

Problem Set 11 (due date: 27.01.2014)

1. Consider the market for a consumer good, whose surface can differ. Think of colors x , which vary over the interval $x_0, x_1 = [0, 1]$. There are N consumers each buying one unit of the good if her willingness to pay exceeds price. The most favored color of a consumer is uniformly distributed in the interval x_0, x_1 and the willingness to pay for a consumer with most favored color x for a good with color x' is $v - t(x - x')^2$, where $v \geq 2t(x_1 - x_0)^2$. There are 2 sellers, where the one has stored goods with color x_0 , and the other has stored goods with color x_1 . The goods are worthless if they are not sold now (i.e. marginal costs are zero).
Calculate the equilibrium price for this market. Discuss how prices change with the transport costs and with the locations.

2. Each of N households buys one car. There is agreement about certain features q , which discriminate between good and bad cars. However, consumer willingness to pay differs. Each buyer is characterized by a threshold ϑ . If $p/q \leq \vartheta$, she buys the car with quality q at price p . These thresholds are equally distributed in the interval $[\vartheta_0, \vartheta_1] = [1, 1 + \bar{\vartheta}]$. Note: the (indirect) utility function for a consumer of type ϑ is $V(\vartheta) = \vartheta q - p$. Assume that the market is covered.
 - a) Derive the demand function for cars of quality q , if only two qualities are offered $q_L < q_H$ at prices $p_L < p_H$.
 - b) Calculate the reaction functions and the price equilibrium, if the two qualities are offered by two competing firms. Production costs are $c (< 1)$ per car. Any quality improvement is achieved by incurring fixed costs (R&D).
 - c) Calculate the profits of the two sellers.
 - d) Assume that $q_L = 1, q_H = 2$ and $c = 0$. Evaluate the equilibrium values for $\bar{\vartheta} = 3$ and $\bar{\vartheta} = 5$. Discuss your results!

3. Suppose that the demand for a new wrinkle cream is given by a nonlinear demand function $Q(P, A) = P^{-1/2}A^{1/4}$.
 - a) Show that the price elasticity of demand is $\eta_P = 1/2$ and that the advertising elasticity of demand is $\eta_A = 1/4$.
 - b) What do you predict the advertising-to-sale ratio would be in this industry? Does it depend on how costly it is to advertise for this product?