EC1340-Fall 2019
Problem Set 6 solutions

(Updated 25 September 2019)

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1. (a) The cost of a reduction in emissions of proportion α of the whole is $\Lambda_0 Y_0 = \frac{2}{3}\alpha^3 Y_0$.

   (b) We need to accomplish αE_0 of emissions in country A. To do this, we need

$$\begin{aligned} \alpha E_0 &= \alpha^A E_A \\ &= \alpha^A E_0/2 \end{aligned}$$

   so that $\alpha^A = 2\alpha$.
   The cost of this reduction to country A is,

$$\begin{aligned} \Lambda_A Y_A &= \frac{2}{3}(\alpha^A)^3 Y_A \\ &= \frac{2}{3}(2\alpha)^3 \frac{1}{2} \\ &= \frac{8}{3}\alpha^3 \end{aligned}$$

   (c) We want to find x to solve,

$$\begin{aligned} x\Lambda_A Y_A &= \Lambda_0 Y_0 \\ x\frac{8}{3}\alpha^3 &= \frac{2}{3}\alpha^3 Y_0 \\ \implies x &= 4 \end{aligned}$$

   That is, it costs 4 times as much to accomplish our reduction in country A alone.