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Econ 812

HW #7 Answer Key

1. Analyze the moral hazard problem the arises in the professor-RA relationship. To what extent can a professor *infer* the effort level of the RA by examining his or her output? Why don't RA's shirk more than they already do? (1 paragraph)

RAs get paid a fixed salary, but there performance can vary widely. Some RAs track down ten articles in a day; others take months to hand in one. Professors can definitely infer a fair amount about RA performance: any one article may be hard to find, but these random shocks should balance out after a while. If they don't, your RA is probably shirking. Perhaps one reason why RAs do not shirk more is that they are hoping that the professor they work for will see them as exceptional and eventually want to co-author.

2. Imagine that cars are worth X to their current owners, with X uniformly distributed on the interval [0,100]. These cars are however worth b*X to buyers. There is asymmetric information: current owners know their cars' true value, while buyers know only average values. Analyze market efficiency as a function of b. To do so, you will need to calculate total potential surplus and compare it to equilibrium surplus.

Unless b>1, there is no surplus to be realized in this market in the first place.

If b>1, total potential surplus is equal to an average of 50(b-1) per car. The average car is worth 50 to the current owner. If b=1.07, this indicates that the buyer values it at 7% more, implying surplus of 3.5.

However, if 1<b<2, 0% of this potential surplus is realized. A bid of x implies that the average sold car was worth x/2 to the initial owner. The value to the buyer is according (x/2)*b, which is less than x for 1<b<2.

If $b \geq 2$, however, the value to the seller of bidding x is greater than or equal to x. This means that 100% of the market surplus will be realized.

3. Suppose there are seven workers. The PDV of their lifetime labor is as follows:

Worker #	**1**	**2**	**3**	**4**	**5**	**6**	**7**
$ PDV	1,000,000	1,200,000	1,400,000	1,600,000	1,800,000	2,000,000	2,500,000

Employers cannot tell how productive a worker is, but they CAN tell whether a worker has a college degree, and they know the **AVERAGE** value of workers with and without college degrees. *Competition forces them make worker pay equal their average PDV.*

A. What will the PDV of lifetime earnings be for workers with and without college educations be if...? (To fill in this table, just take the *average* PDV for workers with and without college degrees in each of the rows).

Worker #'s w/ College Degrees	**Without College PDV**	**With College PDV**	**College Premium**
1-7	--	$1,642,857	--
2-7	$1,000,000	$1,750,000	$750,000
3-7	$1,100,000	$1,860,000	$760,000
4-7	*$1,200,000*	*$1,975,000*	*$775,000*
5-7	**$1,300,000**	**$2,100,000**	**$800,000**
6-7	$1,400,000	$2,250,000	$850,000
7	$1,500,000	$2,500,000	$1,000,000

B. Suppose you are worker #4. Workers #1-3 don't have college degrees; workers #5-7 do. What is your PDV of earnings without a college degree? With a college degree?

If you don't get a college degree, you get lumped in with workers #1-3, so you get $1,300,000. (Look at the #5-7 w/college degree row, in **bold**). If you do get a college degree, you get lumped in with workers #4-7, so you get $1,975,000. (Look at the #4-7 w/college degree row, in *italics*).

C. What are the **total** earnings of the *other* workers if you (still worker #4) get a college degree? If you don't?

If you do get a college degree, then workers #1-3 get $1,200,000, and workers #5-7 get $1,975,000. Total earnings for them: $9,525,000.

If you don't get a college degree, then workers #1-3 get $1,300,000, and workers #5-7 get $2,100,000. Total earnings for them: $10,200,000.

D. Suppose worker #4's college costs $500,000 total. What is the net gain of college to worker #4? The net gain to all seven workers?

If #4 goes to college, he earns $1,975,000; if he doesn't, he earns $1,300,000. The net gain of college would be $675,000-$500,000=$175,000: a gaining proposition for worker #4.

What about the net gain to all 7 workers? If worker #4 goes to college, he earns $1,975,000, and the other six workers earn $9,525,000. If worker #4 doesn't go to college, he earns $1,300,000, and all other workers earn $10,200,000. So:

Total Income If #4 Goes to College: $1,975,000+$9,525,000-$500,000=$11,000,000
Total Income If #4 Does Not Go to College: $1,300,000+$10,200,000=$11,500,000

In other words, the net social benefit of #4 going to college is -$500,000, precisely the cost of going to college!

E. Are there externalities of education in this problem? Explain.

Yes: There are *negative* externalities. A worker who pays for school raises his own income, but the income of other workers falls by an equal amount. Since productivity does not change, the cost of schooling is a pure deadweight cost.

4. Prove/show that if you know the value you put on an object in a second-price auction, it is a weakly dominant strategy to bid your true value exactly.

Let my value be v, and the highest bid OTHER than mine be b_a. Here is why setting my bid b=v is a weakly dominant strategy. (I assume for convenience that in the case of tie bids, everyone has an equal chance to win).

There are three cases to consider: $v>b_a$, $v<b_a$, $v=b_a$.

Case 1: $v>b_a$

If I set b=v, then I win the auction and get surplus $v-b_a$.

If I set b>v, I still win the auction and get surplus $v-b_a$.

If I set $b_a<b<v$, I still win the auction and get surplus $v-b_a$.

If however I set $b_a=b<v$, then I only win with 50% probability and get expected surplus $.5(v-b_a)$.

Finally, if I set $b<b_a$, I lose and get 0 surplus.

Thus, in Case 1, failing to set b=v sometimes hurts me and never helps me.

Case 2: $v<b_a$

If I set b=v, I lose and get 0.

If I set b<v, I lose and get 0.

If I set $b_a>b>v$, I lose and get 0.

If I set $b_a=b>v$, I win with a 50% probability and get expected surplus of $.5(v-b_a)<0$!

If I set $b>b_a>v$, I win and get surplus $(v-b_a)<0$!

Thus, in Case 2, failing to set b=v sometimes hurts me and never helps me.

Case 3: $v=b_a$

If I set v=b, I win with a 50% probability and get 0 expected surplus.

If I set v>b, I lose and get 0 expected surplus.

If I set v<b, I win and get surplus $(v-b_a)<0$!

Thus, in Case 3, failing to set b=v sometimes hurts me and never helps me.

In all three Cases, then, failing to set b=v sometimes hurts me and never helps me. Thus, setting b=v is a weakly dominant strategy. QED.

5. Consider your career goals. From this aspect, what perspective of your graduate education would you say are signaling? What aspects actually

increase your productivity? To what extent can you reasonably generalize from your personal experience to the average student's? (1 paragraph)

My graduate education was probably about 50% signaling. I had to learn all of the first-year high theory in order to get through the program, but I am never going to do any research involving topology. I have used a lot of the game theory and basic econometrics, however, which have enabled me to write more publishable articles. However, I doubt my experience is typical. I only use my graduate education to this high degree because I became an economics professor. If I went into business consulting, I probably wouldn't use more than 10% of what I learned at Princeton.

6. Consider all-you-can-eat buffets. In what sense might these suffer from (a) moral hazard; (b) adverse selection; (c) a winner's curse? (half page)

a. If the marginal cost of eating more is zero, you will probably eat more than you otherwise would. The all-you-can-eat structure eliminates the standard incentive to stop eating once you value the food at less than its MC.

b. The people most likely to select the all-you-can-eat option are probably going to be the people with the biggest appetites. This raises the average cost of the buffet, inducing people with small appetites to withdraw from the buffet and order a less ample dish from the menu.

c. It is possible, though, that people choose the buffet option merely because they *think* they have big appetites. People who think they have big appetites are likely to be precisely those people who most grossly overestimated their own appetites. One could also argue that there is a winner's curse in *offering* buffets. The restaurants that offer them are probably run my managers who most under-estimated the amount of food people will shovel onto their plates when the MC is zero.

7. Before you learned about the "winner's curse," were you appropriately adjusting for it in your real-world behavior? Analyze two examples. (half page)

Probably. When I chose my undergraduate institution, for instance, I did not think it was so much better than my other choices, and I was not disappointed. An outside observer might think that I suffered from the winner's curse when I married my first girlfriend, but ex post she has exceeded my expectations. :-)

8. Regulation of health and safety is often justified in terms of "imperfect information." How, in theory, could regulation improve market performance in these areas? What, in practice, does regulation do? (half page)

Regulators could offer free information; they might also require insurance purchase in markets with severe adverse selection. In practice, though, regulators often simply ban products they consider unsafe. You cannot even use them if you sign an explicit waver. Similarly, regulators often make adverse selection problems worse by forcing insurers to offer money-losing policies to high-risk clients.