Economics 5250 Dr. Lozada
Fall 2006 Final Exam

This exam has 67 points. There are eight questions on the exam; you should work all of them. Most of the questions are are worth 8 points each, but Question 4 is worth 11 points.

Put your answers to the exam in the blue books you have brought (if you remembered to bring blue books).

Answer the questions using as much precision and detail as the time allows. 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.

You have two hours to finish this test.

Answer all of the following eight questions.

1. **[8 points]**

   (a) Explain the Coase Theorem. Use a graph with quantity of output on the horizontal axis in your explanation, and use as your example a polluting firm harming people who live nearby the firm.

   (b) Suppose a firm could keep secret the position of its Marginal Net Private Benefit Curve. (So the firm could tell a lie about the position of MNPB, and the pollution sufferers would believe the lie.) Could a firm benefit from this ability to lie, in the context of Coasian bargaining, and if so, how could it benefit?

2. **[8 points]** What is the point of the "Corrected Figure 8.2" which is attached to this exam? Explain this in complete detail.

3. **[8 points]** Environmentalists often argue that the discount rates used in cost-benefit analysis should be low. Why do they argue this way? (You may ignore the reasons leading environmentalists to sometimes argue the opposite way.)

4. **[11 points]** (You may be able to answer part (c) of this question even if you cannot answer parts (a) and (b), so do not give up too soon.)

   (a) We derived an "upside-down U" shape for the relationship between steady-state harvest and effort in an open access fishery. How did we derive this?

   (b) As part (a) mentions, we derived an "upside-down U" shape for the relationship between steady-state harvest and effort in an open access fishery. How did we get from that to a backward-bending supply curve?

   (c) Give a non-mathematical, non-graphical explanation of why the open access fishery has a backward-bending steady-state supply curve.

   Also explain how the backward-bending supply curve makes the market for fish odd or unusual.

5. **[8 points]**

   (a) Why do neoclassical economists think exhaustible resource firms will follow the Hotelling Rule instead of behaving just like producible resource firms?

   (b) Why might the neoclassical theory described in part (a) be wrong?

6. **[8 points]** Give more than one example of environmental problems which are serious in some low-income ("developing") countries but are not present at all, or are quite minor, in higher-income countries. To what extent do you think the solutions to environmental problems proposed for high-income countries would or would not help low-income countries?

7. **[8 points]** Describe the "Cornucopian" view of resources. Describe criticisms of that view too.

8. **[8 points]** Herman Daly has written about the following ends-means spectrum:

   - Ultimate End
   - Intermediate End
   - Intermediate Means
   - Ultimate Means.

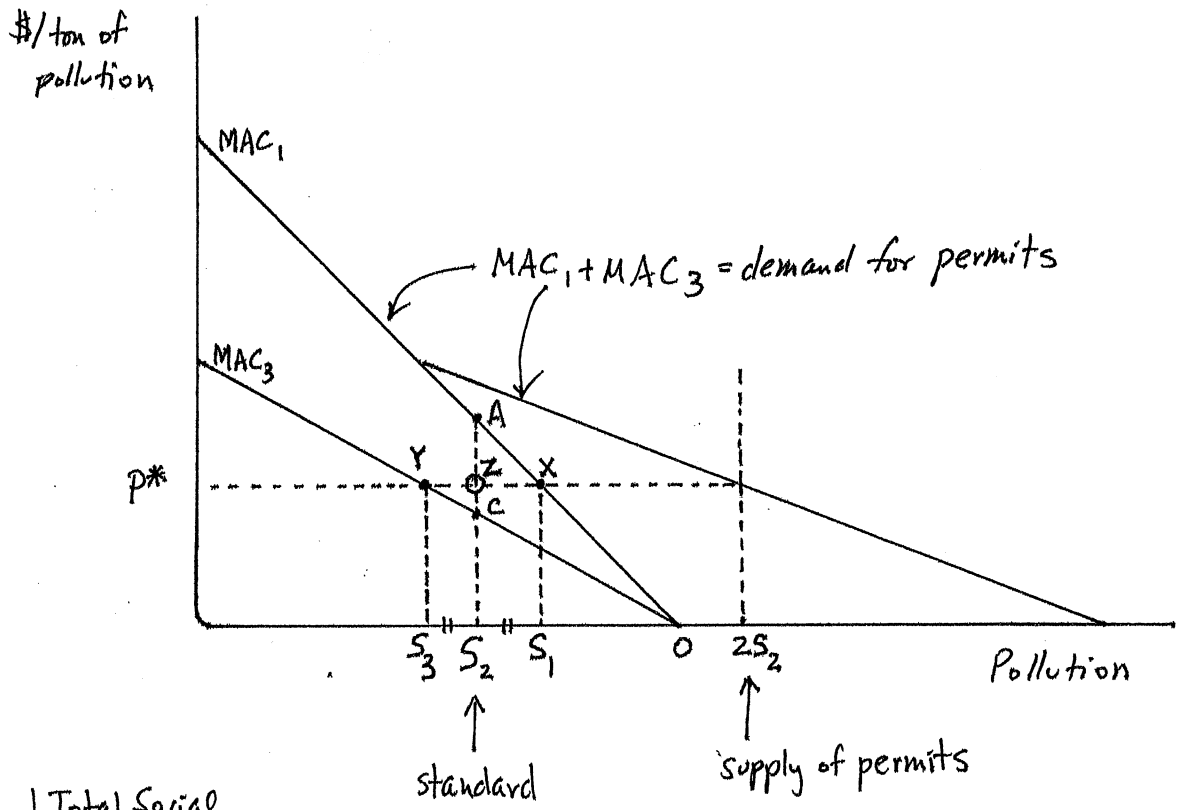
   What do these terms mean?

   What academic disciplines study the first and last components of this spectrum, and which academic disciplines study the connections between each of the components?

   What is the relevance of all this for our course?

Corrected Fig. 8.2

Suppose $S_3S_2 = S_2S_1$.

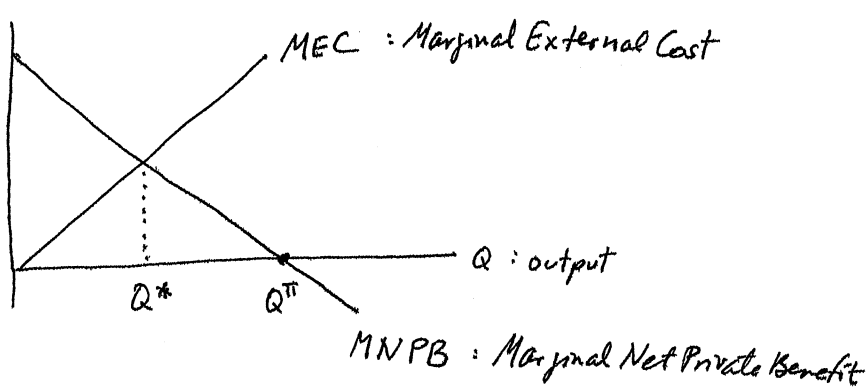


	Total Social Abatement Costs
Standard	$OAS_2 + OCS_2$
Mkt. Perm.	$OXS_1 + OYS_3$
Perm. Advantage	$+AXS_1S_2 - YCS_2S_3 > 0$

	Firm 1	Firm 3
abatement costs	save AXS_1S_2	pay YCS_2S_3
permits	pay ZXS_1S_2	receive $ZXS_1S_2 = YZS_2S_3$
Perm-advantage	AXZ	YZC

Answers to Econ 5250 Final Exam, Fall 2006

① a)

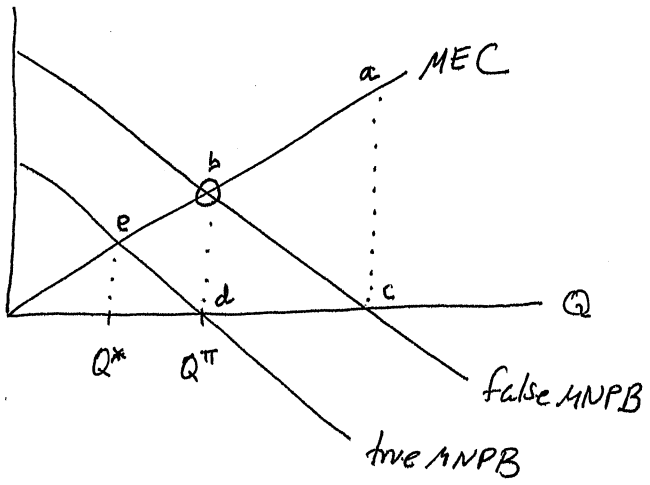


If the firm has the right to pollute, it wants to go to Q^{π}. Pollution victims, however, are willing and able to pay up to the MEC curve for output to be decreased. For $Q > Q^*$, what the firm requires to reduce output, MNPB, is less than what victims are willing and able to pay, MEC, so mutually beneficial agreements reduce output to Q^*. For $Q < Q^*$, no more trades are possible, because firms demand MNPB, which is > what victims are willing and able to pay.

If victims have the right to no pollution, they want to go to $Q = 0$, but they only demand MEC in return for increasing output, and the firm is willing to pay them MNPB. So they'll bargain up from $Q = 0$ to $Q = Q^*$.

Hence in the abscence of bargaining or transactions, Q will be the socially optimal level of Q^* regardless of who owns the property right.

b)



With the false MNPB, output after Coasian Bargaining is indicated by the circle, ○. [Optional: if this is at Q^{π}, as I've drawn it, the firm is very happy because its optimal output Q^{π} occurs. Usually, though, the false MNPB won't cross MEC right at Q^{π}.] The firm would try to ensure that the circled output was closer to its desired output of Q^{π} than Q^{*} was. Then the firm would benefit.

optional

If the firm has the property right, it receives (at most) "abc" with the false MNPB and only bde with the true MNPB; but we do not know how much it actually receives in either situation, and it could receive nothing more than lost profits (i.e., no real gain) if the consumers bargain well.

If consumers have the property right, the firm has to pay them at least the area under the MEC curve to be able to move to Q^{*} or Q^{π}; the firm's minimum payment is larger to get to Q^{π} than Q^{*}. The firm doesn't want to make payments of MEC (or more) when $Q > Q^{*}$, since MEC > true MNPB there.

(2) The point is that Total Social Abatement Costs are less under a marketable permits scheme than under a standard, holding pollution levels fixed.

MAC = Marginal Abatement Costs

Total Social Abatement Costs = area under MAC curve

With the standard, both firms are at S_2.

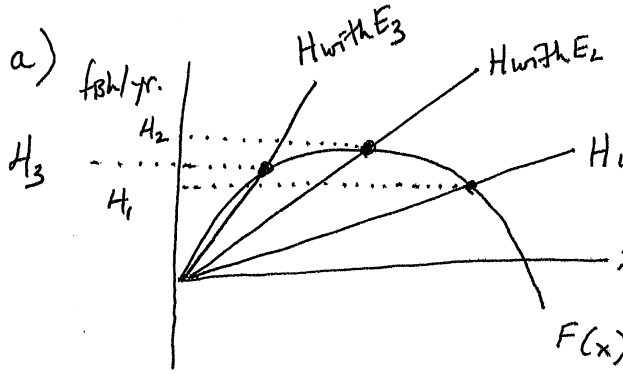
With $2 S_2$ marketable permits, supply = demand at P^*, so firm 1 is at X and firm 3 is at Y.

$AX S_1 S_2 > YC S_2 S_3$ because both have the same width but $AX S_1 S_2$ is taller.

The point of the second table is that (with grandfathering) both firms benefit from the switch from a standard to a marketable permit system. Firm 1 goes from A to X, saving on abatement costs, but has to pay the area under ZX for more permits. Firm 3 goes from C to Y, incurring more abatement costs, but is paid the area under ZX = the area under YZ for its permits.

(3) Many environmentally damaging projects have benefits now and (environmental) costs continuing into the future. With a high discount rate, those future costs count little, so the present value of the project's costs will probably fall below the present value of the project's benefits, allowing the project to go forwards. This is less likely with a low discount rate.

(4) a)



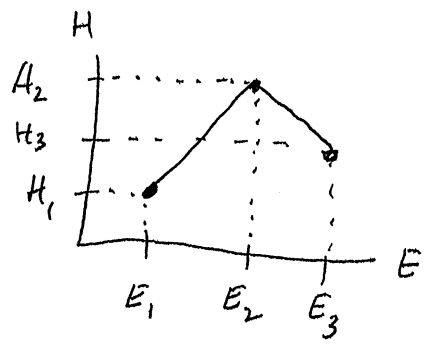
Suppose $E_1 < E_2 < E_3$ where "E" means "effort."

$\uparrow X \Rightarrow \uparrow H$ (harvest) with effort fixed (more fish in ocean $\Rightarrow$ more catch)

At a fixed X, $\uparrow E \Rightarrow \uparrow H$.

Steady state occurs when $H = F(X)$, since then the net growth of fish is $F(X) - H = 0$.

births − natural deaths ↑ ; deaths from fishing ↑



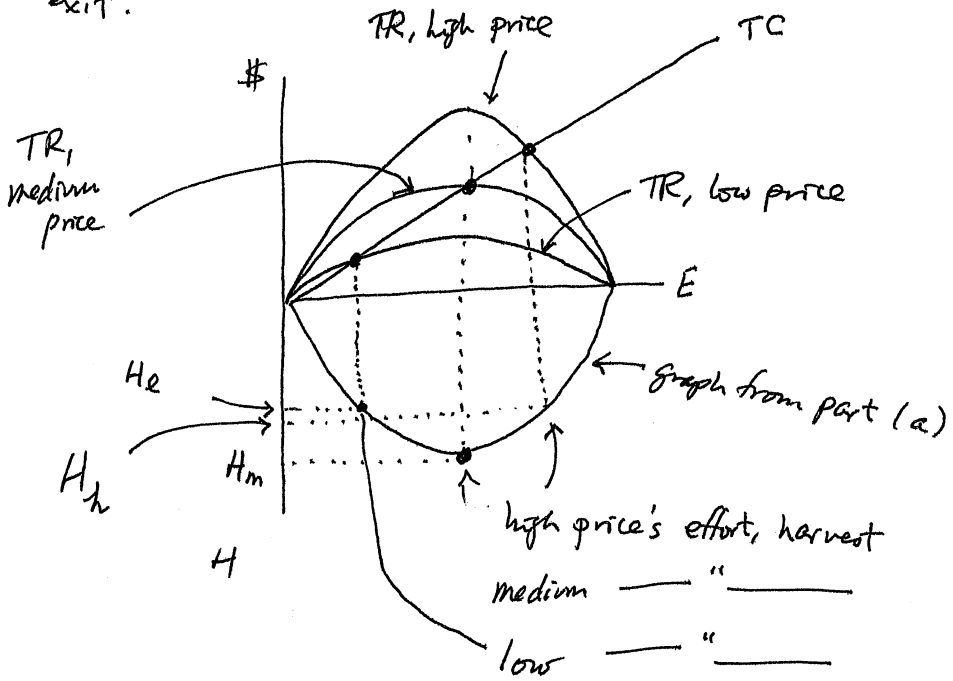
Note:

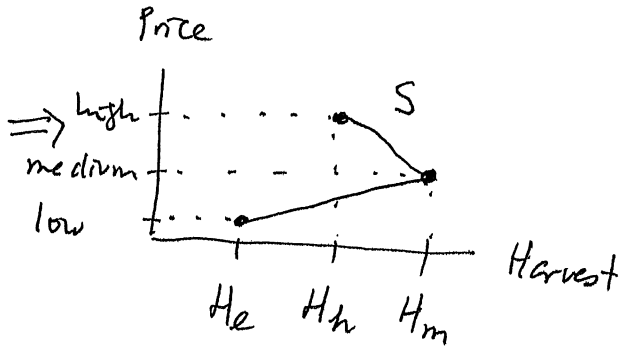
You might have $H_1 > H_3$, which is also OK.

H_2 needn't be at maximum sustainable yield, but if it isn't, you may only capture the left or right side of the shape, and not be able to tell it's an inverted U

b) H gets translated into Total Revenue "TR" via multiplication by a constant, p. (Price.) So TR vs. E graphs look just like the H vs. E graph, except vertically stretched or shrunk depending on whether p is >1 or <1.

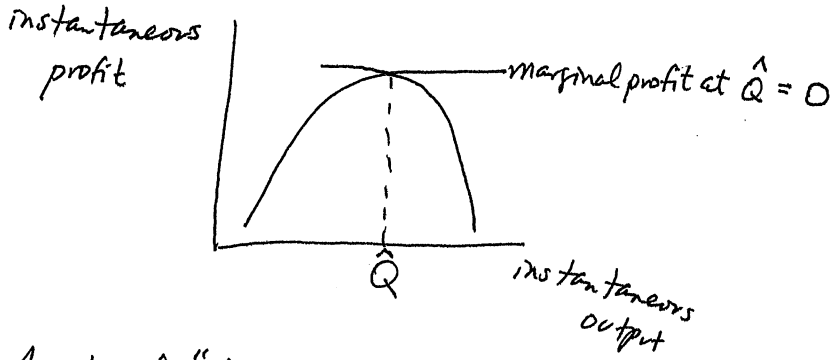
Open access equilibrium occurs when TR = TC, otherwise there's entry or exit.





c) Higher price ⇒ higher effort ⇒ smaller stock size "x" ⇒ fewer "parent" fish ⇒ at some point, smaller $F(x)$, that is, smaller excess of births over natural deaths. In steady state, $H = F(x)$, so when $F \downarrow$, $H \downarrow$.

⑤ a)



A policy of "doing what producible resource firms do" means producing $\hat{Q}$ in every period forever. This is not feasible for the exhaustible resource firm.

The Hotelling Rule turns out to be the optimal way to maximize the present discounted value of profit given the exhaustibility constraint.

b) A firm not producing at $\hat{Q}$ is sacrificing instantaneous profit. A rival firm producing at $\hat{Q}$ will make more profit until it runs out of the resource, which might be a long time from now — so far that no one thinks about it. Hence the firm producing at $\hat{Q}$ will be seen as out-competing the Hotelling Rule firm, and the latter might get bought out or go bankrupt.

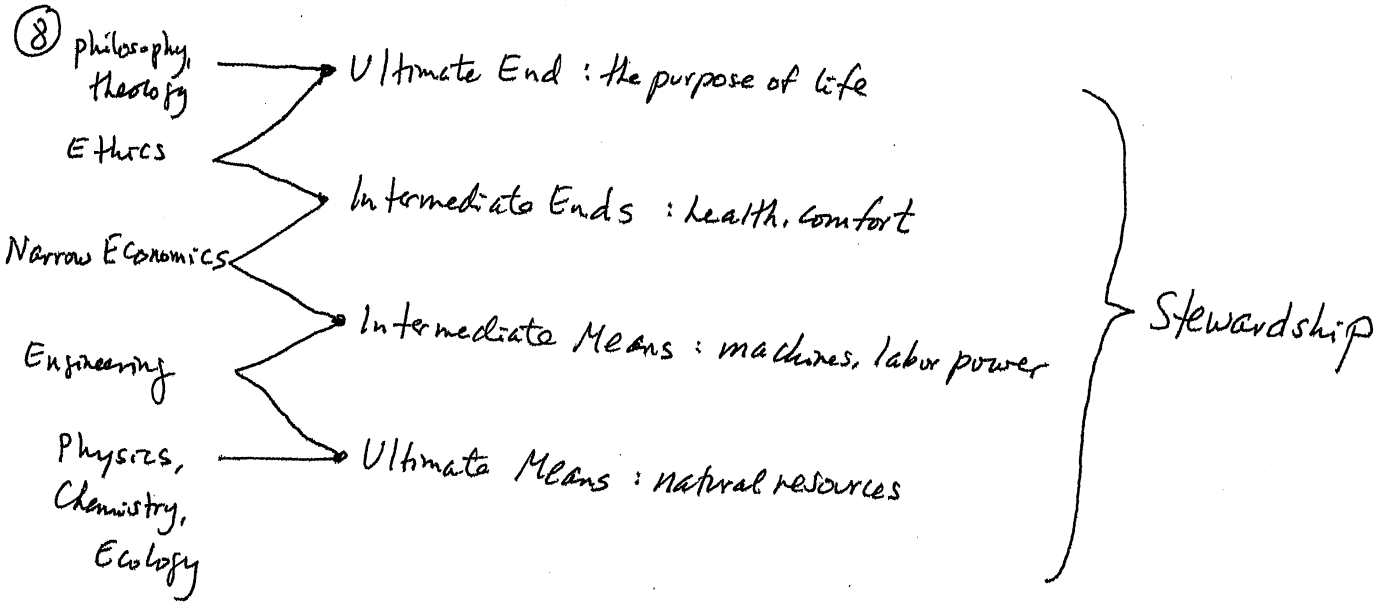
⑥ lack of safe drinking water; lack of fuelwood; lack of dung for cooking or for fertilizer; etc.

Solutions to environmental problems that involve governmental regulation (which means almost all solutions to environmental problems) won't work where governments are weak or corrupt or insensitive to environmental problems.

⑦ The Cornucopians think that "come what may, we will find a way" to prosper regardless of environmental problems. They think technological progress will solve resource exhaustion and pollution problems.

Their critics see no assurance that resource and pollution problems will be solved at low costs. They see the environment as fragile and near its breaking point, or see resources as becoming worryingly scarce. They see the last 500 years as "doing more with more" (exploitation of nature), not of increasing efficiency, which is doing more with less.

(8)



The "Narrow Economics" view might suggest policies which are not feasible (because it ignores the ultimate means) or not truly desireable (because it ignores the Ultimate End). Such policies are inefficient, though it might not seem that way from the perspective of Narrow Economics.