Fiscal Strength within a Framework of Institutional Independence

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How Does the U.S. Finance Itself?

How does the U.S. pay for its

- Outstanding debt (100% of GDP)
- Current spending
- Expected future spending

An obvious option: revenues from distortionary **taxation**

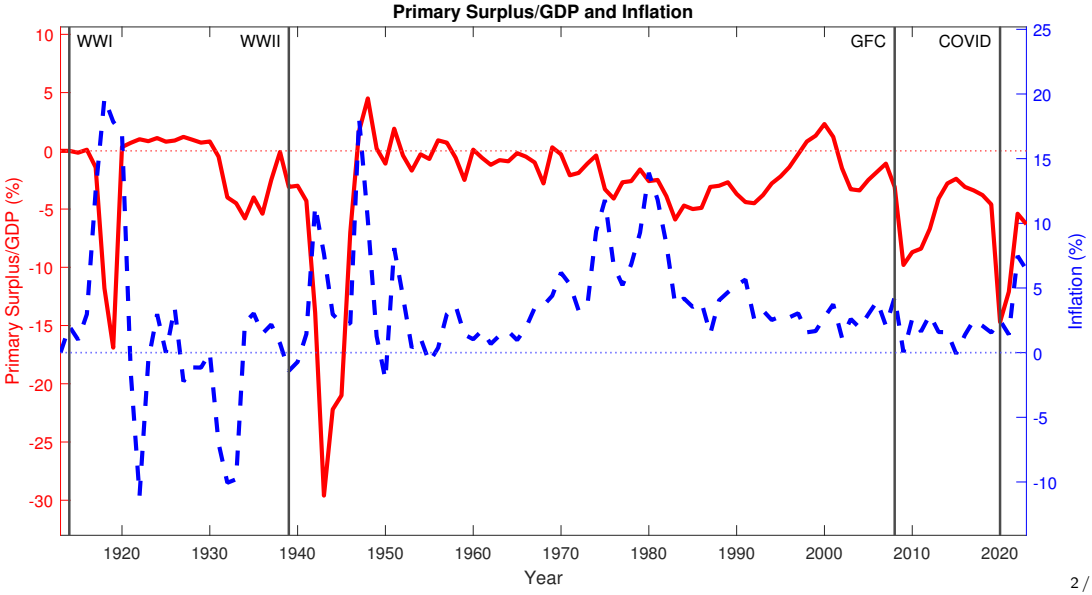
U.S. debt pays out dollars → eroding debt using surprise **inflation**

Tax/**inflation** **mix** tightly linked **theoretically** (Sargent and Wallace, 1981; Leeper, 1991; Sims, 1994; Woodford, 1995)

- Higher taxes today/tomorrow → less aggregate demand today → lower prices

Are they tightly linked **historically**?

U.S. Financing Mix



U.S. Financing Mix

Taxes, **inflation** unpopular with households → politically costly

Costs internalized differently by Congress, Fed

- Raising taxes more costly to **fiscal policymakers**
- High inflation more costly to **central bankers**

Operationally independent institutions

- **Financing mix** is **jointly-determined**
- Both constrained by the others' policy
  - Somewhere between "fiscal dominance" and "monetary dominance"

▸ Treasury, Fed Objectives

Implementing the Financing Mix

Intertemporal financing plan needs to be implemented by the U.S. maturity structure

- Control the **structure** $\rightarrow$ influence the **mix**

Treasury, Fed: biggest players in U.S. debt markets

Treasury

- Issues debt to finance deficits

Fed

- Issues reserves to purchase debt
- Redeems with debt sales

Privately-held **maturity structure** is **jointly-determined**

▸ Jointly-Determined U.S. Structure

Evidence of Non-Cooperation?

What if **fiscal** and **monetary** institutions aren't fully cooperative?

Treasury's stated objectives: missing 'price stability'

Fed Gov. Waller: "Deficit financing and debt servicing issues play no role in our policy decisions and never will."

Greenwood et al. (2015): **Fed QE**, but **Treasury long-term issuance** post-GFC

Miran and Roubini (2024): **Fed QT**, but **Treasury short-term issuance** post-COVID

Separate objectives, offsetting debt management: not **proof** of non-cooperation

- But they are suggestive

Preview of Results

Question: How do non-cooperative **FP**, **MP** choose a single **financing mix**?

- **Institutional strength** selects from a feasible set
  - **Fiscal** strength (relative to **MP**): Nash bargaining power
  - ↑ **Fiscal** strength $\implies$ ↓ taxes, ↑ inflation
  - First-best: powerful **central bank**

- Impute U.S. **fiscal** strength since WWII
  - Three episodes of heightened **fiscal** strength: 1947-1951, 1970s, 2021-2023
  - Lines up with data on **presidential** pressure on the **Fed**
  - Relative to first-best: **FP** **too strong** in the 1970s, **too weak** since GFC
  - Inflation **more powerful** in **high-debt** economies

- Benefits of a **maturity structure**
  - **Welfare-improvement:** govt. **smooths** surprise **debt devaluation** across time
  - **Insurance:** less welfare loss from **deviations** from first-best **fiscal** strength

Model: Lucas and Stokey (1983) with nominal debt

Infinitely lived households choose c_t, n_t, nominally state-contingent government debt to maximize

$$W_0 = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left\{ u\left(c_t\right) - v\left(n_t\right) - w\left(\pi_t\right) \right\}$$

Production technology owned by households

- $y_t = n_t$
- Labor income taxed at rate $\tau_t \in [0, 1)$

1 aggregated good market. Aggregate resource constraint (ARC)

$$n_t = c_t + g_t$$

where g_t transitions between g_h and g_ℓ with known probabilities (e.g. war and peace)

2 government debt markets $B_t = \left\{ B_t^{(h)}, B_t^{(\ell)} \right\}$

- Nominal Arrow securities

Bond prices $Q_t = \left\{ Q_t^{(h)}, Q_t^{(\ell)} \right\}$ adjust so that $B_t = \boldsymbol{B}_t$

HH budget constraint (HHBC) when entering state s

$$P_t c_t + \underbrace{\sum_{s'} Q_t^{(s')} B_t^{(s')}}_{\text{Savings}_t} \leq (1 - \tau_t) P_t n_t + B_{t-1}^{(s)} \quad , \quad s' \in \{\ell, h\}$$

Two simultaneous-moving, committing government branches play a game

- **Debt-manager** chooses τ_t, $\boldsymbol{B}_t^{dm}$
- **Central bank** chooses π_t, $\boldsymbol{B}_t^{cb}$
- $\boldsymbol{B}_t = \boldsymbol{B}_t^{dm} - \boldsymbol{B}_t^{cb}$

Each institution maximizes its own welfare-based objective

$$W_0^i = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left\{ \left(1 - \boldsymbol{\rho}^i\right) \underbrace{\left[u\left(c_t\right) - v\left(n_t\right)\right]}_{\downarrow \text{ as } \tau_t \uparrow} + \boldsymbol{\rho}^i \underbrace{\left[-w\left(\pi_t\right)\right]}_{\downarrow \text{ as } \pi_t \uparrow} \right\} \ , \ \boldsymbol{\rho}^i \in [0,1] \ , \ i \in \{\boldsymbol{dm}, \boldsymbol{cb}\}$$

subject to ARC, HHBC, HH optimization and **opponent's choices**

Traditional economic theory: $\boldsymbol{\rho}^{dm} = \boldsymbol{\rho}^{cb} = .5$

For today: $\boldsymbol{\rho}^{dm} = 0$, $\boldsymbol{\rho}^{cb} = 1$

Competitive Nash Equilibrium

A CNE is a **competitive equilibrium**

- Household optimization
- **Debt-manager** optimization
- **Central bank** optimization
- P_t, Q_t clear commodity, debt markets

A CNE is a **Nash equilibrium** in time-0 state-contingent **plans**

- **Debt-manager's** plan optimal given **central bank's** plan
- **Central bank's** plan optimal given **debt-manager's** plan

Households, **debt-manager**, **central bank** have complete, perfect info., fully rational

- Understand one anothers' problems
- Understand underlying exogenous process

Implementability Constraint

Inflation vs. Taxes

Real debt: $b_t^{(s)} = \frac{B_t^{(s)}}{P_t}$

Time 0 implementability constraint

$$\underbrace{\frac{1}{\pi_0} b_{-1}^{(s)}}_{B_{t-1}^{(s)}/P_0} = \underbrace{\frac{1}{u'(c_0)} \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[u'(c_t) c_t - v'(n_t) n_t \right]}_{\mathbb{E}_0[PV(\text{primary surpluses})]}$$

Implementability constraint is the **key to the game**

- Strict τ_t, π_t trade-off
- **Debt-manager** constrains **central bank** through $\{\tau_t\}$
- **Central bank** constrains **debt-manager** through $\{\pi_t\}$

Welfare maximization (first-best): equate marginal welfare losses from tax distortions and inflation

A Continuum of Equilibria

Debt-manager minimizes distortions from explicit taxation
Central bank minimizes welfare loss from inflation

Two policy choices, but only one implementability constraint

- Like having only one equation to solve for two unknowns

Many finance mixes consistent with equilibrium $\rightarrow$ continuum of equilibria

Worst-case scenarios

- **Debt-manager**: finance all debt and spending with no inflation $\left(\boldsymbol{\lambda}_0^{cb} = 0\right)$
  - "Monetary Dominance"
- **Central bank**: hyperinflate away all inherited debt $\left(\boldsymbol{\lambda}_0^{cb} \rightarrow \infty\right)$
  - "Fiscal Dominance"

A Unique Equilibrium

Asymmetric Nash Bargaining

Want something that delivers a

- Unique equilibrium
- Measure of institutional **strength**

Asymmetric Nash bargaining (Harsanyi and Seltan, 1972)

$$\max_{W_0^{dm}, W_0^{cb}} \left(W_0^{dm} - d^{dm} \right)^{\alpha} \left(W_0^{cb} - d^{cb} \right)^{1-\alpha} \quad , \quad \alpha \in [0, 1]$$

- α : **fiscal** strength, relative to **monetary** policy
- $\boldsymbol{d}^{dm}$ = debt-manager worst-case payout
- $\boldsymbol{d}^{cb}$ = central bank worst-case payout

Baseline Calibration

Utility

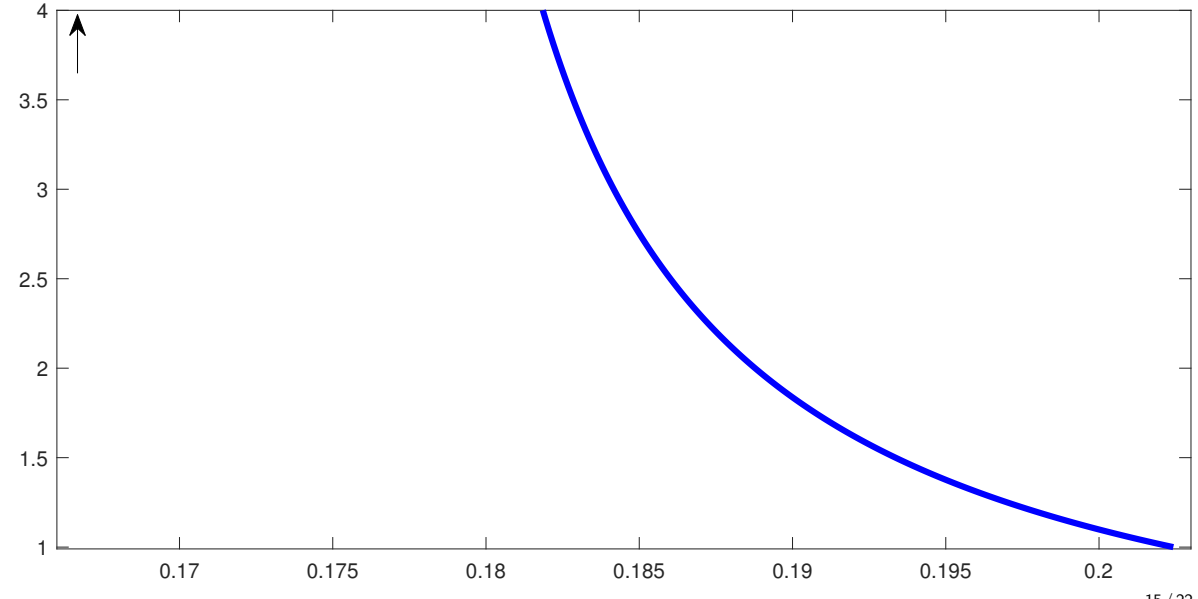
$$u(c_t) - v(n_t) - w(\pi_t) = \frac{c_t^{1-\sigma}}{1-\sigma} - \frac{n^{1+\varphi}}{1+\varphi} - \frac{1}{2}\theta\left(\frac{1}{\pi} - 1\right)^2$$

Calibration

Parameter/Variable	Value	Source
β	0.9875^4	Angeletos (2002), annualized
$\{\sigma, \varphi\}$	$\{2, 2\}$	Havránek (2015), Chetty et al. (2011)
θ	1.22	$\pi_0^* = 1.032$, avg. U.S. inflation rate (1943-2023)
$\{g_\ell, g_h\}$	$\{0.1764, 0.3568\}$	U.S. spending (1942-2024)
$b_{-1}^{(s)}$	0.521	Avg. U.S. debt, face value (1942-2022)

Pareto Frontier

▸ Stationary Tax Rate



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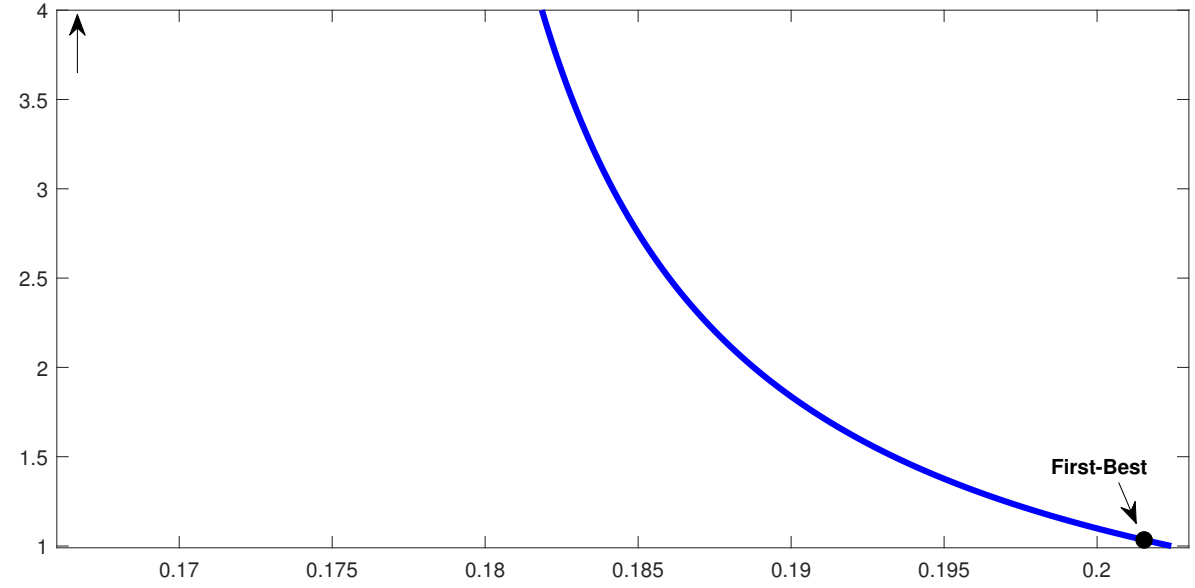
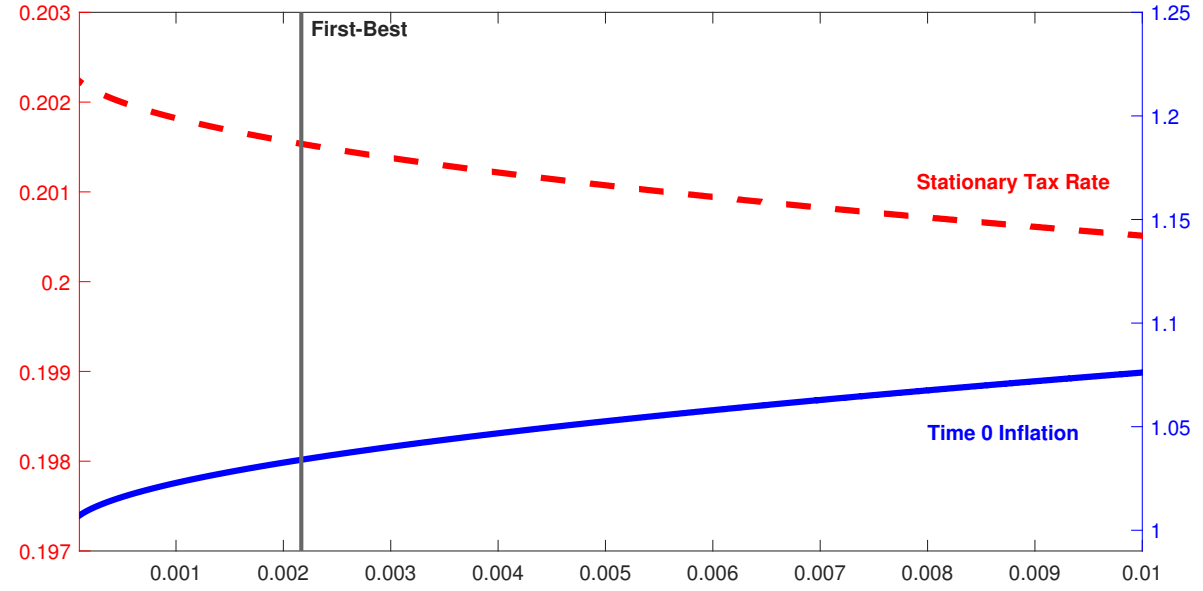
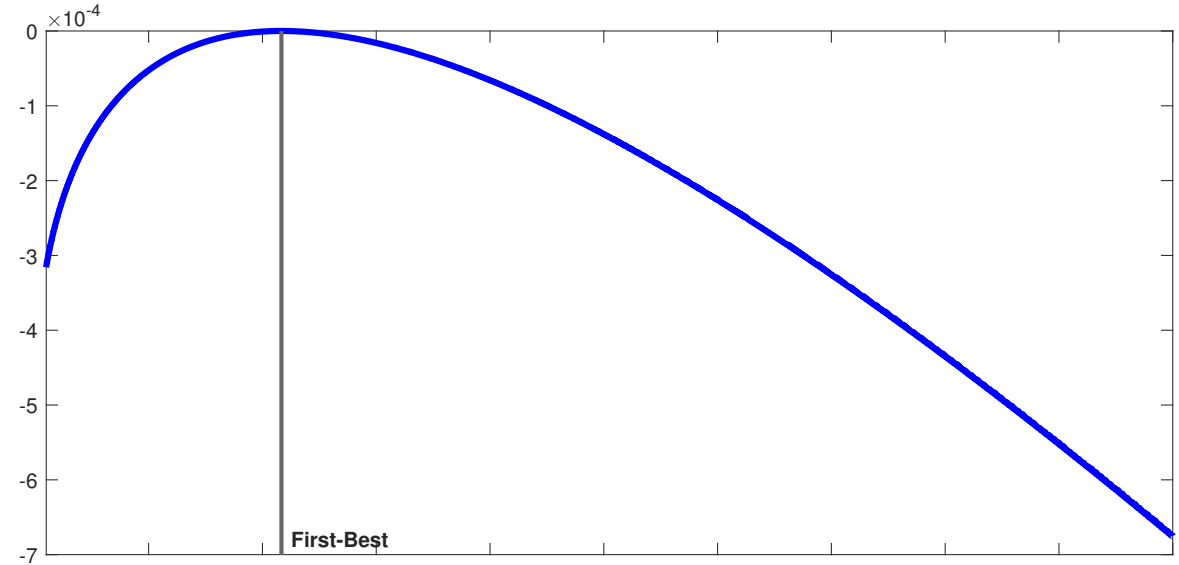


Taxes, Inflation and Fiscal Strength

▸ Stationary Tax Rate



Welfare and Fiscal Strength



Some Intuition

Why is powerful **MP** consistent with welfare-maximization?

Central bank has more to lose

- **Debt-manager** worst-case: smooth taxes under $\pi_t = 1$
- **Central bank** worst-case: hyperinflation

Is cooperation good? $\rightarrow$ Who runs the show?

- Under **monetary control** ($\alpha = 0$): Close to first-best
- Under **fiscal control** ($\alpha \rightarrow 1$): Far from first-best

Historical Fiscal Strength

Post WWII

Given U.S. spending and debt data, what does American inflation reveal about **historical fiscal strength**?

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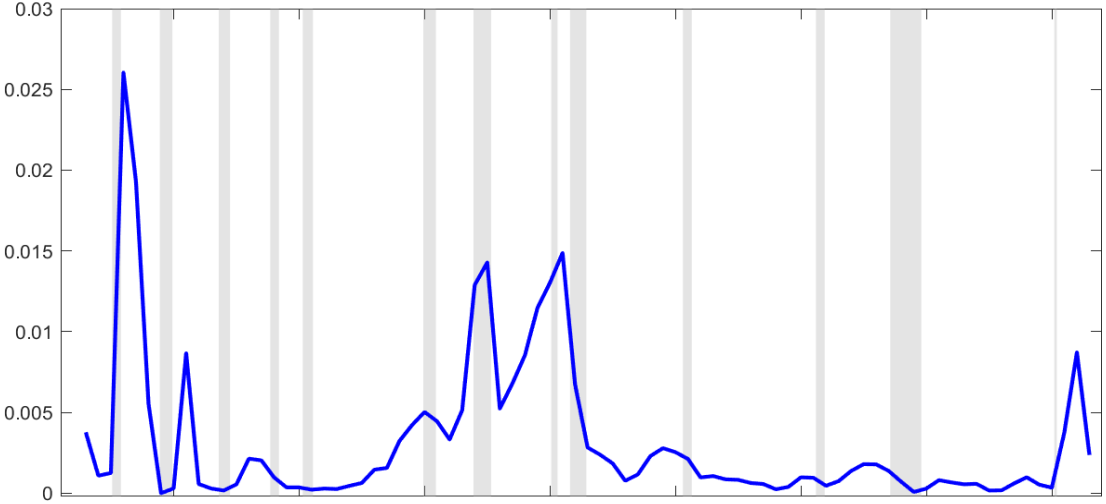
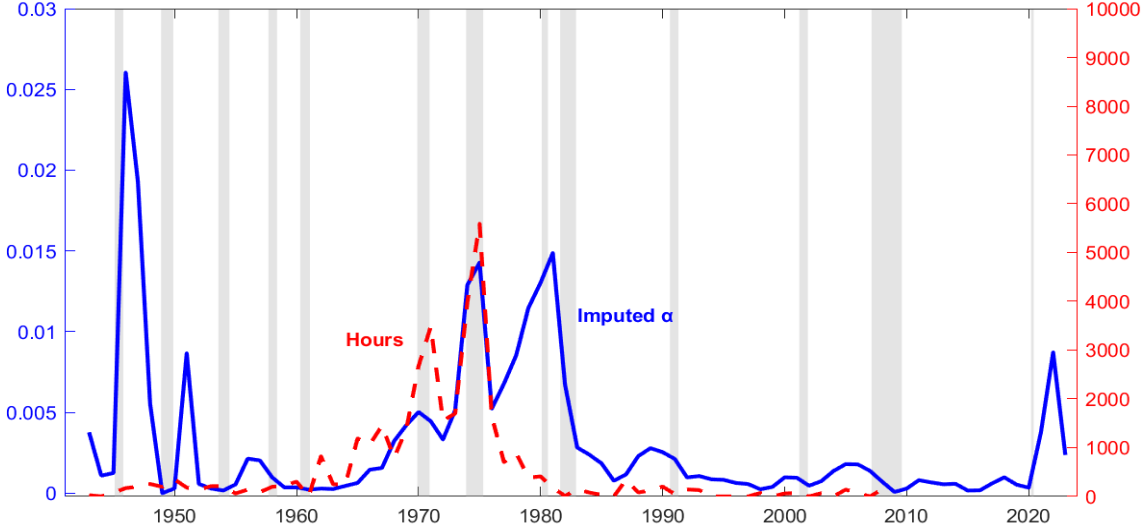


Comparing to Drechsel (2024)'s data on **President-Fed interactions**?

Historical Fiscal Strength

Comparing to an Existing Measure

Comparing to Drechsel (2024)'s data on **President-Fed interactions**?

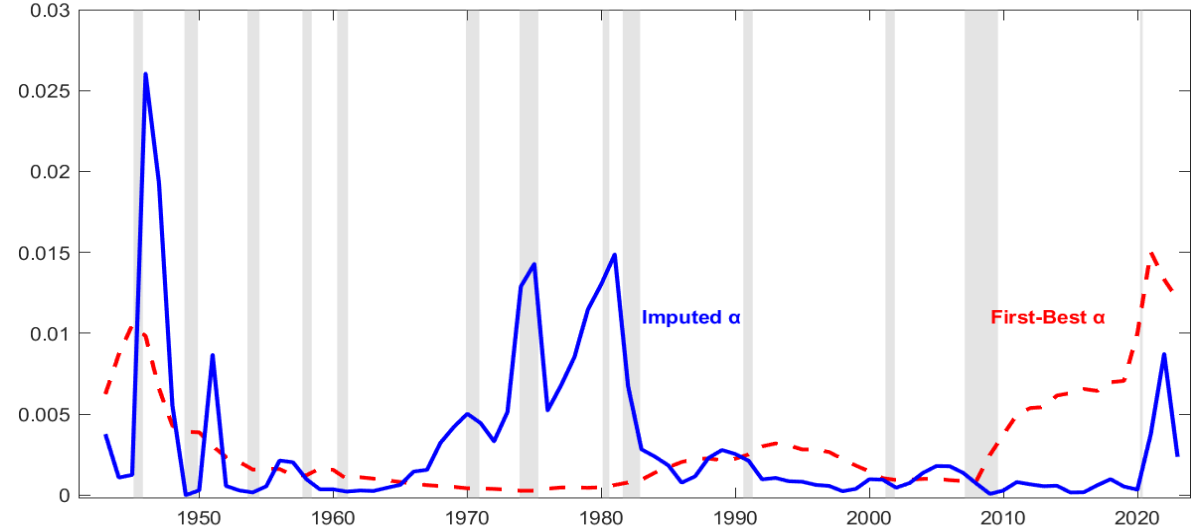


Comparing to **first-best**?

Historical Fiscal Strength

Comparing to First-Best

Comparing to **first-best**?



Takeaways

Bargaining power as a measure of fiscal strength

- Stronger **FP** $\rightarrow$ lower taxes, higher inflation
- First-best calls for strong **MP**
- Historically, **FP** **too strong** in the 70s and **too weak** since the GFC

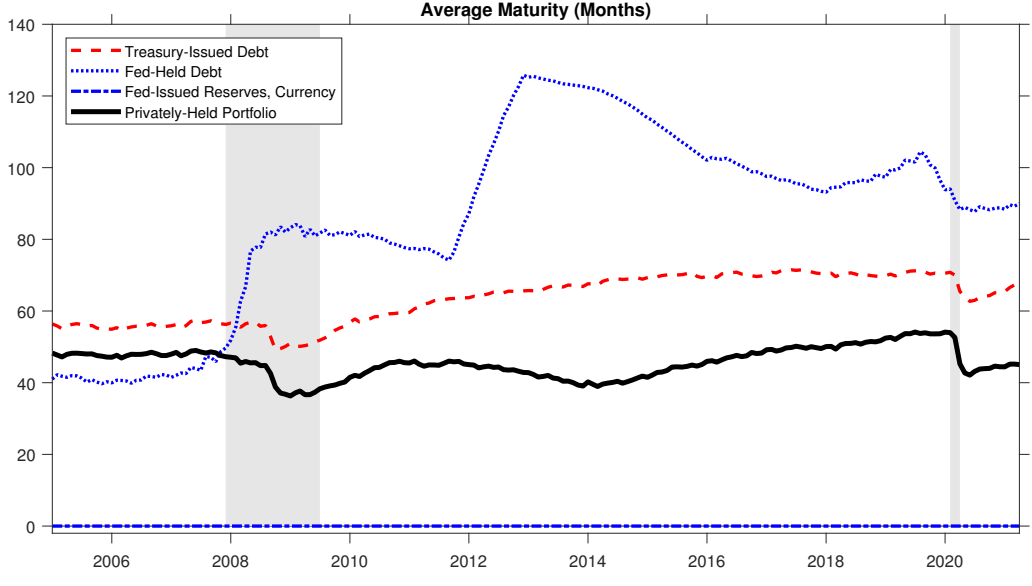
President Trump

- "I feel that the president should have at least [a] say in [making interest rate decisions], yeah, I feel that strongly."
- "Because of its vastly expanded discretionary powers...the Fed lacks both operational effectiveness and political independence...Congress should limit its mandate to the sole objective of stable money." (Project 2025)
- " 'Too Late' Jerome Powell, who is always TOO LATE AND WRONG, yesterday issued a report which was another, and typical, complete mess!... Powell's termination cannot come fast enough!"

Thank you

Average maturities in the U.S. (2005-2022)

Treasury-issued, Fed-held, Fed-issued, privately-held Back



Back to the economy's supporting maturity structure

Recall the pricing relation (after some algebra)

$$\underbrace{\frac{B_{t-1}^{(t)}}{P_t} + \beta \mathbb{E}_t \left[\left(\frac{u'(c_{t+1})}{u'(c_t)} \right) \frac{B_{t-1}^{(t+1)}}{P_{t+1}} \right]}_{\text{MV(outstanding government liabilities)}/P_t} = \underbrace{\frac{1}{u'(c_t)} \mathbb{E}_t \sum_{i=0}^{\infty} \beta^i u'(c_{t+i}) (\tau_{t+i} n_{t+i} - g_{t+i})}_{\mathbb{E}_t[PV(\text{primary surpluses})]}$$

What if we want **only** P_t in terms of current and expected future allocations?

Almost there, just need to deal with P_{t+1} on LHS

Dilution rate of government debt: $\frac{B_t^{(t+1)}}{B_{t-1}^{(t+1)}}$

Short-term issuance with existing long-term debt **dilutes** claims on future surpluses
▸ Dilution in the data

Inverse dilution rate: $a_t \equiv \frac{B_{t-1}^{(t+1)}}{B_t^{(t+1)}}$

When future debt choices are known

$$\underbrace{\frac{B_{t-1}^{(t)}}{P_t}}_{\text{(Maturing debt)}/P_t} = \underbrace{\mathbb{E}_t \sum_{i=0}^{\infty} \beta^i \left(\frac{c_{t+i}^{-\sigma}}{c_t^{-\sigma}}\right) (\tau_{t+i} n_{t+i} - g_{t+i}) \left(1 + \underbrace{\sum_{k=1}^{i} \prod_{h=1}^{k} (-a_{t+h-1})}_{\text{maturity modifier}}\right)}_{\mathbb{E}_t[PV(\text{modified primary surpluses})]}$$

Only P_t remaining. Expected maturity management affects discounting

Dilution Rate of Government Debt

Some intuition Back

$$\underbrace{\frac{B_{t-1}^{(t)}}{P_t}}_{\text{(Maturing debt)}/P} = \underbrace{\mathbb{E}_t \sum_{i=0}^{\infty} \beta^i \left(\frac{c_{t+i}^{-\sigma}}{c_t^{-\sigma}}\right) (\tau_{t+i} n_{t+i} - g_{t+i}) \left(1 + \underbrace{\sum_{k=1}^{i} \prod_{h=1}^{k} (-a_{t+h-1})}_{\text{maturity modifier}}\right)}_{\mathbb{E}_0[PV(\text{modified primary surpluses})]} \quad (1)$$

For intuition, given primary surpluses:

$$\text{Dil}_t \uparrow \implies B_t^{(t+1)} \uparrow \rightarrow P_{t+1} \uparrow \rightarrow Q_t^{(t+1)} \downarrow \rightarrow P_t \downarrow$$

$$\mathbb{E}_t \text{Dil}_{t+1} \uparrow \implies B_{t+1}^{(t+2)} \uparrow \rightarrow P_{t+2} \uparrow \rightarrow Q_{t+1}^{(t+2)} \downarrow \rightarrow P_{t+1} \downarrow \rightarrow P_t \uparrow$$

More fiscal strength $\rightarrow$ more surprise dilution, less expected dilution

Mat. Structure, Dil. Rate

Fiscal, Monetary Objectives

Back

Treasury stated debt management objectives:

- 'Regular and predictable:' slow policy adjustments, advanced issuance notice
- 'Minimized borrowing costs:' facilitate, match debt demand

Fed mandate:

- Maximum employment
- Stable prices
- Moderate long-term rates

Individual objectives, yet both manage one **financing mix** and one **debt structure**

Household FOCs

Back

FOC (c_t, n_t):

$$1 - \tau_t = \frac{v'(n_t)}{u'(c_t)}$$

FOC $\left(Q_t^{(t+j)}\right)$:

$$Q_t^{(t+j)} = \beta^j \mathbb{E}_t \left[\frac{u'(c_{t+j}) P_t}{u'(c_t) P_{t+j}} \right] , \forall j$$

Payoff Dominance

Back

When $\lambda_0^{cb} \in [-N, 0)$:

- Central bank runs deflationary policy
  - b_{-1} more burdensome than under $\pi_t = 1 \ \forall t$
- Debt-manager taxes more than it would under $\pi_t = 1 \ \forall t$
- Given opponent's plan, deviation results in non-existence

Harsanyi and Selten's (1988) payoff dominance criterion:

- Rational, non-cooperative players coordinate to eliminate equilibria where both can be individually made better-off

Eliminate $\lambda_0^{cb} \in [-N, 0)$ equilibria, which are payoff-dominated by $\lambda_0^{cb} = 0$

- Central bank better off from increasing inflation until $\pi_t = 1 \ \forall t$
- Debt-manager better off from decreasing tax rates

Constant Tax Rate

Back

FOCs after $t = 1$:

$$\underbrace{\frac{\left[1 + \lambda_0^{dm}\left(1 - \sigma\right)\right]}{\left[1 + \lambda_0^{dm}\left(1 + \varphi\right)\right]}}_{\text{Debt-manager FOC}} = \frac{v'\left(n_t\right)}{u'\left(c_t\right)} \underbrace{= 1 - \tau_t}_{\text{HH FOC}} = 1 - \tau$$

$$\underbrace{\pi_t = \pi = 1}_{\text{Central bank FOC}}$$

Disagreement Payoffs

Back

$d^{cb} = W_0^{cb}$ under $\lambda_0^{cb} \to \infty$

- Fed. Res. Act: "...wherever any power vested by this Act...appears to conflict with the the powers of the Secretary of the Treasury, such powers shall be exercised subject to the supervision and control of the Secretary"

$d^{dm} = W_0^{dm}$ under $\lambda_0^{cb} = 0$ gives us the most conservative results for ***CB*** strength