

# Seemingly Irresponsible but Welfare Improving Fiscal Policy at the Lower Bound: The Role of Expectations

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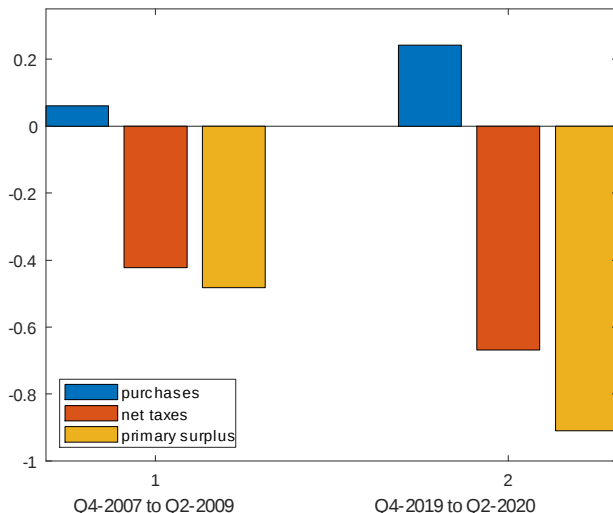
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# On the role of fiscal and monetary policy facing the ZLB, the paper makes four main contributions

- 1 **Evaluate super-active fiscal rules**, which call for tax cuts and/or spending increases when the government's debt-to-GDP level rises—that is, *seemingly-irresponsible* fiscal responses.
- 2 **Welfare comparison of such rules**, employing a model-consistent measure of the welfare costs of fluctuations.
- 3 Depart from rational expectations and instead assume **bounded rationality, in the form of cognitive discounting**, that causes less weight to be placed on future events.
- 4 Study fiscal responses as seen in the U.S. during the **Great Recession** and **COVID recession** (see next slide, Fig. 1).

# Fig. 1: U.S. fiscal responses during GR (1) and COVID (2)

Change in category divided by change in debt held by the public



# Relation to the vast literature on monetary policy frameworks and ZLB

- **Optimal monetary policy (ignoring the role of fiscal policy):** Eggertsson and Woodford (2003, 2006), Adam and Billi (2006), Nakov (2008), Billi, Galí, and Nakov (2023)
- **Emergency budgets and temporary adoption of an active fiscal policy:** Jacobson, Leeper and Preston (2019), Bianchi, Faccini and Melosi (2022), Bianchi and Melosi (2019), Ascari, Florio and Gobbi (2020)
- **Role of long-term government debt:** Caramp and Silva (2023), Leeper (2021), Leeper and Zhou (2021), Leeper, Leith and Liu (2021), Harrison (2021)
- **Deviations from rational expectations in the form of cognitive discounting:** Gabaix (2020), Budianto, Nakata, and Schmidt (2023)

# New Keynesian model with monetary policy facing ZLB

Terminology of Leeper and Leith (2016), regime M vs regime F

$$\pi_t = \beta E_t \{ \pi_{t+1} \} + \kappa \tilde{y}_t \quad (1)$$

$$\tilde{y}_t = E_t \{ \tilde{y}_{t+1} \} - \frac{1}{\bar{\sigma}} (\hat{i}_t - E_t \{ \pi_{t+1} \} - \hat{r}_t^n) \quad (2)$$

$$\hat{i}_t = \max [-\rho, \phi \pi_t] \quad (3)$$

- Regime M, monetary policy reacts strongly to inflation ( $\phi > 1$ ) when away from the ZLB.
- Regime F, weak response to inflation ( $\phi < 1$ ) thus **fiscal inflation**.
- A model-consistent measure of the welfare costs of fluctuations

$$\mathbb{L} = \frac{1}{2} \left[ \frac{\epsilon}{\lambda} \text{var} (\pi_t) + \frac{\kappa}{\lambda} \text{var} (\tilde{y}_t) + \frac{\gamma \kappa}{\lambda} \text{var} (\hat{g}_t) \right] \quad (4)$$

# Government budget, and fiscal rules for net taxes and spending reacting to debt-to-GDP ratio

Assume one-period bonds here in the baseline (and long-term debt in the extended model)

$$\hat{b}_t = \underbrace{\beta^{-1} \hat{b}_{t-1}}_{\text{Roll over}} + \underbrace{\beta^{-1} b (\hat{i}_{t-1} - \pi_t)}_{\text{Real interest cost}} - \underbrace{(\hat{\tau}_t - \hat{g}_t)}_{\text{Primary surplus}} \quad (5)$$

$$\hat{\tau}_t = \psi_\tau \hat{b}_{t-1} \quad (6)$$

$$\hat{g}_t = \psi_g \hat{b}_{t-1} \quad (7)$$

- These together give

$$\hat{b}_t = \left( \beta^{-1} - \psi_\tau + \psi_g \right) \hat{b}_{t-1} + \beta^{-1} b (\hat{i}_{t-1} - \pi_t) \quad (8)$$

# Role of fiscal policy for inflation stabilization

- Regime M, passive fiscal  $\psi_\tau > 0$ , **raise taxes** when the debt-to-GDP level rises, i.e. **austerity** in recessions at the ZLB.
- Regime F, we evaluate **super-active** fiscal policies:
  - $\psi_\tau < 0$ , **cut taxes** when debt rises, and/or
  - $\psi_g > 0$ , **hike spending** when debt rises
- The latter policies generate **expectations of inflation**, which serve to stabilize the economy during **downturns**, especially at the ZLB.

Table 1: Baseline calibration of regime M

| Parameter     | Description                               | Value |
|---------------|-------------------------------------------|-------|
| $\beta$       | Discount factor                           | 0.995 |
| $\sigma$      | Curvature of consumption utility          | 1     |
| $\delta$      | Curvature of government purchases utility | 1     |
| $\varphi$     | Curvature of labor disutility             | 5     |
| $\epsilon$    | Elasticity of substitution of goods       | 9     |
| $\alpha$      | Index of decreasing returns to labor      | 0.25  |
| $\theta$      | Calvo index of price rigidities           | 0.75  |
| $G$           | Government purchases share of output      | 0.2   |
| $\phi$        | Monetary policy response to inflation     | 2     |
| $\psi_{\tau}$ | Fiscal policy, net taxes response to debt | 0.3   |
| $\psi_g$      | Fiscal policy, purchases response to debt | 0     |
| $b$           | Debt-to-GDP target                        | 2.4   |
| $\eta$        | Bond coupon decay rate                    | 0     |
| $\rho_z$      | Persistence of aggregate-demand shock     | 0.8   |
| $\sigma_z$    | Std. deviation of aggregate-demand shock  | 0.028 |

Notes: Values are shown in quarterly rates.

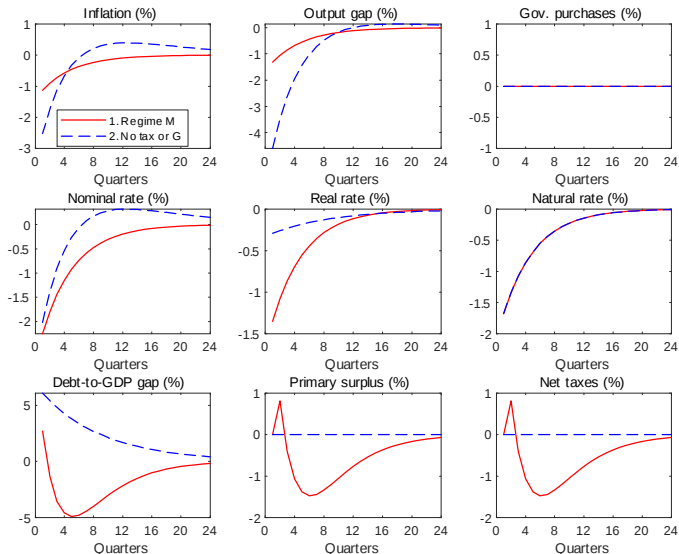
# Table 2: Policy scenarios under regimes M and F

| Scenario       | Policy coefficients |             |          |     |        | Regime |
|----------------|---------------------|-------------|----------|-----|--------|--------|
|                | $\phi$              | $\psi_\tau$ | $\psi_g$ | $b$ | $\eta$ |        |
| 1. Regime M    | 2                   | 0.3         | 0        | 2.4 | 0      | M      |
| 2. No tax or G | 0.8                 | 0           | 0        | 2.4 | 0      | F      |
| 3. Tax         | 0.8                 | -0.3        | 0        | 2.4 | 0      | F      |
| 4. G           | 0.8                 | 0           | 0.3      | 2.4 | 0      | F      |
| 5. G balanced  | 0.8                 | 0.3         | 0.3      | 2.4 | 0      | F      |
| 6. G high b    | 0.8                 | 0           | 0.3      | 8.0 | 0      | F      |
| 7. G long debt | 0.8                 | 0           | 0.3      | 2.4 | 0.955  | F      |

Notes: In regime F,  $\phi < 1$  and  $\psi_s \equiv \psi_\tau - \psi_g \leq 0$ ,  
i.e. super-active fiscal. The debt duration is one quarter  
if  $\eta = 0$  and 5 years if  $\eta = 0.955$ .

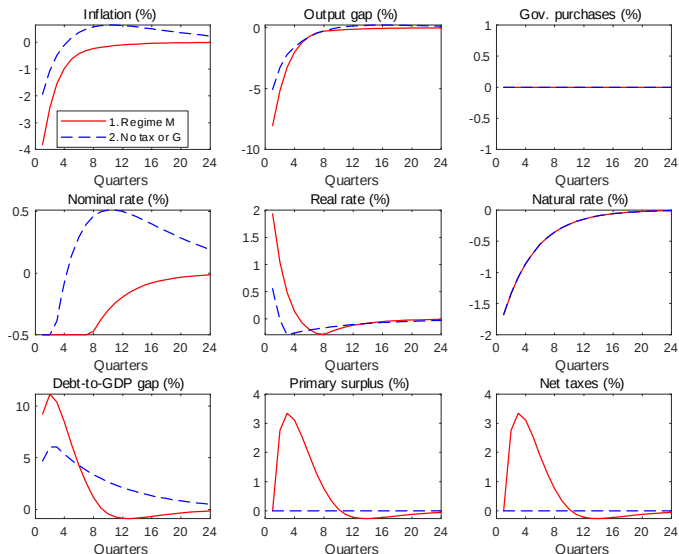
# Fig. 2: Effects of regime F (no tax or G) without ZLB

Deviation from steady state in response to -3sd demand shock



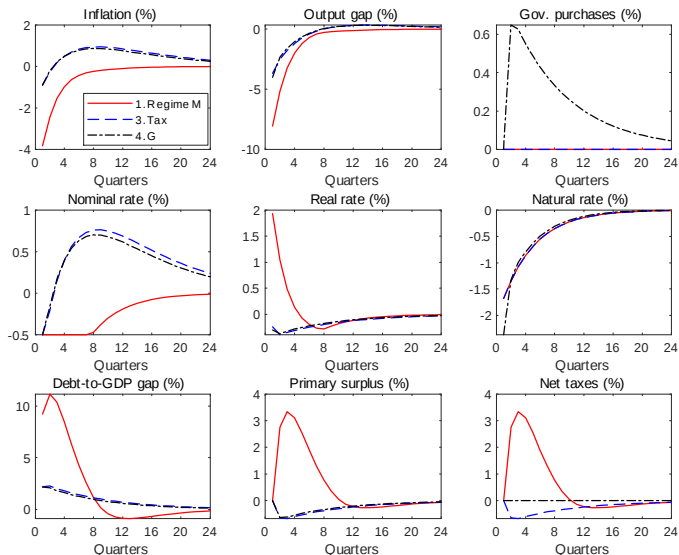
# Fig. 3: Effects of regime F (no tax or G) with ZLB

Deviation from steady state in response to -3sd demand shock



# Fig. 4: Effects of super-active fiscal (tax cut or G hike)

Deviation from steady state in response to -3sd demand shock



# Welfare comparison depends on outcomes away from the ZLB, at the ZLB, and frequency of being at ZLB

Table 3: Welfare costs of business cycles under regimes M and F.

| Scenario           | $\mathbb{L}(\%)$ no ZLB | $\mathbb{L}(\%)$ with ZLB | ZLB freq. (%) |
|--------------------|-------------------------|---------------------------|---------------|
|                    | Tot.                    | Tot.                      |               |
| <b>1. Regime M</b> | 0.31                    | 0.79                      | 25.0          |
| ...                |                         |                           |               |
| <b>4. G</b>        | 0.78                    | 0.64                      | 10.1          |
| ...                |                         |                           |               |

Notes:  $\mathbb{L}$  is the permanent consumption loss from fluctuations.

- Key advantages of super-active fiscal (e.g. **scenario 4** in Table 3):
  - **welfare gains** in the presence of ZLB, and
  - **reduced frequency** of episodes at ZLB

# Deviating from rational expectations: cognitive discounting

- We use a form of **cognitive discounting** developed by Gabaix (2020), i.e. households and firms form expectations placing less weight on future events (see next slide).
- Cognitive discounting affects notably:
  - the conditions for equilibrium **determinacy** (see Fig. 8)
  - the **performance** of super-active fiscal rules (see Fig. 9 and Table 4)

# New Keynesian model with cognitive discounting

- Let  $\bar{m} \in [0, 1]$  be the micro-cognitive discounting factor. We set  $\bar{m} = 0.85$  as in Gabaix (2020) and summarize some of the empirical evidence on  $\bar{m}$ . Note, under rational expectations  $\bar{m} = 1$ .

$$\pi_t = \beta M^f E_t \{\pi_{t+1}\} + \kappa \tilde{y}_t \quad (9)$$

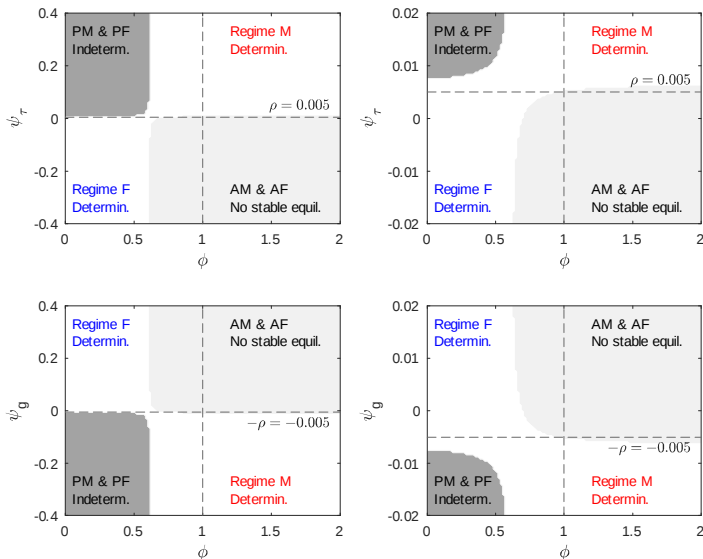
$$\tilde{y}_t = M E_t \{\tilde{y}_{t+1}\} - \frac{1}{\bar{\sigma}} \left( \hat{i}_t - M E_t \{\pi_{t+1}\} - \hat{r}_t^{CD} \right) \quad (10)$$

$$\hat{r}_t^{CD} \equiv (z_t - M E_t \{z_{t+1}\}) - \bar{\sigma} (1 - \Gamma) (M E_t \{\hat{g}_{t+1}\} - \hat{g}_t) + \bar{\sigma} b_d \hat{b}_t \quad (11)$$

- where  $M \equiv \bar{m}$ ,  $M^f \equiv \bar{m} \left[ \theta + (1 - \theta) \left( \frac{1 - \beta\theta}{1 - \beta\theta\bar{m}} \right) \right] \leq \bar{m}$ , and  $b_d \equiv (1 - M) \beta \rho \left( \frac{C}{Y} \right) \left( \frac{\varphi}{\varphi + (1 - \alpha)\bar{\sigma}} \right) \geq 0$

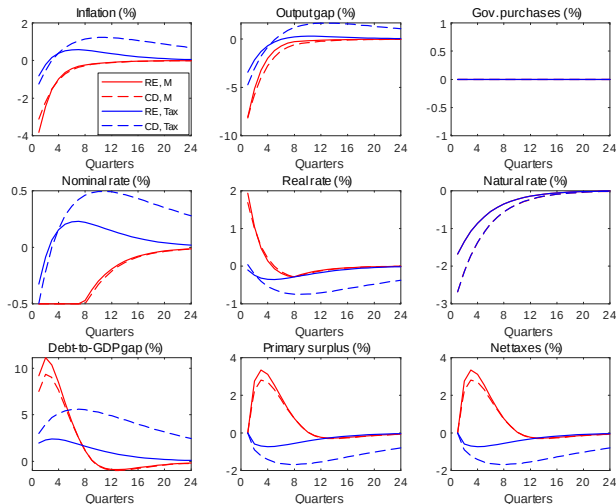
# Fig. 8: Equilibrium determinacy with cognitive discounting

The right column provides a close-up of the left column



# Fig. 9: Effects of super-active fiscal (tax cut) and of cognitive discounting

RE (CD) indicates outcomes under rational expectations (cognitive discounting)



# Cognitive discounting makes super-active fiscal rules much less desirable, despite the reduced frequency of ZLB

Table 4: Welfare costs of business cycles with cognitive discounting.

| Scenario           | $\mathbb{L}(\%)$ no ZLB | $\mathbb{L}(\%)$ with ZLB | ZLB freq. (%) |
|--------------------|-------------------------|---------------------------|---------------|
|                    | Tot.                    | Tot.                      |               |
| <b>1. Regime M</b> | 0.39                    | 0.81                      | 27.0          |
| ...                |                         |                           |               |
| <b>3. Tax</b>      | 2.39                    | 2.07                      | 8.6           |
| ...                |                         |                           |               |

Notes:  $\mathbb{L}$  is the permanent consumption loss from fluctuations.

# Summary and policy implications

- We show that, the standard assumptions of policy credibility and rational expectations are key to why **seemingly-irresponsible fiscal actions** may generate stabilizing movement in inflation expectations.
- In the face of aggregate-demand shocks and the ZLB, a commitment to active fiscal policy and passive monetary policy (**AF/PM**) can yield **welfare gains under rational expectations**, but not under cognitive discounting.