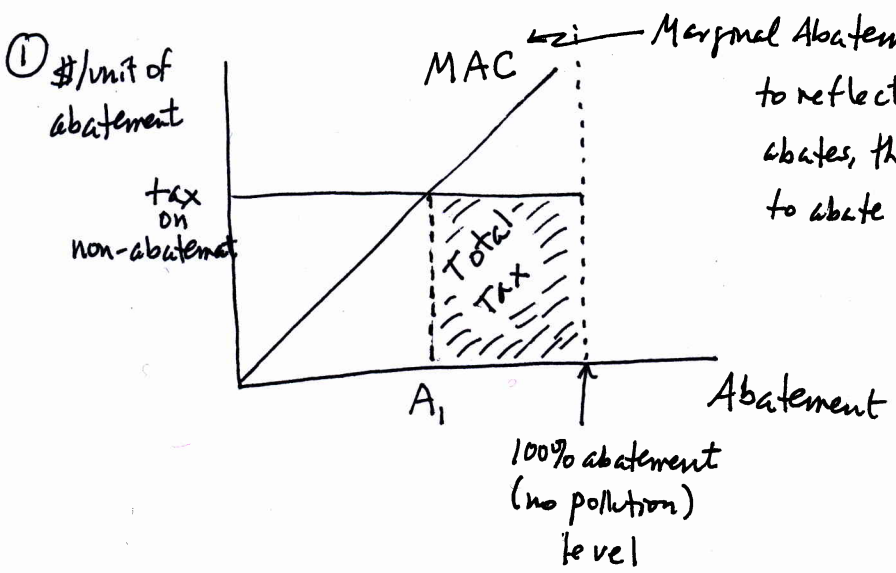
# Answers to Exam 2, Econ 3250, Spring 2012

① 


← Marginal Abatement Cost: rising in abatement to reflect the fact that the more one abates, the harder (more costly) it is to abate even more.

a) If MAC < tax on non-abatement then it's cheaper to ↑ abatement rather than pay the tax.

If MAC > tax on non-abatement, then it's cheaper to ↓ abatement and pay the tax instead.

At $A_1$, the firm has no incentive to change abatement, since MAC = tax on non-abatement. So the firm chooses to be at $A_1$.

b) Height: amount of the (per-unit) tax on non-abatement.

Width: " by which abatement falls short of 100% abatement.

So "total tax" is as shown in the graph.

(2)

Marketable permits are problematic when it comes to allowing new firms to enter the market because existing firms might decide to refuse to sell any of their permits to the new firm. They would do this because they would know that without any way of buying permits, the new firm could not produce (or could not produce much) — stifling competition.

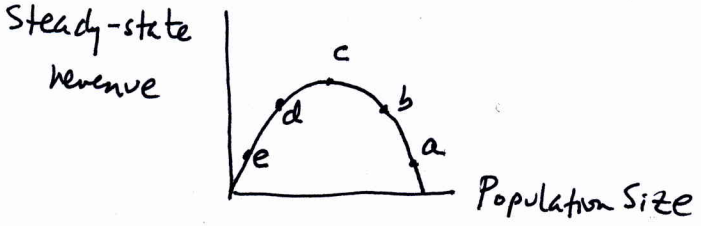
It is not possible for incumbent firms to use pollution taxes in this kind of anti-competitive way.

Optional: This disadvantage of marketable permits is lessened if they expire — especially if they expire and are not grandfathered but auctioned. For instance, a monthly expiration and auction would be a lot like a tax: old firms would have no advantage over new ones.

(3)

For each population size, births - deaths represent sustainable yield. For example, suppose births in one year are 100, and natural deaths (which is what "deaths" means in this graph) is 75. Then births - deaths is 25. If fishermen catch 25 fish, the population size will be unchanged. So 25 is the sustainable yield.

"Steady - state revenue" = "sustainable revenue" = price × "sustainable yield." We've already argued that the first graph shows "sustainable yield" versus population size. Vertically multiplying this by price would give "steady - state revenue" versus population size. If price > 1, this multiplication is vertically stretching; if price < 1, this multiplication is vertically shrinking. The multiplication does not change the basic shape of the graph. Therefore, so far we have



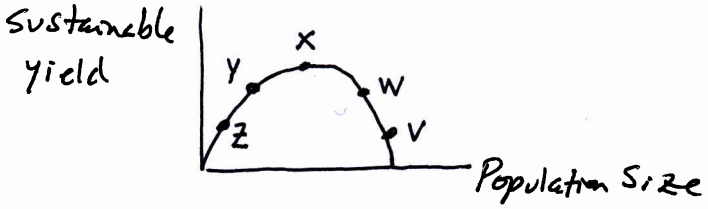

(where births - deaths < 0, sustainable yield is non-existent, and steady - state revenue is nonexistent, so that part of the first figure does not appear here.)

Since ↑ effort ⇒ ↓ population size, ↑ effort will lead to points such as a, then b, then c, then d, then e: namely, steady-state revenue

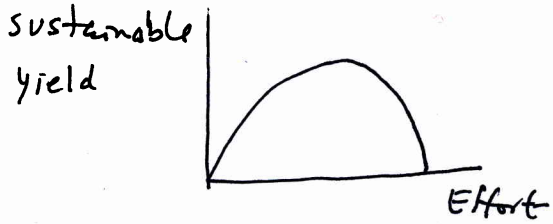
first rising, then falling. This is Fig. 1's second graph.

Alternative explanation:

Same first paragraph:




Since ↑effort ⇒ ↓population size, ↑effort will lead to points such as V, then W, then X, then Y, then Z: namely, sustainable yield first rising, then falling. This is




Now apply the reasoning of the first explanation's second paragraph to argue that steady-state revenue, and thus Fig. 1's second graph, is just a vertically stretched or shrunken version of this graph.

④ Pattern of exhaustible resource use through time

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|---|---|
| Exponential Exhaustion Index | Assumes exhaustible resource use rises exponentially until the date of exhaustion |
| Hotelling Rule |   In order to get marginal profit to grow over time, extraction must fall over time |

(5)

Economists think that firms maximize profits. Firms will therefore only take pollution into account to the extent that it affects internal costs or revenues. (Internal revenue, for example, might be adversely affected if the firm has a "dirty image." The firm will care about this.) Pollution's effect on external costs is ignored by the firm. However, these costs are borne by society. So the firm's voluntary efforts, which deal with pollution's effects on internal costs and revenues, are insufficient to address all of pollution's costs.

In addition, a firm which sacrificed profits in order to protect the environment will be out-competed by firms which don't do that, and so may go out of business or be bought out.

(6)

Traditionally, people could dump as much into a landfill as they wished — there was no "command and control" fixed limit — as long as they paid the landfill fee, which was usually a cost per ton. This is like a pollution tax. Traditional deposit-refund systems are also economic incentive instruments.

(On the other hand, traditional municipal solid waste regulation has included bans on dumping in unapproved areas; bans are a type of "command and control" regulation.)

Optional:

Traditional curbside garbage pickup is completely unregulated, in the sense that there is no weighing of garbage cans. ("Completely unregulated" is too strong — there are rules on the type and number of garbage cans - but most households never think about such regulations, since they are irrelevant to those households.)