

# The Economics of Regulation (Economics 948)

## Problem Set 2

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1. Consider the model of the optimal two-part tariff with a continuum of consumer types ( $\theta$ ). Determine the conditions under which the Coase solution is optimal.
2. A monopolist's cost function is given by  $C = F + c_1Q_1 + c_2Q_2$ . The regulator is able to observe the firm's fixed costs,  $F$ , but not its marginal costs,  $c_i$ ,  $i = 1, 2$ . The regulator sets Ramsey-Optimal prices based on the cost reports,  $\hat{c}_i$ ,  $i = 1, 2$ . that it obtains from the regulated firm.
  - a) Write down a mathematical expression for the problem facing the regulated firm?
  - b) How well do consumers do in this problem relative to the case of perfect information?
  - c) Suppose that the regulator is able to observe the firm's total costs, but not the individual marginal costs,  $c_i$ ,  $i = 1, 2$ . This implies that one alternative is for the regulator to tax away any excess profits that the firm realizes from its given cost reports and rebate this amount to consumers. What can you say about the resultant level of social welfare relative to the case in which the regulator has perfect information?
3. Suppose that there are initially two consumers, Small and Medium. Small's inverse demand function is given by  $P(Q) = 12 - Q$ . The corresponding inverse demand function for Medium is  $P(Q) = 16 - Q$ . Suppose that the cost function for the regulated firm is given by  $C(Q) = 4Q$ . Also, assume that the regulated firm's service is currently sold under a uniform price schedule,  $(E_1, P_1) = (0, 8)$ .
  - a) Determine whether the demand functions satisfy the strong monotonicity property?
  - b) Suppose the regulator introduces an optional two-part tariff,  $(E_2, P_2) = (16, 6)$ . Determine whether the introduction of this optional two-part tariff is Pareto-Superior.
  - c) Suppose there is now a third consumer in this market that we refer to as Large. Large has an inverse demand function given by  $P(Q) = 18 - Q$ . The regulator offers another optional two-part tariff given by  $(E_3, P_3) = (30, 5)$ . Determine whether the tariff offerings  $(E_i, P_i)$ ,  $i = 1, 2, 3$  are incentive compatible.

- d) If you found that the tariff offerings were not incentive compatible, how might you modify them to achieve incentive compatibility?
4. Suppose that there are  $n$  distinct markets characterized by demand independence and constant elasticity of demand. Prove that the optimal price for the unregulated monopolist is increasing in the inelasticity of demand. (You may also assume constant marginal cost in each market.)