

# Chapter 14

## Public Sector in Urban Areas

- Public Good Theory – Samuelson, “The Pure Theory of Public Expenditures,” *Review of Economics and Statistics*, 1954.
- Definition:
  - Non-rival consumption – one person’s consumption does not subtract from another’s -- marginal cost of an additional consumer is zero
  - Non-excludability – infeasible, prohibitively costly to exclude consumers from benefits

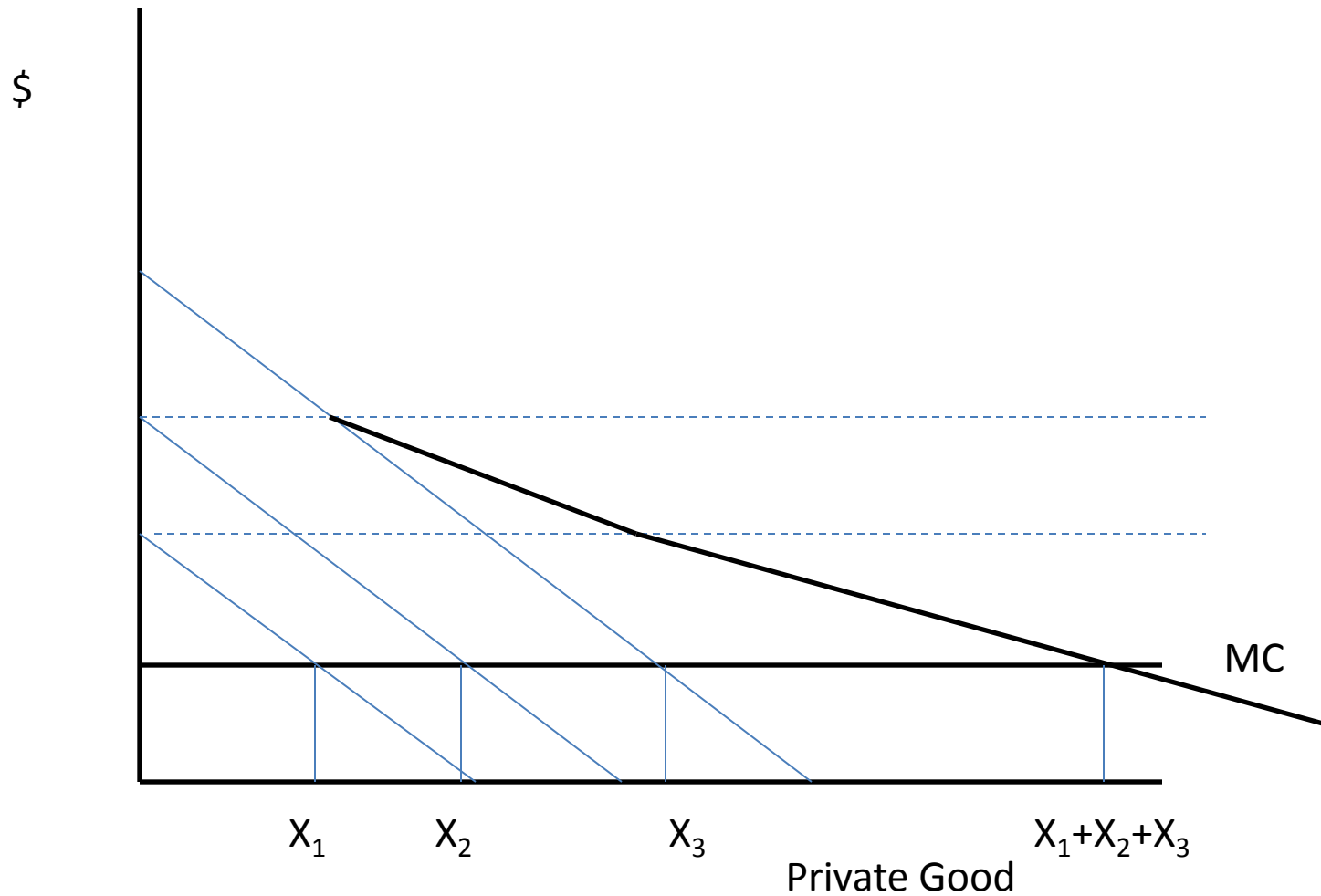
# Optimum Quantity of a Public Good: The Samuelson Condition

- Each person receives the same quantity of the public good
- Sum of the marginal benefits = marginal cost

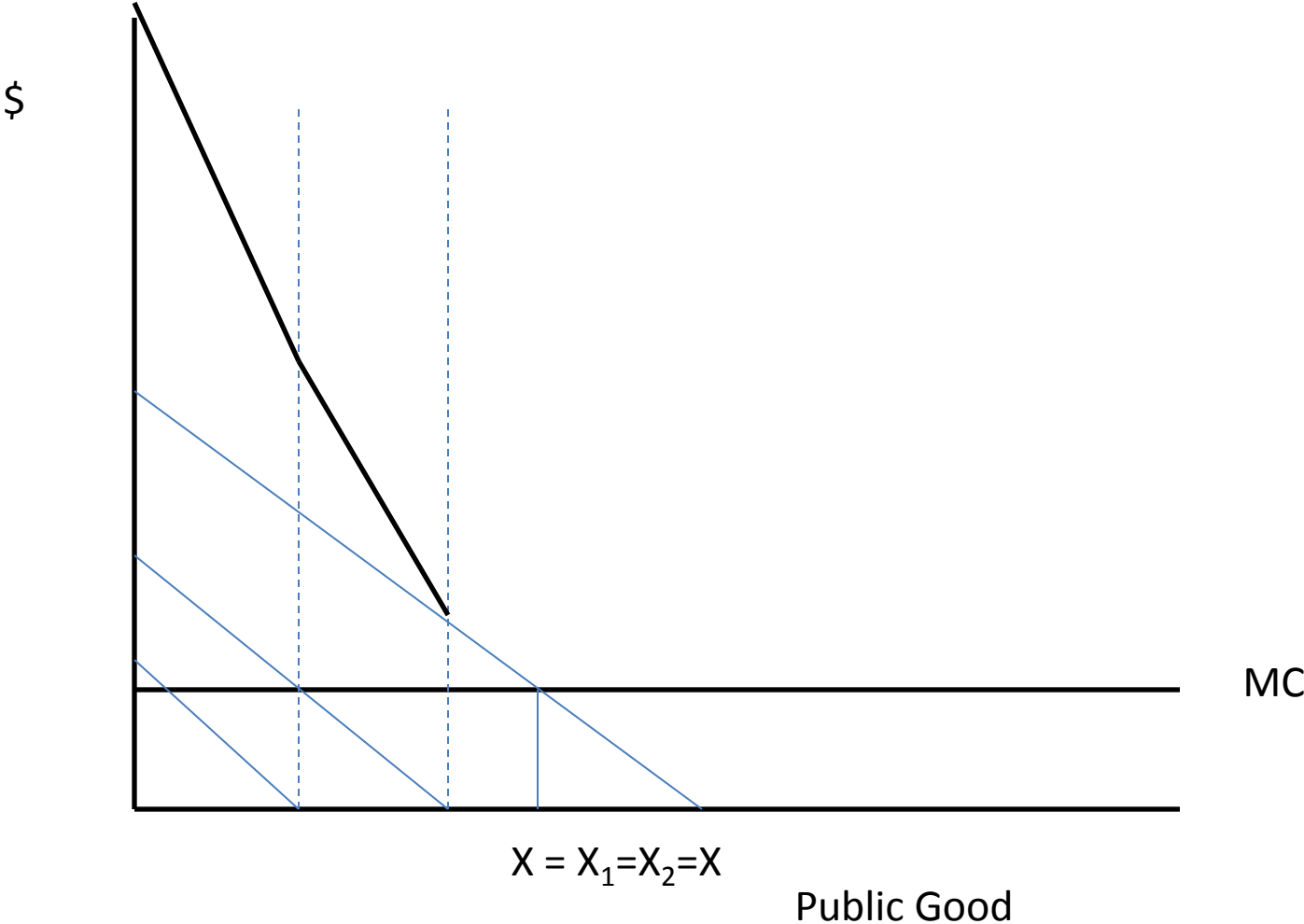
$$\sum_{i=1}^n MRS_{xy}^i = MC_x$$

- X = public good, Y = private good, n individuals

# Private Good: Sum of MB = MC



# Public Good: Sum of MB = MC



# Free Riding – Prisoner's Dilemma

- Two suspects are arrested by the police. The police have insufficient evidence for a conviction, and, having separated both prisoners, visit each of them to offer the same deal. If one testifies (defects from the other) for the prosecution against the other and the other remains silent (cooperates with the other), the betrayer goes free and the silent accomplice receives the full 10-year sentence. If both remain silent, both prisoners are sentenced to only six months in jail for a minor charge. If each betrays the other, each receives a five-year sentence. Each prisoner must choose to betray the other or to remain silent. Each one is assured that the other would not know about the betrayal before the end of the investigation. How should the prisoners act?

# Prisoner's Dilemma Payoff Matrix

	B stays silent	B confesses
A stays silent	Each gets 6 months	Prisoner A: 10 years Prisoner B: goes free
A confesses	Prisoner A: goes free Prisoner B: 10 years	Each gets 5 years

Result: confessing is a dominant strategy

# Free Riding with Public Good: Buying a TV with Roommate

	B buys	B free rides
A buys	A: -50 B: -50	A: -\$50 B: \$ 100
A free rides	A: \$100 B: -\$50	A: 0 B: 0

Benefit of TV = \$100

- Cost = \$150
- Both A and B can independently decide whether to buy the TV
- Roommate will be able to watch TV
- Result: No one buys a TV

# Solution: Public Provision?

- Still have information problems
- Free riding if tax share depends on stated preference
- Under provision or over provision:
  - Depends on cost shares

# Roles of the Urban Public Sector

- Main function is allocation of resources to public goods and services, including
  - Education, Hospitals and Public Health, Transportation, Public Safety (police, fire, courts), Parks, Community Development and Planning, Utilities (water, sewerage, solid waste management), Other Infrastructure
- Other economic functions of government – income distribution and stabilization and growth – are minor part of the job of local government.

# How Resource Allocations Are Made: Two Theories

- Tiebout “vote with the feet” model, based on his reaction to Samuelson’s theory of public goods
- Median Voter Model

So here we go...

# Tiebout Model of Local Public Goods

- JPE, 1956
- Response to Samuelson's contention: "No decentralized price system can serve to determine optimally these levels of collective consumption."
- Local public good – imperfect public goods – crowding may create rivalry; often at least partly excludable. Benefits confined to a small geographic area.

# Assumptions of the Tiebout Model

- Public goods influence choice of residential location – people “vote with their feet”
- Head taxes
- Constant returns to scale in local public goods provision (or small degree of increasing returns)
- No externalities – benefits/costs confined to small geographic area

# Implications of Tiebout Model

- Sorting of people into communities
- Unanimity in local public good choice
- Within each community, sum of marginal benefits = marginal cost
- Tax is simply a user fee as with a private good

# Tiebout Model with Head Taxes

- Suppose there are two demands for public good and two income levels

	Low Demand	High Demand
\$300,000 houses	\$1000	\$5000
\$500,000 houses	\$1000	\$5000

- With head taxes, would have two communities. Community A would have \$1000 in public good provision, B would have \$5000. Both would have a mix of \$300,000 and \$500,000 houses

# Tiebout Model with Property Taxes

- Suppose each community has 50-50 mix of high-priced and low-priced houses

	Community A: Low Demand	Community B: High Demand
\$300,000 houses	\$1000	\$5000
\$500,000 houses	\$1000	\$5000

- Tax has to average 1000 per household in low demand community and \$5000 per household in high demand community:
- $\$1000 = t_1(300,000 + 500,000)/2$ ;  $t_1 = .0025$
- $\$5000 = t_2(300,000 + 500,000)/2$ ;  $t_2 = .0125$

# Tax Payments

	<b>Community A: Low Demand (tax rate = .0025, expenditure = \$1000)</b>	<b>Community B: High Demand (tax rate = .0125, expenditure = \$5000)</b>
\$300,000 houses	\$1000 Tax = $.0025 * 300,000 =$ \$750	\$5000 Tax = $.0125 * 300,000 =$ \$3750
\$500,000 houses	\$1000 Tax = $.0025 * 500,000 =$ \$1250	\$5000 Tax = $.0125 * 500,000 =$ 6250

Result: In both communities, high-income households have an incentive to form their own community

# Tiebout Equilibrium with Property Taxes

	Low Demand (expenditure = \$1000)	High Demand (expenditure = \$5000)
\$300,000 houses	Community A1: \$1000 Tax = \$1000 Tax rate = .0033	Community B1: \$5000 Tax = \$5000 Tax rate = .0167
\$500,000 houses	Community A2: \$1000 Tax = \$1000 Tax rate = .0020	Community B2: \$5000 Tax = \$5000 Tax rate = 0.0100

How does high-demand, high-priced community keep low-income households out?  
Exclusionary zoning – minimum lot sizes

\$300,000 house in B2 would pay  $\$300,000 \times 0.01 = \$3000$  for \$5000 in services.  
Implies that \$300,000 house will end up costing more than \$300,000 in B2.

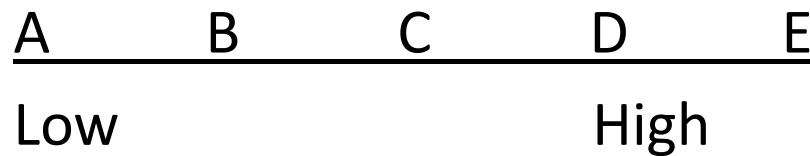
Similarly, A1 resident has an incentive to move to A2: pay  $.0020 \times \$300,000 = \$600$  for \$1000 in services – house price rises above \$300,000

# Implication of Property Taxes for Tiebout Model

- More communities in equilibrium than with head tax – one for each demand/house price combination
- Incentive for low-priced, high-demand households to move to high-priced jurisdictions
- Prices of low-end houses are higher in high-service communities – *Capitalization*

# Median Voter Model

- Voters are not mobile, and preferences for public goods and services vary across people.
- Suppose amount of public good demanded at a particular price varies as shown:



- Two candidates in the election; the winner is the one who proposes the amount demanded by the median voter, person C - the one in the middle of the diagram. If the other candidate proposes B (or D), he loses 3 votes to 2. If both propose C, it does not matter who wins.

# Implications of Median Voter Model

- Outcome is not sensitive to views of voters on the extreme ends, or indeed to views of anyone except the median voter. Move person E to the right on the diagram. Nothing happens...
- Implies spending of various public goods and services are a function of the income and tastes of the median voter – who is thought to be a home owner with the median income for jurisdiction and a child in the public schools. Book by Fischer (2001) is called *The Homevoter Hypothesis*. Good book, very readable.
- Income elasticities of demand vary from .34 to .89 for local public goods, with higher result for parks and recreation.

# Paying for Local Public Services: The Property Tax

- The local property tax is the largest source of revenue raised by local government (28% of all revenue in 2005-06), although inter-governmental revenue from the state government is larger (34%).
- A property owner's tax bill depends on
  - Assessment of property by assessor
    - Assessment is some % of actual value
  - Tax levies by local governments
- Real tax rate (percentage of property value) is
$$\text{Real Tax Rate} = (\text{Tax Bill}/\text{Assessed Value}) \times (\text{Assessed Value}/\text{Actual Value})$$

# Economic Effects of the Property Tax

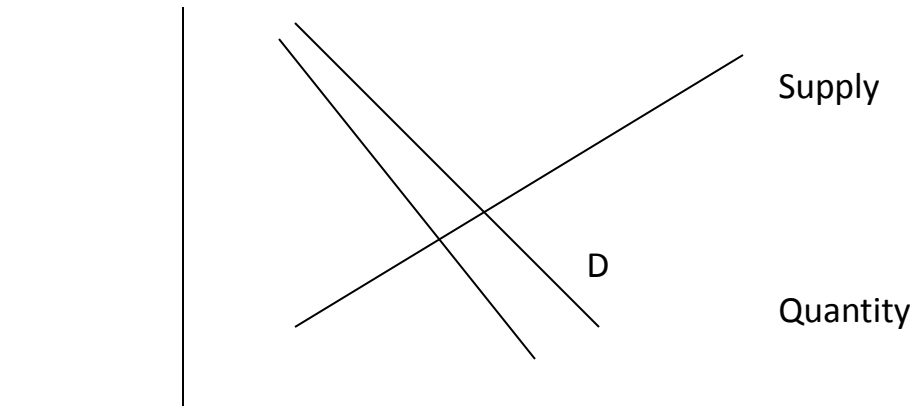
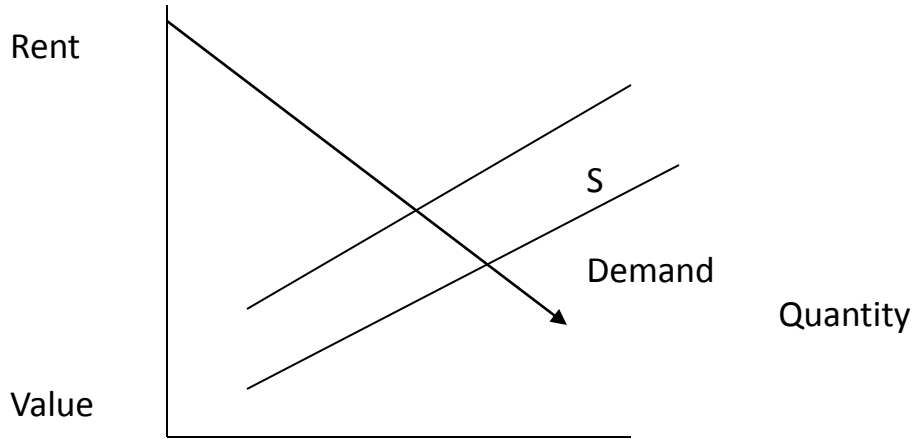
- Tax incidence – who actually pays? Is it the property owner (who gets the tax bill), or is the tax shifted forward to the tenant?
- The general answer is that the tax is partially shifted to tenants if the demand by tenants is negatively sloped and if the supply by landlords is positively sloped. See diagram on next slide.
- Preliminary equation:

Assume real estate asset lasts forever, so value  $V$  is

$$V = (R - tV)/r: \text{ thus } V = R/(r+t).$$

$R$ =rent,  $t$ =property tax rate,  $r$ =discount rate

# Property Tax Model



Demand is function of Rent. Demand on lower diagram found  $V=R/(r+t)$ .

Supply is function of Value. Supply on upper diagram found as  $R=V(r+t)$ .

Increase  $t$  shifts demand and supply as shown. Results are that  $R$  goes up and  $V$  goes down.

# Intergovernmental Grants

- Categorical or Noncategorical

Categorical grant for a specific purpose, but effect on target may be minimal since the local government's funds can be shifted from one use to another.

- Lump sum or matching

Lump sum grant is like an increase in income for the jurisdiction, so one would expect effect is just like an increase in household incomes. But that is not true; the grant sticks where it hits instead of being used for tax reductions. The “flypaper” effect.

# Matching Grants vs Lump Sum Grants

- Matching grants require a local match;  
If state matches local spending \$1 for \$1, then the price for the local public service (as seen by the local government) is just 0.5. If the state matches local spending \$2 for \$1, then the price falls of  $1/3$ .
- Matching grants are like a price cut; they have both income and substitution effects, and therefore tend to increase spending of the target public service more than do lump sum grants.
- State school-aid formulas tend to have both elements – a basic grant per pupil plus a matching component.

# Local Central City Fiscal Problems

- Central cities have particular fiscal problems because
  - High demands for local public services
  - Mobile tax base – residential and commercial
- Solutions to central city fiscal stress include:
  - Let central cities annex territory.
  - Permit central city power to prevent formation of suburban governments (as in Texas).
  - Have states provide more intergovernmental aid.
  - California Proposition 13 (1978) sharply limits local property taxes. State is in control of school funding.