EC1340-Fall 2019
Problem Set 4

(Updated 21 August 2019)

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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. On the basis of Figure 1 of Schlencker and Roberts, approximately what would happen to the yields of corn, soybeans and cotton if we increase by one full day the amount of time that each crop is exposed to 35 degrees C and decrease by one day the time it is exposed to 25 degrees C? Base your answer on the red (piecewise linear) regression line in each figure. (Hint: the vertical scale is in natural log scale, so you need to account for this in your calculation.)

2. Dell, Jones and Olken make extensive use of 'dummy' variable in their analysis. This exercise asks you to figure out how dummy variables work in a regression.

   Suppose that your data set consists of three observations of $(y,x) : (1,1),(4,2),(2,3)$. Define a dummy variable D which is equal to 1 for $x > 3/2$ and zero otherwise.

   We would like to estimate the following regression equation,

   $$y = A_0 + A_1 D + \epsilon$$

   (a) Calculate A_0 and A_1 using OLS.

   (b) Plot the three data points and your regression line.

   (c) Explain, in one or two sentences, what the coefficient of the dummy variable measures.

3. Consider a series of annual temperature shocks, $(T_{i0},T_{i1},T_{i2},T_{i3},T_{i4},T_{i5}) = (0,0,1,1,1,1)$ and a country for which $g_{i0} = 0$, $Y_{i0} = 1$ and $L_{it} = 1$ for all t.

   (a) Using column 2 of table 3 in Dell, Jones and Olken and the model developed in the paper and discussed in class, evaluate and plot the path of $1 + g_{it}$ and Y_{it} for $t = 0,...5$ for i a poor country.

   (b) Repeat part 1 for i a rich country.

(c) On the basis of your work above, what do the results above suggest is the long run effect of one degree Celsius of warming.

(d) Compare this conclusion with the results of Nordhaus, Mendelsohn and Shaw.

Hint: Don't forget that g_{it} is a percentage for the purpose of table 3.