

14.271 Midterm Exam
October 21, 2013

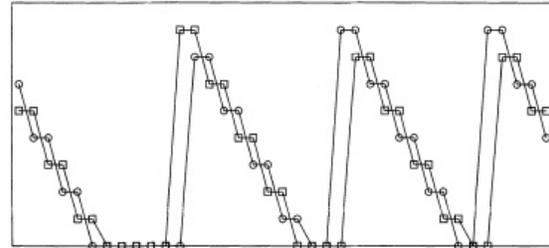
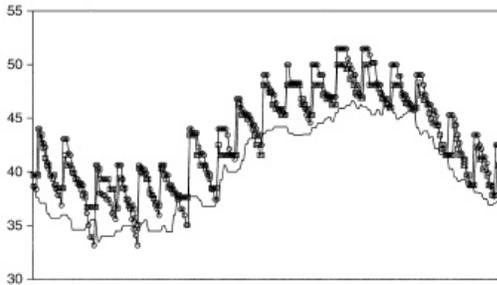
Answer all questions. You have 85 minutes in which to complete the exam. Don't spend too much time on any one question.

1. (20 Minutes – 24 Points) Answer each of the following subquestions BRIEFLY. If you write very long answers you won't have enough time to finish the rest of the exam.

(a) Sorensen regresses the range between the high and low prices for a drug in a city on a set of covariates. What is the main covariate of interest in these regressions? What is the motivation for looking at the effect of this variable? His dataset omits two pharmacies in the towns he studied. Do you remember why?

(b) Describe three potential price war triggers that Ellison examines in his study of the JEC. What is the motivation for using each of them?

(c) Noel's paper includes the figures shown below. What is depicted in each figure and why does Noel present them? In what way is his empirical analysis related to that in Ellison's study of the JEC.



© John Wiley & Sons, Inc. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.

(d) Some regard Bresnahan's analysis of the 1955 automobile price war as more faithful to his model than is Porter's analysis of the JEC. Why is this? Suppose that you wanted to redo Porter's analysis in a more fully structural way. How might you augment the model he has in the paper and what additional conditions would you want the estimated parameters to satisfy?

2. (20 Minutes – 28 Points)

Consider a variant of the standard durable goods model. A monopolist sells a durable good to a continuum of consumers with types $\theta \in [0, 1]$. Consumers derive utility both from using the good and from being able to tell later purchasers that they owned the good before them. Specifically, assume that a type θ consumer gets utility $2\theta - p_1 + x_2$ if he purchases the good at price p_1 at $t = 1$ and x_2 consumers later purchase at $t = 2$, $\theta - p_2$ if he purchases at price p_2 at $t = 2$ and utility 0 if he does not purchase.

(a) Consider first the noncommitment model in which the monopolist's price at $t = 2$ must maximize period 2 profits. What price does the monopolist set at $t = 2$ if it has sold to all consumers with $\theta \in [\theta_1, 1]$ at $t = 1$? What price does the monopolist set at $t = 1$?

(b) Now suppose that the monopolist can commit to a sequence of prices (p_1, p_2) . What prices will the monopolist choose?

(c) In class I showed two properties of a standard two-period durable goods model: in the commitment model the firm sells no units at $t = 2$, and the monopolist earns lower profits in the noncommitment model. Briefly (but with some formality if you can) sketch the argument for these two results. Where in the proof would the argument break down if you had tried to generalize those proofs to this model?

3. (20 Minutes – 24 Points)

Consider a two-type model of price discrimination without unit demands. A monopolist produces a divisible good at a constant marginal cost of zero. There is a unit mass of consumers. They may buy any nonnegative real number of units of the good. Half of the consumers are type $\theta = 1$. Each has inverse demand function $P_1(q) = 1 - q$. The other half of consumers are of type $\theta = 2$. Each has inverse demand function $P_2(q) = 1 - \frac{1}{2}q^2$.

(Note that I have given you inverse demand curves rather than valuations $v(q, \theta)$. They are related by $v(q, \theta) = \int_0^q P(x, \theta) dx$.)

(a) Consider first the best situation from the monopolist's perspective: suppose that θ is observable and the monopolist can charge any tariff $T(q, \theta)$, i.e. the firm can use nonlinear prices and can set separate prices in the two populations with no worries about monitoring, arbitrage, etc.

(b) Now assume that the monopolist is much more limited: assume that θ is unobservable and that the monopolist can monitor which consumers are using the good, but cannot prevent resale among the consumers. Hence, the only feasible tariffs will be two part tariffs of the form $T(q) = A + pq$.

Show that the optimal policy for the monopolist will have $p > 0$.

(c) What about this situation is different from the textbook example of two-part tariffs where the monopolist sets $p = c$ and extracts all the surplus using a fixed fee? Can you give any intuition for why this makes a positive price desirable?

4. (20 Minutes – 24 Points)

Consider two coffee shops indexed by $i = 1, 2$. Assume that they serve three groups of consumers. Consumers in groups 1 and 2 only drive by one shop: the consumers in group i buy one cup of coffee from shop i if the price is less than \$3 and otherwise do not purchase anything. Consumers in group 3 learn the prices at both stores and then buy from the lowest price firm provided the price is less than \$3.

Assume that firm 1 is in a more popular location than firm 2: half of all consumers are in group 1, one-quarter are in group 2, and one quarter are in group 3.

Consider the simultaneous move pricing game where firms 1 and 2 simultaneously choose price p_1 and p_2 and all consumers then shop as in the model above.

(a) Say as much as you can about what the equilibrium **can't** look like. Don't take the time to write out formal proofs, but try to give quick informal descriptions of how you know these things.

(b) Find a Nash equilibrium of the game.

MIT OpenCourseWare
<http://ocw.mit.edu>

14.271 Industrial Organization I
Fall 2013

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.