Preview of Rest of the Course

- We have covered consumer decision making and firm decision making.
- One more lecture on decision making under uncertainty—next Tuesday.
- The rest of the lectures will focus on how consumers and firms interact in a market.
  - The emphasis will be on whether market outcomes are “good.”

Voluntary Trade is Good for Both Parties

- Consider an economy consisting of two people (A and B) with well behaved preferences and two goods (x and y).
- Suppose A starts with \( x_A = 100 \) and \( y_A = 1 \)
- Suppose B starts with \( x_B = 1 \) and \( y_B = 100 \).
- With well behaved preferences, averages are preferred to extremes.
- Some trades that involve A giving up to 99 x in exchange for up to 99 y (at a rate of one for one) will leave both A and B better off.

Trade is good

Sometimes Trade is Not Wanted

Edgeworth Box

A’s Utility in Edgeworth Box
B’s Utility in Edgeworth Box

Trading Region

Trading Region Vanishes When \( MRS_A = MRS_B \)

If \( MRS_A \neq MRS_B \) then Mutually Beneficial Trades Still Exist

Pareto Efficient Allocations

Contract Curves
Example of a Contract Curve

Core of an Exchange Economy

- The core of an exchange economy is defined as the set of all allocations for which no participant in the economy will want additional trades.
  - The core is a subset of the points on the contract curve.
  - The notion of a core depends crucially on a (possibly Pareto inefficient) initial allocation.
  - The core consists of all points on the contract curve that improve the position of at least one of the participants without making any of the other participants worse off relative to that initial allocation.

Example of a Core

A Market Facilitates Trade by Imposing Prices

- All the analysis up to now has abstracted away from price setting in a market.
  - We have effectively assumed that A and B barter with each other.
- The same analysis applies in a market setting, where A and B take the exchange ratio of x for y as given and set by the market.

Properties of Market Exchange

- Market participants will trade from the initial allocation point up to where the market price line intersects the contract curve.
- Market price lines that intersect the contract curve outside the core result in no trade.
- At the equilibrium point, \( MRS_A = MRS_B = -\frac{P_y}{P_x} \) slope of the market price line.
Welfare Properties of Market Equilibrium

- Ken Arrow has shown that in an exchange market with many participants, the core consists of a single point.
- First Welfare Theorem: Market outcomes are necessarily Pareto efficient.
- Second Welfare Theorem: Any Pareto efficient outcome can be supported in a market by a reallocation of initial resources.

Nicholson Example Problem

- Smith and Jones are stranded on a desert island. Each has in his possession some slices of ham (H) and cheese (C). Smith is a very choosy eater and will eat ham and cheese in the fixed proportions of 2 slices of cheese to 1 slice of ham: \( U_s = \min(H, C/2) \).
- Jones more flexible and has a utility function given by \( U_j = 4H + 3C \).
- Total endowments are 100 slices of ham and 200 slices of cheese.

Example Problem—Part (a)

- Draw the Edgeworth box diagram that represents the possibilities for exchange in this situation. What is the only exchange ratio that can prevail in any equilibrium?

Part (a) Solution

- The contract curve must be a straight line with slope = 2 slices of cheese per 1 ham, since for Smith, any allocation outside that line is inefficient.
- Jones will never trade an exchange ratio of less than four pieces of cheese for three slices of ham—such exchanges always leave him worse off.
  - Jones will never trade on exchange line A.
  - Jones is willing to trade on exchange line B.

Part (a) Solution (continued)
Part (a) solution (continued)

- Even after the trade on line B, there is still room to trade at an exchange ratio between the slope of B and $-4/3$.
- Since the slope of B was arbitrarily chosen to be any slope greater than $-4/3$, this argument will always hold until the slope of B is arbitrarily close to $-4/3$.
- Thus, the equilibrium exchange ratio must equal $-4/3$.

Example Problem—Part (b)

- **Suppose that Smith initially had 40H and 80C. What would the equilibrium position be?**
- Jones initially has 60H and 120C, and his initial (and final) utility is $60 \times 4 + 120 \times 3 = 600$.
- The equilibrium position is the intersection of the trading line ($4H_j + 3C_j = 600$) and the contract curve ($C_j = 2H_j$).
- The solution is $H_j = 60$, $C_j = 120$. No trade takes place. This is not surprising since Smith and Jones are already on the contract curve at the start.

Example Problem—Part (c)

- **Suppose that Smith initially had 60H and 80C. What would the equilibrium position be?**
- Jones initially has 40H and 120C, and his initial (and final) utility is $40 \times 4 + 120 \times 3 = 520$.
- The equilibrium position is the intersection of the trading line ($4H_j + 3C_j = 520$) and the contract curve ($C_j = 2H_j$).
- The solution is $H_j = 52$, $C_j = 104$.

Example Problem—Part (d)

- **Suppose that Smith (much stronger of the two) decides not to play by the rules of the game. Then what could the final equilibrium position be?**
- Smith beats up Jones, takes all his ham and all his cheese, leaving Jones with nothing.