ECO206Y Problem Set 3 (Second Half)

Due Thursday, July 25 (optional)

Question 1: Minimum wage and monopsony

A timber company ("Blackjack Lumberjack") in Moosonee, Ontario is the sole employer of the town's labour force. Its (inverse) demand for labour is given by

$$w(L) = 180 - 2L \quad (1)$$

where $w(L)$ describes the wage in dollars per day to worker. The town's folks supply labour according to the rule

$$L = w(L) \quad (2)$$

If people do not work for "Blackjack Lumberjack" they idle their time fishing the local lake.

(a) Find the equilibrium wage and labour supply.

(b) Suppose the local city council sets a "living-wage" law that states that any company wishing to do business in Moosonee must pay its employees at least 70 dollars. (In our example Blackjack Lumberjack is the only employer in town – the city council is staffed with volunteers.) Find the new profit-maximizing levels of L and $w(L)$. With the new wage and labour levels how many people are unemployed at the going wage rate?

Question 2: Shoes in an Edgeworth Box

After a boating mishap you find yourself stranded on a deserted island with a pirate and a crate of shoes. There are ten pairs of shoes in the crate. You manage to grab 10 left shoes and 5 right shoes before being chased away by "Captain Hook".

(a) Suppose your pirate friend has only one good leg – his right leg (his left leg is a wooden stump). Luckily, your feet are intact. Let x_1 denote right shoes and x_2 denote left shoes. Draw the corresponding Edgeworth box with indifference curves for you and Captain Hook. Hint: Since you have two good feet suppose that your utility from shoes is

$$u_1(x_1; x_2) = \min\{x_1; x_2\} \quad (3)$$

while your pirate friend's utility from shoes is given by

$$u_2(x_1; x_2) = x_1: \quad (4)$$

(b) If and when you trade with Hook (assuming he does not just simply kill you for your shoes) what will be the outcome? Illustrate the set of Pareto efficient outcomes of trade.

(c) After a few days on the island Hook loses his good leg. Thus he is left with only two stumps on his legs. In any case, Hook finds shoes useful, but given his condition he is indifferent between right and left shoes. (As long as they fill the stump they do the same job!) Draw the corresponding Edgeworth box along with indifference curves.

(d) Suppose again that you own 10 left shoes and 5 right ones. What will be the outcome when you are allowed to trade with Hook when he has two stumps for legs? Illustrate the set of Pareto-efficient outcomes of trade.

Question 3: Prices and the Edgeworth Box

Suppose that you find yourself stranded on a deserted island (like above) but instead of stumbling upon a crate of shoes, you instead find a crate of peas (10 kg in total). As for your pirate friend, he stumbles upon a crate of carrots (also 10 kg in total). Call peas good 1 (y_1) and carrots good 2 (y_2). Both yourself and Hook enjoy eating veggies, and generally speaking both of you prefer a bit of variety in your diet (i.e. your indifference curves are convex and negatively-sloped). Suppose that the given original endowment does not lie on the contract curve. Furthermore, suppose that at this initial endowment that your marginal rate of substitution of carrots for peas is 2, while for Hook his MRS is 5. (Define MRS of carrots for peas as MU_{y2} / MU_{y1} where MU is the marginal utility with respect to its argument.)

(a) Suppose Hook makes the following offer: “Shiver me timbers mate. Let’s say I give ya three units carrots for one unit of peas.” (“Units” are measured according to weight). Will you accept his offer? Why or why not? Illustrate your answer on an Edgeworth box and show the set of efficient trades that would be rationally made.

(b) Now suppose the price of peas is p_1 and the price of carrots is p_2. For some given price ratio – p_1/p_2 illustrate on the Edgeworth box the competitive equilibrium under trade.

Question 4: Efficiency under general equilibrium

Suppose that there are two individuals, *A* and *B*, consuming two goods y_1 and y_2 (with corresponding prices p_1 and p_2). In turn, these goods are produced by a fixed number of firms using two inputs x_1 and x_2 (with corresponding prices w_1 and w_2), and whose production is subject to a constant-returns-to-scale technology. Take the usual simplifying assumptions (as in your textbook) as given. State the three necessary and sufficient conditions for this exchange economy to reach an efficient solution. Explain (in one or two sentences) the significance of each condition.

Question 5: The Edgeworth Box

Comment on the following statement:

> "The Edgeworth box is not a practical tool for analysing real world economic problems. It is too restrictive since it examines only two individuals who take prices as given. With only two agents each will try to influence the prices at which they trade. Thus taking prices as given is too restrictive of an assumption. Furthermore, the Edgeworth analysis assumes that there is no cost in trading; the idea of a costless auctioneer misses out on an important facet of real world economics (middle-men). In any case, the Edgeworth box can only analyze two goods and ignores production."

Question 6: Production and consumption

Fred Flintstone lives in seclusion on Boulder Island and produces and consumes two goods, y_1 (brontosaurus burgers) and y_2 (pterodactyl wings). Both of these goods are produced using two factors, x_1 (land) and x_2 (labour), which are in fixed supply.

(a) Draw a diagram to represent Fred's equilibrium (i.e. draw a diagram to represent the no-trade equilibrium).

(b) Now suppose that Barney Rubble lives on a nearby island (Granite Island) and like Fred, he too produces and consumes brontosaurus burgers and pterodactyl wings. Finally suppose that there is zero cost in paddling from one island to another. Suppose that the prices of brontosaurus burgers and pterodactyl wings are given (i.e. fixed) at p_1 and p_2 (so that Fred and Barney can trade at these prices and take it as given). On a diagram show the trading equilibrium.