

Midterm Economics Exam

Answer Key

I. Definitions (7 points each) Briefly define each of the following terms.

demand curve (1) *This shows the amount of a good or service that will be purchased, depending on the price charged for it.* (2) *This shows the willingness to pay for each good or service purchased.* Notes: 1. *Either answer is sufficient for full credit.* 2. *The first reads the demand curve from price to quantity, the second from quantity to price.* 3. *The most general answer would be: a curve that depicts the relationship between the price charged and the quantity purchased for a good or service, holding constant all the other factors that affect purchases.* 4. *It would be a mistake in (2) to substitute “marginal benefit” for “willingness to pay”; the second is the same as the first only under rather stringent conditions.*

individual vs collective rationality *Individual rationality is what is good for a single individual, given what other individuals are doing or will do. Collective rationality is what is good for those same individuals when each other's actions are no longer given — when they can make a decision together for their mutual benefit. (You could mention the prisoner's dilemma as an example: when each individual acts alone, the combination of their individual rationalities is less advantageous than what they could achieve through coordination.*

marginal cost (1) *The additional cost incurred by producing one more unit of something.* (2) *The additional cost attributable to the production of one particular unit of a good or service.* (3) TC / Q (4) *The derivative of the total cost function with respect to quantity produced. Any one of these is sufficient.*

II. Short-answer questions (15 points each) For two of the following three statements, indicate whether they are true or false and briefly explain why.

1. The market welfare hypothesis demonstrates that achieving a market equilibrium is always the same thing as achieving economic efficiency. *False. The correspondence between market equilibrium and economic efficiency holds only under a particular set of assumptions — that the supply curve represents the true marginal costs to society of supplying this good, that the demand curve represents the true marginal benefits to society of acquiring this good, and that there is a unique equilibrium in the market. If these assumptions fail to apply, we have a **market failure**, and market equilibrium will be inefficient from a social perspective.*

2. Public higher education, like Evergreen, is not an example of a public good. *True. A public good has at least one of two attributes, nonexclusion and nonrivalry. Nonexclusion means it is impractical to make users pay on a per-use basis. The existence of tuition, however, demonstrates that it is very easy to charge students for their use of Evergreen. Nonrivalry means that the marginal cost of supplying additional users is zero or very near zero. This is not the case at Evergreen; each student requires services, space, the time and attention of faculty, etc. (It is true that the marginal cost to the college of having one more student sit in on a class is very low, but when the college makes curriculum and personnel decisions years in advance, it has to treat each prospective student as an equal cost item; there is no way to know which students will prove to be “cheap” (filling up existing classes) and which ones “expensive” (requiring new classes). Note: Since either attribute is sufficient for categorizing a good as “public” in the economic sense, it is necessary to mention both. Showing that Evergreen violates only one of these (nonexclusion, nonrivalry) earns 10 of the possible 15 points. Also, note that whether everyone has access to the good is not relevant for its potential publicness. Not everyone on the planet can receive the KAOS signal, but KAOS is still a public good in economic terms. A good can have limited access but still exhibit nonexclusion and/or nonrivalry.*

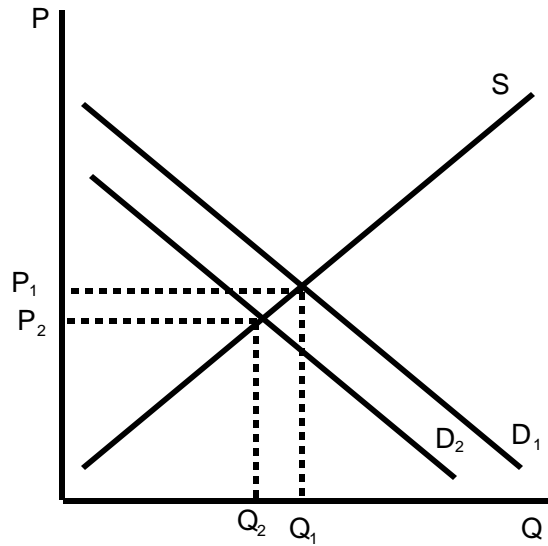
3. By using more volunteers and fewer paid employees, the city of New York can reduce the social cost of the World Trade Center cleanup effort. *False. The social cost of the cleanup consists of the opportunity cost of the time and materials going into it, as well as the disutility experienced by the cleanup workers. Money compensates individuals for these costs, but it doesn't alter them. Whether more of the costs are paid by the city of New York or by some other entity doesn't affect how large they are to begin with. Working out a more efficient way to haul debris, one that would require fewer trucks or fewer trips per truck, for example, would be*

a way to reduce the social cost. (Some people noticed that whether people work for money or as volunteers can alter their psychology and therefore have a modest effect on their level of disutility. This could go either way; there are psychological arguments that indicate that paying people would reduce the attention they paid to the unpleasant aspects of the work, and arguments that suggest that people may suppress their awareness of this unpleasantness if they are volunteering in order to minimize “cognitive dissonance”. These possibilities are entirely speculative in this case.)

III. Problems Solve all of the following numerical and graphical problems.

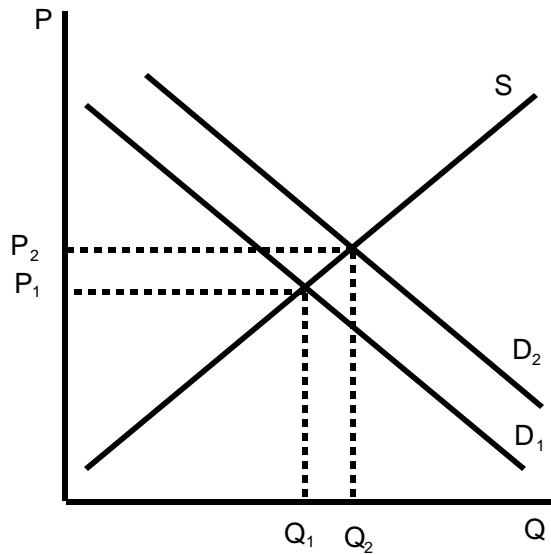
1. (10 points) Draw a diagram for McDonald’s hamburgers at its Olympia franchises, incorporating “normal” supply and demand curves, and indicate the equilibrium price and quantity of burgers. Now, for both of the following, shift either the demand curve or the supply curve in the correct direction and show how this changes the equilibrium price and quantity. Show the old and new curves, and the old and new equilibria, in the same diagram.

a. Newspapers report that McDonald's is using petroleum byproducts to reduce the meat content of its hamburger patties.



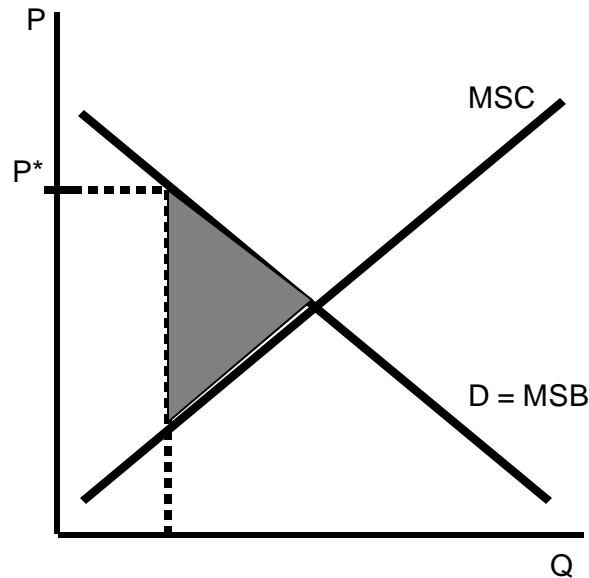
There might be a slight downward shift in the supply curve due to the lower cost of petroleum byproducts compared to meat, but (1) it would be a very small movement relative to the MC of producing hamburgers, and (2) the question says that newspapers have begun to report it, not that McD's has begun doing it.

b. The entire Burger King chain switches to a vegetarian-only menu.



Some of BK's consumers will switch to McD's.

2. (10 points) The following diagram depicts marginal social cost (MSC) and marginal social benefit (MSB) for a pharmaceutical. In this case, assume that MSB and demand are the same. The supplier, however, is a monopolist who charges a price P^* above the optimal level. Shade in the area representing net benefits (NB) lost to society as a result of this monopolistic action.



*This includes all the pharmaceuticals whose MB exceeded their MC, and which would have been produced and sold had the market been competitive, but aren't because of the monopolistically high price. (This is a **huge** issue around the world, for instance in the struggle to get drug companies to lower their prices for AIDS drugs in highly-impacted low-income countries.)*

3. (28 points) Suppose there are two adjacent plots of land in a remote location. On one sits a health spa; visitors pay to enjoy its fresh air and bubbly thermal waters. On the other lies a sunflower farm. The sunflower farmer decides there is more money to be made by ripping out the sunflowers and raising hogs in a feedlot. Unfortunately, this will make the health spa a lot less attractive to customers. In this story we make the following assumptions: (1) There are only two options for the farmer, sunflowers or hogs. (2) There is no other way to operate the hog farm. (3) There are no off-site effects of the hog farm except for the smells wafting over to the health spa. (4) The profits of the two enterprises fully capture the net benefits they provide to society; that is, there is no consumer surplus to take into consideration. The following table shows the profits that result from both farming choices.

	Farm	Spa
Sunflowers	\$100,000	\$75,000
Hogs	\$150,000	\$10,000

a. What farming choice produces the largest net benefit to society? How do you know?

Sunflowers: \$175,000 > \$160,000

b. How large is the externality generated by hog farming?

\$65,000

c. If the government imposes an “optimal pollution tax” on hog farming, how much would it be? What would be the effect on the farmer’s choice between sunflowers and hogs?

\$65,000 (“internalizing the externality”), and the farmer would find it profitable to avoid the tax and grow the sunflowers

d. Suppose the farmer has the right to pollute and there are no taxes or regulations, but negotiations can take place between the two enterprises.

d1. What is the least the farmer will accept from the spa owner to forego hog raising?

\$50,000

d2. What is the most the spa owner will be willing to pay for the same purpose?

\$65,000

d3. What farming choice will be most profitable post-negotiation?

Sunflowers: the payment received by the farmer to not raise hogs will be at least as great, if not greater, than the extra profit to be made by raising them.

d4. What will be the potential range of the farmer’s post-negotiation profits?

\$150,000 – \$165,000

d5. What will be the potential range of the spa owner’s post-negotiation profits?

\$10,000 – \$25,000

e. Now suppose that the spa owner has the right to shut down the farm if it pollutes, but also that negotiations can take place between the two enterprises.

e1. What is the least the spa owner will accept from the farmer to forego his option to shut down a possible hog farm?

\$65,000

e2. What is the most the farmer will be willing to pay for the same purpose?

\$50,000

e3. What farming choice will be most profitable post-negotiation?

Sunflowers

e4. How do the post-negotiation profits for the two enterprises compare to their amounts in parts (d4-d5)?

The farmer’s profit is lower; the spa owner’s profit is higher.

f. What does this problem have to do with the Coase Theorem?

This illustrates it. With either assignment of rights (the right to pollute, the right to not be polluted), the process of negotiation leads to the same efficient outcome. (We know it's efficient because of part a.)