

Homework 1, ECON 5313, Darren Grant, Spring 2004.

Review of Supply and Demand

1. For each of the “events” below, analyze the effect on the price and quantity of obstetrical services provided by physicians in the perfectly competitive market.

- a) More children are being born (a baby boomlet).
- b) Efforts made to attract more physicians into becoming general practitioners.
- c) Medicaid is extended to cover pregnancy and children for a large number of women.
- d) State laws loosen restrictions on the licensing of midwives.
- e) Malpractice premiums for ob/gyns skyrocket *again*.

Theory of Production

2. The Law of Diminishing Returns applies to each of the following situations. Explain how. Identify, in each case, the “output,” the “variable input,” and the “fixed factor.”

- a) Trying to grow more soybeans by fertilizing more.
- b) Scraping old paint off a wall.
- c) Using aspirin to bring a fever down.

3. We used to have a draft for the Army and some politicians have begun discussing this topic again. In this question, consider labor (soldiers) and capital (weapons) substitutes in the production of national defense.

- a) The draft effectively lowers skill-adjusted wages for Army recruits—you still pay them, but you pay them less. How does this influence the optimal capital-labor mix in producing national defense? Does the draft have a scale effect on production? If so, what kind?
- b) One way Congressmen provide “pork” for their districts is by funding a weapons program that was not requested by the Pentagon. One could think of this as Congress requiring a higher level of capital than the Pentagon finds optimal. In this context, describe how to determine how much money is wasted on pork, in that pork increases the cost of providing a fixed level of military readiness.

4. I like to wear Converse high tops, being a man of fashion. When my high tops wear out, everything goes at once—the sole, the insole, the lacing, and the canvas. Is this indicative of productive efficiency or productive inefficiency? Why?

Production of Health and Demand for Health Inputs

5. Consider two kinds of health care: preventive care and acute care. For the sake of argument, assume that preventive care services are closer substitutes (can more easily substitute or be substituted for) with other inputs in the health production function (such as rest, exercise, eating right, etc.) than acute care services are.

- a) Comment on what this “fact” means, or implies, for the elasticity of demand for preventive care and for acute care, and for the ability of providers of acute and preventive care to raise prices in a non-competitive market.

- b) Are preventive care and acute care substitutes in the health production function, or not?
- c) In terms of the theory of the demand for insurance, should consumers typically have greater demand for insurance covering preventive care or for insurance covering acute care? Why?
- d) We know the market for insurance suffers from two market imperfections, moral hazard and adverse selection. The fact that there are behavioral substitutes for health care is relevant for thinking about which market imperfection—neither, both, primarily moral hazard, or primarily adverse selection? Why?

Costs

6. (Mansfield, adapted) In October 1986, the Congressional Budget Office published a study indicating that the marginal cost of a 1989 flight by a space shuttle would be about \$48 million.

- a) What kinds of expenses are included in this figure? What kinds of expenses are not included?
- b) Consider the costs of the shuttle itself (as opposed to the costs of the launch, astronauts, etc.). Should the entire cost of the building and maintaining the shuttle be included in the marginal cost figure? Should any of the costs of building and maintaining the shuttle be included? If so, which?
- c) NASA is offered \$50 million by a foreign government to launch one of their (non-military) satellites into orbit. Is the marginal cost figure relevant for determining whether this flight would be profitable for NASA? Or should, instead, some other cost figure be used?
- d) Several firms are considering offering private flights into space. (Really!) For the purposes of deciding whether to begin offering private space flights, is marginal cost the relevant cost figure? Or should, instead, some other cost figure be used?

7. Consider a perfectly competitive firm where, for simplicity, we can think of all costs as being labor costs, and there is only one worker. The worker can make one unit of the product in 4 hours of work. The firm pays the worker \$20 per hour, up to 40 hours per week (straight time). After that the worker is paid overtime, which is “time and a half,” or \$30 per hour. The firm also provides health insurance for its employee (the only fringe benefit), at a cost of \$50 per week (no matter how many hours are worked).

The firm has committed to paying for health insurance for the worker’s entire one year contract, but can choose the number of weekly hours its employee will work; this can be less than 40 hours or more than 40 hours, as the firm chooses. All units refer to weekly output. Since the worker takes 4 hours to make one unit of the product, the worker works overtime if he makes more than 10 units per week.

- a) Is the wage a fixed cost or a variable cost? Is the health insurance a fixed cost or a variable cost?
- b) What is the Marginal Cost of a unit produced during straight time? What is the Marginal Cost of a unit produced during overtime?

It turns out ATC is at its lowest if 10 units are produced.

- c) Calculate the Total Cost, the Average Total Cost, if 10 units are produced.
- d) In deciding how many hours the worker should work, the firm has three choices: 1) don’t work the worker at all (0 hours); 2) have the worker work at the regular wage but no overtime (between 1 and 40 hours); 3) have the worker work overtime (41 hours or more). At a price of \$100, which should the firm choose? Why?
- e) At a price of \$100, should the firm prefer to stay in or exit the market in the long run? Why?

Homework 2, ECON 5313, Darren Grant, Spring 2004.

General Cost Questions

1. In the hothouse working late one evening, Dr. Ima Masing discovers, to her surprise, the secret to growing the Bonsai Loblolly Pine Tree, which had eluded botanists for years. Dr. Masing can produce 10 Bonsai Pines in one hothouse in one year. Each hothouse costs her \$2000 per year, and the cost of the labor, water, and fertilizer is \$600 per tree.

- a) Currently, what is the market structure of the Bonsai Pine industry?
- b) Currently, Dr. Masing maximizes her profit by selling 50 trees per year at a price of \$1000 each. What is her (yearly) profit?
- c) Why doesn't Dr. Masing produce 60 trees?
 - 1) The additional trees would be especially expensive to produce.
 - 2) She can't find buyers for any more trees.
 - 3) She doesn't want to lower her price to attract more buyers.

Then, suddenly, Dr. Masing's lab assistant posts her Bonsai Pine growing secret on the Internet for all to read. Now anyone can grow a Bonsai Pine tree.

- d) What is the market structure of the industry now?
- e) What will the price (in \$) of Bonsai trees be in the long run?

2. Farmer Chow grows corn and sells it in a perfectly competitive market. She irrigates with water purchased from neighbors. Because of an argument, she recently switched from one neighbor water supplier to another. The new neighbor (being less aquatically endowed) charges a higher price per acre-foot for the water.

- a) Does this represent a change in fixed or variable costs (for this season)?
- b) Does Farmer Chow respond by raising the price of her corn?
- c) Does Farmer Chow respond by changing the quantity she produces?
- d) Would Farmer Chow's behavior (the answers to b and c) have been different if the increase in costs involved fixed costs but not variable costs? If so, how?
- e) Would Farmer Chow's behavior have been different if she was not in a perfectly competitive market? If so, how?

3. Consider a perfectly competitive market, in which all firms have the same costs (identical cost curves). A set of statements is listed below. For each statement, answer with either #1, #2, or #3, and give a brief explanation why.

- 1) This statement is not correct, or only rarely correct (say, by happenstance).
 - 2) This statement is correct only when the market is in long run equilibrium.
 - 3) This statement is usually or always correct, not just when the market is in long run equilibrium.
- a) Firms earn zero accounting profit.
 - b) Firms would stop production immediately if the price fell by even a little bit.
 - c) Firms choose to produce the quantity that minimizes their average total costs.
 - d) If the price goes up, firms will choose to produce more.

e) The firm can sell all units it makes at the market price.

Applications to Health Care

4. The price of malpractice insurance for physicians generally does not depend on the number of patients they see; thus it is a fixed cost and not a variable cost. In this question, we explore what would happen in the short run if obstetricians were charged for malpractice insurance by the delivery instead of by the year. We presume (reasonably) the obstetrical services market is monopolistic competitive.

a) Draw a standard set of cost curves for an obstetrician. Name one or two important costs that contribute to (are part of) MC. Label this graph “Before.”

b) What happens to MC and ATC when insurance is charged by the delivery? Draw a new set of cost curves, shifting MC and ATC as appropriate, and label this graph “After.”

c) Now, to determine the effect on price and quantity, generate two pricing graphs using the two cost curves above. Demand will be the same on each graph, but the structure of costs is different, so the price and quantity of obstetrical services will be different. Identify P and Q on each graph, and show how it changes.

d) If the market for insurance is reasonably competitive, then the total amount of money paid for insurance shouldn't change “after” if the obstetrician continues to perform the same number of deliveries as “before.” In that case the economic profit earned by the obstetrician would not change. However the obstetrician does not perform the same number of deliveries as before. Therefore, if the obstetrician chooses to change the total number of deliveries he performs, his profit must be _____ than before.

5. “Cost-shifting” occurs when the presence of public insurer, such as Medicaid, encourages providers to raise prices to everyone else. The public insurer pays less for services than private pay (privately insured) patients do, but there is an (essentially) unlimited supply of publicly insured patients available for providers to treat at that price. The public insurer's price is not negotiated with providers but merely mandated.

a) Draw a standard pricing graph that illustrates the price a physician will choose to charge for services in a market that is not perfectly competitive and in which there is no public insurer.

b) Assume that a public insurer now enters the market and will provide an unlimited supply of patients to any provider at reimbursement rate R. Because the supply of patients is unlimited, the MR obtained from each publicly insured patient is also R. On the graph, identify the MR obtained from the last private pay patient served by the provider. If R is below this value, the provider will not accept any publicly insured patients.

c) If R is above the value obtained in part b), the provider will accept some publicly insured patients. On the graph, choose an R such that the provider will accept some publicly insured patients. Then identify the number of private pay patients the provider wishes to have. The provider need not accept any private pay patients with a MR below R.

d) Then, using the graph in c), explain why the market price will rise after the public insurer enters the market. Consider the following statement: “The firm raises the market price in order to make up for the lower reimbursement it gets on publicly insured patients.” Is this statement correct for profit-maximizing firms?

Homework 3, ECON 5313, Darren Grant, Spring 2004.

Analysis of Competitive Labor Markets

1. Catholic priests, nuns, and brothers take a vow of chastity, which means that you give up marriage and intimate non-marital relationships. This is one of three vows, none of which are optional. Answer each of the following questions verbally and graphically.

a) How does the vow of chastity affect the labor supply of Catholic priests?

b) Priests (and nuns and brothers) also take a vow of penury, which essentially means that they will earn no more than their sustenance from their work. It's like saying you will only receive a small hourly wage. How does this affect the labor supply of priests?

c) A friend says, "The vow of penury isn't going to affect the number of people that become priests, because you are either destined to become a priest or not, and nothing is going to stop you." In economic terms, what is my friend saying about labor supply? Illustrate this concept on a graph.

d) Protestant ministers typically take neither vow; many are married, and their wages are determined by a fairly competitive market. Which labor market is more likely to have difficulty filling all the available positions—the market for Catholic priests, or the market for Protestant ministers? Why?

2. Imagine that doctors' "wages" are set in a competitive environment. To be licensed as a physician, one must go through roughly seven years of training and pass the state medical exam.

a) Would you expect the supply of domestically trained physicians to be elastic or inelastic in the short run? That is, if wages increased over a fairly short time span (say, several months), would the number of physicians available and willing to work increase proportionately more or proportionately less than the increase in wages?

b) In the 1970's, the demand for physician care increased dramatically, due to the inception and growth of Medicare and Medicaid, and other factors. Illustrate the effect on physician wages on a supply/demand graph. Take account of your answer to part a) in drawing the supply/demand graph.

c) In the scenario in part b), will wages change more when immigration of physicians to the U.S. is permitted or when immigration of physicians is not permitted?

3. RN's in nursing homes typically earn more than RN's in pediatrician's offices, because it's so much more fun to work with babies.

a) Illustrate this on two supply/demand graphs, one for RN's in pediatricians' offices, one for RN's in nursing homes. If pediatricians and nursing homes have identical demands for nurses, would more nurses end up working in pediatricians' offices or in nursing homes?

b) Describe how these wage differentials help sort RN's into nursing homes and pediatrician's offices. Consider the RN's working in pediatrician's offices. As a group, do they "object to" working in nursing homes as much as those RN's that actually do work in nursing homes?

Incentives & Human Capital

4. In the mid-1800's, whale oil was very valuable, and whales were hunted far and wide by whaling ships, as in *Moby Dick*. Sailors were paid with a fraction of the total value of the haul at the end of the voyage. The higher the rank, the higher the fraction. The captain of the ship often owns part of the vessel, in addition. What considerations would lead to this pay scheme; that is, why is this the optimal way to pay your sailors?

5. Prior to *Flood v. Major League Baseball*, major league players did not have "free agency". That is, they

could bargain only with the team that drafted them, and could change teams only if they were traded. If they didn't like the salary their team offered them, they could refuse to play baseball, but they couldn't voluntarily sign with another team. Salaries have risen considerably since the advent of free agency. Read *Ball Four* for a nice illustration of life prior to free agency.

a) In some jobs, such as many manufacturing jobs, the worker often stays with his/her employer for a very long period of time. In other kinds of jobs, such as disc jockey, baseball player, or waitress, workers exercise their "free agency" and change jobs quite frequently. What primary characteristic separates the former from the latter? Explain how it affects the frequency of job change.

b) Even before free agency, better players received higher salaries than mediocre players. Why should teams do this?

c) In professional sports, concrete measures of performance (batting averages, ERA's, etc.) are easily available. Yet pay is rarely closely tied to particular measures of performance. What might be some problems with doing so? Compare the severity of these problems in professional baseball, golf, football, and basketball. In which sport would you expect the largest fraction of pay to be based on bonuses?

d) The author of *Ball Four* is now a U.S. Senator from which state?