ECONOMIC AND BUDGET ISSUE BRIEF

CBO

A series of issue summaries from the Congressional Budget Office

DECEMBER 15, 2006

Is Social Security Progressive?

Summary

For people with lower than average earnings, the ratio of the lifetime benefits they receive from Social Security to the lifetime payroll taxes they pay for the program is higher than it is for people with higher average earnings. In that sense, the Social Security system is progressive. For people in the bottom fifth of the earnings distribution, the ratio of benefits to taxes is almost three times as high as it is for those in the top fifth.

The benefits paid to retired workers, which account for about three-quarters of total benefits, are also progressive, but less progressive than Social Security benefits overall. The Social Security benefit formula is designed to provide beneficiaries who had lower lifetime earnings with monthly benefits that are higher, as a percentage of their lifetime average earnings, than those received by higher-earning beneficiaries. That progressivity in the benefit formula is only partly offset by the fact that higher-earning individuals tend to live longer and thus collect benefits longer.

The benefits paid to disabled workers and to the dependents and survivors of Social Security participants are by their nature generally paid to individuals with lower lifetime earnings. Disabled-worker and auxiliary benefits together account for only about a quarter of total benefits, but they account for most of the differences in the benefit-to-tax ratio across the earnings distribution. Therefore, analyses that consider the entire Social Security system will generally find more overall progressivity than studies that focus only on retired workers. Disabled-worker benefits are still progressive, but less so, when measured by a method that approximates their insurance value to all workers rather than one that considers only the benefits actually paid.

Social Security is the nation's largest domestic program. It provides income support to 49 million beneficiaries, including retired workers, disabled workers, and their dependents and survivors. Benefit payments currently account for more than a fifth of federal outlays, and the payroll taxes that finance the program account for more than a quarter of federal revenues.

Social Security can have a significant effect on the economic well-being of workers and their families. One key to understanding that effect, and how it might change under proposals to modify the program, is to measure how Social Security benefits and the burden of the Social Security payroll tax are distributed among different groups of participants.[1] Of particular interest is whether and to what extent the program is progressive, in the sense of redistributing income from individuals with higher lifetime earnings to those with lower lifetime earnings.

Tax systems are typically identified as progressive if individuals with higher income pay a larger fraction of their income in taxes than do individuals with lower income. Similarly, public benefit programs are identified as progressive if they provide proportionately greater benefits to individuals with lower income.

Because the Social Security system involves both taxes and benefits, measures of its progressivity must incorporate information about both. To do so, analysts com-

1. The Congressional Budget Office's (CBO's) past analyses of proposals to change Social Security have included studies of the effects of proposals on aggregate Social Security finances and the total federal budget and studies of how taxes and benefits are distributed among different groups of participants. See, for example, *Long-Term Analysis of S. 2427, the Sustainable Solvency First for Social Security Act of 2006* (April 2006). Analogous information is included in CBO's baseline analyses; see *The Outlook for Social Security* (June 2004) and *Updated Long-Term Projections for Social Security* (June 2006).

monly focus on various measures of "money's worth," or the net benefit, positive or negative, that participants receive from the system.[2] One measure of money's worth is the ratio of lifetime Social Security benefits that an individual receives to his or her lifetime Social Security taxes paid. If that benefit-to-tax ratio is higher for lower-earning individuals, then the system is considered progressive.

Measuring Money's Worth for Different Groups of Workers

Individuals pay Social Security taxes and receive Social Security benefits at different times in their lives. Because a dollar received or paid today is worth more than a dollar received or paid decades from now, constructing a meaningful measure of the net benefit derived from Social Security requires putting those cash flows from different periods, often decades apart, on a comparable basis. The standard method is to calculate the present discounted value of both taxes and benefits at a single point in time.[3] The benefit-to-tax ratio for an individual is thus calculated as the present value of all benefits received from the program divided by the present value of all taxes paid into the program.

Calculating the present value of taxes paid by an individual is relatively straightforward. All one needs to know or estimate is the individual's earnings in each year of his or her career and the Social Security payroll tax rate applicable in each of those years. The tax is currently 12.4 percent of earnings up to a taxable maximum. Half of the tax is collected from the worker and half from his or her employer, but economists generally agree that the entire tax is effectively paid by the worker, because pressures in the labor market cause wages to adjust so as to offset the employer's share. The Congressional Budget Office (CBO) models the Social Security system as a whole using a statistical sample of workers and calculates lifetime taxes paid on the basis of their historical and projected earnings patterns and on the tax rates in effect over time.

The calculation of benefits is more complex. Workers may become eligible for two types of benefits based on their own earnings: retirement benefits and disability benefits. Spouses and children of a retired, disabled, or deceased worker may also receive benefits, called auxiliary benefits, which are based on the worker's earnings. (Most auxiliary benefits in practice are paid to widows.) As a result, the total benefits received over a lifetime depend on many factors, including the year of birth, number of years worked, earnings in different years, disability status and age at the onset of disability, age at retirement, age at death, and family relationships. In addition, Social Security law changes from time to time, so people born in different years may be subject to different eligibility criteria and benefit formulas.[4] In CBO's calculation, only net benefits are considered; those are equal to gross benefits minus any income taxes on those benefits credited to the Social Security trust funds.[5]

To analyze the progressivity of benefits, CBO's analysis groups individuals according to a measure of their lifetime household earnings. For any years in which an individual is single, household earnings are simply equal to individual earnings. In any years in which the individual is married, household earnings are taken to be equal to 64 percent of the couple's total earnings, to adjust for the fact that two can live more cheaply in one household than in separate households.[6] An individual's lifetime

2. See John Geanakoplos, Olivia S. Mitchell, and Stephen P. Zeldes, "Social Security Money's Worth," in Olivia S. Mitchell, Robert J. Myers, and Howard Young, eds., *Prospects for Social Security Reform* (Philadelphia: Pension Research Council, Wharton School of the University of Pennsylvania, 1999), pp. 79-151.

3. The present values are calculated using a fixed discount rate equal to the expected long-run return after inflation on Treasury bonds, which in this analysis is assumed to be 3.0 percent.

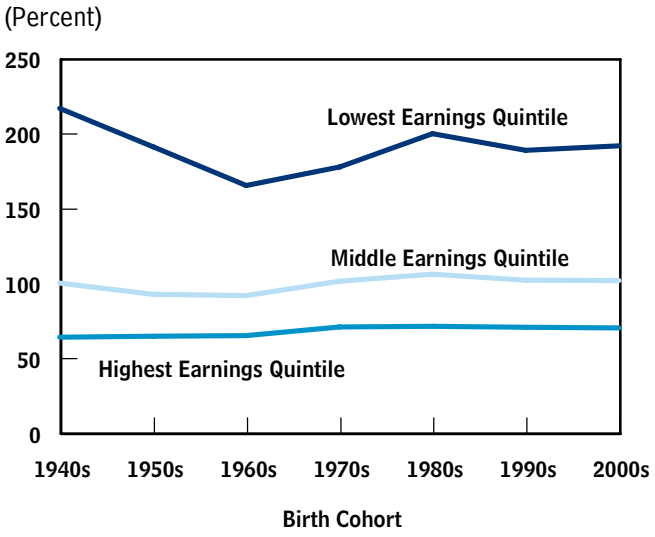
4. In its June 2006 analysis, CBO projected that the Social Security trust funds would be exhausted in the middle of the century; therefore, benefits are not fully payable for all future cohorts. In other publications, CBO has produced scenarios for both scheduled and actually payable benefits, but for simplicity, this brief considers only scheduled benefits.

5. That approach assumes, in particular, that the income taxes on Social Security benefits are, in effect, a type of benefit reduction for high lifetime earners. Subtracting income taxes on benefits lowers benefits more for beneficiaries with high lifetime earnings than for other beneficiaries, making the system more progressive. However, those taxes are a fairly small fraction of the benefits paid (about 5 percent), so the adjustment does not materially affect the analysis.

6. Specifically, the couple's earnings are first summed and then divided by 1.5692 (equal to $2^{0.65}$). The resulting earnings level is assigned to each spouse. That factor is consistent with recommendations made by a 1995 National Research Council panel. See National Research Council, *Measuring Poverty: A New Approach* (Washington, D.C.: National Academy Press, 1995), p. 162. The adjustment affects only how people are sorted into groups, not the measure of an individual's money's worth.

Figure 1.

Lifetime Social Security Benefit-to-Tax Ratio by Birth Cohort and Lifetime Earnings Quintile



Source: Congressional Budget Office.

Note: The analysis assumes that scheduled benefits are paid even after trust fund exhaustion.

earnings are the sum of the present value of those annual earnings when single and when married.[7]

To examine how participants' money's worth varies across time, the analysis also examines various birth cohorts, or groups of people born in the same time period. Social Security policy and demographic trends have changed only infrequently and gradually over the program's history, so grouping people into 10-year birth cohorts allows enough detail to capture the effects of changes in policy and population characteristics yet creates groups that are large enough for statistical precision.

Factors Affecting Social Security's Progressivity

The Social Security system is progressive: the ratio of lifetime benefits to lifetime taxes declines significantly as lifetime earnings rise. As shown in Figure 1, the benefit-to-tax ratio is above 100 percent for the bottom earnings quintile (that is, the 20 percent of individuals with the lowest lifetime earnings) in all birth cohorts; that is, on average, those individuals receive lifetime benefits that exceed their lifetime taxes.[8] The ratio is close to 100 percent for the middle earnings quintile in all birth cohorts: on average, those individuals receive benefits that are roughly equal to their lifetime taxes. The ratio is consistently less than 100 percent for the highest earnings quintile: on average, higher-earining individuals receive less in Social Security benefits than they pay in taxes over their lifetime. The ratio for the bottom quintile is almost three times that for the top quintile.

Estimates of participants' money's worth vary among birth cohorts because of demographic and economic trends and, to a lesser extent, scheduled policy changes.[9] The key demographic trend affecting the estimates is the projected long-term decline in mortality rates: as life spans increase, retirees will collect benefits for more years, so that, all else being equal, lifetime benefit-to-tax ratios will rise. Figure 1 shows, however, that those ratios actually change little over time: the general upward trend associated with declining mortality is offset to some extent by other trends.[10] Indeed, the differences in benefit-to-tax ratios among birth cohorts are quite small compared with the variation among earnings groups. For all cohorts, the ratio of lifetime benefits to lifetime taxes for the

7. CBO uses total earnings—not just the amount taxable under Social Security—to classify people into groups. Because the measure of progressivity is the ratio of benefits to taxes, both of which are limited by the taxable maximum, that choice has little effect on the estimates.

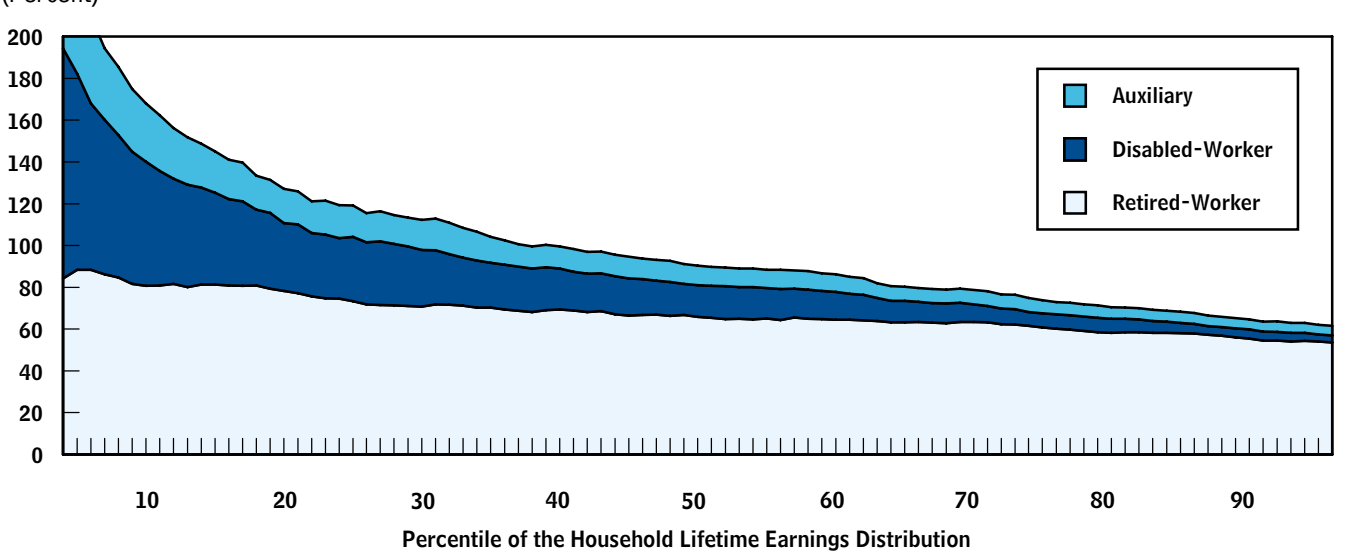
8. The overall ratio for the cohorts shown is less than 100 percent, primarily because of the pay-as-you-go structure of Social Security. See Congressional Budget Office, *How Pension Financing Affects Returns to Different Generations* (September 22, 2004). The ratio for earlier generations, which are not included in this analysis, is much higher. See Dean R. Leimer, *Historical Redistribution Under the Social Security Old-Age and Survivors Insurance and Disability Insurance Programs*, Social Security Administration, Office of Research, Evaluation, and Statistics, Working Paper No. 102 (February 2004).

9. One policy change already scheduled to occur is the increase in the normal retirement age (the age at which a beneficiary is entitled to receive the full primary insurance amount without adjustment for age; see note 13), which is rising from 65 for those born before 1938 to 67 for those born after 1959. Raising the normal retirement age will have the effect of lowering benefit-to-tax ratios for all earnings quintiles, but the effect is generally overwhelmed by economic and demographic trends and is not large enough to be visible in Figure 1.

10. For example, as more women work outside of the home, they become more likely to receive benefits based on their own earnings record and thus less likely to receive spousal benefits. Changes in the earnings distribution also affect benefit-to-tax ratios.

Figure 2.

Lifetime Social Security Benefit-to-Tax Ratio by Type of Benefit for the 1960s Birth Cohort



Source: Congressional Budget Office.

Note: The analysis assumes that scheduled benefits are paid even after trust fund exhaustion.

bottom quintile is nearly double that for the middle quintile, which is in turn about 40 percent higher than for the top quintile.[11]

Progressivity by Benefit Type

To illustrate how each of the three types of benefits—retired-worker, disabled-worker, and auxiliary—contribute to the progressivity of the Social Security system, Figure 2 looks in more detail at a single birth cohort, that consisting of workers born in the 1960s; that cohort is the first for which the normal retirement age will be 67.[12] The same general conclusions hold for other cohorts.

Rather than presenting average benefit-to-tax ratios by earnings quintile as in Figure 1, the top line in Figure 2 shows point estimates for the ratio at each percentile of lifetime earnings among members of the cohort. The average ratio for the lowest-earning 20 percent is about 165 percent; that is the same as the value for the bottom quintile for the 1960s cohort shown in Figure 1. Values of the ratio for the top 20 percent of earners born in that decade average about 65 percent, which is again consistent with the average for the top quintile shown in Figure 1.

As demonstrated by the results for the 1960s birth cohort, the progressivity of Social Security is driven mainly by disabled-worker and auxiliary benefits: in Figure 2, the bands representing those benefits taper sharply as one moves rightward along the earnings distribution, whereas the band representing retired-worker benefits narrows relatively little. That representation reflects the fact that the first two benefit types are inherently more progressive, because disabled workers and auxiliary beneficiaries tend to have lower lifetime earnings. But retired-worker benefits, which account for 74 percent of lifetime benefits for this cohort, are progressive as well. At the 10th percentile of lifetime earnings, the ratio of retired-worker benefits received to total Social Security taxes paid is about 80 percent, falling to about 55 percent at the 90th percentile.

11. As noted above, this analysis assumes that benefits will be paid as scheduled. If benefits were reduced upon trust fund exhaustion to a level payable with Social Security's revenues at that time, the benefit-to-tax ratio would be lower for people collecting benefits after 2046, the year in which, CBO projects, the trust funds will be exhausted.

12. The values in Figure 2 are smoothed by averaging over percentiles in order to eliminate the statistical sampling variation that arises when using a relatively small sample for the calculations.

Disabled-worker benefits account for only 16 percent of lifetime benefits for this cohort but are much more progressive than retired-worker benefits. (Disabled-worker benefits are a much smaller share of lifetime benefits simply because far fewer individuals receive them than receive retired-worker benefits.) The ratio of lifetime disabled-worker benefits to lifetime Social Security taxes falls from 59 percent at the 10th percentile of lifetime earnings to about 4 percent at the 90th percentile; that steeply declining pattern clearly dominates the overall difference in the total benefit-to-tax ratio among earnings groups.

Auxiliary benefits are also much more progressive than retired-worker benefits, but not quite as progressive as disabled-worker benefits. The benefit-to-tax ratio for auxiliary benefits falls from about 28 percent at the 10th percentile to under 5 percent at the 90th percentile. Those figures are not surprising, because auxiliary benefits are paid mainly to people with relatively low lifetime earnings. A spousal beneficiary, in particular, must have earned less than half the retirement benefit of his or her spouse in order to qualify. However, auxiliary benefits have a smaller effect on overall system progressivity than do disabled-worker benefits, because they account for only 10 percent of total lifetime benefits.

Progressivity in Retired-Worker Benefits

The overall progressivity of retired-worker benefits is the net result of two offsetting factors. The first is the degree of progressivity built into the benefit formula, and the second is differences in average mortality observed among workers of different earnings levels.

At retirement, a benefit formula is applied to a measure of the retiring worker's lifetime earnings to determine that worker's initial monthly retirement benefit. The formula is designed to be progressive, so that initial Social Security benefits replace a larger proportion of preretirement earnings for workers with low average earnings than for those with higher earnings.[13] In general, retired-worker benefits can replace 90 percent of taxable earnings for the lowest earners, but as little as 27 percent for the highest earners.

The progressivity of the benefit formula is partly offset by the fact that higher earners tend to live longer than the average worker—a phenomenon known as differential mortality. As a result of differential mortality, higher earners on average collect retired-worker benefits for more years than does the average earner and hence receive higher total lifetime benefits.[14]

How much does the benefit formula contribute to the progressivity of retired-worker benefits, and how much does differential mortality reduce progressivity? Those questions can be answered by making a few counterfactual, or "what-if," calculations. In Figure 3, the reference point for those counterfactuals (the line labeled "Scheduled Benefits") is reproduced from Figure 2. (The line is smoother than in Figure 2 because the variation due to statistical sampling has been eliminated; it declines more steeply than in Figure 2 only because the scale is different.)

The first counterfactual ("Flat Formula and No Differential Mortality") removes both the progressivity in the benefit formula and the effects of differential mortality. That calculation is done by setting benefits equal to 40.5 percent of average earnings for everyone, rather than by the current benefit formula. That level of benefits is chosen to result in the same average annual total outlays for the 1960s cohort as scheduled benefits.[15] At the same time, the effect of earnings and other socioeconomic variables on mortality rates in the model is turned off. The

13. Specifically, at age 62, a worker's earnings are indexed to account for overall wage growth in the economy during the worker's lifetime. The highest 35 years of indexed earnings, including any years with zero earnings, are averaged to obtain that worker's average indexed monthly earnings (AIME). A progressive formula is then applied to the AIME to compute the worker's primary insurance amount (PIA). For workers turning 62 in 2007, the formula is 90 percent of the first $680 of the AIME, 32 percent of the next $3,420 of the AIME, and 15 percent of the rest. Monthly benefits are then adjusted for the age at which the worker chooses to begin receiving payments: workers retiring before the normal retirement age receive less than the PIA, and those retiring after receive more. To qualify for benefits, a worker generally must have worked at least 10 years. For details, see Congressional Budget Office, *Social Security: A Primer* (September 2001), pp. 20-22.

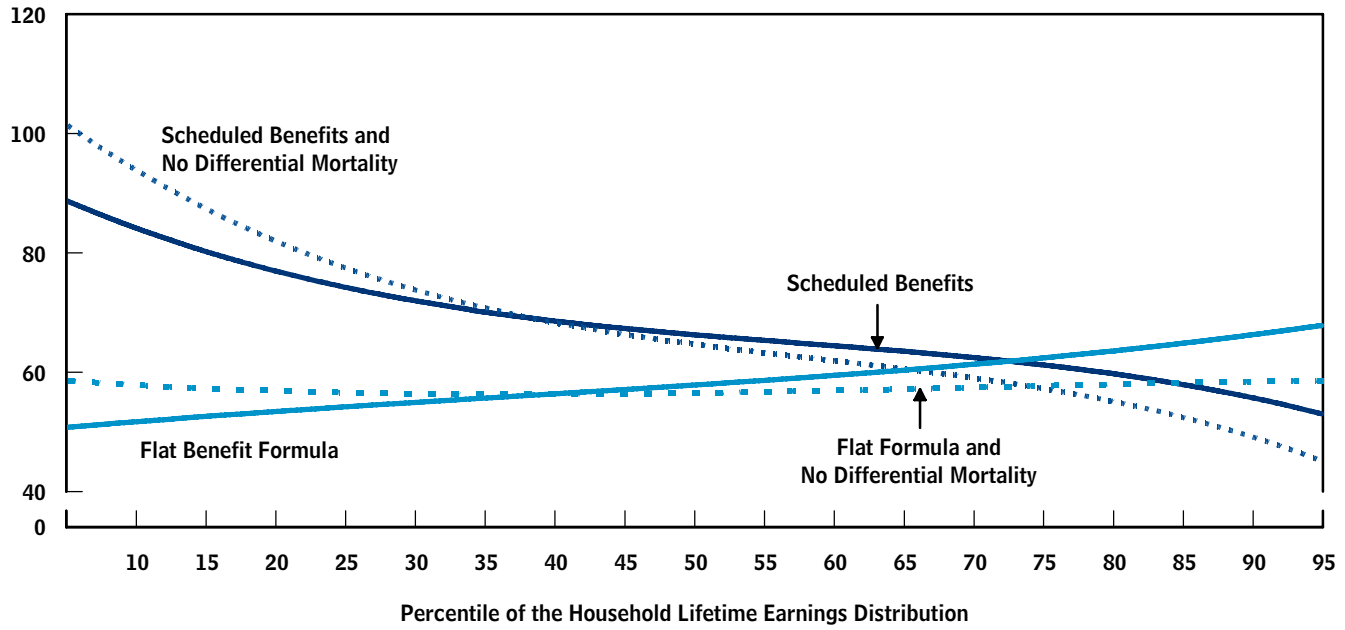
14. CBO uses an estimate of differential mortality based on research done for the Social Security Administration. See Lee Lillard and Stan Panis, "Demographic Projections," Michigan Retirement Research Center, University of Michigan, May 1999, available at www.mrrc.isr.umich.edu/conferences/cp/cp99_lillard_demo.pdf.

15. The 10-year work requirement is also removed, so that even workers who worked only during a single year may receive benefits.

Figure 3.

Lifetime Social Security Retired-Worker Benefit-to-Tax Ratios with Scheduled Benefits and Under Three Counterfactural Scenarios for the 1960s Birth Cohort

(Percent)



Source: Congressional Budget Office.

Note: The analysis assumes that scheduled benefits are paid even after trust fund exhaustion.

result is an almost flat line, indicating that the ratio of retired-worker benefits to taxes would be similar for all earnings groups.[16]

The second and third counterfactuals illustrate the effects of the progressive benefit formula and differential mortality separately. The upward-sloping line in Figure 3 ("Flat Benefit Formula") shows that switching to the simple proportional benefit formula would make retired-worker benefits regressive, because differential mortality would still operate to produce higher lifetime benefits for higher-earning workers. Retired-worker benefits would rise from about 50 percent of lifetime earnings at the 10th percentile to around 65 percent at the 90th percentile. Finally, the steeper downward-sloping line ("Scheduled Benefits and No Differential Mortality") shows that if the current progressive benefit formula was unchanged but lower-earning people lived just as long on average as higher-earning people, the Social Security system would be more progressive than it is.

Taken together, those results indicate that the progressivity of the benefit formula more than offsets the regressive effect of differential mortality: that conclusion can be seen from the fact that the "Flat Benefit Formula" is farther away from the "Scheduled Benefits" curve than is the "Scheduled Benefits and No Differential Mortality" line. Thus, Social Security retired-worker benefits as currently structured are progressive.

In contrast, some previous research has found that the effect of differential mortality equals or outweighs the effect of the progressive benefit formula for retired-worker

16. The average ratio of retired-worker benefits to taxes paid under this counterfactual (around 60 percent) is lower than the overall average under scheduled benefits because assuming the same average life span for everyone lowers average benefits. An alternative way of showing the same principle would be to set the flat benefit replacement factor (the 40.5 percent in this counterfactual) at some higher level, such that the average benefit-to-tax ratio matched scheduled benefits. That would shift the line up, but it would still be flat, which is the point of the exercise.

benefits.[17] It appears that the differences reflect past data limitations and different modeling decisions. Estimates of lifetime progressivity require data on earnings, taxes, benefits, and mortality experiences for the population being analyzed. Some studies, too, have focused on only retired-worker benefits and therefore found less progressivity than did analyses that have included all types of benefits.

One noteworthy difference among studies is sample selection: CBO includes everyone in the population who lives through age 45, whereas some other studies have focused only on those eligible to collect benefits at age 62. Because of differential mortality, those studies disproportionately remove lower earners from the sample. Probably the most important difference between studies is in how people are classified with respect to lifetime earnings: some studies have credited nonworking individuals with "potential" earnings when sorting the population into lifetime earnings groups. The idea is that those individuals—who actually receive low benefits because they have low lifetime earnings—could have earned more but chose not to, and therefore should, for the purpose of analyzing progressivity, be grouped with the people who actually had higher earnings. Decisions like those either make the study group more homogeneous or re-sort people from the low to the high lifetime earnings group and therefore reduce measured progressivity.[18]

Progressivity in Disabled-Worker Benefits

The pronounced progressivity of disabled-worker benefits, illustrated in Figure 2, reflects three distinct factors. First, the disability benefit formula is progressive: like retired-worker benefits, initial disabled-worker benefits replace a larger proportion of earnings for people with low average earnings than for those with higher earnings.

Second, workers with low earnings are more likely than the average worker to become disabled. Such differential disability accentuates the progressivity of disabled-worker benefits. (Note that differential mortality has the opposite effect. Because higher earners tend to live longer, differential mortality reduces progressivity.)

Third, individuals who become disabled are much more likely to have low lifetime earnings for the simple reason that, once disabled, those workers generally cease working or work less than they otherwise would have. (In some cases, that reduction in work results from the availability of disability benefits and the limitation on the amount that disabled beneficiaries may earn while receiving benefits. In the absence of such incentives, some less severely disabled workers would continue to work.)

The third factor presents a challenge in interpreting and measuring the progressivity of disabled-worker benefits. Consider two identical workers, each with the same earnings through age 55 and each with the same earnings potential thereafter. One continues working and retires at age 65. The other is unlucky, becomes disabled at age 55, and receives disability benefits. The disability program clearly provides significant benefits to the second worker. However, one could argue that the program has benefited each worker equally in terms of the value of the disability insurance provided. In other words, the disability program provided the same insurance to each worker, but only the second was unfortunate enough to receive payments from it. On the basis of that reasoning, some analysts have argued that progressivity should be measured by the *expected* benefits for an individual—that is, the up-front value of the insurance—not on any after-the-fact payments that are made.

One way to examine the importance of that insurance effect is to classify individuals not according to their household earnings for a complete working lifetime, but instead according to how much they earned before becoming disabled. There are technical problems with implementing exactly that approach, but classifying *all* individuals on the basis of their earnings through age 45 provides similar results: workers are usually well into their careers by that age but are unlikely to have become disabled. That classification implicitly focuses the analysis on the insurance value of disabled-worker benefits, rather than realized payments, yet it still reflects much information about individuals' lifetime earnings prospects.

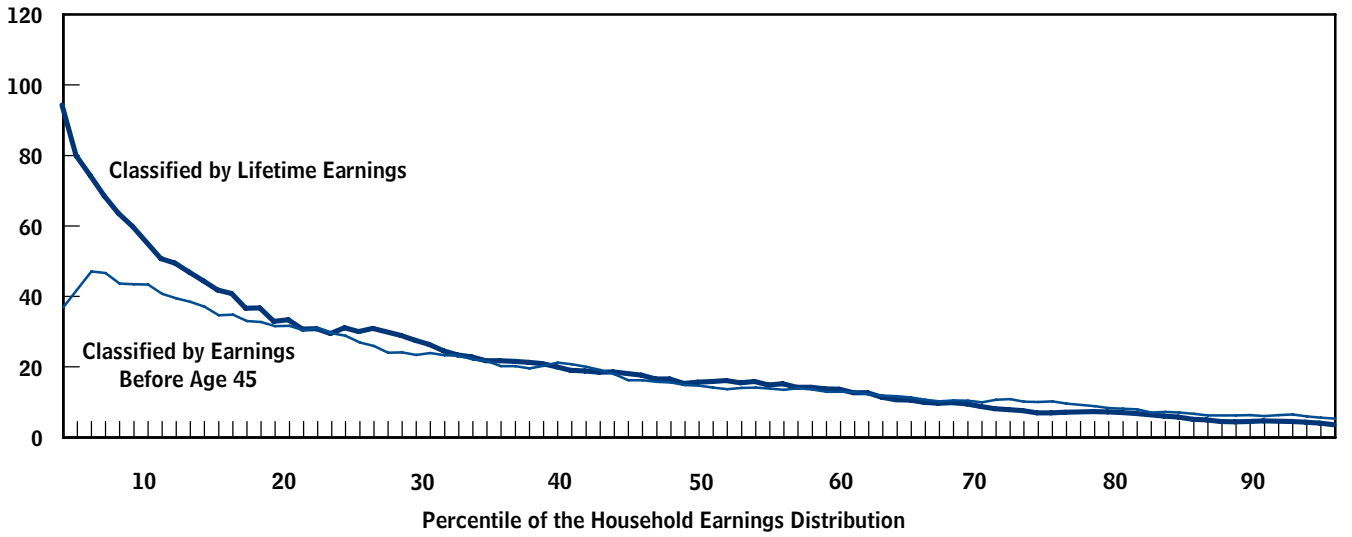
As expected, disabled-worker benefits are less progressive when individuals are classified on the basis of earnings

17. For a summary of studies about Social Security's progressivity see Don Fullerton and Brent D. Mast, *Income Redistribution from Social Security* (Washington, D.C.: American Enterprise Institute, 2005).

18. One study that used the same sample selection, projection, and classification strategy as CBO and included all Social Security taxes and benefits found the same basic patterns in distributional outcomes as reported here. See C. Eugene Steuerle, Adam Carasso, and Lee Cohen, *How Progressive Is Social Security When Old Age and Disability Insurance Are Treated as a Whole?* Straight Talk on Social Security and Retirement Policy Brief 38 (Washington, D.C.: Urban Institute, May 2004).

Figure 4.

Lifetime Social Security Disabled-Worker Benefit-to-Tax Ratios Under Alternative Earnings Classifications



Source: Congressional Budget Office.

Note: The analysis assumes that scheduled benefits are paid even after trust fund exhaustion.

through age 45, as shown in Figure 4. The benefit-to-tax ratio is significantly lower at the lower end of the earnings distribution and slightly higher at the upper end. For example, the ratio of disabled-worker benefits to taxes at the 10th percentile is 43 percent using this measure, compared with 59 percent under the lifetime earnings measure.

Even under the earnings-through-age-45 measure, however, disabled-worker benefits are much more progressive than retired-worker benefits. For example, the ratio of retired-worker benefits to taxes is 45 percent higher at the 10th percentile of the earnings distribution than at the 90th percentile, but the ratio of disabled-worker benefits to taxes is more than 600 percent higher. Under any earnings measure, disabled-worker benefits are a major contributor to system progressivity.

This brief was prepared by Noah Meyerson and John Sabelhaus. It and other publications by the Congressional Budget Office can be found on the agency's Web site, www.cbo.gov.

Donald B. Marron

Donald B. Marron
Acting Director