

Problem Set #2
Economics 661 Spring 2006

1. Consider the model of differentiation on the unit interval. The two competing firms are located at the ends of the line. Consumer transportation costs are linear and the two firms have constant marginal cost functions that are different. However, assume that consumers value the good high enough so that even a monopolist located on one end of the line would want to serve all consumers. Also assume that costs are not so different to imply that one firm has zero market share. Find the equilibrium prices in this market.
2. Consider the linear highway model above with the following alterations. The two sellers can control the cost of transporting their goods to the consumer's location—perhaps by making them heavier or otherwise harder to transport. So in the first stage of the game the sellers simultaneously choose their transportation costs $t_i \in [0, \infty)$ where $i = 0$ for the seller at location 0 and $i = 1$ for the seller at location 1. Note that the firms can set different transportation costs in this first stage. In the second stage the sellers simultaneously choose their prices. To simplify assume both firms have zero costs. Prove that there is no equilibrium with $t_1 = 0$ and $t_2 = 0$. You may assume that consumers' value for the good is high enough to avoid an outcome in the neighborhood of $t_1 = 0$ and $t_2 = 0$ where some consumers do not purchase.
3. Parameterize Stole's model of nonlinear price competition in the following way. Define $\Delta = 1$; $F(\theta) = \theta$, for $\theta \in [0, 1]$; $u(q, \theta, v) = (5 - \theta)q$; and both firms costs are given by $c(q) = 1/2q^2$. Solve for the Nash equilibrium symmetric contracts offered by the two suppliers.