1 Nechyba JPE 1997

1.1 Questions and Results

• Two Questions:

  – Why is the property tax the almost exclusive tax instrument used by local governments?

  – Why do we consistently observe higher levels of governments (e.g. states) undermining local property tax system through income tax-funded grants and through imposing caps on local property tax rates?
• This paper models heterogeneous consumers endowed with income that are mobile and communities competing by choosing combinations of income tax and property tax. The main conclusion is that:

  – under a range of objective functions for the local community leaders, it is a dominant strategy for them to set the local income tax close to zero;

  – if there were some exogenous local dissatisfaction with the property tax, only higher level governments can alleviate the prisoner’s dilemma among the local communities.
1.2 A Computable GE Model

- $N$ : the set of individuals and houses. $n \in N$ is the individual initially endowed with house $n$; $N = [0, 1]$;

- A community structure is an assignment of individuals to communities and moreover to different houses:
  - there are $\bar{h}$ house types: $h \in H = \{1, \ldots, \bar{h}\}$; ($\bar{h} = 3$)
  - there are $\bar{m}$ communities: $m \in M = \{1, \ldots, \bar{m}\}$; ($\bar{m} = 3$);
  - there are $\bar{i}$ income levels: $i \in I = \{1, \ldots, \bar{i}\}$; ($\bar{i} = 5$).
  - $C_{mh} \subseteq N$ is the set of agents living in house type $h$ in community $m$;
- $E_{mhi} \subseteq N$ is the set of agents living in house type $h$ in community $m$ with income level $i$; $[\mu(E_{mhi}) = 1/45$ for all $(m, h, i) \in M \times H \times I]$.

- Agent $n$’s utility function is
  
  \[ u_n(m, h, x, z) = h^{\delta(n)} x_0^{\alpha(n)} x_m^{\beta(n)} z^{\gamma(n)}, \text{ for all } n \in N, \]

  where $x_0$ is the state public good (SPG); $x_m$ is the local public good (LPG) in community $m$, $z$ is private good; and $\delta(n) + \alpha(n) + \beta(n) + \gamma(n) = 1$.

- The production functions for SPG and LPG in the simulation are
  
  \[ f_0(z) = \frac{z}{\mu(N)}, f_m(z) = \frac{z}{\mu(C_m)} \text{ for } m \in M. \]

- Financing of SPG and LPG:
  
  - SPG is financed through a proportional income tax $t_0$;
– LPG is financed through local tax system described by \((t_m, \tilde{t}_m)\) where \(t_m\) and \(\tilde{t}_m\) are community \(m\)'s proportional property and income tax rates respectively.

• Determination of tax rates:

  – State income tax rate \(t_0\) and local property tax rates \(t_m\) are set through absolute majority rule voting by members of the relevant constituencies;

  – local income tax rate \(\tilde{t}_m\) is set exogenously by a community planner.

• Assumptions on the behavior of agents: Residents behave myopically (or competitively): they take community compositions, property values and \(\tilde{t}_m\) as given when voting.
Given local income tax rates \((\bar{t}_1, ..., \bar{t}_m)\), a constrained equilibrium is a list \((p, t, x, J)\) where

- \(p : M \times H \rightarrow R_+\) is the housing prices;
- \(t = (t_1, ..., t_m) \in [0, 1]^m\) is the proportional property tax rates;
- \(x = (x_1, ..., x_m)\) is the public good levels;
- \(J = \{ J_{mh} \subseteq N : \sum_{h \in H} \mu(J_{mh}) = \mu(E_m) \}\) is the assignments of agents to communities;

s.t.

1. housing prices clear the market for each type of houses;
2. all government budget balance;
3. consumers cannot gain utility by moving;
4. local property and state income tax rates are determined through majority rule voting.
• An unconstrained equilibrium is a constrained equilibrium with the local income tax rates \((\bar{t}_1, \ldots, \bar{t}_m)\) endogenized to maximize each community leader’s objectives.

  – Community leaders are assumed to be forward looking and strategic.

  – Various objectives of community leaders are assumed:

    1. maximize community income;

    2. maximize community property values;

    3. maximize local wealth;

    4. maximize local utility levels;

    5. maximize the size of the local public sector;

    6. satisfy the current median voter.
1.3 Calibration and Simulation

- The model’s parameters are calibrated using data from New Jersey, and then the constrained and unconstrained equilibrium are simulated.

- The results are: regardless of the objectives of the community leaders, unilateral deviation from zero local income tax is detrimental.