Tax Cuts, Redistribution, and Borrowing Constraints

Tommaso Monacelli (Bocconi, IGIER and CEPR), Roberto Perotti (Bocconi, IGIER, CEPR and NBER),

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Recent debate on the fiscal stimulus

- Higher **spending** vs. lower **taxes**
- Tax changes: pro-**poor** or pro-**rich**?

Conventional wisdom

1. Lower **taxes** better because **no implementation** lags
2. But effect on private spending can be minimal if households decide to **save**
3. In a recession, should redistribute in favor of **low-income** agents, because **higher** MPC

MPC higher for low income agents: evidence

- MPC out of **transitory** income shocks (Parker 1999, McCarthy 1995, Dynan, Skinner and Zeldes 2001)
- **Tax rebates** (Parker 1999, Souleles 1999, Shapiro and Slemrod 2003, Johnson, Parker and Souleles 2006).

More general questions

1. What are the **aggregate** effects of **redistributing** income?
2. Are effects of **progressive** tax cuts different from effects of **regressive** cuts?

- Rarely addressed in a **general equilibrium** macroeconomic model

Tax redistributions: a first look at the data

- Each US **tax bill** since 1945
- Assemble **data** on the level and composition of **four** categories of **taxes**

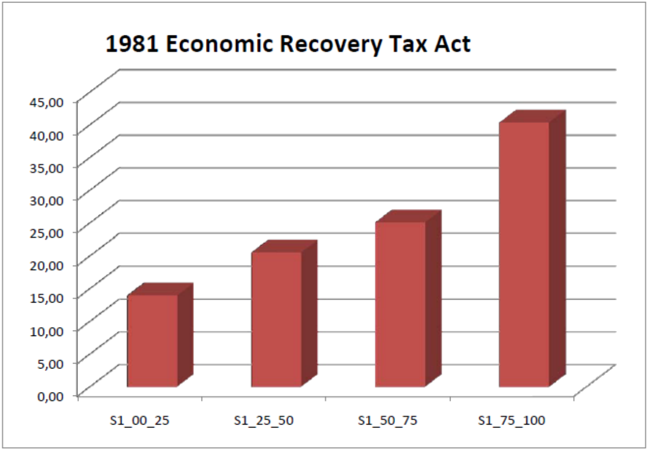
1. personal income taxes
2. corporate income taxes
3. indirect taxes
4. social security taxes

Distributional impact of Personal Income Taxes

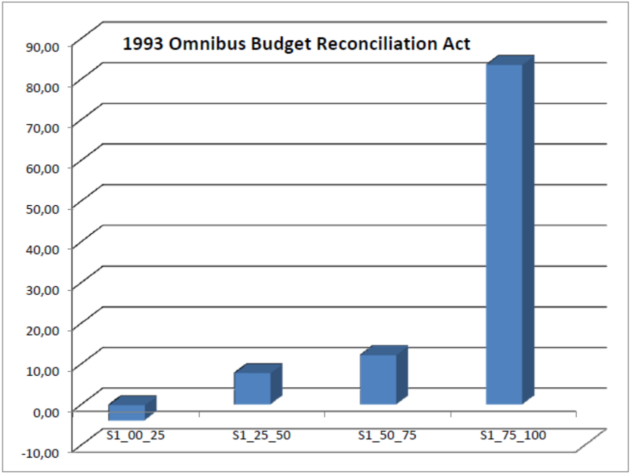
1. Employ original documentation by the *Joint Committee of Taxation*
2. Provide **narrative** estimate of how each tax bill impacts on the taxes paid by individuals in each **income bracket**
3. Data on the *IRS Statistics on Income* $\longrightarrow$ estimate the **number of individuals** in each tax bracket, and the **total income** in each tax bracket.

- Measure how much of the total change in taxes from a given tax bill will be borne by **each decile or quartile** of income.

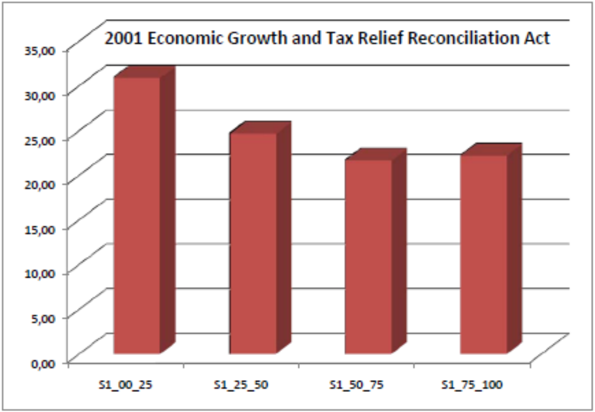
Reagan 1981 Tax Cut



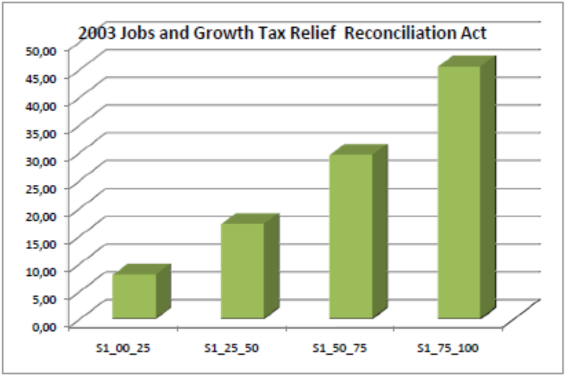
Clinton 1993 Tax Increase



Bush 2001 Tax Cut



Bush 2003 Tax Cut



"Poor-biased" tax change

- The first **two quartiles** pay more than 50 percent of the **increase** in taxes (or benefit for more than 50 percent of the **decline** in taxes).

Some theory

Our approach

1. Heterogenous agents: **patient** vs. **impatient**
2. Impatient agents face **borrowing** limit (as in classic Bewley-Ayiagary-Hugget)
3. Impatience **motivates** borrowing (**not** idiosyncratic shocks)

Results

1. If prices **flexible** $\longrightarrow$ redistribution **neutral** or contractionary
2. If prices **sticky** $\longrightarrow$ redistribution (largely) **expansionary**

- Address role of borrowing constraints, nominal rigidities, persistence, govt. debt

Model: households

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

$$\underbrace{\beta_s}_{\text{savers}} > \underbrace{\beta_b}_{\text{borrowers}}$$

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

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

Efficiency conditions

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

$$\lambda_{s,t} = \beta_s r_t \mathbb{E}_t \{\lambda_{s,t+1}\} \quad \text{Euler for savers}$$

$$\lambda_{b,t} = \beta_b r_t \mathbb{E}_t \{\lambda_{b,t+1}\} + \lambda_{b,t} \underbrace{\psi_t}_{\substack{\text{shadow}\\\text{value}\\\text{of}\\\text{borrowing}}} \quad \text{Pseudo-Euler for borrowers}$$

Notice

1. If borrowing constraint **binding**

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

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

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

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

Government

$$\sum_j \tau_{j,t} = \underbrace{g}_{\substack{\text{fixed}\\\text{govt.}\\\text{spending}}}$$

Neutrality

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

$$c_{s,t} + \tau_{s,t} - \underbrace{(r_{t-1} - 1)\overline{d}}_{\text{zero}} = F^{'}(n_t)n_{s,t}$$

$$c_{b,t} + \tau_{b,t} + \underbrace{(r_{t-1} - 1)\overline{d}}_{\text{zero}} = F^{'}(n_t)n_{b,t}$$

$$c_{s,t}n_{s,t}^{\varphi} = F^{'}(n_t)$$

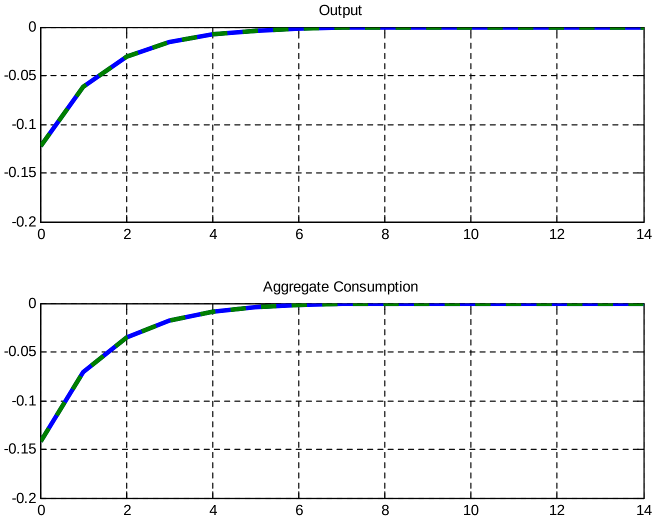
$$c_{b,t}n_{b,t}^{\varphi} = F^{'}(n_t)$$

More generally

- $\overline{d} > 0$
- DRS or monopolistic competition $\rightarrow$ Equilibrium **profits** deviate from zero
- Natural assumption: savers hold **shares** of firms

$\rightarrow$**Result**: redistribution pro-borrowers is **contractionary**

Redistribution from Savers to Borrowers: Flex Prices and Decreasing Returns



Intuition for contraction: asymmetry index

- **Endowment** economy $\rightarrow$ Each agent receive $y_t/2$ in every period
- Resource constraint must imply$\rightarrow$

$$\widehat{y}_t = \left(\frac{c_s}{y}\right)\widehat{c}_{s,t} + \left(\frac{c_b}{y}\right)\widehat{c}_{b,t}$$

$$\widehat{c}_{b,t} = \frac{\widehat{y}_t}{(c_b/y)} - \underbrace{\left(\frac{c_s}{c_b}\right)}_{\substack{\text{asymmetry} \\ \text{index}}} \widehat{c}_{s,t}$$

$$\underbrace{c_s > c_b}_{\substack{\text{steady} \\ \text{state}}}$$

- If **savers**' ss consumption **larger**

$$\left|\Delta\widehat{c}_{b,t}\right| \; > \; \left|\Delta\widehat{c}_{s,t}\right|$$

$$|\underbrace{\Delta\widehat{n}_{b,t}}|_{\substack{\text{borrowers'}\\ \text{l.supply}\\ \text{falls}}} \; > \; |\underbrace{\Delta\widehat{n}_{s,t}}|_{\substack{\text{savers'}\\ \text{l.supply}\\ \text{rises}}}$$

- Asymmetric **wealth effect** on labor supply

Nominal rigidities

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

Nominal rigidities

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

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

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

Nominal rigidities

- Suppose prices fixed for **two** periods (t and t+1) $\rightarrow$ Riskless **real** int. rate **constant**
- Savers' Euler equation implies

$$c_{s,t} = c_{s,t-1} = \underbrace{\bar{c}_s}_{\substack{\text{savers' consumption} \\ \text{constant}}}$$

- Borrowers' consumption **not** constant

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

Nominal rigidities

$$y_t = g + \overline{c}_s + \underbrace{c_{b,t}}_{\substack{\text{B.consumption} \\ \text{drives} \\ \text{aggr. output}}}$$

Tax redistribution

$$\Delta\tau_{s,t} = -\Delta\tau_{b,t} > 0$$

- Transmission

$$\downarrow \tau_{b,t} \;\rightarrow\; \underbrace{\downarrow \psi_t}_{\text{credit premium}} \;\rightarrow\; \uparrow c_{b,t} \rightarrow \underbrace{\uparrow y_t}_{\text{output expansion}}$$

Labor market

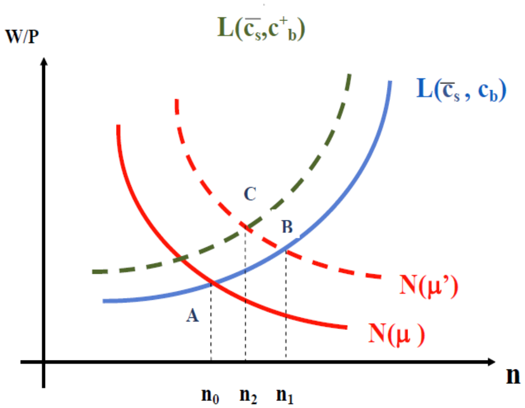
- Aggregate labor **supply**

$$n_t = \sum_j n_{j,t} = \sum_j l\left(c_{j,t}, \frac{w_t}{p_t}\right) \equiv L\left(c_{b,t}, \overline{c}_s, \frac{w_t}{\overline{p}}\right)$$

- Aggregate labor **demand**

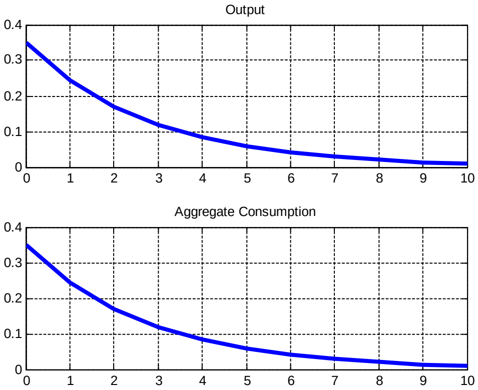
$$n_t = \mathcal{N}\left(\frac{w_t \mu_t}{\overline{p}}\right)$$

Labor market

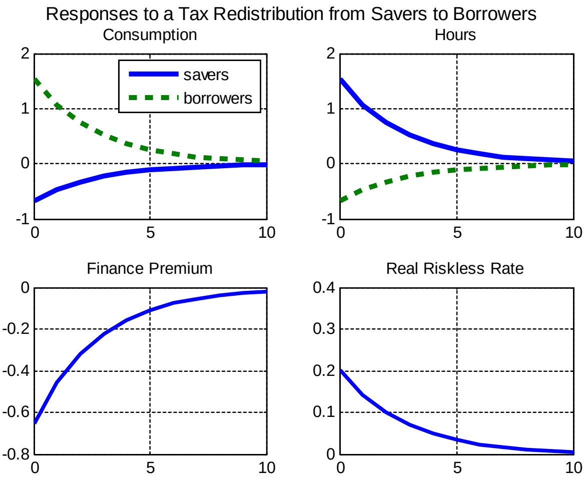


Aggregate labor market effects of a pro-borrower tax redistribution under rigid prices.

Staggered prices

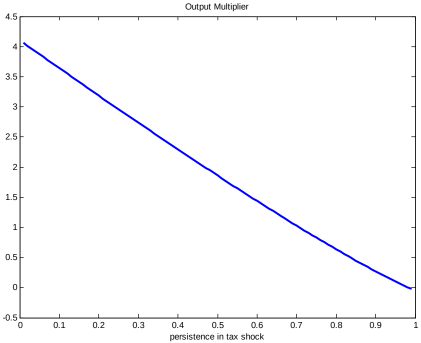


Aggregate effects of a pro-borrower tax redistribution: *staggered* prices.



Responses to a tax redistribution from the savers to the borrowers: sticky prices.

Temporary vs. Permanent Redistributions



Aggregate output impact multiplier of a tax redistribution that favors the borrowers.

Extensions

1. **Endogenous** borrowing limit
2. **Government** debt

Endogenous borrowing limit

$$d_{b,t} \leq \underbrace{(1-\chi)\frac{\mathbb{E}_t\left\{w_{t+1}n_{b,t+1}\right\}}{r_t}}_{\substack{\text{can collateralize} \\ \text{a fraction of} \\ \text{future L. income}}}$$

Government debt

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

Debt-financed redistributions

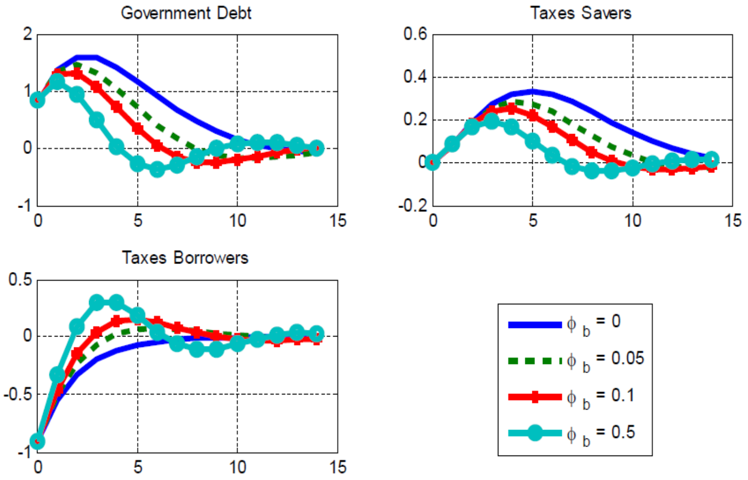
$$g_t + \frac{(1+i_{t-1})\mathcal{B}_{t-1}}{\pi_t} = \mathcal{B}_t + \sum_{j=s,b} \tau_{j,t} \qquad \text{govt. budget constraint}$$

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

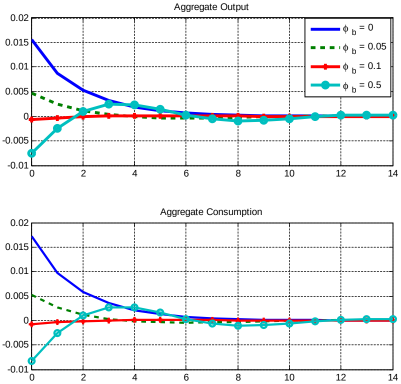
Sharing the burden of debt stabilization

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

Debt-financed redistribution

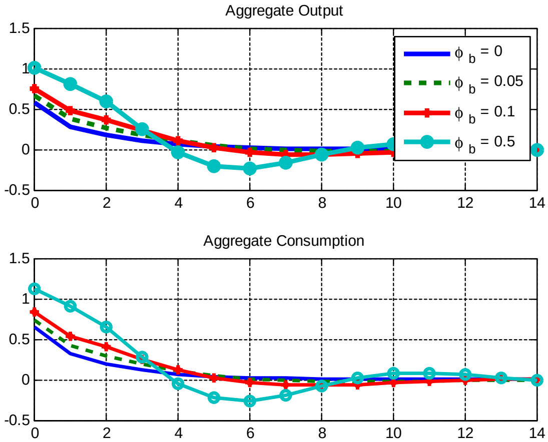


Flexible prices



A tax cut to the borrowers under alternative values of ϕ_b^B: *flexible* prices.

Sticky prices



A tax cut to the borrowers under alternative values of ϕ_b^B: *sticky* prices.