B.E. International Program

Faculty of Economics, Thammasat University

Semester 1/2011
EE311 Microeconomic Theory
Exercise 12 General Equilibrium and Welfare Economics

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1. "Since all points on a contract curve are efficient, they are all equally desirable from a social point of view." Do you agree with this statement? Explain.

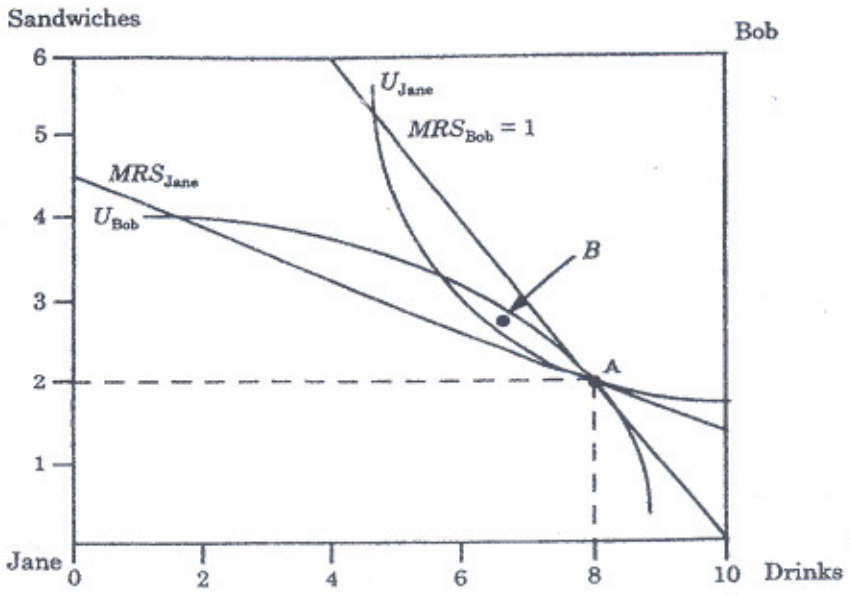
If society is only concerned with efficiency and not with equity, then all points on the contract curve are equally desirable. Since it is impossible to make comparisons of utility between individuals, economics focuses on efficiency. But, if we are also concerned with equity (i.e., whether the final allocation is fair), then all points on the contract curve are not equally desirable.

2. Jane has 8 liters of soft drinks and 2 sandwiches. Bob, on the other hand, has 2 liters of soft drinks and 4 sandwiches. With these endowments, Jane's marginal rate of substitution (MRS) of soft drinks for sandwiches is three and Bob's MRS is equal to one. Draw an Edgeworth box diagram to show whether this allocation of resources is efficient. If it is, explain why. If it is not, what exchanges will make both parties better off?

Given that $MRS_{Bob} \neq MRS_{Jane}$, the current allocation of resources is inefficient. Jane and Bob could trade to make one of them better off without making the other worse off. This is represented in the Edgeworth box in Figure 16.4.

Although we do not know the exact shape of Jane's and Bob's indifference curves, we do know the slope of both indifference curves *at the current allocation*, because we know that $MRS_{Jane} = 3$ and $MRS_{Bob} = 1$.

Assume that the indifference curves shown in the figure represent Jane's and Bob's preferences. Then, both Jane and Bob would be better off (because they would be on indifference curves with greater levels of satisfaction) if Jane traded 1 liter for 1 sandwich, leaving her with 7 liters and 3 sandwiches. Note: if soft drinks and sandwiches were perfect complements for both Jane and Bob, this trade would not leave them better off.



3. Explain the difference between adverse selection and moral hazard in insurance markets. Can one exist without the other?

In insurance markets, both adverse selection and moral hazard exist. Adverse selection refers to the self-selection of individuals who purchase insurance policies. In other words, people who are less risky than the insured population will, at the margin, choose not to insure, while people more risky than the population will choose to insure. As a result, the insurance company is left with a riskier pool of policy holders. The problem of moral hazard occurs after the insurance is purchased. Once insurance is purchased, less risky individuals might engage in behavior characteristic of more risky individuals. If policy holders are fully insured, they have little incentive to avoid risky situations.

An insurance firm may reduce adverse selection, without reducing moral hazard, and vice versa. Researching to determine the riskiness of a *potential* customer helps insurance companies reduce adverse selection. Furthermore, insurance companies reevaluate the premium (sometimes canceling the policy) when claims are made against the policy, thereby reducing moral hazard. Copayments also reduce moral hazard by creating a disincentive for policy holders to engage in risky behavior.

4. Assume that a textile factory pollutes the water supply. Illustrate the situation and offer suggestions to deal with this problem.

5. **A beekeeper lives adjacent to an apple orchard. The orchard owner benefits from the bees because each hive pollinates about one acre of apple trees. The orchard owner pays nothing for this service, however, because the bees come to the orchard without his having to do anything. There are not enough bees to pollinate the entire orchard, and the orchard owner must complete the pollination by artificial means, at a cost of $10 per acre of trees.**

   Beekeeping has a marginal cost of MC = 10 + 2Q, where Q is the number of beehives. Each hive yields $20 worth of honey.

   a. **How many beehives will the beekeeper maintain?**

   The beekeeper maintains the number of hives that maximizes profits, when marginal revenue is equal to marginal cost. With a constant marginal revenue of $20 (there is no information that would lead us to believe that the beekeeper has any market power) and a marginal cost of $10 + 2Q$:

   $$20 = 10 + 2Q, \text{ or } Q = 5.$$

   b. **Is this the economically efficient number of hives?**

   If there are too few bees to pollinate the orchard, the farmer must pay $10 per acre for artificial pollination. Thus, the farmer would be willing to pay up to $10 to the beekeeper to maintain each additional hive. So, the marginal social benefit, *MSB*, of each additional hive is $30, which is greater than the marginal private benefit of $20. Assuming that the private marginal cost is equal to the social marginal cost, we set $MSB = MC$ to determine the efficient number of hives:

   $$30 = 10 + 2Q, \text{ or } Q = 10.$$

   Therefore, the beekeeper's private choice of $Q = 5$ is not the socially efficient number of hives.

   c. **What changes would lead to the more efficient operation?**

   The most radical change that would lead to more efficient operations would be the merger of the farmer's business with the beekeeper's business. This merger would internalize the positive externality of bee pollination. Short of a merger, the farmer and beekeeper should enter into a contract for pollination services.

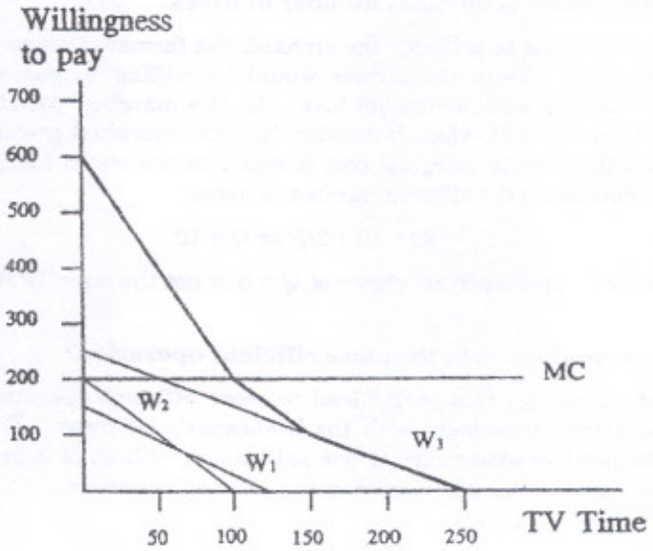
6 There are three groups in a community. Their demand curves for public television in hours of programming per hour, T, are given respectively by

$$W_1 = \$150 - T, \qquad W_2 = \$200 - 2T, \qquad W_3 = \$250 - T.$$

Suppose public television is a pure public good that can be produced at a constant marginal cost of $200 per hour.

a. What is the efficient number of hours of public television?

The efficient number of hours is the amount such that the sum of the marginal benefits is equal to marginal cost. Given the demand curves representing the marginal benefits to each individual, we sum these demand curves vertically to determine the sum of all marginal benefits. Figure 18.6 shows each demand curve and the summation.

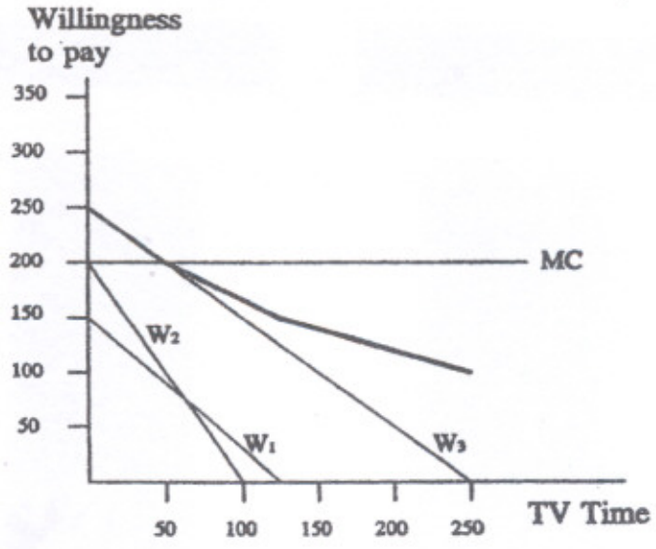


Therefore, from Figure or the table below, one can see that MSB = MC at T = 100 hours of programming.

	Willingness to Pay			
Time	Group 1	Group 2	Group 3	Vertical Sum
0	150	200	250	600
50	100	100	200	400
100	50	0	150	200
150	0	0	100	100
200	0	0	50	50
250	0	0	0	0

b. How much public television would a competitive private market provide?

To find the number of hours that the private market would provide, we add the individual demand curves horizontally. The efficient number of hours is such that the private marginal cost is equal to the private marginal benefit. The demand curves for groups 1 and 3 lie below MC = \$200 for all T > 0. With marginal cost equal to \$200, only group 3 would be willing to pay \$200. At that price, 50 hours of programming would be provided on a subscription.



	Quantity Demanded			
Price	Group 1	Group 2	Group 3	Horizontal Sum
250	0	0	0	0
200	0	0	50	50
150	0	25	100	125
100	50	50	150	250
50	100	75	200	375
0	150	100	250	500