Economics 3250
Spring 2005

Dr. Lozada
Exam 2

Do Not Turn This Page Over Until You Are So Instructed!

This exam has 25 points. There are six questions on the exam. Questions 1, 4, and 5 are worth 5 points each; Question 2 is worth 4 points; and Questions 3 and 6 are worth 3 points each. Put your answers to the exam in a blue book or on blank sheets of paper.

You have **one hour** (that is, until **11:45am**) to take this test. After the test is over, I'll lecture until the regular class period ends.

Answer the questions using as much precision and detail as possible. Correct answers which are unsupported by explanations will not be awarded points. Therefore, even if you think something is "obvious," do not omit it. If you omit anything, you will not get credit for it. You get credit for nothing which does not explicitly appear in your answer. If you have questions about the adequacy of an explanation of yours during the exam, ask me.

Answer all of the following six questions.

1. [**5 points**] In Figure 1, a Marginal External Cost curve and a Marginal Net Private Benefit curve are drawn. Interpret (that is, describe the economic importance and meaning of) areas a, b, c, and d of Figure 1 if:
   (a) there is no regulation;
   (b) there is a pollution standard imposed at the socially optimal level;
   (c) there is a pollution tax imposed at the socially optimal level.
2. [**4 points**] Suppose two factories, A and B, produce pollution. The cost of reducing pollution by 1 ton is \$50 in factory A and \$60 in factory B. Current emissions are 5 from A and 5 from B, so 10 total. It is desired to reduce total emissions to 8. Show (with numbers) how tradeable permits could improve on command-and-control regulation in this situation.
3. [**3 points**] What is "regulatory capture"?
4. [**5 points**] Explain, in Figure 2, the importance of effort levels 1, 2, and 3. When do you expect each of these to be the level of effort observed? Why? Which is/are efficient and which are not?
5. [**5 points**] Why don't neoclassical economists think exhaustible resource firms will keep producing the output that maximizes short-run profit as long as they can?
6. [**3 points**] Give one reason why a recycling program may not, overall, benefit the environment.

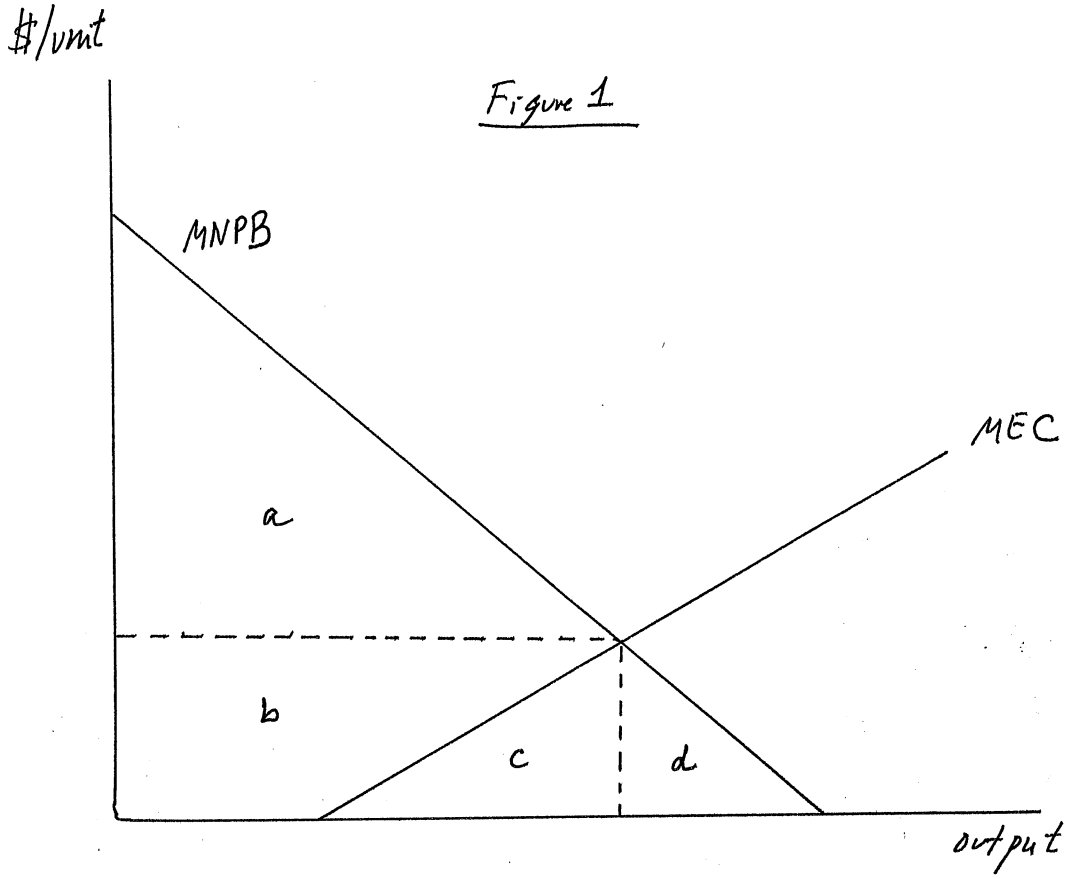


Figure 1

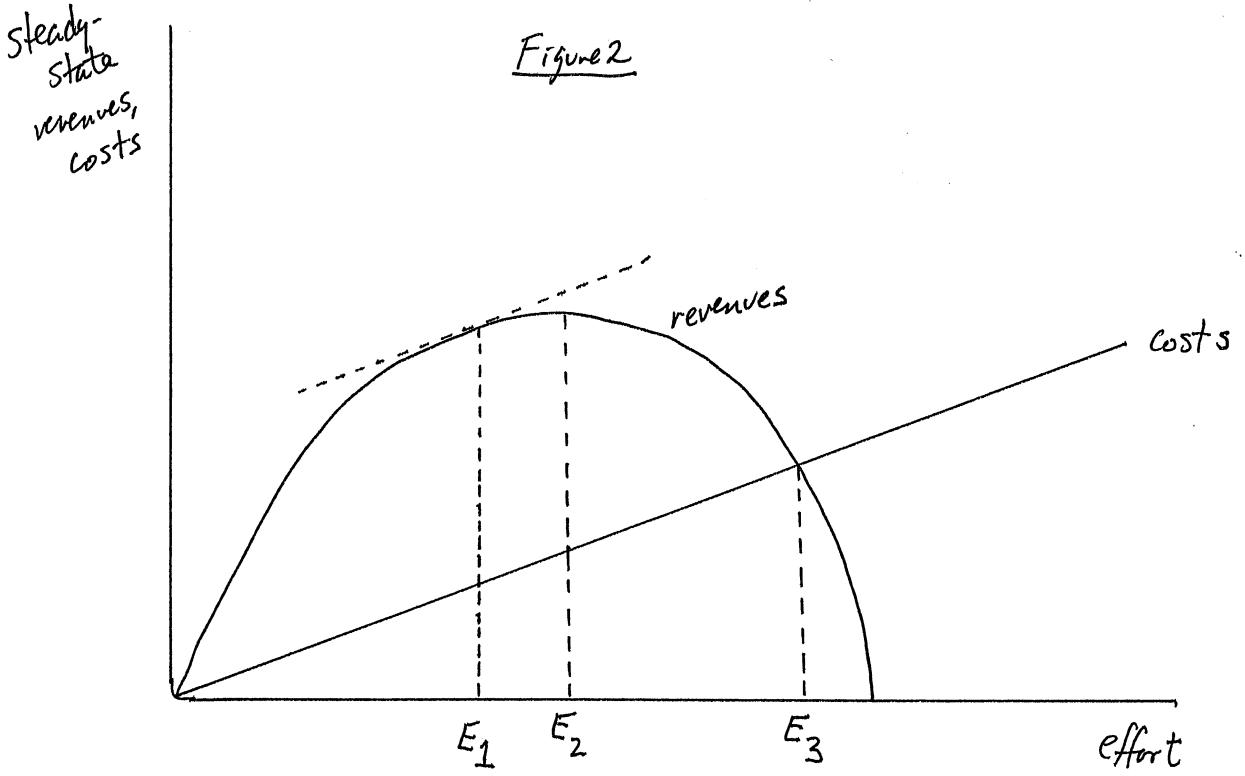


Figure 2

Answers to Exam 2, Econ 3250, Spring 2005

(1)

a) all four areas are firm profit ("π"), since $\pi = NPB$ and they lie under the MNPB curve. Output is where $MNPB = 0$, which maximizes π.

b) Areas a, b, and c are profit, while area "d" is lost because output declines to its so-called-optimal level, which is where MNPB crosses MEC.

c) Output is the same as in part (b), so area "d" is lost. The pollution tax captures areas "b" and "c" from the firm, so the only π left is area "a".

(2) The command-and-control approach would be for each firm to reduce its emissions from 5 to 4. (At least this would be the most common command-and-control approach.)

The tradeable permits approach would involve giving each firm 4 permits (if initial allocation was by grandfathering; there are other approaches). If the price of permits is between \$50 and \$60 per ton, A would like to sell permits (receiving > \$50 apiece) and reduce pollution more (costing only \$50/ton), while B would like to buy permits (paying < \$60 apiece) and reduce pollution less (saving \$60/ton). B starts with 4 permits; it only needs to buy 1 more in order to avoid having to reduce pollution at all from its initial level of 5.

(2) continues →

Pollution Control Costs

	A	B	A+B	
Command and control	50	60	110	← so tradeable permits are better
tradeable permits	100	0	100	←
Cost of trading the tradeable permits	(between $50 and $60)	+ (between $50 and $60)		} optimal
Tradeable permit pollution control costs + trading costs	between and	between $50 and $60		

(3)

The tendency of government regulators to empathize with the industry they are regulating, and thus favor it over the general public to an unwarranted extent ("unwarranted" from the viewpoint of socially optimal behavior).

(4) E_1 is the profit-maximizing level of effort, because revenues exceed costs by the greatest amount at E_1. If the fishery is private property and is in steady state equilibrium, E_1 would be the level of effort. Optimal: Typically, private property maximizes the present discounted value of profit, not short-run profit, so it's not in a steady state, instead approaching (but never reaching) a steady state determined partially by the discount rate.

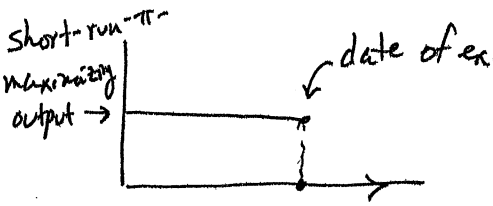
E_2 is the maximum sustainable yield effort level. Regulators who are biologists often limit effort to E_2. ↑ because revenue, and hence yield (if price is constant), is maximized here

E_3 is the open-access equilibrium, where profit = 0. If profit weren't zero, there'd be entry or exit ($\uparrow E$ or $\downarrow E$) depending on whether profit was > 0 or < 0. Entry and exit are possible in open access, but not in a MSY-regulated fishery (beyond E_2), nor in private property (except that the owner himself can adjust effort — no one else can enter his private property).

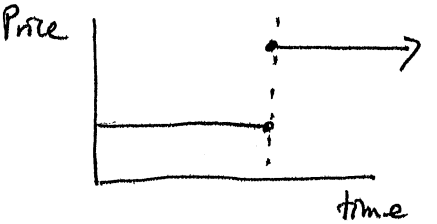
Since E_1 is efficient, neither E_2 nor E_3 are. Optional: E_3 is particularly inefficient, since from there you could both ↑ revenue and ↓ cost by reducing effort.

⑤

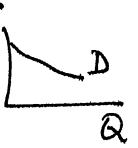
This implies



and hence



because if output jumps down, price has to jump up to stay on the demand curve,



. But any firm seeing (foreseeing) this price path will want to take advantage of the price jump by

conserving some resource till just after the "date of exhaustion," when the price is high. Hence the "date of exhaustion" won't really be the date of exhaustion; this plan is internally inconsistent with profit maximizing firms.

(6)

Recycling requires moving large quantities of paper, aluminum, etc. from many different places to recycling facilities. This transportation of materials requires lots of fuel and creates air pollution, so it itself damages the environment. (Hauling everything to a landfill also requires fuel and creates air pollution, but probably less, since everything is going to the same place.)