Discussion of "Admissible Surplus Dynamics and the Government Debt Puzzle"

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Introduction

- Thought provoking paper in an important line of research.
- Goal of paper: to "resolve" the debt valuation puzzle in Jiang, Lustig, van Nieuwerburgh, and Xiolan 2022 and subsequent papers (henceforth JLNX).
- Approach: estimates the surplus process that:
  - Is associated with a stationary debt-to-GDP process,
  - Is feasible given the span of the treasuries issued by the government, and
  - Satisfies the government budget and transversality conditions.
- My discussion comments:
  1. Unclear that Debt-to-GDP is stationary,
  2. Government can and has changed the span of their debt portfolio, and
  3. Key economic questions remain unanswered.

The JLNX "Puzzle": US Debt Not "Fiscally-Backed" After WW2

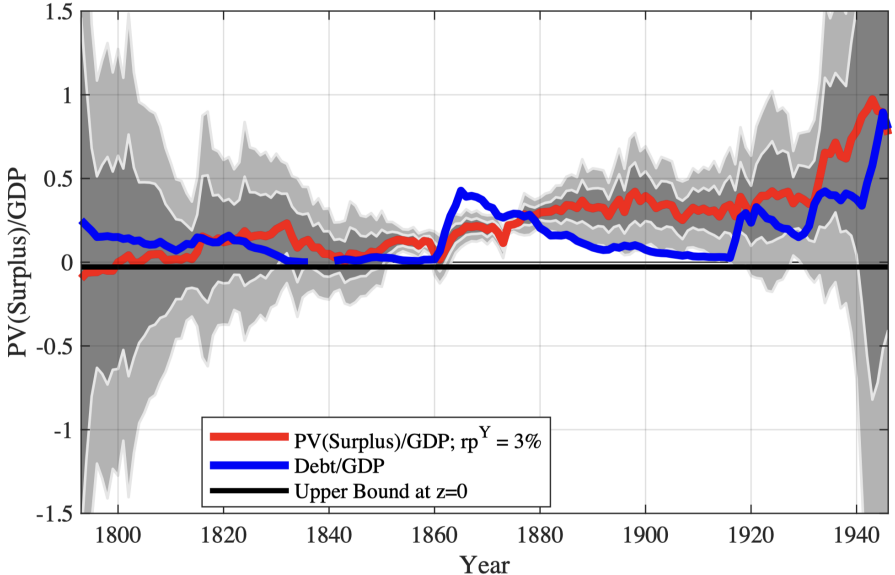
- Under no arbitrage, the market value of government debt, D_t, theoretically satisfies:

$$\underbrace{\frac{D_t}{Y_t}}_{\text{Debt/GDP}} := \frac{1}{Y_t}\mathbb{E}_t\left[\sum_{j=0}^{\infty}\underbrace{M_{t,t+j}}_{\text{SDF}}\left(\underbrace{T_{t+j}}_{\text{Taxes}} - \underbrace{G_{t+j}}_{\text{Spending}} + \underbrace{\psi_{t+j}}_{\substack{\text{Convenience yield}\\ \text{seigniorage revenue}}}\right)\right] + \underbrace{\lim_{j\to\infty}\mathbb{E}_t[M_{t,t+j}D_{t+j}]}_{\text{Bubble term}}$$

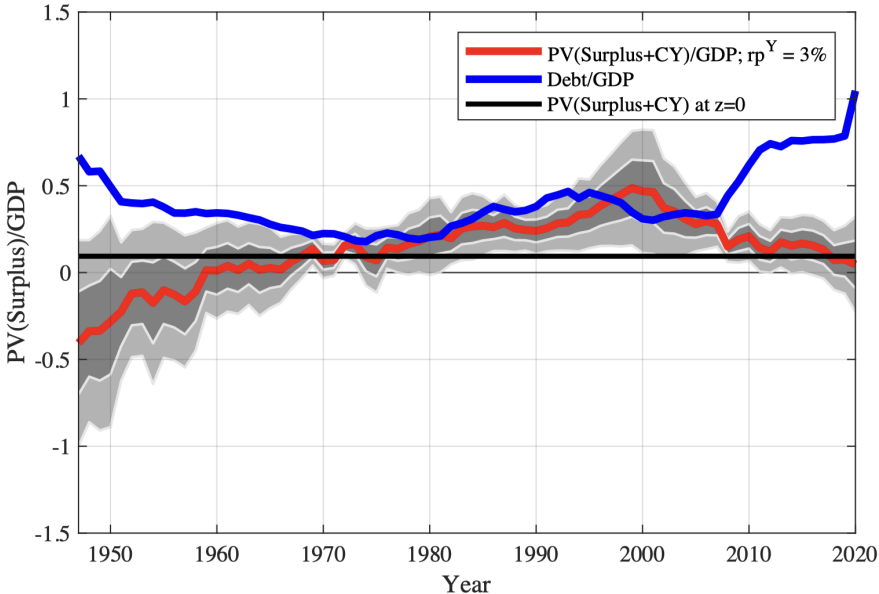
- JLNX estimate the RHS, denoted as V_t^s/Y_t and referred to as "**fiscal-backing**", by:
  - Estimating a stochastic process for surpluses $S_t = T_t - G_t$ using historical data.
  - Estimating an SDF to match yield curve and equity data.
  - Estimating the convenience yield using treasury-to-AAA spreads.
  - Imposing there is no bubble term (i.e. the Transversality Condition (TVC) holds).
  - Their first paper uses data from 1947-2022; follow-up uses data from 1793-2022.

- JLNX compare to market data and find that $D_t/Y_t > V_t^s/Y_t$ after WW2.

Dynamic Fiscal Backing: US (1793 – 1946)



Dynamic Fiscal Backing: US (1950 – 2022)



Potential "Resolutions" to the "Puzzle"

1. The valuation equation cannot be "tested" (e.g. Hansen-Roberds-Sargent 1991)
2. Surplus process in JLNX is "not correct" (e.g. Cochrane 2022,23, *This paper*).
3. US debt has a bubble component (e.g. Brunnermeier et al. 2022).
4. Institutional arrangements give US debt a special role (e.g. Payne-Szoke 2024).
5. Agents get utility from government debt (quantitative macro-finance literature).
6. Arbitrage opportunities exit (mentioned by this paper).

This Paper: JLNX Surplus Process Inconsistent With Debt Returns

- Government budget constraint and debt valuation equations give:

$$D_{t+1} = D_t R_{D,t+1} - s_{t+1}, \qquad \ldots \text{Gov. budget constraint}$$
$$V^s_{t+1} = V^s_t R_{S,t+1} - s_{t+1} \qquad \ldots \text{Recursive debt valuation}$$

- Authors observe: if $R_{D,t+1}$ and $R_{S,t+1}$ are exposed to different shocks (e.g. due to incomplete markets), then government budget constraint and TVC cannot both hold

  $\Rightarrow$ JLNX "puzzle" is mechanical.

- Authors show: $R_{D,t+1}$ and $R_{S,t+1}$ are exposed to different shocks in historical data

  ... which they interpret as evidence the government faces an incomplete debt market.

This Paper: Estimation Strategy

- Authors estimate processes for $[\ln(D_t/C_t), C_t/C_{t+1}, R_{D,t+1}, Z_t]$ s.t. the restrictions:
  - No-arbitrage, no convenience yield, and no bubble component (TVC holds),
  - Debt to consumption process, D_t/C_t , is stationary,
  - Asset pricing is consistent with treasury debt and equity returns.
    However, return on government debt portfolio, $R_{D,t+1}$ does NOT span the asset space:
    (i.e. there are time invariant restrictions on set/risk exposure of government liabilities)

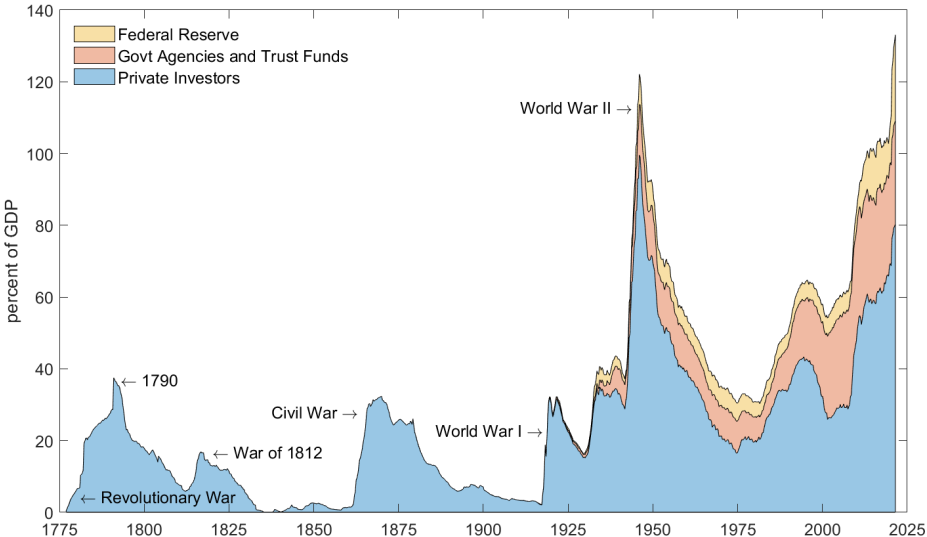
$$R_{D,t+1} - e^{r_t} = \alpha + \sum_{m=1}^{M} (\omega_1 w_{1,m} + \omega_2 w_{2,m} + \omega_3 w_{3,m})(e^{r_t + r x_{t+1}^{m-1}} - e^{r_t}) + u_{t+1}$$

    where $(w_{i,m})_{m \leq 3}$ are principal component of the yield curve price.

- Conceptually, the authors restrict their estimate to surplus processes that satisfy TVCs and can be generated from the implicit government portfolio restrictions.

  $\Rightarrow$ Their estimated surplus & SDF processes "resolve" the puzzle by construction.

Comment 1: Not Clear US Debt-to-GDP Process is Stationary



Comment 1: Not Clear US Debt-to-GDP is Stationary

- Looks to me like the debt-to-GDP process has a time-varying mean.
- Conceptually, this time-varying mean likely relates to demand function for US debt.
- E.g. Bretton-Woods changes the international role of the US dollar debt

  $\Rightarrow$ Shift in international US debt demand function.

  $\Rightarrow$ Higher mean debt-to-GDP ratio.

Comment 2: Govt. Can and Has Changed Liability Risk Exposure

- Government budget constraint & debt valuation equations:

$$D_{t+1} = D_t R_{D,t+1} - s_{t+1}, \qquad V^s_{t+1} = V^s_t R_{S,t+1} - s_{t+1}$$

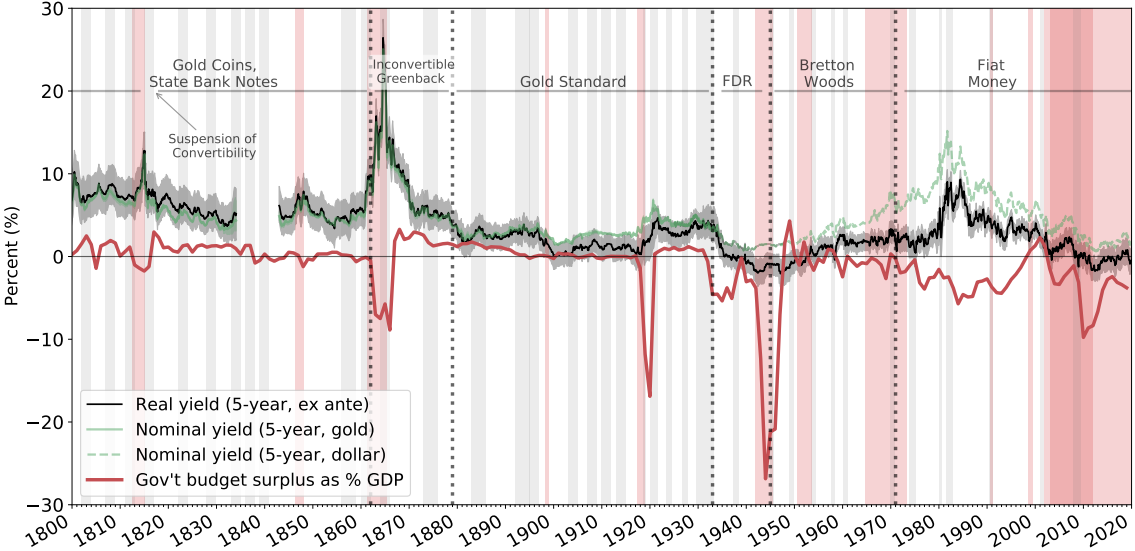
- Authors argue that $R_{D,t+1}$ only spans part of the state space historically.
- Interesting! But, government policy has often changed debt return risk exposure:
  - 1917-1939: Standardization of debt maturity and introduction of short term debt.
  - 1942-1951: Fed "fixes" the yield curve reducing government debt return risk exposure
  - 1950+: Monetary policy changes debt price exposure to business cycle.
  - 2008+: Quantitative easing again changed yield curve risk exposure.

Broader Comment 3: Is the Key Economic Question Being Addressed?

- **Q**: "Does the US government run surpluses when its real debt burden increases?"
- *History:* **A.** Yes. But this hasn't been tested for 80 years (until possibly now).
- *JLNX:* **A.** Not necessarily. Recent trends do not suggest forthcoming surpluses.
- *CHP:* **A.** Yes. D/C is stationary so surplus must ultimately response to fiscal distress.

JLNX and CHP have different "priors" because this question cannot be answered purely statistically $\Rightarrow$ need more model structure.

What Changed for the US Government in the Twentieth Century?



Conclusion

- Interesting and thought provoking paper that led to a long conversation with my coauthors.
- I encourage you to read it.
- My main comments are:
  1. Unclear that Debt-to-GDP is stationary,
  2. Government can and has changed the span of their debt portfolio, and
  3. Key economic questions remain unanswered.

Thank you