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14.771 Development Economics: Microeconomic Issues and Policy Models
Fall 2008

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14.771/Econ 2390b

Development Economics

Final Exam 2006

1 PART I: Short questions

Answer 4 out of 6. Please answer each question in the booklet of the faculty member who wrote it.

1. (Abhijit's question) What are some of the disadvantages of relational contracts (i.e. contracts sustained by repeated games equilibria) relative to formal enforceable contracts?
2. (Abhijit's question) In their paper on "observing unobservables" how do Karlan and Zinman set up the experiment to distinguish between adverse selection, moral hazard and the "mechanical effect" of higher interest rates on default?
3. (Esther's question)
 1. In Israel, public schools are required to have class size no larger than 40 students per class, and to accept any students who want to join the schools. Explain how this rule can be used to devise an empirical strategy to measure the effect of class size on test scores.
 2. The class size rule is the same in Chile, and applies to private schools as well. However, private schools are free to set fees as they feel like. Moreover, imagine there is a fixed cost in opening a new class. Could this invalidate the strategy for estimating the effect of class size that you described in question a? In particular, if you found the same empirical pattern as in question a, could you necessarily interpret it as the effect of class size?
4. (Esther's question) Nancy Qian finds that in regions suitable to tea production, the ratio of surviving boys to surviving girls went down when they became allowed to grow tea, relative to other regions. Propose three models in which this would be true, and propose possible strategies to discriminate between these interpretations.
5. (Sendhil's question) Recall the Foster and Rosenzweig model of learning. Answer the following questions:
 1. Suppose that a producer of HYV seeds decides to subsidize adoption of the seed as a special one-time discount. How will this affect the rate of adoption?
 2. Suppose that a producer of HYV seeds finds a way to alter its seed so that it is less dependent on local conditions. In other words, it requires similar inputs even on different soil types. How will this affect the rate of adoption? Please be as precise as possible.
6. (Sendhil's question) In the Benjamin paper we discussed, he tests for separation in household farm production.
 1. Describe the separation principle. Under what assumptions would this principle apply?
 2. Is the separation principle operative in the Jayachandran model? If so, how does it (or does it not) affect the results? If it is not operative, describe how modifying the model to make it operative would affect Jayachandran's results.

2 PART II: Long questions

Answer all questions. Please answer each question in the booklet of the faculty member who wrote it.

2.1 Question 1 (Abhijit's)

It is often argued that the fact that the investment of small firms is more sensitive to their cash flow than that of larger firms, is evidence that the small firms are credit constrained. To examine this argument, consider the following model of credit constraints: A firm that has w dollars of cash in hand wants to invest an amount $k > w$. It therefore needs to borrow an amount $k - w$. The firm has a production function $F(k, \theta) = \theta k^\alpha$, $0 < \alpha < 1$.

There is a competitive banking sector that can lend to the firm. Its (gross) cost of capital is $\rho > 1$. However the banks are worried about deliberate default. The firm can always default on the loan by paying a cost which is β fraction of its output, $0 < \beta < 1$. If it defaults it retains the remaining $1 - \beta$ fraction of output and pays no interest. The bank that lends to the firm therefore has to make sure that the firm does not want to default. In equilibrium there will be no default and the interest rate that a competitive bank will charge will be equal to ρ .

Show that the the firm's no default constraint is

$$\beta F(k, \theta) + rw \geq rk$$

Using it show that a firm will face an investment limit

$$k \leq k(w, \theta),$$

and that $k(w, \theta)$ is increasing in both w and θ (Hint: draw a figure where you superpose the curve for $\beta F(k, \theta) + rw$ with the straight line for rk).

Also show that $\frac{k(w, \theta)}{w}$ is increasing in θ but decreasing in w (once again drawing a figure helps). Can you suggest an intuition for this result?

Next derive the expression for the sensitivity of investment with respect to cash flow, defined as the elasticity $\frac{w}{k} \frac{dk}{dw}$. Is this elasticity higher or lower for smaller firms (defined as firms with smaller k)? Does it matter whether the difference in size comes from a smaller w or smaller θ ?

Comment on what this tells you about the test mentioned in the first sentence.

2.2 Question 2 (Esther's)

You are asked by the Millenium Challenge Corporation to design an experiment to measure the overall impact of a comprehensive voucher system, which El Salvador is considering adopting. The Voucher system would be similar to the Chilean system, where every kid is entitled to a voucher for private school (or can attend public school if they want to). Prepare the proposal for an experiment, using the following template (which is roughly the template followed by the NIH, though we will not need 15 pages...)

- A. Research questions:
 - a. What are the main aims of your experiment? What are you trying to learn from it?

- B. Background and Significance:
 - a. What are the rationales for a voucher system? What are the sources of uncertainty regarding whether this is the right system to adopt (using economic reasoning for this)?
 - b. What previous research exists, and why it is insufficient for El Salvador to make a policy decision on whether they should adopt the system or not.

- C. Experimental Design and Methods
 - a. What is the design of your experiment (or experiments)? Explain carefully how you will constitute the treatment and comparison groups.
 - b. What are your variables of interest?
 - c. How would you go about calculating needed sample size (I understand you are not in a position to do it)?

- D. Plans for data analysis:
 - a. Explain the regressions/analysis of data that you would do once the experiment has been run. Detail the variables you would use and the techniques you would employ.

2.3 Question 3 (Sendhil's)

Recall the corruption framework in class. Map the framework to each of the following examples. Specifically describe the slots to be allocated, the ranking of private value, whether private ability to pay is important and how you would think about the testing technology. Moreover (i) describe whether the concepts of efficient testing, red-tape and corruption would arise under this framework in this context and (ii) how corruption may distort the efficient allocation. Please be as detailed as possible.

1. The government has a regulation which prevents firms from polluting, specifically the carbon emissions of firms is capped. There is an inspector whose job is to enforce the regulation but who may or may not be corrupt.

2. The government authorizes police to enforce speeding laws. The police set up “speed traps” where they use radar guns to catch speeders. How would you model corruption of the police in this task?
 - a. Is there any feature of corruption in this kind of example which the framework may have trouble explaining?