

Provocative Thoughts about US Fiscal Policy: A Demand-Led Growth Perspective

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Abstract: This paper grounds an understanding of the social consequences of US federal fiscal policy in the theoretical perspective of demand-led growth. The main takeaway is that the primary social cost of high government debt is the regressive distributional effects of debt service and the private wealth created by issuing government bonds. The analysis identifies several myths and about government borrowing, including: (1) marginal increases in government spending are costs to the “taxpayer,” (2) higher government debt raises interest rates, (3) government borrowing imposes a burden on our children and grandchildren, (4) monetary policy must be independent of fiscal policy, (5) the US Social Security systems must be made solvent by a combination of tax increases and/or benefit cuts. I develop a strong case for assuring aggregate growth exceeds the average interest rate on government debt. While typical panic over the US fiscal trajectory is not justified, I propose a modest case for policies to reduce the regressive distributional effects of government debt. When demand leads growth, government spending should focus on achieving full employment and rising standards of living, not fiscal balance. Monetary policy should minimize regressive transfers by keeping interest rates low and reasonably stable.

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1. Introduction

There is much angst among economists, journalists, and policymakers about US federal government debt. Historically high fiscal deficits and a debt-GDP ratio that has hardly declined since it exploded during in the aftermath of the Great Recession and the Covid-19 pandemic lead commentators to prognoses ranging from unpleasant to catastrophic.

These concerns are nothing new. Claims of “unsustainable” US federal borrowing go back, at least, to the early 1980s Reagan years of tax cuts and military expansion. Positions of various critics swing a bit with the pendulum of political power, but the message is almost always that current fiscal profligacy will cause interest rates to skyrocket, crowd out the capital investment needed to propel growth, lead to enormous cuts in the social safety net, and impose unjust burdens on children and grandchildren.¹ A related claim arises whenever higher federal spending is proposed. Critics always emphasize federal initiatives, whether they be enhanced social programs or expanded military, as spending “taxpayers’ money.” Also, a wide consensus of mainstream economists warn against accelerating inflation should policy embody “fiscal dominance” to connect monetary policy and federal debt.

These predictions of severe crises as the result of unsustainable US public borrowing and debt go back almost half a century. As of this writing in 2026, none of the predicted outcomes grounded in mainstream, standard consensus macroeconomics, have come to pass. Real interest rates are lower than before the public debt-output ratio increased. Tax rates on today’s generation are lower than a generation ago, despite enormous growth of government debt.

In this paper I explore these issues through the lens of a Keynesian demand-led growth model. The results are provocative from a standard consensus perspective. An original calibration shows that the US can likely sustain its current fiscal path. Instead of competing for a scarce supply of saving, or “loanable funds,” government deficits create income and create saving and therefore put no upward pressure on interest rates. In the demand-led growth model, strong growth of autonomous demand supports sustained prosperity beyond the short run. Government spending is a critical source of autonomous demand and the engine of demand growth most driven by policy. Rather than reducing the burden of public debt on Americans’ children and grandchildren, fiscal austerity lowers the long-run path of output, reducing the economic welfare of future generations. Perhaps even more provocative, the analysis here shows that higher government spending today need not raise future taxes. Rather, a marginal increase in federal spending raises government debt. Past spending increases have not led to higher federal taxes, but the higher debt is still sustainable. Reasonable future policies that raise federal spending to improve social welfare, to address climate change, or even to expand national defense need not require higher future tax rates due to the effect of demand on long-run growth.

Section 2 of this paper briefly summarizes the history of US federal debt and federal interest payments that scare the critics of US fiscal policy. Section 3 contrasts the standard consensus understanding of the determinants of the long-run ratio of public debt to output with

¹ For example, the non-partisan Concord Coalition’s website home page (<https://www.concordcoalition.org>) begins with the title “Educating Citizens to Fight Unsustainable Debt.”

the results from a demand-led growth model. The primary difference is that in the mainstream model, the long-run path of output is, as a first approximation, independent of demand dynamics—supply leads demand—while in the demand-led growth model hysteresis effects cause demand to lead supply. In addition, there is no unique long-run equilibrium “natural” rate of interest in the demand-led growth model, a result with important consequences for understanding the connection between fiscal and monetary policy.

Section 4 presents the key fiscal policy implications derived from the demand-led growth model. US federal debt need not be on an explosive path. This section also questions the all-too-common claim that any increase in federal spending is a cost to the “taxpayers,” a claim that is questionable even in the standard model but refuted much more strongly when demand leads growth. The results from a demand-led growth analysis imply that, in the US context, the social cost of a high debt-output ratio is not crowding out or default risk. Instead, high debt generates high interest transfer payments and creates greater private wealth through an expanding supply of government bonds that magnify inequality. The reason to pursue policies to lower federal debt is distributional not to achieve conventionally defined fiscal balance. Policies to achieve this objective include higher taxes on households with low propensities to consume and a commitment to low long-run interest rates.

Section 5 provides a brief conclusion summarizing the contrast between the standard consensus analysis of government borrowing that cries for fiscal austerity and the demand-led growth perspective that recognizes the central role of government spending in enhancing social prosperity.

2. The “Scare Data”

Since World War 2, the US debt-output ratio has followed a U-shaped path, as shown in figure 1a. The massive debt incurred to finance the war fell relative to output for the postwar quarter century. But tax cuts and spending acceleration in the early 1980s caused public debt to rise faster than output for almost the next 40 years, with a brief retrenchment during the high-growth years of the late 1990s. The ratio of federal deficits to output in figure 1b is volatile following the business cycle, but the long-run trend for the past half century is toward greater deficits. Figure 1c presents what may well be the scariest data to mainstream commentators in the era of higher interest rates following the inflation induced by the Covid-19 and energy price shocks from the Ukraine war and Donald Trump’s second-term policies. Federal interest payments have skyrocketed relative to GDP after 20 years of stability at a low level. Note, however, that the US weathered another period of similarly high interest payments from 1980 to 2000 without catastrophic consequences.

To most journalists and political leaders who see these data, it seems obvious that US fiscal policy is unsustainable. Economists have a somewhat more nuanced view, but the standard consensus still argues these fiscal trends will create macroeconomic damage. A topic we now explore.

Figure 1a -- Unsustainable Explosion in the US Debt-GDP Ratio?

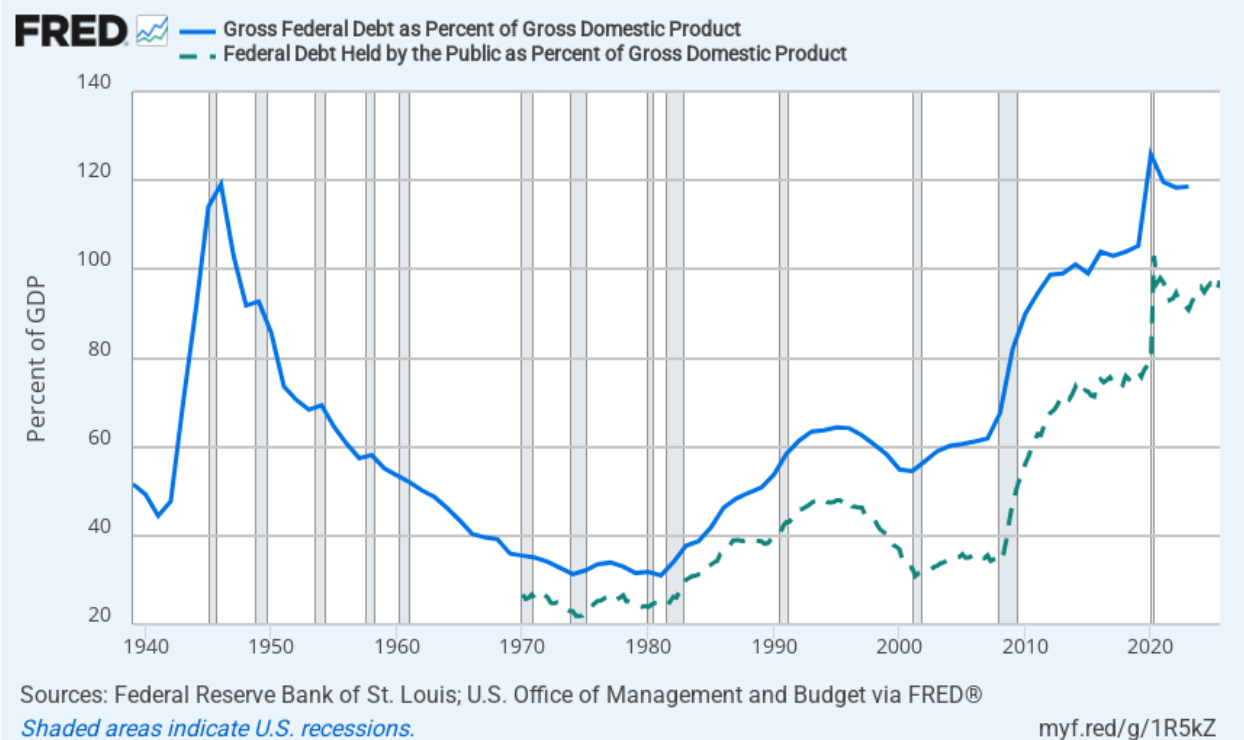


Figure 1b – A Half Century Long-Run Trend of Greater Government Deficits

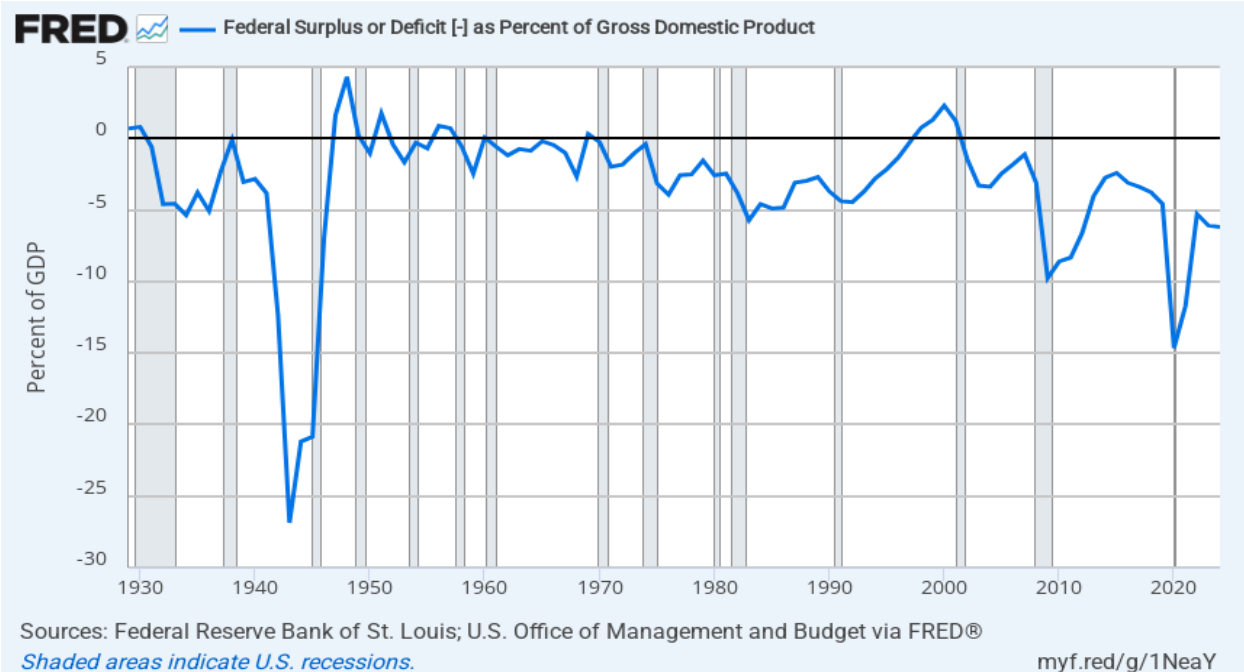
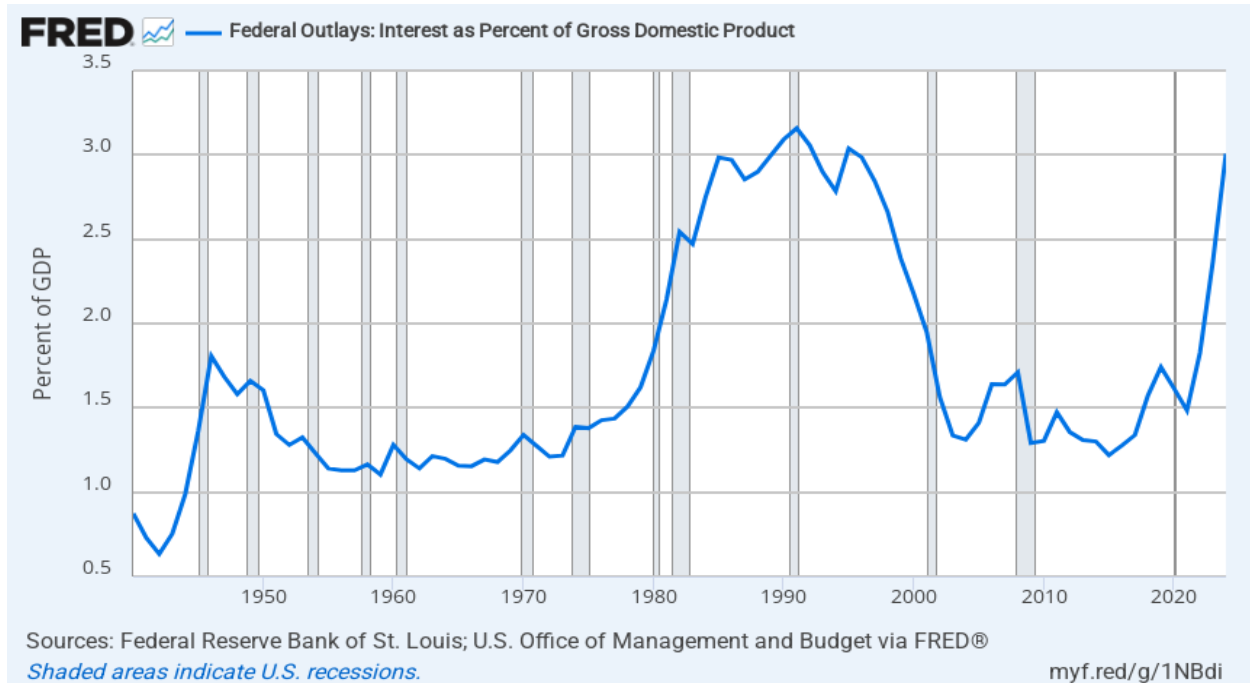


Figure 1c – Explosion in Federal Interest Payments



3. Macroeconomics of Fiscal Policy: Conflicting Theoretical Frameworks

Debates about the macroeconomic effects of federal government borrowing arise from different theoretical perspectives about what determines the long-run path of economic output. Fiscal policy affects both aggregate supply and aggregate demand. Understanding how the supply and demand sides interact is therefore critical to analyzing the role fiscal policy plays in economic growth.

The well-known standard consensus model asserts the supply side rules the long run; aggregate demand converges to this supply-driven output path. By contrast the demand-led growth model proposes supply and demand dynamics have independent long-run effects on the path of output. In particular, demand matters beyond the short run and, within limits, supply accommodates both positive and negative changes to long-run demand growth. This section reviews these conflicting frameworks. But first consider some simple dynamic accounting that provides a foundation for analysis using either model.

3.1 Algebra of the Debt-Output Ratio

Two basic identities (equations 1 and 2 below) anchor the analysis from the perspective of any macroeconomic theory.

Define the following variables:

D_t : Federal government debt at time t

G_t : Federal government spending on goods, services, and transfers (net of interest)

T_t^Y : Federal income taxes (excluding tax on federal interest income)

T_t^r : Federal tax on federal interest income
 Y_t : GDP
 d_t : Ratio of federal government debt to GDP at time t
 d^* : Long-run (steady-state) ratio of federal debt to GDP
 r : Average interest rate on federal debt
 g : Annual GDP growth rate
 τ_Y : Average tax rate on income (excluding federal interest income)
 τ_r : Average tax rate on federal interest income
 γ : Non-interest government spending as share of GDP

The basic law-of-motion identity for government debt, which also serves as the government budget constraint is

$$D_{t+1} = (1 + r)D_t + G_t - T_t^Y - T_t^r \quad (1)$$

To derive the law of motion for the debt-output ratio, divide by current output and simplify

$$\frac{D_{t+1}}{Y_t} = \frac{(1 + r)D_t + G_t - T_t^Y - T_t^r}{Y_t}$$

$$(1 + g)d_{t+1} = (1 + r)d_t + \gamma - \tau_Y - \tau_r r d_t$$

Solve for steady state d^* by setting $d_{t+1} = d_t$

$$(1 + g)d^* = (1 + r)d^* + \gamma - \tau_Y - \tau_r r d^*$$

$$d^* = \frac{\gamma - \tau_Y}{g - (1 - \tau_r)r} \quad (2)$$

While many discussions of d^* refer to the denominator of equation 2 as the difference between the real growth rate of GDP and a real interest rate, it is best to use nominal measures for two reasons. First, tax revenues created by nominal interest payments introduce an inflation non-neutrality. Second, inflation in GDP growth may not translate one-for-one to the average interest rate on government debt.

If the denominator of equation 2 is positive, the debt-output ratio is ultimately sustainable. Convergence may be very slow, but equation 2 provides a center of gravity for the evolution of debt and debt service for any analysis of claims about the way government borrowing affects macroeconomic outcomes. However, the way variables on the right-hand side of equation 2 determine d^* evolve due to fiscal policy differs dramatically between standard consensus macro and the theory of demand-led growth.

3.2 The Standard Consensus (Mainstream) Model

This section will be brief since these principles are well known, presented widely in textbooks and mainstream policy discussions, particularly among those who preach the need for fiscal responsibility and, ultimately, government austerity.²

² See section III of Moreno-Brid et al. (2026) for an extensive survey.

Long-run growth (g) is supply determined, mostly driven by technical change and the demographics of labor force growth. This is not to say supply growth is exogenous or independent of fiscal policy. Tax policy, subsidies for technological development, long-run interest rates that affect the cost of capital and investment, etc. can affect g . But the key result for our purposes is that in the standard consensus model, g is independent of demand dynamics in the long run.³

Loanable funds theory guides analysis of the long-run interest rate (r) that converges to the “natural” or “neutral” level to equate aggregate demand to supply-determined potential output. Indeed, this convergence, induced either by long -adjustment of wages and price or wise monetary policy, is the key mechanism that causes the supply side to rule the long run in these models, and the key source of economic damage from unbalanced fiscal policy. According to the loanable funds model, government borrowing competes for scarce supply of private saving, drives up interest rates and crowds out private spending. Crowding out affects consumption, exchange rates, and trade flows. But the primary concern focuses on how higher interest rates raise the cost of capital and crowd out private investment and R&D, leading to a lower capital stock, reduced labor productivity, and a lower level of long-run output.⁴

A given path of government borrowing may or may not be sustainable, depending on the sign of the denominator of equation 2. As a first approximation, however, the sustainability condition is out of the hands of policy makers since growth is primarily determined by technology and demographics while the long-run interest rate arises from general equilibrium conditions that balance aggregate demand with potential output.

Because according to this model the long-run output path is determined independently from the long-run path of demand, higher government spending crowds out, again as a first approximation, an equivalent amount of private spending through higher real interest rates. Somebody sacrifices spending to accommodate larger government consumption of resources. For this reason, “responsible” long-run fiscal policy from the perspective of standard consensus macro theory recommends keeping the numerator of equation 2 reasonably low to prevent the need for higher interest rates that will crowd out productive investment and possibly cause debt service to explode. Both the government spending share (γ) and the tax share (τ) can be set by

³ This result abstracts from possible indirect effects of demand dynamics on the cost of capital and intertemporal relative prices in neoclassical models. If higher demand raises the long-run “natural” or “neutral” interest rate, the cost of capital increases, and the capital stock declines, reducing potential output. Alternatively, higher interest rates could induce more labor supply since higher rates increase the value of income today versus income in the future. A related effect due specifically to higher government spending is that the associated tax increase, contemporaneously or in the future, reduces household wealth and induces greater current labor supply. Indirect effects like these break the independence of long-run supply from demand. However, they do not reflect the direct effect of demand on production that is the foundation of Keynesian models. Furthermore, it seems difficult to reconcile channels I have labeled “demand effects for supply-side reasons” with empirical evidence on fiscal multipliers. See, for example, Ríos-Rull and Dyrda (2012).

⁴ Under very strong assumptions, Ricardian Equivalence models suggest private saving could rise to offset part, even all, of the effect of fiscal deficits on interest rates for a given level of government spending. But this view is largely confined to economic theory.

policy. Fiscal responsibility in this sense also tends to raise the denominator of equation 2 primarily by keeping the “natural” interest rate low.

3.3 Post-Keynesian Demand-Led Growth

Various models of demand-led growth have been presented in a rapidly growing research literature. Their common feature is that the dynamics of aggregate demand are the primary determinant of output over any time horizon. Fazzari (2026) provides an overview of the “principles” necessary and sufficient for demand-led growth along with numerous references to related literature.⁵ The model appendix summarizes a representative demand-led growth model.

Demand-led growth models lead to a fundamentally different understanding from the standard consensus about how the variables in equations 1 and 2 interact to determine the time path of d^* . This section explores the demand-led growth perspective of the aggregate growth rate, interest rates, and the ratio of the primary public deficit to GDP.

The Growth Rate

The growth of aggregate demand determines g subject to a resource constraint. In Fazzari et al. (2020) and Fazzari and González (2025), the resource constraint is a minimum unemployment rate. But, as discussed in Fazzari (2024 and 2026) there is no reliable economic mechanism, neither wage and price flexibility nor monetary policy reaction functions, that assures convergence of demand growth to a level consistent with full resource utilization. Therefore, insufficient demand growth can cause under-utilization of labor resources in the long run. Of particular significance, hysteresis effects cause supply to adjust to demand.⁶ Strong demand raises long-run potential output if demand stimulus does not push the unemployment rate below the minimum level (see the formalization in the model appendix). Negative shocks to demand growth always reduce output and, again through the hysteresis channel, cause the supply-driven potential output path to converge to a lower path of aggregate demand. Therefore, observed output gaps are not informative about the utilization rate of labor. Supply can converge to any path of aggregate demand, including those associated with high unemployment and output stagnation.

The hysteresis channel is especially important for understanding fiscal policy. On the one hand, the ability of government spending to stimulate both the level and growth rate of output can cause effective demand stimulus to boost the supply path. On the other hand, fiscal austerity in the service of conventionally defined “fiscal responsibility” necessarily raises unemployment, reduces the supply side, and, unless it is reversed, result in a permanently lower output path, other things equal.

Interest Rates

As in any Keynesian model, including Keynes’s own analysis in chapter 14 of the *General Theory*, the loanable funds theory of interest rate is flawed. It is logically incorrect to

⁵ Also see chapters 5, 6, 12, 13, 16, and 20 in Setterfield (2026).

⁶ Fazzari and González (2025) provide empirical evidence that an increase in the unemployment rate reduces both labor force growth and labor productivity, although the latter effect is larger.

analyze aggregate saving as independent of the actual path of demand. An increase in demand, for example higher government spending financed by bond issue, creates income and, through the multiplier process, creates an equivalent amount of saving plus tax revenue. This basic accounting principle criticizes the crowding out argument central to the standard consensus view of federal government borrowing. This fact is not recognized at all in the popular discussion of public deficits, leading to deeply misleading comparisons of the aggregate effects of public deficits to an over-extended individual household.

A deeper criticism of the standard consensus theory is that there is no unique equilibrium “natural” interest rate to deliver a zero output gap equating aggregate demand to aggregate supply. The hysteresis effects cause supply to respond to demand. The absence of an output gap can occur at any level or growth rate of aggregate demand.⁷ This result implies that the interest rate in equation 2, *even in the long run*, is anchored in monetary policy rather than the borrowing and lending behaviors centered loanable funds theory.⁸

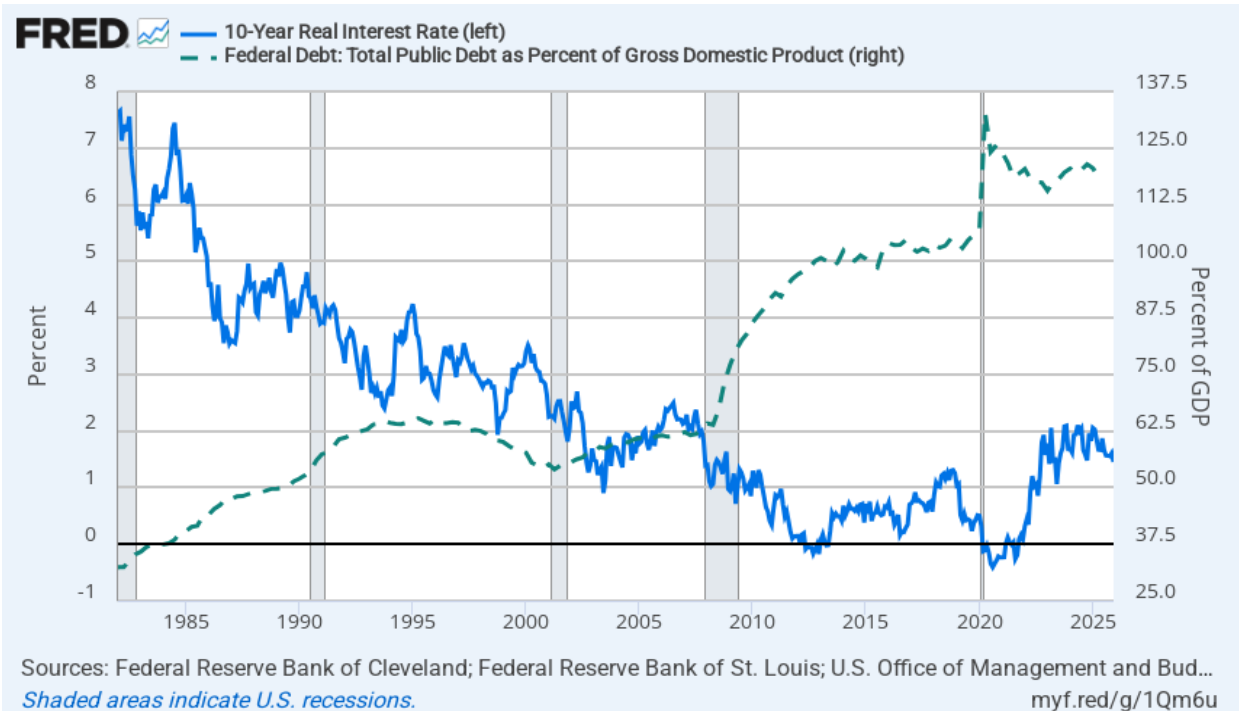
In support of the Keynesian model, it is striking to consider long-run historical evidence on the correlation between interest rates and US federal debt. Figure 2 plots the Cleveland Federal Reserve Bank’s estimate of the real interest rate on 10-year Treasury bonds (left scale) and the ratio of US federal debt held by the public to GDP (right scale). It does not require sophisticated econometrics to see the correlation is exactly the *opposite* of what the standard consensus loanable funds model would predict. Of course, this contradictory evidence encourages those who want to validate mainstream thinking to explore how their theory might be rescued by controlling for other variables influencing interest rate and addressing endogeneity concerns. But it will take especially creative econometrics to uncover a positive effect of federal debt on interest rates from the basic data shown in figure 4.⁹

⁷ Fazzari (2024) analyzes this result in greater detail arguing that when demand growth is stagnant either monetary policy guided by a Taylor-rule reaction function will settle for both a level and growth rate of the economy below what is possible or will engage in an inevitable march of the policy rate to the zero lower bound.

⁸ In current monetary policy practice, short rates obviously depend on policy decisions. Longer rates have a dimension of liquidity preference but much of that effect depends on expected policy choices that set future short rates.

⁹ A recent example is Fuceri et al. (2025) which contains citations to related studies. The authors use forecasts of both interest rates and debt rather than actual values. Perhaps believers in the loanable funds model raise forecasts of future interest rates when their forecast of future government borrowing rises. But the evidence in figure 2 implies such forecasts were incorrect.

Figure 2 – 10-Year Real Interest Rates and the Debt-GDP Ratio



According to the demand-led growth model, the negative correlation between interest rates and the debt ratio need not imply direct causation because interest rate policy is independent of government borrowing as long as the economy has the slack at the margin to accommodate any demand induced by either higher government spending or tax cuts. However, to the extent demand growth was insufficient to maintain full employment, policymakers faced pressure to both raise fiscal stimulus and lower interest rates, causing indirect causation between interest rates and the debt-GDP ratio.¹⁰

Consistent with the post-Keynesian theory of endogenous money, the primary determinant of interest rates, especially interest rates on the public debt of sovereign currency countries, is monetary policy. This conclusion applies beyond the short run, reinforced by the hysteresis results that there is no long-run “natural” interest rate.

Ratio of the Primary Deficit to Output

The numerator of the long-run debt-output ratio in equation 2 is the primary public deficit (total government spending net of interest less tax revenue) as a share of aggregate output. The average tax rate (τ) in both the standard consensus and demand-led growth models is primarily determined by policy choices. It may seem intuitive, as in the standard consensus model, to think of the government spending share (γ) as a policy choice. But the logic of demand-led growth shows this intuition is incorrect.

¹⁰ Summers (2014) resurrects Alvin Hansen’s “secular stagnation” concept arguing the US economy needed to generate technology and housing “bubbles” to support aggregate demand. Many authors cite rising inequality as a source of demand stagnation. See Cynamon and Fazzari (2015) for discussion and further references.

To analyze the connection between γ and government spending policy requires an explicit demand-led growth model. Here I use the model from Fazzari et al. (2020), a supermultiplier model, summarized in the model appendix. Similar results are obtained from other demand-led growth models used to analyze fiscal policy.¹¹ In this model, aggregate demand has three components: consumption related to after-tax aggregate income, investment determined by the rate of growth (or expected rate of growth) of aggregate output, and autonomous demand that is independent of current output. Tax revenue is a proportion τ_Y of aggregate income.¹²

Suppose government spending is the only source of autonomous demand growing at a rate g^* (an assumption relaxed below) and there is no consumption out of interest income on public debt. Then, in the long run, the model delivers a steady-state growth path with output growing at g^* and the share of government spending in output of

$$\gamma^* = (1 - \tau_Y)s_Y + \tau_Y - v^*(g^* + \delta) \quad (3)$$

where s is the average saving propensity out of after-tax income. Steady-state investment maintains a constant capital-output ratio (v^*) by replacing depreciation (at rate δ) and accounting for aggregate growth of g^* . The straightforward interpretation of this equation is that the share of autonomous demand in output equals the difference between the share of “leakages” due to saving and taxes and the share of investment. That is, this condition reflects goods market equilibrium.

This result differs in three fundamental ways from the standard consensus view that the share of government spending is a policy choice. First, γ^* is *endogenous*. Following Keynesian logic, this equilibrium is established by the adjustment of output through the typical multiplier process. For example, if government spending falls by an amount ΔG then output falls by $m\Delta G$ where m is the Keynesian (super)multiplier and the long-run γ^* is unchanged holding constant the parameters that determine the multiplier. Fiscal policy cannot choose the share of government spending in output. In this sense, fiscal austerity is counterproductive because it does not lower γ^* and fiscal stimulus does not raise γ^* . Second, faster growth of government spending raises output growth if the economy does not run up against the minimum unemployment rate. Remember that due to hysteresis effects, productivity and labor force growth rise when the unemployment rate falls. Therefore, higher long-run government spending growth raises the long-run growth rate of potential output along with the growth of actual output.

Third, and perhaps counter-intuitively, faster growth of government spending *reduces* the share of government spending in aggregate output.¹³ To provide the capital necessary to produce along a higher growth path of output, the investment share ($v^*(g^* + \delta)$ from equation 3) must

¹¹Research grounded in supermultiplier papers is rapidly growing. Recent contributions that center fiscal policy include Allain (2015), Freitas and Christianes (2020), Fiebiger (2021), Hein and Woodgate (2021) and Braga and Serrano (2022).

¹² This analysis abstracts from spending out of interest income for simplicity. All the qualitative results discussed here are not affected by allowing consumption out of interest, although quantitative analysis would change. Details of a more general model are available from the author.

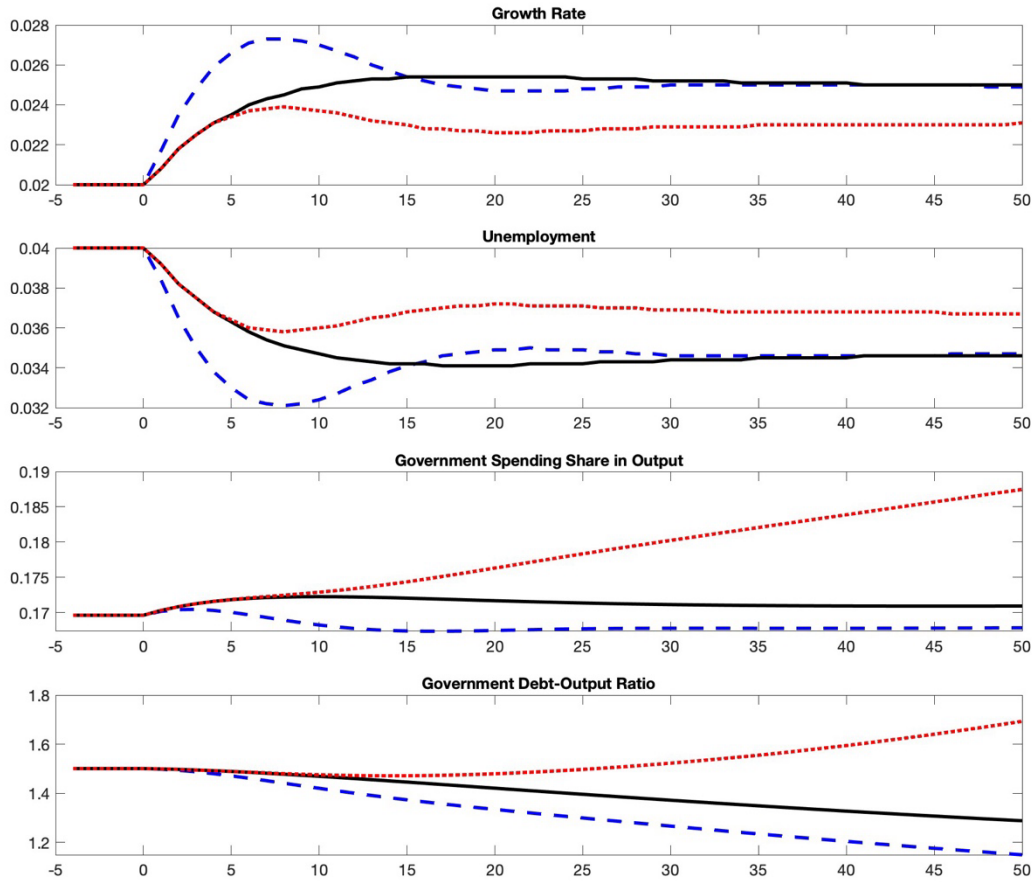
¹³ The models cited in footnote 12 also deliver this result.

rise. The consumption share is pinned down by the propensity to consume and the tax rate. Therefore, in a closed economy, the share of autonomous demand in output must fall to accommodate the higher investment share.

These results present a strong case for a fiscal policy that targets high growth and a strong criticism of austerity to lower the debt-output ratio. However, the assumption that government spending is the only source of autonomous demand is unrealistic. Other likely sources include exports, debt-financed consumption (including residential construction), and consumption of high wealth households. Some recent calibration exercises suggest government spending is about half of autonomous demand. This recognition complicates the analysis. Suppose government spending grows persistently faster than other components of autonomous demand. Output growth will accelerate, but not as much as the increase in government spending growth. As a result, government spending becomes a larger share of autonomous demand, which may cause γ to rise.

The outcome depends on how other components of autonomous demand respond to faster overall GDP growth. Figure 3 below shows simulation results for output growth, the unemployment rate, the share of government spending in output, and the federal debt-output ratio from three different models of autonomous demand growth calibrated to US data (calibration details are available from the author). In the initial steady state, all components of autonomous demand grow at the same 2% rate. Then, in period 1, government spending growth jumps to 2.5%. The blue dashed line shows results when other components of autonomous demand also immediately jump to 2.5% growth at time zero as in Freitas and Christianes (2020). In this case, admittedly rather unrealistic, the bottom panel shows, the debt-output ratio declines immediately and substantially. The red dotted line is the opposite limiting case in which other autonomous demand components continue to grow at just 2% indefinitely and the debt-GDP ratio eventually rises. In the intermediate case, depicted by the black solid line, the non-government autonomous demand component growth rate responds with a long lag to a faster growing economy. In this calibrated example, the debt-GDP ratio also declines.

Figure 3—Simulated Macro Data from Three Models of Autonomous Demand



Note: Government spending growth rises from 2.0% to 2.5% in period 1. In the simulation shown by the red dotted line non-government autonomous demand continues to grow at 2.0% indefinitely. The blue dashed line simulation assumes non-government autonomous demand growth jumps to 2.5% along with government spending growth in period 1. The black solid line simulation assumes non-government autonomous demand growth slowly adjusts to the total output growth rate.

While it seems unrealistic for non-government autonomous demand growth to follow government spending growth mechanically in lock step, it also seems unrealistic to suppose non-government components of autonomous demand would never respond to a faster growing economy. For example, one would expect debt financed consumption and residential construction to eventually rise faster if aggregate growth accelerates for decades. Nikiforis (2018) and Skott (2019) raise this point as a criticism of the assumption of constant autonomous demand growth in many supermultiplier models. Brochier (2019) develops an interesting model with consumption out of wealth as the source of autonomous demand, but wealth evolves endogenously. Export growth may be less sensitive to the domestic growth rate. But for a large economy like the US, faster income growth surely induces faster import growth stimulating growth in the rest of the world and possibly also inducing currency depreciation over time that

would raise exports. These observations suggest that various components of aggregate demand are neither completely “autonomous” nor completely “induced.” Rather the degree of autonomy is a more continuous variable reflected in different lags of response to output growth. One can make a strong logical case that spending by a sovereign-currency government is the most independent component on the autonomy spectrum. These observations motivate additional empirical work on the relative size of various autonomous demand components and, more important, how they respond to each other dynamically.

It is also interesting to note that even in the least favorable case for the debt-output ratio shown in figure 3 (dotted line), when non-government autonomous demand is completely unresponsive to aggregate output growth, the ratio initially dips slightly and it takes more than 30 year for the debt ratio to rise above its initial steady-state value, despite the substantial increase in output growth, reduced unemployment, and greater opportunity for government to support social development. This transitional dynamic happens because of the growth-enhancing effects of accelerated government spending.

The table below provide interesting evidence related to these issues. The figures are correlations between federal government spending growth and the share of federal spending in GDP. Each column represents a different measure of government spending, with broader measures from left to right. Federal “social spending” is almost entirely federally financed health transfers (Medicare and Medicaid) and Social Security payments. The final column adds exports and residential construction to include non-government components of autonomous demand. The rows give results using the Baxter-King filter to extract longer-term trends in the data. The filters isolate longer-term variation as the frequency increases from no filter to more than 48 quarters.

Table 1—Correlation of Government Spending Growth with the Government Spending Share in GDP

B-K Trend Frequency	Gov. Consumption and Investment Only	Add Gov. Social Spending	Add Exports and Resid. Construction
No Filter	0.16	0.41	0.14
16+ quarters	0.20	-0.23	-0.51
24+ quarters	0.27	-0.43	-0.69
32+ quarters	0.30	-0.53	-0.76
48+ quarters	0.32	-0.55	-0.78

Note: The sample period is quarterly from 1959 through 2025. Data are deflated by the chained price index for personal consumption expenditure. Details of the application of the Baxter-King (B-K) filter are available from the author. Government social spending consists almost entirely of Medicare, Medicaid, and Social Security.

Using just a narrow measure of government spending (government consumption and investment spending alone), the correlation is modestly positive at all frequencies indicating a tendency for the share of government spending in GDP to rise when government spending grows faster. This result suggests some support to the standard consensus view that higher government spending growth would increase the share of government spending in output. However, the correlations become strongly *negative* when the definition of government spending includes the social transfer components. US federal health spending and retirement benefit are almost completely isolated from the overall state of the economy and are therefore appropriately treated as autonomous. Furthermore, when the data are filtered to capture longer term variation, the correlations become more negative.¹⁴ These results are consistent with a demand-led growth view that faster government spending growth may reduce γ , or at least not increase γ .

In summary, the demand-led growth model challenges the standard consensus understanding of the evolution of d^* , the ratio of public debt to output in equation 2. Faster public spending growth raises the economy's growth rate which lowers the steady-state d^* , other things equal. The long-run interest rate is, to a first approximation, a policy choice rather than the "natural" equilibrium from the loanable funds model. The long-run share of government spending in output is endogenous, not a policy choice, that may well decline with faster government spending growth.

4. Demand-Led Growth and Fiscal Policy

If demand leads economic growth, this analysis makes a strong case for government spending as an engine of prosperity and, symmetrically, austerity is counterproductive. This section develops the implications of these results for effective fiscal policy.

4.1 Government Spending, Growth, and Fiscal Sustainability

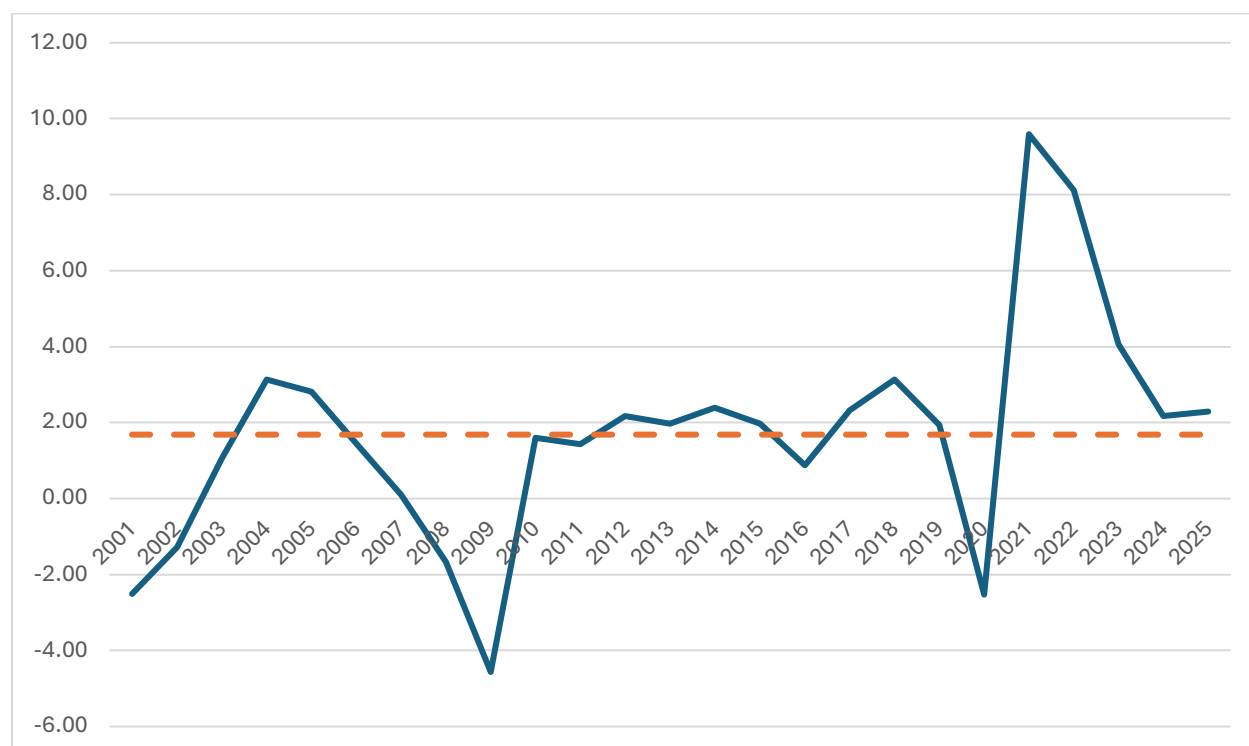
Federal government spending anchors autonomous demand. US federal consumption, investment, and social spending was 22% of GDP in 2025 and 54% of a standard definition of autonomous demand that includes state and local government spending, exports and residential construction. Although "animal spirits" and associated bubbles in other components of private demand may offset stagnant spending by the federal government, it seems impossible for the aggregate economy to perform well without sustained growth of federal spending in the long run. Recent history supports this view. The "pivot to austerity" in both the US and Europe around 2010 correlates with a historically weak recovery from the Great Recession. By contrast, remarkable US federal stimulus in response to the 2020 pandemic crisis led to an especially rapid recovery.

However, the mixed history of public spending of recent years also correlates with rising federal debt. Mainstream fears of an unsustainable debt trajectory could force austerity despite its consequences for demand, growth, and unemployment. To assess this fear, consider data that

¹⁴ These results include outliers in social spending during the Covid-19 pandemic. Limiting the sample to 2019 and earlier strengthens the negative correlations, especially for the upper rows of the table. With the shorter sample, even unfiltered correlations are slightly negative for definitions of autonomous demand that include government social spending. Note that social spending is almost entirely independent of the state of the economy.

determine the long-run debt-output ratio. Figure 4 shows a measure of the denominator of d^* from equation 2 ($g - (1 - \tau_r)r$) assuming a modest tax rate of 5% on interest income. This statistic is positive except in recessions, averaging 1.68 percentage points (the dotted line in figure 3). For a quarter century, the US debt-output ratio was not “explosive” in the long run.

Figure 4—Nominal GDP Growth Minus Tax-Adjusted Average Interest Rate on US Federal Debt (Tax Rate on Interest Income of 5%)



Going forward, the Congressional Budget Office projection for the US primary deficit is 2.2% of GDP, which implies a long-run d^* of $2.2\% / 1.68\% = 131\%$, which seems entirely manageable. Furthermore, the convergence is very slow. Starting from the current value near 100%, d^* reaches just 117% in 25 years.¹⁵

It is reasonable to question the relevance of this steady-state analysis for two reasons. First, the difference between the growth rate and the tax-adjusted interest rate in the denominator of d^* is small so small changes in either growth or interest rates lead to large change in d^* . Second, changes in the government deficit induced by temporary circumstances can overwhelm the long-run dynamics. For example, unusually large federal deficits and unusually slow growth in the Great Recession raised the debt-output ratio by 37 percentage points over just five years.

¹⁵ This simulation uses the geometric average growth rate of nominal GDP from 2000 to 2019 of 4% and solves for the average nominal interest rate of 2.44% to yield 1.68% in the denominator of d^* with a tax rate on interest income of 5%. The CBO primary deficit projection assumes Social Security benefits will continue at current levels set by law passed the projected exhaustion of the trust fund. It also assumes tariff revenue remains elevated. Restoration of tariffs to the 2024 share of GDP raises the projected primary deficit by 0.4 percentage points, other things equal.

Nonetheless, steady state d^* is a center of gravity for long-run fiscal policy. The data from figure 4, while volatile, suggest the denominator of d^* is largely stationary.

4.2 Government Debt is Not Necessarily a Burden on Future Taxpayers

Perhaps the biggest fear in popular discussion of public debt, and an effective cudgel politicians swing who benefit from criticizing the status quo, is that future generations of taxpayers will have to pay off, or at least service, a much greater burden of debt. But does the tax share really need to rise in the future because of a rising debt-GDP ratio? This hasn't happened in the past four decades, more than a generation, despite an increase in the U.S. debt ratio from about 25 percent to almost 100 percent.¹⁶

Indeed, it is far from clear taxes need to rise at all on future generations to pay off or service the federal debt. The analysis above shows d^* is not explosive or “unsustainable” as long as economic growth exceeds the average interest rate on federal debt (adjusted for tax revenue on interest), a condition satisfied every year outside of recessions since (at least) 2010.

Perhaps more surprising, no future taxes are necessary to service the debt as long as the debt ratio does not explode. Interest costs are simply covered by higher deficits. Note that in the algebra presented earlier in equation 1, interest payments at time t (rD_t) simply add to outstanding government debt at time $t + 1$, other things equal.

To better understand this admittedly provocative result, consider a simple thought experiment. Imagine a very small government that spends a tiny share of its GDP, say 3 percent excluding interest, but imposes no taxes at all. In this case, the logic above still applies. If the growth rate of our small government economy exceeds its tax-adjusted interest rate, its debt ratio is sustainable at about 179 percent of GDP with growth and interest rates similar to recent US experience ($3.00 / 1.68 = 1.79$). But it imposes no taxes at all! Ever! Its interest payments are financed, along with its non-interest government spending, by its year-by-year borrowing. Bondholders receive their historically normal rate or return. Domestic plus foreign saving equals domestic plus government borrowing.

If a country like the US or any other modern economy ran its fiscal policy with no taxes at all, its debt ratio, even if logically sustainable, would be enormous. The interest transfer would likely trigger massive inflation and would be politically unsustainable. Therefore, the tax rate is not zero, and should not be zero, for modern economies with large public sectors. However, the logic still applies that current government deficits, or marginal increases in government spending, need not be “paid for” by taxes on future generations. This outcome is consistent with the fact that average federal tax rates have not risen for decades in the US even though the debt ratio has risen by a factor of four.

One might criticize this logic because it may seem to imply there is no limit on how much the government can borrow if it can always just borrow more to cover its interest costs. This may seem absurd, but in a sense it is true. However, this result does not mean it is a good

¹⁶ The sum of federal personal, corporate, and social insurance taxes as a share of GDP is volatile due to cyclical fluctuations. Using annual business cycle peaks, this share was 16.7% in 1979 and 15.4% in 2019.

idea for the government to borrow and spend unlimited amounts. The economy has a limited capacity to produce output. If government spending creates more demand than the economy's productive capacity one of two outcomes will occur. Interest rates will rise to choke off private spending or inflation will rise, also pushing down private spending. That is, the government would somehow “crowd out” private spending if productive resources cannot satisfy demand.

The implications of possible crowding out, however, differ fundamentally between the competing theoretical perspectives. According to the standard consensus model, the economy will reach potential output with full utilization of resources in the long run regardless of the path of government spending. Therefore, higher government spending necessarily crowds out private spending in the long run with the adjustment caused by rising interest rates to choke off excess demand if higher government spending is not financed by higher taxes. By contrast, the demand-led growth model implies supply converges to the demand path, a long-run trajectory that depends on government spending. Faster growth of public spending induces faster productivity and labor force growth, the hysteresis effect takes center stage again. The rate of growth of the supply side depends on the rate of growth of aggregate demand. If the “speed limit” imposed by labor resources, modeled as a minimum unemployment rate in Fazzari et al. (2020), is respected, higher government spending need not imply higher taxes or higher interest rates. Instead of “crowding out” there is “crowding in” as increased aggregate demand induces multiplier-accelerator effects. Moreover, starting from an initial position without excess demand, higher taxes or lower spending induced by mainstream “fiscal responsibility” principles necessarily lead to both lower long-run output and higher long-run unemployment.¹⁷

4.3 Why Reduce the Debt-Output Ratio?

The demand-led growth model refutes predictions from the standard consensus model of economic damage and intergenerational burdens of public deficits and debt when the level and growth rate of production are demand-constrained—when aggregate demand does not exceed the economy's capacity to produce—and the debt-output ratio is not on an explosive dynamic path. This observation might suggest there is no reason to worry about public debt. Rather, following the functional finance principle originating with Lerner fiscal policy should focus on the “function” of full resource use, not fiscal balance as discussed from various perspectives in Summa (2022).

However, post-Keynesian macroeconomic theory also, and appropriately, focuses on the distributional impact of macroeconomic conditions. Rising government debt service need not lead to higher taxes, but it does cause larger interest transfers to bondholders. Furthermore, government bonds issued to finance deficits become assets on private balance sheets and therefore add to wealth. These transfers provide those who receive them greater command over whatever the economy produces, and they are not distributionally neutral. Distributional

¹⁷ The so-called New Keynesian response to this point is that activist monetary policy will lower interest rates to close this kind of output gap. Fazzari (2024, 2026) provides an extensive critique of this claim. Furthermore, if monetary policy cannot do the job in very short order, hysteresis effects reduce the potential output target.

accounts show federal debt ownership at the personal level is highly regressive. In addition, a large share of government debt is held by financial institutions, ultimately owned by the rich.¹⁸

Interest payments to service the debt are an injection of income into the economy. They will add to aggregate demand. Since these payments go disproportionately to higher income/wealth units, the marginal propensity to consume out of them may be relatively small, but probably much more than zero. This source of demand can stimulate higher production and employment. But if the economy has productive capacity to meet this source of demand with additional output, this implies the interest payments have a distributional opportunity cost. In the absence of big interest payments, the federal government would have more “fiscal space” to do other things: provide better health care, build infrastructure, enhance care work, ... , without violating the speed limit imposed by resource constraints.

These points imply that a socially optimal “functional finance” fiscal policy will target full employment and full utilization of resources, both at a point in time and, dynamically, over time recognizing the hysteresis effects that cause demand to lead supply. These objectives likely require robust government spending, the most obvious source of autonomous demand controlled by policy. But the regressive distributional consequences of the debt-GDP ratio motivate a policy mix to constrain government debt.

Consider how to resolve this apparent tension by again referring to the variables in equation 2

$$d^* = \frac{\gamma - \tau_Y}{g - (1 - \tau_r)r}. \quad (2)$$

The long-run share of government spending in output (γ) is endogenous, not directly controlled by policy, although faster government spending growth may well reduce γ as the evidence in the previous section demonstrates. This outcome frees policy to pursue macroeconomic functional objectives without concerns about magnifying regressive transfers.

If the objective is to reduce regressive income and wealth transfers created by a high government debt-output ratio, higher tax rates are a possible policy response. In the post-Keynesian demand-led growth model the average income tax rate (τ_Y) is a policy choice (unlike the government spending share). However, in a Keynesian model, one must account for the effect of higher taxes on demand. From the identities that determine d^* in a supermultiplier model, it can be shown that

$$\frac{dd^*}{d\tau_Y} = \left[\frac{-\lambda s_Y}{g^* - r(1 - \tau_r)} \right] \left(\frac{1}{1 + \phi} \right) < 0$$

where λ is the share of government spending in total autonomous demand and the positive ϕ term comes from a rather complicated analysis required if interest income induces consumption. Consumption out of interest reduces the quantitative effect of any policy designed to lower the debt-output ratio because a lower d^* reduces interest income, reduces consumption, and lowers

¹⁸In the first quarter of 2026, households in the top one percent wealth percentile hold 38% of household-sector government securities (including federal, state, and local). The top ten percent hold 79%.

the output path. Furthermore, a lower saving share (smaller s_Y) reduces the effect of higher tax rates on d^* . This result is intuitive: a tax increase reduces demand ($s_Y < 1$) and therefore output falls in the denominator of d^* to partially offset the effect of a higher tax rate on the primary deficit in the numerator of d^* . The formal result is somewhat less obvious because s_Y does not appear directly in the formula for d^* . However, the algebra shows a higher value of s_Y raises the government spending share (γ) by lowering the output path leading to the effect of s_Y on $dd^*/d\tau_Y$. This result implies tax increases will have a bigger impact on d^* if they are imposed on households and businesses with high saving propensities. An approximate calibration shows that a one percentage point increase in the income tax rate of the top income quintile of American households lowers the debt-output ratio by about four percentage points while a one percentage point increase in the average tax rate for the bottom four quintiles lowers d^* by just one percentage point.¹⁹

The average interest rate on public debt has a large effect on d^* . The understanding of what determines interest rates is a critical difference between the post-Keynesian demand-led growth model and the standard consensus model. As explained in Fazzari (2026) when supply accommodates demand beyond the short run, there is no “natural” rate of interest. Interest rates, and asset prices more generally, are determined by Keynesian liquidity preference with the anchor set by monetary policy. Therefore, policy designed to reduce long-run regressive income and wealth transfers associated with government debt includes setting interest rates at low levels. Indeed, the more important policy target is likely rd^* rather than just d^* alone. Furthermore, low interest rates improve debt sustainability by reducing d^* itself.

Post-Keynesians propose a variety of long-run interest rate rules. The focus here on distributional effects of government debt suggests a “parking-it” rule for the policy rate at a low level, consistent in spirit to the statement in Rochon and Setterfield (2008, page 16) that “central banks should stop changing interest rates in pursuit of short-run macro stabilization and instead attend to the long-run distributional consequences of monetary policy.” One can debate whether this rate should or should not allow for a positive real rate of return on low-risk financial assets, but with even a slightly positive real rate, the regressive distributional effects of government debt and debt service will be minimal.²⁰

This objective does not preclude temporary, more “activist” monetary policy, such as boosting interest rates to slow the economy and reduce inflation expectations. Such a policy is costly in terms of temporarily high unemployment and lost output, and other responses may be more effective. But a few years of high interest rates will have modest distributional effects on interest transfers created by public debt and not compromise fiscal sustainability if rates return to low levels within a few years.

¹⁹ This calibration sets the income share of the top quintile at 50% and the top quintile saving rate at 20%. The bottom 80% receive 50% of aggregate income and save 5%. The ϕ and λ parameter is 0.29 and 0.54 respectively.

²⁰ Rochon and Setterfield (2008) provide a useful summary of a variety of post-Keynesian perspectives on appropriate long-run interest rate policy, all of which recognize this rate as a policy choice.

Setting interest rates to mitigate debt service conflicts with the mainstream criticism of “fiscal dominance.” The difference in policy principles follows from the different theoretical understanding of interest rate determination. In the standard consensus model, there is a neutral long-run interest rate. Any policy attempt to push rates below this level leads down the slippery slope of accelerating inflation. In the demand-led growth model, the dynamics of aggregate demand determine the output path. Different growth paths are possible following different dynamics of autonomous demand for any given policy anchored interest rate as discussed in more detail in Fazzari (2024). A low-rate policy need not be inflationary. That said, both fiscal and monetary policy should coordinate to avoid pushing demand above the level determined by resource constraints. But the analysis of resource constraints in the policy debate should recognize the hysteresis effects through which demand leads supply.

5. Conclusion

This paper starts from the identity that establishes an anchor for the ratio of government debt relative to GDP:

$$d^* = \frac{\gamma - \tau_Y}{g - (1 - \tau_r)r} \quad (2)$$

The standard consensus model, according to which the supply side rules the long-run path of output independent of demand dynamics, predicts the denominator of d^* will decline with expansionary fiscal policy due to crowding-out effects induced by a higher r . The numerator is under control of policy and should be kept low, triggering the never-ending political debate between proponents of reduced government spending (lower γ) versus higher taxes (greater τ_Y and/or τ_r). But both camps in the typical political debate seek conventional “fiscal responsibility.” The left is just as likely to claim unsustainable debt dynamics when tax cuts for the rich are on the table as the right is when they lambast higher social spending.

In sharp contrast, the post-Keynesian demand-led growth model implies faster government spending can raise g beyond the short run, and γ , which is endogenous and not controlled by policy, is likely to decline. Expansionary fiscal policy growth reduces d^* . Fiscal policy can therefore functionally target full employment and solid growth in standards of living along the lines suggested by Fazzari (2026) among many others without the need for higher future tax rates.

Indeed, as long as d^* is not excessive, public debt sustainability is not much of a concern in countries that borrow in their own sovereign currency and do not face balance-of-payments constraints. However, because the wealth created by government bond issue and the income transfers induced by debt service have regressive distributional effects, there is a case to target modest levels of both d^* and rd^* .

This argument leads to a post-Keynesian case for higher taxes on the rich and perhaps even the affluent, groups with low marginal propensities to consume.²¹ The objective is not to move the government fisc closer to balance. Rather, the goal is distributional. In addition, and perhaps more important, the interest rate is a policy choice in the long run. Near zero real interest rates will mitigate regressive distributional consequences of a functional finance fiscal policy to enhance long-run prosperity.

References

- Allain, O. 2015. ‘Tackling the Instability of Growth: a Kaleckian-Harrodian Model with an Autonomous Expenditure Component.’ *Cambridge Journal of Economics*, 39(5), 1351-1371.
- Braga, J. and F. Serrano. 2022. ‘Notes on a Fiscal Policy Strategy for Growth.’ Working paper prepared for the 34th Annual EAEPE Conference, Naples, Italy, September 9.
- Brochier, L. and A. Carolos. 2019. ‘A Supermultiplier Stock-Flow Consistent Model: the ‘Return’ of the Paradoxes of Thrift and Costs in the Long Run?’ *Cambridge Journal of Economics*, 43(2), 413-442.
- Cynamon, B.Z. and S.M. Fazzari. 2015. ‘Rising Inequality and Stagnation in the US Economy.’ *European Journal of Economics and Economic Policy*, 12(2), 170-182.
- Fazzari, S.M. 2024. ‘Supermultiplier Models, Demand Stagnation, and Monetary Policy: Inevitable March to the Lower Bound for Interest Rates?’ *Review of Political Economy*, 36(5), 1801-1826.
- _____. 2026. ‘Three Principles for Demand-Led Growth,’ working paper.
- _____, P.E. Ferri and A.M. Variato. 2020. ‘Demand-Led Growth and Accommodating Supply.’ *Cambridge Journal of Economics*, 44(3), 583-605.
- _____, and González, A. 2025. ‘How Large are Hysteresis Effects? Estimates from a Keynesian Growth Model.’ *Journal of Economic Dynamics and Control*, 173.
- Fiebiger, B. (2021). The post-Keynesian “crowding-in” policy meme: government-led semi-autonomous demand growth, FMM working paper number 67 (July).
- Freitas, F. and R. Christianes, R. (2020). A baseline supermultiplier model for the analysis of fiscal policy and government debt. *Review of Keynesian Economics*, 8(3), 313-338.
- Fuceri, D., C. Goncalves, and H. Li. 2025. ‘The Impact of Debt and Deficits on Long-Term Interest Rates in the US.’ International Monetary Fund Working Paper WP/25/141.

²¹ A practical definition of “affluent” in this context would be households who must work to finance a comfortable lifestyle and therefore would not be considered “rich.” But the labor and capital income of affluent households provide the means to finance ample discretionary consumption.

- Hein, E. and R. Woodgate (2021). Stability issues in Kaleckian models driven by autonomous demand growth—Harrodian instability and debt dynamics, *Metroeconomica*, 72(2), 388-404.
- Moreno-Brid, J.C., E.P. Caldentey, L. Nalin, and E. Pérez-Medina. 2026. ‘Public Debt and Economic Growth’ chapter 20 in M. Setterfield, ed. *Handbook of Alternative Theories of Economic Growth, Second Edition*, Edward Elgar, forthcoming.
- Nikiforos, M. 2018. ‘Some Comments on the Sraffian Supermultiplier Approach to Growth and Distribution.’ *Journal of Post Keynesian Economics*, 41(4), 659-675.
- Ríos-Rull, J.V. and S. Dyrda. 2012. ‘Models of Government Expenditure Multipliers,’ Federal Reserve Bank of Minneapolis, March 14, <https://www.minneapolisfed.org/article/2012/models-of-government-expenditure-multipliers>.
- Rochon, L.P. and M. Setterfield. 2008. The political economy of interest-rate setting, inflation and income distribution, *International Journal of Political Economy*, 37(2), 5-25.
- Setterfield, M. (ed.) 2026. *Handbook of Alternative Theories of Economic Growth, Second Edition*, Edward Elgar, forthcoming.
- Skott, P. 2019. ‘Autonomous Demand, Harrodian Instability and the Supply Side.’ *Metroeconomica*, 70(2), 233–246.
- Summa, R. 2022. ‘Alternative Uses of Functional Finance: Lerner, MMT and the Sraffians,’ working paper 175, Institute for International Political Economy Berlin, Berlin School of Economics and Law.
- Summers, L.H. 2014. ‘US Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound.’ *Business Economics*, 49(2), 65–73.

Model Appendix

The analytical results described in the text can be derived from the following model based on Fazzari et al. (2020) modified to incorporate interest income from public debt service and proportional taxes on both GDP and interest income. Also see Fazzari (2024, 2026) and Fazzari and González (2025) for further explanation of the model structure, empirical evidence, and interpretation.

Consumption (C_t) t is determined by expected after-tax labor income and interest income paid on the household sector’s stock of government debt (rD_t):

$$C_t = (1 - s_Y)(1 - \tau_Y)(1 + E g_t)Y_{t-1} + (1 - s_r)(1 - \tau_r)rD_t \quad (A1)$$

where s_Y and s_r are saving rates out of labor and interest income, τ_Y and τ_r are tax rates on labor and interest income. Capital investment is set by firms to achieve a target capital output ratio ($\hat{v}_t$):

$$I_t = K_{t+1} - (1 - \delta)K_t = \hat{v}_t(1 + Eg_t)^2Y_{t-1} - (1 - \delta)K_t \quad (\text{A2})$$

where δ is the geometric depreciation rate. The target capital-output ratio at any point in time adjust toward a long-run value v^* :

$$\hat{v}_t = (1 - \lambda)v_{t-1} + \lambda v^* \quad (\text{A3})$$

The value of v^* depends on technology as well as the long-run rate of capacity utilization chosen by firms. Autonomous demand grows at a constant rate :

$$Z_t = (1 + g^*)Z_{t-1}. \quad (\text{A4})$$

Growth expectations adjust adaptively:

$$g_t = (1 - \alpha)g_{t-1} + \alpha Eg_{t-1} \quad (\text{A5})$$

Equations A1 through A5 determine the demand side of the model and output is determined by aggregate demand (Y_t^D):

$$Y_t = Y_t^D = C_t + I_t + Z_t \quad (\text{A6})$$

subject to the constraint that output not exceed a ceiling imposed by aggregate supply.

Supply is determined by available labor hours (L_t) and labor productivity (A_t):

$$Y_t^S = A_t L_t. \quad (\text{A7})$$

Assume a target utilization rate low enough that capital, which is produced endogenously, is not a constraint on output for realistic levels of demand. The unemployment rate (u_t) is:

$$u_t = 1 - Y_t/Y_t^S. \quad (\text{A8})$$

As in Fazzari et al. (2020), both the growth of labor supply (g_t^L) and the growth of productivity (g_t^A) as negative functions of the lagged unemployment rate:

$$g_t^L = \theta_0 - \theta_1 u_{t-1} \quad (\text{A9})$$

$$g_t^A = \rho_0 - \rho_1 u_{t-1} + \rho_2 (g_{t-1}^K + \delta). \quad (\text{A10})$$

For a given, uniform growth rate of Z_t , the equilibrium share of autonomous demand in output (γ^*) satisfied a generalization of Harrod's warranted rate of growth:

$$g^* = \frac{(1 - \tau_Y)s_Y + \tau_Y - (1 - s_r)(1 - \tau_r)rd^* - \gamma^*}{v^*} - \delta \quad (\text{A11})$$

The steady-state output path follows autonomous demand multiplied by the “supermultiplier:”

$$Y_t = \frac{Z_t}{(1 - \tau_Y)s_Y + \tau_Y - v^*(g^* + \delta)} = \frac{Z_t}{\gamma^*}$$

If the “hysteresis effects” from A9 and A10 are positive ($\theta_1 + \rho_1 > 0$) the growth rate of aggregate supply converges to the dynamic demand path and an equilibrium unemployment rate.

Therefore, supply accommodates demand as long as the equilibrium unemployment rate remains above its minimum value determined by labor supply demographics.

When there is consumption out of interest ($s_r < 1$), γ^* depends on the debt-output ratio d^* . In long-run equilibrium, γ^* and d^* simultaneously solve the warranted growth rate equation from (A11):

$$\gamma^* = (1 - \tau_Y)s_Y + \tau_Y - (1 - s_r)(1 - \tau_r)rd^* - v^*(g^* + \delta). \quad (A12)$$

and the steady-state debt-output ratio from equation 2 in the text:

$$\gamma^* = d^*[g^* - (1 - \tau_r)r] + \tau_Y. \quad (A13)$$

The total derivatives of A12 and A13 are:

$$(d\gamma^*) = -s_Y(d\tau_Y) + (d\tau_Y) - (1 - s_r)(1 - \tau_r)r(dd^*) - v^*(dg^*) \quad (A14)$$

$$(dd^*) = \left[\frac{1}{g^* - r(1 - \tau_r)} \right] [d\gamma^* - d\tau_Y - d^*(dg^*)] \quad (A15)$$

Define a term ϕ that will be positive if there is consumption out of interest income:

$$\phi = \frac{(1 - s_r)(1 - \tau_r)r}{g^* - r(1 - \tau_r)} \quad (A16)$$

Solve for the derivative of d^* with respect to the growth rate by plugging A14 into A15 and setting $d\tau_Y = 0$:

$$\frac{dd^*}{dg^*} = \frac{-(v^* + d^*)}{g^* - r(1 - \tau_r)} \left(\frac{1}{1 + \phi} \right) < 0 \quad (A17)$$

and the derivative of d^* with respect to the income tax rate:

$$\frac{dd^*}{d\tau_Y} = \left[\frac{-s_Y}{g^* - r(1 - \tau_r)} \right] \left(\frac{1}{1 + \phi} \right) < 0 \quad (A18)$$