Paths Towards Prosperity

US Debt and Taxes: 1776-2023 by Thomas Sargent.

Trade-off

Treasury Balance Sheet

Assets	**Liabilities**
*PDV(T)***	*PDV(G)**
	D=Valuation of Treasurys

*Excluding Interest Expense ** Includes Seigniorage from convenience yields.

$$\beta^T = \frac{PVD(G)}{D+PVD(G)}\beta^G + \frac{D}{PVD(G)+D}\beta^D$$

- Treasurys are backed by future surpluses.
- **Treasury can't make risk disappear.**
- **Trade-off** between insuring bondholders and taxpayers:
  - **Insuring taxpayers** (against aggregate shocks) ➡️ *T* is risky, and *D* is risky (Lucas and Stokey (1983) tax smoothing).
  - **Insuring bondholders** (Manufacturing risk-free or zero-beta debt)➡️ *T* has to be safer than *G*
    - Safe assets earn convenience yields.

$$\beta^T = \beta^G \frac{PDV(G)}{PDV(G)+D}$$

Price Discovery in Treasury Markets

Mark-to-Market

Assets	**Liabilities**
PDV(T)	*PDV(G)**
	Valuation of Treasurys

*Excluding Interest Expense

- **Price discovery** in Treasury markets:
  - Bond markets enforce government debt valuation eqn.:

    News on PDV(Surpluses)=News on Treasury Valuation.

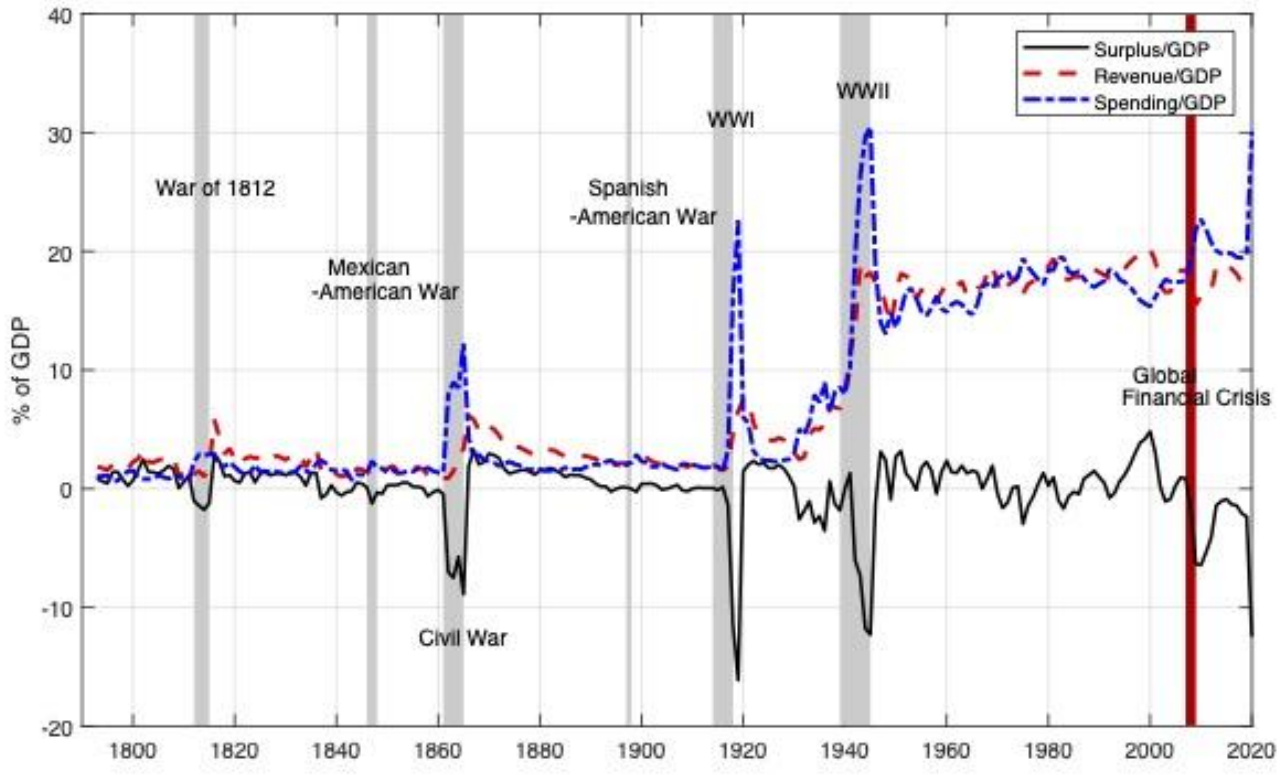
    - News about Surpluses should be priced into Treasurys
      - Higher Deficits➡️Higher Yields (expected inflation, term premium, real rates, or default risk)
      - If Debt is risk-free, then there is no news.

US Federal Government

During war tax rates should be set to

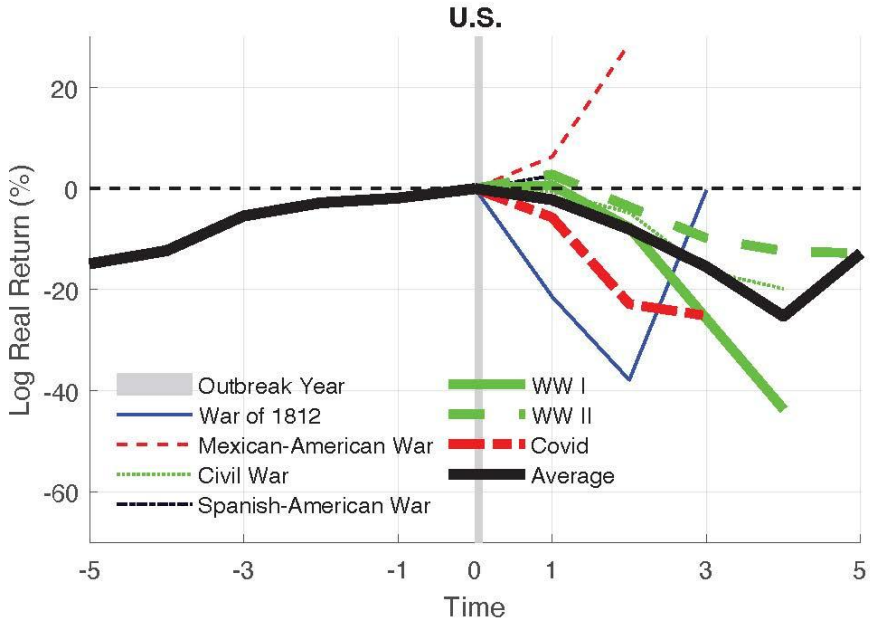
"provide a revenue at least equal to the annual expenses on a peace establishment, the interest on the existing debt, and the interest on the loans which may be raised. . . . ***losses and privations caused by war should not be aggravated by taxes beyond what is strictly necessary.****. " Galatin (1807).*

Hall and Sargent (2013)



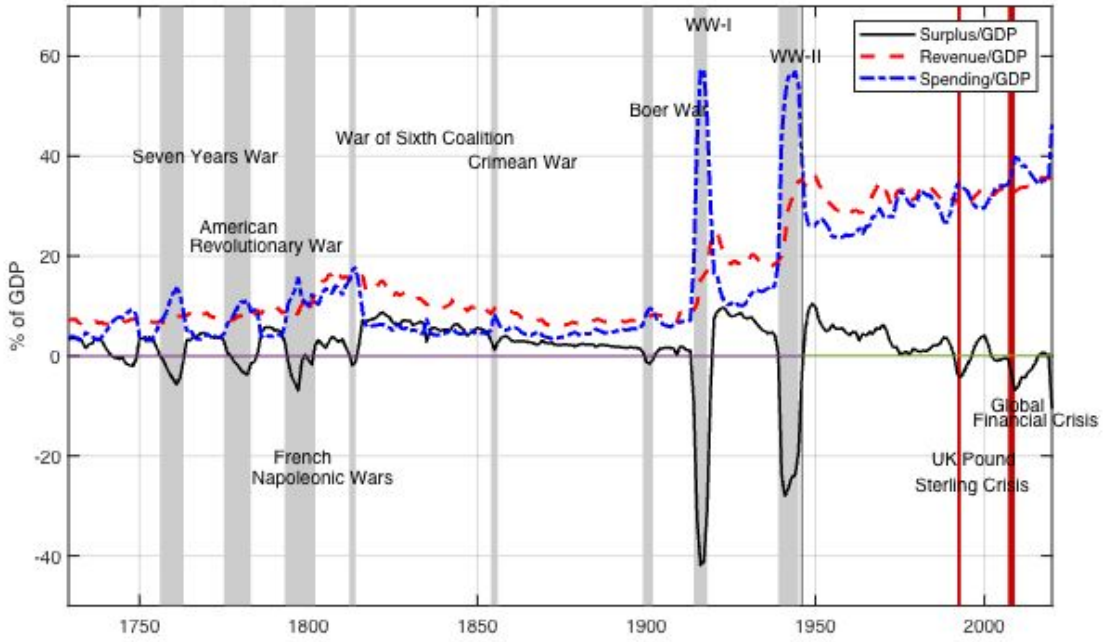
Wars and COVID

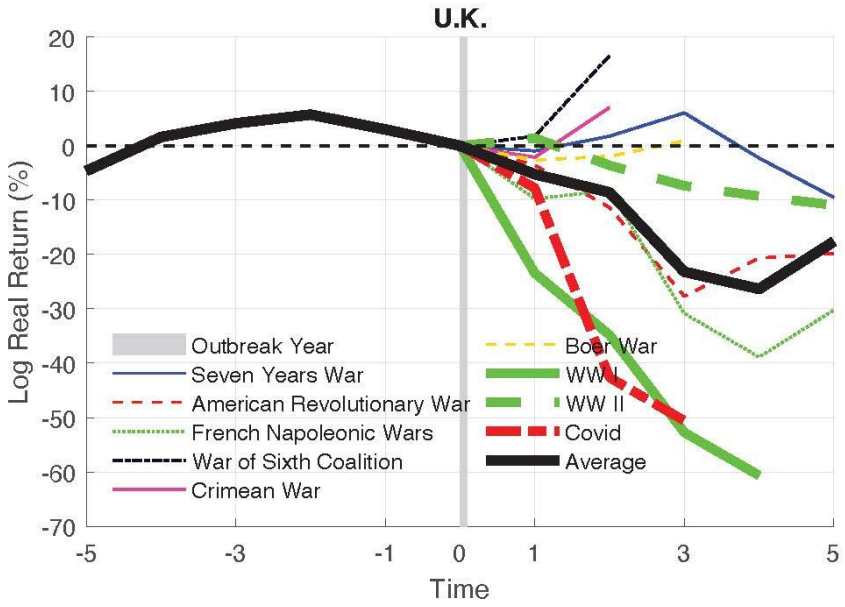
- COVID-episode looks a lot like wars (recent work by *Hall and Sargent (2022, 2023)*)
- Governments face trade-off between insuring bondholders and taxpayers.
  - Governments seem to favor shifting at least some of fiscal burden to **bondholders** (e.g., wars or COVID)
    - Implement Lucas and Stokey (1983) recipe.
    - During COVID, QE reduced duration of consolidated government's liabilities and reduced benefit to taxpayers. (see Fed mark-to-market losses)
  - **Government Debt is *not safe/risk-free* (or negative beta).**



see Hall, Payne and Sargent (2018)

UK Central Government





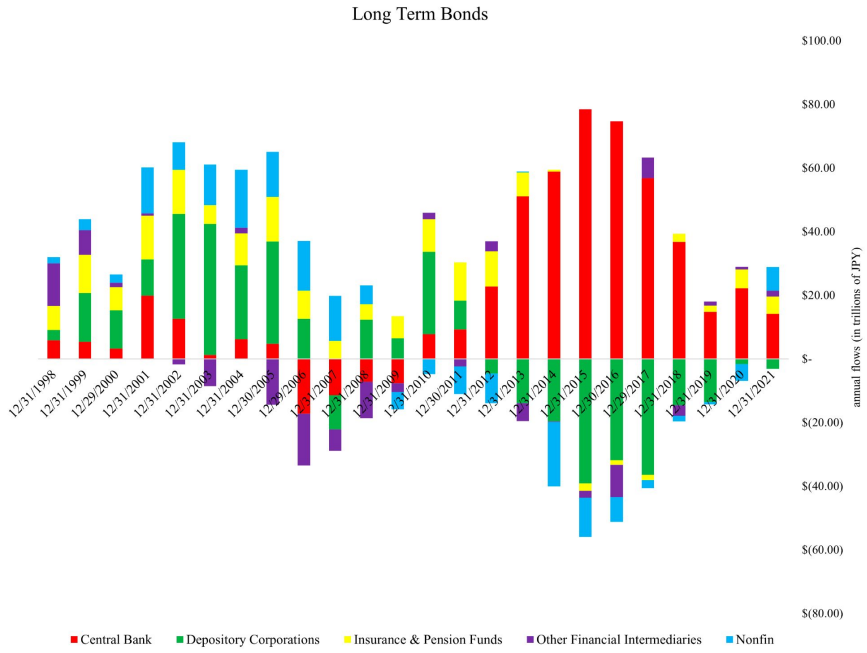
See Ellison and Scott (2017)

Low-rate and Slow M-to-M Policies

Low Real Rates and slow Mark-to-Market

- Long history of U.S. and other governments adopting low-rate policies in wars:
  - U.S: Civil war, WW-I, WW-II. (Financial repression) (recent work by *Payne et al.(2023)*)
- Recently: Central banks and financial regulators have again adopted low-rate policies.
  - Bank of Japan led the charge (now Yield Curve Control) (*What about Japan?*, *Chien, Cole and Lustig (2023)*.)
  - The ECB and the Fed have followed.
  - U.S: **COVID**. (recent work by *Hall and Sargent (2022, 2023)*)
- **Price Discovery** in Treasury markets slowed down and impaired

Purchases of JGBs.

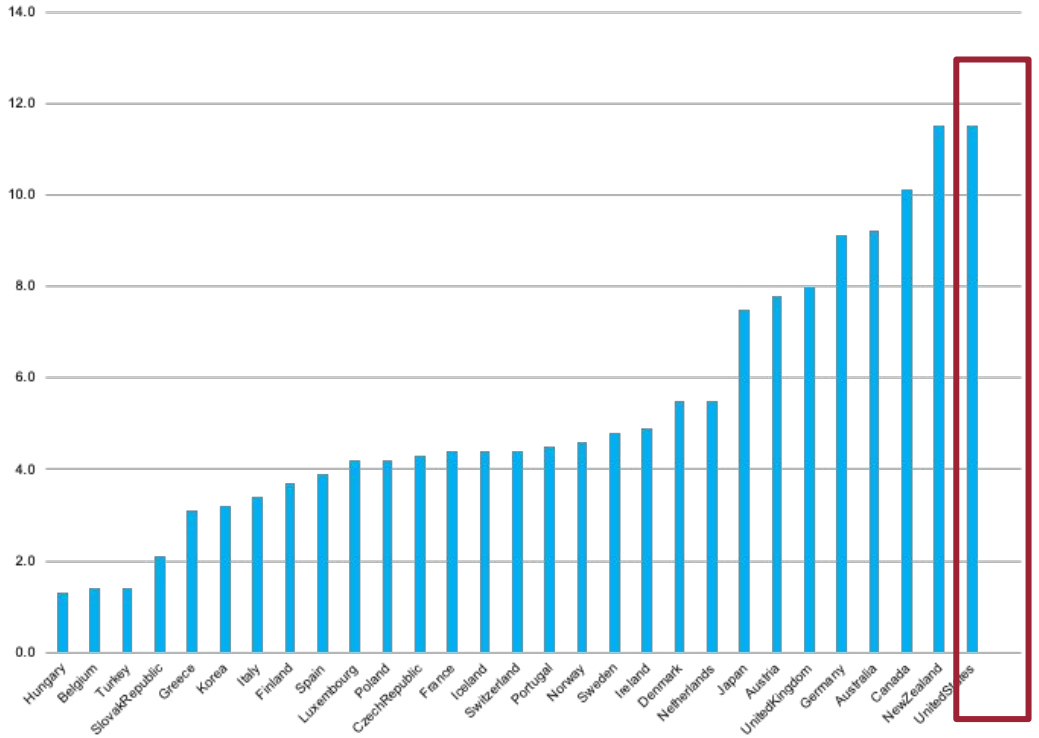


Taking the long view

Mini-Case study: COVID-19, March 2020.

1. $2 trillion *CARES act* on March 25, 2020.
   a. $480 billion income support.
   b. $274 billion on stimulus checks.
   c. $440 billion Paycheck Protection.
2. $900 billion *Response & Relief Plan* on Dec 2020.
3. $2 trillion *American Rescue Plan* in March 2021.

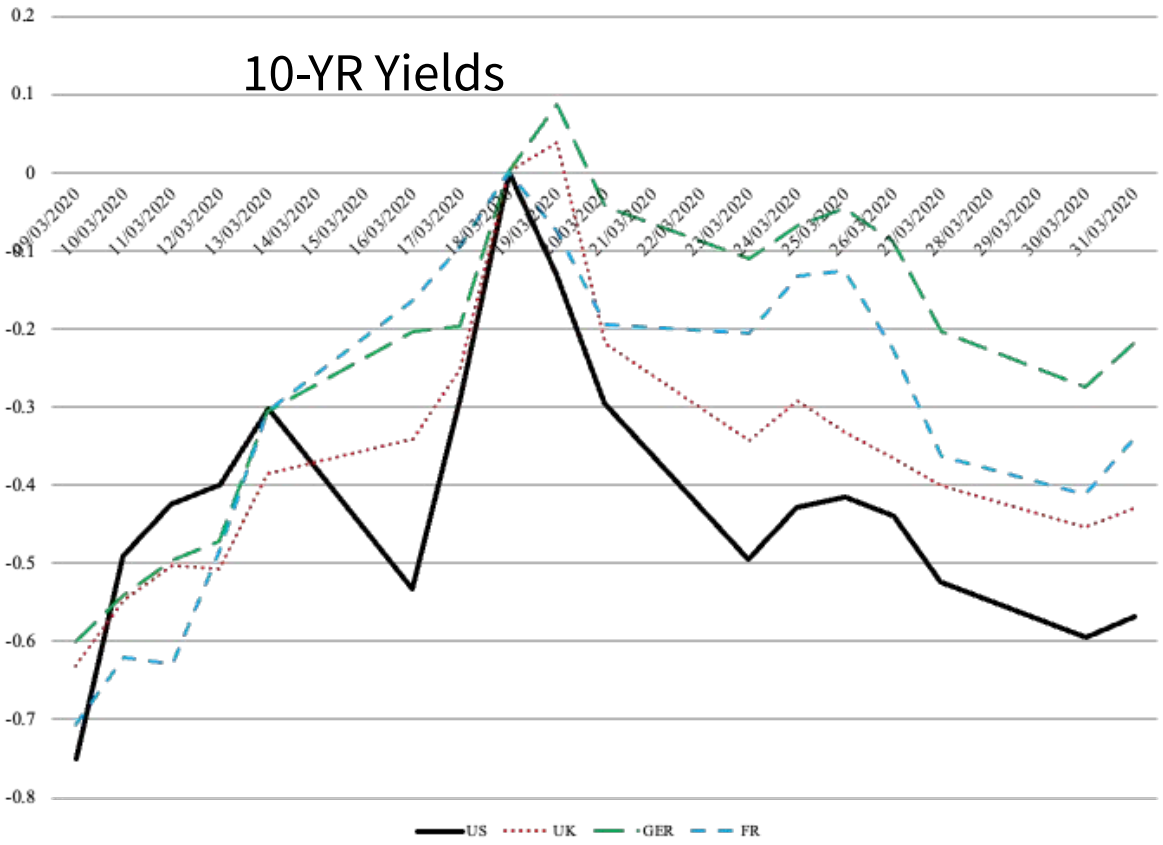
Between March and July of 2020, US outspent (11.5% of GDP) France, Italy or Spain by factor of 3.



Romer (2023)

Treasury markets aren't functioning

COVID-19, March 2020.

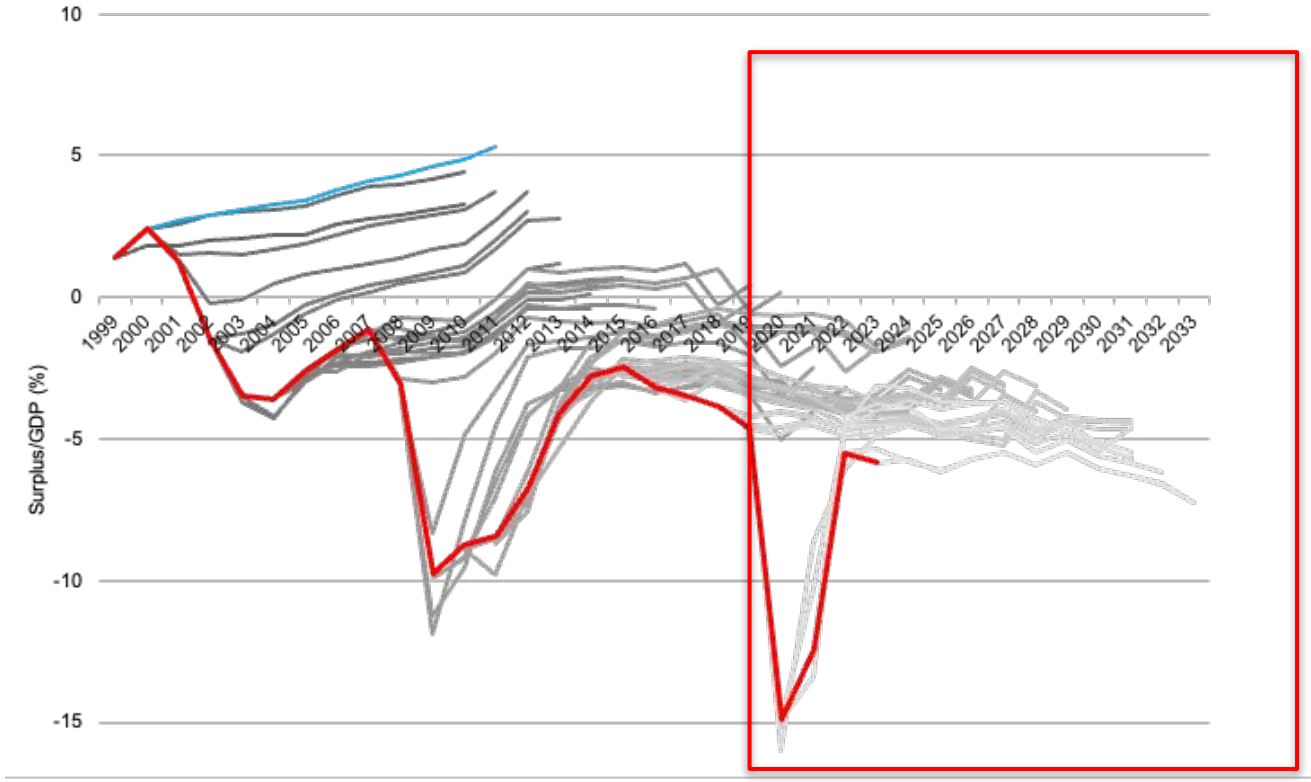


- 10 YR Treasury Yield ⬆️ by 70 bps between March 9 and March 18.
  - Perspective based on *recent* US experience (Gov Debt is risk-free): Treasury markets aren't functioning (Primary Dealers balance sheet capacity.)
    - We expect increase in *convenience yields* on USTR (as in GFC), but observe decrease
    - We expect negative *stock-bond correlation* (Campbell, Pflueger and Viceira, 2020), but observe positive correlation.

see He, Nagel and Song (2022)

Treasury markets are functioning

COVID-19, March 2020.



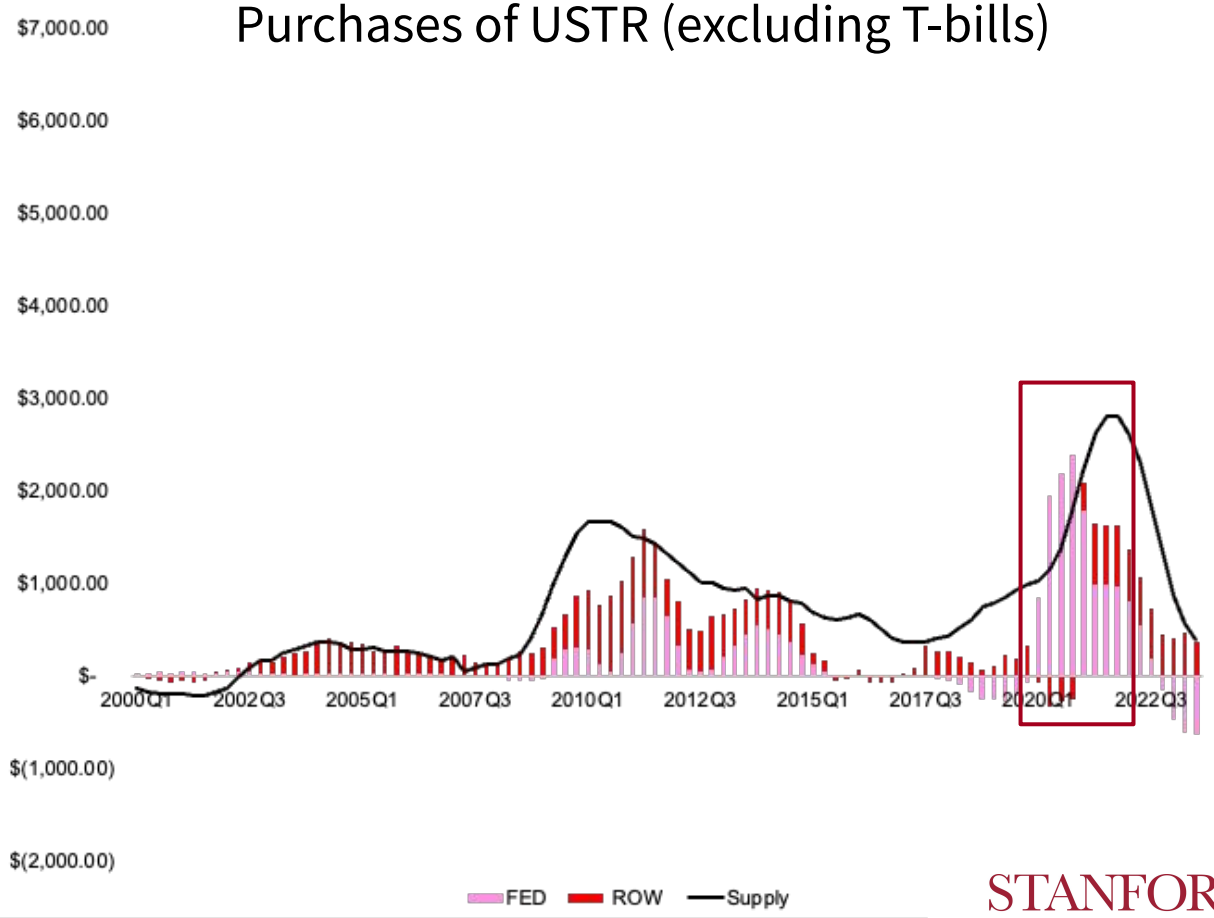
- 10 YR Treasury Yield ⬆️ by 70 bps between March 9 and March 18.
  - Largest post-war fiscal shock in the U.S.
  - Hall-Sargent Perspective based on *US and UK history* (Gov. Debt is risky)
    - Treasury markets are functioning.
    - Valuation of USTR has to backed by PDV(Surpluses)
    - Treasury yields have to increase to mark the valuation of all Treasurys to market.

Fed Intervention.

"Smooth functioning."

- On March 15, 2020, Fed announced purchases to support *"smooth functioning of Treasury markets"*
  - At least $500 billion in Treasurys
  - $200 billion in MBS.
- On March 23, 2020, Fed announced purchases were open-ended:
  - Using Fed balance sheet to warehouse USTR.
- Fed hits ⏸️ on Mark-to-Market
  - Excluding T-bills, the Fed had absorbed 99% of Bond and Note issuance.
- Suspension of SLR (excluding USTR)

Purchases of USTR (excluding T-bills)

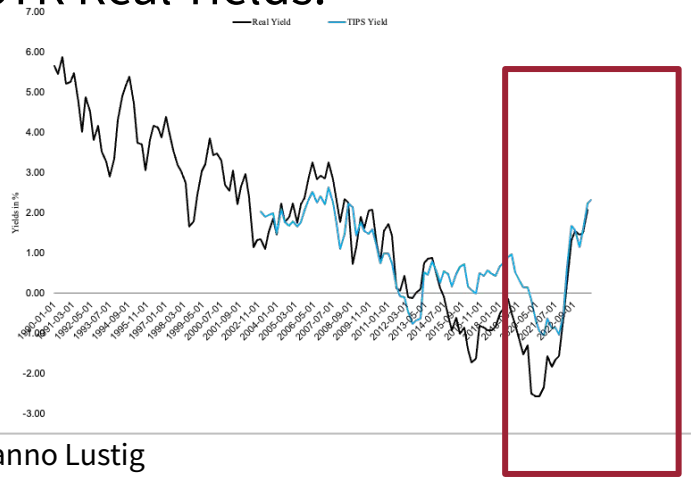


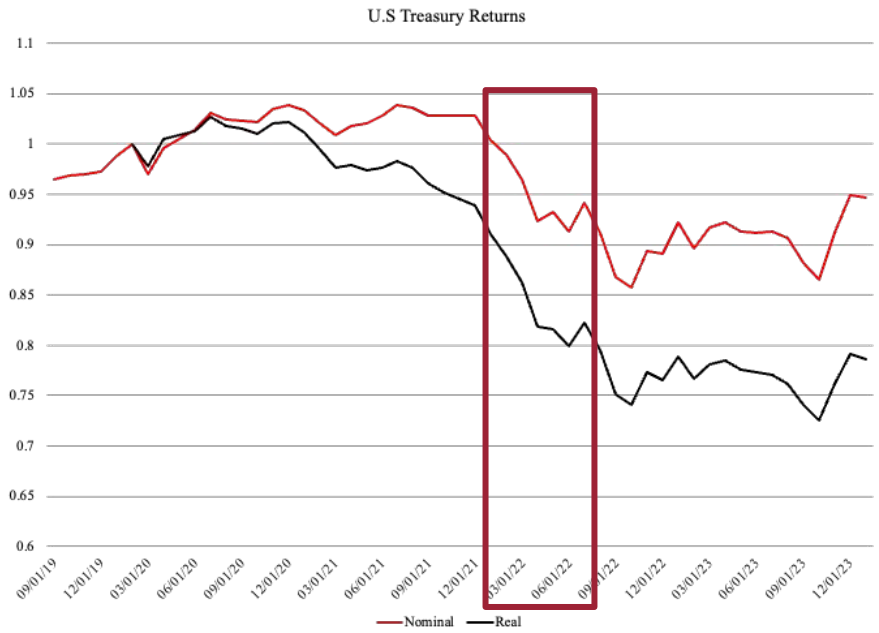
Fed stops intervening

Markets are functioning.

- QT starts in March 2022.
- Fed stops warehousing USTR.
  - Fed hits ⏯️ on Mark-to-Market in March 2022 by announcing 🛑 of large-scale asset purchases
- Real 10-year yields ⬆️ by more than 300 bps.

10-YR USTR Real Yields.





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Slowing down mark-to-market

Low-rate policies

Things Central Bankers will Say *(Zero beta view of Debt)*

- Treasury markets are illiquid (FED).
  - Primary dealers running out of balance sheet capacity.
- Sovereign Debt Markets are Segmented (ECB).
- Transmission of Monetary Policy is Impaired (Fed+ECB).
- Firesales in Gilt Markets (BoE) .

What Central Bankers really Mean. *(Risky debt view)*

- The US Treasury needs low rates to fund its deficits.
- The periphery (e.g. Italy) in the Eurozone needs low rates to avoid default.
- We want to bail out UK pension funds.

Caveat

Low-Rate Policies

- Long history of governments resorting to low-rate policies.
- Low-rate policies may:
  - Help governments shift burden to **future generations.**
    - Extra fiscal capacity: Government debt has short duration.
  - Have heterogeneous effects on the wealth and welfare of **current generations.**
    - Extra spending power for the rich/old**: Household Portfolio duration** is concentrated
  - Distort incentives of agents (including the government and market participants)
  - Re-engineer financial system.

Conclusion

Historical Perspective.

- **Government debt is *risky.***
  - When facing large shocks, governments like to shift part of the fiscal burden to bondholders.
    - COVID is an example.
    - Wars are an another example.
- A lot of economic analysis, economic policy and financial regulation assumes government debt is ***risk-free or zero-beta.***
- Governments use low-rate and slow mark-to-market policies to manage the fiscal burden when facing large shocks.
  - Need more work on the effects of low-rate policies.
  - Need debate on whether low-rate policies are desirable

Low-rate policies Re-engineering Financial System

Pension Funds reach for yield

Defined benefit PFs invest in risky assets

- Natural holders of long-dated USTR but they don't buy USTR.
- Invest in risky assets (and prefer private assets because the risks are hidden)--> rise of private equity.
- Increases the risk of future shortfalls.
- Shifts the *burden to future taxpayers.*

Banks reach for yield

Banks invest in long-dated USTR.

- Not natural holders of long-dated USTR but they do buy long-dated USTR (zero risk weights)
- Taking on interest rate risk, borrowing from depositors at low-rates (taxpayer-funded deposit insurance)
- Shifts the *burden to future taxpayers*
    - SVB Bailout March 2023

Low-Rate Policies Benefit Current Generations

Government Duration Mismatch

Losers

- **Future Young** face a tax bill.
  - Cheap Debt allows governments to borrow more.
  - Shift burden to future young.

Winners.

- **Governments** gets extra fiscal space
  - Surpluses have **high duration** (far in the future), but government debt does not (especially after QE and consolidation)
    - *duration mismatch*: lower rate create extra fiscal capacity (higher *G* or lower *T*)

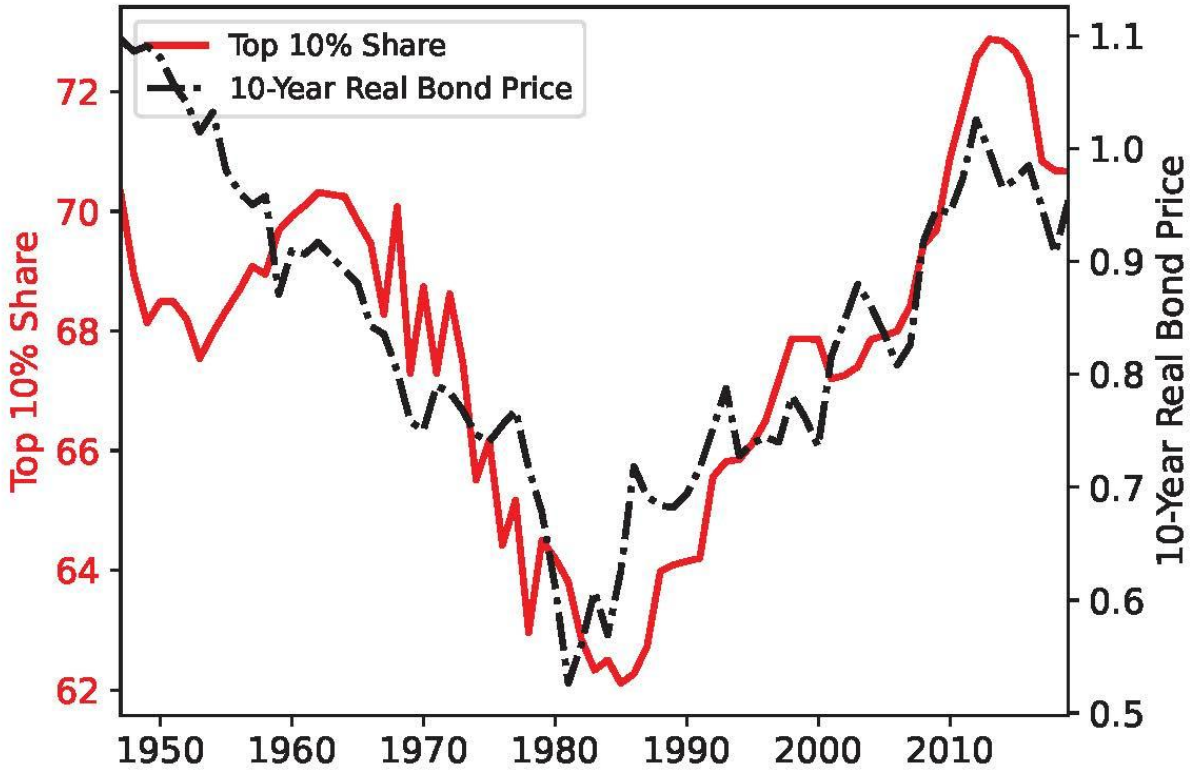
  $Duration(D)<Duration(T-G)$

- **Current Old** get government transfers.
  - Social security payments
  - Other transfers.

*What about Japan * joint with Yili Chien and Hal Cole.*

Wealth Inequality

Lower Rates increase Wealth Inequality for Current Generation



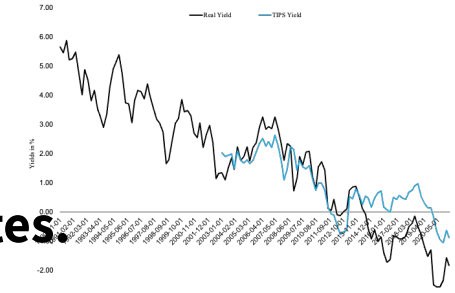
- Between 1980 and 2020, real rates ⬇️ by 350 basis points.
  - Discount rates for long-lived assets ⬇️.
  - Asset valuations ⬆️ more for assets with longer duration.
  - Long-lived assets (with high duration) mostly held in top percentiles of wealth distribution.
  - Wealth inequality ⬆️.

*Financial and Total Wealth Inequality with Declining Interest Rates (2020)**

**joint with Greenwald, Leombroni and Van Nieuwerburgh*

Low-Rate Policies Redistribute

Household Duration Mismatch



Losers from lower real rates

- **Currently Young,** Poor, Least Financially Sophisticated
  - Young need to save for retirement at low-rates
  - Poor and least sophisticated save in deposits
    - Don't participate in asset markets (no stocks, no bonds)
      - Not enough **duration** in their portfolio

        Duration(portfolio)<Duration(C-Y)
  - Young need to buy house

*Financial and Total Wealth Inequality with Declining Interest Rates (2020)**

Winners from lower real rates.

- **Old,** Rich, More Financially Sophisticated
  - Old don't need to save for retirement
  - Rich and more financially sophisticated (and asset managers who earn fees on AUM)
    - Do participate in asset markets (stocks and bonds)
      - Too much **duration** in their portfolio *Duration(portfolio)>Duration(C-Y)*
  - Old typically own a house.

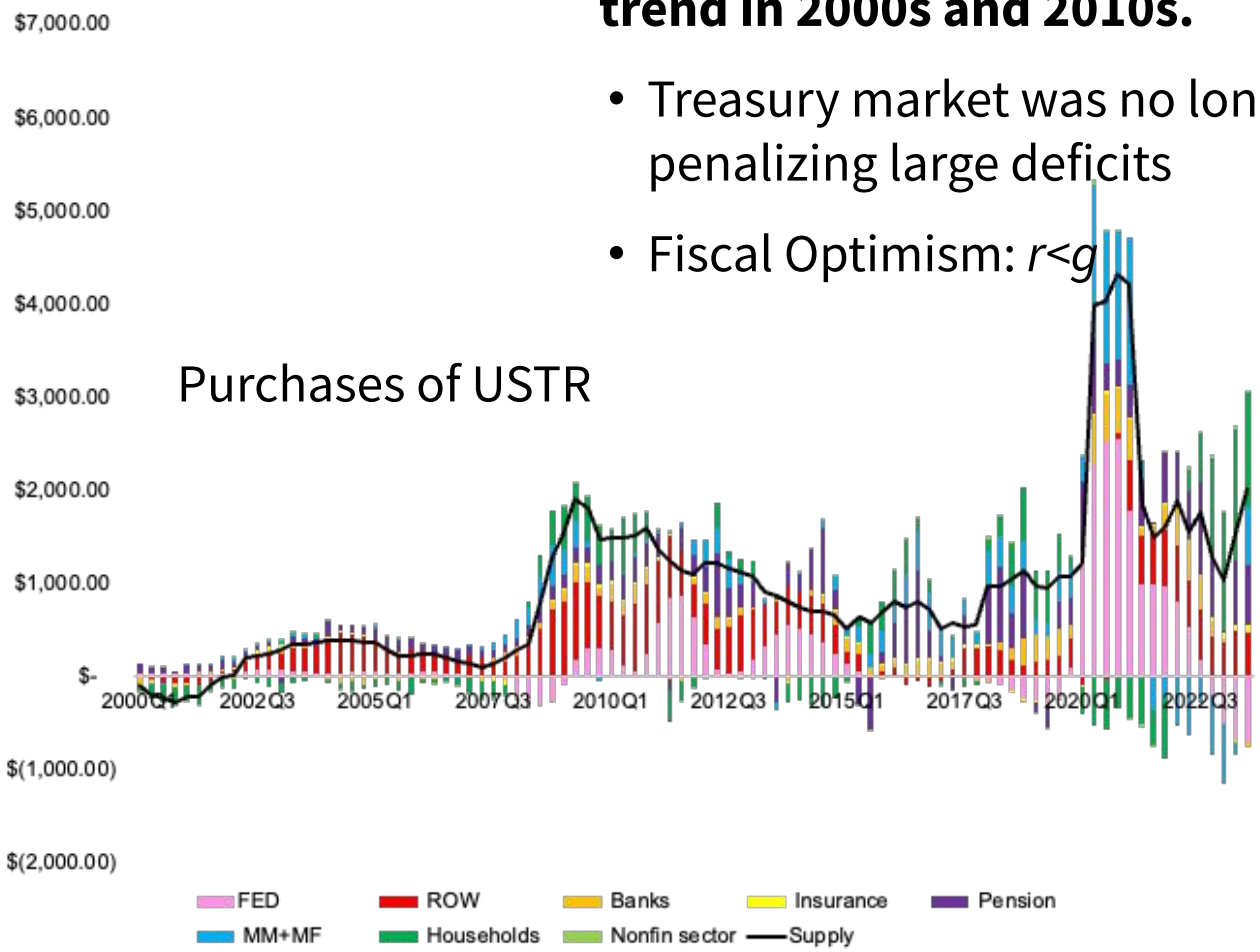
**joint with Greenwald, Leombroni and Van Nieuwerburgh*
See also Fagereng, Gomez , Moll et al (2022)

Why were rates so low before pandemic?

Yields continued downwards trend in 2000s and 2010s.

- Treasury market was no longer penalizing large deficits
- Fiscal Optimism: *r<g*

Purchases of USTR



- **2 Large Inelastic buyers of US Treasurys:**
  - RoW: U.S. Treasury is the *world's safe asset supplier.*
    - Between 2007 and 2022, RoW absorbed $5.36 trillion (mostly prior, during and after GFC).
  - Fed replaced ROW : In 4 different rounds of QE, the **Fed** absorbed $5.15 trillion in issuance.
    - **Fed** 29% of issuance of Notes and Bonds.
  - disconnect between valuation of USTR and *PDV(Surpluses)*

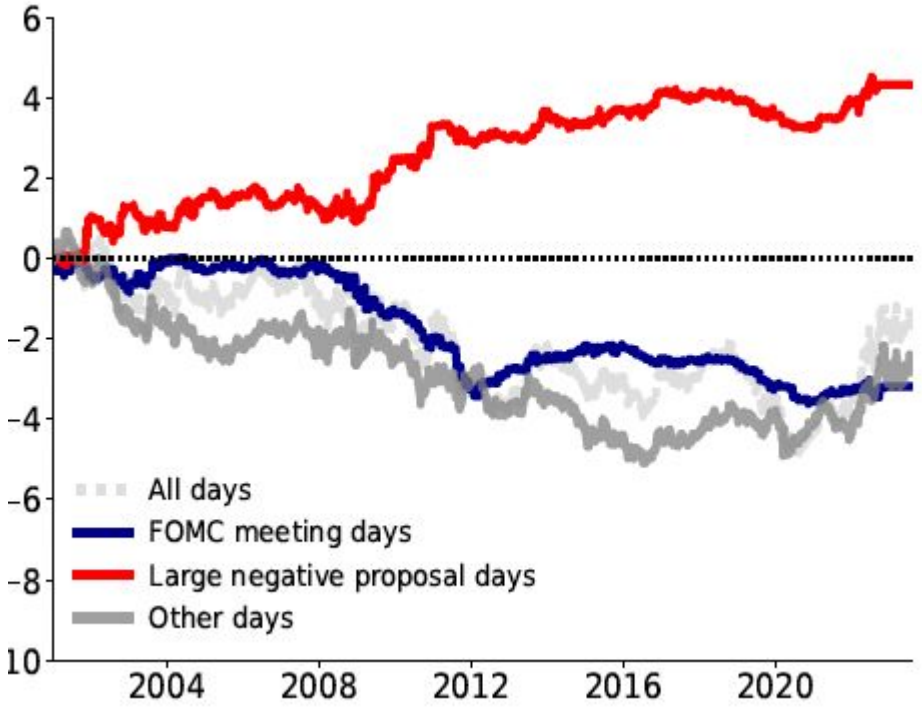
Government debt valuation wedge

Yields continued downwards trend after GFC

- Treasury market is no longer penalizing large deficits.
  - Hard to get *PDV(Surpluses)* anywhere close to valuation of USTR.
  - US Treasury valuations do not respond to fiscal fundamentals.
    - *The Dogs that didn't bark (2020)*
  - Treasurys seem overpriced (footprint of low-rate policies).
    - *U.S. Government Debt Valuation Puzzle (2019); Measuring U.S. Fiscal Capacity Using Discounted Cash Flow Analysis (2023)*.*
    - *Feed in CBO Projections and compute PDV(Surpluses)*
- Limits to Arbitrage: Bond trader don't trade against the Fed (in Japan, they call this the "widowmaker trade").

**joint work with Zhengyang Jiang, Stijn Van Nieuwerburgh and Mindy Xioalan.*

Fed Leaning Against the Fiscal Winds



- Change in 10-year yields in short windows
  - Around CBO cost releases for new bills.
    - Bad fiscal news ⬆️ 10-year yields by 400 bps.
  - Around FOMC meetings.
    - FOMC ⬇️ long yields by 350 bps.

*Can Treasury Markets Add and Subtract? **

**joint work with Roberto Gomez Cram Howard Kung*