

## N10. Local Government

- 85,000 local governments in the U.S.
- Ratio of spending  $\frac{\text{local}}{\text{state}}$  DE, AK, RI, VT is  $\leq .65$ , CA, FL, NY, TX  $\geq 1.74$
- Spent on:
  - education
  - public Services

## • Economic Role of Government?

- natural monopoly (water, sewer, trash?,...)
- public good (nonrivalrous, nonexcludable) *Free-Rider Problem*
- externality (leads to market failure. But doesn't mean government should necessarily be the provider of the service.)

## Education

- Huge private good component
- Case for a public good component. How might you benefit from an increase in the average level of education in population?
  - Less likely to be robbed
  - Knowledge spillovers

## A Model of Local Educational Finance

- Assume for now no public good component. Education a locally provided private good
- $U(x, y, z)$ 
  - $x$  : consumption (aside from housing and education)
  - $y$  : education
  - $z$  : housing
- $p_x = 1, p_y = 1, p_z = 1.$

- Robinson Crusoe

$$\begin{aligned} & \max_{(x,y,z)} U(x, y, z) \\ \text{s.t. } & x + y + z = I \end{aligned}$$

Then

$$\begin{aligned} \frac{U_x}{U_y} &= 1 \\ \frac{U_x}{U_z} &= 1 \end{aligned}$$

- Let  $(x^*, y^*, z^*)$  solve this

### Local Government Provision of Education

- Suppose everyone in the community has the same utility function and the same income
- Suppose education is locally funded.
- Optimum: school board sets  $y = y^*$ . Set *head* tax of  $T = y^*$  to fund it (Literally a tax on heads.). Individuals solve

$$\begin{aligned} & \max_{(x,z)} U(x^*, y, z) \\ \text{s.t. } & x + z = I - y^* \end{aligned}$$

- Suppose have to use a property tax. Let  $t$  be tax per unit of housing. Suppose local government sets

$$t = \frac{y^*}{z^*}.$$

Will this implement the optimum? No. See graph

- To get the optimum here we need zoning. Set  $t$  as above and set minimum house size  $z \geq z^*$ .

### Preference Heterogeneity and Voting

- In one dimensional elections, the median voter rules
- Consider education model with a head tax and heterogeneity in income  $I$ . Ignore housing for now so there are two goods, education  $y$  and other consumption  $x$ .
- Assume education a normal good. Let  $y^*(I)$  be the optimum education level for income  $I$ , *assuming a head tax*. See figure.

- Let  $f(I)$  be the density of income type  $I$ . Let  $I_{med}$  be the median. See plot.
- The education level that wins the election is  $y^*(I_{med})$ .

#### Alternative Educational Finance: Income Tax

- Suppose  $T = tI$ . (So all proceeds are used to pay for schooling.)

- Total income in the community is

$$I_{total} = \int_{I_{low}}^{I_{high}} f(I)IdI$$

- Total Tax

$$T_{total} = tI_{total}$$

- Education level ( $H$  is number of households in community. Assume one child per household.)

$$y = \frac{T_{total}}{H} = \frac{tI_{total}}{H} = tI_{mean}$$

- Median voter picks  $t$  and then  $y$  solve above.

- Case 1. Symmetric Distribution so

$$I_{med} = I_{avg} = \frac{I_{total}}{H}$$

Here for the median voter things are the same as in the head tax case. So level of education is same as before,  $y = y^*(I_{med})$ . Finance is different. Median vote's tax bill exactly pays for education. Individuals with  $I < I_{med}$  pay less, individuals with  $I > I_{med}$  pay more, so there is a redistribution of income as compared to the head tax.

- Case 2. Asymmetric Distribution where

$$I_{med} < I_{mean} = \frac{I_{total}}{H}$$

Now for a given education level  $y$ , the total tax is

$$tI_{mean} = y$$

But the median vote pays

$$tI_{med} < tI_{mean}.$$

Price of education to the median vote is less than under a head tax. So the median voter selects more education than under a head tax.

## Jurisdiction Formation

### Tiebout Model: A simple version

- Utility function  $U(x, y, \theta)$  depends upon taste parameter  $\theta$  so that  $y^*(I, \theta)$  is strictly increasing in  $\theta$ , where  $y^*(I, \theta)$  is the optimal education level in the Robinson Crusoe economy with income  $I$  and taste parameter  $\theta$ .
- $I$  is income, varies across individuals. Education a normal good.
- No scale economies,  $p_y = 1$ , a constant.
- Education determined collectively (e.g. voting model)

- Head Tax
- No jurisdictional spillovers. Education a private good. (So utility function depends upon  $y$  but not  $y_{mean}$ )
- Choice and mobility

### Tiebout Equilibrium

- Complete sorting by education demand. Let

$$y_{\min} = y(I_{\min}, \theta_{\min})$$
$$y_{\max} = y(I_{\max}, \theta_{\max})$$

Then  $[y_{\min}, y_{\max}]$  is the range of education levels observed and an individual of type  $(I, \theta)$  moves to a community with  $y = y^*(I, \theta)$

- First best. First Welfare Theorem
- Consumption clubs. Here education is like food at a grocery store.
- Vote with your feet!

### Property Tax instead of Head Tax

- Suppose instead of head tax have property tax. So now introduce third good  $z$ , housing, like earlier, and utility function is  $U(x, y, z, \theta)$
- Tax paid is  $tz$ .
- Free-rider problem. Individuals with high  $\theta$ , but low  $I$  will want to move to areas with high  $y$  and buy a small house.
- Zoning. Solve Robinson Crusoe problem with choice of  $x, y, z$  for a type  $\theta$ . Let  $y^*(I, \theta)$  and  $z^*(I, \theta)$  be optimum. Then tax solves

$$tz^*(I, \theta) = y^*(I, \theta)$$

Set a minimum lot size of  $z \geq z^*(I, \theta)$ . Get complete sorting on income and taste for education.

### Jurisdictional Spillovers and Scale Economies

- Jurisdictional spillovers. Education a public good that extends beyond a jurisdiction, then equilibrium provision will be too low. (Free Rider problem). May make jurisdiction larger to *internalize* the spillovers
- Scale economies: A reason to make districts larger than would in the Tiebout example above.

Above Benefits of consolidation are traded off against costs:

- Less able to accommodate preference diversity
- Less *competition* between districts.