EE441 Economics of Public Expenditure

3. Public Goods

Euamporn Phijaisanit
Faculty of Economics
Thammasat University
1/2017

Outline of Topic 3

- Public Goods Defined
- Efficient Provision of Public Goods
  - Deriving the Efficiency Condition
  - Problems in Achieving Efficiency
  - The Free Rider Problem
- Privatization
  - Public versus Private Provision
  - Public versus Private Production
- Public Goods and Public Choice

Characteristics of Goods

- Excludable vs. Non-excludable
  - Excludable – preventing anyone from consuming the good is relatively *easy*
  - Non-excludable – preventing anyone from consuming the good is either *very expensive* or impossible
- Rival vs. Non-rival
  - Rival – once provided, the *additional resource cost* of another person consuming the good is positive
  - Non-rival – once provided, the *additional* resource cost of another person consuming the good is *zero*

Types of Goods

		RIVAL	
		YES	NO
EXCLUDABLE	YES	PRIVATE GOODS	NATURAL MONOPOLY
	NO	COMMON RESOURCES	PUBLIC GOODS

Noteworthy Aspects of Public Goods

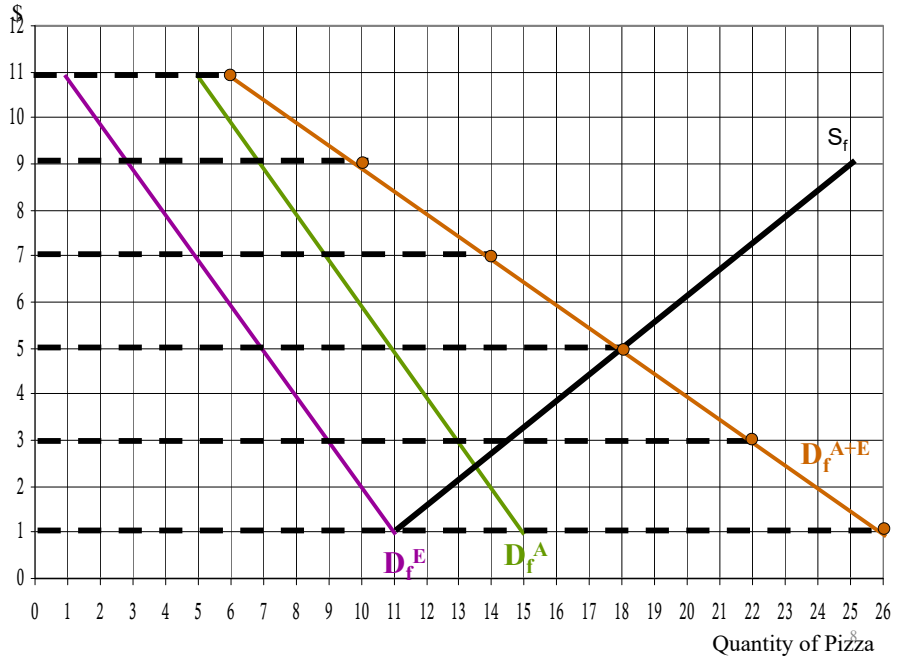
- Even though everyone consumes the *same quantity* of the good, it need not be *valued equally* by all
  - Eg., clean bathroom in dormitory, defense
- Classification as a public good is not absolute; it depends on market conditions and the state of technology
  - A commodity can satisfy one part of the definition of a public good but not the other
  - **Impure public good:** rival and/or excludable. Eg., lighthouse, scenic view, beaches
- Some things that are not conventionally thought of as commodities have *public good characteristics*
  - Eg. Honesty, fairness of income distribution, certain types of information
- Private goods are not always provided only by the private sector
  - **publicly provided private goods:** rival and excludable goods provided by government. Eg., medical services, housing
- Public provision of a good does not necessarily mean that it is also *produced* by the public sector (e.g. garbage collection)

Some Public Goods

- Basic research
- Programs to fight poverty
- *Uncongested* non-toll roads
- Fireworks display
- Honesty
- National Defense

Efficient Provision of Private Goods

Price	Adam (D_f^A)	Eve (D_f^E)	Market (D_f^{A+E})
$11	5	1	6
$9	7	3	10
$7	9	5	14
$5	11	7	18
$3	13	9	22
$1	15	11	26



Horizontal Summation

- The process of creating a market demand curve by *summing the quantities demanded* by each individual at every price.

Pareto Efficiency – Private Goods Case

- $MRS_{fa} = P_f/P_a$
- Set $P_a = \$1$
- $MRS_{fa} = P_f$
- D_f^A shows MRS_{fa} for Adam
- D_f^E shows MRS_{fa} for Eve
- S_f shows MRT_{fa}
- Necessary condition for Pareto efficiency: $MRS_{fa}^{Adam} = MRS_{fa}^{Eve} = MRT_{fa}$

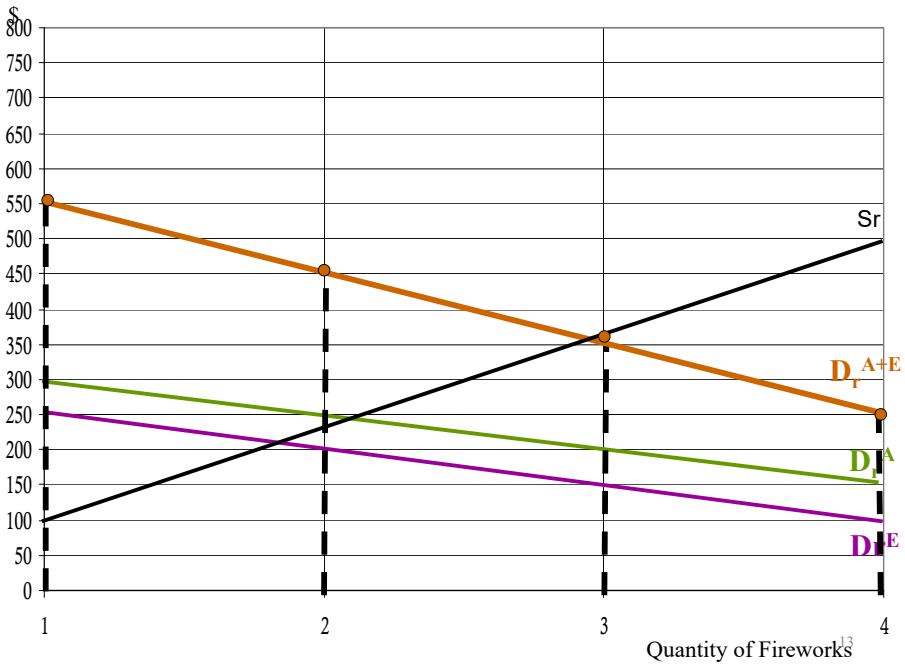
Pareto Efficiency – Private Goods Case

As long as the market is competitive and functions properly, the First Welfare Theorem guarantees that this condition holds.

- Necessary condition for Pareto efficiency: $MRS_{fa}^{Adam} = MRS_{fa}^{Eve} = MRT_{fa}$

Efficient Provision of Public Goods

Units of Fireworks				
	1	2	3	4
Adam ($D_r^{A)}$)	\$300	\$250	\$200	\$150
Eve (D_f^E)	250	200	150	100
Market (D_f^{A+E})	\$550	\$450	\$350	\$250



Vertical Summation

- The process of creating a market *aggregate* demand curve for a public good by *adding the prices* each individual is willing to pay *for a given quantity* of the good.

Pareto Efficiency – *Public Goods* Case

- $MRS_{fa} = P_f/P_a$
- Set $P_a = \$1$
- $MRS_{fa} = P_f$
- D_f^A shows MRS_{fa} for Adam
- D_f^E shows MRS_{fa} for Eve
- S_f shows MRT_{fa}
- Necessary condition for Pareto efficiency: $MRS_{fa}^{Adam} + MRS_{fa}^{Eve} = MRT_{fa}$

A point to note

- With a private good, everyone has the same MRS, but people can consume different quantities.
  - Therefore, demands are summed horizontally over the differing quantities.
- For public goods, everyone consumes the same quantity, but people can have different MRSs.
  - Vertical summation is required to find the group willingness to pay.

Problems Achieving Efficiency

- True preference revelation bye Adam and Eve
  - The Free-Rider Problem: the incentive to let other people pay for a public good while you enjoy the benefits
- Solutions to the free-rider problem
  - Suppose that: (1) entrepreneur knows each person's demand curve for the public good (firework) and (2) it is difficult to transfer the good from one person to another. In this case the entrepreneur could charge according to *willingness to pay*.
  - Perfect price discrimination: When a producer charges each person the maximum he or she is willing to pay for a good.
- Policy Perspective: GPS is non-rival **but** excludable since technology exist to scramble signals

Laboratory Experiments: Do People Free-Ride?

- How a typical experiment works
- Typical results
  - People contribute about 50% of resources to provision of public good
  - Contributions fall the more often the game is repeated
  - Cooperation fostered by prior communication
  - Contribution rates decline when opportunity cost of giving goes up
- "Warm-glow" giving

The Privatization Debate

- Privatization – taking services supplied by government and turning them over to the private sector
- Public Sector vs Private Sector Provision:
  What is the right mix?
  - Relative wage and materials costs: less expensive sector preferred on efficiency grounds
  - Administrative costs: large fixed admin costs can be spread over a large group under public sector
  - Diversity of tastes: larger diversity better handled by private sector
  - Commodity egalitarianism: some commodities ought to be made available to everyone better achieved under public sector

Public vs Private Production Debate

- Which sector is more efficient?
  - Theory that public sector managers have little incentive to be efficient
  - However, problems in comparing cost differences since quality of services offered by public and private sectors can differ. (e.g., hospitals)
    - Incomplete contracts
    - Competition to supply good or service
    - Reputation building
- Ultimately depends on Market Environment facing the providers

Topic 3 Summary

- Public goods are non-rival and non-excludable in consumption
  - Impure public goods exhibit some qualities of private and/or public goods
- Efficient provision of *public goods:*
  - $\sum MRS^{i}_{xy} = MRT_{xy}$ i=person i…..n
- An incentive exists to free-ride in the payment of public goods
- Public goods can be provided privately; private goods can be provided publicly

Appendix: Preference Revelation Mechanisms for Public Goods

- $\Delta T^{Eve} = MRT_{ra} - (MRS_{ra}^{Total} - MRS_{ra}^{Eve})$
- Eve's choice: $\Delta T^{Eve} = MRS_{ra}^{Eve}$
- By substitution: $MRT_{ra} - (MRS_{ra}^{Total} - MRS_{ra}^{Eve}) = MRS_{ra}^{Eve}$
- Add $(MRS_{ra}^{Total} - MRS_{ra}^{Eve})$ to both sides: $MRT_{ra} = MRS_{ra}^{Total}$

Class Exercise

1. Which of the following do you consider pure public goods? Private goods? Why?
   1. Wilderness areas
   2. Satellite television
   3. Medical school education
   4. Public television programs
   5. ATM

Class Exercise

2. Some privately run airports provide amenities such as pod hotels, which enable fliers to nap between flights. These amenities are generally not available at publicly run airports. Given this, would you recommend that airports be privatized? If not, what other information would you require?