The Economics of Regulation
(Economics 948)

Problem Set 1

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1. Derive the optimal mark-up rule for a 2-product, unregulated monopolist with interdependent demands, $Q^1(P_1,P_2)$ and $Q^2(P_1, P_2)$. How do these results compare with the independent demand case? You should analyze (i) substitutes and (ii) complements. Provide an intuitive explanation for your findings. How does the pattern of deviation of price from marginal cost for the unregulated monopolist compare to those that would be chosen by a welfare-maximizing regulator?

2. Let the regulator's welfare function be given by $W = CS + \alpha\Pi$, where $\alpha \in [0, 1)$. (i) Derive the Ramsey-optimal prices assuming that total revenues must cover total costs and independent demands for the two goods. (ii) Interpret the Lagrange multiplier (λ) and place a lower bound on λ when $\alpha = 0$. (iii) Determine the comparative static properties of this pricing rule by computing $dP_1/d\alpha$, $dP_2/d\alpha$ and $d\lambda /d\alpha$. (iv) Supply the intuition for your findings.

3. Suppose the U.S. Postal Service offers only two mail services, First Class and Second Class, with inverse demand functions given respectively by

   (1) $P_1 = 20 – 0.01Q_1$, and

   (2) $P_2 = 15 – 0.005Q_2$.

   Total cost is given by

   (3) $C(Q_1, Q_2) = 2400 + 10Q_1 + 10Q_2$.

   (a) What are the first-best efficient prices and output levels?

   (b) What are the Ramsey-Optimal Prices?

   (c) Suppose that rather than the goal in part (b), the Postal Service attempted to maximize total revenue subject to the constraint that total revenue must cover total costs? Determine the optimal prices in this scenario and interpret any changes from the prices given in part (b).

4. Over the past decade in the United States, regulators have adopted more decentralized methods for controlling the market power of regulated monopolists. Consider the following regulatory regime. The regulator allows the two-good monopolist to maximize profit subject to the constraint that consumers' surplus in the two markets must be greater than or equal to S*. Derive the monopolist's optimal pricing rule in this regulatory regime using general functional forms for the (independent) demand and cost functions. Provide an interpretation of the Lagrange multiplier (λ) and place an upper bound on λ. Do you believe this decentralized approach is superior or inferior to the Ramsey approach in terms of economic efficiency? Why?