How Much AI Growth Will It Take to Grow Us Out of Debt?

Productivity, Longevity, and the U.S. Fiscal Gap

AI-generated research note · Edited by Kurtis Hingl · Version of 17 November 2026

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Cite: Claude. 2026. "How Much AI Growth Will It Take to Grow Us Out of Debt? Productivity, Longevity, and the U.S. Fiscal Gap." Edited by Kurtis Hingl. https://kurtishingl.com/explainers/ai-fiscal/

Abstract

Optimists argue that artificial intelligence will raise growth enough to fix the federal budget. This paper asks how much faster growth would need to be and compares the answer with published forecasts. Scaling the sensitivity analyses of the Congressional Budget Office and the Social Security Trustees, it finds that holding federal debt near today's 100 percent of GDP for thirty years would require AI to add about 1.2 percentage points to annual productivity growth. Closing Social Security's 75-year shortfall would require about 2.3 points. Most forecasts lie between 0.1 and 1.0 points. Longevity pushes the other way. If AI-driven medicine made death rates fall 2 percent a year, twice the pace of the past century, Social Security would lose the full benefit of an extra point of growth. A simple model built on an expert survey puts the odds that AI growth alone stabilizes the debt at about one in five, and the odds that it rescues Social Security at about one in twenty.

1 Introduction

In a talk in early November 2026, Tyler Cowen predicted that AI would add about half a percentage point to annual growth in U.S. GDP per capita. That, he argued, would be enough for the government to pay Social Security without cutting benefits. Later in the same talk he suggested that AI-driven medicine could let people now 40 or younger live to 120. Henderson (2026) spotted the tension. Growth helps the budget, but longevity hurts it. A retiree who claims at 70 and lives to 110 or 120 collects benefits for 40 to 50 years instead of about 18.

The hope that growth will rescue the budget is not confined to economists' talks. "With 3% growth, we grow our way out of this," Treasury Secretary Scott Bessent said in September 2026. A month later, CBO Director Phillip Swagel offered the official rejoinder: "growth will help, but it's probably not plausible that growth alone will stabilize our fiscal trajectory" (Ma, 2026).

This paper asks how likely it is that AI-driven growth gets the United States out of its fiscal hole, once we allow for the possibility that the same technology lengthens lives. It builds no new macroeconomic model. Instead, it takes the official sensitivity analyses at face value, scales them up, and compares the growth they require with the growth that forecasters expect. The findings are threefold:

1. **The bar is high.** To keep federal debt from rising above today's level through the mid-2050s, AI would need to add about 1.2 points to annual productivity growth, sustained for three decades. To close Social Security's 75-year gap through growth alone would take about 2.3 points, which means real wages growing roughly 3.4 percent a year for 75 years. The past 20 years averaged about 0.9 percent.

2. **Forecasts fall short.** Nearly every central forecast, from Acemoglu (2025)'s 0.1 points to Aghion and Bunel (2024)'s 0.8 to 1.3, lies below the federal threshold, and every one lies below the Social Security threshold. Only the boom scenarios clear them.
3. **Longevity is a large offset.** Each extra 0.1 point of annual decline in death rates costs Social Security about as much as 0.08 points of extra growth adds. A decline of 2 percent a year erases a full point of growth.

Putting these together in a simple model whose inputs come from an expert survey, the odds that AI growth alone stabilizes the debt are about one in five. The odds that it closes Social Security's gap are about one in twenty.

Several 2026 studies reach related conclusions from different angles. Harris, Mehrotra, and Overcash (2026) find that a large, conventional productivity shock would cut the 2036 deficit from about 6 to about 2 percent of GDP. Here, they write, "the techno-optimists are validated." But their AI-specific scenarios keep only about half of that gain, or less. Some assume a smaller boom, and all add offsets: longer lives, a shift of income from labor to capital, or higher interest rates. The Yale Budget Lab (2026) finds that a large, persistent productivity boom would make the fiscal path "more sustainable" even after interest rates rise, while warning that falling labor supply would offset part of the gain. Riedl (2026) puts the savings at perhaps $600 billion a year within a decade, a little over one-eighth of the deficit she projects under current policies. CRFB (2026) calculates that stabilizing the debt would take 2.5 percent TFP growth for a decade, a pace never sustained in the postwar era. This paper differs in three ways. It puts growth and longevity on a single map. It looks beyond the 10-year window, to the horizon over which Social Security's wage-indexed benefits catch up with wages. And it turns the comparison into explicit odds.

2 The size of the problem

The fiscal problem has two parts: a deadline and a gap. The deadline is close. The Social Security retirement trust fund runs out in late 2032. From then on, the fund can pay only 78 percent of scheduled retirement benefits, a share that falls to 62 percent by 2100. Medicare's hospital insurance fund runs out in 2033, and the combined Social Security funds in 2034 (SSA Trustees, 2026; Medicare Trustees, 2026).

The gap is large. Under CBO's long-term projections, debt held by the public rises from 101 percent of GDP in 2026 to 175 percent in 2056, well past the 1946 record of 106 percent (Figure 1a). Over the same period, net interest climbs from 3.3 to 6.9 percent of GDP (CBO, 2026b). Keeping the debt at its 2026 level would require primary deficits that average about 2 percentage points of GDP smaller over thirty years (Swagel, 2026). Social Security alone faces a 75-year shortfall of 4.42 percent of taxable payroll, about 1.5 percent of GDP. That shortfall rose from 3.82 percent of payroll a year earlier. Spending on Social Security and Medicare together rises from 9.4 to 14.2 percent of GDP by 2100 (Figure 1b). Meanwhile, Social Security's dedicated income stays between 4.4 and 4.8 percent.

These projections are not knife-edge. The Social Security Trustees run 5,000 random simulations of the economy and population. In 97.5 percent of them the 75-year deficit is at least 1.86 percent of payroll, and in 97.5 percent the trust funds run dry by 2039 (SSA Trustees, 2026, Table VI.E1). Even the Trustees' low-cost scenario, in which every assumption breaks favorably at once, still runs out of money in 2048.

(a) Federal debt held by the public, % of GDP (b) Social Security and Medicare spending, % of GDP

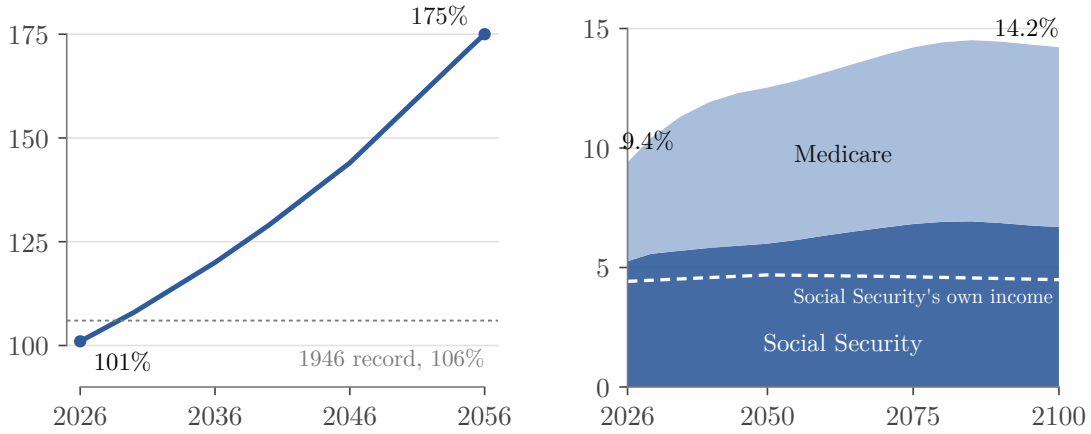


Figure 1: Federal debt and the two big entitlement programs under current law

Notes: Panel (a): debt held by the public, CBO extended baseline, February 2026 (CBO, 2026b). Panel (b): Social Security (OASDI) cost and total Medicare spending, intermediate assumptions of the 2026 Trustees Reports (SSA Trustees, 2026; Medicare Trustees, 2026). The dashed line is Social Security's dedicated income (payroll taxes and taxation of benefits).

3 How much growth would it take?

Faster growth helps the budget. But three features of U.S. fiscal law mean it helps less than intuition suggests.

Benefits follow wages. A worker's starting Social Security benefit is computed from lifetime earnings indexed to economy-wide wage growth. So when AI raises wages, it raises payroll-tax revenue at once, and it also raises the benefits that today's workers will collect later. The Trustees explain why growth still helps: "Higher wages increase taxable payroll immediately, but they increase benefit levels only gradually," and benefits after retirement rise only with prices (SSA Trustees, 2026). Still, the offset is large. The 2026 report raised projected real earnings growth for 2025–35 from 1.44 to 1.72 percent a year. Together with the report's other economic updates, that improved the 75-year balance by only 0.10 percent of payroll, and the combined funds' depletion date did not move. As Kent Smetters of the Penn Wharton Budget Model put it, a faster productivity boost "barely moves the balance because the initial benefits go up" (Pringle, 2026).

Interest rates rise with growth. In standard models, faster expected growth raises real interest rates (Chow, Halperin, and Mazlish, 2026). Furman (2026) reports a simulation in which markets expect the AI buildout to continue through 2031 and productivity growth to rise by half a point. The 10-year Treasury yield rises by about 75 basis points. With debt above 100 percent of GDP, this matters: CBO calculates that interest rates one point higher than projected would push 2056 debt from 175 to 222 percent of GDP (Swagel, 2026).

The tax system leans on labor income. If AI's gains flow mainly to profits, capital, or salaries above the payroll-tax cap, much of the growth never reaches Social Security. Growth in capital income raises only about half as much federal revenue as the same growth in labor income (CRFB, 2026). In the most dramatic scenario of Korinek et al. (2026), labor's share of income falls from 60 to 45 percent by 2030.

With these leaks in mind, the official sensitivity analyses give the thresholds.

Social Security. The Trustees report that each 0.1-point increase in long-run real wage growth improves the 75-year balance by about 0.19 percent of payroll. Extending that slope:

- Cowen's half point closes 22 percent of the gap.
- Henderson's full point closes 43 percent.
- Closing the whole gap takes about 2.3 extra points. Real wages would have to grow about 3.4 percent a year for 75 years, compared with the Trustees' 1.14 percent and roughly 0.9 percent over the past two decades (SSA Trustees, 2026, Table V.B1).

If only half of AI's gains reach taxable wages, the requirement doubles to 4.6 points.

Federal debt. CBO's most recent productivity sensitivity, from May 2025, found that total factor productivity (TFP) growth half a point faster than projected would leave debt at 113 percent of GDP in 2055, against a baseline of 156 percent (CBO, 2025). That scenario already lets interest rates rise somewhat. The 2026 baseline is worse, so scaling the same effect implies that holding debt near 101 percent through 2055 would take roughly 0.8 points of extra TFP growth. That is about 1.2 points of labor-productivity growth.[1]

The federal bar is lower than Social Security's for two reasons. It sets a modest goal: it stops debt from rising further from a record level, rather than paying every promised benefit for 75 years. And income-tax brackets are indexed to prices, not wages, so real growth pushes revenue up faster than GDP.

4 What forecasters expect

Figure 2 sets these thresholds against published estimates of AI's effect on growth. The forecasts fall into three groups:

- *Skeptical.* Acemoglu (2025) estimates a TFP gain of under 0.07 points a year over a decade. CBO builds 0.1 points into its baseline for 2026–36 (CBO, 2026a). Penn Wharton Budget Model (2025) projects a TFP boost that peaks at 0.2 points in 2032 and then fades.
- *Middle.* Estimates from the OECD (Filippucci, Gal, and Schief, 2024) and McKinsey (McKinsey Global Institute, 2023) run from 0.1 to 0.9 points, and a Dallas Fed illustration uses 0.3 (Wynne and Derr, 2025). Cowen's half point sits here too (Cowen, 2025).
- *Optimistic.* Aghion and Bunel (2024) put the boost at 0.8 to 1.3 points over a decade, and Goldman Sachs at just under 1.5 points in the decade after wide adoption (Briggs and Kodnani, 2023).

The best evidence on what experts actually believe comes from Karger et al. (2026), who surveyed economists, AI industry and policy professionals, superforecasters, and the general public. The median economist expects 2.5 percent annual GDP growth in the late 2040s. That is about 0.8 points above the 1.7 percent long-run baseline used by the Trustees and CBO.

Only the boom scenarios reach the thresholds. Economists in the Karger survey give 14 percent odds to "rapid" AI progress, in which AI surpasses humans at many cognitive and physical tasks by 2030. In that world, the median economist forecasts 3.5 percent growth in the late 2040s, or about 1.8 points of extra growth. That clears the federal line but not the Social Security line. Further out are Dario Amodei's suggestion that 10–20 percent growth "may be possible" (Amodei, 2026) and the "extreme" scenario of Korinek et al. (2026), in which growth reaches 15 percent by 2030.

Figure 2 also flatters the optimists in one respect. Most forecasts describe a decade-long boost, but the thresholds require the boost to last thirty to seventy-five years. A temporary acceleration raises the *level* of wages for good. Social Security, however, eventually pays a higher wage level back

[1] In growth accounting, labor productivity grows by roughly TFP growth divided by labor's share of income in production, about $1/(1-\frac{1}{3}) = 1.5$ times TFP, once capital accumulates to match. The scaling assumes the debt effect per point of TFP growth is the same in the 2026 baseline as in the 2025 one. Because the 2026 baseline starts with more debt, the true effect is probably a little larger. All calculations are reproduced in the replication code.

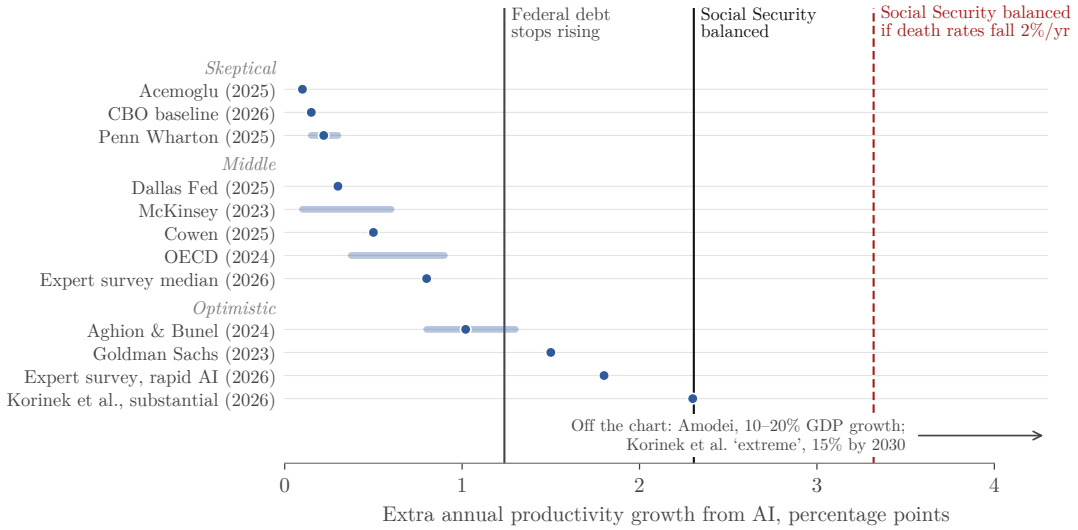


Figure 2: Growth needed versus growth forecast

Notes: Dots are point estimates and bars are published ranges, in percentage points of extra annual labor-productivity growth. TFP estimates are multiplied by 1.5. GDP-growth forecasts are measured against a 1.7 percent baseline. Horizons differ: most estimates cover about a decade, the expert survey (Karger et al., 2026) covers 2045–49, and Korinek et al. (2026) covers 2026–30. The vertical lines are this paper's thresholds (Section 3). The "rapid AI" row is the survey's conditional forecast, to which economists assign 14 percent probability.

out as higher benefits, so a one-time level gain does little for its 75-year balance. Early data are encouraging but not decisive. Nonfarm productivity grew 3.2 percent in 2024 and 2.3 percent in 2025, against 1.5 percent over 2007–19 (BLS, 2026). Productivity data are noisy, however, and it is too early to tell how much of the recent strength comes from AI.

5 The longevity offset

Henderson's point is that AI may lengthen lives as well as raise incomes. The Trustees assume death rates will fall 0.73 percent a year. Over the past century they fell about 1.0 percent a year. Each extra 0.1 point of annual decline worsens the 75-year balance by about 0.15 percent of payroll. Set against 0.19 percent of payroll per 0.1 point of growth, this gives a simple exchange rate: *a decline in death rates of about 2 percent a year cancels a full point of extra growth.* In more intuitive units, each extra year that a 65-year-old can expect to collect benefits costs about 0.27 percent of payroll, so one point of extra growth pays for roughly seven more years of retirement, and no more. Under a 2 percent decline, a 65-year-old in 2100 would expect to live to about 96 rather than the Trustees' 89, collecting benefits for about 31 years rather than 24.

Figure 3 puts both forces on one map. Moving right is faster wage growth; moving up is a longer expected life for a 65-year-old, which under current law means more years of benefits. Above and to the left of the black line, Social Security runs short. The map shows that growth-only optimism and health optimism pull in opposite directions:

- Cowen's and Henderson's growth figures on their own (+0.5 and +1.0 along the Trustees' line) leave most of the gap open.
- The "health" scenario of Harris, Mehrotra, and Overcash (2026), with death rates falling 3 percent a year, leaves Social Security *worse* off than with no AI at all.
- The scenario that comes closest to balance, Brookings' "traditional" shock, is the one that assumes AI does nothing for lifespans.

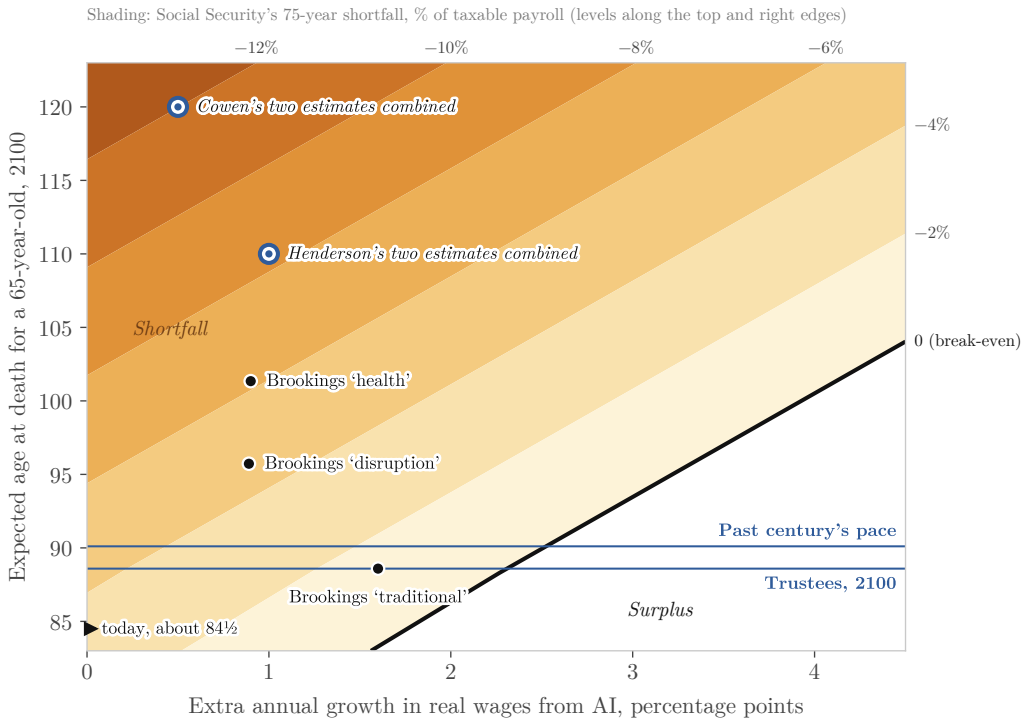


Figure 3: The race between growth and longevity: Social Security's 75-year balance under current law

Notes: Shading shows the 75-year OASDI actuarial balance implied by adding the Trustees' one-at-a-time sensitivities to real wage growth and to the rate of mortality decline (SSA Trustees, 2026, Tables VI.D4 and VI.D2). The vertical axis is the expected age at death of a 65-year-old in 2100 (65 plus period life expectancy at 65), which maps one-for-one to the rate of mortality decline across the Trustees' three scenarios (ages 86.0, 88.6, and 91.5 at 0.27, 0.73, and 1.24 percent a year). Under current law benefits are paid for life, so a longer life means more years of benefits. The Trustees tested growth up to 0.6 points above baseline and ages up to about 91.5; everything beyond is linear extrapolation, increasingly rough toward the top. The black line is break-even. The two blue lines mark the Trustees' longevity projection and the past century's pace of mortality decline; the small marker on the age axis is today. **Each ring combines one person's growth estimate with the same person's longevity speculation. That combination is this document's construction, not theirs: it shows what current law would cost if both came true, and it is not a policy proposal or an endorsement by anyone named.** Black dots are the scenarios of Harris, Mehrotra, and Overcash (2026), each of which specifies both growth and mortality; in their "disruption" scenario labor receives 30 rather than 54 percent of new income, so that point is plotted at the implied wage growth.

- Combining each person's growth estimate with that person's own longevity speculation (the rings) lands deep in shortfall. Neither Cowen nor Henderson proposes paying benefits for that long; Henderson's point is precisely that current law would have to change. Lifespans of 110 to 120 imply 45 to 55 years of benefits under current rules, which would need mortality to fall 4.5 to 6.3 percent a year, and the growth they discuss pays for only a few of those extra years.

How plausible are large longevity gains? The leaders of the AI labs are bullish. Dario Amodei expects AI to "compress" 50–100 years of biology into 5–10 and suggests lifespans could double to 150 (Amodei, 2024). Demis Hassabis calls the end of disease "within reach" in a decade or so (CBS News, 2025). Demographers are skeptical. Olshansky et al. (2024) find that life-expectancy gains in the longest-lived countries have been slowing since 1990. Curing a single disease does surprisingly little, because people spared one cause of death die of another: eliminating all cancer would raise life expectancy at 65 by about 2.2 years, and eliminating heart disease by about 3.2 (Arias, Heron, and Tejada-Vera, 2013). Radical life extension would require slowing aging itself, not curing diseases one at a time. The fiscal risk is correlated, though. The worlds in which AI is capable enough to

Table 1: Growth required and the odds that AI delivers it

Goal	Extra growth needed (pts/yr, sustained)	Odds AI delivers it	
Federal debt stops rising as a share of GDP, through the mid-2050s	1.2	21.9%	1 in 5
Social Security 75-year gap closed	2.3	4.7%	1 in 21
… if 65-year-olds live to about 96 (death rates fall 2% a year) in every scenario	3.3	2.9%	1 in 34
… if only half of AI's gains reach taxable wages	4.6	0.6%	1 in 181
Trust funds avoid depletion in 2032–34	—	near zero (not modeled)	

Notes: Thresholds from Sections 3 and 5, at the Trustees' longevity unless stated. Odds come from the model described in the text, with inputs drawn from the scenario probabilities and conditional forecasts of economists in Karger et al. (2026). Several inputs are judgments; the online version lets readers replace every one of them.

deliver 2 points of growth are the worlds in which it is most likely to transform biology.

Medicare is exposed differently. When longer lives are healthy lives, as they have been recently, they raise Social Security costs more than Medicare costs. Between 1992 and 2019, changes in elderly health and mortality raised expected lifetime Social Security spending by 14 percent but Medicare spending by only 6 percent (Einav and Finkelstein, 2026). Medicare's main risk is health-cost growth, and here AI could help directly. Under current law, payment updates for most non-physician providers are reduced by a ten-year average of economy-wide productivity growth, so an AI boom trims Medicare prices automatically, though with a lag. The catch, which the Medicare Trustees flag, is whether providers can sustain those cuts (Medicare Trustees, 2026).

6 How likely is it?

To turn the comparison into odds, the paper uses a deliberately simple model whose every input can be changed in the online version. It starts from the scenario probabilities in Karger et al. (2026): economists put 39 percent on slow AI progress, 47 percent on moderate progress, and 14 percent on rapid progress. Within scenario s, sustained extra productivity growth g is normally distributed with mean μ_s and standard deviation σ_s, and death rates fall at rate m_s. The odds of clearing a bar are

$$\Pr(\text{clear}) \;=\; \sum_s p_s \,\Pr(\,\lambda\, g \;\geq\; T(m_s) \mid s),$$

where $T(m)$ is the threshold from Sections 3 and 5, which rises with faster mortality decline, and $\lambda \leq 1$ is the share of growth that does fiscal work. The defaults are as follows:

- *Growth.* Rapid: $\mu = 1.8$, $\sigma = 2.3$, the survey's conditional median and its 10th–90th percentile range. Moderate: $\mu = 1.1$, $\sigma = 0.8$. Slow: $\mu = 0.3$, $\sigma = 0.4$. The means are the survey's conditional medians; the two smaller spreads are judgments. The three together average 0.9 points, just above the survey's unconditional median of 0.8.
- *Mortality decline.* 0.73, 0.9, and 1.5 percent a year in the slow, moderate, and rapid scenarios: the more capable the AI, the faster the medical progress.
- *Leaks.* For Social Security, λ is the share of gains reaching taxable wages (0.9). For the federal budget, income that bypasses wages still raises half as much revenue (CRFB, 2026), and 10 percent of the gain is lost to interest rates beyond those CBO already assumes.

Figure 4 shows the resulting prior and the two bars.

Under these defaults the odds that AI growth alone stops the debt from rising are about

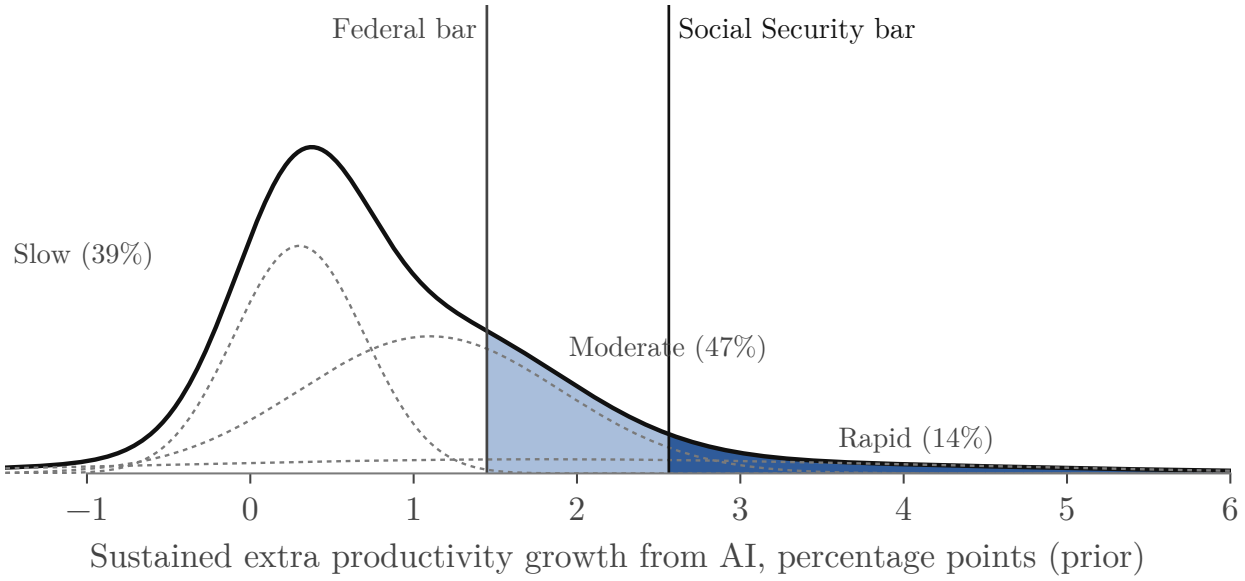


Figure 4: The prior behind the odds

Notes: The solid curve is the probability-weighted mix of the three scenario distributions (dashed). Vertical lines are the federal and Social Security bars at the Trustees' longevity, adjusted for the leaks described in the text. The odds in Table 1 also raise each bar with the faster mortality decline assumed in the moderate and rapid scenarios.

22 percent, or roughly one in five. The odds that it closes Social Security's gap are about 4.7 percent, roughly one in twenty. Both fall further if faster medical progress comes along with the growth, or if the gains bypass wages.

The last row deserves emphasis. The 2032–34 deadlines arrive before any plausible AI dividend could accumulate. In 97.5 percent of the Trustees' stochastic simulations, the combined funds run dry by 2039. Whatever AI does to growth, Congress faces a Social Security decision within six years.

7 Conclusion

AI is the best fiscal news the United States is likely to get. Even the mainstream forecasts would shrink the gap: half a point of extra growth closes about a fifth of Social Security's shortfall and about 40 percent of the federal one. But growing out of the problem requires a boom at the top end of expert expectations. It also requires that boom to last for decades, to pay off in wages rather than profits, and to leave interest rates and lifespans roughly where they were. Those conditions are unlikely to hold together. The boom that would deliver the growth is the same boom most likely to deliver the longevity.

The policy lesson follows from the asymmetry. Growth is uncertain and arrives late, while the deadlines are fixed and close. Three implications stand out:

- *Act on the near-term shortfalls now.* Treat any AI dividend as a bonus that reduces later adjustments.
- *Index benefits to longevity.* Because longevity is the channel through which AI's own success raises costs, the most valuable reform links benefits to it. That could mean tying the retirement age or benefit duration to life expectancy, as Denmark and Sweden do. Henderson's proposal of a fixed 20-year benefit window, to be drawn whenever the retiree chooses, does the same.
- *Broaden the tax base.* If AI shifts income from wages to capital, a tax base built on payroll will need to follow it.

Hope for the boom, but legislate for the median.

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