PRELIMINARY EXAMINATION FOR THE Ph.D. DEGREE

Answer **four** of the six questions.
You must choose at least one question from each of the three sections (A, B, and C) of the exam.

Section A

1. A monopoly with cost function $C(Q) = Q$ faces two consumers, one with demand function

$D_1(p) = 1 - \dfrac{p}{4}$ and the other with demand function $D_2(p) = 1 - \dfrac{p}{6}$. The monopolist cannot tell

which consumer has what demand function but knows the two demand functions.

(a) Suppose that the monopolist decides to serve only one consumer by using a two-part tariff. What two-part tariff will it use and what will its profits be?

(b) Suppose that the monopolist decides to serve only one consumer by using bundling. What bundle will it offer and what will its profits be?

(c) Suppose that the monopolist decides to offer a menu of two two-part tariffs. What menu will it offer and what will its profits be?

(d) Suppose that the monopolist decides to offer a menu of bundles. What menu will it offer and what will its profits be?

(e) Rank the four alternatives (a)-(d) in terms of the profit that it generates for the monopolist.

(f) Rank the four alternatives (a)-(d) in terms of consumer surplus.

(g) Rank the four alternatives (a)-(d) in terms of total surplus.

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2. Consider a homogeneous-product market where inverse demand is given by $P = 46 - 2Q$ and

the per-period cost function is $C = 2q + 32$. The market lasts two periods and then it

obliterates. Assume throughout that there is no discounting (i.e. the discount factor is 1). At

the moment there is only one firm in the industry and it will be the only firm in period 1.

Consider three scenarios.

Scenario 1. The firm is protected from entry also in period 2.

      (a) Determine the firm's output and profits in each period.

Scenario 2. There is a potential entrant who is considering entry in period 2 (with the same cost

function as the incumbent). The incumbent, when it chooses its output in period 1, can commit to

the same output in period 2. The commitment is credible and is observed by the potential entrant.

      (b) Is it possible for the incumbent to deter entry?

      (c) Write down the incumbent's total (i.e. for both periods) profit function (taking into

             account the entry and output decision of the potential entrant).

      (d) What output does the incumbent choose and what are its total profits?

      (e) Is there entry in period 2?

Scenario 3. There is a potential entrant who is considering entry in period 2 (with the same cost

function as the incumbent). The incumbent, when it chooses its output in period 1, *cannot*

commit to the same output in period 2. In fact, the output decision in period 2 is independent of

the output decision in period 1.

      (f) Is it possible for the incumbent to deter entry?

      (g) What output levels does the incumbent choose in the two periods and what are its

             total profits?

      (h) Is there entry in period 2?

Section B

3. (a) Discuss the logit demand model. In particular, discuss the assumptions underlying the model and the data needed to estimate the model. Provide an equation, or two, if helpful.

(b) The next few questions deal with Berry, Levinsohn and Pakes (*Econometrica* 1995) which estimates a model partially based on the logit demand model. Discuss the empirical setting of the model and the data.

(c) Discuss the major differences between BLP and a "standard" logit demand model as well as any issues/weaknesses with the standard model that BLP seek to address.

(d) Give a brief overview of BLP's estimation strategy. Given the nature of their data are there additional hurdles that the authors must overcome? Discuss their results. Can you say anything about the non-linear search issues associated with estimation?

(e) Compare and contrast BLP with Gowrisankaran and Rysman (*WP* 2008). What are the similarities between the two papers? What the key differences in the empirical models? Describe the GR estimation strategy. Be as detailed as you can.

(f) This is a general IO question. Analyze this "email strategy" for lowering gasoline prices (answer only once):

"For the rest of this year, DON'T purchase ANY gasoline from the two biggest companies (which now are one), EXXON and MOBIL. If they are not selling any gas, they will be inclined to reduce their prices. If they reduce their prices, the other companies will have to follow suit.

But to have an impact, we need to reach literally millions of Exxon and Mobil gas buyers. It's really simple to do! Now, don't wimp out at this point..."

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4. (a) Describe the economics behind vertical foreclosure.

(b) Describe the market setting and data for Hortaçsu and Syverson (Vertical Integration, Foreclosure, …, JPE 2007).

(c) Describe the empirical questions and empirical model from HS? What is the source of identification?

(d) Describe a structural model that one could estimate with the HS data. What additional question could you answer with your model?

(e) The table below is from HS and contains the main empirical results. Interpret their results.

A. Benchmark Specifications

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
N	1870	1870	1870	1550	1550	1870	1870	1870	1550	1550
R^2	0.087	0.433	0.434	0.573	0.573	0.087	0.432	0.432	0.573	0.573
Mkt share of VI firms	-0.125* (0.028)	-0.090* (0.041)	-0.086* (0.041)	-0.043 (0.039)	-0.043 (0.039)					
Mkt share of MU firms			-0.015 (0.022)		0.001 (0.024)					
Number of VI firms						-0.028* (0.007)	-0.015 (0.011)	-0.013 (0.011)	-0.009 (0.009)	-0.007 (0.009)
Number of MU firms								-0.003 (0.004)		-0.004 (0.004)
Quantity-wt avg TFP				-0.293* (0.054)	-0.293* (0.054)				-0.294* (0.054)	-0.294* (0.054)
Market fixed effects?	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Notes: The panel shows the coefficients obtained by regressing quantity-weighted average concrete prices in a market on either the market share or number of vertically integrated firms operating in the market. The market share or number of multi-unit firms and the quantity-weighted average TFP in the market are also included in some specifications. All regressions control for the HHI and density of demand in the market as well as year effects (coefficients not reported). Standard errors clustered by market. An asterisk denotes significance at the five percent level.

(f) What are some robustness checks that you would want to include in the analysis. This can include those robustness checks that HS include. When possible, describe whether HS included this in the analysis as well as what they found.

(g) This is a general IO question. Analyze this "email strategy" for lowering gasoline prices (answer only once):

"For the rest of this year, DON'T purchase ANY gasoline from the two biggest companies (which now are one), EXXON and MOBIL. If they are not selling any gas, they will be inclined to reduce their prices. If they reduce their prices, the other companies will have to follow suit.

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Section C

5. This question deals with Cohen and Einav, "Estimating Risk Preferences from Deductible Choice", (2007, *AER*), Chiappori and Salanié, "Testing for Asymmetric Information in Insurance Markets", (2000, *JPE*) and Finkelstein and Poterba, "Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market", (2004, *JPE*).

(a) For Cohen and Einav (2007), discuss carefully what the empirical setting is and what their main research question is.

(b) Briefly describe the data set used by Cohen and Einav (2007).

(c) Give an overview of the empirical strategy employed by Cohen and Einav (2007). Why do authors use a structural empirical model? Briefly discuss a possibility of using reduced-form approaches as an alternative empirical strategy.

(d) What is the estimation method used by Cohen and Einav (2007)? What is its advantage and why do authors choose to use the method?

(e) What are empirical findings in Cohen and Einav (2007)? Compare them with empirical findings of Finkelstein and Poterba (2004) and those of Chiappori and Salanié (2000). What are possible explanations for the differences in their findings regarding asymmetric information?

6. This question deals with Krasnokutskaya, "Identification and Estimation in Highway Procurement Auctions Under Unobserved Auction Heterogeneity", (working paper, 2004), and Guerre, Perrigne, and Vuong, "Optimal Nonparametric Estimation of First-Price Auctions", (*Econometrica*, 2000).

(a) For Krasnokutskaya (2004), discuss carefully what the empirical setting is. Compare the empirical setting with that of GPV (2000).

(b) Describe, as fully as you can, the nonparametric identification result and the two-step nonparametric estimation strategy of Krasnokutskaya (2004).

(c) Briefly describe the empirical application of Krasnokutskaya (2004). Especially, what are the possible sources of auction-specific unobserved heterogeneity?

(d) Briefly discuss, in general, why and when researchers choose to use structural empirical models in studying auctions and when they choose to use reduced-form models.

(e) Consider a single-object, first-price sealed-bid auction with independent private values. There are N potential bidders. Assume N is exogenous and known. Bidders are symmetric and risk-neutral. Each bidder draws his or her private value v_i from a common distribution $F(v)$ and $F(v)$ has a support $[0, \infty)$. Assume there are no reserve price and no unobserved heterogeneity for simplicity. In the above setting, derive symmetric Bayesian Nash equilibrium bidding strategies, $\beta(v_i)$. (Consider increasing and differentiable strategies only.)