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Sign the Pledge:

Economics 222, Mike Lovell  
May 19, 2000, 9:00-12:00

## Final Examination Postmortem: Public Finance

### Part I: Answer four (only 4) of the following 5 questions (1 hour)

I.1. The Laffer curve shows tax revenue as a function of the tax rate. Sketch a typical Laffer curve in your Bluebook and show the point of maximum tax revenue. What policy recommendations did Laffer make on the basis of his graph? Were they appropriate? Why or why not?

See figure 25.3, Stiglitz page 699. Art Laffer, an adviser to Reagan, advanced the Laffer curve to argue that cutting taxes would increase revenue. Reagan ran the biggest deficits in history (not in real dollars), proving Laffer was wrong in assuming the US was on the downward side of the curve.

I.2. In Middletown the mill rate is 28. The Assessment Rate is 70%. If you purchased a house in Middletown today for \$285,000, about how much property tax should you expect to pay each year? Some Connecticut towns are able to raise twice as much revenue per student as other towns that are imposing much higher tax rates. How is this possible?

The assessed value of the house will be  $0.7 \times 285,000 = \$200,000$ ; the tax will be the mill rate  $\times (200,000/1000) = \$5,600$ .

I.3. The Personal Responsibility and Work Reconciliation Act of 1996 replaced Aid to Families with Dependent Children (AFDC) with Temporary Assistance to Needy Families (TANF). What are the essential differences between AFDC and TANF?

TANF is temporary; it did away with the 100% marginal tax rate on earned income of AFDC (the welfare step); it allowed for the continuation of medicare coverage. It is a block grant, which removes the matching grant incentive under AFDC for states to spend more, but it also means the states will not receive support from the federal government for increased welfare expenditures during the next recession.

I.4. Unlike most other commodities, we do not rely on the market mechanism to allocate medical resources. Explain why.

Uninformed consumers; third party payment of medical bills; possible financially exhausting medical bills if hit by a serious illness; adverse selection making private provision of catastrophic insurance difficult. Also, the exemption of employer financed medical insurance from the income tax, instituted in World War II, is hard politically to remove.

I.5. At the end of year 2000 the national debt of Econoland was \$10 billion dollars. The official price index (1995 = 100) stood at 200. In year 2001 the government borrowed \$2 billion. Also, the price index had climbed to 220.

- How big was the real national debt (1995 \$) at the end of year. (i.e., how big was the debt deflated by the level of the 1995 price index in 2000)
- How big was the real national debt (1995 \$) at the end of year 2001.
- How big was the real government's deficit in year 2001? Explain carefully any ambiguities involved.

a:  $2000: 10/2.00=5$ ; b:  $12/2.2 = 5.45$ ; c: is the real deficit  $= 5.45 - 5 = 0.45$  or  $2/2.2 = 0.909090$ ?

### Part II: Answer four (only 4) of the following five questions (2 hours)

II.1. The graph shows the demand and supply functions for a good produced under competitive conditions.

Please Answer this question on the exam page; not in your Bluebook.

Suppose the governor imposes a \$4.00 tax per unit sold on the seller for each unit sold of the commodity. Determine graphically what will happen to quantity sold and the price paid by consumers. Explain.

The price paid by consumers cannot rise to \$10 because at that price producers, still receiving \$6, will produce 1200; but consumers won't pay that much for so much stuff. See Figure 18.1 page 485 of Stiglitz for the answer.

- a. Show on the graph the reduction in consumer surplus. Show clearly on the graph the excess burden (dead-weight loss) inflicted by the tax.

Stiglitz shows the deadweight loss triangle on Figure 19.5 page 525 for the case of infinitely elastic demand. See problem set #1 for the case of a positively sloped supply curve.

- b. What tax would maximize the total tax revenue collected by the governor?

From the same problem set, its just  $(18-2)/2 = \$8$ . This yields the largest revenue rectangle inside the triangle formed by the demand and supply curves.

II.2 Two goods are produced in Never-Never Land. Good X is a public good and good Y is a private good. The top panel of the graph shows one of Alice's indifference curves revealing her preferences between Good X and Good Y. It also displays the Production Transformation curve showing alternative output combinations that may be produced in Never-Never Land. The indifference curve on the bottom panel of the graph reflects Bob's preferences between the two goods.

- a. Explain what is meant by a Public Good and how it differs from a Private Good.

A "public good" (1) violates the exclusion principle and (2) involves no rivalry in consumption. It is not the same as a government produced good or service.

- b. Determine an efficient allocation of resources – you should indicate how much of good X and Good Y should be produced and how good Y will be allocated between our two citizens. In answering this question you may add more curves to the graph.

You need to plot the "left-over" curve on the graph.

II.3 The graph shows the indifference curve of a citizen who lives in a two period world. In year 2000 and year 2001 she will earn income of \$1,000; then its all over! The interest rate is 20%; the bank will pay her 20% interest on money she places in the bank or charge her 20% on money she borrows. The budget line shows her the choices that would be available if there were no taxes.

The before tax budget line already on the graph goes through point  $\langle 1000, 1000 \rangle$ ; it also goes through  $\langle 0, 2400 \rangle$  (spend nothing this year and everything next year and point  $\langle 1000 + 1000/1.2, 0 \rangle$  (spend all you can this year and starve tomorrow).

- a. Indicate with an e the point where our consumer will consume if there are no taxes.

At the tangency point.

- b. Suppose the government imposes a tax of \$400, payable in year 2000. Show how her budget line will shift. Then draw a reasonable indifference curve tangent to the budget line and indicate with an e\* the point where our taxpayer will consume.

If our consumer saves nothing, she can consume at point  $\langle 600, 1000 \rangle$ ; she can also consume at points  $\langle 600 + 833, 0 \rangle$  or  $\langle 0, 1000 + 720 \rangle$ .

- c. Suppose that the government decides instead to impose a tax of \$200 in year 2000 and borrows the other \$200 that it needs from the bank. The government announces that it will impose a tax of \$240 in year 2001 in order to pay off its loan plus accumulated interest. Indicate where our taxpayer will consume on the indifference map. Is the consumer made worse off by the decision of the government to go into debt?

The budget line is exactly the same as for b, so our consumer chooses the same point and is just as well off as when the government doesn't borrow.

- d. Explain what Professor Robert Barro's concept of Ricardian Equivalence is all about? Is your indifference curve analysis consistent with this concept? Mention at least one major limitation of the Ricardian Equivalence argument.

Barro argues that it doesn't matter whether the government borrows and taxes later or taxes now, working through many cases similar in spirit but more complicated than this example. One complication is that the government may be able to borrow at a lower rate than the private taxpayer; for example, states and towns can do this because municipal bonds are exempt from federal taxes. Also, the Ramsey rule suggests that it would be better to spread the tax burden over several years in order to reduce its effect on work effort.

II.4 Duncan Black showed that the Arrow Paradox would not arise if Voters Preferences are "Single Peaked."

- a. Draw a graph in your Bluebook showing the preferences of two voters for expenditure per pupil on the school budget. Have Voter A's preferences be single peaked and have Voter B's preferences violate this condition.

See Stiglitz, Figure 7.4, page 167

- b. Write a paragraph in your bluebook explaining concisely what Arrow's Impossibility Theorem is all about.

Briefly, Arrow showed that there exists no voting rule that satisfies a set of properties that he argued any *ideal* voting rule should meet. Even the Gods couldn't write an ideal constitution.

II.5 At the Robber Byron Business school some courses are even more popular than others. Enrollment has been decided on a first come first served basis. Some students stand in line all night in order to be able to enroll in the most popular courses.

The new Reform Dean decides to remedy the problem by putting the market to work. Each student will be given 1,000 points that can be used only to purchase admission to courses. The dean will give merit bonuses to faculty based on the total number of points collected from students enrolling in their courses. Faculty members will be allowed to charge whatever price they wish.

- a. Do you think that this procedure would lead to an efficient allocation of resources? Would it be fairer than first come first served? Analyze this problem, drawing appropriate graphs where helpful

Many students thought the procedure might be efficient (it would save time wasted waiting in line). One student argued that if we are willing to assume that all students get equal utility out of an equal education and that there is diminishing marginal utility, then the equal distribution of points would maximize the total utility gained by students attending the business school.

- b. As an amendment to the Dean's proposal, a student leader suggests that students be allowed to buy points with dollars from other students in order to get into the classes they wish to take. Would this contribute to a more efficient allocation of resources.

All but one student opposed this procedure, arguing that both the buyer and seller are made better off by the transaction. Here are some of the objections: A student might sell all his points and not get into any good courses. It would mean that the school would graduate some poorly educated students who would degrade the quality of the degree.

- c. Do you think Wesleyan should use the price mechanism to allocate seats in limited enrollment courses? Why or why not?

No! It would discriminate against double majors. Too complex to administer. Students who couldn't get into required courses (like E270 and E271) might not be able to graduate on schedule. The present system works well. Wesleyan computer system is fair and efficient. I hate the point system for food and this would be just as bad. Wesleyan should hire more faculty to teach overcrowded courses.

Some expressed concern that faculty teaching courses with small enrollments that generate a lot of consumer surplus would not get merit raises. No one was concerned that faculty might practice monopolistic pricing in order to maximize the number of points collected or explain why in the case

of congestion costs this might be an optimal solution. And no one suggested that faculty would lighten up and grade more easily in order to collect more points and earn more merit pay. Only one student indicated that she had read the *New York Times* article, "Classes on the Block," on the handout I distributed on 4/18<sup>th</sup>: Georgetown University sells seats in computer classes on eBay. Many business schools, including MIT, Berkeley, and Chicago have computerized bidding. Wharton gives students 5,000 points a semester, allows students to barter among them selves, and even allows scalping. At Chicago students bid on their entire course load and for time slots to meet with job recruiters.