Microeconomics

Lecture 4

First Fundamental Theorem of Welfare Economics

Given that consumers' preferences are well-behaved, trading in perfectly competitive markets implements a Pareto-optimal allocation of the economy's endowment.

Theoremes of Welfare Economics

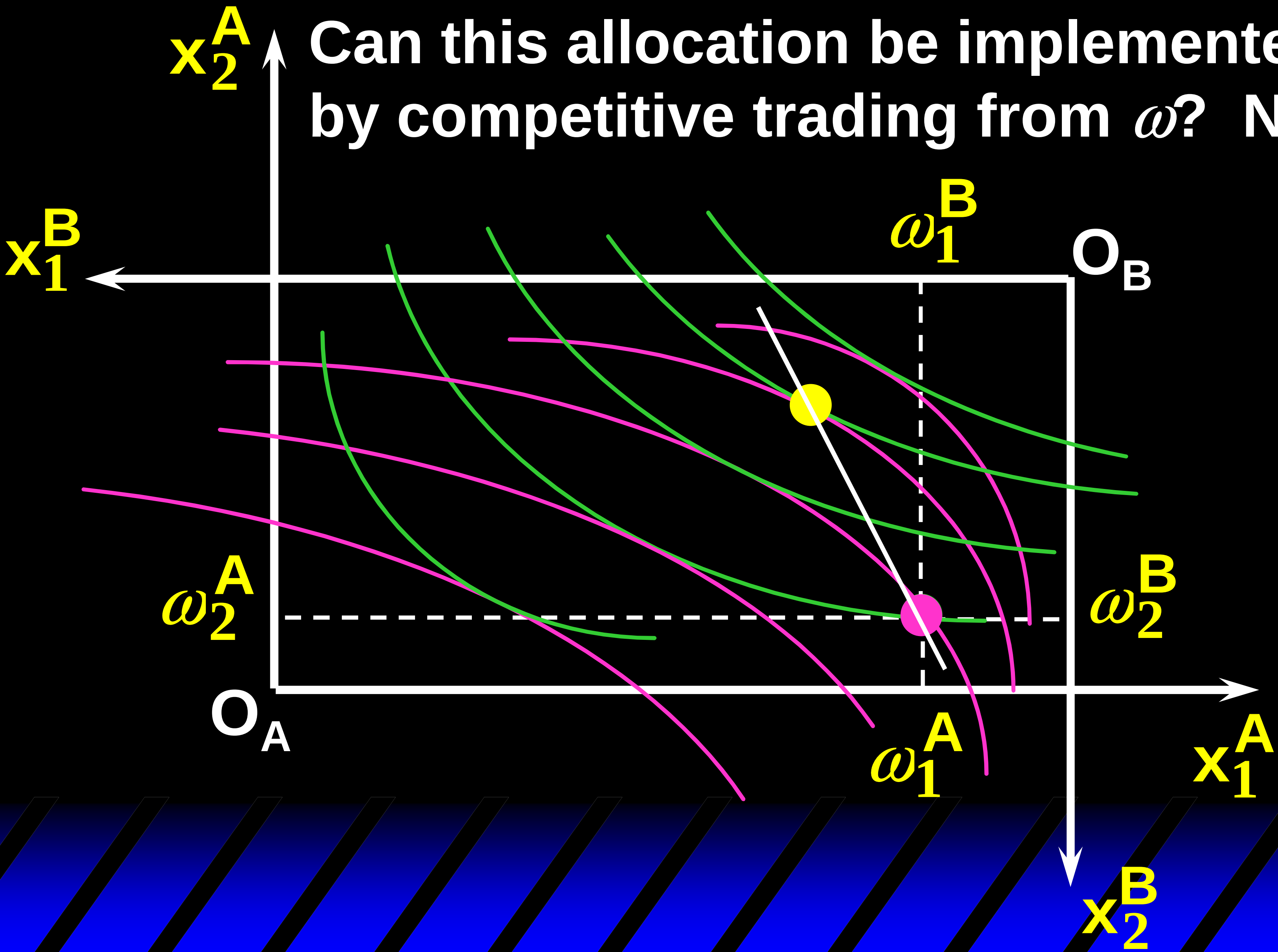
The First Theorem is followed by a second that states that any Pareto-optimal allocation (i.e. any point on the contract curve) can be achieved by trading in competitive markets provided that endowments are first appropriately rearranged amongst the consumers.

Second Fundamental Theorem of Welfare Economics

Given that consumers' preferences are well-behaved, for any Pareto-optimal allocation there are prices and an allocation of the total endowment that makes the Pareto-optimal allocation implementable by trading in competitive markets.

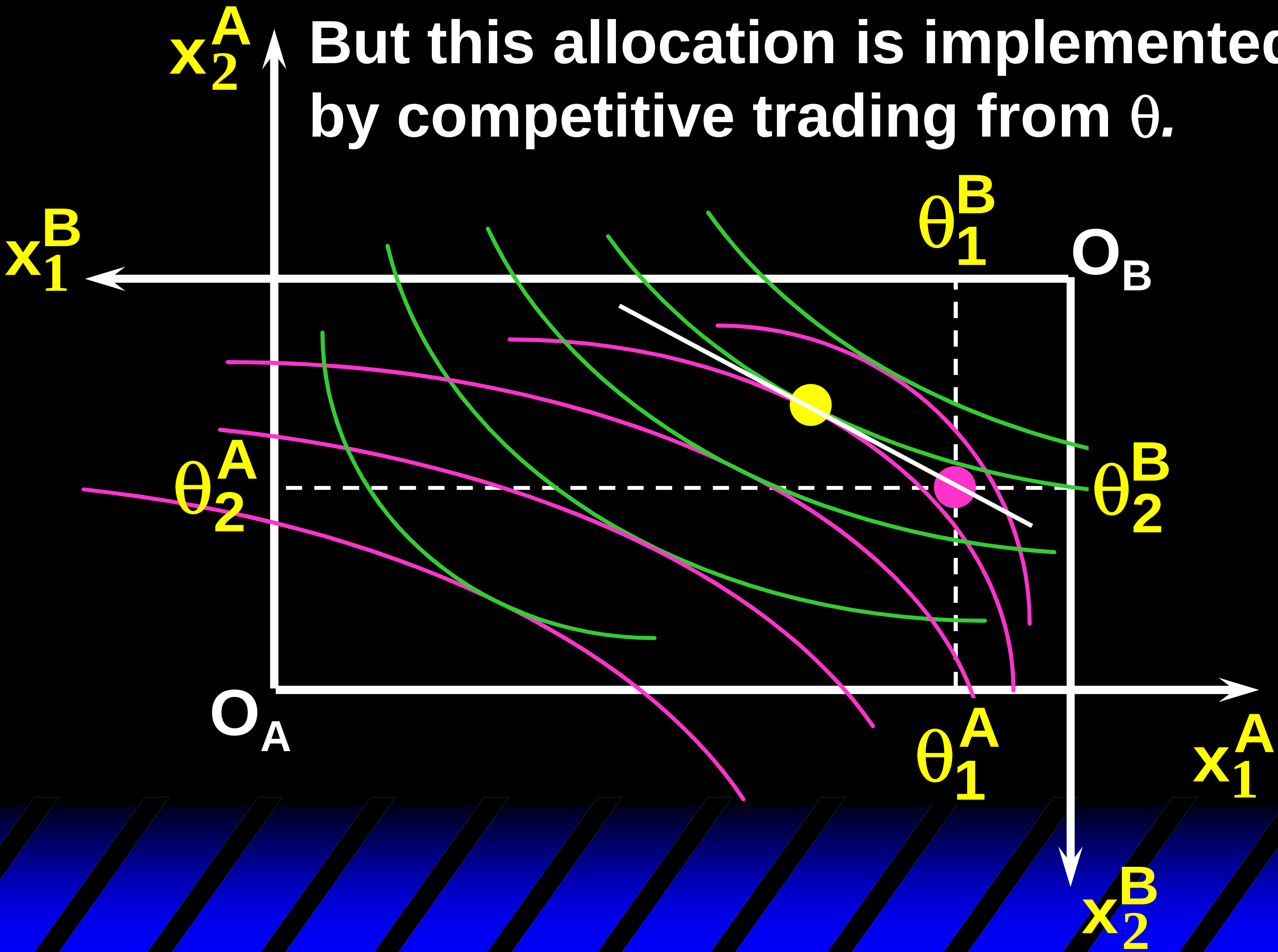
Second Fundamental Theorem

Can this allocation be implemented by competitive trading from ω? No.



Second Fundamental Theorem

But this allocation is implemented by competitive trading from θ.



Walras' Law

- **Every consumer's preferences are well-behaved so, for any positive prices (p_1,p_2), each consumer spends all of his budget.**
- **For consumer A:**

$$p_1 x_1^{*A} + p_2 x_2^{*A} = p_1 \omega_1^A + p_2 \omega_2^A$$

For consumer B:

$$p_1 x_1^{*B} + p_2 x_2^{*B} = p_1 \omega_1^B + p_2 \omega_2^B$$

Walras' Law

$$p_1 x_1^{*A} + p_2 x_2^{*A} = p_1 \omega_1^A + p_2 \omega_2^A$$

$$p_1 x_1^{*B} + p_2 x_2^{*B} = p_1 \omega_1^B + p_2 \omega_2^B$$

Summing gives

$$p_1 (x_1^{*A} + x_1^{*B}) + p_2 (x_2^{*A} + x_2^{*B})$$

$$= p_1 (\omega_1^A + \omega_1^B) + p_2 (\omega_2^B + \omega_2^B).$$

Walras' Law

$$p_1(x_1^{*A} + x_1^{*B}) + p_2(x_2^{*A} + x_2^{*B})$$
$$= p_1(\omega_1^A + \omega_1^B) + p_2(\omega_2^B + \omega_2^B).$$

Rearranged,

$$p_1(x_1^{*A} + x_1^{*B} - \omega_1^A - \omega_1^B) +$$
$$p_2(x_2^{*A} + x_2^{*B} - \omega_2^A - \omega_2^B) = 0.$$

That is, ...

Walras' Law

$$p_1(x_1^{*A} + x_1^{*B} - \omega_1^A - \omega_1^B) +$$

$$p_2(x_2^{*A} + x_2^{*B} - \omega_2^A - \omega_2^B)$$

$$= 0.$$

This says that the summed market value of excess demands is zero for any positive prices p_1 and p_2 -- this is Walras' Law.

Walras' Law

$\sum_j p_j z_j =$ where h – firms, i – consumers, j - goods

1= $\sum_j p_j(x_j - \omega_j - q_j) =$

2= $\sum_j p_j(\sum_i x_{ij} - \sum_i \omega_{ij} - \sum_h q_{hj}) =$

3= $\sum_j p_j(\sum_i x_{ij} - \sum_i \omega_{ij} - \sum_h (\sum_i \theta_{ih}) q_{hj}) =$

4= $\sum_j \sum_i (p_j x_{ij} - p_j \omega_{ij} - \sum_h \theta_{ih} p_j q_{hj}) =$

5= $\sum_i (\sum_j p_j x_{ij} - \sum_j p_j \omega_{ij} - \sum_h \theta_{ih} \sum_j p_j q_{hj}) =$

6= $\sum_i 0 = 0$.

Explanation:

1 **a definition of excess demand**

2 **rearranged x_j, ω_j i q_j**

3 **$\theta_{1h}+...+\theta_{kh}=1$ where θ_{ih} – a share of consumer *i* in a profit of firm *h***

4 **rearranged p_j**

5 **summary order is changed**

6 **this is budget constraint: $\sum_j p_j x_{ij} = \sum_j p_j \omega_{ij} + \sum_h \theta_{ih} \sum_j p_j q_{hj}$**

Walras' Law

- Walras' Law is an **identity**; i.e. a statement that is true for **any** positive prices (p1,p2), whether these are equilibrium prices or not.

Implications of Walras' Law

Suppose the market for commodity 1 is in equilibrium; that is,

$$x_1^{*A} + x_1^{*B} - \omega_1^A - \omega_1^B = 0.$$

Then

$$p_1(x_1^{*A} + x_1^{*B} - \omega_1^A - \omega_1^B) +$$

$$p_2(x_2^{*A} + x_2^{*B} - \omega_2^A - \omega_2^B) = 0$$

implies

$$x_2^{*A} + x_2^{*B} - \omega_2^A - \omega_2^B = 0.$$

Implications of Walras' Law

So one implication of Walras' Law for a two-commodity exchange economy is that if one market is in equilibrium then the other market must also be in equilibrium.

Implications of Walras' Law

What if, for some positive prices p_1 and p_2, there is an excess quantity supplied of commodity 1? That is,

$$x_1^{*A} + x_1^{*B} - \omega_1^A - \omega_1^B < 0.$$

Then

$$p_1(x_1^{*A} + x_1^{*B} - \omega_1^A - \omega_1^B) +$$

$$p_2(x_2^{*A} + x_2^{*B} - \omega_2^A - \omega_2^B) = 0$$

implies

$$x_2^{*A} + x_2^{*B} - \omega_2^A - \omega_2^B > 0.$$

Implications of Walras' Law

So a second implication of Walras' Law for a two-commodity exchange economy is that an excess supply in one market implies an excess demand in the other market.