

Economics 5250/6250  
Fall 2018

Dr. Lozada  
Midterm Exam

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.

For the question involving a figure, you may either draw on the original figure, then remove it from the exam and include it with your answers; or you may redraw the figure on your answer sheet. If you choose the first option, write your first name on each page (to prevent confusion if the page gets separated from the rest of your exam).

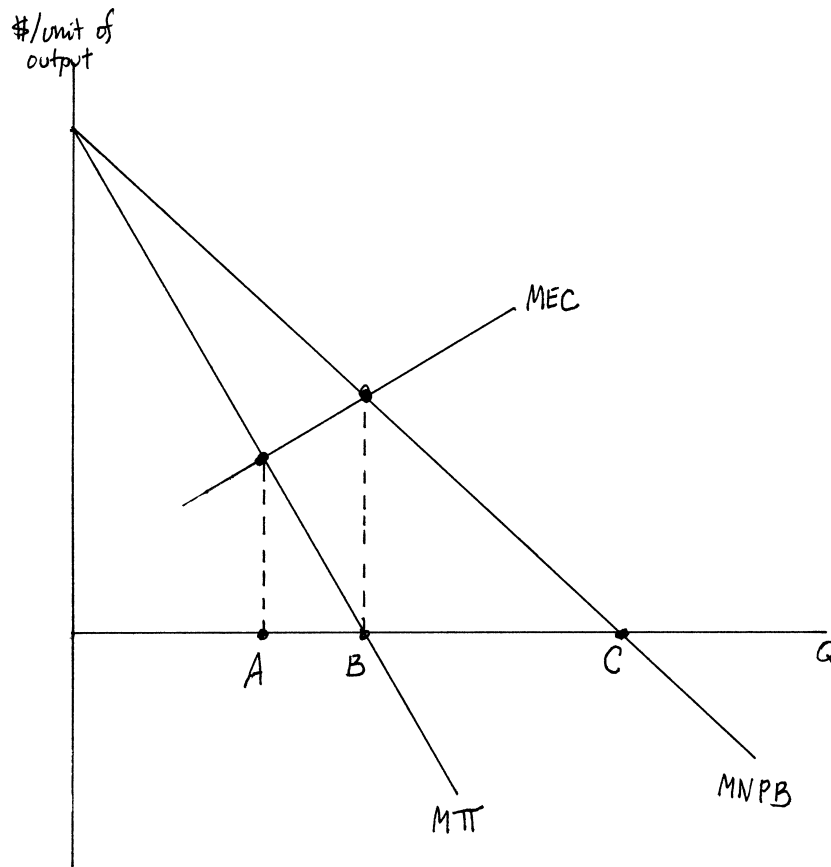


Figure 1

**Answer all of the following six questions.**

1. **[6 points]** Figure 1 illustrates a polluting monopolist. In the figure, *MNPB* is the social marginal net private benefit; *MTI* is the (private) monopoly marginal profit; *MEC* is marginal external cost; and  $Q$  is the amount of output.
  - (a) What is  $Q$  if the government does nothing?
  - (b) What is  $Q$  if the government does nothing about the monopoly power of the firm but fixes the pollution externality?
  - (c) What is  $Q$  if the government does nothing about the pollution externality but fixes the monopoly power of the firm?
  - (d) What is  $Q$  if the government fixes both about the pollution externality and the monopoly power of the firm?
  - (e) How does this figure illustrate the Theory of the Second Best?

2. **[5 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 production of a good pollutes the environment.
  - (a) Sketch a graph showing how the optimal Pigouvian tax is calculated if *output* is on the horizontal axis.
  - (b) Sketch a graph showing how the optimal Pigouvian tax is calculated if *pollution* is on the horizontal axis.
  - (c) Under what situations (if any) is it better, worse, or just as good to model the optimal Pigouvian tax as a tax on output instead of a tax on pollution?
4. **[5 points]** Construct a graph showing the operation of a marketable pollution permit scheme when there are two polluting firms. You do not have to prove anything about abatement costs; just explain why the permit price is what you think it is, explain which firm(s) will be buying permits and which will be selling permits (assume a free and equal initial distribution of permits), and what the pollution levels of each firm will be.
5. **[6 points]** What is the “starting point bias” present in (some) contingent valuation analyses?
6. **[5 points]** Explain the connection between the ethical ideas of John Rawls and a social welfare function of the “maxi-min” form

$$\max \min_i U_i$$

where  $U_i$  denotes the utility of person  $i$  and the minimization is taken with respect to all persons (all  $i$ 's) in the society.

### Answers to Exam 1, Econ. 5250, Fall 2018

1. (a) “B” because the pollution externality  $MEC$  is ignored, and the social benefit of production  $MNPB$  is ignored, so the firm just sets  $MII = 0$  to maximize its profit.
  - (b) “A” because the pollution externality  $MEC$  is taken into account, but the social benefit of production  $MNPB$  is ignored, so the social planner sets  $MEC = MII$ .
  - (c) “C” because the pollution externality  $MEC$  is ignored, but the social benefit of production  $MNPB$  is taken into account, so the social planner sets  $MNPB = 0$ .
  - (d) “B” because the pollution externality  $MEC$  and the social benefit of production  $MNPB$  are taken into account, so the social planner sets  $MNPB = MEC$ .
  - (e) When both (that is, all) externalities are taken into account, the socially-optimal amount of output “B” is produced. However, fixing only one externality, not both of them, results in output of either “A” or “C,” both of which are worse than the output if the government had done nothing (“B”). This example is contrived because usually the “government does nothing” output will not be socially-optimal, but it does show that “fixing some but not all market imperfections may decrease social welfare,” which is “The Theory of the Second Best.”
2. ch 5; Fall 13 Ex1 Qu 2
  3. ch6; Fall 05 Ex1 Qu 2
  4. ch 8; Fall 08 Ex1 Qu3
  5. ch 10; Fall 10 Ex1 Qu5
  6. Suppose the set of utilities of individuals in a society are  $\{U_i\} = \{5, 3, 17, 14, 9\}$ . Then  $\min_i U_i = 3$ , “the utility of the worst-off person.” Hence the objective function  $\max \min_i U_i$  means “maximize the utility of the worst-off person” (and ignore anyone else’s utility). This is a very egalitarian objective. If resources can be costlessly transferred between individuals, it will lead to everyone having the same utility level.

Rawls felt the rules of a just society would emerge from a constitutional convention held behind a “veil of ignorance,” behind which participants would be unaware of their own gender, age, height, wealth

and income, race, and so forth. Behind this veil of ignorance, Rawls thought individuals would write constitutional rules while being scared that when they emerged from the veil of ignorance, they would discover that they were members of a potentially-disadvantaged group, so the constitution they wrote would protect all potentially-disadvantaged groups. Considering income, “protecting potentially-disadvantaged groups” naturally, though perhaps not inevitably, leads to “maximizing the income of the worst-off member of society.” This is the maximin objective function “ $\max \min_i U_i$ .”