

# Chapter 8: Local Public Goods and Services (Brueckner's textbook)

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# Introduction

- We will cover this chapter up to 8.3. Sections after 8.4 are skipped.
- Many public goods and services are provided at a local level – at a city or county level or even smaller scale (township, district, community, etc)
  - ▶ elementary and secondary education, mass transit, city streets, recreational activities, public health facilities, sewers and sanitation, etc.
- What is public good?
  - ▶ non-rival: consumption of the good by one individual does not reduce availability of the good for consumption by others.
  - ▶ non-excludable: no one can be effectively excluded from using the good.
- If both are satisfied, then it is a pure public good. A spectrum of public good based on the degree of the above two measures.

# Introduction

- Typical problem of public good: Insufficient provision occurs when there is no collective decision. People free rides!
- One key message of this chapter is that majority voting may not necessarily result in optimal provision of the public good.
- Tiebout (1956): if voting with one's feet is allowed, then efficient outcome may be achieved.

*A non-political solution to the free rider's problem!*

- The crucial feature of local governance: there are multiple local governments, in contrast to a single federal government and relatively few state governments.

# Introduction

- Multiplicity of local governments means that people can change their consumption of public goods and services by changing the jurisdiction in which they live.
- *Voting with one's feet*: moving from one local jurisdiction to another in order to get a different level of public goods and services.
- In many parts of Asia, democratic process is not the main collective procedure that determines the level of provision of public goods. Even in places where it is, the central governments are usually quite strong that it decides many local matters.
- Nevertheless, very useful to think about what will result from a majority-voting democratic process.

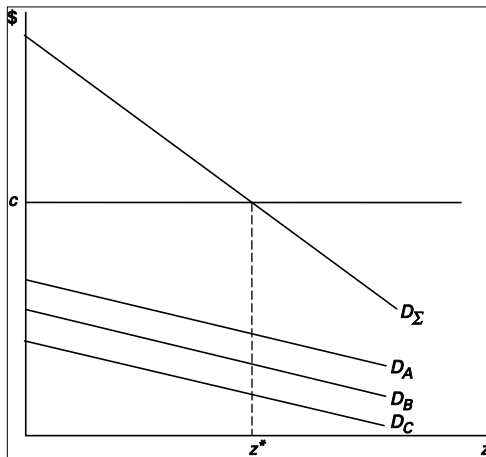
# The Socially Optimal Level of a Public Good

- Suppose the public good is police protection, and the level is measured by the number of policemen  $z$ . The per unit cost is  $c$  (e.g., the salary of a policeman).
- Suppose three consumers A, B, and C who differ in their valuation on the public good.
- Table 8.1: Downward slopping marginal benefit (willingness to pay). A has larger willingness to pay than B, and B's larger than C's.
- The social marginal benefit in adding one more policeman equals the sum of the consumers' marginal benefits.
- When  $c = \$24,000$ , the optimal level is 5. See Figure 8.1 for a depiction of how optimal level  $z^*$  is determined.

Table 8.1 The socially optimal number of policemen  
(policeman's salary = \$24,000)

Number of policemen (z)	Marginal benefit for consumer A	Marginal benefit for consumer B	Marginal benefit for consumer C	Marginal social benefit
1	\$19,000	\$16,000	\$13,000	\$48,000
2	\$17,000	\$14,000	\$11,000	\$42,000
3	\$15,000	\$12,000	\$9,000	\$36,000
4	\$13,000	\$10,000	\$7,000	\$30,000
5	\$11,000	\$8,000	\$5,000	\$24,000
6	\$9,000	\$6,000	\$3,000	\$18,000
7	\$7,000	\$4,000	\$1,000	\$12,000

Figure 8.1 Socially optimal  $z$



# Private Contribution to Public Good

- Suppose there is no collective process determine the provision of the public good.
- What is the equilibrium level of public good provided?
- In Figure 8.1, no public good will be provided.
- Draw a different figure in which positive public good is provided. It is always provided by the person with the largest willingness to pay (A), but the amount must be less than optimal.
- Why? Because B and C free ride A!



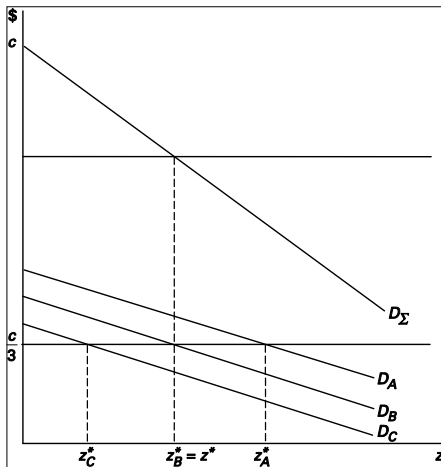
# Public Good Provision under Majority Voting

- Suppose the consumers pay a uniform tax to fund the provision of the public good.
- In our example, this means each consumer pay  $c/3$  for each unit provided.
- So, the price that each consumer face is in fact  $c/3$ . Their preferred levels of public good provision are  $z_A^*$ ,  $z_B^*$ , and  $z_C^*$ .
- People differ in their opinions! Vote.
- Majority voting decides which level is picked.

# Public Good Provision under Majority Voting

- Medium voter theorem: under some conditions (which is satisfied here and we are therefore not concerned with these conditions), in a *pairwise* majority voting, the outcome would be the one preferred by the medium voter.
- Voting 1:  $z_C^*$  or not...
- Voting 2:  $z_B^*$  or not...
- Voting 3:  $z_A^*$  or not...
- The outcome is  $z_B^*$ , the medium voter's (B) preferred outcome.

## Figure 8.2 Majority voting



# Public Good Provision under Majority Voting

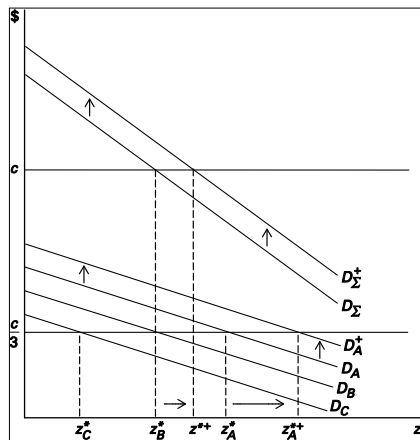
- Is the outcome under majority voting optimal?
- It looks so in Figure 8.2. But, this relies on the fact that the gap between  $D_A$  and  $D_B$  is the same between  $D_B$  and  $D_C$ . In this case,  $\sum D_i = 3D_{median}$ .
- This generalizes to the case of  $n$  voters, and so the outcome under majority voting is optimal if mean willingness to pay equals the median willingness to pay, i.e.,

$$\frac{\sum_{i=1}^n D_i}{n} = D_{median}.$$

# Public Good Provision under Majority Voting

- This condition is more of a coincidence.
- If  $D_A$  is higher, then the equilibrium outcome  $z_B^*$  is less than optimal.
- If  $D_C$  is lower, then the equilibrium outcome  $z_B^*$  is more than optimal.
- Optimal outcomes depends on the aggregate marginal benefit, while the medium voter's preferred outcome is not affected by other people's marginal benefit.
- Put differently, the voting process fails to register the intensity of preferences for non-medium voters.

# Figure 8.3 Inefficiency of majority voting



# Voting with One's Feet

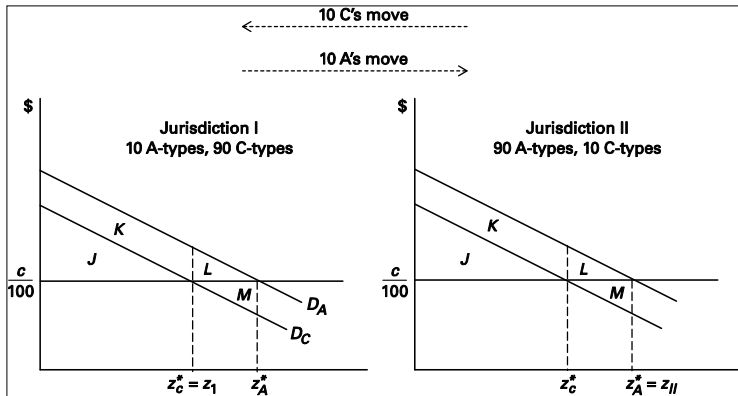
- Think about the discrepancy between  $z^*$  and  $z_B^*$  when  $D_A$  is higher than the one depicted in Figure 8.2.
- The fact that  $z^* > z_B^*$  reflects that  $z_A^* > z_B^*$ . A is not happy with the outcome, if there is a jurisdiction that offers a level closer to  $z_A^*$ , A would like to move (if the benefit of moving outweighs the moving cost).
- Similar argument applies for C when  $D_C$  is lower than the one depicted in Figure 8.2.
- Consider a simpler case with two jurisdictions and two types, A and C.
  - ▶ In jurisdiction I, there are 10 A-types and 90 C-types, and in jurisdiction II, there are 90 A-types and 10 C-types.
  - ▶ In jurisdiction I, majority voting outcome is  $z_C^*$ , while in jurisdiction II, the outcome is  $z_A^*$ .

# Voting with One's Feet

- In jurisdiction I, an A-type individual feels the public good is under-supplied, and he/she would be better off moving to jurisdiction II. Similarly, a C-type in II would want to move to I.
- Suppose zero moving cost for simplicity. Then, equilibrium outcome is that on top of majority voting, voting with one's feet results in *homogeneous jurisdictions*: Jurisdiction 1 all type-C and 2 all type-A.
- Thus, those with lower/higher willingness to pay end up paying lower/higher tax and consume less/more public good. Most importantly, it is efficient!
- Each of the relocating A-type individual enjoys a welfare increase of size L, whereas each of the relocating C-type individual enjoys a welfare increase of size M. So, the total welfare increase is  $10 \times (L+M)$ .



## Figure 8.4 Voting with one's feet



# Voting with One's Feet

- Majority voting lacks a freedom to choose in the sense that one has to settle for the medium voter's preferred level of public good, regardless of his/her own preference intensity.
- Voting with one's feet creates a freedom to choose, solving this problem.
- Seems a simple logic, but people are not aware of this before Tiebout's paper. A first answer to the free riding problem.
- This could be an argument for local autonomy.

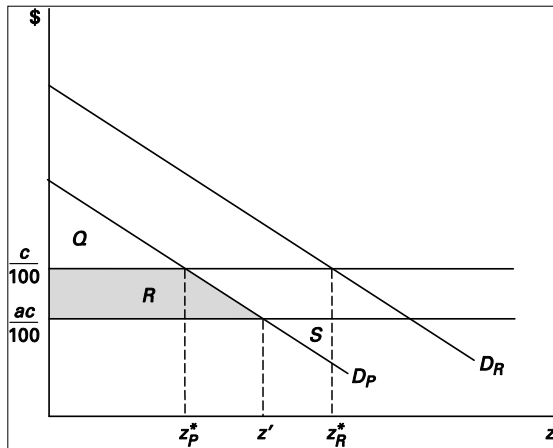
# Voting with One's Feet

- If people basically have similar preference toward public good, then difference in willingness to pay can be solely generated by difference in income.
- If this were the real process playing out, then we should expect to see homogeneous jurisdictions.
- There is a sense that the districts in Western cities are more segregated in terms of income. But, this needs careful testing because of racial/ethnic issues, and it may also mingled with housing issues.
- *Empirically/positively*, how well this process describe reality is yet to be examined.
- *Normally*, this provides a guideline as to how to efficiently provide local public good.

# Voting with One's Feet Under a Property-Tax System

- So far we assume a “head tax.” While local governments get their revenue mainly through property tax.
- Under a head tax, poor consumers did not want to move into a rich jurisdiction even though its high public good level is attractive, but the tax burden is too large for their low incomes.
- Under a property tax system, poor consumers may want to relocate to rich jurisdiction by living in a smaller house and paying less than their per capita share of public-good costs.
- Suppose the rich (R) and the poor (P) live in homogeneous jurisdictions of size 100. Then, per capita cost per unit of  $z$  is  $c/100$  under either system. Public good level is  $z_R^*$  and  $z_P^*$ ; see Figure 8.5.

## Figure 8.5 Voting with one's feet under a property tax



# Voting with One's Feet Under a Property-Tax System

- Suppose a single poor individual contemplates moving into the rich jurisdiction.
- The cost per unit of  $z$  for this person is  $\alpha c/100$ , for some  $\alpha < 1$ . Welfare change  $= R - S$ . It is possible that  $R > S$ , if  $\alpha$  is sufficiently small. So, the tax break by living in a small house provides an incentive for relocation.
- The rich household pay a little more than  $c/100$  to subsidize this new poor member. If the difference in size (e.g., 100:1 here) is large, then the per capita cost per unit of  $z$  can be viewed as relatively unchanged.
- This breaks the homogenous jurisdiction result under the head tax system.

# Voting with One's Feet Under a Property-Tax System

- When more poor people move into the rich jurisdiction, the subsidy increases to maintain the same level of public good.
- Fiscal zoning: by imposing minimum lot size of houses, this reduce the poor's incentive to move into jurisdiction due to the need to pay for large housing.

# Voting with One's Feet: Other issues

- The ideal is that people sort themselves into levels of public good provisions that fit their needs.
- But, this may look “unequal.” When mixed with issues of racial segregation and “gentrifications,” it may look worse.
- Or, think differently, is the so-called racial segregation is based on a taste on racial similarity, or is it a result of the incentive to homogenize income-public good provision link (the unwillingness to subsidize the poor, while the image of the races is statistically linked with income. Or, maybe both of them matter.



# Voting with One's Feet: Other issues

- Urban sprawl.....Ch. 4, but we didn't talk about it.
- The idea is that an increase in  $y$ , a decrease in  $t$  causes the city to sprawl (larger  $\bar{x}$ , lower population density).
- One often argued reason for urban sprawl is that rich households (large  $y$ ; recall the monocentric city model with two income groups) avoid heterogeneous city center, and create (more or less homogeneous) suburban communities at the city edge, based on the incentives described in this chapter.