Redistribution and the Multiplier

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Analytics of the government spending multiplier

1. **Zero lower bound** (Christiano et al. 2009, Correia et al. 2010)
2. Imperfect competition and **price stickiness** (Woodford 2010, Hall 2010)
3. **Complementarity** in preferences (Monacelli and Perotti, 2008, Bilbie, 2010, Nakamura and Steinsson 2011)
4. **Fiscal rules** (Davig and Leeper 2011, Corsetti et al. 2010)

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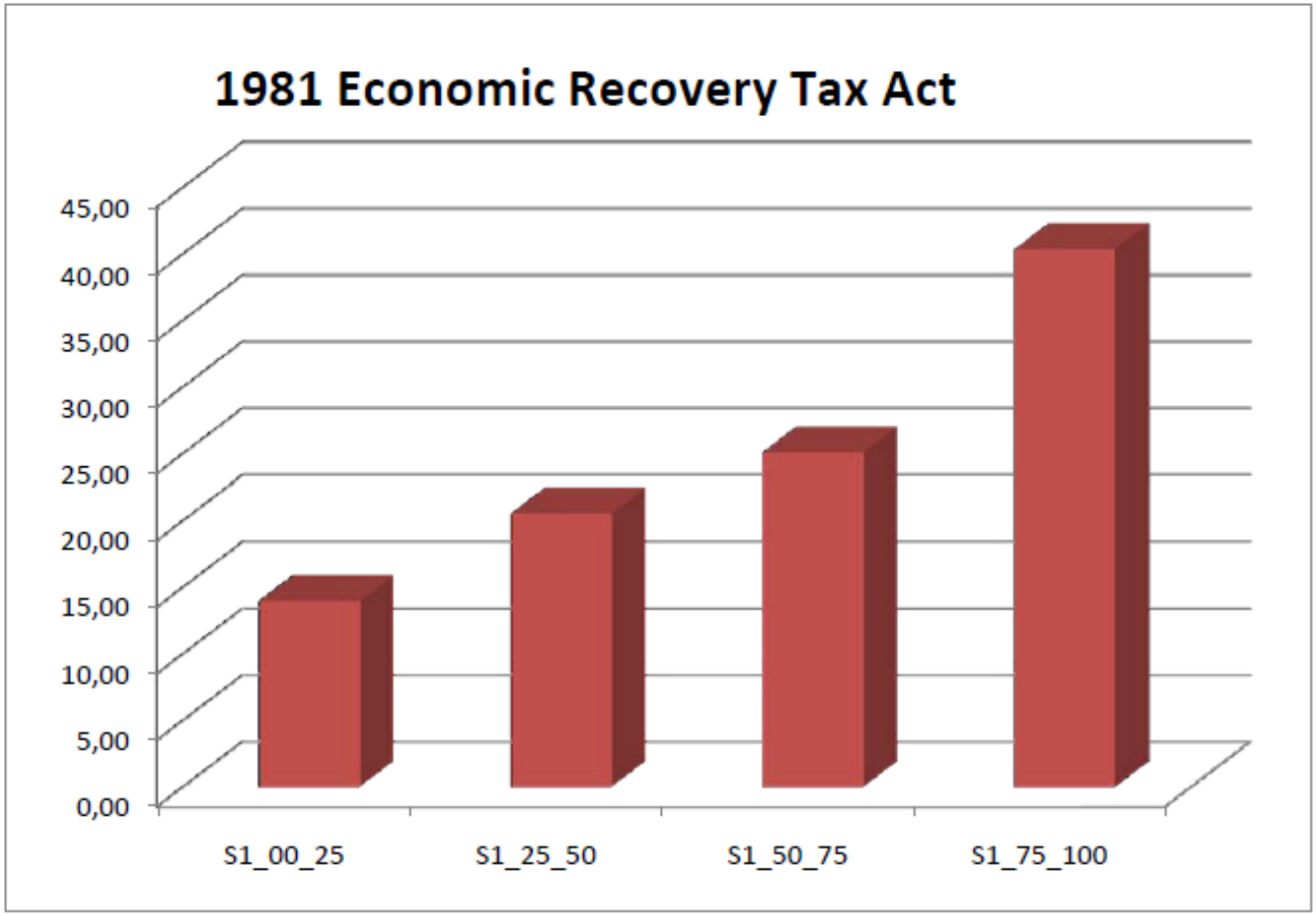
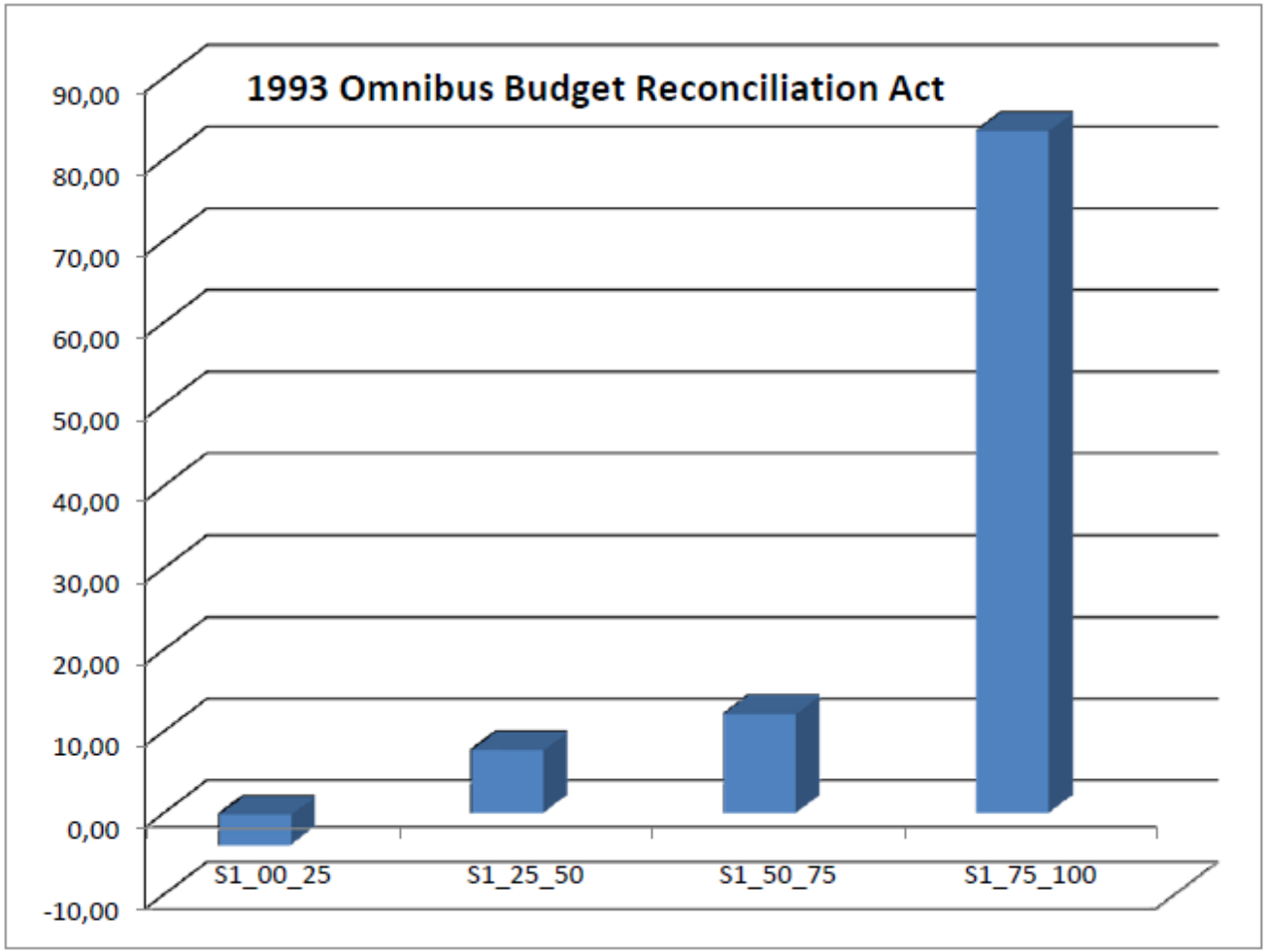
- Lump sum taxes can **at most** generate a **wealth** effect
- But tax changes often have strong **redistributive** content
- Does tax redistribution matter for the size of the multiplier?

- Tax changes and **redistribution**: some evidence

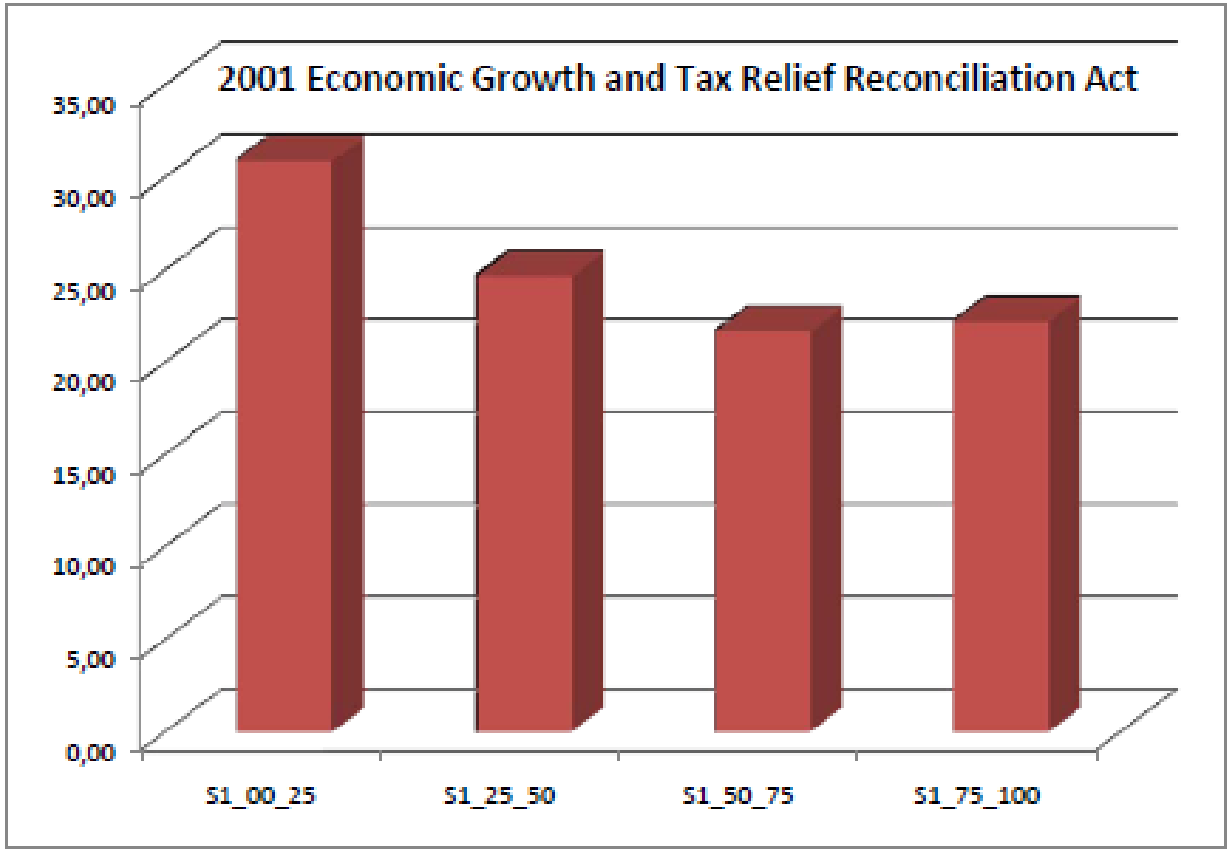
Reagan 1981 Tax Cut



Clinton 1993 Tax Increase



Bush 2001 Tax Cut



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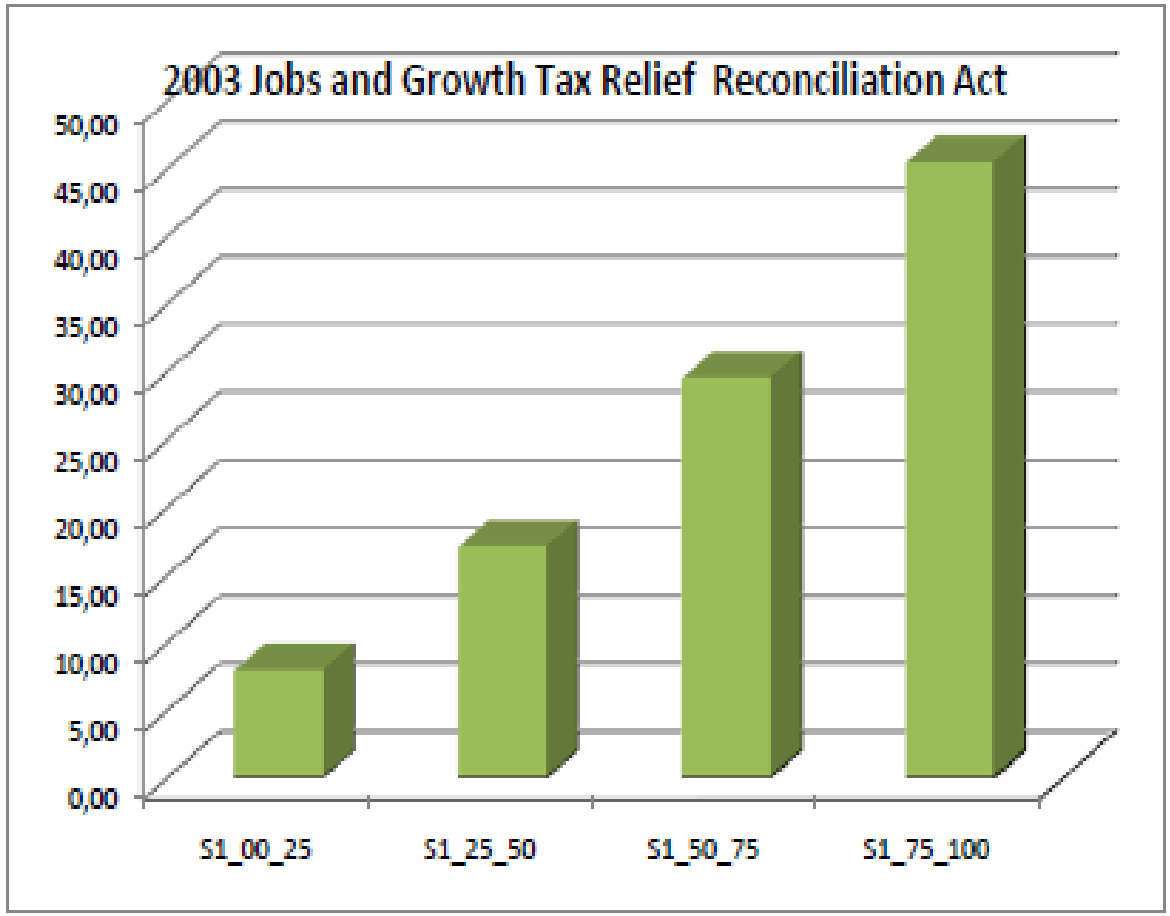

Our approach

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2. Impatience **motivates** borrowing (**not** idiosyncratic shocks)
3. Impatient agents face **borrowing** limit (as in classic Bewley-Ayiagary-Hugget)

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- Address role of borrowing constraints, nominal rigidities, persistence, government debt

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Speed of accumulation of govt. debt depends on the type of tax redistribution scheme in place

The Model

Model: households

$$\max \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \beta_j^t \left[u(c_{j,t}) - v(n_{j,t}) \right] \right\} \qquad j = b, s$$

$$\underbrace{\beta_s}_{\text{Savers}} > \underbrace{\beta_b}_{\text{Borrowers}}$$

$$c_{j,t} + r_{t-1} d_{j,t-1} = d_{j,t} + w_t n_{j,t} - \underbrace{\tau_{j,t}}_{\text{lump-sum}} + \underbrace{\sigma_j \mathcal{P}_t}_{\substack{\text{profits} \\ \text{share}}}$$

$$\underbrace{d_{b,t} \leq \overline{d}}_{\substack{\text{borrowing} \\ \text{constraint}}}$$

Efficiency conditions

$$\frac{v^{'}(n_{j,t})}{\lambda_{j,t}} = w_t \qquad \text{cons/leisure}$$

$$\lambda_{s,t} = \beta_s r_t \mathbb{E}_t \left\{\lambda_{s,t+1}\right\} \qquad \text{Euler for Savers}$$

$$\lambda_{b,t} = \beta_b r_t \mathbb{E}_t \left\{\lambda_{b,t+1}\right\} + \lambda_{b,t}\psi_{t\searrow} \qquad \text{pseudo-Euler for Borrowers}$$

shadow value of borrowing

Notice

1. If borrowing constraint **binding**

$$\psi_t > 0 \quad \rightarrow \quad \underbrace{\lambda_{b,t} > \lambda_{s,t}}_{\substack{\text{Borrowers have} \\ \text{higher} \\ \text{shadow} \\ \text{value of} \\ \text{wealth}}}$$

2. **Credit premium**

$$\lambda_{b,t} = \beta_b \left(\frac{r_t}{1 - \psi_t} \right) \mathbb{E}_t \left\{ \lambda_{b,t+1} \right\}$$

Firms

- Perfect competition

$$\underbrace{y_t = F(n_t)}_{\text{production function}} = F\left(\sum_j n_{j,t}\right)$$

$$w_t = \underbrace{F'(n_t) = 1}_{\text{if CRS}}$$

Government

$$\sum_j \tau_{j,t} = g_t$$

- Govt. spending follows **exogenous** process

Flexible prices: neutrality of tax rule

1. Perfect competition
2. Constant return to scale (CRS)
3. **Steady state** taxes are the same across agents
4. $\overline{d} = 0$

Nominal rigidities

- New Keynesian setup + heterogenous agents + borrowing constraint
- Role of borrowing constraints in **intertemporal** substitution

Nominal rigidities

$$y_t = \left(\int_0^1 y_t(i)^{(\varepsilon-1)/\varepsilon} di \right)^{\varepsilon/(\varepsilon-1)} \qquad \text{final good}$$

$$y_t(i) = n_t(i) \quad i \in [0,1] \qquad \text{pf. differentiated varieties}$$

$$(1 + i_t) = r \pi_t^{\phi_\pi} \qquad \text{monetary policy}$$

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- Borrowers' consumption **not** constant

constant riskless rate $$\overline{r}\beta_b \mathbb{E}_t \left\{ \frac{c_{b,t}}{c_{b,t+1}} \right\} = 1 - \psi_t$$ movements in credit premium

Fixed prices

$$y_t = g_t + \overline{c}_s + c_{b,t}$$

- Borrowers consumption determines the size of the multiplier

Size of multiplier

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2. If financial conditions **deteriorate** $(\uparrow \psi_t) \rightarrow \downarrow c_{b,t}$

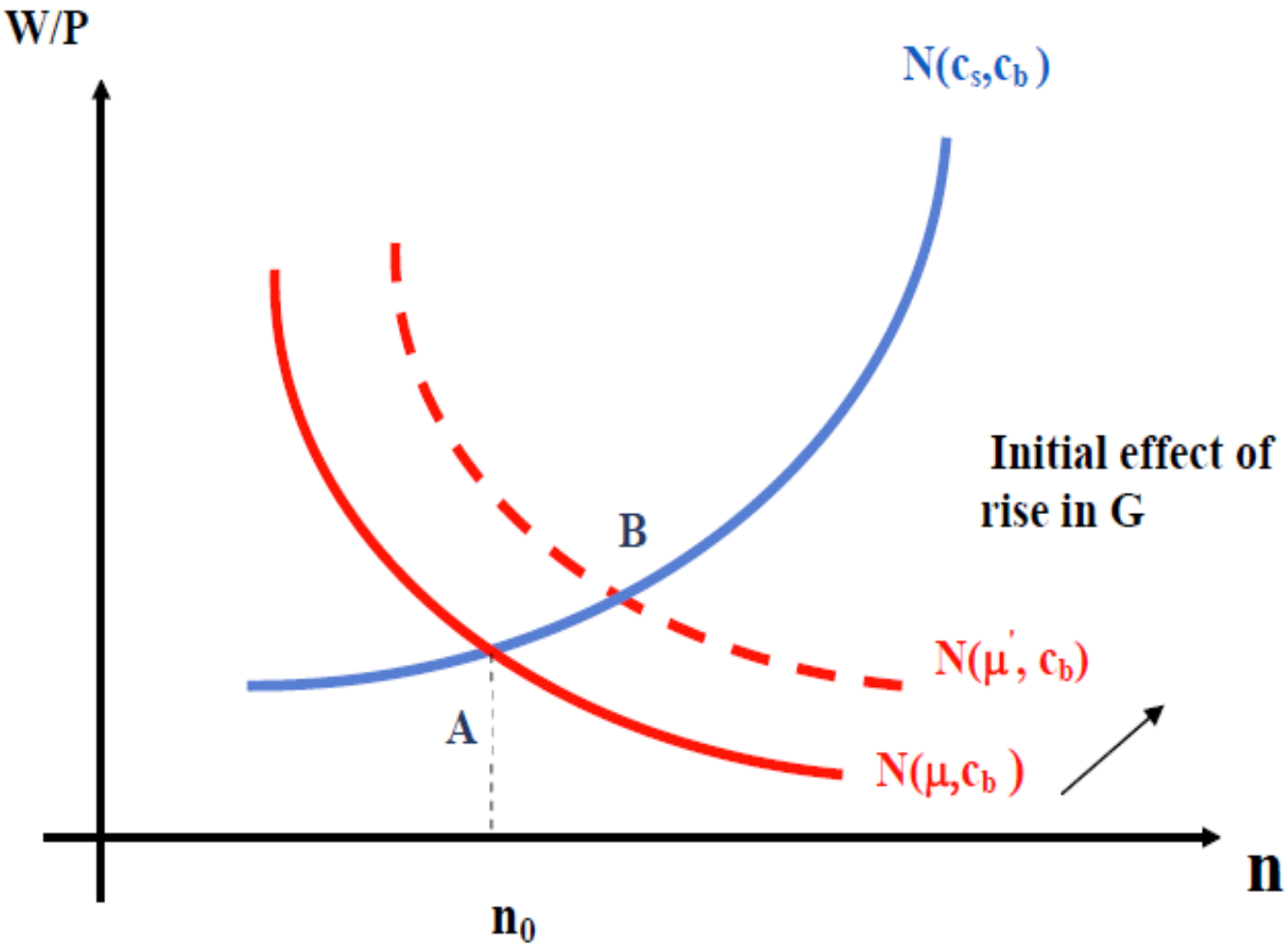
$\rightarrow$ multiplier < 1

Higher government spending and financial conditions

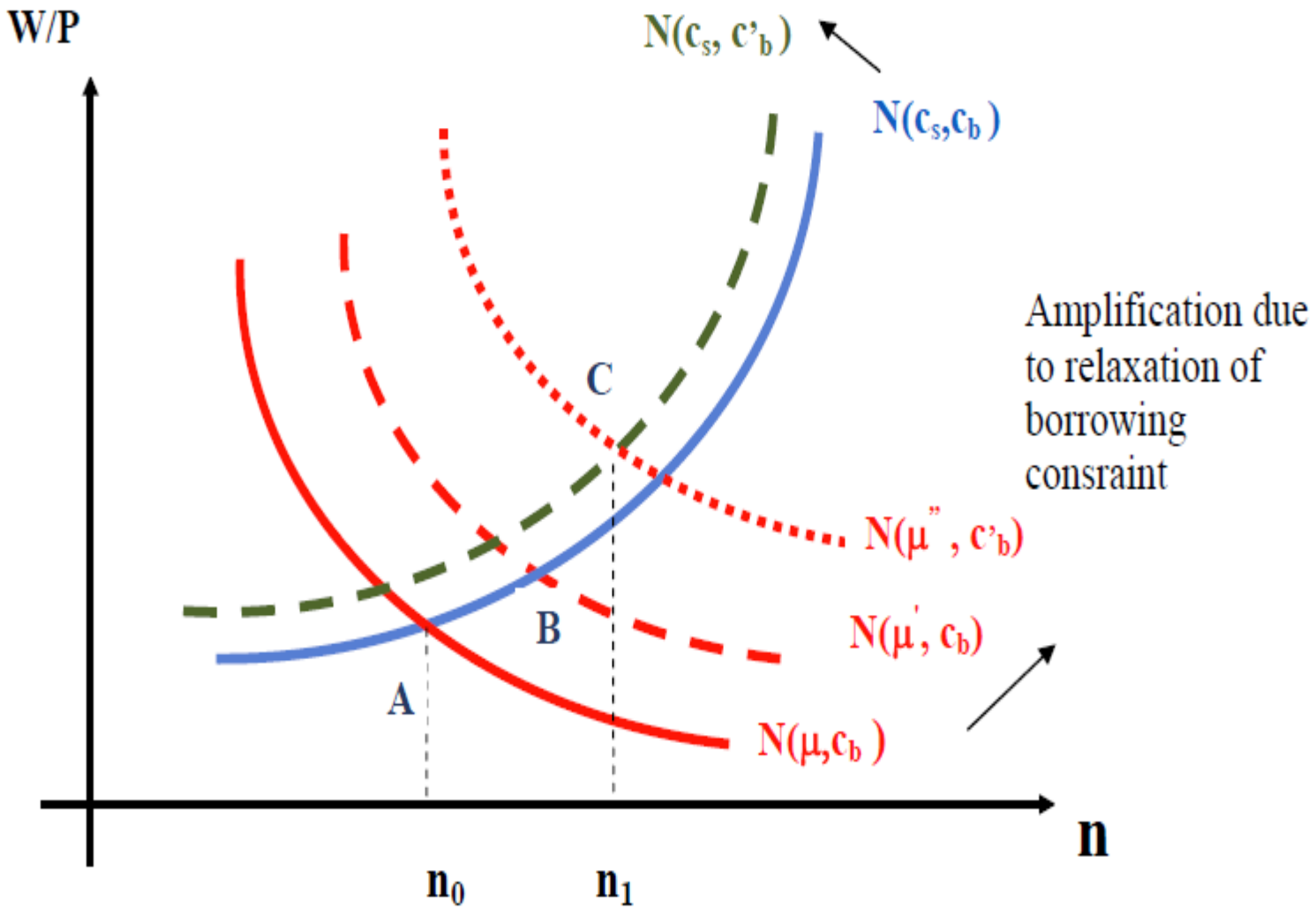
1. $\uparrow$ inflation $\longrightarrow$ **redistribution** from Savers to Borrowers
2. $\uparrow$ real wage

- Relax borrowing constraint ($\downarrow \psi_t$)
- Tax financing can amplify or overturn this effect, depending on which category of agents is taxed

Aggregate labor market 1



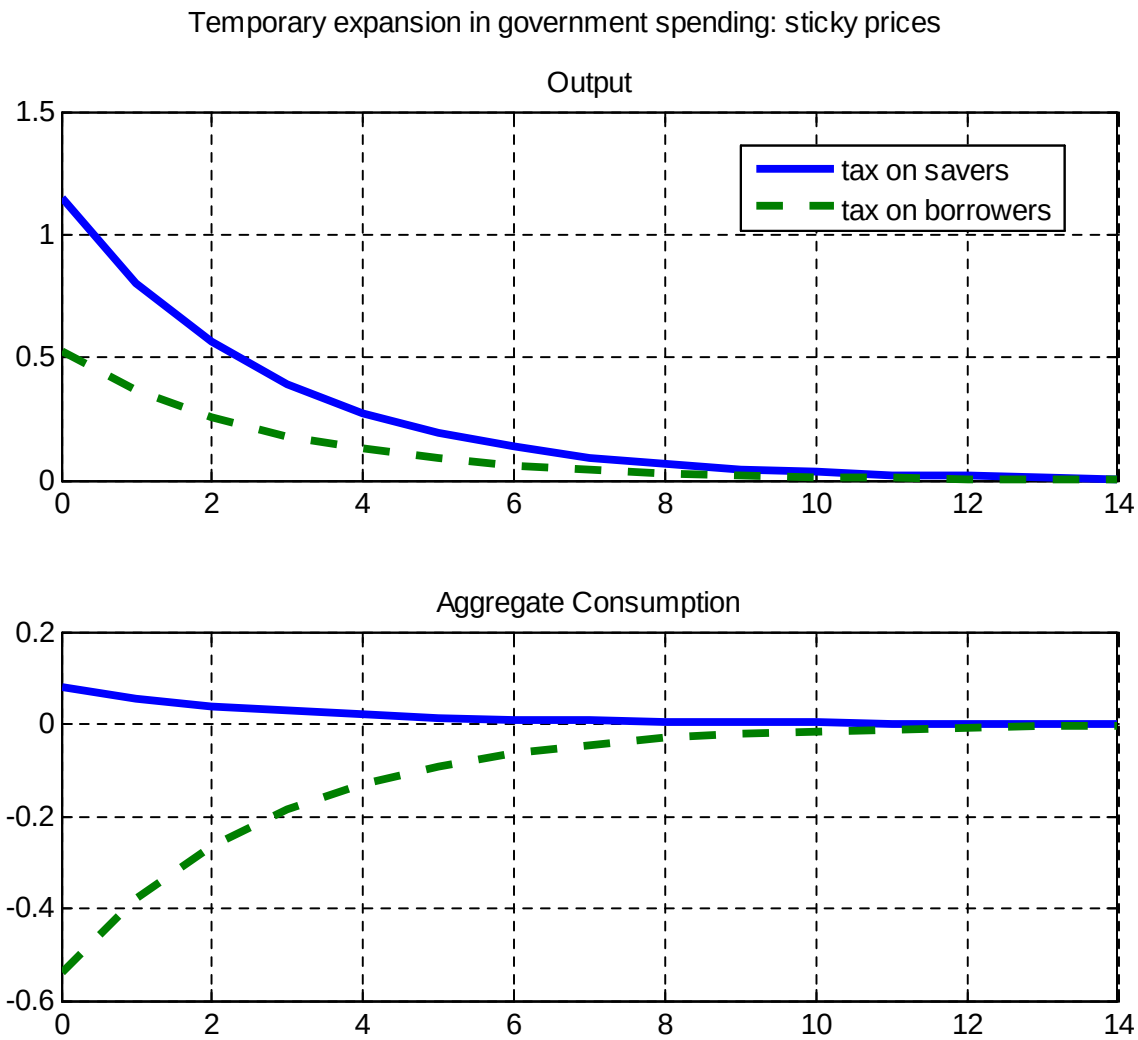
Aggregate labor market 2



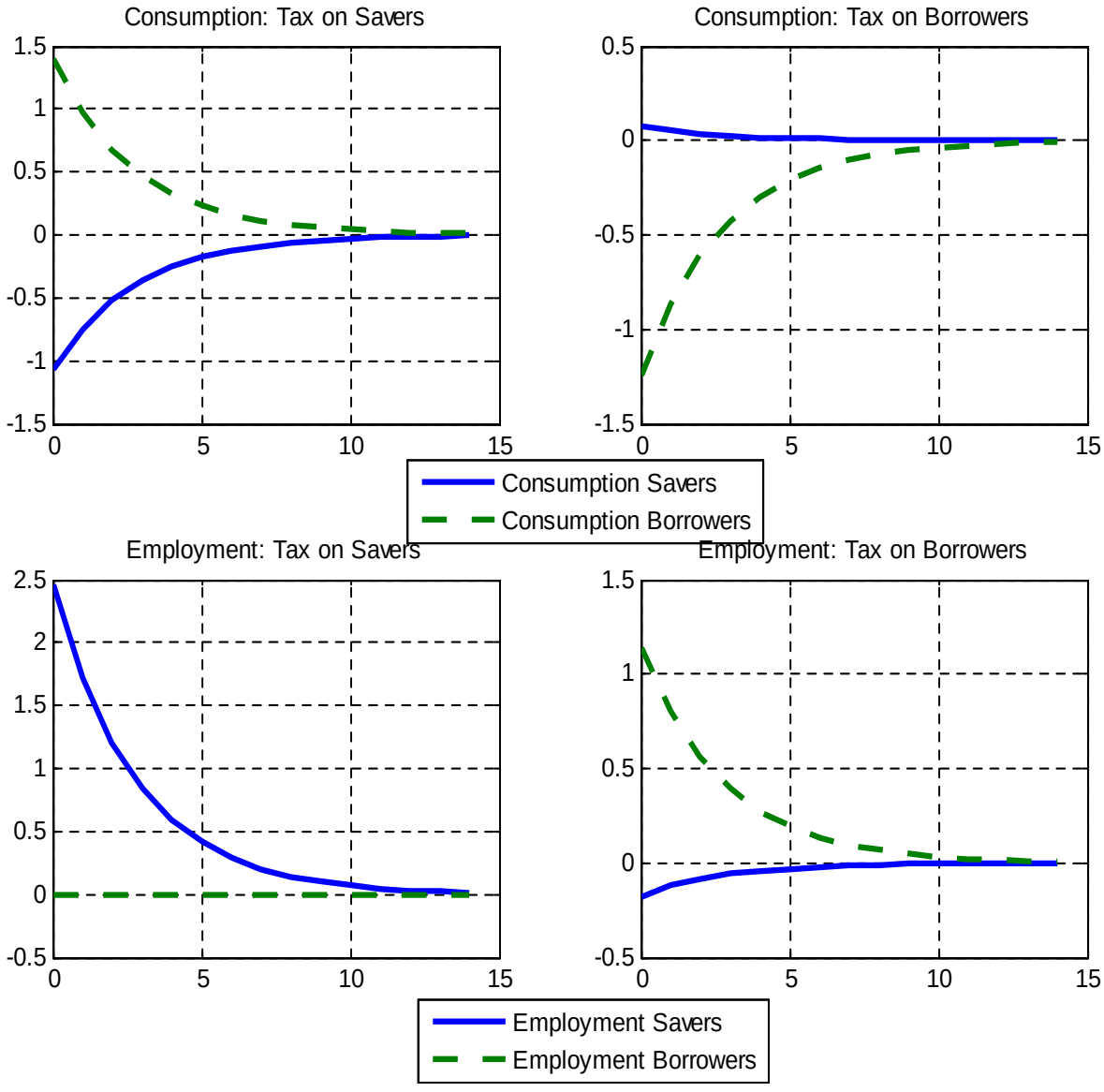
General case

- Staggered Calvo prices
- Real interest rate **not** constant

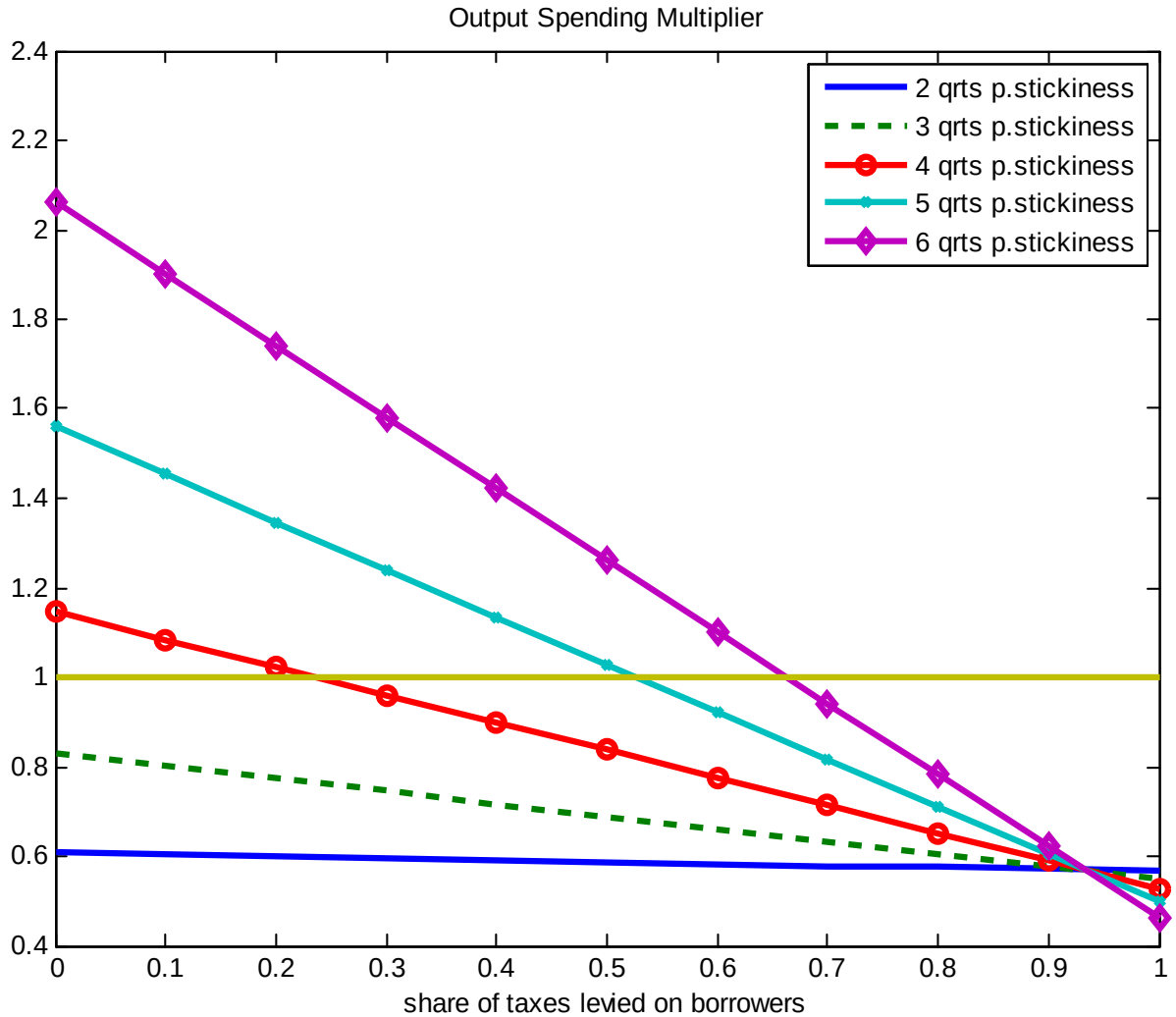
Tax distribution rule matters



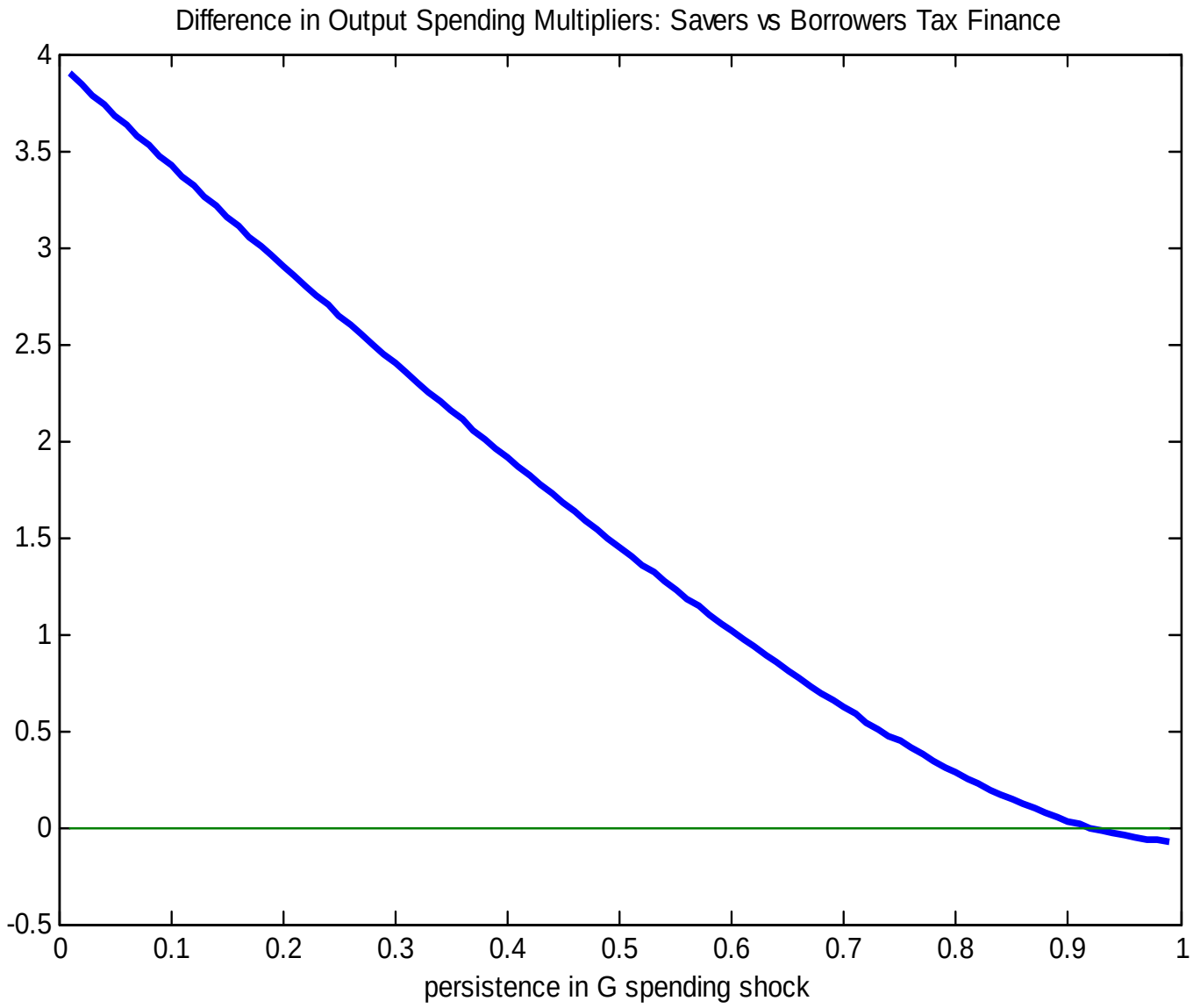
Temporary expansion in government spending: sticky prices



How far can go in taxing the Borrowers?



Persistence of fiscal expansion



Government debt

- Redistribution of current and **future** tax burden is relevant

Government debt: modified model

Savers	Fin. Intermediaries	Borrowers
govt. bonds B_t	$s_t = d_{b,t} + \underbrace{\Delta\left(d_{b,t}\right)}_{\text{intermed. frictions}}$	$d_{b,t} \leq \overline{d}_b$
riskless deposits s_t	$\frac{(1+i_t^d)}{(1+i_t)} = \underbrace{(1+\delta_t)}_{\text{spread}}$	

Debt-financed redistributions

$$g_t + \frac{(1+i_{t-1})\mathcal{B}_{t-1}}{\pi_t} = \mathcal{B}_t + \sum_{j=s,b} \tau_{j,t} \qquad \text{govt. budget constraint}$$

$$\tau_{j,t} = (1-\rho_\tau)\tau_j + \rho_\tau \tau_{j,t-1} + \underbrace{\phi_j^B \mathcal{B}_{t-1}}_{\substack{\text{reaction to} \\ \text{govt. debt}}} + \varepsilon_{j,t}$$

Sharing the burden of debt stabilization

$\phi_b^B = 0$	$\phi_s^B > 0$	only **Savers'** taxes adjust
$\phi_b^B > 0$	$\phi_s^B > 0$	both taxes adjust

Debt-financed fiscal expansion

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- Tradeoff

Tax the Savers vs. accommodate loosening of financial conditions

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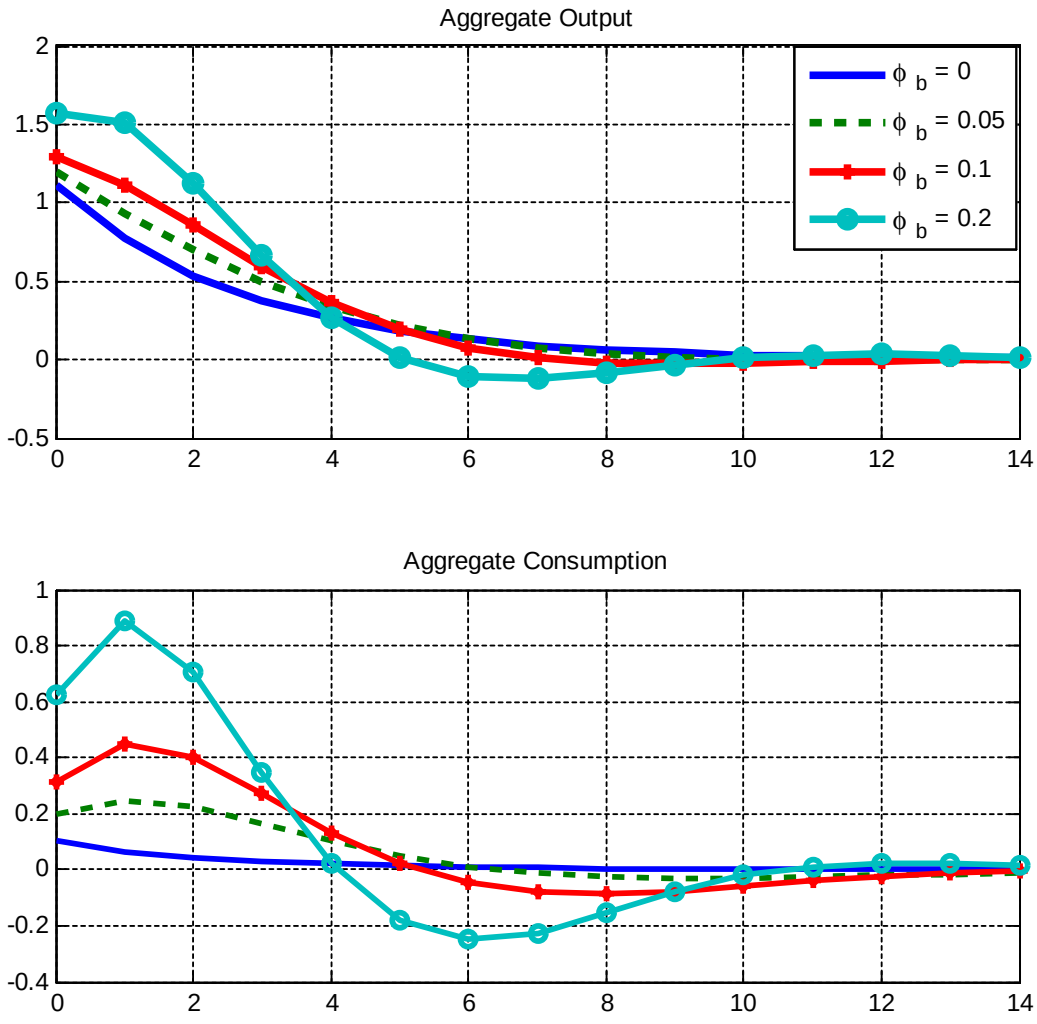

Responses to a fiscal expansion: sticky prices