Exchange Slides

Econ 360

Summer 2025

Learning Outcomes/Goals

1. Draw an Edgeworth Box based on 2 consumers' endowments and utility functions.
2. Compare and contrast Pareto Improvement and Pareto Optimal/Efficient.
3. Identify Pareto Optimal allocations on the Edgeworth.
4. Given endowments and utility functions, predict the outcome(s) of trade between two people.

Where We Are/Going

- Not all utility maximization centers on a consumer buying bundles of goods from a firm.
- Sometimes utility maximization involves negotiations or bartering between two people.
- A less serious example is when little kids trade random things they find with their friends.
- These sorts of trades are what we are going to study in this set of slides.

Notation Reminder

- Two people A and B, two goods x and y, and each person starts with an endowment.

- Person A's endowment of good X is ω_x^A and their endowment of good Y is ω_y^A.
  - Therefore person B's endowment is ω_x^B,ω_y^B.
- Total endowments (person A's+person B's endowment) for the two goods are represented as $(\bar{\omega}_x, \bar{\omega}_y)$ and represent the total amount of each good between the two people.

- Person A's choice (after trade) will be denoted as (x^A, y^A) and person B's choice (after trade) will be denoted as (x^B, y^B).

Notation Reminder

- Given prices for each good (p_x, p_y) we can figure out the worth of each person's endowment.
- For person A, the worth of their endowment is $p_x\omega_x^A + p_y\omega_y^A$.
- For person B, the worth of their endowment is $p_x\omega_x^B + p_y\omega_y^B$.

Simplification–Remove Prices

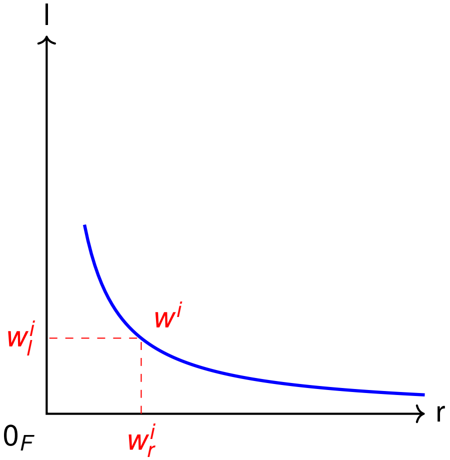
- For now, let's not use prices. We will bring them back later.
- Consider two kids who have each collected some leaves and some rocks from around where they live.
- For now, assume all leaves and all rocks look the same and have the same intrinsic value to both little kids.
- Both kids have rational preferences over leaves and rocks.
- Let's call them Darius and Faith, or D and F.
- We will represent rocks as r and leaves as l.

Building an Edgeworth Box

- Suppose Darius comes to the trading table with 4 leaves and 5 rocks.
  - $W^D = (w_r^D, w_l^D) = (5, 4)$.
- Faith comes to the trading table with 3 leaves and 6 rocks.
  - $W^F = (w_r^F, w_l^F) = (6, 3)$.
- We can think of our total endowments:
  - $\bar{\omega}_r = 5 + 6 = 11$.
  - $\bar{\omega}_l = 4 + 3 = 7$.
- The first thing we want to do is figure out all the **feasible** allocations.
  - This is simply all the allocations such that the total amount of leaves allocated is fewer than 7, and the total amount of rocks allocated is fewer than 11.

Building an Edgeworth Box

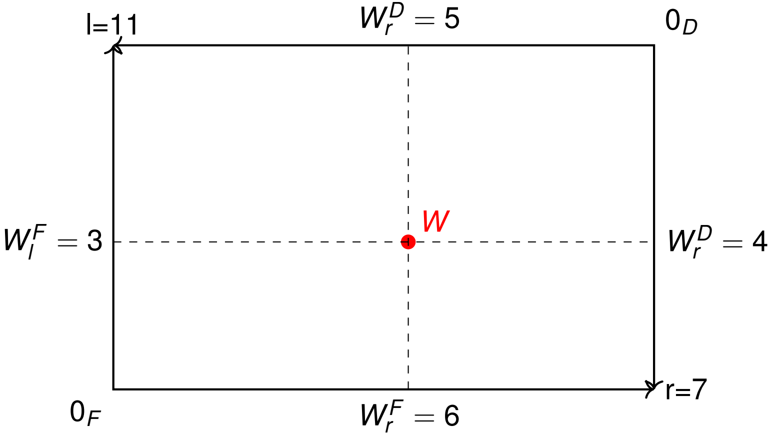
- If Darius and Faith had well-behaved preferences, their individual utility maximization graphs would look something like this.



Building an Edgeworth Box

- Now we need to incorporate these two together.
- We also need to incorporate that giving Faith an additional rock means we have to remove one rock from Darius. (There is only a limited amount of rocks between the two of them).
- So we are going to take Darius's graph, flip it 180 degrees and line it up with Faith's graph.
- **I will go over this "flipping and lining up the graphs" in class.**

Building an Edgeworth Box



Predicting Trade

- Let's think about how Darius and Faith would interact assuming they are both rational and only care about their own utility.
- Darius and Faith each have a certain utility based on their endowment of leaves and rocks.
- So any trade they may make either Darius or Faith better than their utility of the endowment, but it definitely won't make either person worse.
- I.e. if Darius suggests a trade that makes Faith worse off than what she has before the trade, she would simply walk away.
- The same is true if Faith suggests a trade that makes Darius worse off than he is before the trade.

Predicting Trade

- If Darius and Faith have well-behaved preferences, then their utility increases with having higher amounts of both rocks and leaves.
- But as we increase the number of rocks and leaves Darius has after the trade, that means we are decreasing Faith's number of rocks and leaves (and vice versa).
- So the trade must mean that we are exchanging rocks for leaves in some way that makes either both Darius and Faith better off (higher utility) than before the trade, or
- the trade makes one person better off without making the other person worse off.

Predicting Trade-Vocab

- **Pareto Improvement**–Making either both people better off than at a given allocation or making one person better without making the other person worse.
  - Point-specific.
- **Pareto Optimal/Efficient**–An allocation for which there are no feasible Pareto Improvements to be made. Making one person better would make the other person worse off.
  - Not point-specific.
- We predict that Darius and Faith will pick a Pareto Optimal point by the end of their negotiation, otherwise at least one of them could be made better off if they kept trading!