Fiscal Equalization and Yardstick Competition

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Two mechanisms of fiscal competition
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<th>Consequence of fiscal competition</th>
<th>Mobility of tax base</th>
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<td>Fiscal externalities reduce</td>
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<td>“Yardstick competition” improves accountability.</td>
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<td>Impact of fiscal equalization</td>
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| This paper: **Equalization reduces accountability.** |
Approach
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• Fiscal capacity in a jurisdiction depends on
  ◆ the ability of the incumbent politician in this jurisdiction,
  ◆ rent extraction by this incumbent,
  ◆ a federation-wide shock.
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• Voters evaluate the incumbent's ability based on observing public good supplies in both jurisdictions.
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  - the ability of the incumbent politician in this jurisdiction,
  - rent extraction by this incumbent,
  - a federation-wide shock.

- Voters evaluate the incumbent’s ability based on observing public good supplies in both jurisdictions.

- Incumbents trade off the immediate gain from rent diversion against the induced loss in election prospects.
Fiscal Equalization
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- The extent of equalization is determined by the *equalization rate*.

- Fiscal capacities are imperfectly measured.

- Therefore, citizens cannot derive fiscal capacities from the observation of public goods supplies.
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Result

The rent taken in a symmetric equilibrium increases in the equalization rate.
The model
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• two jurisdictions \( i = 1, 2 \)

• two periods 1, 2

• In each jurisdiction an incumbent politician decides on rent extraction in period 1.

• At the end of period 1, in each jurisdiction, citizens either re-elect the incumbent or elect a challenger.

• The winners of the elections decide on rent extraction in period 2.
Fiscal capacity in period 1
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\[ \tau_i = (\eta_i + \varepsilon)(\bar{\tau} - r_i), \quad i = 1, 2 \]
Fiscal capacity in period 1

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- \( \eta_i \sim N(1, \sigma^2_\eta) \) ability of the incumbent in jurisdiction \( i \)
- \( \varepsilon \sim N(0, \sigma^2_\varepsilon) \) economic environment of the federation
- \( \bar{\tau} \) exogenous tax rate
- \( r_i \) rent extracted by the incumbent of jurisdiction \( i \), with \( \bar{\tau} > \bar{r} \geq r_i \geq 0 \)
- \( \eta_1, \eta_2, \) and \( \varepsilon \) are independent from each other and unknown to both voters and incumbents.
Fiscal equalization
Fiscal equalization

- transfer to jurisdiction $i$

$$z_i = t \left[ \frac{(\tau_1 + \Gamma_1) + (\tau_2 + \Gamma_2)}{2} - (\tau_i + \Gamma_i) \right]$$

- $z_1 + z_2 = 0$  budget balances

- $t$  equalization rate, with $0 \leq t \leq 1$

- $g_i = \tau_i + z_i$  public good supply in period 1 in jurisdiction $i = 1, 2$
• mistake in the assessment of fiscal capacities $i = 1, 2$

\[ \Gamma_i = (\bar{r}_i - r_i)\gamma_i \]

• $\gamma_1, \gamma_2 \sim N(0, \sigma^2_\gamma)$ independent of $\eta_1, \eta_2$, and $\varepsilon$, and unknown to both voters and incumbents
• mistake in the assessment of fiscal capacities $i = 1, 2$

$$\Gamma_i = (\bar{\tau}_i - r_i) \gamma_i$$

• $\gamma_1, \gamma_2 \sim N(0, \sigma_{\gamma}^2)$ independent of $\eta_1, \eta_2$, and $\epsilon$, and unknown to both voters and incumbents

Payoff to citizens in jurisdiction $i = 1, 2$

$$u_i = 1 - \bar{\tau} + \alpha g_i + \delta (1 - \bar{\tau} + \alpha g_i^2) \quad \text{with } \alpha > 1$$

• $\delta$ discount factor

• $g_i^2$ public good supply in period 2 in jurisdiction $i = 1, 2$
Payoff to the incumbent of jurisdiction $i = 1, 2$

$$r_i + p_{I,i} \cdot \delta(R + r_i^2)$$

- $p_{I,i}$ probability of re-election
- $R$ benefit from gaining office
- $r_i^2$ rent diverted in period 2, with $\bar{\tilde{r}} > \bar{\tilde{r}} \geq r_i^2 \geq 0$

- If elected, the challenger’s payoff is $r_i^2$. 
Second period and the election
Second period and the election

- Fiscal capacity, equalization and public goods are determined as in period 1.
- The ability of the government in jurisdiction $i = 1, 2$ is
  - $\cdots \eta_i$ if the incumbent is re-elected, or
  - $\cdots$ drawn from $N(1, \sigma^2_\eta)$ if the challenger is elected.
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  ◦ \( \ldots \eta_i \) if the incumbent is re-elected, or
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• The government of the second period takes maximal rent, \( r^2_i = \bar{r} \).

• Voters in jurisdiction \( i \) re-elect the incumbent if their estimate \( \tilde{\eta}_i \) of the incumbent’s ability is at least as large as the expected ability of the challenger, \( \tilde{\eta}_i \geq 1 \).
Equilibrium
Equilibrium

- Citizens make an assumption $\tilde{r}_1, \tilde{r}_2$ on the first period rent taking strategies of both incumbents.
Equilibrium

• Citizens make an assumption $\tilde{r}_1, \tilde{r}_2$ on the first period rent taking strategies of both incumbents.

• Citizens form estimates $\tilde{\eta}_1, \tilde{\eta}_2$ based on this assumption, the equalization rate $t$, and the observation of public goods supplies $g_1, g_2$. 
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- Citizens form estimates $\tilde{\eta}_1, \tilde{\eta}_2$ based on this assumption, the equalization rate $t$, and the observation of public goods supplies $g_1, g_2$.

- Incumbents choose rents $r_1, r_2$ anticipating the impact of this choice on the estimates $\tilde{\eta}_1, \tilde{\eta}_2$ and the ensuing re-election probability $p_{I,1}, p_{I,2}$. 
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• Incumbents choose rents \( r_1, r_2 \) anticipating the impact of this choice on the estimates \( \tilde{\eta}_1, \tilde{\eta}_2 \) and the ensuing re-election probability \( p_{I,1}, p_{I,2} \).

• In an equilibrium, the rents chosen by the incumbents coincide with the rents assumed by the citizens, \( \tilde{r}_1 = r_1 \) and \( \tilde{r}_2 = r_2 \).
The decision of jurisdiction i’s incumbent
The decision of jurisdiction $i$’s incumbent

- The citizens’ estimate $\tilde{\eta}_1$ of the incumbent’s ability is normally distributed with mean $\mu(r_1, r_2, t)$ and variance $\sigma^2(r_1, r_2, t)$.

- With $F(\cdot, \mu, \sigma^2)$ for the c.d.f. of the $(\mu, \sigma^2)$-normal distribution, the re-election probability is

  $$p_{I,i} = \text{Prob}\{\tilde{\eta}_i \geq 1\} = 1 - F\left(1; \mu_i(r_1, r_2, t), \sigma_i^2(r_1, r_2, t)\right).$$
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- Decision problem and first-order condition

$$\max_{r_i} r_i + \left[1 - F\left(1; \mu_i(r_1, r_2, t), \sigma^2_i(r_1, r_2, t)\right)\right] \cdot \delta(R + \bar{r})$$

$$\text{FOC: } 1 + \frac{\partial}{\partial r_i} \left[1 - F\left(1; \mu_i(r_1, r_2, t), \sigma^2_i(r_1, r_2, t)\right)\right] \cdot \delta(R + \bar{r}) = 0.$$
Symmetric equilibrium
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In a symmetric equilibrium with \( r_i = \tilde{r}_i \) for \( i = 1, 2 \) in period 1 both incumbents take the rent

\[
r = \bar{\tau} - \left( \frac{\sigma^2_{\eta} + \sigma^2_{\varepsilon} + [t/2(1-t)]^2 \sigma^2_{\gamma}}{(\sigma^2_{\eta} + 2\sigma^2_{\varepsilon}) \cdot (\sigma^2_{\eta} + 4 [t/2(1-t)]^2 \sigma^2_{\gamma}) \cdot 2\pi} \right)^{1/2} \cdot \delta(R + \bar{r}).
\]
Symmetric equilibrium

In a symmetric equilibrium with $r_i = \tilde{r}_i$ for $i = 1, 2$ in period 1 both incumbents take the rent

$$r = \bar{\tau} - \left( \frac{\sigma_2^2 + \sigma_2^2 + \left[t/2(1-t)\right]^2 \sigma_2^2}{\left(\sigma_2^2 + 2\sigma_2^2\right) \cdot \left(\sigma_2^2 + 4 \left[t/2(1-t)\right]^2 \sigma_2^2\right) \cdot 2\pi} \right)^{1/2} \cdot \delta(R + \bar{r}).$$

Proposition 1. Starting from a positive equalization rate $t > 0$, a marginal increase in the equalization rate increases rents taken by incumbents in a symmetric equilibrium:

$$\frac{\partial r}{\partial t} > 0.$$
FOC in a symmetric equilibrium

\[ 1 = \left[ -\frac{\partial \mu_i(r, r, t)}{\partial r_i} \right] \cdot f(1; \mu(r, r, t), \sigma^2(r, r, t)) \cdot \delta(R + \bar{r}) \]

marginal benefit of rent diversion = impact of additional rent on mean estimate of incumbent’s ability loss in re-election * probability per unit of change in \(\mu\) value * of re-election
FOC in a symmetric equilibrium

\[ 1 = \left[-\frac{\partial \mu(r_j, r_i, t)}{\partial r_j}\right] \cdot f(1; \mu(r, r, t), \sigma^2(r, r, t)) \cdot \delta(R + \bar{r}) \]

marginal benefit of rent diversion

impact of additional rent on mean estimate of incumbent’s ability

loss in re-election value

* probability per unit of change in \( \mu \)

effects of equalization

↓

Rent diversion is less likely to be interpreted as incompetence.

↑

Observations in period 1 are less informative.
Conclusions
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• From this effect, fiscal equalization is detrimental to citizens’ welfare, but ...
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• A welfare analysis of fiscal equalization should trade off these benefits against the political cost treated in this paper.