



Stochastic Rates of Return for Social Security Under Various Policy Scenarios

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Executive Summary

One measure that summarizes welfare effects of a pension system on its participants is the “internal rate of return” (ROR), which equates the present value of Social Security payroll tax payments to the present value of benefit payments. Calculating the ROR for a range of birth cohorts allows us to compare welfare effects across these cohorts. Therefore it is particularly useful when analyzing the impact of any reforms, because reform plans appear to have very different effects across cohorts.

In this *Issue in Brief*, we summarize a method of estimating the ROR for each cohort born between 1941 and 1999, and discuss our estimation results for the Old-Age and Survivors Insurance (OASI) trust fund under three different scenarios. The first scenario is a benchmark: we estimate the ROR assuming that both tax and benefit schedules will be kept as currently legislated. Given our forecast that the trust fund without any changes in tax or benefit schedule is likely to become empty, or insolvent, in 2038, this is an implausible scenario. We thus also estimate the ROR under two alternative scenarios, under which we project that the trust fund will remain solvent until 2074 with a 50% degree of certainty; these reforms are an immediate increase in the payroll tax rate from 12.4% to 14.4% and a gradual increase in the Normal Retirement Age (NRA) to age 69 by 2024.

Estimating the rates of return under these different scenarios, we first point out that a decrease in the ROR following each reform is usually larger for younger cohorts; this indicates that costs of reform tend to fall on younger cohorts. Comparing the different ROR estimates under the two reform plans, we also point out

that changes in the rates of return for younger cohorts are consistently greater in the scenario that increases the NRA than in the scenario that increases the payroll tax, while the opposite is true for older cohorts. This illustrates that a delay in reform tends to further shift its costs to younger cohorts.

Methods

Estimating tax and benefit payments in the future is the main challenge we face in calculating the ROR for cohorts born between 1941 and 1999. For example, for the cohort born in 1941, just about to retire, we can draw the tax profiles from data but must estimate benefit payments. For the youngest cohort born in 1999, however, we have to estimate both tax and benefit payments.

In our estimation, we used both historical data and forecasts in the future. The historical data came from two sources: age- and sex-specific tax profiles from 1941 to 1999 were based on the Continuous Work History Sample provided by the Social Security Administration; age- and sex-specific benefit figures were taken from the Annual Statistical Supplements to the Social Security Bulletin. In forecasting tax and benefit profiles in the future, we started with the known age- and sex-specific Old-Age, Survivors, and Disability Insurance (OASDI) tax and benefit profiles for 1999 and updated these profiles according to the stochastic forecasts of productivity growth. Other things also incorporated in estimation are shifts in the composition of workers, the Normal Retirement Age, and disability recipients.

Based on the historical data and the stochastic forecasts of tax and benefit payments, we generated random full-lifetime trajectories and derived the distribution of the ROR for each cohort. To note, we used the full OASDI tax and benefit profiles in simulating the trust fund to determine the probability of solvency; however, only the OASI profiles are used in estimating the ROR.

Major Findings

To start with, we estimated the ROR keeping tax and benefit schedules as currently legislated. There were two findings. First, the median ROR, starting at 2.77% for the 1941 cohort, initially decreases with cohort (to 2.40% for the 1959 cohort) but then increases again for younger cohorts (to 2.62% for the 1999 cohort). This trend is different from previous studies, which found a consistent decrease in the estimated ROR with cohort; in Leimer (1994), for example, it decreases from 2.6% for the 1941 cohort to 1.7. This is likely due to the substantially higher forecasts of life expectancy used in our estimation (especially at retirement ages): this increases total benefits received by younger cohorts and therefore increases their rates of return. Second, as expected, the variance of the ROR estimates increases with cohort; this reflects greater uncertainty in estimating tax and benefit profiles for younger cohorts.

Increasing the Payroll Tax Rate

Next, we calculated the ROR, assuming an immediate increase in the payroll tax rate from 12.4% to 14.4%. Under this scenario, the trust fund is assumed to remain solvent until 2074 with 49%

probability.

As expected, the oldest cohorts remain largely unaffected by the tax increase, because their taxpaying years have mostly passed; however, the ROR for younger cohorts (especially those born after 1950) decreases substantially. For example, the median ROR for the 1999 cohort is now equal to 2.19%, compared with 2.62% in the benchmark scenario.

Increasing the NRA

Finally, we calculated the ROR, assuming a gradual increase in the NRA to age 69 by 2024. (Currently, it is scheduled to increase to age 66 and age 67 starting in 2000 and 2017, each in the six-year time span.) Under this scenario, the trust fund is assumed to remain solvent until 2074 with 46% probability.

As in the previous scenario, the impact of this reform is greater on younger cohorts (especially those born after the early 1960s); for example, the median ROR for the 1999 cohort is now equal to 1.54%, compared with 2.62% in the benchmark scenario. In particular, this trend seems more apparent in this scenario than the previous one; decreases in the rates of return for cohorts born after 1963 are consistently greater here than the previous scenario. For example, the median ROR for the 1969 cohort equals 2.61% in the first, benchmark scenario, 2.26% in the second scenario, and now 1.47% in this scenario. This is due to an additional effect coming from an extended reform delay in implementing an increase in the NRA. An immediate increase in the payroll taxes allows an accumulation of interest, which alleviates the need for Social Security reform in the future; without this ad-

ditional resource, a gradual increase in the NRA induces a sharper decline in the trust fund in the future and thus a sharper decline in the benefit payments.

Conclusion

This study considered the ROR of the Social Security system. Estimating the ROR for each cohort born between 1941 and 1999 under different scenarios, we illustrated how useful the ROR is in understanding the different welfare effects of a reform plan across cohorts. In particular, from our own simulation results, we emphasized two patterns. First, both reform plans considered, that is, an immediate increase in the payroll taxes and a gradual increase in the NRA, affect younger cohorts more than older cohorts. Second, the burdens from a slow increase in the NRA are more on younger cohorts than those from an immediate increase in payroll taxes. This illustrates the shift of burden to younger cohorts due to a delay in reform.

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