Supervision 4: Part IIB Paper 8
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When all families in a local area own the same amount of land and have the same family size (labor supply), there are no gains from trade. Once we introduce inequality in land ownership and/or family size, however, either the land rental market or the labor market will open up. Families with excess land will rent some of it or families with excess labor will sell some of it at the market wage. A long-standing puzzle in development economics is why multiple contractual arrangements often coexist in the same local area.

Three contractual arrangements are typically observed between landlords with excess land and peasants with excess labor: (a) Fixed rent contracts where the peasant gives the landlord an amount R in each period and keeps the remainder of the profit from cultivation. (b) Fixed wage contracts where the peasant is paid a wage W in return for the labor he supplies. (c) Sharecropping contracts where the peasant gets to keep a fraction α of the output but must bear the cost of the inputs himself. Our objective is to understand the relative benefits and costs of these contractual arrangements. This will, in turn, explain why they coexist.

(a) Consider the following production technology: $Y=L^{1/3}$, where Y is output and L is labor input (effort). Normalize so that the unit price of the output is one. Let the wage (cost per unit of labor) be w.

(i) Derive the efficient (first-best) level of effort. [Hint:- the information problem that arises with the contracts that we will examine is that the peasant's effort cannot be observed by the landlord. This is why he cannot contract directly on the level of labor effort. When deriving the first-best level of effort we avoid this problem by assuming that the landlord, who owns the land, supplies the labor as well.]

(ii) Now assume that the peasant puts in the labor effort, while the landlord either rents out the land, hires the peasant for a fixed wage, or enters into a sharecropping arrangement with him. The terms of these contracts were described above. Derive the labor effort with each contractual arrangement, assessing how it compares with the first-best.

(iii) Show the result you derived above graphically [Hint:- plot output and total cost on the Y-axis and labor effort on the X-axis].

(b) You should have found that the fixed rent contract dominates the sharecropping contract, which, in turn, dominates the fixed wage contract. Why then do these contracts coexist in practice? To answer this question, shift attention from the level of effort (and the accompanying output) to the uncertainty that the peasant faces.

Change the setup so that there are now two output levels (rather than a continuum): H with probability P and L<H with probability 1-P. Output is determined exogenously. In particular, it no longer depends on labor effort L. This allows us to ignore the incentive problems that we examined above and assume that the expected output for the peasant is the same for the fixed rent and the sharecropping contracts; i.e. $P(H-R)+(1-P)(L-R)=P\alpha H+(1-P)\alpha L$. Show that this implies that the variance of income for the peasant will be greater for the fixed rent than for the sharecropping contract. If he is risk averse, this implies that the sharecropping contract dominates the fixed rent contract on the risk dimension.

(c) Based on the analysis above, one explanation for the coexistence of different contracts is that they have different benefits and costs. On the incentive dimension, fixed rent dominates sharecropping, which dominates fixed wages. On the risk dimension, fixed wages (there is no uncertainty here) dominate sharecropping, which dominates fixed rents. Different contracts will thus be preferred, depending on growing conditions and the peasant's characteristics.

One test of the incentive versus risk hypothesis would be to compare the output level generated by fixed rent versus sharecropping contracts. In India, peasants typically cultivate multiple plots. Some peasants will rent all the plots they cultivate. Other peasants will only operate as sharecroppers. Finally, some peasants enter into both contractual arrangements (on different plots with different landlords). Suppose we had plot-level data on output and contracts (fixed rent versus sharecropping), as well as the identity of the peasant cultivating each plot. If you simply regressed plot-level output on the plot-level contract and found that fixed rent plots had higher output, would you consider that to be convincing evidence supporting the incentives versus risk hypothesis? If not, what could you do to increase the robustness of your results? Would any concerns still remain? [Hint:- write down the regression equation as we did in class when discussing the identification problem. Take care to include potential omitted variables and show how you could account for some (but not all) of them.]