

# Putting the Finance Back in Public Finance

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# Massive Fiscal Expansion

- ▶ Government debt expanded massively since the GFC and Covid-19 crises, across many countries
- ▶ But nowhere more than in the United States
  - ▶ Outstanding U.S. federal debt held by the public is \$29 trillion in August 2025
  - ▶ Tripled from 35% of GDP before the GFC to 100% of GDP in 2025

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- ▶ Fiscal expansion during Covid-19 was much larger in the U.S. than elsewhere
  - ▶ CARES Act, Response & Relief Plan, and American Rescue Plan added 11.5% of GDP
  - ▶ 3 times more than Italy, France, Spain relative to GDP

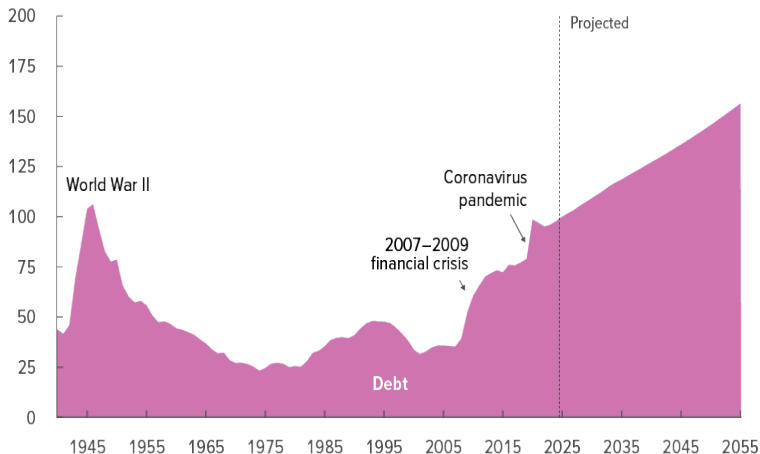
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- ▶ August 2025 One Big Beautiful Bill will add a lot more debt
  - ▶ Adds \$4.1 trillion to debt over 2025-34
  - ▶ Raising debt/GDP by 2034 by 9.5% of GDP relative to Jan 2025 baseline forecast
  - ▶ Become \$5.0 trillion and 11.5% of GDP if temporary provisions are made permanent

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- ▶ U.S. debt now predicted to grow to well over 160% of GDP by 2055

# Massive Fiscal Expansion



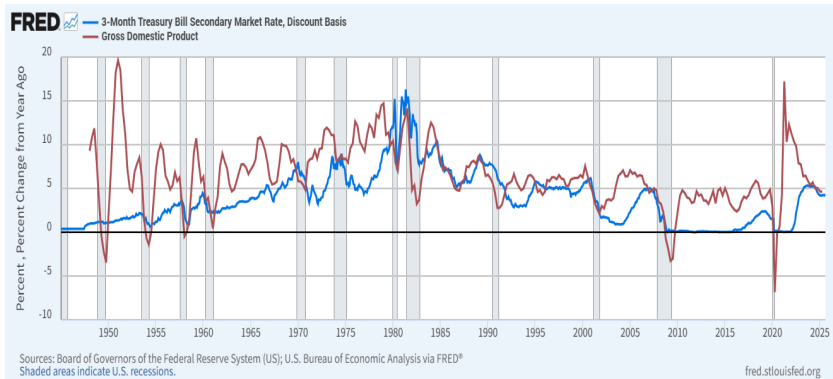
▶ Source: Committee for a Responsible Federal Budget, Congressional Budget Office.

▶ To be revised up once OBBB is incorporated

# What is U.S. Fiscal Capacity?

- ▶ Key questions for economists and policymakers:
  - ▶ Can the U.S. federal government easily borrow trillions more?
  - ▶ Can it do so without jeopardizing the safety of its debt and its exorbitant privilege as the global safe haven asset?
  - ▶ Or should the U.S. federal government start reducing the deficit to avoid a debt market crash?
  - ▶ And if so, how much time is there left before it must begin to take action?

# Blanchard: “public debt may have no fiscal cost”



- ▶ In 2019, Blanchard’s AEA presidential address argued that the U.S. can safely roll over its debt since  $r^f < g$ .

# Key Equation for the Government Bond Portfolio

- ▶ Revisit this question bringing in considerations of **risk**
- ▶ Government debt is backed by current and future primary surpluses.
- ▶ Iterate forward on the government budget constraint:

$$G_t + Q_{t-1}^1 = \sum_{h=1}^H (Q_t^h - Q_{t-1}^{h+1}) P_t^h + T_t,$$

- ▶ Impose no-arbitrage:  $P_t^h = \mathbb{E}_t [M_{t,t+1} P_{t+1}^{h-1}]$ ,  $\forall h \leq H$

$$D_t = \sum_{h=0}^H Q_{t-1}^{h+1} P_t^h = \mathbb{E}_t \left[ \sum_{j=0}^T M_{t,t+j} (T_{t+j} - G_{t+j}) \right] + E_t [M_{t,t+T} D_{t+T}]$$

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- ▶ Impose a TVC:  $E_t [M_{t,t+T} D_{t+T}] \rightarrow 0$  as  $T \rightarrow \infty$ 
  - ▶ TVC can hold even if  $r^f < g$

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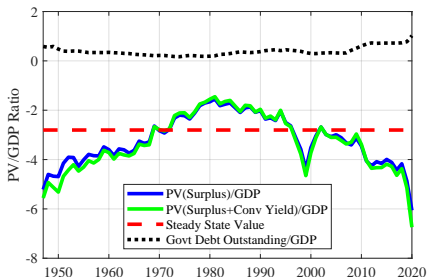
$$\underbrace{D_t = \sum_{h=0}^H Q_{t-1}^{h+1} P_t^h}_{\text{the market value of government debt}} = \mathbb{E}_t \left[ \underbrace{\sum_{j=0}^{\infty} M_{t,t+j} (T_{t+j} - G_{t+j})}_{\text{the expected risk-adjusted PDV of future primary surpluses}} \right]$$

- ▶ Holds ex-ante both in real and nominal terms
- ▶ Can be extended to allow for sovereign default risk

# The U.S. Public Debt Valuation Puzzle

$$D_t = \mathbb{E}_t \left[ \sum_{j=0}^{\infty} M_{t,t+j} (T_{t+j} - G_{t+j}) \right]$$

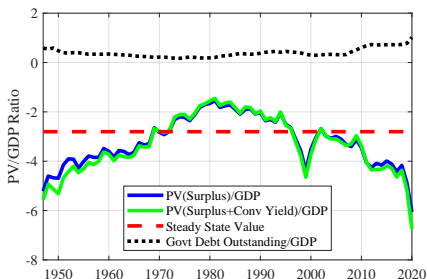
- ▶ Rich VAR model of fiscal dynamics  $\{T_t, G_t\}$
- ▶ Realistic model of risk  $M_{t,t+j}$



Source: Jiang, Lustig, Van Nieuwerburgh, Xiaolan, *Econometrica* 2024

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Source: Jiang, Lustig, Van Nieuwerburgh, Xiaolan, *Econometrica* 2024

- ▶ The MV of public debt is **much higher** than the risk-adjusted PDV of surpluses: gap is 360% of GDP on average
- ▶ Gap grows to 700% by 2020

# Understanding the Puzzle with Asset Pricing Logic

$$D_t = \mathbb{E}_t \left[ \sum_{j=0}^{\infty} M_{t,t+j} (T_{t+j} - G_{t+j}) \right]$$

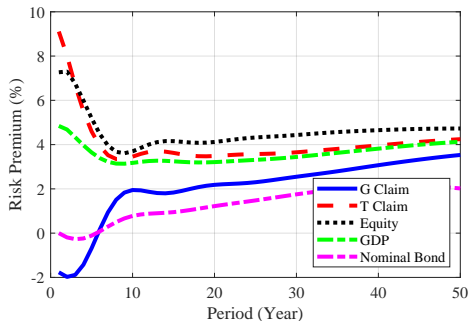
- ▶ A representative investor who buys all government debt issuances and receives all redemptions has a claim to future primary surpluses  $\{T_{t+j} - G_{t+j}\}$ . Surpluses are the **cash flows on this investment strategy**.
- ▶ At **business-cycle frequency**, these cash-flows are highly pro-cyclical
  - ▶ Tax revenues/GDP pro-cyclical
  - ▶ Government spending/GDP counter-cyclical
  - ▶ In recessions, Treasury is net issuer of debt = investor has negative cash flows
  - ▶ Cash flows have wrong-way business cycle risk  $\Rightarrow$  surplus claim carries business-cycle risk premium (just like dividend claim)

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- ▶ At **business-cycle frequency**, these cash-flows are highly pro-cyclical
- ▶ At **lower frequency**, these cash-flows comove with GDP
  - ▶ Tax revenue is cointegrated with GDP
  - ▶ Government spending is cointegrated with GDP
  - ▶ GDP carries substantial long-run risk (high equity risk premium)
  - ▶  $\{T\}$  and  $\{G\}$  claims inherit this risk (just like dividend claim)

# Government Debt Risk Premium Puzzle



Source: Jiang, Lustig, Van Nieuwerburgh, Xiaolan, *Econometrica* 2024

- ▶ Correct discount rate for surplus claim = govt debt portfolio is **not** the risk-free bond yield
- ▶ Much higher than average risk-free yield due to short- and long-term risk premia

# U.S. Public Debt Valuation Puzzle

- ▶ **Puzzle:** Government debt is positive while surplus claim has negative value when measured in the data

$$D_t > 0 > \mathbb{E}_t \left[ \sum_{j=0}^{\infty} M_{t,t+j} (T_{t+j} - G_{t+j}) \right]$$

- ▶ Equivalently, interest rates on the government bond portfolio in data are much lower than the **risk-adjusted** “interest rate” on the surplus claim.
- ▶ U.S. government seems to enjoy **excess fiscal capacity** relative to what is justified by fiscal/macro fundamentals

# Public Debt Valuation Puzzle in Return Space

- ▶ Modigliani-Miller for the Treasury

$$\begin{array}{c} \textit{Treasury Balance Sheet} \\ \hline \text{Tax Revenue } P_t^T \quad \left| \quad \begin{array}{l} \text{Govt Spending } P_t^G \\ \text{Debt } D_t = P_t^T - P_t^G \end{array} \end{array}$$

- ▶  $D = PDV(T - G) \Leftrightarrow$  Risk premium on government bond portfolio:

$$\mathbb{E}_t \left[ R_{t+1}^D - R_t^f \right] = \frac{P_t^T}{D_t} \mathbb{E}_t \left[ R_{t+1}^T - R_t^f \right] - \frac{P_t^G}{D_t} \mathbb{E}_t \left[ R_{t+1}^G - R_t^f \right]$$

- ▶ In our model with realistic fiscal cash flows and asset prices:

$$\mathbb{E}_t \left[ R_{t+1}^D - R_t^f \right] > \mathbb{E}_t \left[ R_{t+1}^T - R_t^f \right] > \mathbb{E}_t \left[ R_{t+1}^G - R_t^f \right]$$

- ▶ Government debt investors have a **net long** position in a claim that is exposed to the same long-run cash flow risk as GDP and that has a lot of short-run cash-flow risk

- ▶ But in U.S. data:  $\mathbb{E}_t \left[ R_{t+1}^D - R_t^f \right]$  is only 1.1% per year.

# Manufacturing Risk-free Government Debt

- ▶ If the government wants to keep debt risk-free,  $\beta^D = 0$ , then given a spending policy  $\{G\}$ , it must set tax revenues  $\{T\}$  such that

$$\beta_t^T = \frac{P_t^G}{D_t + P_t^G} \beta_t^G < \beta^G.$$

- ▶ Jiang, Lustig, Van Nieuwerburgh, and Xiaolan (2025) study what this constraint implies for  $\{T\}$  given realistic processes for  $\{G\}$  and  $\{D\}$
- ▶ Conclude that insisting on safe debt allows for **very limited** tax reductions in bad times
- ▶ Trade-off between insuring bond holders (keeping debt safe) and tax payers; steeper when outstanding debt  $D_t$  is already high
- ▶ Observed tax policy suggests that governments prefer to insure taxpayers  $\Rightarrow$  debt is risky ( $\beta^D > \beta^T > \beta^G$ )

# Exorbitant Privilege Gained and Lost

- ▶ Previous global hegemon also enjoyed excess fiscal capacity, but only during their time as hegemon
  - ▶ Holland/Netherlands 1601–1794 versus 1817–1914
  - ▶ United Kingdom 1729–1946 versus 1947–2020
  - ▶ United States 1793–1946 versus 1947–2020

	NL		UK		USA	
	1601-1794	1817-1914	1729-1946	1947-2020	1793-1946	1947-2020
$D/Y$	118.9	59.1	87.1	53.6	16.5	40.0
$PV(S)/Y$	75.3	60.6	64.9	85.5	21.1	12.8

Source: Chen, Jiang, Lustig, Van Nieuwerburgh, Xiaolan, *JPE* 2025

- ▶ Bond markets bestow global hegemon status on country with strongest *relative* fiscal fundamentals at that time; force all other countries to live within their fiscal means
- ▶ Will U.S. be able to hang onto its privileged status?

# Potential Resolutions of the Puzzle?

## Convenience Yields

- ▶ Treasury bonds paying lower yields than implied by SDF:

$$E_t[M_{t+1}P_{t+1}^K] = P_t^{K+1}e^{-\lambda_t}.$$

- ▶ Debt now also backed by convenience services that Treasuries offer:

$$D_t = E_t \left[ \sum_{j=0}^{\infty} M_{t,t+j} \left( T_{t+j} - G_{t+j} + (1 - e^{-\lambda_{t+j}})D_{t+j} \right) \right]$$

# Convenience Yields

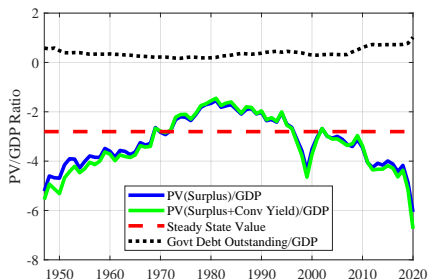
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- ▶ Too small; discount rate effect offsets cash flow effect (conv yield seigniorage claim has long-run risk)



## Aside: Convenience Yields Within Euro Zone

- ▶ Currency unions like the EZ have a common risk-free rate
- ▶ Variation in the market value of debt across EZ members must reflect either variation in default risk or in convenience yields (Jiang, Lustig, Van Nieuwerburgh, and Xiaolan, 2025)
  - ▶ From 2002-08, CY were small, similar across countries, and drive 100% of relative bond yield movements
  - ▶ From 2008-24, CY were larger, more heterogeneous, and drive 38% of relative bond yield movements
  - ▶ **fiscal situation** is important driver of CY differentials in TS & CS
- ▶ If all countries had the same CY as Germany over euro era, fiscal revenue would have been 4% of GDP higher
- ▶ Sovereign bond CY spill over onto corporate bond market

# Bubble in Treasuries

- ▶ Bond markets are not enforcing the TVC on govt bond portfolio
  - ▶ Bubble = value of outstanding debt – value of surplus claim
  - ▶ We quantify the size of the bubble at 360% of GDP unconditionally
  - ▶ Brunnermeier, Merkel, and Sannikov (2024) link presence of bubble to risk-sharing benefits of government debt

## Bubble in Treasuries

- ▶ Bond markets are not enforcing the TVC on govt bond portfolio
- ▶ But, TVC may very well hold given large risk premium on debt;  
 $r^f < g$  is not the relevant condition (even if debt is risk-free);  
 $r^f + rp > g$

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 $r^f + rp > g$
- ▶ TVC violations are hard to sustain in the presence of long-lived investors (Santos and Woodford, 97)
- ▶ If Treasury can run Ponzi scheme, why not AAA-rated corporates?
- ▶ If risk sharing benefits are so important, why do countries with much more idiosyncratic risk not see larger debt bubbles?

# Government Assets

- ▶ Government assets lower **net** government debt held by the public by only 8.8% of the GDP; makes little difference for the puzzle
- ▶ Other assets (national park land, defense assets, critical infrastructure, etc.) arguably off limits for political and military-strategic reasons
- ▶ Massive off-balance sheet **liabilities** (Medicare, Social Security) will further **deepen** the puzzle in the future

# The Dogs that Did Not Bark

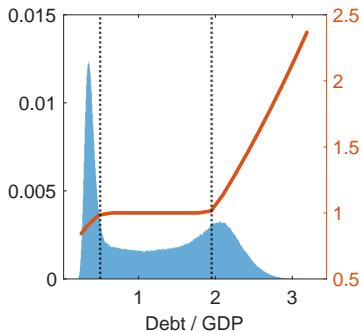
- ▶ Could today's high market value of debt reflect higher future surpluses or lower future discount rates?
- ▶ Jiang, Lustig, Van Nieuwerburgh, and Xiaolan (JF 2024) find that, in historical data, the debt/GDP ratio has neither forecasted higher future surpluses nor lower future debt returns, once statistical issues are dealt with. Instead, a high debt/GDP ratio has forecasted higher future debt/GDP ratios.
- ▶ Large structural increase in the mean debt/GDP ratio after 2007 obscures surplus predictability
- ▶ This structural break in mean debt/GDP ratio could reflect
  - ▶ Overly optimistic forecasts of future surpluses
  - ▶ Increased holdings of treasuries by foreigners and Central Bank
  - ▶ A change in fiscal policy regime (Corhay et al. 2023)

# The Austerity Threshold

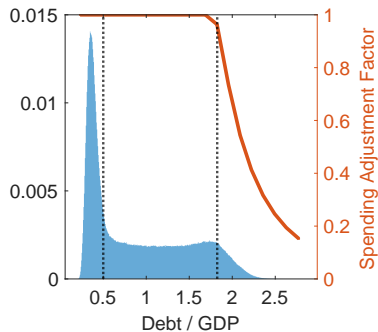
- ▶ Possible that higher future surpluses will be forthcoming, but only when absolutely necessary. Have not seen this in historical data.
- ▶ Elenev, Landvoigt, and Van Nieuwerburgh (2025) develop a full-fledged globally-solved New-Keynesian model with govt, banking, firm, and two household sectors to investigate this
- ▶ Assume that primary surpluses will be increased when the **austerity threshold** for debt/GDP is crossed
  - ▶ Algo to solve for threshold: highest debt/GDP ratio s.t. adjustment can no longer be delayed if debt is to remain default-free
  - ▶ Two austerity regimes: higher taxes or lower govt. spending

# The Austerity Threshold

- Find threshold of 195% of GDP in tax austerity regime and 183% of GDP in spending austerity regime



(a) Tax Austerity



(b) Spending Austerity

Source: Elenev, Landvoigt, Van Nieuwerburgh WP 2025

# The Austerity Threshold

- ▶ Find threshold of 195% of GDP in tax austerity regime and 183% of GDP in spending austerity regime
- ▶ Threshold depends on key model parameters
  - ▶ risk aversion
  - ▶ labor supply elasticity
  - ▶ share of households that are hand-to-mouth
  - ▶ share of govt debt that is short-term
  - ▶ financial repression (LCR regulation)
  - ▶ monetary policy credibility

# The Austerity Threshold

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# The Austerity Threshold

- ▶ Find threshold of 195% of GDP in tax austerity regime and 183% of GDP in spending austerity regime
- ▶ Threshold depends on key model parameters
- ▶ Much lower threshold of 110% of GDP if there is **uncertainty** over which austerity regime will occur (changes in political control)
- ▶ **Upshot:** Monetary and fiscal policy can both remain **active** for long periods of time, but not forever

# Conclusion

- ▶ Looking at the market value of government debt through a modern finance lens creates a puzzle
  - ▶ A portfolio strategy that buys all outstanding Treasuries produces risky cash flows
  - ▶ When sources of aggregate risk reflected in bond and stock prices are adequately quantified, substantial risk premium on debt portfolio results
  - ▶ Implies that bond yields are puzzlingly low, esp. post-GFC
- ▶ Interpretations:
  1. Bubble: Bond market investors fail to enforce the TVC
  2. Convenience yields could be much larger than we think
  3. Treasury debt could be mispriced—investors hold optimistic beliefs about future fiscal rectitude
  4. Fiscal adjustment will eventually start, once economy crosses the austerity threshold, but have not seen this in historical data

## Where have all the bond market vigilantes gone?



Maybe they are getting ready?

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