

This exam has 33 points. There are six questions on the exam; you should work all of them. Half the questions are worth 5 points each and the other half are worth 6 points each.

Put your answers to the exam in a blue book or on blank sheets of paper.

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.

Answer all of the following questions.

1. **[5 points]** On page 64, your textbook says: “Calls for ‘no pollution’ thus appear illogical.” Argue that the textbook’s position is wrong. Illustrate your argument with a graph (appropriately labeled).
2. **[6 points]** Suppose a polluter owns the property right to pollute, but a pollution victim engages in Coasian Bargaining with this polluter in order to lessen the amount of pollution. On a graph, show how much money would change hands once the final bargain is reached. If there is more than one correct answer, graph all the correct answers.
3. **[6 points]** Suppose firms produce output Q , and this output causes pollution. Suppose the government tries to reduce the pollution by subsidizing the firms to decrease output. Graph the amount of social cost—that is, the loss in social surplus—in each of the following two cases.
 - (a) The true Marginal Net Private Benefit curve lies above where the government thinks it is, but the government knows the true location of the Marginal External Cost Curve.
 - (b) The true Marginal External Cost Curve lies above where the government thinks it is, but the government knows the true location of the Marginal Net Private Benefit curve.
4. **[5 points]** What difficulties might occur due to the fact that Willingness to Pay is not equal to Willingness to Accept?
5. **[5 points]** Below are three quotes giving a 2013 update of the status of the Kyoto Protocol. Give some historical background behind the actions of Russia, and, very briefly, of Canada.
 - (a) *New Scientist*, “Has the Kyoto protocol done more harm than good?” 03 January 2013:

Fifteen years after its painful birth in Kyoto, Japan, the world’s first legally binding agreement to limit emissions of greenhouse gases ended this week.... Formally the protocol lives on. Climate talks in Doha in December created a second “compliance period” stretching to 2020, when diplomats promise a new deal involving all nations will

come into force. But with Russia, Japan, New Zealand and Canada pulling out, this next period only covers nations which contribute 14 per cent of global emissions, mainly the European Union and Australia.¹

- (b) “Ghost of Kyoto Protocol haunts Russia’s energy plans,” 15 March 2013:

Russia left Kyoto at the Doha climate talks after an amendment to terms of the second commitment period would have forced it to surrender carbon credits from the first phase.²

- (c) “Climate Change: Russia Is Steamed About U.N.’s Kyoto Carbon Credit COP-Out,” June 23, 2013:

Russia has since announced that it will not be part of a second Kyoto commitment period under these conditions, saying that they are committed to keep the credits and sell them to other countries regardless of a claimed COP “consensus” that would terminate them. They are still smarting over a snub during two-week-long U.N. Climate talks in Doha, Qatar last year when, during the final minutes, Vice Prime Minister Abdullah bin Hamad al-Attiya ended the eighteenth Conference of the Parties (COP-18) before their delegation which wished to be recognized could speak. While Christiana Figueres, the U.N.’s climate chief, claimed that a consensus had been reached, Oleg Shamanov, the chief negotiator for Russia’s delegation called that an “absolutely obvious violation of this procedure.” Shamanov added, “This is a systemic issue. Unless we put our house back in order, we may not be able to guarantee that in 2015 we end up with something productive.”³

6. [6 points] Consider the following quotation:

¹<http://www.newscientist.com/article/dn23041-has-the-kyoto-protocol-done-more-harm-than-good.html>

²<http://www.rtcc.org/2013/03/14/ghost-of-kyoto-protocol-haunts-russias-energy-plans/>

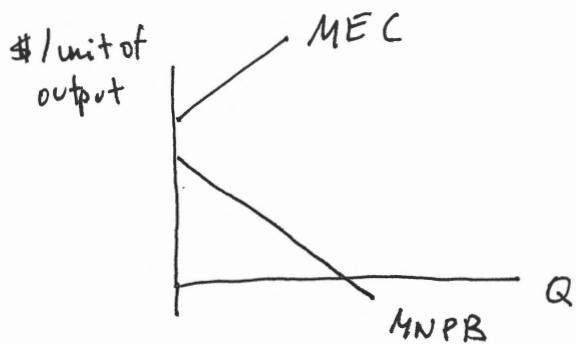
³<http://www.forbes.com/sites/larrybell/2013/06/23/climate-change-russia-is-steamed-about-u-n-s-kyoto-carbon-credit-cop-out/2/>

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.” (Aldo Leopold, *A Sand County Almanac*, 1949, p.262)

- (a) Does this reflect consequentialism or non-consequentialism? Why?
- (b) Does this reflect an anthropocentric or ecocentric ethics? Why?

Answers to Exam 1, Econ. 5250, Fall 2013

①

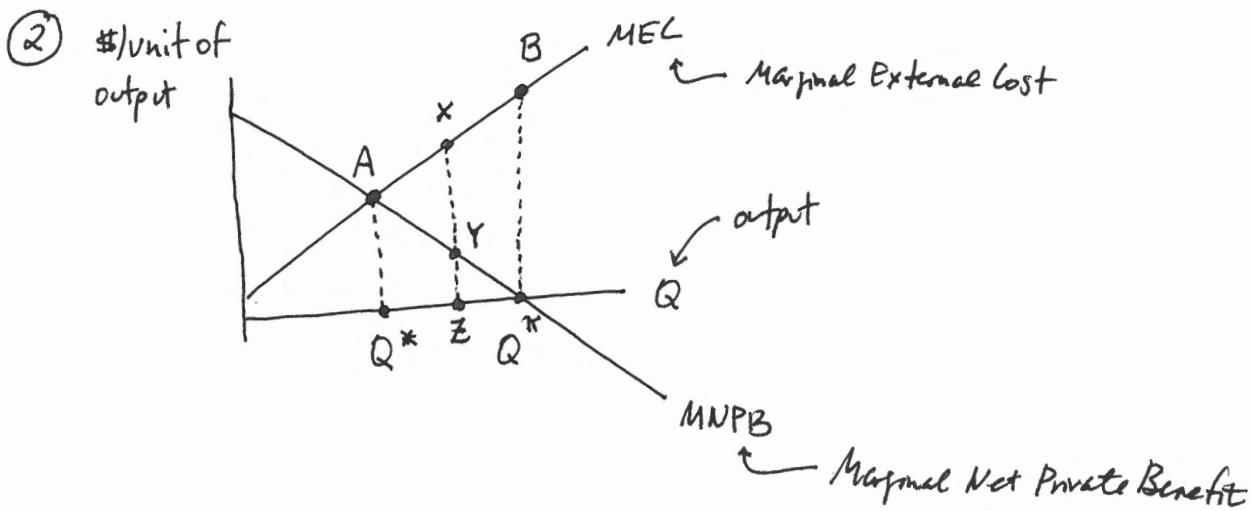


MEC: Marginal External Cost

MNPB: Marginal Net Private Benefit

Q : output

The MEC curve measures external damages at the margin; MNPB measures internal profits (and perhaps marginal consumer surplus). In this graph, there is no Q for which $MNPB > MEC$, so there is no Q which, overall, benefits society. Thus the optimal Q is zero. With zero Q comes zero pollution. (MEC at $Q=0$ is not zero, but EC at $Q=0$ is zero because if there's no polluting output, there's no pollution.)



Q'' : profit-maximizing level of Q

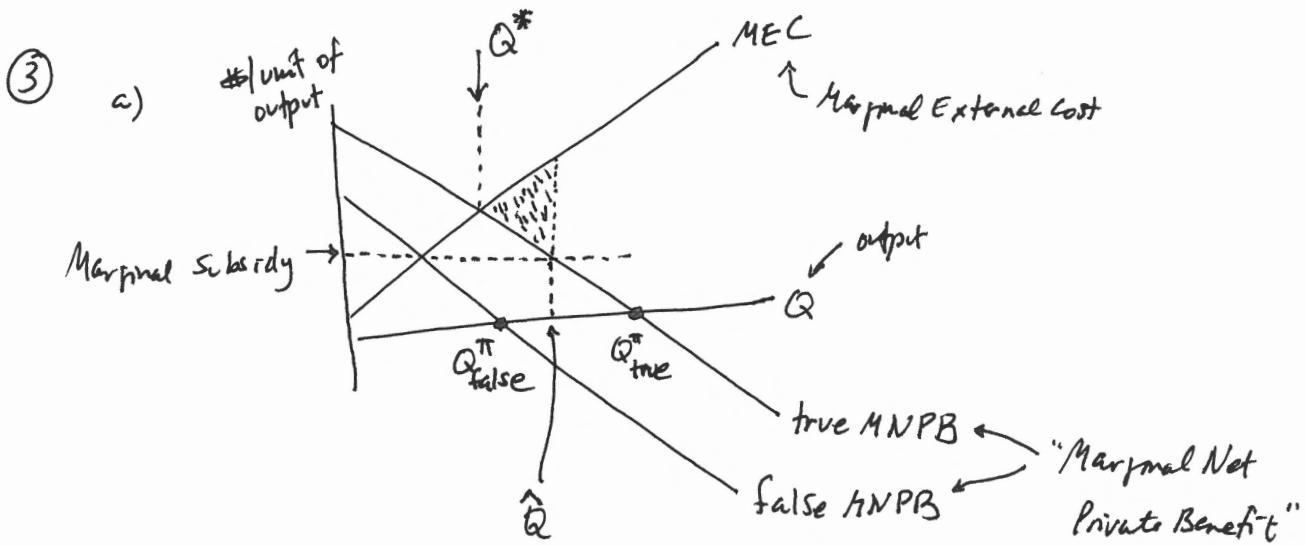
Q^* : socially-optimal level of Q

Consider output level Z . It benefits the firm by Y at the margin, so the firm will agree not to produce Z if it receives from the pollution victims a payment in return of Y or more. " Z " hurts pollution victims by X at the margin, so the victims are willing and able to pay the firm X or less

\hookrightarrow as measured by the victim's willingness and ability to pay for ↓ pollution - or their willingness to accept more pollution if the firm agrees not to produce Z .

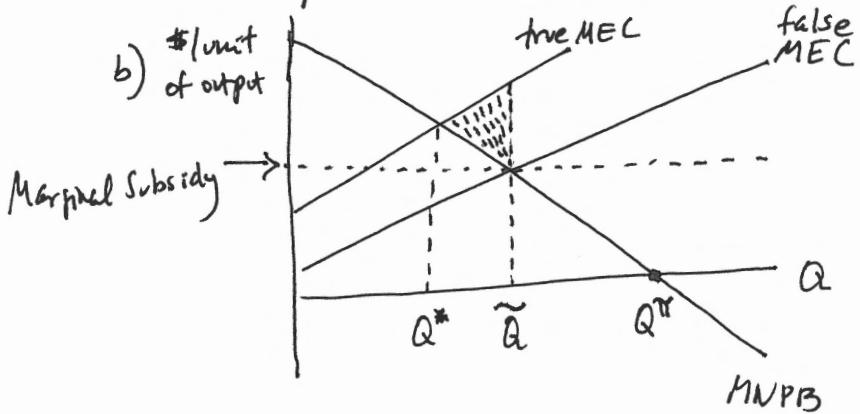
Therefore, the amount of money that changes hands must be between Y and X , but we don't know where between Y and X .

It follows that in going from Q'' to Q^* , the amount of money that changes hands is between $Q^* A Q''$ and $Q^* A B Q''$.



The government sets the Marginal Subsidy where MEC equals the false MNPB.

For all Q at which the Marginal Subsidy is above the true MNPB, the firm would rather not produce — thereby earning the Marginal Subsidy — instead of producing and earning only MNPB. So the firm will produce \hat{Q} . This is above the socially optimal Q^* : units having $MEC > MNPB$ are socially undesirable, but the firm produces some of them anyway, the ones from Q^* to \hat{Q} . The loss in social surplus is the area with dashes.



The government sets the marginal subsidy where MNPB equals the false MEC. Reasoning as in part (a), the firm reduces output from Q''_{true} to \hat{Q} , but

no further. The Q 's between Q^* and \hat{Q} have $MEC > MNPB$, so should not

be produced, but the firm does produce them, so these units generate net losses of social surplus of the amount shown in the area with dashes.

Optional: Hence both a too-low MEC and a too-low MNPB lead to a marginal subsidy which is too small, and thus too much pollution.

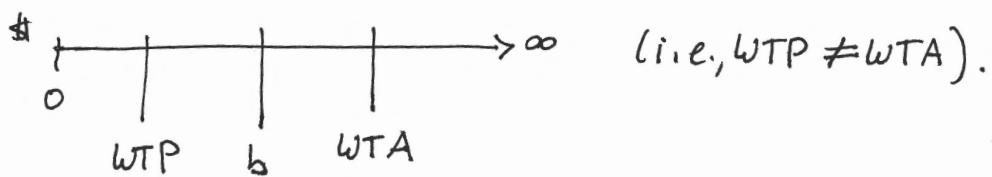
(4)

Suppose the benefit of a project is $\$b$. This is the private net benefit.

Suppose the cost of the project is $\underbrace{\text{external}}_{\$WTP}$ as measured by Willingness to Pay, and $\$WTA$ as measured by Willingness to Accept.

The social decision-making criterion is : Approve the project if $\$b > \text{external cost}$, otherwise do not approve the project.

Consider the possibility that :



If the social planner uses WTP to measure the project's external costs, then $\$WTP = \text{external cost} < \b so the project should be approved.

If the social planner uses WTA to measure the project's external costs, then $\$WTA = \text{external cost} > \b so the project should not be approved.

Since $\$WTP$ and $\$WTA$ are equally good measures of external costs, the social decision rule is indecisive — that is, it does not tell society what is the best decision.

If $\$b < \$WTP < \$WTA$ or $\$WTP < \$WTA < \$b$, the social decision rule is decisive (reject the project in the first case, accept it in the second).

⑤

Russia only agreed to ratify the Kyoto Protocol in the first place because it realized that by doing so, it could make money by selling excess carbon credits to other countries which needed to buy them to cover their increased carbon emissions. Russia had credits to sell because they were given more than they could use: they were given credits based on pollution in the last years of the USSR, but the fall in economic output after the breakup of the USSR meant Russia's pollution fell below its Kyoto targets, so it had carbon credits leftover.

Evidently the Doha talks stipulated that Russia will lose these Soviet-based credits, meaning Russia would no longer make money being a party to the continuation of the Kyoto Protocol. So they pulled out.

Canada withdrew from the Kyoto Protocol earlier because meeting its Kyoto carbon targets proved to be extremely expensive.

Optional: Japan is pulling out because it planned to reduce carbon output by using nuclear power, but since the Fukushima power plant disaster, it does not want to use as much nuclear energy as it had planned on.

⑥

a) It is consequentialist: an action is deemed right depending on what its consequences for "the integrity, stability, and beauty of the biotic community" are.

b) Ecocentric, since the definition doesn't even mention humans specifically, instead referring only to the "biotic community" as a whole.