

Problem Set 3 Solutions

Economic Development

September 24, 2009

1 Chapter 12, problem 1

1.1 Part a)

Since each laborer needs to be compensated at \$1100, the effective rent that can be charged is \$800 for an acre of land. The net payments that labor needs to receive are \$2200. Since output is \$3000 if the land is farmed optimally, the best rent the family can obtain is the \$800 left over after the two laborers are paid a total of \$2200. So:

$$\text{Rent per acre} = \$800$$

1.2 Part b)

Notice that the family members will choose to farm their own land; the \$1500 earned per person is higher than the \$1000 that is available by working elsewhere. So the family members will choose to rent out land only when their landholdings are sufficiently large that it doesn't make sense to farm all the land themselves.

$$\text{Lease if acres owned} > 3$$

1.3 Part c)

First, observe that the family will either choose: 1) to hire a supervisor and completely hire wage labor (no rental contracts) or 2) to not hire a supervisor and completely use rental contracts (no wage contracts). To see this, notice that, once the supervisor is hired, the family gets more in net profits

by using wage labor (\$1000) than it does by renting out land (\$800). So a family will either do all rental or all wage, not a combination of the two.

If the family decides only to rent out land and it owns x acres of land, its income is:

$$y_1 = 9000 + 800(x - 3)$$

It earns \$9000 from the three acres the family farms itself and \$800 from each acre that it rents out.

If a family hires a supervisor, its income is:

$$y_2 = 9000 + 1000(x - 3) - 2000$$

It earns \$1000 from each acre of land, net of labor costs, and it pays the \$2000 fixed cost of hiring the supervisor.

$$y_2 > y_1 \Rightarrow 200(x - 3) > 2000$$

$$y_2 > y_1 \Rightarrow x > 13$$

To summarize:

- 1) If $x \leq 3$: Family uses its own labor only
- 2) If $3 < x \leq 13$: Family rents out the land it can't farm
- 3) If $x > 13$: Family hires supervisor and wage labor for land it can't farm

The statements are largely correct. If most farms are small and of similar size, we would expect people to farm their own plots. As land inequality rises, rent contracts will emerge. At high levels of inequality, the farms become rich enough to afford the fixed costs of hiring labor supervisors.

2 Chapter 12, Problem 6

There are two reasons that we could expect the share of the costs paid by the tenant to be the same as the share of the output that the tenant gets. First, this arrangement will get us to efficiency in terms of the amount of inputs that the tenant chooses to utilize, since the marginal benefit to the tenant of increasing inputs is equal to the marginal cost that he hears. Second, sharecropping contracts balance the desire for full provision of insurance and the need to provide incentives to laborers. A higher share of output going to the tenant and a higher cost share means the tenant gets greater rewards but has to bear greater risk. A smaller share of output and costs means there is less risk to the tenant, but also less reward from putting in effort. So a very risk-averse tenant will end up with a contract in which the output and cost shares are smaller, while a less risk-averse tenant will bear more of the cost but also keep more of the output.