Problem Set 6

1. Outsourcing or not?

A buyer needs one unit of an intermediate good. There are two sellers; both can produce the good at zero cost. The buyer invests $x$ before trading with one of the sellers at a cost of $\frac{1}{2}x^2$. He also must choose a degree of asset specificity $\alpha$. Suppose that his value from transacting with seller 1 is $\alpha x$ and the value from transacting with seller 2 is $(1 - \alpha)x$, where, without loss of generality, $\alpha \in [\frac{1}{2}, 1]$.

(a) Suppose that the buyer can sign a complete long-term contract with one of the sellers. What investment and degree of asset specificity would result?

(b) From now on, assume that it is impossible to specify investment, degree of asset specificity and the transaction (including its price) in a contract. In parts (b) and (c), ex post bargaining takes the special form of Bertrand competition between the sellers. Thus, the sellers make simultaneous take-it-or-leave-it price offers.

Show that the buyer chooses $\alpha = \frac{1}{2}$ and $x = \frac{1}{2}$. How is this related to the claim of Williamson that asset specificity is a crucial component of the hold-up problem.

(c) Show that an exclusive dealing clause, saying that the buyer commits not to trade with seller 2, would make things even worse. (Assume seller 1 makes a take-it-or-leave-it offer ex post). What about integration?

(d) Change the model in two respects:

- The value of transacting with seller 1 is $\alpha x$ and the value of transacting with seller 2 is $(1 + \epsilon)(1 - \alpha)x$, where $\epsilon$ is “very small” and $\alpha \in \left[\frac{1+\epsilon}{1-\epsilon}, 1\right]$;
- The bargaining outcome between seller 1 and the buyer is the Nash bargaining outcome (with $(1 + \epsilon)(1 - \alpha)x$ as the reservation value (i.e., status quo threat point) for the buyer).

Show that exclusive dealing is now better than competition (i.e., the existence of a viable competitor, seller 2). Explain.

(e) Suppose, in this part only, that seller 1 is the only firm able to supply the buyer, unless he (seller 1) licenses to seller 2. Is licensing optimal in either of the two versions of the model (that is, with ex post Bertrand bargaining or with ex post Nash bargaining)?

(f) Suppose that seller 1 and the buyer are divisions of a corporation, and are subordinate to its general office. The timing of production is as follows:

$t=1$ The buyer invests $x$;
the general office decides whether to allow the buyer to buy outside the firm (i.e., from seller 2) if the buyer wants to; the buyer chooses $\alpha$; bargaining occurs according to either the part (b) variant or the part (d) variant.

Suppose that the general office’s objective is to maximize the total welfare of its two divisions, and that it cannot commit in advance to allow transfer pricing to be market-based (i.e., determined in part by competition between the sellers.) Show that the general office mandates internal transactions. Is the corporate conglomerate preferred to non-integration in the two versions of the model?

2. Variation on Bolton-Dewatripont (1994)

We saw in class that, ”in an optimal hierarchy, layer-0 individuals only send reports to layer-1- and layer-2 individuals”.

- Can you prove that, similarly, in an optimal hierarchy, layer-1 individuals only send reports to layer-2- and layer-3 individuals?
- And can you prove that in an optimal hierarchy, layer-2 individuals only send reports to layer-3- and layer-4 individuals?

3. Variation on Dessein-Santos

As suggested in class, simplify the model by assuming a single primary action, on ”task 1” (i.e. $a_{11}$ using their notation) and a single secondary action, $a_{21}$ (thus linked to ”task 2”, whose sole purpose here is to set $a_{21}$ as close as possible to $a_{11}$). The rest of the model is unchanged: having one individual per task allows to take advantage of returns to specialization, but implies potential coordination failures (when the communication probability $p$ from ”task 1” to ”task 2” is less than 1), ...

- Can you show the complementarity between adaptation and communication/task bundling?
- Can you perform the same comparative statics exercises as in the paper?