Problem Set

Due: Q3&4 due on Dec.11th and Q1&2 due on Dec.16th
Submission via Canvas only

Problem 1

A monopolist can produce a good in different qualities. The cost of producing a unit of quality s is $5s^2$. Consumers with type θ buy at most one unit and have utility function

$$u(s|\theta) = \begin{cases} \theta \cdot s & \text{if they consume one unit of quality } s \\ 0 & \text{if they do not consume} \end{cases}$$

The monopolist decides on the quality (or qualities) s it is going to produce and price T. Consumers observe qualities and prices and decide which quality to buy if at all.

Part a. Characterize the first-best solution.

Part b. Suppose that the seller cannot observe θ, and suppose that

$$\theta = \begin{cases} \theta_H & \text{with probability } 1 - \beta \\ \theta_L & \text{with probability } \beta \end{cases}$$

with $\theta_H > \theta_L > 0$. Characterize the second-best solution and consumers' informational rents.

Problem 2

Consider a government contracts with a monopolist to construct a bridge. The government is interested in choosing a contract that minimize the cost of such construction. The overall cost $c = \theta - e$, which is observable to both the government and the monopolist. θ is the type of the monopolist; with probability β the monopolist is an efficient type for $\theta = 5$, with probability $1 - \beta$ the monopolist is an inefficient type for $\theta = 8$. The monopolist can exert effort to reduce costs by paying private cost $\frac{e^2}{2}$. The government pays the monopolist $t + c$ where t is a transfer. The monopolist has reservation utility at $\bar{u}$.

Part a. Suppose the government could observe both the type θ and the effort e of the monopolist, characterise the first-best effort e^{FB} and transfer t^{FB}.

Part b. From now on, assume the government cannot observe the type θ and the effort e of the monopolist. Write down the optimal contract

which minimizes the cost, and is incentive compatible and individual rational.

Part c. Characterize the second-best effort e^{SB} and transfer t^{SB} under such contract. Show each step clearly. Are first-best effort e^{FB} implementable for both types?

Problem 3

MWG Problem 13.C.5

Problem 4

MWG Problem 13.C.6