Microeconomics

Lecture 3

Exchange

- Two consumers, A and B.
- Their endowments of goods 1 and 2 are $\omega^A = (\omega_1^A, \omega_2^A)$ and $\omega^B = (\omega_1^B, \omega_2^B)$.
- E.g. $\omega^A = (6,4)$ and $\omega^B = (2,2)$.

  The total quantities available are $\omega_1^A + \omega_1^B = 6 + 2 = 8$ units of good 1 and $\omega_2^A + \omega_2^B = 4 + 2 = 6$ units of good 2.

Feasible Allocations

- **What allocations of the 8 units of good 1 and the 6 units of good 2 are feasible?**
- **One feasible allocation is the before-trade allocation; i.e. the endowment allocation.**
- **Edgeworth and Bowley devised a diagram, called an Edgeworth box, to show all possible allocations of the available quantities of goods 1 and 2 between the two consumers.**

Starting an Edgeworth Box

Height = $\omega_2^A + \omega_2^B$

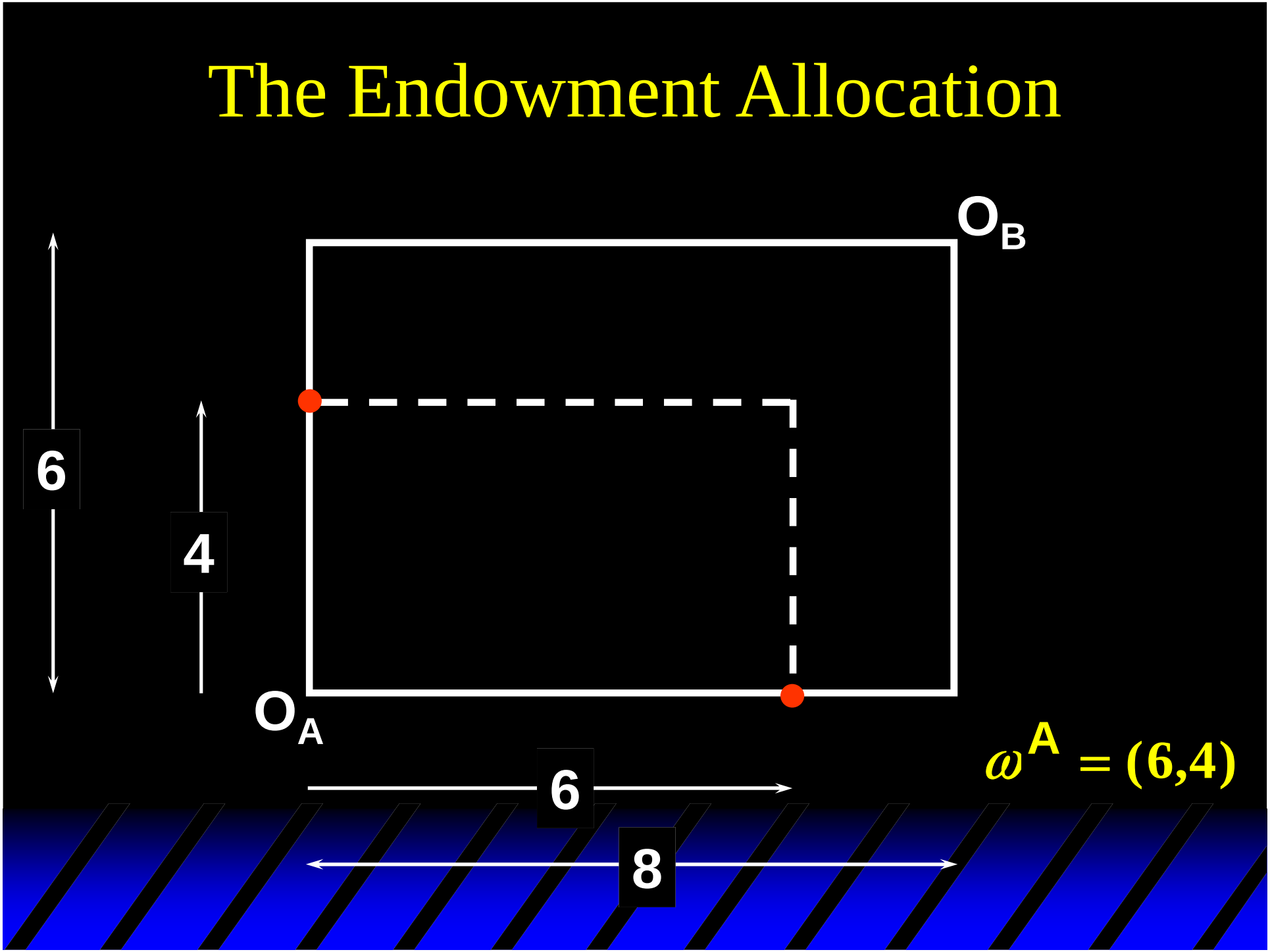
$= 4 + 2$

$= 6$

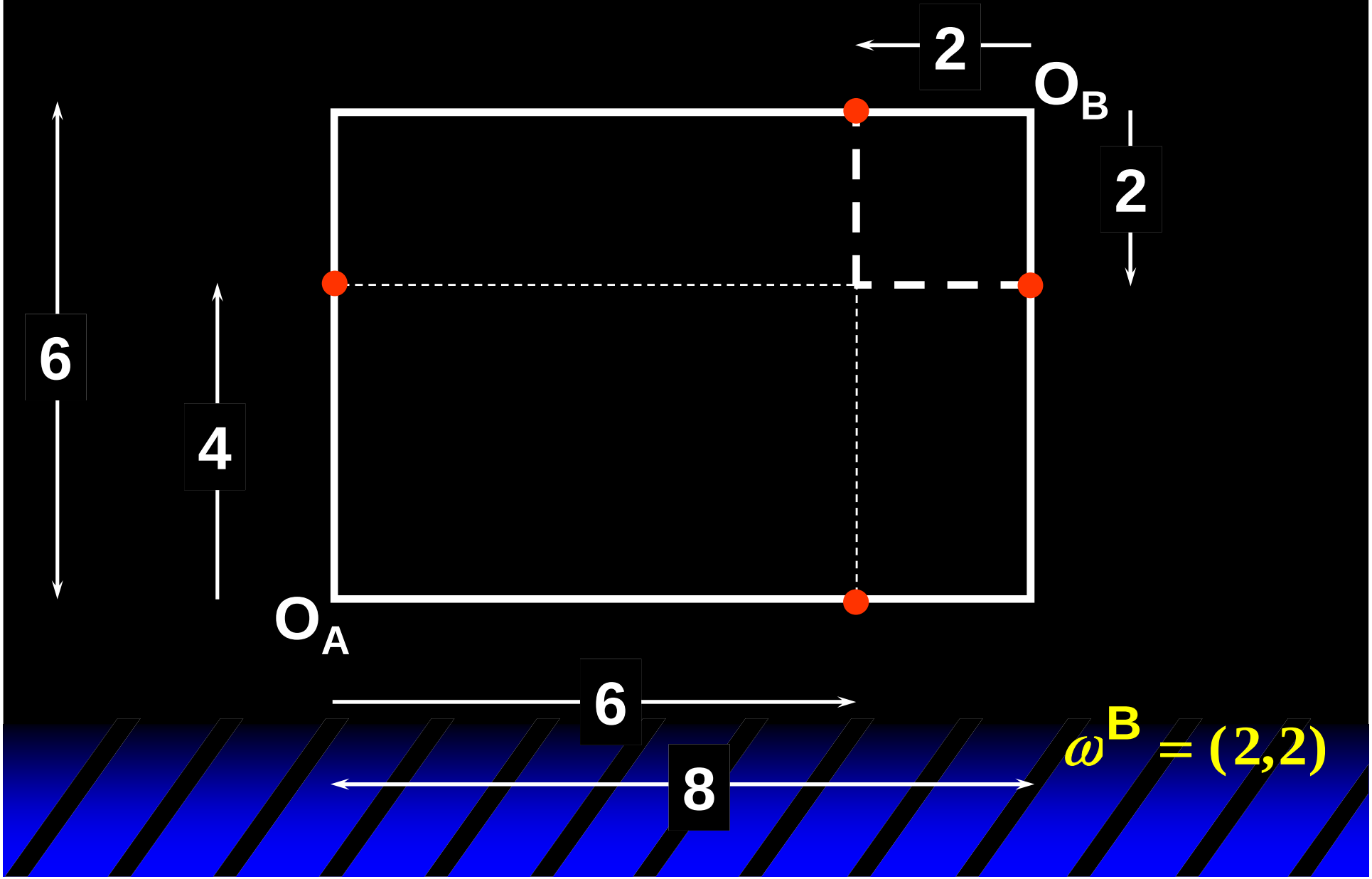
The dimensions of the box are the quantities available of the goods.

Width = $\omega_1^A + \omega_1^B = 6 + 2 = 8$

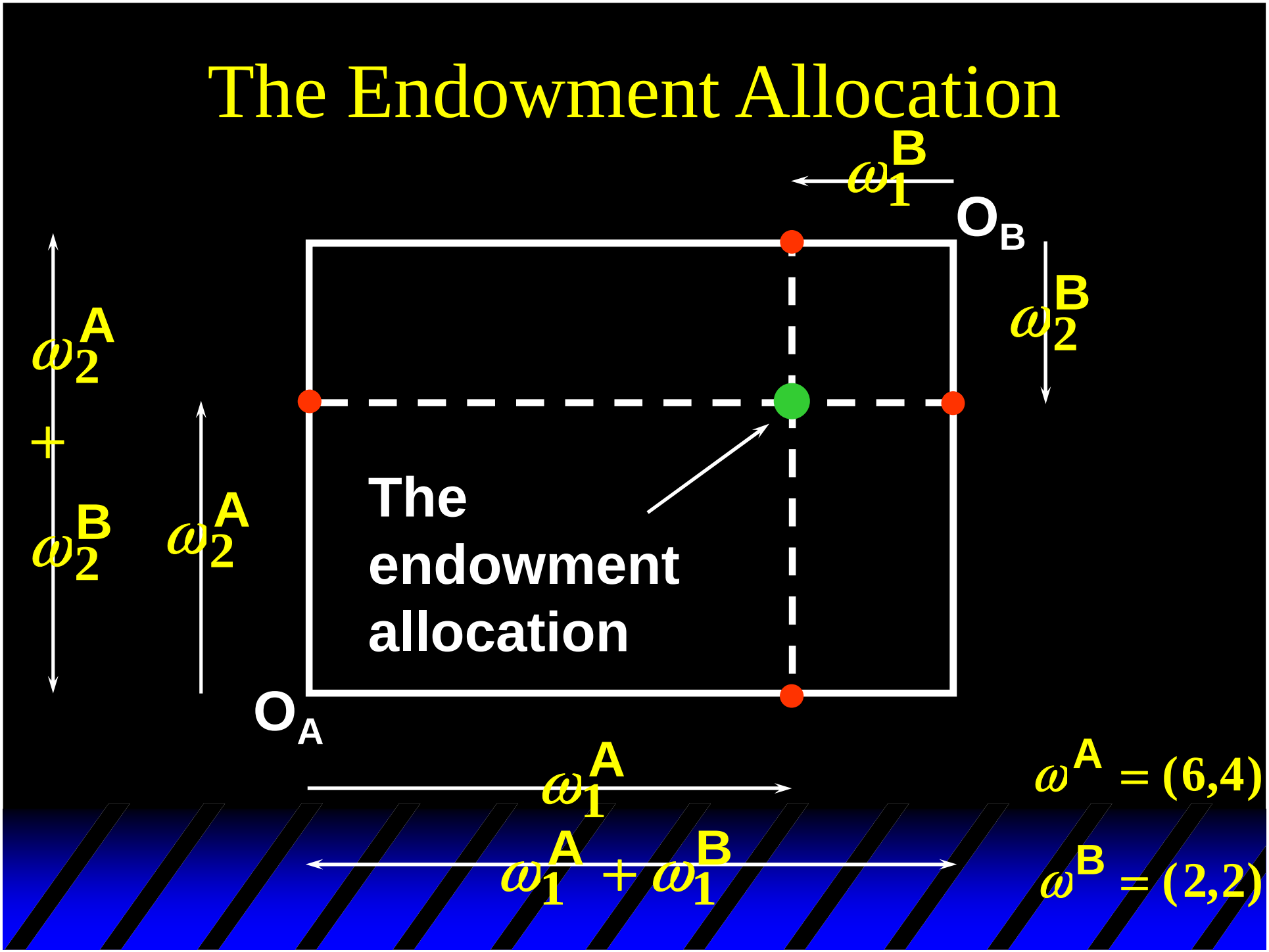
The Endowment Allocation



The Endowment Allocation



The Endowment Allocation



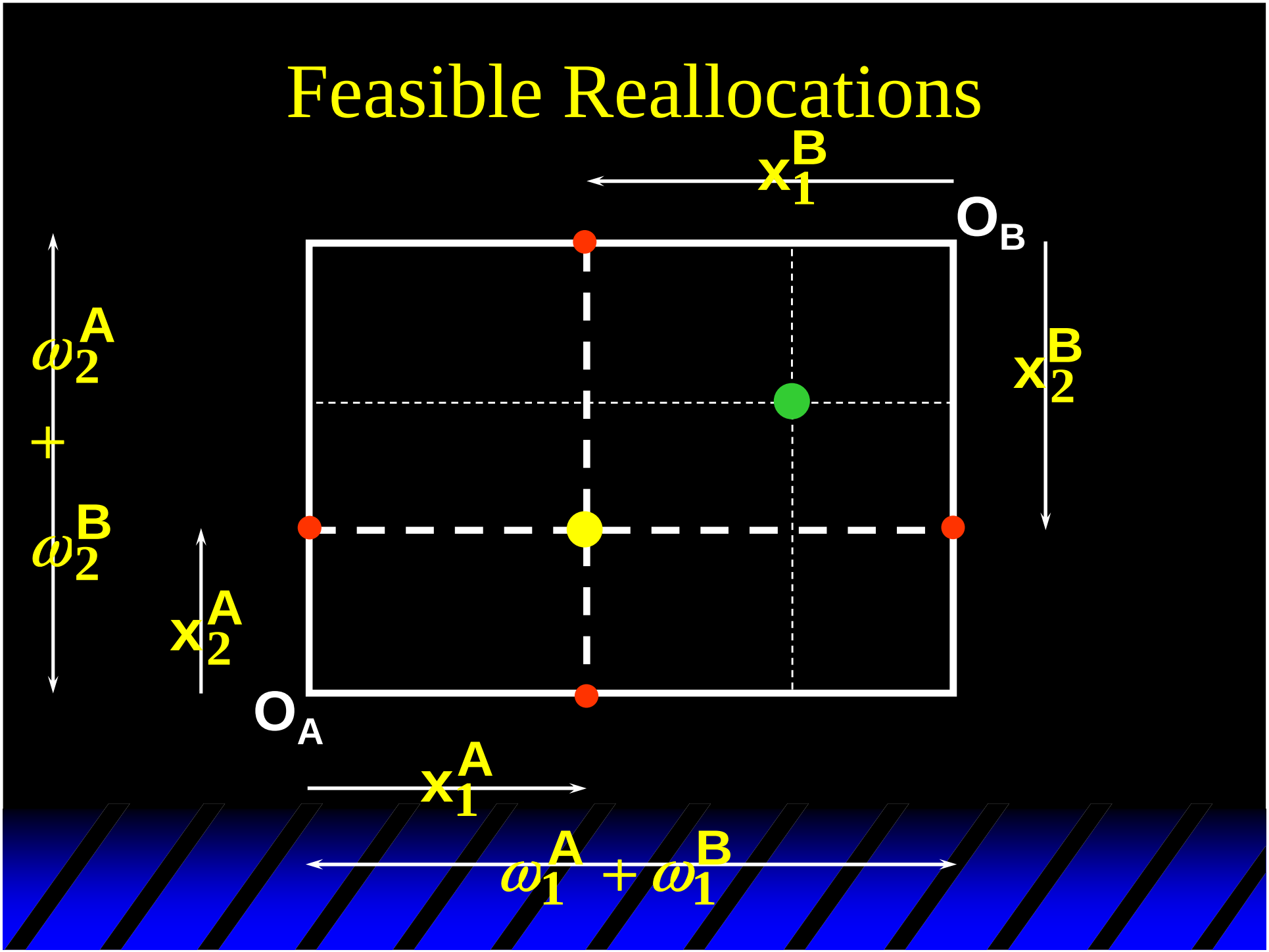
Other Feasible Allocations

- (x_1^A, x_2^A) denotes an allocation to consumer A.
- (x_1^B, x_2^B) denotes an allocation to consumer B.
- An allocation is **feasible** if and only if

$$x_1^A + x_1^B \leq \omega_1^A + \omega_1^B$$

and $$x_2^A + x_2^B \leq \omega_2^A + \omega_2^B.$$

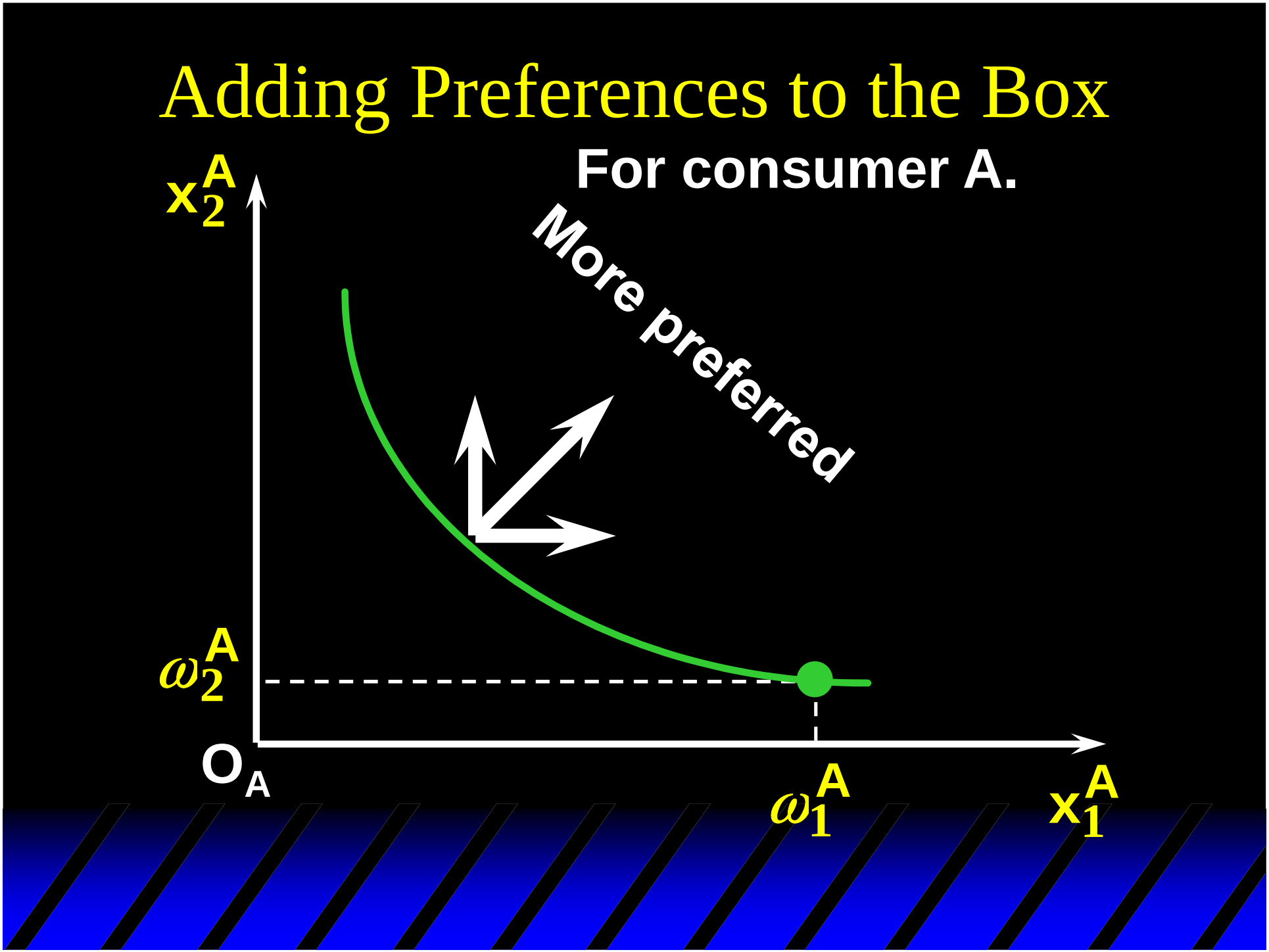
Feasible Reallocations



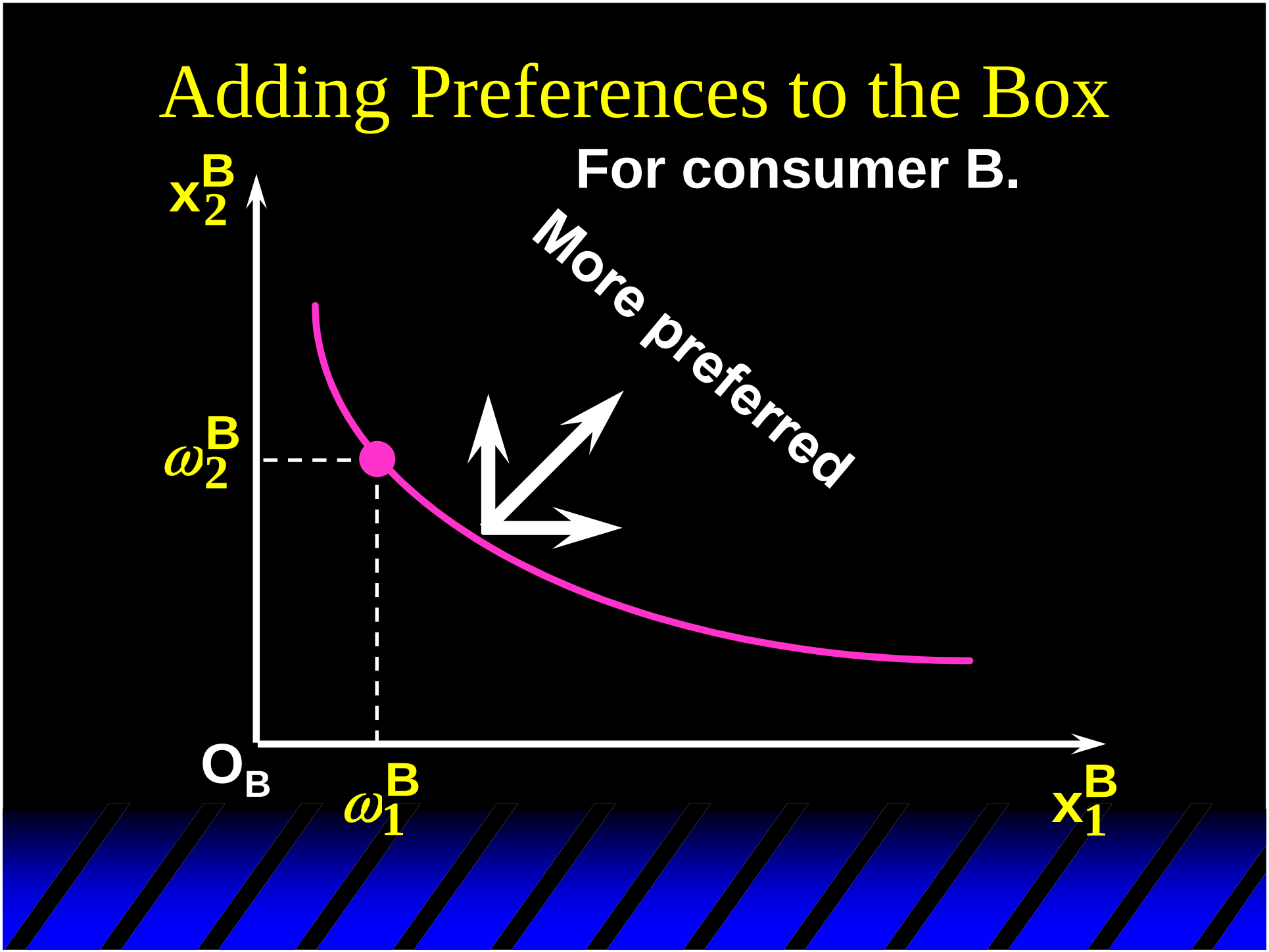
Feasible Reallocations

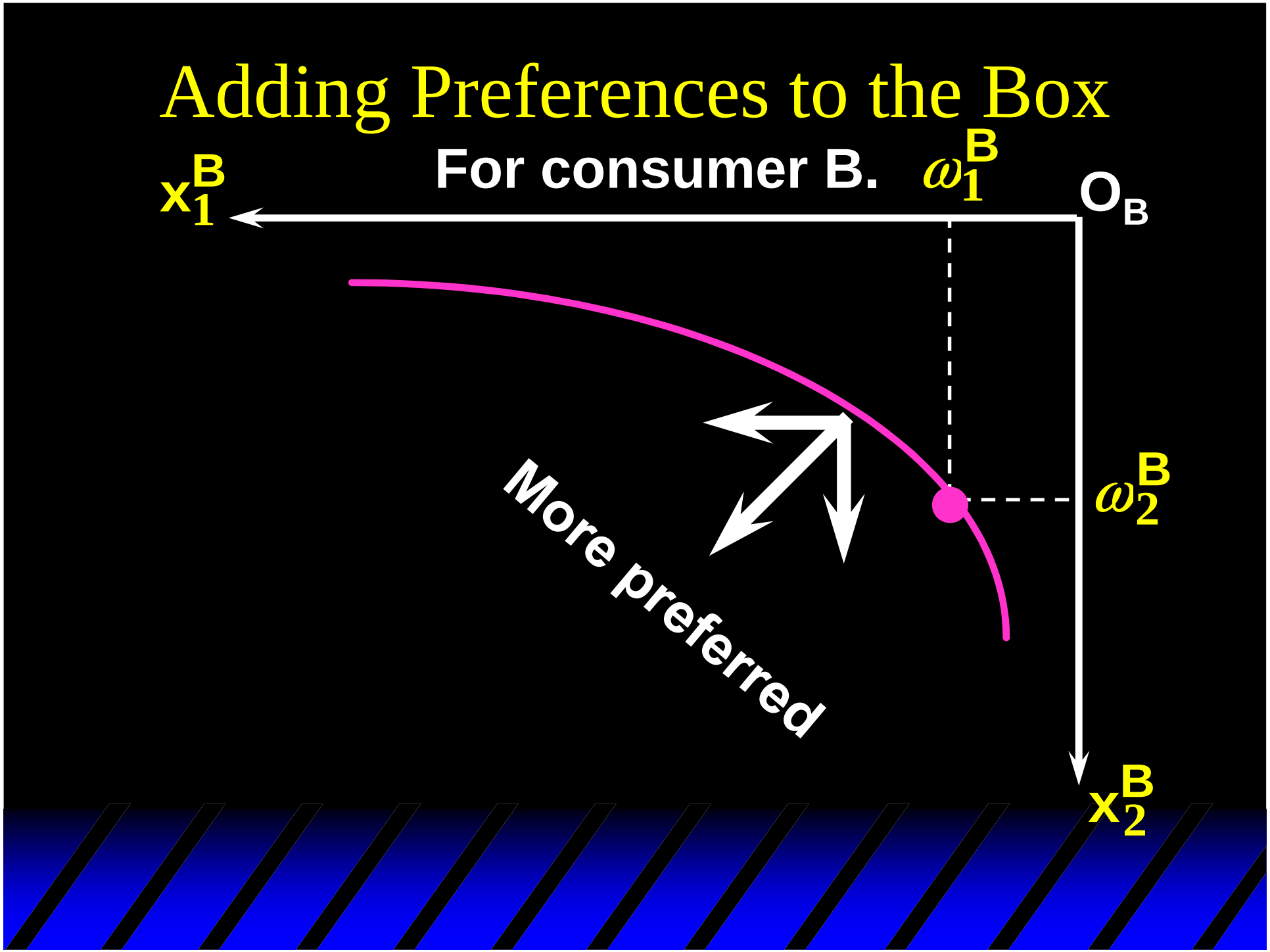
- **All points in the box, including the boundary, represent feasible allocations of the combined endowments.**
- **Which allocations make both consumers better off?**

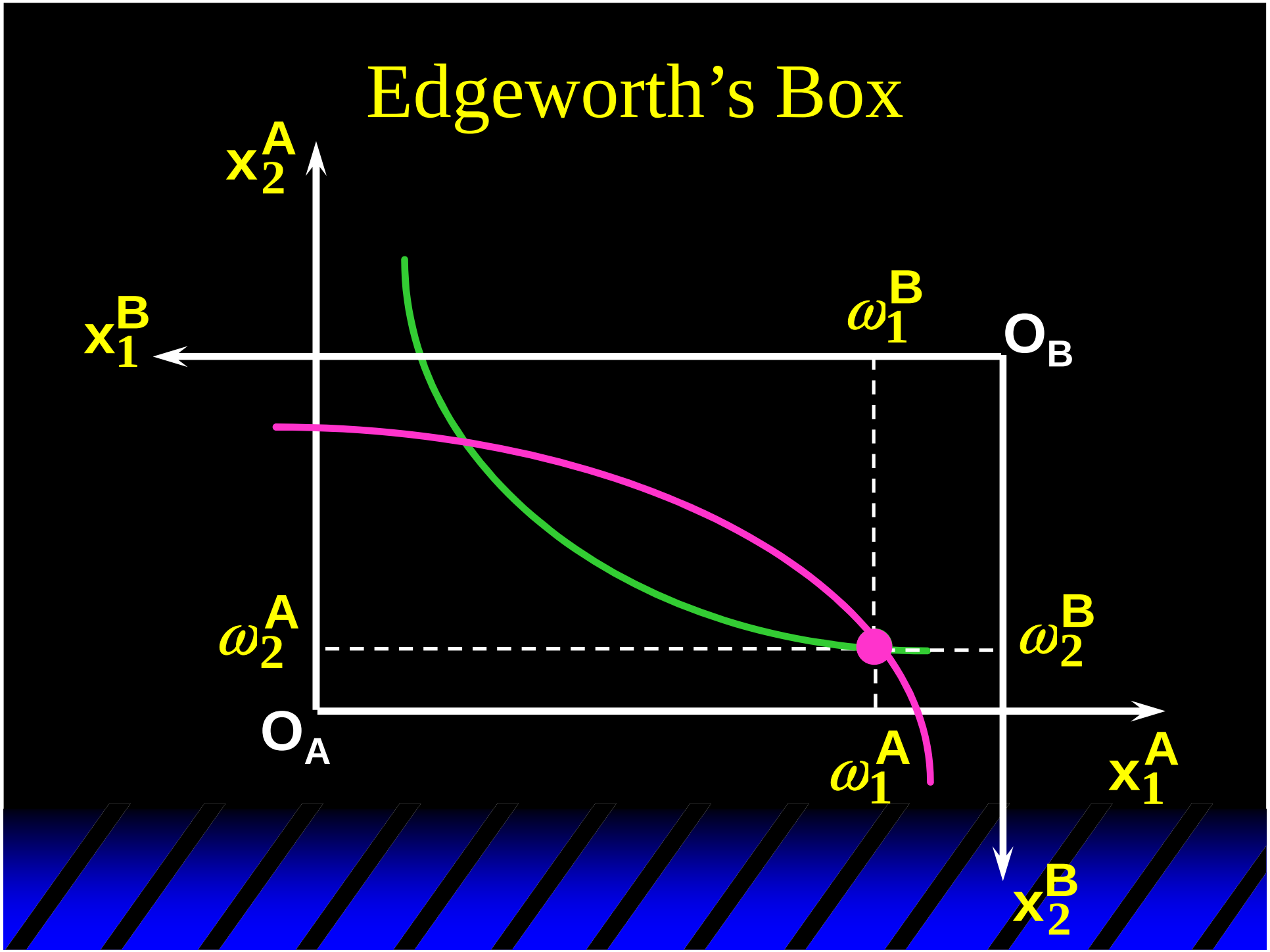
Adding Preferences to the Box

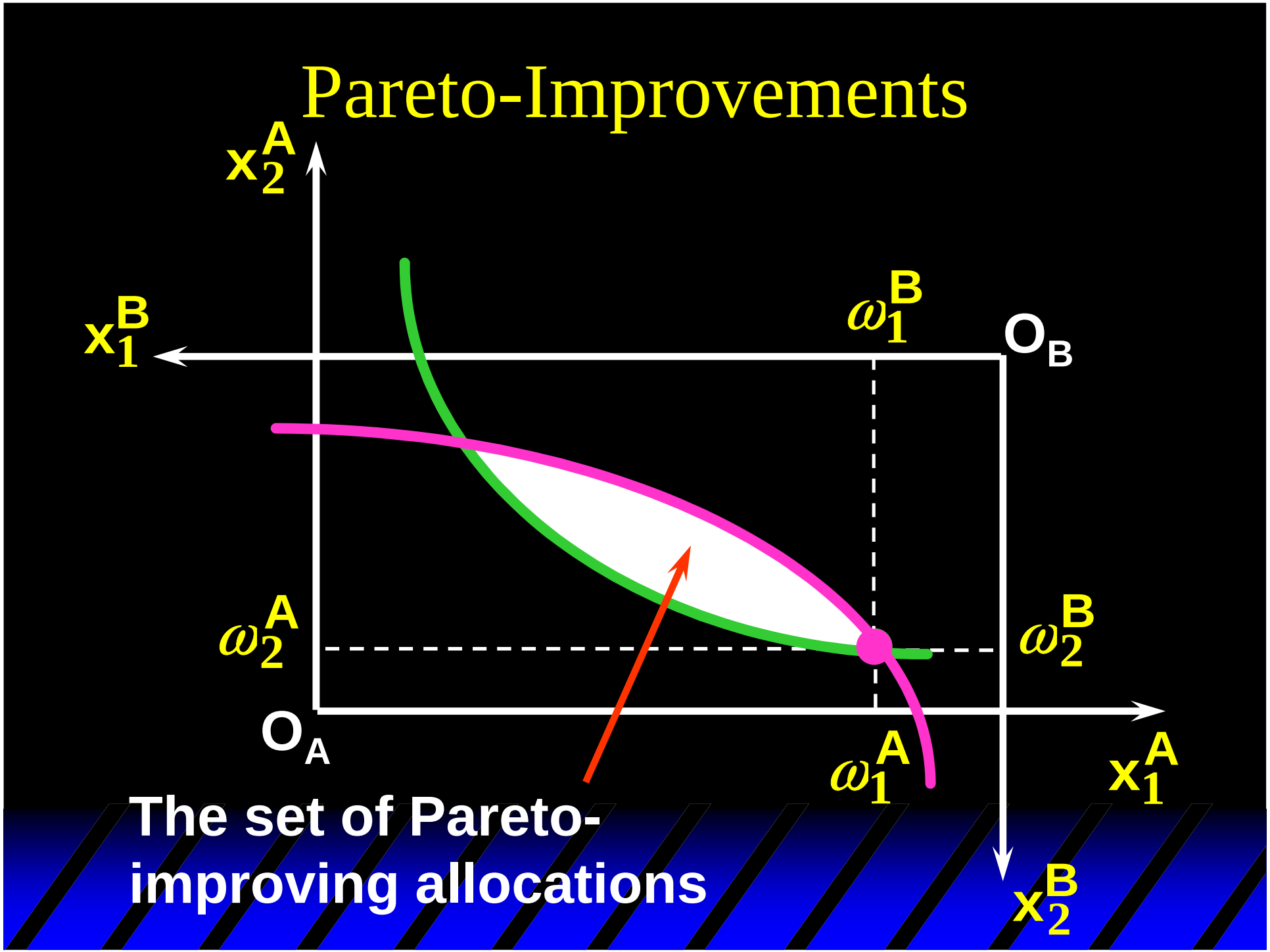


Adding Preferences to the Box




Adding Preferences to the Box
For consumer B. ω_1^B
x_1^B
O_B
More preferred
ω_2^B
x_2^B

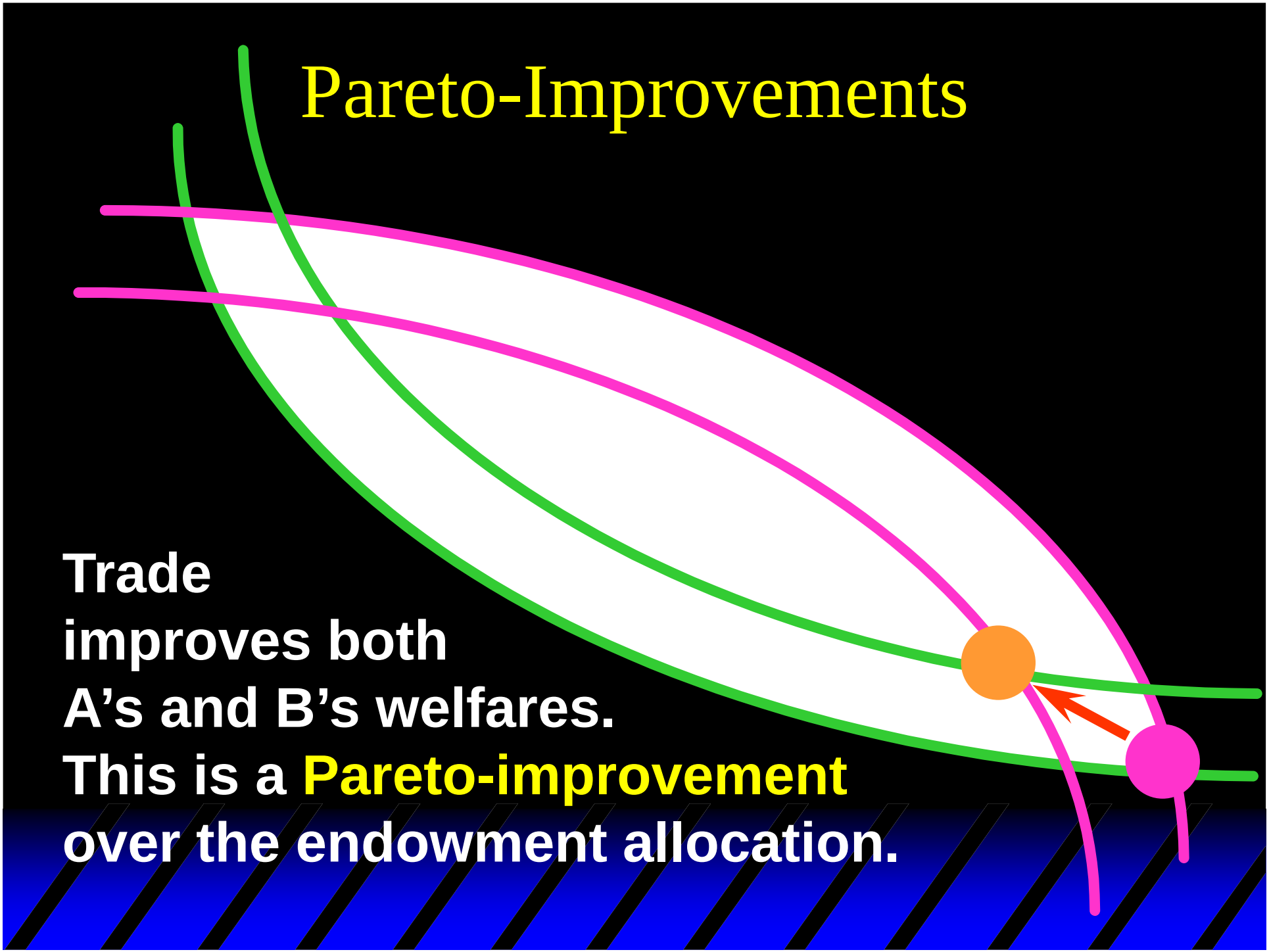

Edgeworth's Box
x_2^A
x_1^B
ω_1^B
O_B
ω_2^A
ω_2^B
O_A
ω_1^A
x_1^A
x_2^B


Pareto-Improvements
x_2^A
x_1^B
ω_1^B
O_B
ω_2^A
ω_2^B
O_A
ω_1^A
x_1^A
x_2^B
The set of Pareto-improving allocations

Pareto-Improvements

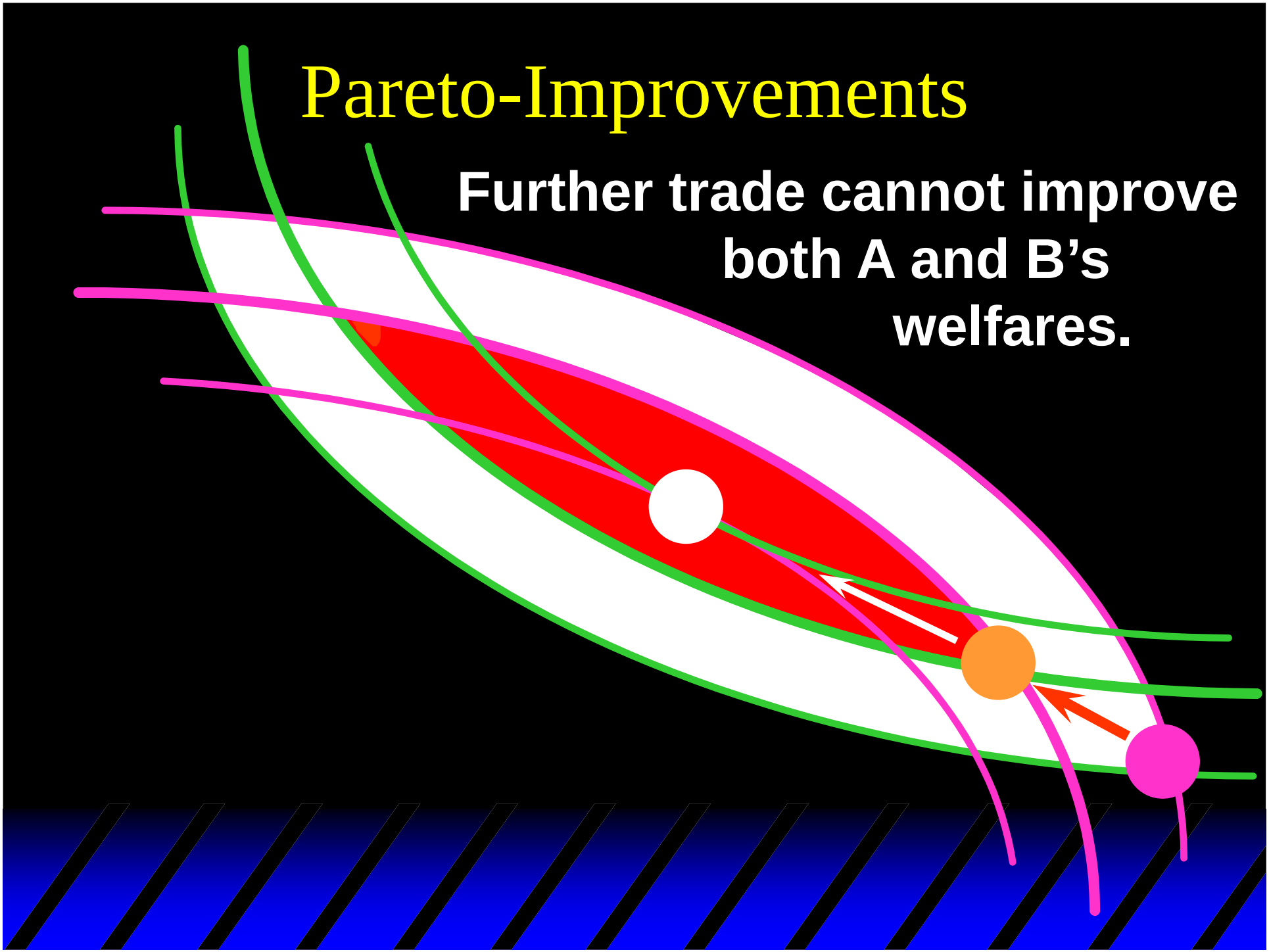
- **Since each consumer can refuse to trade, the only possible outcomes from exchange are Pareto-improving allocations.**
- **But which particular Pareto-improving allocation will be the outcome of trade?**

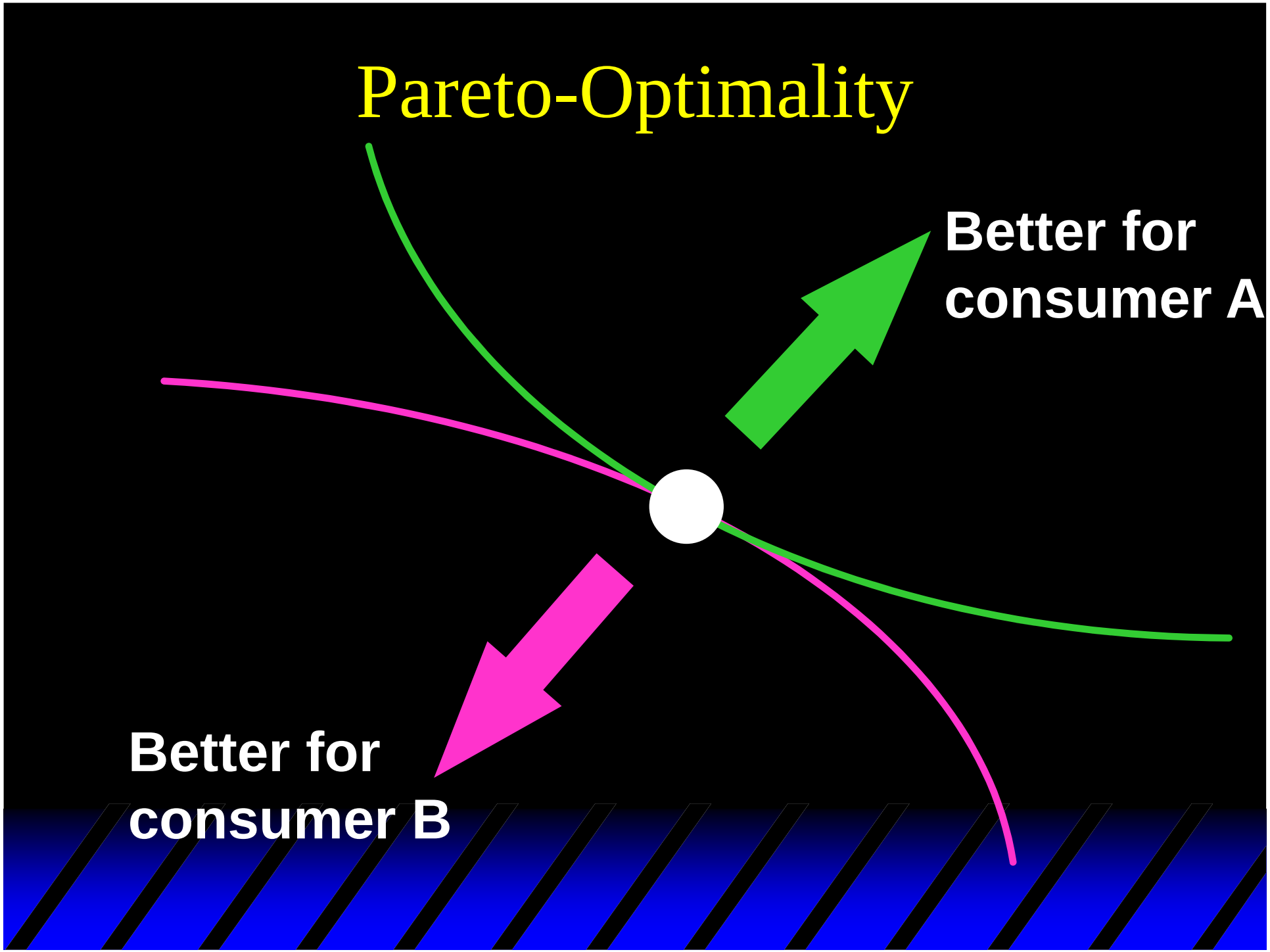
Pareto-Improvements

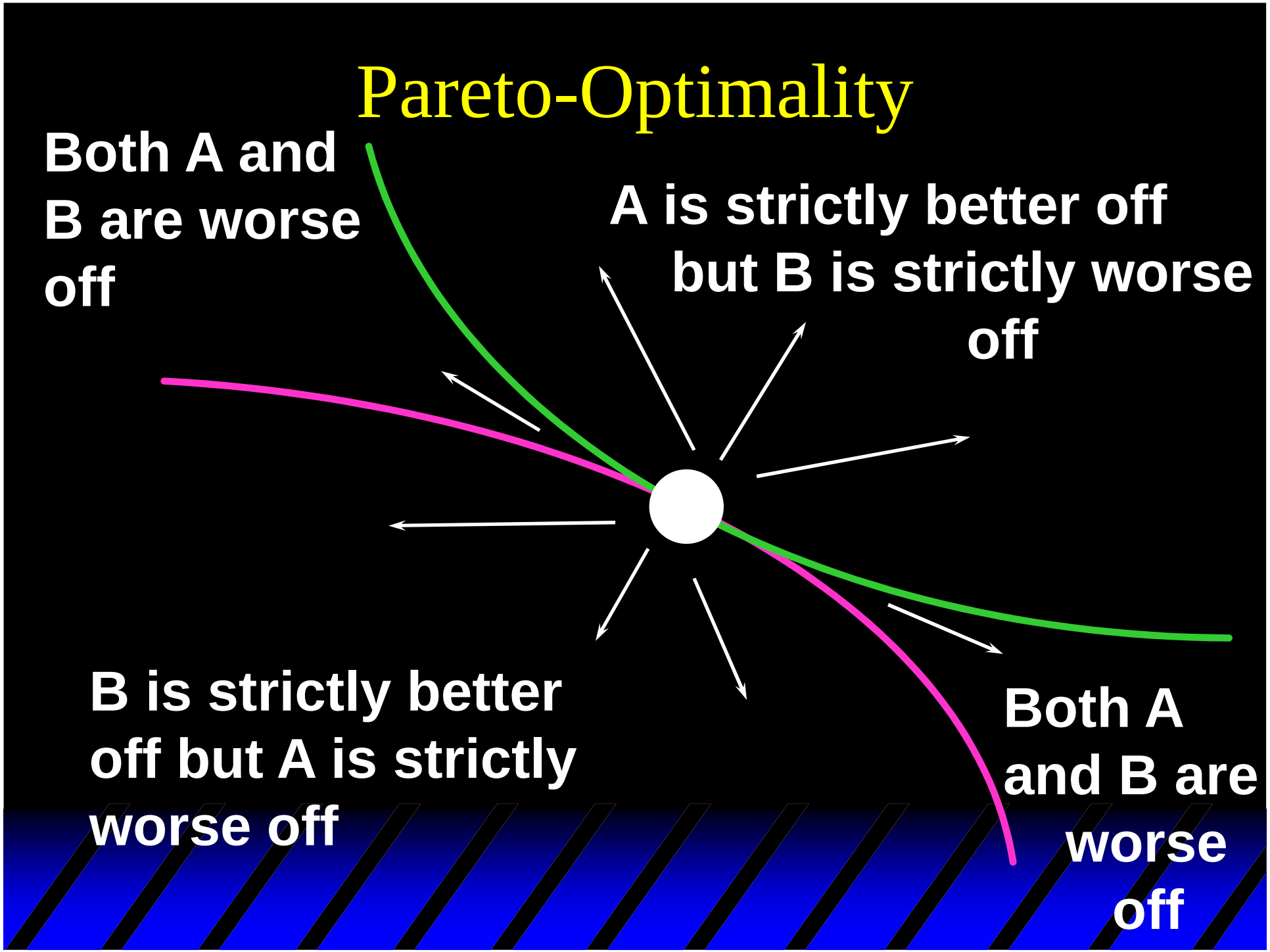


Trade improves both A's and B's welfares. This is a Pareto-improvement over the endowment allocation.

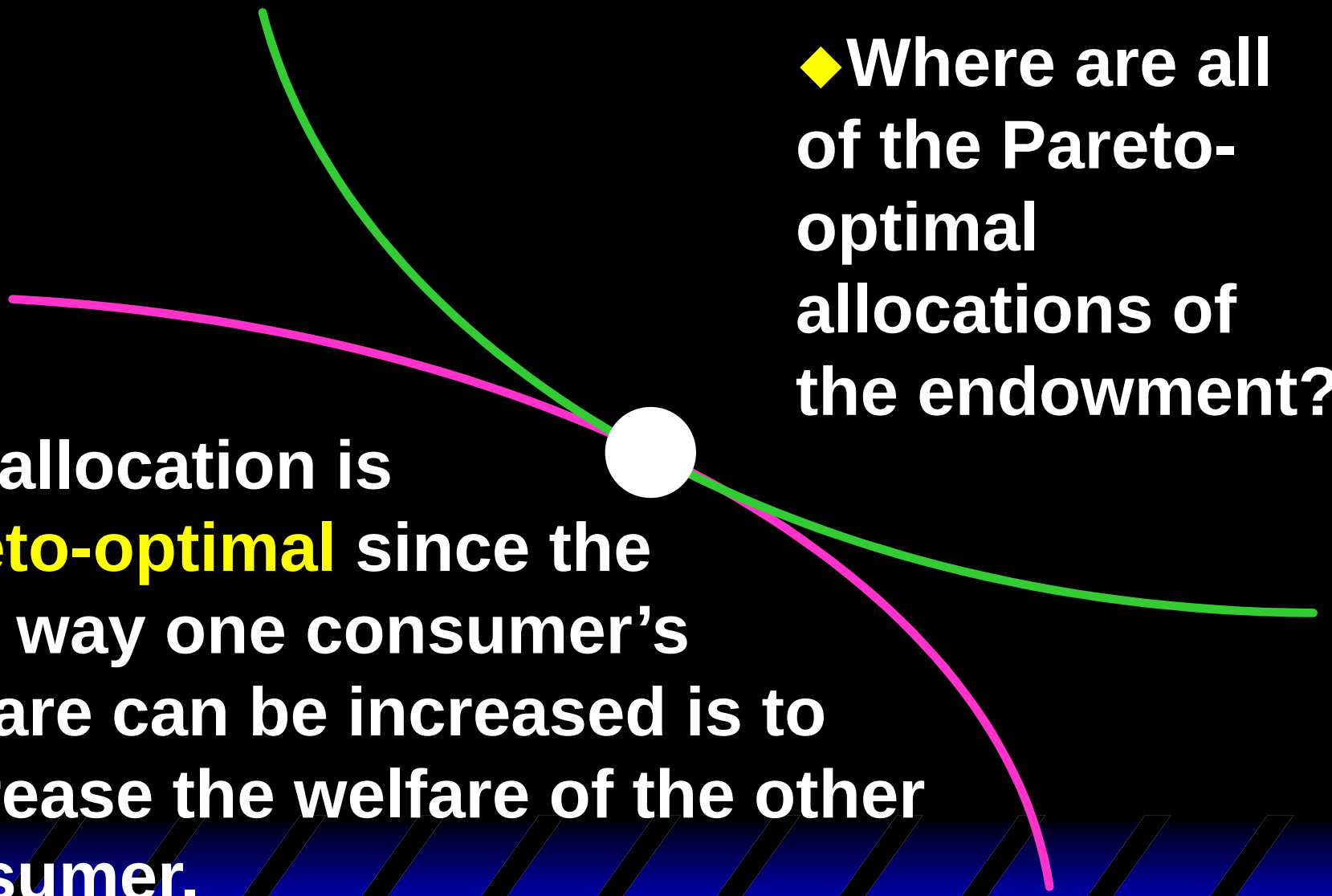
Pareto-Improvements




Pareto-Optimality
Better for consumer A
Better for consumer B


Pareto-Optimality
Both A and B are worse off
A is strictly better off but B is strictly worse off
B is strictly better off but A is strictly worse off
Both A and B are worse off

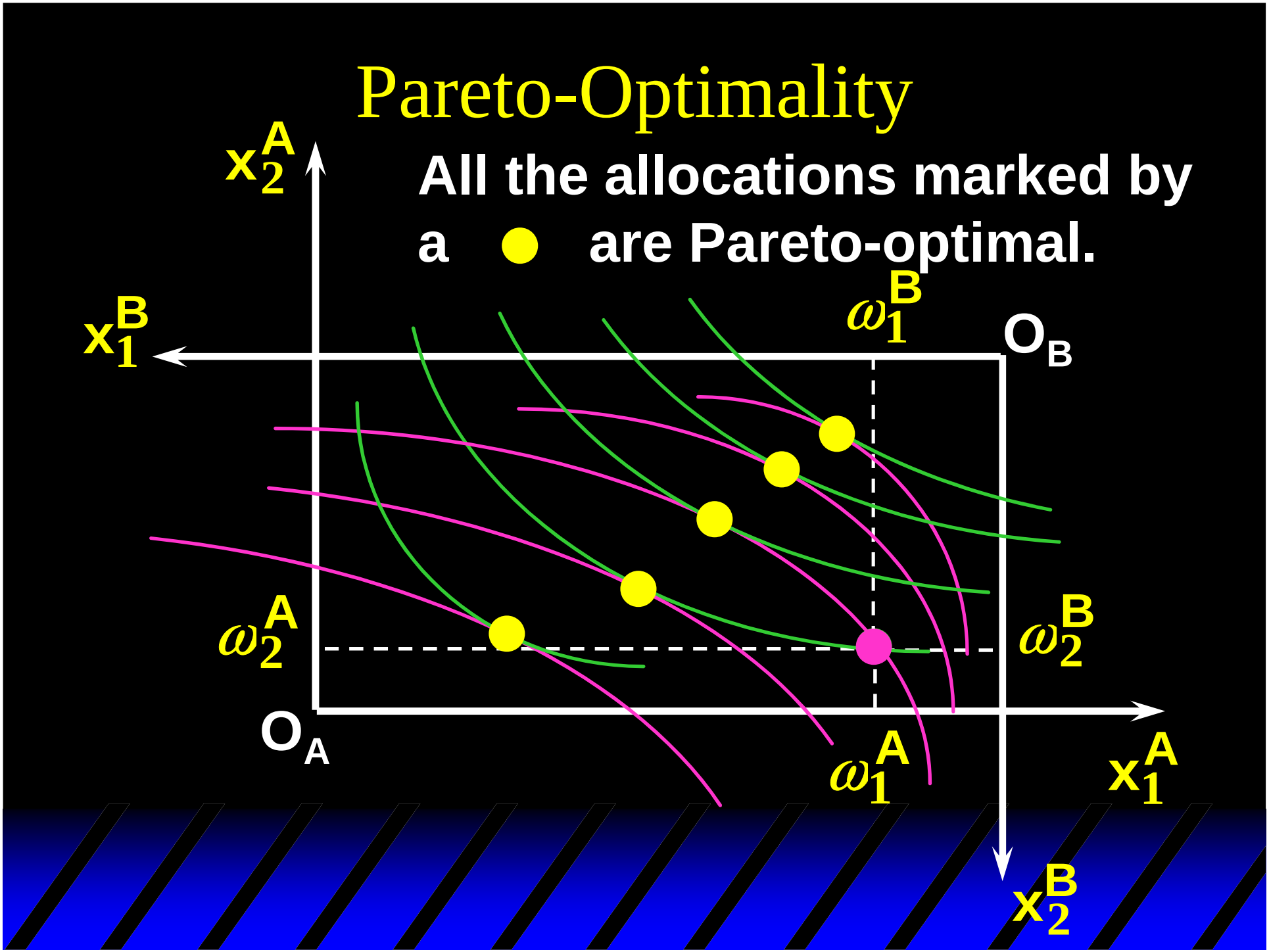
Pareto-Optimality



- **Where are all of the Pareto-optimal allocations of the endowment?**

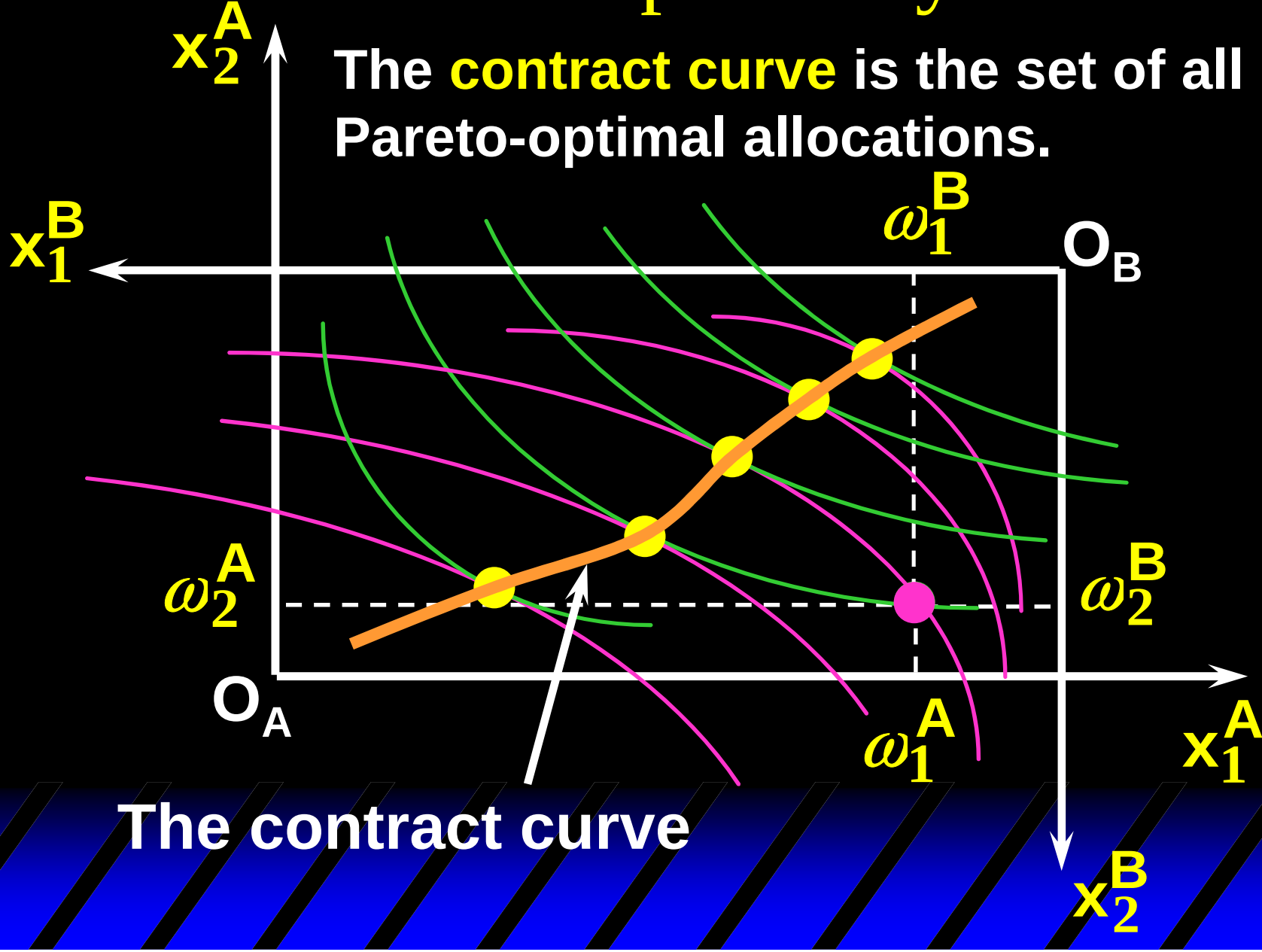
The allocation is Pareto-optimal since the only way one consumer's welfare can be increased is to decrease the welfare of the other consumer.

Pareto-Optimality



Pareto-Optimality

The **contract curve** is the set of all Pareto-optimal allocations.



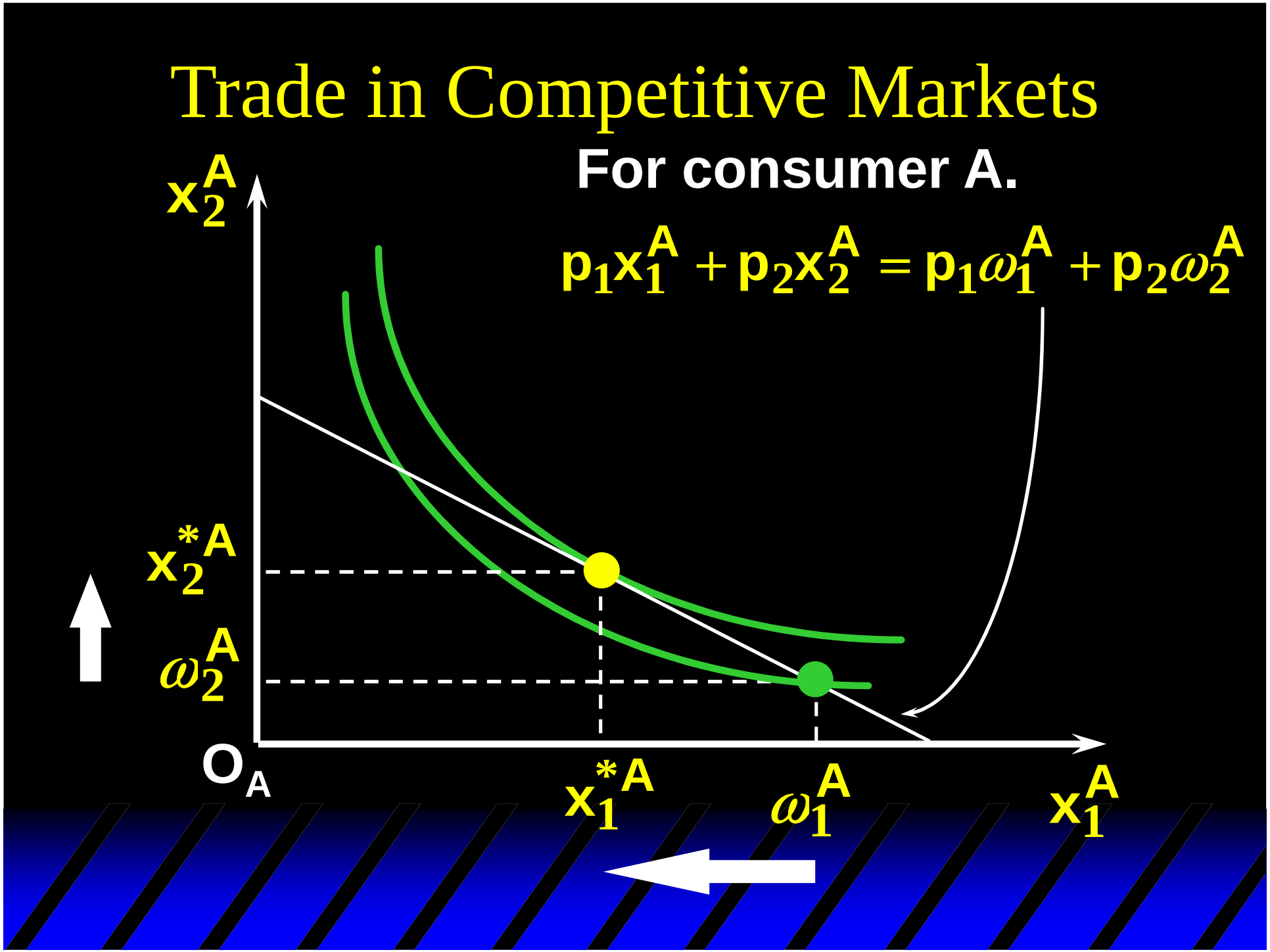
Pareto-Optimality

- **But to which of the many allocations on the contract curve will consumers trade?**
- **That depends upon how trade is conducted.**
- **In perfectly competitive markets? By one-on-one bargaining?**

Trade in Competitive Markets

- **Consider trade in perfectly competitive markets.**
- **Each consumer is a price-taker trying to maximize her own utility given p_1, p_2 and her own endowment. That is, ...**

Trade in Competitive Markets



Trade in Competitive Markets

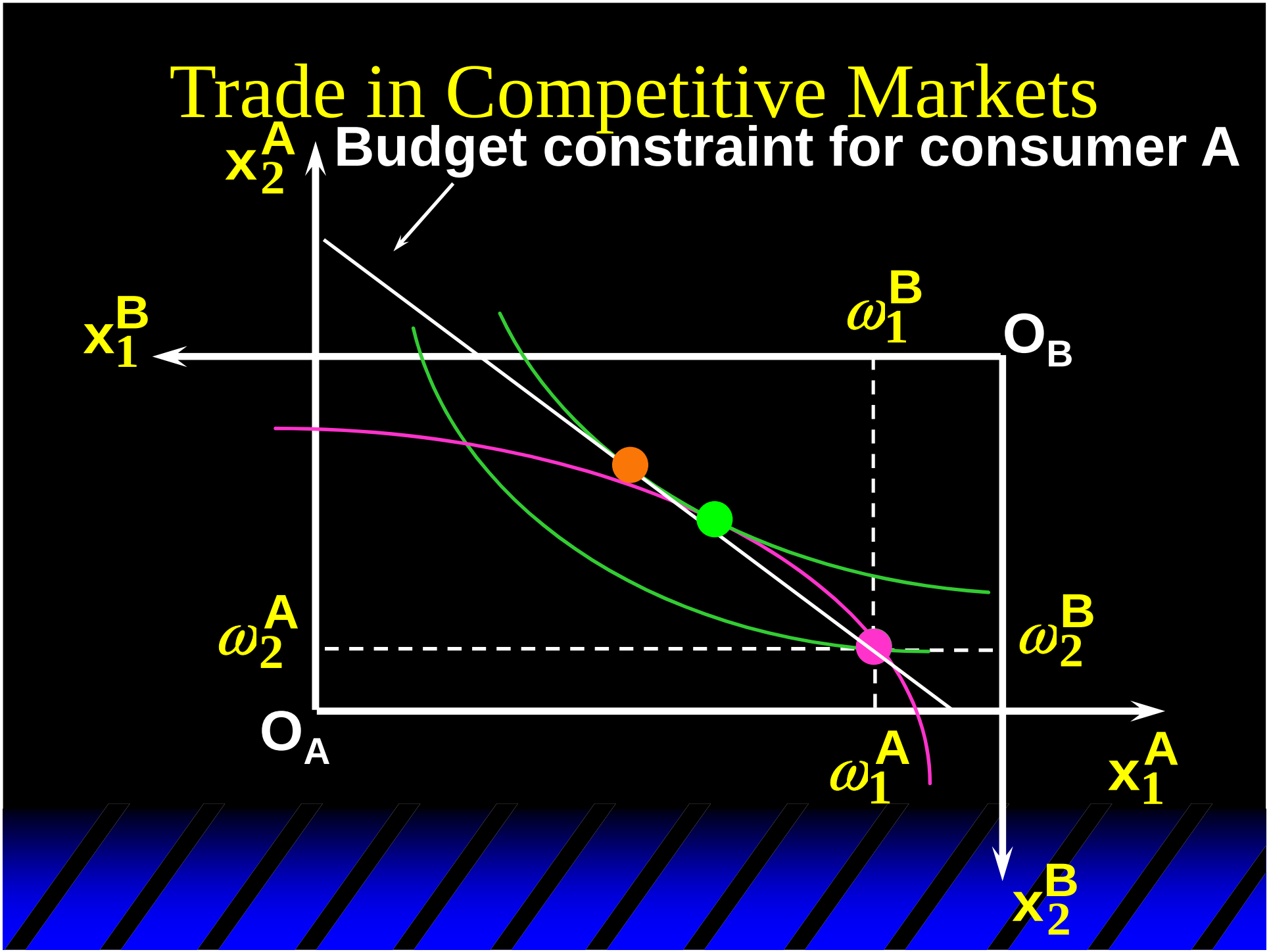
- So given p_1 and p_2, consumer A's net demands for commodities 1 and 2 are

$$x_1^{*A} - \omega_1^A \quad \text{and} \quad x_2^{*A} - \omega_2^A .$$

- And, similarly, for consumer B …
- A **general equilibrium** occurs when prices p_1 and p_2 cause both the markets for commodities 1 and 2 to clear; i.e.

$$x_1^{*A} + x_1^{*B} = \omega_1^A + \omega_1^B \quad \text{and} \quad x_2^{*A} + x_2^{*B} = \omega_2^A + \omega_2^B .$$

Trade in Competitive Markets



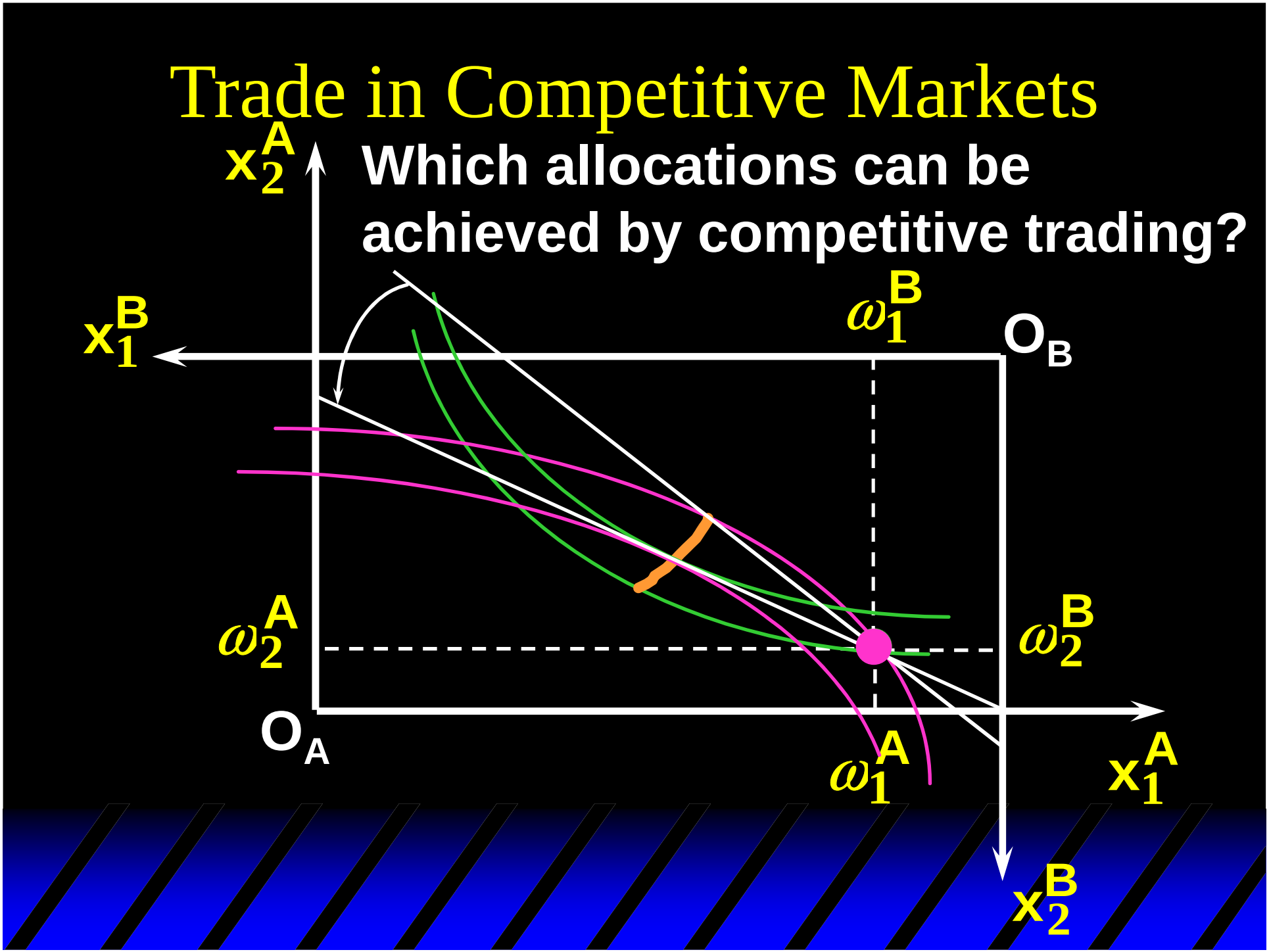
Trade in Competitive Markets

- So at the given prices p_1 and p_2 there is an
  - excess supply of commodity 1
  - excess demand for commodity 2.
- Neither market clears so the prices p_1 and p_2 do not cause a general equilibrium.
- Which allocations can be achieved by competitive trading?

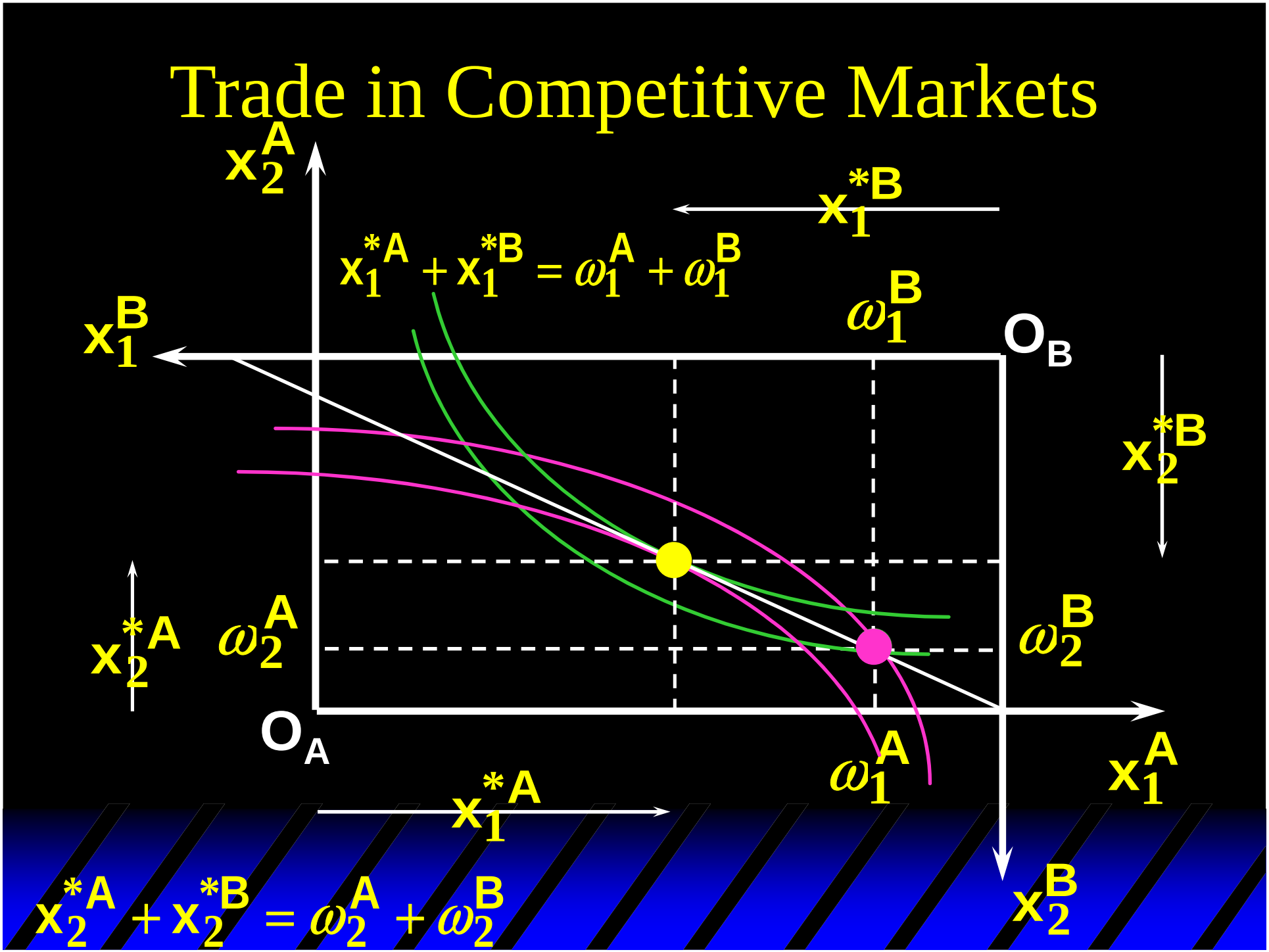
Trade in Competitive Markets

- Since there is an excess demand for commodity 2, p_2 will rise.
- Since there is an excess supply of commodity 1, p_1 will fall.
- The slope of the budget constraints is - p_1/p_2 so the budget constraints will pivot about the endowment point and become less steep.

Trade in Competitive Markets



Trade in Competitive Markets



Trade in Competitive Markets

- At the new prices p_1 and p_2 both markets clear; there is a general equilibrium.
- Trading in competitive markets achieves a particular Pareto-optimal allocation of the endowments.
- This is an example of the **First Fundamental Theorem of Welfare Economics**.