Fiscal-Monetary Interactions in HANK vs RANK

George-Marios Angeletos Chen Lian Christian Wolf

December 4, 2025

Questions

Two questions:

- **Q1:** How, and how much, do fiscal deficits drive y and π?
  ALW (2024) "Deficits and Inflation: HANK meets FTPL"
- **Q2:** What fiscal framework best supports CB's dual mandate?
  ALW (2025) "Fiscal Inaction as Monetary Support"

Questions

Two questions:

- **Q1:** How, and how much, do fiscal deficits drive y and π?
  ALW (2024) "Deficits and Inflation: HANK meets FTPL"
- **Q2:** What fiscal framework best supports CB's dual mandate?
  ALW (2025) "Fiscal Inaction as Monetary Support"

Two approaches to answering these questions:

- **RANK w/ fiscal dom:** equil selection $\longmapsto$ fragile + no empirical microfoundations
- **HANK:** non-Ricardian consumers $\longmapsto$ robust + ample empirical microfoundations

RANK w/ Fiscal Dominance

- Slow or no fiscal adjustment is "bad" because it yields fiscal dominance
  - MP looses control of π and y; these are instead pinned down by fiscal deficits
- **Paradox:** requires Ricardian Equiv to fail despite Ricardian households!
  - underscores that fiscal dominance = fragile self-fulfilling prophesy
- **Takeaway:** in "refined" RANK,
  - FP is irrelevant
  - MP is dominant even if Taylor principle fails
  - traditional approach to F-M interactions is out

HANK

- **Different mechanism:** hhs are **non-Ricardian**, so deficits naturally stimulate AD
  - theoretically robust, supported by micro evidence

- **Lesson 1** (ALW'24)**:** deficits can be "very" inflationary
  - despite diff mechanism, FTPL-like predictions – indeed even w/ active MP & passive FP
  - but only under appropriate & empirically verifiable conditions

- **Lesson 2** (ALW'25)**:** CB may welcome slow or even no fiscal adjustment
  - stabilizes both y and π against *demand* shocks
  - minimizes tax distortions, improves y, π trade off against *supply* shocks

Roadmap

- Framework — nests both RANK and HANK
- Deconstruct fiscal dominance in RANK
- Study F-M interaction in HANK
  - focus on Lesson 2: CB may prefer no fiscal adj over business cycle

Framework

AS

- **AS:** a Phillips curve

$$\pi_t = \mathscr{P}(\{y_{t+k}\}) + u_t = \begin{cases} \kappa y_t + u_t & \text{theory} \\ \text{standard or hybrid NKPC} & \text{quantitative} \end{cases}$$

- elementary observation: π is pinned down by real spending

  $\Rightarrow$ deficits can be inflationary iff they drive c, y (or via tax distortions entering u)

AD

- **AD:** perpetual youth OLG, with survival prob $\omega \in (0,1]$

  simplifying assumptions: annuities; social fund; labor unions; no capital

$$c_t = \underbrace{(1-\beta\omega)}_{\text{MPC}}\left(\underbrace{a_t}_{\text{assets}} + \underbrace{\mathbb{E}_t\left[\sum_{k=0}^{\infty}(\beta\omega)^k(y_{t+k}-t_{t+k})\right]}_{\text{permament income net of taxes}}\right) - \underbrace{\psi\mathbb{E}_t\left[\sum_{k=0}^{\infty}(\beta\omega)^k r_{t+k}\right]}_{=0 \text{ with "neutral" MP}} - \sigma\tilde{e}_t$$

  - $\omega = 1$ nests RANK
  - $\omega < 1 \Rightarrow$ high MPC, high discounting; mimics liquidity frictions/HANK

AD

- **AD:** perpetual youth OLG, with survival prob $\omega \in (0,1]$

  simplifying assumptions: annuities; social fund; labor unions; no capital

$$c_t = \underbrace{(1-\beta\omega)}_{\text{MPC}}\left(\underbrace{a_t}_{\text{assets}} + \underbrace{\mathbb{E}_t\left[\sum_{k=0}^{\infty}(\beta\omega)^k(y_{t+k}-t_{t+k})\right]}_{\text{permament income net of taxes}}\right) - \underbrace{\psi\mathbb{E}_t\left[\sum_{k=0}^{\infty}(\beta\omega)^k r_{t+k}\right]}_{=0 \text{ with "neutral" MP}} - \sigma\tilde{e}_t$$

  - $\omega = 1$ nests RANK
  - $\omega < 1 \Rightarrow$ high MPC, high discounting; mimics liquidity frictions/HANK

- Use market clearing and rewrite recursively $\Rightarrow$ modified DIS

$$y_t = -\sigma r_t + y_{t+1} + \underbrace{\frac{(1-\beta\omega)(1-\omega)}{\omega} d_{t+1}}_{\text{wealth or liquidity effect} \neq 0 \text{ only if } \omega < 1} - \sigma e_t$$

Fiscal Policy

- Baseline: risk-free, one-period, real bonds (as in Barro etc)
  - later: nominal and/or long-term debt
- Gov budget:

$$d_{t+1} = \beta^{-1}(d_t - s_t) \qquad \text{w/} \quad s_t \equiv \text{tax}_t - \text{gov}_t - \frac{D^{ss}}{R^{ss} Y^{ss}} r_t$$

  - plus no-Ponzi (or HH transversality) $\Rightarrow d_t = NPV(s_t)$

Fiscal Policy

- Baseline: risk-free, one-period, real bonds (as in Barro etc)
  - later: nominal and/or long-term debt
- Gov budget:

$$d_{t+1} = \beta^{-1}(d_t - s_t) \qquad \text{w/} \quad s_t \equiv \text{tax}_t - \text{gov}_t - \frac{D^{ss}}{R^{ss} Y^{ss}} r_t$$

  - plus no-Ponzi (or HH transversality) $\Rightarrow d_t = NPV(s_t)$
- **Fiscal Rule:**

$$s_t = \underbrace{\tau_y y_t}_{\text{automatic stabilizer}} + \underbrace{\tau_d d_t}_{\text{fiscal adjustment}}$$

τ_d: how fast taxes are hiked (or g is cut) in order to stabilize debt

Equilibrium and Monetary Policy

Definition. An equilibrium is a (bounded) path $\{r_t, y_t, \pi_t, d_t\}$ such that

- y_t satisfies DIS (consumer optimality + goods/asset market clearing)
- π_t satisfies Phillips curve (worker/firm optimality + labor market clearing)
- d_t satisfies gov's flow budget, along with FP rule and no-Ponzi

4 variables, 3 equations $\Rightarrow$ CB chooses $\{r_t\}$, equilibrium maps $\{r_t\}$ to $\{y_t, \pi_t, d_t\}$

subtleties: boundedness; unique equil; implementation w/ nominal rate

Q1: how does τ_d matter holding $\{r_t\}$ fixed? **Q2:** how does τ_d matter along *optimal* MP?

τ_d in RANK vs HANK

τ_d in RANK

- How does FP matter in RANK?
- Suppose $\omega = 1$ and, wlog, let $\{r_t\} = 0$. Then:

$$c_t = (1-\beta)\, z_t + (1-\beta)\, \mathbb{E}_t \sum_{k=0}^{\infty} \beta^k y_{t+k} \qquad \text{with} \qquad z_t \equiv \text{assets}_t - \mathbb{E}_t \sum_{k=0}^{\infty} \beta^k \text{taxes}_{t+k}$$

- In equilibrium, FP has no wealth effect:

$$\text{assets}_t = d_t = \mathbb{E}_t \sum_{k=0}^{\infty} \beta^k \text{taxes}_{t+k} \quad \Rightarrow \quad z_t = 0 \quad \Rightarrow \quad c_t = \underbrace{(1-\beta)\, \mathbb{E}_t \sum_{k=0}^{\infty} \beta^k y_{t+k}}_{\text{permanent income}}$$

- Ricardian equiv can fail, and FP can drive c, y and thus π, only via **self-fulfilling belief**
  - if others spend more $\Rightarrow$ my permanent income increases $\Rightarrow$ I spend more

Fiscal dominance in RANK

- Essence: fiscal dominance in RANK = self-fulfilling belief
  - Formal analysis: ALW & Zhang (2025)
  - Irrelevant details: whether debt is real or nominal, whether the gov's IBC is a constraint or an equil condition, which authority is active, etc
- This mechanism is controversial, hard-to-test, and **fragile**
  - If agents expect $y = 0$ (return to steady state) at $t < \infty$, instead of asymptotically, then:
    - y and π invariant to FP
    - MP dominant even if Taylor principle is violated
  - Same w/ appropriate MPE concept (ALWZ 2025) or global-game perturbation (AL 2022)"
- **Takeaway:** let's "outlaw" fiscal dominance in RANK and instead focus on HANK

τ_d in HANK

- Same consumption, modulo $\beta \mapsto \beta\omega$:

$$c_t = \underbrace{(1-\beta\omega)\, z_t}_{\text{wealth effect}} + \underbrace{(1-\beta\omega)\,\mathbb{E}_t \sum_{k=0}^{\infty} (\beta\omega)^k\, y_{t+k}}_{\text{permament income}}$$

- But now $z_t \neq 0$:

$$z_t = \underbrace{\mathbb{E}_t \sum_{k=0}^{\infty} \beta^k \text{taxes}_{t+k}}_{\text{private assets, gov debt}} - \underbrace{\mathbb{E}_t \sum_{k=0}^{\infty} (\beta\omega)^k \text{taxes}_{t+k}}_{\text{effective tax liability}}$$

- FP matters always, robustly, and for empirically grounded reasons
  - lower τ_d stimulates c_t by shifting taxes to future gen's or easing liquidity constraints

Key Lessons

1. **ALW'24:** HANK features different mechanism, but can produce FTPL-like predictions
   - outcomes that resemble fiscal dominance even if there is monetary dominance
   - although existing litt is built on flawed foundations, its applied lessons are still relevant

Key Lessons

1. **ALW'24**: HANK features different mechanism, but can produce FTPL-like predictions
   - outcomes that resemble fiscal dominance even if there is monetary dominance
   - although existing litt is built on flawed foundations, its applied lessons are still relevant

2. **ALW'25**: **CB welcomes fiscal inaction** ($\tau_d \approx 0$)
   - helps stabilize against demand shocks
   - eases tax distortions and y, π trade off

Fiscal Inaction as Monetary Support

Policy Problem and Key Question(s)

Policy Problem. Taking (τ_d, τ_y) given, the Central Bank solves

$$\mathscr{L}^{CB} = \mathbb{E}_{\text{shocks}} \left[\min_{\text{set of equilibria}} \sum_{t=0}^{\infty} \beta^t \left\{ \lambda_y y_t^2 + \lambda_\pi \pi_t^2 + \lambda_r r_t^2 \right\} \right]$$

rationale for r^2: financial stability, uncertainty about shocks/model/transmission, ZLB, etc

essential restriction: CB cannot achieve full first-best

Normative Q: how does optimal $\{r^*, y^*, \pi^*\}$ and resulting loss $\mathscr{L}^{CB}$ vary with τ_d?

- intermediate **positive** step: how does τ_d shape business cycle holding MP fixed?

The effect of τ_d for given $\{r\}$

Lemma. $\exists$ a unique equil and is s.t.

$$y_t = \sum_{s=0}^{\infty} \mathscr{Y}_{t,s} (r_s + e_s), \tag{1}$$

where $\mathscr{Y}_{t,s}$ is date-t response to one-off, date-0 news about date-s demand shock or rate hike.

Proposition. Holding $\{r\}$ fixed, slower fiscal adj stabilizes output:

1. The IRF coefficients $\mathscr{Y}_{t,s}$ increase with lower τ_d for all t, s.
2. Cumulative $\sum_{h=0}^{\infty} \beta^t \mathscr{Y}_{t,s}$ is < 0, but increases with lower τ_d and $\to 0$ as $\tau_d \to 0$.

- Flip side: slower fiscal adj reduces MP effectiveness!

Illustration for a contractionary shock

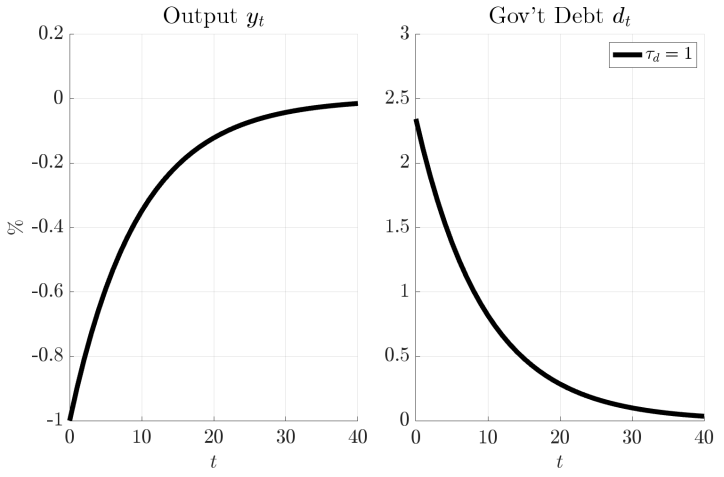
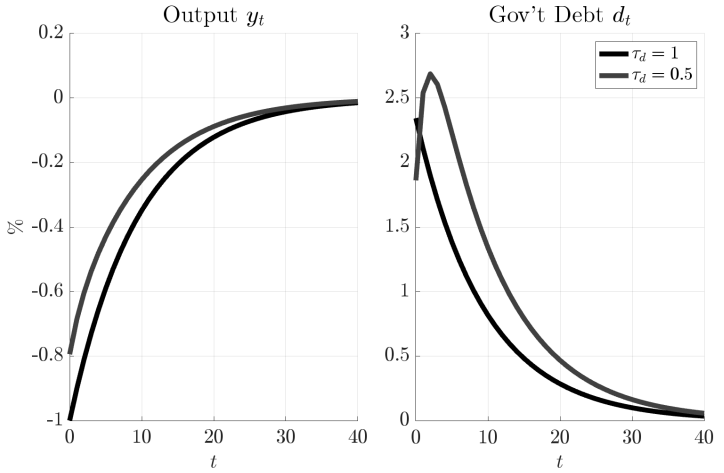
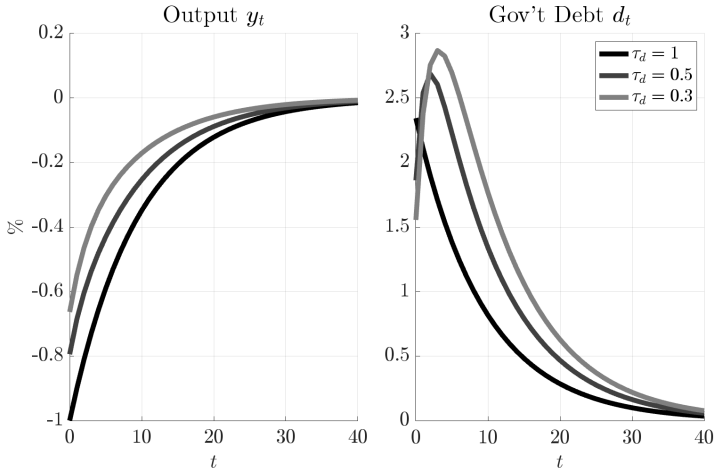


Illustration for a contractionary shock



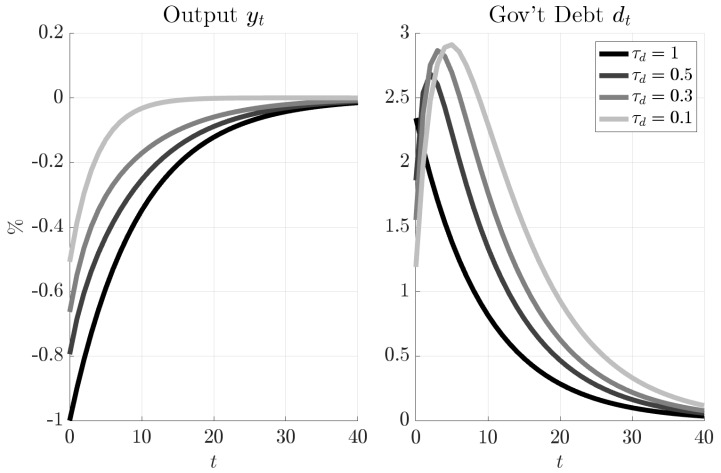
$\tau_d \downarrow \Rightarrow$ { tax hikes postponed; future debt & private wealth/liquidity $\uparrow$ } $\Rightarrow y \uparrow$

Illustration for a contractionary shock



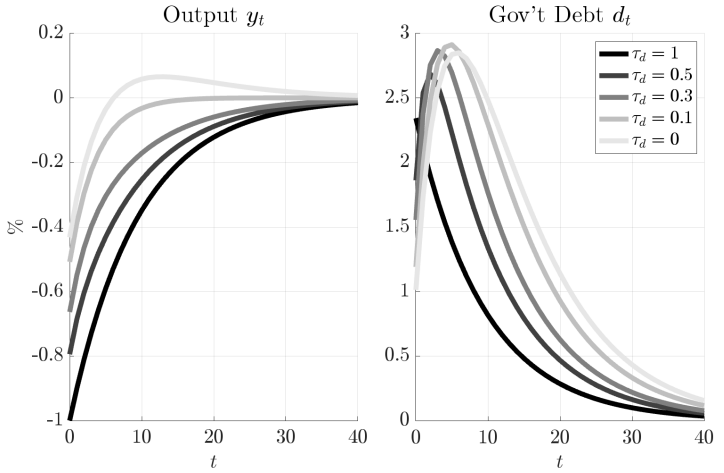
$\tau_d \downarrow \Rightarrow \left\{ \begin{array}{c} \text{tax hikes postponed} \\ \text{future debt \& private wealth/liquidity} \uparrow \end{array} \right\} \Rightarrow y \uparrow$

Illustration for a contractionary shock



$\tau_d \downarrow \Rightarrow \left\{ \begin{array}{c} \text{tax hikes postponed} \\ \text{future debt \& private wealth/liquidity} \uparrow \end{array} \right\} \Rightarrow y \uparrow$

Illustration for a contractionary shock



$\tau_d \downarrow \Rightarrow$ { tax hikes postponed; future debt & private wealth/liquidity $\uparrow$ } $\Rightarrow y \uparrow$

Sketch of limit as $\tau_d \to 0$

- Consider gov's IBC:

$$0 = \underbrace{\tau_y \sum \beta^t y_t}_{\tau_y NPV(y)} + \underbrace{\tau_d \sum \beta^t d_t}_{NPV(\text{tax hikes})}$$

- Assume contractionary shock: $NPV(y) < 0$ & $T \equiv NPV(\text{tax hikes}) > 0$
- As long $T > 0$: delaying tax hikes $\Rightarrow \uparrow y \Rightarrow \uparrow \tau_y NPV(y) \Rightarrow \downarrow T$
- Delaying more and more $\Rightarrow T \to 0$. But then also $\tau_y NPV(y) \to 0$

Two sides of same coin:

- $NPV(y) \to 0$: core mechanism when tax hikes are lump-sum (next)
- $NPV(\text{tax hikes}) \to 0$: crucial once they are distortionary (later)

The effect of τ_d along the optimal MP

- **Strategy:**
  - use envelope to get $\frac{\partial \mathscr{L}_{CB}}{\partial \tau_d} = F\left(\{r^*, y^*, \pi^*\}; \left\{\frac{\partial \mathscr{Y}_{t,s}}{\partial \tau_d}\right\}\right)$
  - use properties of optimum and earlier result about $\frac{\partial \mathscr{Y}_{t,s}}{\partial \tau_d}$ to sign $\frac{\partial \mathscr{L}_{CB}}{\partial \tau_d}$
  - proofs for simplified 2-period case; illustrations for infinite-horizon case

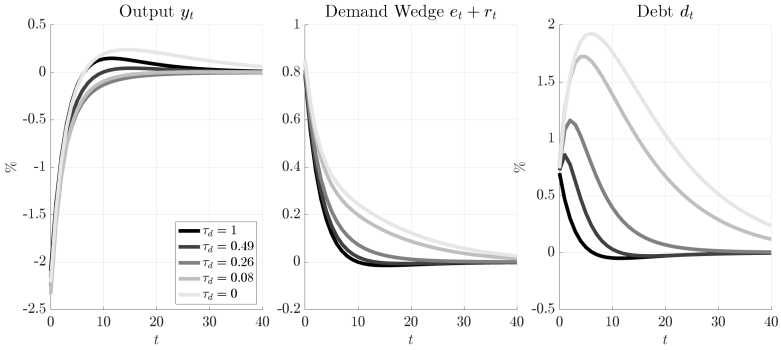
- **Results:**
  - for supply shocks: $\frac{\partial \mathscr{L}_{CB}}{\partial \tau_d} > 0$, so best $\tau_d = 0$ (provided τ_y not too large)
  - for supply shocks, $\frac{\partial \mathscr{L}_{CB}}{\partial \tau_d} < 0$ so best $\tau_d = 1$

- **Basic intuition:**

  stabilizing effect of low τ_d is desirable for AD shocks, undesirable for AS shocks

Demand Shocks

IRFs to AR(1) contractionary AD shock, under optimal MP, across different τ_d

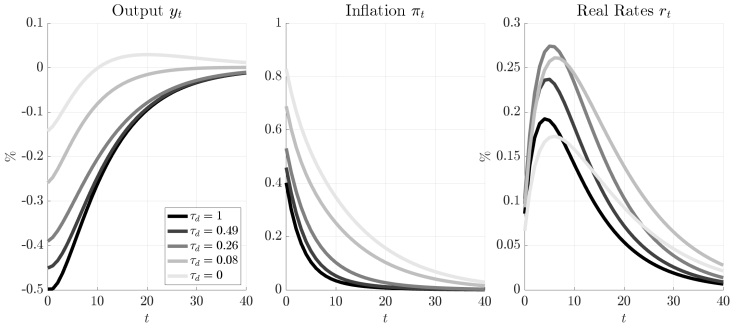


- when $\tau_d = 1$, CB stabilizes y via both concurrent cuts & forward guidance
- lower $\tau_d \Rightarrow$ *more* (y, π) stabilization with *less* MP action $\Rightarrow$ lower $\mathscr{L}_{CB}$

Supply Shocks

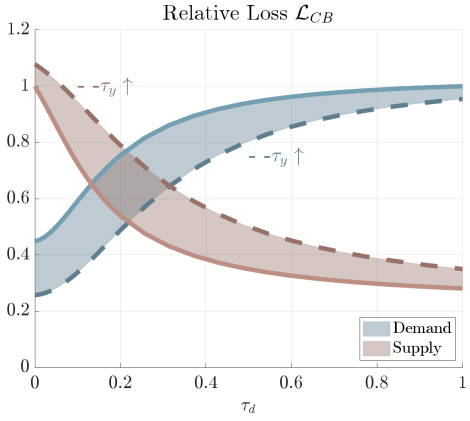
- CB leans against π pressures by hiking r and reducing y
- lower τ_d still stabilizes y, but now this works *against* CB and destabilizes π

IRFs to AR(1) contractionary AS shock, under optimal MP, across different τ_d



- lower τ_d, not only destabilizes π, but may even "demoralize" the CB

Demand vs Supply Shocks



Takeaway: CB prefers $\tau_d = 0$ for AD shocks and $\tau_d = 1$ for AS shocks

Also: $\tau_y \uparrow$ (larger auto stabilizer) helps w/ AD shocks, hurts w/ AS shocks

Distortionary Fiscal Adjustment

Before:

- Tax hikes were lump-sum $\Rightarrow$ τ_d operated only via AD (or IKC)

Now:

- Tax hikes are distortionary $\Rightarrow$ τ_d operates also via AS (or Phillips curve)

$$\pi_t \;=\; \kappa y_t + \tilde{\kappa} \underbrace{\tau_d d_t}_{t_t^{\text{adj}}} + u_t$$

Key Lesson:

- This tilts the balance in favor of low τ_d even with cost-push shocks

Supply-side effects of τ_d

Mechanisms inherited from RANK:

1. During AS shock: $\pi > 0$, optimal to $\downarrow$ tax distortion $\Rightarrow$ favors $\tau_d \approx 0$
2. During AD shock: $\pi < 0$, opportune time for $\uparrow$ tax distortion $\Rightarrow$ favors $\tau_d \approx 1$
3. Tax smoothing $\Rightarrow$ favors $\tau_d \approx 1 - \beta$ after either shock is gone

Supply-side effects of τ_d

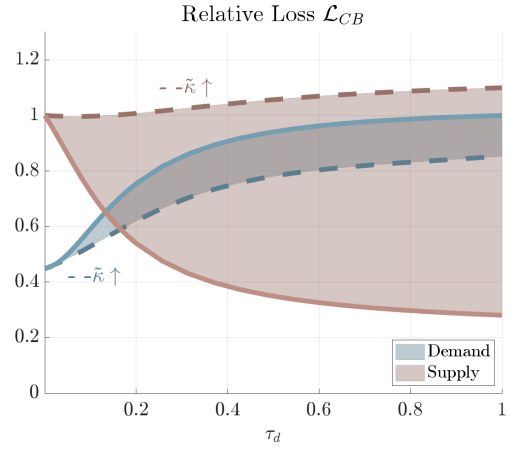
Mechanisms inherited from RANK:

1. During AS shock: $\pi > 0$, optimal to $\downarrow$ tax distortion $\Rightarrow$ favors $\tau_d \approx 0$
2. During AD shock: $\pi < 0$, opportune time for $\uparrow$ tax distortion $\Rightarrow$ favors $\tau_d \approx 1$
3. Tax smoothing $\Rightarrow$ favors $\tau_d \approx 1 - \beta$ after either shock is gone

New mechanism exclusive to HANK:

4. Postponing tax hikes reduces $Var(NPV(\text{tax distortion}))$ $\Rightarrow$ favors $\tau_d \approx 0$

Effect of τ_d with distortionary fiscal adjustment



When distortions are large enough, CB prefers $\tau_d = 0$ for both shocks

Quantitative evaluation

Theoretical guidance: $\tau_d \approx 0$ best if

- τ_y is not too large relative to PIH departure
- demand shocks are more important
- inflationary pressure from tax distortions is large

Priors about US business cycles:

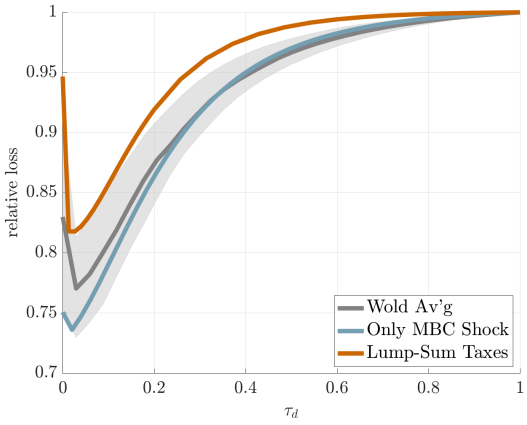
- demand shocks are indeed more important of y, but not for π
  - DSGE: Smets & Wouters (2007), Justiniano, Primiceri, and Tambalotti (2010)
  - Semi-structural VAR: Angeletos, Collard & Dellas (2020)
- unclear: supply shocks and tax distortions?

Next: Quantitative evaluation

Model and Empirical Discipline

- **AD block:** realistic heterogeneity
  - three types of OLG consumers to capture heterogeneity in MPCs & wealth
  - calibrated to evidence on i-MPCs and wealth shares
- **AS block:** Hybrid NKPC and modest tax distortion
  - Barnichon & Mesters (2022) update to Gali & Gertler (2000)
  - Frisch elasticity $= 1$
- **Fiscal block:**
  - $\tau_y = .33$, $D_{ss}/Y_{ss} = 1.04$, and $\delta = .9$ (maturity structure)
- **Shocks:**
  - flexible Wold representation a la Caravello, McKay & Wolf (2025)
  - or, MBC shock a la Angeletos, Collard & Dellas (2020)

Quantitative evaluation



For the US, significant gains from $\tau_d \approx 0$

3/4 due to dyn stabilization, 1/4 due to min tax dist

Conclusion

- HANK offers the "correct" way to study M-F interactions
  - sensible, grounded on micro evidence, theoretically robust
- Our specific question: how does speed of fiscal adj affects CB's job?
- **Our contribution:** fiscal inaction may be welcome because
  - helps stabilize output
  - helps minimize Var(tax distortions) and improve y, π trade off
- Obvious caveats:
  - applies to business cycle, not steady state or trends
  - and only insofar y is demand determined (Keynesian mech)

Thank You!