Final exam for ECON 7510

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Instructions You have three hours to complete the exam. Responses should be submitted on Canvas.

1. **Doing empirical research** [35 points] Described below are two empirical questions. Select **one** of these questions.

   Question A Governor Kathy Hochul recently revived a plan to implement congestion pricing in Manhattan. Starting on January 5, 2025, any driver entering Manhattan below 60th Street during peak hours will be charged a $9 fee. Governor Hochul wants you to help predict the impact of this policy on car travel times. Suppose that, in particular, she wants you to predict how long it will take a driver to get from their home in Ho-Ho-Kus, New Jersey (outside of the congestion zone) to the Port Authority parking garage (inside the congestion zone) if they leave home at 7:30AM on a Wednesday after the policy has been implemented.

   Question B Suppose New York State currently subsidizes each unit of electricity produced using renewable energy (solar and wind). This policy is intended to encourage increased entry by renewable generators. Suppose the federal government is considering banning such subsidies to level the playing field between these renewable generators and natural gas-powered electricity generators. If implemented, this ban would go into effect in 2027. Governor Kathy Hochul has asked you to analyze how the removal of these subsidies would change the path of renewables' entry relative to the status quo. For example, how would the removal of the subsidies change the proportion of the state's electricity produced renewably in 2025, 2026, etc.?

   How would you go about answering your chosen empirical question? Your answer should include

   - a high-level description of methodology,
   - a description of the kind of data you would use and how you might obtain such data (feel free to speculate about what data might be available),
   - the kind of model (if any) that you might want to develop,
   - how you might estimate that model, and
   - how that model could be used to answer Governor Hochul's question.

   You may not have thought much about these topics previously—that is fine. I'm more interested in seeing how you think about research questions in general than in your knowledge of particular details of this setting. If there are institutional details you don't know that you think are important, you can feel free to speculate.

2. **Paper-based questions** [35 points]

   (a) Summarize the paper's argument in six or fewer bullet points. Each bullet point should be no more than two sentences. Together, these bullet points should give a full summary of the paper's most important economic insights and what the author does/argues to arrive at those insights. (Note: This is a difficult exercise, as the paper does a lot of things. I am challenging you synthesize and pull out the most critical links in the paper's chain of logic.)

   (b) Offer a critique of choices the author made in modeling one of the following features of the setting:

      i. Assumptions on information

      ii. Reputation externality

      iii. Entry game

   (c) In estimating the demand model, the author allows for random coefficients. Why might this be necessary? In other words, how might the answer to the paper's main questions have been different if the authors had not allowed for random coefficients? (This may require a bit of speculation on your part; that's okay.)

   (d) On page 32, after referring to demand estimates, the authors say "We then back out the vehicle marginal cost using firms' first-order conditions and the estimated consumer price elasticities." Give an intuitive explanation of how the authors back out marginal costs. How does this relate to a paper or papers we discussed this semester? What critical assumption about *firm conduct* is implicitly being used?

3. **Conceptual questions** [30 points total] Answer as many of the following questions as you like (at least one). If you answer one, that question will be worth 30 points and getting full credit will require a very well-reasoned and detailed answer; if you answer two, each will be worth 15 points and I will expect somewhat less specificity in each answer; if you answer all three, each will be worth 10 points and my expectations for each answer will be lower still.

   (a) Suppose you're answering a question that requires estimating a demand system. How would you choose between various possible demand models (e.g., logit, nested logit, mixed logit, etc.)? Your answer should reference specific properties of one or more of these models, but I'm more interested in the broader principles you might weigh when thinking about model selection.

   (b) Discuss the following statement: "The identification and estimation of dynamic discrete choice models tends to require relatively strong assumptions; however, in many cases, the benefits of making these assumptions outweigh their costs."

   (c) In what ways can the availability of big data change the landscape of empirical IO research? What new opportunities and challenges does it present for structural modeling and estimation?