How Do Lifetime Social Security Benefits and Taxes Differ by Earnings?

Projections from Urban Institute's DYNASIM Model

C. Eugene Steuerle, Damir Cosic, and Caleb Quakenbush

February 2019

Assessing the distributional impact of Social Security requires comparing taxes paid and benefits received by people at different earning levels. But taxes are paid on lifetime earnings, and old-age benefits are received throughout a beneficiary's retirement years. Therefore, examining lifetime rather than annual benefits and taxes is also key for assessing the program's impact. Given that Social Security's revenues are projected to fall short of benefits to be paid, the currently scheduled level of lifetime benefits, taxes, or both must change. But by how much, and for whom? Only by knowing the scheduled level of lifetime benefits and taxes, as well as how they grow over time, are distributed, and might be affected by economic and demographic trends, can we decide how best to restore balance to the system.

Looking at Social Security's annual benefits is insufficient to determine its progressivity. The program is widely perceived to be progressive because its benefit formula replaces a larger share of earnings for lower earners than for higher earners. But the benefit structure also has regressive features, one of which is the payment of benefits mainly as annuities. This effectively provides a bonus to those with lower mortality rates, who on average also have higher incomes. Measuring and comparing lifetime benefits to taxes, therefore, provides an important way to account for how the many features of Social Security combine to create its overall progressivity.

In this brief, we use Urban Institute's Dynamic Simulation of Income Model (DYNASIM) to analyze how lifetime Social Security benefits and taxes currently scheduled are distributed for cohorts born

between 1940 and 1999. DYNASIM accounts for the interaction of Social Security's design with economic and demographic trends, such as mortality and employment rates for women and men.

Four conclusions stand out:

1. Under current benefit and tax formulas, lifetime benefits and taxes in Social Security for nondisabled beneficiaries who survive to age 65 are scheduled to increase almost continually in real terms for all earning groups. Real benefits grow largely because of increased life expectancy and because Social Security benefits are scheduled to grow with wages for each new cohort of retirees, leading to relatively stable annual replacement rates.
2. Partly because of shortfalls of taxes relative to benefits, lifetime net transfers (benefits minus taxes) are also currently scheduled to increase steadily, albeit modestly, for all groups, apart from a possible modest tail off for the top 20 percent of earners retiring in the distant future.
3. Relative to models that compare stylized earners who work and contribute each year—the hypothetical workers typically displayed by the Social Security Administration (SSA)—dynamic simulation models show projected lifetime taxes to be significantly lower but average benefits roughly the same.
4. When comparing lifetime net transfers of low-earning groups versus high-earning groups, Social Security is projected to become slightly more progressive over time for nondisabled people who survive to age 65. At the same time, the benefit-to-tax ratio is scheduled to remain fairly steady for many lifetime earning groups.

Forthcoming Urban Institute research both considers how related programs, such as Disability Insurance and Medicare, combine with Social Security and tests sensitivity to alternative assumptions (Favreault and Johnson, forthcoming; Favreault, forthcoming). Still, these results for Social Security's Old-Age and Survivors Insurance (OASI) make clear that achieving equity in reform requires looking beyond annual benefit levels and retirement age requirements to a more comprehensive measure of lifetime benefits and taxes. Indirectly, this brief's results also pinpoint that many equity issues lie outside of the structure of cash benefits for those eventually receiving old-age insurance, such as the health risks that influence the likelihood of surviving long enough to receive those benefits. This last issue has been made especially pertinent by recent increases in mortality among many younger groups because of opioid addiction and other factors.

Population and Methods

This study focuses on the OASI portion of Social Security. We focus solely on the benefits received and taxes paid by those who survive to age 65 and ever receive retirement or aged survivor benefits. Excluding those who either receive disability benefits or die before age 65 is helpful when considering the lifetime experience of the typical retiree. Also, reforms such as those enacted in 1983 often focus mainly on benefits for those who survive to old age.[1] Including those who die before age 65 or ever

receive disability benefits would lead to different distributional conclusions because mortality and disability vary with lifetime earnings.[2]

BOX 1

Assumptions Underlying This Analysis

For couples receiving benefits, we attribute all Social Security benefits and taxes equally between the two in periods when both are alive, but we exclude any child benefits. Lifetime earnings are also calculated per capita. A person's earnings equal his or her earnings when single or one-half of a couple's combined earnings in years when married. All years' earnings, benefits, and taxes are converted to real dollars; discounted at the 2 percent rate relative to the year in which the person reaches age 65; and summed up as lifetime earnings, benefits and taxes. We include all earnings for all years, including noncovered earnings and earnings not subject to Social Security tax, such as for state and local employees in some jurisdictions. We use these lifetime earnings to divide the sample into cohort-specific, lifetime-earnings quintiles. Average Social Security benefits and taxes are calculated for each quintile. Social Security benefits are calculated net of income taxes paid on benefits.

We use DYNASIM4, Urban's dynamic microsimulation model designed to analyze the long-term distributional consequences of retirement and aging issues. The model starts in 2007 with a representative sample of the United States population and ages this population year by year, simulating key demographic, economic, and health events. The sample, which is based on 2004 and 2008 data from the Survey of Income and Program Participation, is replenished in each simulation year by new births and immigrants. The model simulates over the 75-year forecasting horizon used in the Social Security Trustees Report.

Simulation of events is based on probabilities generated by hundreds of carefully calibrated equations estimated by our colleagues over the past two decades using nationally representative longitudinal data from a range of sources. At the population level, we impose rates projected by the Board of Trustees (2018) under their intermediate cost scenario (such as the average likelihood of dying by age group and sex). We also calibrate aggregate earnings to the average wage index used by Social Security, and benefits are based largely on those earnings. However, the Survey of Income and Program Participation data on which the mortality models were estimated allow individual projections to include each person's sex and age and their socioeconomic, health, and disability characteristics. Individual projections also incorporate a time trend, including an interaction term between lifetime earnings and time.

The model integrates program rules combined with projections of lifetime earnings to project Social Security retirement taxes and benefits. Earning histories of people in the Survey of Income and Program Participation sample, going back as far as 1951, are imputed by statistically matching them to participants in the Panel Study of Income Dynamics. During the simulation period, earnings are projected as the product of independently simulated hourly wage, employment status, and number of hours worked in a year. In the aggregate, the average annual earnings are also aligned with the trustees' projections.

We report cohort averages except where noted. When considering the ratio of Social Security benefits to contributions, we use the ratio of the means. Adults in the sample are sorted in cohort-specific quintiles of per capita lifetime earnings evaluated at age 65.

DYNASIM's aggregate assumptions parallel those made by the Social Security actuaries, who project roughly equal earnings growth across earning groups (maintenance but not an increase in the inequality of earnings) in the period covered by this analysis. The model captures the lifetime earnings projected for each household, including earnings for employment not covered by Social Security, as well as earnings above the cap on maximum earnings subject to Social Security tax. Other important assumptions for this study are listed in box 1, and further information about DYNASIM can be found in briefs by the Urban Institute (2015) and Favreault, Smith, and Johnson (2015).

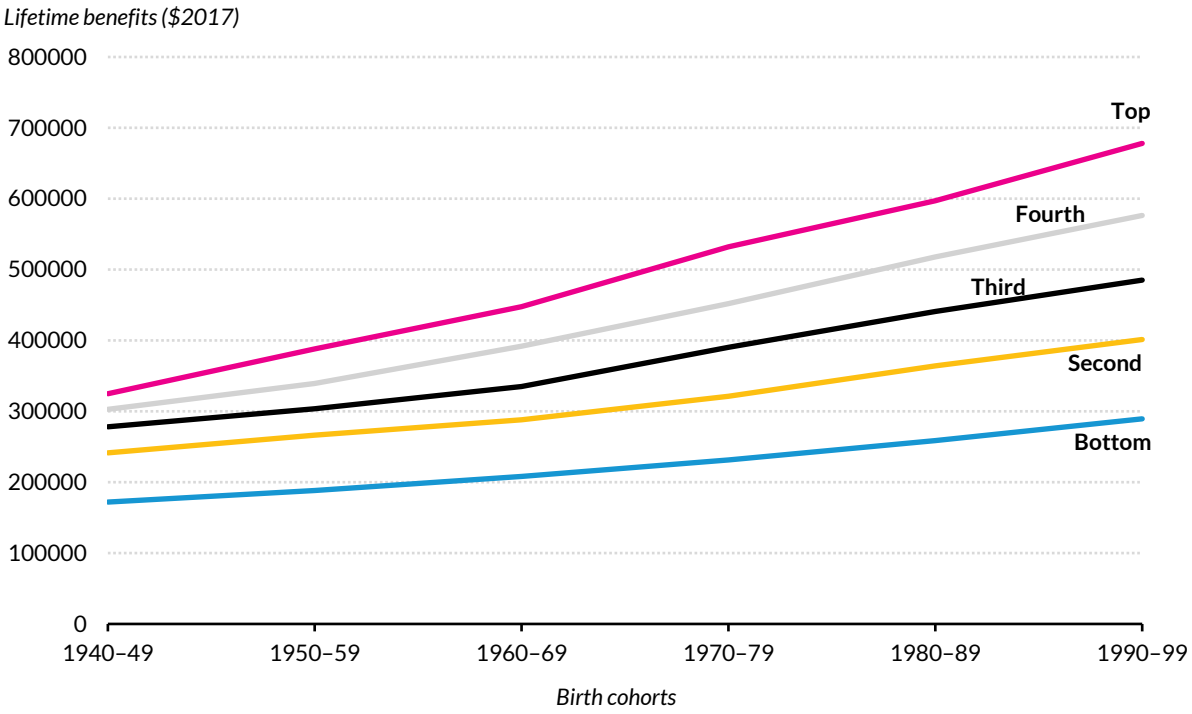
Findings

Because of several factors, including economic growth and longer lives at benefit-eligible ages, Social Security schedules lifetime benefits to increase substantially for succeeding cohorts of retirees who survive to age 65 in all lifetime earnings quintiles. However, the absolute dollar gap in lifetime benefits between richest and poorest widens over time (figure 1).

FIGURE 1

Average Present Value of Lifetime Social Security Benefits by Lifetime Earnings Quintile

Benefits grow for all, but they grow somewhat faster for higher-earning groups



Source: DYNASIM4 ID961.

Notes: Includes all people who survive to age 65 and have positive Social Security benefits and do not receive disability benefits. Assumes scheduled benefits. Couples split Social Security benefits. Social Security benefits are net of income taxes paid on benefits. Benefits are in 2017 price-adjusted dollars discounted to age 65 using a 2 percent real discount rate.

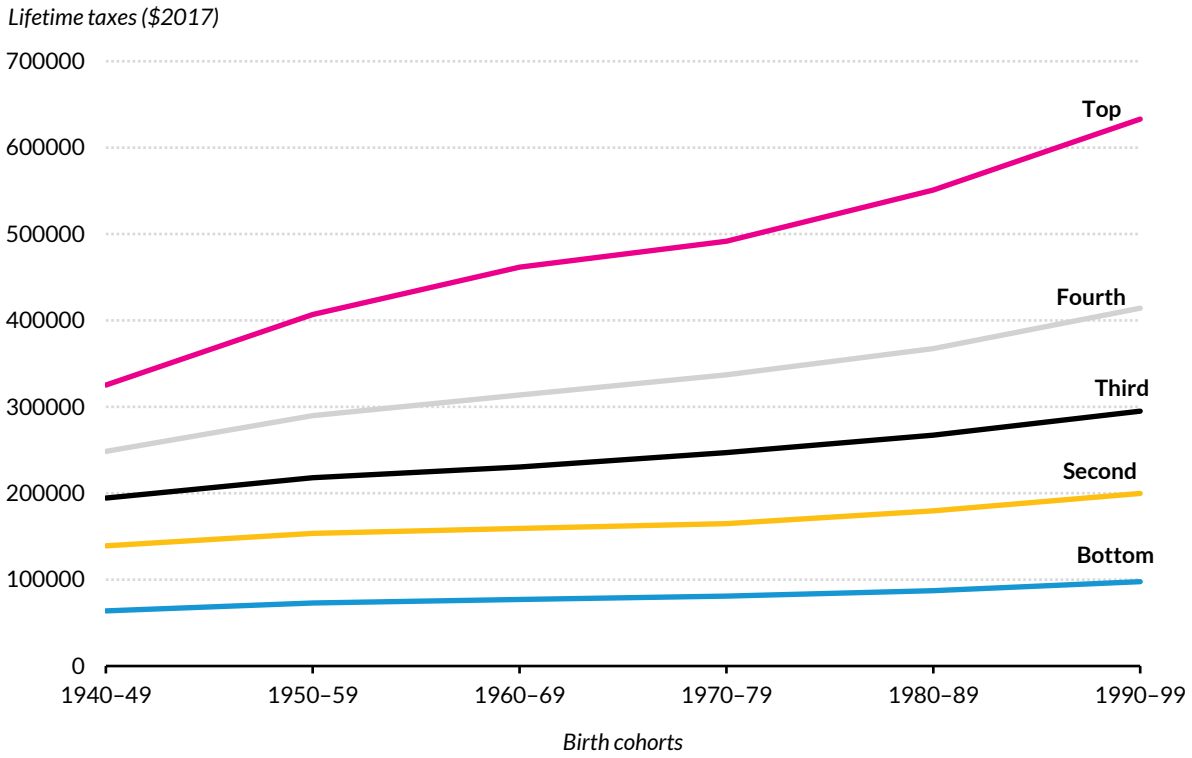
- Social Security benefit formulas schedule average lifetime benefits to increase from $272,000 to $509,000 in 2017 dollars—an increase of 87 percent—over a 50-year period stretching from those born between 1940 and 1949 (turning 65 between 2005 and 2014) to those born between 1990 and 1999 (turning 65 between 2055 and 2064).
- A slightly higher growth rate is projected for higher-earning quintiles. For the 1940–49 cohort, the top quintile of nondisabled survivors to age 65 are projected to receive roughly 1.9 times the lifetime Social Security benefits of the bottom quintile, or about $153,000 more in 2017 price-adjusted dollars. The top quintile in the 1990–99 cohort is projected to receive about 2.3 times more than the bottom quintile in scheduled lifetime benefits, or about $389,000 more in real dollars.

Despite this widening benefit gap between the richest and poorest retirees, the highest quintile also witnesses the largest increase in taxes, both relatively and absolutely (figure 2).

FIGURE 2

Average Present Value of Lifetime Social Security Taxes by Lifetime Earnings Quintile

Lifetime taxes increase faster for higher lifetime earnings groups



Source: DYNASIM4 ID961.

Notes: Includes all people who survive to age 65 and have positive Social Security benefits and do not receive disability benefits. Couples split Social Security benefits. Social Security benefits are net of earning taxes paid on benefits. Taxes are in 2017 price-adjusted dollars discounted to age 65 using a 2 percent real discount rate. Assumes scheduled taxes.

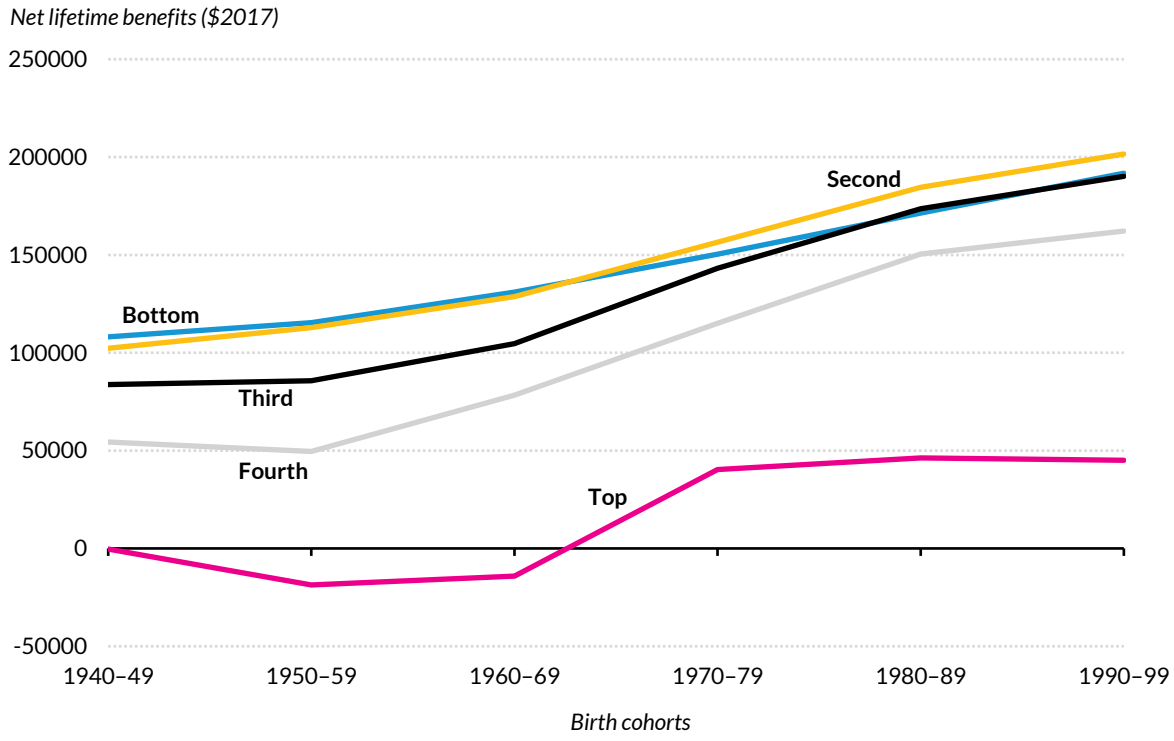
- For the 1940–49 cohort, the top quintile of survivors to age 65 paid roughly 5.1 times the taxes of the bottom quintile (about $325,000 compared with about $64,000). The top quintile in the 1990–99 cohort is projected to pay 6.5 times more in lifetime taxes than the bottom quintile ($633,000 compared with about $98,000), assuming current tax rates.
- The projected increases do not grow at the same rate for all lifetime earnings quintiles. Lifetime taxes are projected to increase between 43 and 53 percent for nondisabled survivors to age 65 in the lowest three quintiles, 67 percent for the fourth quintile, and 95 percent for the top quintile.

When taxes are deducted from benefits, the system currently schedules ever-higher levels of net transfers for all quintiles for most cohorts. The only exceptions are the top two quintiles for the 1950–59 cohort that have a slight fall-off relative to the 1940–49 quintiles (figure 3).[3]

FIGURE 3

Average Net Lifetime Social Security Transfers (Lifetime Benefits Less Lifetime Taxes) by Lifetime Earnings Quintile

Lifetime net transfers increase with each cohort, except for the top lifetime earnings group



Source: DYNASIM4 ID961.

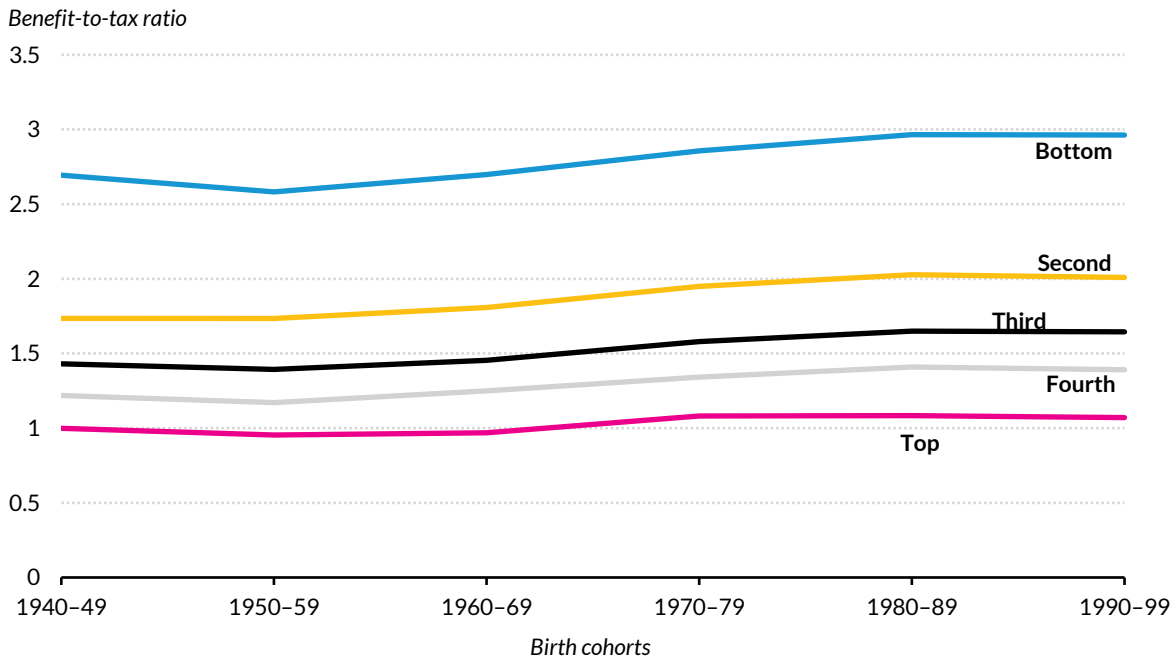
Notes: Includes all individuals who survive to age 65 and have positive Social Security benefits and do not receive disability benefits. Couples split Social Security benefits. Social Security benefits are net of income taxes paid on benefits. Benefits and taxes are in 2017 price-adjusted dollars discounted to age 65 using a 2 percent real discount rate. Assumes scheduled benefits and taxes.

- Projected net transfers are positive and mostly growing for the bottom four quintiles. Survivors to age 65 in the bottom three quintiles can expect to net between $84,000 and $108,000 for the 1940–49 birth cohort and between $190,000 and $202,000 by the time the 1990–99 cohort retires. Net scheduled transfers for the fourth quintile are projected to grow from a bit more than $50,000 to more than $160,000 over the same period. The top quintile hovers closer to "breaking even," sometimes receiving positive net transfers of up to $46,000 and sometimes receiving negative amounts as low as -$19,000.
- Comparisons across cohorts in the benefit-to-tax ratio show a fairly stable pattern (figure 4).

FIGURE 4

Average Lifetime Benefit to Tax Ratio by Lifetime Earnings Quintile

Scheduled benefit to tax ratios are expected to stabilize for most groups, increasing modestly less for those with higher lifetime earnings



Source: DYNASIM4 ID961.

Notes: Includes all individuals who survive to age 65 and have positive Social Security benefits and do not receive disability benefits. Calculated as the ratio of the average benefits to the average taxes. Couples split Social Security benefits. Social Security benefits are net of income taxes paid on benefits. Benefits and taxes are in 2017 price-adjusted dollars discounted to age 65 using a 2 percent real discount rate. Assumes scheduled benefits and taxes.

Many results surrounding the high ratio of benefits to taxes per recipient should not be surprising for a system that, in aggregate, schedules annual benefits paid to exceed annual taxes collected. Clearly, these results represent not a prediction of how reform will deal with such imbalance but rather a baseline from which reform will inevitably reduce average benefits relative to taxes paid. (Of course, some of that retreat in the benefits-to-taxes ratio could occur indirectly through transfers made outside of Social Security, such as with an additional revenue source.)

Comparison with Models of Hypothetical Households

One widely cited series of Urban Institute publications compares lifetime benefits with taxes at age 65 across generations; the series is updated periodically based on the latest Social Security trustees' reports.[4] The model in those publications uses hypothetical workers who fall within the Social Security actuaries' examples of low-, average-, and high-earning workers. It makes similar assumptions to DYNASIM for average growth in real earnings and improvements in mortality over time.

The advantage of this hypothetical model is that it allows comparisons for similarly situated people each year, from its earliest payment of benefits to far into the future, so that that one can easily visualize how the system has evolved and is scheduled to evolve with respect to lifetime benefits, taxes, net lifetime transfers, and rates of return, with and without the addition of Medicare benefits valued at some average cost per recipient.

And as a model of hypothetical households, the hypothetical model doesn't deal with issues such as how changes in the share of the population who are married or single may affect average benefits over time or how average mortality might vary across earning classes.

When we compare individuals in the middle earning quintile (as derived by DYNASIM) with the average male worker in the hypothetical model, we find that lifetime benefits are remarkably similar for almost all cohorts, usually with less than a 7 percent difference for five of the six cohorts. For instance, the average benefit for men born between 1960 and 1969 included in our DYNASIM simulation is $347,000, and the median benefit for those in the 3rd quintile is $335,000; the average benefit in the hypothetical model for the male worker earning average wages during his career and retiring at age 65 between 2025 and 2035 is $354,000. For female workers, the hypothetical model produces benefits between 13 percent and 16 percent higher in five of the six cohorts.

Lifetime taxes, on the other hand, tend to range from 32 percent to 61 percent higher in the hypothetical models. The main reason for this difference is almost certainly the assumption in the hypothetical model that workers work every year and pay Social Security tax on their earnings. The dynamic model recognizes that some people leave the workforce in some years and sometimes work for entities whose payrolls are not subject to Social Security taxation, such as state or foreign governments. Consequently, comparisons across birth cohorts in the dynamic model do not compare people with the same work history.

Each model serves a different purpose: the hypothetical model crisply displays growth patterns of benefits and taxes for people in similar relative circumstances over long periods, while DYNASIM provides a better way of examining the broad distributional effects of various features of Social Security on a population with an evolving set of demographic characteristics (although it begins only with generations who have recently retired).

Conclusion

Currently, Social Security schedules substantial real growth in benefits per retiree for all lifetime earning classes, ranging from lowest to highest. That growth is independent of the growth in numbers of beneficiaries relative to taxpayers supporting the system, often loosely referred to as the "baby boom" retirement problem. The continued per-beneficiary growth is largely attributable to the ways that Social Security schedules benefits to grow along with earnings as the economy expands, as well as its accommodation of more years in retirement with no past or scheduled increase in the early retirement age and no additional scheduled increases in the full retirement age for those turning 62 after 2022.

Despite assumptions that lower-earning workers have less improvement in life expectancy and no significant catch up in relative cash earnings after a period of increased earnings inequality, this system still schedules a maintenance and possibly an increase in progressivity, at least as measured by benefits relative to taxes paid for survivors to age 65 who do not receive Disability Insurance benefits. Of course, these assumptions about future mortality may be wrong, and any reform effort may need to account for the resultant loss in benefits to those who die well before reaching eligible retirement ages.

Forthcoming Urban Institute research (Favreault, forthcoming) expands on the work presented here by incorporating changes in Medicare and Disability Insurance benefits and taxes, comparing results under different assumptions about mortality and other important factors, and assessing the losses attributable to mortality for those who die in middle age. Other future work could consider how Social Security can be indexed (e.g., for longevity) to avoid negative repercussions when assumed demographic projections turn out to be incorrect, and, most importantly, examine the impact of different reforms on Social Security's lifetime benefits and taxes and its overall progressivity.

Notes

[1] Earlier studies, which used an earlier version of a model similar to this one, also examined Social Security's progressivity with and without Disability Insurance. See Cohen, Steuerle, and Carasso (2001, 2002)

[2] In the first birth cohort we examine (1940), the Social Security Trustees project that about 22 percent of men and 14 percent of women are expected to die between ages 21 and 65. In the 2000 cohort, about 13 percent of men and 8 percent of women are expected to die between ages 21 and 65. In recent years, about 15 percent of men and 13 percent of women in the Social Security area population were receiving Disability Insurance benefits at age 65.

[3] In earlier generations, lifetime transfers (but not benefit-to-tax ratios) were higher for higher-earning groups. See Steuerle and Bakija (1994).

[4] See, for example, Steuerle and Quakenbush (2018).

References

Board of Trustees, Federal Old-Age and Survivors Insurance and the Federal Disability Insurance Trust Funds. 2017. *The 2017 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*. Washington, DC: Board of Trustees.

Cohen, Lee, C. Eugene Steuerle, and Adam Carasso. 2001. "Social Security Redistribution by Education, Race, and Income: How Much and Why." Paper prepared for the Third Annual Conference of the Retirement Research Consortium, Washington, DC, May 17–18.

———. 2002. "The Effects of Disability Insurance on Redistribution within Social Security by Gender, Education, Race, and Earning." Paper prepared for the Fourth Annual Joint Conference for the Retirement Research Consortium, Washington, DC, May 30–31.

Favreault, Melissa M. Forthcoming. "Socioeconomic Disparities in Disabled and Disability-Free Life Expectancy: Implications for Our Fiscal Future." Paper prepared for the US2050 project, Supported by the Peterson Foundation and Ford Foundation.

Favreault, Melissa M. and Richard W. Johnson. Forthcoming. "How Would Social Security Changes Affect Medicare Costs and Seniors' Out-of-Pocket Spending? A Microsimulation Analysis." BC15-100416F. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Favreault, Melissa M., Karen E. Smith, and Richard W. Johnson. 2015. "The Dynamic Simulation of Income Model (DYNASIM): An Overview." Washington, DC: Urban Institute.

Steuerle, C. Eugene, and Jon M. Bakija. 1994. *Retooling Social Security for the 21st Century: Right and Wrong Approaches to Reform*. Washington, DC: Urban Institute Press.

Steuerle, C. Eugene, and Caleb Quakenbush. 2018. "Social Security and Medicare Lifetime Benefits and Taxes: 2017 Update." Washington, DC: Urban Institute

Urban Institute. 2015. "DYNASIM: Projecting Older Americans' Future Well-Being." Washington, DC: Urban Institute.

About the Authors

C. Eugene Steuerle is an Institute fellow and the Richard B. Fisher chair at the Urban Institute. Among past positions, he was deputy assistant secretary of the US Department of the Treasury for Tax Analysis (1987–89), president of the National Tax Association (2001–02), codirector of the Urban-Brookings Tax Policy Center, chair of the 1999 Technical Panel advising Social Security on its methods and assumptions, and chair of the 2015–16 National Academy of Sciences Committee on Advancing the Power of Economic Evidence to Inform Investments in Children, Youth, and Families. Between 1984 and 1986, he was the economic coordinator and original organizer of the Treasury's tax reform effort.

Damir Cosic is a research associate in the Income and Benefits Policy Center at Urban Institute and part of a group that studies retirement income and benefits. His work focuses on policy evaluation using microsimulation models. Cosic holds a BS in electrical engineering from the University of Zagreb in Croatia and has extensive experience as a software engineer. He received an MA in economics from Hunter College in New York City and PhD in economics from the Graduate Center at the City University of New York. His research focus was income and wealth distribution.

Caleb Quakenbush is a research associate at the Urban Institute, where he works with the Opportunity and Ownership initiative, the Program on Retirement Policy, and the Urban-Brookings Tax Policy Center. His areas of research include the interaction of federal tax and transfer programs, Social Security, state and local pensions, low-income finance, mobility, and federal budget issues. Before joining Urban, Quakenbush was a supplemental instructor for microeconomics at American University while completing a BS in economics. He holds an MS in applied economics from Johns Hopkins University.

Acknowledgments

This brief was funded by the Peter G. Peterson Foundation. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at urban.org/fundingprinciples.

The authors thank Melissa Favreault and Richard Johnson for valuable comments. Results reported in this brief are based on the Urban Institute's Dynamic Simulation of Income Model 4 (DYNASIM4). Karen Smith and Melissa Favreault direct DYNASIM4 development. Douglas Murray was DYNASIM4's lead programmer from 1998 through 2017, and Damir Cosic has been lead programmer since 2018. Current and recent funders of DYNASIM4 include the US Department of Labor, AARP, Alfred P. Sloan Foundation, Andrew W. Mellon Foundation, Ford Foundation, Kaiser Family Foundation, National Institute on Aging, Office of the Assistant Secretary for Planning and Evaluation at the US Department of Health and Human Services, Rockefeller Foundation, SCAN Foundation, and the Social Security Administration.

URBAN INSTITUTE

2100 M Street NW
Washington, DC 20037

www.urban.org

ABOUT THE URBAN INSTITUTE

The nonprofit Urban Institute is a leading research organization dedicated to developing evidence-based insights that improve people's lives and strengthen communities. For 50 years, Urban has been the trusted source for rigorous analysis of complex social and economic issues; strategic advice to policymakers, philanthropists, and practitioners; and new, promising ideas that expand opportunities for all. Our work inspires effective decisions that advance fairness and enhance the well-being of people and places.