

# ***Lifetime Redistribution Under the Social Security Program: A Literature Synopsis***

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This article provides a brief overview of the more important studies of lifetime redistribution under the Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI) programs. Studies are categorized into two types, those that focus on redistribution across successive cohorts of workers or typical members of those cohorts and those that focus on the distribution of results across characteristics of interest within particular cohorts of workers. A list of related studies is provided at the end of the article for those interested in additional reading.

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*Acknowledgments:* The author thanks Benjamin Bridges, Jr., Michael J. Brien, and Harriet Orcutt Duleep for helpful comments on this article.

## ***I. Introduction***

This article provides a brief overview of the more important studies of lifetime redistribution under the Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI) programs. Such studies are sometimes referred to as “money’s worth” studies, since they address the question of the extent to which various groups of workers get their money’s worth from the program when lifetime benefits are compared with the lifetime taxes paid by the workers.<sup>1</sup>

Studies of lifetime redistribution under the Social Security program can be classified into two types. The first type focuses on redistribution across successive cohorts of workers or typical members of those cohorts.<sup>2</sup> The second type of study focuses on the distribution of results across characteristics of interest within a given cohort of workers—that is, how does the program treat lower-paid workers relative to higher-paid workers, single workers relative to couples, males relative to females, and so forth. The rest of this article summarizes some of the more important results drawn from published studies of each type. The summary focuses on results from studies that are likely to be more reliable, either because they are based at least in part on sample data, rather than on an insufficiently sophisticated “representative” worker approach,<sup>3</sup> or because they were conducted more carefully and documented more completely, imparting more import to the results. The list of studies included in the “References and Additional Reading” section provides additional references for those interested in a more comprehensive view of the literature.

## ***II. Redistribution Across Cohorts***

### ***Old-Age and Survivors Insurance Program***

Most birth cohorts who have reached retirement age to date have

received, or can expect to receive, relatively high rates of return under the OASI program. This result is characteristic of the startup of a pay-as-you-go retirement program that grants benefit rights to workers who have not contributed to the program over their entire working lifetimes; an analogous effect is created for current and many future beneficiaries by the liberalization of benefits in an existing pay-as-you-go retirement program. As a pay-as-you-go retirement program matures, however, the balance between taxes and benefits naturally becomes less favorable for later cohorts.

This effect has been widely documented in the literature and is illustrated in table 1, which displays inflation-adjusted internal rates of return<sup>4</sup> for selected birth cohorts under the OASI program as estimated by Leimer (1994).<sup>5</sup> These estimates are derived from historical and projected OASI benefits and taxes under present law for members of each cohort and include both the employee and employer share of the tax for wage earners. As shown, these inflation-adjusted internal rate of return estimates decline from over 36 percent for the 1876 birth cohort to less than 2 percent for birth cohorts now beginning their working lives. Internal rate of return estimates for recent and future birth cohorts would fall even lower under many of the proposals now being considered to resolve projected long-run deficits in the OASI program.<sup>6</sup>

### Disability Insurance Program

A somewhat different pattern of redistribution across cohorts emerges for the DI program. This is illustrated in table 2, which contains estimates of lifetime benefit/tax ratios *to date* for selected birth cohorts under the DI program taken from Leimer (1998).<sup>8</sup> An important difference between these estimates and those in table 1 is that the table 2 estimates consider only *historical* taxes and benefits (from the beginning of the DI program in 1957 through the last available data year, 1995). Nevertheless, all of the cohorts shown in table 2 attained age 65 by the end of the analysis period, so that any remaining interaction with the DI program will have little additional effect on their lifetime treatment under the program.<sup>9</sup>

As shown, estimated lifetime benefit/tax ratios to date under the DI program are smaller (and less than one) for the earliest cohorts. The first exposure of these early cohorts to the DI

program, which began in 1957, came after age 64, when net transfers (benefits less taxes) under the DI program tend to be relatively small and potentially negative.<sup>10</sup> Estimated lifetime benefit/tax ratios to date increase rapidly for subsequent cohorts and remain relatively stable, with lifetime benefits more than twice lifetime taxes, for cohorts born around the turn of the century through those born around 1920. Although the estimated lifetime benefit/tax ratio declines for subsequent cohorts, it remains above one for cohorts attaining at least age 62 by 1995, the end of the analysis period. Lifetime benefit/tax ratios may fall below one for subsequent cohorts who spend their entire working lives under the DI program.<sup>11</sup> This redistributive pattern across cohorts under the DI program differs from that for the OASI program, particularly for the earliest cohorts, who received positive lifetime net transfers and generally the highest lifetime benefit/tax ratios under the OASI program.

## III. Redistribution Within Cohorts

### Old-Age and Survivors Insurance Program

Within cohorts, studies based at least in part on historical data have generally, but not always, reached consistent conclusions regarding the broad lifetime redistributive effects of the OASI program.<sup>12</sup> The most relevant of these studies suggest that:

- In general, the Social Security program has been progressive with respect to income or lifetime earnings; that is, internal rates of return and lifetime benefit/tax ratios tend to decline as measures of earnings or income increase, even when other factors are held constant.<sup>13</sup>
- Internal rates of return and lifetime benefit/tax ratios have tended to be more favorable for women than for men<sup>14</sup> and for married couples than for single individuals. Women tend to fare better than men, even when other factors (such as earnings) are held constant, because of their lower mortality rates. Couples tend to fare better than singles primarily because of the spouse benefit; single mortality rates also generally exceed those for married individuals.

Table 1.—Inflation-adjusted internal rates of return under OASI present law for selected birth cohorts, as estimated by Leimer (1994)

| [In percent] |                |              |                |
|--------------|----------------|--------------|----------------|
| Birth cohort | Rate of return | Birth cohort | Rate of return |
| 1876.....    | 36.5           | 1950.....    | 2.2            |
| 1900.....    | 11.9           | 1975.....    | 1.9            |
| 1925.....    | 4.8            | 2000.....    | 1.7            |

Table 2.—Ratio of DI benefits and taxes accumulated through 1995 for selected birth cohorts, as estimated by Leimer (1998)

| Birth cohort | Benefit/tax ratio | Birth cohort | Benefit/tax ratio |
|--------------|-------------------|--------------|-------------------|
| 1880.....    | 0.05              | 1910.....    | 2.11              |
| 1890.....    | .08               | 1920.....    | 2.14              |
| 1900.....    | 2.29              | 1930.....    | 1.24              |

On average, whites appear to have received lower rates of return than nonwhites, due in part to the historically lower earnings of nonwhites coupled with the progressivity of the benefit formula; these factors appear to outweigh the generally lower survival probabilities for nonwhites.<sup>15</sup> Studies that have examined mortality differentials by race have found that these differentials can be largely explained by socioeconomic factors.<sup>16</sup> Thus, controlling for other socioeconomic factors such as marital status, family size, education, earnings, income, and wealth should substantially reduce the effect of any remaining racial mortality differentials on the relative treatment of different racial groups under the program.<sup>17</sup>

Most of these results are illustrated in table 3, taken from Duggan et al. (1993), for a sample of persons born from 1895 to 1922.<sup>18</sup> The “Net transfers” column gives the difference between lifetime benefits and lifetime taxes for this sample.<sup>19</sup> As shown, “dependent couples” (defined as single-earner couples with a dependent spouse) fared better on average in terms of both the internal rate of return and the lifetime net transfer than did “individual” workers (defined to include both single persons and dually entitled beneficiaries and their spouses).<sup>20</sup> On average, females fared better than males by the rate of return measure, but females received lower average lifetime net transfers because their higher rate of return applied to much lower average lifetime taxes.<sup>21</sup> On average, nonwhites fared better than whites by the internal rate of return measure, but blacks received smaller lifetime net transfers on average

because of their lower lifetime tax payments. Finally, the program was progressive, on average, across lifetime earnings levels for this sample, as indicated by the decline in internal rates of return across the earnings categories;<sup>22</sup> again, the lifetime net transfer increased across the earnings categories, reflecting an increase in lifetime tax payments sufficient to outweigh the decline in internal rates of return.

The most relevant studies that project the distributional results of the OASI program for future retirees under present law have generally reached conclusions consistent with the conclusions summarized earlier in this article for studies based on historical data.<sup>23</sup> Specifically, these studies generally suggest that the program will continue to be progressive with respect to earnings for future retirees,<sup>24</sup> that single females will generally receive higher internal rates of return and lifetime benefit/tax ratios than single males, and that single-earner couples will generally fare better than singles or two-earner couples by those measures.

### Disability Insurance Program

Similar qualitative results across race and gender groups have obtained historically under the DI program, as illustrated in table 4. This table from Leimer (1998) summarizes cumulative redistribution from the start of the program in 1957 through 1995 across specific race and gender groups without regard to their cohort affiliation; that is, DI benefits and taxes for each race and gender group in each historical year are accumulated through 1995 using the effective rate of return earned by the DI Trust Fund.<sup>25</sup> As shown, accumulated benefit payments to all

Table 3.—Accumulated net transfers and inflation-adjusted internal rates of return under OASI for the 1895-1922 birth cohorts, by various worker classifications, as estimated by Duggan, Gillingham, and Greenlees (1993)

| Worker category         | Present values (in 1988 dollars) |           |               | Rate of return<br>(in percent) |
|-------------------------|----------------------------------|-----------|---------------|--------------------------------|
|                         | Taxes                            | Benefits  | Net transfers |                                |
| All sample worker:..... | \$26,000                         | \$113,082 | \$87,082      | 9.1                            |
| Household type:         |                                  |           |               |                                |
| Individual.....         | 23,527                           | 89,484    | 65,957        | 8.6                            |
| Dependent couple.....   | 32,007                           | 170,396   | 138,390       | 9.8                            |
| Gender:                 |                                  |           |               |                                |
| Female.....             | 17,037                           | 96,204    | 79,167        | 10.9                           |
| Male.....               | 31,630                           | 123,684   | 92,054        | 8.5                            |
| Race:                   |                                  |           |               |                                |
| White.....              | 27,010                           | 116,963   | 89,953        | 9.1                            |
| Black.....              | 17,447                           | 76,972    | 59,525        | 9.6                            |
| Other.....              | 20,766                           | 110,872   | 90,106        | 10.7                           |
| Earnings:               |                                  |           |               |                                |
| Low.....                | 5,820                            | 67,675    | 61,855        | 13.8                           |
| Medium.....             | 23,303                           | 111,027   | 87,724        | 9.9                            |
| High.....               | 48,876                           | 160,540   | 111,665       | 7.6                            |

beneficiaries since the inception of the DI program were about 93 percent of, or \$97 billion less than, accumulated tax payments by all workers, reflecting the effects of other trust fund activities, primarily administrative expenses and the buildup of the trust fund itself. On balance, the accumulated benefit/tax ratio measures suggest that the net effect of cumulative transfers across the race and gender groups since the start of the program has been a net redistribution from males to females and a more pronounced net redistribution from Whites to Nonwhites, as defined in the analysis;<sup>26</sup> that is, the accumulated benefit/tax ratio for males is 0.9 percent below; for females, 2.1 percent above; for Whites, 5.1 percent below; and for Nonwhites, 39.1 percent above the corresponding ratio for all persons. The ranking of outcomes among the race and gender subgroups, from most favorable to least favorable, is Nonwhite males, followed by Nonwhite females, followed by White females, followed by White males; specifically, the accumulated benefit/tax ratio for Nonwhite males is 49.5 percent above; for Nonwhite females, 22.2 percent above; for White females, 1.3 percent below; and for White males, 6.8 percent below the corresponding ratio for all persons. Thus, while there has been a net redistribution from males to females, Nonwhite males have, on average, experienced more favorable outcomes to date than any other race and gender subgroup, including Nonwhite females. Other results in the Leimer (1998) analysis suggest that the favorable outcomes experienced to date by females relative to males under the DI program may be eroded over time for present and future cohorts as they move through their working lives.<sup>27</sup>

### ***Combined Old-Age and Survivors Insurance and Disability Insurance Programs***

Because of the nature of the measures employed and differences in the methods applied in the various studies, it is not possible to simply combine the estimates of the OASI and

DI studies to obtain an overall net result for the combined OASDI programs. Because similar overall results were generally obtained by both sets of studies across race and gender groups, however, some inferences can be drawn about net results for the combined OASDI programs.

For both the OASI and DI programs, the most relevant studies suggest that within cohorts nonwhites have received more favorable relative treatment than whites, on average, implying that the same result would hold for the combined OASDI programs. Under the OASI program, the historically lower earnings of nonwhites coupled with the progressivity of the benefit formula appear to outweigh the generally lower survival probabilities experienced historically by nonwhites. Under the DI program, the historically lower earnings of nonwhites coupled with the progressive benefit formula and the higher disabled worker to taxpayer ratios experienced historically by nonwhites appear to be major factors in their favorable treatment relative to whites historically.

Studies of both the OASI and DI programs also suggest that females have received more favorable relative treatment than males, on balance, again implying that the same result would hold historically for the combined OASDI programs. Under the OASI program, the effect of the historically lower earnings of females, coupled with the progressivity of the benefit formula, is reinforced by their generally lower mortality rates. Under the DI program, there are a number of factors working in opposite directions. As examples, the effect of the historically lower earnings of females coupled with the progressive benefit formula and their historically dominant share of dependent benefits is offset to some extent by their historically lower disability rates. While these factors have led to the more favorable treatment of females historically, on balance, changes in these factors over time may erode this favorable treatment under the DI program for female members of present and future cohorts.

Table 4.—Accumulated benefit/tax ratios and net transfers under the DI program over the period 1957-95, as estimated by Leimer (1998)

| Race/gender group     | Accumulated benefit/tax ratio | Accumulated net transfers (in billions) |
|-----------------------|-------------------------------|---|
| All persons.....      | 0.931                         | -\$97.160                               |
| White males.....      | .868                          | -115.086                                |
| White females.....    | .919                          | -29.996                                 |
| Nonwhite males.....   | 1.391                         | 39.434                                  |
| Nonwhite females..... | 1.137                         | 8.488                                   |
| All Whites.....       | .883                          | -145.082                                |
| All Nonwhites.....    | 1.295                         | 47.922                                  |
| All males.....        | .922                          | -75.653                                 |
| All females.....      | .950                          | -21.508                                 |

### ***Notes***

<sup>1</sup>The “money’s worth” label is somewhat misleading, in part because such studies typically do not incorporate the administrative costs of the alternatives to which the Social Security program is implicitly or explicitly being compared. Administrative costs are automatically reflected in a comparison of Social Security taxes and benefits, however, because administrative costs are paid out of program tax receipts, reducing the level of benefits that can be financed in a pay-as-you-go program.

<sup>2</sup>In some studies, a cohort is defined as the group of workers who are born during a given period of time, such as a year; in other studies, a cohort might be defined as the group of beneficiaries who become entitled to benefits during a given period of time or who receive benefits during a given period of time.

<sup>3</sup>One approach adopted in many studies is to construct lifetime Social Security tax and benefit estimates for what are referred to as “representative,” “hypothetical,” or “synthetic” workers who differ in various characteristics of interest, such as race, gender, marital status, and earnings level. Unfortunately, the tax and benefit streams constructed in these studies typically are overly simplistic and not really representative of the corresponding categories of actual

workers. Given adequate data and analysis, it is possible to construct tax and benefit streams using synthetic data that are actually representative of particular groups of workers. The more detailed the worker categorizations, however, the more deficient available data sources and the more difficult the attendant analyses become. See Leimer (1995) for a more thorough critique of the representative worker approach, along with a discussion of the major assumptions, key analytical methods, and measures used in Social Security money's worth analyses.

<sup>4</sup>The internal rate of return is the interest rate that a worker would have to receive on his or her lifetime Social Security tax payments in order to generate lifetime benefits equal to those received under Social Security. As such, the internal rate of return can be compared to the interest rate available to workers for their private investments to determine if Social Security represents an attractive "investment" alternative, taking into account any differences in risk and liquidity between the implicit Social Security "investment" and private alternatives. The "inflation-adjusted" qualifier reflects the fact that the actual internal rates of return estimated for these cohorts have been reduced to adjust for the effect of increases in the price level over time. See Leimer (1995) for a more thorough explanation of alternative measures of lifetime redistribution under the Social Security program, including the internal rate of return measure, as well as a discussion of the issues involved in the choice of an interest rate for comparison to the internal rate of return.

<sup>5</sup>Other studies that have estimated redistributive results for cohorts as a whole include Leimer and Petri (1981), Moffitt (1984), and Duggan et al. (1993).

<sup>6</sup>The Leimer (1994) estimates were derived from projections of OASI taxes and benefits consistent with the intermediate assumptions of the 1991 Trustees' Report (see Board of Trustees (1991)), which projected that the OASI Trust Fund would become negative around the middle of the next century without some combination of revenue increases or expenditure cuts. To illustrate the potential effects of alternative policies to close the projected long-run deficit, Leimer (1994) also presents estimates under a stylized tax rate increase policy and under a stylized benefit award reduction policy. Both of these alternative policies generated inflation-adjusted internal rate of return projections below 1 percent for cohorts born around the middle of the next century, compared to a projection of 1.7 percent for those cohorts under the present law assumptions.

<sup>7</sup>The lifetime benefit/tax ratio measure is the ratio of the present value of lifetime Social Security benefits to the present value of lifetime Social Security taxes, where "present value" means that past or future benefits or taxes are accumulated or discounted to the "present" period using a particular rate of interest. As such, a lifetime benefit/tax ratio measure greater than, equal to, or less than one indicates whether lifetime benefits exceed, equal, or fall short of lifetime taxes, respectively, when evaluated *using that interest rate*. Again, Leimer (1995) provides a more thorough discussion of alternative measures of lifetime redistribution, including the lifetime benefit/tax ratio measure.

<sup>8</sup>In the Leimer (1998) analysis, estimates of historical DI benefits and taxes over the period 1957-95 were accumulated through 1995 using the effective rate of return earned on DI Trust Fund assets. Both the employer and employee shares of the payroll tax for wage earners were included in the denominator of the benefit/tax ratio. The Leimer (1998) analysis does not report internal rate of return estimates.

<sup>9</sup>Because disabled worker benefits are automatically converted at age 65 to old-age benefits paid out of the OASI Trust Fund, net transfers (benefits less taxes) experienced by cohort members under the DI program after age 65 are relatively small compared to net transfers at earlier ages. Net transfers to persons older than age 64 consist of the benefits paid to aged dependents of disabled workers less the taxes paid by cohort members who continue working.

<sup>10</sup>While lifetime taxes exceed lifetime benefits under the DI program for these cohorts, the absolute difference between their lifetime taxes and benefits is relatively small. See Leimer (1998) for further detail.

<sup>11</sup>This follows in part because a simple comparison of DI benefits and taxes does not adjust for the administrative costs of providing the disability insurance. Some of the taxes collected from each cohort are used to cover administrative expenses, necessarily creating an imbalance between taxes and benefits (see footnote 1). The bias against Social Security that is introduced by a simple comparison of benefits and taxes is larger for the DI program than for the OASI program, because the administrative costs of the DI program are substantially higher as a proportion of taxes or benefits than for the OASI program. In 1997, for example, DI administrative expenses were reported as 2.3 percent of net contributions and 2.8 percent of benefit payments, while OASI administrative expenses were reported as 0.6 percent of net contributions and 0.7 percent of benefit payments.

<sup>12</sup>In addition to the Duggan et al. (1993) study discussed later in this section, examples of studies that examine within-cohort distributional effects and are based at least in part on historical data include Freiden et al. (1976), Burkhauser and Warlick (1981), Hurd and Shoven (1985), Meyer and Wolff (1987), Wolff (1987), and Duggan et al. (1995).

<sup>13</sup>Even studies based on historical sample data that have used mortality rates differentiated by income or earnings levels suggest that these mortality differentials may reduce, but do not eliminate, the progressivity of the program. For example, see Meyer and Wolff (1987) and Duggan et al. (1995).

<sup>14</sup>Because of data and analytical considerations, different studies have used different treatments and allocations by gender of benefits to dependents. These differences do not alter the general conclusion, however, that internal rates of return and lifetime benefit/tax ratios have tended to be more favorable for women than for men under the OASI program.

<sup>15</sup>Conclusions regarding differential treatment by race under the OASI program have been less consistent across studies than conclusions regarding differential treatment across earnings, gender, and marital status groups. For example, a study by Hurd and Shoven (1985) found lower rates of return for nonwhites than for whites, on average, but data limitations forced them to assume, in effect, that tax payments of young decedents, while they were alive, were the same as for those who survived to interview age. A later study by Duggan et al. (1993) based on Social Security administrative data did not suffer from this limitation and found higher rates of return for nonwhites than for whites, on average.

<sup>16</sup>These studies include Behrman et al. (1991), Rogers (1992), and Menchik (1993). Behrman et al. (1991) conclude that socioeconomic characteristics account for most of the black-white mortality differences represented in their sample of older men drawn from the Retirement History Survey, with estimates ranging between 60 and 80 percent. Using a sample drawn from the National Longitudinal Survey

of Mature Men, Menchik (1993) finds that controlling for socioeconomic variables leads to a reduction of 75 percent in the effect of being black on mortality. Using a broader sample of all U.S. adults, Rogers (1992) finds that controlling for five key sociodemographic factors essentially eliminates race differences in mortality.

<sup>17</sup>Few studies based on historical data have made rigorous attempts to identify the effect of race on lifetime redistribution under the OASI program while controlling for other socioeconomic factors. Using a multiple regression approach to hold a number of other characteristics constant, Freiden et al. (1976) found that nonwhites received slightly lower internal rates of return than whites for a sample of beneficiaries with no dependents retiring between 1967 and 1970; the Freiden et al. analysis employed survivor probabilities disaggregated only by age, gender, and race. Applying similar models to a sample of beneficiaries who retired between 1962 and 1972, Wolff (1987) and Meyer and Wolff (1987) found that single nonwhites fared less well than single whites, but these results did not carry over to couples in general; the Wolff and Meyer and Wolff analyses employed survival probabilities differentiated by age, race, gender, income, education, and marital status. Because these studies rely on samples of retired beneficiaries, they do not reflect differences by race in the probability of attaining retirement age or in benefits to survivors of early decedents.

<sup>18</sup>The Duggan et al. (1993) estimates are based on a sample of actual case histories drawn from Social Security administrative data and incorporate both the employee and employer share of the payroll tax for wage earners. The present values in the table are calculated using historical and projected interest rates earned by the Social Security trust funds. Mortality rates are differentiated by age, gender, and race, but not by other characteristics, such as household type or lifetime earnings.

<sup>19</sup>This lifetime net transfers measure, then, is similar to the lifetime benefit/tax ratio measure except that it reflects the difference between, rather than the ratio of, the present values of lifetime Social Security benefits and lifetime Social Security taxes. As such, a lifetime net transfers measure greater than, equal to, or less than zero indicates whether lifetime benefits exceed, equal, or fall short of lifetime taxes, respectively, when evaluated using that interest rate. Again, Leimer (1995) provides a more thorough discussion of alternative measures of lifetime redistribution, including the lifetime net transfers measure.

<sup>20</sup>Dually entitled beneficiaries are spouses who are entitled to a benefit on their own account that is less than the benefit to which they are entitled as dependent spouses.

<sup>21</sup>Using a savings account analogy, the much larger lifetime “deposits” made by males to their Social Security “accounts” allowed them to experience larger “withdrawals” and net “interest earnings,” despite their lower rate of return. Limitations of the Social Security administrative data forced somewhat complicated gender groupings in the Duggan et al. (1993) analysis. In particular, the female category includes many dual beneficiaries, whose benefits include some portion based on the earnings of their spouses, while the male category includes many “dependent couple” records that associate the contributions of a male insured worker with benefits paid both to the worker and his wife. Despite these complications, the general thrust of these gender-based differences in redistributive outcomes is the same as that found in other studies based on historical sample data.

<sup>22</sup>The lifetime benefit/tax ratio can be computed from these results as the ratio of the “Benefits” and “Taxes” columns. This measure also declines across the earnings categories, consistent with

progressivity; the ratios for the low, medium, and high earnings categories are, respectively, 11.6, 4.8, and 3.3.

<sup>23</sup>Examples of studies projecting redistributive results for future retirees include Leimer (1978), Pellechio and Goodfellow (1983), Boskin et al. (1987), Myers and Schobel (1992), and Steuerle and Bakija (1994).

<sup>24</sup>Again, the usual definition of progressivity is used here, namely, that the internal rate of return, lifetime benefit/tax ratio, or other analogous relative lifetime redistributive measure used in the analysis tends to decline as lifetime earnings increase.

<sup>25</sup>As indicated earlier in this article, the Leimer (1998) analysis includes both the employer and employee shares of the payroll tax for wage earners.

<sup>26</sup>Limitations of the Social Security administrative data constrained the gender and race groupings used in the Leimer (1998) analysis. First, DI benefits received by a dependent beneficiary were assigned to the gender group to which the dependent beneficiary belonged, not the group to which the worker on whose account the benefits were paid belonged. Second, problems with the administrative data race variable somewhat muddled the definitions of the White and Nonwhite race categories. In addition, while these results reflect actual outcomes for the groups taken as a whole, limitations of the administrative data prevented the identification of the differential treatment that would persist across the groups when other characteristics of interest, such as earnings, are held constant. See Leimer (1998) for additional detail.

<sup>27</sup>In addition to the cumulative results discussed in this article, the Leimer (1998) analysis examines the relative treatment to date of race and gender groups within successive cohorts as well as across time. Estimated benefit/tax ratios were generally higher for Nonwhites than for Whites, as defined in the analysis, both within cohorts and across time. Estimates by gender differed somewhat between the cohort and intertemporal analyses. Within cohorts, accumulated benefit/tax ratios through 1995 for females exceed those for males in the earliest cohorts, fall below those for males in a number of subsequent cohorts, and then exceed those for males again in cohorts born since about 1910. Across time, a different pattern emerges, with annual benefit/tax ratios for females exceeding those for males for most of the early years of the program, but falling below those for males after 1982. This latter result suggests that the favorable treatment experienced to date by females relative to males in the more recent cohorts may be eroded over time for present and future cohorts as they complete their working lives.

## References and Additional Reading

- Aaron, Henry J. 1966. “The Social Insurance Paradox.” *Canadian Journal of Economics and Political Science*, Vol. 32 (August), pp. 371-374.
- \_\_\_\_\_. 1967. “Benefits Under the American Social Security System.” In *Studies in the Economics of Income Maintenance*, Otto Eckstein (ed.). Washington, DC: The Brookings Institution, pp. 49-72.
- \_\_\_\_\_. 1977. “Demographic Effects On the Equity of Social Security Benefits.” In *Economics of Public Services*, Martin S. Feldstein and Robert P. Inman (eds.). New York: Macmillan Press, Ltd., pp. 151-173.

- \_\_\_\_\_. 1982. *Economic Effects of Social Security*. Washington, DC: The Brookings Institution.
- Bakija, Jon and C. Eugene Steuerle. 1993. *Social Security Disability Insurance: Fiscal Imbalance and Lifetime Value*. Urban Institute Project Report, Washington, DC: Urban Institute (April).
- Beach, William W. and Gareth G. Davis. 1998. "Social Security's Rate of Return." Report No. CDA98-01, Heritage Center for Data Analysis (January 15).
- \_\_\_\_\_. 1998. "Social Security's Rate of Return for Hispanic Americans." Report No. CDA98-02, Heritage Center for Data Analysis (March 27).
- \_\_\_\_\_. 1998. "Social Security's Rate of Return: A Reply To Our Critics." Report No. CDA98-08, Heritage Center for Data Analysis (December 14).
- Behrman, Jere R., Robin Sickles, Paul Taubman, and Abdo Yazbeck. 1991. "Black-White Mortality Inequalities." *Journal of Econometrics*, Vol. 50 (October/November), pp. 183-203.
- Bennett, Carol T.F. 1979. "The Social Security Benefit Structure: Equity Considerations of the Family As Its Basis." *American Economic Review*, Vol. 69 (May), pp. 227-231.
- Blackburn, John O. 1967. "The Social Insurance Paradox: A Comment." *Canadian Journal of Economics and Political Science*, Vol. 33 (August), pp. 445-446.
- Board of Trustees, Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds. 1991. "1991 Annual Report of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Fund." Communication to the 102nd U.S. Congress, 1st Session, House Document 102-88.
- Boskin, Michael J., Marcy Avrin, and Kenneth Cone. 1983. "Modeling Alternative Solutions To the Long-Run Social Security Funding Problem." In *Behavioral Simulation Methods in Tax Policy Analysis*, Martin Feldstein (ed.). Chicago: University of Chicago Press, pp. 211-237.
- Boskin, Michael J., Laurence J. Kotlikoff, Douglas J. Puffert, and John B. Shoven. 1987. "Social Security: A Financial Appraisal Across and Within Generations." *National Tax Journal*, Vol. 40 (March), pp. 19-34.
- Boskin, Michael J. and Douglas J. Puffert. 1987. "Social Security and the American Family." In *Tax Policy and the Economy*, Lawrence H. Summers (ed.). Cambridge, Massachusetts: The MIT Press, pp. 139-159.
- \_\_\_\_\_. 1988. "The Financial Impact of Social Security By Cohort Under Alternative Financing Assumptions." In *Issues in Contemporary Retirement*, Rita Ricardo-Campbell and Edward P. Lazear (eds.). Stanford: Hoover Institution Press, pp. 207-232.
- Brittain, John. 1967. "The Real Rate of Interest On Lifetime Contributions Toward Retirement Under Social Security." In U.S. Congress, Joint Economic Committee, *Old Age Income Assurance, Part III: Public Programs*. 90th Congress, 1st Session (December), pp. 109-132.
- Brown, Robert L. 1998. "Social Security: Regressive or Progressive?" *North American Actuarial Journal*, Vol. 2 (April), pp. 1-33.
- Burkhauser, Richard V. 1979. "Are Women Treated Fairly in Today's Social Security System?" *Gerontologist*, Vol. 19 (June), pp. 242-249.
- Burkhauser, Richard V. and Timothy M. Smeeding. 1981. "The Net Impact of the Social Security System On the Poor." *Public Policy*, Vol. 29 (Spring), pp. 159-178.
- Burkhauser, Richard V. and John A. Turner. 1985. "Is the Social Security Payroll Tax a Tax?" *Public Finance Quarterly*, Vol. 13 (July), pp. 253-267.
- Burkhauser, Richard V. and Jennifer L. Warlick. 1981. "Disentangling the Annuity From the Redistributive Aspects of Social Security in the United States." *Review of Income and Wealth*, Vol. 27 (December), pp. 401-421.
- Caldwell, Steven, Melissa Favreault, Alla Gantman, Jagadeesh Gokhale, Thomas Johnson, and Laurence J. Kotlikoff. 1998. "Social Security's Treatment of Postwar Americans." NBER Working Paper No. 6603, National Bureau of Economic Research (June).
- Campbell, Colin D. and Rosemary G. Campbell. 1967. "Cost-Benefit Ratios Under the Federal Old-Age Insurance Program." In U.S. Congress, Joint Economic Committee, *Old Age Income Assurance, Part III: Public Programs*. 90th Congress, 1st Session (December), pp. 72-84.
- Capra, James R., Peter D. Skaperdas, and Robert M. Kubarych. 1982. "Social Security: An Analysis of Its Problems." *Federal Reserve Bank of New York Quarterly Review*, Vol. 7 (Autumn), pp. 1-17.
- Chen, Yung-Ping. 1967. "Inflation and Productivity in Tax-Benefit Analysis for Social Security." In U.S. Congress, Joint Economic Committee, *Old Age Income Assurance, Part III: Public Programs*. 90th Congress, 1st Session (December), pp. 85-108.
- Chen, Yung-Ping and Kwang-Wen Chu. 1974. "Tax-Benefit Ratios and Rates of Return Under OASI: 1974 Retirees and Entrants." *Journal of Risk and Insurance*, Vol. 41 (June), pp. 189-206.
- \_\_\_\_\_. 1976. "Tax-Benefit Ratios and Rates of Return Under OASI: Authors' Reply." *Journal of Risk and Insurance*, Vol. 43 (March), pp. 145-151.
- Chen, Yung-Ping and Stephen C. Goss. 1997. "Are Returns on Payroll Taxes Fair?" In *Social Security in the 21st Century*, Eric R. Kingson and James H. Schulz (eds.). New York: Oxford University Press, pp. 76-90.
- Deran, Elizabeth. 1966. "Income Redistribution Under the Social Security System." *National Tax Journal*, Vol. 19 (September), pp. 276-285.
- \_\_\_\_\_. 1967. "Some Economic Effects of High Taxes for Social Insurance." In U.S. Congress, Joint Economic Committee, *Old Age Income Assurance, Part III: Public Programs*. 90th Congress, 1st Session (December), pp. 181-201.
- Duggan, James E., Robert Gillingham, and John S. Greenlees. 1993. "Returns Paid To Early Social Security Cohorts." *Contemporary Policy Issues*, Vol. 11 (October), pp. 1-13.
- \_\_\_\_\_. 1995. "Progressive Returns to Social Security? An Answer from Social Security Records." Research Paper No. 9501, Office of the Assistant Secretary for Economic Policy, Department of the Treasury (November).
- \_\_\_\_\_. 1996. "Distributional Effects of Social Security: The Notch Issue Revisited." *Public Finance Quarterly*, Vol. 24 (July), pp. 349-370.
- Feldstein, M. and A. Samwick. 1992. "Social Security Rules and Marginal Tax Rates." *National Tax Journal*, Vol. 45 (March), pp. 1-22.
- Ferrara, Peter J. and John R. Lott. 1985. "Rates of Return Promised By Social Security To Today's Young Workers." In *Social Security:*

- Prospects for Real Reform*, Peter J. Ferrara (ed.). Washington, DC: Cato Institute, pp. 13-32.
- Flowers, Marilyn R. and John B. Horowitz. 1993. "Distributional Implications of the Social Security Spouse Benefit." *Southern Economic Journal*, Vol. 60 (October), pp. 490-494.
- Freiden, Alan, Dean Leimer, and Ronald Hoffman. 1976. "Internal Rates of Return To Retired Worker-Only Beneficiaries Under Social Security, 1967-70." *Studies in Income Distribution*, No. 5, Office of Research and Statistics, Social Security Administration (October).
- Galbraith, J.A. 1985. "Valuing Pensions (Annuities) With Different Types of Inflation Protection in Total Compensation Comparisons: A Note." *Canadian Journal of Economics*, Vol. 18 (November), pp. 810-813.
- Garrett, Daniel M. 1995. "The Effects of Differential Mortality Rates On the Progressivity of Social Security." *Economic Inquiry*, Vol. 33 (July), pp. 457-475.
- Geanakoplos, John, Olivia Mitchell, and Stephen Zeldes. 1997. "Social Security Money's Worth." Pension Research Council Working Paper 97-20, The Wharton School, University of Pennsylvania (October). Forthcoming in *Prospects for Social Security Reform*, Olivia S. Mitchell, Robert J. Myers, and Howard Young (eds.). Pension Research Council.
- Gokhale, Jagadeesh and Kevin J. Lansing. 1996. "Social Security: Are We Getting Our Money's Worth?" *Economic Commentary*, Federal Reserve Bank of Cleveland (January 1).
- Harmelink, Philip J. and Janet Furman Speyrer. 1994. "Social Security: Rates of Return and the Fairness of Benefits." *Cato Journal*, Vol. 14 (Spring/Summer), pp. 37-54.
- Harris, William T. 1998. "Intergenerational Redistribution Under Social Security." *Humanomics*, Vol. 14, No. 1, pp. 3-13.
- Holden, Karen C. 1979. "The Inequitable Distribution of OASI Benefits Among Homemakers." *Gerontologist*, Vol. 19 (June), pp. 250-256.
- Hurd, Michael D. and John B. Shoven. 1985. "The Distributional Impact of Social Security." In *Pensions, Labor, and Individual Choice*, David A. Wise (ed.). Chicago: University of Chicago Press, pp. 193-215.
- Kaplan, Robert S. 1979. "A Comparison of Rates of Return To Social Security Retirees Under Wage and Price Indexing." In *Financing Social Security*, Colin D. Campbell (ed.). Washington, DC: American Enterprise Institute for Public Policy Research, pp. 119-144.
- Kijakazi, Kilolo. 1998. "African Americans, Hispanic Americans, and Social Security: the Shortcomings of the Heritage Foundation Reports." Policy Brief, Center on Budget and Policy Priorities (October 8).
- Kollmann, Geoffrey. 1995. "How Long Does It Take New Retirees To Recover the Value of Their Social Security Taxes?" *CRS Report for Congress*, Congressional Research Service, Library of Congress (January).
- \_\_\_\_\_. 1998. "Social Security: The Relationship of Taxes and Benefits for Past, Present, and Future Retirees." *CRS Report for Congress*, Congressional Research Service, Library of Congress (May).
- Leimer, Dean R. 1978. "Projected Rates of Return To Future Social Security Retirees Under Alternative Benefit Structures." In *Policy Analysis with Social Security Research Files*, Research Report No. 52, Office of Research and Statistics, Social Security Administration, pp. 235-267.
- \_\_\_\_\_. 1994. "Cohort-Specific Measures of Lifetime Net Social Security Transfers." ORS Working Paper No. 59, Office of Research and Statistics, Social Security Administration (February).
- \_\_\_\_\_. 1995. "A Guide to Social Security Money's Worth Issues." *Social Security Bulletin*, Vol. 58 (Summer), pp. 3-20.
- \_\_\_\_\_. 1998. "Historical Redistribution Under the Social Security Disability Insurance Program." *Social Security Bulletin*, Vol. 61 (Fall), pp. 3-19.
- Leimer, Dean R. and Peter A. Petri. 1981. "Cohort-Specific Effects of Social Security Policy." *National Tax Journal*, Vol. 34 (March), pp. 9-28.
- Menchik, Paul L. 1993. "Economic Status as a Determinant of Mortality Among Black and White Older Men: Does Poverty Kill?" *Population Studies*, Vol. 47 (November), pp. 427-436.
- Meyer, Charles W. and Nancy L. Wolff. 1987. "Intercohort and Intracohort Redistribution Under Old Age Insurance: The 1962-1972 Retirement Cohorts." *Public Finance Quarterly*, Vol. 15 (July), pp. 259-281.
- \_\_\_\_\_. 1993. *Social Security and Individual Equity: Evolving Standards of Equity and Adequacy*. Westport, Conn.: Greenwood Press.
- Moffitt, Robert. 1984. "Trends in Social Security Wealth By Cohort." In *Economic Transfers in the United States*, Marilyn Moon (ed.). Chicago: University of Chicago Press, pp. 327-353.
- Murray, Michael L. 1976. "Tax-Benefit Ratios and Rates of Return Under OASI: 1974 Retirees and Entrants: Further Comment." *Journal of Risk and Insurance*, Vol. 43 (March), pp. 142-144.
- Myers, Robert J. 1967. "Analysis of Whether the Young Worker Receives His Money's Worth Under Social Security." In U.S. Congress, House, Committee on Ways and Means, *President's Proposals for Revision in the Social Security System*. 90th Congress, 1st Session, pp. 331-341.
- \_\_\_\_\_. 1976. "Tax-Benefit Ratios and Rates of Return Under OASI: 1974 Retirees and Entrants: Comment." *Journal of Risk and Insurance*, Vol. 43 (March), pp. 139-142.
- \_\_\_\_\_. 1998. "The Narrowing Gap Between African-American and White Mortality: The Impact on the Social Security Program." *Contingencies* (March/April), pp. 10-12.
- Myers, Robert J. and Bertram Oppal. 1965. "Studies on the Relationship of Contributions to Benefits in Old-Age Benefit Awards." *Actuarial Note*, No. 20, Division of the Actuary, Social Security Administration (June).
- Myers, Robert J. and Bruce D. Schobel. 1992. "An Updated Money's-Worth Analysis of Social Security Retirement Benefits." *Transactions of the Society of Actuaries*, Vol. 44, pp. 47-70.
- Nichols, Orlo R. and Richard G. Schreitmuller. 1978. "Some Comparisons of the Value of a Worker's Social Security Taxes and Benefits." *Actuarial Note*, No. 95, Office of the Actuary, Social Security Administration (April).
- Okonkwo, Ubadigbo. 1973. "Individual Equity Under Social Security: Some Black-White Comparisons." Paper presented at the annual meeting of the American Economic Association, New York, NY (December).



- \_\_\_\_\_. 1975. "Intragenerational Equity Under Social Security." Paper presented at the annual meeting of the Econometric Society, Dallas, TX (December).
- Outsley, Edmund. 1988. "An Analysis of the Effect of the 1983 Social Security Amendments On Individual and Family Equity." In *Contemporary Tax Research*, S. Moriarity and J. Collins (eds.). Norman: University of Oklahoma Press, pp. 76-109.
- Outsley, Edmund and James E. Wheeler. 1982. "Separating the Annuity and Income Transfer Elements of Social Security." *The Accounting Review*, Vol. 57 (October), pp. 716-733.
- Ozawa, Martha N. 1974. "Individual Equity Versus Social Adequacy in Federal Old-Age Insurance." *Social Service Review*, Vol. 48 (March), pp. 24-38.
- Panis, Constantijn W.A. and Lee A. Lillard. 1996. "Socioeconomic Differentials in the Returns to Social Security." Rand Working Paper Series 96-05, DRU-1327-NIA (February).
- Parsons, Donald O. and Douglas R. Munro. 1978. "Intergenerational Transfers in Social Security." In *The Crisis in Social Security: Problems and Prospects*, Michael J. Boskin (ed.). San Francisco: Institute for Contemporary Studies, pp. 65-86.
- Pechman, Joseph A., Henry J. Aaron, and Michael K. Taussig. 1968. *Social Security: Perspectives for Reform*. Washington, DC: The Brookings Institute.
- Pellechio, Anthony J. and Gordon Goodfellow. 1983. "Individual Gains and Losses From Social Security Before and After the 1983 Amendments." *Cato Journal*, Vol. 3 (Fall), pp. 417-442.
- Pesando, James E. 1984. "Valuing Pensions (Annuities) With Different Types of Inflation Protection in Total Compensation Comparisons." *Canadian Journal of Economics*, Vol. 17 (August), pp. 569-587.
- Robinson, Brooks. 1994. "Disparity in Present Value Net Social Security Wealth." *The Black Scholar*, Vol. 24, No. 2 (Spring), pp. 19-29.
- Rofman, Rafael. 1993. "Adult Mortality Differentials and Social Security Systems." Paper presented at the annual meeting of the Population Association of America, Cincinnati, OH (April).
- Rogers, Richard G. 1992. "Living and Dying in the U.S.A.: Sociodemographic Determinants of Death Among Blacks and Whites." *Demography*, Vol. 29 (May), pp. 287-304.
- Russell, Louise B. 1982. *The Baby Boom Generation and the Economy*. Washington, DC: The Brookings Institution.
- Samuelson, Paul A. 1958. "An Exact Consumption-Loan Model of Interest With or Without the Social Contrivance of Money." *Journal of Political Economy*, Vol. 66 (December), pp. 467-482.
- Schreitmuller, Richard C. 1979. "Is Social Security a Good Buy?" *Journal of Pension Planning and Compliance*, Vol. 5 (January), pp. 3-8.
- Steuerle, C. Eugene and Jon M. Bakija. 1994. *Retooling Social Security for the 21st Century*. Washington, DC: The Urban Institute Press.
- Wolff, Edward N. 1993. "The Distributional Implications of Social Security Annuities and Transfers On Household Wealth and Income." *Research on Economic Inequality*, Vol. 4, pp. 131-157.
- \_\_\_\_\_. 1993. "Social Security Annuities and Transfers: Distributional and Tax Implications." In *Poverty and Prosperity in the USA in the Late Twentieth Century*, Dimitri B. Papadimitriou and Edward N. Wolff (eds.). New York, NY: St. Martin's Press, pp. 211-239.
- Wolff, Nancy. 1987. *Income Redistribution and the Social Security Program*. Ann Arbor: UMI Research Press.
- World Bank Policy Research Report. 1994. *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*. New York: Oxford University Press.