

U.S. Treasury Investors Are Long in AI*

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Abstract

The U.S. federal government's tax revenue is highly sensitive to long-run productivity growth but its mandatory spending commitments are not. As a result, U.S. Treasury investors have acquired a long position in AI. Using the CBO's 30-year budget projections, elasticities, and interest rate pass-through estimates, we find that 0.1 pps. of extra productivity growth raises the fundamental value of U.S. Treasuries by \$1.19 trillion (3.7% of the market value), implying a 63 basis point decline in nominal Treasury yields. A larger 0.5 pps. acceleration raises the fundamental value by \$5.7 trillion (17.8% of the market value).

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1 Introduction

There is a great deal of uncertainty about the effects of AI on future productivity growth. Recently, researchers have tried to infer these effects from the response of asset valuations (Chow et al., 2025; Andrews and Farboodi, 2025). Standard theory predicts that higher anticipated growth should raise real risk-free rates if investors have a limited willingness to substitute between consumption today and consumption in the future. Chow et al. (2025) point out that long-term real rates remain low, suggesting markets are not yet pricing in near-term transformative AI. Andrews and Farboodi (2025) document a significant decline in nominal rates around AI model releases, which they interpret as evidence that investors may have revised their growth estimates downwards.

These measurement approaches implicitly assume that the valuation of government debt has a zero beta with respect to AI-related productivity news. We find that U.S. government debt has a large positive productivity beta: its fundamental value seems highly sensitive to the long-run productivity growth outlook. In the absence of legislative changes to the tax code, government revenue is highly sensitive to productivity growth while its spending is not. When the economy grows faster, the government collects more tax revenue, because households creep into higher tax brackets, but its spending commitments barely change in the short run.

As a result, bondholders are long in a levered claim to GDP and short in a portfolio of inflation-indexed bonds. This means that bondholders benefit when growth surprises to the upside and suffer when growth disappoints. In other words, given the structure of the tax code and the current composition of federal spending, the federal government's cost of funding declines in response to higher than expected growth, but, conversely, the cost of funding rises in response to lower growth.

This spending inelasticity reflects a dramatic shift in the composition of federal spending over the past half century. In the decades after World War II, discretionary appropriations — defense, infrastructure, research, and the federal workforce — made up roughly half to two-thirds of federal outlays. Today, they account for about a quarter (26%), and under the CBO's projections they fall to roughly one-sixth (17%) by the mid-2050s. Mandatory programs — chiefly Social Security, Medicare, and Medicaid — have grown in mirror image, from under one-fifth of outlays in the late 1940s to about 60% today, and they keep rising as the population ages (Section 7).

We think of the recipients of these mandatory transfers as senior claimants on the Treasury. Their claims are large, growing, and — indexed

to demographics, medical costs, and consumer prices rather than to output — largely insensitive to productivity growth, and they are met ahead of the residual cash flow that accrues to bondholders. Bondholders, in effect, hold a junior, residual claim on the government’s primary surpluses: what remains of tax revenue after these senior transfer commitments and discretionary spending are honored. It is precisely this junior position behind a large, growth-inelastic senior tranche that makes bondholders long productivity growth. Faster growth increases tax revenue without really increasing the senior claims, expanding the residual that backs the debt.

The U.S. government has accumulated \$32 trillion in debt. Under the Congressional Budget Office’s baseline projections, the federal government will run primary deficits every year for the next three decades, and the debt-to-GDP ratio will rise from 100% today to 172% by 2055. Rather than asking what AI does to the equilibrium real rate, we ask what AI does to the valuation of all Treasuries. Even though the real rate rises one for one with growth in the baseline case, we find that nominal Treasury yields decline, as the debt is marked to market in response to positive news about long-run productivity growth.

When investors revise their estimate of productivity growth upwards, they may mark up their valuation of government debt, even if they anticipate higher real rates. Using the CBO’s 30-year budget projections, elasticities, and real interest rate pass-through estimates, we find that 0.1 pps. of permanent extra productivity growth raises the fundamental value of government debt by \$1.19 trillion (3.7% of the market value), implying a 63 basis point decline in nominal Treasury yields. A larger 0.5 pps. acceleration raises the fundamental value by \$5.7 trillion (17.8% of the market value), implying a 304 basis point decline. These declines could happen either through reduced inflation expectations, compressed term premia, or higher convenience yields on Treasuries in response to AI-related productivity news.

The U.S. Treasury issues mostly nominal IOUs. When there is news about higher future surpluses, the present value of the government’s future cash flows rises. This raises the fundamental value of Treasuries, which is reflected in lower yields. The yield decline can be decomposed into three channels: (i) lower expected inflation, (ii) lower term premia, and (iii) higher convenience yields.

[Gómez-Cram et al. \(2025a\)](#) show evidence of all these mechanisms operating in response to large fiscal shocks. To the extent that higher productivity growth reduces the probability of sovereign default, either through

explicit default or surprise inflation, Treasury yields should decline (Miller et al., 2025).

Gómez-Cram et al. (2025a) study high-frequency Treasury market reactions to CBO cost estimates of legislative proposals and find that a 1 percentage point surprise increase in the expected debt-to-GDP ratio raises the 10-year nominal yield by 31 basis points. Their decomposition attributes 39% of the yield response to expected inflation, 44% to nominal term premia, 17% to convenience yields, and insignificant effects to nominal short rates and credit risk. Applying these shares to our +0.1pp scenario, the 63bp yield decline would decompose into roughly 25bp from lower inflation expectations, 28bp from compressed term premia, and 11bp from higher convenience yields. The term premium channel reflects reduced interest rate risk (Gómez-Cram et al., 2025b). The convenience yield channel reflects the decreased supply of safe assets as the government runs down the debt/GDP ratio. In the 0.1pps extra growth scenario, the debt/GDP ratio in 2055 drops by 6 pps. from 172% to 166%.

2 Related Literature

This paper connects several strands of research.

AI, productivity growth, and interest rates. A growing literature studies how AI might reshape growth and asset markets. Aghion et al. (2019), Acemoglu (2025), and Nordhaus (2021) analyze the growth consequences of automation and AI, while Jones (2024) and Jones and Tonetti (2026) emphasize, respectively, the trade-off between growth and existential risk and the “weak links” that may restrain any growth explosion. A second group infers market beliefs about AI from asset prices: Chow et al. (2025) argue that low long-term real rates imply markets are not yet pricing near-term transformative AI, Andrews and Farboodi (2025) document declines in Treasury yields around major model releases, and Rachel (2025) quantifies how AI-driven capital demand could raise the natural rate r^* . These papers ask what AI does to growth and to the equilibrium real rate. We take that response as given and ask a different question: what happens to the market value of the entire stock of government debt, which has a large positive productivity beta even when real rates rise one-for-one with growth?

Government debt as a claim on primary surpluses. We value Treasuries as the present discounted value of future primary surpluses, following

Jiang et al. (2022), Jiang et al. (2024a), and Jiang et al. (2024b), who measure U.S. fiscal capacity and document a public-debt valuation puzzle. This builds on a long literature on debt sustainability and the government’s intertemporal budget constraint (Bohn, 1998; Hall and Sargent, 2011; Cochrane, 2023) and on the implications of persistently low interest rates for debt capacity (Blanchard, 2019; Mian et al., 2021). Our contribution is to trace how a specific, quantifiable shock — a permanent change in productivity growth — revalues this surplus claim through the sharply asymmetric response of tax revenue and mandatory spending. We find that the government’s cost of funding may decrease significantly when g increases, even if the real interest rate rises one-for-one with g .

Treasurys as safe assets and convenience yields. Part of the yield response we identify operates through the convenience yield on Treasurys, which moves inversely with the supply of government debt (Krishnamurthy and Vissing-Jorgensen, 2012; Greenwood et al., 2015; Jiang et al., 2021; Du et al., 2018). AI-driven growth runs down the debt-to-GDP ratio, shrinking the supply of safe government debt and raising its convenience yield — one channel through which nominal yields fall.

The fiscal theory, inflation, and default. The surplus-discounting valuation at the heart of our analysis is an application of the fiscal theory of the price level, under which the real value of nominal government debt is pinned down by the present value of real primary surpluses (Leeper, 1991; Sims, 1994; Woodford, 2001; Cochrane, 2023). In this framework, higher productivity growth raises the surpluses that back the debt and so lowers nominal yields by reducing the extent to which nominal debt must be devalued through surprise inflation; the same fiscal improvement lowers the probability of outright default (Miller et al., 2025; Hilscher et al., 2022). These channels complement the direct surplus-revaluation mechanism that is our focus.

Asset prices, macro news, and AI equity values. Our event study around AI model releases builds on the high-frequency tradition for identifying the asset-price effects of macroeconomic and policy news (Gürkaynak et al., 2005; Nakamura and Steinsson, 2018), and on Gómez-Cram et al. (2025a) and Gómez-Cram et al. (2025b), who study Treasury-market responses to CBO cost estimates and fiscal redistribution risk. The cross-sectional AI-equity evidence in Appendix A connects to work on the effect of genera-

tive AI on firm values and growth (Eisfeldt et al., 2023; Babina et al., 2024). Relative to this work, our contribution is to show that long-dated nominal Treasuries — assets with no direct claim on AI — nonetheless carry a large, positive exposure to AI-driven productivity growth through the structure of the federal budget.

3 Treasury Market Response to AI Model Releases

Before turning to the valuation framework, we document the Treasury market’s response to major AI model releases. Table 1 reports the average change in yields around the 17 AI model release dates identified by Andrews and Farboodi (2025), using a ± 3 trading day window.¹

Component	± 3 days (bp)	± 15 days (bp)
Nominal yield (10yr)	−6.6	−9.0
Breakeven inflation	−1.5	−2.4
ACM term premium	−3.0	−3.1
AAA credit spread	+0.8	+0.2

Table 1: Average change in Treasury yields around 17 major AI model releases (Andrews-Farboodi sample). The ACM term premium is from the New York Fed.

Figure 1 shows the average path of the 10-year nominal yield around the 17 AI model release dates, normalized to zero on the event day. Yields drift down in the days before the release, as news leaks, and remain depressed for roughly two weeks after. Nominal yields fall by 6.6 bps on average around AI model releases at the 3-day window, growing to 9.0 bps at 15 days. The decline is driven partly by a decline in inflation expectations, a decline in the term premium and a smaller increase in the convenience yield. These effects have the right sign. The reduced supply of safe assets increases convenience yields by 0.8 bps, while the increase in the PDV of surpluses lowers inflation expectations by 1.5 bps. Finally, the decline in the term premium by 3 bps reflects reduced interest rate risk.

¹Data from FRED: DGS10 (nominal yield), DFII10 (TIPS yield), T10YIE (breakeven inflation), DAAA (Moody’s AAA yield). The ACM term premium is from the New York Fed (FRED series THREEFYTP10). The expected rate is the nominal yield minus the term premium.

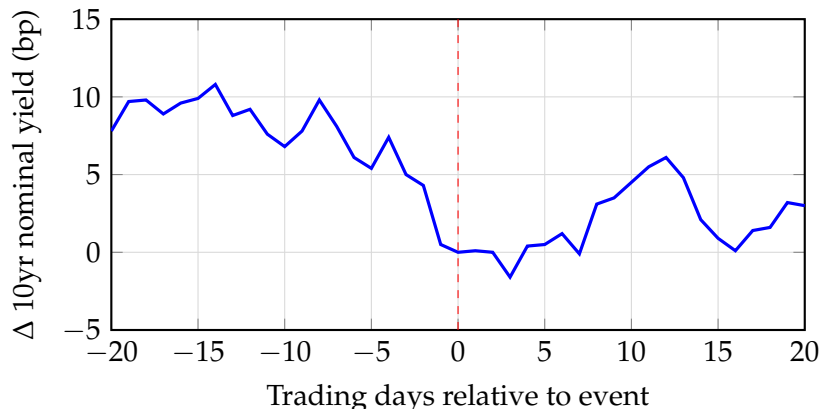


Figure 1: Average path of the 10-year nominal Treasury yield around 17 major AI model releases (Andrews-Farboodi sample). Yields are normalized to zero on the event day. The decline begins before the release (likely reflecting pre-announcement leaks or anticipation) and persists for roughly two weeks.

Appendix A extends this event study along the maturity curve, documents the response of AI-related equities to the same releases, and relates the cross-section of yield changes to technology-sector returns.

4 Valuation Framework for US Treasuries

Government bonds are backed by future primary surpluses — the difference between tax revenue and non-interest spending. Just as a pool of mortgage-backed securities is valued by discounting the underlying mortgage payments, government debt can be valued by discounting the stream of projected surpluses.² The government’s intertemporal budget constraint says:

$$D_0 = \sum_{t=1}^T \frac{S_t}{(1 + r_t)^t} + TV \quad (1)$$

where D_0 is the current market value of debt, S_t is the primary surplus in year t , r_t is the discount rate at horizon t , and TV is the terminal value — the present value of all surpluses beyond the projection horizon. The correct discount rate for the surplus claim is not the risk-free rate. Surpluses are

²This framework is developed in Jiang et al. (2022). See also Jiang et al. (2024b).

high when GDP is high and low when GDP is low, so the surplus stream has positive exposure to GDP risk. Following [Jiang et al. \(2024a\)](#) and [Jiang et al. \(2022\)](#), we discount surpluses at the Treasury yield curve plus a GDP risk premium that reflects this covariance.³

Using the CBO’s 30-year budget projections, the present discounted value of primary surpluses over 2026–2055 is deeply negative: $-\$12.5$ trillion.⁴ The CBO projects primary *deficits* — not surpluses — in every single year of this window. Federal revenue averages roughly 17.7% of GDP, while non-interest spending averages 19–21% of GDP and grows over time as Social Security and Medicare costs rise with an aging population.

Since the within-horizon cash flows are negative, the entire market value of the debt must be supported by the terminal value. Following [Jiang et al. \(2022\)](#), we calibrate TV so that equation (1) holds at the observed market price $D_0 = \$32.1$ trillion:

$$TV^* = D_0 - \sum_{t=1}^T \frac{S_t}{(1+r_t)^t} = 32.1 - (-12.5) = \$44.6 \text{ trillion} \quad (2)$$

This is the present value of post-horizon surpluses implied by current bond prices. We assume that investors anticipate a large fiscal correction and/or financial repression after 2055.

Under AI growth scenarios, we hold the *market-implied* post-2055 surplus-to-GDP ratio at its baseline level, so TV^* scales proportionally with the terminal GDP level. This market-implied surplus (12.4% of GDP) is far larger than the CBO’s projected primary deficit of -2.2% of GDP in 2055 — the gap reflects the market’s implicit bet on future fiscal adjustments.

We assume a unit elasticity of this long-run surplus to GDP — a conservative assumption, given that the revenue elasticity exceeds one while most spending categories have elasticities at or below one.

³The GDP risk premium compensates investors for bearing the risk that surpluses will be low precisely when the economy is weak and the marginal utility of wealth is high. [Jiang et al. \(2024a\)](#) derive the appropriate discount rate from a no-arbitrage framework and show that the market value of U.S. debt exceeds its fundamental value. [Jiang et al. \(2022\)](#) estimate the risk premium from the covariance of surplus growth with aggregate consumption growth. We use their estimates, which imply a risk premium of approximately 2.6 percentage points over Treasuries.

⁴We use the CBO’s 30-year baseline projections from the Long-Term Budget Outlook (Publication 62044, February 2026), which extends the 10-year baseline through 2056. Discount factors are constructed from the Treasury yield curve published in the US-CBO/discount-factors repository, augmented with the GDP risk premium.

4.1 Why Growth Matters

What happens to this calculation if productivity growth accelerates? The key insight is that revenue and spending respond very differently to GDP growth.

The CBO publishes “rules of thumb” that quantify these sensitivities.⁵ If productivity growth is 0.1 percentage points slower per year than projected, then over the 2026–2035 period:

- Revenue falls by \$572 billion.
- Mandatory spending falls by only \$43 billion.
- The cumulative deficit increases by \$388 billion.

For every dollar of revenue lost to slower growth, spending falls by just eight cents. We compute the implied elasticities as the ratio of the percentage change in cumulative nominal revenue (or spending) to the percentage change in cumulative nominal GDP over the CBO’s 10-year window. Under the -0.1 pp productivity scenario, cumulative nominal GDP over 2026–2035 falls by 0.79% (from \$373.2 trillion to \$370.2 trillion), while cumulative revenue falls by 0.85% (\$572 billion on a \$67.5 trillion base). The revenue elasticity is therefore $0.85/0.79 = 1.07$.

Revenue has an elasticity of 1.07 — modestly above one — because of the progressive tax code: when incomes rise, taxpayers are pushed into higher brackets, so revenue grows slightly faster than GDP. The CBO calls this “real bracket creep.”

For mandatory spending, the cumulative decline of \$43 billion on a \$55.4 trillion base represents a 0.08% change, giving an elasticity of $0.08/0.79 = 0.10$. Since Social Security accounts for nearly all of the mandatory response, the implied SS elasticity is approximately 0.25.⁶ The implied elasticities tell the story:

On the spending side, Social Security benefits are only partially linked to growth. The initial benefit formula (the Average Indexed Monthly Earnings) is wage-indexed, but once a retiree starts collecting, benefits are adjusted for inflation, not wages. Over the CBO’s 10-year window, most beneficiaries are already receiving CPI-indexed benefits, so the effective elasticity is only 0.25. Beyond that horizon, the beneficiary pool turns over: old

⁵Congressional Budget Office, “How Changes in Economic Conditions Might Affect the Federal Budget: 2025 to 2035,” Publication 61198, March 2025.

⁶Total SS spending over 2026–2035 is \$21.4 trillion. If all \$43 billion of the mandatory change is attributed to SS: $\epsilon_{SS} = (43/21,420)/(2,946/373,164) = 0.25$.

Component	Elasticity	Mechanism
Revenue	1.07	Progressive income tax (bracket creep)
Social Security	0.25–0.81	Initial benefits wage-indexed (AIME), existing benefits CPI-indexed (see text)
Medicare	0 → 1.0 (long run)	Per-beneficiary cost indexed to GDP/capita (Trustees); ≈ 0 within CBO 10-yr window
Medicaid	0.00	Countercyclical enrollment offsets cost growth
Discretionary	0.00	Set by appropriations

Table 2: Elasticity of federal budget components to GDP growth, implied by CBO rules of thumb (Publication 61198, March 2025).

cohorts whose benefits are locked at pre-shock wage levels die, and new cohorts claim benefits at the higher post-shock wage level. We model this turnover as an exponential process, $\varepsilon_{SS}(t) = 1 - e^{-t/D}$, where $D = 18.3$ years is calibrated to reproduce the CBO’s 10-year elasticity of 0.25.⁷

Medicare is the exception in the long run. Following the Medicare Trustees’ convention, per-beneficiary Medicare cost is indexed to GDP per capita (plus a slowly declining excess-cost wedge), so with the dependency ratio held fixed the Medicare-to-GDP share is invariant to the productivity perturbation — a unit income elasticity — once the adjustment is complete. We phase this in: the Medicare response is held near zero over the first decade, consistent with CBO’s productivity rule of thumb, which leaves the mandatory-health share essentially unchanged near term, and ramps linearly to unity by the end of the 30-year horizon.⁸

We keep Medicaid and other mandatory programs inelastic to productivity: Medicaid’s means-tested, countercyclical enrollment and its income-inverse federal match offset the per-enrollee technology growth that drives

⁷The calibrated D implies an average benefit duration of roughly 18 years, consistent with SSA data on average claiming age (≈ 64) and life expectancy for beneficiaries (≈ 84). By year 20, the elasticity reaches 0.66; by year 30, it reaches 0.81.

⁸2026 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds: long-run per-beneficiary cost is projected to grow with GDP per capita plus a declining excess-cost wedge, implying a unit income elasticity with the Medicare-to-GDP share roughly constant. Within CBO’s 10-year rule-of-thumb window our model matches CBO’s treatment (the mandatory-health response is ≈ 0 ; the \$43 billion mandatory figure above is essentially all Social Security), and the unit elasticity operates only beyond that window. Holding Medicare at a zero elasticity instead — letting its share *fall* below the Trustees’ baseline as the economy grows — would raise the headline +0.1pp gain from \$1.19 trillion to \$1.35 trillion.

the Medicare adjustment, leaving its net elasticity near zero, while the remaining categories are driven by demographics and medical-cost inflation.

Discretionary spending is set by annual appropriations and has no automatic link to GDP growth. The CBO’s rules of thumb assign it an elasticity of zero. Historically, discretionary spending as a share of GDP has *declined* from roughly 10% in the 1960s to 5% today, suggesting that the revealed-preference elasticity, if anything, is negative. To the extent that Congress chose to increase discretionary spending in response to AI-driven growth, the fiscal windfall would be smaller than our estimates.

This asymmetry is what makes bondholders implicitly long productivity growth. When GDP grows faster, the government collects more revenue but barely spends more. The difference flows straight to improved primary surpluses.

Figure 2 shows the projected paths of federal revenue and primary spending as a share of GDP under the CBO baseline and the two AI scenarios. Under the baseline, revenue rises slowly from 17.5% to 18.7% of GDP (due to bracket creep under current law) while spending rises from 20.1% to 20.9% — the deficit widens. Under the +0.5pp AI scenario, revenue rises to 18.9% by 2055 while spending *falls* from 20.1% to 19.5% as the economy outgrows its non-health obligations. The primary deficit narrows sharply — from 2.6% of GDP to about 0.6% — but does not close by 2055, because Medicare costs rise with GDP in the long run (Section 4.1).

5 AI Growth Scenarios and Treasury Valuations

We take the CBO’s baseline projections and ask: what happens to the fundamental value of government debt if AI raises productivity growth by 0.1 or 0.5 percentage points per year?⁹ The terminal value is calibrated to match the market price of debt in the baseline, as described in equation (2).

We use the CBO’s 30-year budget projections from the Long-Term Budget Outlook, apply the CBO-implied elasticities to compute alternative surplus paths, and roll forward the debt using the CBO’s baseline interest rate assumptions. In each AI scenario, we also allow the real interest rate to rise with productivity growth, using the pass-through implied by the CBO’s own rules-of-thumb workbook.¹⁰ For the terminal value we impose *com-*

⁹For context, the CBO’s baseline assumes long-run real GDP growth of 1.8% per year. An additional 0.5 percentage points would bring growth to 2.3%, modestly above the post-2000 average.

¹⁰Congressional Budget Office, “Workbook for How Changes in Economic Conditions

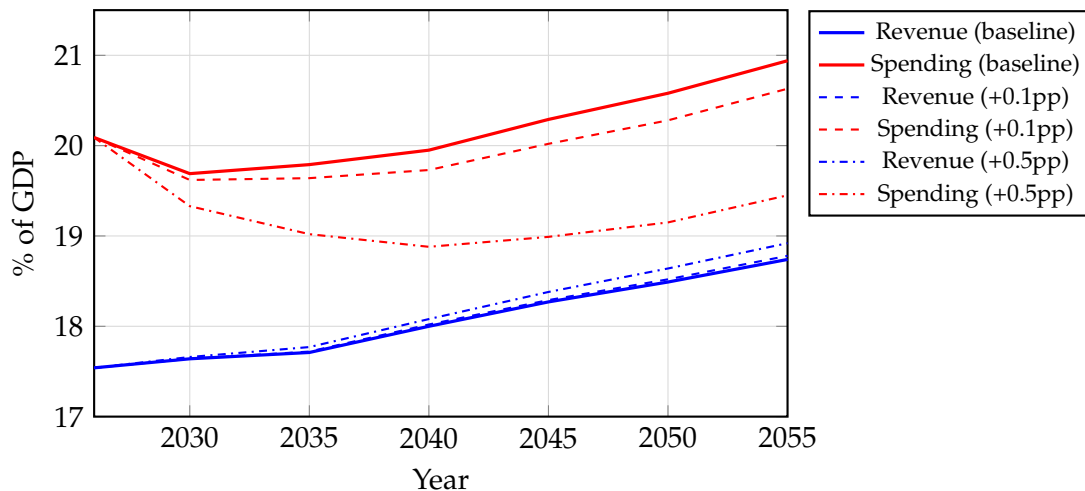


Figure 2: Projected federal revenue and primary spending as a share of GDP, 2026–2055. Under the CBO baseline, spending exceeds revenue throughout (persistent primary deficits). Under the +0.5pp AI scenario, the gap between spending and revenue narrows sharply but does not close by 2055, as Medicare costs rise with GDP in the long run. Revenue rises because of real bracket creep ($\epsilon = 1.07$); the spending share falls because most non-health categories are inelastic to growth.

plete long-run pass-through, $\Delta r = \Delta g$, so the Gordon growth denominator ($r - g$) is held fixed across scenarios; the terminal value then scales only with the level of GDP and the year-30 discount factor, as used in equation (2) and discussed in Section 4. This ensures that our discount rates are consistent with the CBO’s own view of how growth affects the equilibrium real rate.

Following Jiang et al. (2022), we calibrate the terminal value so that the CBO baseline reproduces the market price of debt. Under AI scenarios, the market-implied post-2055 surplus-to-GDP ratio is held fixed, and the terminal value is recapitalized at the scenario-specific long-run discount rate. Table 3 shows the results.

A 0.1 percentage point increase in productivity growth — well within

Might Affect the Federal Budget: 2025 to 2035,” Publication 61183, March 2025. When productivity growth is permanently 0.1 percentage points lower, the 10-year Treasury rate falls by 1.2 basis points in year 1, ramping to 10.9 basis points by year 10 — close to full pass-through ($\Delta r \approx \Delta g$) in the long run. We apply this partial, gradually ramping pass-through within the 30-year projection horizon.

Scenario	PDV(S) (\$T)	TV^* disc. (\$T)	Fundamental Value (\$T)	Δ Val (\$T)	Δ Val (% of D_0)
CBO Baseline	-12.5	44.6	32.1	—	—
AI +0.1pp	-11.3	44.6	33.3	+1.19	+3.7
AI +0.5pp	-6.7	44.5	37.8	+5.72	+17.8

Table 3: Fundamental value of U.S. government debt under AI growth scenarios. Following [Jiang et al. \(2022\)](#), the terminal value TV^* is calibrated so that the CBO baseline reproduces the market price of debt ($D_0 = \$32.1T$). Under AI scenarios, the market-implied post-2055 surplus-to-GDP ratio (12.4%, far above the CBO’s projected -2.2%) is held fixed, so TV^* scales with the terminal GDP level. Within-horizon discount rates incorporate the CBO’s implied pass-through from productivity growth to real interest rates. The terminal value is recapitalized using the scenario-specific year-30 discount factor and long-run rate, and all discount rates include a 2.6 percentage point GDP risk premium (following [Jiang et al. \(2022\)](#)).

the range of plausible near-term AI effects — raises the fundamental value of government debt by \$1.19 trillion, or 3.7% of the market value of outstanding debt. The gain comes entirely from the within-horizon surplus improvement: the PDV of surpluses improves from $-\$12.5$ trillion to $-\$11.3$ trillion as revenue growth outpaces spending. The terminal value is essentially unchanged at \$44.6 trillion: the higher GDP level raises the nominal terminal surplus, but the higher within-horizon discount rates reduce the present value by a nearly identical amount. Under the larger +0.5pp scenario, the fundamental value rises by \$5.7 trillion (+17.8% of D_0).

The decomposition of the +0.5 percentage point scenario reveals the mechanics. The \$5.7 trillion gain in fundamental value comes entirely from within-horizon surpluses:

- **Surplus improvement.** Revenue grows faster than spending, raising the PDV of within-horizon surpluses by about \$5.8 trillion (from $-\$12.5$ to $-\$6.7$ trillion). This combines the direct effect of higher surpluses with the partially offsetting effect of higher discount rates. The surplus improvement is moderated by the time-varying SS elasticity, which raises SS spending more in later years as the beneficiary pool turns over.
- **Terminal value unchanged.** The terminal value is essentially flat at

\$44.5 trillion. With $\Delta r = \Delta g$, the Gordon growth denominator ($r - g$) is unchanged, so the terminal value scales with the GDP level. But the higher GDP level is almost exactly offset by the higher within-horizon discount rates reducing the 30-year discount factor.

This partial offset has an important structural interpretation. Under the baseline, all of the fundamental value comes from the terminal claim — the bet that surpluses will materialize after 2055. The effective duration of the government’s cash flow stream is 36.8 years, well beyond the 30-year projection horizon. Since the terminal value is approximately invariant to permanent growth under $\Delta r = \Delta g$, all the action is in the within-horizon surpluses and reducing the reliance on the terminal claim. These estimates already incorporate the CBO’s view of how faster growth raises real interest rates.

Table 4 shows how much larger the gains would be without the real interest rate pass-through. Under fixed discount rates, the +0.1pp scenario delivers \$2.4 trillion instead of \$1.19 trillion, and the +0.5pp scenario delivers \$12.5 trillion instead of \$5.7 trillion. The difference is driven entirely by the terminal value: when rates stay low, the GDP-scaled post-horizon surpluses are capitalized at unchanged rates, so TV^* rises with the GDP level rather than falling.

Scenario	PDV(S) (\$T)	TV^* disc. (\$T)	Fundamental Value (\$T)	ΔVal (\$T)	ΔVal (% of D_0)
CBO Baseline	-12.5	44.6	32.1	—	—
AI +0.1pp	-11.4	45.9	34.5	+2.4	+7.4
AI +0.5pp	-7.0	51.6	44.6	+12.5	+38.9

Table 4: Fundamental value of U.S. government debt under AI growth scenarios with fixed discount rates (no CBO interest rate pass-through). The terminal value TV^* is calibrated as in Table 3, but discount rates do not rise with productivity. The gains are larger because the terminal value rises with GDP rather than falling.

5.1 Debt Dynamics

Figure 3 shows the projected debt-to-GDP ratio under each scenario. Under the CBO baseline, debt rises steadily from 99% of GDP in 2025 to 172% by 2055. With just 0.1 percentage points of extra productivity growth, the

2055 ratio falls to 166% — a 6 percentage point improvement. Under the larger +0.5pp scenario, debt-to-GDP slows to 141% by 2055, no longer on an explosive path.

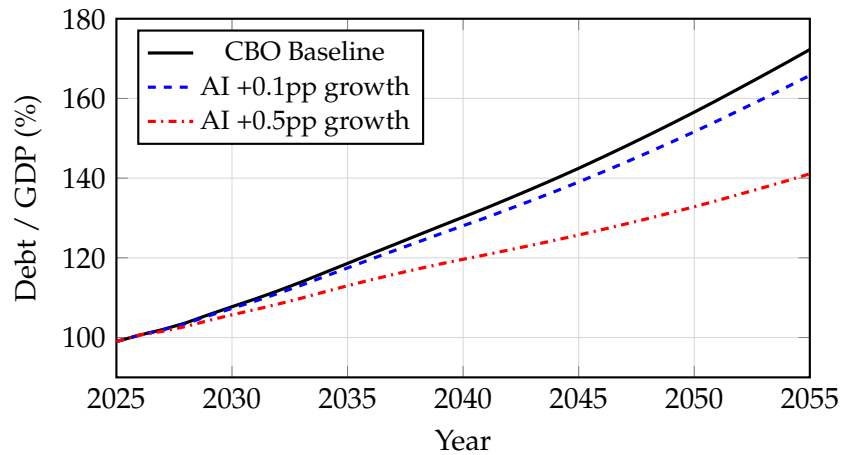


Figure 3: Projected debt-to-GDP ratio under CBO baseline and AI growth scenarios, 2025–2055, with CBO-implied increase in real interest rates. Under the +0.5pp scenario, debt-to-GDP slows to 141% by 2055.

Our debt-to-GDP projections are consistent with the CBO’s own sensitivity analysis. In its May 2025 report on alternative budget scenarios, the CBO projects that 0.5 percentage points of higher productivity growth would reduce the 2055 debt-to-GDP ratio from 156% to 113% — a 43 percentage point improvement.¹¹

5.2 Effect on Nominal Treasury Yields

To translate these value changes into yield terms, we use the weighted average duration of the outstanding Treasury portfolio (70.4 months, or 5.87 years, from the TBAC presentation of December 2025). Table 5 reports the approximate change in nominal yields implied by each panel.

Under the +0.1pp scenario, the improvement in fiscal fundamentals would justify a 63 basis point decline in Treasury yields. The +0.5pp scenario implies a larger 304bp decline. These are first-order approximations, but the magnitudes underscore how sensitive Treasury valuations are to

¹¹Congressional Budget Office, “The Long-Term Budget Outlook Under Alternative Scenarios for the Economy and the Budget,” Publication 61332, May 2025.

Scenario	$\Delta\text{Val} / D_0$ (%)	Implied Δy (bp)
AI +0.1pp	+3.7	−63
AI +0.5pp	+17.8	−304

Table 5: Implied change in nominal Treasury yields if AI growth is fully priced into bond valuations. $\Delta y = -(\Delta\text{Val}/D_0)/\text{Duration}$, where $D_0 = \$32.1\text{T}$ and $\text{Duration} = 5.87$ years (70.4 months, TBAC December 2025). A negative Δy means yields fall (prices rise). The approximation is linear.

the growth outlook. If the market became more confident that AI would deliver sustained productivity gains, the repricing of government debt could be substantial.

Our implied yield effects are substantially larger than what the CBO’s framework would produce. The CBO’s rules-of-thumb workbook models the effect of productivity on interest rates through an equilibrium channel: faster growth raises the real rate, and lower debt/GDP reduces rates through a crowding-out parameter (approximately 2bp per percentage point of debt/GDP). Under the CBO’s approach, a 0.5pp increase in productivity raises the 10-year rate by roughly 60bp directly, while the debt reduction of 35 percentage points of GDP offsets only about 70bp at their crowding-out parameter — leaving rates roughly unchanged or slightly higher. Our approach is fundamentally different: we value the *entire stock* of government debt as the present discounted value of projected surpluses, calibrate to the market price, and then ask how the market value changes when productivity growth shifts. The yield change we report is what is needed to reconcile the new fundamental value with the outstanding portfolio, using its duration. This forward-looking, mark-to-market approach captures the full 30-year surplus path and the terminal value, whereas the CBO’s 10-year cash-flow exercise misses the compounding effects that dominate at longer horizons.

Nominal yields would decline because investors expect inflation to be lower, as predicted by the fiscal theory of the price level. In addition, the supply of Treasurys would decline as well, which would put upward pressure on the convenience yields on Treasurys. Finally, the nominal term premium would likely compress as the government’s fiscal position improves, reducing the risk of higher inflation in bad states of the world.

What components of nominal yields would adjust? [Gómez-Cram et al. \(2025a\)](#) study high-frequency Treasury market reactions to CBO cost estimates of legislative proposals and find that a 1 percentage point surprise in-

crease in the expected debt-to-GDP ratio raises the 10-year nominal yield by 31 basis points. Their decomposition attributes 39% of the yield response to expected inflation, 44% to nominal term premia, 17% to convenience yields, and insignificant effects to nominal short rates and credit risk. Applying these shares to our +0.1pp scenario, the 63bp yield decline would decompose into roughly 25bp from lower inflation expectations, 28bp from compressed term premia, and 11bp from higher convenience yields. The inflation channel reflects the fiscal impact of productivity growth. The term premium channel reflects reduced uncertainty about the government’s ability to service its debt. The convenience yield channel reflects the decreased supply of safe assets as the government runs down the debt/GDP ratio.

Figure 4 shows the projection that incorporates the *decline* in nominal yields implied by the improved fiscal position. If the market immediately prices in the fiscal windfall from AI growth, Treasury yields fall (Table 5), reducing the government’s interest expense from 2026 onward. Under the +0.5pp scenario, this feedback loop brings debt-to-GDP down to 92% by 2055 — far below the 141% path that ignores the yield response.

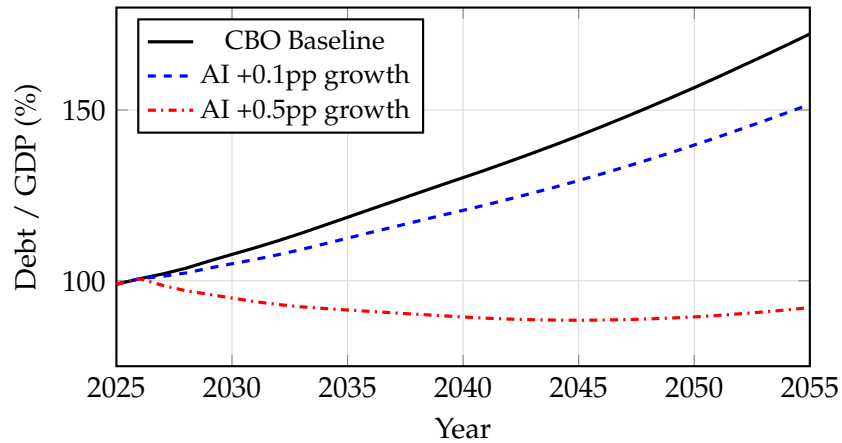


Figure 4: Projected debt-to-GDP ratio incorporating the immediate decline in nominal Treasury yields from improved fiscal fundamentals. The full yield decline (63bp for +0.1pp, 304bp for +0.5pp) is applied from 2026 onward. Lower yields reduce interest expense, creating a virtuous cycle that amplifies the fiscal benefit of growth. Compare with Figure 3, which holds yields at the CBO baseline.

5.3 The Jones-Tonetti Growth Path

Our baseline assumes that AI raises the growth rate immediately. Jones and Tonetti (2026) argue that complementarities among production tasks — “weak links” — prevent AI-driven automation from raising the growth rate quickly. In their calibrated model, the growth acceleration is gradual and back-loaded: output is only 4% above baseline by 2040 and 19% by 2060. What does the fiscal windfall look like under this growth path?

We approximate their calibration with a smooth GDP path that reaches +0.5% by 2030, +4% by 2040, and +15% by 2055 relative to the CBO baseline.¹² We calibrate the within-horizon CBO interest rate pass-through to the time-varying extra growth implied by that level path. In line with the permanent-growth calibration, the terminal value recapitalization includes the scenario-implied nominal growth rate in the Gordon denominator.

Scenario	PDV(S) (\$T)	TV^* disc. (\$T)	Fundamental Value (\$T)	ΔVal (\$T)	ΔVal (% of D_0)
CBO Baseline	-12.5	44.6	32.1	—	—
Permanent +0.1pp	-11.3	44.6	33.3	+1.19	+3.7
Permanent +0.5pp	-6.7	44.5	37.8	+5.72	+17.8
Jones-Tonetti	-8.3	42.2	33.8	+1.71	+5.3

Table 6: Fundamental value under the Jones-Tonetti growth path versus permanent growth scenarios. The Jones-Tonetti path raises GDP by 15% over 30 years, but the growth is back-loaded. Within-horizon discount rates incorporate the CBO interest rate pass-through calibrated to the time-varying extra growth rate at each year. For permanent scenarios, $\Delta r = \Delta g$ in the terminal value. For Jones-Tonetti, both r and g revert to baseline, so the terminal value scales with the GDP level.

The Jones-Tonetti scenario delivers a \$1.7 trillion gain in fundamental value (+5.3% of D_0), implying a 91 basis point decline in nominal Treasury yields. Although the GDP level by 2055 is 15% higher — similar to the permanent +0.5pp scenario — the gain is smaller than the permanent case (\$5.7 trillion) because the JT growth is back-loaded. The terminal value falls from \$44.6 to \$42.2 trillion: although both r and g revert to baseline (so the Gordon denominator is unchanged), the higher within-horizon discount rates reduce the 30-year discount factor by 18%, more than offsetting the

¹²We interpolate the Jones-Tonetti anchor points (4% by 2040, 19% by 2060) using a monotone cubic spline, and linearly interpolate to 2055.

15% GDP level gain.

The result highlights how much the timing of AI growth matters. The JT path is back-loaded, with most of the GDP gain arriving after 2040. Early surpluses barely improve, but the elevated within-horizon discount rates (which reflect the contemporaneous growth rate) still erode the present value of the terminal claim. The fiscal bet is not just on whether AI will raise productivity, but on *how soon*.

6 Robustness: Persistence of Growth and Interest Rate Pass-Through

The fiscal windfall depends critically on whether the AI-driven growth is permanent or temporary, and on the long-run pass-through from growth to real interest rates. Table 7 summarizes the results under three assumptions.

Assumption	AI +0.1pp		AI +0.5pp	
	ΔVal (\$T)	Δy (bp)	ΔVal (\$T)	Δy (bp)
Temporary (r, g revert)	+2.39	-127	+12.49	-663
Permanent, $\Delta r = \Delta g$	+1.19	-63	+5.72	-304
Permanent, CBO literal	+1.12	-59	+5.38	-286

Table 7: Sensitivity to the persistence of growth and the long-run interest rate pass-through. “Temporary” assumes growth lasts 30 years then reverts, so both r and g return to baseline after the projection window; within-horizon rates are held fixed. “Permanent, $\Delta r = \Delta g$ ” assumes the long-run real rate rises one-for-one with growth, leaving the Gordon denominator ($r - g$) unchanged. “Permanent, CBO literal” uses the CBO’s implied pass-through of 109bp per 1pp of growth, slightly above one-for-one, in both the within-horizon and terminal discount rates.

Temporary growth produces the largest windfall (\$12.5 trillion for +0.5pp) because the GDP level is permanently higher but the discount rate reverts. The two permanent assumptions give similar results: the CBO’s 109bp pass-through is only 9bp above one-for-one, which barely affects the terminal value. The key distinction is between temporary and permanent growth, not between alternative pass-through calibrations.

7 The Changing Composition of Federal Spending

The low elasticity of spending to growth is not a fixed feature of the U.S. budget; it has been built up over the post-war period through the gradual replacement of discretionary appropriations with formula-driven mandatory programs. Figure 5 plots the shares of total federal outlays going to discretionary spending, mandatory spending, and net interest from FY1945 through FY2056, splicing historical OMB data with the CBO’s February 2026 Long-Term Budget Outlook.

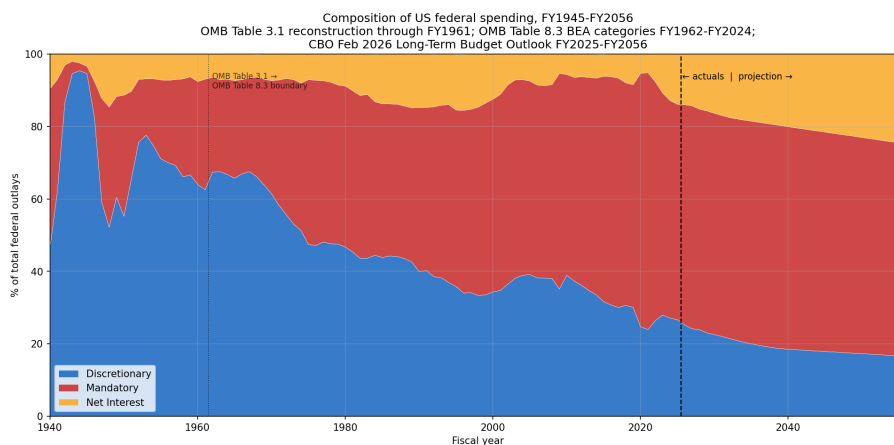


Figure 5: Composition of U.S. federal outlays, FY1945–FY2056. Shares of total spending going to discretionary appropriations (blue), mandatory programs (red), and net interest (yellow). Historical data: OMB Table 3.1 reconstruction through FY1961 and OMB Table 8.3 BEA categories FY1962–FY2024. Projections: CBO February 2026 Long-Term Budget Outlook (publication 62044) for FY2025–FY2056.

The shift is dramatic. In the immediate post-war years, discretionary appropriations — defense, infrastructure, scientific research, and the civilian federal workforce — accounted for roughly half of federal outlays, peaking near 80% as the wartime defense establishment was wound down. By the mid-1960s, before the creation of Medicare and Medicaid, discretionary spending still represented over two-thirds of outlays. By 2025, that share has collapsed to roughly 26%, and under the CBO baseline it falls further to about 17% by 2056. Mandatory programs — Social Security, Medicare, Medicaid, and other entitlements — have grown in mirror image, from under 20% of outlays in the late 1940s to roughly 60% today, and

they continue to expand as the population ages. Net interest, which sat near 7% of outlays in the late 1940s and again in the early 2000s, rises from about 13% today to nearly 25% by 2056 as the debt stock compounds.

This compositional shift is precisely what makes the spending-side elasticity to growth so low. The discretionary share that has been squeezed out is the part of the budget Congress sets each year through appropriations; historically, it has roughly tracked GDP, with an effective elasticity not far from one. The mandatory share that has replaced it is governed by statutory formulas indexed to demographics, medical-cost inflation, and the CPI — none of which respond meaningfully to productivity growth at horizons under a decade. Net interest is tied to the stock of debt and prevailing nominal yields, which are if anything *negatively* correlated with growth surprises in our framework. The composite spending elasticity of 0.10 from Table 2 is the weighted average of these very different sensitivities — and as the mandatory and interest shares continue to rise, the composite spending elasticity drifts further toward zero.

The implication for the bondholder long-AI position is that the asymmetry between revenue and spending sensitivities is structural and growing, and that it operates in both directions. Forty years ago, with discretionary spending at 40–50% of outlays, growth surprises in either sign would have been partially absorbed by Congressional adjustment of appropriations — larger defense and domestic programs in good times, sequester and shutdown in bad times. Today, with discretionary spending below 30% of outlays and falling, that adjustment margin has largely been exhausted. On the upside, almost any positive growth surprise flows directly to the primary surplus, because the mandatory and interest blocks barely move.

On the downside, the same compositional rigidity cuts the other way: when growth disappoints, revenue falls by roughly its full elasticity but Social Security checks still go out at their CPI-indexed levels, Medicare and Medicaid spending still tracks the demographic and medical-cost path, and interest payments continue to compound on the existing debt stock. Negative growth surprises therefore translate almost one-for-one into wider primary deficits and faster debt accumulation, with little near-term spending offset. Bondholders capture the upside of positive growth surprises through improved surpluses, while bearing the downside through accelerated debt issuance and a deteriorating fiscal trajectory. The long position in AI documented in this paper is in part a byproduct of seven decades of compositional drift that has removed the buffer in both directions.

8 Conclusion

Holders of \$32 trillion in U.S. Treasurys are implicitly making a bet on one of three outcomes. In the absence of a large fiscal correction or high unanticipated inflation, bondholders must be pricing in higher economic growth. Based on the composition of the federal government’s spending and the tax code, U.S. bondholders have a massive long position in AI.

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A The Event Study Across Maturities, AI Equities, and the Cross-Section

This appendix extends the event study of Section 3 along three dimensions: the maturity structure of the yield response, the response of AI-related equities to the same releases, and the cross-section linking the two.

The yield response is present across the maturity curve. Panel A of Table 8 reports the average change in nominal Treasury yields at the 1-, 5-, 10-, 20-, and 30-year maturities studied by [Andrews and Farboodi \(2025\)](#),

using their ± 5 and ± 15 trading-day windows. At the ± 15 -day window the decline exceeds 12 basis points at the short end (13.9bp at 1 year, 11.0bp at 5 years), consistent with the average decline of more than 12bp reported by [Andrews and Farboodi \(2025\)](#), and attenuates to 7.6bp at 30 years. Because long-maturity yields are far less volatile, [Andrews and Farboodi \(2025\)](#) find the longer-maturity declines statistically significant under a permutation test against placebo dates, even though their point estimates are smaller; the simple t -statistics we report in parentheses do not exploit that placebo benchmark and therefore understate significance at the long end.

While Treasuries are not directly exposed to AI, AI-related equities are, which lets us check whether the release dates carry genuine, priced AI news. Panel B reports the average cumulative total return around the same release dates on three AI-themed equity portfolios: the Global X Artificial Intelligence & Technology ETF (AIQ), the Global X Robotics & Artificial Intelligence ETF (BOTZ), and the iShares Semiconductor ETF (SOXX).¹³ AI equities rise sharply — by 4.6% to 6.6% over the ± 15 -day window — on exactly the dates Treasury yields fall, and the equity response is far more statistically significant (t -statistics of 2.5 to 3.4) than the yield response. This confirms that major model releases convey economically meaningful AI news and supports interpreting the yield declines as a response to revised AI growth expectations.

The cross-section of events reinforces this reading. Figure 6 plots, for each of the 17 releases, the change in the 10-year Treasury yield against the contemporaneous NASDAQ-100 return over the ± 15 -day window. The two move together tightly: a release that lifts the NASDAQ-100 by an additional percentage point is associated with a 5.1 basis point larger decline in the 10-year yield (correlation -0.64 , $R^2 = 0.40$, $t = -3.2$), and the same relation holds for the dedicated AI-equity portfolios (a slope of -4.9 bp per 1% for AIQ). Because the NASDAQ-100 and the AI ETFs are near-substitutes, controlling for the broad equity market absorbs most of this comovement, so we do not claim to isolate an AI-specific yield response from the broader tech rally. What the cross-section does establish is that the dates on which the AI/technology complex rallies most are precisely the dates on which Treasury yields fall most — the comovement one would expect if both respond to news about AI-driven growth.

¹³Total-return indices (including distributions) from LSEG Datastream; the Datastream return index matches CRSP total returns to within rounding over the period CRSP also covers.

	± 5 days	± 15 days
<i>Panel A: Nominal Treasury yield change by maturity (bp)</i>		
1-year	-6.7 (-1.6)	-13.9 (-1.9)
5-year	-5.6 (-1.1)	-11.0 (-1.0)
10-year	-4.9 (-1.1)	-9.0 (-0.9)
20-year	-4.2 (-1.1)	-9.2 (-1.0)
30-year	-3.6 (-0.9)	-7.6 (-0.8)
<i>Panel B: AI-equity cumulative total return (%)</i>		
AIQ (AI & Technology)	2.9 (3.6)	4.6 (3.4)
BOTZ (Robotics & AI)	2.1 (2.0)	4.6 (2.5)
SOXX (Semiconductors)	3.5 (3.1)	6.6 (2.9)

Table 8: Treasury yields and AI-equity returns around the 17 major AI model releases identified by [Andrews and Farboodi \(2025\)](#). Panel A reports the average change in nominal Treasury yields (basis points) by maturity; Panel B reports the average cumulative total return (percent) on AI-themed equity portfolios (LSEG Datastream). Simple t -statistics are in parentheses.

B Debt-to-GDP Paths

Figure 7 shows the projected debt-to-GDP ratio under the CBO baseline and each AI growth scenario. These paths are computed by rolling forward the debt stock using the CBO’s baseline interest rate assumptions plus the CBO-implied pass-through from productivity growth to real interest rates, and applying the CBO-implied elasticities to revenue and spending. Under the +0.5pp scenario, debt-to-GDP slows to 141% by 2055, compared to 172% under the CBO baseline. Even the modest +0.1pp scenario reduces the 2055 ratio to 166%.

C Revenue and Spending Decomposition

Figures 8 and 9 decompose the surplus improvement into its revenue and spending components, varying extra productivity growth from 0 to 1 percentage point.

Figure 8 holds discount rates fixed. Revenue rises steeply with growth ($\epsilon = 1.07$), while spending rises modestly as the SS elasticity ramps up over time. At +0.1pp, revenue rises by \$1.5 trillion while spending rises by only \$0.4 trillion. The vertical gap between the two lines is the improvement in

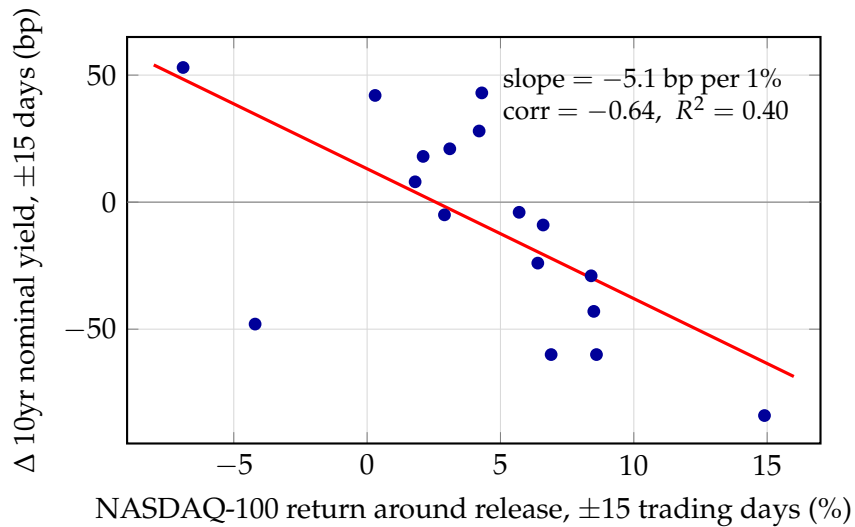


Figure 6: Change in the 10-year Treasury yield against the NASDAQ-100 return around the 17 major AI model releases identified by [Andrews and Farboodi \(2025\)](#), each measured over a ± 15 trading-day window. The red line is the OLS fit. Releases that lift the technology complex most coincide with the largest yield declines.

the present value of surpluses.

Figure 9 shows what happens when we allow discount rates to rise with productivity, using the CBO's implied pass-through. The picture changes dramatically. Revenue now barely rises — only \$1.3 trillion at +1pp — because the higher discount rates almost entirely offset the present value of the extra revenue. But spending now *falls* by \$9.9 trillion, because the same higher rates hit the spending stream hard (even though Social Security and Medicare spending rise in nominal terms as their elasticities ramp up, the discounting effect dominates). At +0.1pp, the surplus improvement is about \$1.2 trillion, almost all of it from the reduced present value of spending (+\$1.1 trillion); higher revenue contributes only about +\$0.1 trillion once the CBO pass-through is applied. The CBO pass-through thus shifts the source of the fiscal windfall almost entirely onto the discounting of the inelastic spending stream.

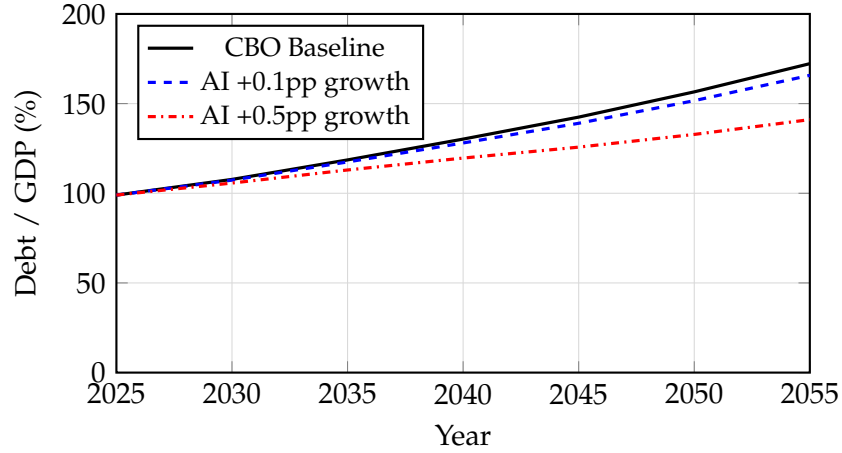


Figure 7: Projected debt-to-GDP ratio under CBO baseline and AI growth scenarios. The CBO baseline assumes 1.8% real GDP growth. AI scenarios add 0.1 and 0.5 percentage points to productivity growth, with revenue and spending responses computed using CBO-implied elasticities. Debt dynamics incorporate the CBO-implied increase in real interest rates with productivity growth.

D Structural Validation of the Social Security Elasticity

The exponential turnover model $\varepsilon_{SS}(t) = 1 - e^{-t/D}$ with $D = 18.3$ years is a reduced-form approximation calibrated to the CBO’s 10-year mandatory spending response. Table 9 compares this approximation to a structural model that uses SSA period life tables to compute the exact fraction of SS spending going to post-shock cohorts.

In the structural model, each year a new cohort claims benefits at the current (post-shock) wage level. Their benefits are then CPI-indexed. Old cohorts die according to SSA survival probabilities from age 65. The elasticity at year t is the spending-weighted fraction of benefits that reflect post-shock wages.

The structural model produces lower elasticities than the exponential approximation at all horizons. The 10-year average is 0.19, below the CBO-implied 0.25. The gap likely reflects non-SS mandatory spending components (such as means-tested transfers) that respond to growth faster than SS, or the fact that disability and survivor benefits — which are included in

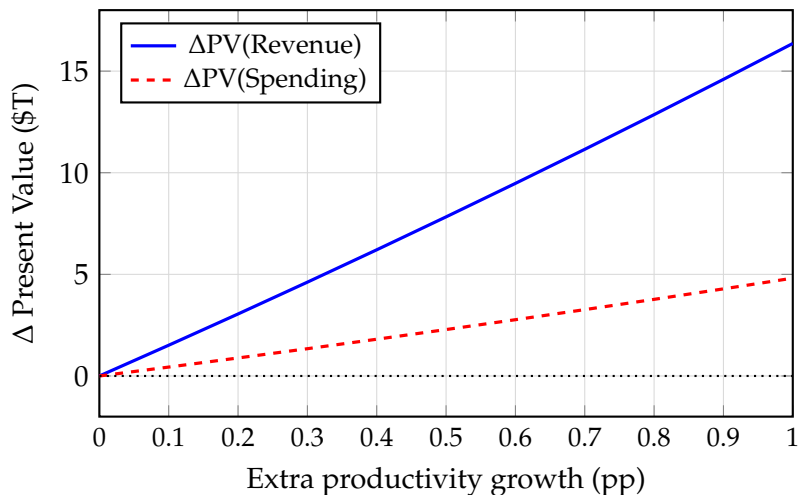


Figure 8: Change in the present value of federal revenue and primary spending as a function of extra productivity growth, holding discount rates fixed at the baseline level. Revenue rises steeply ($\varepsilon = 1.07$), while spending rises only modestly (Social Security and, in the long run, Medicare scale with growth, but most other categories are inelastic). The vertical gap between the two lines is the improvement in the present value of surpluses.

the CBO’s mandatory total — turn over more quickly than retired-worker benefits. Using the structural model instead of the exponential would make our estimates more conservative.

E Data Appendix

All data used in this paper are publicly available. The valuation, yield, robustness, persistence, debt-to-GDP, revenue/spending-share, and PV-decomposition exhibits are reproduced by `cbo_ai_growth_scenarios.py` together with the helper script `analysis.py`, which emits the figure coordinates. The main script automatically downloads the public CSV inputs listed below; the two CBO workbooks — the Long-Term Budget Outlook and the Rules-of-Thumb workbook — are not exposed at stable auto-download URLs and therefore ship with the replication package. The script reads the Long-Term Budget Outlook workbook at runtime; the CBO-implied interest-rate pass-through schedule is taken from the Rules-of-Thumb workbook and embedded directly in the script rather

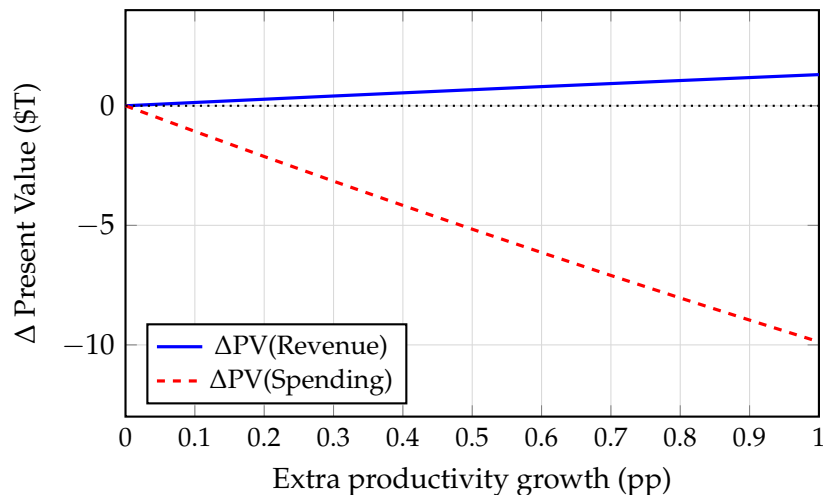


Figure 9: Change in the present value of federal revenue and primary spending as a function of extra productivity growth, incorporating the CBO-implied increase in real rates with productivity growth. Revenue rises modestly because higher discount rates partially offset the elasticity effect. Spending *falls* because inelastic spending is discounted at higher rates. Compare with Figure 8.

than read from the file. The event-study results in Appendix A are reproduced by `ai_event_study.py`, which pulls Treasury and breakeven series live from FRED and reads the AI-equity total-return series assembled from LSEG Datastream by `pull_ai_equity_wrds.py`. The federal spending-composition figure is an external image included with the package.

CBO Budget Projections

- 10-year baseline projections (February 2026).** Revenue, outlays (by category), net interest, and debt, 2026–2036.
 Source: [US-CBO/eval-projections](#) on GitHub.
 File: `input_data/baselines.csv`, filtered to `baseline_date=2026-02-01`.
 Publication: [The Budget and Economic Outlook: 2026 to 2036](#) (CBO Publication 61882).
- 30-year extended baseline projections (February 2026).** Revenue, Social Security, Medicare, Medicaid, other mandatory, discretionary, net

Year	Structural (SSA survival)	Exponential ($D = 18.3$)
1	0.06	0.05
5	0.18	0.24
10	0.31	0.42
15	0.43	0.56
20	0.53	0.66
25	0.61	0.74
30	0.67	0.81
Avg 1–10	0.19	0.25
Avg 1–30	0.41	0.52

Table 9: Social Security elasticity: structural model versus exponential approximation. The structural model uses SSA period survival probabilities from age 65 and assumes new claimants enter at a constant rate with benefits set at the current wage level. The exponential model $\varepsilon_{SS}(t) = 1 - e^{-t/D}$ is calibrated to match the CBO’s 10-year mandatory spending elasticity of 0.25. The structural model produces lower elasticities because the SSA survival curve is concave (mortality accelerates at older ages), implying slower effective turnover than the exponential. The average benefit duration in the structural model is 9.7 years.

interest, debt/GDP, and GDP, 2026–2056 (all as % of GDP).

Source: [The Long-Term Budget Outlook Data: 2026 to 2056](#) (CBO Publication 62044).

File: 51119-2026-02-25-LTB0-Budget (1) .xlsx, sheet “1. Summary Ext Baseline.”

CBO Economic Data

- **Historical GDP and economic indicators.** Nominal GDP, real GDP, inflation, interest rates, 1949–2035.

Source: [CBO Budget and Economic Data](#) page.

File: 55022-2025-01-Historical-Economic-Data.zip, extracted to Annual_FY_January2025.csv.

CBO Rules of Thumb

- **Budget sensitivity to economic conditions.** Elasticities of revenue and spending to productivity growth, labor force growth, interest

rates, and inflation.

Source: [How Changes in Economic Conditions Might Affect the Federal Budget: 2025 to 2035](#) (CBO Publication 61198, March 2025).

- **Interactive workbook.** User-adjustable scenarios showing the effect of productivity changes on interest rates, revenue, and outlays. Used to extract the CBO-implied pass-through from productivity growth to real interest rates.

Source: [Workbook for How Changes in Economic Conditions Might Affect the Federal Budget: 2025 to 2035](#) (CBO Publication 61183, March 2025).

File: `61183-Rules-of-Thumb-2025.xlsx`, sheet “5. Productivity_CBO.”

Medicare Trustees Report

- **Long-run Medicare cost growth.** Used to calibrate the long-run income elasticity of Medicare spending to productivity. The Trustees project per-beneficiary Medicare cost to grow with GDP per capita plus a slowly declining excess-cost wedge, which implies a unit elasticity (the Medicare-to-GDP share is invariant to the productivity perturbation in the long run); we phase this in over the 30-year horizon, holding it near zero within the CBO’s 10-year window (Section 4.1).

Source: [2026 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds](#) (Centers for Medicare & Medicaid Services, released June 9, 2026).

The elasticity assumption is embedded directly in `cbo_ai_growth_scenarios.py` (`medicare_elasticity`); no data file is read at runtime.

Treasury Yield Curve

- **Zero-coupon spot rates (2025Q1).** Used to construct discount factors at maturities 1–30 years.

Source: [US-CBO/discount-factors](#) on GitHub.

File: `data/treasury_yield_data.csv`, filtered to `yq=2025Q1`.

Rates interpolated to annual maturities using cubic spline.

GDP Risk Premium

- **Estimate: 2.6 percentage points.** Added to the Treasury yield curve to discount the surplus claim.
Source: [Jiang et al. \(2022\)](#), Table 4. The premium reflects the positive covariance of primary surpluses with GDP growth.

Treasury Portfolio Duration

- **Weighted average maturity: 70.4 months (December 2025).** Used to translate value changes into implied yield changes.
Source: Treasury Presentation to the Treasury Borrowing Advisory Committee (TBAC), Q4 2025.
Available at [Treasury TBAC page](#).

CBO Long-Term Sensitivity Analysis

- **Debt/GDP under alternative productivity assumptions.** CBO projects that ± 0.5 pp of productivity growth changes the 2055 debt/GDP ratio by ∓ 43 percentage points relative to the baseline of 156%.
Source: [The Long-Term Budget Outlook Under Alternative Scenarios for the Economy and the Budget](#) (CBO Publication 61332, May 2025).