

Suggested Answers to Problem Set 1

Econ 441 Fall 07

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Chapter 1 #5

The national debt was 420 billion pounds and inflation was 1.6 percent, so the real value of the debt decreased by $420 \cdot 0.016 = 6.72$ billion pounds. This decrease in the real value of debt can be counted as government revenue.

Chapter 2 #5

The switching will bias the results if the switches are correlated with students' test scores. For example, parents might think smaller classes are better for their kids. If the parents of higher ability kids are more involved, they might be more likely to switch their kids to smaller classes. This would bias the results towards the finding that smaller classes give better outcomes. Alternatively, suppose parents of low ability kids are more likely to switch their kids to smaller classes (maybe they think their kid needs more one on one attention). That would bias the results towards the finding that smaller classes don't improve test scores.

On the other hand, if the switches are uncorrelated with ability, we wouldn't expect the switches to bias the results. For example, if kids are switching because one class fits in their schedule better than another, that might not bias the results.

Chapter 2 #6

You need to do a better analysis to try to control for other things that might have changed over the time period. For a difference in difference analysis you would find the difference in savings before and after the tax cut in these five states and then compare it to the difference in savings over the same time period in other states where there was no tax cut. For this to be valid, all the states need to be just the same except that some states cut taxes and others didn't. For example, suppose the five states that cut taxes did so because they were particularly hard hit by a recession, and the other states weren't as hard hit. Then the difference in difference analysis won't be valid because the two groups of states aren't the same.

Chapter 3 #7

In this economy there is only one good – bags of peanuts. The possible allocations can be represented as points along a line. Every point is pareto efficient because you can't make one person better off (give them more peanuts) without making the other person worse off (taking peanuts away).

Chapter 3#8

$$W = U_A + U_B$$

We want to maximize this social welfare function. First, plug the utility functions into the welfare function:

$$W = 100(I_M)^{-.5} + 200(I_J)^{-.5}$$

We know that we have \$300 to divide between the two, so $I_M + I_J = 300$. Solve this for one of the two variables and plug into the social welfare function.

$$W = 100(300 - I_J)^{-.5} + 200(I_J)^{-.5}$$

To maximize, take the derivative and set it equal to 0:

$$-.5 * 100 * (300 - I_J)^{-1.5} * (-1) + .5 * 200 * (I_J)^{-1.5} = 0$$

Simplifying:

$$200 * (I_J)^{-1.5} = 100 * (300 - I_J)^{-1.5}$$

$$4(300 - I_J) = I_J$$

$$I_J = 240, I_M = 80$$

Chapter 4 #1

Answers may vary. For each good you should evaluate the degree to which you think it is rival and excludable.

Chapter 4 #2

- False. For efficient provision of a public good, the sum of individuals' value of the last unit should be equal to the cost of providing the public good.
- False. For example, cable TV is nonrival and excludable, and it is produced by the private sector.
- Uncertain. If the road is not busy this will be true, but if it is a road with a lot of traffic this won't be true.
- True. Because larger communities have more people, there will be a greater total demand for nonrival goods in those areas, so they will tend to have greater quantities of those goods provided. For example, big cities typically have much bigger fireworks displays than small towns.

Chapter 4#10

At quantities below 4, both individuals have positive willingness to pay for the public good, so total demand is $12 - Z + 8 - 2Z = 20 - 3Z$. At quantities greater than four, only Thelma has positive willingness to pay, so the total demand is $12 - Z$. The socially optimal quantity is $20 - 3Z = 16$, $Z = 4/3$.

Chapter 5#3

Answers may vary. In each case, you should consider whether the conditions of the Coase theorem are met. The conditions are (from the book): 1. The costs to the parties of bargaining are low. 2. The owners of resources can identify the source of damages to their property and legally prevent damages.

- a. Both conditions likely hold – Coase Theorem is applicable
- b. Neither #1 or #2 holds
- c. #1 likely doesn't hold
- d. #1 likely doesn't hold

Chapter 5# 8

In the absence of government intervention, the equilibrium will be where private marginal cost equals private marginal benefit: $10 - X = 5$ so $X = 5$. The efficient level of production is where the marginal benefit is equal to the social marginal cost. The social marginal cost is the private marginal cost plus the external cost, or $5 + 2 = \$7$. So $10 - X = 7$, $X = 3$. The gain to society from moving to the social optimum is 2. We could get this result by imposing a tax of \$2/unit on production. If we did this, the tax revenue would be \$6.

Essay

The goal of the RECLAIM program is to reduce emissions of nitrogen oxides and sulfur oxides by businesses. One RECLAIM Trading Credit (RTC) allows one pound of sulfur oxide or nitrogen oxide during a calendar year. The original target of the RECLAIM program was to get a 75% reduction in NO_x and a 60% reduction in SO₂ by 2003 (measured from the original allocations in 1994). Overall, emissions of NO_x are down 60% since 1994, so the program didn't meet its goal but did make substantial reductions in emissions. In 2004, the total RTCs for NO_x emissions were 12,477 tons. Actual reported emissions were 9,953 tons.

Firms can't actually buy and sell credits online, but they can post offers to buy or sell on the website of the California Air Quality Management District. This matters because the Coase theorem depends on low transaction costs, and the more easily firms can trade credits, the lower transaction costs. One paper that checks the applicability of the Coase theorem to the RECLAIM program is Fowlie and Perloff (2004). Fowlie and Perloff argue that firms face significant transaction costs in the RECLAIM market, and they find that actual emissions by firms depend on initial allocations, which should not be the case if the Coase theorem applies.

Sources:

<http://www.aqmd.gov/reclaim/reclaim.html>

Annual RECLAIM Audit Report for the 2004 Compliance Year. South Coast Air Quality Management District, March 2006.

An Overview of the Regional Clean Air Incentives Market (RECLAIM). Staff Paper, EPA Clean Air Markets Division, August 2006.

<http://www.epa.gov/airmarkets/resource/docs/reclaimoverview.pdf>

Fowlie, Meredith and Jeffrey M. Perloff, "The Effect of Pollution Permit Allocations on Firm-Level Emissions," January 2004. (Unpublished)