

## Econ 302: Microeconomics II - Strategic Behavior

## Problem Set # 1 – May 16, 2016

1. True/False/Uncertain? Explain your answer.
  - (a) If people have identical preferences, there are no benefits from trade.
  - (b) The competitive equilibrium quantity and price depends on the initial distribution of goods/resources.
2. Airline Companies often sell more seats than are actually available on a flight. In the occasional event that all passengers do show up, this practice of over-booking naturally means that some people with tickets are “bumped” to a later flight. What criteria might be used to decide which passengers will get on the flight they booked and which do not? Discuss alternatives and evaluate them from an efficiency point of view.
3. There are still 5 tickets available for the upcoming Canucks playoff game and 8 fans who would really like to go. Their reservation prices for a ticket are

person	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>
reservation price in \$	15	10	8	5	4	3.5	2	1

Assume that the (marginal) cost of a selling/distributing a ticket is 1.

- a) What is the efficient amount of tickets to be allocated and to whom?
- b) The Canucks are thinking about how best to distribute these tickets. The options are:
  - i) Sell the tickets through price-taking agents on a competitive market
  - ii) Sell the tickets through a monopolist (ticketmaster)
  - iii) Sell the tickets at a price of \$ 3 each.
  - iv) Give all 5 of them away for free to the Smith family. The Smith’s are persons *A*, *C*, *G* and toddler *Z* who can’t yet go to a game

For each case, explain what you expect to happen and whether the outcome will be efficient. For the first three options, give a numerical answer and illustrate your reasoning graphically.

- c) Suppose the spouse of person *A* plans to celebrate the couple’s upcoming wedding anniversary the night of the game. If *A* actually went to the game (rather than have a romantic dinner), the spouse would suffer a dis-utility of 12 (in \$). Are your answers in questions a) and b)i) affected and if so, how?

- d) In the original problem, suppose that there are three additional tickets for sale (i.e., there are now 8 tickets in total), all of which are fake however. Fans cannot distinguish the fake tickets from the real thing and may discover that their tickets are worthless (have zero value) the night of the game, at which point whoever sold them will have disappeared. Sellers do know whether their ticket is fake or not. The (marginal) cost of a fake ticket is zero. Are your answers in questions a) and b)i) affected and if so, how?

Additional Problems for Review:

1. In Gas Pump, a small town in South Dakota, live 20 car owners. 10 people own a Beetle and 10 people own a Hummer. Every Beetle owner has a demand function for gasoline  $D_B(p) = 20 - 4p$  for  $p \leq 5$  and  $D_B(p) = 0$  for  $p > 5$ , and every Hummer owner has a demand function  $D_D(p) = 16 - 2p$  for  $p \leq 8$  and  $D_D(p) = 0$  if  $p > 8$ . There are many competitive gas stations in Gas Pump; the industry supply curve is  $S(p) = -40 + 40p$  for  $p \geq 1$  and  $S(p) = 0$  otherwise (all prices are \$ per gallon and all quantities are gallons/week).

- a) Draw a diagram with the (inverse) demand curves representing the total demand of gasoline by Beetle and Hummer owners, respectively, as well as the (inverse) aggregate demand function for gasoline. Give an analytic expression for the aggregate demand function. Draw the (inverse) supply function in your diagram.
- b) Determine the competitive equilibrium price of gasoline. How many gallons are sold in equilibrium?
- c) Tensions in the Middle East drive the cost of crude oil up. The new industry supply curve is  $S(p) = -140 + 40p$  for  $p \geq 3$  and  $S(p) = 0$  otherwise. What is the new equilibrium price and quantity?
- d) Compare the equilibria in b) and c). Show that everybody (consumers and gas station owners) are worse off in c). Does this mean that the equilibrium in c) is not Pareto optimal? Explain!
2. Suppose that David and Harry consume oranges and apples. David views the two as perfect complements. Harry views them as perfect substitutes. David has 2 orange and 4 apples. Harry has 5 oranges and 1 apple. Determine the competitive equilibrium allocation(s) and the (relative) equilibrium price. Determine the

set of Pareto optimal allocations. How do these allocations depend on the total endowments of apples and oranges, and their initial distribution?

3. (The point here is to review welfare measures. See, e.g., Varian Ch 14). Lolita, an intelligent and charming Holstein cow, consumes only two goods, cow feed (made of ground corn and oats) and hay. Her preferences are represented by the utility function  $U(x, y) = x - x^2/2 + y$ , where  $x$  is her consumption of cow feed and  $y$  is her consumption of hay. Lolita has been instructed in the mysteries of budgets and optimization and always maximizes her utility subject to her budget constraint. Lolita has an income of \$  $m$  that she is allowed to spend as she wishes on cow feed and hay. The price of hay is always \$1, and the price of cow feed will be denoted by  $p \leq 1$

- a) Write Lolita's inverse demand function for cow feed.
- b) If the price of cow feed is  $p$  and her income  $m$ , how much hay does Lolita choose? What is the utility level that she enjoys at this price and this income?
- c) Suppose that Lolita's daily income is \$ 3 and that the price of feed is \$ 0.50. What bundle does she buy? What bundle would she buy if the price of cow feed rose to \$1?
- d) How much money would Lolita be willing to pay to avoid having the price of cow feed rise to \$1 (**equivalent variation**)? Suppose the price of cow feed rose to \$1. How much extra money would you have to pay Lolita to make her as well-off as she was at the old prices (**compensating variation**)? Compare equivalent and compensating variation, and explain. Calculate Lolita's change in consumer surplus.