

University of Notre Dame
Department of Finance
Economics of the Firm
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Problem Set #1:

- 1) Suppose that you are currently leasing your office space for \$130,000 per year. You have the opportunity to buy the facility for \$1.8M. With a 10% down payment, you can get a mortgage for 8% interest per year. You can pay for the down payment from bank account that has been earning you 5% interest per year. Setting aside all other issues, should you lease the facility? Explain.

- 2) Suppose that a Dentist's office is located next door to a psychiatrist's office. The psychiatrist complains of violent screams from next door and that the noise is destroying his practice. He takes the dentist to court to try and get the dentist evicted. If you were the judge and you were interested in efficiency, how would you rule and why?

- 3) Suppose you are thinking about starting a lawn service in your area. The lawn service market can be considered perfectly competitive. You own a \$200 lawnmower. You have a fixed cost of \$90 (maintenance costs on the mower, etc.). Your variable costs are as follows:

# of Lawns Mowed	Total Variable Costs	Fixed Cost	Total Costs	Average Total Costs	Average Variable Costs	Marginal Costs
1	\$5					
2	\$15					
3	\$30					
4	\$50					
5	\$75					
6	\$105					
7	\$140					
8	\$180					
9	\$225					
10	\$275					

- a) Calculate total costs, average total costs, average variable costs, and marginal costs.
- b) Suppose that the going rate for lawns is \$35 per lawn. How many lawns would you mow?
- c) Calculate your producer surplus, and your profit. Are you earning economic profit?

- d) How would your production decision change if the price fell to \$20 per lawn?
 - e) Sketch out your supply curve for lawns.
- 4) Suppose that we have the following information about wheat production (assume that each producer will operate at full capacity as long as it is strictly profitable):

Producer	Capacity (in Bushels)	Cost per bushel
1	100	\$3
2	200	\$4
3	200	\$5
4	400	\$6

Further, we also have some consumer information (Reservation price refers to the maximum price each consumer would pay). Assume that consumers will make their full purchase as long as the price is below their reservation price.

Consumer	Reservation Price	Wheat Purchases (in Bushels)
1	\$2	150
2	\$3	170
3	\$4	100
4	\$5	130
5	\$6	200
6	\$7	90

- a) What should be the market price of wheat?
 - b) Calculate the profits of the wheat producers
- 5) Explain how each of the following events would affect the supply curve for education (by colleges), the demand curve for education (by potential students), total enrollments, and tuition rates. (Assume a perfectly competitive market). Note that there is not necessarily one correct answer.
- a) University professors unionize and use their increased bargaining power to increase their salaries by 20%.
 - b) Legislation is passed raising the minimum wage.
 - c) Students nationwide file a class action lawsuit charging universities with unfair tuition policies. The result is that each university nationwide is fined \$200M.
 - d) Universities increase the availability of student aid.

- 6) Explain how each of the following events would influence market prices/quantities (assume that each is a perfectly competitive market)
- The surgeon general announces that eating oranges lowers the risk of a heart attack (market for oranges)
 - Terrorists destroy a major oil pipeline in Iraq (market for oil)
 - Immigration increases in the US by 20% (market for labor – what's the price here?)
 - Consumers start getting their news from the internet (market for newspapers)
 - Real income in the US increases (the market for BMW's)

- 7) Suppose that you estimated the following demand curve for footballs.

$$Q = 400 - 6P + .005I$$

Q Represents quantity demanded, P represents price and I represents average income.

You know that the current market price is \$50 and average income is \$20,000

- Calculate current demand.
 - Calculate the price elasticity of demand.
 - Calculate current market expenditures. (i.e. total spending on footballs)
- 8) Now, suppose, we know what demand and supply look like for restaurant meals:

$$Q_d = 40 - 2P + 3I$$

$$Q_s = 20 + 2P$$

Where Q is the number of meals sold (in thousands) per month, P is the average meal price and I is average income (in thousands). Assume that average income is equal to \$20,000.

- Calculate the equilibrium price and quantity.
 - Calculate the elasticity of demand at the equilibrium price.
 - What effect would a 10% increase in average income have on the price of restaurant meals?
- 9) Suppose that it costs \$40,000/yr to get an MBA degree and that non MBAs expect to earn \$60,000/yr while MBAs earn \$80,000/yr. Assuming an MBA takes two years to finish and that all other costs are negligible, are wages and tuitions in equilibrium (i.e. would your average person strictly prefer one activity (getting an MBA) over another activity (not getting an MBA?). If not, how will markets adjust?

More difficult...attempt if you dare!

10) Suppose that you are concerned about teenage smoking in the US. You are interested in what the impact would be if a \$1 federal tax was added to each pack of cigarettes sold. You have the following data available:

- Elasticity of Demand (General Public): $-.45$
- Elasticity of Demand (Teenagers): $-.7$
- Elasticity of Supply: 7.0
- Current Market Price of Cigarettes: $\$5.51$
- Current Cigarette Sales: $17.4B$

a) First, we need to estimate the model. We are using a simply supply/demand framework:

$$Q_d = a - bP$$

$$Q_s = c + dP$$

Use the data above (use elasticity for the general population) to find the parameters a,b,c, and d.

b) Using your estimated model, solve for the equilibrium price and quantity. We already know this, but you should double check to make sure you did part (a) right.

c) To put in the effect of the tax, we need to do the following:

- We have $Q_s = c + dP$. Now, solve this for price: $P = \left(\frac{1}{d}\right)Q_s - \left(\frac{c}{d}\right)$

- Now, add in the tax: $P = \left(\frac{1}{d}\right)Q_s - \left(\frac{c}{d}\right) + \1

- Now, Take the above and solve for Quantity: $Q_s = (c - d) + dP$

d) Now, use your new supply curve and solve for the new equilibrium price and quantity. By what percentage do cigarette sales fall?

e) Given the price increase, by what percentage should teenage smoking fall?

f) How much would you raise in taxes revenues?