

Name \_\_\_\_\_

First Hour Exam  
Public Finance - 180.365  
Fall, 2001  
Answers

This exam consists of three parts. You must answer all components of all parts of the exam.

**Part I. True/False. (30 points)** Decide whether each of the following statements is true or false. You do *not* need to discuss or justify your answer.

- T 1. For an activity to cause an externality, that activity must have an effect on more than one entity in the economy.

*Answer:*

This is true. The whole point of externalities is that they happen when some action has an effect on someone or something (an entity) external to the person or entity taking the action. An action taken by a person that affects only that person is by definition not an externality.

- F 2. If a company invents a cheaper way of making something, the lower price it charges will cause a negative externality for its competitors.
- F 3. Externalities do not arise in communist countries.
- T 4. Public goods are a form of externality.
- T 5. Pigouvian taxes achieve a socially efficient level of pollution output if the tax rate is set correctly.
- F 6. Optimal provision of a public good occurs at the level at which each member of society places the same value on one more unit of the public good.
- F 7. Eliminating tariffs and other trade barriers results in a Pareto improvement in economic welfare.

*Answer:*

False. A Pareto improvement occurs only if *nobody* is made worse off. Even if society as a whole is made better off by repealing a tariff, if *any person* is hurt then it cannot be a Pareto improvement. This is why one needs utilitarian analysis, which makes assumptions about how to trade off some people's utility against others.

- T 8. Most environmental policy in the United States takes the command-and-control form.
- F 9. Normative economics determines what the normal outcome of a policy is expected to be.
- F 10. Evidence suggests that many important natural resources will be exhausted in the next 25 years unless major worldwide reforms of environmental policies are undertaken.
- F 11. Air pollution in London has gotten steadily worse over time.

*Answer:*

False. There was a graph in one of the Economist articles on this.

- F 12. The organic philosophy of society says that “greed is good” because it helps society function better.
- F 13. A positive theory in economics describes how society can be made better off by an economic policy.
- T 14. Fear caused by terrorist attacks can be thought of as a public good.

*Answer:*

True. I made the point in class that a ‘public good’ isn’t necessarily a positive thing. One could call a public good with a negative sign a ‘public bad’, but the analysis is the same. Fear caused by terrorist attacks is clearly an example where the action of one entity (the terrorist) causes an effect on the utility of others (the population) in a way that is not mediated by perfectly competitive market prices.

- F 15. The fact that economists disagree on many questions of public policy proves that economics is not a scientific discipline.

## Part II. Short Discussion Questions (32 points).

Briefly comment on each of the following assertions, indicating whether it is true, false, or uncertain and why.

- 8 pt 1. In the early 1990s, Afghanistan fell into a civil war in which there was no national government and local warlords battled each other throughout the country. This set of circumstances is ideal for analysis using the Coase theorem, the Fundamental Theorem of Welfare Economics, and other tools of public finance analysis.

*Answer:*

False. The first lecture in this class indicated that almost all of the traditional tools of economic analysis are predicated on an assumption that the rule of law was in place. The situation described in Afghanistan is clearly one without rule of law, but with local personal rule instead. You had to use the phrase 'rule of law' to get full credit, and to demonstrate an understanding of the point that without order and rule of law the analysis of this class does not apply very well.

- 8 pt 2. Homer has obtained a patent for hamburger bun earmuffs and allows companies to produce this popular product for a licensing fee of 25 cents per pair. Under this licensing scheme, production of hamburger earmuffs satisfies the conditions necessary for Pareto efficiency.

*Answer:*

False. Pareto efficiency requires that the marginal cost of producing something should be equal to the good's price (perfect competition). But even after the earmuffs are produced, the producer must pay an additional 25 cents to Homer to use his idea; but the idea already existed and using it again has no cost. So the price of the earmuffs including the patent licensing fee is greater than the marginal cost of producing them.

Thus, patent rights prevent Pareto efficient pricing and therefore prevent Pareto efficiency.

This is not necessarily to say that patents are bad. Total welfare may be much higher in a society with good patent laws, because without them people would not have the incentive to come up with good inventions. But the point made here is the reason that patents expire after a certain period of time.

- 8 pt 3. In 2000, President Clinton set aside some Federal land in Utah containing \$10 million in coal deposits to form the Grand Staircase-Escalante National Monument, protecting the land from future economic development. Polls indicated that most Americans didn't care whether this land was protected or not. This implies that protecting the land cannot be justified under the utilitarian philosophy of government.

*Answer:*

False.

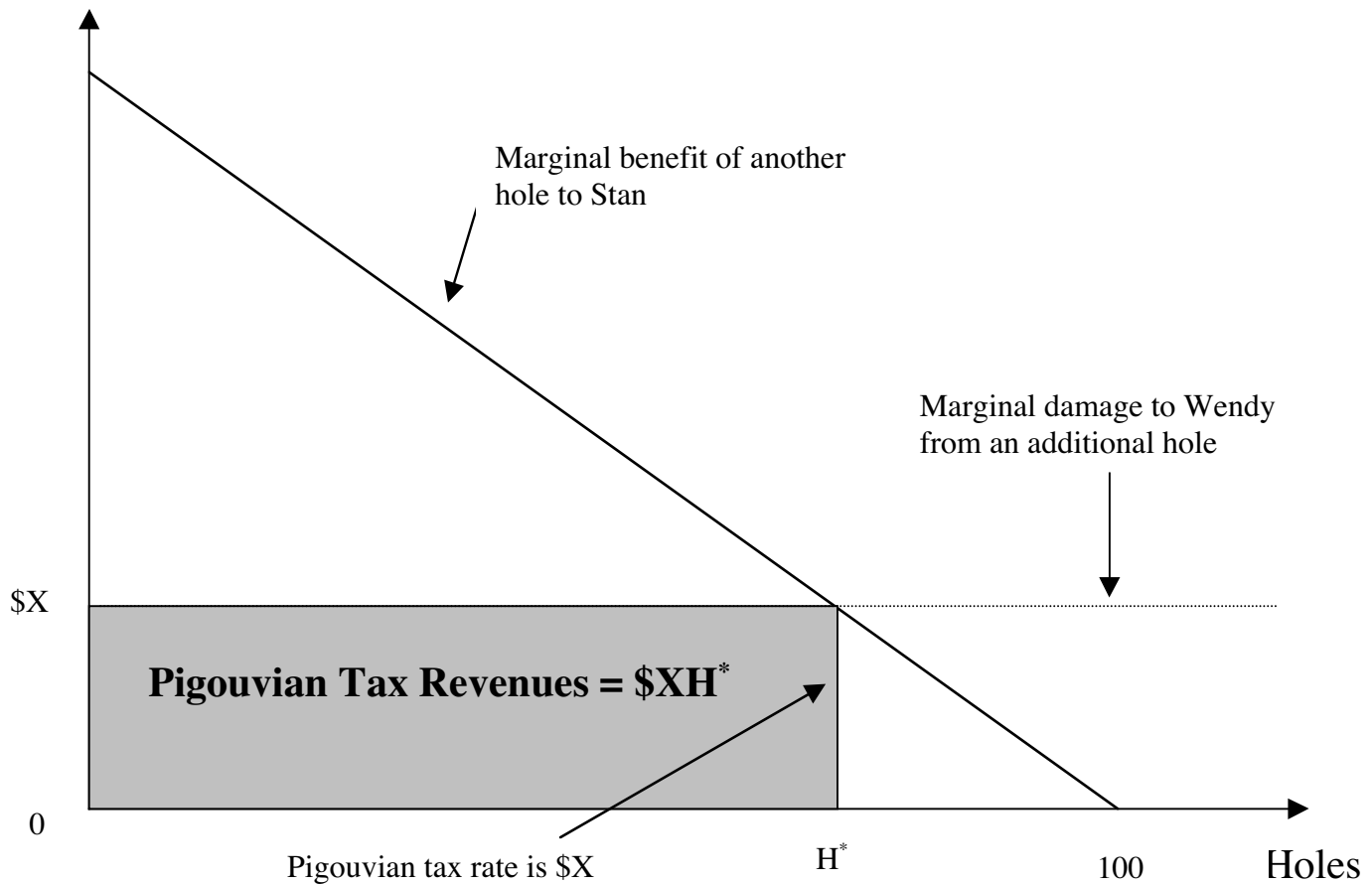
The utilitarian strand of the individualistic philosophy says that it is worth making a national monument if enough people now and in the future will value it enough. Note that it does not matter whether they are a majority; all that matters is whether when the amount everyone in the population would be willing to pay is added up, the total amount that people would be willing to pay adds up to more than \$10 million.

It is very important to understand that the utilitarian philosophy does not say that all questions should be decided by majority vote. If a majority of people doesn't care at all, or only cares a tiny bit about something, while a substantial minority cares a lot, then it may be worth responding to the strong preferences of the minority.

- 8 pt 4. The additive utilitarian social welfare function implies that all incomes should be equalized.

*Answer:*

False. There is a long list of assumptions beyond additive utilitarianism that is necessary to reach the conclusion that incomes should be equalized. See your notes.



### Part III. (38 points)

Stan and Wendy are the only people who live near a public pond, which is frozen in the winter. Wendy enjoys skating on the pond, while Stan wants to cut holes in it for ice fishing; he sells all the fish he catches. The first hole Stan cuts will produce the most fish, the second hole will produce fewer fish, and so on; once Stan has cut 100 holes, cutting any further holes will produce no more fish. Suppose that Wendy's pleasure in skating is reduced by  $\$X$  for every hole Stan cuts.

- 14 pt 1. Draw a diagram that depicts this situation. Show the number of holes that Stan cuts if he and Wendy cannot talk to each other or negotiate about what Stan does.

*Answer:*

The horizontal axis has the number of holes Stan cuts, the vertical axis is in dollars. A downward-sloping line should be labelled as the marginal

benefit (MB) to Stan, and a flat line at  $\$X$  corresponds to Wendy's marginal damage. The marginal damage line is flat because the question stated that Wendy's pleasure in skating was reduced by  $\$X$  for every hole Stan cuts, whether it's the first or the last hole. If Wendy's extra displeasure were greater and greater with every hole Stan cuts, Wendy's marginal damage would be an upward-sloping line (this is the case analyzed in class).

With no negotiations, Stan will cut 100 holes. He won't cut more because he wouldn't get any more fish. He won't cut less because every hole before the 101st yields him positive extra profits.

Most people in the class drew this diagram wrong because they just reproduced the diagram I drew in class for the Lisa/Mr. Burns example. The Stan/Wendy situation is a lot simpler than the Lisa/Mr. Burns one, but producing the right graph required you to actually *understand* what the Lisa/Burns figure meant and how it was constructed. So the lesson is: Don't just memorize what I say in class, try to understand the underlying reasons a diagram looks the way it does, so that if I change something in the problem you will know how to change the diagram or problem.

- 10 pt    2. On your diagram, show the Pigouvian tax that will induce Stan to cut the efficient number of holes, and show the amount of revenues collected by the tax.

*Answer:*

The Pigouvian tax rate is the rate corresponding to the marginal damage at the efficient level of output. Since the marginal damage to Wendy is  $\$X$  at *every* level of output, the marginal damage is  $\$X$  at the efficient level of output. The socially efficient level of output is for Stan to cut holes up to the point where the extra fish he can catch from the last hole is worth  $\$X$  in output. This corresponds to the intersection between the marginal damage curve and Stan's marginal benefit curve. Call the optimal amount of holes  $H^*$ ; the total revenue from the optimal Pigouvian tax would be  $\$XH^*$ .

- 14 pt    3. Explain what economic theory says would happen if Wendy were given exclusive property rights to the pond, then discuss what would happen if Stan were given property rights. Be sure to discuss effects on Stan's and Wendy's utility as well as on the number of holes. (Assume in both cases that Wendy and Stan can now negotiate about the outcome, and can pay each other if such payments would permit a Pareto-improving bargain.)

*Answer:*

This is an application of the Coase theorem, which says that the efficient level of production will occur regardless who is given the property rights. If Wendy has the property rights, she can make a Pareto-improving bargain with Stan to allow him to cut  $H^*$  holes. Any bargain that involves fewer

holes would be Pareto-inefficient, since Stan would be willing to pay more than \$X to cut an extra hole, while the damage to Wendy is only \$X. If Stan has the property rights, Wendy will be willing to pay him to reduce his fishing from 100 holes to  $H^*$ , because any smaller reduction would leave them in a position where Wendy would be willing to pay \$X to reduce Stan's fishing further but Stan would only lose some amount of money less than \$X if he were to do so.

While these two outcomes are the same in terms of the level of production, they are not the same in terms of utility, because in the first situation Stan must pay Wendy while in the second situation Wendy must pay Stan.

Obviously, in utility terms Wendy is better off if Stan is paying her while Stan is better off if Wendy is paying him. So although either allocation of property rights results in the efficient level of production they have quite different effects on the distribution of utility.