Ricardian Non-Equivalence

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June 2025

Introduction

What is the economic impact of **fiscal deficits**?

- **Ricardian Equivalence**: deficits have no effect on the economy [Ricardo (1820), Barro (1974)]
- Many ways of breaking Ricardian Equivalence:
  - Distortionary taxation [Elmendorf–Mankiw (1999)]
  - Finite lives [Blanchard (1985), Poterba–Summers (1987)]
  - Liquidity constraints [Buiter-Tobin (1978), Aiyagari (1995)]
- Recent evidence on the impact of deficits on economy [Barro–Bianchi (2024), Hazell–Hobler (2024)]

Ricardian Non-Equivalence

*"**but the people who pay the taxes never so estimate them**, and therefore do not manage their private affairs accordingly.*

We are too apt to think, that the war is burdensome only in proportion to what we are at the moment called to pay for it in taxes, without reflecting on the probable duration of such taxes"

David Ricardo

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  - Distortionary taxation [Barro (1979), Elmendorf–Mankiw (1999),…]
  - Finite lifes [Blanchard (1985), Poterba–Summers (1987),…]
  - Imperfect capital markets [Buiter-Tobin (1978), Aiyagari (1995),…]
- Recent evidence on the impact of deficits on economy [Barro–Bianchi (2024), Hazell–Hobler (2024)]

This paper: Theory and evidence of **Ricardian Non-Equivalence** (RNE) [Ricardo (1820), O'Driscoll (1977)]

- People fail to estimate the future tax burden of fiscal deficits…

This paper

New **empirical** survey-evidence on people's spending-plans in response to fiscal policy

- Planned spending response to fiscal transfers $\approx$ MPC
- People do not incorporate the implications of future taxes into current spending decisions

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- ➢ Planned spending response to fiscal transfers $\approx$ MPC
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Using **standard HANK** model:

- ➢ Argue that empirical facts are inconsistent with full-information and rational expectations
- ➢ Intuition: model still features substantial degree of forward-looking behavior

This paper

HANK model with **sparsity**: people work with a simplified model of the world

[Gabaix (2014)]

Two additional effects:

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Two additional effects:

- **RNE**: People do not fully incorporate future tax liabilities into current spending decisions
- **GE-dampening**: But, also fail to fully incorporate the GE effects of policy

[Angeletos–Lian (2017)]

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[Angeletos–Lian (2017)]

$$\underset{\text{Multiplier}}{\text{Transfer}} = \underset{\text{Multiplier}}{\text{FIRE}} + \underset{\text{Multiplier}}{\text{RNE}} - \underset{\text{Dampening}}{\text{Gen. Equil.}}$$

- Not obvious which force dominates... Important advantage is that we can address the question of which force dominates quantitatively

This paper

Calibrate quantitative model using **micro-evidence** on planned spending from survey experiments

- ➢ Sparsity significantly increases the transfer multiplier
- ➢ Results mainly driven by RNE, while GE dampening has a small net effect
- ➢ Effects grow larger the higher the persistence of fiscal debt

Deficit-financed **fiscal-spending shocks**:

- ➢ Key result: sparsity generates a much larger multiplier than FIRE

Empirical Results

Our Survey

Design and implement survey via Prolific

6,000 prime-aged adults in the US

Representative of the general population in terms of gender, education and political affiliation

- Also fairly representative along other dimensions
- Slight bias towards younger and more educated

Incentives: $1.5 for 10 minutes

Not today (in paper) – Some basic facts: people have little information about US fiscal situation

Survey experiments – how do people incorporate future fiscal implications into current spending decisions?

RNE Conceptual Framework

We study people's **spending response** to hypothetical fiscal transfers

- As in the literature on MPC estimation using surveys

  [Shapiro-Slemrod (2003), Jappelli-Pistaferri (2014,2020), Bunn et al. (2018), Christelis et al. (2019, 2020), Fuster-Kaplan-Zafar (2021), Colarieti-Mei-Stantcheva (2024), Andre–Flynn–Nikolakoudis–Sastry (2025)]

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Simple consumption/savings problem with government transfer:

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Simple consumption/savings problem with government transfer:

$$U^* = \max u(c_0) + \beta E_0[u(c_1)]$$

$$c_0 + b = y_0 + \varepsilon_0 \quad \& \quad c_1 = y_1 - t_1 + RB$$

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The impact of a government transfer:

$$\frac{dc_0}{d\varepsilon_0} = \overbrace{m_0}^{\text{MPC}} - \underbrace{m_1 \times E_0\left[\frac{dt_1}{d\varepsilon_0}\right]}_{\text{iMPC} \times \text{ Future taxes}}$$

In this model, $m_1 = m_0/R$ – PIH.

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Under FIRE: $E_0\left[\frac{dt_1}{d\varepsilon_0}\right] = R$

$$\frac{dc_0}{d\varepsilon_0} = m_0 - \frac{m_0}{R} \times R = 0$$

[Ricardian Equivalence]

In this model, $m_1 = m_0/R$ – PIH.

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But, **forecasting future taxes is hard**… Capture this idea with a model of bounded rationality/inattention [Gabaix (2014)]

- Despite **knowing the transfer**, still need to think about future implications
- The key property of sparsity is that people work with a simplified model of the world that takes into account only the variables that are most relevant to their decisions…

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- Expectations of future taxes $E_0[t_1] = (1 - \lambda)t_1$
  - If $\lambda = 0$, then fully attentive – FIRE
  - If $\lambda = 1$, then fully inattentive

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$$\max_{\lambda}\{\mathbb{E}_{-}[U(\lambda)] - \overbrace{\kappa^{cogn}(1-\lambda)}^{\text{Cognitive Costs}}\}$$

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Proposition (Sparsity)

Let $\mathbb{L}(\lambda) \equiv \mathbb{E}_-[U^* - U(\lambda)]$ be the expected-utility losses from inattention. To second order, the losses from inattention are given by

$$\mathbb{L}(\lambda) \approx \frac{1}{2}\psi\lambda^2 m_1^2 \mathbb{E}_-[t_1^2],$$

where $\psi > 0$ translates spending misoptimization into utility losses.

$$\min_{\lambda}\{\mathbb{L}(\lambda) + \overbrace{\kappa^{cogn}(1-\lambda)}^{\text{Cognitive Costs}}\}$$

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- Despite **knowing the transfer**, still need to think about future implications
- The key property of sparsity is that people work with a simplified model of the world that takes into account only the variables that are most relevant to their decisions...
- Expectations of future taxes $E_0[t_1] = (1 - \lambda)t_1$
- The optimal level of attention is given by:

$$\lambda = \min\left\{\frac{\kappa^{cogn}}{\psi \cdot m_1^2 \cdot \mathbb{E}_-[t_1^2]}, 1\right\} > 0$$

How Sparsity affects spending decisions

Proposition

The planned consumption response to transfers is given by

$$\frac{dc}{d\varepsilon_0} = m_0 - (1-\lambda)\cdot m_1 \cdot \frac{dt_1}{d\varepsilon_0}$$

Inattention brings marginal propensity to consume closer to m_0

$$\text{RNE} \equiv \lambda \cdot m_1 \cdot \frac{dt_1}{d\varepsilon_0} = \lambda \cdot m_0$$

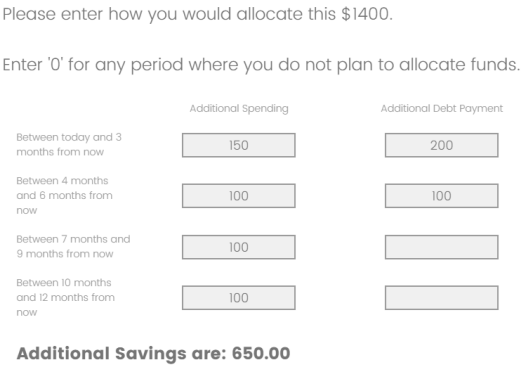
➢ Objects to measure:

1. The individual MPC m_0
2. The planned spending response to transfers $\frac{dc}{d\varepsilon_0}$

Empirical implementation

We study people's **spending response** to hypothetical transfers

➢ We use an interactive matrix as in Colarieti-Mei-Stantcheva (2024)



- We aggregate the consumption responses over the year

$$\frac{dc}{d\varepsilon_0} = \frac{\Delta Spending_{Year}}{1,400}$$

Empirical implementation

We study people's **spending response** to hypothetical transfers

- We use an interactive matrix as in Colarieti-Mei-Stantcheva (2024)
- Treatment 1: Individual Transfer

> In this scenario your household receives **a one-time unexpected cash transfer of $1,400 from the government today**. You know that no other household will receive such a payment. We are interested in understanding how you would use this additional cash.

  - Benchmark consumption response: estimate m_0

Empirical implementation

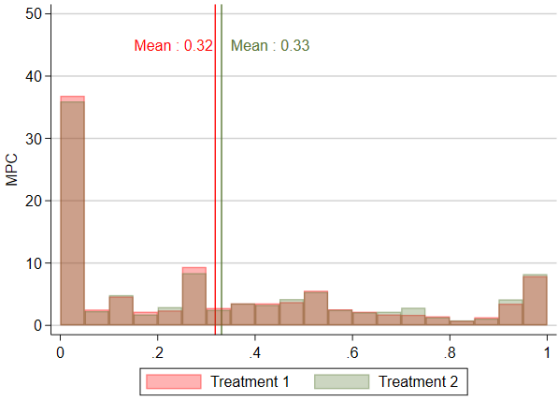
We study people's **spending response** to hypothetical transfers

- We use an interactive matrix as in Colarieti-Mei-Stantcheva (2024)
- Treatment 1: Individual Transfer
- Treatment 2: Transfer Policy

> In this scenario the government sends **a one-time unexpected cash transfer of $1,400 to every household in the USA today, including yours**. We are interested in understanding how you would use this additional cash.

  - Consumption response to policy with future tax implications

No distinguishable differences in consumption responses…



What proportion of the transfer would you spend in the first year?

Essentially no differences in consumption responses across T1 and T2

Implicit future tax liabilities have no effect on spending response

- ➢ Could arise due to lack of information of future taxes or because it still requires difficult deliberation to incorporate information of future taxes into current spending decisions
- ➢ Both of these may be at play here…

Empirical implementation

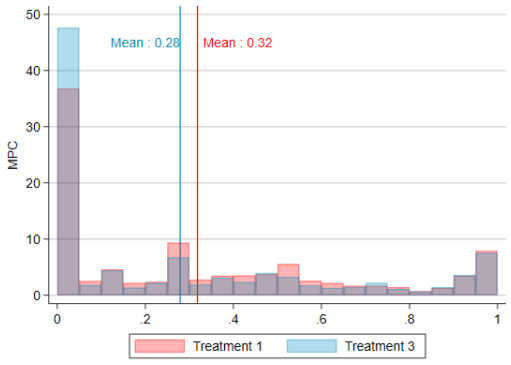
We study people's **spending response** to hypothetical fiscal transfers

- We use hypothetical vignettes as in Colarieti-Mei-Stantcheva (2024)
- Treatment 1: Individual Transfer
- Treatment 2: Transfer Policy
- Treatment 3: Transfer Policy + Information on Future Taxes

> In this scenario, the government sends **a one-time unexpected cash transfer of $1,400 to every household in the USA today**, including yours. To finance this deficit, the government will raise your taxes by $1,400 next year. We want to understand how you would use the $1,400 transfer today.

- As T2 but also provides information about future taxes
- Benchmark as if everyone acquired perfect info about future taxes from their news sources – Upper bound on the effects of giving public information
- Eases cognitive burden, akin to $\lambda \downarrow$ (more attention)

Muted spending response when given information of future taxes



What percentage of the transfer would you spend in the first year?

Good information of future taxes

- ➢ Reduction in spending response to transfers
- ➢ Increase in share of people who would save the entire transfer

But, still full reductions

- ➢ suggests still some cognitive burden to incorporating information into decision

s

How do expectations of future taxes change?

Q: how does each treatment affect expectations of taxes?

- We elicit expectations of growth in own tax burden both before and after seeing the treatment
- 1-, 2-, and 6-years ahead

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- 1-, 2-, and 6-years ahead

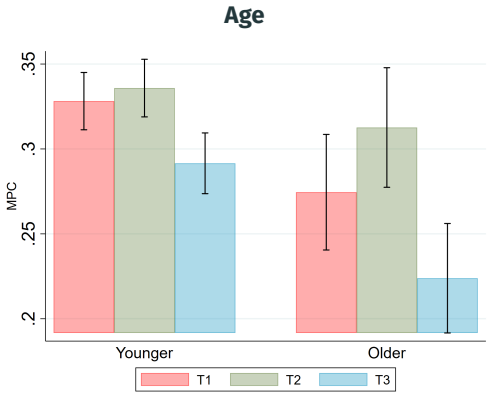
Findings:

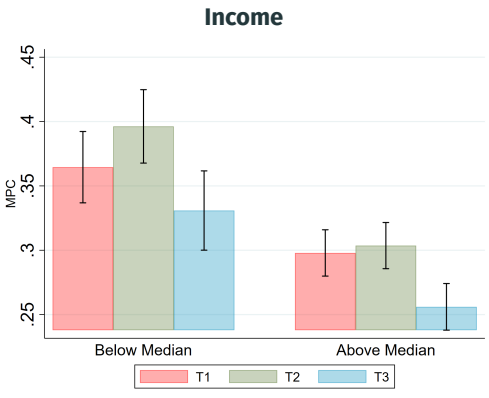
- Expectations of future taxes in T1 and T2 are essentially the same
- Expectations of future taxes increases in T3 for 1- and 2-years ahead
- Long-run expectations only slightly affected in T3

So, evidence on tax expectations suggests that people do not reflect on future tax burden

Tax Expectations

Heterogeneity in MPCs





- MPCs are higher for younger (age<50) and lower-income groups
- T1 and T2 yield similar responses across subgroups, T3 leads to significantly lower spending

The GE Consequences of RNE

Study impact of RNE in tractable HANK – adapt **HANK-OLG** model [Angeletos-Lian-Wolf (2024)]

Households: unit continuum of households

- Survive with probability ω, replaced by a newborn upon death

$$\mathcal{U}_{i,t} = \sum_{h=0}^{\infty} (\beta\omega)^h E_t[u(C_{i,t+h}) - v(N_{i,t+h})]$$

- Save and borrow in actuarially fair annuities

$$c_{i,t} + a_{i,t+1} = w_t N_{i,t} + \frac{(1+r_t)}{\omega} a_{i,t} - T_t$$

- Abstract from SS effects $\omega < 1$ with transfers between old and newborn [Angeletos-Lian-Wolf (2024)]

Model

Firms: flex prices + competitive, $Y_t = N_t$

Wage NKPC: continuum monopolistic labor unions [Standard]

$$\pi_t = \kappa y_t + \beta \mathbb{E}_t[\pi_{t+1}]$$

Monetary Policy: Taylor-rule with coefficient of 1 on expected inflation

$$i_t = \mathbb{E}_t[\pi_{t+1}] \Rightarrow r_t = 0$$

Government: Budget constraint

$$b_{t+1} = Rb_t - t_t$$

and taxes/transfers are given by

$$t_t = -\varepsilon_t + \tau_d R b_t$$

➢ Debt persistence $\rho_B \equiv R(1 - \tau_d) \in (0, 1)$

Aggregate demand and expectations

Goal: study GE consequences of sparsity in a tractable HANK model

➢ Augment **HANK-OLG** model of Angeletos-Lian-Wolf (2024) with sparsity

$$c_t = \underbrace{(1-\beta\omega)}_{m_0} \sum_{h=0}^{\infty} (\beta\omega)^h \left(E_t[y_{t+h}] - E_t[t_{t+h}]\right) + (1-\beta\omega) b_t$$

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GE Dampening: $E_t[y_{t+h}] = (1-\lambda_y)y_{t+h}$

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RNE: $E_t[t_{t+h}] = (1-\lambda_t)t_{t+h}$

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Proposition 1 (Aggregate demand)

Let c_t^* denote aggregate demand under FIRE. In the equilibrium under sparsity, aggregate demand is given by

$$c_t = c_t^* \underbrace{-\lambda_y \cdot (1-\beta\omega) \sum_{t=1}^{\infty} (\beta\omega)^h \mathbb{E}_t[y_{t+h}]}_{\text{GE Dampening}} + \overbrace{\lambda_\iota \cdot (1-\beta\omega) \sum_{t=1}^{\infty} (\beta\omega)^h \mathbb{E}_t[\iota_{t+h}]}^{\text{RNE}}$$

The Transfer Multiplier

Even under FIRE, the transfer multiplier in this economy is not zero

- ➢ If $\omega < 1$, Ricardian Equivalence fails [Standard HANK]

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In the sparsity economy, two additional effects

- ➢ GE-dampening lowers the consumption response (standard)

  [Angeletos-Lian (2018), Farhi–Werning (2019), Woodford–Xie (2019), Gabaix (2020),Bianchi-Vimercati–Eichenbaum–Guerreiro (2024), …]
- ➢ RNE increases the multiplier – "the people who pay taxes never so estimate them"

The Transfer Multiplier in Behavioral Economy

Proposition 2 (Transfer Multiplier)

Equilibrium output in the sparsity economy is given by $y_t = \mathbb{M} \cdot \rho_B^t \varepsilon_t$*, where:*

$$\mathbb{M} = (\mathbb{M}^* + \mathbb{M}^{RNE}) \cdot \delta^{GE}.$$

1. *The FIRE multiplier is* $\mathbb{M}^* = \frac{m_0}{1-m_0} \frac{1-\omega}{1-\rho_B}$
2. *The RNE multiplier is* $\mathbb{M}^{RNE} \equiv \frac{1-\beta\rho_B}{\beta(1-\rho_B)} m_0 \lambda_t > 0$
3. *The GE dampening factor is* $\delta^{GE} = \frac{1-\rho_B}{1-\rho_B\{1-m_0\lambda_y\}} \in (0,1)$

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   - 2.1 *Increasing in inattention:* $d\mathbb{M}^{RNE}/d\lambda_t > 0$
   - 2.2 *Increasing in MPC:* $d\mathbb{M}^{RNE}/dm_0 > 0$
   - 2.3 *Complementarity between MPC and inattention:* $d^2\mathbb{M}^{RNE}/d\lambda_t dm_0 > 0$
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   - 3.1 *Increasing in inattention:* $d\delta^{GE}/d\lambda_y < 0$
   - 3.2 *Increasing in MPC:* $d\delta^{GE}/dm_0 < 0$

The Transfer Multiplier in Behavioral Economy

Sparsity generates two countervailing forces that shape the equilibrium response to fiscal transfers

1. GE-dampening lowers the consumption response (standard)

   [Angeletos-Lian (2018), Farhi–Werning (2019), Gabaix (2020),Bianchi-Vimercati–Eichenbaum–Guerreiro (2024), Woodford–Xie (2019), …]

2. RNE increases the multiplier – "the people who pay taxes never so estimate them"

Net effect is ambiguous

➢ We now turn to a quantitative analysis of these forces

Quantitative Analysis

Summary of extensions:

1. Extend household block to state-of-the-art quantitative HANK model

   [Auclert et al. (2020, 2024), Guerreiro (2023)]

$$c_{i,t} + a_{i,t+1} = (1 - \tau_t)\, e_{i,t} w_t n_{i,t} + (1 + r_t)\, a_{i,t} - T_t \quad \& \quad a_{i,t} \geq 0$$

2. Sparsity allowing for variable- and horizon-dependent inattention [Guerreiro (2023)]

$$E_{i,t}\left[dX_{t+h}\right] = (1 - \lambda_{X,h})\, \mathbb{E}_t\left[dX_{t+h}\right], \quad h \in \{1, 2, ...\}$$

3. Standard NK wage-Phillips Curve [Auclert-Rognlie-Straub (2018)]
4. Extend government block to allow for spending and distortionary taxation

$$G_t + (1 + r_t)\, B_t = \tau_t \cdot Y_t + T_t + B_{t+1}$$

5. Taylor rule for monetary policy: $(1 + i_t) = (1 + r^*)\, e^{\phi_\pi \pi_t}$

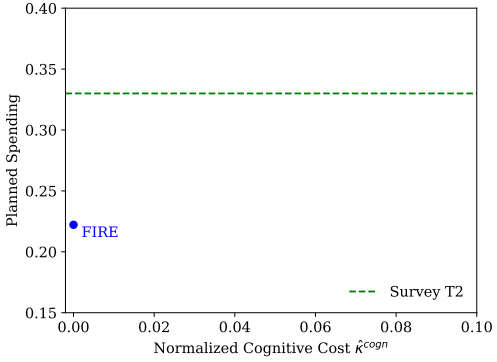
Calibrate model so $m_0 = 0.32$ from T1 Calibration

Question: How much do people plan to spend in response to a transfer?

- Not summarized by m_0
- Also depends on expectations of future income, taxes, interest rates,…
- Compute **planned spending response** which takes into account expectations for future variablels
- This is T2 in the model

$$\frac{dc_0}{d\varepsilon_0}$$

Calibrating Cognitive Costs Using Micro Evidence from Survey

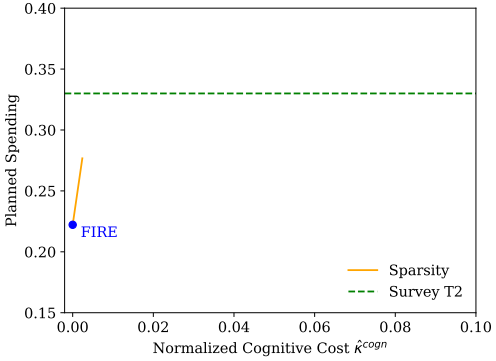


Calibrate model so $m_0 = 0.32$ from T1

Calibration

FIRE: no hope to match simultaneously m_0 and planned-spending response from transfer policy

Calibrating Cognitive Costs Using Micro Evidence from Survey



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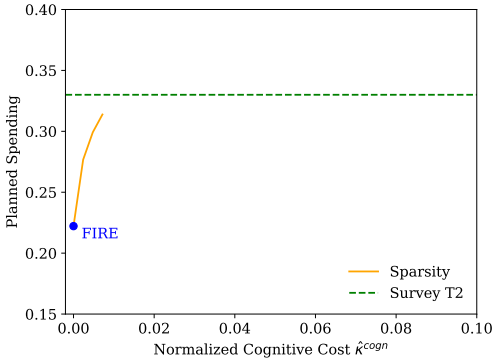

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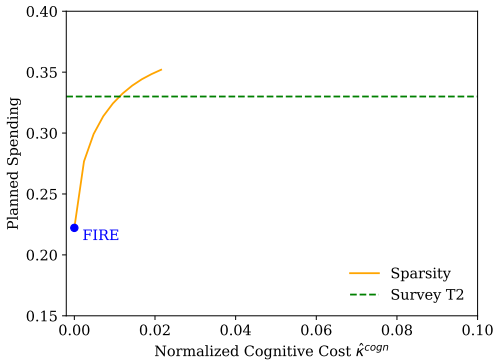

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[Almost fully attentive to 1-quarter ahead income]

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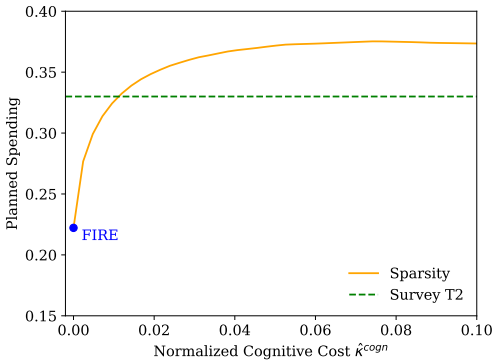

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The Macro Consequences of Stimulus Checks

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Panel A: The Transfer Multiplier

Model	Response	% Change from *FIRE*
Sparsity	0.31	+41%
FIRE	0.22	–
RNE-only		

Panel B: GE Attenuation

GE Component	Change from RNE
Inattention to Y	
Inattention to r	
GE dampening	

➢ Sparsity increases multiplier by $>$ 40% relative to FIRE

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RNE-only	0.31	+41%

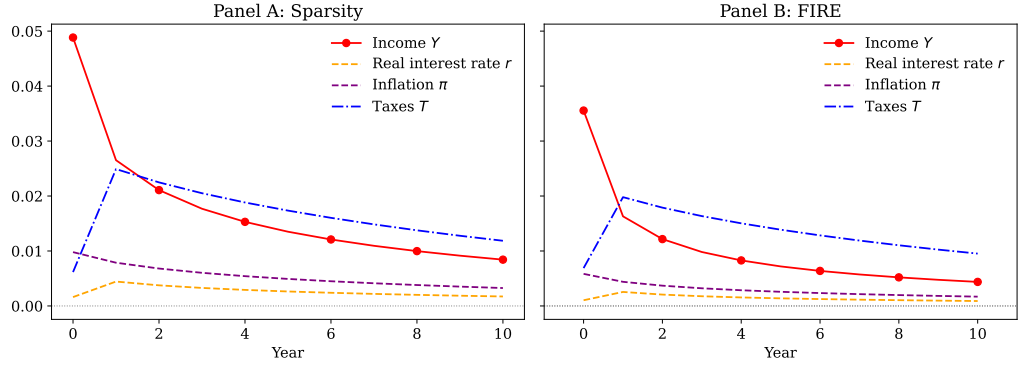
Panel B: GE Attenuation

GE Component	Change from RNE
Inattention to Y	–0.01
Inattention to r	+0.01
GE dampening	$\approx$ -0.00

- Sparsity increases multiplier by $>$ 40% relative to FIRE
- Most of increase is attributed to RNE – RNE-only has no GE dampening
- Why is GE dampening small? Offsetting effects of inattention to *Y* and *r*

Dynamic Responses – Magnitude Shock ≈ Covid Stimulus Checks 0.16% of GDP

Consider a transfer of the magnitude of Covid stimulus checks



➢ Steeper and more persistent rise of aggregate output under sparsity

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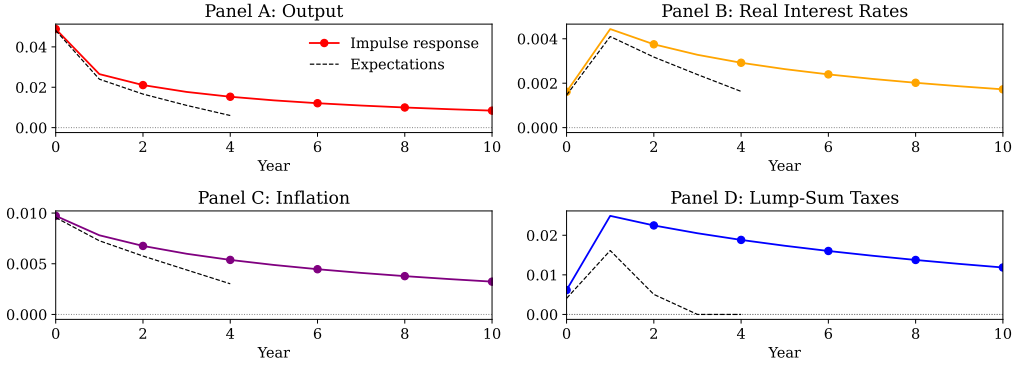

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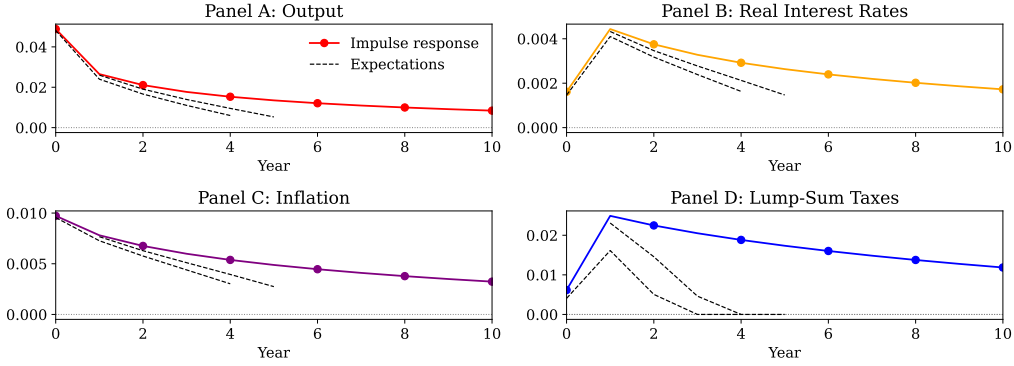

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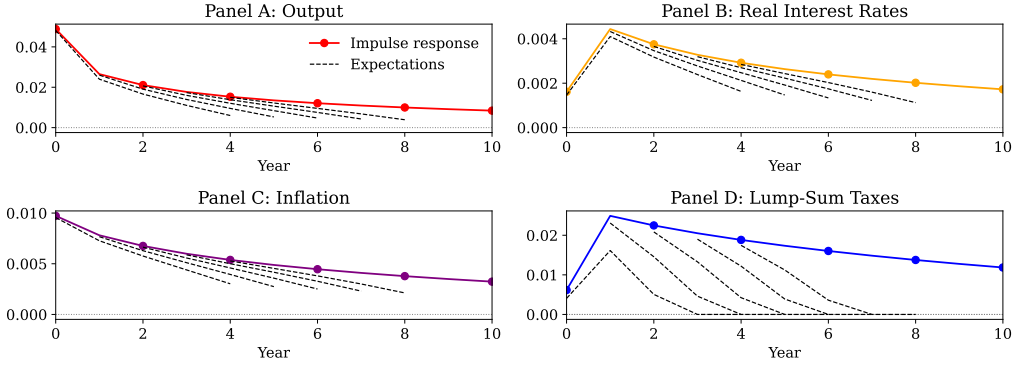

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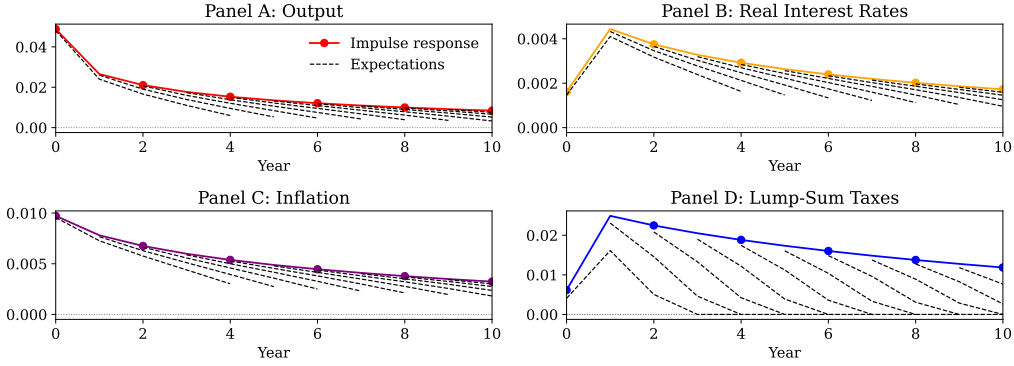

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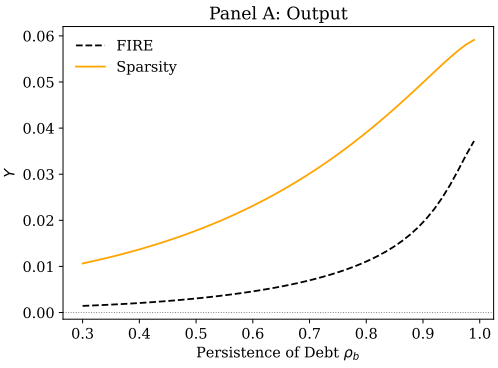
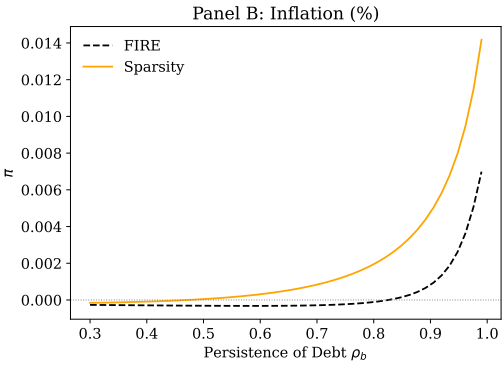
RNE Becomes More Relevant as the Persistence of Debt Increases





Fiscal Spending

The Macro Consequences of Fiscal Spending

Panel A: The Spending Multiplier			Panel B: GE Attenuation	
Model	**Response**	**% Change from *FIRE***	**GE Component**	**Change from RNE**
Sparsity	1.16	+23%	*Inattention to Y*	
FIRE	0.95	–	*Inattention to r*	
RNE-only			*GE dampening*	

➢ Spending multiplier is substantially larger under sparsity

The Macro Consequences of Fiscal Spending

Panel A: The Spending Multiplier

Model	Response	% Change from *FIRE*
Sparsity	1.16	+23%
FIRE	0.95	–
RNE-only	1.10	+16%

Panel B: GE Attenuation

GE Component	Change from RNE
Inattention to Y	
Inattention to r	
GE dampening	

- Spending multiplier is substantially larger under sparsity
- Again, results are mainly driven by RNE

The Macro Consequences of Fiscal Spending

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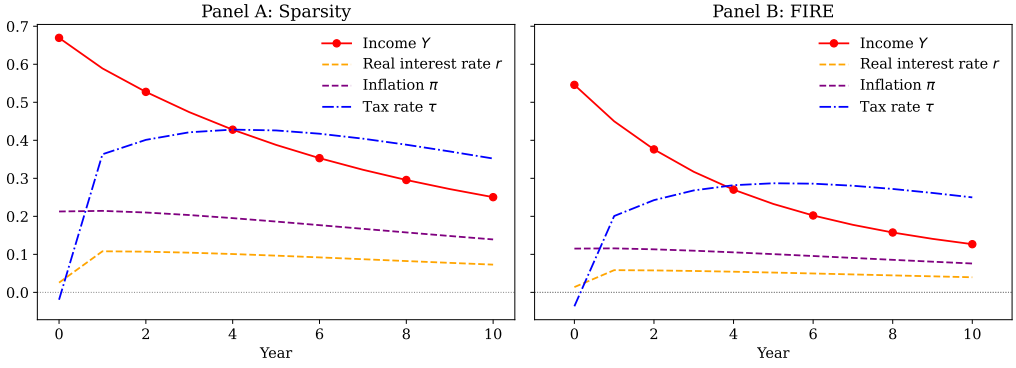
Sparsity	1.16	+23%
FIRE	0.95	–
RNE-only	1.10	+16%

Panel B: GE Attenuation

GE Component	Change from RNE
Inattention to Y	–0.07
Inattention to r	+0.13
GE dampening	+0.06

- Spending multiplier is substantially larger under sparsity
- Again, results are mainly driven by RNE
- GE dampening slightly increases the multiplier

Dynamic Responses



Conclusions

- Evidence: planned-spending does not internalize future tax liabilities from transfers
- Theoretical framework formalizes the idea of **Ricardian Non-Equivalence**

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- Using survey results to calibrate HANK model, RNE significantly amplifies effects of fiscal policy
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- Theoretical framework formalizes the idea of **Ricardian Non-Equivalence**
- Using survey results to calibrate HANK model, RNE significantly amplifies effects of fiscal policy
  - FIRE has counterfactual implications for microdata
- Limitation 1: At the zero lower bound, GE effects are more important, so GE-dampening could be quantitatively more relevant.
- Limitation 2: do not account for capital and investment. How do deviations from FIRE affect investor behavior in response to fiscal policy shocks?

Thank You!

Literature

1. **Ricardian Equivalence**: Ricardo (1820), Barro (1974), Barro (1979), Elmendorf–Mankiw (1999),…

   ➢ Departures due to bounded rationality: Gabaix (2020), Woodford–Xie (2019, 2022), Bianchi-Vimercati–Eichenbaum–Guerreiro (2024), Guerreiro (2024), …

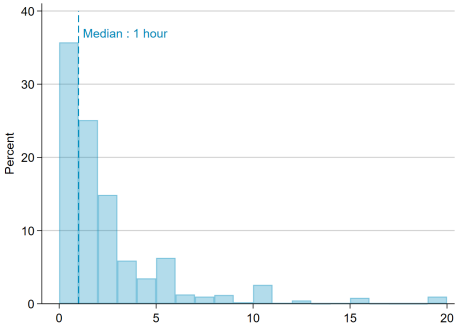
2. **Fiscal Policy with heterogeneous agents**: Farhi–Werning–Petri (2020), Angeletos–Lian–Wolf (2024a,2024b), Auclert–Rognlie–Straub (2024a, 2024b), Guerreiro (2024) …

3. **Behavioral HANK Models**: Farhi-Werning (2019), Farhi–Werning–Petri (2020), Auclert–Rognlie–Straub (2020), Angeletos-Huo (2021), Pfauti–Seyrich (2023), Guerreiro (2023), Bardóczy–Guerreiro (2024), …

Facts from the survey:

1. **People spend little time obtaining information about the US fiscal situation**
2. People rely on a small number of information sources
3. People's perception of the fiscal situation is far from the truth

People spend little time obtaining information about the US fiscal situation



How many hours a week do you usually spend gathering information about the US economy?

Over 70% of people spend $<$ 2 hours weekly obtaining information about the US fiscal situation

Facts from the survey:

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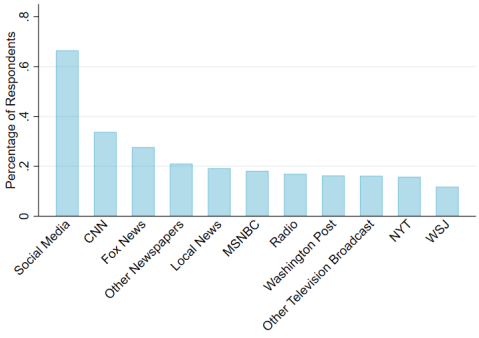
People rely on a small number of information sources



What is your primary source of news about national issues?

Most people report only 1 or 2 primary sources of news

Social media is the most common source of information, with two thirds reporting it as a primary source of news

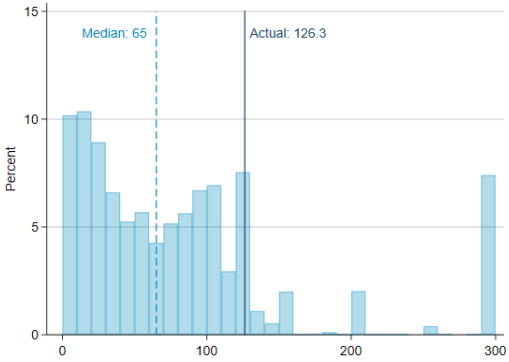
Facts from the survey:

1. Little time and effort spent on obtaining and processing information
2. Most people rely on social media as source of information
3. **People misperceive the current fiscal situation**

Perceptions of fiscal debt

What do you think federal debt was, as a percentage of GDP, in 2023?

Perceptions of fiscal debt

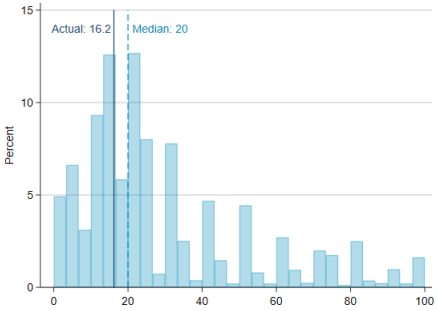


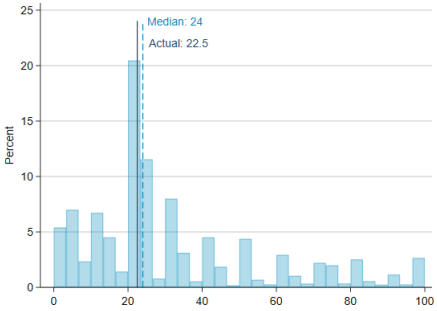
What do you think federal debt was, as a percentage of GDP, in 2023?

- Large mistakes about the US federal debt
- The median person thinks the federal debt to GDP ratio is $\approx$ 50% of the true value

Spending & Taxes

Perceptions of federal spending and taxes





- Large dispersion in perceptions of tax revenue and federal spending
- Medians are not far from truth, but quite different for means

Impact on expectations of future taxes

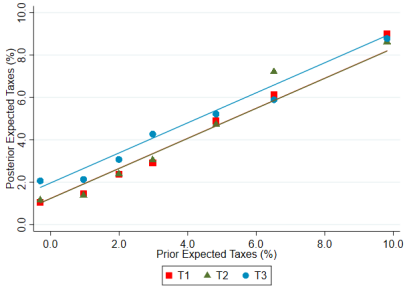
Back

Q: How does the treatment affect expectations of future taxes? Elicit expectations of future taxes before and after the treatments

Impact on expectations of future taxes

Back

Figure 1: 1-Year Ahead



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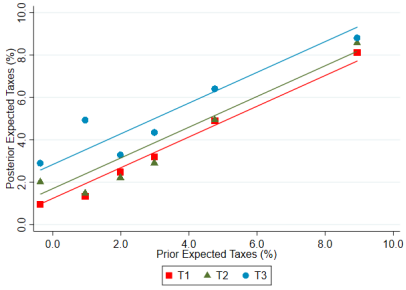
T1 and **T2** have essentially the same average effect on expectations of future taxes

T3 significantly increases expectations of future taxes

Impact on expectations of future taxes

Back

Figure 1: 2-Year Ahead



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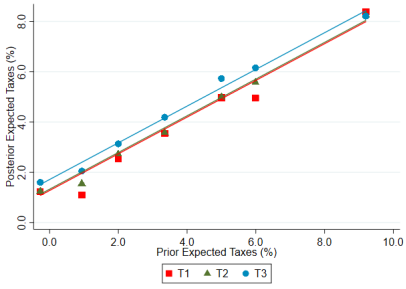
Positive effect on expectations persists for expected taxes in 2 years

Impact on expectations of future taxes

Back

Figure 1: 6-Year Ahead



Q: How does the treatment affect expectations of future taxes? Elicit expectations of future taxes before and after the treatments

T1 and **T2** have essentially the same average effect on expectations of future taxes

T3 significantly increases expectations of future taxes

Positive effect on expectations persists for expected taxes in 2 years

And still a small positive effect on longer-run expectations...

Taxes Expectations Reg. | Income Expectations Reg. | Inflation Expectations Reg. | Interest Rate Expectations Reg.

Impact on expectations of future taxes

Back

Q: How does the treatment affect expectations of future taxes?

[Treatment 1 is control]

Horizon	1 year		2 years		6 years	
Treatment 2	−0.143	−0.047	0.010	0.090	0.012	0.076
	(0.12)	(0.09)	(0.13)	(0.09)	(0.14)	(0.11)
Treatment 3	0.428***	0.428***	0.648***	0.625***	0.326*	0.218**
	(0.12)	(0.09)	(0.13)	(0.09)	(0.15)	(0.11)
Prior		0.678***		0.721***		0.588***
		(0.012)		(0.000)		(0.001)

➢ People do not reason about future tax implications of current deficits unless directly informed

Impact on expectations of future income

Back

Q: How does the treatment affect expectations of future income?

Horizon	1 year		2 years		6 years	
Treatment 1	0.051	0.033	0.123	0.152	0.190	0.298*
	(0.13)	(0.09)	(0.14)	(0.11)	(0.21)	(0.153)
Treatment 2	0.359**	0.191*	0.422**	0.325**	0.314	0.078
	(0.13)	(0.10)	(0.137)	(0.11)	(0.21)	(0.155)
Prior		0.522***		0.466**		0.567**
		(0.000)		(0.008)		(0.008)

Impact on expectations of future interest rates

Back

Q: How does the treatment affect expectations of future taxes?

Horizon	1 year		2 years		6 years	
Treatment 1	0.150	0.067	0.152	0.024	0.124	0.103
	(0.08)	(0.06)	(0.08)	(0.06)	(0.09)	(0.06)
Treatment 2	0.256***	0.189***	0.267***	0.143**	0.202*	0.052
	(0.08)	(0.06)	(0.09)	(0.06)	(0.09)	(0.06)
Prior		0.732***		0.732***		0.663***
		(0.009)		(0.009)		(0.009)

Impact on expectations of future inflation

Back

Q: How does the treatment affect expectations of future taxes?

Horizon	1 year		2 years		6 years	
Treatment 1	−0.043	0.065	0.018	0.012	0.127	0.157*
	(0.09)	(0.06)	(0.09)	(0.04)	(0.13)	(0.08)
Treatment 2	0.143	0.214***	0.262**	0.209***	0.340***	0.377***
	(0.09)	(0.06)	(0.09)	(0.04)	(0.13)	(0.09)
Prior		0.679***		0.702***		0.710***
		(0.010)		(0.010)		(0.010)

Proposition 3 (Transfer Multiplier)

Equilibrium output in the sparsity economy is given by $y_t = \mathbb{M} \cdot \rho_B^t \cdot \varepsilon_0$*, where:*

$$\mathbb{M} = (\mathbb{M}^* + \mathbb{M}^{RNE}) \cdot \delta^{GE}.$$

1. *The FIRE multiplier is* $\mathbb{M}^* = \frac{m_0}{1-m_0} \frac{1-\omega}{1-\rho_B}$
2. *The RNE multiplier is* $\mathbb{M}^{RNE} \equiv \frac{1-\beta\rho_B}{\beta(1-\rho_B)} m_0 \lambda_t > 0$
3. *The GE dampening factor is* $\delta^{GE} = \frac{1-\rho_B}{1-\rho_B\{1-m_0\lambda_y\}} \in (0,1)$

where ρ_B *is the persistence of government debt.*

Back

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   - 2.1 *Increasing in inattention:* $d\mathbb{M}^{RNE}/d\lambda_t > 0$
   - 2.2 *Increasing in MPC:* $d\mathbb{M}^{RNE}/dm_0 > 0$
   - 2.3 *Complementarity between MPC and inattention:* $d^2\mathbb{M}^{RNE}/d\lambda_t dm_0 > 0$
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   - 3.1 *Increasing in inattention:* $d\delta^{GE}/d\lambda_y < 0$
   - 3.2 *Increasing in MPC:* $d\delta^{GE}/dm_0 < 0$

where ρ_B *is the persistence of government debt.*

Calibration

Back

Parameter	Description	Value	Parameter	Description	Value
σ	IES	0.5	ρ_B	Persistence of debt	0.98
β	Discount factor	0.96	G	Spending	0.20
r	Real interest rate	0.5%	B	Assets	3.92
ρ_e	Persistence e	0.95	ϕ_π	Taylor coefficient	1.5
σ_e	Variance e	0.75	κ^{cogn}	Cognitive Cost	0.0007
χ	Labor disutility	0.64	$\sqrt{\mathbb{E}_-[\hat{y}^2]}$	St. Dev. of Y_t	1
ψ	Frisch	0.76	$\sqrt{\mathbb{E}_-[\hat{\tau}^2]}$	St. Dev. of τ_t	0.41
κ_w	Wage Rigidity	0.0062	$\sqrt{\mathbb{E}_-[\hat{r}^2]}$	St. Dev. of r_t	0.27