EC1340-Fall 2019
Problem Set 3

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When you write up your answers, your goals should be to (1) be correct, and (2) convince your reader that your answer is correct. It is always helpful if your work is legible and if all steps are presented, possibly with a line of explanation.

In the case of empirical exercises, your goal should be to provide enough information to allow a reader to replicate your answer. This requires a description of data and data sources as well as a description of your analysis of the data.

Answers which do not achieve these goals will not be awarded full credit.

To assist us in complying with the University's privacy policy, the first page of each problem set should be blank except for your name and the problem set number. This will allow us to write your score inside your problem set. Failure to include such a page will be understood as permission to write your score on the front of your problem set where others might accidentally see it.

Problems

1. This question asks you to think about the estimation of the cost of climate change conducted in Nordhaus and Mendelsohn (1995) that we discussed in class.

   (a) Using the notation from lecture, suppose that

   $$R = A_0 + A_1 T + A_2 T^2 + A_3 S + \epsilon$$

   where R is unit land rent, T is a scalar mean annual temperature, A_1 and A_2 are the parameters we care about, S is the farmer's skill, and ϵ is unobserved determinants of land rent.

   Suppose that skillful farmers choose places with the best climate, but that we don't observe the skill of a farmer. We do know, however, that skill depends on climate according to $S = B_0 T - B_1 T^2$ for $B_0 > 0$, $B_1 > 0$ and $A_3 > 0$.

   Suppose we estimate the model

   $$R = \hat{A}_0 + \hat{A}_1 T + \hat{A}_2 T^2 + \epsilon.$$

   Will our estimated coefficients of $\hat{A}_1$ and $\hat{A}_2$ measure what we want them too? Explain briefly.

   (b) Does this approach overestimate or underestimate the effects of climate on agricultural land rents?

2. Suppose that value of an average acre of US farmland in 1982 is about 1500$ when all of the variables in the regression are zero(so that 1500 is the intercept of the regression line). Using the results of table 3 column 1 in Nordhaus and Mendelsohn, write the equation describing the way that land value varies with changes in climate. Plot this equation as January temperature varies from 20 to 50 (note that temperature is Fahrenheit here). What does this graph suggest about the importance of a 5 degree Fahrenheit increase in January temperature?