

100 points total. Answer each question in the space provided. General advice: show your work, including any formulas or diagrams that you use in reasoning through your answers.

1. (10 pts.) From the WSJ 8/5/08, "No Fun for Six Flags as Parks Face Slump": In 2006 management raised prices by \$5, driving the price to \$40. But attendance dropped below 25 million in 2006, from 28.7 million in 2005. Calculate own-price elasticity of demand for Six Flags amusement parks. Was this a good move for the company?

$$E_{x, P_x} = \frac{\% \Delta Q_x}{\% \Delta P_x} = \frac{\frac{28.7 - 25}{\frac{1}{2}(28.7 + 25)}}{\frac{40 - 35}{\frac{1}{2}(40 + 35)}} = \frac{.138}{.133} = 1.03$$

Own-price elasticity of demand is essentially unity, so total revenue will not change by any significant amount. 25 million people spend a lot less money on hot dogs, soft drinks, and souvenirs, however, so maybe this was not such a good idea!

2. (5 pts.) Describe the vertical chain of production for J.C. Penney's men's shirts. What functions are outsourced and why?

Upstream functions of design, manufacturing, and distribution of J.C. Penney men's shirts are handled by TAL Apparel, Ltd., a Hong Kong shirtmaker. J.C. Penney carries out the downstream retailing function. By outsourcing the upstream activities J.C. Penney was able to reduce inventory costs tremendously.

3. (10 pts.) Doughdaddy is contemplating the input mix he is currently using to make doughnuts in his doughnut shop. Keeping the same number of workers, if he were to upgrade his deep-fat fryer from the current medium size to a large-sized one, daily output of doughnuts would increase by 200 doughnuts. The additional daily cost of leasing the large rather than the medium fryer would be \$25. Alternatively, Doughdaddy could increase output by 400 doughnuts per day by adding another worker to the production process. Each additional worker-day costs him \$80. Is Doughdaddy using the cost-minimizing mix of capital and labor to produce doughnuts? If he wants to increase output, should he use relatively more capital or relatively more labor?

Marginal Product of capital =  $MP_K = 200$

Price of capital =  $P_K = \$25$

Marginal Product of labor =  $MP_L = 400$

Price of labor =  $P_L = \$80$

$$\text{Does } \frac{MP_K}{P_K} = \frac{MP_L}{P_L} ? \quad \frac{200}{25} \stackrel{?}{=} \frac{400}{80}$$

$$8 \neq 5$$

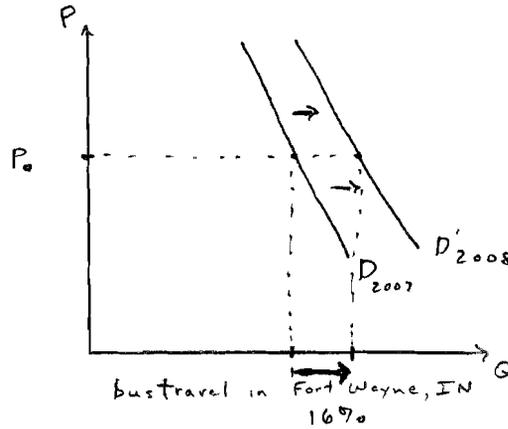
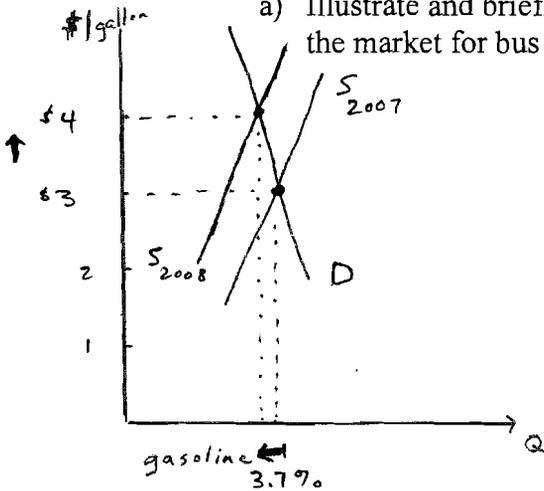
The <sup>current</sup> input mix uses too much labor relative to capital. If Doughdaddy wanted to increase output he should alter his input mix and use relatively more capital and relatively less labor.

4. (5 pts.) In northern Chinese cities like Beijing, apartment residents often open their windows in the winter because their heating systems give off so much heat. In southern cities like Wuhan, residents shiver under blankets in the winter because they have no heat. How did this situation arise?

When China's economy was centrally planned, the government drew a line across the country. Cities north of the line were provided heat in the wintertime, while cities south of the line were not. China's economy is in the process of transitioning ~~out~~ from central planning to a market system.

5. (25 pts.) In the past year gasoline prices have increased roughly from \$3 to \$4 per gallon. In response Americans drove 9.66 billion fewer miles in May than in the same month a year earlier, a 3.7% decline. Bus ridership in Fort Wayne, IN was up 16% in the first six months of this year, compared with the year-ago period, even though the city kept bus fares constant.

a) Illustrate and briefly explain what has happened in the market for gasoline and the market for bus travel in Fort Wayne.



Reduced supply of gasoline causes price to rise, and quantity demanded to fall.

Increase in price of a substitute form of transportation (your own car) increases demand for bus travel.

b) Calculate the own-price elasticity for gasoline and the cross-price elasticity with bus travel.

$$- E_{x, P_x} = \frac{\% \Delta Q_x}{\% \Delta P_x} = \frac{3.7\%}{\frac{4-3}{\frac{1}{2}(4+3)} \times 100\%} = \frac{3.7\%}{28.6\%} = .129$$

Short-run demand for gasoline is very inelastic.

$$- E_{y, P_x} = \frac{\% \Delta Q_y}{\% \Delta P_x} = \frac{16\%}{28.6\%} = .56$$

So, bus travel is a substitute for driving your own car.

c) If gasoline stays at \$4 per gallon, do you think Americans will use more, the same, or less gasoline next May as they did this May?

The more time consumers have to adjust to a price change, the more elastic demand will tend to be. So with a year to make adjustments, we expect miles driven and hence gasoline consumption to decline even further.

6. (5 pts.) Most non-liquid non-bulk ocean cargo is hauled in container ships. Container ships today are much larger today than they were twenty years ago. Why do ocean-going container ships keep getting bigger and bigger?

Economies of scale in container ships, arising from fixed set-up costs and engineering relationships.

7. (10 pts.) Briefly explain why we see the following patterns in many industries:
- a) Small firms are more likely to outsource production of inputs than are large firms.

Larger firms are more likely to attain MES in their own needs for an input than are smaller firms. A small firm whose own usage of the input is less than MES should purchase it in the market place.

- b) "Standard" inputs (used by several different firms) are more likely to be outsourced than are "tailor-made" inputs (used by only one firm).

Tailor-made inputs are more likely to require some sort of asset specificity in the production of the input. Asset specificity creates problems for arms-length market transactions — potential for hold-up. So tailor-made inputs are more likely to require a formal vertical connection with the input supplier.

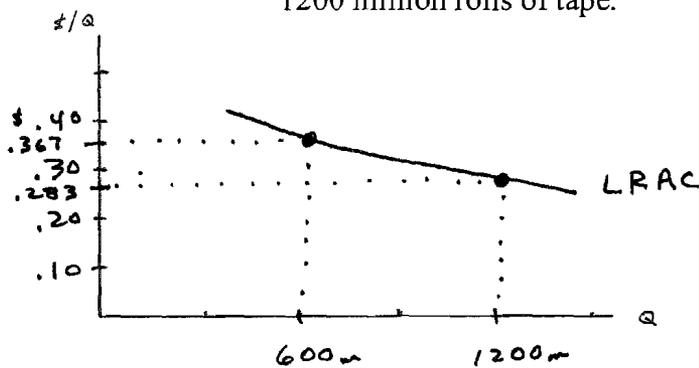
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8. (15 pts.) You work for 4M—Middle Mississippi Mining and Manufacturing Co. Your company produces tape (good Y). To produce this tape 4M must spend \$100 million to perfect the process of working with chemical adhesives, attaching these adhesives to cellophane, and manufacturing and packaging tape. Once this setup cost is incurred, each roll of tape can be produced at a cost of \$.20 each. Thus,  $TC(Y) = \$100m + .20Y$ .

Given that 4M has made the investment in developing the know-how for manufacturing tape, much of this knowledge can be applied to producing related products, such as adhesive message notes (good X). For an additional \$20 million investment, you can ramp up production of stick-up notes (not to be confused with Post-It notes, which are trademarked by the 3M Company). These stick-up notes can be produced at a cost of \$.05 per pack. Thus the total cost of producing tape and stick-up notes together is given by  $TC(X,Y) = \$120m + .05X + .20Y$ .

Finally, a stand-alone company that did not produce tape would have to incur an initial investment of \$50 million in order to begin producing stick-up notes from scratch. Its total cost function would be  $TC(X) = \$50m + .05X$ .

- a) What does the LRAC for tape look like, i.e. are there economies or diseconomies of scale? Hint: calculate the cost of producing 600 million and 1200 million rolls of tape.



$$TC(Y) = 100m + .20Y$$

$$\text{if } Y = 600m, TC = 100m + .20(600m)$$

$$TC = \$220m$$

$$ATC = \frac{220}{600} = \$,367$$

$$\text{if } Y = 1200m, TC = \$340m$$

$$ATC = \frac{340}{1200} = \$,283$$

LRAC is downward sloping, indicating economies of scale.

- b) Does it make sense for 4M to produce both tape and stick-up notes, i.e. are there economies of scope? Hint: compute  $TC(0, 600m)$ ,  $TC(100m, 0)$ , and  $TC(100m, 600m)$ .

Economies of scope if  $TC(100, 600) < TC(0, 600) + TC(100, 0)$

$$TC(0, 600m) = \$100m + .20(600m) = \$220m$$

$$TC(100m, 0) = \$50m + .05(100m) = \$55m$$

$$TC(100m, 600m) = \$120m + .05(100m) + .20(600m) \\ = 120m + 5m + 120m = \$245m$$

$$\$245m < \$220m + \$55m$$

so economies of scope. It makes sense to produce both tape and stick-up notes.

9. (15 pts.) Your little sister works in Chicago making \$45,000 per year. Hearing about all that you are learning in the MBA program at UK, she contemplates quitting her job and joining next year's class. She decides to do a cost-benefit analysis and comes up with the following costs of a decision to move to Lexington for a year to pursue a UK MBA:

Tuition	\$9,000
Textbooks and supplies	\$1,000
Meals	\$4,000
Lodging	\$10,000
Purchase of a car	\$15,000
Operating costs of car (gas, maintenance, insurance, taxes, title, tags, and anything else you can think of)	\$3,000

Your sister also figures that she will have \$8,000 in incidental living expenses, so she plans to take \$50,000 out of her savings to pay for all of this. At the end of the year she expects to be able to sell the car for \$10,000, since she plans to move back to Chicago to look for a job, and only needs a car while in Lexington. Assume that the market interest rate at which she can borrow or lend is 10%. What do you think about her cost analysis? Do a point-by-point critique and come up with your own estimate of the total economic cost of her decision to get her MBA.

*Costs of quitting her job in Chicago and moving to Lexington for a year to get her MBA:*

<i>opportunity cost of her time . . . . .</i>	<i>\$ 45,000</i>
<i>tuition . . . . .</i>	<i>\$ 9,000</i>
<i>books and supplies . . . . .</i>	<i>\$ 1,000</i>
<i>depreciation on car . . . . .</i>	<i>\$ 5,000</i>
<i>interest earnings foregone on \$15,000 that is tied up in car for one year . . . . .</i>	<i>\$ 1,500</i>
<i>operating costs of car . . . . .</i>	<i>\$ 3,000</i>
<i>total economic cost =</i>	<i>\$ 64,500</i>

*Meals, lodging, and incidental living expenses are not a cost of getting an MBA. The purchase price of the car is not lost, you get it back in a year minus depreciation.*