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ECON-UA 323

Development Economics

Outline of Answers to Problem Set 4

(1) Are the following statements true or false? It is *not* enough to just guess one or the other. You need to provide an argument for or against, and only then will any credit be awarded.

[a] If in a society of 100, there are 70 beneficiaries of a policy (they gain 1 dollar) and 30 losers (they lose one dollar), and if 49 beneficiaries know their identity while no one else does, then the policy *must fail* a majority vote.

True. Suppose there are 100 people and a new project is universally known to have 70 people who gain a dollar, and 30 people who lose a dollar. The 49 beneficiaries will vote yes on the policy. The remaining 51 voters know that there are 21 beneficiaries among them, but don't know if they will be one or not. Then the expected value for each of these 51 voters is

$$(21/51) \times 1 - (30/51) \times 1 < 0.$$

So they will all vote against the policy.

Partial credit will be given if you repeat verbatim what was said in class but you can only get full credit if you solve out this particular example.

[b] A potential entrant to a new market with superior costs of production may not enter if there are imperfect credit markets *and* increasing returns in production, but will not find it a problem if only one of these restrictions holds.

True. Even if the better product has a lower cost curve, its initial average cost (at relatively small levels of production) may be higher. It will take time for the product to build up to volumes which will lower cost to the point at which it can make a profit. If capital markets are imperfect, the entrant may not have enough funds to cover this interim period.

If only one of these restrictions holds, then there is no problem. If credit markets are positive, then the entrepreneur can ride out the intervening period of losses by getting a loan. Even if credit markets are imperfect or missing, she is fine if the products are produced using decreasing or constant returns to scale. The better product can then make money from day 1, starting at small scales of production.

Credit will be given for the following central points: (i) it takes time for the product quality to spread via word of mouth, and so profits will be negative in the short or medium run, and (ii) it will take access to deep pockets or good capital markets to ride out this short-run

period of losses. You will also get credit for drawing diagrams and using them in a clean, careful way to illustrate these points.

[c] A good instrument must be correlated with the independent variable but uncorrelated with the dependent variable.

False. In general, if the instrument I is correlated with the independent variable x, and the latter is in turn correlated with the dependent variable y, then I will typically be correlated with y. No getting around that. That is not by itself a disqualification or a failure of the exclusion restriction. What we do need — for a good instrument — is for I to have a non-zero correlation with X, but a zero correlation with Y via *any other channel other than* X. Specifically, if the main equation is

$$Y = A + bX + \epsilon$$

then we need I to influence X but to be uncorrelated with Y conditional on X; that is, I must be uncorrelated with ϵ. *Note.* Some of you might write "True," because you interpret the question as saying that "I has a non-zero correlation with X, and also has a *separate* nonzero correlation with Y, *even after conditioning for* X. If so, and you make that clear, you will also get appropriate credit. Otherwise not.

(2) Recall the Munshi-Myaux study of declining fertility in Bangladesh. Briefly and precisely describe the study:

(a) the question:

They view the fertility transition in Bangladesh as a multiple equilibrium phenomenon, transiting from a norm in which contraceptive use is frowned upon to another where it is widely accepted, thus resulting in a marked decline in fertility. There was a study done of 70 villages in Matlab thana, with contraceptive use data collected from every woman (between some age limits) twice a year. This was in the background of the Maternal Child Health - Family Planning program. Over 1983–1993, the total fertility rate fell from 4.5 to 2.9.

Is this an example of a multiple equilibrium phenomenon? How would we show this? The idea would be to regress current contraception use on the overall contraception use in the village, and see if there is a relationship. But ...

(b) the main empirical problem, and

There is a problem here with identification. We cannot figure out if there is an omitted variable that would cause individual and village-level use to be correlated, entirely different from the peer effects that are needed to generate multiple equilibria. Here is the relevant equation that we would like to estimate and interpret (this was all done in class):

$$y_{it} = \text{Constant} + \gamma y_{i,t-1} + \beta x_{t-1}^{v(i)} + \eta Z_{it} + C_t^v + \epsilon_{it}$$

where y is a 0-1 variable describing contraceptive use, t is time, x is the aggregate village-level use, $v(i)$ is the village of person i, Z is a vector of individual characteristics (such as age), C_v^t is this unobserved omitted variable that can vary across villages and over time.

The point is that C_t^v can be decomposed into three parts. The first is a component that only depends on the village, the second only depends on time, and the third is one that varies *in a village-specific way over time*. The first component can be dealt with by including village fixed effects in the panel regression, the second by including time fixed effects in the panel regression, but the last one screws everything up: this is the identification problem.

(c) the strategy employed to deal with this problem.

The strategy used is to allow for separate regressions within the village. Specifically, the authors exploit the idea that Hindu and Muslim women do not hang out with each other. They re-specify the above regression by looking at the connection with *own-group* contraceptive use, as well as the cross-effects. The idea is that if the own-group effects are positive, and the cross-group effects are zero, then this can only be explained away by some omitted variable that not only varies by village and time, but independently by religious group within the village and time. They then argue that the nature of the MCH-FP program did not allow for such variation: both religious groups would have been served by the program in a highly correlated way.

Specifically, this is the equation that they now estimate. I will write it for a Muslim woman, but we can also write the same sort of thing for Hindu women: for a Muslim woman i:

$$y_{it} = \text{Constant} + \gamma_M y_{i,t-1} + \beta_{MM} x_{t-1}^{M,v(i)} + \beta_{MH} x_{t-1}^{H,v(i)} + \eta_M Z_{it} + C_t^{M,v} + C_t^{H,v} + \epsilon_{it}.$$

Summarizing what I said in words, if we get $\beta_{MM} > 0$ (the own effect) and $\beta_{MH} = 0$, then this is evidence of the peer effect unless we are willing to entertain the highly unlikely alternative (so they say) that $C_t^{M,v}$ and $C_t^{H,v}$ are entirely independently distributed within the village.

Indeed, that's what they get in their regressions: $\beta_{MM} > 0$ (the own effect) and $\beta_{MH} = 0$, and the same for Hindu women.

How much of this you say back to us will depend on how much you've studied the stuff. But you have been taught all this in the class, and to some extent you have to get the main ideas here right to get serious credit. But as you can see, there is a lot of room for still more credit; say, someone gets all the equations right as well; then that's a perfect answer.

(3) The readings. No answers provided, but See Slides 10a.