

The Market Value of Social Security

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The Social Security Administration calculates a number of measures to assess the financial state of the system. This requires assigning a current value to the stream of benefit payments and payroll tax revenues that can be expected in the future. The traditional actuarial approach to making these calculations ignores risk, and assigns an expected value. Private financial markets would value these future costs and revenues differently by adjusting for uncertainty and risk.

In exploratory work completed last year, our focus was on the market value of already obligated future benefits. The idea was to value future Social Security benefit obligations in a way that accounts for future risks and uncertainties in a way that investors would do if they regarded these payments as liabilities of their own businesses. We found that a very substantial difference between market valuation and SSA's "actuarial" valuation. Overall, the market value of accrued benefits was estimated to be only 3/4 of that implied by the actuarial approach. Ignoring retirees (for whom the valuations are the same), market value was found to be only 2/3 as large as that implied by the actuarial approach.

The advantage of the market-based approach, we argued, was that it adjusts correctly for the uncertainties of the future, rather than applying a risk-free discount rate. When participants in financial markets value cash flows associated with traded financial assets, they adjust present values to incorporate the riskiness of the cash flows. All else equal, future cash inflows with greater risk (appropriately defined) are discounted with a higher discount rate, leading to a lower present value.

In this study, we expand these preliminary results by estimating the market value for the Social Security system as a whole. We first estimate the market value of Social Security's future expenditures (worker benefits) and receipts (worker contributions obtained from payroll taxes). In addition to already-obligated benefits (the focus of our preliminary work), we consider the full stream of benefits and payroll tax contributions that can be expected in the future. We then construct market-based (i.e. risk-adjusted) estimates of three common measures of Social Security's financial health, and compare these estimates to those obtained using the traditional SSA methods with no correction for the price of risk.

When it comes to valuing the difference between benefits and tax receipts over the next 75 years (the open group unfunded liabilities) the situation is qualitatively more subtle than when we analyze already-accrued benefits only. In this expanded work, we need to account for risk in both the benefit obligation that is paid out over time, and the payroll tax revenues that are received over time. Which number should go down more as a result of the risk correction, the taxes or the benefits?

We demonstrate in the paper that there is a larger risk adjustment for taxes than for benefits. The reason is that future taxes are dependent on wage growth indefinitely into the future; while future benefits are dependent on wage growth only up until the time of retirement. Thus taxes would be discounted more.

In order to focus on the key conceptual points, we use a relatively simple stochastic model for our market-based estimates. We assume that there is only one source of uncertainty in the cash flows: average economy-wide earnings, or what SSA calls the “Average Wage Index” (AWI). This uncertainty is important because by law future benefits depend explicitly on the AWI at the time of retirement, and future contributions in each working year are proportional to earnings in the corresponding year. We assume processes for earnings and stock prices such that the AWI is highly correlated with the stock market over long horizons. We then use modern financial tools (risk neutral pricing) to value future Social Security cash flows as derivatives on the stock market.

Using this market-based approach, and applying risk adjustment empirically, we estimate an open group unfunded liability that is 30 percent lower than the SSA estimates using actuarial methods. The market-based closed group unfunded liability is calculated to be less than half the size of the official SSA amount.

The full working paper is available on our website, www.nber.org/programs/ag/rrc/books&papers.html as paper NB08-11.

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