

Problem Set #2

I. Consumer Surplus and Compensating Monetary Value

Suppose a person's demand curve for cigarettes is:

$$c = 100 - 10P_c \quad \text{where } c \text{ is packs of cigarettes per month} \\ \text{and } P_c \text{ is the price per pack of cigarettes}$$

- 1) If the price of cigarettes \$1 per pack, what is this person's consumer surplus?
- 2) If the government taxes cigarettes such that the price paid by this person rises to \$3 per pack, what is the compensating monetary value of this change?

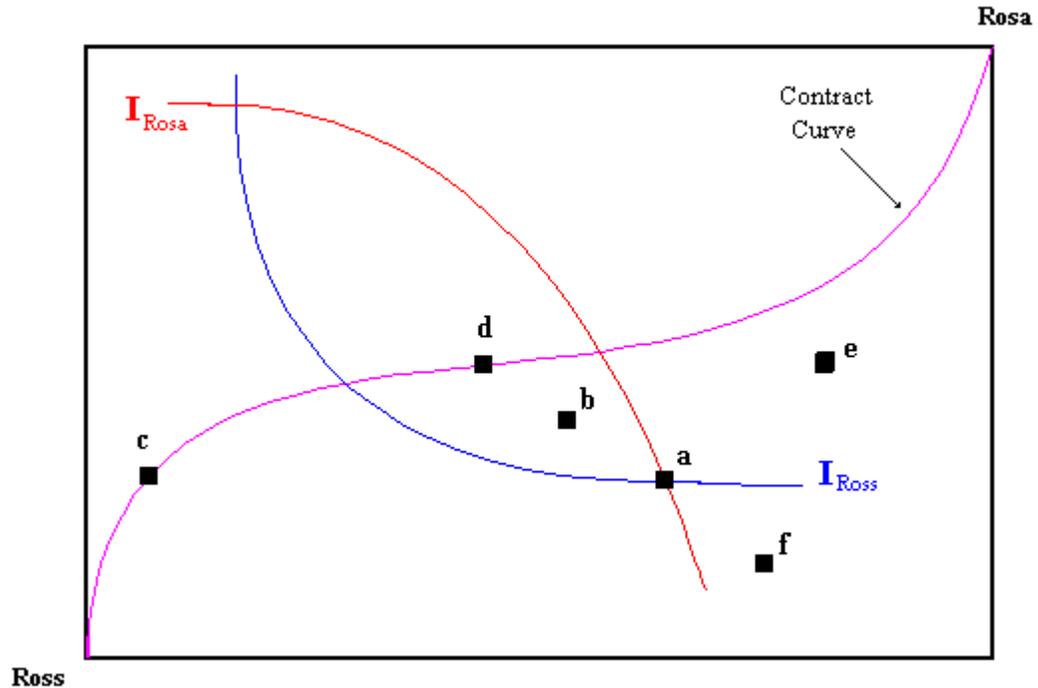
II. Compensating Principal

We subsidize clothing for Raggedy Andy by giving him vouchers to be used in buying clothes. Each voucher is worth \$10 and can be used in purchasing one item of clothing. We allow him an unlimited supply of vouchers. The price of clothing is \$15 per item, and so these vouchers lower the price that Andy pays to \$5 per item. With these vouchers, Andy buys 10 items of clothing. The clothing merchants submit the vouchers to us, which we redeem (that is, we pay the merchants \$10 for each voucher they give us). We pay for the program by taxing Slick Sly \$100.

Does this program result in a better allocation by the compensation principal? Show your answer graphically. (This is a simple problem; don't make it complex.)

III. Consumption Economy

- 1) Consider the following Edgeworth Box for consumption of two goods by Ross and Rosa.



Consider allocations b-f. Which allocation(s)

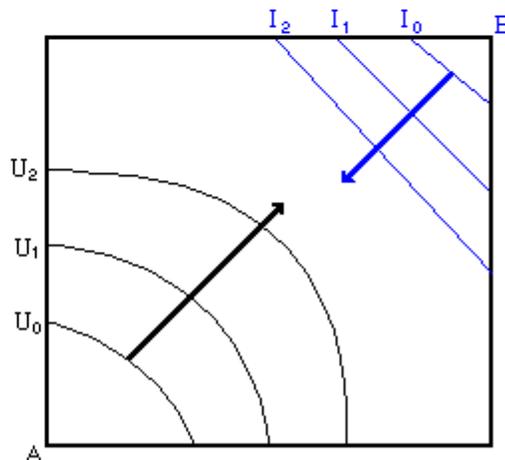
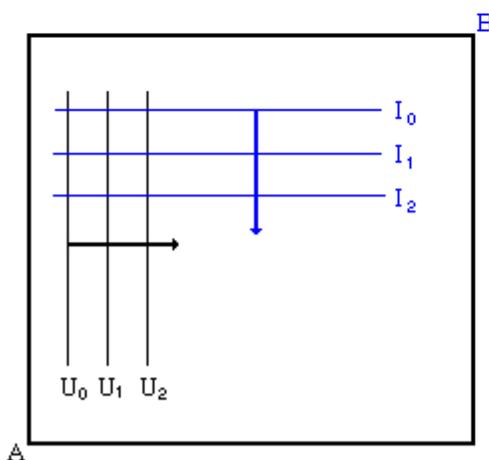
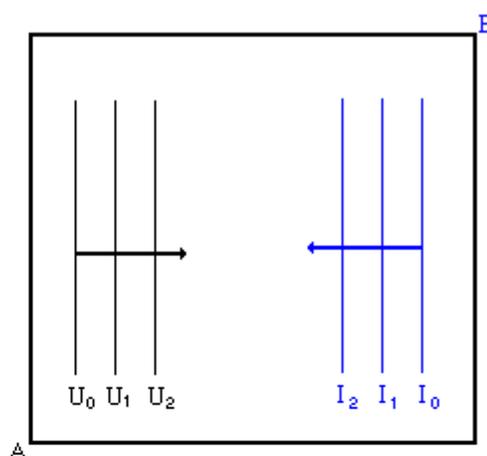
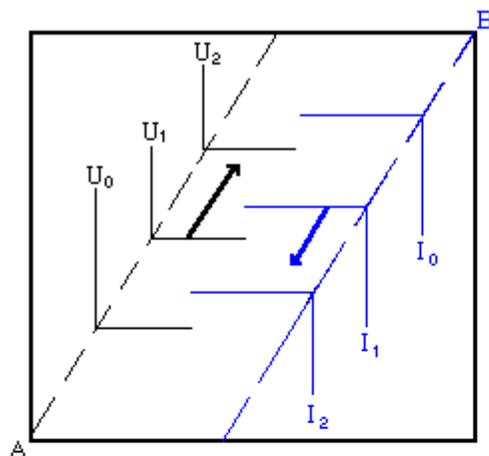
- a) are better for Ross than “a” (ignoring Rosa)?
- b) are better for Rosa than “a” (ignoring Ross)?
- c) are worse for both Ross and Rosa than “a”?
- d) are better for both Ross and Rosa than “a”?
- e) are Pareto superior to “a”?
- f) can be reached through free (voluntary trade) from “a”?
- g) can be reached through free trade from “a,” and once they have been reached, no further mutually beneficial trade is possible?
- h) are Pareto optimal? (Be careful!)
- i) are Pareto optimal but not Pareto superior to “a”?
- j) are better than “a” by the compensation principal?

- 2) Abel and Mable are baseball card aficionados. Abel's MRS of Joe DiMaggio cards for Willie Mays cards is 4, meaning that he is willing to trade 1 Joe DiMaggio for 4 Willie Mays, or vice versa. Mable's MRS, defined analogously, is 2. Suggest a trade that makes both people better off.

- 3) True or False. You must explain your answer.

A Pareto optimal allocation is better than any allocation that is not Pareto optimal; consequently, a policy that moves us from a non-Pareto optimal allocation to a Pareto optimal allocation is necessarily making an improvement.

- 4) Consider an exchange economy with 2 consumers. Let U and I denote the indifference curves for consumers A and B respectively, with the arrows indicating the direction of increasing utility. For each of the cases below, graph the set of Pareto optimal points. In each case, think about what the shapes of the indifference curves mean and why the Pareto optimal points are indeed Pareto optimal.



5) Consider Ahmad and Beth with utility functions:

$$U_A = x_A y_A$$

$$U_B = x_B + y_B$$

- a) What is the formula for each person's MRS of x for y ?
- b) If trade is performed through a price system, what is the equilibrium (that is, feasible) price ratio?
- c) Suppose there are a total of 100 units of x and 200 units of y . Initially, Ahmad has 25 units of x and 75 units of y , and Beth has the remainder. What is the amount of each good that each person has at equilibrium in a price system.
- d) Draw an Edgeworth box for this situation. Label the initial allocation and all Pareto optimal allocations that are Pareto superior to this initial allocation (that is, label the core). Each of these allocations in the core could be obtained as an equilibrium under pure trade. Label the one allocation that is obtained as an equilibrium in a price system.

IV. Elasticities

- 1) The price elasticity of toll calls within an area code (for example, calls from Berkeley to Palo Alto) is estimated to be about -1.2. If rates for these calls are raised, will Pacific Bell make more or less revenue? Explain. (Assume that Pacific Bell is the only legal carrier of toll calls within an area code).
- 2) Consider a family in Berkeley whose income is only \$6,000 per year. This family spends \$2,000/year on rent and \$4,000/year on all other goods. The City Council thinks it is unfair that this family pays a third of its income for housing. Thus the City Council plans to lower the proportion of this family's income going to housing by giving the family \$500/year. If the family's income elasticity of housing is 1.5, will this plan accomplish its goal? Explain briefly.

V. Market Demand

Economics majors demand education according to the relationship:

$$Q_e = 75 - \left(\frac{3}{4}\right)P \quad \text{where } Q_e \text{ is the number of course hours they take}$$

and P is the price per course hour

Business majors demand education such that:

$$Q_b = 50 - \left(\frac{1}{2}\right)P \quad \text{where } Q_b \text{ is the number of course hours they take}$$

and P is the price per course hour

- 1) Graph each group's demand curve.
- 2) If these two groups are the only consumers of education in Berkeley, what is the total Berkeley market demand for education: Show your answer graphically and give the equation.
- 3) Even though benevolent teachers and philanthropists donate all of the resources needed to provide education (i.e., the cost of providing education is zero), the governor decides that the state could use extra revenue. Thus the governor imposes a fee of \$40 on each unit of education.
 - a) What is the market-wide compensating monetary value of this price increase (as compared to the situation where education is offered free of charge)?
 - b) How much does the state gain in revenues from the education fee?
 - c) What is the net loss associated with the fee? Net loss is the compensating monetary value (that is, the loss to students) minus the revenues (that is, the gain to the state). This net loss is often called the "deadweight loss."