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# A glaring error

## Why one study of Social Security misstates returns

by Robert J. Myers

By definition, actuaries are preeminent in making actuarial analyses. Nevertheless, in some areas, such analyses can be adequately performed by persons from other professions, such as economists and statisticians. The danger exists, however, that the nonactuary may, unknowingly, make serious errors in methodology through improper oversimplification. A glaring example of this is a recent report from The Heritage Foundation, a conservative Washington think tank ("Social Security's Rate of Return," by William W. Beach, senior fellow in economics, and Gareth G. Davis, research assistant, Jan. 15, 1998). Heritage study's conclusions. The conclusions of the Heritage Foundation study are well summarized in the following quotation from it:

Low-income, single African-American males born after 1959 face a negative rate of return from Social Security (-0.66% for 1970 births). For every dollar he has paid into Social Security, a low-income, single African-American male in his mid-20s who earned about 50% of the average wage, or \$12,862, in 1996 can expect to get back less than 88 cents.

These results have been widely disseminated through the news media and Web sites. For example, *The Wall Street Journal*, in its Jan. 12 issue, stated, "Most surprising are low rates of return for African-Americans. As a group, single black men born in the 1960s face negative rates of return from Social Security, regardless of income." *The Journal* repeated this conclusion in an editorial on April 13. The reason that the results were so surprising is that they were grossly in error due to faulty methodology. Study's methodology. The Heritage study projected the year-by-year amounts of (1) the combined employer-employee payroll taxes (contributions) after first taking out

the insurance cost for preretirement survivor and disability benefits and (2) the retirement benefits payable after reaching the normal (or full-benefits) retirement age. Then, an interest rate was determined that makes the present values of the two streams of amounts be equal. Adjustments were made for inflation and, quite properly and objectively, for the spread between African-Americans' and Caucasians' mortality eventually being eliminated.

The fatal flaw occurred in making projections based on averages — i.e., that all members of the group live exactly to their average life expectancy and then drop dead— rather than properly basing projections on the distribution by single years of the group members' ages at death.

Specifically as to African-American males, the Heritage study assumed that all currently aged 21 would live exactly to age 69 (i.e., a life expectancy of 48 years after age 21). The result would be that all members of such a group would pay contributions for 46 years, before retiring at age 67, and would receive retirement benefits for two years. A similar procedure was followed for the other race and sex groups, in all cases producing erroneous results, although not as much so as for this group. The following discussion concentrates on that group, but the criticism applies to some extent for all groups.

### Error in methodology

That the foregoing result for young African-American males is unrealistic and erroneous can readily be seen from two facts. First, about 40% of the group would die before age 67 and thus pay less than 46 years of contributions. Second, the 60% of the group who survive to age 67 will live for anywhere from a few months to as much as 30 years (averaging perhaps 12 years). Thus, the taxes are overstated and the benefits are understated.

That the Heritage methodology is erroneous can be seen even more clearly if slightly different conditions are assumed. Suppose that the life expectancy at age 21 for this group was 46 years instead of 48 years, a not unreasonable situation. Then, the result would be that the entire group would be shown as making 46 years of contributions and receiving no retirement benefits whatsoever, for a rate of return of -100%. Because, in fact, about 50% of the group would die before age 67 and pay contributions for less than 46 years, and the other 50% would live to age 67 and then an average of about 12 years thereafter, the foregoing results are obviously grossly in error.

If the computations for young African-Americans had been made correctly, it is certain that a positive rate of return would have been shown. This is because of the weighted benefit formula (which provides higher relative benefits to low-earning workers), which more than offsets their lower longevity. Let the Heritage researchers run their model again — this time using correct methodology that makes projections by single years of age rather than averages. A crucial lesson. Persons who have not had actuarial training should be very careful when using life expectancy data. In particular, analyses should not be made on the basis that all persons of a given age will live for a number of years exactly equal to their life expectancy at that age and then die. Significant errors can result thereby. The old story about misuse of averages is still true: the non-swimmer who wades into a lake with an average depth of two feet will certainly drown if venturing into the part that is seven feet deep.

**Robert J. Myers was chief actuary of the U.S. Social Security Administration, 1947-70, and deputy commissioner of Social Security, 1981-82.**