Econ 301 - Microeconomic Theory 2 **Winter 2018**

Lecture 14: February 28, 2018

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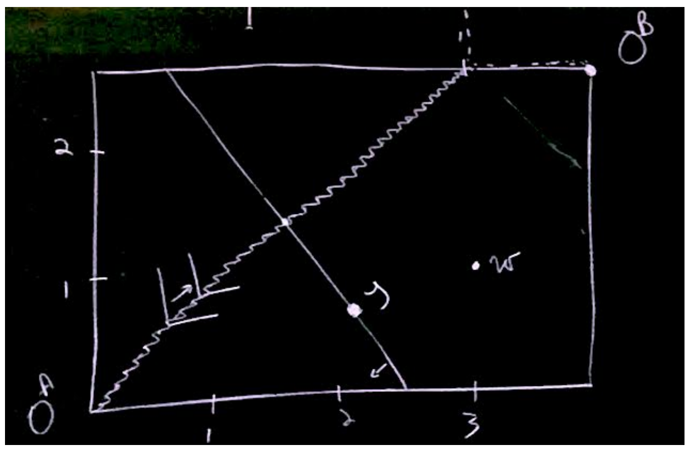
14.1 Welfare Continued

Example 14.1 *Say $\omega^A = (3,1)$, $\omega^B = (1,2)$, $u^A(x_1^A, x_2^A) = \min\{x_1^A, x_2^A\}$, and $u^B(x_1^B, x_2^B) = x_1^B + x_2^B$*



- *Fix any allocations y^A and y^B*
- *If $y_1^A > y_2^A$, allocations y^A and y^B are pareto-dominated by allocations $x^A = \left(\frac{y_1^A + y_2^A}{2}, \frac{y_1^A + y_2^A}{2}\right)$ and $x^B = \left(4 - x_1^A, 3 - x_2^A\right)$*
- *Pareto set is the allocations x^A and x^B such that $x_1^A = x_2^A$*

14.1.1 First Welfare Theorem

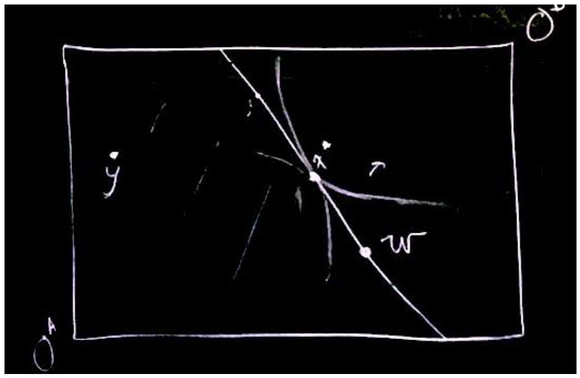
In-Class Numbering : 3.1

- **Question**: what is the relationship between Pareto-efficient allocations and competitive equilibrium allocations?

Theorem 14.2 *FWT : Suppose that consumers' preferences are monotone and that price p^* and allocations x^{A*} and x^{B*} form a competitive equilibrium. Then x^{A*} and x^{B*} are Pareto-efficient.*

- *Competitive Equilibria must exhaust gains from trade*

Proof: By Contradiction. Suppose p^*, x^{A*} and x^{B*} are a competitive equilibrium where x^{A*} and x^{B*} are not Pareto-efficient. Then there exists feasible allocations y^A and y^B such that $u^J(y_1^J, y_2^J) \geq u^J(x_1^{J*}, x_2^{J*})$ for all $J = 1, 2$, with one strict inequality . Say $u^A(y_1^A, y_2^A) > u^A(x_1^{A*}, x_2^{A*})$



- Since $y^A \succ x^{A*}$, then we must have $p_1^* y_1^A + p_2^* y_2^A > p_1^* x_1^{A*} + p_2^* x_2^{A*}$
- We have $y^A \succeq x^{B*}$
  - If $y^B \succ x^{*B}$, then $p_1 y_1^B + p_2^* y_2^B > p_1^* x_1^{B*} + x_2^{B*}$
  - If $y^B \sim x^{B*}$, then we must have $p_1 * x_1^{B*} + p_2^* x_2^{B*}$ [< contradicts optimality of monotonicity]
  - Then,
$$\begin{aligned} p_1^* y_1^A + p_2^* y_2^A + p_1^* y_1^B + p_2^* y_2^B &> p_1^* x_1^{A*} + p_2^* x_2^{A*} + p_1^* x_1^{B*} + p_2^* x_2^{B*} \\ &= p_1^* \omega_1^A + p_2^* \omega_2^A + p_1^* \omega_2^B + p_2^* \omega_2^B \end{aligned}$$
  - So we have,
$$p_1^*[y_1^A + y_1^B - \omega_1^A - \omega_2^B] + p_2^*[y_2^A + y_2^B - \omega_2^A - \omega_2^B] > 0$$

  Contradiction, feasibility of y^A, y^B is violated. Basically, this statement implies we have more of a good than what actually exists.

  Note : Proof is included to supplement the First Welfare Theorem to make understanding it easier. The proof itself, despite the awesomeness of mathematical proofs, is not a testable topic. It can essentially be ignored.

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- First Welfare Theorem says that competitive equilibrium allocations reproduce the outcomes of <u>some</u> bargaining protocol
- In bargaining, computing outcomes (P-E Allocations) requires a lot of information about consumers preferences and aggregate endowments.
- Markets only require consumers to know their own preferences and endowments.
- Prices aggregate economy-wide information.