	869	451	2.62%
1963 TO 1972	1724	2498	774	462	2.47%
1973 TO 1982	1730	2520	789	452	2.50%
1983 TO 1992	2055	3022	967	523	2.55%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	177,382	175,680	189,049	206,122
Present Value Taxes	153,492	176,518	190,083	202,926
Present Value Transfer	23,890	-838	-1,034	3,196
Rate of Return	2.48%	1.98%	1.98%	2.05%

Notes: a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.12

<u>Overall Pessimistic Scenario</u>

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS / PAYROLL
1986 TO 2010	36597	4036	3987	114	163	0.44%
2011 TO 2035	30288	3326	4232	152	-755	-2.49%
2036 TO 2060	20795	2283	4434	176	-1975	-9.50%
1986 TO 2060	87679	9644	12653	441	-2567	-2.93%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	401	3729	3329	174	11.66%
1913 TO 1922	522	1646	1123	103	5.78%
1923 TO 1932	749	1509	759	175	3.69%
1933 TO 1942	941	1400	458	179	2.70%
1943 TO 1952	1423	1706	283	251	2.06%
1953 TO 1962	1457	1924	466	264	2.37%
1963 TO 1972	1303	1662	359	222	2.29%
1973 TO 1982	1135	1474	338	175	2.37%
1983 TO 1992	1073	1424	351	149	2.46%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	156,901	134,791	118,899	107.208
Present Value Taxes	139,419	135,729	117,675	100.761
Present Value Transfer	17,482	-938	1,225	6.447
Rate of Return	2.36%	1.98%	2.03%	2.17%

Notes: a. Income taxation of benefits.
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.

Table A.13

Pay-As-You-Go Tax Rates

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS\ PAYROLL
1986 TO 2010	39584	3875	3997	114	-8	-0.02%
2011 TO 2035	38540	4263	4422	158	0	0.00%
2036 TO 2060	34460	4730	4925	196	0	0.00%
1986 TO 2060	112584	12868	13344	468	-8	-0.01%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3671	3286	186	11.61%
1913 TO 1922	489	1582	1093	121	5.74%
1923 TO 1932	770	1508	739	149	3.73%
1933 TO 1942	917	1446	529	190	2.84%
1943 TO 1952	1277	1695	418	324	2.17%
1953 TO 1962	1398	2040	642	321	2.56%
1963 TO 1972	1332	1809	477	296	2.37%
1973 TO 1982	1284	1660	376	270	2.26%
1983 TO 1992	1441	1751	309	293	2.09%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	161,460*	140,255*	133,714*	122,097*
Present Value Taxes	135,689	136,580	136,663	143,260
Present Value Transfer	25,771	3,675	-2,947	-21,163
Rate of Return	2.53%	2.08%	1.93%	1.51%

Notes: a: Income taxation of benefits.
b: Payroll taxes paid by those who survive to collect benefits.
c: Benefits net of income taxation.
d: Payroll taxes paid by those who do not survive to collect benefits.
*Same as Base Case.

Table A.14

Pay-As-You-Go Benefits

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS\ PAYROLL
1986 TO 2010	39584	4366	4504	130	-8	-0.02%
2011 TO 2035	38540	4232	4388	156	0	0.00%
2036 TO 2060	34460	3784	3940	156	0	0.00%
1986 TO 2060	112584	12381	12832	443	-8	-0.01%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3729	3344	186	11.62%
1913 TO 1922	489	1702	1213	121	5.94%
1923 TO 1932	776	1722	946	149	4.16%
1933 TO 1942	952	1640	688	193	3.18%
1943 TO 1952	1378	1696	317	340	1.96%
1953 TO 1962	1525	1768	244	350	1.89%
1963 TO 1972	1414	1463	49	325	1.56%
1973 TO 1982	1287	1308	21	283	1.54%
1983 TO 1992	1337	1348	11	282	1.54%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	167,542*	117,851*	106,195*	93,737*
Present Value Taxes	144,950*	149,825*	139,859*	128,581*
Present Value Transfer	22,592	-31,974	-33,664	-34,844
Rate of Return	2.47%	1.27%	1.17%	1.06%

Notes: a: Income taxation of benefits.
b: Payroll taxes paid by those who survive to collect benefits.
c: Benefits net of income taxation.
d: Payroll taxes paid by those who do not survive to collect benefits.
*Same as Base Case.

Table A.15

Benefit Ratchet-unfunded

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS% PAYROLL
1986 TO 2010	39584	4366	4511	130	-15	-0.04%
2011 TO 2035	38540	4232	5748	206	-1311	-3.40%
2036 TO 2060	34460	3784	6403	254	-2365	-6.86%
1986 TO 2060	112584	12381	16662	591	-3690	-3.28%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3730	3346	186	11.62%
1913 TO 1922	489	1713	1224	121	5.95%
1923 TO 1932	776	1782	1006	149	4.25%
1933 TO 1942	952	1840	889	193	3.50%
1943 TO 1952	1378	2203	825	340	2.75%
1953 TO 1962	1525	2652	1127	350	3.07%
1963 TO 1972	1414	2351	937	325	2.92%
1973 TO 1982	1287	2158	871	283	2.96%
1983 TO 1992	1337	2276	939	282	3.02%

Notes: a: Income taxation of benefits.
b: Payroll taxes paid by those who survive to collect benefits.
c: Benefits net of income taxation.
d: Payroll taxes paid by those who do not survive to collect benefits.

Table A.16

<u>Benefit Ratchet, funded by taxes</u>

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS/ PAYROLL
1986 TO 2010	39584	4373	4511	130	-8	-0.02%
2011 TO 2035	38540	5542	5748	206	0	0.00%
2036 TO 2060	34460	6149	6403	254	0	0.00%
1986 TO 2060	112584	16064	16662	591	-8	-0.01%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3730	3346	186	11.62%
1913 TO 1922	489	1713	1224	121	5.95%
1923 TO 1932	776	1782	1006	149	4.25%
1933 TO 1942	952	1840	889	193	3.50%
1943 TO 1952	1390	2203	813	341	2.73%
1953 TO 1962	1611	2652	1041	359	2.95%
1963 TO 1972	1622	2351	730	354	2.58%
1973 TO 1982	1634	2158	524	342	2.33%
1983 TO 1992	1871	2276	405	380	2.09%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefit	209,904	182,337	173,834	158.731
Present Value Taxes	145,058	159,960	173,405	186.244
Present Value Transfer	64,846	22,377	429	-27.513
Rate of Return	3.16%	2.40%	2.01%	1.51

Notes:
- a: Income taxation of benefits.
- b: Payroll taxes paid by those who survive to collect benefits.
- c: Benefits net of income taxation.
- d: Payroll taxes paid by those who do not survive to collect benefits.

Table A.17

Surplus Dissipated, Funded by Tax Increase After 2025

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS / PAYROLL
1986 TO 2010	39584	4366	3997	114	483	1.22%
2011 TO 2035	38540	4470	4422	158	206	0.54%
2036 TO 2060	34460	4730	4925	196	0	0.00%
1986 TO 2060	112584	13565	13344	468	689	0.61%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3671	3286	186	11.61%
1913 TO 1922	489	1582	1093	121	5.74%
1923 TO 1932	776	1508	732	149	3.72%
1933 TO 1942	952	1446	495	193	2.75%
1943 TO 1952	1378	1695	316	340	1.96%
1953 TO 1962	1527	2040	513	350	2.31%
1963 TO 1972	1450	1809	359	328	2.11%
1973 TO 1982	1378	1660	283	296	2.04%
1983 TO 1992	1500	1751	251	308	1.96%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 Dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	161,460*	140,255*	133,714*	122,097*
Present Value Taxes	144,950*	150,028	147,709	146,518
Present Value Transfer	16,510*	-9,773	-13,995	-24,421
Rate of Return	2.34%*	1.80%	1.70%	1.44%

Notes: a: Income taxation of benefits.
b: Payroll taxes paid by those who survive to collect benefits.
c: Benefits net of income taxation.
d: Payroll taxes paid by those who do not survive to collect benefits.
*Same as Base Case.

Table A.18

Surplus Dissipated - Benefits Reduced After 2025

A. FINANCIAL FLOWS OF OASI TRUST FUND
1986 $BILLIONS, DISCOUNTED TO 1986

TIME PERIOD	PAYROLL	TAXES	BENEFITS	BEN TAXES[a]	SURPLUS	SURPLUS / PAYROLL
1986 TO 2010	39584	4366	3997	114	483	1.22%
2011 TO 2035	38540	4232	4175	149	206	0.54%
2036 TO 2060	34460	3784	3940	156	0	0.00%
1986 TO 2060	112584	12381	12112	420	689	0.61%

B. FINANCIAL PATTERNS FOR BIRTH-YEAR COHORTS
1986 $BILLIONS, DISCOUNTED TO 1986

Year of Birth	RETIREE TAXES[b]	NET BENEFITS[c]	TRANSFER	NONSURVIVOR TAXES[d]	REAL RATE OF RETURN
BEFORE 1912	385	3671	3286	186	11.61%
1913 TO 1922	489	1582	1093	121	5.74%
1923 TO 1932	776	1506	730	149	3.71%
1933 TO 1942	952	1425	473	193	2.71%
1943 TO 1952	1378	1609	231	340	1.80%
1953 TO 1962	1525	1767	242	350	1.89%
1963 TO 1972	1414	1463	49	325	1.56%
1973 TO 1982	1287	1308	21	283	1.54%
1983 TO 1992	1337	1348	11	282	1.54%

C. EXPECTED VALUES FOR MIDDLE-INCOME SINGLE-EARNER COUPLES
(1986 Dollars, discounted to 1986)

	Year of Birth of Couple			
	1945	1960	1975	1990
Present Value Benefits	155,297*	117,851	106,195*	93,737*
Present Value Taxes	144,950*	149,825	139,859*	128,581*
Present Value Transfer	10,347	-31,974	-33,664	-34,844
Rate of Return	2.22%	1.27%	1.17%	1.06%

Notes: a. Income taxation of benefits
b. Payroll taxes paid by those who survive to collect benefits.
c. Benefits net of income taxation.
d. Payroll taxes paid by those who do not survive to collect benefits.
*Same as Base Case.

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