



Economics of the Public Sector

Tutorial 2 (May 8, 2024)

Utrecht School of Economics
2022–2023

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Recap

Market failures and the role of government

1. Failure of competition

To achieve Pareto efficiency, there must be *perfect competition*; that is, there must be a sufficiently large number of firms.

2. Public goods

Some goods either will not be supplied by the market or, if supplied, will be supplied in insufficient quantity (referred to as pure public goods).

Two emerging critical properties:

- (i) There is zero marginal cost for an additional individual enjoying the good;
- (ii) In general it is difficult or impossible to exclude individuals from the enjoyment of a pure public good.

3. Externalities

Instances in which one individual's actions impose a cost (confer a benefit) on others are referred to as *negative (positive)* externalities.

Market failures and the role of government

4. **Incomplete markets**

Whenever private markets fail to provide a good or service even though the cost of providing it is less than what individuals are willing to pay, there is a market failure called *incomplete markets*. Example: Deposit Insurance Corporation.

5. **Information failures**

Products and services are required to disclose contents/what is really offered.

6. **Unemployment, inflation, and disequilibrium** (not discussed in this course)

High levels of unemployment is a *prima facie* evidence that *something* is not working well in the market.

Classification of goods

	Excludable	Non-excludable
Rivalrous	Private goods food, clothing, cars, parking spaces	Common-pool resources fish stocks, timber, coal
Non-rivalrous	Club goods cinemas, private parks, satellite television	Public goods free-to-air television, air, national defense

Figure 1: Classification of goods in economics. Source: [Econlib](#).

It is a matter of how the goods are classified, not who provides the goods.

Group issue

1. Group formation
 - Mergers and acquisitions will take place during the break
 - Please fuse with an open mind and a big heart
2. For technical details of the project, please refer to Appendix B of the course manual

Select Exercises

Select exercises

1. Where should each of the following goods lie in the figure?
(Chapter 5 of Stiglitz and Rosengard (2015), question 1)
 - (a) College education
 - (b) A local park
 - (c) Retirement insurance
 - (d) Police protection
 - (e) TV

Select exercises

2. An economy consists of three individuals, A, B, and C, who have the following demand function for a particular public good (with $p > 0$):

$$Q = -p + [3, 6, 10]',$$

with $Q = [q_A, q_B, q_C]'$. The supply function for this good is $q^s = \frac{2}{9}p - \frac{8}{9}$.

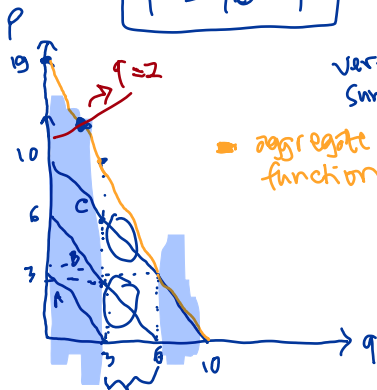
- (a) Draw the aggregate demand function and show where the social optimum is! $D^A + D^B + D^C = \text{aggregate } D$.
- (b) Calculate the efficient number of the units of the public good!
- (c) Calculate the Lindahl taxes—prices in the equilibrium that each individual should pay for the public good.

(a) Demand functions

$$A: \quad q = -p + 3 \\ \boxed{p = 3 - q}$$

$$B: \quad q = -p + 6 \\ \boxed{p = 6 - q}$$

$$C: \quad q = -p + 10 \\ \boxed{p = 10 - q}$$



vertical
summation

= aggregate demand
function

$$A+B+C = \\ (3-q) + (6-q) + \\ (10-q) = \underline{19 - 3q}$$

$$\text{aggregate demand function} = \begin{cases} p = 19 - 3q, & \text{if } q \leq 3 \\ p = 16 - 2q, & \text{if } 3 < q \leq 6 \\ p = 10 - q, & \text{if } 6 < q \leq 10. \end{cases}$$

$$B+C = \\ (6-q) + (10-q) \\ = 16 - 2q$$

(b)

$$\text{aggregate demand function} = \begin{cases} P = 19 - 3q, & \text{if } q \leq 3 \\ P = 16 - 2q, & \text{if } 3 < q \leq 6 \\ P = 10 - q, & \text{if } 6 < q \leq 10 \end{cases}$$

To calculate the equilibrium, we set $P (= MB_{\text{tot}})$ equal to MC .

$$\begin{aligned} * \quad 19 - 3q &= \frac{9}{2}q + 4 \\ 15 &= \frac{15}{2}q \\ q^* &= 2 \end{aligned}$$

$$0 \leq q^* \leq 3.$$

The solution is correct. This is efficient because the equilibrium quantity is in the range of 0 and 3, which is the quantity that covers everyone in the economy.

$$\begin{aligned} q &= -\frac{8}{9} + \frac{2}{9}P \\ \frac{2}{9}P &= -\frac{8}{9} - q \\ P &= \frac{9}{2} \left(-\frac{8}{9} \right) - \frac{9}{2}q \\ &= -4 - 4.5q \\ P &= \frac{9}{2}q + 4 \end{aligned}$$

(c) Lindahl tax

Equilibrium: $q^* = 2$.

$$t_A = MB_A^{q^*=2} = 3 - q^* \\ = 3 - 2 = 1.$$

$$t_B = MB_B^{q^*=2} = 6 - q^* \\ = 6 - 2 = 4.$$

$$t_C = MB_C^{q^*=2} = 10 - q^* \\ = 10 - 2 = 8.$$

Break until 16:20

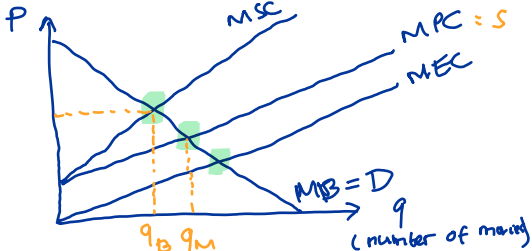
Select exercises

3. Owning a dog gives benefits to the owner such as protection and cuddling. However, the dogs can be noisy and disturb the neighbours. Imagine a market for dogs in a city where q represents the number of dogs. The market can be described using the following functions:
- $$MEC = q, MB = 350 - q, MPC = 50 + q;$$
- where MEC, MB, and MPC show the marginal external costs, marginal benefits, and marginal private costs of q number of dogs, respectively.
- (a) Calculate the marginal social cost function (MSC)!
 - (b) Sketch the MEC, MB, MPC, and MSC curves!
 - (c) Calculate the equilibrium that will be reached by the market and the socially optimal price and quantity of dogs!
 - (d) Show in the graph and also calculate the benefit of reducing output from private to the social optimum. How much would society gain from moving from the private to the social solution?

4. (8) MEC
MB

MPC
MSC

mark is
downloading movie (

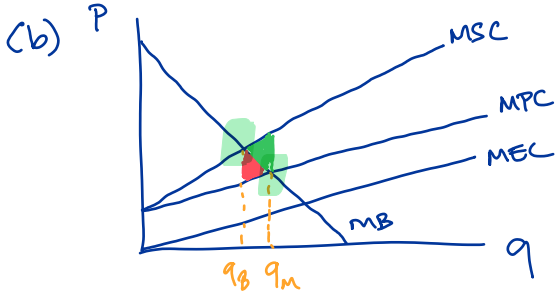


For Mark (only),
the market equilibrium prevails.

The q_M is the market equilibrium because
it is simply $S = D$.

$$MSC = \underbrace{\text{supply}}_{\substack{MC \\ MC_{\text{private}}}} + MEC$$

q_B is the optimum quantity for
both Mark & Evan.



If Mark can only download at q_B , Mark wants to get compensation.

Then Evan should be willing to pay for the compensation.

Green one: This is the minimum amount of money that Mark is willing to accept because his q moves from q_M to q_B .

Red one: This is the maximum amount of money that Evan is willing to spend on the reduction of quantity.

Multiple-Choice Questions

MCQ

1. A decentralised economy has trouble providing an efficient level of public goods because
 - (a) The government must produce all goods that are not private goods.
 - (b) The market can add up individuals' marginal rates of substitution but cannot set this sum equal to marginal cost.
 - (c) A decentralised market cannot take into account the benefits accruing to other consumers once someone buys a unit of the public good.
 - (d) Only a king or dictator cares enough to provide public goods.
2. If a private good is publicly provided at a zero price, it
 - (a) becomes a public good because everyone can consume as much as desired and no one is excluded.
 - (b) will be overconsumed as marginal benefits are driven to zero.
 - (c) will be underconsumed because marginal benefits are zero.
 - (d) will be consumed to the point where marginal benefits equal marginal costs of production.

Thank you for your participation!