CHAPTER

Will Population Aging Push Us over a Fiscal Cliff?

by John Sabelhaus

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ABSTRACT

The share of the US population age 65 and older is rising dramatically. In the year 2000, 12 percent of the population was over age 65; by 2050 that share will be 22 percent. Much of that aging has already occurred: in 2022, just over 17 percent of Americans are retirement age. Population aging is applying upward pressure on government deficits as a result of increased public spending on programs, including Social Security and Medicare, that are designed to support older Americans. I argue that broader distributional measures assessing who pays for and who benefits from age-related government programs, both across and within generations, are necessary to inform policy decisions. However, in addition to direct aging-related government expenditures, I argue that unfunded spending in other, non-aging parts of the budget along with recent tax policy changes portend significant intergenerational redistribution. These distributional impacts should be measured and taken into account by lawmakers who seek to address looming fiscal challenges in a more equitable way.

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1. Introduction

The share of the US population age 65 and older was just 12.5 percent in 1990. By 2010, with older members of the Baby Boomer generation (defined here as those born between 1945 and 1965) nearing retirement, this number had increased slightly, to 13.1 percent. But by 2030, when the last of the Baby Boomers will turn 65, the share of the population age 65 and older is expected to balloon to 20.6 percent. Rather than crest and fall, however, this large shift in the age distribution will create a new American normal. A steady though less dramatic trend toward an increasingly older population, attributable to longer-term shifts in longevity, fertility, and immigration, is likely to cause the share of the population 65 and older to reach 22 percent by 2050.[1]

Forecasters have long anticipated population aging. Because these trends are key inputs for projecting outlays and revenues, government agencies including the Congressional Budget Office (CBO) and the Social Security Administration continuously monitor and adjust projected demographic shifts, including age distributions (Congressional Budget Office, 2021b, 2021c; Social Security Administration, 2021). New information suggests that these forecasts could be underestimating the country's shift toward an older population: recent data on fertility trends might be indicating a slowing birth rate, further increasing the share of the older population in the coming generations (Kearney, Levine, and Pardue, 2022). Absent dramatic increases in fertility or immigration, the demographic cards have largely been dealt for the next few decades.

Population aging is often cited in budgetary discussions as a harbinger of unsustainable fiscal policy and a call to action. At face value, the budgetary math is straightforward: government programs in which taxes are levied on workers and payments or services are then furnished to retirees will be pushed toward deficit as the ratio of retirees to workers increases; the outflows become imbalanced from the inflows. Two easy examples of such programs are Social Security and Medicare, but revenue sources such as income taxes and estate taxes, as well as other government programs including Medicaid, are also significantly impacted by the population's age distribution. An aging population is generally associated with slower growth in real output and incomes, and therefore lower income tax revenues per capita. If spending per capita remains unchanged, the budget is pushed further into deficit.

Nor is population aging a concern limited to the future; rather, it is already upon us. As of 2022, the share of the population age 65 and older, just over 17 percent, is already well on its way to its projected 22 percent share in 2050. Whether the

1 See Statista (2021).

remaining increase will represent the difference between sustainable levels of government debt and a fiscal cliff remains to be seen. How important to the overall budget picture are age-related programs such as Social Security and Medicare, particularly as they risk slipping into deficit? How should policymakers think about maintaining these programs' essential benefits, while modifying them to avoid dire fiscal consequences? Or do we face an even broader policy challenge, the solution to which requires that we reconsider all forms of revenues and expenditures?

This paper aims to move the policy debate on population aging and resulting deficits and debt beyond macroeconomic phenomena and instead consider them in terms of their distributional consequences, with solutions grounded in the principle of fairness. Most economists would agree that government debt—in addition to the possibility that debt crowds out investment and slows economic growth—imposes a burden on future generations. And transfers across generations are indeed key to the distributional framework discussed here. But transfers within generations must also be considered.[2]

I begin by separating age-related social insurance programs from all other revenues and spending in the federal budget. That division provides a preliminary sense of how various budgetary components have contributed to deficits past, present, and into the future. Although programs such as Social Security and Medicare have grown as a share of GDP, due to both population aging and the increasing overall share of health spending, recent trends in deficit spending are also being driven by other patterns in spending and revenues. For example, the government responded to the COVID-19 pandemic with a spike in outlays, while changes to income tax policy have slowed the growth of revenues.

Second, I explore the redistributive impacts of Social Security and Medicare, focusing on how program design affects who pays and who benefits. These social insurance programs exist to improve economic welfare, requiring that their overall net benefits exceed their costs. Even when that balance is correctly struck, however, social insurance can lead to redistribution across and within generations. For example, Social Security redistributes from lifetime high-earners to lifetime low-earners within each generation. Both Social Security and Medicare generate redistribution across generations as well; for example, a generation of retirees may be receiving more in Social Security and Medicare benefits than they paid in taxes while they were working, and that redistribution is being paid for by current and future workers. The extent of this redistribution is largely determined by policy changes and by factors such as the pace of health cost growth.

2 A much older "generational accounting" literature (Auerbach et al., 1994) seeks to measure how government policy transfers resources across generations, but that approach ignores transfers within generations, which are key to the arguments here. Criticisms of the generational accounting approach (Ruffing e. al., 2014) are also important to heed.

Third, I review the evidence on redistribution within Social Security (CBO, 2021c). One insight that emerges is that the determinants of redistribution across and within generations are resolved only ex post. For example, the projected exhaustion of the Social Security trust fund will ultimately be resolved by determining redistribution across (and possibly within) generations. If benefits are reduced when the Social Security trust fund exhausts, the generations then receiving benefits will bear the burden. If instead taxes are raised to cover the shortfall, the burden will fall on those in the workforce at the time. Medicare coffers face the same issues, and redistribution within Medicare is also dependent on how health costs grow over the ensuing generations and how policymakers choose to fund those cost increases.

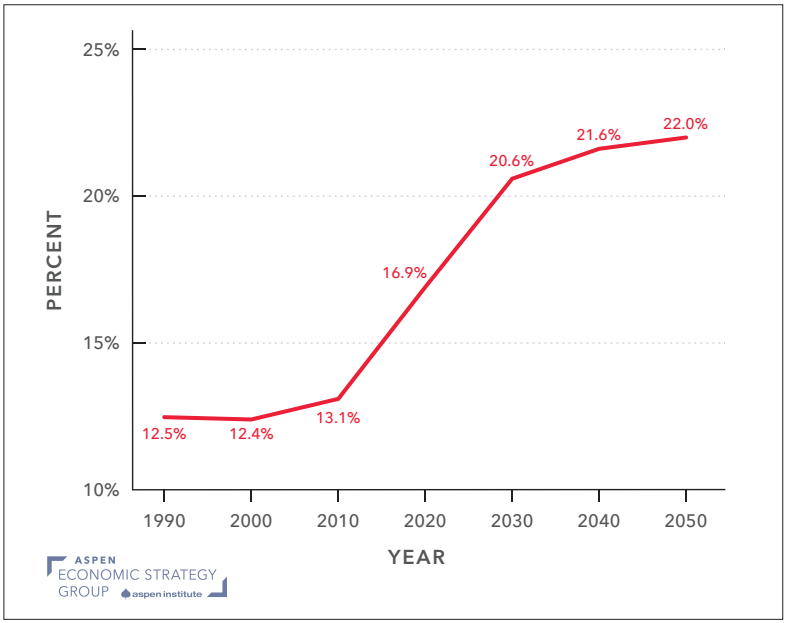
Fourth, I argue that more government spending programs can and should be evaluated based not only on their efficiency but also their distributional impacts, characterized here through the lens of fiscal winners and losers. Fairness suggests that the subset of the population that benefits most from an efficient social insurance program, or from public investment in, for instance, roads, defense technology, or education, should be responsible for the costs when the investment returns are realized. As a result, policy responses in some cases will involve borrowing on behalf of future generations and having them share in repaying the costs in future years.

Lastly, I discuss how the distributional perspective on government deficits and debt should affect our thinking about fiscal policy in response to the population aging. The public economics literature provides the tools for determining whether a government program's benefits exceed its costs. Those tools are best used not only to help inform our decisions about a program's desirability and ideal scale, but also to frame discussion about how the program should be funded across and within generations. If we ignore the other drivers of government deficits and debt and focus only on changes to aging-related programs including Social Security and Medicare, we greatly risk undoing or foregoing otherwise desirable government policies.

2. Population Aging and Government Budgets: Past, Present, and Future

The oldest members of the Baby Boomer generation began turning 65 in 2010, and the youngest will be 65 by 2030. During that 20-year period, the fraction of the US population age 65 and older will increase from 13.1 to 20.6 percent (Figure 1). This paper begins by examining how population aging has affected government outlays and revenues as of 2022, and the outlook for future budgets.

Figure 1. Share of the US Population 65 and Older



Source: Statista (2021).

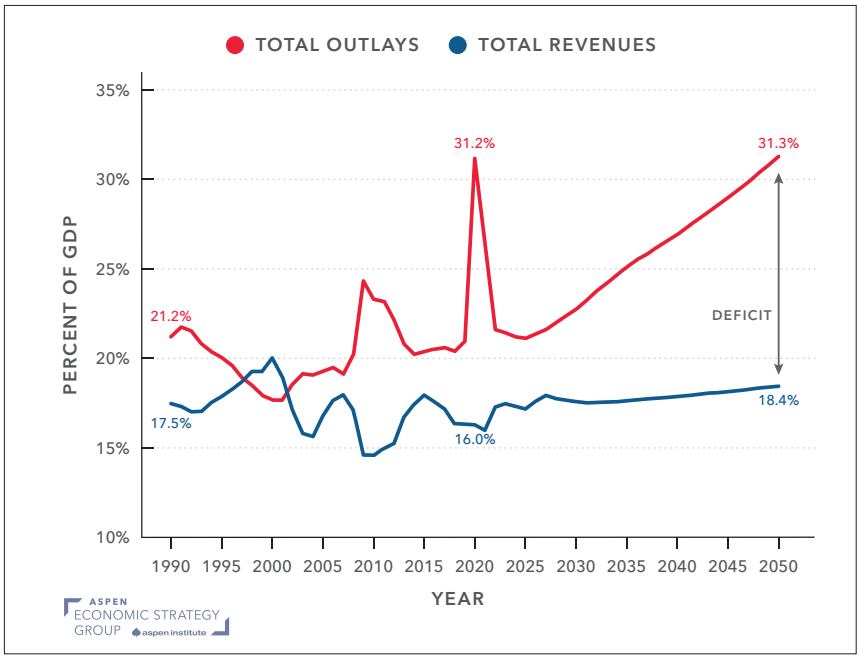
Understanding the relationship between population aging and budgets first requires examining the population's aging curve. Figure 1 covers the years between 1990 and 2050, which includes 20 years on either side of the Baby Boomer retirement period. Next, aging-related components of the federal budget—including Social Security, Medicare, and other health-related expenditures— should be separated from other budget components. Third, large movements in other budget components not directly affected by population aging, such as countercyclical spending and the impact of tax policy changes on long-run revenues, are also instructive and must be understood.

2.a. Federal Outlays, Revenues, and Deficits

The outlook for federal government outlays and revenues and the resulting deficits may appear alarming in historical context, as demonstrated in Figure 2 below.[3] In 1990, outlays represented 20.2 percent of GDP, and revenues were 17.5 percent, resulting in a budget deficit of 3.7 percent of GDP. At the time, such budget deficits motivated concerted action on the budget that contributed to budget surpluses by the turn of the century. Both spending restraint and the dot-com stock market boom pushed the budget into surplus, as outlays declined and revenues increased.

3 Charts in this section are created by splicing together time series from the supporting data files associated with the CBO 10-Year and Long-Term Budget Outlooks (CBO, 2021a, 2021b).

Figure 2. Federal Revenues and Outlays as a Share of GDP



Source: Congressional Budget Office.

These budget surpluses were short-lived. Changes in tax law in 1998 and 2001 led to lower revenues, though the housing and stock market bubbles in the early 2000s offset some of the decrease. Revenues declined dramatically as a result of the 2008 Financial Crisis and associated Great Recession, even outpacing the dramatic decline in GDP. Automatic stabilizers and deliberate policy responses to the economic downturn also increased outlays relative to GDP, and the resulting deficit reached 10 percent of GDP in 2010, nearly tripling its previous peak two decades earlier.

Large deficits associated with the Great Recession led to renewed fiscal discipline between 2010 and 2016. Deficits shrank relative to GDP, but the decrease in federal government outlays also likely contributed to the economy's slow recovery. Although the unemployment rate fell consistently during this period, labor force participation remained stubbornly low, and lower aggregate demand contributed to slower overall growth. Such fiscal discipline, motivated by the textbook macroeconomic idea that government deficits slow growth by crowding out private investment, was likely misplaced. Crowd-out is only a concern in an economy operating at full capacity, which was not the case between 2010 and 2016. Between 2017 and 2019, increased spending and tax cuts resulted in improved GDP growth, even though the economy had appeared to be at full employment.

The COVID-19 pandemic and the associated recession wrote a new chapter in federal budget history. As in all recessions, the spike we observed in outlays relative to GDP could be attributed in part to the decrease in GDP itself. However, the pandemic led to a much more aggressive spending response, with the usual increases in unemployment insurance and other support programs supplemented by direct cash transfers to individuals, businesses, and states. As a result, federal outlays surged to 31.2 percent of GDP. One indicator of the federal response's success was the rapid return to a more normal budgetary situation, with both outlays and revenues approaching pre-pandemic levels by 2022.

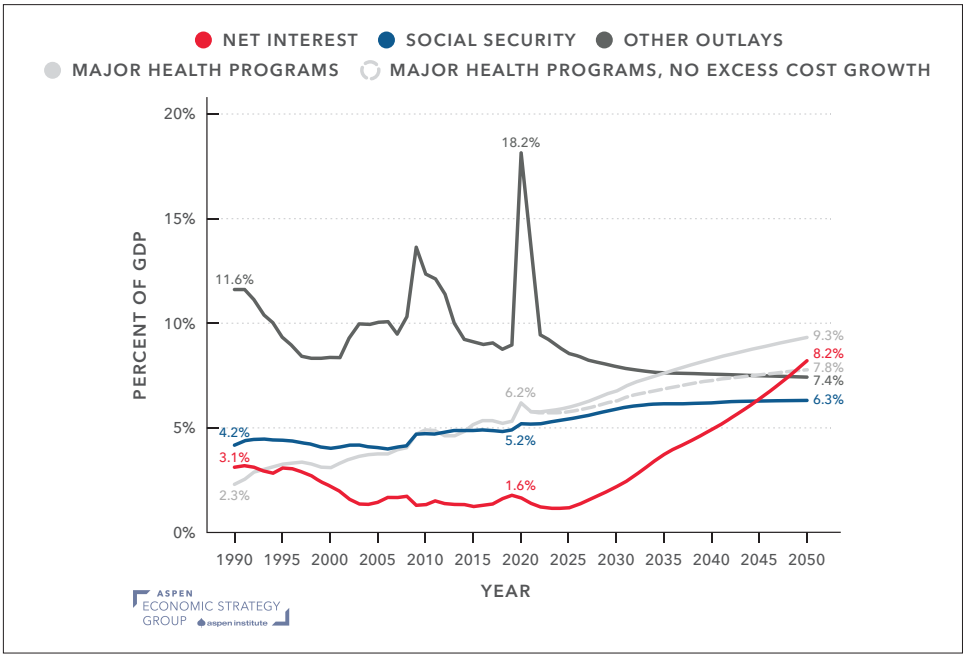
Revenues are expected to return to pre-pandemic levels (relative to GDP) as the economy recovers and as some provisions of the 2017 tax changes expire. Forecasters then expect bracket creep to lead to a slight upward trajectory in revenues as a share of output, but the ratio is not expected to recover to its 2000 level. An important story unfolds meanwhile on the other side of the ledger. Outlays are expected to surge relative to GDP in the coming decades, and the spike in outlays during the COVID-19 pandemic provides an interesting reference point: the one-time spike in spending relative to GDP in 2020 is the CBO's expected norm in 2050.

If the upcoming surge in outlays were primarily driven by population aging, then the trends in Figure 1 suggest we should expect those outlays eventually to level off. However, as Figure 2 illustrates, the increase in outlays is expected to persist well beyond Baby Boomers' retirement, warranting a deeper dive into the components of federal outlays.

2.b. Components of Federal Outlays

While population aging will continue to contribute to rising federal outlays, there are other important contributors. Figure 3 compares projected spending on aging-related programs (Social Security and major health programs) to other drivers of government outlays, net interest, and non-aging components of health spending. Major health programs include Medicare parts A, B, C, and D, Medicaid, Affordable Care Act (ACA) exchange subsidies, and veterans' health, each of which are subject (to varying degrees) to aging- and non-aging-related spending drivers.

Figure 3. Components of Federal Outlays as a Share of GDP



Source: Congressional Budget Office.

Figure 3 separates the projected growth in health spending into two components: the first is "excess" health cost growth, which captures expectations of how health spending will evolve beyond the effects of population aging or policy changes. The historical rate of excess cost growth is computed as a residual by subtracting the effects of population aging and policy changes from actual health spending relative to GDP. That historical average then informs analysts' expectations for future health cost growth. The second component is health spending absent excess cost growth, which reflects the impact of age-related demographic change.

Separating population aging, policy changes, and excess health cost growth helps to explain and to interpret the country's budget history between 1990 and 2020, as detailed in Figure 3. Both Social Security and health spending have increased alongside population aging since 1990, but the increase in Social Security spending (1 percentage point) is well below the increase in health spending (3.9 percentage points). The growth of Social Security can be entirely attributed to population aging, while the growth in health spending reflects aging-related increases along with excess cost growth and policy changes such as the introduction and subsequent modification of Medicare Part D and ACA-related spending.

Projections for the two spending categories that relate directly to an aging population—Social Security and health spending absent excess cost growth—show the expected jump in outlays relative to GDP as Baby Boomers become eligible for benefits. But neither is the dominant factor driving exploding total outlays relative to GDP. Social Security is expected to add only 1.1 percentage point to spending relative to GDP between now and 2050, while the aging-related component of health spending is expected to add another 1.6 percentage points of GDP; other factors are far more significant.

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The largest single driver of future outlays relative to GDP is net interest, as shown in Figure 3, which is projected to increase from 1.6 percent of GDP today to 8.2 percent by 2050. That 6.6 percentage-point increase alone represents more than double the 2.7 percentage-point increase attributable to aging among Social Security and health program recipients. The expected growth in net interest reflects deficits accumulated to date and the incremental effect of continued primary deficits going forward. While some of that growth is aging-related, more generally it reflects the government's failure to pay for current spending.

Roughly half of future health spending growth (1.5 percentage points of GDP) is attributed to excess health cost growth between now and 2050. Forecasters often combine excess cost growth with aging-related spending growth when characterizing budgetary problems that result from population aging. But excess cost growth is by construction not driven by population aging, and it should be analyzed from a distributional perspective that examines effects not only across but also within generations, which I address in Section 3.

The final component of federal outlays shown in Figure 3 is a residual, accounting for all "other" spending. Absent the COVID-19 spike, other spending is expected to decline from around 9 percent of GDP to 7.4 percent by 2050. Although other spending relative to GDP declined during two periods of fiscal restraint in the 1990s and 2010s, the 7.4 percent that forecasters expect by 2050 would represent an even lower share of GDP than was observed in any year during those periods. CBO projections suggest that population aging is not adding to upward spending pressures in the category that captures "other" outlays, and indeed, reduced relative spending in these other

parts of the budget may in fact provide an offset to the upward effects of aging on spending in Social Security and health programs.

Examining both the history of budget components and their future projections provide key perspective for understanding how population aging affects the federal budget. Prior to the COVID-19 spike, total federal outlays were about 20 percent of GDP. The CBO projects spending to increase to 31.3 percent of GDP by 2050, an increase of more than 11 percentage points. Social Security and other aging-related health programs are together expected to account for 2.7 percentage points of this outlay growth. Thus, about one-fourth of the expected increase in federal spending relative to GDP will be directly attributable to population aging.

2.c. Components of Federal Revenues

Changes in government outlays relative to GDP is only the first part of an overall fiscal equation that also considers how revenues relative to GDP relate to population aging.

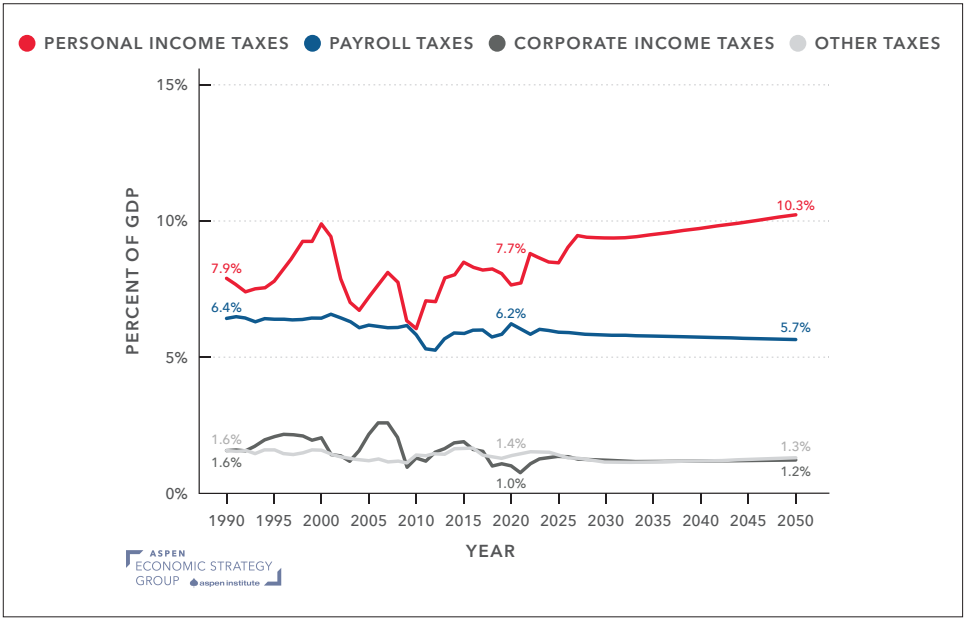
In general, the direct effects of population aging on revenues relative to GDP are more modest compared to the spending side of the ledger. Population aging exerts direct downward pressure on GDP itself as workers age out of the workforce, which forms the basis for tax collection. Though the government collects less in gross income taxes from an aging population, the relationship between revenues and GDP remains stable. Nevertheless, as spending increases relative to GDP, population aging expands the gap between revenues and spending.

Two key determinants of long-term growth demonstrate the effect of population aging on GDP: the size and productivity of the labor force. The CBO estimates that labor force growth contributed 1.4 percent annually to potential GDP growth between 1950 and 2020,[4] while labor productivity grew at 1.7 percent per year. Altogether, potential GDP grew 3.1 percent per year. But over the next decade, potential GDP growth is expected to slow to only 1.8 percent per year. Productivity growth is expected to decrease to 1.4 percent per year, lagging the annual rate of growth from 1950 to 2020 by .3 percent. More notably, labor force growth is expected to decrease to only 0.4 percent per year, nearly a full percentage point below the historic annual average. This decline can largely be attributed to the Baby Boomer generation exiting the workforce without adequate replacement by younger workers; population aging is slowing the growth of GDP, and its associated revenue streams, by 1 percent per year.

4 See Table 2-3 in CBO's economic outlook, https://www.cbo.gov/system/files/2021-02/56970-Outlook.pdf.

Figure 4 shows revenues disaggregated into four broad categories: personal income taxes, payroll taxes, corporate income taxes, and other taxes. Recall how Figure 2 shows that revenues have historically been much more stable relative to GDP than have outlays and are projected to remain that way. Figure 4 demonstrates how offsetting trends and cyclical variability in the various components explain this difference. Personal income taxes are the largest source of federal revenue, with payroll taxes a close second. Corporate income and other taxes (including excise, estate and gift, customs, and miscellaneous) each account for between 1 and 2 percent of GDP, with a downward trend.

Figure 4. Components of Federal Revenues as a Share of GDP



Source: Congressional Budget Office.

Note that Figure 4 does not demonstrate the most direct implication of population aging on revenues—slowing the growth of GDP via downward pressures on labor force growth and earnings—because each of the four revenue sources are measured relative to GDP. Rather, in its generally more stable revenue projections, Figure 4 reflects the direct connection between GDP growth and tax revenues, especially personal income taxes, payroll taxes, and corporate income taxes.

Payroll taxes provide a good example of how revenue streams should be unaffected by population aging and remain stable over time relative to GDP, but Figure 4 reflects how other factors lead to declining payroll tax revenues over time. Most

payroll taxes are designated for Social Security spending and are levied at a rate of 12.4 percent on earnings up to a taxable maximum that grows with average wages. Medicare payroll taxes are meanwhile levied at a rate of 2.9 percent on all earnings. If earnings as a share of GDP are stable, and the share of earnings below the taxable maximum is stable, payroll taxes will be constant relative to GDP. Moreover, payroll tax policy has not changed since 1990 except for a temporary cut in payroll taxes in response to the Great Recession, which shows up as a downward notch in the series. The downward trend in payroll taxes relative to GDP from 6.4 percent in 1990 to 5.7 percent by 2050 therefore reflects that earnings are forecasted to represent a declining share of GDP, while earnings inequality is forecasted to increase.

Income taxes are also fundamentally correlated with GDP, though again factors unrelated to population aging lead to changes in the relationship between the two. In 1990, personal income taxes represented 7.9 percent of GDP. The ratio surged to 10 percent by 2000, due in large part to the surge in asset values and incomes borne from rapid economic growth during the dot-com bubble. Asset values bear directly on personal incomes through capital gains realizations. But increases in GDP itself do not necessarily increase revenue from personal income taxes relative to GDP; the relationship between personal income taxes and GDP depends on where in the income distribution rises occur. During the 1990s, for example, revenues increased relative to GDP because rising income inequality led to more rapid growth at the top of the income distribution, where taxpayers face higher marginal tax rates. Rising incomes toward the bottom portions of the distribution, where marginal tax rates are lower, would decrease personal income taxes relative to GDP.

A series of tax policy changes between 1998 and 2017 led to much of the downward movement in personal income taxes relative to GDP, while variability during those two decades was largely due to business-cycle and asset-value effects. While tax policy to some extent impacted marginal tax rates throughout the income distribution, business and financial incomes saw more notable policy changes (Gale, Joshi, Pulliam, and Sabelhaus, 2022). Policies such as lower rates on long-term capital gains, the Qualified Dividend exclusion, and the Qualified Business Income deduction combined to dramatically decrease the already low effective tax rates on business and capital incomes.

The projected increase in personal income taxes relative to GDP shown in Figure 4 is expected to contribute positively to the country's long-run fiscal position. This increase is attributable mostly to two factors.[5] First, the 2017 tax cuts—like other tax policies enacted in the past two decades—were "paid for" by rescinding some

5 Tax preferences for retirement saving are an additional factor expected to increase future revenues, because Baby Boomers who enjoyed tax breaks when they made contributions will owe tax on the withdrawals under current law (Sabelhaus, 2000).

provisions toward the end of the 10-year budget window. Whether those cuts remain rescinded is a budgetary wild card. "Bracket creep" is the second driver of the projected increase: static income cutoffs for marginal tax rate brackets coupled with growth in real incomes over time pushes more taxpayers into higher tax brackets, which raises revenues relative to GDP. Finally, estate tax revenues should increase as a result of population aging, though recent policy changes have all but eliminated estate taxation.

Taken together, the history of federal spending (Figure 3) and federal revenues (Figure 4) relative to GDP shows that while population aging had the expected impact on federal outlays in the three decades between 1990 and 2020, recent deficits and debt reflect a failure to match increases in other (non-aging) spending with increased revenues. The accumulation of both aging and non-aging related federal debt is unlikely to be repaid by its current consumers, and thus has important distributional consequences, which I turn to next.

3. Fiscal Winners and Losers

Social Security and the major health programs such as Medicare have accounted for roughly half of all federal outlays in recent (non-pandemic) years and are expected to contribute to increased government spending in the coming decades. Because total spending over time must equal total revenues, fiscal imbalances today will be resolved by some combination of higher taxes or diminished benefits. The most important question facing policymakers is whose taxes to increase or whose benefits to cut. Answering those questions will require identifying the fiscal winners and losers across and within generations.

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3.a. Redistribution Defined

Redistribution—the process by which government takes economic resources from one group and gives those resources to another—is theoretically a simple concept. For example, each year the government redistributes resources from the current workforce (via payroll taxes) to current retirees (via benefits such as Social Security and Medicare Part A).[6]

6 The Social Security and Medicare Trust Funds add a subtlety because, for example, in years when benefits paid out exceed taxes, Trust Fund balances are drawn down, and those balances were paid for by taxes levied on workers in some earlier period.

Government insurance programs such as Social Security and Medicare insure recipients against above-average longevity and large, negative health shocks. Those within the insured group who experience the insured outcomes—living longer or suffering a health shock—will receive more in government benefits, but everyone in the group enjoys the insurance value of understanding that they are covered. A similar framework describes every group for whom we measure taxes paid and benefits received.

I argue that the method developed by CBO to measure redistribution in the Social Security program, which compares *average* lifetime costs and benefits among and across age cohorts and income quintiles, should be applied more broadly across tax and spending programs. Average outcomes are a necessary measure because lifetime taxes and benefits will vary enormously among a given sample of individuals, depending on actual mortality and health experiences. The average taxes and benefits for groups of similar individuals, however, both across and within generations, provides more information about a program's redistributive effects. While the measure does not capture the insurance value of the program, it does tell us how the program's costs and benefits are distributed across and within generations.

In the case of Social Security, a taxpayer's benefits received in retirement are dependent on the payroll taxes they incurred while working. When the sum of an individual's lifetime payroll taxes are equal to their lifetime Social Security benefits (after adjusting for the time value of money), then the program's main accomplishment is to shift resources within that taxpayer's lifetime; no redistribution has occurred to or from that taxpayer. As this paper will show, that is often the case. Although Social Security produces some net redistribution within 10-year birth cohorts from lifetime high-earners to lifetime low-earners, and some net across-cohort redistribution as a result of policy changes, most taxpayers who live to an average age receive in Social Security benefits close to what they paid into the system through payroll taxes. And everyone covered by the program enjoys the insurance value.

3.b. Estimated Redistribution in Social Security

The CBO regularly produces and publishes a lifetime redistribution framework for Social Security, which compares the average lifetime earnings, taxes paid, and benefits received across population cohorts (CBO, 2021c).[7] The data are available for the 10-year birth cohorts born between the 1940s and 2000s, for a total of seven

7 The modeling framework used to generate the long-term budget projections described in Section 2 has an integrated dynamic microsimulation that tracks and projects lifetime earnings, taxes paid, and benefits for a representative sample of the population. Those person-by-person lifecycle outcomes are then aggregated to measure and characterize redistribution across and within birth cohorts. See CBO (2021c) for a description of the modeling framework and details about how the statistics presented here are constructed from the individual life histories in the representative sample.

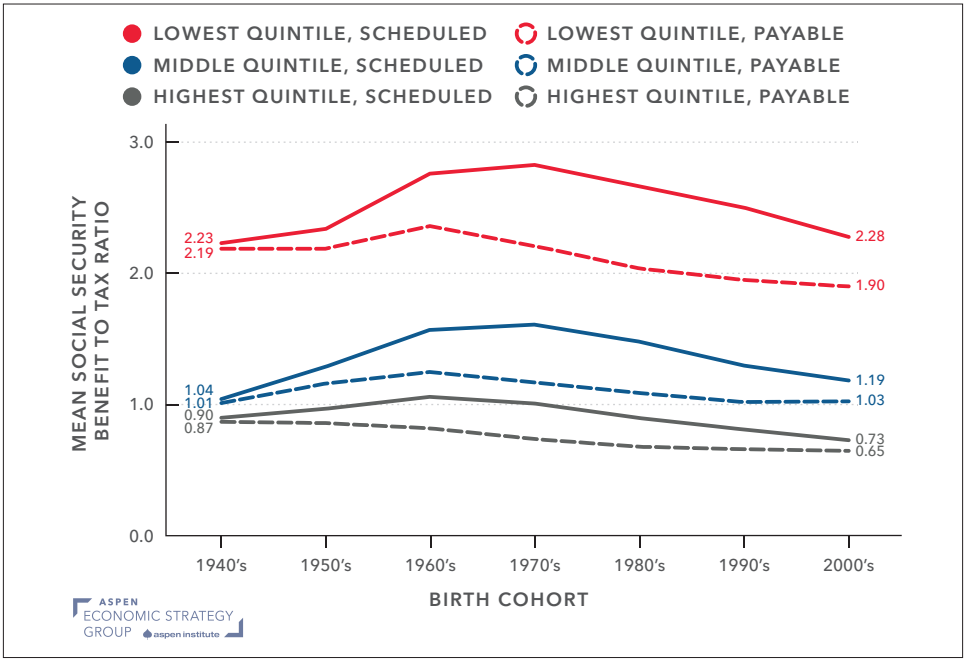
cohorts, and within each cohort by lifetime income quintile. The lifetime benefit and taxes measures allow for measuring within-cohort redistribution.[8] Because the two measures are capturing individual inflows and outflows on a conceptually equivalent basis, the ratio of lifetime benefits to lifetime taxes provides what Social Security analysts often refer to as a "money's worth" statistic. When the ratio of lifetime benefits received to lifetime taxes paid is exactly one, the individual can be said to have received back everything they paid in, with interest.

As demonstrated in Figure 5, lifetime benefit-to-tax ratios vary across and within birth cohorts, but for much of the population they are close to one, indicating little or no net redistribution. The solid (scheduled) lines indicate lifetime benefits and taxes are near to one another for the middle quintile by lifetime earnings in all birth cohorts. Lifetime benefits received exceed lifetime taxes paid by a factor of two or more for the lowest quintile of earners across birth cohorts; progressivity is built into the benefit formula and amplified by the higher incidence of disability benefits in that group. Meanwhile, the highest quintile of earners on average receives less than what they paid into the system, indicated by lifetime benefit-to-tax ratios below one. The differences between the lowest and highest lifetime earnings quintiles demonstrate net redistribution within birth cohorts, though that redistribution is likely more modest than many observers would have expected (Meyerson and Sabelhaus, 2006).

Why do lifetime benefit-to-tax ratios vary across birth cohorts after controlling for lifetime income quintile? Focusing again on just the solid (scheduled) lines in Figure 5, we see for example that the CBO benefit-to-tax ratios for the 1950s and 1960s cohorts are slightly higher than those for the 1940s cohort, the 1970s cohorts are slightly above those for all but the highest earners, and that the ratios decline for those born in the 1980s and later. Benefit-to-tax ratios vary across cohorts because of changes in demographics, economics, and policy. Life expectancy is generally increasing over time, which increases lifetime benefits. Rising earnings inequality meanwhile disadvantages those in lower earnings quintiles to a greater degree than had been the case in earlier decades, and Social Security's built-in progressivity counteracts this trend by increasing the benefit-to-tax ratio. The timing of average real wage growth over an individual's life also impacts on their ratio, since benefits are indexed for wages and prices. And finally, policy changes such as the two-step increase in the Full Retirement Age (FRA) changes benefits across birth cohorts.

8 Lifetime taxes is the sum of annual taxes paid by an individual, inflation- and time-adjusted forward to age 65. Similarly, lifetime benefits is the sum of annual benefits received by the individual, inflation- and time-adjusted back to age 65. The construction of lifetime taxes and benefits underscores the need for a representative sample approach, because it is important to capture the heterogeneity in realized earnings, demographics, disability, retirement, and lifespan.

Figure 5. Social Security Lifetime Benefit-to-Tax Ratios



Source: Congressional Budget Office.

Lifetime benefits and tax data for later birth cohorts, including the 2000s birth cohort who mostly consist of teenagers and college-age adults, are estimated by using historical data to inform future expectations. Fewer inferences—though still some—are needed to complete the lifetime data for the 1940s cohort, for example, who are currently of retirement age. Uncertainty about the random sample's lifetime outcomes corresponds one-to-one with uncertainty about the Social Security system's finances, since total benefits and taxes are summed across the representative sample in the model.[9]

Social Security's redistributive effects are uncertain not only because of shifting demographics and economics, but also because of the inherent uncertainty regarding future policy changes. The dashed (payable) benefit-to-tax ratios in Figure 5 represent this policy uncertainty: they show the average benefit-to-tax ratio for each birth cohort and lifetime income group if benefits are reduced proportionally

9 The connection between individual and macroeconomic outcomes in the CBO model also makes it possible to study uncertainty about Social Security outcomes under alternative polices in situations where demographic and macroeconomic inputs are unknown (Harris, Sabelhaus, and Simpson, 2005; Sabelhaus and Topoleski, 2007).

when the Social Security Trust Fund is exhausted in the mid-2030s, as the CBO projects. At that inflection point, current taxes will pay for only about 75 percent of Social Security benefits, and beneficiaries from that point forward will receive a proportional reduction. The gradual widening between the solid and dashed lines captures the growing certainty that younger birth cohorts will spend more of their retirement years in the post-exhaustion period.

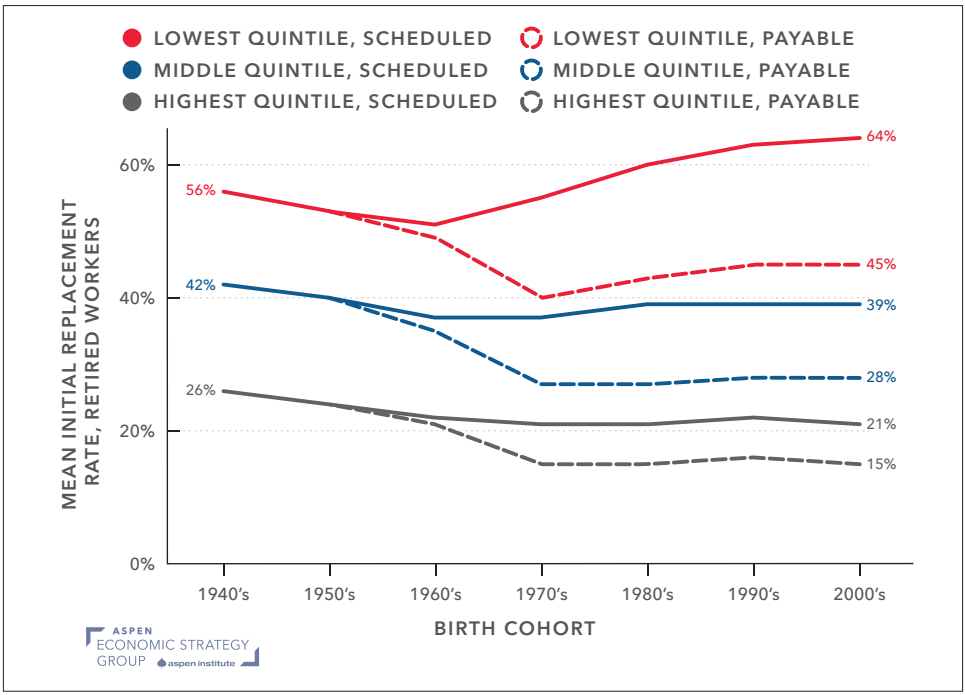
The lifetime benefit-to-tax ratios shown in Figure 5 provide support for the argument that Social Security is much less redistributive than most budget observers would expect. Even the top quintile of lifetime earners in all birth cohorts on average receive most of what they pay in taxes. Before discussing this result's policy implications, we first examine another set of findings from the CBO model that illustrates the importance of Social Security across and within cohorts.

The replacement rate estimates the share of an individual's earnings that are replaced after retirement by Social Security payments. The average initial replacement rate is measured by dividing initial benefits at age 65 by a measure of the individual's peak average earnings. As Figure 6 demonstrates, for instance, Social Security benefits replaced 56 percent of peak earnings for the lowest quintile of lifetime earners in the 1940s cohort, the middle quintile had 42 percent of earnings replaced, and the top quintile had 26 percent of earnings replaced.

While a 26 percent replacement rate may strike some readers as low, recall that the denominator used here is gross earnings measured at peak earnings age. Because top-quintile earners generally have steep earnings profiles, their average earnings over their lifetime relative to their earnings at peak age are lower than that for other groups. Meanwhile, top earners' net income at their peak earnings age is well below their gross income, since these earners are clustered in higher tax brackets and are more likely to prioritize saving. The same adjustments apply to the other income groups as well, but less dramatically. Thus, adjusting Figure 6 to reflect net rather than gross incomes would implicitly shift up the resulting replacement rates and equalize them across quintiles. The main takeaway from Figure 6 is that Social Security—although most important for lifetime low-earners—plays an important role in retirement income security across the entire lifetime income distribution.

Figure 6 shows that cutting benefits when the Social Security Trust Fund exhausts would dramatically lower replacement rates and thus change the nature of Social Security for future generations of retirees across the entire lifetime earnings distribution.

Figure 6. Social Security Benefit to Earnings Replacement Rates at Age 65



Source: Gale, Joshi, Pulliam, and Sabelhaus (2022).

Figure 5 meanwhile shows that the scheduled lifetime benefit-to-tax ratios for the birth cohorts now entering or approaching retirement (the 1950s, 1960s, and 1970s cohorts) are greater than the scheduled lifetime benefit-to-tax ratios for both the preceding birth cohorts and those that follow. If Social Security's twin goals are to replace income and to mitigate redistribution across generations, the appropriate policy response should shift more of the net burden of system solvency onto those high benefit-to-tax-ratio birth cohorts. Whether that change is reflected in lowering benefits or increasing taxes is a policy decision, and arguably one that the affected birth cohorts should be involved with resolving.

3.c. Measuring Redistribution in Major Health Programs

Because of its built-in individualized connection between taxes and benefits, Social Security provides a useful example of how to measure a policy's net redistributive effects, but the same approach, measuring lifetime costs against lifetime benefits, can and should be extended to other government programs, beginning with those that provide Americans healthcare.

Medicare is the primary aging-related health program, covering individuals 65 and older and the disabled beneficiary population. Other health programs like Medicaid have an aging-related component, through the provision of long-term care and other "dual" benefits for some elderly. Although major health programs have some similarities with Social Security, a key difference is that Social Security shifts resources across a taxpayer's lifetime based solely on age, while health programs shift resources based on other factors including health status. Most people contribute to these programs while young and healthy, and the unlucky few receive large returns on those contributions when they become very ill. In theory, constructing redistribution measures for these health programs, just like the lifetime benefit-to-tax ratios calculated for Social Security in Figures 5 and 6, should be feasible.

Medicare Part A, which is funded by payroll taxes, is a good candidate for measuring average taxes paid and benefits received across and within birth cohorts, to produce a measure of net redistribution. Unlike Social Security it imposes no taxable maximum. Those with higher taxable earnings therefore pay a higher share of Medicare Part A program costs than they do for Social Security. The remaining components of Medicare and Medicaid are funded out of general revenues, as are the other major federal health programs that CBO includes in this spending category, such as CHIP and the ACA marketplace exchange subsidies. Funding health programs through general revenues again suggests that higher lifetime earners within cohorts will pay a larger share of program costs, because income taxes are progressive.

Health program benefits are paid in the form of in-kind medical care, and therefore an individual's net lifetime benefits depend on both their need and willingness to seek medical treatment, and their longevity. These factors can interact in complicated ways with the income distribution. Low earners on average are in poorer health, but higher earners are generally more willing to seek medical attention, especially expensive treatments, because they can better afford program copays.[10] Higher earners also in general have longer life expectancies—an important factor for Social Security captured by the CBO dynamic microsimulation model—but longevity's impact on health spending is less obvious. Although end-of-life medical spending is disproportionately high relative to medical spending at other ages, it happens only once regardless whether a program recipient dies at 75 or 85.

Although specific empirical estimates of these health programs' redistributive effects within or across generations comparable to those for Social Security are not yet available, we can easily observe that the across-generation transfer is quite

10 For an excellent discussion of the type of simulation modeling required to construct such estimates, see Jones, De Nardi, French, McGee, and Kirschner (2018).

substantial. This conclusion is particularly certain in light of the "excess" cost growth factor that has recently caused health spending to grow disproportionately and that is expected to continue impacting health costs over the CBO's long-term budget window. Excess cost growth is calculated by subtracting the overall rate of economic growth from health spending per person, adjusted for fixed differences in health spending by age. That is, the recent trend in excess cost growth indicates that overall health spending has represented an increasing share of GDP *after controlling for age,* and that share is expected to continue increasing.

Advances in healthcare technology are at the heart of excess cost growth. Medical advances make more procedures possible, but also require more doctors and nurses to implement those procedures. Relative changes in prescription drug prices and doctors' salaries also likely contribute to excess health cost growth. These rapid changes in technology and how healthcare is priced sever the link between lifetime taxes paid and lifetime benefits received. No generation adequately prepays for the modernized healthcare they receive in retirement, nor is it clear how that prescience and foresight would even be feasible.

Health cost growth from technological advancements requires using different parameters for measuring cross-generation redistribution than those used for Social Security. Social Security benefits are direct cash payments, which makes them easy to quantify for the purposes of measuring transfer ratios, and the CBO's time-adjusting (that is, discounting) of future benefits is appropriately based on a risk-free interest rate. But healthcare benefits should be discounted at the risk-free rate of interest plus the assumed rate of excess health cost growth, since the technology pressuring costs upward is only available in the future. In that formulation, time-adjusted lifetime benefits would be lower and more in line with lifetime taxes paid, and the implied redistribution across generations would be significantly more modest.

3.d. Measuring Redistribution in Other Parts of the Budget

The unemployment insurance program —like Social Security and Medicare—is funded by taxes on the same workers who will eventually receive the program's benefits. Thus, UI could also be analyzed through a distributional framework that uses data from tax schedules and benefit distribution across and within generations, which are readily available.

Matching benefits and costs across and within generations is easier in programs that provide direct benefits, such as unemployment insurance. Other programs such as investments in infrastructure and technology provide tangible benefits to the general public, though some subgroups benefit more than others. While still

other programs, such as education and medical research, confer both individual and public benefits.

Measuring redistribution in programs that provide only public benefits is more challenging, because the benefits vary over time and across lifetime income groups. A key task for budget analysts is to identify who benefits most from these more generalized government programs. Benefits from programs such as infrastructure and technology development likely skew toward the wealthiest; these groups see their incomes increase disproportionately when productivity rises.

3.d.1. Intergenerational Redistribution in Tax Policy

Recent changes to capital income tax policy have created clear fiscal winners and losers: an ever-shrinking share of capital income is subject to the personal income tax, corporate tax rates have been reduced, and the estate tax has been all but eviscerated. These changes have shifted the burden of paying for government programs disproportionally onto the less wealthy or been deferred onto future generations.

The implications of these changes for population aging, and the prospects of a looming fiscal cliff, are first order. Gale, Joshi, Pulliam, and Sabelhaus (2022) show that effectively taxing all capital incomes could increase personal income tax revenues by more than 16 percent, or slightly better than 1 percent of GDP. Gale, Pulliam, Sabelhaus, and Sawhill (2020) show that simply reinstating the 1982 estate tax system adjusted for inflation would bring the total increase in revenues to over 2 percent of GDP. Recall from Section 2 that the entire increase in aging-related spending between 2020 and 2050 is expected to represent 2.7 percent of GDP.

Most discussion of how to address the impact of population aging on looming fiscal deficits is rightly focused on programs like Social Security and Medicare. However, disproportionate attention on these programs contributes to a false sense of fiscal crisis and unnecessarily narrows the set of tools available to work with. The solution is to broaden the discussion about fiscal winners and losers to taxing and spending policies more generally.

4. Policy Implications

Distributional analysis of government programs provides a useful framework for understanding the budgetary implications of population aging. The potential for net redistribution is limited in programs including Social Security and Medicare, where recipients generally bear their own costs through past taxation. Addressing aging-

related fiscal imbalances in those programs begins with devising better distributional measures that can help elucidate how changes in taxes and benefits will impact individuals across and within birth cohorts. A threshold question is to measure a program's overall net costs and benefits, which is key to understanding whether the program should exist and at what scale. Finally, the distributional perspective casts light on government programs' implications on equity, particularly as pertains to tax policy.

4.a. Measuring Redistribution

The CBO redistribution measures provide a tool for policymakers to frame Social Security proposals in ways that voters can understand. Does the current Social Security system cause too much or too little redistribution within age cohorts, or is the balance (as argued here) about right? Is the current generation of retirees receiving a larger net lifetime benefit than are future retirees? How will answers to these questions be affected by the tax or benefit changes that will likely be required to resolve expected Social Security shortfalls? Support for Social Security is widespread, in large part because of the program's limited potential for redistribution across and within generations. Changing the redistribution calculus could threaten that widespread support.

"CBO should be resourced to regularly measure the distributional impacts of other government programs, existing or proposed, beginning with healthcare programs."

CBO should be resourced to regularly measure the distributional impacts of other government programs, existing or proposed, beginning with healthcare programs. Public discourse over health spending is distorted by a disconnect between the taxes people perceive they are contributing into the programs relative to the benefits they are receiving. For example, the costs for employer-sponsored health plans are paid in part through deductions on federal income taxes. And people who do not require medical care are unlikely to calculate the insurance value they nevertheless receive—only the unlucky few receive substantial, tangible benefits. Despite these challenges, better measures of redistribution in health programs should become a primary focus of budget analysis.

Next, analysts should measure whether those groups benefitting from costly programs with high rates of return, such as infrastructure and technology investment, are paying a fair share of those programs' costs. These evaluations should be based on comprehensive measures of group incomes, and not on the biased income measures currently used in the personal, corporate, and estate tax systems. Our current tax

system allows a substantial fraction of non-wage income to escape taxation, fueling the justifiable impression that the wealthy are not paying a fair share. Developing more comprehensive income measures should therefore be another focal point for budget analysts.

4.b. Measuring the Net Benefits of Government Programs

Modern-day debates over population aging and the trajectory of government spending would be greatly improved not only by measuring redistribution but also by measuring existing and proposed programs' net benefits—that is, their rate of return. The field of public finance has long focused on measuring the net costs and benefits of government programs, and work in that area has recently accelerated.[11] When an existing or proposed government program has a demonstrably high rate of return, that is generally indicative of some form of market failure—otherwise private industry would have already moved to take advantage of the potential investment opportunity. How government chooses to fund the program in the absence of private investment becomes the key question.

Social Security is a prime example of why policymakers ought to consider overall net benefits when making program decisions related to population aging. Distributional analysis tells part of that story. Rising life expectancies for future retirees may for example justify reducing future benefits: future generations expected to live longer should perhaps begin receiving benefits at a later age to keep their lifetime taxes and benefits aligned. But if that generation is willing to increase their working-age taxes to keep their benefits unchanged, that option should not be dismissed either. A benefit reduction justified simply by what the government can continue to afford—especially benefit cuts that would greatly reduce middle-class benefits while establishing a minimum benefit—ignores the primary reason for Social Security's existence.

Social Security is not a welfare program; it is a government-run pension program that voters continually express a desire to maintain because it provides them with value they cannot obtain from private markets. Social Security is famously referred to as a "Ponzi scheme that works" because the program inflows can always be matched to program outflows by adjusting tax and benefit parameters. Population aging has shifted the balance between inflows and outflows, with Baby Boomers currently on track to receive more benefits than they put into the system, on average, and thus redistribute resources away from future generations. A declining worker-to-beneficiary ratio will require some beneficiaries to be taxed more or receive less, on average, across and within generations. But policymakers should heed that Social

11 One exciting ongoing development in this area is a concerted effort within public economics to standardize how we measure the costs and benefits of government programs. See www.policyimpacts.org/.

Security also confers an important insurance value that is unavailable without government intervention.

Other examples of positive net benefits from government intervention abound, and distributional analysis helps to quantify those benefits. Investment in early childhood education changes the lifetime income trajectory for program participants, and the overall benefits, which spring largely from increased lifetime incomes, exceed the program's costs. Distributional analysis shows that those higher lifetime earnings can also lead to higher tax revenues (depending on the tax system), which both pay for the program and match costs and benefits for the program participants over their lifetimes. Similar examples are found in government health programs, where lower-cost early intervention helps avoid more costly care down the road.

4.c. From "What We Can Afford" to Matching Costs and Benefits

Many politicians argue that the government can't afford to expand or even to continue some types of age-related social programs, and that further increasing government debt risks doing irreparable harm to long-term economic growth, diminishing our ability to afford even basic government programs in the future.

The redistributive approach provides an alternative to the macroeconomic affordability criteria. The criteria for whether a program is sustainable is whether that program improves welfare by correcting a market failure (such as by providing insurance value in the case of Social Security or health programs) or has a high return on investment (such as in technology or infrastructure investments). In both cases there are analogs back to the most basic building blocks of economic theory: households and businesses routinely make decisions about borrowing and investing, and the criteria they use—analyzing costs and benefits--are similar to those proposed here for evaluating government programs.

Household and businesses make decisions based on whether an option's benefits are expected to exceed its costs. When making such private decisions, individual actors rightly focus on their own costs and benefits, calculated over the entire period during which the decision will continue to bear consequences. These are present-value calculations that are comparable to the money's worth measures CBO produces for Social Security, and likewise comparable as this paper argues to the calculations that should be produced for government programs more generally. But even when an existing or proposed government program produces a positive net benefit as viewed through the lens of traditional public economics, an important follow-up question is whether the costs and benefits are matched across and within generations. Failure to match costs and benefits threatens political support for

desirable government interventions; leery of paying for programs from which they expect little or no value, voters are unlikely to support such programs.

Will our aging population push us over a fiscal cliff? The macroeconomic perspective tells us little. Analysts can project the extent to which spending on aging-related programs like Social Security and Medicare will contribute to overall increased government spending. But the same analysts can also measure those programs' lifetime costs and benefits and address the question of fiscal winners and losers across and within generations under any proposed set of policy parameters. By measuring redistribution, we can focus on more than merely the overall debt picture and begin to think about who is responsible for that debt, and how that debt should be repaid.

Avoiding exploding deficits and debt will almost certainly involve some changes to aging-related programs, but the size and nature of those changes will depend on our budget policies more broadly. Continuing to shrink the income tax base by eliminating taxes on capital income calls into question more than just fiscal fairness; it also increases the pressure to resolve expected budget shortfalls through changes to programs like Social Security and Medicare. If we ignore fiscal winners and losers in other parts of the budget, we risk undoing or foregoing otherwise desirable government policies.

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