Microeconomic Theory — ECON 323 503
Chapter 10: General Equilibrium and Economic Welfare

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Outline

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1. General Equilibrium: We can study all interrelated markets at once.
2. Trade between two people: Both benefit from mutually agreeable trades.
3. Competitive exchange:
    - Allocation is efficient at a competitive equilibrium.
    - Every efficient allocation is a competitive equilibrium for some initial distribution.
4. Efficiency and equity: Efficiency doesn't narrow down what allocations are good. Equity can be considered to do that.

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But how do changes in the market for one good affect the market for another good?

To answer this, we use "general equilibrium" analysis.

That is, we look at equilibrium in all markets simultaneously.

Competitive equilibrium in two interrelated markets

Market for Good 1:

$$D_1(p_1, p_2) \quad S_1(p_1)$$

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Equilibrium in market for the first good:

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Competitive equilibrium in two interrelated markets

Let's try an example:

$$D_1(p_1, p_2) = 20 - 5p_1 + 2p_2$$

$$D_2(p_1, p_2) = 15 - 4p_2 + 10p_1$$

$$S_1(p_1) = 5p_1$$

$$S_2(p_2) = 3p_2$$

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Solving for p_1 and p_2,

$$\begin{aligned} p_1 &= 7 \\ p_2 &= 3.4 \end{aligned}$$

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Solving for p_1 and p_2,

$$\begin{aligned} p_1 &= 7 \\ p_2 &= 3.4 \end{aligned}$$

Substituting p_1 and p_2 into either supply or demand functions says that

$$\begin{aligned} q_1 &= 17 \\ q_2 &= 21 \end{aligned}$$

Competitive equilibrium in two interrelated markets

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Suppose that the supply function in market 2 changes:

$$S_2'(p_2) = 8p_2$$

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Let's re-solve for the general equilibrium. Two equations:

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Equilibrium in the second market:

$$D_2(p_1, p_2) = 15 - 4p_2 + 10p_1 = 8p_2 = S_2'(p_2)$$

Competitive equilibrium in two interrelated markets

Solving for p_1 and p_2 and then for q_1 and q_2,

$$
\begin{aligned}
p_1 &= 2.7 \\
p_2 &= 3.5 \\
q_1 &= 13.5 \\
q_2 &= 28
\end{aligned}
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$$\begin{aligned} p_1 &= 2.7 \\ p_2 &= 3.5 \\ q_1 &= 13.5 \\ q_2 &= 28 \end{aligned}$$

The only thing that changed was the supply of good 2. But the equilibrium price and quantity both decreased in market 1!

Trade between two people

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When people are free to make mutually beneficial trades, the equilibrium is Pareto-efficient.

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Starting point: *endowment*

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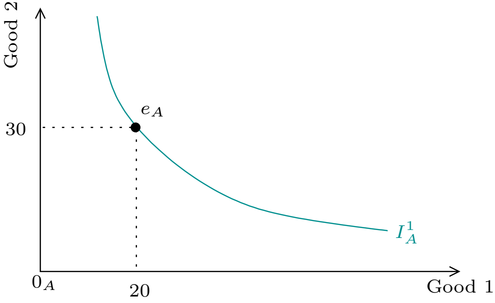
So B owns 60 ($= 80 - 20$) units of the first good and 20 ($= 50 - 30$) units of the second good.

Trade between two people



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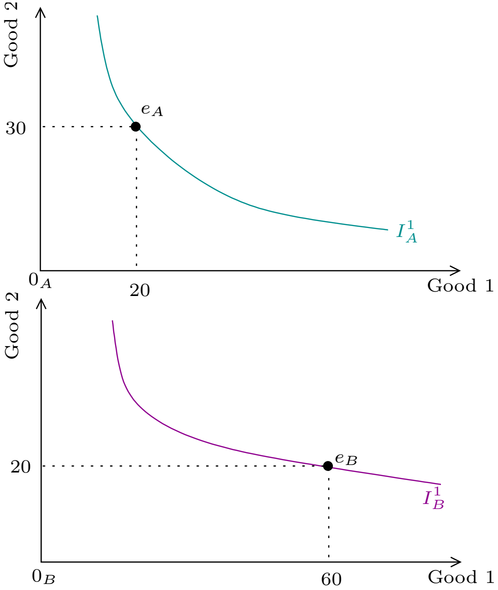

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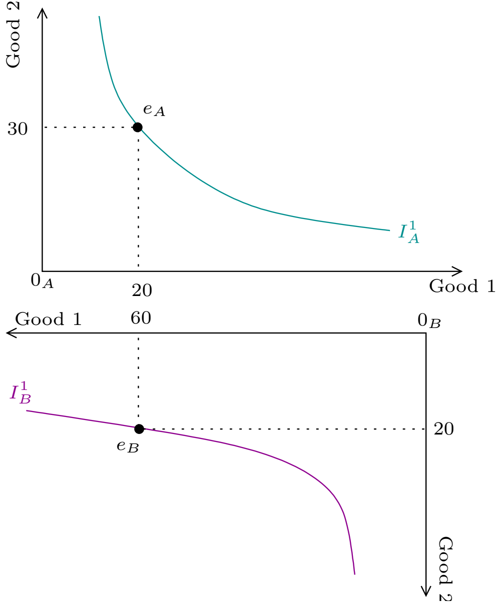

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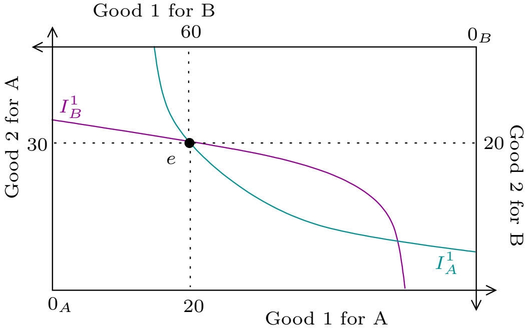


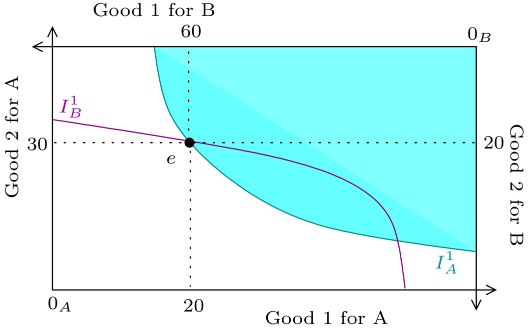
Every possible allocation is associated with a unique point in this box!

Mutually beneficial trades

The usual assumptions on preferences:

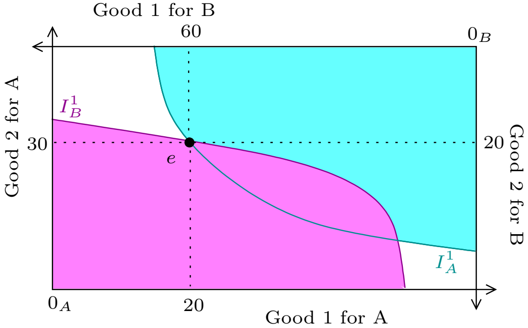
1. Utility maximization
2. Convex indifference curves
3. More is better
4. No interdependence: I only care about my own bundle.

The Edgeworth Box



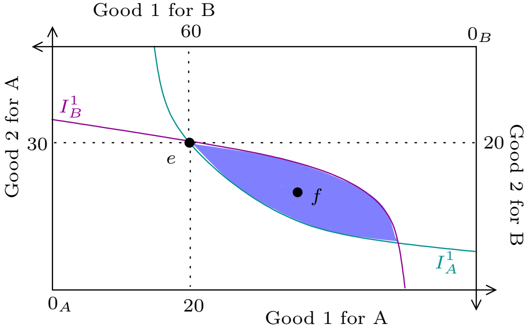
These are the allocations that A prefers to e.

The Edgeworth Box



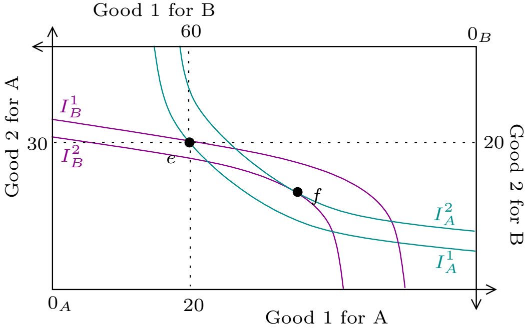
These are the allocations that B prefers to e.

The Edgeworth Box



Both A and B prefer f to e.

The Edgeworth Box



Are there allocations that both A and B prefer to f?

Pareto-efficient allocations

Equivalent statements about allocation f:

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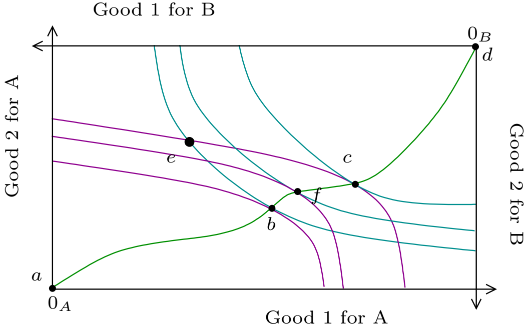
Are there are other such allocations?

Many of them. The line through all of them is the *contract curve.*

The contract curve



Competitive exchange in the Edgeworth box

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If price of good 1 is $p_1 = \$2$ and the price of good 2 is $p_2 = \$1$, then the relative price of good 1 in terms of good 2 is $\$\frac{1}{2}$.

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At these prices, A and B will pick the allocation f.

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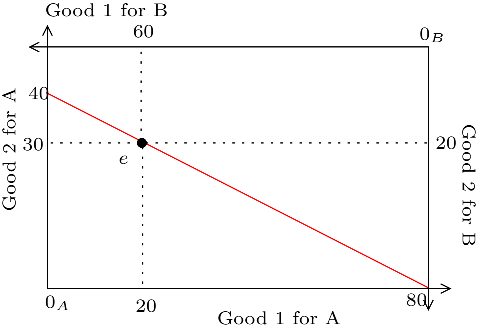

These prices give A the red budget line.

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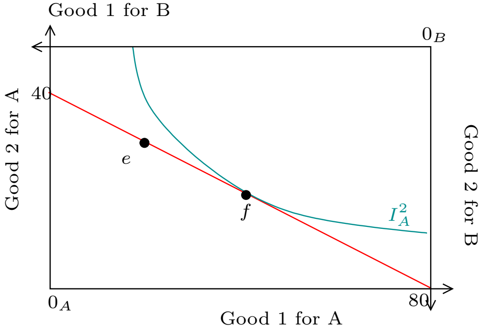

A maximizes his preferences in this budget set.

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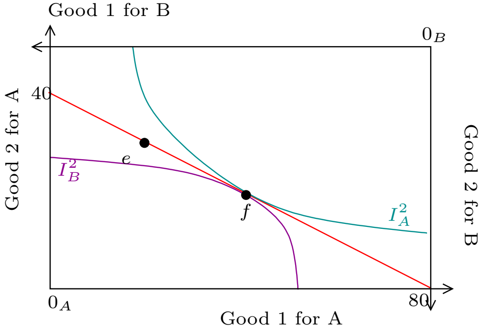
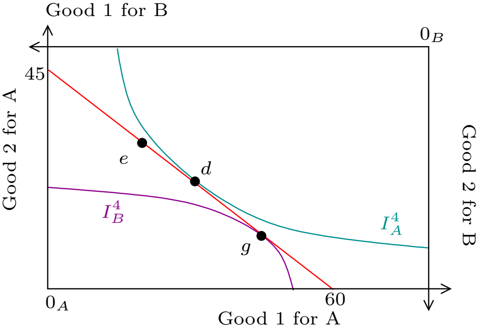


B maximizes his preferences in his corresponding budget set.

Not all prices work though



A picks allocation d but B picks allocation g.

Efficiency of competitive equilibrium

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First fundamental theorem of welfare economics: *Every competitive equilibrium allocation is Pareto-efficient.*

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Second fundamental theorem of welfare economics: *Any Pareto-efficient allocation can be obtained in equilibrium given the right endowment.*

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When we move from one Pareto-efficient allocation to another, some people are better off while others are worse off.

Picking an efficient allocation

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Increasing W is a “sharper” objective than just looking for a Pareto-improvement.

A policy that maximizes W does more than just find a Pareto-efficient allocation.

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Higher iso-welfare lines correspond to higher social welfare.

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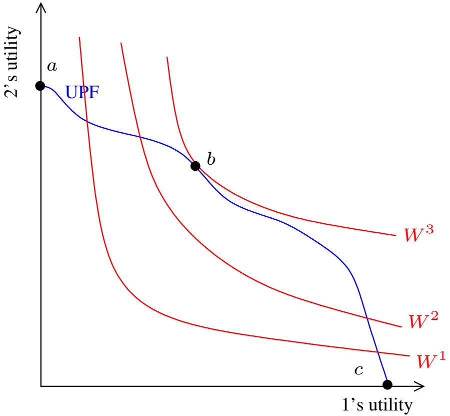
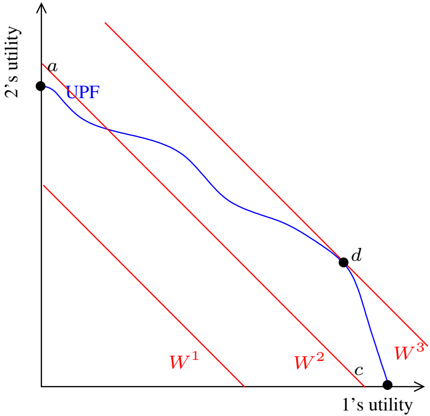


If the W has these iso-welfare lines, we pick b.

Equity



The iso-welfare line has slope -1: we weight each individual's utility equally.

Social welfare

Where does the social welfare function come from?

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Unfortunately not.

Voting

	Individual 1	Individual 2	Individual3
First choice	a	b	c
Second choice	b	c	a
Third choice	c	a	b

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When they vote: a beats b, b beats c, and c beats a!

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Criteria for social decision making:

1. Social preference is complete and transitive.

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The Theorem says that there is no such way of social decision making!

Social welfare functions

1. Utilitarianism: just add up everyone's utility.

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   Notice that this may not lead us to anything resembling a fair allocation.

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2. Rawlsianism: society is only as well off as its worst member.

$$W = \min\{u_1, u_2, \ldots, u_n\}$$