# Intermediate Microeconomics

Part I: Welfare Economics

**Sessions 2-3: Exchange**

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# INTRODUCTION

In **session 1**, we have defined the informational basis of welfare economics: *utility*.

Now, *according to what* a situation is better than another one?

- We can already say that if we are to evaluate the well-being of an individual, we can compare her level of utility in different states, and say that a higher level of utility is better for her than a lower level of utility
- Fine, but it seems even more compelling to evaluate the well-being of a *group* of individuals (*social* well being) than the well-being of *one* individual (*individual* well-being)
- Methodology of welfare economics: *methodological individualism*. It is by collecting *individuals' preferences* that we are able to compare different *social states*

# INTRODUCTION

In **sessions 2 and 3**, we will be concerned about:

- Defining what is called a **normative criterion**: a rule that tells us which outcome is better than another one, or more precisely, a rule that tells us *according to what* an outcome is better than another one
- Studying the implications of such a normative criterion for public policy
  - Our particular case of study will be the market
  - We will try to provide an answer to the question: ”is the market efficient?”

# Introduction

**How is social well-being evaluated in welfare economics?**

Assume that society is only composed by two individuals: $A$ and $B$.
**First intuition:** A situation seems obviously better than another one if $A$ and $B$ have respectively higher utility levels.

Let us denote the social state by $(u_A, u_B)$,
where $u_A$: utility of $A$ and $u_B$: utility of $B$.

If we pass from $(2, 2)$ to $(4, 4)$, it seems that we can reasonably state that social well-being has increased, and therefore that $(4, 4)$ is **better than** $(2, 2)$

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But what if we pass from $(2, 2)$ to $(1, 4)$ ? Can we say that social well-being has increased? Not obvious... what would you say?

1. Social well-being **has increased** because we have more amount of utility $(2 + 2 = 4 < 1 + 4 = 5)$
2. Social well-being **has not increased** because one of the two individuals is worse off ($B$ increases his utility of 2 but $A$ decreases her utility of 1)

# INTRODUCTION

How about if we pass from $(2, 2)$ to $(1, 3)$? Would you rather say that:

1. Social well-being is **equal** in the two social states because we have the same amount of utility ($2 + 2 = 4$ and $1 + 3 = 4$)
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(Note: according to another criterion, we could have also answered:)

3. Social well-being is **worse off** because it is better for individuals to have an equal amount of utility.

- (For now, we leave this criterion apart and come back to it in **session 4**)

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There are no good/bad answers (it really depends on your own vision of ethics), but 1. takes a stronger ethical commitment than 2.

# INTRODUCTION

**Comparing 1. and 2.**

If you answer 1., it seems that you assume at least three things:

- That preferences are *cardinal*, which means that the number assigned to a level of utility represent's one intensity of pleasure/happiness
- That *interpersonal comparisons of utility* are possible, meaning that:
  - If $u_A = 4$ and $u_B = 8$, it means that $B$ has exactly twice as much utility as B
  - If $u_A = 4$ and $u_B = 4$, it means that $A$ and $B$ have exactly the same intensity of utility
  - and so on...
- That an increase of the amount of utility of one individual is enough to compensate the decrease of the same amount of utility of the other individual, and therefore that:
  - $(2,2) \sim (1,3) \sim (0,4) \sim (4,0) \sim (0.1,3.9) \sim (0.2,3.8)$; and so on...

# INTRODUCTION

**Comparing 1. and 2.**

If you say 2., it seems that you assume pretty much nothing except that:

- *Both* individuals need to increase their utility in order to say that social well-being has increased
- Utility is an *ordinal* concept, meaning that we cannot make any assumption about one's *intensity* of utility

If you answer 2., perhaps it means that you want to avoid ethical judgements as best as you can.

That is, if two social states have to be evaluated, you prefer to consider a normative criterion that **weakly discriminates** between two alternatives.

# INTRODUCTION

To put it differently, answering 2. means that **you prefer to say the less about what constitutes social-well being**, so that:

- You can be more confident that most of your economist-colleagues would agree with your normative criterion
- Otherwise, maybe they would argue that:
  - The intensity of one's utility is hard to measure
  - That even if we could measure it, it does not mean that $A$'s level of utility of (for example) 4 is exactly the same as $B$'s level of utility of 4
  - etc.

Such kind of normative criterion that weakly discriminates between two alternatives already exists! It's called the **Pareto criterion** (named after the eminent economist Pareto).

# INTRODUCTION

In **sessions 2-3**, we will present:

- *The Pareto criterion*: the main tool economists use to evaluate social well-being
- As an application of the Pareto criterion, a market economy composed by two individuals $A$ and $B$ who have the opportunity to exchange between two goods: $x_1$ and $x_2$
  - In particular, we will see how social well-being can be increased by trade
- This will take us to two results in welfare economics, known as
  - The first theorem of welfare economics
  - The second theorem of welfare economics

# PARETO CRITERION

In order to introduce the Pareto criterion, let us take an example.

Assume $A$ and $B$ have preferences towards two goods: $x_1$ and $x_2$.

As seen in **session 1**, if their preferences towards these goods satisfy some axioms, they can be represented by a *utility* function.

Assume their utility functions are identical, that is:
$u_A(x_1, x_2) = x_1 x_2$
$u_B(x_1, x_2) = x_1 x_2$

Let's say that $A$ is initially endowed with $x_1 = 9$ and $x_2 = 3$,
and that $B$ is initially endowed with $x_1 = 1$ and $x_2 = 7$.

We have therefore: $u_A = 27$ and $u_B = 7$.

# Pareto criterion

**Our question:** if $A$ and $B$ can exchange their goods by trading, can they both be better off?

How could such a trade be organised?

- By an authority (e.g. the World Trade Organization) who can fix the exchange rate of each good
  - For example, $x_1 = 2x_2$, or equivalently, $\frac{1}{2}x_1 = x_2$
- By a direct bargaining (individuals negotiate)
- By the decentralised market (Walras' auctioneer in *general equilibrium*)

What if $A$ trades one unit of $x_2$ in exchange of one unit of $x_1$?
She obtains $x_1 = 8$ and $x_2 = 4$
Her utility is then $u_A = 8 \times 4 = 32$

In return, $B$ earns one unit of $x_1$ but loses one unit of $x_2$
He obtains $x_1 = 2$ and $x_2 = 6$
His utility is then $u_B = 2 \times 6 = 12$

# PARETO CRITERION

We observe that both individuals ($A$ and $B$) have gained from trading:

- **Before trade:** $u_A = 27$ and $u_B = 7$
- **After trade:** $u_A = 32$ and $u_B = 12$

But can we do better?

It appears that if $A$ and $B$ repeat the exchange of one $x_1$ with one $x_2$, we have the following allocations:

- Allocation of $A$: $x_1 = 7$ and $x_2 = 5$
- Allocation of $B$: $x_1 = 3$ and $x_2 = 5$

And eventually: $u_A = 35$ and $u_B = 15$

The principle of the Pareto criterion is thus the following:

**Social well-being increases until individuals cannot simultaneously increase their utility**

# Pareto criterion

**A Pareto efficient allocation can then be described as an allocation where:**

1. **There is no way to make all individuals better off; or**
2. **There is no way to make some individual better off without making another individual worse off; or**
3. **All of the gains from trade have been exhausted; or**
4. **There are no mutually advantageous trades to be made**

Taking back our example, if we have to compare the allocations:

$$(27,7); (32,12); (35,15)$$

We will say that $(27,7) \prec (32,12) \prec (35,15)$ *according to the Pareto criterion*.

That is, passing from $(27,7)$ to $(32,12)$ is a **Pareto-improvement**, and passing from $(32,12)$ to $(35,15)$ is also a **Pareto-improvement**.

This implies that $(27,7)$ and $(32,12)$ cannot be **Pareto optima** because we can do better: $(35,15)$.

# PARETO CRITERION

Is $(35, 15)$ however a **Pareto-optimum**?

To prove it, we have to show that it is not possible to increase the utility of one individual without decreasing the utility of the other one.

So let us analyse the possible resources allocations between $A$ and $B$ if they continue trading. We have:

| | **Allocations** $(x_1^A, x_2^A); (x_1^B, x_2^B)$ | **Utility** $(u_A, u_B)$ |
|---|---|---|
| **Initial state** | $(9, 3)$ ; $(1, 7)$ | $(27, 7)$ |
| **Social state 1** | $(8, 4)$ ; $(2, 6)$ | $(32, 12)$ |
| **Social state 2** | $(7, 5)$ ; $(3 ; 5)$ | $(35, 15)$ |
| **Social state 3** | $(6, 6)$ ; $(4, 4)$ | $(36, 16)$ |
| **Social state 4** | $(5, 7)$ ; $(5, 3)$ | $(35, 15)$ |
| **Social state 5** | $(4, 8)$ ; $(6, 2)$ | $(32, 12)$ |
| **Social state 6** | $(3, 9)$ ; $(7, 1)$ | $(27, 7)$ |

# Pareto criterion

| | **Allocations** $(x_1^A, x_2^A); (x_1^B, x_2^B)$ | **Utility** $(u_A, u_B)$ |
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| **Social state 1** | (8, 4) ; (2, 6) | (32, 12) |
| **Social state 2** | (7, 5) ; (3 ; 5) | (35, 15) |
| **Social state 3** | (6, 6) ; (4, 4) | (36, 16) |
| **Social state 4** | (5, 7) ; (5, 3) | (35, 15) |
| **Social state 5** | (4, 8) ; (6, 2) | (32, 12) |
| **Social state 6** | (3, 9) ; (7, 1) | (27, 7) |

Here, social state 3 (36, 16) is better than any other social state, so:

**(36, 16) is Pareto optimum**

Note: careful though! A Pareto optimum is not necessarily *unique*.

# Pareto criterion

**Explanation:** we have said that there can be Pareto-improvements until we reach a Pareto optimum: a situation where we cannot increase the well-being of *both* individuals.

In our example, (36, 16) is the only social state where *both* individuals benefit from trade, and there are no situations where the increase of one's utility decreases another one's utility.

To understand why *Pareto optima* (plural) are possible, let's practice a bit.

Assume the following other social states:

$$(100, 0); (50, 50); (30, 30); (10, 55); (0, 80); (0, 100)$$

**Which ones are Pareto optima?**

# Pareto criterion

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Assume the following other social states:

$$(100, 0); (50, 50); (30, 30); (10, 55); (0, 80); (0, 100)$$

**Which ones are Pareto optima?** Answer:

$$(100, 0); (50, 50); (10, 55); (0, 100)$$

# Pareto criterion

**Explanation:**

If we compare $(100, 0)$; $(50, 50)$; $(10, 55)$; $(0, 100)$, we decrease one's utility and increase the other one's utility.

**By definition, a Pareto optimum is a situation where it is impossible to make an individual better off without making another one worse off.**

Therefore, $(100, 0)$; $(50, 50)$; $(10, 55)$; $(0, 100)$ are all *Pareto optima*.

However, $(30, 30)$ cannot be a *Pareto optimum* because there is one situation that makes both individuals better off: $(50, 50)$.

Also, $(0, 80)$ cannot be a *Pareto optimum* because it is possible to increase $B$'s utility while leaving $A$'s utility unchanged: $(0, 100)$.

# EXCHANGE: IS THE MARKET EFFICIENT?

**Application of the Pareto criterion: *Edgeworth box***

**Our first policy evaluation: the market**

- We ofter hear some talks in politics about liberalism, free-trade, competition, etc.
- One question we may ask ourselves as economists: is the market *efficient*? That is, does it allocate the available goods in the economy so that everyone can be better off?
- The market: a mechanism of resources allocation

Taking individuals' preferences as given, we will see if $A$ and $B$ can both increase their utility by exchanging goods.

# EDGEWORTH BOX

Two individuals: $A$ and $B$. Two goods: $x_1$ and $x_2$.

$A$'s endowment of $x_1$ and $x_2$ is: $\omega^A = (\omega_1^A, \omega_2^A)$
$B$'s endowment of $x_1$ and $x_2$ is: $\omega^B = (\omega_1^B, \omega_2^B)$

(In our example): $\omega^A = (9, 3)$, $\omega^B = (1, 7)$

The total quantities available of each good are:
$\omega_1 = \omega_1^A + \omega_1^B$
$\omega_2 = \omega_2^A + \omega_2^B$

A pair of consumption bundle is called an *allocation*.
Allocation of $A$: $X^A = (x_1^A, x_2^A)$
Allocation of $B$: $X^B = (x_1^B, x_2^B)$

# EDGEWORTH BOX

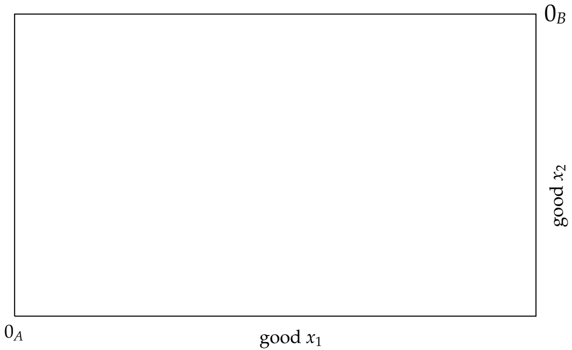
An allocation is feasible if the total amount of each good consumed is equal to the total amount available. That is:

$$x_1^A + x_1^B = \omega_1^A + \omega_1^B$$
$$x_2^A + x_2^B = \omega_2^A + \omega_2^B$$

Edgeworth (among others) proposed a diagram, called an "Edgeworth box", which is useful for analysing the exchange of two goods between two individuals. In particular, it will be useful to us for:

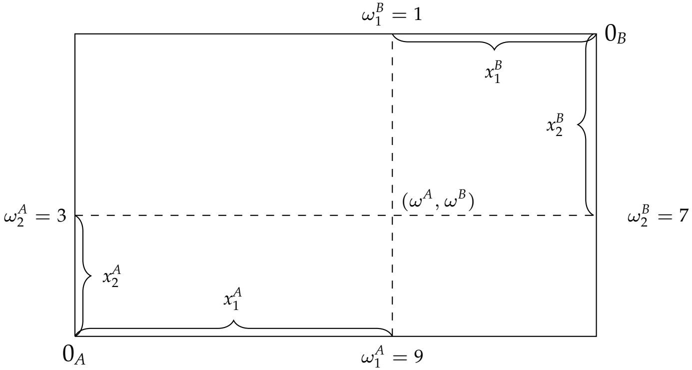
- Studying various outcomes of the trading process
- Showing the set of Pareto optima
- Showing how we get to the two theorems of welfare economics

# Drawing an Edgeworth Box




All points in the box, including the boundary, represent feasible allocations of the combined endowments.

# Drawing an Edgeworth Box

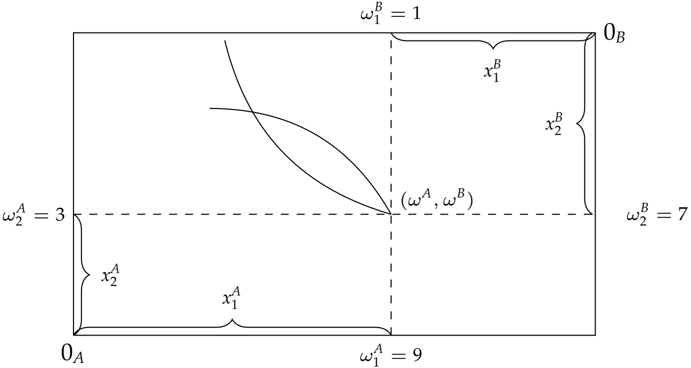



In our example, we have:

$\omega_1 = \omega_1^A + \omega_1^B = 9 + 1 = 10$ (width of the box)
$\omega_2 = \omega_2^A + \omega_2^B = 3 + 7 = 10$ (height of the box)

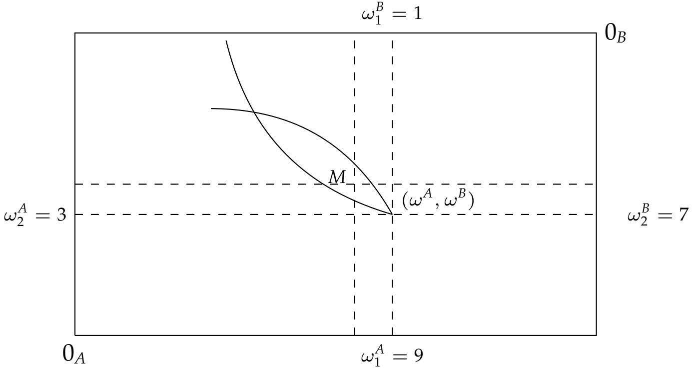
with $(\omega^A, \omega^B)$: the endowment allocation

# DRAWING AN EDGEWORTH BOX




We can now draw the indifference curves of *A* and *B* (where *B*'s indifference curve is turned upside down)

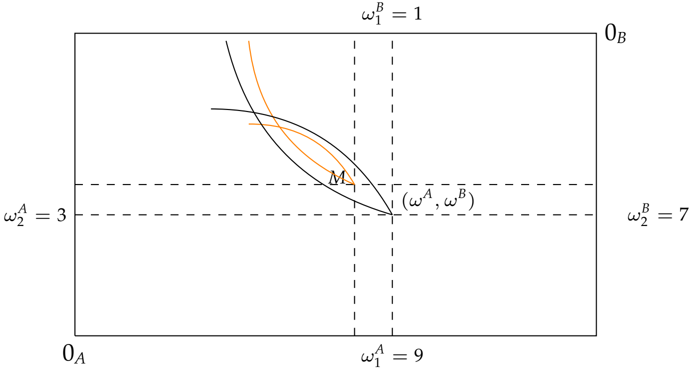
# Edgeworth Box: trade




The movement from $(\omega^A, \omega^B)$ to M involves $A$ giving up $|x_1^A - \omega_1^A|$ units of good 1 and acquiring in exchange $|x_2^A - \omega_2^A|$ units of good 2.

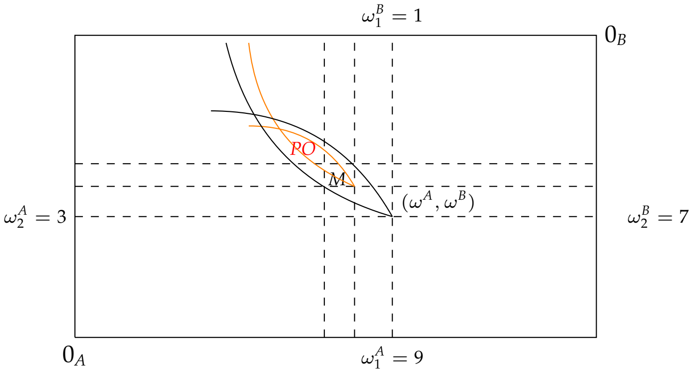
This means that $B$ acquires $|x_1^B - \omega_1^B|$ units of good 1 and gives up $|x_2^B - \omega_2^B|$ units of good 2.

# EDGEWORTH BOX: PARETO-IMPROVEMENT



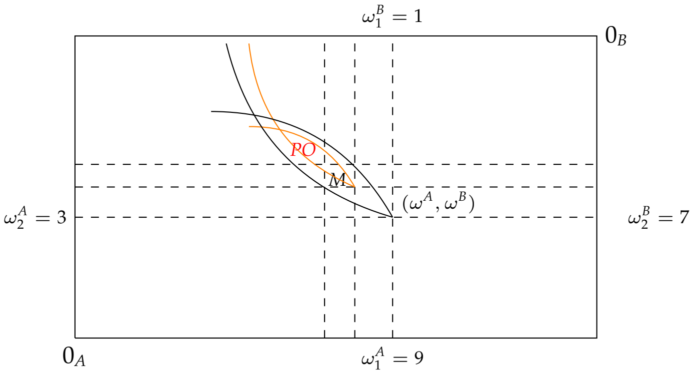

Is M a Pareto-improvement? Yes, simply because M is above both individuals' indifference curves, which represents a higher level of utility (seen in **session 1**).

# EDGEWORTH BOX: PARETO OPTIMUM



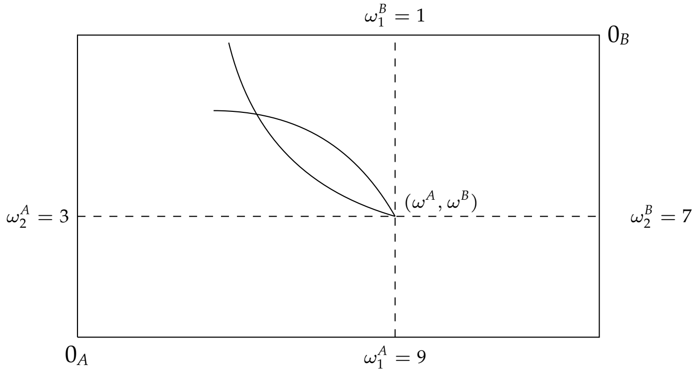

What if we repeat this process? As seen previously, the trade will continue until there are no more trades that make both individuals better off (36, 16): we will reach the **Pareto-Optimum** (*PO*).

# Edgeworth Box: Pareto optimum



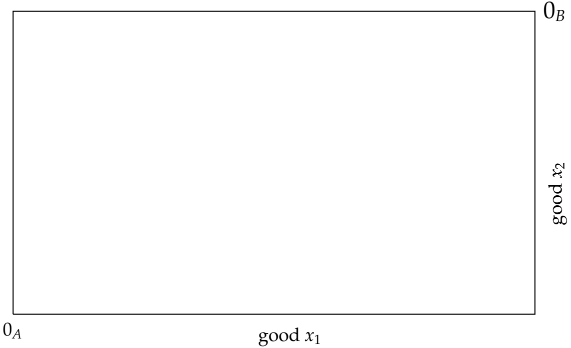

Graphically, we will reach to a point where $IC_A$ is *tangent* to $IC_B$: this point represents the **Pareto-Optimum** (*PO*) because it is no longer possible to increase both *A*'s and *B*'s well-being, and since the only way one individual's well-being can be increased is to decrease the other's.

# EDGEWORTH BOX: PARETO OPTIMUM



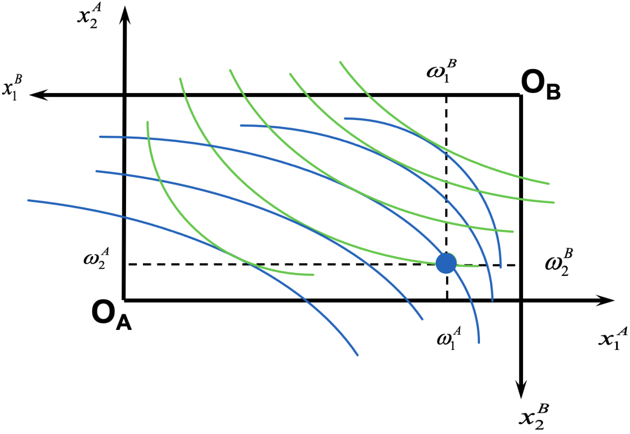

So where is the set of Pareto-improvements? Inside the lens, which represents all the points for which both $A$ and $B$ can have higher utility.
So if individuals start with initial endowments, they will reach PO by trade.

# Edgeworth Box: contract curve




But what if individuals *do not* start with initial endowments?
They will negotiate, and come up to an equilibrium somewhere on the graph.
Where? We do not know. This depends on $A$'s and $B$'s power of negotiation.
We can represent the sets of all Pareto optima by the *contract curve*.

# EDGEWORTH BOX: CONTRACT CURVE



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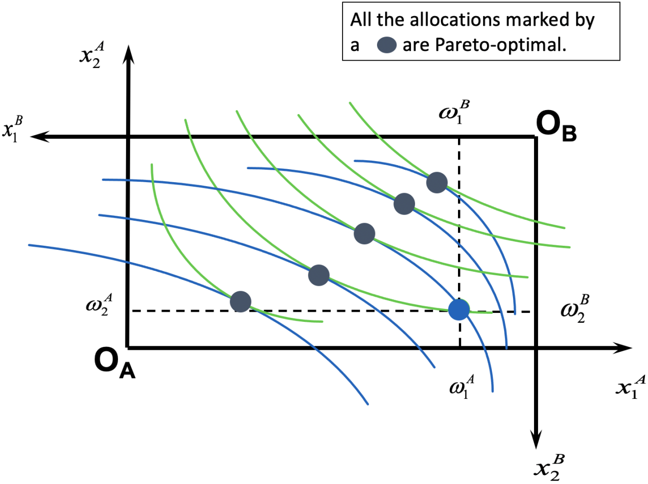

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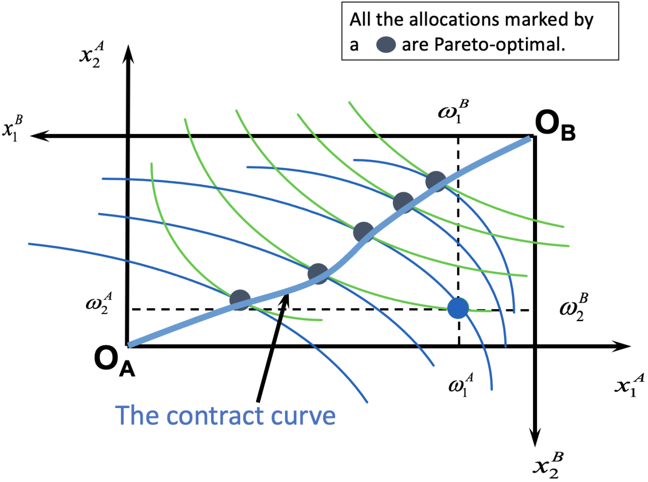

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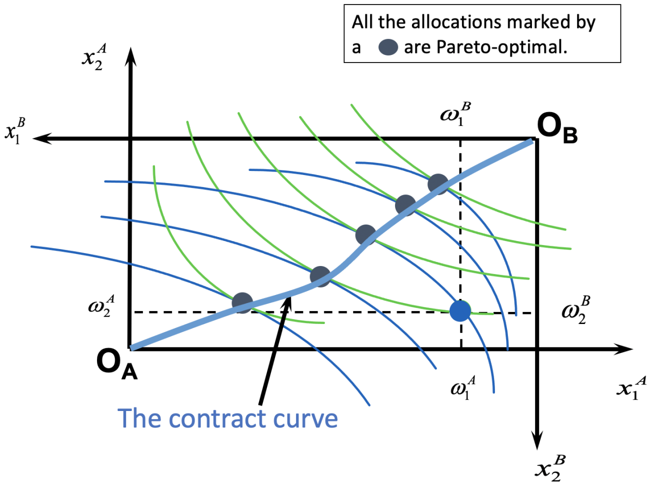
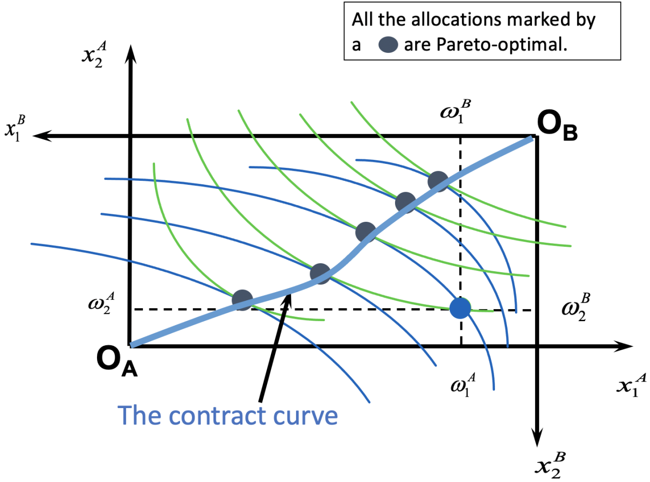


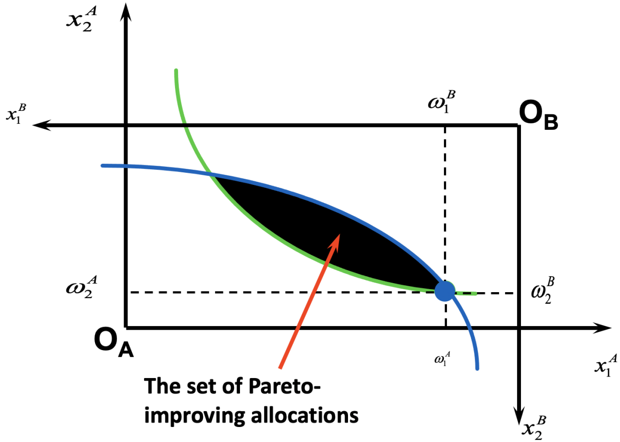

Is $0_A$ a Pareto optimum?

# EDGEWORTH BOX: CONTRACT CURVE



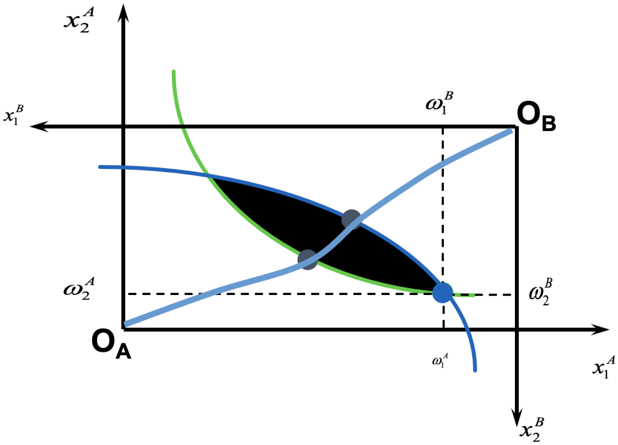

Is $0_A$ a Pareto optimum? Answer: Yes.
The only way A can make herself better off is that B makes himself worse off.

# EDGEWORTH BOX: THE CORE

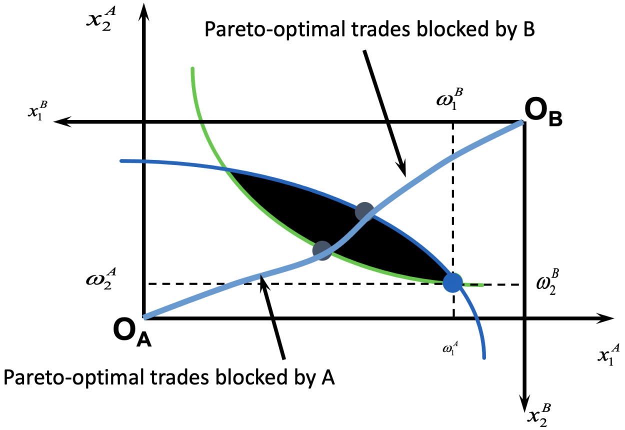



What is inside the lens: the set of mutually beneficial trades, called **the core**.
But Pareto optima do not depend on the initial endowment!

# EDGEWORTH BOX: THE CORE



# EDGEWORTH BOX: THE CORE



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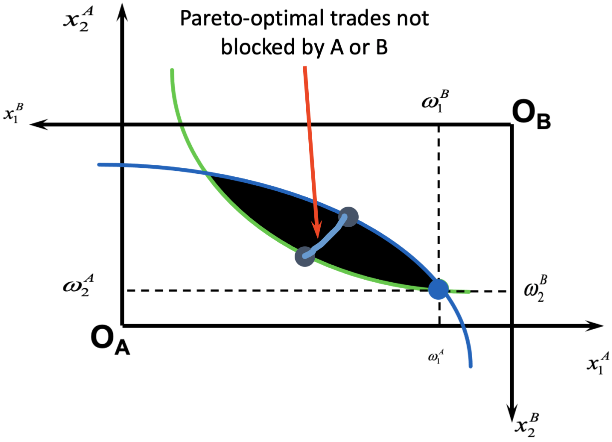
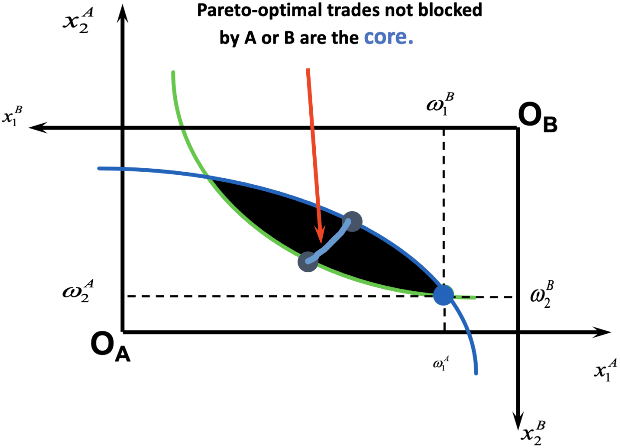


# EDGEWORTH BOX: THE CORE




**Definition of the core:** the set of allocations that are Pareto-improving for both individuals *relative to their own endowments*.

# From competitive markets to PO

Now that we have studied how a PO can be achieved between two individuals, can such a situation be generalised at the level of the *market*?

Recall our initial question: *is the market efficient?*

- General equilibrium refers to the study of how the economy can adjust to *demand* = *supply* in all markets at the same time
- That is, general equilibrium is about how demand and supply conditions interact in several markets to determine prices of many goods (in our model, there are only two goods: $x_1$ and $x_2$)

**What changes in our model?**

- We have to introduce Walras' auctioneer (or God?), so that PO is not achieved by individuals' negotiation but by the mechanism of the market (the force of supply and demand)

Just like there should be an equilibrium in the Force (like in Star Wars), we will see how the competitive market should tend to a PO.

# FROM COMPETITIVE MARKETS TO PO

**Technically, what does it mean?**

That such an auctioneer will consider both $A$'s and $B$'s demands for $x_1$ and $x_2$, then *adjust* the prices of $x_1$ and $x_2$, so that $A$'s and $B$'s situation tends to PO.

If we show that the market always tends to a PO, we have a first theoretical result (named **the first theorem of welfare economics**), **and so we could answer that the market is efficient**.

So how do we show this?

# FROM COMPETITIVE MARKETS TO PO

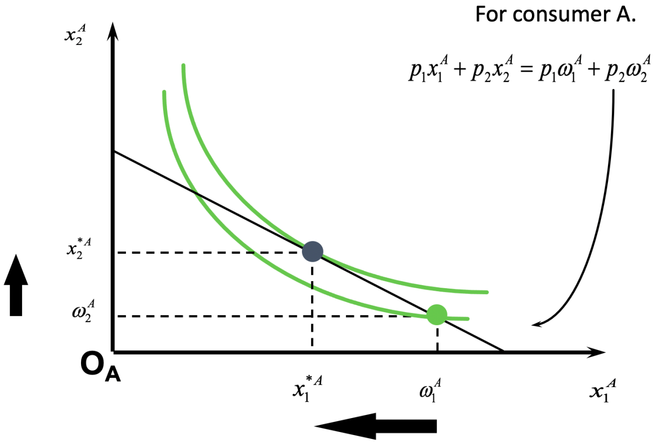
Assume trade is made in perfectly competitive markets: this means that $A$ and $B$ are *price-takers*.

They cannot influence the market, and therefore have no power of negotiation.

As we already know, each individual aims at maximising her/his own utility.

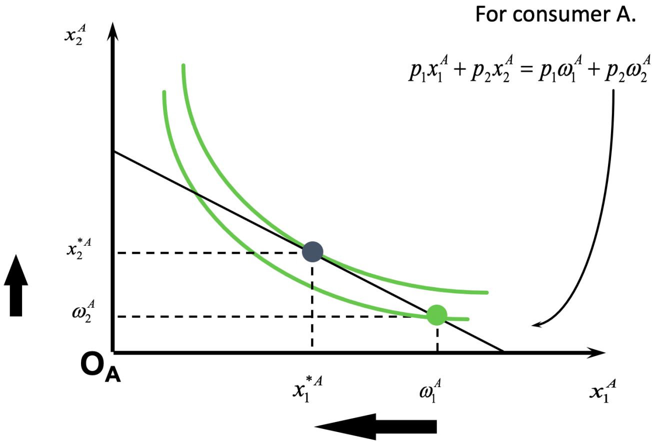
If $p_1$ (price of the good $x_1$) and $p_2$ (price of the good $x_2$) are given by the market, individuals will aim at maximising their own utility given these prices. That is:

# FROM COMPETITIVE MARKETS TO PO



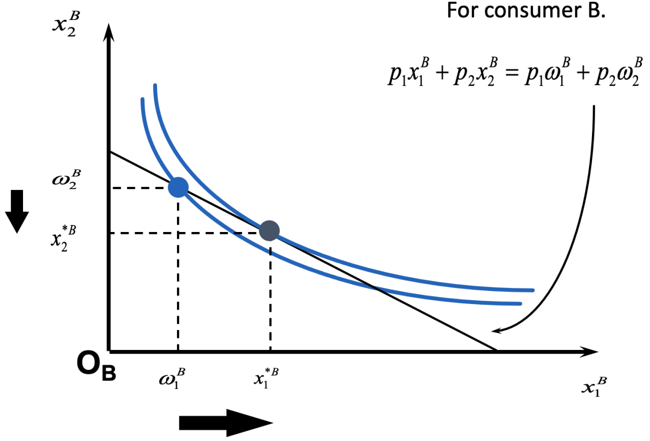

Given $p_1$ and $p_2$, $A$ aims at maximising her utility.
<u>Reminder:</u> utility is maximised when one's budget constraint is tangent to her indifference curve, which is equal to $-\frac{p_1}{p_2}$.

# FROM COMPETITIVE MARKETS TO PO



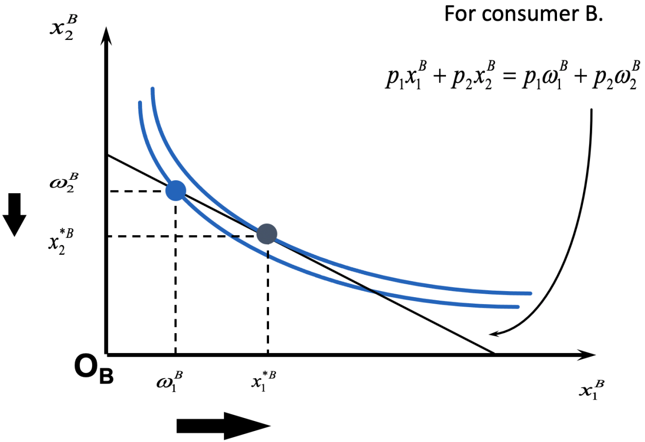

Given $p_1$ and $p_2$, $A$'s *net demand* (or excess demand) for $x_1$ and $x_2$ is:
$e_1^A = x_1^{*A} - \omega_1^A$ and $e_1^A = x_2^{*A} - \omega_2^A$.
We denote by $x_1^{*A}$ and $x_2^{*A}$ the *gross demands* of $A$ towards $x_1$ and $x_2$: the allocation she aims to purchase.

# FROM COMPETITIVE MARKETS TO PO




Given $p_1$ and $p_2$, $B$ aims at maximising his utility.
Reminder: utility is maximised when one's budget constraint is tangent to her indifference curve, which is equal to $-\frac{p_1}{p_2}$.

# From competitive markets to PO




Given $p_1$ and $p_2$, $B$'s *net demand* (or excess demand) for $x_1$ and $x_2$ is: $e_1^B = x_1^{*B} - \omega_1^B$ and $e_1^B = x_2^{*B} - \omega_2^B$.
We denote by $x_1^{*B}$ and $x_2^{*B}$ the *gross demands* of $B$ towards $x_1$ and $x_2$: the allocation he aims to purchase.

# FROM COMPETITIVE MARKETS TO PO

A general equilibrium occurs when prices $p_1$ and $p_2$ cause both the markets for $x_1$ and $x_2$ to *clear*, that is,

$$x_1^{*A} + x_1^{*B} = \omega_1^A + \omega_1^B$$
$$x_2^{*A} + x_2^{*B} = \omega_2^A + \omega_2^B$$

Note: "To clear" means that all the goods are consumed in the economy, and therefore that there are no leftovers. For example, if:

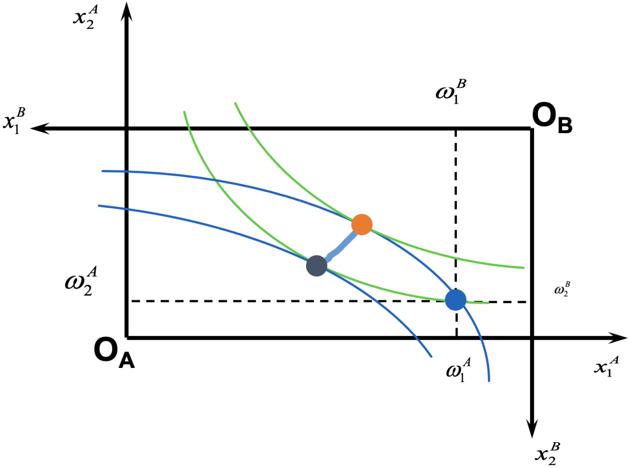
$$x_1^{*A} + x_1^{*B} < \omega_1^A + \omega_1^B$$

Then there is an amount of $x_1$ that is left over. Also, if:

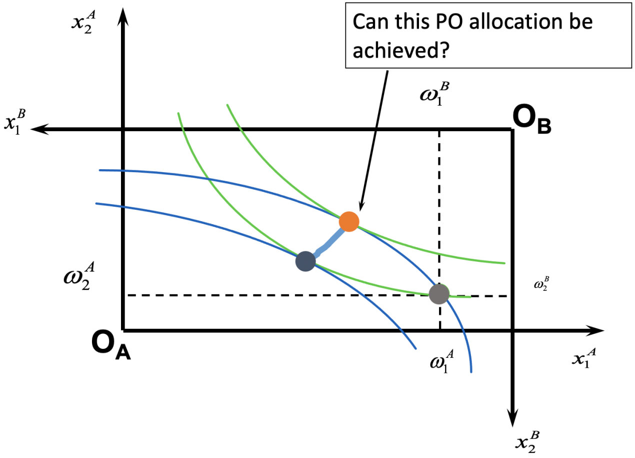
$$x_2^{*A} + x_2^{*B} > \omega_2^A + \omega_2^B$$

Then there is an amount of $x_2$ that is over-consumed, and therefore the market cannot allocate this amount of $x_2$.

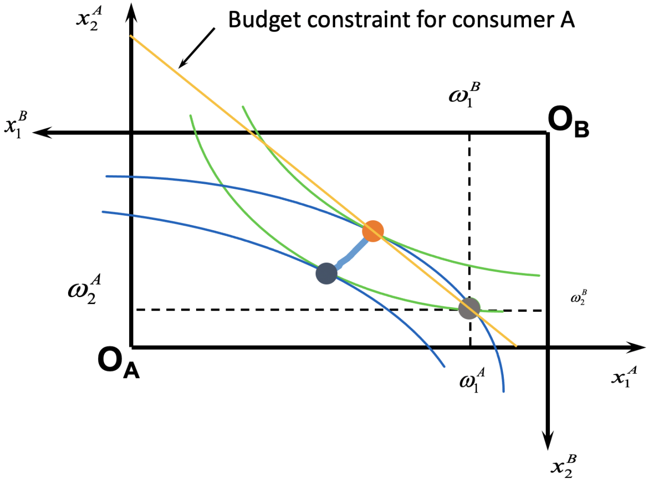
# FROM COMPETITIVE MARKETS TO PO



# FROM COMPETITIVE MARKETS TO PO



# FROM COMPETITIVE MARKETS TO PO



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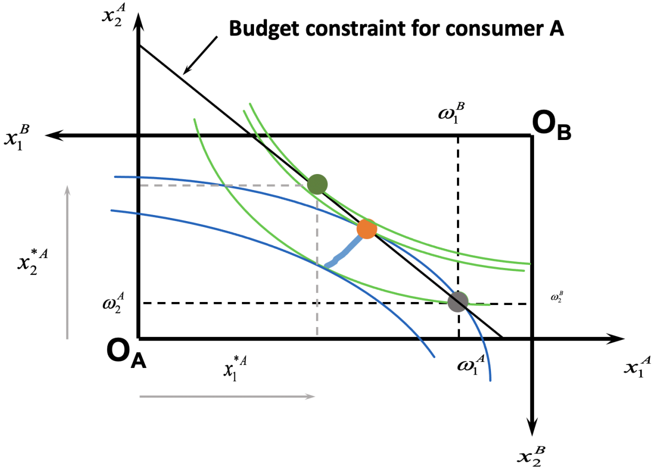

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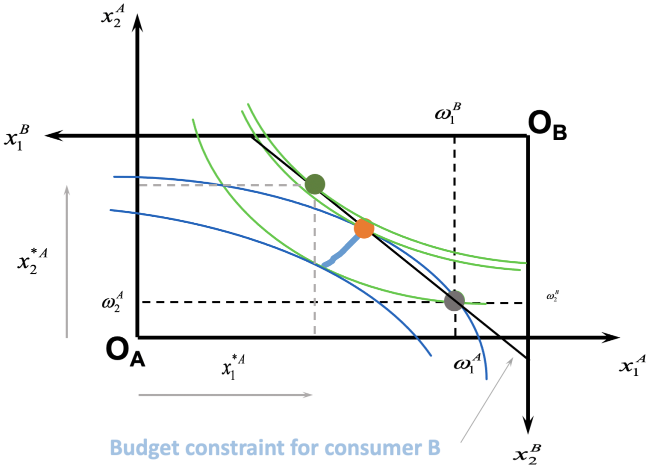

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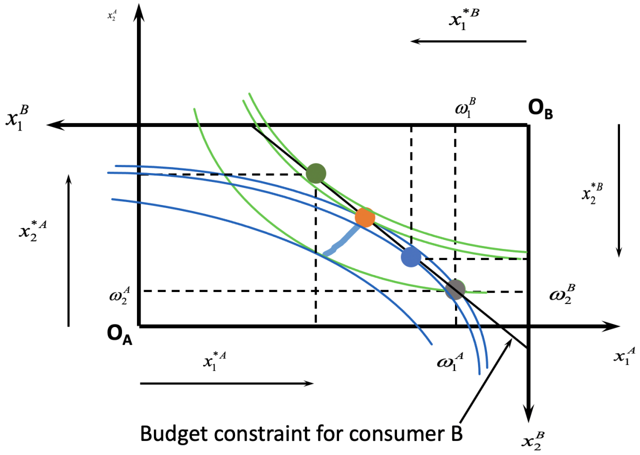
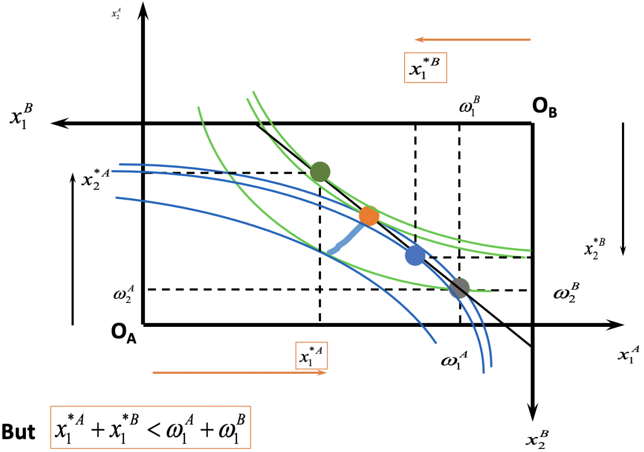


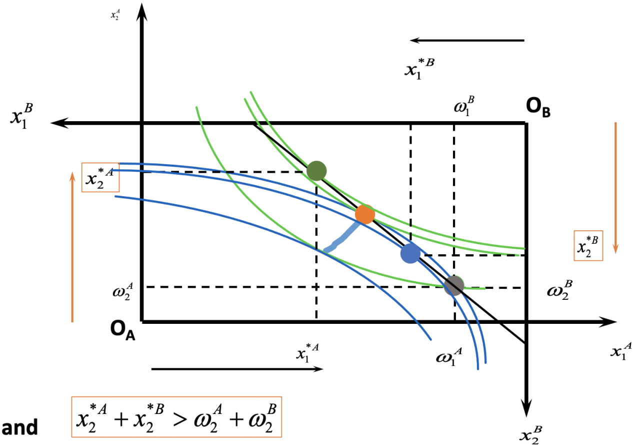
# FROM COMPETITIVE MARKETS TO PO




**But** $x_1^{*A} + x_1^{*B} < \omega_1^A + \omega_1^B$

At given prices $p_1$ and $p_2$: *excess supply* of $x_1$.

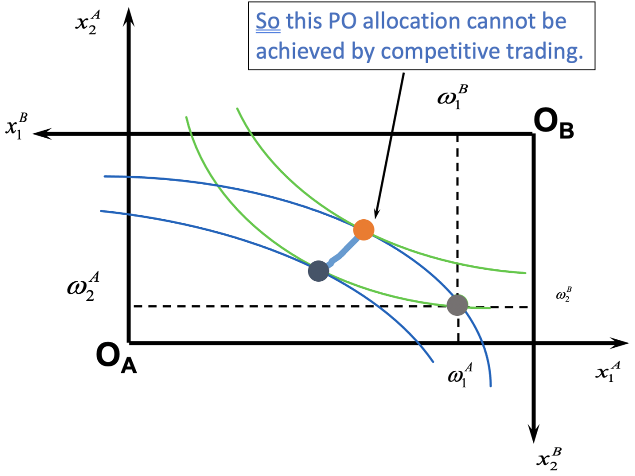
# FROM COMPETITIVE MARKETS TO PO




**and** $x_2^{*A} + x_2^{*B} > \omega_2^A + \omega_2^B$

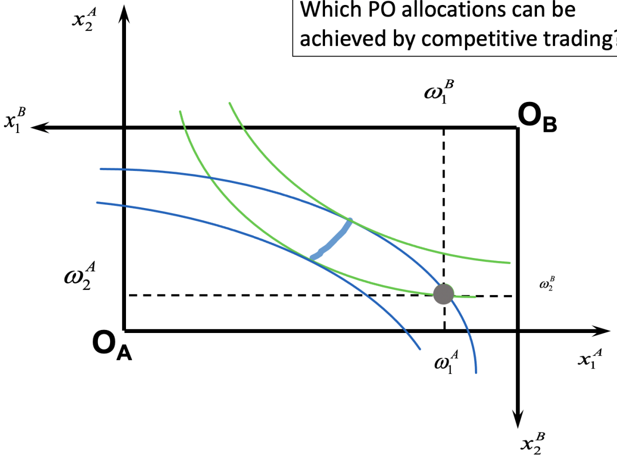
At given prices $p_1$ and $p_2$: *excess demand* of $x_2$.
Neither market clears, so $p_1$ and $p_2$ do not cause a general equilibrium.

# FROM COMPETITIVE MARKETS TO PO

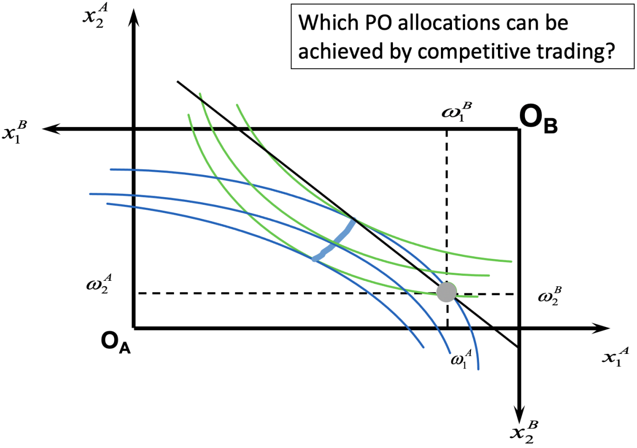


# FROM COMPETITIVE MARKETS TO PO

Which PO allocations can be achieved by competitive trading?

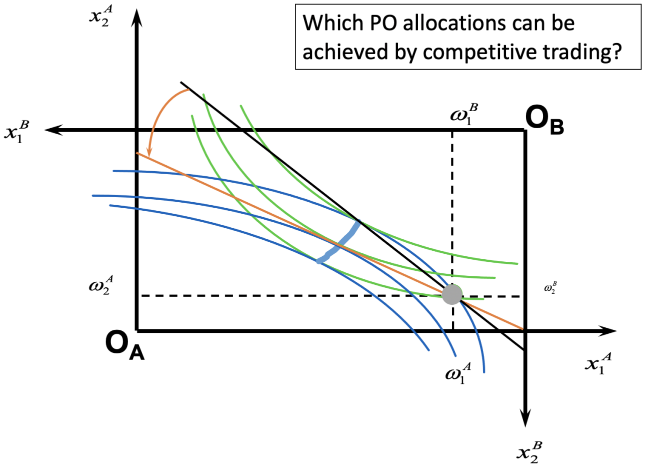


# FROM COMPETITIVE MARKETS TO PO



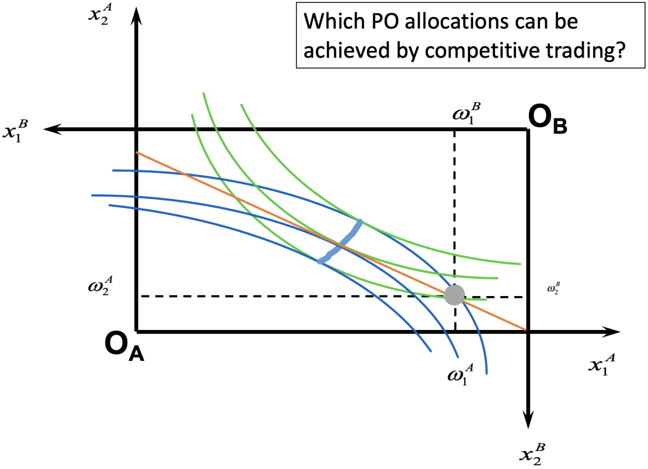

Since there is an *excess supply* of $x_1$, $p_1$ will fall.
Since there is an *excess demand* for $x_2$, $p_2$ will rise.

# FROM COMPETITIVE MARKETS TO PO




The slope of the budget constraint is $-\frac{p1}{p2}$, so if $\downarrow p_1$ and $\uparrow p_2$, the budget constraint will pivot about the endowment point and become less steep.

# FROM COMPETITIVE MARKETS TO PO

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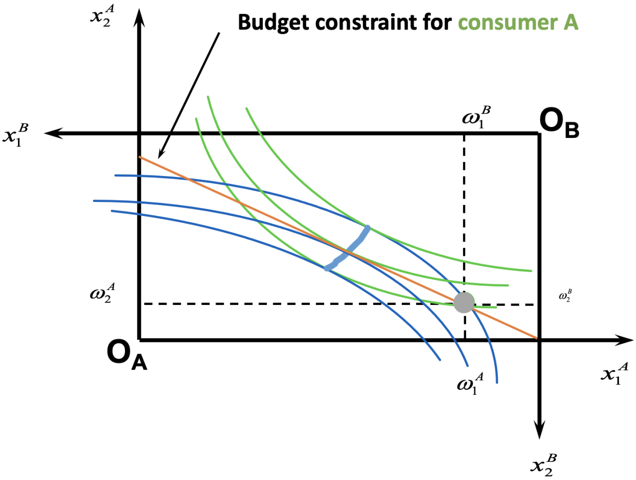
# FROM COMPETITIVE MARKETS TO PO

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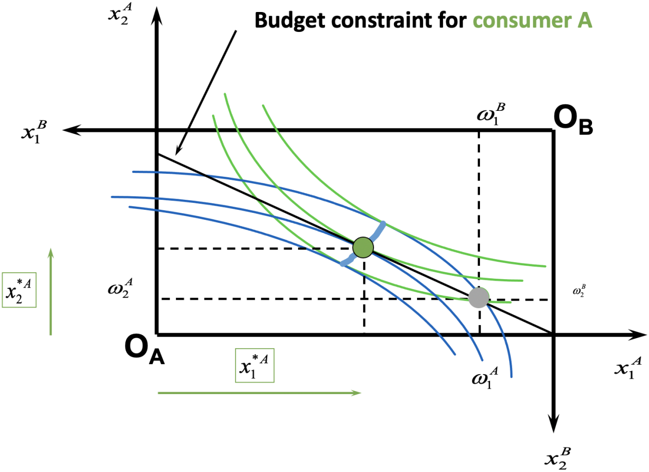
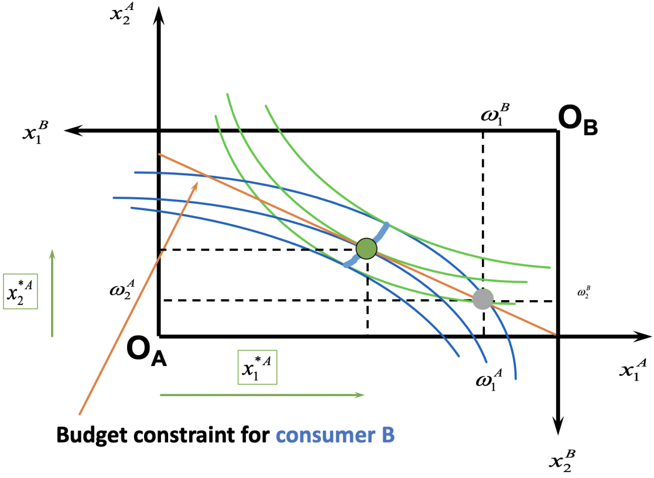
# From competitive markets to PO

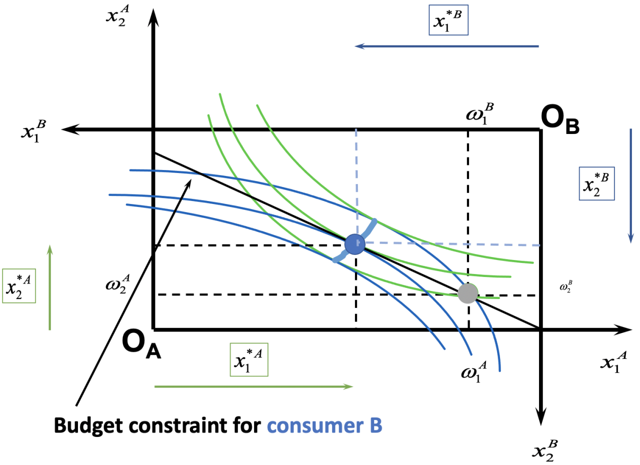



The budget constraint will pivot until markets clear, that is, until $x_1^{*A} + x_1^{*B} = \omega_1^A + \omega_1^B$ and $x_2^{*A} + x_2^{*B} = \omega_2^A + \omega_2^B$.

# FROM COMPETITIVE MARKETS TO PO



# FROM COMPETITIVE MARKETS TO PO



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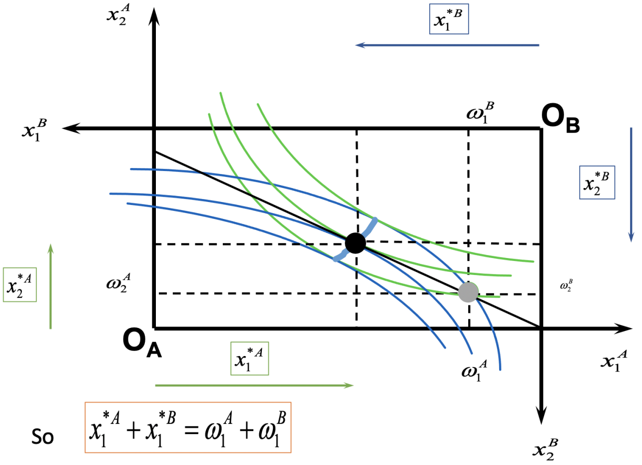
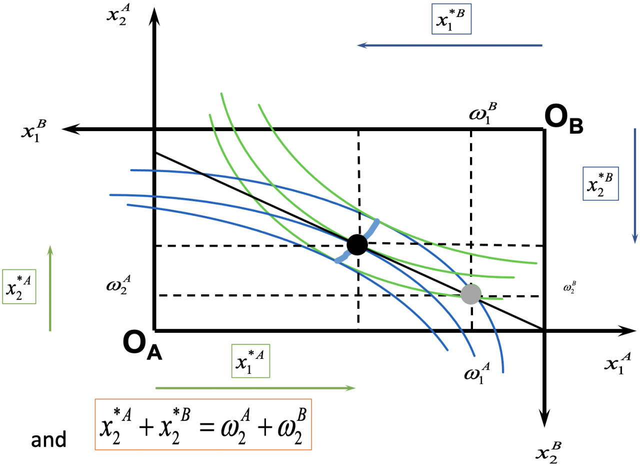



So $x_1^{*A} + x_1^{*B} = \omega_1^A + \omega_1^B$

# FROM COMPETITIVE MARKETS TO PO




and $x_2^{*A} + x_2^{*B} = \omega_2^A + \omega_2^B$

# FIRST THEOREM OF WELFARE ECONOMICS

At the new prices $p_1$ and $p_2$, both markets clear: there is a *general equilibrium* (or market equilibrium).

An equilibrium is defined by:

- A set of prices such that each individual is choosing his or her most-preferred affordable bundle; and
- All individuals' choices are compatible in the sense that demand equals supply in every market

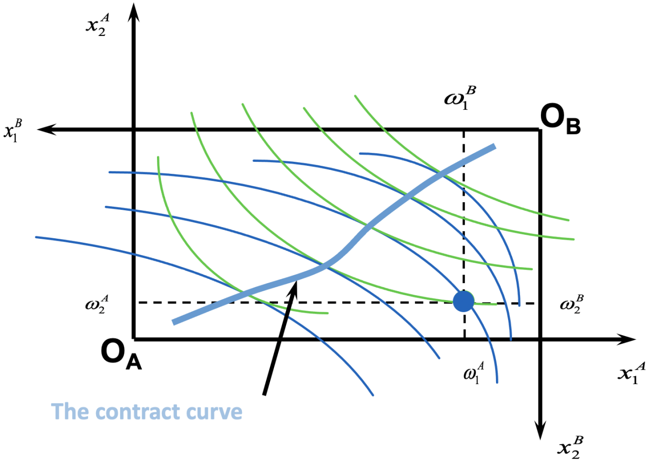
So is the market *efficient*? Answer:

**YES. In the sense of Pareto optimality (and under the hypotheses of perfect competition), a competitive equilibrium is a Pareto-optimum.**

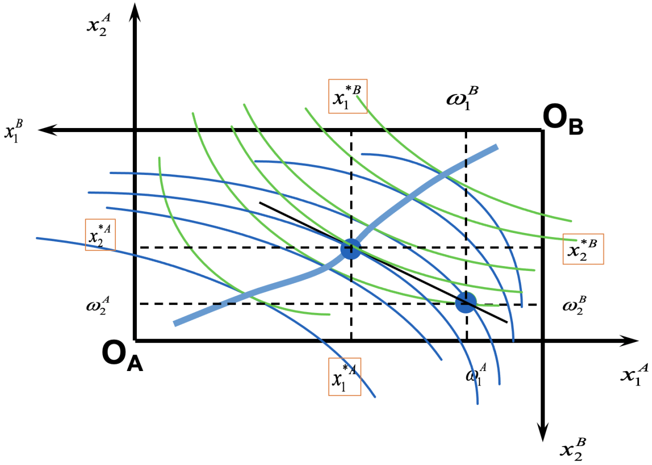
This result is known as the **First Theorem of Welfare Economics**.

Very interesting, but what about the other way around? Given a Pareto efficient allocation, can we find prices such that it is a market equilibrium?

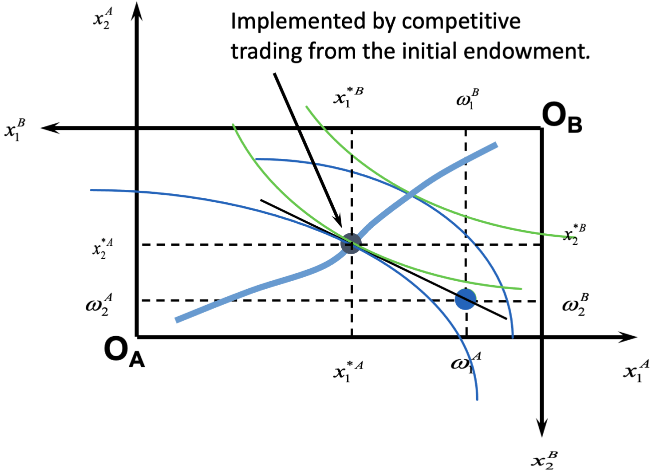
# From PO to competitive markets



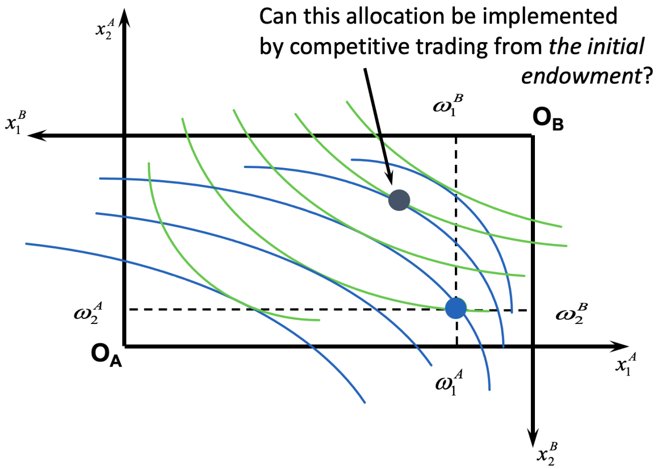
# From PO to competitive markets



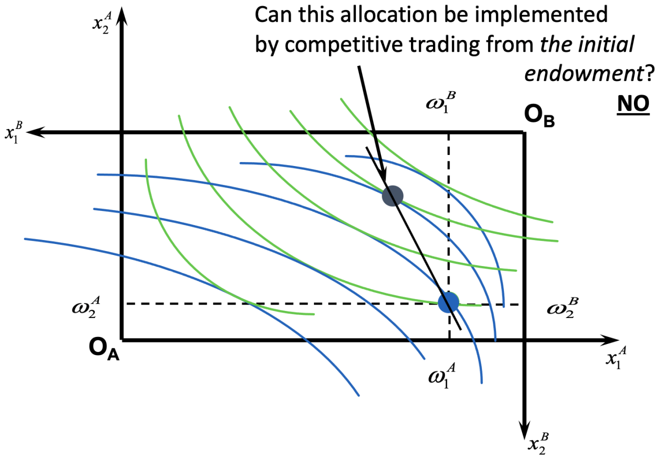
# FROM PO TO COMPETITIVE MARKETS



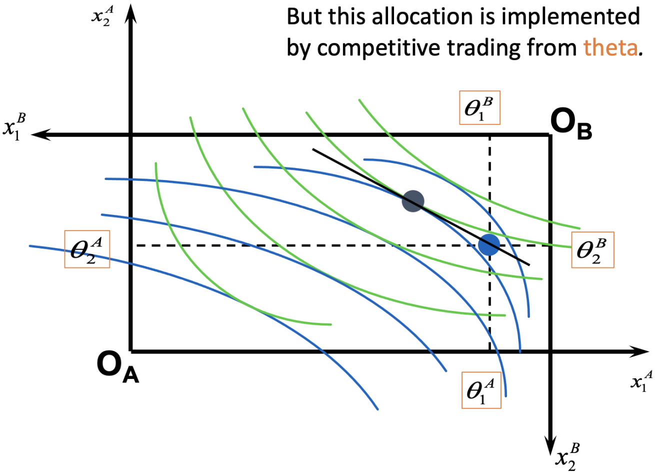
# FROM PO TO COMPETITIVE MARKETS



# From PO to competitive markets



# FROM PO TO COMPETITIVE MARKETS



# Second theorem of welfare economics

So given a Pareto efficient allocation, it is possible to find prices such that it is a market equilibrium.

This result is known as the **Second Theorem of Welfare Economics**. It states that:

**Pareto-optimal allocation of resources can be realised by a competitive equilibrium (as long as preferences are convex).**

- It means that whatever Pareto efficient allocation you want can be supported by the market mechanism
- **That is, whatever your criterion of a good/just distribution of welfare, you can use competitive markets to achieve it**
- This essentially means that the problems of distribution and efficiency can be separated

# INTERPRETATIONS OF THE FIRST THEOREM OF WELFARE ECONOMICS

- Sometimes seen as the mathematical demonstration of the ”invisible hand” (almost two centuries after Smith’s (1776) *Wealth of Nations*)
  - Careful: This is a strong interpretation of what Adam Smith initially said in the *Wealth of the Nations*! (read the book)
- If resources allocation by the free market is efficient, the theorem can be taken as an argument for *neoliberalism*: a doctrine that promotes the free market (i.e. against the intervention of the State in the market economy)

# Limits of the first theorem of welfare economics

- We are talking about *efficiency*, but not *equity*: if the initial endowments of $A$ and $B$ are already unequal, there are good chances that their resource allocations will also be unequal
  - For example, assume we pass from $(1, 100\,000)$ to $(2, 1\,000\,000)$: sure it is a Pareto-improvement, but are you satisfied with such a redistribution? People who promote *equity* instead of *efficiency* would not be happy with it, and so far, **nothing states why efficiency is more important than equity**
- The equilibrium is not necessarily stable, nor unique, and nothing tells us that individuals will tend to such an equilibrium
  - Field experiments can give us some empirical results: do people converge towards such an equilibrium in real-case scenarios (financial markets, etc.)?
- The conditions to reach such an equilibrium are extremely theoretical. We need to assume the classical hypotheses of perfect competition:
  - Firms are price takers
  - Firms can enter and exit the market without costs
  - Capital resources and labor are perfectly mobile
  - ...

# What next?

- In **sessions 2 and 3**, we introduced the Pareto criterion as a tool to analyse our very first policy evaluation: is the market efficient?
  - We answered ”yes” if we consider the Pareto criterion as a ”good” tool to analyse market efficiency
  - Problem: the Pareto criterion seems a bit restricted. It can judge if an allocation is *efficient*, but it cannot judge if an allocation is *fair*
  - There are other normative criteria welfare economics has to offer about what makes a social state better than another
  - In **session 4**, we will see what these other normative criteria are

- So far, we have not discussed how individual preferences could be aggregated so that a *social* (or collective) preference can be formed. We will see in **session 4** that:
  - Aggregating individual preferences to form a *social* (or collective) preference may be problematic
  - Depending on the normative criterion we endorse, we can reach to very different policy recommendations

# Intermediate Microeconomics

Part I: Welfare Economics

**Sessions 2-3: Exchange**

Lecturer: Ivan Mitrouchev

Université de Strasbourg

Fall 2021