

Lifetime Benefits and Taxes in Social Security

The Effect of Different Discount Rates on Present Value Calculations

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It is often useful to compute contributions and benefits over a lifetime when studying policies for retirement and Social Security. However, these calculations are complicated by factors like economic growth and inflation, which change the relative value of investments over time. The fact that \$1 in the bank today might accrue enough interest to be worth \$1.03 next year leads economists, accountants, and actuaries to find ways to equate the two amounts at a point in time. That is, they try to find the value of an account today that might provide the stream of benefits to be paid out tomorrow, assuming some interest would be paid on the account. A similar calculation can be made on how much a worker paid in taxes or contributions over a lifetime, depending upon the interest earned on those contributions.

Consider first a situation where there is 0 percent real interest or one simply wants to know the real value of all future benefits without treating \$1 tomorrow as worth less today. In Social Security, the real value of benefits is held constant each year after retirement through a cost-of-living adjustment. Take a male worker who has earned the average wage over his entire lifetime, who turns 65 in 2010, and who remains in retirement for an average remaining lifespan of approximately 18 years.¹ His annual Social Security benefits would be approximately \$17,400 in real (inflation-adjusted) terms. The worker's benefits are paid as an annuity over his remaining lifetime, however long it turns out to be: one worker might live 14 years and another 22 years, but together they will average 18 years of payment. Because here we assume a real interest rate of zero, the real value of benefits and the present value of the Social Security benefits the typical worker would expect to receive over his lifetime would be approximately \$314,000 (or, roughly, 18 times \$17,400; figure 1). Said differently, if this worker in 2010 were going to purchase an annuity from which

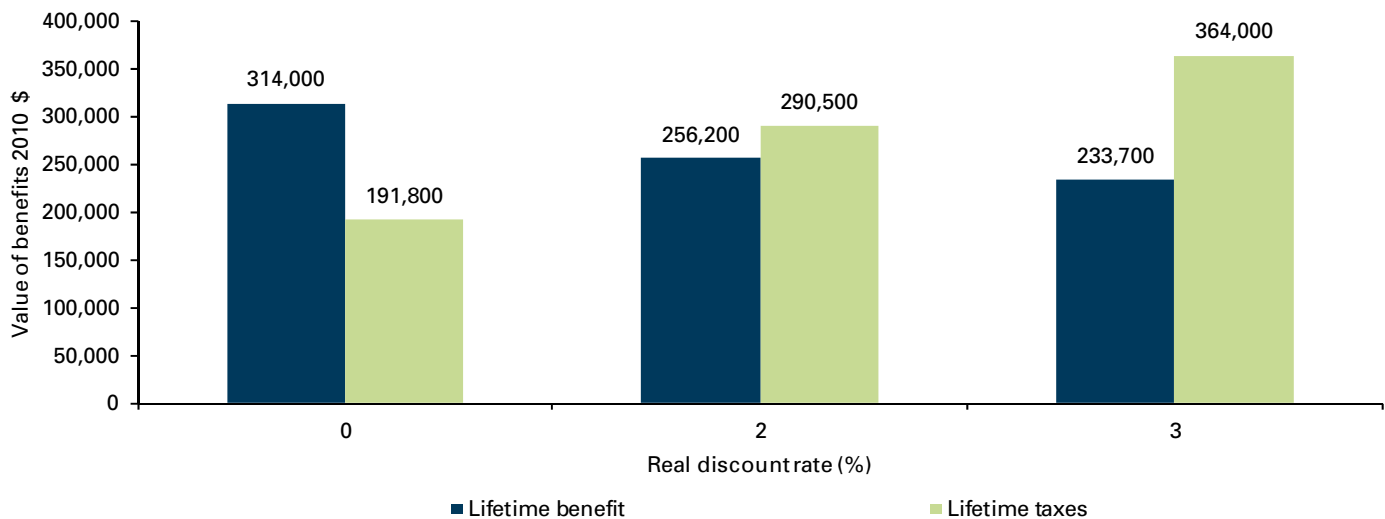
he expects to receive \$17,400 annually, but received no interest on his account, it would cost \$314,000.

However, if the money were sitting in a bank account or an account with an insurance company, it likely would earn interest until it was withdrawn. In this situation, the present value calculation must adjust for some real rate of return. If that rate were 2 percent, then the male worker who receives \$17,400 in annual Social Security benefits could buy his total Social Security "annuity" for about \$256,000 in 2010 on this discounted basis. If instead the real rate of return were 3 percent, the present value of the lifetime benefits would be approximately \$234,000. The higher the real rate of return, the lower the "price" of the total annuity in present value terms.

We can do the same for taxes. If one adds up the taxes the worker pays, excluding any interest that might have been earned on those contributions, the total tax burden adds up to almost \$192,000. At a 2 percent or 3 percent real return, those contributions would have grown to approximately \$291,000 and \$364,000, respectively, by 2010.

What real rate of return, or discount rate, should be used? That question has been debated by economists and actuaries, and depends partly on what is being asked and the perceived riskiness of the investment. Riskier investments have higher—but less certain—rates of return. Lower rates of return are assumed the safer investment for the individual, because more risks are covered by the insurer. Private annuities tend to provide lower rates of return than do other private investments, and they provide much less protection than Social Security against the risk of default and inflation. Generally, most analyses of Social Security use a higher discount rate than annuities offered on the private market, but lower than riskier market investments like stocks—because Social Security is considered to be a safe investment.²

Figure 1. Lifetime Benefits and Taxes in 2010 under Various Discount Rates (Average-Wage Male Worker)



Source: Author calculations (2011) based on intermediate assumptions from the Social Security's 2010 Trustees Report.

The discount rate is closely related to the internal rate of return (IRR). In the case of Social Security, the IRR shows the discount rate at which lifetime taxes would be equal to the expected value of lifetime benefits. In general, if the discount rate is higher (lower) than the IRR, then the taxpayer pays more (less) in taxes than she receives in benefits. For instance, assume the IRR is 2 percent. If the discount rate is 3 percent, then one pays more in taxes on a present value basis than one receives in benefits. However, if the discount rate is 0 percent, then any positive IRR shows that workers pay less on a present value basis than they receive.

Typical calculations for Social Security recipients retiring today show IRRs between 1.5 and 2 percent for average workers, higher for women than men. However, Social Security also provides other benefits. In particular, spousal and survivor benefits require no additional contribution but generally provide additional benefits to those who are married (but not to single people). For married people, then, the present value of benefits and the IRRs will be higher than in the example presented here.

Notes

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1. According to Social Security Administration mortality tables, 18.11 years is the average remaining life expectancy for 65-year-old men born in 1945. For females, the corresponding life expectancy is 20.43 years. In calculating the present value of taxes and benefits, we take into account the probability of survival each year and the benefit or tax paid; that is, we perform a full actuarial calculation and do not merely multiply years of benefits by benefit received.
2. See, for example, Congressional Budget Office (2010), which assumes a real interest rate of 3 percent, or research by Leimer (2007), which reports lifetime benefit values using four different interest rates.

References

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