



EE 474 Health Economics

Semester 1/2014

Problem Set 3

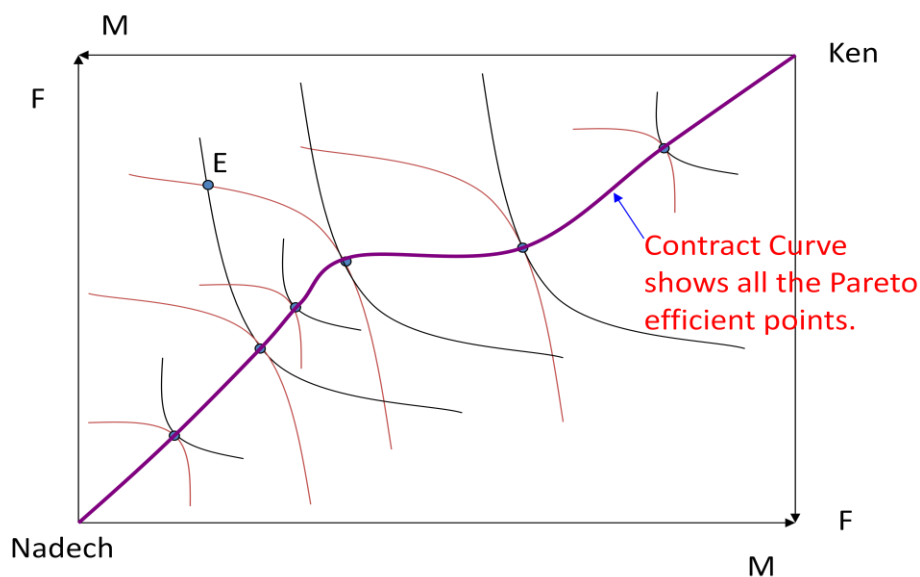
Due 2 December 2014 (In Class)

There are four questions in total. Each of them is worth 10 points.

1. In a pure exchange economy with two persons and two commodities, use the Edgeworth box diagram to illustrate the followings: [Note: You may use separate diagrams.]

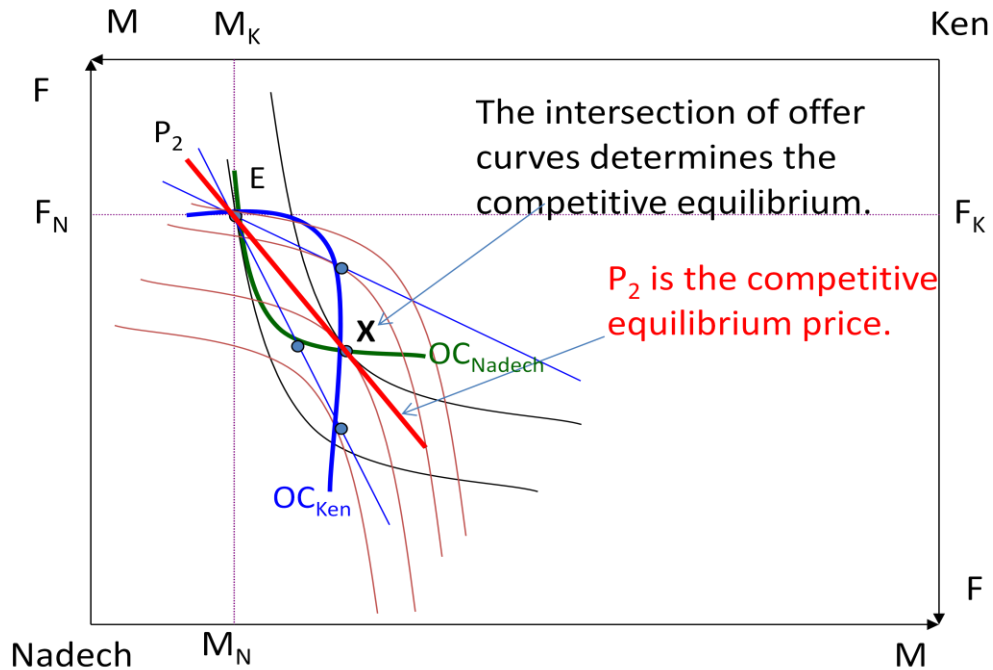
a. (5 points) Contract curve

Ans.



b. (5 points) Competitive equilibrium

Ans.



2. Public goods

a. (5 points) Explain the two features of public goods and provide examples of *pure* public goods.

Ans. Public goods are non-rival and non-excludable.

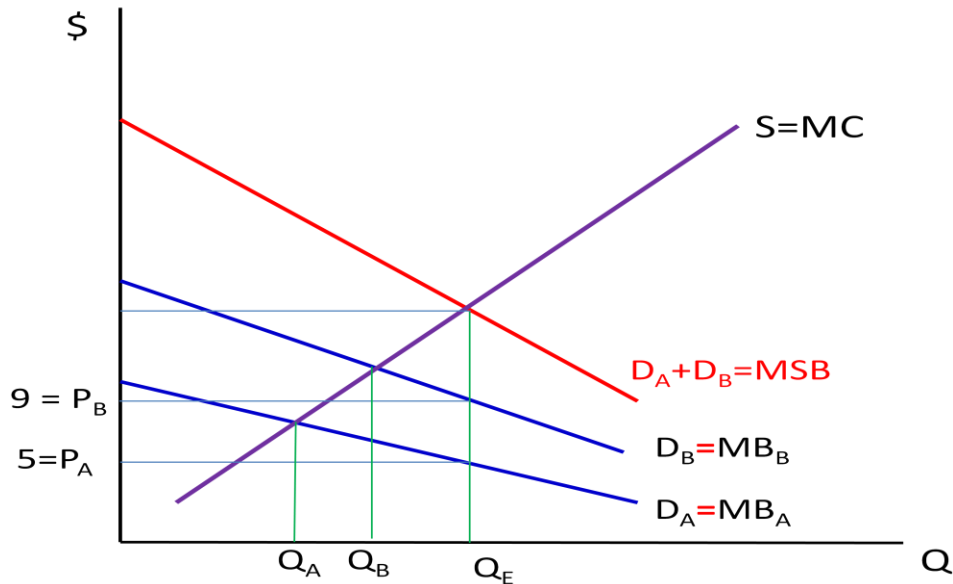
A good is non-rival when more than one consumer can simultaneously receive benefits from consuming it.

A good is non-excludable if it is difficult to exclude consumers from benefiting from the good once it exists

Examples of pure public goods are national defense, free TV, public radio.

b. (5 points) Draw a diagram to illustrate the optimal quantity of a public good, and discuss why the existence of public goods leads to inefficiency.

Ans.

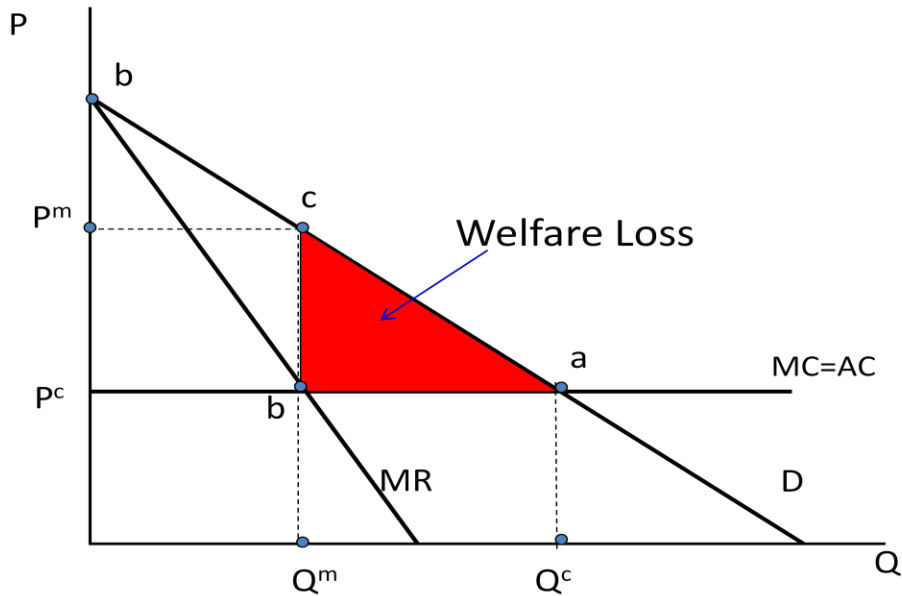


The existence leads to inefficiency because it tends to be underprovided if left to private initiatives. From graph, the optimal quantity that A wants to produce is at Q_A and B wants to produce is Q_B , which are lower than Q_E that is socially optimal. The under-provision of public goods is caused by free-rider problem; each private party tends to produce less because if one produces the goods, the other has an incentive to consume this good without making any contribution. The free-rider problem can only occur because it is impossible to exclude the other from consuming it once it exists.

3. Monopolist

- a. (5 points) Draw a diagram to illustrate the optimal price and quantity in the monopolist market, and identify the corresponding welfare loss in the society. Explain why the optimal quantity for the monopolist is not efficient. Assume that the marginal cost of the monopolist is constant.

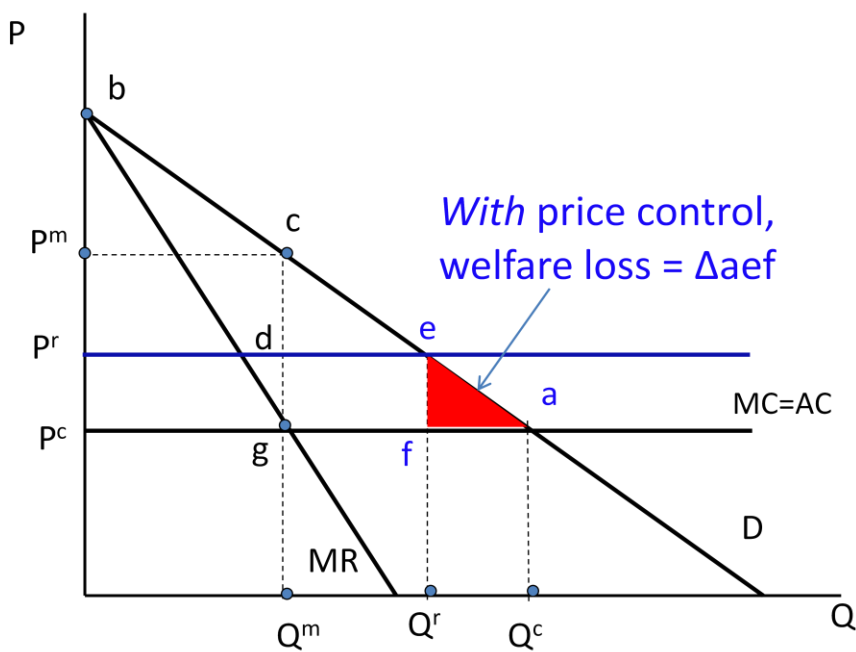
Ans.



Q^m is not efficient because too little is being produced in the market and it creates a welfare loss.

b. (5 points) Suppose a price control is imposed by the government. Show the changes in the quantity and the corresponding change in welfare loss.

Ans.



With price control, the quantity changes to Q^r , which is greater than Q^m . The amount of welfare loss is smaller than that in the case without price control. This is because Q^r is closer to the optimal quantity in the competitive market, Q^c .

4. Use the information below to answer the following questions.

Treatment	Cost	Outcomes (Life-years gained)	Quality of Life
A	\$50,000	4 years	0.8
B	\$122,000	8 years	0.5

a. (5 points) Suppose that treatment A is currently adopted. Based on cost-effectiveness analysis (CEA), calculate the ICER for replacing treatment A with treatment B. Should the new treatment be adopted, and why?

Ans. $ICER = \$(122000 - 50000) / (8 - 4) = \$18,000$ per life-year gained.

Treatment B should be adopted in place of treatment A if the value of an additional life-year gained is worth more than \$18,000.

b. (5 points) Recalculate ICER by using cost-utility analysis (CUA). Is your decision on adopting treatment B still the same as the answer in part (a)? Why or why not?

Ans. $ICER = \$(122000 - 50000) / (4 - 3.2) = \$90,000$ per QALY gained.

When using the CUA, treatment B appears to be more costly than it was when using CEA. This is because the quality of life for each additional life-year gained from using treatment B is lower than that of treatment A. So, if each QALY is worth more than \$90,000, treatment B should still be adopted. However, if \$90,000 is greater than the value of an additional QALY gain, treatment B should not be adopted.