

First Hour Exam
Public Finance - 180.365
Fall, 2003
Answers

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

1 True/False. (20 points)

Decide whether each of the following statements is true or false.

- F 1. If at the introduction of a tradable permits system, the permits are simply given to the polluting companies in proportion to their emissions, less pollution reduction can be expected than if the government auctions the permits to the highest bidder

Answer:

False. See the class discussion, or note that the Coase theorem applies, so the amount that gets produced depends on the marginal cost of permits regardless of who owns the permits.

- T 2. One argument for having a progressive income tax system that imposes a higher tax rate on people with higher incomes is that this provides a form of insurance that reduces the variability in after-tax income, compared to a system that raises the same amount of revenue but imposes the same tax rate on everyone.

Answer:

This was discussed at some length in class.

- F 3. There is no basis in public finance theory for having tax breaks for different kinds of households (for example, tax credits for families with children).

Answer:

According to utilitarian theory, households with a higher marginal utility of income should be given more income. It is plausible to argue that households with kids have higher marginal utility than households without kids, so utilitarian theory provides a straightforward argument for why it might make sense to have a child tax credit.

- T 4. Knowledge of the fact that a Hopkins faculty member won the Nobel prize in chemistry this year is a public good.

Answer:

Anything that is public knowledge can be thought of as a public good, since the fact that I know it does not reduce the extent to which someone else can know it.

- F 5. A recent Environmental Protection Agency study found that U.S. air pollution has increased significantly since 1970.

Answer:

According to the *Washington Post* reading EPABenefitsExceedCosts.pdf, "Earlier this month, the EPA issued its annual air trends report showing that, since 1970, emissions of the six principal air pollutants have declined by 48 percent."

- T 6. The reason a social welfare function is necessary for analysis of economic policies is that many policies make some people better off and others worse off.

- F 7. "The U.S. government should try to foster democracy abroad because terrorists do not come from countries that are democracies." This statement is incompatible with an individualistic conception of the role of government.

Answer:

False. If the goal of fostering democracy is presented as something that should be done because it is good in itself, then that would be an organic approach. But if it is presented as something that should be pursued because it will protect the American people from harm, then it can easily be encompassed in an individualistic framework, in which protecting the individuals who compose society from harm is of great importance.

- F 8. In the moral philosophy of John Rawls, the proper goal of society is to make all citizens equally well off.

Answer:

Rawls says the only thing that matters is the welfare of the poorest person.

- F 9. The market for textbooks is a competitive market where we should expect the marginal cost of production to equal the marginal benefit to the student.

Answer:

False. See the slides “RosenTextAuction.pdf” for a discussion of some of the problems in the market for textbooks.

- F 10. According to the play “A Man for All Seasons,” the Catholic saint Sir Thomas More believed that the purpose of human laws was to accomplish the will of God, and so it was OK sometimes to violate a human law in order to prevent something evil from happening.

Answer:

This is pretty much the exact opposite of the point of the excerpt from the play “A Man for All Seasons” that I assigned as the first reading in class, MoreRuleOfLaw.pdf.

2 Multiple Choice (40 points)

- c 1. Which of the following statements about income inequality is false?
- (a) In 1980, the average CEO of a U.S. company was paid about 40 times as much as the average worker; now the average CEO is paid about 400 times as much as the average worker
 - (b) Incomes and wealth of the richest US households has grown much faster over the last 30 years than incomes and wealth of the middle class and poorer households
 - (c) A pure libertarian approach to income distribution would say that income should be redistributed until everyone has the same after-tax income
 - (d) The theory of Pareto efficiency provides little guidance about how to redistribute income to achieve maximum social welfare
 - (e) The utilitarian theory of income distribution says that an additional dollar of income makes more difference to utility for a poor person than for a rich one
- d 2. Which of the following statements is true?
- (a) Population growth has outstripped food production in the developing world, leading to increasing risk of famine and starvation
 - (b) Known reserves of oil are dwindling quickly; at current levels of oil usage the world will run out of oil in the next two or three decades
 - (c) Pollution gets worse and worse as economic development of a country progresses
 - (d) None of (a)-(c) is true
 - (e) All of (a)-(c) are true

Answer:

- b 3. Sulfur dioxide emissions are the major cause of acid rain. Which of the following statements is not true:
- (a) Tradable permits that give polluters the right to emit certain amounts of pollution were first tried on a large scale starting with sulfur dioxide permits in the U.S. in the 1990s
 - (b) Permits are the most efficient way to control pollution when the marginal damage caused by the pollution is constant and easy to calculate but the marginal cost of reducing pollution is unknown
 - (c) Tradable permits for sulfur dioxide have proven a much cheaper way to reduce emissions than the command-and-control approach was projected to have been
 - (d) A large portion of the environmental benefits of recent environmental regulations has come from a sharp reduction in the problem of acid rain

Answer:

A Pigouvian tax, not permits, is the most efficient way to control pollution when the marginal damage caused by the pollution is constant and easy to calculate but the marginal cost of reducing pollution is unknown

- e 4. The state of Maryland is considering legalizing slot machine gambling (“slots”). Which of the following statements could be a valid argument from the standpoint of the utilitarian approach to analyzing social welfare?
- (a) Slots should be legalized because society works best (happiness is greatest) when people are allowed to do anything that does not harm someone else
 - (b) Slots should remain illegal because some people do not have the self control to resist the temptation to gamble, and gambling ultimately makes them unhappy
 - (c) Slots should remain illegal because the traffic congestion associated with casinos would outweigh any benefits they might bring
 - (d) Slots should remain illegal because some people are likely to become addicted to gambling and turn into criminals, or destroy their families, to finance their gambling addiction
 - (e) All of the above

Answer:

Utilitarianism is a very flexible doctrine. Ultimately the test is just whether Marylanders as a whole will be made happier or unhappier, and each of the statements above argues in one way or another about whether the happiness

caused by the introduction of slots would outweigh the unhappiness. Even though some of the statements contradict each other, they do so because they make different assumptions rather than because they violate the principle that overall happiness matters. So they are all compatible with the utilitarian philosophy.

- b 5. Which of the following is not a normative statement?
- (a) The goal of society should be to achieve the greatest good for the greatest number
 - (b) The most efficient way to reduce emission of global warming gasses is through a system of tradable permits
 - (c) A policy which hurts a few people a little bit, and helps a lot of people a lot, is a policy that should be pursued
 - (d) The government should have no role in promoting morality
 - (e) A society that guarantees individual rights is better than one that puts the interests of the state above the interests of individuals

Answer:

A normative statement is one that depends on values. The alternative is a positive statement, which is a matter of fact about how the world works. (Note that there can be a debate about whether a particular positive statement is actually true, but that doesn't mean it isn't a positive statement, only that it is a positive statement that has not yet been empirically proven yet.)

- c 6. Which of the following factors is essential for a country to experience long-term economic prosperity
- (a) Abundant natural resources
 - (b) A democratic government
 - (c) A firm foundation of the rule of law
 - (d) A high national saving rate
 - (e) A good climate

Answer: Without effective rule of law, there is no point in setting up a productive economic enterprise, because as soon as you start making money, someone with guns (or bigger guns than yours) will find out and just steal your profits. There are plenty of countries without one or more of (a), (b), or (d) that are rich nevertheless, but no rich country has no effective legal system.

- b 7. In the early 1990s, upon the collapse of the government of Siad Barre, the country of Somalia degenerated into a situation of tribal and clan and even within-clan warfare, which resulted in a widespread humanitarian disaster, including a famine. The philosopher we have discussed whose analysis of society is closest to this situation is
- (a) John Rawls
 - (b) Thomas Hobbes
 - (c) Robert Nozick
 - (d) Jeremy Bentham
 - (e) Immanuel Kant

Answer:

Thomas Hobbes analyzed what he called “Man in a state of nature,” by which he meant in a situation without any effective laws. In this situation, he said all men would fight, and the strongest and most vicious and best armed would tend to win. He said that human life in these circumstances was “solitary, poor, nasty, brutish - and short.” That pretty much sums up Somalia in the early 1990s. See the additional reading by PJ O’Rourke describing his experiences in Somalia in the 0-CourseIntro/OroukeATTITWCh3.pdf

- c 8. “Freedom of the press, freedom of speech, and freedom of religion should be treated as inalienable rights because societies which establish these rights end up as healthier and happier.” This statement is most compatible with which of the following philosophical points of view?
- (a) Pure Utilitarianism
 - (b) Pure Libertarianism
 - (c) Instrumental Libertarianism
 - (d) The Organic Conception of the State
 - (e) Procedural Justice

Answer:

3 Long Discussion Question (30 points)

Suppose JHU is trying to decide whether to spend \$41,000 to set up a wireless internet networking system on campus. Suppose the university does a survey and finds that there are 1,000 students with laptop computers to whom it would be worth exactly \$40 to have the system set up, and another 1,000 students to whom it would only be worth \$10. (Assume there are no other students or faculty who would want to use the network even if it were free).

- 5 pt 1. Suppose that once the network is set up it is impossible to prevent anyone on campus from using it. What is the technical term for a good like this network? Use the appropriate theory analyze the dollar value to students of setting up the network.

Answer:

The network is a nonexcludable public good. The theory of public goods says to add up the demands for the good among all demanders. Here the 'quantity' is either 0 wireless networks or 1. For 1 network, the value of setting up the network would be $\$50,000 = 1000 * \$40 + 1000 * \$10$.

- 7 pt 2. If the university could get each student to honestly tell how much the network would be worth to them personally, and then could charge each student a fee equal to the amount they said it was worth to them, what is the maximum amount of money the university could raise from these fees? Suppose the university will only set up the network if it can raise enough money from students to pay for the \$41,000 setup cost. Would the university set up the network in this case? Could the university realistically expect students to give honest answers in these circumstances? Why?

Answer:

The amount the university could raise would be the same \$50,000, because the assumption that the students will be honest means that they will be charged an amount exactly equal to the value they place on the network.

Of course, if you know that the amount you will be charged equals the amount you say the network is worth to you, but that whether the network gets set up doesn't depend on what you personally say, everyone has the incentive to lie and say the network is worth zero to them, because then if it gets set up they will be able to use it for a cost of zero. But in this case the university could not raise any money from fees.

- 4 pt 3. Now assume that the university develops a new technology that makes it possible to exclude people from the network unless they pay a one-time fee, but must charge everyone the same fee. How much could the university raise by charging a fee greater than \$40? A fee of exactly \$40? A fee of exactly \$10?

Answer:

If the university charges more than \$40, nobody will pay the fee. If it charges \$40, then it will get revenues of $\$40,000 = \40×1000 . If it charges \$10, it will get revenues of $\$20,000 = 1000 \times \$10 + 1000 \times \$10$.

- 7 pt 4. Suppose the university makes a proposal to a rich alum named Bergbloom: If he will pay the setup costs that cannot be covered by the maximum amount of student fees that can be raised, the university will call the network “The Bergbloom Network.” How much will the alum have to pay for this glory?

Answer:

If the university charges a fee between \$10 and \$40, the same students will pay as would pay for a fee of \$40, but since they are paying a lower fee the university will raise less money. Therefore the maximum amount that could be raised is \$40,000, so the alum would have to pay $\$1000 = \$41,000 - \$40,000$ to get the network named after him.

- 7 pt 5. Explain why the solution in part (4) is not Pareto efficient. What is the maximum fee that would be compatible with Pareto efficiency? Now suppose the university makes another proposal: If the alum will give enough money so that the network can be set up with a fee low enough so that there will be no Pareto inefficiency, then the network will be called “The Network of the Generous, Mighty, and All-Wise Bergbloom.” How much will the alum have to give to achieve this greater glory?

Answer:

In the case of an excludable public good, any solution is Pareto inefficient if there is anyone with a positive valuation of the good who is excluded. In this case, if the fee is greater than \$10, then the students who value the network at \$10 would not pay the fee and would be excluded, and therefore the solution would be Pareto inefficient. However, if the fee were exactly \$10, these students would pay and there would be no Pareto inefficiency. If the university charges a \$10 fee, it can raise \$20,000, as noted above. Therefore in order to obtain the more glorious title, Bergbloom would have to pay $\$41,000 - \$20,000 = \$21,000$.

4 Short Discussion Question (10 points)

A common practice in modern farming is to mix antibiotics into the food of all of a farm’s animals, because this makes the animals healthier and increases profits. However, because of this practice, many animal and human diseases are becoming resistant to antibiotics. In a few sentences, analyze this problem using the tools of public finance, and propose a policy response. Explain why an outright ban on antibiotics use by farms would be a bad solution.

Answer:

When a farmer puts antibiotics in his animals' food, the possible resulting increase in drug-resistant strains of disease constitutes a major negative externality the farmer is imposing both on other farmers, whose animals may get sick, and on all of humanity, because humans might also get sick. The appropriate response would be to impose a stiff tax on the farm use of antibiotics (the suggestion of tradable permits was also treated as a correct answer, but in practice this would probably be too cumbersome). An outright ban would be inefficient, because there might be circumstances under which use of a small amount of antibiotics could be very valuable (for example, if a valuable breeding steer gets a toe infection, it might be worth thousands of dollars to cure it with antibiotics, which would outweigh the trivial risk that this one use of the drugs could lead to drug-resistant disease strains).