

Problem Set #4

Due October 9, 2013

1. Consider a slight elaboration of the traditional competition-on-a-line model. A unit mass of consumers get utility $v - p$ if they purchase one unit of a good at price p . Two firms can produce the good at a constant marginal cost $c < v$.

Consumers types θ are distributed uniformly on $[0, 1]$. A type θ consumer incurs a disutility of $t\theta$ if she drives to the store at the left endpoint and $t(1 - \theta)$ if she drives to the store at the right endpoint. Assume that these disutilities are driving costs incurred whenever the consumer visits a store, regardless of whether she makes a purchase.

(a) Suppose the two firms choose prices simultaneously, but these prices are not observable to consumers, so the only way that consumers can learn the price that a firm charges is to visit the firm. Show that there is no pure strategy equilibrium in which the firms make positive sales.

(b) Suppose now that the advertising is not perfectly effective: a fraction $1 - x$ of consumers learn both prices, but a fraction x (uniformly distributed along the line) do not see an advertisement and will need to visit a firm to learn its price. Show that for small x this model has a pure strategy equilibrium in which the price is higher than in the standard competition on a line model. Why is the outcome of this model different from the outcome of Stahl's model of price dispersion?

(c) Suppose that the firms have greater scope to design partially-revealing advertising intermediary: suppose that they can partition the real line into a set of intervals $I_1, I_2, I_3, \dots, I_k$ and have the intermediary commit to a policy of announcing the interval to which each firm's price belongs. Show with an appropriately chosen advertising policy the firms can receive the same profits as if they fully colluded on price setting.

2. Consider Stahl's model of price dispersion with sequential consumer search. Suppose that $D(p) = 1 - p$, $c = 0$ and consumers with a positive search cost all have the same (small) search cost s . See if you can get far enough solving the equilibrium equations (analytically or numerically) to draw a picture of what the equilibrium price distribution looks like with 5 firms. Does the distribution seem reasonable? What is the upper bound of the support of the price distribution? Would the distribution change if you instead assumed that half of the consumers with positive search costs had cost s and half had cost $2s$?

3. Read as much as De Los Santos, Hortacsu, and Wildenbeest's paper "Testing Models of Consumer Search Using Data on Web Browsing and Purchase Behavior" as you can with out spending an unreasonable amount of time on it.

(a) Section I of the paper describes how they build a dataset of book shopping sessions from search logs. Describe the paper and comment on some ways in which it may not give a fully accurate view of a shopping session.

(b) Section II of the paper argues that the data can help distinguish between sequential and

fixed sample size search models. Test 1 involves examining whether a consumer returned to an earlier store to purchase. How do they argue that this is a valid test? Can you think of variants of the search model in which it would not be valid? If one does accept the test as valid would you find the evidence convincing?

(c) Describe Tests 2 and 3 for sequential vs. fixed sample search. Comment on reasons why these do or do not seem like good tests.

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