Due Friday, October 9th, 2020

# Problem Set 5 – General Equilibrium

***Instructions***: *Please write your answers on a separate sheet of paper, showing all necessary work. I will collect answers in class on the due date. The problem set is worth a total of 10 points – 5 for completion and 5 for correctness of one question selected by me.*

1. Cali and David both collect stamps ($x$) and fancy spoons ($y$). They have the following preferences and endowments.

$$U_C(x,y) = x_C \cdot y_C{}^2 \qquad U_D(x,y) = x_D \cdot y_D$$

$$\omega_C = (10, 5.2) \qquad \omega_D = (14, 6.8)$$

   a. Write down the resource constraints and draw an Edgeworth box that shows the set of feasible allocations.
   b. Label the current allocation inside the box. How much utility does each person have?
   c. Show that the current allocation of stamps and fancy spoons is not efficient. (Hint: Define the contract curve, or the set of Pareto optimal allocations.)
   d. Show that the following allocation would make both Cali and David better off compared to the original allocation. Is it possible to make any further pareto improvements?

$$\omega_C = (8, 6) \qquad \omega_D = (16, 6)$$

2. Suppose the economy consists of two individuals, Ariel and Brad, who consume two goods, $x$ and $y$, with the following preferences and initial endowments.

$$U_A(x,y) = x_A \cdot y_A \qquad U_B(x,y) = x_B + y_B$$

$$\omega_A = (4, 2) \qquad \omega_B = (2, 3)$$

   a. In an Edgeworth Box label the initial endowment, draw an indifference curve through the initial endowment for each individual, and shade the region of allocations that would be a Pareto improvement to the initial endowment.
   b. Derive an equation to describe the set of Pareto-optimal allocations, and draw it in the Edgeworth Box.
   c. Define the competitive equilibrium allocation $[(x_A, y_A), (x_B, y_B)]$ and price ratio $p_x/p_y$. (Remember that without loss of generality, you may set $p_1 \equiv 1$.)
   d. Find a set of transfers, $T_A$ and $T_B$, where $T_A + T_B = 0$, such that the competitive equilibrium becomes $[(1, 1), (5, 4)]$.