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Exam 1
Fall 2024

DO NOT OPEN THIS EXAM UNTIL YOU ARE TOLD TO DO SO.

Instructions

1. Write your SUID in the upper right corner of this exam. **DO NOT** write your name.

2. **SHOW ALL YOUR WORK**. Answers without supporting work will receive little or no credit.

3. There are 75 points possible on this exam and you will have 80 minutes to complete it. Be sure to budget your time accordingly.

4. You may write on the backs of pages, on the extra page at the end, or on extra sheets of paper but **BE SURE TO NOTE THAT NEAR THE QUESTION**.

5. If you use extra sheets of paper, please number them so you can do step 4 above.

Area of a triangle: $\frac{1}{2}bh$ Area of a trapezoid: $\left(\frac{b_1 + b_2}{2}\right)h$

Question 1 (30 points)

A good is purchased by households of types A and B and produced by sellers of type C. Key information about each group is shown below, where *count* is the number of individuals of that type:

Type	Count	Curve	Income
Individual type A buyer	50	$WTP_a = 500 - 5Q_{Ai}^D$	80,000
Individual type B buyer	40	$WTP_b = 200 - 2Q_{Bi}^D$	30,000
Individual type C seller	90	$WTA_c = 20 + 1Q_{Ci}^S$	NA

(a)   *15 points.* Please compute: □ the market equilibrium price and quantity; □ the quantities purchased by an individual of each type (A and B); and □ illustrate the market equilibrium with an appropriate graph. (There is additional space on the next page.)

Additional space for Question 1.

Question 1, continued

Now suppose the government is considering a $40 tax on the good and would like to know how it would impact the market, whether buyers or sellers benefit the most, and whether it would be progressive or regressive.

(b)   *15 points.* Please compute the following when the tax is in place: ☐ the new buyer and seller prices; ☐ the percentages of the tax burden borne by buyers and sellers; ☐ the new market quantity; ☐ the new quantity purchased by an individual household of each buyer type (A and B); and, finally, ☐ indicate whether the tax is progressive or regressive, including all necessary calculations.

Question 2 (15 points)

A key goal of EU climate policy is to shift people from gas and diesel cars to electric vehicles (EVs). At the same time, the EU has just imposed a substantial tariff on EVs from China to protect its domestic car industry. This question explores the conflict between those goals via a stylized version of the EU EV market.

Suppose the demand for EVs by consumers has an elasticity of -2 and the supply elasticity of EVs by European manufacturers (E) is 1. Initially, the price of an EV is $40,000 and 4 million are being purchased, all produced by EU manufacturers (E).

(a)   *6 points*. Suppose China (C) begins manufacturing and exporting EVs with a perfectly elastic supply at WTA_C = $20,000. Starting from the initial equilibrium, please determine the following for the new equilibrium: □ the price P^d, the total quantity consumed, Q_M, and the quantities produced by the EU and China, Q_E and Q_C. To keep things simple, you should assume throughout the problem that buyers regard EVs from the EU and China as identical: P^d is the same for both.

Question 2, continued

(b)   *9 points.* Now suppose instead that the EU imposes a $10,000 tariff on Chinese EVs when they become available. Starting the analysis from the initial equilibrium, please determine the following for the new equilibrium when the tariff is imposed: ☐ the price P^d, the total quantity consumed, Q_M, and the quantities produced by the EU and China, Q_E and Q_C.

Finally, compute the following to compare the tariff equilibrium with the previous one from part (a) that had no tariff: ☐ the change in CS; ☐ the change in PS for EU manufacturers; and ☐ the revenue is produced by the tariff. Finally, ☐ briefly comment on the tariff's impacts on the EU's two goals: protecting its industry and expanding the EV market.

Suppose that consumption of a particular good creates a positive externality. The market WTP and WTA curves for the good are given below, as is the marginal benefit curve for the externality. Initially there is no tax or subsidy.

$$WTP = 800 - 4Q$$
$$WTA = 200 + 2Q$$
$$MB_e = 2Q$$

15 points. Please determine: □ the initial market equilibrium price and quantity in the absence of a policy; □ the efficient quantity; □ the efficient buyer and seller prices; □ the subsidy that would move the market to the efficient equilibrium; □ the change in government revenue; and □ the change externality benefits created by the policy.

Question 4 (15 points)

A government is considering a sin tax to discourage consumption of a particular product. The product is purchased by two buyers, A and B, and produced by one seller, C. The demands and supplies for each are given below:

$$Q_A^D = 1200 - 2P^d$$
$$Q_B^D = 600 - 4P^d$$
$$Q_C^S = 12P^s$$

Initially (BAU), there are no taxes or subsidies. The government is considering imposing a $60 tax on the good.

15 points. Please determine: □ the initial BAU equilibrium prices and values of Q_A^D, Q_B^D and Q_C^S. Then, determine: □ the equilibrium buyer and seller prices under the tax policy; □ the buyer and seller tax burdens; □ the new quantities Q_A^D, Q_B^D and Q_C^S; and □ the amount of total tax revenue contributed by each agent, A, B and C. Finally, discuss how the tax impacts the two buyers by comparing percentage changes in Q and total tax revenue paid.

Additional page for calculations
If you use this, please remember to indicate near the question that part of the answer is here.