

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.

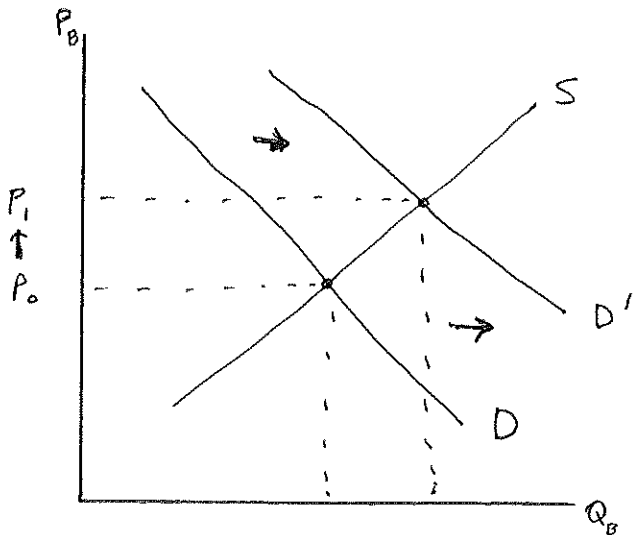
1. (5 pts.) $TFC = \$2000$, $AVC = \$10$, and $ATC = \$12$. What is Q ?

$$AFC = ATC - AVC = 12 - 10 = 2$$

$$AFC = \frac{TFC}{Q} \Rightarrow 2 = \frac{2000}{Q}$$

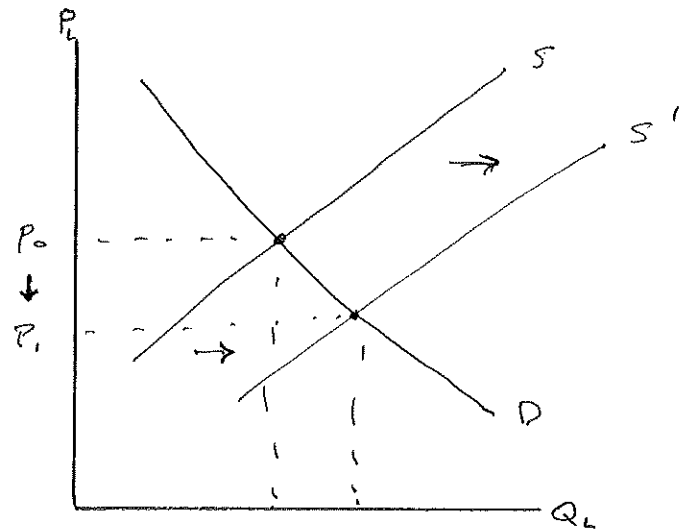
$$Q = 1000$$

2. (10 pts.) From the WSJ, 8/25/10: "Cattle prices are soaring toward records, pushing up the cost of beef in grocery stores. The gains are being fueled by rising appetites globally. . . Nations in Asia and elsewhere are buying more U.S. beef." Briefly explain and illustrate in the market diagrams below what is going on in the market for beef. Then explain and illustrate any secondary effects that you think might occur in the market for leather.



Market for Beef

Demand for U.S. beef increases, pushing its price upward.



Market for Leather

Since beef and leather are complements in production, higher beef prices cause the supply curve for leather to shift to the right. Leather prices are likely to fall.

3. (10 pts.) Why might hold-up potentially be a problem for the vertical relationship between Corning and Sharp? In your answer, you should explain what hold-up is and what specifically might give rise to it in this case.

Corning built a new factory ~~on~~ right next to Sharp's new TV plant, on land that was owned by Sharp. This is an example of an irreversible investment, and the cost incurred is a sunk cost. The Corning factory is a specific asset - site specificity. Once Corning builds their factory, they are susceptible to being held up by Sharp, i.e. Sharp could lower the price they pay Corning and Corning would have to take it.

4. (10 pts.) You use fertilizer and insecticide to grow roses in your garden. Given the amounts of each that you are currently using, another pound of fertilizer applied to your rose bushes would yield an additional 10 roses, while an additional quart of insecticide would increase your rose output by 25. Insecticide costs \$5 per quart, and fertilizer costs \$2 per pound. What can we conclude from this information about the economic efficiency of the mix of fertilizer and insecticide you are currently using? Show any formula that you use in arriving at your answer.

Efficient combination of inputs:

$$\frac{MP_f}{P_f} = \frac{MP_i}{P_i}$$

$$MP_f = 10 \quad P_f = \$2$$

$$MP_i = 25 \quad P_i = \$5$$

$$\frac{10}{2} \stackrel{?}{=} \frac{25}{5}$$

Yes, so you are ^{currently} combining fertilizer and insecticide in an economically efficient way.

5. (10 pts.) Southeast Airlines and Jet Purple are the only two airlines serving the Pikeville-Paducah city pair market. You collect the following data on the prices charged by each airline and the number of passengers flying on each:

<u>Month</u>	<u>SE Price</u>	<u>JP Price</u>	<u>SE passengers</u>	<u>JP passengers</u>
1	109	111	70	61
2	109	110	62	63

- a) Calculate the own-price elasticity of demand for air travel on Jet Purple. Show the formula you use and the numbers you use to perform the calculation.

$$\epsilon_{x, P_x} = \frac{7\% \Delta Q_x}{7\% \Delta P_x} = \frac{\frac{2}{61}}{\frac{1}{111}} \approx 3.6$$

demand is elastic

- b) Calculate the cross-price elasticity between JP's price and SE's passenger load. Show the formula you use and the numbers you use to perform the calculation.

$$\epsilon_{x, P_y} = \frac{7\% \Delta Q_x}{7\% \Delta P_y} = \frac{\frac{8}{70}}{\frac{1}{111}} \approx 12.7$$

SE and JP are substitutes.

6. (5 pts.) Why is a person with only a grade-school education likely to be able to grow tobacco at a lower cost than a person with an MBA degree?

The cost of the farmer's labor is a major implicit cost in growing tobacco. The opportunity cost of time for a grade-school graduate is likely to be much lower than the opportunity cost of time for an MBA graduate.

7. (20 pts.) Labor and capital are used to produce widgets according to the production table below:

		Labor Input				
		1	2	3	4	5
Capital Input	1	20	40	55	65	75
	2	40	60	75	85	90
	3	55	75	90	100	105
	4	65	85	100	110	115
	5	75	90	105	115	120

- a) Is this production process subject to the law of eventually diminishing marginal returns? Pick a set of combinations of inputs to illustrate and explain your answer.

Short run: $Q = f(L, \bar{K})$

Add more and more labor to a fixed amount of capital - pick any row - and see what happens to output.

$K=2 \Rightarrow L=1, Q=40; L=2, Q=60; L=3, Q=75; L=4, Q=85; L=5, Q=90.$
 $MP_L = 40 \quad MP_L = 20 \quad MP_L = 15 \quad MP_L = 10 \quad MP_L = 5$

Output goes up by smaller and smaller amounts.

- b) Does this production exhibit increasing, constant, or decreasing returns to scale? Pick a set of combinations of inputs to illustrate and explain your answer.

Double all inputs and see what happens to output:

Long run: $Q = f(L, K)$, all inputs are variable.

$L=1, K=1, Q=20$
 $L=2, K=2, Q=60$
 $L=4, K=4, Q=110$

> output more than doubles, so increasing returns to scale
 > output less than doubles, so decreasing returns to scale

This production function exhibits at first increasing and then decreasing returns to scale.

8. (5 pts.) Why are there blackouts in Jakarta while at the same time Indonesian coal producers are exporting significant quantities of coal to India?

The Indonesian government has placed a maximum price on retail electricity prices. Electric utilities are thus not able to pay as much for domestically produced coal as those coal producers can get if they sell it overseas. So Indonesian coal gets shipped to India and Jakarta residents suffer electricity shortages.

9. (5 pts.) Briefly explain what Honda has recently done to actually **reduce** the economies associated with long production runs in its U.S. plants.

Honda has made its plants more flexible by reducing the set-up costs associated with switching from one model to another. Hence shorter production runs are more economical now.

10. (15 pts.) Thinking about the make or buy decision, why might firms find it advantageous to use the market? Why might firms find it advantageous to vertically integrate? In that context, explain why we see beef processors rely on arm's length spot market transactions to acquire cattle while chicken and pork processors have much closer contractual vertical relationships with farmers who produce chickens and hogs.

Advantages of using the market:

- 1) economies of scale
- 2) aggregate uncorrelated demands
- 3) economies of scope
- 4) discipline

Advantages of vertical integration:

- 1) production efficiencies
- 2) extensive coordination.
- 3) information asymmetries
- 4) reputation externalities
- 5) specialized assets

There are no significant economies of scale in raising cattle (in the east), but there are significant economies of scale in raising hogs or chickens. There is a thick market for cattle, so beef processors can reliably depend on cattle auctions to procure enough beef to keep their plants operating efficiently. It only takes a handful of efficient-sized hog farms or chicken farms to supply a pork or chicken processing plant, so the necessary extensive coordination argues for a more formal vertical connection between chicken processors and chicken farmers, such as a long-term contract.

11. (5 pts.) True or False and Explain: Your parents own and operate a local jewelry store. They buy diamonds at wholesale and sell them at retail. At any point in time they will have some diamonds in inventory that they purchased last week and some that they purchased last year. Wholesale diamond prices have risen sharply in the past month. Hence the economic profit from selling a diamond of given size and quality that was purchased last year will be greater than that from selling an equivalent diamond that was purchased last week.

The historical cost of the diamond that you hold in inventory is irrelevant. Its economic cost is how much you will have to pay to replace it, i.e. the current wholesale price.

So two identical diamonds, one purchased a year ago and one purchased last month, have the same economic cost, and hence the same economic profit, associated with their sale to a customer.