This exam is comprised of three sections. The first section is for material covered in IO, 220A taught in the spring of 2012 by Ben Handel. The second covers material by Joseph Farrell taught in Fall 2013. The third section is for material covered in IO, 220C taught in the fall by Denis Nekipelov. Each section is worth either 30 or 35 points.

Part 1

Question 1 (35 points)

1. (10 points) Write down a structural consumer choice model typical of the structural literature on health insurance choice. Use clear notation, and outline the micro-foundations that you include in the model. You must include at least 3 distinct micro-foundations. For each of these foundations describe how (i) an empirical paper in the literature identifies that quantity in data and (ii) what assumptions based on economic theory you would implement to estimate those foundations.

2. (10 points) The 2010 QJE paper by Einav, Finkelstein, and Cullen outlines a sufficient statistics approach to quantifying the welfare loss from adverse selection in a health insurance market. Describe the key quantities they need to measure to do this sufficient statistics welfare analysis. Illustrate these quantities in a graph, and shade the area that represents the deadweight loss / welfare loss from adverse selection.

3. (10 points) In Handel (2012) the paper separately identifies inertia from other micro-foundations in a health insurance context. What data elements are necessary to identify inertia separately from other micro-foundations? Without that unique data structure, what is the main problem past researchers run into when trying to identify inertia / switching costs? Describe why inertia interacts with adverse selection, and why this interaction is economically meaningful. Use a graph to illustrate this point.

4. (5 points) Health insurance markets are heavily regulated: what typical U.S. regulation increases adverse selection in health insurance markets? Why is this same regulation not present in other insurance markets, such as auto insurance? What are several key features of health insurance markets that make them economically different than other insurance markets?

Part 2

Question 1 (30 points)

(a) Describe one or two efficiency effects of competition *other than* bringing prices closer to marginal costs.

(b) What evidence would you cite regarding the importance of those effects?

(c) Comment on how some aspect, instance, example, or approach in antitrust enforcement does either a good or a poor job of contributing to the effects you describe.

Part 3

Question 1 (35 points) N bidders participate in a first-price auction for a single non-divisible product. It is known that valuations of bidders in the auction are independently drawn from a *discrete* distribution with support points $\{\nu_1, \nu_2, \nu_3\}$ such that for each bidder $i = 1, \ldots, N$ $\Pr(v_i = \nu_k) = \pi_k$, $k = 1, 2, 3$. The econometrician does not know the location of support points and the probabilities π_k.

(a) Assuming that the distribution of valuations is common knowledge among bidders, derive the best response correspondence for a bidder with valuation v_i

(b) Define the Bayes-Nash equilibrium in the considered auction game.

(c) Characterize *a* symmetric Bayes-Nash equilibrium in this auction game and the equilibrium bidding strategy.

(d) Suppose that an econometrician observes a sample of N bids $\{b_i\}_{i=1}^N$ that comes from a single realization of the auction. Describe the procedure that can be used for estimation of the distribution of valuations from the observed sample of bids.

(e) Prove that there exists an estimator for each support point ν_k denoted $\widehat{\nu}_k$ that has an *exponential* rate of convergence: for some $\alpha > 0$

$$N^\alpha \left(\Pr\left(\widehat{\nu}_k = \nu_k\right) - 1\right) \to 0, \text{ as } N \to \infty.$$

Find α that determines the convergence rate.

(f) Prove that there exists an estimator for probability π_k denoted $\widehat{\pi}_k$ that has a parametric rate of convergence:

$$\sqrt{N}\left(\widehat{\pi}_k - \pi_k\right) = O_p(1).$$