

The USA TODAY Lifetime Social Security and Medicare Benefits Calculator: Assumptions and Methods

C. Eugene Steuerle and Adam Carasso of the Urban Institute helped USA TODAY design a web-based retirement benefits calculator that appeared on the paper's website October 4, 2004.

The calculator estimates the lifetime value of Social Security and Medicare benefits and compares them against the lifetime value of taxes for these two programs. Included is the new Medicare prescription drug program. Not included are estimates of the benefits and taxes for the Disability Insurance program.

Accompanying this explainer are the [6 Excel tables](#) that underlie the USA TODAY calculator. In the text below, we first explain how the calculator computes lifetime Social Security benefits and taxes. Then we explain the somewhat different approach used to calculate lifetime Medicare benefits and taxes.

Lifetime Social Security Benefits and Taxes

Our approach calculates the *annuity value* (also known as the “actuarial present value”) of all Social Security contributions made by a worker plus his or her employer over a lifetime, given certain assumptions about wage level, family type, probability of death, and year of birth. The employer's portion of the payroll tax is included here, since they are made on a worker's behalf. These contributions are then compared with the full annuity value of the Social Security benefits that a worker and his or her dependents or survivors may receive over a lifetime. If the system were to meet the “individual equity” standard perfectly, these two amounts would be identical: an “actuarially fair” annuity would have been purchased through one's contributions. To the extent that the system is progressive on a lifetime basis—and the system was designed in its benefit formula to provide higher rates of return for those with lower earnings—one would expect the value of benefits to exceed that of contributions for low-wage workers and to fall short of contributions for higher-wage workers.

We assume workers start at age 22 and work until age 65. However, since most workers don't work continuously, we assume all workers, male and female, drop out of the labor force for five years, from ages 30 to 34. We further assume that both spouses in a couple are the same age and that, if they have had any children, they are fully grown by the time their parents retire and therefore not counted in the benefit stream. As the statute does, we further define couples as having been married a minimum of ten years. The calculator uses the Social Security Trustees April 2004 intermediate economic and demographic assumptions for all of its long-term projections.

This annuity calculation adjusts all possible payments for the effects of inflation, interest, and probability of occurrence. We compensate for inflation by converting all amounts into their real value in constant 2004 dollars, using the consumer price index. Next, we account for interest. While workers' payroll taxes paid into Social Security and Medicare do not actually accrue any interest for workers, of course, we are providing a money's worth analysis that effectively asks

“What if workers could have instead invested these payroll taxes every year?” Thus, all payroll tax payments plus accrued interest are summed to age 65. Likewise, all benefit payments after age 65 are converted to the amount that would have to be invested at age 65 at the 2 percent real rate to yield the benefit stream realized. Both taxes and benefits, converted to their equivalent present value at age 65, can be properly compared. Our analysis calculates present values at the same age for every cohort, so that comparisons may be made among different generations. We use a real (after-inflation) interest rate of 2 percent for all past and future years, which seems reasonable when compared with average real interest rates over time for safe investments. Social Security is an extremely safe investment uniquely resistant to economic fluctuations and inflation and receives favorable tax treatment.

Finally, an annuity calculation must adjust values according to their probability of occurrence, which in this case depends on the likelihood of survival. This calculation examines the actuarial present value of lifetime benefits and taxes assuming survival to age 21. The tax number becomes the total value of lifetime Social Security and Medicare tax contributions, plus interest, for someone in this group who exhibits a particular pattern of lifetime earnings. The benefit number is determined by multiplying the present value of each possible benefit payment by the probability that someone will be alive to receive that payment, given that he or she has already survived to age 21. For example, a woman who was alive at age 65 in 1970 had about an 80 percent chance of surviving to age 75, so the value of a benefit at age 75 is multiplied by 0.8. Survivors benefits are similarly weighted according to probability of occurrence. All possible benefits payment through age 119 are adjusted in this manner and then summed together. The procedure expresses the value of Social Security benefits in terms of a “lump sum” of money that someone would have to pay to purchase a similar annuity from a private insurance company at age 65. Calculations of this sort are very useful for examining the obligations that Social Security incurs and its responsiveness to the needs of those who do survive to retirement.

Our model also performs the elaborate calculations necessary to determine the benefit that would be paid to a worker’s survivors if the worker died in any year after age 65, and weights each possible benefit stream according to the probability of occurrence. Thus, our calculations include the full actuarial value of Social Security benefits.

Survival probabilities for each sex and cohort, based on mortality tables published by the Office of the Actuary at the Social Security Administration, take into account the longer life expectancies of women relative to men, as well as improvements in life expectancy for each new generation. Since women have higher survival probabilities at each age relative to men, women workers will pay higher expected taxes than men and receive larger expected benefits than men. But the larger benefits more than make up for the higher tax payments, so women can expect higher returns from Social Security than men in all generations. Unfortunately, mortality tables that differentiate among people with different lifetime income levels are not available. However, for evidence on how rates of return can vary by education, race, and lifetime income, see publications listed at the end.

Lifetime Medicare Benefits and Taxes

For Medicare, lifetime taxes which are paid only under Hospital Insurance Part A are calculated in the same manner as Social Security taxes above. For lifetime benefits, we calculate per-enrollee benefits by taking aggregate Medicare benefits paid in each year—net of all premiums—and divide by the number of enrollees. We take these nominal, annual numbers, adjust them for inflation, interest, and mortality as above, and sum them over the lifetime of each worker to calculate the actuarial present value of lifetime Medicare benefits for each birth cohort. Note that these totals *do not* vary by workers' wages over their careers or the amount of their contributions, but only by gender and whether they are married or single. For example, all employees at a given firm should have the same health insurance policy, regardless of income. Also, one-earner and two-earner couples in a particular birth cohort can expect the same lifetime Medicare benefits, according to our simple assumptions. Persons who retired prior to Medicare's inception in 1967 still receive benefits – even without contributing any taxes to this program.

Additional Readings on Social Security and Medicare

To explore these topics and others in more detail, please click on the following links:

- [**Lifetime Social Security and Medicare Benefits**](#) by C. Eugene Steuerle and Adam Carasso
- [**How Progressive Is Social Security When Old Age and Disability Insurance Are Treated as a Whole?**](#) By C. Eugene Steuerle, Adam Carasso, Lee Cohen
- [**How Progressive Is Social Security and Why?**](#) By C. Eugene Steuerle, Adam Carasso, Lee Cohen
- [**The Retirement Project**](#)
- [**Social Security and the Family: Introduction**](#)
- [**Contemporary U.S. Tax Policy**](#) by C. Eugene Steuerle