Part II

Development (2 hours). Total points: 100.

1 Questions (40 points)

Answer each question below. Cite specific papers when you refer to empirical evidence.

1. (a) (15 points) Microfinance organizations tend to lend money in groups. What failures can group liability solve? How much evidence is there that these failures are important? How much evidence is there that group liability can indeed solve them?

   (b) (10 points) Think about the Duflo (AER, 2001) paper on the returns to education in Indonesia. What additional data would you need to test for general equilibrium effects of education? What analysis would you do?

   (c) (15 points) In theory, when can land redistribution achieve higher efficiency (in addition to higher equity)? What empirical evidence is there that it is the case?

2 Moral Hazard and Financial Constraints: Theory and Empirics (60 points)

Consider the following model between a landlord and a tenant. The production function is given by:

$$y = f(le, x)$$

where l is labor, e is effort. Thus $\hat{l} = le$ is labor in efficiency units. x is another input.

A contract between landlord and tenant takes the form (α, β, r), where α is the share of output kept by the tenant, β is the share of input x contributed by the tenant, and r is the certain payment (r can be positive or negative).

1. (3 points) How does a pure rental contract look like? a wage contract? a sharecropping contract?

2. Let $\psi(le)$ be the disutility of labor, with $\psi(0) = 0$, $\psi' > 0$, and $\psi'' > 0$. Tenant is risk neutral, with utility:

$$U_T = \alpha f(le, x) - \beta x - \psi(le) - r - w$$

where w is living expenses at subsistence level. Let $\bar{u}$ be the tenant's reservation utility. Assume all prices are equal to 1.

(a) (4 points) Assume the landlord can observe all variables, and is risk neutral. Solve for the efficient contract. Show that we could observe all types of contracts in this case. (You do not need to solve the model explicitly, just write the solution in terms of first order conditions).

(b) (5 points) Now assume that credit markets are imperfect. In particular, the working capital R of the tenant is limited, with the constraint given by

$$w + \beta x + r \leq R.$$

Is there a reduction in output because of this new constraint?

(c) (5 points) Suppose, in addition, that the landlord wants as much cash advance from the tenant as possible (as r or βx). Write down the equality that determines α. What should the sign of the correlation between α and R be, in the data, under this theory?

(d) (10 points) Next, suppose, in addition, that the tenant's effort (e) is unobservable. Write down the new moral hazard constraint, and solve for the optimal contract(s). Plot the landlord's utility function as a function of R and give the intuition behind it. (Again, don't try to solve the model explicitly).

(e) With the theory in hand, you survey 100 farming contracts in your favorite village. Your survey data includes the following variables, all measured on a per-hectare basis:

- $Z_1 = 1$ when the farmer is the owner of the land, or has a pure rental contact over the land
- $Z_2 = 1$ when the farmer is a sharecropper
- $Z_3 = t \times Z2$ where t is the length of the relationship between the landlord and the farmer (for a sharecropping contact)

- FL: quantity of family labor used on the farm
- HL: quantity of hired labor used on the farm
- M : other inputs used on the farm
- C : type of crop
- W : farmer's wealth
- N : number of working members in the family
- R_l : Landlord's working capital
- R_t : Tenant's working capital
- AGE : farmer's age

i. (4 points) A local official suggests that to understand the effect of contracts on output, you run the following regression:

$$\log\ Y = aZ_1 + bZ_2 + cZ_3 + d\log FL + e\log HL + f\log M + \epsilon$$

Explain why she insists on including FL as a separate regressor (instead of using $TL = HL + FL$ as a single regressor). Does this make sense under the model above?

ii. (8 points) Why should Z_3 be included? Give *two* possible explanations.

iii. (5 points) What is the major concern with the suggested regression above? How would you improve upon her suggestion by using other variables in the dataset, or by collecting new data?

iv. (6 points) In the specification above, we haven't distinguished between self-owned land and purely rented land. This makes sense under our theory, as the two are indistinguishable under our model above. Can you think of a theory under which we would expect different outcomes for rented vs. self-owned and cultivated land?

v. (5 points) So far we have only tested the prediction of the theory pertaining to the relationship between contract type and output. Imagine that you have a new variable, CT, which tells you the share of output kept by the tenant. Suggest a regression that would test for the second prediction of the model, namely, the relationship between contract type and financial constraints.

vi. (5 points) Is it possible using this data to discriminate between our theory, and one based on risk aversion?