

Problem Set 1 Solutions

Economic Development

September 24, 2009

1 Chapter 10, Problem 9

1.1 Part a)

<i>Number of brothers</i>	1	2	3	4	5
Total farm output (in \$)	1000	1800	2400	2800	3000

Risk-neutrality \Rightarrow The workers' problem is equivalent to the maximization of expected income.

Expected income from going to the city:

$$E y_{city} = 0.50 * \$1300 = \$650$$

Rural income depends on the number of people working on the farm. As a function of the number of people who stay on the farm, the table below captures the earnings of each worker.

<i>Number of workers on the farm</i>	1	2	3	4	5
Rural income for an <i>individual</i> worker (in \$)	1000	900	800	700	600

No individual can increase her income if one worker goes to the city.

Equilibrium: One worker to the city, four stay on the farm.

1.2 Part b)

Each worker who goes to the city expects to earn \$650. So the table below captures total family income as the sum of farm and city incomes.

<i>Number of workers on the farm</i>	1	2	3	4	5
Total farm output (in \$)	1000	1800	2400	2800	3000
Total city income (in \$)	2600	1950	1300	650	0
Overall family income	3600	3750	3700	3450	3000

Overall family income is maximized if two workers stay on the farm and three migrate.

Equilibrium: Three workers to the city, two stay on the farm.

1.3 Part c)

Expected income from going to the city:

$$E_{y_{city}} = \$200 + \$650 = \$850$$

As a function of the number of people who stay on the farm, the table below captures the earnings of each worker.

<i>Number of workers on the farm</i>	1	2	3	4	5
Rural income for an <i>individual</i> worker (in \$)	200	600	633	650	600

As an example, if four workers go to the city and each receives \$200, there is only \$200 left in farm output for the farm worker. If three workers go to the city and each receives \$200, there will be \$1200 in farm income to divide among two people.

In this environment, everyone will leave, since their expected income is higher from going to the city. Notice, however, that there will be no farm income on which to make the transfer. So each individual will have expected income of \$650, not \$850.

Equilibrium: All five family members go to the city.

1.4 Part d)

Migration increases when the family moves from caring about individual income to caring about family income. The distortion created by paying average product wages in agriculture is lessened when altruism increases. Note that the outcome in part b) is also what would occur in an individualistic

environment where labor received its marginal product in agriculture. Below is the marginal product of agriculture as a function of the number of workers:

<i>Number of workers on the farm</i>	1	2	3	4	5
Marginal income for an <i>individual</i> worker (in \$)	1000	800	600	400	200

So altruism gets us to efficiency. But altruism only on the part of farmers and selfishness on the part of those who move to the city causes excessive migration to the city.

2 Chapter 10, Problem 11

It is the case that the percentage of people who work in the informal sector must shrink *as a percentage of the urban labor force*. Still, it is possible that enough people will migrate to the city such that the share of the informal sector *as a percentage of the total labor force* will increase. Denoting by L_A the agricultural labor force, by L_I the urban informal labor force, and by L_F the urban formal labor force:

$$\frac{L_I}{L_I + L_F} \text{ must fall, but } \frac{L_I}{L_I + L_F + L_A} \text{ could rise.}$$

The book explains this idea on pages 380-381.

In other words, the Kenyan government made the city a more attractive option by making more jobs available. The fact that more jobs were available was actually quite likely to make even more people migrate to the city than could be accommodated by the increase in jobs. To see the idea, suppose that before the policy change 20% of the people lived in the city and 10% found jobs in the formal sector, with the other 10% working in the informal sector. In the Harris-Todaro model, this means that anyone moving to the city will have a 1/2 chance of finding a formal sector job. So people are indifferent about moving to the city when they have a 1/2 chance of finding a formal sector job.

Now suppose that the Kenyan government creates enough jobs so that 15% of the country can find formal sector jobs. If wages stay about the same (which will be true if the labor supply curves in the city and agriculture are relatively flat), then it still has to be the case that anyone going to the city has a 1/2 chance of finding a formal sector job. This means that 30% of the country will end up living in the city, 15% working in formal sector jobs and 15% in informal sector jobs. So even though the Kenyan government succeeded in increasing the size of the urban formal sector, the informal sector also grew (from 10% to 15% of the population). This is indeed similar to the situation that scientists predict will occur when we make roadways wider. The resulting increase in traffic may leave the traffic situation unchanged from its original state.