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

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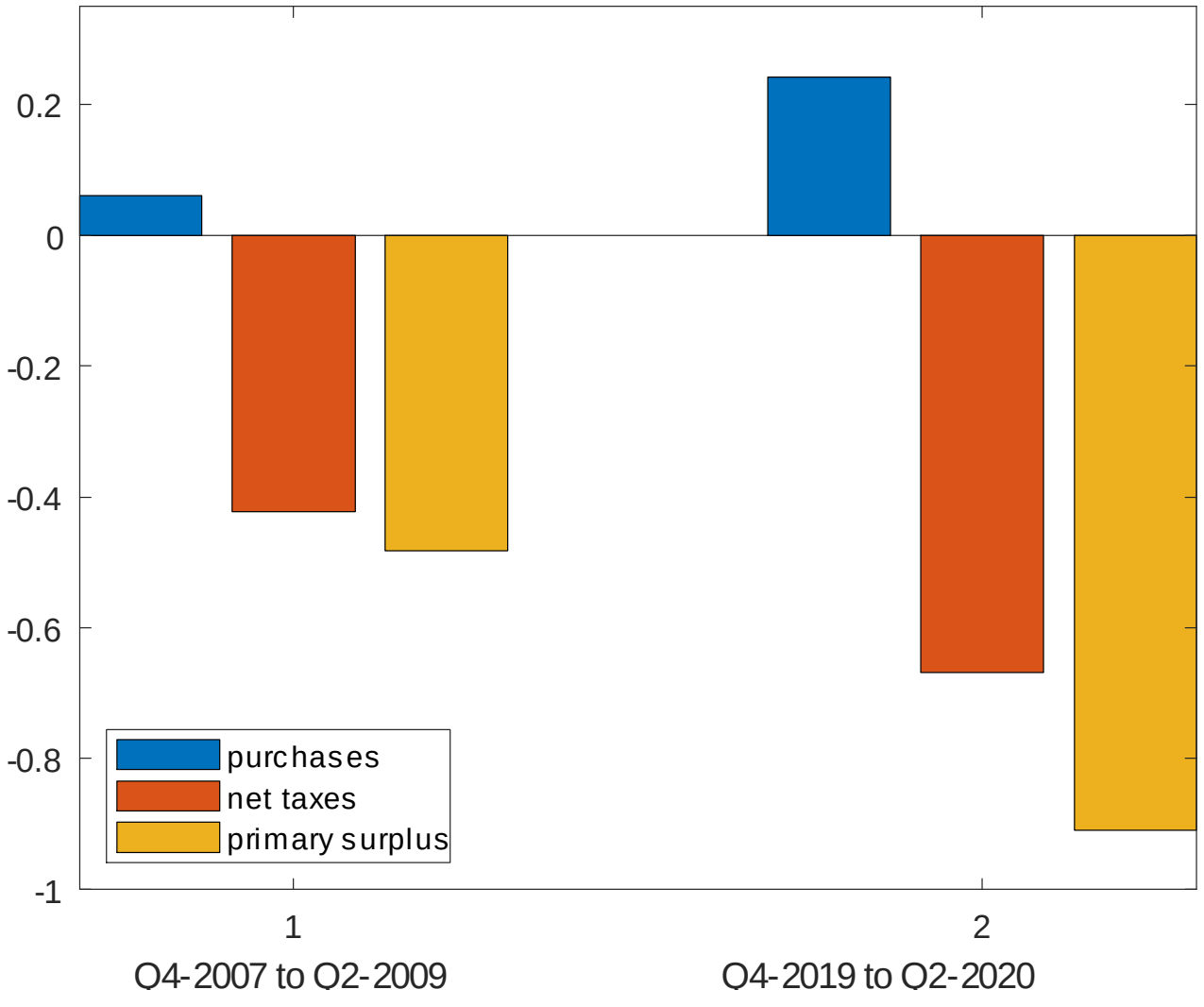
On the role of fiscal and monetary policy facing the ZLB, the paper makes four main contributions

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

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

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

$$\hat{\imath}_t = \max [-\rho, \phi \pi_t] \tag{3}$$

- 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

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

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)

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

$$\hat{\tau}_t = \psi_\tau \hat{b}_{t-1} \tag{6}$$

$$\hat{g}_t = \psi_g \hat{b}_{t-1} \tag{7}$$

- These together give

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

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
β	Discount factor	0.995
σ	Curvature of consumption utility	1
δ	Curvature of government purchases utility	1
φ	Curvature of labor disutility	5
ϵ	Elasticity of substitution of goods	9
α	Index of decreasing returns to labor	0.25
θ	Calvo index of price rigidities	0.75
G	Government purchases share of output	0.2
ϕ	Monetary policy response to inflation	2
ψ_τ	Fiscal policy, net taxes response to debt	0.3
ψ_g	Fiscal policy, purchases response to debt	0
b	Debt-to-GDP target	2.4
η	Bond coupon decay rate	0
ρ_z	Persistence of aggregate-demand shock	0.8
σ_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 ϕ	ψ_τ	ψ_g	b	η	Regime
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

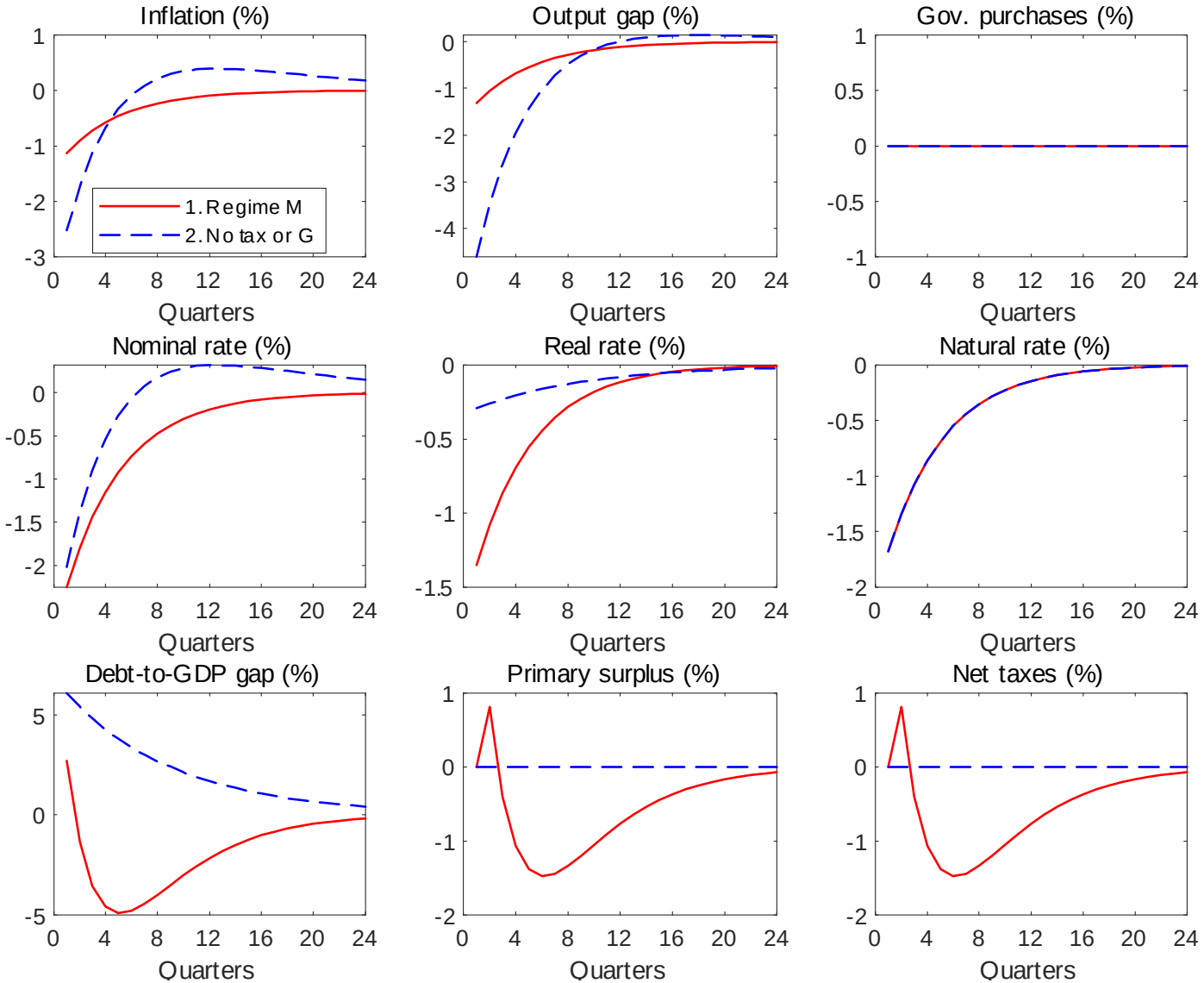


Fig. 3: Effects of regime F (no tax or G) with ZLB

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

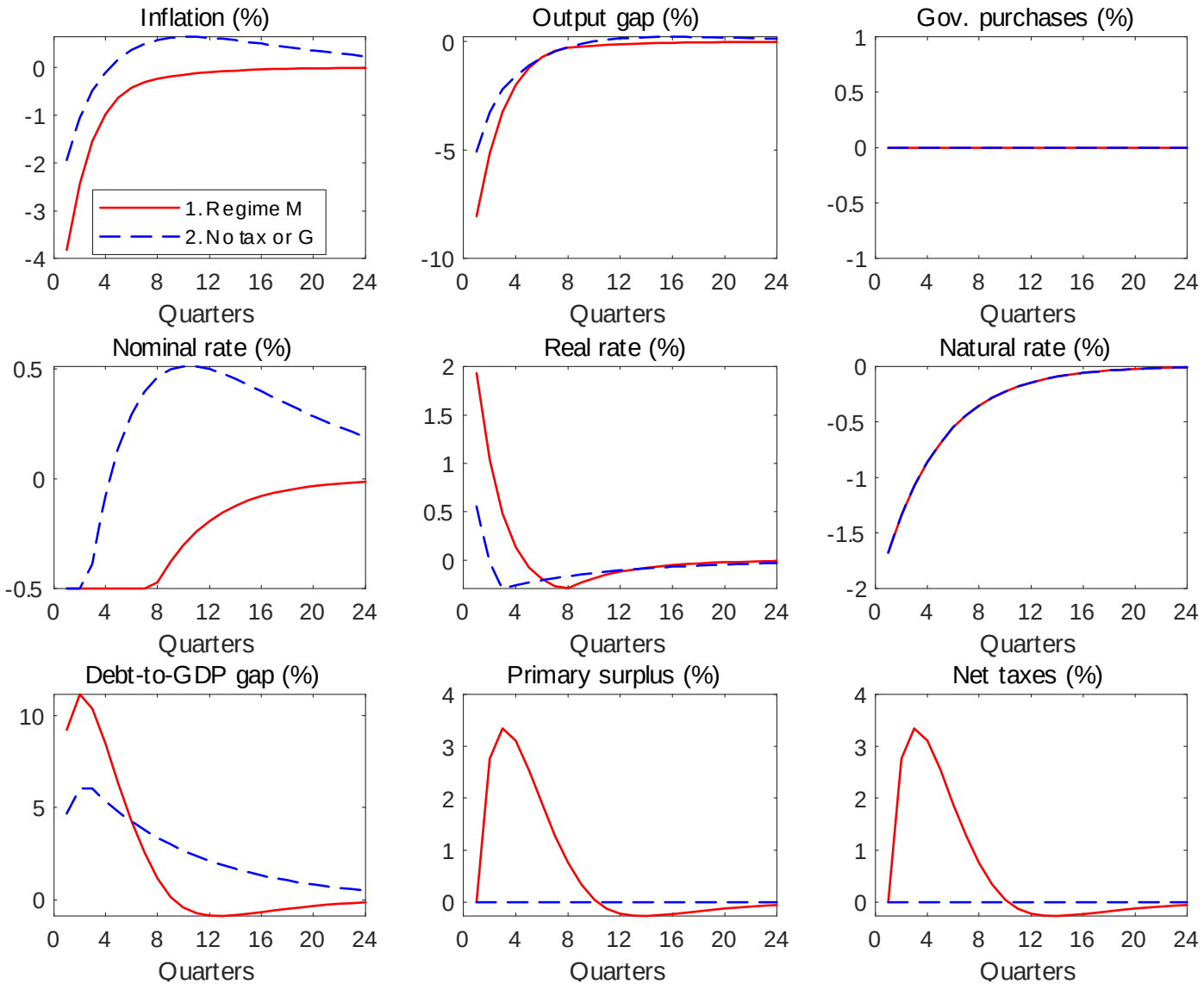
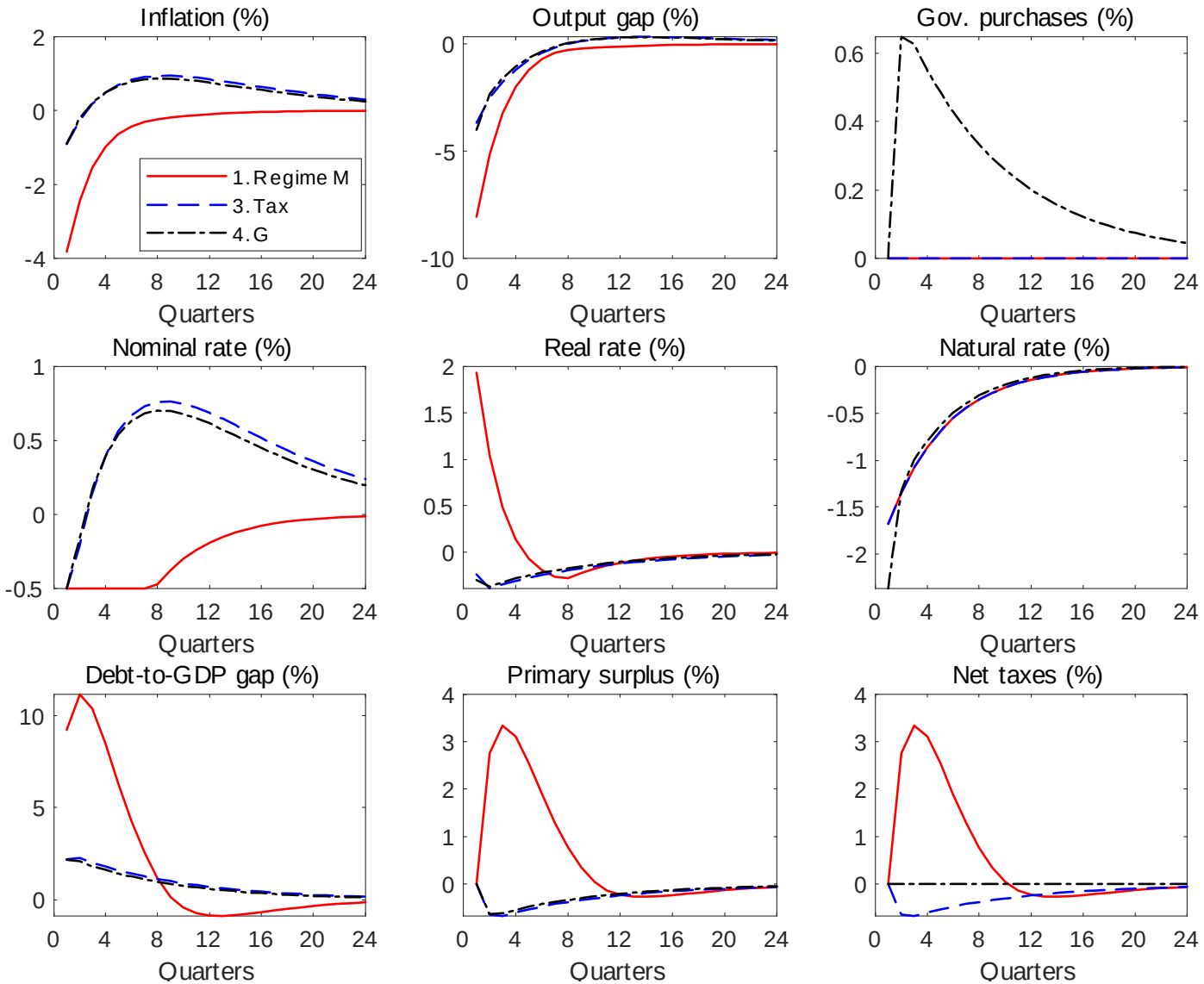


Fig. 4: Effects of super-active fiscal (tax cut or G hike)

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.

	$\mathbb{L}(\%)$ no ZLB	$\mathbb{L}(\%)$ with ZLB	
Scenario	Tot.	Tot.	ZLB freq. (%)
1. Regime M	0.31	0.79	25.0
...			
4. G	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 $\bar{m} = 1$.

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

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

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

- 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

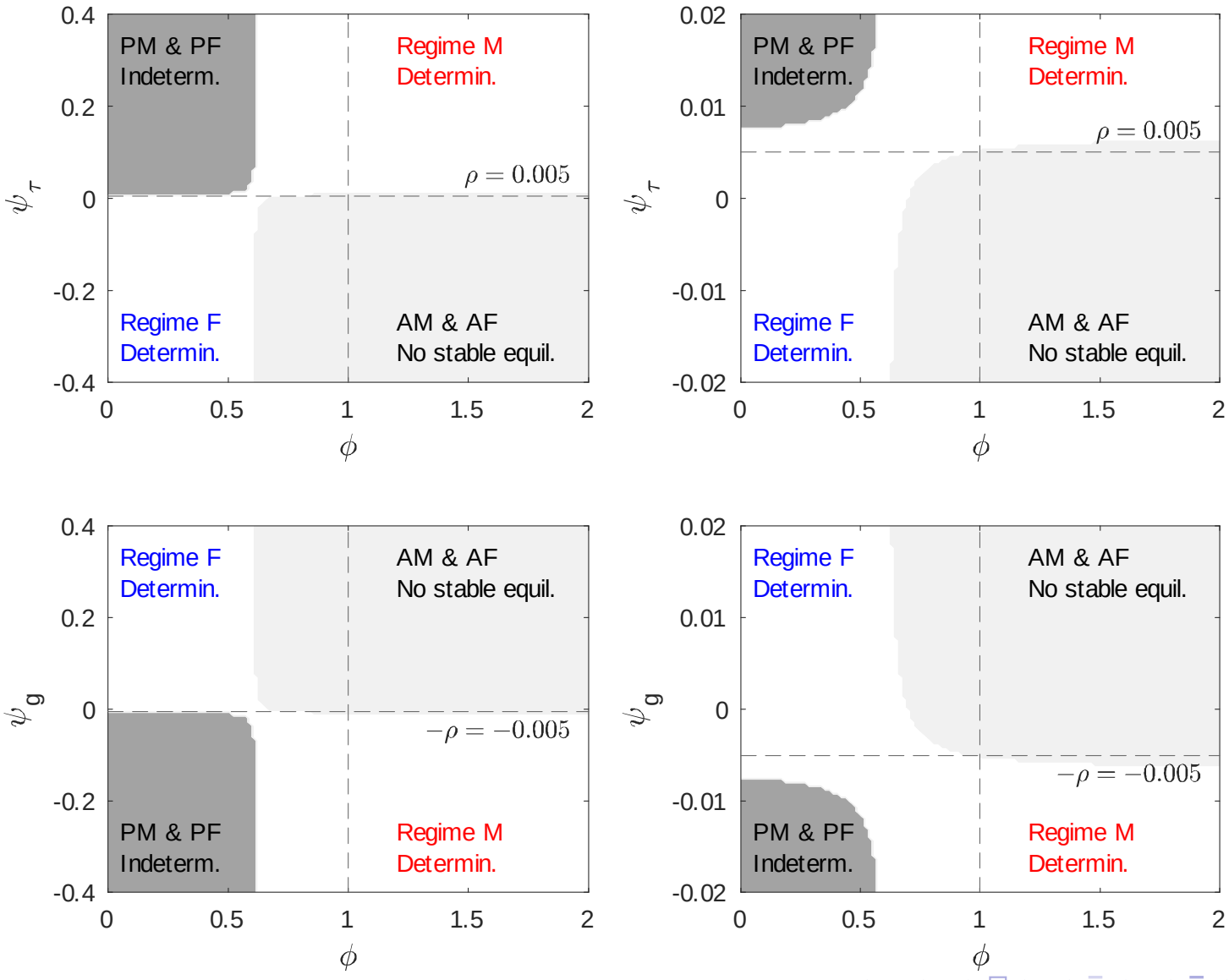
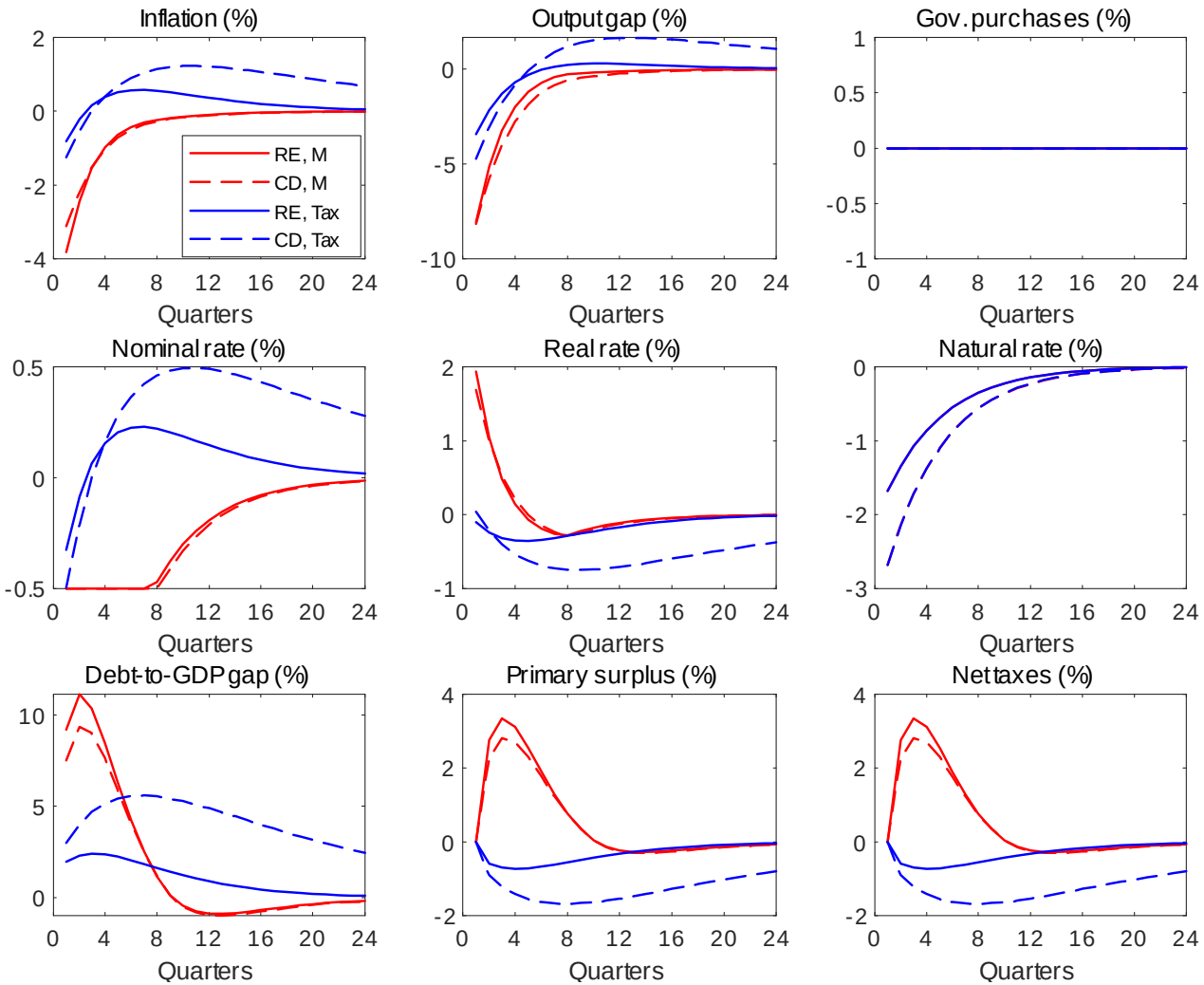


Fig. 9: Effects of super-active fiscal (tax cut) and of cognitive discounting

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.

	$\mathbb{L}(\%)$ no ZLB	$\mathbb{L}(\%)$ with ZLB	
Scenario	Tot.	Tot.	ZLB freq. (%)
1. Regime M	0.39	0.81	27.0
...			
3. Tax	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.