

Midterm 2

EC201

Instructions

- There are 10 questions on the midterm
- Each question is worth 10 points
- Partial credit will be awarded based on the quality of the explanation
- The midterm is “open Google”. That is, you can search the web if you think that might be helpful. You **cannot** communicate, though, with anyone inside or outside of this class.
- When you are instructed that time is up, stop typing. Anyone who continues to type after the allotted time will be deducted points. Let me be clear, it is **not** in your best interest to continue to type after time is up, even if you are in the middle of a sentence.
- Please write all answers in a colab notebook. Please share the notebook with **pharringtonp19@gmail.com**

Problems

Problem 1. True/False: A random variable is a function

Problem 2. True/False: Assuming the optimization problem has a unique solution, the relationship between a parameter of the objective function and the solution is an implicit function as highlighted below.

$$x^*(\theta) = \underset{x}{\operatorname{argmin}} f(x, \theta)$$

Problem 3. In problem set 3, we used a solver to determine the optimal amount of leisure. Why is a solver not needed to determine the optimal amount of consumption in that example?

Problem 4. Explain why the willingness to pay for lotteries in problem set 4 is a decreasing function of the number of lotteries?

Problem 5. Propose a solution for the type of market failure exhibited in the Market for Lemons example. Either introduce some type of government policy, create a new type of firm, or alter the choice sets of the existing agents (consumers/sellers). Please explain in words how your proposal corrects for the market failure. Are there any unintended consequences of this proposal? Who stands to benefit the most from it?

Problem 6. In the Stackleberg model that we considered in class, why do we model the firm that sets the quantity first as solving the problem of the firm that sets quantity second?

Problem 7. One of the aims of this course is to illustrate how we build economic models by “nesting” optimization problems. Explain how the example of the Optimal Policy model represents this idea. Describe all of the nested optimization problems in the model.

Problem 8. In class, when discussing a consumer’s decision to purchase insurance, we noted that there are essentially three different characterizations/representations for the choice set. Please explain why each representation is valid.

Problem 9. In class, we discussed how in some models, multiple equilibriums exist. Explain how multiple equilibrium may exist in the Market for Lemons model. Note, the key elements of the Market for Lemons model is that all cars would be exchanged under full information. Please don’t restrict your answer to the exact values used in class.

Problem 10. In our model for optimal compensation, the firm faced two sources of uncertainty. Please describe how we account for these two distinct sources in our model. Please be specific.