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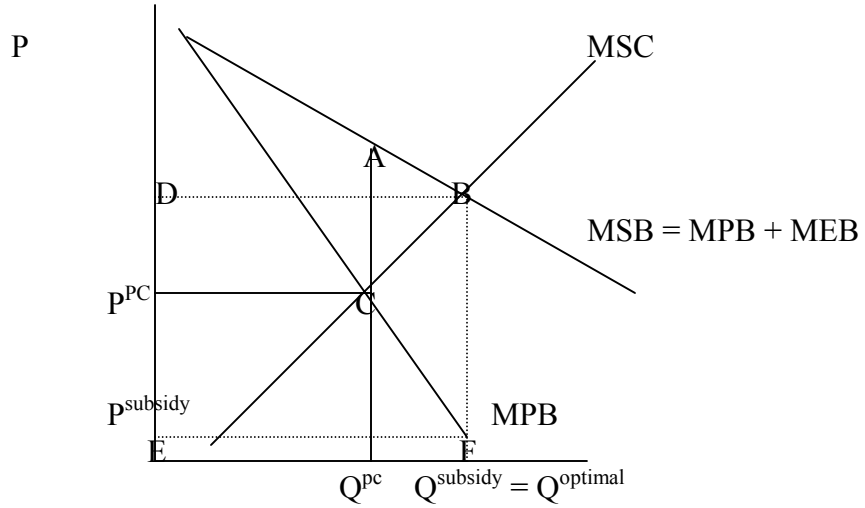
FE431: PUBLIC FINANCE
Fall 2006
Professor Schmitt
Homework 7 – due September 23rd

1. Assume that a positive externality is associated with college enrollment. Assume that college instruction is sold in a competitive market and that the marginal social cost of providing it increases with enrollment. Show how a corrective subsidy to college students will increase the market price of instruction. Show the net gain in efficiency (well-being) possible from the subsidy and the amount of tax revenue required to finance its cost on your graph.



MSC slopes upward because the social cost of providing instruction increases with enrollment.

ABC is the net gain in efficiency (well-being) – because it is the deadweight loss associated with perfect competition and no subsidy.

BDEF is the tax revenue required to finance the subsidy.

2. True/False/Explain: According to the Coase Theorem, corrective taxes are necessary to internalize negative externalities when transactions costs of exchanging property rights are zero.

False – with zero transactions costs the efficient outcome is reached because parties can freely exchange property rights (regardless of who is given initial rights)

3. The supply of paper is described by the following equation:

$$Q^S = 5{,}000P$$

Where Q^S is tons supplied per year and P is the price per ton. The demand is described by

$$Q^D = 400{,}000 - 1{,}000P$$

Where Q^D is tons demanded per year. Because of the pollution associated with paper production, marginal external costs of $20 are associated with each ton of paper.

a. Assuming that paper is sold in a competitive market, what is the market price per year?

$Q^S = Q^D = 400{,}000 - 1{,}000P = 5{,}000P$
→ $400{,}000 = 6{,}000\ P$
or $P = 400{,}000/6{,}000 = \$66.67$ per ton

b. How many tons of paper will be produced per year at that price?

Plug into either Q^S or Q^D → $Q^S = 5{,}000*66.67 = 333{,}350$ tons sold
$Q^D = 400{,}000 - 1{,}000*66.67 = 333{,}330$ tons sold (just a rounding difference)

c. What is the efficient annual output of paper?

To calculate the efficient output of paper add $20 to the supply, however to correctly indicate this on the graph the supply shifts left. Therefore, we need to invert Q^S (so now it is P as a function of Q, not Q as a function of P)

The supply curve becomes $Q^S/ 5000 = P$ → so $P = 20 + Q/5000$
From demand → $P = 400 - Q/1000$
→ $20 + Q/5000 = 400 - Q/1000$
or $Q = 316{,}667$ tons sold is the efficient quantity

d. How can a corrective tax achieve efficiency?

A corrective tax of $20 per ton can achieve the efficient output.