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Contract theory Phd course Spring 2009

Problems for seminar, 3 April 2009

Question 15 (p. 654), and

Question 42 (pp. 675-676),

both in Bolton and Dewatripont's book.

In addition:

Consider a situation where government cannot transfer money to the regulated form, which must cover costs through direct charges to the customers.

A regulated firm has cost $C = cq + \beta - e$, where c is known marginal cost, $\beta \in \{\underline{\beta}, \overline{\beta}\}$ is private information to the firm, and e is effort. The firm has utility $U = t - \psi(e)$, where t is the income of its managers. Social welfare is $S^n(p) + U$, where S^n is the government net surplus. (Recall that there are no transfers from the government here.) Let

$$R(p) := D(p)(p - c)$$

denote the firm's revenue net of marginal cost, and assume R is concave. The budget constraint of the firm is:

$$R(p) = (\beta - e) + t = \alpha + U, \qquad (*)$$

where $\alpha := (\beta - e) + \psi(e)$. Let $p^*(\alpha + U)$ denote the solution to (*), and let $\varphi(\alpha + U) := S^n(p(\alpha + U))$. Otherwise, make necessary assumptions.

(a) Assume first that the government has full information about β. Assume that $\min_e [(\beta - e) + \psi(e)] > 0$, and show that $\varphi' < -1$. What is the optimal effort?

(b) Assume asymmetric information: the government cannot observe β and e. Let $\nu := \Pr(\beta = \underline{\beta})$. The government offers the menu $\{(\underline{p}, \underline{e}), (\overline{p}, \overline{e})\}$. Derive low-$\beta$ type's rent as a function of $\overline{e}$. compute the optimum for the government. Discuss the analogy with the case where government transfers are feasible.