

Industrial Organization and Data Science

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Course Assignments & Reading

Course assignments should be printed (code, output and descriptive answers) and turned in at the start of class unless otherwise noted. Feel free to work in groups but everyone is required to turn in their own work with answers written in your own words. In both calculations and complex ideas, write down each step of logic used in reaching your conclusion. Keep in mind that in most cases a good answer is one precise sentence; quality is heavily favored over quantity. This will be graded on a full credit, half credit and no credit basis. All work must be typed

Discussion questions do not need be written out ahead of time. At the beginning of each class the professors will lead a discussion around these questions. Students will be called on, potentially at random, to add their insight. This part of class will contribute heavily to your course participation grade.

Week 1, due April 6

Reading: McMillan Ch. 1-3, McAfee Ch. 1-2, ISL Ch. 2.3

Discussion questions.

- 1) McMillan discussed Dutch flower auctions at the beginning of the book, what is your reaction to this sort of mechanism? How does it differ from “typical” auctions common in movies and TV with an auctioneer calling out a price? Why do you think they use it?
- 2) McAfee notes that the “law of one price” is a ridiculous “law”. What are some examples in your experience where you see two similar goods in “similar places” having very different prices vs. generally having prices that do not differ by much?
- 3) McMillan states his intention of the book is to “demystify markets.” What are some aspects of markets that are confusing to you now (e.g. how are prices set on the stock market, why is that high oil prices seem to be bad for the stock market, but low oil prices are bad too?). Please come to class with some questions along these lines.

Assignment to be turned in.

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Exercises Set 1. Due beginning of class, Wednesday, March 6th.

- 1) Consider the expression “decreasing marginal utility”.
 - a. Please define the last two terms of the expression individually and explain what the entire phrase means in one sentence.

- b. If an individual exhibits decreasing marginal utility for a good, is their demand curve increasing, decreasing or flat? In one sentence, why?
 - c. If an individual exhibits constant marginal utility for a good, is their demand curve increasing, decreasing or flat? Why?
- 2) This question has to do with the difference between extensive and intensive margins. Remember that the firm must charge all consumers the same price.
- a. If a firm lowers price do they gain or lose money on the extensive margin? What about the intensive margin? In one sentence, why?
 - b. If a firm increases price do they gain or lose money on the extensive margin? What about the intensive margin? In one sentence, why?
- 3) Assume that an average consumer of appetizers with dinner at the most popular bar and grill in the U district has a demand curve given by the expression $Q = 4 - (1/3)P$. Note that because this is a linear demand curve, the elasticity will change at different points of the curve (e.g., not constant own price elasticity).
- a. Find the mathematical expression for the inverse demand curve.
 - b. In excel, graph the demand curve remembering that price is on the y-axis.
 - c. Make a chart in the same excel file that states total revenue, marginal revenue and the price elasticity of demand at each quantity.
 - i. At the highest level of total revenue what is marginal revenue? In one sentence, why?
 - ii. What price should the Sunspot charge for appetizers to maximize revenue?
 - d. Now assume that there are 100 identical consumers who eat at the bar on an average night and consider the market demand curve for appetizers.
 - i. Without performing any calculations, what price should the bar charge to maximize revenue for the market? In one sentence, how did you come to that answer?
 - e. Assume now that there is a constant marginal cost of production of appetizers for ingredients and labor of \$2.
 - i. What is net marginal revenue associated with each quantity on the average consumer's demand curve now?
 - ii. On the market demand curve in question 3.d.i, if you decreased the price from \$9 to \$6, what would be the change on the extensive and intensive margins *net costs*?
 - f. List exactly what type of elasticity summarizes each instance below. State the sign of the elasticity (positive or negative) and whether the magnitude of the elasticity you list is large or small.
 - i. During happy hour with \$2 pints, the quantity demanded for appetizers increases significantly.
 - ii. On the first and fifteenth of every month, there is a modest increase in orders of appetizers.
 - iii. When there is a special on baked tofu, there is a fall in orders of appetizers.
 - iv. After 9pm when appetizers are \$2 off, there is a significant increase in orders of appetizers.
 - v. Chipotle opens and there is no change in demand for appetizers.
 - vi. Chipotle opens and there is fall in the total customers at Sunspot but the customers that do come buy more appetizers on average. *HINT: there are at least two things going on here.*

- 4) Deriving actual demand:
 - a. Does observing the price and quantity sold for a good on one day inform the economist about elasticities or optimal pricing? In one sentence, why?
 - b. Does observing the price and quantity sold for a good over two years inform the economist about elasticities or optimal pricing? In one sentence, why?
 - c. Does observing the price and quantity sold for a good over a month when there is an unexpected shift in supply inform the economist about elasticities or optimal pricing? In one sentence, why?
 - d. Does observing the price and quantity sold for a good when there is an expected shift in supply inform the economist about elasticities or optimal pricing? In one sentence, why?
- 5) If a consumer has a demand curve for martinis such that at a price of \$10, they would be willing to buy 3 martinis and the bar is charging \$8 per martini, what is the lower bound on their consumer surplus? In one sentence, why? Can you make a claim as to their upper bound? In one sentence, why or why not?
- 6) If a firm can price discriminate, must there be a loss on the intensive margin for each additional unit sold? In one sentence, why or why not?

Download R Studio and install on laptop or identify access to a desktop machine in a computer lab that has R Studio installed.

- 1) Complete the R Studio lab in ISL 2.3. Save all your commands to a .R "script". You can execute commands from the script by highlighting them and pressing the run button (or a shortcut key, which depends on your operating system). This lab will familiarize you with the basic workings of R.
 - a. Turn in your script (all the commands you ran).
 - b. Choose 1 plot to turn in and provide an explanation of what it is telling us.