EC1340-Fall 2018
Problem Set 6

(Updated 25 October 2018)

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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.

Problems

1. Let Y_0 and E_0 denote world income and emissions of CO_2. Suppose that $Y_0 = 1$ and that the world consists of two countries, A and B that each account for half of emissions and income.

   Suppose that the relationship between income and mitigation is given by

   $$\Lambda_i = \frac{2}{3}\mu_i^3$$

   where $\mu_i E_i$ is the reduction in emissions in country i and $\Lambda_i Y_i$ is the cost of this reduction.

   We would like to accomplish a reduction of αE_0 in world emissions, for $0 < \alpha < 1$.

   (a) Calculate the cost of this reduction if each country reduces its emissions by the same amount.

   (b) Calculate the cost of this reduction if the entire reduction is accomplished by country A.

   (c) Calculate the 'participation multiplier', that is, the number by which we must multiply the cost in part 1a to get the cost in part 1b.

   (d) The Kyoto protocol required emissions reductions from only a fraction of the world. Briefly explain why this problem suggests that this is (or is not) a good idea.