Homework 5 Solutions

ECON 5332 Government, Taxes, and Business Strategy
Spring 2008

Due Tuesday, February 19, at 7:00 pm

1. In a recent study, Americans stated that they were willing to pay $70 billion to protect all endangered species and also stated that they were willing to pay $15 billion to protect a single species. Which problem with Lindahl pricing does this demonstrate? Explain.

   This illustrates the preference knowledge problem. Lindahl pricing requires an accurate measure of each individuals marginal willingness to pay, but people often do not have a good idea of their own marginal willingness to pay for things that are not ordinarily bought or sold in the market. Endangered species protection is an abstract concept, so it is unlikely that people had thought about their willingness to pay for it before being surveyed. At $15 billion per species, all endangered species could not be protected for $70 billion. It appears that the respondents either overstated their willingness to pay to preserve one species or understated their willingness to pay to preserve all endangered species.

2. The preference revelation problem associated with Lindahl pricing becomes more severe as the number of people in society increases. Why do you think this is true?

   The more people there are in a community, the easier it is to free ride. One reason is that it is less likely that anyone would detect a single free rider in a large community. Another reason is that by free riding, a person reduces the aggregate contribution to the public good, thus reducing the level of public good provision; in a large community, though, each individuals share is so small relative to the whole that free riding by a single individual does not significantly change the level of public good provision.

3. Major League Baseball used to use what is known as a 5-3-1 system to vote for the Most Valuable Player (MVP) in each league. Each voter gets to vote for three different players they consider worthy of the award. Their first-place candidate gets 5 points, their second-place candidate gets 3 points, and their third-place candidate gets 1 point. Points are then added up across all voters, and the player with the most total points wins the award. Suppose there are three voters - Neyer, Law, and Phillips - and five potential candidates for the award - Alex, David, Raffy, Manny, and Mario. The table below shows how each voter ranks the candidates. Raffy is embroiled in a substance abuse scandal. The "guilty" or "innocent" verdict will come out the day before voting, and a guilty verdict will ban him from being voted on as an MVP.

Rank	Neyer	Law	Phillips
Best	David	David	Raffy
Second Best	Alex	Alex	Alex
Third Best	Raffy	Raffy	Manny
Fourth Best	Manny	Manny	Mario
Fifth Best	Mario	Mario	David

(a) Who will win the MVP if Raffy is found innocent?

If Raffy is found innocent, David gets 10 points (5 from Neyer and 5 from Law). Alex gets 9 points (3 from each voter), Raffy gets 7 points, and Manny gets 1 point. David wins the MVP.

(b) Who will win the MVP if Raffy is found guilty?

If Raffy is found guilty, David still gets 10 points, but Alex now gets 11 points: 5 from Phillips and 3 each from Neyer and Law. So Alex wins the MVP.

(c) What problem with consistent aggregation does this illustrate?

This illustrates a violation of the independence of irrelevant alternatives. Raffy was not going to win the competition either way, but the winner changes depending on whether he is in the competition or not.

4. Empirical evidence suggests that when congressional districts are redrawn to include more elderly people, members of Congress become more likely to take pro-elderly positions in congressional votes. Why does the median voter model predict that this would be so?

   Redistricting can change the distribution of voters in a district. When the distribution shifts, the median of the distribution shifts with it. In this case, there are now more voters at the end of the spectrum that prefers pro-elderly policies, and thus the median shifts toward more pro-elderly policies. The median voter model predicts that representatives will seek to satisfy the median voter in an effort to obtain the most votes, so the changes in congressional votes following the redistricting are perfectly consistent with the median voter theory

5. When local telephone companies wish to raise the rates they charge to phone customers, they must first argue their case at a public hearing before a regulatory body. How does the free rider problem explain why telephone companies are usually successful in getting permission to raise their rates?

   The telephone companies have a strong incentive to expend resources lobbying for higher rates. Because a rate increase is valuable to each of those companies, no individual company will risk trying to free ride on another telephone companys efforts. Individual consumers, however, do not stand to lose a substantial amount of money from a rate increase, so each individual has less of an incentive to be involved in the issue. The large number of consumers, together with the small potential individual gain from lobbying against rate hikes, increases the likelihood that nobody will oppose the rate increases.

6. Alfie, Bill, and Coco each value police protection differently. Alfie's demand for the public good is $Q_A^D = 55 - 5P$, Bill's demand is $Q_B^D = 80 - 4P$, and Coco's demand is $Q_C^D = 100 - 10P$. If the marginal cost of providing police protection is \$13.50, what is the socially optimal level of police provision? Under Lindahl pricing, what share of the tax burden would each of the three people pay?

   To answer these questions, first rewrite each demand so that P (willingness to pay) is expressed as a function of Q:

   Alfie: $P_A = 11 - 0.2Q$; Bill: $P_B = 20 - 0.25Q$; Coco: $P_C = 10 - 0.1Q$. Adding each person's willingness to pay yields $P_A + P_B + P_C = 41 - 0.55Q$. The left-hand side gives the marginal social benefit of providing the Qth unit of the good. Setting this marginal benefit equal to the marginal cost gives the socially optimum level of provision:

$$41 - 0.55Q = 13.50,$$

   or $Q^\circ = 50$.

   When $Q = 50$, Alfie's marginal benefit is $11 - 0.2(50) = 1$, Bill's marginal benefit is $20 - 0.25(50) = 7.5$, and Coco's is $10 - 0.1(50) = 5$. Hence, Alfie's share of the tax burden under Lindahl pricing is $1/13.5 \approx 7.4\%$, Bill's share is $7.5/13.5 \approx 55.6\%$ and Coco's share is $5/13.5 \approx 37\%$.

7. Carrboro has three equal-sized groups of people: (1) type A people consistently prefer more police protection to less; (2) type B people prefer high levels of police protection to low levels and they prefer low levels to medium levels; (3) type C people prefer medium levels to low levels, which they in turn prefer by a modest amount to high levels.

   (a) Which types of people have single-peaked preferences? Which have multi-peaked preferences?

   Types A and C have single-peaked preferences, with peaks at "high" and "medium" respectively. Type B has multiple-peaked preferences, with peaks at "high" and "low" and a dip at "medium."

   (b) Will majority voting generate consistent outcomes in this case? Why or why not?

   Majority voting does not usually generate consistent outcomes when some voters have preferences that fail to be single peaked. But they do happen to generate consistent outcomes in this case. If "high" and "low" are the two options on the ballot, "high" will win, since types A and B will vote for it. Similarly "high" wins when "high" and "medium" are the two options on the ballot. When "low" and "medium" are on the ballot, "medium" wins, since types A and C will vote for it. Finally, when all three are on the ballot, types A and B will both vote for "high," which will therefore win. Notice that there are no cycles, so the voting outcomes are, in fact, consistent. The decisions coincide with those that would be made by a society that prefers "high" to "medium" and "medium" to "low."