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14.74 Foundations of Development Policy
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14.74

Land

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1 Agriculture: The efficiency of land use

- Share of agriculture in employment is close to 50% for the world as a whole (50% in China, 57% in India).
- Is land used efficiently?

1.0.1 Farm size and productivity: observed relationship

- Farm size productivity differences: see table.
- Profit-Wealth ratio and weather variability (monsoon onset is a measure of the risk faced by the farmer): see figure
 - The Profit-Wealth ratio is always greater for small farmers
 - Small farmers' profits are hurt much more by uncertainty than large farmers'

1.0.2 Why is this surprising?

- Arguments for increasing returns (the opposite relationship)
 - Technology with fixed costs (tractors, etc..)
 - Larger farmers have better access to capital (evidence in a few lecture)
 - Larger farmers have better access to politically allocated inputs (evidence from Africa in a book by Bates “Market and states in tropical Africa”).
 - The best farmer will have more land...
- Mitigating factors:
 - Rental markets in farm machinery
 - Technological change in not very rapid. Savings not that important.

1.0.3 What could be going on: Arguments for decreasing returns

- – Agency problems: large farms are cultivated by hired labor, which has fewer incentive to work hard. Small farms are owner cultivated. ⇒ Redistributing land will create more owner cultivated land which will be more productive.
- But why cannot the owner of the land not give the right incentive to the farmers?

1.0.4 Different potential explanations for the observed inverse productivity relationship:

- Differences in land quality
- Differences in farmer characteristics
- Incentive Problems

Problem with the observed relationship: all of this could be going on... How can we separate these different effects.

1.0.5 Evidence: Study by Biswanger and Rosenzweig

- Using ICRISAT data: very detailed panel (repeated observation for every household) data from India.
- Some individuals cultivate both an owner-operated plot and a rented plot.
- Biswanger and Rosenzweig compare the inputs they apply on their own plot and the rented plots, and the overall productivity of both plots.

$$\Pi_{ij} = \alpha + \beta R_{ij} + \eta_i + v_{ij},$$

- where Π_{ij} is farmer's i outcome (profit, investment) on plot j , and R_{ij} indicate whether the plot is rented. η_i is the unobserved (but fixed) characteristics of the farmers (risk aversion, quality, etc...). We think that η_i and R_{ij} may be correlated, but, for a minute, not v_{ij} and R_{ij} . What can we do?
- Control for the individual fixed effect to compare plots within individual's. So for example, for all the farmers that cultivate two plots of land, we can run the regression:

$$\Pi_{i2} - \Pi_{i1} = \beta(R_{i2} - R_{i1}) + v_{i2} - v_{i1},$$

- The individual fixed effect is gone!

Biswanger and Rosenzweig find a strong negative β . What does this suggest? What could be the remaining problem?

1.0.6 More evidence: Shaban (1987)

- Uses the same data, but controls in addition for plot quality.
- He finds that individual work 40% more on their own land (controlling for land size) and that the productivity is 15% to 30% higher on own land than on rented land (with or without controlling for land quality).
- On balance, the evidence suggests that the inefficiency comes from incentive problems.

1.1 Incentive problems: A simple model of sharecropping

- Tenant farms the land, and applies effort e .
- The tenant can choose to work somewhere else and obtain \underline{w}
- The landlord cannot observe e .
- Effort is costly to the tenant: $\frac{1}{2}ce^2$
- Two things can happen:
 - with probability e : Output is H
 - with probability e : Output is 0

- The tenant and landlord write a contract which specifies a payment to the tenant
 - a payment h if output is H
 - a payment l if the output is 0

1.1.1 Optimal Effort

- Maximize $eH + (1 - e)0 - \frac{1}{2}ce^2$
 - What is the solution?
 - Why?

1.1.2 No Limited Liability

- Work sequentially: given h and l , what is the tenant's effort? Tenants want to maximize income minus the cost of effort: $eh + (1 - e)l - \frac{1}{2}ce^2$
- What is the solution for e given h and l ?
- How do we need to fix h and l to incite the tenant to choose the optimal effort $\frac{H}{c}$?
- $l =$
- $h =$
- This contract is a *fixed rent contract*.

- How is the rent, R , chosen?
- Tenant has to agree to work with landlord: he has to receive at least \underline{w} . → exercise: calculate R

1.1.3 Limited Liability

- Imagine that the tenant cannot receive negative payment: *limited liability*.
- What will l be?
- What will e be?
- What will the output be?
- How does it move with h ?

- Maximization problem of the landlord: Maximize his income.

$$\max e_{tenant}[H - h]$$

$$\max \frac{h}{c}[H - h]$$

- What is the optimal h now?
- What is the output?
- How does the output compare to the optimal output?
- What is the difference $h - l$?
- How does it compare to the case without limited liability?
- Why is the effort smaller than the optimal effort?

1.1.4 Outside Option

Remember that the tenant can choose to work somewhere else and will receive a utility \underline{w} . How does it modify the contract chosen above?

- Tenant's utility under the contract:

$$\frac{h}{2}h - \frac{1}{2}c\left(\frac{h}{c}\right)^2 = \frac{1}{2}\frac{h^2}{c} = \frac{1}{8}\frac{H^2}{c}$$

if $\frac{1}{8}\frac{H^2}{c} \geq \underline{w}$, they can choose this contract: Is there anything strange about this contract?

if $\frac{1}{8}\frac{H^2}{c} < \underline{w}$, they have to pick a contract which will give at least \underline{w} to the tenant Pick h such that:

$$\frac{1}{2}\frac{h^2}{c} = \underline{w}$$

$h =$

$e =$

- e is always an increasing function of \underline{w}
- output is always an increasing function of \underline{w}

→ increasing the tenant outside option increases productivity

1.1.5 Other sources of inefficiency

1. (a) The rental contract makes the farmer bear all the risk of production: if he is risk averse he may dislike that and want some insurance from the landlord: a contract where he will need to pay less during bad times than during good times.

2. The rental contract provides no incentives for the land owner—and there may be things he needs to do (management-type things)

1.1.6 The desirability of land reform

1. (a) If limited liability is important, then redistributing wealth clearly will help: if the farmer is wealthier, it improves the ability for a fix rent contract. But why land in particular?

2. If risk aversion is important, then redistributing land may or may not have an effect on productivity, depending on why people have different level of risk aversion:
 - a. Suppose that difference in risk aversion are exogenous: then what will happen after the land reform?

 - b. Suppose that risk aversion is bigger for those who don't have much land how does it change the argument?

3. If there are incentive problems on both sides: what will happen after theland reform?

1.2 The case for redistributing land

Why redistribute land rather than money? As economists, we tend to think that money is better, since with money, the poor could buy land if they wanted to. So why land reform?

- The giving end: Getting land from the rural rich.
 - Common argument (1): land cannot flee to Switzerland, and cannot be hidden: easy to seize
Yet: Land titles are very sketchy. Formal titles can be quite different from effective control, especially if people have an incentive to do so. Land may not be so easy to take away after all.

- Common argument (2): redistributing land does not create distortions, since it is a fixed asset (income taxation would reduce labor supply, but land does not).

Yet: Redistributing land is difficult: it is opposed by landowners who often control important political resources. There are very few instances of large scale land redistribution that did not take place in the midst of massive social upheaval. Land reform may be politically very costly.

- Perhaps we want to tax the rural rich, and not the urban elite (entrepreneurs, etc...), for example because we want to foster industrialization. This does not seem to be important now, since recent examples have favored *market assisted* land reforms, whereby landlords are compensated out of general tax revenues.

- The receiving end: giving land to the rural poor.
 - Makes them more likely to migrate to the cities. But are cities really too large?
 - Land is an asset: Intrahousehold allocation issues. Perhaps money would be spent by the household head in alcohol etc... whether land will remain in the household. We should make it hard to sell the land then! This may be the most compelling argument in favor of land reform. ●

1.3 Does land reform work?

- Few studies of the efficiency consequences of large-scale reforms of property rights: Most reforms have been accompanied by major upheaval and social unrest → difficult to separate the effects of the two.
- The paper, “Empowerment and Efficiency: The Economics of Agrarian Reform” (Banerjee, Gertler, Ghatak), studies a *tenancy reform* = improvement in the rights of tenants. It differs from a traditional land reform (redistribution of land). Land is not redistributed. The tenant is offered the *security of tenure* = if he registers, he cannot be evicted by the landlord, as long as he pays 25% of the output to the landlord

1.3.1 Traditional System: Sharecropping

Definition: The landlord owns the land. The tenant farms the land and provides the inputs (Sometimes, the landlord provides some inputs too(e.g., fertilizer). At the end of the season, the tenant gives the landlord a share of the crop (e.g., $1/3$ or $1/2$).

Consequences of the reform on the tenant

1 Bargaining power effect

- Tenant and landlord negotiate on the share
- Before, what would happen to the tenant if he disagreed with the landlord?
- After, what can happen to him?
- What are the consequences of this on the share of the tenant?
 - is it good or bad for productivity?
 - why?

2 Security of tenure effect

- What positive effect does it have on productivity?
- What negative effect does it have on productivity?

1.4 Empirical analysis of the reform

- Left front government came to power in 1977
 - Started registration camps in villages (officials came to help tenants register)
 - Faced some difficulties = flood, landlords' opposition
- registration progressed more slowly than expected (Figure 6)

1.5 The expected effects of the reform

1. Reform → bargaining power → improvement in share → improvement in productivity

2. Reform → security of tenure → improvement in productivity (?)

Questions asked in the study=

- a) Did reform increase share of output for the tenants?
- b) Did reform increase security of tenure?
- c) Did reform increase productivity?

1.6 Empirical analysis

1.6.1 Security and share of output

- Table 2 – Conclusion?

- Figure 4 – Conclusion?

1.6.2 Productivity

- Figure 1: Productivity and registration rate
 - observation:
 - what else could be going on?
 -
 -

- What can we do:

- a) Bangladesh

- Neighboring country but no reform
 - Difference in difference

	BEFORE	AFTER	DIFFERENCE
WEST BENGAL	1308.2	1649.52	
BANGLADESH	1296.76	1561.64	
DIFFERENCE			

- b) Within West Bengal

District had different registration rates at different times. At any given point, was productivity higher in the districts which had more registered tenants?

Regression

$$y_{dt} = \alpha_d + \lambda_t + \beta b_{dt} + \gamma X_{dt} + \epsilon_{dt}$$

α_d = district specific effect

λ = year effect

b_{dt} = number of registered tenants

X_{dt} = other district-time varying variables

γ = effect of other district-time varying variables on productivity

Result in table 4