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SOCIAL SECURITY'S TREATMENT OF POSTWAR AMERICANS

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EXECUTIVE SUMMARY

Social security faces a major long-term funding crisis. A 38 or greater percentage increase in the system's tax rate is needed to meet benefit payments on an ongoing basis. Tax increases of this magnitude or comparable benefit cuts would significantly worsen social security's treatment of

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postwar Americans. This paper uses CORSIM (a dynamic micro simulation model) and SOCSIM (a detailed social security benefit calculator) to study this treatment. The study finds that Americans born in the postwar period will, under current law, lose roughly 5 cents of every dollar they earn to the OASI program in taxes net of benefits. Measured as a proportion of their lifetime labor incomes, the middle class are the biggest losers, surrendering about 7 cents per dollar earned. But measured in absolute dollars, the rich lose the most. Out of every dollar that postwar Americans contribute to the OASI system, 67 cents represent a pure tax. The system treats women better than men, whites better than non-whites, and the college-educated better than the non-college-educated. While the system has been partially effective in pooling risk across households, it offers postwar cohorts internal rates of return on their contributions that are quite low—1.86 percent. This is half the real rate currently being paid on inflation-indexed long-term U.S. government bonds. If taxes are raised or benefits cut by the amounts needed, under intermediate assumptions, to achieve intertemporal budget balance in the OASI program, postwar Americans will end up receiving a 1 percent real return on their contributions.

1. INTRODUCTION

Social security is facing a severe long-term financing problem. The problem is much deeper than is either commonly understood or publicly acknowledged. According to unpublished "intermediate" estimates by Social Security's actuaries, a 4.7-percentage-point hike in the current 12.4-percentage-point old age, disability, and survivors (OASDI) tax rate is needed to pay for social security benefits on an ongoing basis. This tax hike is twice as large as the rate social security's *Trustees Report* says is needed to achieve long-term actuarial balance. The discrepancy is easily explained. The *Trustees Report* uses a truncated projection horizon—one which makes social security's long-term finances look much better than they actually are.

The size of this requisite tax hike is even more remarkable when one considers that it was calculated using "intermediate" demographic and economic assumptions. Under more pessimistic, but arguably more realistic assumptions, more than a 6-percentage-point immediate and permanent payroll tax hike is needed. If such tax hikes are not enacted in the short term, even larger tax hikes will be required in the long term. Alternatively, social security benefits will have to be dramatically reduced. Such tax increases or benefit cuts would significantly raise the significant net taxes being paid to Social Security by postwar Americans.

This paper first examines the lifetime net old age and survivors insur-

ance (OASI) benefits—OASI benefits less OASI taxes—to be paid to postwar generations based on current law, ignoring the tax hikes or benefit cuts needed to maintain the system's solvency. It then shows how social security's treatment of postwar Americans worsens when alternative fiscal adjustments are made. The paper also compares the lifetime net benefits of successive postwar cohorts to determine whether younger cohorts are getting a worse deal than older ones. Equally important, it compares social security's treatment of the rich, middle-class, and poor members of each of these cohorts. This intra-cohort analysis of the system's progressivity is also conducted on a lifetime basis. The paper also considers the degree of insurance protection provided by the OASI program. It does so by considering the variability of individuals' lifetime incomes before and after the application of OASI taxes and the provision of OASI benefits. Understanding this insurance function is important, since the losses that postwar generations incur through the saving portion of OASI may be offset by gains through its provision of insurance. Finally, the paper considers the real internal rate of return that postwar cohorts earn on their OASI contributions.

Although the paper considers the OASI system in great detail, it leaves out the disability insurance (DI) portion of social security. It also ignores the taxation of social security benefits under federal and state income taxes. Both of these omissions lead to an understatement of social security's redistribution from the lifetime rich to the lifetime poor.

Our tools are two: CORSIM (a dynamic micro simulation model) and SOCSIM (a detailed social security benefit calculator). We use these programs to calculate lifetime net OASI benefits for baby-boomers and their children. CORSIM generates a representative sample of lifetime earnings and demographic trajectories for Americans born or to be born between 1945 and 2000. SOCSIM determines the OASI benefits and taxes received and paid by the CORSIM sample. The paper then uses these benefits and taxes to (1) compute the lifetime net benefits (benefits less taxes) paid to different cohorts and subgroups within cohorts of the baby boomers and their children and (2) measure how well OASI pools risk across cohort members by reducing the variance of lifetime income.

CORSIM starts with a representative sample of Americans alive in 1960. It then "grows" this sample demographically and economically. Specifically, it ages, marries, divorces, fertilizes, educates, employs, unemploys, re-employs, retires, and kills original sample members and their descendants over the period 1960 through 2090. SOCSIM uses completed lifetime demographic and economic experiences to determine OASI retirement, spousal, widow(er), mother, father, children, and divorcee benefits as well as OASI taxes. It does so taking into account social security's earnings

test, family benefit maxima, actuarial reductions and increases, benefit recomputation, eligibility rules, ceiling on taxable earnings, and legislated changes in normal retirement ages.

To summarize the paper's main findings: Americans born in the postwar period will, under current law, lose roughly 5 cents of every dollar they earn to the OASI program in taxes net of benefits. Out of every dollar that postwar Americans contribute to the OASI system, 67 cents represents a pure tax. The system treats women better than men, whites better than non-whites, and the college-educated better than the non-college-educated. While the system has been partially effective in pooling risk across households, it offers postwar cohorts internal rates of return on their contributions that are quite low—under 2 percent. If taxes are raised or benefits cut by the amounts needed, under intermediate assumptions, to achieve intertemporal budget balance in the OASI program, postwar Americans will end up receiving a 1 percent real return on their contributions and giving 7 cents of every dollar earned to OASI in net taxes.

Measured as a proportion of their lifetime labor incomes, the middle class are the biggest losers from social security, but measured in absolute dollars, the rich lose the most. On average, postwar middle-class workers pay about 7 cents per dollar earned to OASI in net taxes, compared to −0.7 cents for the lowest-paid workers and 4.3 cents for the highest-paid workers. But in absolute terms, today's highest earners pay roughly $625,000 measured as of age 65, compared to roughly $375,000 for today's middle-class workers, and −$40,000 for today's lowest earners.[1]

As an average, out of every dollar that postwar Americans contribute to the OASI system, 67 cents represent a pure tax. The pure-tax component of each dollar contributed is very similar across all postwar Americans. The degree of pure OASI taxation is less than 50 cents on the dollar for very low lifetime earners and greater than 75 cents on the dollar for very high lifetime earners.

Men pay about 1 percent more of their lifetime earnings to OASI in net taxes than do women. The higher male net tax rates obtain even controlling for lifetime earnings. They reflect shorter male life expectancy and less frequent receipt of OASI dependent and survivor benefits. Nonwhites, because of their shorter life expectancies, face slightly higher

[1] Our findings about the system's progressivity are sensitive to the assumed real discount rate. We use a 5-percent rate for reasons discussed below. For lower discount rates, social security appears more progressive when progressivity is measured in terms of net taxes relative to lifetime labor income. Indeed, with a low enough discount rate, social security's lifetime net rate rises with the level of lifetime income for postwar cohorts—the same finding reported by Steuerle and Bakija (1994) and Coronado, Fullerton, and Glass (this volume).

(about a third of a percentage point) lifetime OASI net tax rates than do whites. This is particularly true at lower levels of lifetime earnings. College-educated workers face somewhat lower (about three-fifths of a percentage point) lifetime OASI net tax rates than non-college-educated workers, but this difference disappears once one controls for lifetime earnings.

One rationale for the OASI program is that it pools earnings and longevity risks through the progressivity of its benefit schedule as well as through its provision of dependent and survivor benefits. The data support this view. Across and within postwar cohorts, the OASI program reduces the variance of lifetime income by about 6 percent.

We proceed in the next section with a brief discussion of social security's long-term financial difficulties and their implications for the baby boomers and their children. Section 3 briefly reviews the literature on social security's inter- and intragenerational redistribution and clarifies how this study breaks new ground. Sections 4 and 5 briefly describe the CORSIM and SOCSIM models, respectively. A detailed description is provided in our NBER working paper (Caldwell et al., 1998). Section 6 summarizes our sample and our constructed data. Section 7 presents our findings, and section 8 summarizes and concludes the paper.

2. SOCIAL SECURITY'S LONG-TERM FINANCIAL CRISIS

As mentioned, under intermediate assumptions, a 4.7-percentage-point immediate and permanent payroll tax increase is needed to pay for projected benefits on an ongoing basis. Since the current tax rate is 12.4 percent, this would represent a 38-percent tax hike. The magnitude of this tax adjustment is more than twice as large as the requisite tax hike acknowledged in the *Social Security Trustees Report.*

The reason for the discrepancy is that the *Trustees Report* looks only 75 years into the future, whereas the calculation generating the 4.7 percent requisite tax hike considers what is needed to maintain the system's solvency on a perpetual basis. Although 75 years may appear to be a safe enough projection horizon, social security is slated to run major deficits in all years beyond this horizon. The *Trustees Report*'s use of the 75-year truncated projection period explains, in part, why social security's finances are again deeply troubled after having been "fixed" by the Greenspan Commission in 1983. Each year that passes brings another major deficit year within the 75-year projection window, and 15 years have now passed since the Commission met.

As painful as a 38-percent tax hike would be, even it would likely fall short of what is really needed to sustain Social Security without cutting benefits. The demographic and economic assumptions for the "intermediate" projections appear to be optimistic on at least two important counts. First, they assume a slower growth in life span than the U.S. has experienced in recent decades. Second, they assume higher future real wage growth than recent experience would suggest.

The life expectancy for Americans born this year is 76 years. The intermediate projection assumes that, over the next 45 years, life expectancy will rise by only 3 years, to 79 years. Since this is Japan's current life expectancy, the Social Security Administration would have us believe that it will take America another 45 years just to reach the current Japanese life span. In assessing this prognosis, it's worth bearing in mind that the last time U.S. life expectancy grew by 3 years, it took only 20 years—from 1977 to the present.

Leading demographers, including Lee and Tuljapurkar (1997, 1998), project much more rapid growth in life expectancy. Indeed, the mid-range of Lee's projection indicates a 10-year, rather than a 5-year life-span extension between now and 2070. This is twice the rise forecast over this period by Social Security in its intermediate projection. Assuming Lee is right, the requisite immediate and permanent OASDI tax hike rises from 4.7 to 5.4 percentage points.

Since 1975, real wages have grown at only 0.4 percent/year, although the growth rate in this decade has been almost twice as high. The intermediate projection assumes a 0.9-percent/year growth rate in real wages over the next 75 years. In conjunction with an extra 5 years of life-span extension, lowering the real-wage growth assumption to 0.4 percent/year would raise the needed tax hike to 5.9 percentage points—a 48-percent increase relative to its current value.

This 48-percentage-point hike in the payroll tax would leave the OASDI tax rate permanently at 18.3 percent. But that's only if it were enacted immediately. If the government waited, say, 10 years to raise tax rates, it would have to raise the OASDI tax rate by another 0.8 percentage points to 19.1 percent to generate the same amount of tax revenue present-valued to today. If it waited 20 years, the OASDI tax rate hike would need to rise to over 20 percent.

There are additional factors, including fertility and net migration, which could turn out worse than projected in the intermediate assumptions. Indeed, one can consider the actuaries' high-cost projection, which assumes that all critical factors will be worse than those assumed in the intermediate projection. Under the high-cost assumptions, which, by the way, are very close to Lee with respect to life-span extension and

assume 0.4 percent future real wage growth, we need a 7-percentage-point OASDI tax rate hike, right now and forever, to pay for social security's benefits on an ongoing basis. This would put the OASDI tax rate at 19.4 percent.

Clearly, social security's finances are troubled. And clearly, it would be mistaken to assess social security's treatment of postwar American generations assuming no future change in current law. Indeed, the government is now actively debating such changes. But knowing precisely what that change will be is, at this point, impossible. Still, the most likely scenario seems to be the maintenance of the program through time, albeit with either major tax hikes, benefit cuts, or both. To cover both of these bases, we entertain below two alternative policies: an immediate and permanent 38 percent increase in the OASI tax rate and an immediate and permanent 25 percent cut in Social Security benefits.

3. PREVIOUS STUDIES OF SOCIAL SECURITY'S LIFETIME NET BENEFITS

Past studies have calculated the value of social security's lifetime net benefits for selected types of married couples and single individuals who differ by age of birth, sex, race, and lifetime earnings patterns. These studies include Nichols and Schreitmueller (1978), Pellechio and Goodfellow (1983), Myers and Schobel (1993), Hurd and Shoven (1985), Boskin, Kotlikoff, Puffert, and Shoven (1987), Steuerle and Bakija (1994), and Diamond and Gruber (1997). Like our paper, Coronado, Fullerton, and Glass (this volume) represents a different approach—namely, considering the dispersion of all potential outcomes. But unlike our paper, Coronado, Fullerton, and Glass examine actual data (from the Panel Study of Income Dynamics) rather than synthetic data. Their paper represents a real step forward in determining exactly how postwar Americans are being treated.

Steuerle and Bakija's study is fairly representative of the past literature and may be the best known prior study. They consider three alternative lifetime wage patterns: low, average, and high, where "low" refers to 45 percent of the average value of social-security-covered earnings, "average" refers to the average value of social-security-covered earnings, and "high" refers to the value of the maximum taxable level of social-security-covered earnings. For each cohort reaching age 65 between 1940 and 2050, Steuerle and Bakija calculate the lifetime net benefits from social security for singles and married couples for alternative sets of these three lifetime wage patterns. For example, they con-

sider married couples in which both spouses have low earnings, one spouse has low earnings and the other average earnings, and one spouse has average earnings and the other high earnings. Steuerle and Bakija use their assumed earnings trajectories to compute retirement, dependent, and survivor benefits. In the case of survivor benefits, the authors consider all possible truncations of the earnings trajectories resulting from all possible alternative dates of early death. Each of the various state-contingent benefits is actuarially discounted to form a lifetime net benefit.

Steuerle and Bakija's findings generally accord with those of previous studies in showing that today's and tomorrow's workers will fare much worse under social security than current and past retirees, that men are disadvantaged relative to women, and that single individuals and two-earner couples face higher net taxes than do single-earner couples. The authors also claim that "for most of Social Security's history, the system has been regressive within generations. That is, within a given cohort of retirees, net transfers have been inversely related to need: people with the highest lifetime incomes have tended to receive the largest absolute transfers above and beyond what they contributed."

Steuerle and Bakija's study pays careful attention to detail and provides an impressive and extensive array of calculations. Yet, it raises five concerns. First, in considering only uninterrupted earnings histories, the study omits a potentially very important source of intra- and intergenerational heterogeneity in lifetime social security net benefits. Second, in assuming fixed lifetime marital status, the study ignores the role of divorce and remarriage in altering social security net benefits. Third, in assuming that receipt of social security retirement benefits starts at workers' ages of normal retirement, the study ignores benefit reductions for age, delayed retirement credits, benefit recomputation, and the earnings test—all of which can materially affect social security's lifetime net benefits. Fourth, the study uses an extremely low real interest rate, just 2 percent, in discounting future net benefits. And fifth, in failing to consider workers who earn above the taxable maximum, the study fails to capture an important regressive element of the system—the fact that for very high-income single individuals and couples, social security's net lifetime taxation is a smaller fraction of lifetime earnings than it is for Steuerle and Bakija's "high" earners.

The fact is that essentially no Americans experience the kinds of smooth and consistent earnings trajectories assumed by Steuerle and Bakija and the other above-cited authors. To begin, there is considerable variation across and within cohort members in work experience. At the macro level we see periodic recessions, changes over time in the normal

rate (what economists call the "natural rate") of unemployment, changes in the duration of unemployment, changes in labor-force participation, a strong and ongoing trend toward early retirement, significant changes over time in fertility rates, and, particularly among the upper income classes, a rise in the average age of first birth. Each of these macro phenomena can materially alter the amount of time members of particular cohorts spend working over the course of their lifetimes. We also know that particular members within each cohort are differentially affected by these phenomena; i.e., we know that blacks experience much higher unemployment rates in general than whites and that these differences are accentuated during downturns; we know that female labor-force participation has risen dramatically in the postwar period; we know that males are retiring ever earlier, whereas females appear to be retiring somewhat later; and we know that changes over time in fertility rates and the age of first birth have altered the amount of time young females spend working.

Even for workers continuously employed from age 21 through their normal retirement age—the type of workers Steuerle and Bakija (1994) and other studies consider—one should expect considerable variation in annual earnings due to variation in weeks worked per year and earnings per week. The Panel Study of Income Dynamics, which is one of the main panel data sets used to study annual earnings, suggests significant year-to-year variation in annual earnings, even of those working full time. Given that some of this variation may reflect measurement/reporting error, there is still a very strong empirical basis for modeling annual earnings variability.

The changing propensity of Americans to form and dissolve marriages also provides a strong argument for a micro simulation approach to studying social security's treatment of the population. Social security is anything but neutral with respect to marital status. The system provides dependent benefits to non-working spouses and secondary earning spouses, provided the dependent spouse was married for at least 10 years with the living worker on whose earning record she or he wishes to claim such benefits. Social security also provides survivor benefits to spouses who are married for as little as 9 months provided the marriage is ongoing at the time the decedent spouse dies or provided the marriage had lasted for at least 10 years. In ignoring divorce and the timing of when divorce occurs, the studies cited have left out a potentially rich form of social security benefit variation.

By entertaining alternative ages of retirement and social security entitlement ages (the age one elects to start collecting social security retirement benefits), micro simulation lets us study how benefit reductions for

age, delayed retirement credits, benefit recomputation, and the earnings test alter who gets what from social security. As detailed below, these decisions and provisions influence not only the worker's own benefits, but also the dependent and survivor benefits that are available under his or her earnings record. For example, individuals who are married for 10 years are eligible to collect spousal dependent benefits at or beyond their age of early retirement, but only if their spouses are themselves collecting social security retirement benefits.

As mentioned, Steuerle and Bakija discount social security benefits and taxes at a 2-percent real rate of return. In using such a low rate, they bias upward their estimates of social security's net benefits for all contributors. But they differentially bias upward their net benefit estimate for those with longer life expectancies—in this case women.

Steuerle and Bakija justify their discount-rate choice as comparable to average real interest rates over time for safe investments. To them "Social Security is an extremely safe investment that is uniquely resistant to economic fluctuations and inflation and receives favorable tax treatment." Each of their rationales is troubled. First, the current real rate of return on the only safe asset available in the economy—inflation-indexed Treasury bonds—is roughly 3.5 percent, which is almost twice Steuerle and Bakija's discount rate. Moreover, the maximum maturity of these bonds is currently 10 years. It could well be that safe rates of return for maturities beyond 10 years could exceed 3.5 percent. Second, social security is a highly risky asset. It's risky with respect to demographic change, the rate of real wage growth, and legislative changes instigated by reform-minded politicians. The repeated number of changes over the years to both tax and benefit provisions of social security as well as its current dire long-term fiscal position attest to these risks. Third, the system has a sorry history with respect to inflation. The double-digit inflation in the early 1970s brought forth double indexation of benefits to inflation. More recently, the CPI Commission reported that social security's benefits are being significantly overindexed to inflation because of mismeasurement of the CPI.

Finally, social security is not a capital asset, and the tax treatments of social security contributions and social security benefits are not relevant to deciding the rate of return at which these flows should be discounted. What is relevant is the after-tax rate of return workers could otherwise receive were they able to invest their contributions in real assets. The opportunity to invest one's contributions in real assets would arise in the context of a privatization of social security. If such a privatization relied on an independent revenue source (e.g., a consumption tax) to pay off benefits accrued under the old system, then workers would be able to

invest at the economy-wide *pre-tax* rate of return.[2] This study takes a 5-percent real discount rate as its central assumption, but also shows results for 3- and 7-percent discount rates. The 5-percent figure can be viewed as combining a 3.5-percent risk-free, pre-tax real rate with a 1.5-percent premium that takes account of the riskiness of social security benefits and taxes.

The use of a more realistic after-tax discount rate and our other methodological choices lead to conclusions that, in many cases, differ from those drawn by Steuerle and Bakija. First, Steuerle and Bakija suggest that, in addition to most lower-income households, "many middle- and upper-income households will continue to receive generous positive transfers from Social Security far into the future" (Steuerle and Bakija, 1994, p. 112). We find much the opposite: net taxes for all postwar generations are positive and very large at all levels of lifetime incomes. Second, Steuerle and Bakija suggest that for most households net lifetime OASI tax rates will be negative and that "even in the worst case" (op. cit., p.115) this nex tax rate will not exceed 5.67 percent. In contrast, we find that baby boomers, as a group, face a 5-percent lifetime net tax rate and that those born after the boomers face a 7-percent rate. We also show that these net tax rates will rise to 6 percent and 10 percent, respectively, if OASI taxes are immediately raised by enough to make the OASI system fiscally sustainable. Finally, Steuerle and Bakija (1994) as well as Coronado, Fullerton, and Glass (this volume) find that the OASI system is progressive when one measures progressivity in terms of lifetime net taxes relative to lifetime income. Although our results accord with theirs assuming a very low discount rate,[3] for the rate we consider, the OASI system is not progressive; instead, for most postwar cohorts, those with the highest level of lifetime income face the smallest lifetime net tax rate.

4. CORSIM

CORSIM is a dynamic micro simulation model of the U.S. population developed by Professor Steven Caldwell of Cornell University and his associates.[4] Micro simulation begins with a population sample and then grows (ages) this population in discrete intervals, such as a month or

[2] To fully evaluate the net gains from privatization, one would also need to discount the future value of any new taxes imposed to finance the privatization transition.

[3] See Appendix Table 1 in Caldwell et al. (1998).

[4] The model is a descendant of DYNASIM, which was developed in the 1970s by Professor Guy Orcutt of Yale University, Professor Caldwell, and others at the Urban Institute.

year. Through the aging process, one simulates life histories for each sample member. Life histories refer to sample members' demographic, economic, health, and social experiences. The simulation is generated by a set of mathematical processes which combine deterministic (systematic) and stochastic (random) elements.[5]

4.1 Alignment to Macro Aggregates

Micro simulation models typically incorporate an alignment process in which initial outcomes generated by the model's in part deterministic and in part stochastic modules are benchmarked to historical aggregates. These aggregates are typically group-specific, such as the average earnings of white females ages 19 to 25 who are married with children in the home and working part time. Benchmarking is performed by calculating group-specific alignment factors, which are applied within each group to the values of the sample member's predicted continuous variable (such as earnings) and probabilities (such as the chance of divorcing). These adjustment factors are then used in a second pass of the model through the population.[6]

4.2 The CORSIM Model

CORSIM begins in 1960. Its initial population is the representative sample of Americans surveyed in the 1960 U.S. Census Public-Use Microdata Sample. This data set is a 1 : 1,000 sample, so one out of every thousand Americans alive in 1960 is included. The Census survey provides much, but not all, of the information needed as baseline data. The remaining information is imputed to the 1960 sample from a variety of sources.

CORSIM grows the 1960 sample demographically and economically in one-year intervals through the year 2100. Demographic growth refers to birth, death, and immigration, entry into the marriage market, family formation, family dissolution, and the schooling attainment. Economic

[5] The processes for continuous variables, such as income, are typically regression equations with a deterministic component that is based on the sample member's socioeconomic characteristics and an error that is typically drawn from a normal distribution with zero mean and known variance. Discrete-state changes (e.g., the transition from unmarried to married, from living to dead, or from not working to working) are generally modeled as logistic functions.

[6] For example, if the model generates fewer (more) than the expected number of births in a given period, the fertility probabilities for women of childbearing age in the period are scaled upward (downward). One can scale continuous variables in a simple linear fashion or by using more complex non-linear methods (see, for example, Johnson, 1996, and Neufeld, 1996a, 1996b).

growth refers to working or not working, choosing annual weeks worked, and determining weekly labor earnings.[7]

As detailed in Caldwell et al. (1996), these and other CORSIM processes are determined by over 1,000 distinct equations, hundreds of rule-based algorithms, and over 5,000 parameters. Data used to estimate and test the separate equation-based modules were drawn from large national microdata files, including High School and Beyond (HSB), the National Longitudinal Survey (NLS), the National Longitudinal Survey of youth (NLS-Y), the Panel Study of Income Dynamics (PSID), the National Longitudinal Mortality Study (NLMS), the Survey of Consumer Finances (SCF), and the U.S. Census Public Use Microdata Sample (PUMS). Data used to construct the rule-based modules and to compute alignment factors are drawn from another six files plus miscellaneous sources.

5. SOCSIM

SOCSIM is a highly detailed OASI benefit calculator developed by Economic Security Planning, Inc. for use in its financial planning software program—ESPlanner™. SOCSIM calculates retirement, spousal, widow(er), mother, father, children, and divorcee benefits as well as OASI taxes. It does so taking into account social security's earnings test, family benefit maxima, actuarial reductions and increases, benefit recomputation, eligibility rules, ceiling on taxable earnings, and legislated changes in normal retirement ages.

Calculation of OASI benefits, the basics of which are described below, is extremely complex. The *Social Security Handbook* describing the rules governing these benefits runs over 500 pages. Even so, on many key points, the *Handbook* is incomplete and misleading. This assessment is shared by Social Security's senior actuaries, who were consulted repeatedly in preparing SOCSIM. Their assistance, which proved invaluable, came in the form of both extensive discussions and the transmittal of numerous, highly detailed benefit calculations. The Social Security actuaries also introduced us to their ANYPIA, which calculates PIAs. Unfortunately, the ANYPIA program considers only one person at a time and does not permit the calculation of multiple, interdependent benefits of household members. Consequently, ANYPIA did not provide an alternative to developing SOCSIM, although we have used it, where possible, to

[7] CORSIM's other economic processes include consumption expenditures; saving; federal, state, and local income and property taxation; individual asset holdings; inheritance; and disability.

check SOCSIM's accuracy. We refer readers to Caldwell et al. (1998) for a detailed discussion of SOCSIM's calculation of each of the various types of social security benefits.

6. SAMPLE SELECTION AND CHARACTERISTICS

Our master sample was produced by running CORSIM from 1960 through 2100. From this master, we selected (1) all never married males and females born between 1945 and 2000 who lived to at least age 15, (2) all males born between 1945 and 2000 who married women born between 1945 and 2010 and lived to at least age 15, and (3) all females born between 1945 and 2000 who married males born between 1945 and 2000 who lived to at least age 15. Selecting the sample in this manner omits (1) males born between 1945 and 2000 who married females born either before 1945 or after 2010 and (2) females born between 1945 and 2000 who married males born either before 1945 or after 2000. Thus, at the early end of the sample we lose some males who married older females and some females who married older males. At the late end of the sample we lose some males who married very much younger females and some females who married younger males.

Whatever bias this selection process introduces should be absent for cohorts born in the central years of our sample. For these cohorts, we are presumably omitting very few, if any, observations. Take those born in 1965. The males born in 1955 who are left out of the sample are those who either married females 20 or more years older than themselves or married females 45 or more years younger than themselves. Those females born in 1965 who are omitted from the sample either married males 20 or more years older than themselves or married males 35 or more years younger than themselves.

The tables presented below break the data down by multi-year cohorts, lifetime earnings, sex, race, and education. With the exception of cohort 95, all multi-year cohorts contain all sample observations born during five consecutive years. Cohort 45 refers to all sample observations born in 1945 through 1949. Cohort 50 refers to all observations born between 1950 and 1954. This definition of the multi-year cohorts prevails except for cohort 95, which contains all sample observations born during the six-year period 1995–2000. In discussing the results below, we use the term cohort to refer to the multi-year cohort groups.

All reported averages in the tables are cell-specific. All lifetime variables are present values measured in 1997 dollars and calculated as of the year the individual is age 18. Unless otherwise indicated, all present values reflect discounting at a 5-percent real rate. The taxes and benefits

used in forming lifetime OASI taxes and benefits are those nominally paid by the taxpayer and his employer and received by the beneficiary. Thus, a dependent benefit paid to a husband is counted as his benefit, notwithstanding the fact that the benefit is based on his wife's earnings record.

Although the discounting we do here is simple, not actuarial, the average cell values we report are averages over life span as well as other outcomes and, in that sense, represent actuarial averages. For example, if we consider the lifetime net taxes paid by all males born between 1945 and 1949 within a certain range of realized lifetime income, the males in this cell will live for different numbers of years, experience different marital outcomes, have different numbers of children at different ages, etc. By averaging the net taxes across all the males in these cells, we are effectively producing the same result as if we considered all the possible life spans and other experiences of each male, multiplied his net taxes under each possible set of outcomes by the probability of that outcome, summed across these products to form an actuarial net tax payment, and then averaged these actuarial net tax payments across all males in the cell.

6.1 The Number and Distribution of Observations

The total number of sample observations is 68,688 individuals. Table 1 gives sample counts, and Table 2 shows the distribution of observations by levels of lifetime earnings. The choice of lifetime earnings brackets was made to spread the observations across the different earnings cells. As Table 1 indicates, the observations are almost equally divided among men and women. They are also fairly evenly distributed across the 11 cohorts. Sixteen percent of the observations are non-white, and 41 percent have one or more years of college education. These percentages increase for successive cohorts. Eleven percent of cohort 45 is non-white, compared with 21 percent of cohort 95. Thirty-one percent of cohort 45 observations have at least one year of college education, compared with 46 percent of cohort 95.

For the earliest (oldest) cohorts, most of the observations are concentrated among lifetime earnings groups below $500,000. But since CORSIM takes into account historical as well as projected real wage growth, the distribution of observations for later cohorts shifts toward higher labor earnings. For example, in cohort 45 less than 7 percent of the observations have lifetime labor earnings in excess of $1.08 million, whereas in cohort 95 almost 15 percent have earnings in that range.

In each cohort women are disproportionally represented among low lifetime earners. For example, in cohort 80, 38 percent of women, but

TABLE 1
Number of Observations

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	1406	1030	721	514	375	240	165	120	87	343	5001
Cohort 50	1725	1257	883	597	399	290	226	156	101	411	6045
Cohort 55	1980	1465	1043	689	441	300	223	182	123	630	7076
Cohort 60	1883	1336	829	578	383	257	192	161	118	629	6366
Cohort 65	1664	1196	792	509	362	293	200	153	117	571	5857
Cohort 70	1598	1142	755	493	358	244	196	126	108	585	5605
Cohort 75	1516	1121	753	493	375	242	209	141	111	584	5545
Cohort 80	1724	1214	821	571	431	272	207	181	124	784	6329
Cohort 85	1665	1309	874	617	452	318	235	176	127	825	6598
Cohort 90	1698	1336	896	607	458	363	274	172	160	868	6832
Cohort 95	1632	1418	973	710	527	372	290	229	196	1087	7434
Men 45	295	396	403	340	269	196	131	91	66	275	2462
Men 50	433	498	459	382	279	205	160	120	74	315	2925
Men 55	560	603	556	408	275	209	155	109	86	457	3418
Men 60	535	589	430	338	228	151	116	97	87	442	3013
Men 65	493	529	413	298	215	190	126	92	84	419	2859
Men 70	500	496	378	290	218	153	126	87	74	413	2735
Men 75	436	488	365	293	241	146	126	79	80	407	2661
Men 80	502	543	453	337	250	155	121	127	88	563	3139
Men 85	475	563	389	329	260	198	143	110	88	575	3130
Men 90	508	547	445	323	268	204	187	110	109	593	3294
Men 95	471	586	498	400	295	236	174	163	123	753	3699
Women 45	1111	634	318	174	106	44	34	29	21	68	2539
Women 50	1292	759	424	215	120	85	66	36	27	96	3120
Women 55	1420	862	487	281	166	91	68	73	37	173	3658
Women 60	1348	747	399	240	155	106	76	64	31	187	3353
Women 65	1171	667	379	211	147	103	74	61	33	152	2998
Women 70	1098	646	377	203	140	91	70	39	34	172	2870
Women 75	1080	633	388	200	134	96	83	62	31	177	2884
Women 80	1222	671	368	234	181	117	86	54	36	221	3190
Women 85	1190	746	485	288	192	120	92	66	39	250	3468
Women 90	1190	789	451	284	190	159	87	62	51	275	3538
Women 95	1161	832	475	310	232	136	116	66	73	334	3735
White 45	1279	902	623	434	331	220	153	108	77	321	4448
White 50	1539	1080	749	508	348	261	191	141	89	373	5279
White 55	1737	1267	901	602	377	268	205	166	114	571	6208
White 60	1626	1150	711	492	334	225	170	144	107	548	5507
White 65	1428	980	650	434	318	251	177	133	105	504	4980
White 70	1352	921	613	422	287	215	164	112	90	500	4676
White 75	1263	891	639	407	300	205	176	117	86	498	4582
White 80	1419	991	672	472	364	225	167	146	97	679	5232
White 85	1367	1058	715	519	367	256	194	151	106	701	5434
White 90	1345	1060	707	499	374	275	221	132	134	742	5489
White 95	1288	1072	751	556	401	301	229	194	163	893	5848

TABLE 1 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	127	128	98	80	44	20	12	12	10	22	553
Non-white 50	186	177	134	89	51	29	35	15	12	38	766
Non-white 55	243	198	142	87	64	32	18	16	9	59	868
Non-white 60	257	186	118	86	49	32	22	17	11	81	859
Non-white 65	236	216	142	75	44	42	23	20	12	67	877
Non-white 70	246	221	142	71	71	29	32	14	18	85	929
Non-white 75	253	230	114	86	75	37	33	24	25	86	963
Non-white 80	305	223	149	99	67	47	40	35	27	105	1097
Non-white 85	298	251	159	98	85	62	41	25	21	124	1164
Non-white 90	353	276	189	108	84	88	53	40	26	126	1343
Non-white 95	344	346	222	154	126	71	61	35	33	194	1586
Non-college 45	1050	758	540	352	258	129	97	67	52	168	3471
Non-college 50	1233	887	601	401	242	179	124	86	55	201	4009
Non-college 55	1402	994	688	442	281	168	134	110	73	325	4617
Non-college 60	1297	843	549	356	224	144	121	91	67	288	3980
Non-college 65	1104	758	492	297	202	168	111	97	68	268	3565
Non-college 70	1006	679	430	264	202	117	95	57	58	247	3155
Non-college 75	941	661	407	268	205	104	101	71	55	255	3068
Non-college 80	1034	695	444	310	227	147	103	87	60	310	3417
Non-college 85	1037	746	498	335	229	153	102	70	63	351	3584
Non-college 90	1039	775	514	321	237	180	126	90	78	364	3724
Non-college 95	1013	835	562	355	276	187	143	99	105	439	4014
College 45	356	272	181	162	117	111	68	53	35	175	1530
College 50	492	370	282	196	157	111	102	70	46	210	2036
College 55	578	471	355	247	160	132	89	72	50	305	2459
College 60	586	493	280	222	159	113	71	70	51	341	2386
College 65	560	438	300	212	160	125	89	56	49	303	2292
College 70	592	463	325	229	156	127	101	69	50	338	2450
College 75	575	460	346	225	170	138	108	70	56	329	2477
College 80	690	519	377	261	204	125	104	94	64	474	2912
College 85	628	563	376	282	223	165	133	106	64	474	3014
College 90	659	561	382	286	221	183	148	82	82	504	3108
College 95	619	583	411	355	251	185	147	130	91	648	3420

only 16 of men, have lifetime earnings below $120,000. At the other earnings extreme, 18 percent of men, but only 10 percent of women, have lifetime earnings of $1.08 million or more. Non-whites and non-college-educated observations also have disproportionately low levels of lifetime earnings. Take cohort 65. Overall, 62 percent of observations have lifetime earnings below $480,000. But among non-whites, this percentage is 68, and among the non-college-educated, it is 66.

TABLE 2
Distribution of Observatons

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	28.1	20.6	14.4	10.3	7.5	4.8	3.3	2.4	1.7	6.9	100.0
Cohort 50	28.5	20.8	14.6	9.9	6.6	4.8	3.7	2.6	1.7	6.8	100.0
Cohort 55	28.0	20.7	14.7	9.7	6.2	4.2	3.2	2.6	1.7	8.9	100.0
Cohort 60	29.6	21.0	13.0	9.1	6.0	4.0	3.0	2.5	1.9	9.9	100.0
Cohort 65	28.4	20.4	13.5	8.7	6.2	5.0	3.4	2.6	2.0	9.7	100.0
Cohort 70	28.5	20.4	13.5	8.8	6.4	4.4	3.5	2.2	1.9	10.4	100.0
Cohort 75	27.3	20.2	13.6	8.9	6.8	4.4	3.8	2.5	2.0	10.5	100.0
Cohort 80	27.2	19.2	13.0	9.0	6.8	4.3	3.3	2.9	2.0	12.4	100.0
Cohort 85	25.2	19.8	13.2	9.4	6.9	4.8	3.6	2.7	1.9	12.5	100.0
Cohort 90	24.9	19.6	13.1	8.9	6.7	5.3	4.0	2.5	2.3	12.7	100.0
Cohort 95	22.0	19.1	13.1	9.6	7.1	5.0	3.9	3.1	2.6	14.6	100.0
Men 45	12.0	16.1	16.4	13.8	10.9	8.0	5.3	3.7	2.7	11.2	100.0
Men 50	14.8	17.0	15.7	13.1	9.5	7.0	5.5	4.1	2.5	10.8	100.0
Men 55	16.4	17.6	16.3	11.9	8.0	6.1	4.5	3.2	2.5	13.4	100.0
Men 60	17.8	19.5	14.3	11.2	7.6	5.0	3.8	3.2	2.9	14.7	100.0
Men 65	17.2	18.5	14.4	10.4	7.5	6.6	4.4	3.2	2.9	14.7	100.0
Men 70	18.3	18.1	13.8	10.6	8.0	5.6	4.6	3.2	2.7	15.1	100.0
Men 75	16.4	18.3	13.7	11.0	9.1	5.5	4.7	3.0	3.0	15.3	100.0
Men 80	16.0	17.3	14.4	10.7	8.0	4.9	3.9	4.0	2.8	17.9	100.0
Men 85	15.2	18.0	12.4	10.5	8.3	6.3	4.6	3.5	2.8	18.4	100.0
Men 90	15.4	16.6	13.5	9.8	8.1	6.2	5.7	3.3	3.3	18.0	100.0
Men 95	12.7	15.8	13.5	10.8	8.0	6.4	4.7	4.4	3.3	20.4	100.0
Women 45	43.8	25.0	12.5	6.9	4.2	1.7	1.3	1.1	0.8	2.7	100.0
Women 50	41.4	24.3	13.6	6.9	3.8	2.7	2.1	1.2	0.9	3.1	100.0
Women 55	38.8	23.6	13.3	7.7	4.5	2.5	1.9	2.0	1.0	4.7	100.0
Women 60	40.2	22.3	11.9	7.2	4.6	3.2	2.3	1.9	0.9	5.6	100.0
Women 65	39.1	22.2	12.6	7.0	4.9	3.4	2.5	2.0	1.1	5.1	100.0
Women 70	38.3	22.5	13.1	7.1	4.9	3.2	2.4	1.4	1.2	6.0	100.0
Women 75	37.4	21.9	13.5	6.9	4.6	3.3	2.9	2.1	1.1	6.1	100.0
Women 80	38.3	21.0	11.5	7.3	5.7	3.7	2.7	1.7	1.1	6.9	100.0
Women 85	34.3	21.5	14.0	8.3	5.5	3.5	2.7	1.9	1.1	7.2	100.0
Women 90	33.6	22.3	12.7	8.0	5.4	4.5	2.5	1.8	1.4	7.8	100.0
Women 95	31.1	22.3	12.7	8.3	6.2	3.6	3.1	1.8	2.0	8.9	100.0
White 45	28.8	20.3	14.0	9.8	7.4	4.9	3.4	2.4	1.7	7.2	100.0
White 50	29.2	20.5	14.2	9.6	6.6	4.9	3.6	2.7	1.7	7.1	100.0
White 55	28.0	20.4	14.5	9.7	6.1	4.3	3.3	2.7	1.8	9.2	100.0
White 60	29.5	20.9	12.9	8.9	6.1	4.1	3.1	2.6	1.9	10.0	100.0
White 65	28.7	19.7	13.1	8.7	6.4	5.0	3.6	2.7	2.1	10.1	100.0
White 70	28.9	19.7	13.1	9.0	6.1	4.6	3.5	2.4	1.9	10.7	100.0
White 75	27.6	19.4	13.9	8.9	6.5	4.5	3.8	2.6	1.9	10.9	100.0
White 80	27.1	18.9	12.8	9.0	7.0	4.3	3.2	2.8	1.9	13.0	100.0
White 85	25.2	19.5	13.2	9.6	6.8	4.7	3.6	2.8	2.0	12.9	100.0
White 90	24.5	19.3	12.9	9.1	6.8	5.0	4.0	2.4	2.4	13.5	100.0
White 95	22.0	18.3	12.8	9.5	6.9	5.1	3.9	3.3	2.8	15.3	100.0

TABLE 2 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	23.0	23.1	17.7	14.5	8.0	3.6	2.2	2.2	1.8	4.0	100.0
Non-white 50	24.3	23.1	17.5	11.6	6.7	3.8	4.6	2.0	1.6	5.0	100.0
Non-white 55	28.0	22.8	16.4	10.0	7.4	3.7	2.1	1.8	1.0	6.8	100.0
Non-white 60	29.9	21.7	13.7	10.0	5.7	3.7	2.6	2.0	1.3	9.4	100.0
Non-white 65	26.9	24.6	16.2	8.6	5.0	4.8	2.6	2.3	1.4	7.6	100.0
Non-white 70	26.5	23.8	15.3	7.6	7.6	3.1	3.4	1.5	1.9	9.1	100.0
Non-white 75	26.3	23.9	11.8	8.9	7.8	3.8	3.4	2.5	2.6	8.9	100.0
Non-white 80	27.8	20.3	13.6	9.0	6.1	4.3	3.6	3.2	2.5	9.6	100.0
Non-white 85	25.6	21.6	13.7	8.4	7.3	5.3	3.5	2.1	1.8	10.7	100.0
Non-white 90	26.3	20.6	14.1	8.0	6.3	6.6	3.9	3.0	1.9	9.4	100.0
Non-white 95	21.7	21.8	14.0	9.7	7.9	4.5	3.8	2.2	2.1	12.2	100.0
Non-college 45	30.3	21.8	15.6	10.1	7.4	3.7	2.8	1.9	1.5	4.8	100.0
Non-college 50	30.8	22.1	15.0	10.0	6.0	4.5	3.1	2.1	1.4	5.0	100.0
Non-college 55	30.4	21.5	14.9	9.6	6.1	3.6	2.9	2.4	1.6	7.0	100.0
Non-college 60	32.6	21.2	13.8	8.9	5.6	3.6	3.0	2.3	1.7	7.2	100.0
Non-college 65	31.0	21.3	13.8	8.3	5.7	4.7	3.1	2.7	1.9	7.5	100.0
Non-college 70	31.9	21.5	13.6	8.4	6.4	3.7	3.0	1.8	1.8	7.8	100.0
Non-college 75	30.7	21.5	13.3	8.7	6.7	3.4	3.3	2.3	1.8	8.3	100.0
Non-college 80	30.3	20.3	13.0	9.1	6.6	4.3	3.0	2.5	1.8	9.1	100.0
Non-college 85	28.9	20.8	13.9	9.3	6.4	4.3	2.8	2.0	1.8	9.8	100.0
Non-college 90	27.9	20.8	13.8	8.6	6.4	4.8	3.4	2.4	2.1	9.8	100.0
Non-college 95	25.2	20.8	14.0	8.8	6.9	4.7	3.6	2.5	2.6	10.9	100.0
College 45	23.3	17.8	11.8	10.6	7.6	7.3	4.4	3.5	2.3	11.4	100.0
College 50	24.2	18.2	13.9	9.6	7.7	5.5	5.0	3.4	2.3	10.3	100.0
College 55	23.5	19.2	14.4	10.0	6.5	5.4	3.6	2.9	2.0	12.4	100.0
College 60	24.6	20.7	11.7	9.3	6.7	4.7	3.0	2.9	2.1	14.3	100.0
College 65	24.4	19.1	13.1	9.2	7.0	5.5	3.9	2.4	2.1	13.2	100.0
College 70	24.2	18.9	13.3	9.3	6.4	5.2	4.1	2.8	2.0	13.8	100.0
College 75	23.2	18.6	14.0	9.1	6.9	5.6	4.4	2.8	2.3	13.3	100.0
College 80	23.7	17.8	12.9	9.0	7.0	4.3	3.6	3.2	2.2	16.3	100.0
College 85	20.8	18.7	12.5	9.4	7.4	5.5	4.4	3.5	2.1	15.7	100.0
College 90	21.2	18.1	12.3	9.2	7.1	5.9	4.8	2.6	2.6	16.2	100.0
College 95	18.1	17.0	12.0	10.4	7.3	5.4	4.3	3.8	2.7	18.9	100.0

6.2 Average Ages of Death

Since social security pays its benefits in the form of annuities, how long one lives is a critical factor in determining how much one benefits from the system. Table 3 reports the average ages of death for our sample. As one would expect, later cohorts live longer, females outlive males, whites outlive non-whites, and those with college education outlive those without. The average age of death for the first five cohorts is 79.5, compared with 81.1 for the last five. Across the entire sample, females outlive males by 6.3 years. But this age gap narrows between the earliest

TABLE 3
Average Age of Death

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	79.0	79.4	78.2	78.9	78.6	79.1	79.8	80.4	79.7	79.8	79.1
Cohort 50	79.2	78.7	78.2	78.4	79.2	78.8	79.3	78.7	79.4	80.3	78.9
Cohort 55	79.2	79.1	79.2	79.9	80.8	78.9	78.5	79.9	79.5	81.3	79.5
Cohort 60	79.6	79.4	80.0	78.3	80.5	81.6	80.4	79.8	80.2	82.3	79.9
Cohort 65	79.2	80.0	80.9	79.5	80.3	81.0	82.8	83.6	79.4	81.2	80.2
Cohort 70	80.0	80.5	81.3	80.8	80.7	81.7	81.7	79.1	80.9	81.7	80.7
Cohort 75	80.3	81.1	80.9	80.4	81.6	82.1	81.0	82.9	79.4	82.3	81.0
Cohort 80	80.9	80.9	80.4	80.8	81.2	81.4	83.8	80.8	81.0	82.1	81.1
Cohort 85	80.7	80.9	81.6	81.5	82.9	81.6	83.5	81.6	80.6	83.1	81.5
Cohort 90	80.8	80.5	81.3	80.7	81.2	81.0	81.4	82.7	80.9	82.8	81.2
Cohort 95	79.9	80.1	79.9	80.9	81.3	82.3	82.2	81.7	80.4	81.0	80.6
Men 45	70.2	74.5	74.4	76.8	77.0	77.8	78.7	78.5	78.3	78.8	75.8
Men 50	70.0	74.1	75.1	75.8	77.1	77.3	76.9	77.2	77.8	79.1	75.3
Men 55	71.2	74.0	76.2	77.3	79.2	77.0	75.8	77.8	78.9	80.0	76.0
Men 60	72.6	74.9	77.0	76.1	78.0	80.0	77.7	77.2	78.8	81.1	76.6
Men 65	72.1	75.7	77.1	77.2	77.3	78.7	82.1	82.3	78.3	79.6	76.9
Men 70	72.1	76.4	78.2	78.8	77.9	80.5	79.8	78.2	79.9	80.1	77.3
Men 75	73.2	76.8	77.8	78.2	80.1	78.8	78.4	78.7	77.3	80.7	77.6
Men 80	74.0	76.5	77.6	77.7	78.8	78.2	82.0	79.4	80.0	80.4	77.8
Men 85	73.4	76.7	77.9	79.2	80.3	79.9	80.3	79.4	77.5	81.9	78.3
Men 90	74.4	76.3	77.9	77.7	80.2	78.7	80.8	80.6	79.6	81.2	78.2
Men 95	74.3	75.7	76.9	79.2	78.8	80.9	80.1	80.9	79.6	79.5	78.0
Women 45	81.4	82.4	83.0	83.0	82.6	84.7	84.2	86.1	84.0	83.8	82.2
Women 50	82.3	81.7	81.5	82.9	84.1	82.6	85.0	83.7	83.6	84.3	82.3
Women 55	82.4	82.6	82.6	83.7	83.5	83.0	84.7	83.0	81.0	84.7	82.8
Women 60	82.4	82.9	83.3	81.5	84.0	83.8	84.6	83.6	84.3	85.2	82.9
Women 65	82.2	83.4	85.0	82.6	84.7	85.4	83.9	85.6	82.2	85.8	83.4
Women 70	83.6	83.6	84.5	83.6	85.1	83.7	85.2	81.1	83.1	85.5	83.9
Women 75	83.1	84.4	83.8	83.6	84.3	87.1	84.8	88.2	84.7	86.2	84.1
Women 80	83.8	84.4	83.8	85.3	84.5	85.6	86.4	84.1	83.2	86.6	84.4
Women 85	83.6	84.1	84.6	84.2	86.3	84.3	88.5	85.4	87.6	86.0	84.4
Women 90	83.5	83.4	84.7	84.2	82.6	83.8	82.9	86.5	83.7	86.0	83.9
Women 95	82.2	83.2	83.1	83.0	84.6	84.8	85.5	83.8	81.7	84.3	83.2
White 45	79.6	79.5	78.8	78.9	79.0	78.6	79.7	80.8	80.5	79.5	79.3
White 50	79.7	78.9	78.4	78.3	79.3	78.9	79.1	78.5	79.1	80.4	79.1
White 55	79.6	79.4	79.5	79.9	81.2	78.8	78.8	80.7	79.8	81.2	79.8
White 60	80.1	79.6	80.4	78.6	80.3	81.7	80.3	80.2	80.0	82.4	80.2
White 65	79.8	80.4	80.6	79.4	80.0	81.6	83.0	83.4	78.3	81.1	80.4
White 70	80.5	81.0	81.6	80.9	81.0	82.0	81.4	78.2	81.6	81.3	81.0
White 75	80.8	81.7	80.6	80.7	81.9	81.8	81.7	83.4	80.2	82.0	81.3
White 80	82.0	81.1	80.4	80.8	81.0	81.3	83.4	81.3	80.4	82.3	81.4
White 85	81.3	81.3	82.1	81.7	82.9	81.5	83.8	81.5	81.2	83.0	81.9
White 90	81.4	80.9	81.7	80.9	80.8	81.0	81.4	82.7	81.7	83.1	81.5
White 95	80.5	80.6	80.4	81.4	81.8	82.5	82.0	81.6	80.7	81.5	81.0

TABLE 3 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	73.1	78.4	74.6	78.9	75.4	85.0	80.7	76.7	73.0	84.0	76.7
Non-white 50	74.7	77.6	76.9	79.0	78.9	78.2	79.9	80.3	81.2	79.2	77.4
Non-white 55	76.5	77.1	77.0	79.8	78.6	79.2	75.1	71.3	76.0	82.5	77.6
Non-white 60	76.6	77.6	78.0	76.7	81.7	80.9	81.2	75.8	82.2	82.1	78.2
Non-white 65	75.7	78.1	82.2	79.9	82.8	77.7	81.2	84.9	88.7	82.4	79.2
Non-white 70	76.8	78.3	80.0	79.7	79.4	79.6	83.4	86.1	77.2	84.3	79.2
Non-white 75	77.9	78.6	82.6	78.8	80.3	83.8	77.2	80.3	76.7	84.3	79.7
Non-white 80	76.1	80.1	80.1	80.8	82.3	81.9	85.4	78.9	82.9	81.3	79.6
Non-white 85	77.6	79.0	79.5	80.3	82.6	81.8	81.9	82.5	78.0	83.9	79.9
Non-white 90	78.3	79.0	80.1	80.0	82.7	80.8	81.5	83.0	76.7	80.9	79.8
Non-white 95	77.7	78.6	78.2	79.0	79.7	81.8	83.2	82.2	78.9	78.8	78.9
Non-college 45	78.4	78.4	77.8	78.0	78.2	79.3	79.9	80.6	78.4	80.1	78.5
Non-college 50	79.0	78.0	78.0	77.9	79.1	79.5	79.9	78.3	77.8	80.2	78.6
Non-college 55	78.5	78.9	79.0	80.0	81.3	77.3	77.5	79.9	77.8	80.8	79.1
Non-college 60	79.3	78.9	79.0	78.6	80.1	80.3	81.3	79.2	78.2	81.8	79.4
Non-college 65	78.9	79.7	80.2	78.4	80.9	81.2	82.2	82.2	78.5	81.0	79.8
Non-college 70	79.4	80.2	79.8	79.6	81.1	82.4	82.8	77.4	80.1	81.9	80.2
Non-college 75	79.6	80.0	80.1	80.6	80.8	80.3	80.5	82.3	80.1	80.7	80.1
Non-college 80	80.1	79.9	79.8	80.7	79.6	82.7	82.7	82.1	80.7	81.0	80.4
Non-college 85	80.0	79.8	80.7	81.2	82.3	81.5	83.3	82.9	81.2	82.5	80.8
Non-college 90	80.4	80.2	81.2	80.3	81.2	81.2	80.3	81.3	81.2	82.7	80.8
Non-college 95	79.3	80.0	79.8	79.9	79.8	82.3	80.8	81.4	79.9	80.2	80.0
College 45	80.7	82.1	79.6	80.9	79.3	78.9	79.6	80.1	81.6	79.4	80.4
College 50	79.6	80.3	78.6	79.4	79.4	77.7	78.5	79.1	81.3	80.4	79.5
College 55	81.0	79.4	79.5	79.6	79.9	80.8	80.0	79.8	82.1	81.7	80.3
College 60	80.2	80.1	82.1	77.9	80.9	83.2	78.9	80.5	82.9	82.8	80.8
College 65	80.0	80.4	82.0	81.0	79.6	80.8	83.5	86.0	80.7	81.4	80.9
College 70	80.9	81.0	83.4	82.0	80.3	81.1	80.7	80.4	81.8	81.5	81.4
College 75	81.5	82.7	81.9	80.1	82.6	83.5	81.5	83.5	78.7	83.6	82.1
College 80	82.1	82.2	81.1	80.9	82.9	79.8	84.9	79.7	81.2	82.9	82.0
College 85	81.7	82.4	82.9	81.8	83.4	81.7	83.6	80.8	80.1	83.6	82.4
College 90	81.4	80.9	81.5	81.2	81.2	80.8	82.4	84.3	80.6	82.8	81.6
College 95	81.0	80.3	80.1	81.8	83.0	82.4	83.7	81.9	80.8	81.5	81.3

and latest cohorts by about one year. The gap between whites and non-whites narrows for successive cohorts from about three years to about two. The average gap between those with and without college education is almost one and a half years.

There is also a strong correlation between lifetime earnings and average length of life. Part of this correlation runs from earnings to life span; i.e., the mortality probabilities used in the CORSIM model are smaller at higher levels of earnings. But part runs from life span to earnings. Those with shorter life spans have fewer years during which to work and may,

for that reason, have lower lifetime earnings. The differences by lifetime earnings levels in life span can be substantial. Cohort 80 is illustrative. For men in this cohort the life-span gap between the highest and lowest lifetime earnings groups is over 6 years for men and almost 3 years for women.

7. FINDINGS

This section describes OASI's treatment of postwar Americans. First, it shows OASI lifetime net tax rates. Second, it considers the degree to which contributions made to OASI represent a pure tax. Third, it describes how lifetime net tax rates would rise in response to either an immediate and permanent 4.0-percentage-point increase in the OASI tax rate or an immediate and permanent 25-percent reduction in benefits. Fourth, it considers the role of the OASI program in reducing the riskiness of lifetime income. Finally, it examines the internal rates of return being paid by the OASI program to postwar Americans on their contributions.

7.1 OASI Lifetime Net Tax Rates

Table 4 reports OASI lifetime net tax rates computed as average net taxes within each cell divided by average lifetime earnings in that cell. Bear in mind that the table's entries are not average lifetime tax rates across cell observations, but rather the average rate of net taxation applied to total within-cell lifetime earnings.

As indicated in the introduction, Americans born between 1945 and 2000 will, under current law, pay about 5 percent of their lifetime earnings in net taxes to the OASI program. The level of the net tax rate is clearly sensitive to the choice of discount rate. Using a 3-percent discount rate lowers lifetime net tax rates by close to 2 percentage points; using a 5-percent discount rate raises lifetime net tax rates by over 1 percentage point. Net tax rates decrease with decreasing discount rate because (1) most OASI benefits are received later than most OASI taxes are paid and (2) the farther away receipt or payment is in time, the more discounting reduces its present value.

7.2 Differences across Lifetime-Earnings Levels in OASI Lifetime Net Tax Rates

A striking feature of Table 4's first block of numbers is the higher lifetime net tax rates social security imposes on the middle class than on the poor

or the super-rich. Take Cohort 80. Its members earning less than $120,000 over their lifetimes face a −1.0-percent lifetime net tax rate. Those earning $1.8 million or more face a 4.6-percent rate. In contrast, those in the middle of the earnings distribution, earning from $480,000 to $600,000, face a 6.8-percent rate.

Compared to the net tax rates of those in the middle class, the relatively low net tax rates faced by the poor reflect the significant progressivity of social security's PIA benefit formula. Offsetting this somewhat is the fact that individuals with lower lifetime incomes tend to die at younger ages. For upper-income individuals (those in the top two deciles), their relatively low lifetime net tax rates reflect the fact that only a part of their earnings—the amount up to the ceiling on taxable earnings—is subject to the OASI payroll tax.

In considering this regressive aspect of the OASI system, it's worth bearing in mind that the super-rich pay, in absolute terms, much more in net taxes than do members of the middle class. It's also important to note that our calculations don't include the taxation of OASI benefits under the federal income tax. Inclusion of these taxes would make social security look more progressive.

7.3 *Male and Female OASI Lifetime Net Tax Rates*

Women generally have lower lifetime earnings than men. Consequently, they are more likely than are men to receive dependent benefits and survivor benefits based on their spouse's earnings record. In addition, women live longer than men, permitting them to receive benefits for more years. Both of these factors explain why Table 4's lifetime net tax rates for men exceed those for women for each of the 11 cohorts. The difference is significant. Across all cohorts, the lifetime net tax rate faced by males is 1.1 percentage points higher than that faced by females. This, again, is based on a 5-percent discount rate. The male–female differential is substantially larger if one discounts using a 3-percent rate. In this case, the average difference across the 11 cohorts exceeds 2 percentage points; using a 7-percent discount rate, the average difference is less than 0.5 percentage points. Thus depending on one's view of the appropriate discount rate, postwar women are either being treated much better than, better than, or about the same as postwar men by the OASI system.

Male–female differences in lifetime net tax rates are largest and most persistent at lower levels of lifetime income where the average lifespan differences are largest and where females receive significant amounts of dependent and survivor benefits relative to their own tax contributions.

TABLE 4
Average Lifetime OASI Net Tax Rates

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	0.4	5.5	6.7	6.8	7.1	7.1	6.8	5.9	6.0	3.7	5.5
Cohort 50	−2.3	4.1	5.5	6.0	6.4	6.7	6.6	6.3	6.2	3.6	4.9
Cohort 55	−0.9	4.6	6.0	6.4	6.6	7.2	7.4	7.3	6.7	3.9	5.2
Cohort 60	−0.1	5.1	6.4	7.0	7.1	7.3	7.6	7.4	7.5	3.9	5.2
Cohort 65	0.1	5.1	6.3	7.2	7.0	7.1	7.6	7.5	7.3	4.4	5.5
Cohort 70	0.1	4.8	6.2	6.7	7.2	7.2	7.7	7.8	7.5	4.3	5.4
Cohort 75	−0.3	4.6	6.1	6.7	6.9	7.0	7.2	7.4	7.8	4.5	5.4
Cohort 80	−1.0	4.5	5.8	6.6	6.8	7.2	7.0	7.6	7.5	4.6	5.4
Cohort 85	−1.2	4.1	5.7	6.3	6.7	6.8	7.0	7.4	7.6	4.4	5.1
Cohort 90	−1.2	4.0	5.5	6.3	6.7	6.8	7.0	6.9	7.6	4.7	5.3
Cohort 95	−1.8	3.8	5.3	6.1	6.4	6.4	6.7	7.3	7.3	4.9	5.3
Men 45	4.7	6.3	7.2	7.3	7.5	7.3	6.9	6.1	6.6	3.9	5.9
Men 50	3.6	5.4	6.3	6.5	6.7	6.8	7.0	6.5	6.2	3.7	5.5
Men 55	4.0	5.9	6.5	6.9	6.9	7.5	7.7	7.9	7.0	4.0	5.6
Men 60	4.2	6.2	7.2	7.3	7.6	7.6	8.2	7.7	7.7	3.9	5.6
Men 65	4.4	6.1	6.9	7.5	7.4	7.3	7.7	7.5	7.4	4.6	5.9
Men 70	4.4	6.0	6.9	7.0	7.5	7.3	8.0	8.0	7.9	4.6	5.9
Men 75	4.0	5.8	6.7	7.1	7.2	7.5	7.6	8.0	8.1	4.6	5.9
Men 80	4.3	5.3	6.5	7.1	7.1	7.4	7.2	7.8	7.6	5.0	5.8
Men 85	3.4	5.1	6.4	6.8	6.9	6.9	7.4	7.8	8.1	4.4	5.4
Men 90	2.8	4.9	6.1	6.8	6.8	7.1	7.0	7.2	7.9	4.9	5.7
Men 95	1.9	4.6	5.8	6.2	6.8	6.4	6.9	7.5	7.3	5.0	5.6
Women 45	−0.6	4.9	6.0	5.9	6.1	6.1	6.5	5.2	4.1	2.7	4.4
Women 50	−4.3	3.3	4.7	5.3	5.7	6.4	5.6	5.7	6.0	3.3	3.8
Women 55	−3.0	3.6	5.3	5.6	6.1	6.4	6.7	6.4	5.8	3.7	4.3
Women 60	−2.0	4.2	5.7	6.5	6.5	6.9	6.6	7.0	6.9	3.8	4.7
Women 65	−1.8	4.3	5.5	6.7	6.5	6.7	7.3	7.4	7.0	3.9	4.9
Women 70	−2.0	3.9	5.6	6.3	6.6	6.9	7.3	7.3	6.5	3.7	4.6
Women 75	−2.3	3.7	5.5	6.1	6.5	6.1	6.5	6.7	7.2	4.2	4.7
Women 80	−3.3	3.8	5.1	5.9	6.3	6.8	6.8	7.2	7.3	3.9	4.5
Women 85	−3.1	3.4	5.1	5.8	6.3	6.7	6.3	6.7	6.3	4.2	4.6
Women 90	−2.9	3.5	4.9	5.8	6.5	6.6	7.0	6.3	6.0	4.5	4.7
Women 95	−3.3	3.2	4.8	6.0	5.9	6.4	6.5	6.8	7.4	4.7	4.8
White 45	0.3	5.5	6.6	6.9	7.1	7.1	6.9	5.8	5.9	3.7	5.4
White 50	−2.6	4.0	5.5	6.0	6.3	6.7	6.6	6.3	6.2	3.6	4.8
White 55	−1.1	4.5	5.9	6.4	6.5	7.2	7.4	7.3	6.6	3.9	5.1
White 60	−0.3	5.0	6.3	7.0	7.1	7.3	7.7	7.4	7.6	3.9	5.2
White 65	−0.2	5.0	6.3	7.1	7.0	7.0	7.5	7.5	7.5	4.3	5.5
White 70	−0.2	4.6	6.1	6.7	7.2	7.1	7.7	7.9	7.5	4.4	5.4
White 75	−0.3	4.5	6.0	6.7	6.8	6.9	7.1	7.4	7.8	4.4	5.3
White 80	−1.4	4.3	5.8	6.6	6.8	7.1	7.0	7.7	7.5	4.5	5.2
White 85	−1.5	3.9	5.5	6.2	6.7	6.9	6.9	7.4	7.4	4.3	5.0
White 90	−2.0	3.8	5.3	6.3	6.8	6.8	7.0	7.1	7.6	4.7	5.3
White 95	−2.2	3.4	5.1	6.0	6.3	6.3	6.6	7.2	7.3	4.8	5.2

TABLE 4 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	1.3	5.3	7.0	6.4	7.4	6.4	6.2	6.6	7.0	3.8	5.8
Non-white 50	−0.3	4.8	5.9	6.0	6.9	7.0	6.4	6.5	6.3	4.1	5.4
Non-white 55	0.2	5.3	6.5	6.2	7.1	7.2	7.7	7.6	7.9	4.3	5.6
Non-white 60	1.3	5.8	7.0	7.0	7.4	7.5	6.5	8.1	6.9	3.5	5.1
Non-white 65	1.9	5.7	6.1	7.2	7.4	7.3	8.1	7.4	5.3	4.8	5.8
Non-white 70	1.7	5.4	6.6	6.7	7.1	7.4	7.8	7.4	7.4	4.0	5.4
Non-white 75	−0.7	5.1	6.5	6.9	7.3	7.2	7.8	7.7	8.0	4.9	5.9
Non-white 80	0.7	5.1	5.9	6.7	6.7	7.4	7.3	7.3	7.9	5.5	6.0
Non-white 85	−0.1	5.1	6.3	6.8	6.5	6.6	7.3	7.1	8.3	4.7	5.5
Non-white 90	1.3	5.1	6.0	6.4	6.2	6.9	7.3	6.1	7.6	4.7	5.5
Non-white 95	−0.5	5.0	6.0	6.5	6.9	6.9	7.0	7.6	7.6	5.5	5.9
Non-college 45	0.6	5.7	6.9	7.0	7.2	6.8	6.8	5.7	6.4	3.8	5.7
Non-college 50	−2.0	4.4	5.7	6.2	6.5	6.8	6.5	6.5	6.1	4.0	5.1
Non-college 55	−0.4	4.7	6.0	6.4	6.5	7.4	7.6	7.3	7.0	4.2	5.4
Non-college 60	0.3	5.3	6.6	6.8	7.2	7.5	7.6	7.8	7.9	4.2	5.6
Non-college 65	0.5	5.2	6.4	7.3	7.0	7.2	7.7	7.8	7.6	4.7	5.8
Non-college 70	0.3	5.0	6.5	6.9	7.2	7.2	7.5	8.0	7.4	4.7	5.7
Non-college 75	0.3	4.8	6.2	6.5	7.0	7.3	7.2	7.7	8.0	4.8	5.7
Non-college 80	−0.4	4.8	6.0	6.4	7.0	7.0	6.9	7.6	7.9	5.0	5.6
Non-college 85	−0.9	4.5	5.9	6.3	6.8	6.9	7.0	7.5	7.4	4.6	5.3
Non-college 90	−0.5	4.2	5.5	6.4	6.9	6.9	7.1	6.9	7.8	5.2	5.6
Non-college 95	−0.9	3.9	5.4	6.2	6.7	6.8	7.1	7.6	7.3	5.6	5.7
College 45	−0.2	4.7	6.1	6.5	7.1	7.4	6.9	6.1	5.5	3.6	5.1
College 50	−3.0	3.5	5.2	5.6	6.3	6.6	6.7	6.2	6.3	3.3	4.6
College 55	−2.2	4.2	5.9	6.4	6.7	6.8	7.1	7.3	6.2	3.6	4.8
College 60	−1.0	4.8	6.1	7.2	7.1	7.1	7.6	7.0	7.1	3.6	4.8
College 65	−0.6	5.0	6.1	6.9	7.0	6.9	7.4	6.8	6.9	4.1	5.2
College 70	−0.3	4.5	5.9	6.4	7.1	7.1	7.9	7.7	7.6	4.1	5.1
College 75	−1.4	4.3	6.0	6.9	6.8	6.8	7.2	7.2	7.7	4.3	5.2
College 80	−1.8	4.1	5.7	6.9	6.6	7.3	7.1	7.6	7.2	4.4	5.1
College 85	−1.8	3.6	5.4	6.3	6.5	6.8	7.0	7.3	7.8	4.2	5.0
College 90	−2.6	3.8	5.5	6.2	6.5	6.8	7.0	6.8	7.4	4.4	5.1
College 95	−3.4	3.5	5.3	5.9	6.1	6.0	6.4	7.0	7.4	4.6	5.0

Take cohort 95: For males earning below $120,000, the net tax rate equals 3.8 percent, compared with −2.6 percent for females.

7.4 Lifetime Net Tax Rates of Whites and Non-Whites

Lifetime net tax rates for non-whites generally exceed those for whites for each of the 11 cohorts and 10 lifetime earnings brackets. Across all cohorts, the lifetime net tax rate of non-whites is 0.4 percentage points higher than that of whites. This difference arises primarily because of non-whites' shorter life expectancies.

7.5 OASI Lifetime Net Tax Rates of the College- and Non-College-Educated

Those with less education are relatively disadvantaged by social security on two counts. First, less education means a shorter life expectancy, which, other things equal, means fewer years of collecting social security benefits. Second, less education generally means earlier entrance into and earlier exit from the labor market. Since social security doesn't credit contributors for making their contributions earlier in time, these tax contributions will have a larger present value than were the same annual contributions made later in life. As Table 4 makes clear, college-educated cohort members face lower lifetime net tax rates than do non-college-educated cohort members for each of the 11 cohorts. On average, the difference in net tax rates is 0.6 percentage points.

7.6 OASI's Effective Degree of Taxation

Another way to assess OASI's treatment of postwar Americans is to ask what fraction of its payroll taxes are actually taxes. We compute this degree of taxation by forming the ratio within each cell of net taxes to gross taxes. Table 5 presents the results. It shows that for each successive cohort a larger share of OASI contributions represents pure taxes rather than the purchase of a future benefit. On average, of every dollar contributed to OASI, 67 cents represents a pure tax.

A quick glance through the table shows that the pure-tax component of the OASI payroll contribution increases with lifetime earnings. As we've seen, the pure-tax component is negative for the lowest lifetime-earnings class. For the highest lifetime-earnings class, 79 cents of every dollar contributed to OASI is a pure tax. The degree of pure taxation is also substantially higher for men than for women, somewhat higher for non-whites than for whites, and somewhat higher for the college-educated than the non-college-educated.

7.7 Lifetime Net Tax Rates after Two Alternative Responses to OASI's Long-Term Funding Crisis

As mentioned in section 1, social security faces a severe long-term financing crisis. Since no one knows how the imbalance will be corrected, it's worthwhile considering OASI's lifetime net taxation of postwar Americans under alternative adjustment scenarios. Table 6 displays lifetime OASI net tax rates assuming the current 10.6-percent OASI tax rate is raised immediately and permanently by 37.9 percent, which is the ratio of the 4.7-percentage-point tax rate hike needed for permanent OASDI bal-

ance under the intermediate assumptions to the current 12.4-percentage-point OASDI tax rate. This policy leaves the OASI tax rate at 14.6 percent.

Although the new OASI tax rate is 4.2 percentage points higher than the current rate, the lifetime net tax rates of all postwar Americans don't rise by this amount. The reasons are that (1) many postwar Americans already have much of their lifetime earnings behind them and the tax hike would not be imposed retroactively, and (2) those earning above social security's ceiling on taxable earnings experience a 4.2 percent higher rate of taxation only on their OASI-taxable earnings.

Table 6 shows a dramatic worsening, because of this policy, in the treatment of today's children compared to the baby boomers. For the oldest boomers, cohort 45, the OASI tax hike would raise their own lifetime net tax rate by 0.3 percent. For cohort 95, on the other hand, the average net tax rate rises by 3.1 percentage points; i.e., the oldest boomers end up giving social security 0.3 percent more of their lifetime incomes, whereas today's newborns end up giving social security over 3.1 percent more of their lifetime incomes.

The table also shows a significant increase in the lifetime net tax rates of the poor and middle class within each cohort relative to the rich. For cohort 95 the net tax rate of the lowest earners rises by 3.8 percentage points, and the net tax rate of those earning $600,000 to $720,000 on a lifetime basis also rises by 3.8 percentage points, whereas for the highest lifetime earners in this cohort the rise is 2.3 percentage points. Since men, whites, and the college-educated are disproportionately high earners, the tax hike raises net tax rates somewhat more for women, nonwhites, and the non-college-educated.

Table 7 shows the lifetime net tax rates that would arise if OASI benefits were permanently cut by 25 percent starting in 1998. Unlike the previous policy, which disproportionately hurt later cohorts, this policy raises the net tax rates of almost all cohorts to about 6 percent. Although, in absolute terms, the lifetime rich lose more in benefits than do the poor, these benefits are a much smaller proportion of their lifetime earnings. So the poor are disproportionately hurt. For example, in cohort 95, the lifetime net tax rate of the lowest earners is 1.2 percent—up 3.0 percentage points from the case of no benefit cuts. In contrast, the top earners in cohort 95 experience only a 0.4-percent increase in their lifetime net tax rates. Women also experience a disproportionately large increase in their lifetime net tax rates. As an example, compare the 3.4-percentage-point rise in the lifetime net tax rate of the poorest women in cohort 95 with the corresponding 2.0-percentage-point rise of the poorest men in cohort 95.

TABLE 5
Average Wealth Tax Rates

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	3.47	53.28	67.05	70.61	73.71	75.72	76.88	75.34	77.60	77.20	67.59
Cohort 50	−26.22	46.35	61.26	67.68	70.62	74.54	76.04	76.79	77.60	76.09	64.58
Cohort 55	−9.75	48.31	62.48	67.29	70.36	75.23	77.78	77.98	78.33	78.05	67.03
Cohort 60	−0.98	51.24	63.52	70.26	71.37	73.61	77.41	78.73	79.98	78.64	68.47
Cohort 65	1.06	49.97	61.27	69.79	70.99	72.95	74.64	75.55	79.69	80.18	68.63
Cohort 70	0.93	46.66	60.48	66.49	70.57	71.81	75.41	79.06	77.97	79.79	67.94
Cohort 75	−3.30	45.08	59.98	66.39	68.40	70.07	73.59	74.61	78.97	79.49	67.35
Cohort 80	−9.44	44.24	57.80	65.20	67.69	70.57	70.54	75.24	77.74	79.43	67.47
Cohort 85	−12.13	40.98	55.36	61.82	66.03	68.79	69.75	74.32	77.09	78.42	66.04
Cohort 90	−12.35	39.59	54.43	62.28	66.35	68.66	70.75	71.62	75.37	77.61	65.83
Cohort 95	−18.17	37.01	52.67	59.67	64.04	64.27	67.29	71.66	74.78	78.88	66.19
Men 45	45.08	64.52	72.91	74.38	76.26	77.25	78.26	77.27	79.79	78.88	75.55
Men 50	39.84	60.11	68.09	71.81	73.25	76.40	78.36	78.58	78.47	77.35	73.41
Men 55	42.23	60.71	68.15	71.79	72.59	77.61	80.32	80.63	79.43	79.09	74.47
Men 60	42.02	62.40	69.39	73.47	74.07	75.66	80.79	81.37	80.98	79.42	75.16
Men 65	42.84	59.83	68.20	72.94	74.66	75.39	75.20	76.51	80.69	81.51	75.16
Men 70	43.57	57.88	66.42	69.87	73.43	73.20	77.11	80.16	79.31	80.91	74.42
Men 75	40.64	55.47	66.30	69.74	70.84	73.75	76.65	78.30	80.53	80.74	74.06
Men 80	42.03	53.42	63.66	69.60	70.56	73.49	71.50	76.42	78.38	80.65	73.78
Men 85	33.47	50.42	62.03	65.93	68.60	70.18	73.25	76.36	79.56	79.29	72.43
Men 90	27.90	47.71	60.74	66.78	67.32	70.64	70.66	73.57	76.43	78.43	71.39
Men 95	19.22	44.74	57.40	60.57	67.64	64.90	68.21	72.05	74.81	79.40	70.84
Women 45	−4.81	46.40	59.63	62.72	66.80	68.41	71.56	68.99	68.15	69.04	51.73
Women 50	−49.48	36.76	53.37	60.08	64.38	70.05	69.71	70.60	75.27	71.90	48.64
Women 55	−32.25	39.12	55.87	60.42	66.46	69.48	71.78	73.50	75.42	75.24	54.80
Women 60	−20.21	42.28	56.96	65.64	67.16	70.62	71.68	74.70	77.08	76.74	58.33
Women 65	−17.16	42.11	53.68	65.39	65.55	68.54	73.65	74.14	77.12	76.40	58.23
Women 70	−20.04	37.78	54.54	61.68	65.97	69.38	72.32	76.50	74.62	77.08	57.67
Women 75	−22.28	36.71	54.04	61.30	64.02	64.12	68.67	69.65	74.80	76.52	56.98
Women 80	−32.32	36.91	50.44	58.81	63.70	66.74	69.17	72.42	76.14	76.21	56.95
Women 85	−30.44	33.72	49.90	57.00	62.56	66.56	64.07	70.68	70.75	76.31	56.26
Women 90	−28.78	33.94	48.30	57.10	64.96	66.12	70.95	68.01	72.94	75.76	57.31
Women 95	−32.35	31.31	47.67	58.51	59.41	63.19	65.87	70.64	74.72	77.63	58.60
White 45	2.54	53.13	66.23	70.95	73.58	76.24	76.88	74.98	76.83	77.38	67.50
White 50	−28.90	45.14	60.65	67.78	70.41	74.64	75.99	76.97	77.88	75.94	64.29
White 55	−11.44	47.29	61.94	67.43	69.79	75.18	77.66	77.34	77.95	78.31	66.99
White 60	−3.23	50.26	62.64	70.03	71.55	73.68	77.61	78.46	80.29	78.61	68.34
White 65	−1.91	48.55	61.65	69.86	71.23	72.53	74.45	75.69	80.66	80.27	68.77
White 70	−2.15	45.26	59.79	66.13	70.58	71.51	75.84	79.87	77.45	80.12	67.95
White 75	−2.61	44.05	59.57	66.13	67.92	70.11	72.94	74.21	78.61	79.82	67.35
White 80	−13.27	43.06	57.36	64.93	67.70	70.47	70.60	74.84	78.32	79.40	67.40
White 85	−14.73	38.77	54.10	61.06	66.07	68.67	69.46	74.68	76.68	78.68	65.95
White 90	−19.68	36.96	53.10	61.65	66.87	68.13	70.18	71.97	75.04	77.40	65.59
White 95	−21.39	33.28	50.53	58.36	62.96	63.45	67.03	71.57	74.11	78.48	65.58

TABLE 5 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	13.72	54.41	72.40	68.73	74.74	69.83	76.80	78.40	83.03	74.74	68.36
Non-white 50	−3.94	53.60	64.67	67.12	71.95	73.68	76.33	75.26	75.66	77.54	66.59
Non-white 55	2.24	54.60	65.80	66.33	73.71	75.64	79.03	84.84	82.59	75.41	67.33
Non-white 60	12.48	57.34	68.66	71.64	70.27	73.08	75.68	80.86	76.90	78.83	69.37
Non-white 65	17.81	56.51	59.55	69.42	69.39	75.43	76.06	74.64	69.28	79.53	67.77
Non-white 70	16.53	52.47	63.42	68.70	70.51	74.00	73.30	72.84	80.71	77.82	67.92
Non-white 75	−6.62	49.04	62.22	67.61	70.31	69.85	76.90	76.53	80.23	77.63	67.39
Non-white 80	7.10	49.41	59.86	66.52	67.65	71.05	70.30	77.05	75.84	79.61	67.82
Non-white 85	−0.90	50.00	60.94	65.70	65.86	69.32	71.10	72.17	79.03	76.89	66.48
Non-white 90	12.45	49.15	59.38	65.35	63.90	70.38	73.12	70.28	77.13	78.91	66.93
Non-white 95	−5.03	48.21	59.91	64.50	67.43	67.70	68.24	72.12	78.05	80.71	68.65
Non-college 45	5.30	55.97	68.32	71.98	73.80	74.90	76.55	74.51	79.60	76.15	66.91
Non-college 50	−23.05	48.72	62.25	68.82	71.36	74.19	75.64	77.49	78.61	76.68	63.79
Non-college 55	−4.37	49.96	62.51	66.908	69.63	76.85	78.78	77.81	79.76	78.56	66.41
Non-college 60	3.22	53.02	65.74	70.13	71.97	74.26	76.40	79.92	82.37	79.11	68.09
Non-college 65	4.74	50.49	61.92	71.15	70.54	73.41	75.49	76.93	80.62	80.74	68.23
Non-college 70	3.12	48.40	62.88	68.33	70.92	71.82	73.64	80.33	77.96	79.67	66.97
Non-college 75	3.03	47.40	60.77	65.72	69.45	72.18	73.82	75.25	79.22	80.96	66.98
Non-college 80	−4.33	46.66	59.38	64.92	69.60	69.13	71.49	74.45	78.55	80.10	66.45
Non-college 85	−8.61	44.36	57.80	62.14	67.30	68.95	70.01	74.43	75.83	78.92	65.09
Non-college 90	−4.56	41.00	54.62	63.23	66.67	69.00	72.59	73.48	75.26	77.34	64.69
Non-college 95	−8.71	38.65	52.97	61.95	67.04	66.61	69.68	72.27	75.79	79.71	65.59
College 45	−1.56	45.80	63.13	67.65	73.51	76.61	77.35	76.38	74.40	78.18	68.76
College 50	−34.74	40.43	59.09	65.23	69.49	75.13	76.52	75.91	76.47	75.48	65.84
College 55	−23.64	44.81	62.43	67.86	71.66	73.11	76.22	78.26	76.07	77.50	68.00
College 60	−10.29	48.18	59.28	70.48	70.54	72.76	79.21	77.07	76.74	78.23	68.97
College 65	−6.10	49.09	60.19	67.88	71.57	72.32	73.57	72.93	78.32	79.67	69.16
College 70	−2.58	44.11	57.27	64.35	70.11	71.80	77.07	77.99	77.99	79.88	68.93
College 75	−14.28	41.74	59.05	67.17	67.13	68.45	73.37	73.93	78.73	78.35	67.73
College 80	−17.13	40.94	55.97	65.51	65.59	72.25	69.64	75.99	76.94	78.99	68.40
College 85	−17.89	36.44	52.20	61.43	64.75	68.64	69.55	74.25	78.31	78.05	66.92
College 90	−25.19	37.64	54.19	61.20	65.98	68.33	69.21	69.66	75.49	77.81	66.92
College 95	−34.41	34.60	52.25	57.44	60.78	61.76	64.89	71.16	73.66	78.32	66.74

TABLE 6
Average Lifetime OASI Net Tax Rates Assuming a 38% Tax Rate Increase Beginning in 1999

	Lifetime labor earnings in thousands of 1997 dollars:										
Group	0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	0.7	5.8	7.0	7.2	7.5	7.5	7.2	6.3	6.4	3.9	5.8
Cohort 50	−1.8	4.6	6.1	6.6	7.0	7.3	7.3	7.0	6.8	4.0	5.4
Cohort 55	−0.1	5.4	6.9	7.3	7.6	8.1	8.4	8.3	7.6	4.5	5.9
Cohort 60	1.1	6.3	7.8	8.4	8.5	8.8	9.1	8.8	9.0	4.6	6.3
Cohort 65	1.8	6.9	8.2	9.1	9.0	9.0	9.7	9.5	9.2	5.5	7.1
Cohort 70	2.4	7.3	9.0	9.3	9.9	9.9	10.6	10.6	10.2	5.7	7.5
Cohort 75	2.8	7.9	9.5	10.1	10.4	10.4	10.5	10.8	11.3	6.4	8.1
Cohort 80	2.9	8.3	9.7	10.5	10.6	11.0	10.8	11.4	11.2	6.8	8.4
Cohort 85	2.6	7.9	9.5	10.2	10.5	10.6	10.8	11.1	11.3	6.5	8.0
Cohort 90	2.6	7.9	9.3	10.2	10.5	10.6	10.8	10.5	11.4	7.1	8.4
Cohort 95	2.0	7.6	9.2	10.0	10.2	10.2	10.5	11.1	11.0	7.3	8.4
Men 45	5.2	6.6	7.5	7.6	7.9	7.7	7.3	6.5	7.1	4.2	6.3
Men 50	4.3	6.0	6.9	7.1	7.3	7.5	7.7	7.2	6.9	4.1	6.0
Men 55	5.0	7.0	7.5	8.0	8.0	8.5	8.8	9.0	8.0	4.6	6.4
Men 60	5.7	7.6	8.7	8.8	9.1	9.2	9.8	9.2	9.3	4.6	6.7
Men 65	6.3	8.2	9.1	9.6	9.5	9.3	10.0	9.6	9.4	5.7	7.5
Men 70	7.0	8.8	9.8	9.7	10.4	10.2	10.9	10.9	10.8	6.1	8.1
Men 75	7.3	9.3	10.1	10.7	10.6	11.1	11.1	11.5	11.6	6.6	8.6
Men 80	8.2	9.1	10.3	11.0	10.9	11.2	11.0	11.6	11.3	7.3	8.8
Men 85	7.2	8.8	10.3	10.7	10.7	10.6	11.3	11.6	12.0	6.6	8.3
Men 90	6.7	8.7	9.9	10.7	10.7	10.8	10.8	10.9	11.8	7.2	8.7
Men 95	5.7	8.5	9.7	10.0	10.6	10.2	10.7	11.4	11.0	7.4	8.6
Women 45	−0.3	5.2	6.3	6.3	6.6	6.5	6.9	5.6	4.5	2.9	4.8
Women 50	−3.8	3.7	5.2	5.8	6.3	7.0	6.3	6.3	6.6	3.7	4.3
Women 55	−2.2	4.4	6.2	6.4	6.9	7.3	7.6	7.3	6.7	4.3	5.1
Women 60	−0.9	5.3	6.8	7.7	7.7	8.2	7.9	8.3	8.2	4.5	5.7
Women 65	−0.2	5.9	7.3	8.5	8.2	8.5	9.2	9.3	8.7	4.9	6.4
Women 70	0.2	6.2	8.1	8.7	9.1	9.4	9.9	9.9	8.9	4.9	6.6
Women 75	0.7	6.9	8.8	9.3	10.0	9.4	9.7	10.0	10.4	6.0	7.4
Women 80	0.5	7.6	8.8	9.7	10.1	10.7	10.5	10.9	10.9	5.8	7.5
Women 85	0.8	7.2	8.9	9.6	10.2	10.6	10.0	10.3	9.7	6.2	7.7
Women 90	0.9	7.3	8.8	9.6	10.3	10.3	10.7	9.9	10.5	6.7	7.9
Women 95	0.6	7.0	8.6	9.9	9.7	10.2	10.2	10.5	11.1	7.0	8.0
White 45	0.6	5.8	6.9	7.3	7.5	7.5	7.3	6.2	6.3	3.9	5.7
White 50	−2.0	4.5	6.0	6.6	6.9	7.3	7.3	7.0	6.8	4.0	5.4
White 55	−0.2	5.3	6.8	7.3	7.5	8.1	8.4	8.3	7.5	4.4	5.9
White 60	0.9	6.2	7.7	8.4	8.5	8.7	9.2	8.8	9.1	4.6	6.3
White 65	1.5	6.8	8.2	9.1	8.9	9.0	9.6	9.5	9.4	5.4	7.0
White 70	2.1	7.2	8.8	9.3	9.9	9.9	10.5	10.7	10.2	5.8	7.5
White 75	2.8	7.8	9.4	10.1	10.3	10.3	10.4	10.8	11.3	6.3	8.0
White 80	2.5	8.1	9.7	10.5	10.6	10.9	10.7	11.5	11.0	6.7	8.2
White 85	2.3	7.7	9.4	10.1	10.5	10.7	10.7	11.2	11.1	6.4	7.9
White 90	1.8	7.6	9.2	10.2	10.7	10.6	10.7	10.9	11.4	7.1	8.3
White 95	1.7	7.2	9.0	9.9	10.0	10.0	10.4	11.0	11.0	7.2	8.2

TABLE 6 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	1.5	5.6	7.3	6.8	7.7	6.8	6.6	6.9	7.4	4.0	6.1
Non-white 50	0.0	5.3	6.5	6.6	7.6	7.6	7.0	7.2	6.9	4.4	5.9
Non-white 55	0.9	6.1	7.4	7.2	8.1	8.3	8.8	8.6	8.9	4.9	6.5
Non-white 60	2.5	7.0	8.4	8.3	8.9	9.0	7.8	9.6	8.3	4.1	6.2
Non-white 65	3.6	7.6	8.1	9.3	9.6	9.2	10.3	9.4	7.0	5.9	7.5
Non-white 70	4.0	8.1	9.5	9.2	9.8	10.1	10.6	10.2	10.1	5.4	7.5
Non-white 75	2.7	8.6	9.9	10.5	10.9	10.7	11.3	11.2	11.4	7.1	8.9
Non-white 80	4.7	9.0	9.7	10.5	10.5	11.3	11.2	10.9	11.8	8.1	9.4
Non-white 85	3.8	8.9	10.2	10.8	10.3	10.3	11.1	10.8	12.2	6.9	8.7
Non-white 90	5.2	9.0	9.9	10.1	9.9	10.6	11.0	9.4	11.4	7.0	8.6
Non-white 95	3.3	8.9	9.9	10.3	10.7	10.7	10.8	11.6	11.3	8.1	9.2
Non-college 45	0.9	6.0	7.2	7.3	7.5	7.2	7.2	6.1	6.8	4.1	6.0
Non-college 50	−1.5	4.9	6.3	6.8	7.1	7.4	7.2	7.1	6.7	4.4	5.7
Non-college 55	0.5	5.6	6.9	7.3	7.5	8.4	8.7	8.3	8.0	4.8	6.2
Non-college 60	1.6	6.6	8.0	8.2	8.5	9.0	9.1	9.2	9.3	5.0	6.8
Non-college 65	2.2	7.1	8.4	9.3	9.0	9.2	9.8	9.9	9.5	5.8	7.5
Non-college 70	2.7	7.6	9.2	9.6	9.9	10.0	10.3	10.8	10.1	6.2	7.9
Non-college 75	3.5	8.2	9.6	9.9	10.5	10.7	10.5	11.2	11.5	6.8	8.5
Non-college 80	3.4	8.6	9.8	10.2	10.7	10.8	10.6	11.5	11.7	7.4	8.8
Non-college 85	3.0	8.3	9.7	10.2	10.6	10.6	10.8	11.3	11.1	6.8	8.4
Non-college 90	3.3	8.1	9.3	10.3	10.8	10.7	10.8	10.5	11.7	7.8	8.9
Non-college 95	3.0	7.8	9.2	10.1	10.4	10.7	10.9	11.6	10.9	8.2	9.0
College 45	0.1	5.0	6.4	6.8	7.4	7.8	7.3	6.5	5.9	3.8	5.4
College 50	−2.5	3.9	5.7	6.2	6.9	7.2	7.3	6.8	6.9	3.7	5.1
College 55	−1.4	5.1	6.8	7.3	7.7	7.8	8.1	8.2	7.1	4.2	5.5
College 60	0.0	5.9	7.4	8.6	8.5	8.5	9.0	8.4	8.5	4.2	5.8
College 65	1.0	6.7	8.0	8.8	8.9	8.7	9.5	8.8	8.7	5.2	6.6
College 70	2.0	7.0	8.6	9.0	9.9	9.8	10.8	10.5	10.3	5.4	7.1
College 75	1.5	7.6	9.3	10.4	10.3	10.1	10.6	10.4	11.1	6.1	7.8
College 80	2.1	7.9	9.5	10.9	10.4	11.2	11.0	11.4	10.8	6.5	8.0
College 85	2.0	7.4	9.3	10.2	10.3	10.6	10.8	11.0	11.5	6.3	7.8
College 90	1.3	7.7	9.3	10.0	10.2	10.6	10.8	10.6	11.1	6.6	7.9
College 95	0.3	7.3	9.1	9.8	9.9	9.6	10.1	10.8	11.2	6.8	7.8

7.8 How Well Does OASI Pool Risk?

If the OASI program represents a net tax, on average, for postwar Americans, how well does it do in pooling risks these Americans face? Table 8 attempts to address this question. It compares the variance of lifetime earnings before OASI taxes and benefits with the variance of lifetime earnings net of OASI's lifetime net taxation. Specifically, within each cell indicated in the table, we calculate the percentage difference between the variance of lifetime earnings (*a*) and the variance of lifetime earnings minus lifetime OASI taxes plus lifetime OASI benefits (*b*). The table

TABLE 7

Average Lifetime OASI Net Tax Rates Assuming a 25% Reduction in Social Security Benefits Beginning in 1999

	Lifetime labor earnings in thousands of 1997 dollars:										
Group	0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	3.1	6.7	7.5	7.6	7.8	7.7	7.4	6.4	6.5	3.9	6.1
Cohort 50	0.4	5.3	6.4	6.8	7.1	7.3	7.1	6.8	6.6	3.9	5.6
Cohort 55	1.6	5.8	6.9	7.2	7.3	7.8	8.0	7.8	7.1	4.2	5.8
Cohort 60	2.4	6.3	7.4	7.7	7.9	8.0	8.1	8.0	8.0	4.1	5.8
Cohort 65	2.7	6.4	7.3	7.9	7.7	7.7	8.2	8.1	7.8	4.6	6.2
Cohort 70	2.6	6.2	7.3	7.5	7.9	7.9	8.4	8.3	8.0	4.6	6.0
Cohort 75	2.3	6.0	7.1	7.6	7.8	7.7	7.8	8.1	8.4	4.8	6.1
Cohort 80	1.9	5.9	6.9	7.6	7.6	7.9	7.8	8.2	8.1	4.9	6.0
Cohort 85	1.6	5.6	6.8	7.3	7.5	7.6	7.8	8.0	8.2	4.7	5.8
Cohort 90	1.6	5.6	6.7	7.3	7.6	7.6	7.8	7.6	8.2	5.1	6.0
Cohort 95	1.2	5.4	6.6	7.2	7.3	7.3	7.5	8.0	7.9	5.3	6.0
Men 45	6.2	7.2	7.9	7.9	8.1	7.9	7.4	6.6	7.1	4.2	6.4
Men 50	4.9	6.3	7.1	7.1	7.3	7.4	7.5	7.0	6.7	4.0	6.0
Men 55	5.4	6.9	7.3	7.6	7.6	8.1	8.2	8.4	7.5	4.3	6.1
Men 60	5.7	7.2	8.0	8.0	8.3	8.2	8.7	8.2	8.2	4.1	6.0
Men 65	5.9	7.2	7.8	8.2	8.0	7.9	8.4	8.1	7.9	4.8	6.4
Men 70	5.8	7.1	7.8	7.7	8.2	8.0	8.6	8.5	8.5	4.9	6.4
Men 75	5.5	6.9	7.6	7.9	7.9	8.2	8.2	8.6	8.6	4.9	6.4
Men 80	5.8	6.5	7.4	8.0	7.9	8.1	7.9	8.4	8.2	5.3	6.4
Men 85	5.1	6.3	7.4	7.7	7.7	7.6	8.1	8.4	8.7	4.7	6.0
Men 90	4.7	6.2	7.1	7.7	7.7	7.8	7.8	7.9	8.5	5.2	6.2
Men 95	3.9	6.0	7.0	7.2	7.6	7.3	7.7	8.2	7.9	5.4	6.2
Women 45	2.4	6.3	7.0	6.8	6.9	6.8	7.1	5.8	4.6	3.0	5.5
Women 50	−1.1	4.6	5.8	6.2	6.5	7.1	6.2	6.3	6.6	3.6	4.8
Women 55	0.1	5.1	6.4	6.5	6.9	7.1	7.4	6.9	6.3	4.0	5.2
Women 60	1.0	5.7	6.8	7.3	7.3	7.6	7.2	7.6	7.5	4.0	5.5
Women 65	1.3	5.8	6.8	7.6	7.3	7.5	8.0	8.1	7.5	4.2	5.8
Women 70	1.0	5.5	6.8	7.3	7.5	7.6	8.0	7.9	7.1	4.0	5.5
Women 75	0.9	5.3	6.7	7.1	7.5	7.0	7.3	7.5	7.8	4.5	5.6
Women 80	0.1	5.4	6.3	7.0	7.3	7.7	7.6	7.9	7.9	4.2	5.4
Women 85	0.2	5.1	6.4	6.9	7.3	7.6	7.2	7.4	7.0	4.5	5.5
Women 90	0.4	5.2	6.2	6.9	7.4	7.4	7.7	7.1	7.6	4.8	5.6
Women 95	0.1	4.9	6.1	7.1	7.0	7.3	7.3	7.6	8.0	5.1	5.7
White 45	3.1	6.7	7.5	7.6	7.8	7.7	7.4	6.3	6.4	3.9	6.1
White 50	0.3	5.2	6.4	6.8	7.0	7.2	7.2	6.8	6.6	3.9	5.5
White 55	1.5	5.7	6.8	7.2	7.3	7.8	7.9	7.8	7.0	4.2	5.7
White 60	2.2	6.3	7.3	7.7	7.8	8.0	8.3	7.9	8.1	4.2	5.9
White 65	2.4	6.3	7.3	7.9	7.7	7.7	8.2	8.1	8.0	4.6	6.1
White 70	2.4	6.1	7.2	7.5	7.9	7.9	8.3	8.4	8.0	4.6	6.0
White 75	2.3	5.9	7.1	7.5	7.7	7.7	7.7	8.0	8.3	4.7	6.0
White 80	1.6	5.8	6.9	7.6	7.6	7.9	7.7	8.3	8.0	4.8	5.9
White 85	1.4	5.4	6.7	7.3	7.6	7.7	7.7	8.0	8.0	4.6	5.7
White 90	1.0	5.4	6.6	7.3	7.7	7.6	7.7	7.8	8.2	5.1	6.0
White 95	0.9	5.0	6.4	7.1	7.2	7.2	7.5	7.9	7.9	5.2	5.9

TABLE 7 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	3.5	6.5	7.7	7.2	8.0	7.1	6.6	7.0	7.4	4.1	6.5
Non-white 50	1.7	5.9	6.7	6.7	7.6	7.6	6.9	7.0	6.8	4.3	6.1
Non-white 55	2.3	6.4	7.3	7.0	7.8	7.8	8.2	7.9	8.3	4.6	6.3
Non-white 60	3.5	6.9	7.9	7.7	8.2	8.2	7.0	8.6	7.4	3.7	5.7
Non-white 65	3.9	6.8	7.2	8.0	8.2	7.9	8.7	8.0	5.9	5.1	6.5
Non-white 70	3.8	6.6	7.6	7.5	7.8	8.1	8.5	8.1	7.9	4.3	6.1
Non-white 75	2.1	6.5	7.5	7.8	8.1	8.0	8.4	8.3	8.5	5.3	6.6
Non-white 80	3.2	6.4	7.0	7.6	7.6	8.1	8.0	7.9	8.5	5.9	6.7
Non-white 85	2.5	6.3	7.3	7.7	7.4	7.4	8.0	7.7	8.8	5.0	6.2
Non-white 90	3.6	6.4	7.1	7.3	7.1	7.6	7.9	6.8	8.2	5.0	6.2
Non-white 95	2.2	6.3	7.1	7.4	7.7	7.7	7.8	8.4	8.2	5.8	6.6
Non-college 45	3.2	6.9	7.7	7.7	7.8	7.4	7.3	6.2	6.8	4.1	6.4
Non-college 50	0.6	5.6	6.6	7.0	7.1	7.4	7.1	7.0	6.5	4.3	5.9
Non-college 55	2.0	5.9	6.9	7.2	7.3	8.0	8.1	7.8	7.4	4.5	6.1
Non-college 60	2.7	6.5	7.5	7.6	7.9	8.1	8.2	8.3	8.3	4.5	6.3
Non-college 65	2.9	6.5	7.4	8.1	7.8	7.9	8.3	8.4	8.1	4.9	6.5
Non-college 70	2.8	6.3	7.5	7.7	8.0	8.0	8.2	8.5	8.0	5.0	6.4
Non-college 75	2.8	6.2	7.2	7.4	7.8	8.0	7.8	8.4	8.5	5.1	6.4
Non-college 80	2.3	6.1	7.1	7.3	7.8	7.8	7.6	8.3	8.4	5.3	6.4
Non-college 85	1.9	5.9	7.0	7.3	7.6	7.7	7.8	8.1	8.0	4.9	6.0
Non-college 90	2.2	5.7	6.7	7.4	7.8	7.7	7.8	7.6	8.4	5.6	6.4
Non-college 95	1.9	5.5	6.6	7.2	7.5	7.7	7.8	8.3	7.8	5.9	6.5
College 45	2.8	6.1	7.0	7.3	7.7	8.0	7.4	6.6	6.0	3.8	5.7
College 50	−0.1	4.8	6.1	6.4	7.0	7.1	7.2	6.7	6.8	3.6	5.2
College 55	0.7	5.5	6.9	7.2	7.4	7.5	7.7	7.8	6.7	3.9	5.4
College 60	1.7	6.0	7.1	8.0	7.9	7.8	8.1	7.5	7.6	3.8	5.3
College 65	2.1	6.4	7.2	7.8	7.7	7.5	8.1	7.5	7.3	4.4	5.8
College 70	2.4	6.0	7.0	7.3	7.9	7.8	8.5	8.2	8.1	4.3	5.7
College 75	1.4	5.8	7.1	7.8	7.7	7.5	7.9	7.8	8.2	4.6	5.8
College 80	1.3	5.6	6.8	7.8	7.5	8.1	7.9	8.2	7.8	4.7	5.7
College 85	1.2	5.2	6.6	7.3	7.4	7.6	7.7	7.9	8.3	4.5	5.6
College 90	0.6	5.4	6.6	7.2	7.3	7.6	7.7	7.6	8.0	4.8	5.7
College 95	−0.1	5.1	6.5	7.1	7.1	6.9	7.2	7.8	8.1	4.9	5.6

reports the percentage reduction calculated as $(a\text{-}b)/a$. The rows labeled "Total" show variance reductions across all cohorts.

Across all cohorts, the OASI system reduces lifetime income variance by 5.9 percent. The variance reduction is higher (7.0 percent) among the non-college-educated, and smaller (5.1 percent) among the college-educated. The reductions in variance among women and among men are fairly similar. There is also no clear time trend across cohorts in the degree of lifetime-income variance reduction.

What should one make of these findings? Three things: first, the vari-

TABLE 8
Percentage Reduction in Variance of Lifetime Income

Group	Total	College	Non-college
Total	5.9	5.1	7.0
Cohort 45	6.8	5.5	8.1
Cohort 50	6.3	5.5	7.1
Cohort 55	6.1	5.4	6.8
Cohort 60	5.3	4.2	7.4
Cohort 65	6.3	5.9	6.6
Cohort 70	5.3	4.3	7.3
Cohort 75	6.3	5.8	6.9
Cohort 80	5.4	5.4	5.3
Cohort 85	5.4	5.0	5.7
Cohort 90	6.4	5.5	7.9
Cohort 95	6.0	4.9	9.0
Total	5.6	4.9	6.8
Men 45	5.9	4.6	7.3
Men 50	5.8	4.3	8.1
Men 55	5.7	4.4	7.7
Men 60	4.8	3.7	6.4
Men 65	6.0	5.4	6.7
Men 70	6.2	5.5	7.0
Men 75	6.2	5.2	8.0
Men 80	5.2	5.6	4.6
Men 85	4.9	4.2	5.9
Men 90	6.0	5.3	6.9
Men 95	6.1	5.0	9.0
Total	5.5	4.9	6.5
Women 45	6.3	4.8	7.5
Women 50	5.8	7.2	5.2
Women 55	5.7	6.7	5.2
Women 60	5.7	4.3	8.5
Women 65	6.0	6.0	5.9
Women 70	4.0	3.1	6.9
Women 75	5.8	6.3	5.3
Women 80	5.1	4.6	6.0
Women 85	5.7	6.3	5.1
Women 90	6.5	5.4	9.4
Women 95	5.5	4.3	8.5
Total	5.81	5.15	6.79
White 45	6.62	5.38	7.96
White 50	6.17	5.46	6.91
White 55	5.89	5.25	6.54
White 60	5.67	4.62	7.26
White 65	6.07	5.78	6.34
White 70	6.13	5.50	7.10

TABLE 8 (*cont.*)

Group	Total	College	Non-college
White 75	6.15	5.69	6.75
White 80	5.04	5.08	4.94
White 85	5.22	4.91	5.60
White 90	6.40	5.42	8.64
White 95	5.68	4.58	8.97
Total	6.29	5.15	8.19
Non-white 45	8.77	8.05	9.72
Non-white 50	8.26	6.72	9.41
Non-white 55	8.54	6.81	10.69
Non-white 60	3.76	2.70	8.52
Non-white 65	8.47	7.29	10.11
Non-white 70	2.83	1.76	8.34
Non-white 75	7.24	6.67	7.93
Non-white 80	9.42	8.23	12.98
Non-white 85	6.42	6.00	6.99
Non-white 90	6.19	6.63	5.86
Non-white 95	8.82	8.58	9.06

ance reductions, although small, are not trivial. Second, the OASI system appears successful in reducing lifetime-income variance across and within cohorts and, indeed, within all subgroups of cohorts considered. Third, although the OASI system reduces the variance of lifetime income, this doesn't necessarily mean that it reduces the riskiness of lifetime income. If all agents knew for sure what they would earn, how long they would earn it, and when they would die, lifetime income would be known with certainty; i.e., there would be no risks to pool. Nonetheless, the OASI system could reduce the variance of lifetime income by redistributing from those with high to those with low lifetime incomes. A counterargument here, however, is that even if people know their lifetime earnings once they are in the work force, they don't know them before they are born, and the OASI system is reducing the risk of being born a low lifetime earner.

7.9 Internal Rates of Return on OASI Contributions Earned by Postwar Americans

Table 9 presents calculations of the real internal rate of return projected to be earned by postwar Americans on their OASI contributions. We calculate this rate by determining the discount rate that equates the

TABLE 9
Internal Rates of Return

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Cohort 45	4.91	3.00	1.99	1.53	1.21	0.88	0.78	0.92	0.52	0.53	1.84
Cohort 50	5.63	3.27	2.27	1.73	1.46	0.97	0.79	0.54	0.56	0.70	1.98
Cohort 55	5.25	3.17	2.21	1.81	1.49	0.93	0.62	0.52	0.47	0.54	1.81
Cohort 60	5.03	3.03	2.19	1.54	1.47	1.19	0.63	0.46	0.29	0.57	1.73
Cohort 65	4.97	3.10	2.38	1.64	1.53	1.27	1.07	0.97	0.34	0.39	1.74
Cohort 70	4.98	3.29	2.44	1.92	1.57	1.40	1.06	0.40	0.57	0.43	1.80
Cohort 75	5.09	3.38	2.48	1.95	1.73	1.61	1.20	1.12	0.47	0.52	1.87
Cohort 80	5.24	3.42	2.61	2.09	1.79	1.53	1.56	0.97	0.52	0.52	1.85
Cohort 85	5.31	3.57	2.79	2.36	2.00	1.70	1.65	1.14	0.75	0.66	1.99
Cohort 90	5.31	3.63	2.83	2.29	1.94	1.68	1.47	1.42	0.96	0.69	1.97
Cohort 95	5.45	3.73	2.89	2.39	2.10	2.03	1.78	1.33	0.93	0.41	1.87
Men 45	3.35	2.07	1.29	1.11	0.92	0.62	0.55	0.65	0.07	0.26	0.88
Men 50	3.45	2.27	1.55	1.21	1.08	0.64	0.35	0.21	0.27	0.48	0.99
Men 55	3.40	2.19	1.60	1.20	1.13	0.49	0.11	−0.01	0.17	0.35	0.91
Men 60	3.36	2.09	1.45	1.04	1.00	0.83	−0.09	−0.13	0.00	0.38	0.85
Men 65	3.41	2.26	1.62	1.14	0.92	0.83	0.89	0.74	0.09	0.11	0.90
Men 70	3.35	2.46	1.72	1.43	1.10	1.13	0.72	0.22	0.31	0.17	0.99
Men 75	3.50	2.64	1.85	1.50	1.40	1.07	0.68	0.51	0.06	0.27	1.07
Men 80	3.47	2.74	2.06	1.53	1.42	1.06	1.34	0.73	0.35	0.25	1.09
Men 85	3.82	2.96	2.17	1.88	1.63	1.47	1.10	0.74	0.17	0.47	1.25
Men 90	4.08	3.12	2.21	1.77	1.74	1.38	1.41	1.12	0.70	0.48	1.32
Men 95	4.37	3.23	2.44	2.16	1.62	1.87	1.54	1.20	0.81	0.25	1.29
Women 45	5.11	3.42	2.63	2.24	1.84	1.80	1.47	1.63	1.81	1.52	3.06
Women 50	6.06	3.77	2.89	2.45	2.15	1.61	1.65	1.41	1.16	1.31	3.15
Women 55	5.73	3.69	2.77	2.50	2.00	1.73	1.50	1.21	1.09	0.99	2.82
Women 60	5.47	3.57	2.80	2.12	2.04	1.63	1.50	1.15	0.97	0.96	2.65
Women 65	5.42	3.59	2.99	2.19	2.21	1.90	1.37	1.27	0.90	1.03	2.67
Women 70	5.48	3.77	2.97	2.48	2.17	1.83	1.57	0.79	1.14	0.95	2.71
Women 75	5.51	3.82	2.95	2.49	2.24	2.28	1.85	1.74	1.26	1.02	2.75
Women 80	5.72	3.82	3.15	2.70	2.23	2.02	1.83	1.46	0.87	1.11	2.75
Women 85	5.69	3.94	3.19	2.82	2.41	2.03	2.32	1.73	1.76	1.05	2.80
Women 90	5.65	3.92	3.29	2.76	2.20	2.01	1.59	1.88	1.47	1.10	2.72
Women 95	5.74	4.02	3.27	2.64	2.59	2.28	2.09	1.65	1.11	0.76	2.59
White 45	4.94	3.02	2.06	1.51	1.24	0.81	0.78	0.97	0.63	0.48	1.84
White 50	5.69	3.33	2.33	1.71	1.46	0.93	0.77	0.52	0.52	0.72	2.00
White 55	5.29	3.22	2.25	1.79	1.55	0.93	0.62	0.62	0.50	0.50	1.82
White 60	5.08	3.09	2.26	1.56	1.45	1.19	0.58	0.49	0.24	0.56	1.74
White 65	5.05	3.18	2.34	1.65	1.51	1.30	1.10	0.93	0.17	0.37	1.73
White 70	5.06	3.36	2.50	1.95	1.56	1.42	1.01	0.26	0.65	0.37	1.80
White 75	5.07	3.43	2.50	1.98	1.78	1.61	1.25	1.19	0.51	0.47	1.87
White 80	5.33	3.47	2.64	2.10	1.80	1.56	1.54	1.03	0.44	0.53	1.86
White 85	5.37	3.68	2.88	2.42	2.01	1.72	1.67	1.09	0.79	0.62	2.00
White 90	5.47	3.75	2.92	2.34	1.90	1.72	1.51	1.39	0.99	0.72	1.99
White 95	5.52	3.89	3.02	2.48	2.17	2.10	1.77	1.33	1.01	0.47	1.92

TABLE 9 (*cont.*)

Group	Lifetime labor earnings in thousands of 1997 dollars: 0–120	120–240	240–360	360–480	480–600	600–720	720–840	840–960	960–1080	>1080	Total
Non-white 45	4.64	2.91	1.47	1.69	0.93	1.60	0.67	0.48	−0.36	1.11	1.78
Non-white 50	5.11	2.88	1.91	1.82	1.44	1.27	0.90	0.69	0.80	0.51	1.83
Non-white 55	4.94	2.81	1.96	1.88	1.05	0.89	0.61	−0.90	0.05	0.91	1.78
Non-white 60	4.62	2.69	1.72	1.42	1.59	1.15	1.01	0.18	0.73	0.64	1.65
Non-white 65	4.43	2.69	2.55	1.61	1.66	1.07	0.85	1.18	1.61	0.51	1.81
Non-white 70	4.52	2.98	2.20	1.76	1.61	1.30	1.28	1.27	0.05	0.75	1.83
Non-white 75	5.17	3.18	2.37	1.80	1.53	1.65	0.91	0.69	0.33	0.76	1.86
Non-white 80	4.81	3.15	2.48	2.05	1.74	1.37	1.61	0.67	0.76	0.43	1.81
Non-white 85	5.02	3.08	2.38	2.07	1.96	1.61	1.54	1.44	0.51	0.86	1.94
Non-white 90	4.65	3.15	2.47	2.03	2.13	1.53	1.28	1.51	0.78	0.53	1.88
Non-white 95	5.13	3.20	2.41	2.00	1.86	1.71	1.81	1.32	0.45	0.16	1.67
Non-college 45	4.86	2.83	1.85	1.39	1.15	0.97	0.77	1.01	0.19	0.61	1.89
Non-college 50	5.57	3.12	2.18	1.59	1.38	1.04	0.78	0.46	0.33	0.62	2.04
Non-college 55	5.12	3.06	2.20	1.83	1.55	0.66	0.37	0.50	0.25	0.47	1.85
Non-college 60	4.91	2.90	1.97	1.53	1.39	1.00	0.77	0.28	−0.09	0.47	1.73
Non-college 65	4.87	3.02	2.27	1.44	1.56	1.19	0.98	0.79	0.12	0.29	1.74
Non-college 70	4.91	3.17	2.23	1.68	1.54	1.41	1.25	0.14	0.56	0.47	1.87
Non-college 75	4.92	3.23	2.36	1.97	1.61	1.33	1.14	0.96	0.48	0.21	1.86
Non-college 80	5.11	3.28	2.47	2.08	1.56	1.69	1.43	1.12	0.41	0.39	1.92
Non-college 85	5.22	3.39	2.60	2.30	1.86	1.65	1.58	1.11	0.94	0.59	2.04
Non-college 90	5.12	3.55	2.78	2.20	1.86	1.64	1.27	1.25	0.98	0.70	2.05
Non-college 95	5.23	3.65	2.84	2.20	1.83	1.86	1.56	1.22	0.76	0.30	1.92
College 45	5.04	3.44	2.36	1.81	1.33	0.79	0.78	0.81	0.97	0.46	1.75
College 50	5.78	3.60	2.45	1.99	1.57	0.83	0.80	0.63	0.78	0.77	1.88
College 55	5.55	3.38	2.25	1.77	1.37	1.24	0.95	0.55	0.78	0.61	1.75
College 60	5.25	3.24	2.57	1.57	1.57	1.40	0.34	0.69	0.73	0.65	1.72
College 65	5.16	3.22	2.54	1.90	1.50	1.38	1.19	1.27	0.62	0.47	1.73
College 70	5.07	3.46	2.70	2.18	1.61	1.40	0.87	0.59	0.57	0.39	1.74
College 75	5.34	3.57	2.61	1.92	1.87	1.81	1.24	1.26	0.46	0.73	1.88
College 80	5.40	3.59	2.76	2.09	2.01	1.32	1.67	0.82	0.62	0.60	1.79
College 85	5.43	3.79	3.02	2.44	2.13	1.74	1.69	1.17	0.55	0.71	1.93
College 90	5.58	3.74	2.90	2.38	2.04	1.72	1.62	1.59	0.94	0.68	1.89
College 95	5.77	3.85	2.95	2.56	2.36	2.21	1.98	1.41	1.10	0.49	1.83

present value of all benefits received by members of a particular cell to the present value of all contributions paid by members of that cell.

On average, the real rate of return being paid to postwar Americans on their social security contributions is very small—1.86 percent. This is half the real rate currently being paid on inflation-indexed long-term U.S. government bonds. Interestingly, there is no trend across the cohorts with respect to the rates of return they earn. In other words, under current law, the deal social security is offering current middle-aged Americans is not any better than the one it is offering younger Ameri-

cans. On the one hand, earlier cohorts experienced lower OASI tax rates over the early parts of their working lives than do later cohorts. On the other hand, later cohorts have greater longevity, reflecting the trends incorporated in CORSIM's mortality module. In evaluating these figures, one should also bear in mind that the observed differences may reflect sampling variability.

In contrast to the cross-cohort and cross-assumption comparisons, there are very marked differences in real rates of return across lifetime income levels. Across all cohorts, those in the lowest earnings group earn on average a 5.19-percent return, whereas those in the highest earnings group average a 0.54-percent return. On this metric, at least, the OASI system appears to be highly progressive. There is also a systematic and significant difference in rates of return earned by women and by men. Across all cohorts and under the intermediate assumptions, women earn, on average, 2.79 percent on their contributions, whereas men earn only 1.05 percent. This difference reflects three things. First, women live longer than men. Second, women are lower lifetime earners than are men and thus benefit more from social security's progressive OASI benefit formula. Third, we are allocating dependent, mother and father, child, and survivor benefits to the recipients of these benefits even though these benefits are based on the earnings record of one's spouse.

Non-whites average about a 15 basis point lower rate of return than do whites, reflecting their shorter life spans. Non-white–white differences are somewhat greater among low lifetime earners, where mortality differences are greatest. Table 9 also indicates a slightly higher internal rate of return for non-college-educated than for college-educated postwar Americans. This is expected given the fact that the non-college-educated are lower lifetime earners and thus benefit, relatively speaking, from social security's progressive benefit formula.

8. CONCLUSION

This paper has used CORSIM (a dynamic micro simulation model) and SOCSIM (a detailed social security benefit calculator) to study social security's treatment of postwar Americans through its OASI program. This treatment is measured in terms of (1) the net taxes (gross taxes minus gross benefits) individuals pay to social security over their lifetimes and (2) the internal rates of return they earn on their contributions. Social security represents a substantial net tax for all but the poorest postwar Americans. It also provides almost all postwar Americans with a very low rate of return on their contributions—about half of what they could earn by investing in inflation-indexed long-term government bonds.

Although social security hits the rich the hardest in absolute terms, it hits them lightly in relative terms. The lifetime OASI net tax rate facing the top earners is substantially lower than that faced by the middle class. The OASI system also favors women over men, whites over non-whites, and the college-educated over the non-college-educated. The OASI system's generally high lifetime net tax rates and low internal rates of return should be set against its role in reducing, albeit by a small amount, the variance in lifetime incomes as well as its role in redistributing to earlier cohorts of Americans.

However one evaluates the current OASI system's treatment of postwar Americans, one thing is clear. That treatment will get significantly worse once the government takes the rather severe steps needed to shore up the system's long-term finances. The precise size of the burden ultimately imposed on postwar Americans will depend on how fast the government acts and whether it asks pre- as well as postwar Americans to help solve social security's truly grave long-term financial problems.

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