A Williamson Hold-up Model

Econ 8601 Fall 2002

1. Description of the Model

There are two kinds of individuals, type A and type B. The measure ot type A individuals is N_A and the measure of type B individuals is N_B, where $N_A < .5N_B$.

There are two periods, $t = \{1, 2\}$. Each individual is endowed with a single labor unit in each period. The discount factor is $\beta = 1$.

There are two technologies for producing the final good, the regular technology and the special technology. With the regular technology, a type j individual can produce q_j units of the final good with a single unit of time. Assume that $q_A > q_B$ so that a type A individual has an absolute advantage in production with the regular technology.

The special technology works as follows. In period 0, a type A individual builds a factory (type B individuals cannot build factories). Factories vary in quality i. To build a factory of quality i requires i units of time in period 0. A type A individual building a factory of quality i uses the balance $1 - i$ of his or her time endowment in period 0 to make the final good (and thus produce $(1 - i)q_A$ units in period 0).

A factory produces no final good in period 0. A factory will produce output in period 1 if an individual uses his or her unit time endowment to manage the factory in period 1. When a factory is built in period 0, it is customized to be managed in period 1 by a *particular* individual. If this particular individual manages the factory in period 1, the output in period 1 is $f(i) + q_S$, where $f(0) = 0$, $f'(0) > 0$, and $f''(0) < 0$. It does not matter whether this particular individual is a type A or type B person; the output is the

same in either case. It also makes no difference whether the particular individual is the type A person who built the plant or whether the particular individual is someone else.

But there is a difference if the person who manages the factory is different from the person the factory was customized for. In this case, the output is q_S instead of $f(i) + q_S$; i.e., the investment i is wasted.

2. Complete Contracting Case

Suppose that contracts are complete and can specify a publicly observable investment level i.

The questions to be addressed are: What is an equilibrium in this economy? Under what conditions is the special technology used? Under what condition is there specialization where one worker customizes a factory for a different worker?

3. Incomplete Contracting Case

Suppose contracts are incomplete. Investment decisions must be made in period 0 before any contracts can be written. Suppose in period 0 one agent customizes a factory for another agent. Model the bargaining in period 1 between these two agents as Nash bargaining, with weight α the person doing the customizing and weight $1 - \alpha$ on the person the factory is customized for.