

**ECONOMICS 1  
FIRST MIDTERM EXAMINATION**

October 5, 2011

**INSTRUCTIONS**

1. Please fill in the information below:

Student's Name: \_\_\_\_\_

SID #: \_\_\_\_\_

GSI's Name: \_\_\_\_\_

Section Number (Day/Time): \_\_\_\_\_

2. **This exam starts at 12:08 pm and ends at 12:58pm.**
3. If you finish early, please remain in your seat so that you do not disturb others.
4. When time is called, please stop writing and pass your exam to the aisle. Please stay in your seats until all the exams are collected.
5. **There is a total of 100 points, 5 questions, and 7 pages (including this cover sheet) points for each question are in parenthesis.**
6. **NO BLUE BOOKS NEEDED.** Please answer the questions in the space provided. If you need extra room to answer the questions, use the backs of the pages.
7. **Calculators are not permitted.**
8. Good Luck!!!

**DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO BEGIN THE EXAM**

**Question 1: TRUE, FALSE, UNCERTAIN. (24 points)**

For each question explain whether the statement is false, true or uncertain. Your grade is determined by your explanation; an answer without an explanation receives no credit. Use graphs when needed to complement your answer.

a) (8 points)

In a monopoly market, the firm is not a “price taker”, and so it might set the price of the product at where the elasticity of demand is below 1 in magnitude.

False. The monopolist would raise its price until elasticity was no longer less than one. As demand elasticity is below 1, when the firm increases the price, the quantity decreases, but the total revenue would increase, which generates more profit for the firm.

b) (8 points)

Consider a good that is infinitely divisible (that is, consumers can buy and consume fractional quantities). Each consumer buys a different quantity, including some consumers who do not buy any of the good (quantity of zero). At their levels of consumption, all consumers have the same marginal willingness to pay for the good.

False .  $MWTP=p$  only if the consumer consumes a strictly positive amount; if  $MWTP < p$  for all  $q > 0$ , then the person will buy none. So all consumers that consume more than 0 will have the same  $MWTP$ , but consumers that consume 0 will have different  $MWTP$ s.

c) (8 points)

Effective minimum wage legislation benefits all low-skilled workers in the economy.

False. A binding minimum wage would increase the wage of low-skilled workers who found a job, but would reduce the number of low-skilled workers who would be able to find a job. (At the minimum wage, the quantity of low skilled workers demanded is lower at the minimum wage than at the equilibrium wage.) So those workers who would find a job at the original wage but can't find a job at the minimum wage are hurt by the legislation.

**Question 2: (21 points) PPF**

Suppose there are two countries, Capriland and Melodia. Both countries produce two goods, pianos and cars. Furthermore, assume that both countries have linear production possibility frontiers (PPFs). The following table provides information about the amount of labor necessary to produce one piano or one car in each of these two countries.

Assume that Capriland and Melodia both have a total of 120 hours of labor available to devote to the production of pianos and cars. (Hint: put pianos (P) on the vertical axis and cars (C) on the horizontal axis as you work the various parts of this problem.)

	Labor Needed to Produce One Piano	Labor Needed to Produce One Car
Capriland	2 hours of labor	10 hours of labor
Melodia	4 hours of labor	12 hours of labor

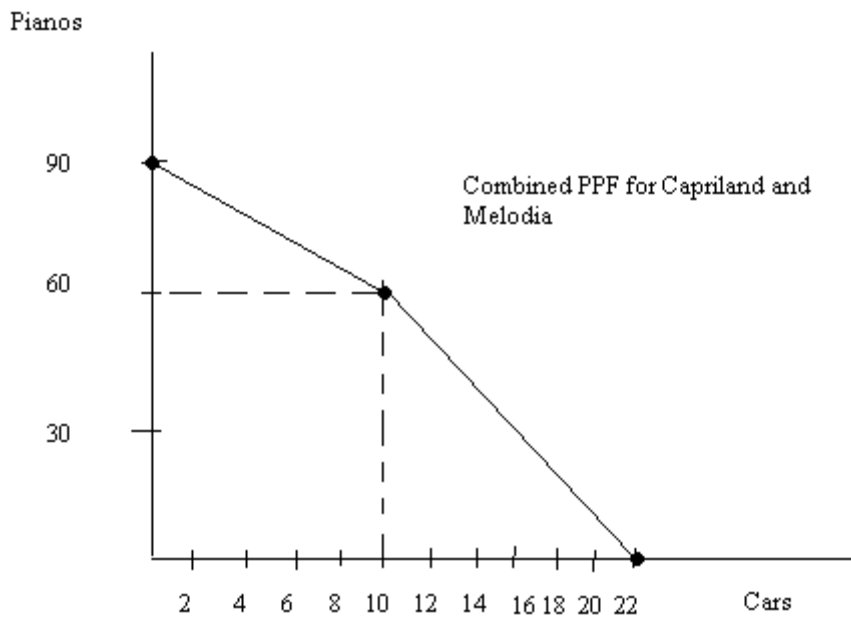
a. (9 points) Given the above information, write an equation that represents Capriland's PPF. In your equation pianos should be abbreviated as P and cars should be abbreviated as C.

With 120 hours of labor Capriland can produce 60 pianos and 0 cars or 12 cars and 0 pianos. Using these two points we can write an equation for Capriland's PPF as  $P = 60 - 5C$ . This equation could also be expressed as  $C = 12 - (1/5)P$ .

b. (12 points)

Suppose the two countries decide to merge into one. Given the initial information, construct a PPF that illustrates the production possibility frontier for these two countries combined. If the PPF has different linear segments identify the coordinates of the endpoints for any segment. Label your graph carefully and completely. Measure pianos (P) on the vertical axis and cars (C) on the horizontal axis.

Answer:



### Question 3: Demand and Supply (25 points)

The following equations depict the market demand and supply curves for a good, where  $Q$  is the quantity and  $P$  is the price:

Market Demand:  $Q_d = 5000 - 460P$

Market Supply:  $Q_s = -100 + 50P$

For the following questions, show your numerical calculations and you may use graphs in your explanation.

a) (8 points)

What are the equilibrium price and quantity sold? Be sure to show your numerical calculations.

$$Q_d = Q_s$$

$$5000 - 460P = -100 + 50P$$

$$5100 = 510P$$

So:

$$P^* = 10$$

$$Q^* = 5000 - 460 \cdot 10 = 400$$

b) (9 points)

The government imposes excise tax of  $t$  per unit. What will be the equilibrium price now? Express your answer as a formula for price that depends on  $t$ . Show how you derived your formula.

Two methods (either answer is correct):

1. Shift in supply curve

Let  $P$  be the price paid by consumers. Then the price received by suppliers is  $P-t$ . The supply curve then becomes  $Q_s = -100 + 50(P-t)$ .

Set  $Q_d = Q_s$  and solve for  $P$

$$5000 - 460P = -100 + 50(P-t)$$

$$P^* = (5100 + 50t) / 510 = 10 + (5/51)t$$

So price paid by consumers rises by  $5/51$ -th of  $t$ . Price received by suppliers is

$$P-t = 10 + (5/51)t - t = 10 - (46/51)t.$$

2. Shift in demand curve

Let  $P$  be the price received by suppliers. Then price paid by consumers is  $P+t$ . The demand curve then becomes:  $Q_d = 5000 - 460(P+t)$ .

Set  $Q_d = Q_s$  and solve for  $P$

$$5000 - 460(P+t) = -100 + 50P$$

$$P^* = (5100 - 460t) / 510 = 10 - (46/51)t$$

So price received by suppliers drops by  $46/51$ -th of the tax. Price paid by consumers is  $P+t = 10 - (46/51)t + t = 10 + (5/51)t$ . So price paid by

c) (8 points)

Which group bears a larger burden of the tax -- the consumers or producers? Explain your answer.

Producers bears a larger burden of the tax: The producers' burden is  $46/51$ -th of the tax and the consumers' burden is  $5/51$ -th of the tax.

Extra explanation that is not needed for full credit:

Consumers have very elastic demand in this example, much higher than the elasticity of supply.

Elasticity of Demand at equilibrium price and quantity in (a):  $E_d = -460 \cdot 10 / 400 = -11.5$

Elasticity of Supply at equilibrium price and quantity in (a):  $E_s = 50 \cdot 10 / 400 = 1.25$

Since suppliers are less responsive than consumers, suppliers end up bearing a larger share of the tax.

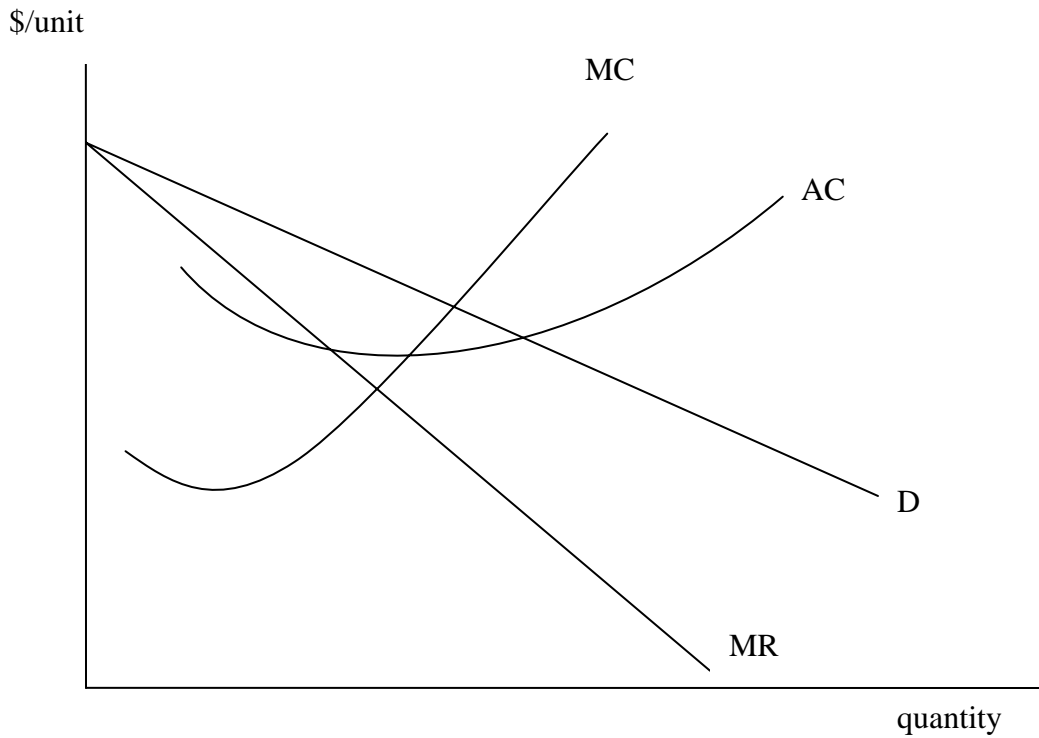
**Question 4: Competition (15 points)**

Explain, using words and graphs, why the market demand curve and the firm's marginal cost curve do not affect the equilibrium price in stage 2 of a perfectly competitive market.

Equilibrium price in stage 2 is equal to the minimum AC. The market demand curve simply determines the total amount sold at this price and the number of firms in the market. The firm's marginal cost curve is not relevant because  $MC=AC$  at  $\min AC$ , and so the firm necessarily produces at the minimum of the AC curve. (Lots of different explanation are fine here.)

**Question 5: Monopoly. (15 points)**

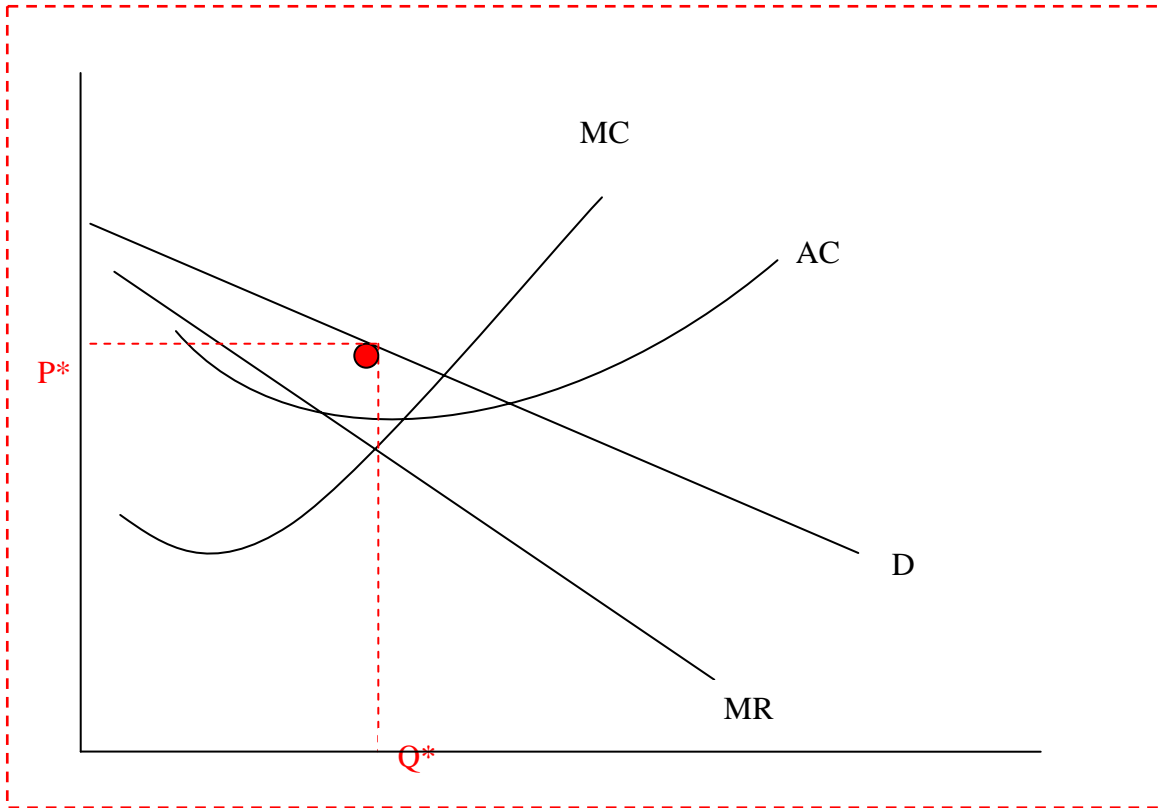
A monopolist faces the following revenue and cost curves.



a. (5 points)

Show on the graph the price and output that the monopolist will choose. Mark them as  $P^*$  and  $Q^*$ . Just put them on the graph: there is no need for a verbal explanation.



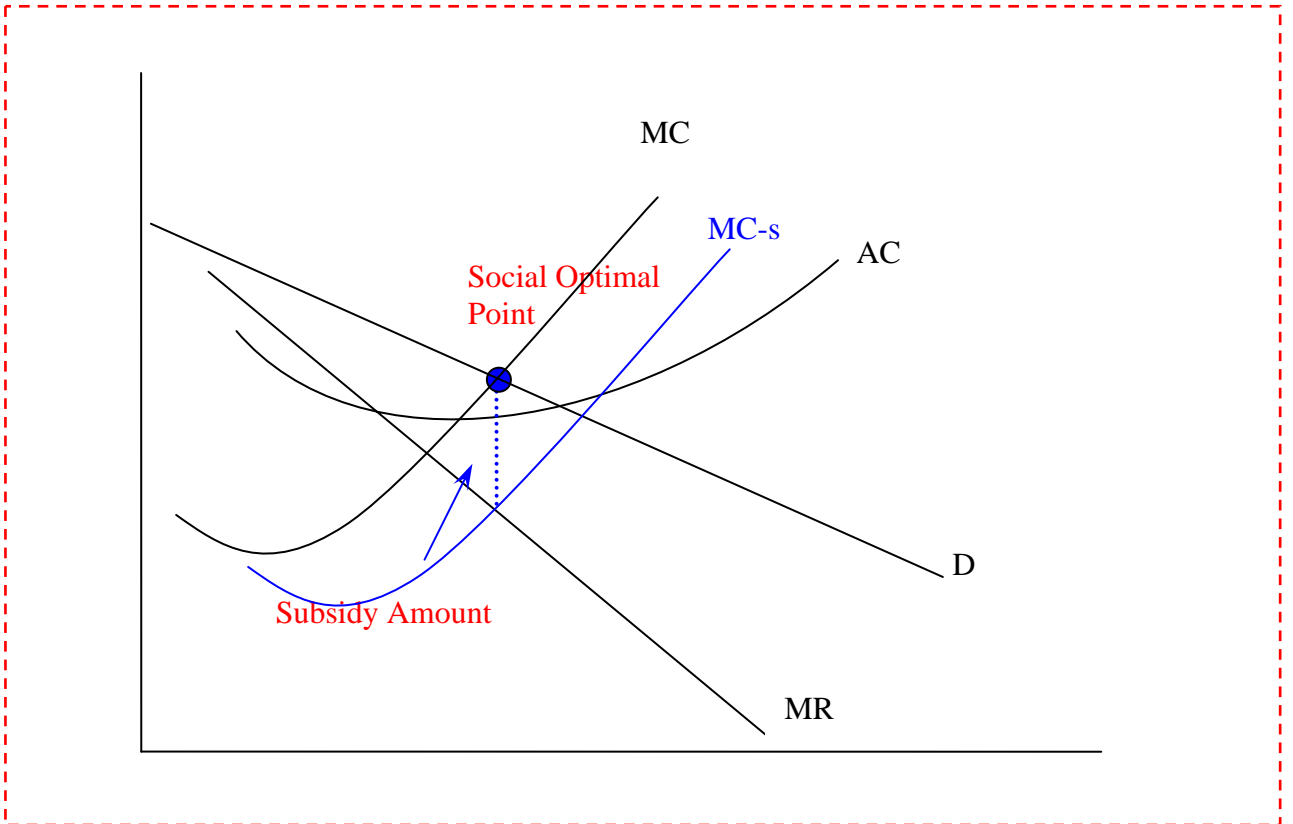


b. (10 points)

The government can induce the monopolist to increase its output by giving the firm a subsidy per unit sold. Show on the graph the amount of subsidy per unit that is needed in order to induce the firm to produce the socially optimal level of output. Explain your answer briefly below.

The socially optimal output occurs where the MC intersects D (such that  $MWTP=MC$ ). There are two ways to show the effect of a subsidy (either explanation is fine for full credit):

1. A shift in the MC curve. The subsidy shifts the monopolist's MC curve down by  $s$ , where  $s$  is the subsidy per unit. The monopolist chooses its output where this lower MC curve intersects MR. The optimal subsidy shifts MC down just the amount that is needed for it to intersect MR at the socially output output, as shown in the graph below



2. A shift in the demand curve. The subsidy shifts the demand curve up by  $s$ , where  $s$  is the subsidy per unit. The MR curve therefore shifts up by  $s$ . The monopolist chooses its output where its MC intersects the new MR at the socially optimal output, as shown in the graph below:

