Fall 2024   Professor Emmanuel Saez
University of California, Berkeley

ECONOMICS 2

FIRST MIDTERM SOLUTIONS

<u>INSTRUCTIONS</u>

1. Put your name, your SID number, and your GSI's name or your section number in the blanks provided on the front of the exam. ***Please do not put your name or your GSI's name anywhere else on the exam.***

2. The exam is written on ***both sides of the page***. Be sure to answer all the questions.

3. Write all of your answers directly on the exam in the spaces provided. **Use a dark enough pen so that answers remain legible** after electronic scanning.

4. Use blank pages at the back for scratch paper NOT your own paper.

5. The exam consists of three parts. There are 21 points in total. Part I counts for 7 points; Part II counts for 7 points; and Part III counts for 7 points.

6. Turn off and put away all cellphones and other electronics.

7. We collect the exams at exactly 6:30 p.m.

PLEASE DO NOT OPEN THE EXAM UNTIL INSTRUCTED TO DO SO.

Name _____

SID Number _____

GSI or Section Number _____

During the exam, I will NOT obtain help from anyone, provide help to anyone else, or use any notes or other resources. Sign below:

_____

PART I: PROBLEMS   [14 POINTS TOTAL]

Answer all problems. Each numbered problem is independent.

1. Suppose improved agricultural practices lead to a reduction in the marginal cost of producing blueberries (which are bought and sold in a highly competitive market). If the price elasticity of demand for blueberries is greater than 1, will total spending on blueberries rise or fall as a result of the fall in marginal cost? **[2 points]**

- Because the market supply curve is the industry marginal cost curve, a reduction in the marginal cost of producing blueberries leads to a downward shift of the supply curve of blueberries (from S_1 to S_2).
- As a result, the price of blueberries falls (from P_1 to P_2) and the quantity rises (from Q_1 to Q_2).
- The price elasticity of demand is defined as the percentage change in quantity demanded divided by the percentage change in price. A price elasticity greater than 1 (in absolute value) corresponds to elastic demand.
- Elastic demand can be represented (imperfectly) in a graph by a relatively flat demand curve.
- With a price elasticity of demand greater than one, the percentage increase in quantity is larger than the percentage fall in price. Thus total spending (which is just price times quantity) rises. The area of the blue rectangle is larger than that of the red one.
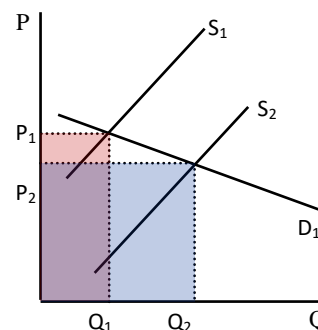
2. Let consider a market for a specific good.

   a. **[2 points]** Draw a graph to explain how the monopoly chooses production Q and price P, and why the outcome is inefficient.

   Monopoly choose P and Q to maximize the red area of profits in the graph below taking into account demand D(P). Profit maximizing Q is below efficient Q* creating deadweight loss.

Profit Maximization for a Monopolist

P

Deadweight loss

MC

Consumer Surplus

P

P*

Profits

D

Q

Q
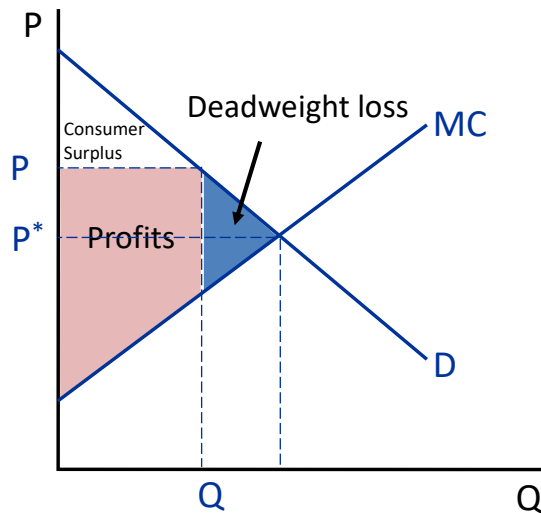
Increasing P above P* increases monopoly's profit until red area is maximized creating deadweight loss

b. Suppose the government introduces a subsidy $S per unit for consumers in this monopoly market: When a consumer buys one unit, it pays P to the monopoly but the consumer then receives S from the government. Explain graphically how the subsidy affects the demand curve. If the monopoly does not change production Q, what happens to its profits and consumer surplus? **[2 points]**

Demand shifts up by S because the marginal benefit of buying 1 unit goes up by S (as you receive S on top of the value you get from the good). If Q stays the same, profits increase by S*Q and consumer surplus does not change. The monopoly pockets the entire subsidy.

Monopoly with subsidy (keeping Q constant)

P

Consumer
Surplus

P_S

Subsidy S

MC

Profits

P^*

D_2

D

Q

Q
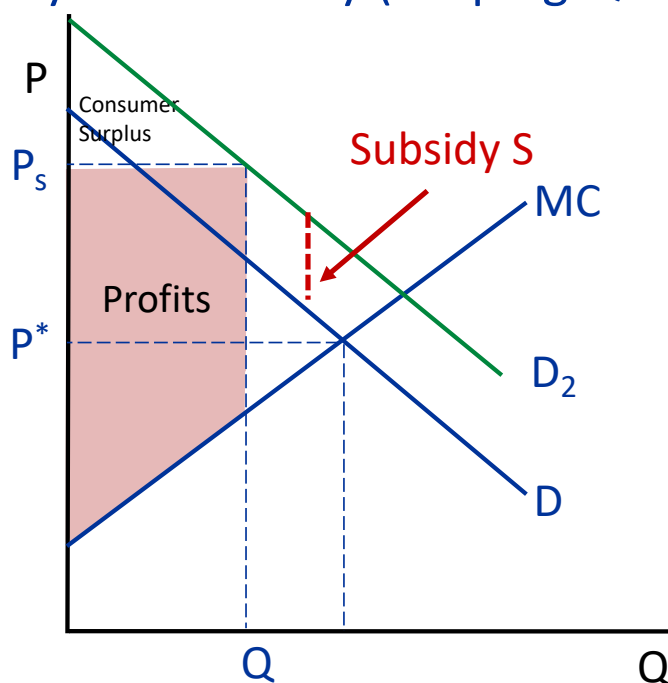
c. Show graphically that with the subsidy, the monopoly finds it profitable to increase the quantity produced relative to a. Does the subsidy increase, reduce, or does not change deadweight loss relative to a.? **[2 points]**

Hardest question: with the subsidy, increasing Q a little bit brings more profits from the marginal unit sold (as the price received by monopoly has gone up by S) while profits lost due to the decline of P along demand curve is as in a. Therefore, it is profitable for the monopoly to increase Q. Because the monopoly was underproducing relative to efficiency, this increase in Q actually reduces deadweight loss (Not expected for full credit: deadweight loss could actually increase is the subsidy is massive and leads to overproduction relative to efficiency).

Monopolist with a subsidy increases Q
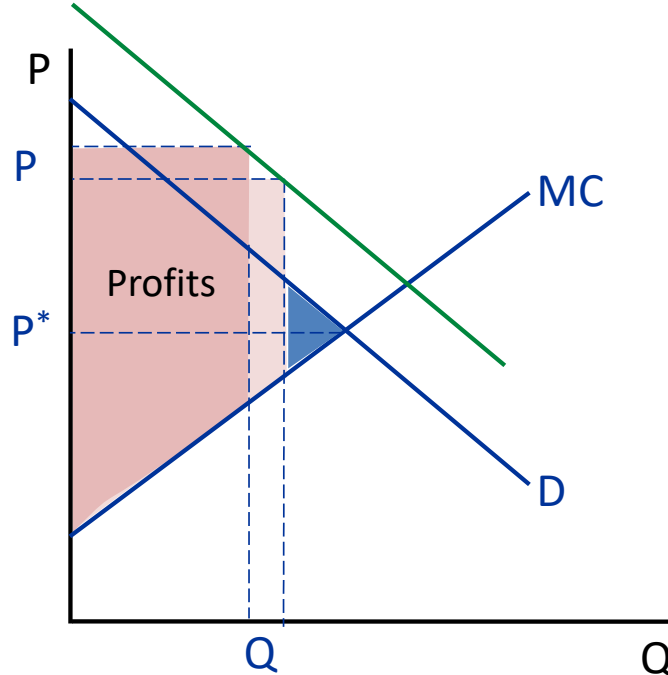
With the subsidy, increasing Q (relative to a.) is now profitable
Vertical light pink band profit gain is taller while horizontal band profit loss is as in a.
This shrinks the deadweight loss triangle in blue

3. Marketing analysts believe that the pandemic experience may have permanently reduced American households' enjoyment of travel. **[2 points]**

Consider a household that buys two goods, travel services and everything else. What will the change in the enjoyment of travel do to the amount of travel services and everything else that the household wants to consume at the initial prices for the two goods?

Before the change in tastes, utility-maximizing consumers would be choosing the quantities of travel services and everything else such that $mu_T/P_T = mu_E/P_E$.
- The change in tastes implies that the mu curve for travel services has shifted down. At the initial quantities and market prices of travel services and everything else, $mu_T/P_T < mu_E/P_E$. Therefore, the household will need to consume fewer travel services (which will push up the marginal utility of travel services) and more of everything else (which will push down the marginal utility of everything else), until $mu_T/P_T = mu_E/P_E$.
- The change in tastes has changed the quantity of travel services that a typical household wants to consume at a given price.

What will this do the household's demand curve for travel services? How will the change in the enjoyment of travel affect the equilibrium price and quantity in the market for travel services?

- This corresponds to a leftward shift in the household's demand curve for travel services


Market for Travel Services
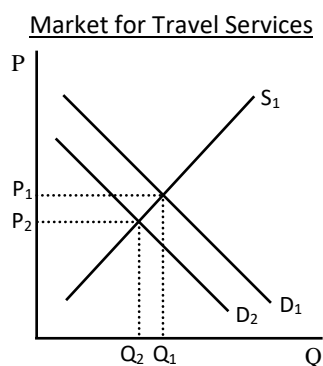
- The market demand curve is the horizontal sum of the individual households' demand curves. Thus, if the typical household's demand curve for travel services has shifted back, so has the market demand curve.
- The change in tastes will result in a fall in both the equilibrium quantity of travel services in the market and the equilibrium price.

4. Many people are concerned about the high level of rents in Berkeley.

a. Suppose the City Council imposes a price ceiling that is below the current equilibrium rent. What would this do to the quantity of apartments rented in Berkeley? What would be the effect on the ***producer*** surplus in the market for rental housing? **[2 points]**

- The initial equilibrium price is P_1 and the initial equilibrium quantity is Q_1.
- At the price ceiling (P_C), the quantity supplied is Q_S, and the quantity demanded is Q_D. There is a shortage of rental housing.
- The quantity of apartments rented after the price ceiling will be Q_S. This is true because landlords will only be willing to supply this smaller amount. When there is a shortage or a surplus, the quantity bought and sold in the market will be the smaller of quantity supplied and quantity demanded.
- Producer surplus before the price ceiling is area a+b (the area under the price and above the supply curve); after the price ceiling, producer surplus is area b. The price ceiling will lower the producer surplus in the housing market.
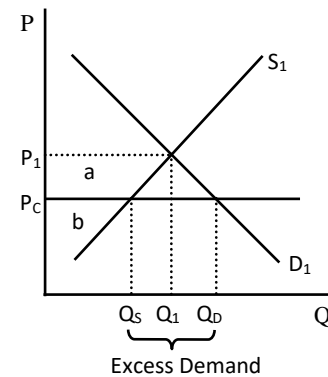
b. Suppose instead that the City Council decides to give a per-unit subsidy to landlords that reduces the equilibrium rent to the same level as the price ceiling described in part (a). In which case (the price ceiling or the subsidy to landlords) will the *consumer* surplus in the market for rental housing be larger? **[2 points]**
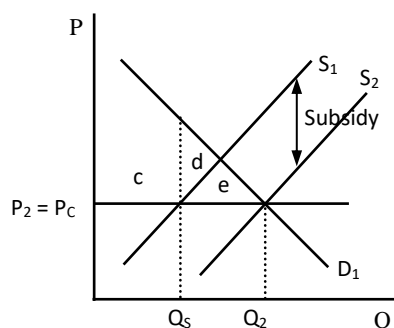
- A per-unit subsidy physically paid to landlords will shift down the supply curve by the amount of the subsidy. The problem states that the size of the subsidy is set such that it makes the new equilibrium price equal to P_C. Thus, the subsidy must be large enough that it shifts the supply curve down so that it intersects the demand curve at P_C. P_2 is the equilibrium rent when there is a subsidy of the size shown in the picture.
- The consumer surplus when there is a price ceiling is area c (the area under the demand curve and above the price ceiling, up to the quantity bought and sold). Note but not needed for credit (it could also be less than area c if the consumers who get the apartment are not the highest value consumers).
- With the subsidy, the consumer surplus is c+d+e. It is larger than at Q_S because the price is the same and the quantity is much bigger.

PART III: MULTIPLE CHOICE QUESTIONS   **[7 POINTS TOTAL]**

Each question is worth 1 point. Please write the letter of the ***best*** answer for each multiple choice questions below, like so:

       1.   **F**

       2.   **E**

       ...

1.   **C**

2.   **C**

3.   **E**

4.   **B**

5.   **D**

6.   **C**

7.   **A**

1. In an hour, Lars can do 2 Econ 2 problems, or read 4 chapters of a book, or play 6 video games. The opportunity cost to Lars of doing 1 Econ 2 problem is:
 - **A.** the number of additional points Lars would earn on the Econ 2 exam by doing the problem.
 - **B.** reading 2 chapters of a book and playing 3 video games.
 - **C.** either reading 2 chapters of a book or playing 3 video games, depending on which activity Lars would choose if they didn't do the Econ 2 problem.
 - **D.** zero, since none of the possible activities involve earning or spending money.

2. Consider a household's budget constraint between food and clothing, with food on the vertical axis. If the household's income does not change but the prices of both food and clothing double, the budget constraint will:
 - **A.** not change.
 - **B.** shift out.
 - **C.** shift in.
 - **D.** it is not possible to tell.

3. The demand curve facing an individual firm in a perfectly competitive market (over the range of quantities the firm could plausibly produce) is:
 - **A.** the same as its marginal revenue curve.
 - **B.** perfectly elastic at the prevailing market price.
 - **C.** the same as its marginal cost curve.
 - **D.** always above the firm's average total cost curve.

E. (A) and (B).
F. (A) and (C).
G. (B) and (D).
H. (C) and (D).

4. If we observe increases in both the price and quantity of a good that is produced and sold in a perfectly competitive market, we can deduce that:
   A. the supply curve must have shifted.
   B. the demand curve must have shifted.
   C. the supply and the demand curve must both have shifted.
   D. we cannot deduce anything about shifts of the curves.

5. A drought in blueberry-growing areas will cause:
   a. both the price and quantity of blueberries to fall.
   b. both the price and quantity of blueberries to rise.
   c. the price of blueberries to fall and their quantity to rise.
   d. the price of blueberries to rise and their quantity to fall.

6. A utility-maximizing household will allocate its spending so that:
   a. the total utility it gets from each good is the same.
   b. the additional utility it gets from one more unit of each good is the same.
   c. the additional utility it gets from spending one more dollar on each good is the same.
   d. the average utility it gets per dollar spent is the same for each good.

7. Suppose the price elasticity of supply in a competitive market is very high. Then an outward shift of the demand curve will tend to cause:
   a. a large rise in quantity and a small rise in price.
   b. a small rise in quantity and a large rise in price.
   c. a large fall in quantity and a small rise in price.
   d. a small fall in quantity and a large rise in price.