Economics 101A
(Lecture 26, Revised)

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Outline

1. Barter
2. Walrasian Equilibrium
3. Example
4. An Example of Excellent Economics
5. Unsolicited advice

1 Barter

- Consumers can trade goods 1 and 2

- Allocation $\Big((x_1^{1*}, x_2^{1*}), (x_1^{2*}, x_2^{2*})\Big)$ can be outcome of barter if:

- **Individual rationality.**

$$u_i(x_1^{i*}, x_2^{i*}) \geq u_i(\omega_1^i, \omega_2^i) \text{ for all } i$$

- **Pareto Efficiency.** There is no allocation $\Big((\hat{x}_1^1, \hat{x}_2^1), (\hat{x}_1^2, \hat{x}_2^2)\Big)$ such that

$$u_i(\hat{x}_1^i, \hat{x}_2^i) \geq u_i(x_1^{i*}, x_2^{i*}) \text{ for all } i$$

with strict inequality for at least one agent.

- Barter outcomes in Edgeworth box
- Endowments (ω_1, ω_2)
- Area that satisfies individual rationality condition
- Points that satisfy pareto efficiency
- **Pareto set.** Set of points where indifference curves are tangent

- **Contract curve.** Subset of Pareto set inside the individually rational area.

- Contract curve = Set of barter equilibria

- Multiple equilibria. Depends on bargaining power.

- Bargaining is time- and information-intensive procedure

- What if there are prices instead?

2 Walrasian Equilibrium

- Prices p_1, p_2

- Consumer 1 faces a budget set:

$$p_1 x_1^1 + p_2 x_2^1 \leq p_1 \omega_1^1 + p_2 \omega_2^1$$

- How about consumer 2?

- Budget set of consumer 2:

$$p_1 x_1^2 + p_2 x_2^2 \leq p_1 \omega_1^2 + p_2 \omega_2^2$$

or (assuming $x_i^1 + x_i^2 = \omega_i$)

$$p_1(\omega_1 - x_1^1) + p_2 \left(\omega_1 - x_2^1\right) \leq p_1 \left(\omega_1 - \omega_1^1\right) + p_2 \left(\omega_2 - \omega_2^1\right)$$

or

$$p_1 x_1^1 + p_2 x_2^1 \geq p_1 \omega_1^1 + p_2 \omega_2^1$$

- **Walrasian Equilibrium.** $\left((x_1^{1*}, x_2^{1*}), (x_1^{2*}, x_2^{2*}), p_1^*, p_2^*\right)$ is a Walrasian Equilibrium if:

  - Each consumer maximizes utility subject to budget constraint:

$$\begin{aligned} (x_1^{i*}, x_2^{i*}) &= \arg\max_{x_1^i, x_2^i} u_i\left((x_1^i, x_2^i)\right) \\ s.t.\ p_1^* x_1^i + p_2^* x_2^i &\leq p_1^* \omega_1^i + p_2^* \omega_2^i \end{aligned}$$

  - Markets clear:

$$x_j^{1*} + x_j^{2*} \leq \omega_j^1 + \omega_j^2 \text{ for all } j.$$

- Compare with partial (Marshallian) equilibrium:
  - each consumer maximizes utility
  - market for good i clears.
  - (no requirement that all markets clear)

- Graphical depiction in Edbeworth box. Set of optimal points as prices p_1 and p_2 vary.

- Draw offer curve for consumer 1 (equivalent of demand curve in partial equilibrium):

$$\left(x_1^{1*}\left(p_1, p_2, (\omega_1, \omega_2)\right), x_2^{1*}\left(p_1, p_2, (\omega_1, \omega_2)\right)\right)$$

- Offer curve is set of points that maximize utility as function of the varying prices p_1 and $p_{2.}$

- Draw offer curve for consumer 2.

- Walrasian Equilibrium is at intersection of the two offer curves!

- Walrasian Equilibrium is a subset of barter equilibrium:
  - Does satisfy individual rationality?
  - Does it satisfy the Pareto Efficiency condition?
  - Is any point in Contract Curve a WE for allocation (ω_1, ω_2)?

3 Example

- Consumer 1 has Leontieff preferences:

$$u(x_{1,}x_2) = \mathsf{min}\left(x_1^1, x_2^1\right)$$

- Bundle demanded by consumer 1:

$$\begin{aligned} x_1^{1*} &= x_2^{1*} = x^{1*} = \frac{p_1\omega_1^1 + p_2\omega_2^1}{p_1 + p_2} = \\ &= \frac{\omega_1^1 + (p_2/p_1)\,\omega_2^1}{1 + (p_2/p_1)} \end{aligned}$$

- Consumer 2 has Cobb-Douglas preferences:

$$u(x_1, x_2) = \left(x_1^2\right)^{.5} \left(x_2^2\right)^{.5}$$

- Demands of consumer 2:

$$x_1^{2*} = \frac{.5\left(p_1\omega_1^1 + p_2\omega_2^1\right)}{p_1} = .5\left(\omega_1^1 + \frac{p_2}{p_1}\omega_2^1\right)$$

and

$$x_2^{2*} = \frac{.5\left(p_1\omega_1^1 + p_2\omega_2^1\right)}{p_2} = .5\left(\frac{p_1}{p_2}\omega_1^1 + \omega_2^1\right)$$

- Impose Walrasian equilibrium in market 1:

$$x_1^{1*} + x_1^{2*} = \omega_1^1 + \omega_1^2$$

- This implies

$$\frac{\omega_1^1 + (p_2/p_1)\,\omega_2^1}{1 + (p_2/p_1)} + .5\left(\omega_1^1 + \frac{p_2}{p_1}\omega_2^1\right) = \omega_1^1 + \omega_1^2$$

4 An example of Excellent Economics

- Savings Rate in the US very low: essentially zero in year 2,000

- Perhaps: Self-control Problem

- People would like to save but...Not today!

- Credit cards and (too) high borrowing rates

- Is this testable?

- Prediction of hyperbolic discounting theory:
  - people do not like to save today
  - people like to save tomorrow

- Save Tomorrow?

- Benartzi and Thaler (2002): Design of Save More Tomorrow (SMT) Plan

- 401(k) private savings or retirement

- SMT Plan:

  - No increase in savings today

  - 3% *automatic* increase in savings at time of paycheck raise

  - can drop out at any time

- Advantages:
  - No current increase
  - Commit today for future
  - Use inertia/procrastination the good way!
  - No decrease in nominal salary (loss aversion)
  - Option out

- The facts:
  - 1998: mid-size company, 315 eligible employees
  - ‘you guys are saving too little!’
  - 79 employees: increase savings now
  - 162 employees: no increase now, will try SMT
  - 158 employees: remain in SMT plan for two years
  - Effect: savings rate up from 3.5 to 11.6 percent! In three years!

5 Advice

1. Listen to your heart

2. Trust yourself

3. Take ‘good’ risks:

   (a) hard courses

   (b) internship opportunities

   (c) research – URAP

   (d) (graduate classes?)

4. Learn to be curious, critical, and frank

5. Be nice to others! (nothing in economics tells you otherwise)