

### Property regimes, Transaction Costs, and Enforcement Technology

An economy is composed of two sectors: urban (or manufacturing) and rural (or agricultural). The total output function in the manufacturing and agricultural sectors are expressed as  $f_M(L_M)$  and  $f_R(L_R)$  respectively, where  $L_M \times 10^3$  and  $L_R \times 10^3$  denote the total number of workers working in each sector. Output functions take on the following specific forms:

$$f_M(L_M) = \sqrt{L_M}, \quad (1)$$

$$f_R(L_R) = \sqrt{L_R}. \quad (2)$$

This means, for instance, that if 3000 workers are working in the manufacturing sector, then total manufacturing output is  $\sqrt{3} = 1.732$ . The total number of workers in this economy is  $\bar{L} = 5 \times 10^3$  and there is no unemployment. Let  $p$  be the unit price of agricultural goods in terms of manufactured goods and assume that it is fixed.

- a) Let  $p = 1$ . Derive the equilibrium distribution of workers between sectors for this economy assuming *open access* in the rural sector and *exclusive ownership* (at no cost) in the urban sector. Assume that firms in the urban sector pay a wage  $w$  to hired workers and that all agents in this economy take wages and prices as given. Calculate the equilibrium values of the wage rate, total profits in the urban sector, and national income. Explain intuitively why this equilibrium is considered inefficient.
- b) Assume now that there is the possibility of exclusive ownership in the rural sector but that exclusion uses up real resources in the following sense: In order to enforce exclusion in the rural sector, 2000 guards must be hired among the pool of workers and paid the same wage rate  $w$  as other workers. The labor market clearing condition is thus  $L_M + L_R + 2 = 5$ . Find the new equilibrium distribution of workers, the wage rate, firm net profits in both sectors, and national income. Can exclusive ownership be a sustained equilibrium for this economy?
- c) Assume now that a technological innovation reduces the required number of enforcement guards to 1000. Derive the new equilibrium values for the economy and verify that exclusive ownership can be sustained as an equilibrium. Is it efficient? Who gains and who loses from this technological improvement? Interpret and comment.