

Name: **KEY**
ECON 202—Montgomery College
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EXAM 2

- There are 110 possible points on this exam. The test is out of 100.
- You have one class session to complete this exam, but you should be able to complete it in less than that.
- Please turn off all cell phones and other electronic equipment.
- You are allowed a calculator for the exam. This calculator cannot double as a cell phone.
- Be sure to read all instructions and questions carefully.
- Remember to show all your work.
- Try all questions! You get zero points for questions that are not attempted.
- *Please print clearly and neatly.*

Part I: Matching. Write the letter from the column on the right which best matches each word or phrase in the column on the left. You will not use all the options on the right and you cannot use the same option more than once.

2 points each.

- | | |
|----------------------------------|--|
| 1. E Club good | A. Corrects externalities through corrective taxes or subsidies |
| 2. B Coase theorem | B. Corrects externalities through exchange |
| 3. C Commons | C. Example: a long river many farmers draw from to water their crops |
| 4. G Negative externality | D. Example: city roads |
| 5. A Pigou's solution | E. Example: dating websites |
| 6. D Public good | F. Example: potatoes |
| 7. I Rivalry | G. Example: talking loudly in public |
| | H. Gains that go to no one |
| | I. Marginal cost is greater than zero |
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- A club good is excludable but nonrivalrous; the marginal cost of adding an additional user is zero. In the case of a dating website, more users actually make the good more valuable (network effect).*
 - The Coase theorem notes that externalities can be eliminated through market transactions (as long as property rights are assigned).*
 - Commons are nonexcludable but rivalrous. Each additional user interferes with the consumption of other users but you can't stop them from using it. A river is such an example: each farmer has an incentive to not only take a water from the river but to take a lot of water. The Colorado River is such an example: so much is taken from it to irrigate crops that the Colorado has trouble reaching the ocean!*
 - Individuals who talk loudly make the lives around other people worse, much like pollution. Such individuals are not fully accounting the costs of their loudness into the cost-benefit analysis.*
 - Arthur Pigou argued that you could tax or subsidize an externality so the decision-makers internalize it, thus eliminating deadweight loss.*
 - A good that's both hard to exclude and an additional user has a marginal cost of zero. While city roads sometimes violate this latter point due to congestion, this violation (a) doesn't occur under ordinary circumstances and (b) when it happens, the marginal cost is very small. (Will traffic move measurably faster during rush hour if you eliminated one car?)*

7. *As noted in the previous question, rivalry can be tricky to nail down sometimes but it can be thought of as the marginal cost of adding an additional user is zero (or very near it).*

Part II: Multiple Choice. *Choose the best answer to the following.*
4 points each.

8. If a maximum production quota is set below equilibrium, what happens to the price?
- a. **It increases**
 - b. It stays the same
 - c. It decreases
 - d. It depends on the elasticity of the good or service
 - e. It depends on how big the production quota is

A maximum production quota below equilibrium quantity has an effect (above equilibrium has no effect). Forcing production lower will cause the price to rise.

9. If a good is elastic, it is most likely due to:
- a. Its low price
 - b. Its large number of complements
 - c. **Its large number of substitutes**
 - d. B & C
 - e. None of the above

Price has little to do with elasticity. The exception is if it's in terms of a person's budget (a small percent of budget would suggest a small price) in which case it would be an inelastic, not elastic, good. Complements have little to do with elasticity. More substitutes, however, suggest it's easier to walk away from a higher price. The good is elastic.

10. During an interview Steve Cole, a sales manager at a car dealership, revealed that he considers how much the customer appears to know about the car when he's negotiating a price. Ignorant people tend to pay a premium on their car. How is this "ignorance premium" explained with price discrimination?
- a. People who don't bother to research probably don't want a car that much.
 - b. People who do research probably know that gas is very expensive and thus require a cheaper car.
 - c. **People who don't bother to research are probably less sensitive to price.**
 - d. A & C
 - e. None of the above

Cole is using a customer's level of knowledge to determine how sensitive they are to prices. If you are willing to research a car, you are probably more

willing to shop around or walk away than someone who can't be bothered to research.

11. Some economists suggest that that price of popcorn at the movies is a form of price discrimination: the movie experience is a tied good composed of tickets and popcorn. Those who really value the experience of the movies pay more because such people tend to get popcorn. If the price of popcorn is **not** a form of price discrimination, which fact would challenge the theory?
- a. The theater has a monopoly on selling popcorn
 - b. The popcorn gets cold very quickly (it cannot be resold)
 - c. **The theater needs to clean up after popcorn eaters (the costs aren't uniform)**
 - d. A & B
 - e. None of the above.

Both A and B would support the theory of price discrimination. Only C suggests a possibility that it is not price discrimination since the costs are not uniform (and thus the costs of serving a non-popcorn eater are different from serving a popcorn eater).

12. US Highway 12 is part of a crucial two-lane artery from the seaports in Washington State to the tar sands in Canada. Extracting oil from the tar sands requires very large equipment: transporting it takes up both lanes of US 12. In August of 2010, Idaho granted ConocoPhillips a road permit which allowed it to transport four oil processing units. Without this permit, ConocoPhillips would have to transport those units a much longer distance to get to their destination. If no permits for US 12 were allowed, how would that affect the elasticity of which curve in the market for oil?
- a. The supply curve would become more elastic
 - b. **The supply curve would become less elastic**
 - c. The demand curve would become more elastic
 - d. A & C
 - e. None of the above

Without the permit, it takes more time to deliver inputs. Also note that this reduces the availability of inputs. Both of these make the supply curve less elastic (or more inelastic).

13. Former judge Andrew Napolitano argued in March of 2014 that President Lincoln buying up all the slaves in the South and setting them free would have been cheaper (both in lives and money) than fighting the Civil War.¹ At the time, the

¹ Ignore the fact that when the Civil War began, both sides believed it would be a short war and thus comparing the cost of the entire war with the cost buying up all the slaves is a comparison that is only relevant in hindsight.

international slave trade was abolished by an act of Congress; no slaves were imported into the United States. Assume this was strongly enforced. Based on this information, would such slave redemption be more successful or less successful than modern-day slave redemption (as we discussed in class)?

- a. More successful because the supply of slaves was more elastic then
- b. More successful because the supply of slaves was less elastic then**
- c. Less successful because the supply of slaves was more elastic then
- d. Less successful because the supply of slaves was less elastic then
- e. They would be equally unsuccessful

The problem with modern-day slave reparation is that the supply curve is quite elastic because people can easily import slaves from all over the world. Sometimes it's forced trafficking but often women are lured into coming into the U.S. of their own volition and only after arriving are they enslaved. If the ban on slave imports in the 1800s was strongly enforced, then the supply of slaves would be less elastic and so such redemption would be more successful. Travel, too, was more expensive then compared to now so even with equal enforcement, the supply curve was more elastic.

I do not know how well enforced this ban was. It is equally likely it wasn't enforced well at all and if not the assumption that it was, Option E would be the best choice.

One thing is for certain: Civil War-era slave redemption would have been more successful than modern day gun buy-back programs.

14. Imagine you work at a movie theater that offers student discounts. To demonstrate they are eligible of the discount, customers must show a student ID. This is pure price discrimination; students are not less expensive to serve compared to other patrons of the theater. Suppose a man in his 40s shows his obviously expired student ID. Is it a smart business decision to accept it and give him the discount?
- a. No, because the discount is for students and he's not a student.
 - b. No, because if he's in his 40s, he can surely afford to pay full price.
 - c. Yes, because it will show other customers how seriously you take your discounts.
 - d. Yes, because he's demonstrating he is sensitive to price.**
 - e. None of the above

Remember, price discrimination isn't about being nice. It's about separating out those sensitive to price from those insensitive to price. Those with a low willingness to pay from those with a high willingness to pay. Holding onto your student ID decades after you don't need it anymore is difficult. This man may not be a student, but you have the discount because students tend to be

more sensitive to price. If he belongs to that price-sensitive group, you'll want to honor his ID. Otherwise, you might not get his business at all.

For similar reasons, you wouldn't offer the discount to someone who is clearly a student (e.g. is of the appropriate age and is carrying a backpack) but doesn't request the discount.

15. Food used to take up one-third of the average budget. Now it is closer to one-sixth. All other things being equal, what can we say has happened?
- a. Food is more elastic.
 - b. Food is now a normal good.
 - c. Food has fewer substitutes.
 - d. A & C
 - e. **None of the above**

Food is now more inelastic because it takes up a smaller portion of a person's budget.

16. What is the relationship between flexibility of production and elasticity of supply and why?
- a. **Greater flexibility means more elastic supply because producers can easily leave low-priced production and enter high-priced production.**
 - b. Greater flexibility means more elastic supply because it becomes easier to find substitutes for inputs of production.
 - c. Greater flexibility means less elastic supply because it cuts into the time allowed to produce something.
 - d. Greater flexibility means less elastic supply because it would require more inputs to be that flexible, thus it's harder to adapt to changing prices.
 - e. None of the above

Nimbleness of production options allows easier transition and adaptability, which allows for an easier response to prices.

17. Which of the following is a positive externality?
- a. Buying a house
 - b. **Getting vaccinated**
 - c. Giving a homeless person some food
 - d. B & C
 - e. None of the above

Buying a house is just a market transaction. Giving a homeless person some food is also a market transaction, in a way. You, as the donor, are purchasing good feelings. Remember, a positive externality must be externalized to others. You can't give a homeless person food if there's no one to give it to.

But you can (and would) get vaccinated if there was no one that could get the disease. You help others incidentally. It is a benefit external to your transaction, thus it's a positive externality.

18. Which of the following would cause the elasticity of supply of robots in Pittsburgh to decrease?
- f. Other cities get smaller
 - g. Other cities get larger
 - h. Pittsburgh gets larger
 - i. A & C**
 - j. None of the above

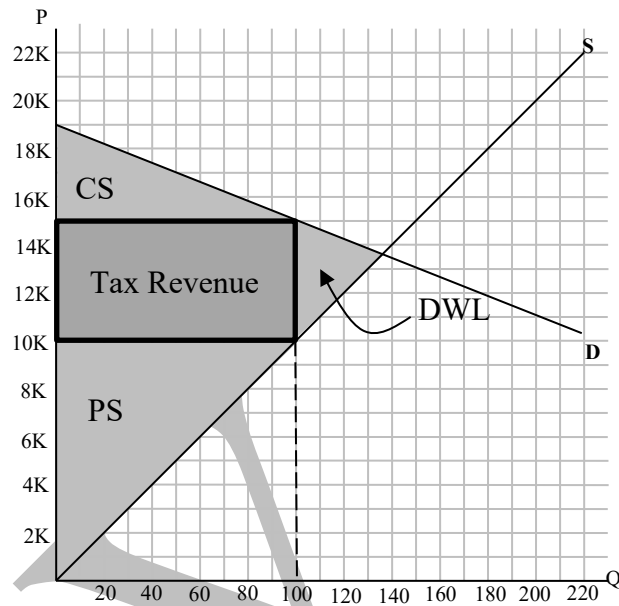
*As a city gets larger the supply of its goods become more inelastic as it becomes harder and harder to adjust the quantity. Think in extremes: if the city was the size of a planet, wouldn't it be harder to increase the supply of robots compared to a city the size of a hamlet? And since this determinant is relative—a larger city compared to others—if other cities shrink and Pittsburgh stays the same size, that's functionally the same as Pittsburgh getting larger...because it's getting **relatively** larger.*

19. If a baby is crying in a restaurant, its guardian(s) is/are
- a. Externalizing costs onto other patrons.
 - b. Demonstrating a market failure.
 - c. Illustrating an example of a public good.
 - d. A & B**
 - e. None of the above

The crying child is making dining less enjoyable to other patrons—thus it is externalizing costs. This would be a market failure because, like any activity that externalizes costs (e.g. pollution), the actions by individuals lead to an inefficient outcome.

Part III: Short Answer. *Answer the following.*
16 points each.

20. Consider the market for used cars in the graph below. Illustrate the effects of a \$5,000 excise tax on the market for used cars. Highlight the area of deadweight loss. **Indicate on the lines** the following values (estimate, if needed): the new quantity sold, the price consumers pay, the price suppliers receive, and the total tax revenue. Does one side (demand or supply) pay more of the tax? Why or why not? (Note that the price is in thousands of dollars...2K is \$2,000, etc.)



The quantity sold is 100.

Consumers pay \$15,000.

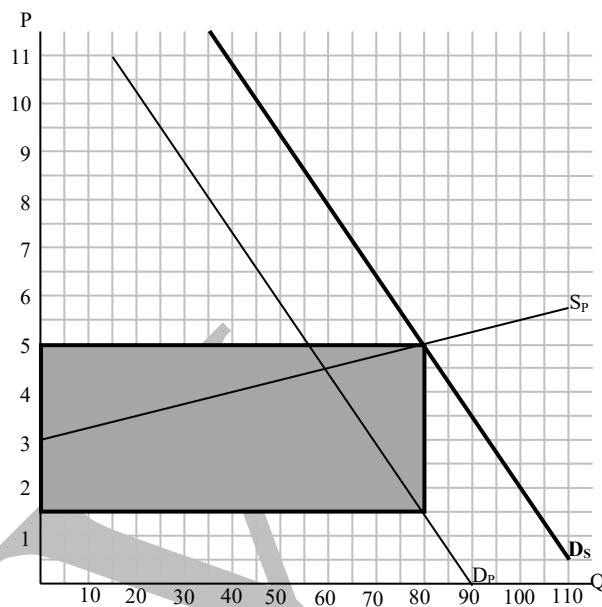
Suppliers get \$10,000.

Total tax is \$500,000.

As suggested by where the tax must come from in relation to market equilibrium, suppliers pay most of this tax since their supply curve is more inelastic than the demand curve.

Don't forget the last questions on the back!

21. Consider the following diagram depicting the market for flu vaccines. Both the supply curve and demand curve are private. Suppose each flu vaccine includes a positive externality of \$3.50. **Carefully** sketch the social curve capturing this benefit and then sketch the proper Pigouvian correction so there's no deadweight loss. Highlight the area of total tax revenue or total subsidy cost. If there is deadweight loss, highlight it.



There are two important ideas in this question. The first is depicting an externality in our supply and demand diagram. The second is depicting how to correct the externality.

*To illustrate the externality, first recognize that it's a positive externality. Flu vaccines make it harder for **everyone** to get sick, not just the person who takes the vaccine, so it makes sense that there's an additional benefit on society as a whole. Thus, we will draw a social demand curve that's higher than the private demand curve (the supply curve remains the same). How much higher? The size of the externality: \$3.50. So we draw a line parallel to demand \$3.50 above it. In the market equilibrium, 60 people get vaccines. But the optimal number is 80.*

Normally we would draw some deadweight loss but the question asks us to correct the externality. Because it's a positive externality, that means a subsidy. How big of a subsidy? \$3.50—equal to the size of the externality (a perfect correction is always equal to the size of the externality). We wedge that \$3.50 in the original diagram coming from the right. Note the resulting quantity is 80, which is the optimal number of vaccines. The total cost of the subsidy is the grey box: cost per vaccine times the total number of vaccines ($\$3.50 \times 80 = \280).

Why wedge the subsidy in the original diagram and not the one with the social demand curve? Because remember that the market works based on the private demand curve. That's the problem: there are benefits people are not considering when they choose to get vaccinated or not. We want them to consider that factor so we add a subsidy, thus internalizing the externality.

22. For each of the following pairs of prices and quantities, calculate the elasticity of demand using the midpoint method (aka arc price elasticity).

	Quantity 1	Quantity 2	Price 1	Price 2
a.	50	100	\$9	\$6
b.	20	22	\$3	\$1
c.	14	8	\$5	\$17
d.	900	100	\$15	\$135

$$a) \frac{(100-50)/(100+50)/2}{(\$6-\$9)/(\$6+\$9)/2} = \frac{50/75}{-\$3/\$7.5} = \frac{5/7.5}{-3/7.5} = -\frac{5}{3}, \text{ elastic}$$

$$b) \frac{(20-22)/(20+22)/2}{(\$3-\$1)/(\$3+\$1)/2} = \frac{-2/21}{\$2/\$2} = \frac{-2/21}{1} = -\frac{2}{21}, \text{ inelastic}$$

$$c) \frac{(14-8)/(14+8)/2}{(\$5-\$17)/(\$5+\$17)/2} = \frac{6/11}{-\$12/\$11} = \frac{6/11}{-12/11} = -\frac{1}{2}, \text{ inelastic}$$

$$d) \frac{(900-100)/(900+100)/2}{(\$15-\$135)/(\$15+\$135)/2} = \frac{800/500}{-\$120/\$75} = \frac{8/5}{-\$8/5} = -1, \text{ unit elastic}$$