

Problem Set 1

Due Friday, April 3rd at 3:30pm

Problem 1

Evaluate whether each statement is true, false, or uncertain. Use economic reasoning, graphical analysis, or evidence discussed in class.

For questions relating to the Edgeworth box: suppose there are two countries, two goods, and both countries are endowed with some (i.e., positive and finite amount) of each good.

1. If the contract curve was a straight line connecting the two origins, then both countries have the same preferences.
2. If consumers in both countries thought both goods were perfect substitutes, then there would be no gains to trade.
3. If the total endowment doubled, then the market clearing terms-of-trade would double as well.

Problem 2

The economy consists of two countries: Eastland and Westworld. There are two goods, x and y . The aggregate indifference curves for both countries have the usual properties: they are bowed inward, do not intersect, and a curve farther from the origin represents higher utility. However, Eastland's indifference curve is flat, while Westworld's is steep in (x, y) space. Eastland is endowed with (x^e, y^e) , and Westworld is endowed with (x^w, y^w) , such that $x^e + x^w = \bar{x}$ and $y^e + y^w = \bar{y}$, where $\bar{x}$ and $\bar{y}$ are the total resources in the economy. We also assume that $\frac{x^e}{y^e} > \frac{x^w}{y^w}$, that is, Eastland is relatively more abundant in x compared to Westworld.

1. Using the term "marginal rate of substitution," describe the preferences of Eastland and Westworld.
2. Draw an Edgeworth box diagram with Eastland's origin in the top right and Westworld's origin in the bottom left. Indicate the endowment point. (Hint: Be sure to use the assumption $\frac{x^e}{y^e} > \frac{x^w}{y^w}$.)
3. Suppose Eastland and Westworld can exchange their endowments at a given terms-of-trade p_x/p_y . Draw the budget constraint for each country in the diagram. Explain why the budget constraint is shared by both countries.
4. Describe, in another Edgeworth box, a situation in which residents of both countries are maximizing their utilities given their constraints but there exists a shortage of x and a surplus of y . Explain the situation intuitively.
5. How must the terms-of-trade adjust to fix the surplus/shortage? Explain intuitively.

Problem 3

There are two countries, North and South, and two goods, x and y . North has preferences $u^N(x, y) = \min\{x, 2y\}$ and South has preferences $u^S(x, y) = \min\{2x, y\}$. Endowments are $(x^N, y^N) = (2, 6)$ and $(x^S, y^S) = (6, 2)$. Let $p = p_x/p_y$ denote the relative price of x , with $p_y = 1$ as numéraire.

1. Explain why North's optimal consumption must satisfy $x = 2y$, and South's must satisfy $2x = y$. (*No calculus required—reason from the shape of the indifference curves.*)
2. Using the condition from (1) and each country's budget constraint, derive demand for x and y as a function of p .
3. Find the equilibrium relative price p^* and the equilibrium allocation.
4. Compute each country's utility in autarky and at the trading equilibrium. Do both countries gain from trade? Provide intuition for *why* they gain (or don't).
5. Is the equilibrium allocation Pareto efficient?