LECTURE 4

Welfare economics

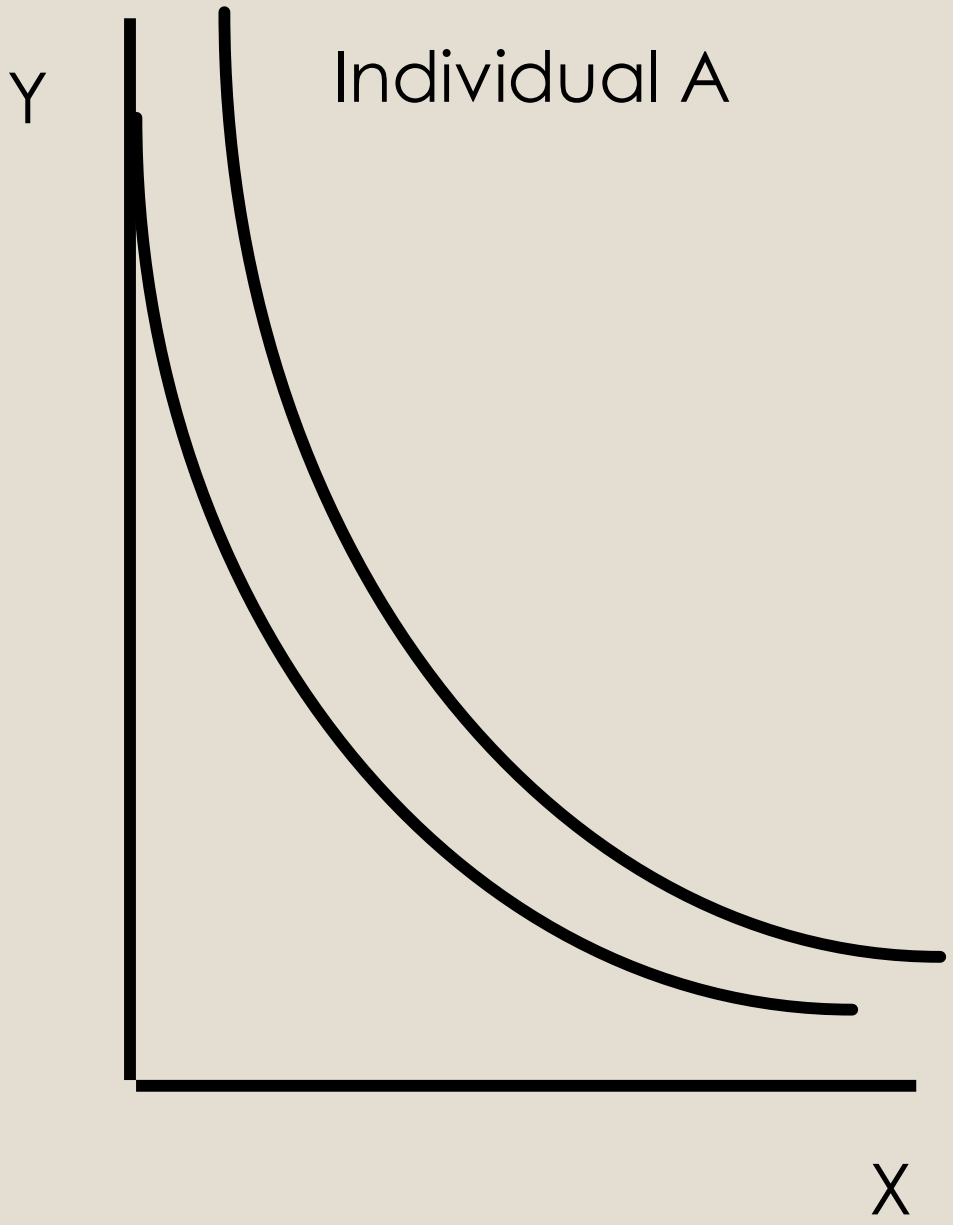
Welfare economics

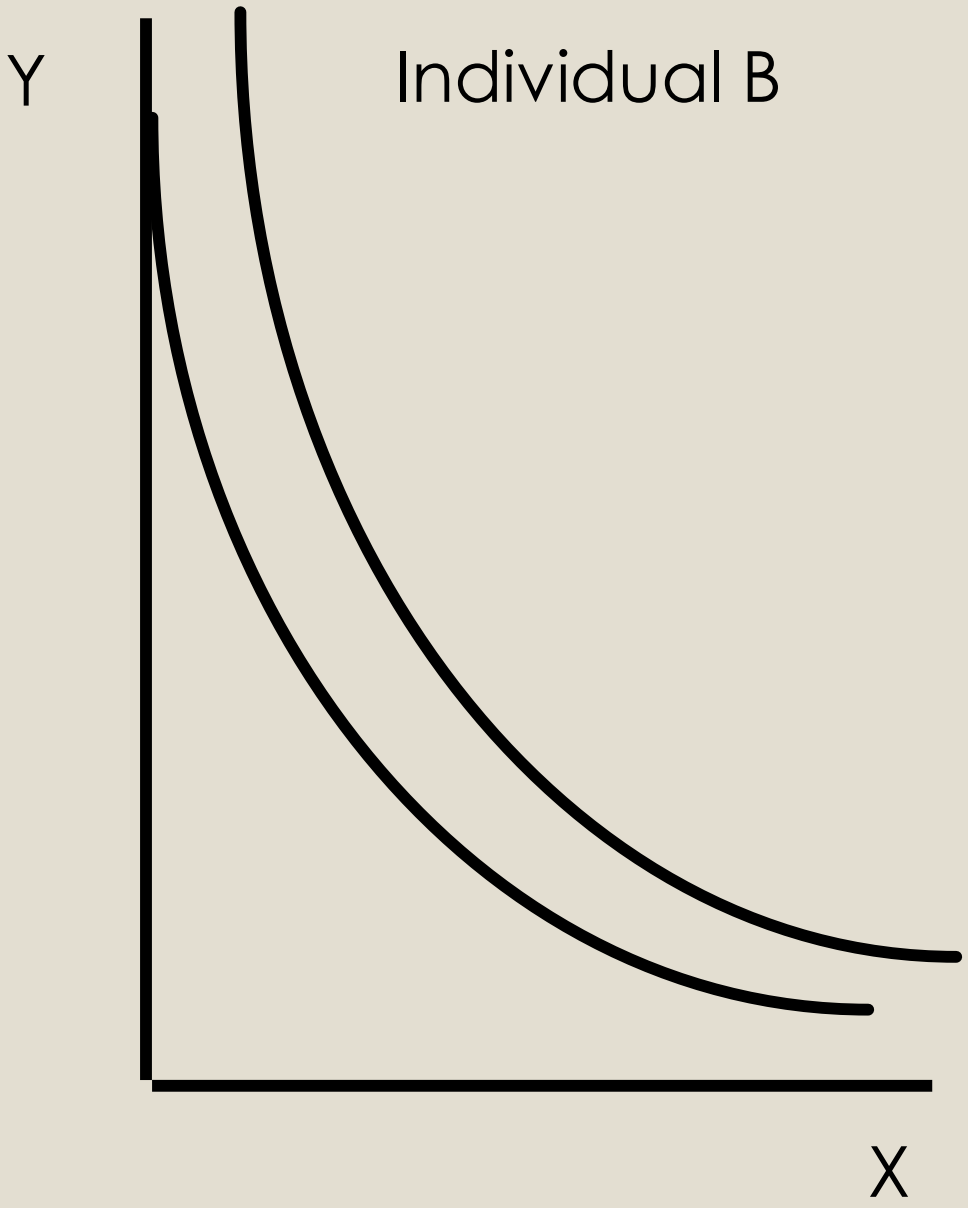
INTERACTIONS AMONG INDIVIDUALS IN A COMPETITIVE SOCIETY

Welfare economics

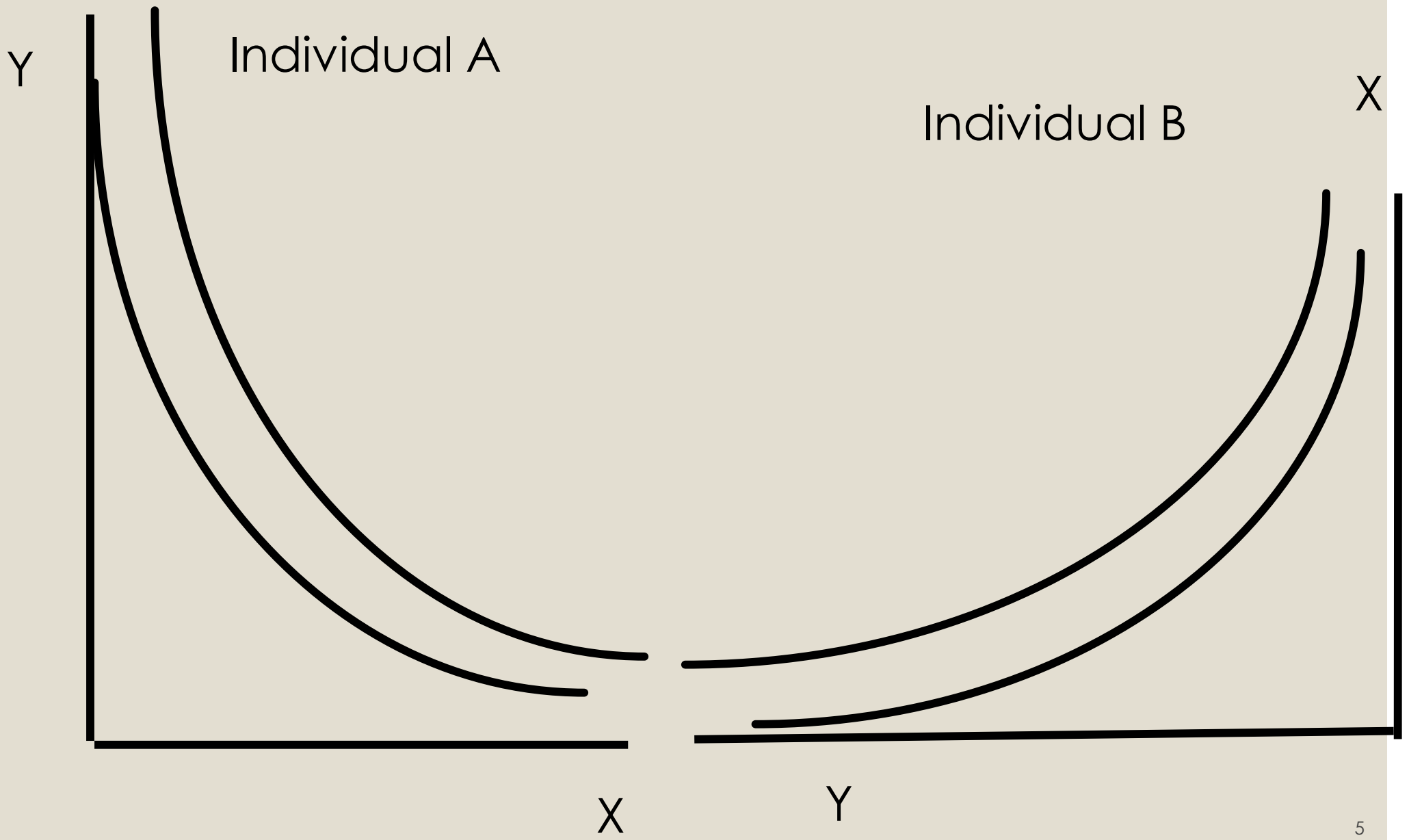
- Welfare economics is that branch of economic theory that deals with the social desirability of alternative economic states.
- We begin with the Edgeworth exchange box which was invented by Francis Edgeworth. The box depicts an economy where two isolated individuals freely trade two **private** goods.

Exchange box diagram

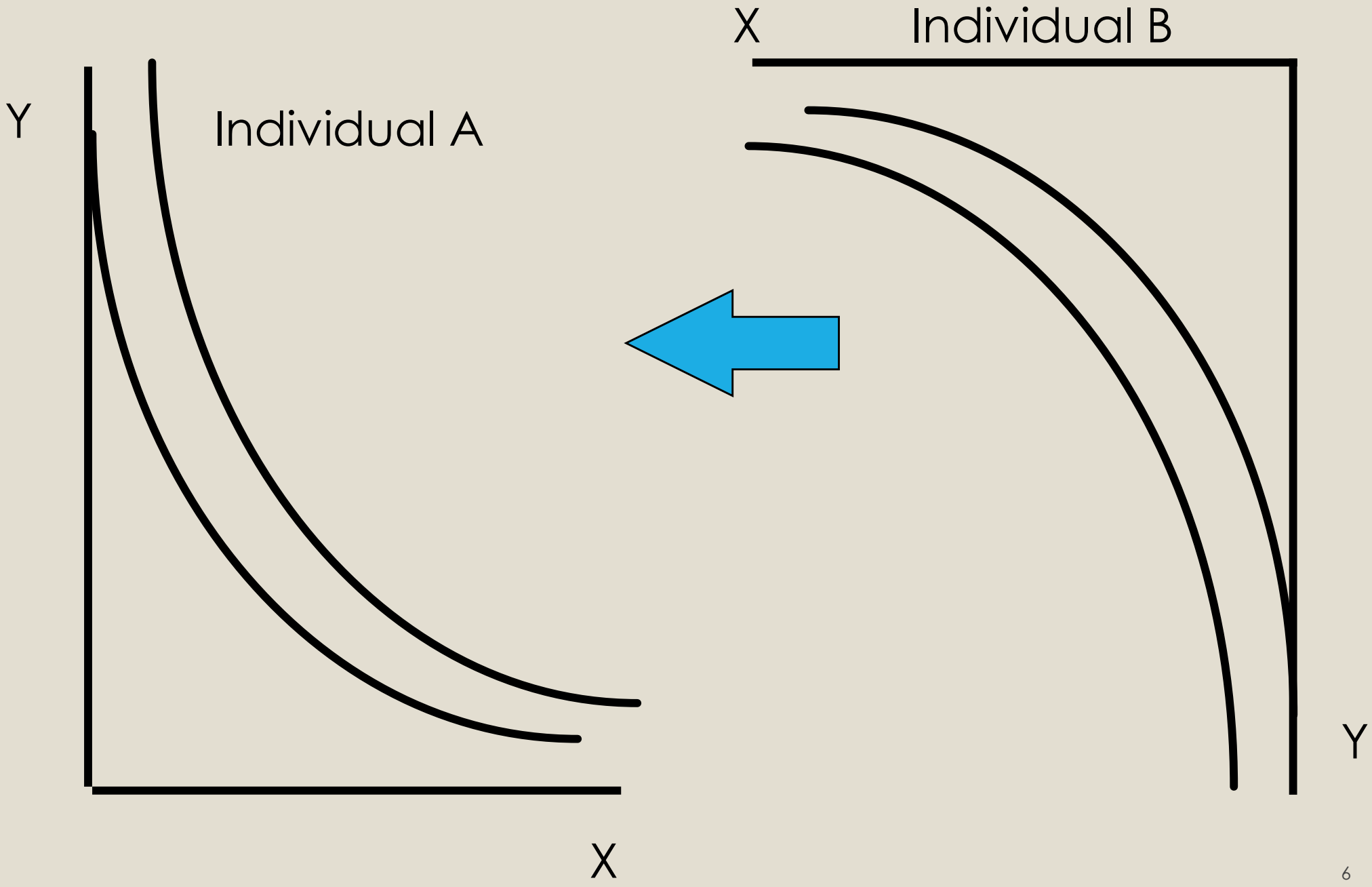




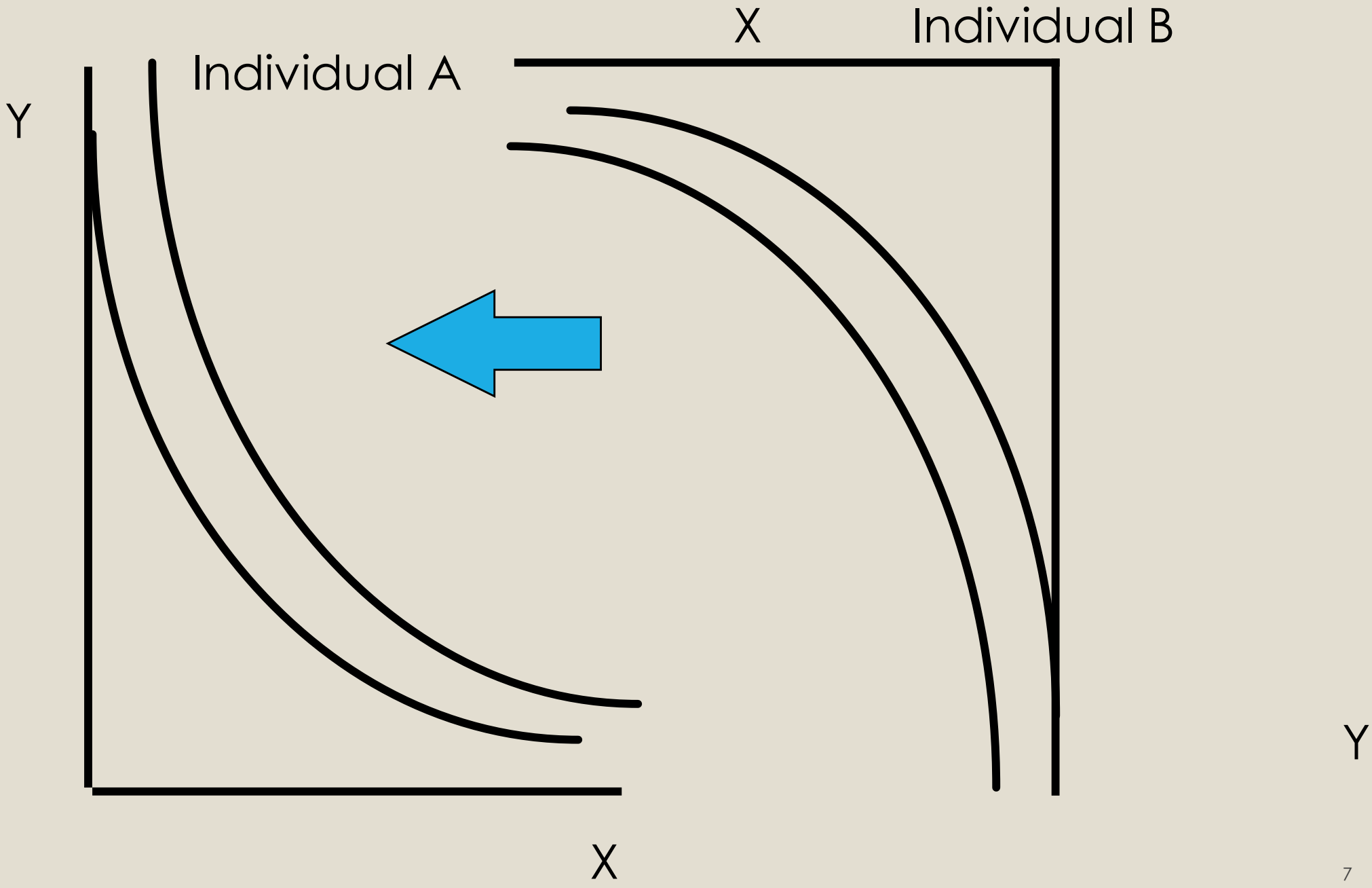
Exchange box diagram



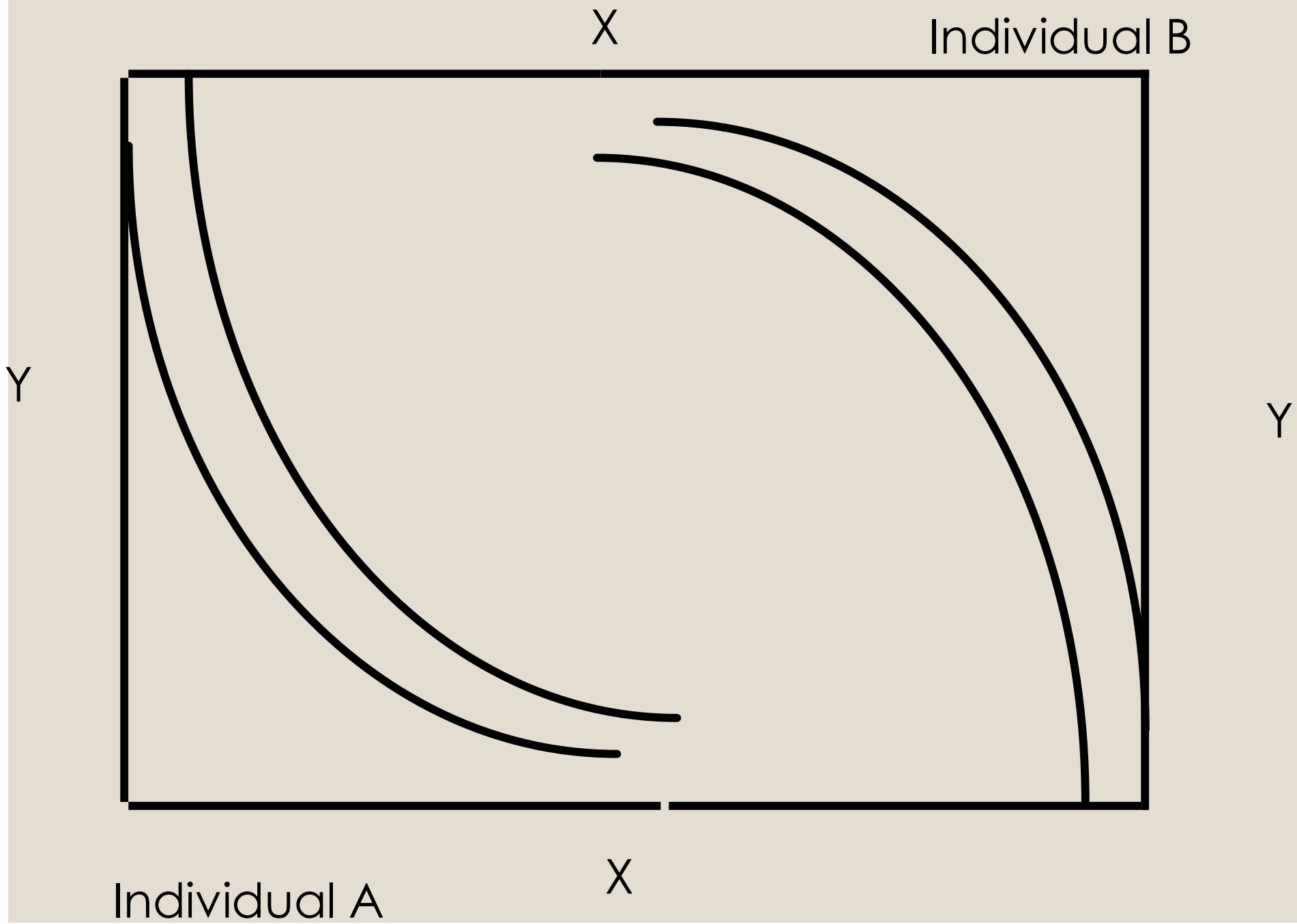
Exchange box diagram



Exchange box diagram

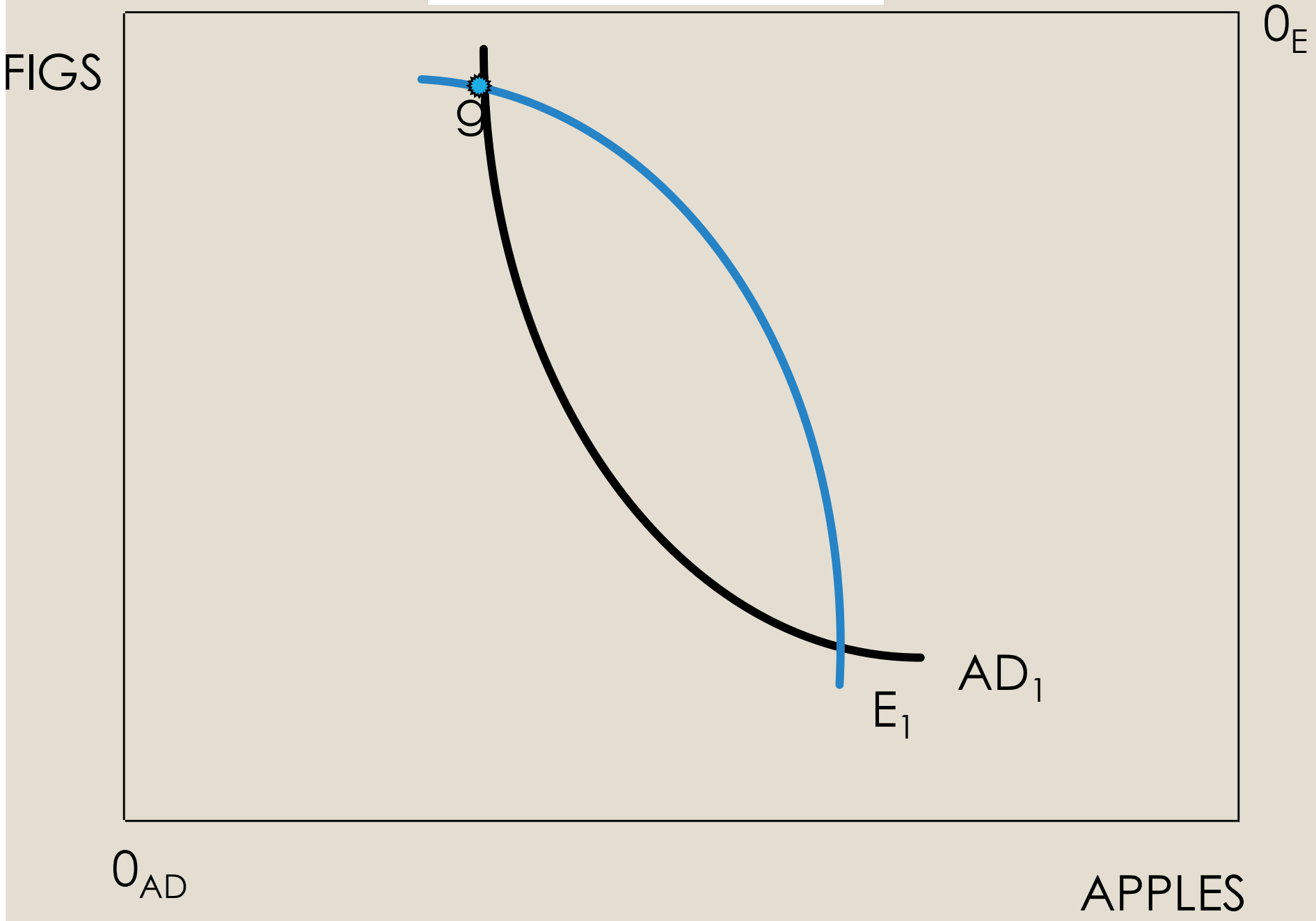


Exchange box diagram

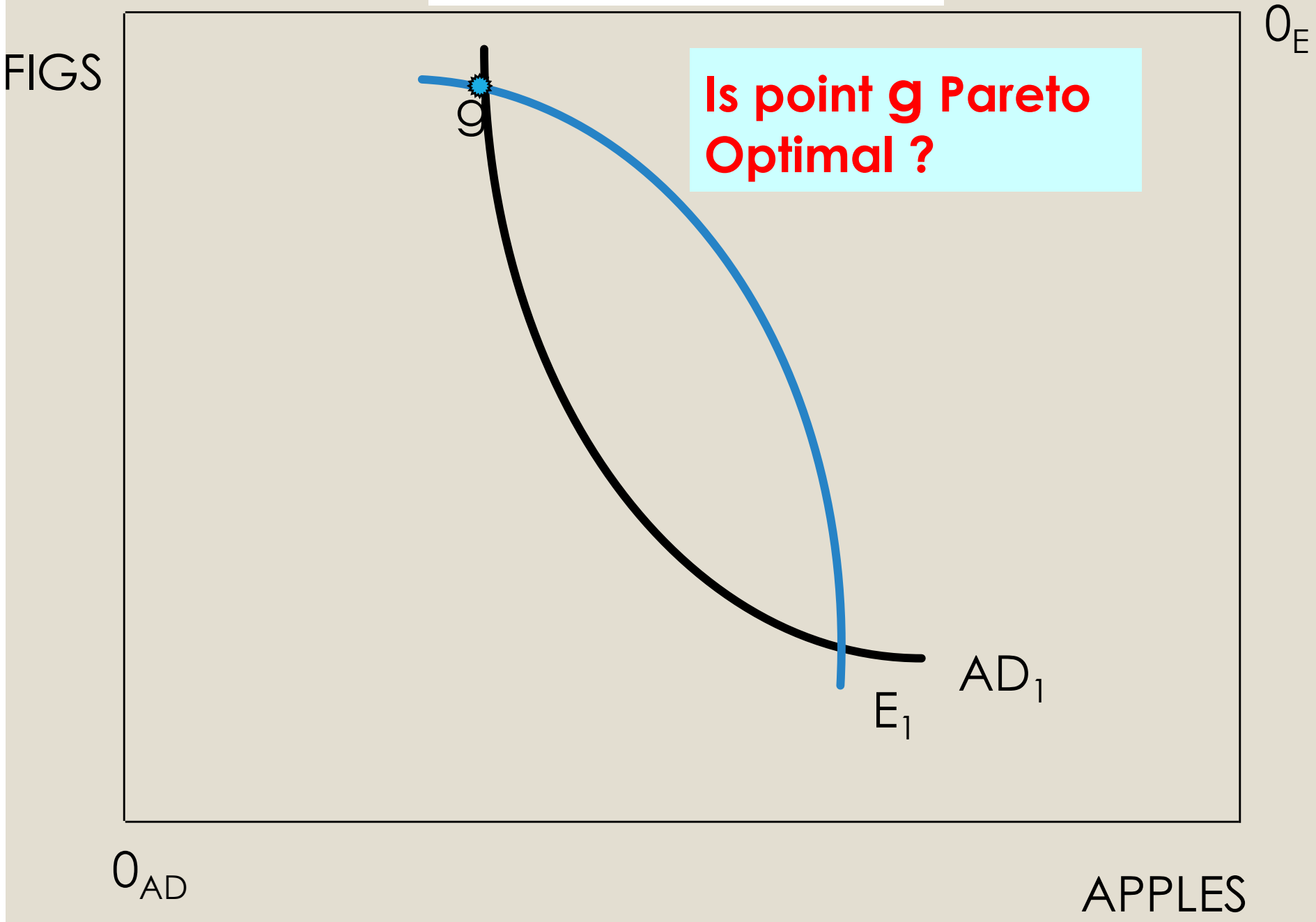


PARETO OPTIMAL IN A TWO-PERSON TWO-GOODS ECONOMY

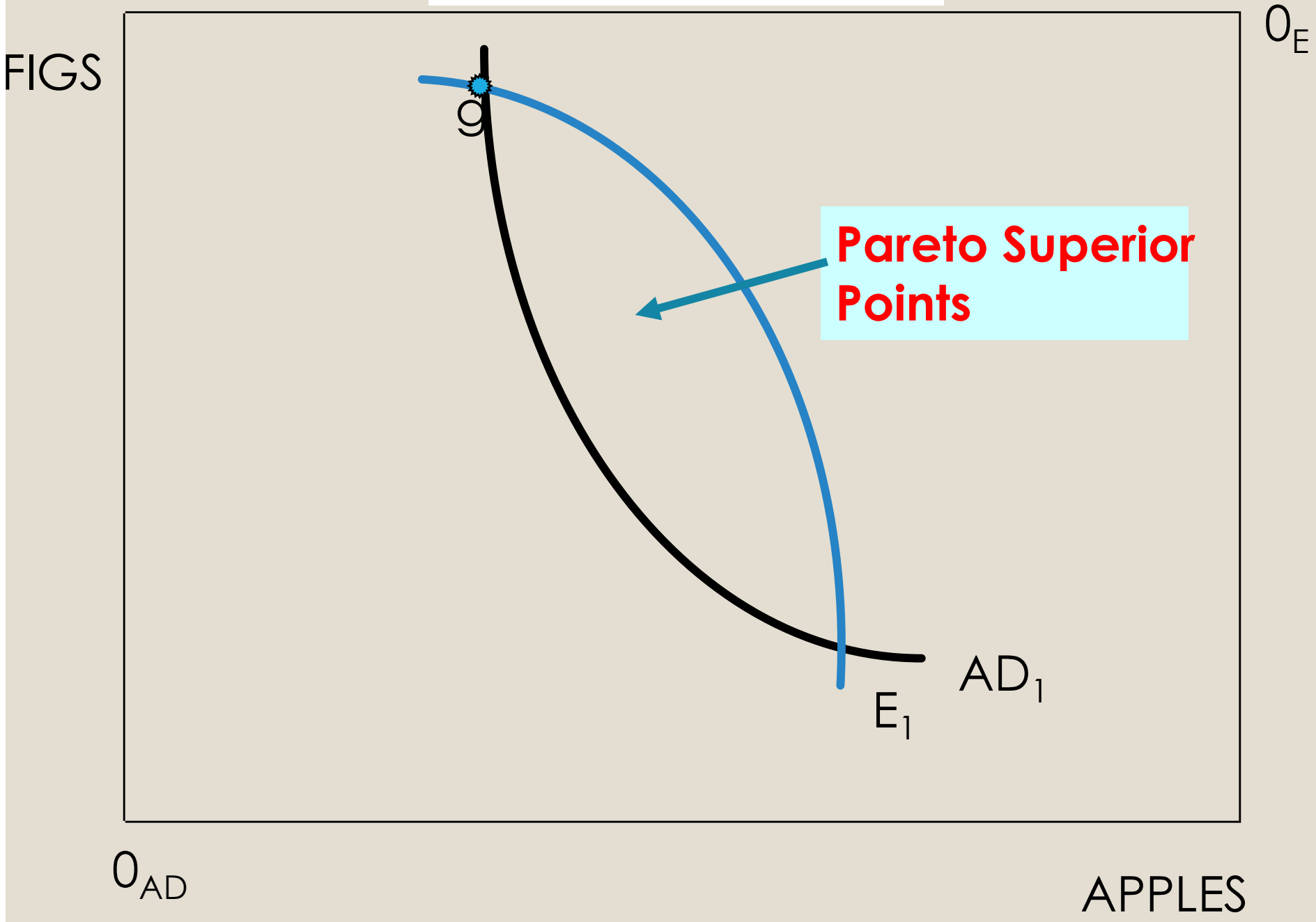
Edgeworth box



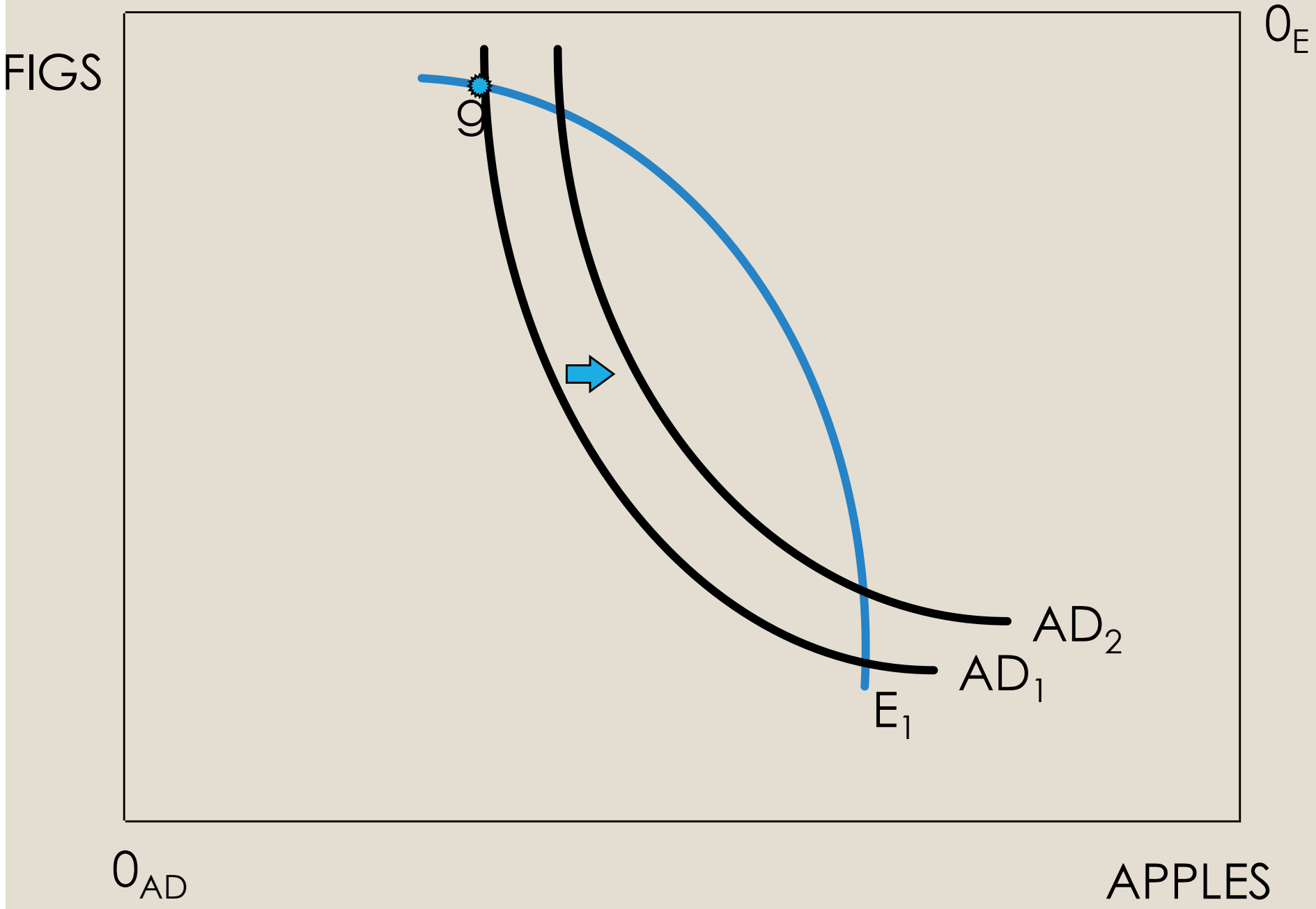
Edgeworth box



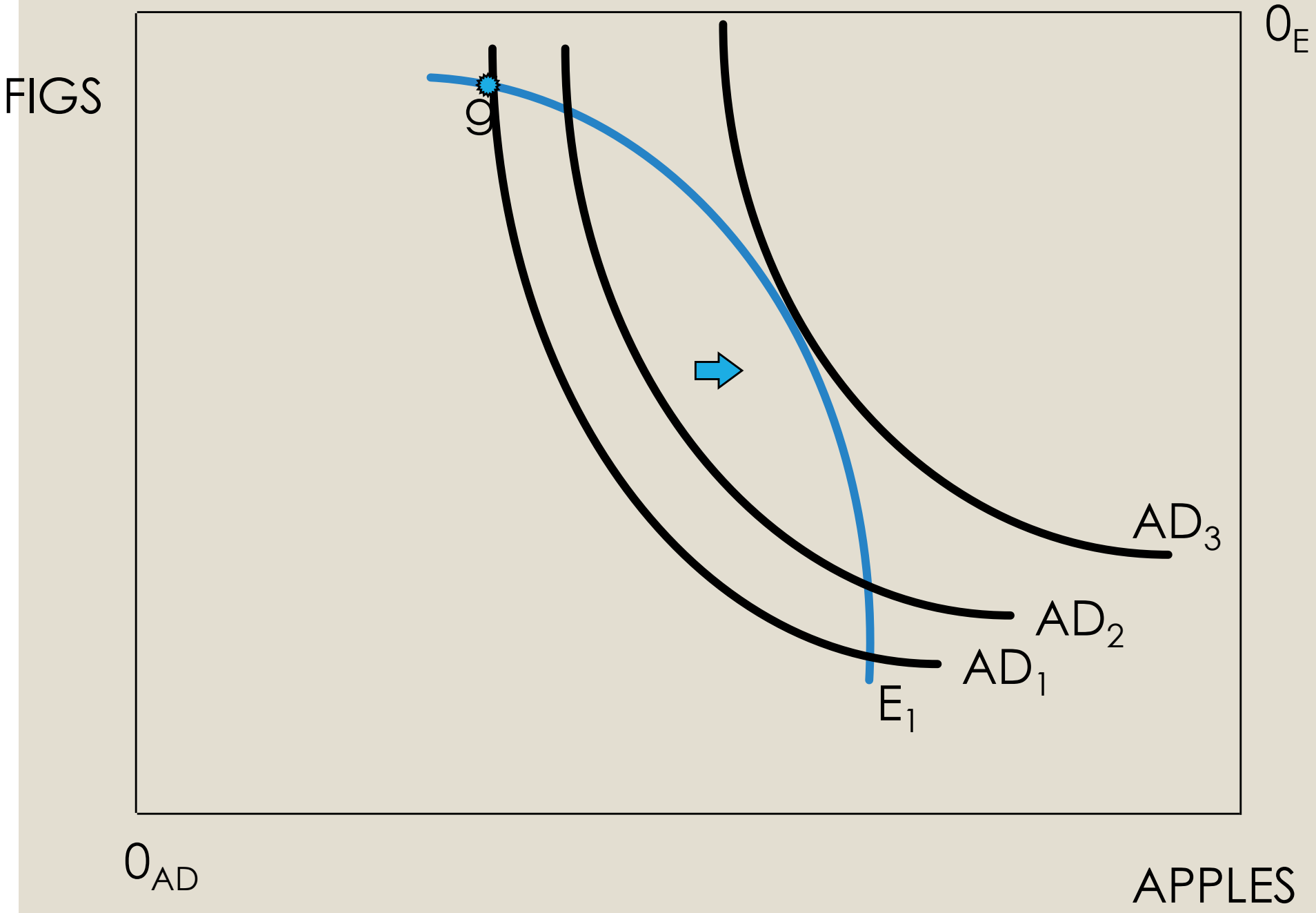
Edgeworth box



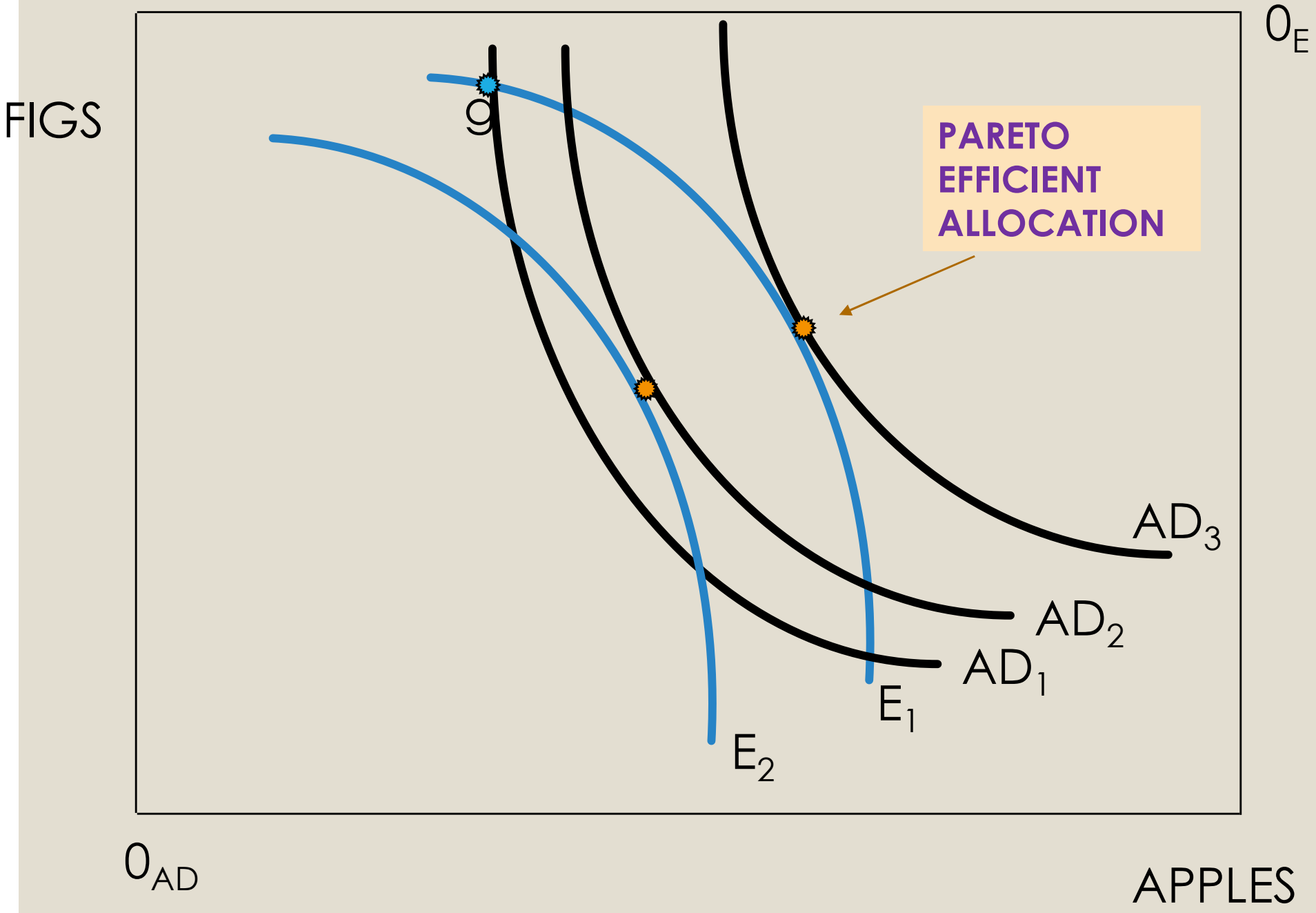
Edgeworth box



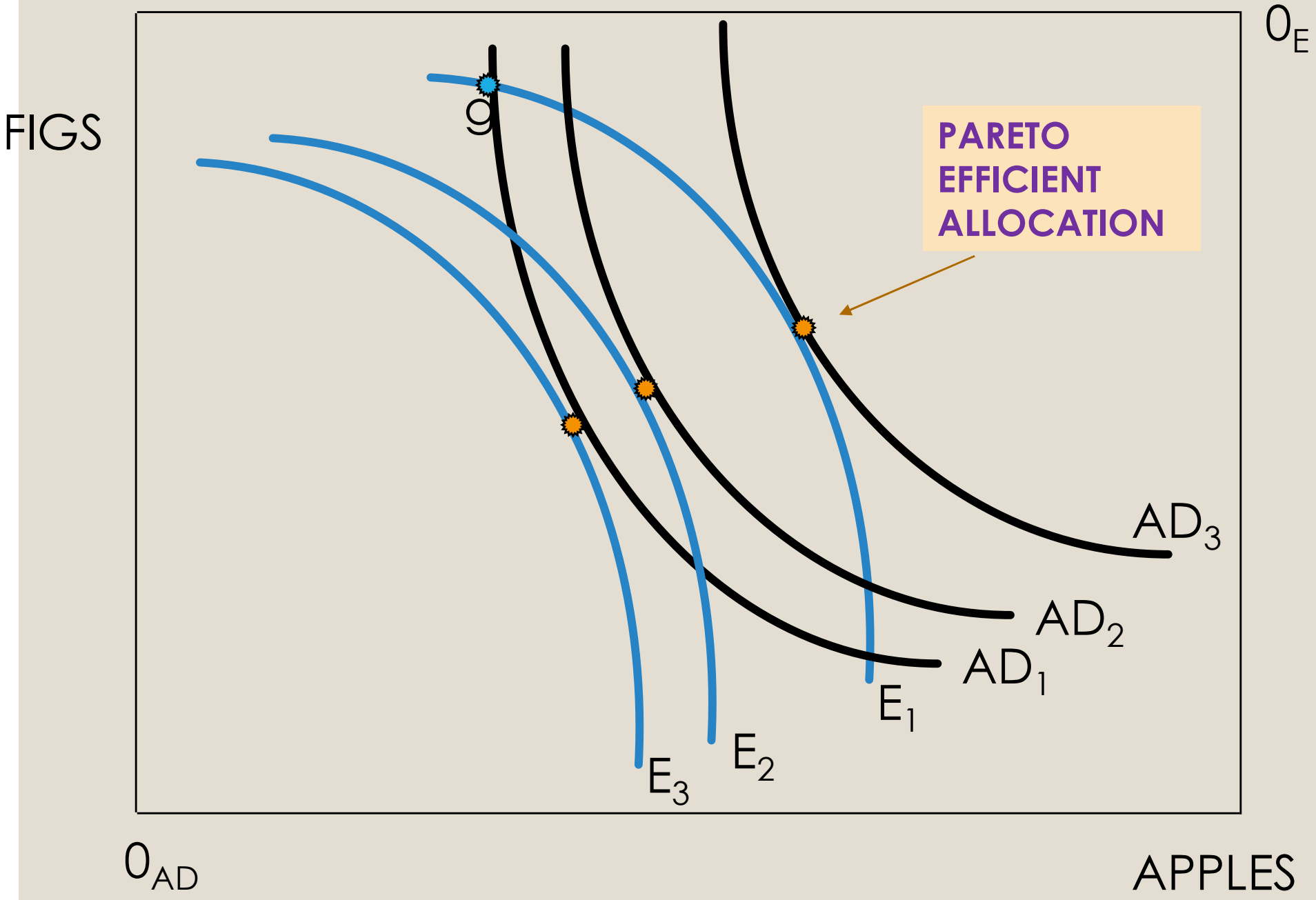
Edgeworth box



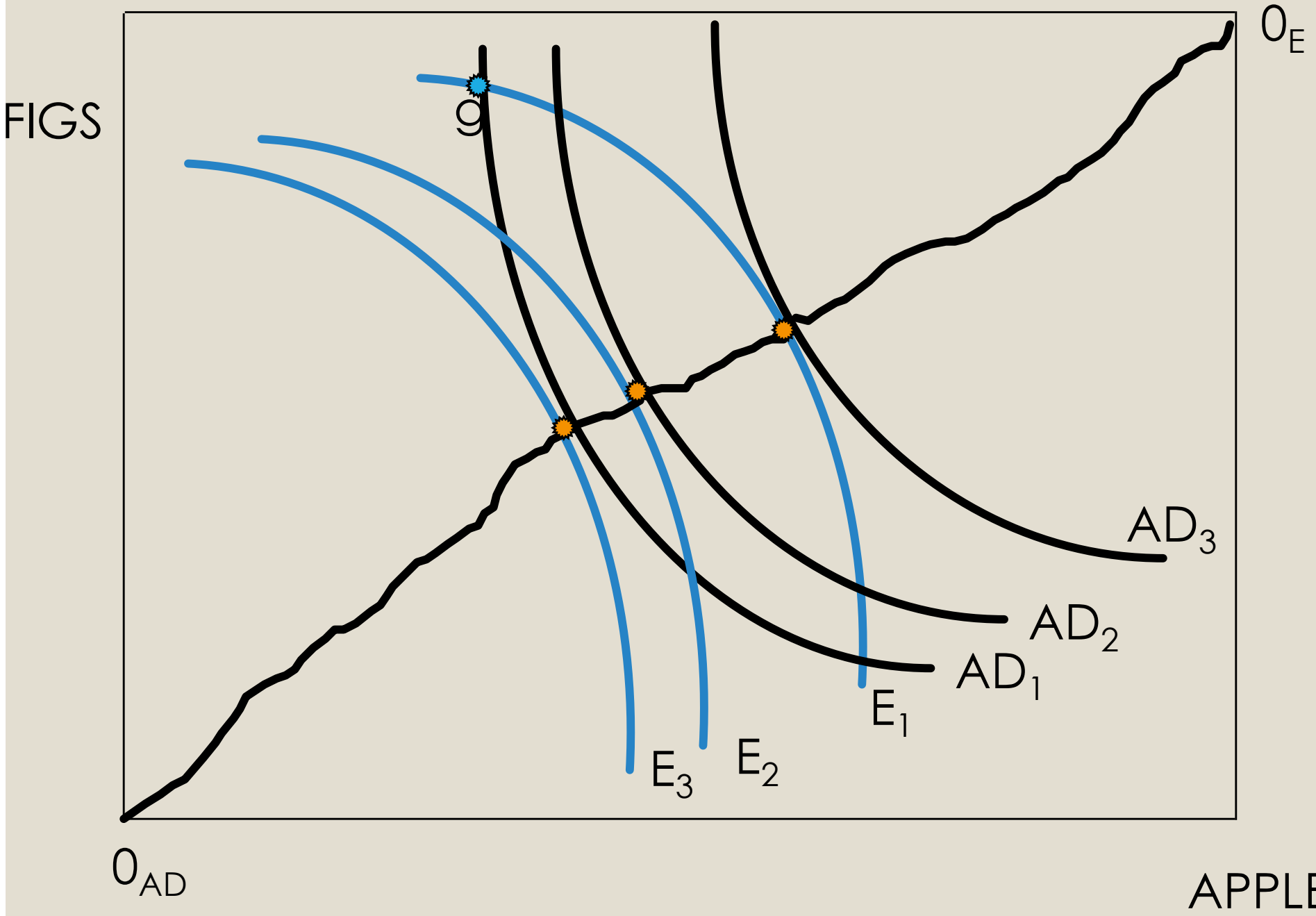
Edgeworth box



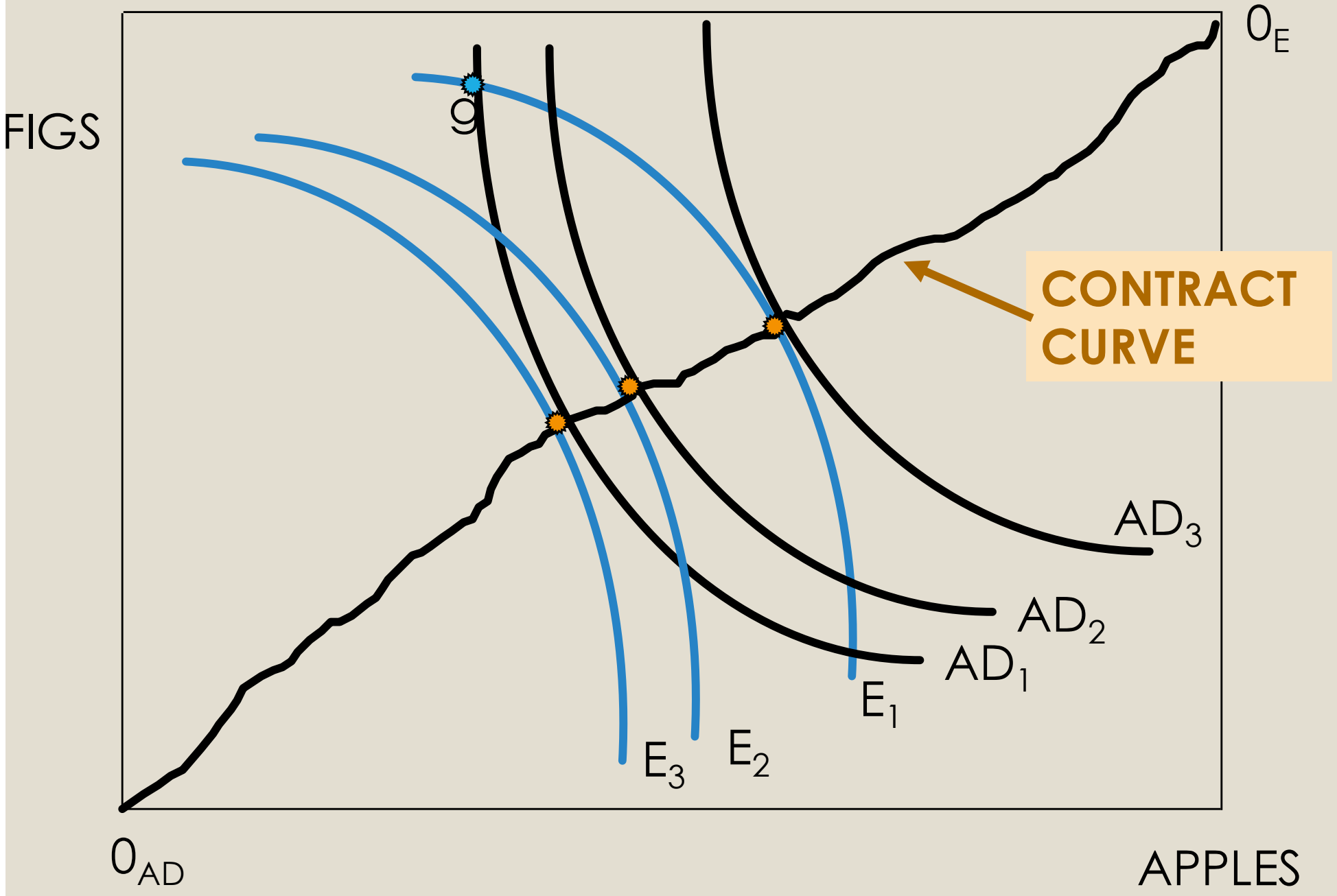
Edgeworth box



Edgeworth box

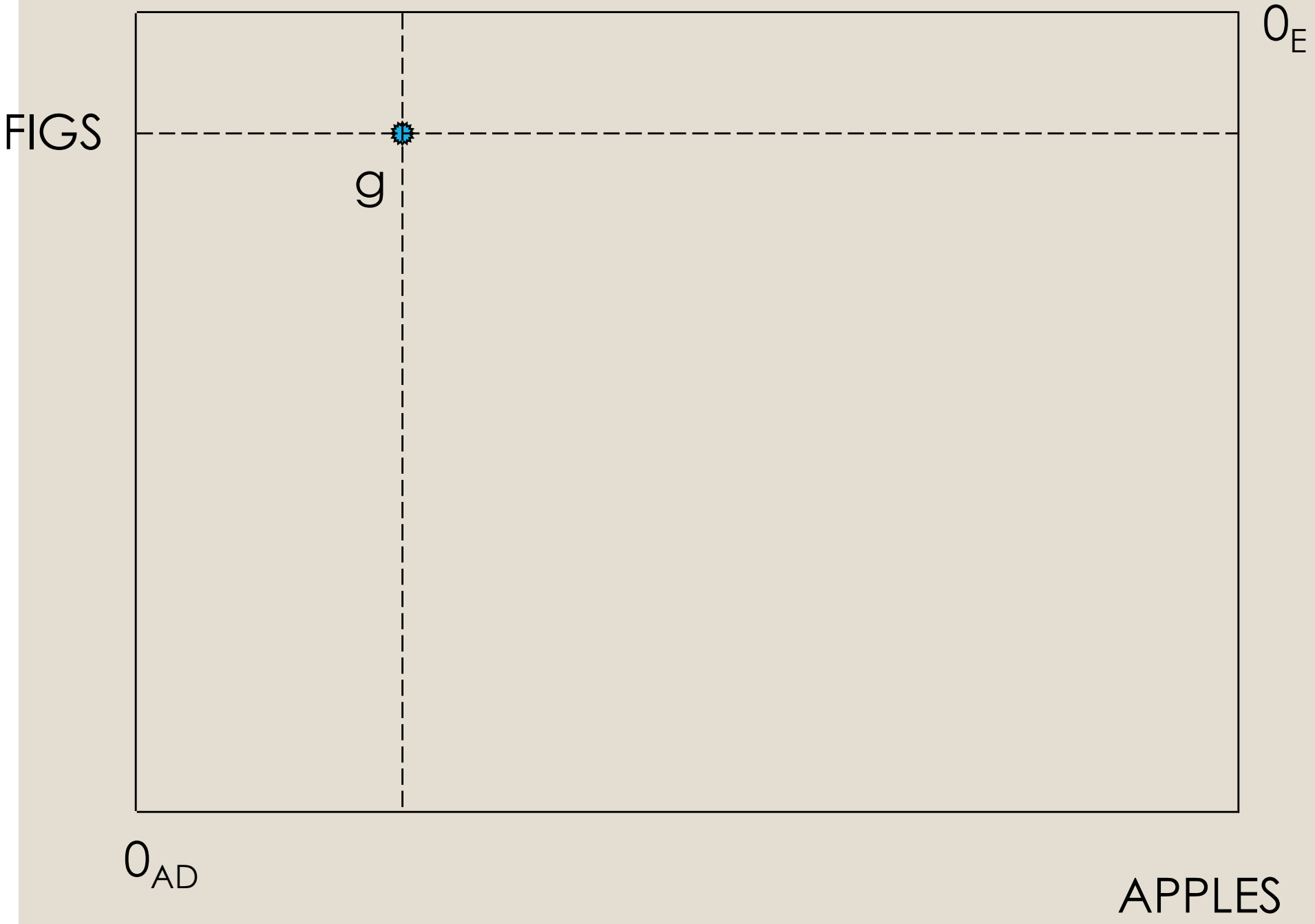


Edgeworth box

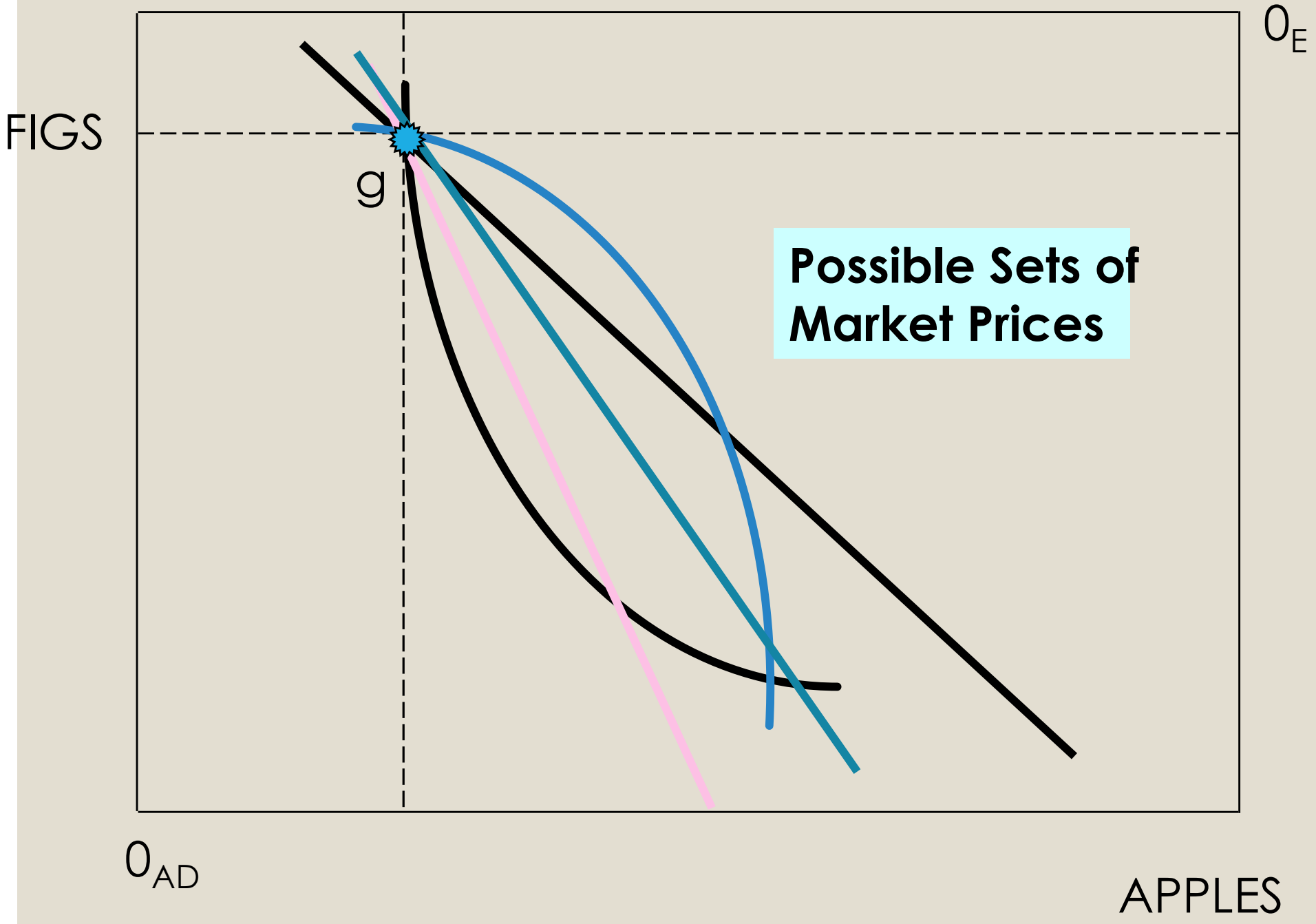


How do the individual's get to the contract line from point g ?

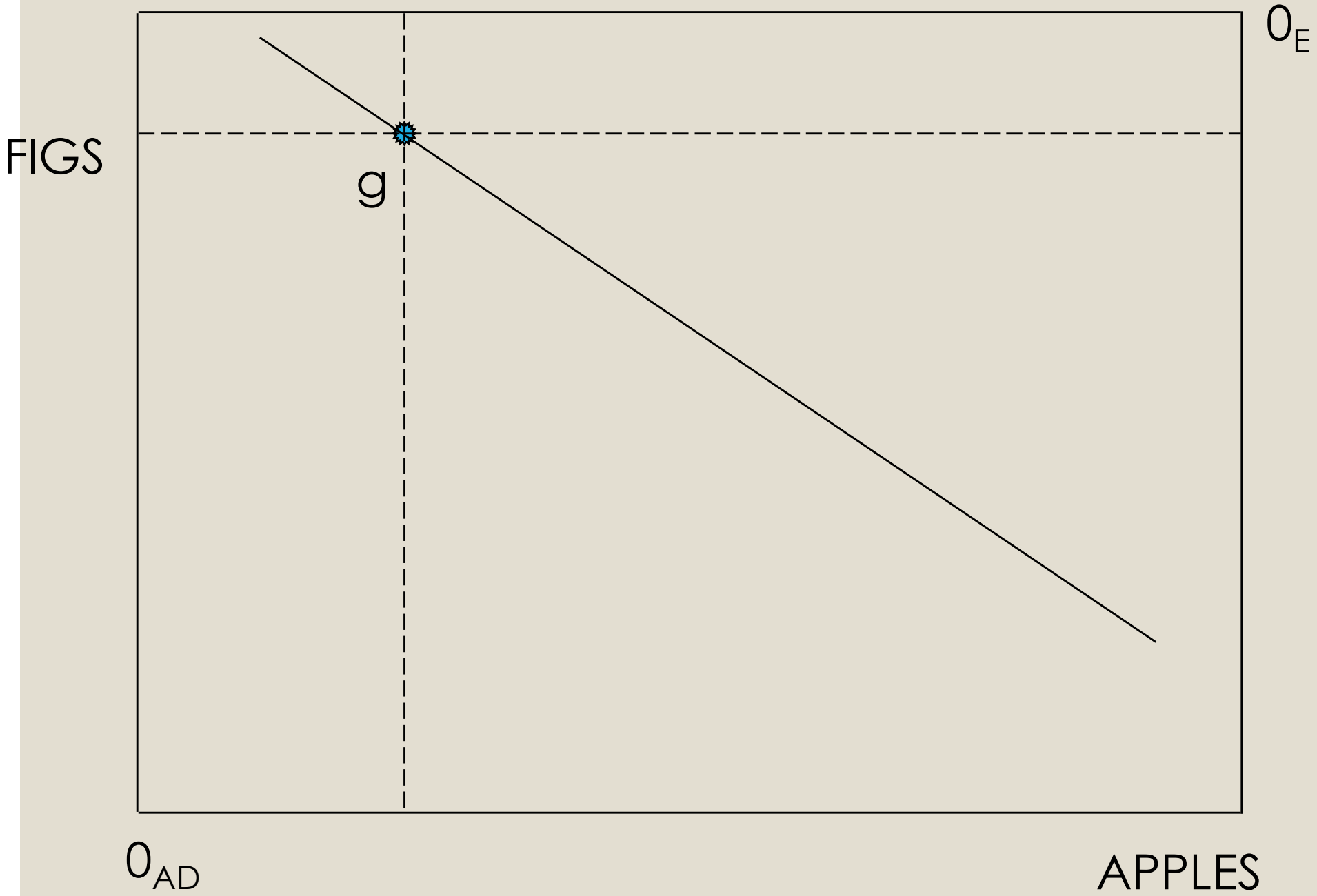
Edgeworth box



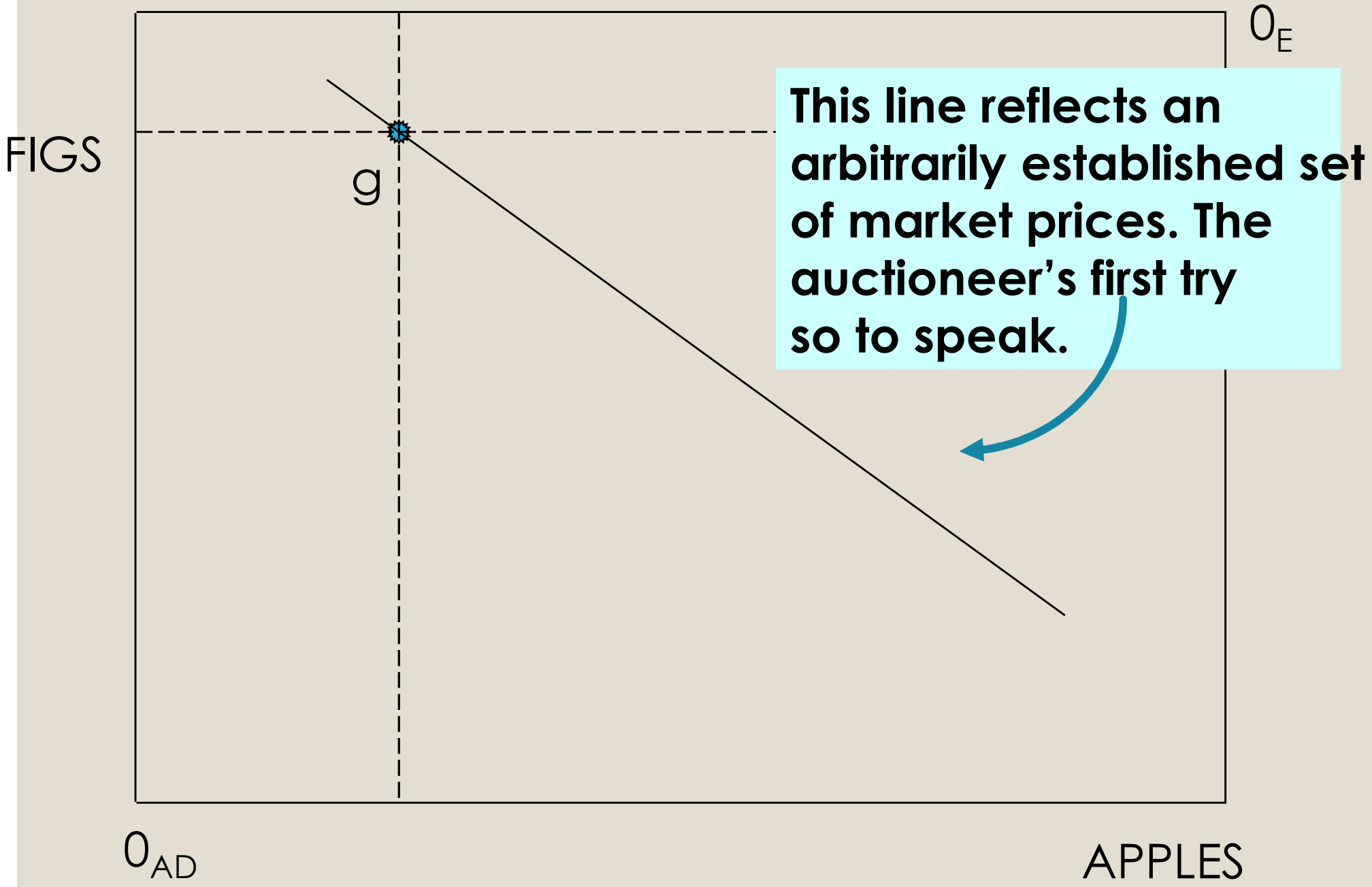
Edgeworth box



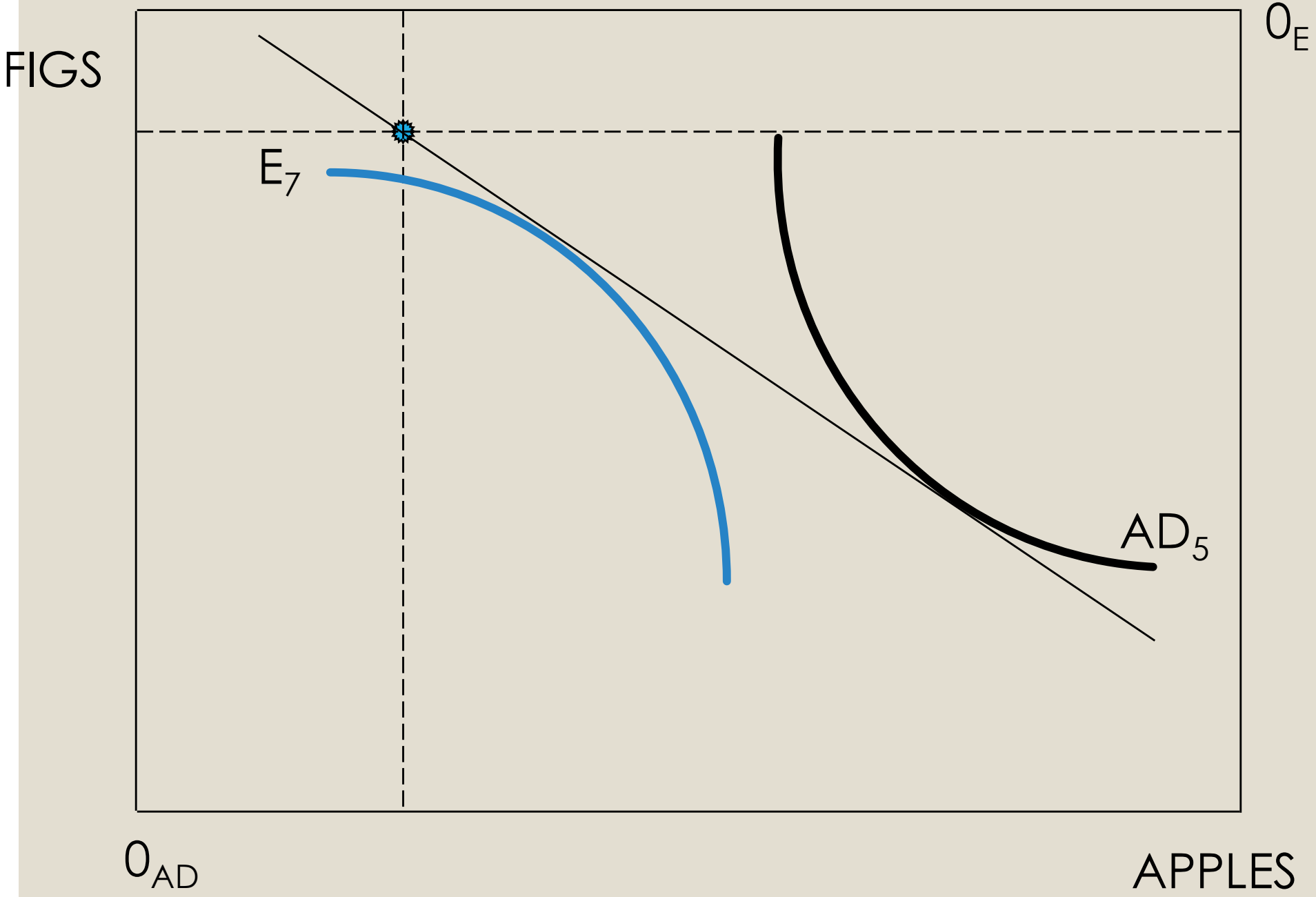
Edgeworth box



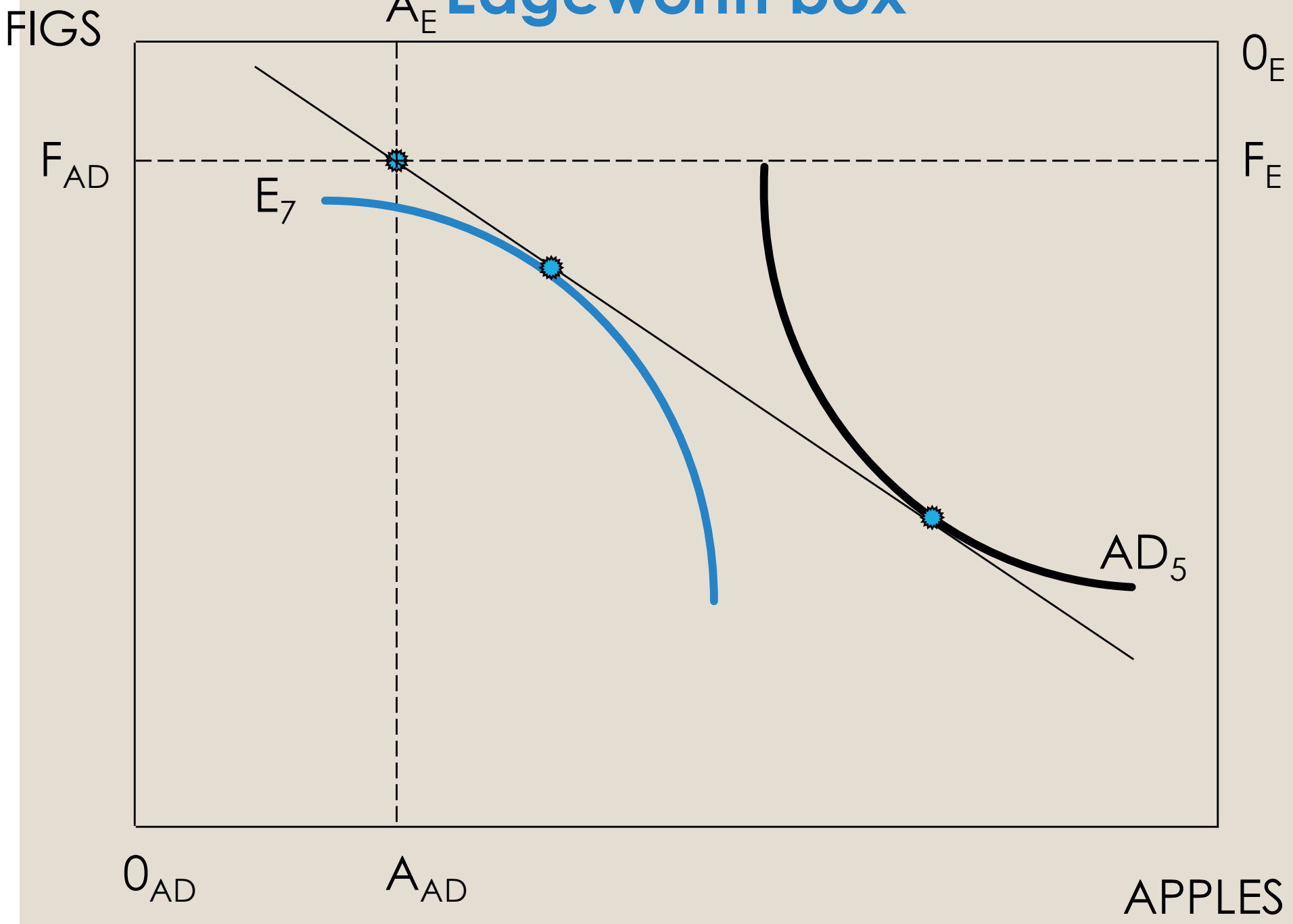
Edgeworth box

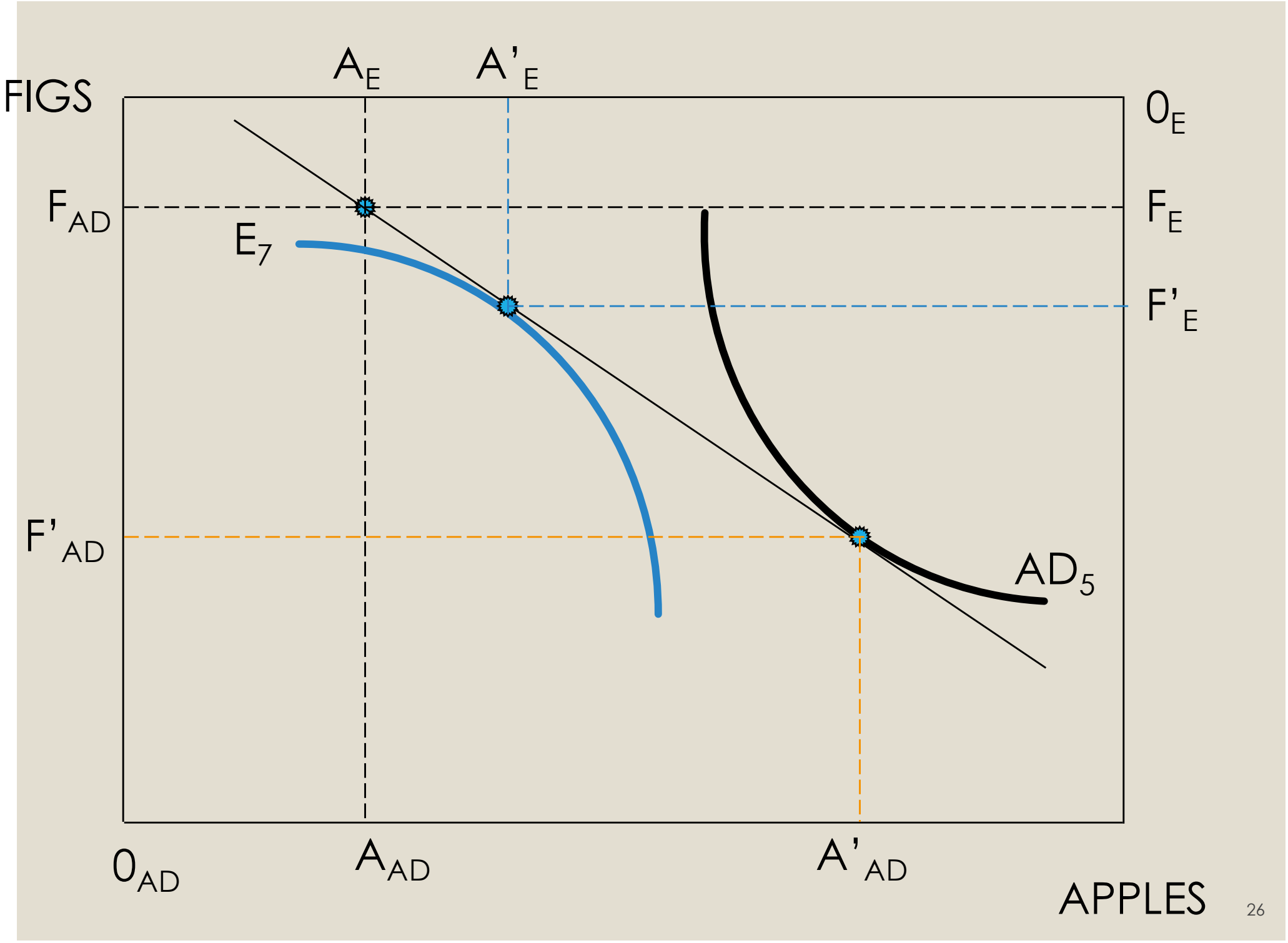


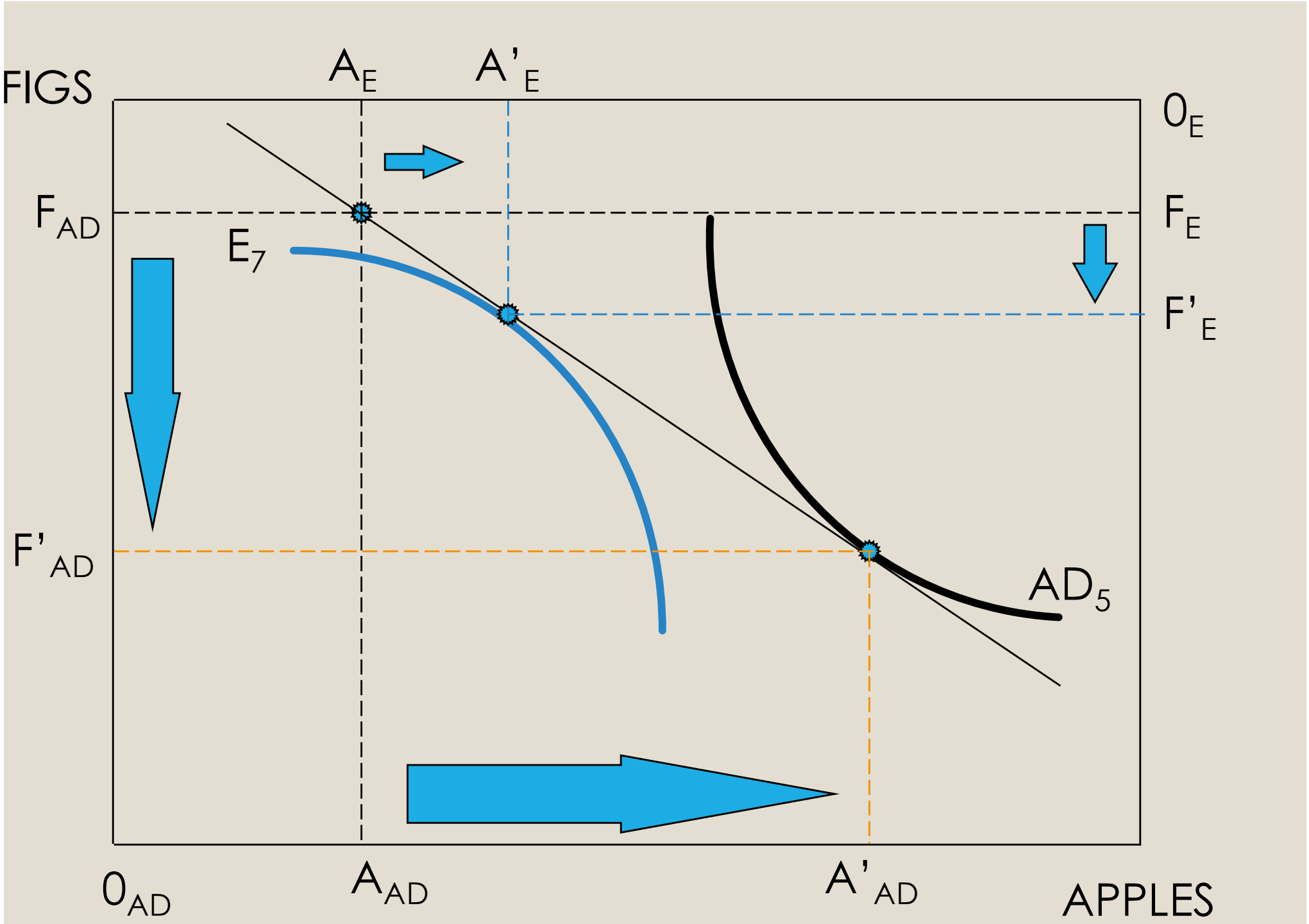
Edgeworth box

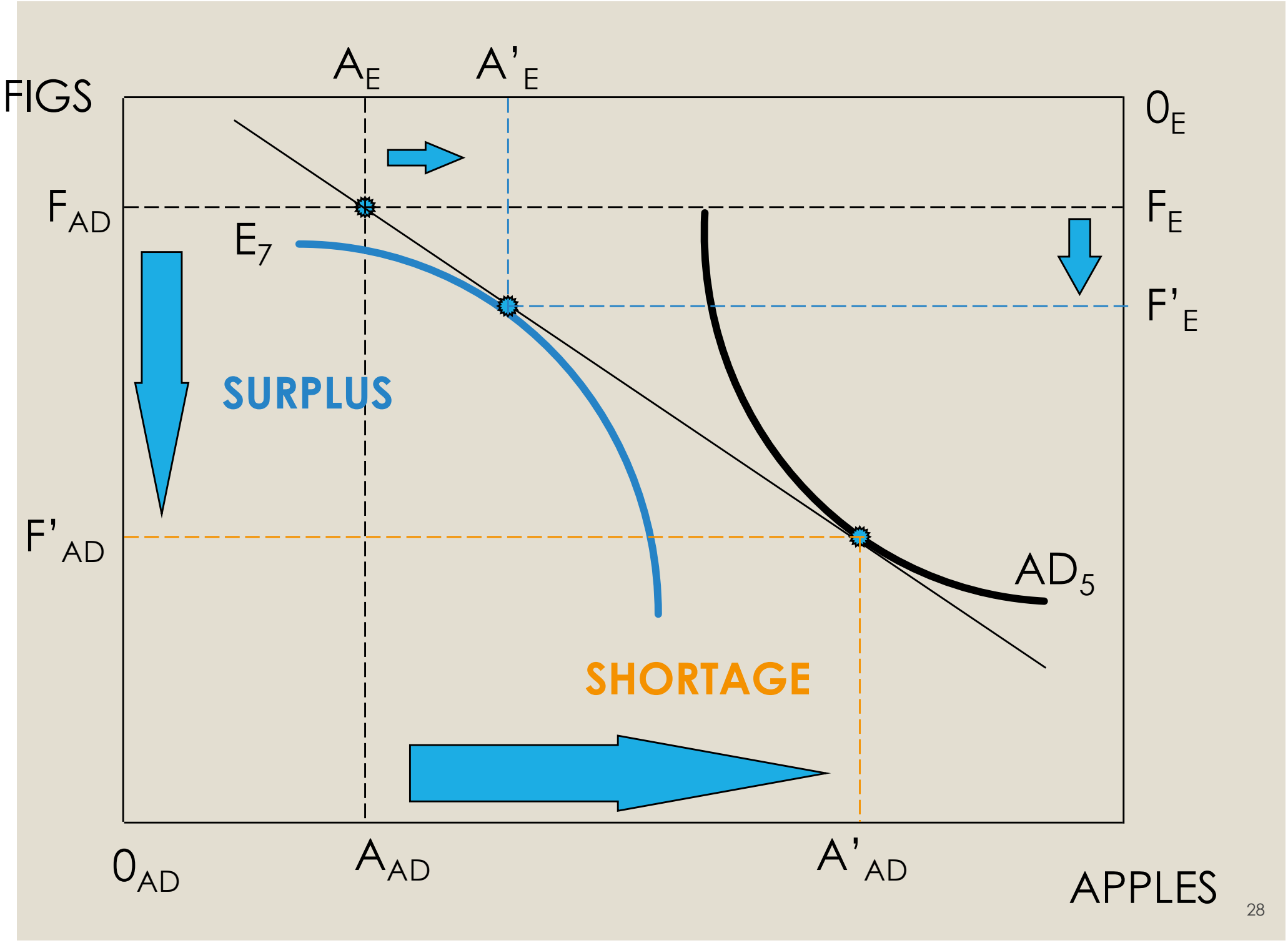


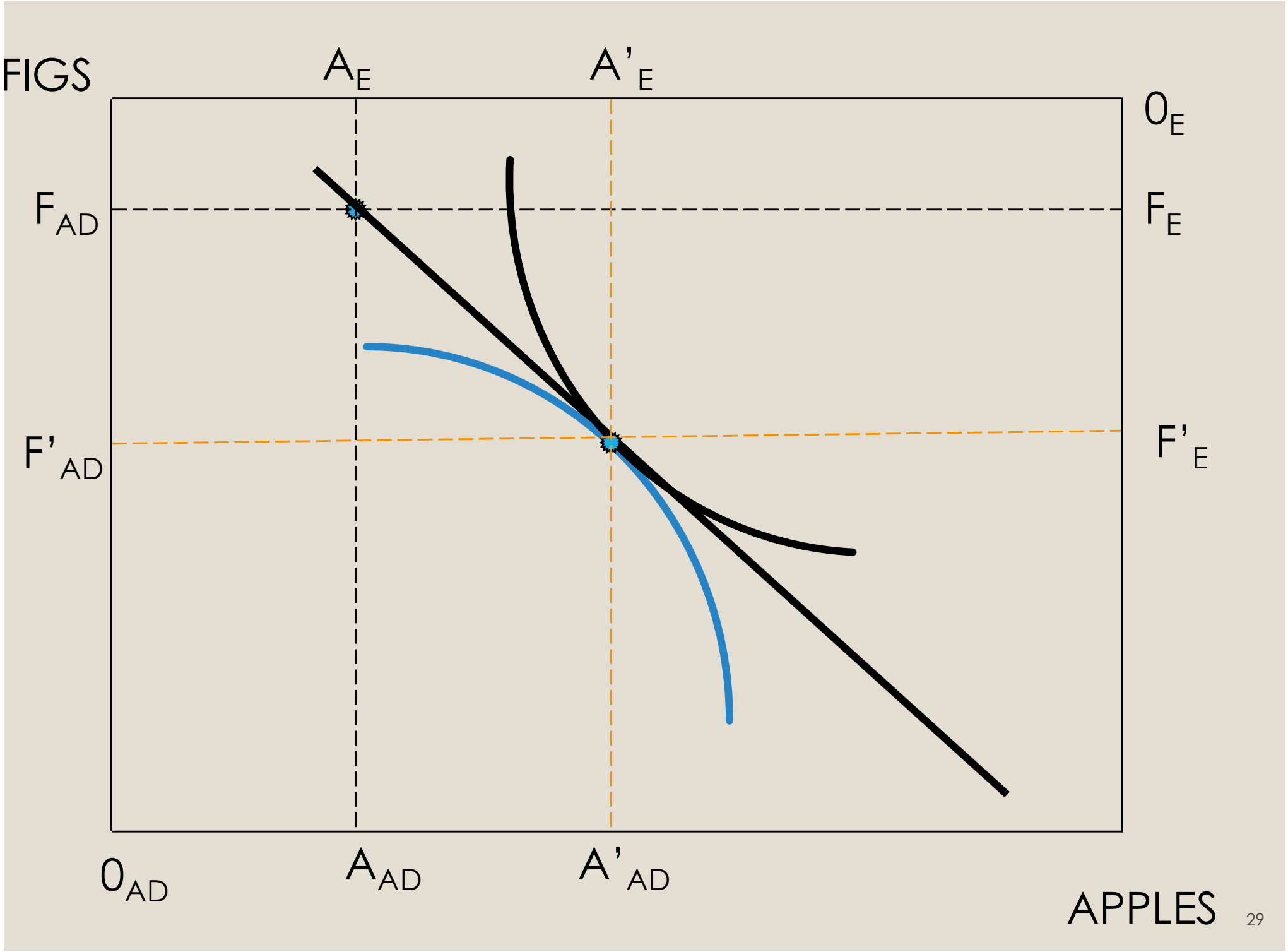
Edgeworth box

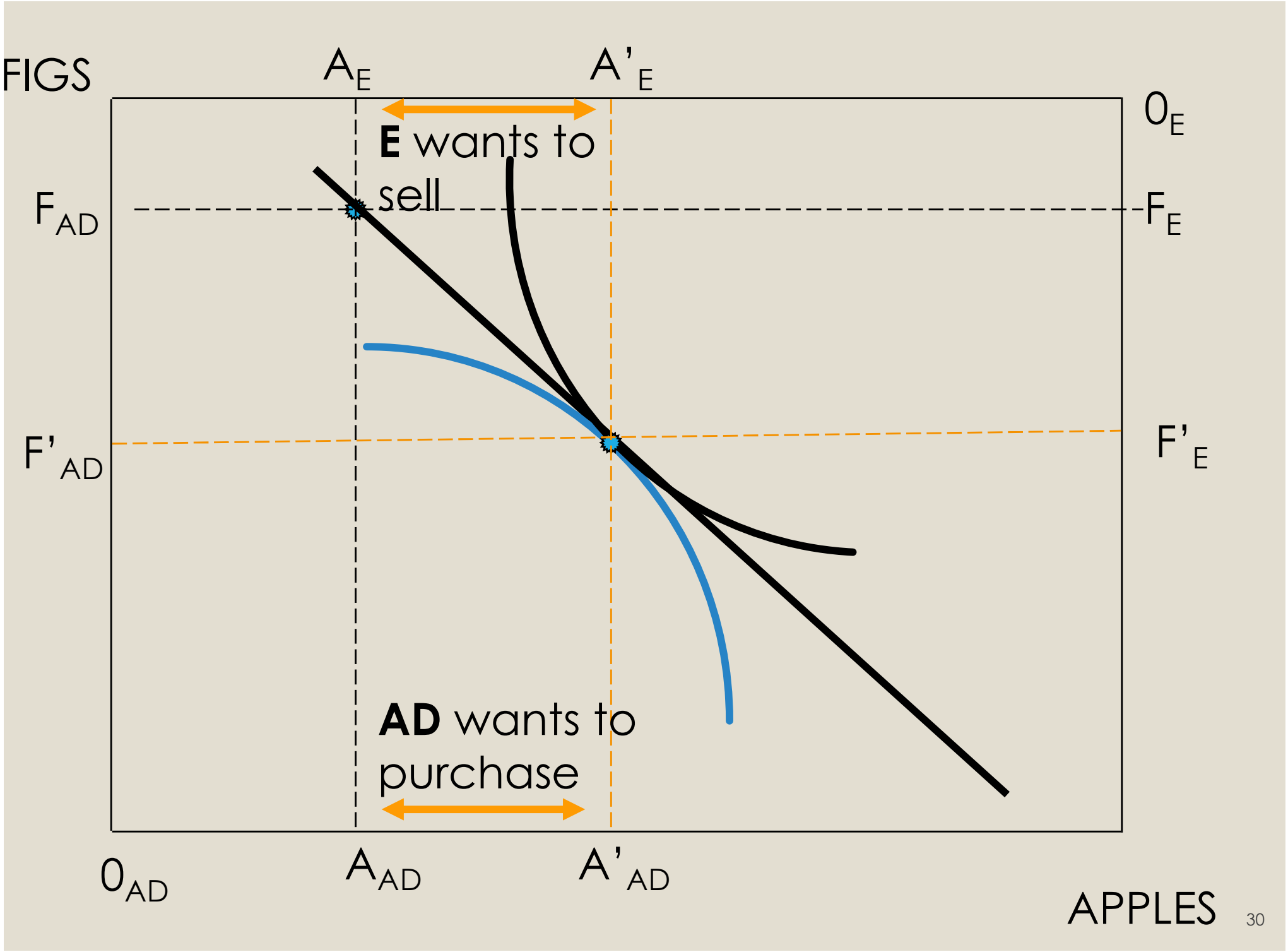


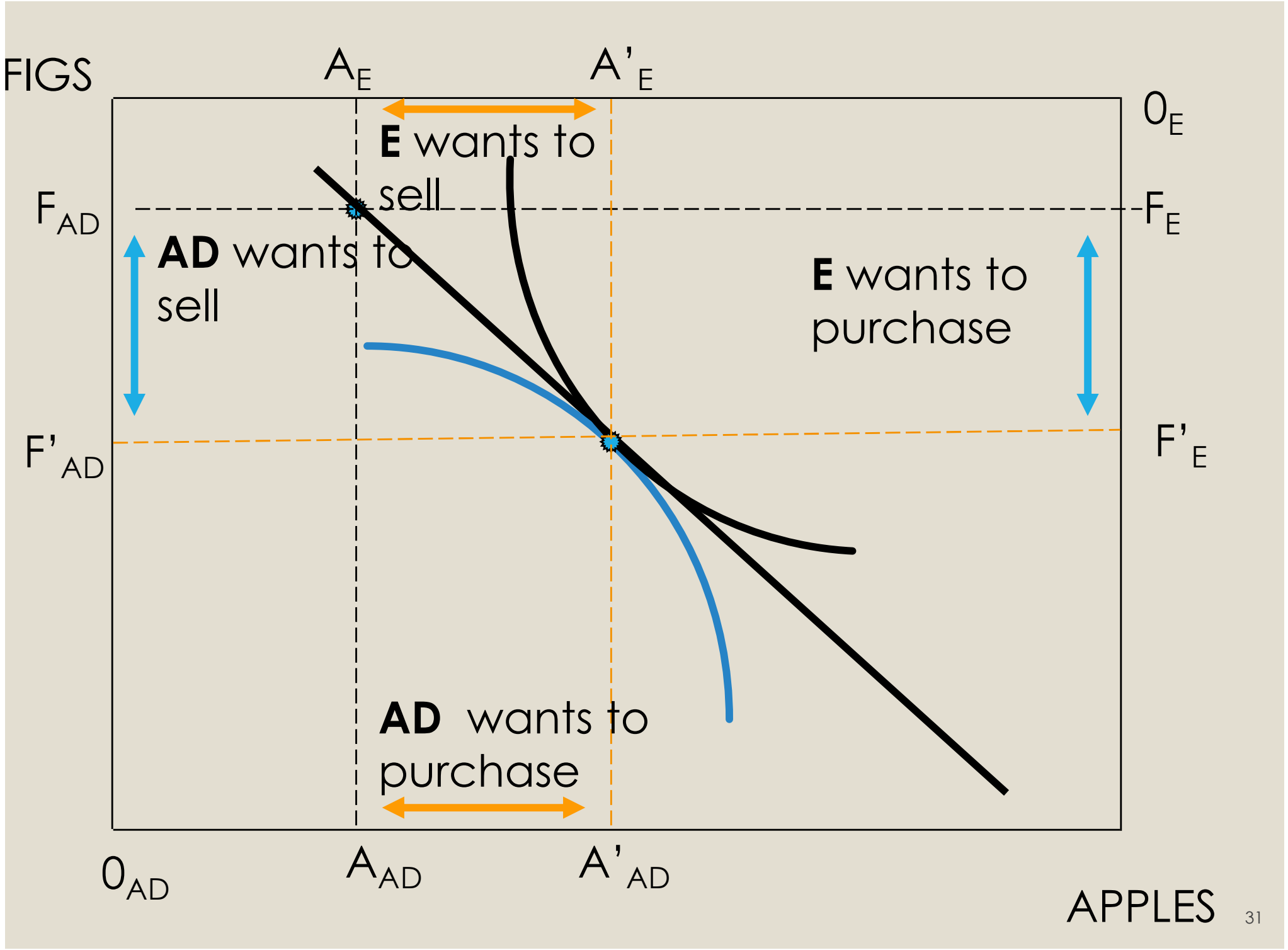

FIGS
A_E
A'_E
0_E
F_{AD}
E_7
F_E
F'_E
F'_{AD}
AD_5
0_{AD}
A_{AD}
A'_{AD}
APPLES


FIGS
A_E
A'_E
0_E
F_{AD}
E_7
F_E
F'_E
F'_{AD}
AD_5
0_{AD}
A_{AD}
A'_{AD}
APPLES


FIGS
A_E
A'_E
0_E
F_{AD}
F_E
E_7
F'_E
SURPLUS
F'_{AD}
AD_5
SHORTAGE
0_{AD}
A_{AD}
A'_{AD}
APPLES

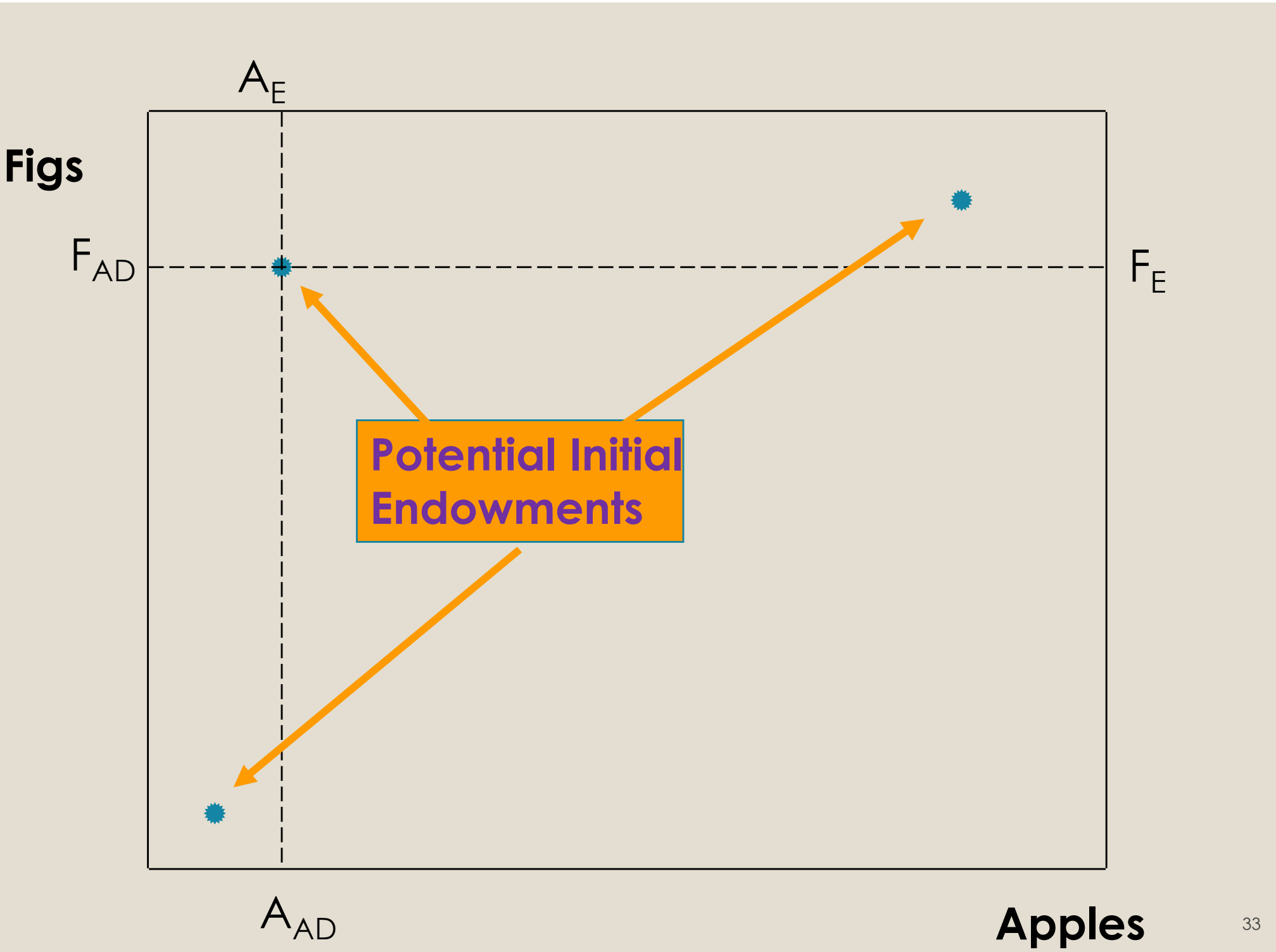

FIGS
A_E
A'_E
0_E
F_{AD}
F_E
F'_{AD}
F'_E
0_{AD}
A_{AD}
A'_{AD}
APPLES

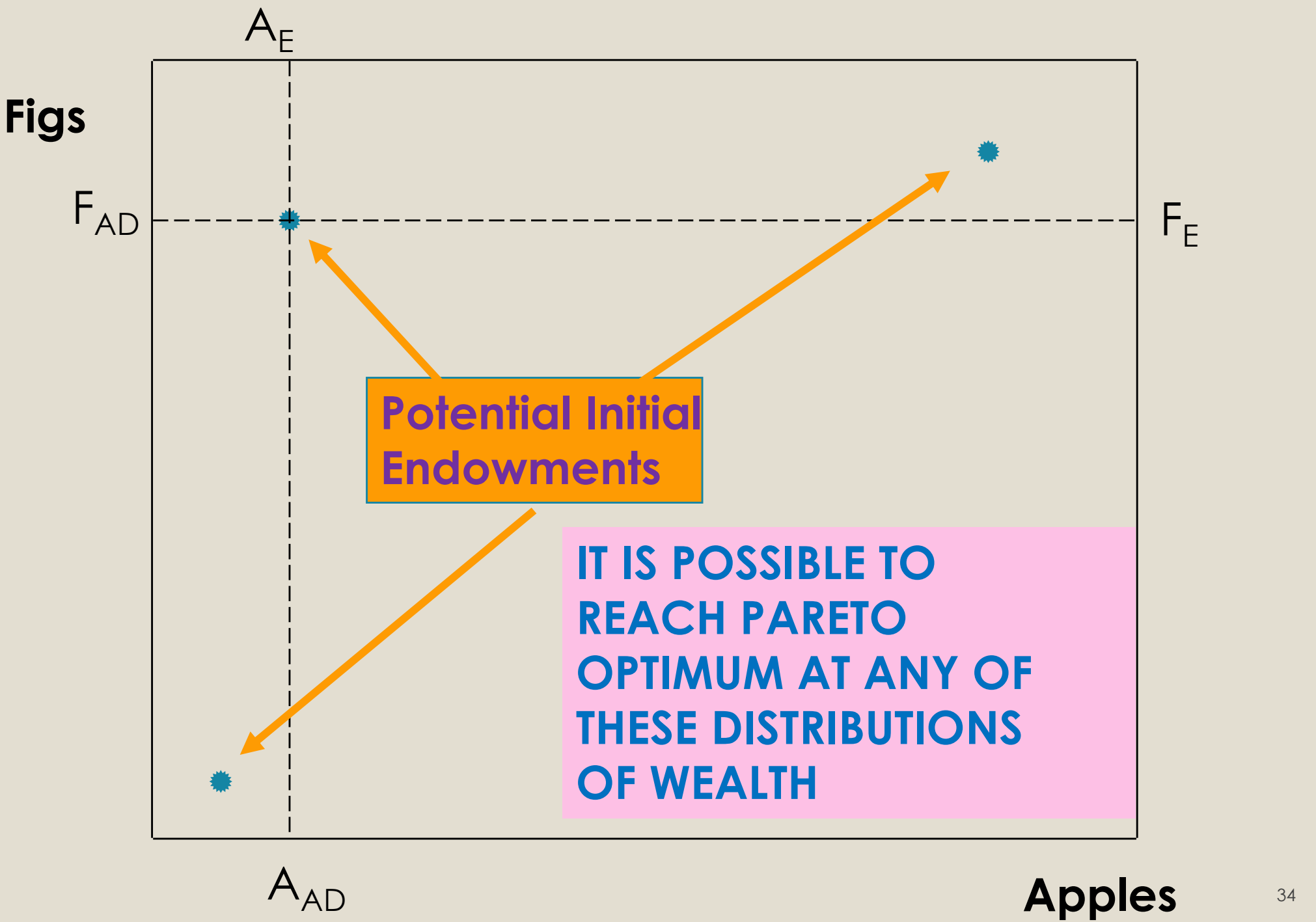

FIGS
A_E
A'_E
0_E
E wants to sell
F_{AD}
F_E
F'_{AD}
F'_E
AD wants to purchase
0_{AD}
A_{AD}
A'_{AD}
APPLES

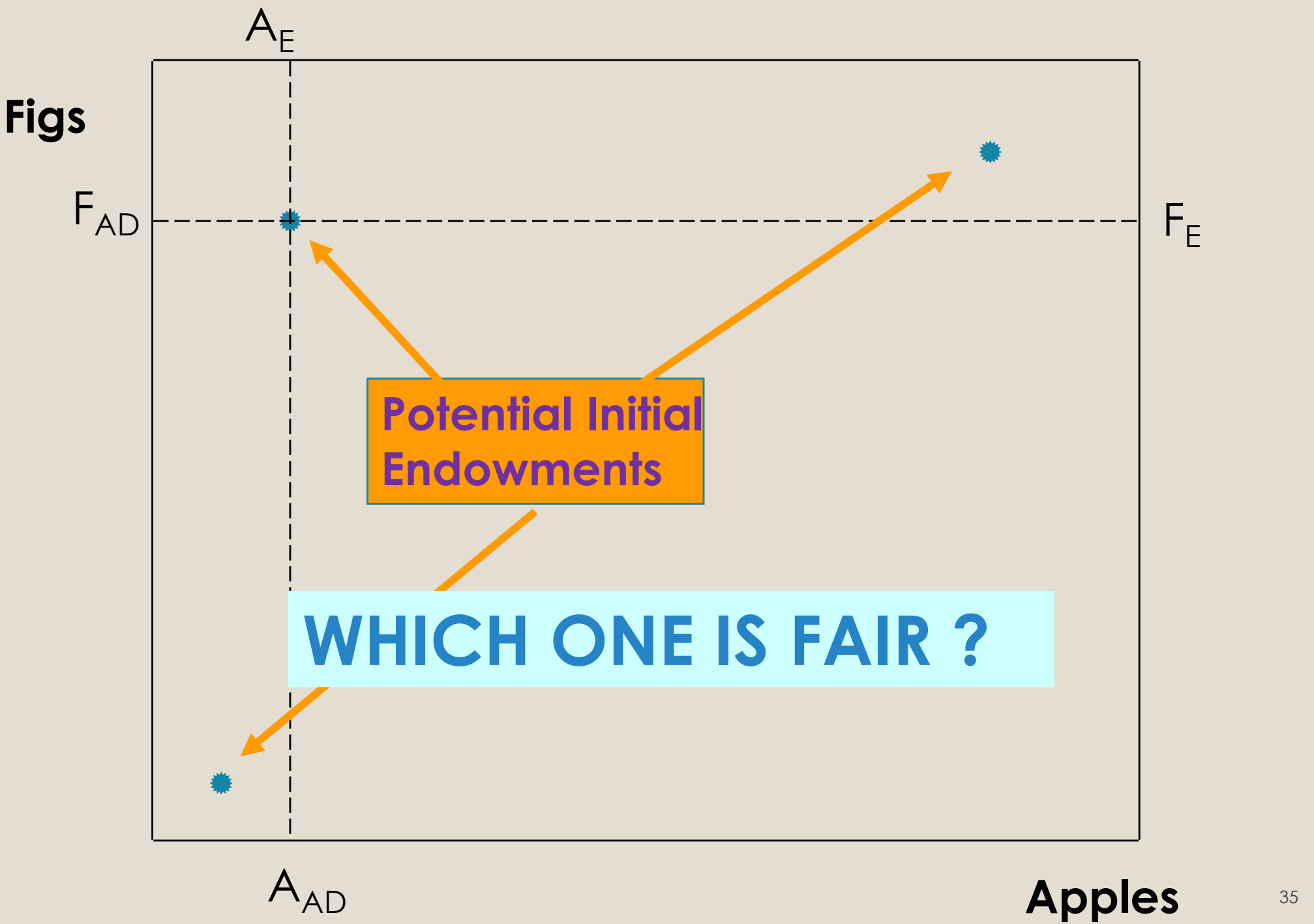

FIGS
A_E
A'_E
0_E
E wants to sell
F_{AD}
F_E
AD wants to sell
E wants to purchase
F'_{AD}
F'_E
AD wants to purchase
0_{AD}
A_{AD}
A'_{AD}
APPLES

Conditions for competitive equilibrium

- $\underline{MRS}^{AD} = \underline{MRS}^{E}$ (Pareto efficient allocation)
- Quantity demanded equals quantity supplied in all markets-- auction prices lead to market clearing


A_E
Figs
F_{AD}
F_E
Potential Initial Endowments
A_{AD}
Apples


A_E
Figs
F_{AD}
F_E
Potential Initial Endowments
IT IS POSSIBLE TO REACH PARETO OPTIMUM AT ANY OF THESE DISTRIBUTIONS OF WEALTH
A_{AD}
Apples

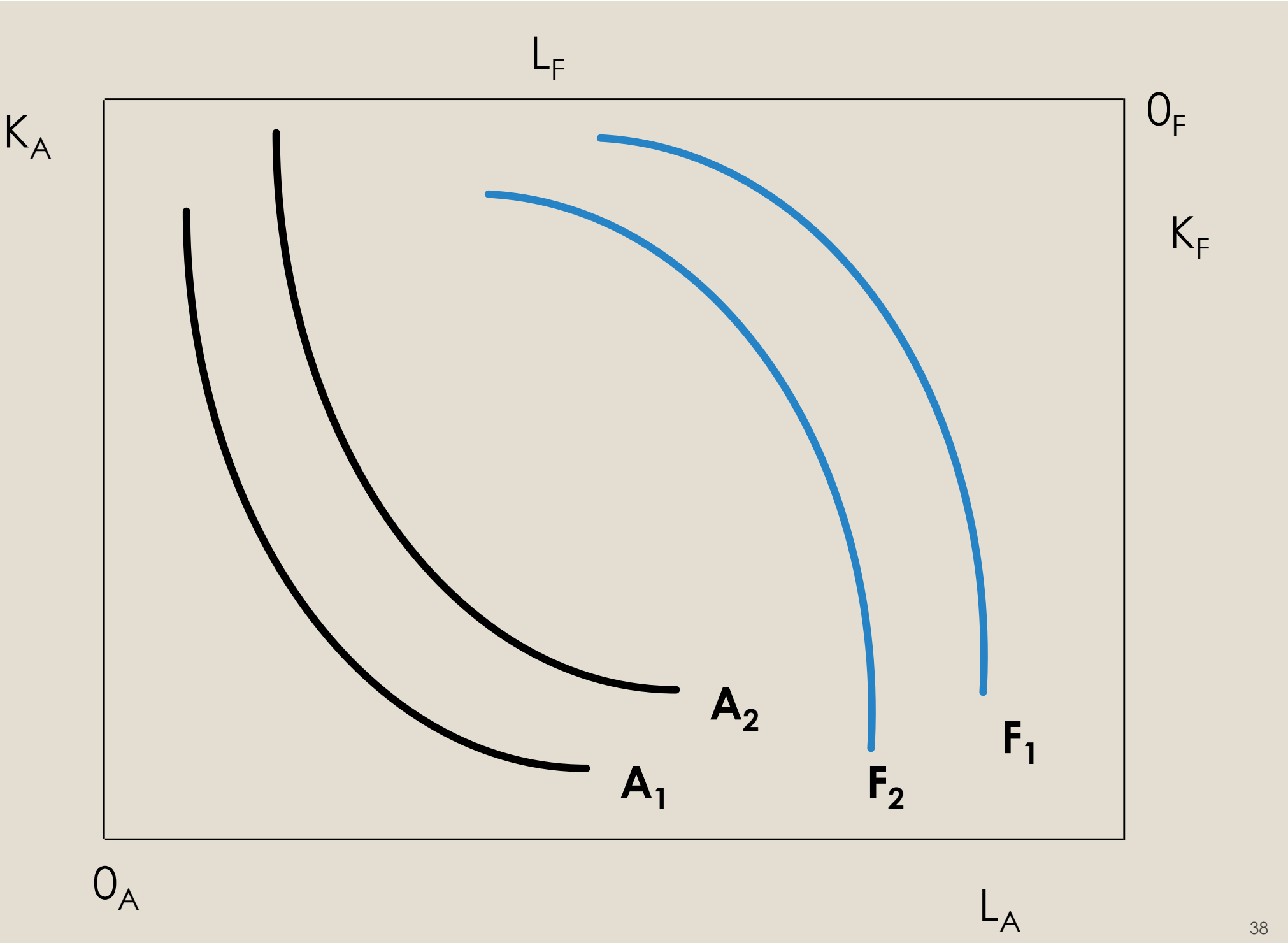

A_E
Figs
F_{AD}
F_E
Potential Initial Endowments
WHICH ONE IS FAIR ?
A_{AD}
Apples

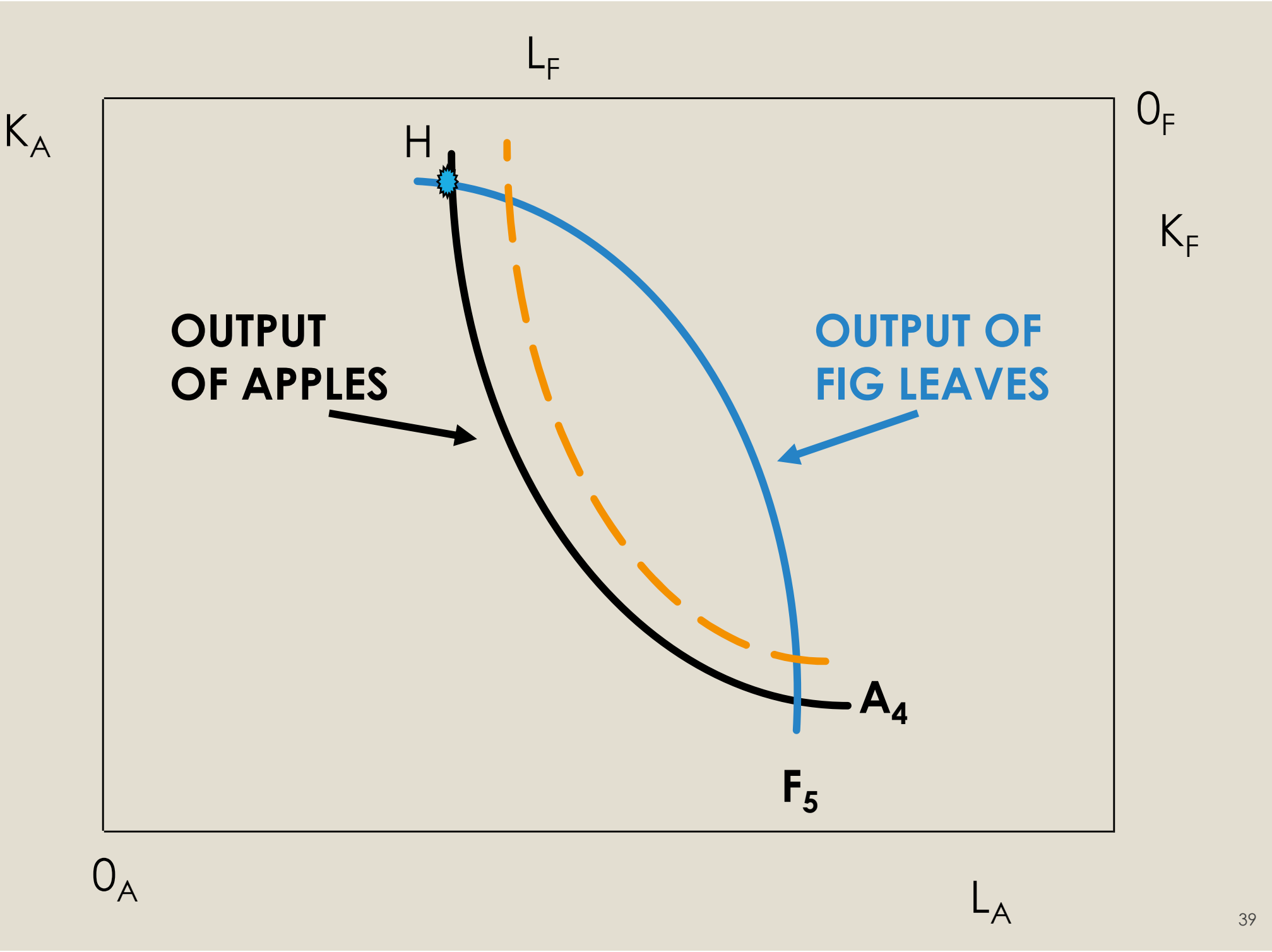
What process assures that consumers achieve a Pareto optimum in exchange ?

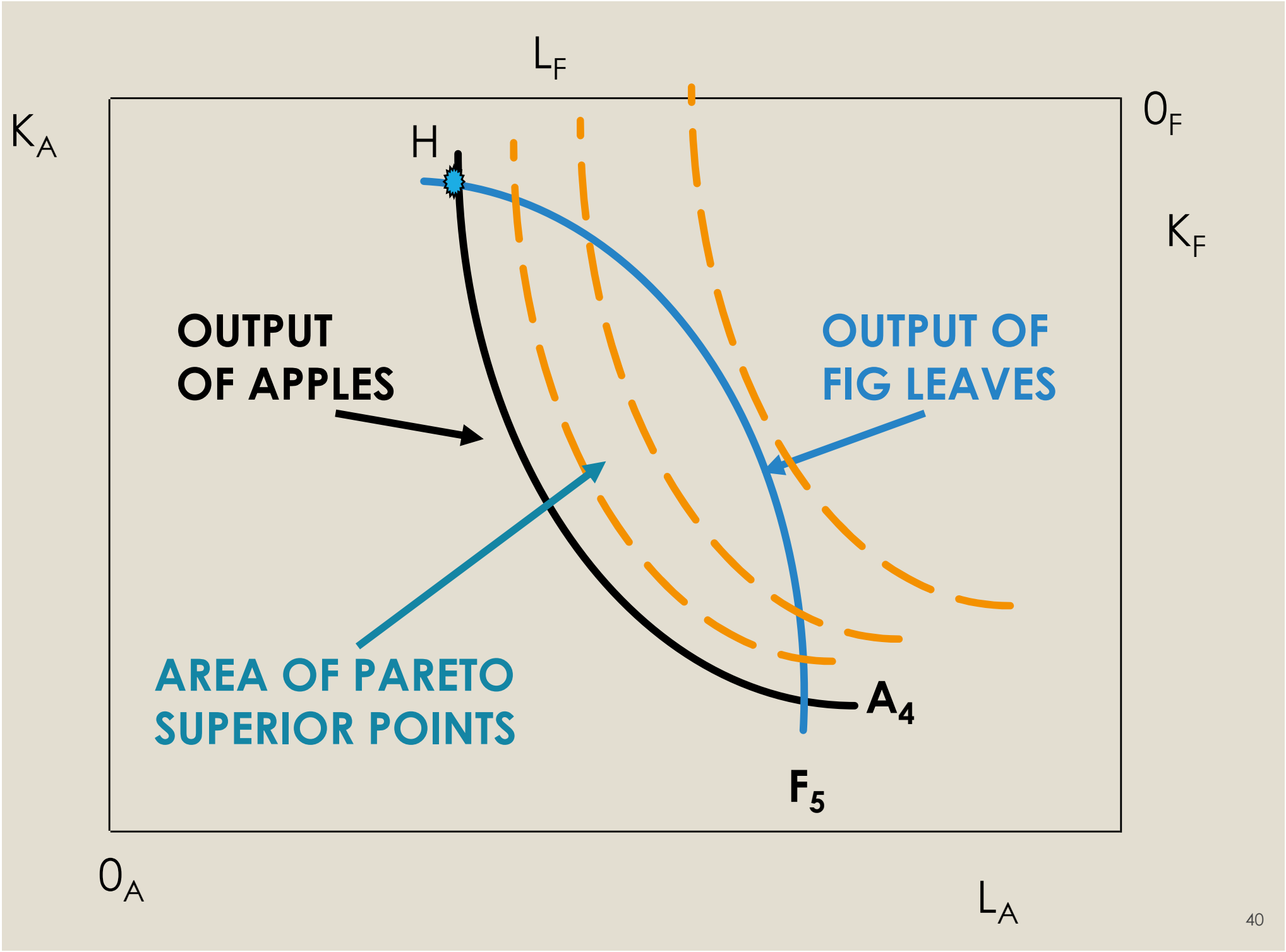
- Its the market pricing process that leads consumers to Pareto optimum.
- The prices convey ***correct*** information and consumers equate their subjective evaluations to the objective reality or possibilities reflected in market prices.
- Flexible prices also lead to market clearing; that is a ***pure*** state where no surpluses or shortages exist.

Production side and constrained bliss

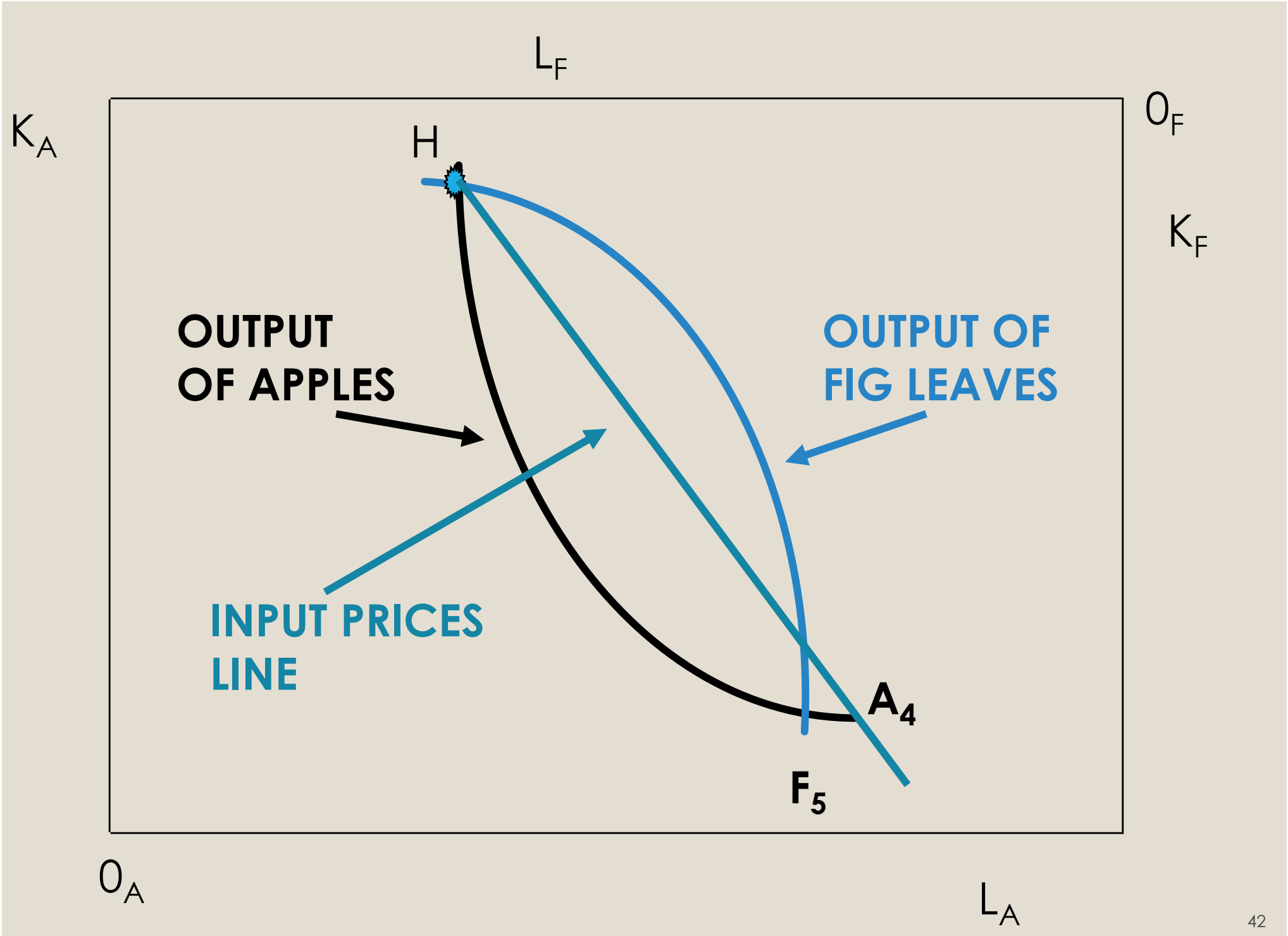
- Optimal use of society's scarce resources in the production of goods.

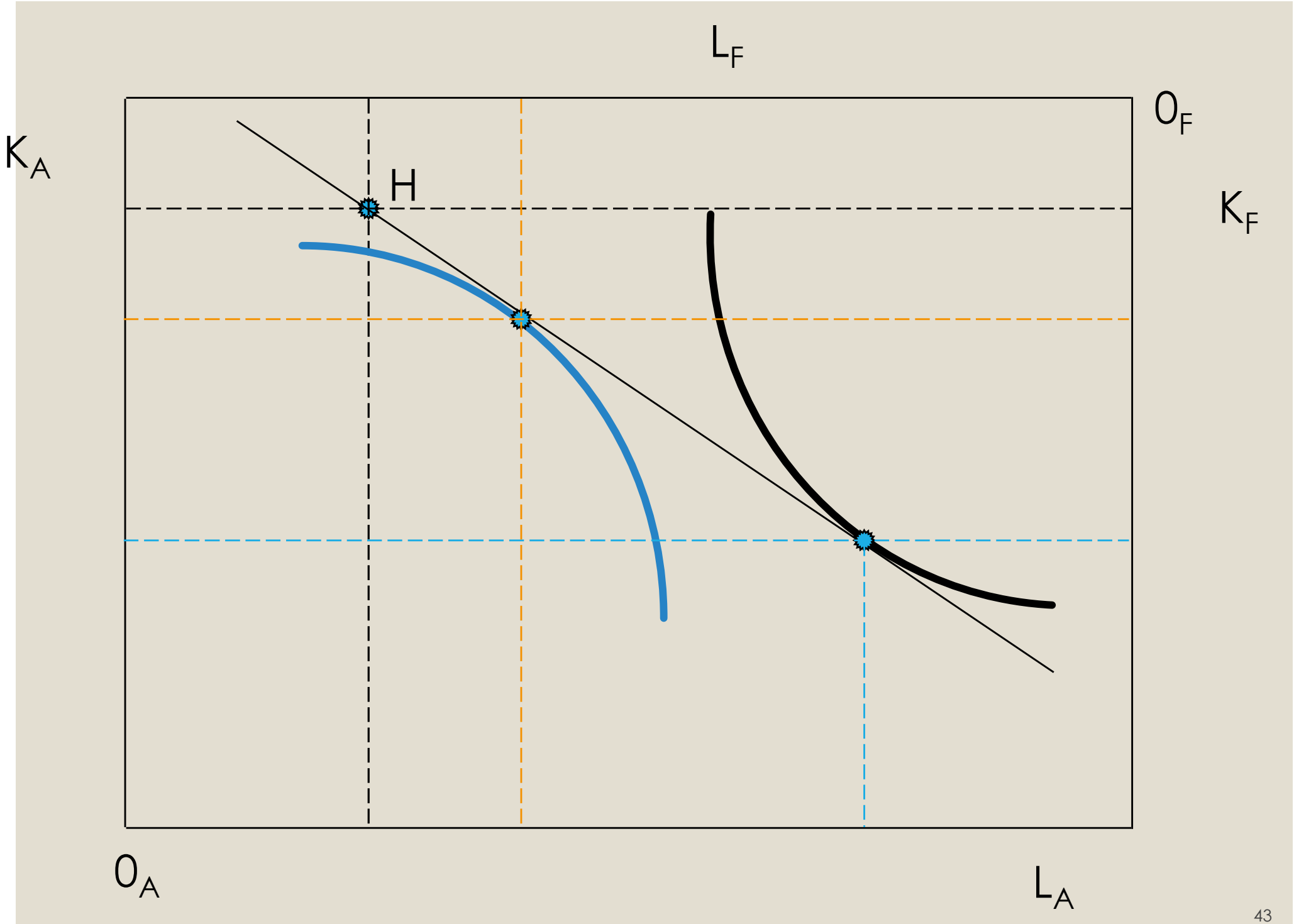

L_F
K_A
0_F
K_F
A_2
A_1
F_1
F_2
0_A
L_A

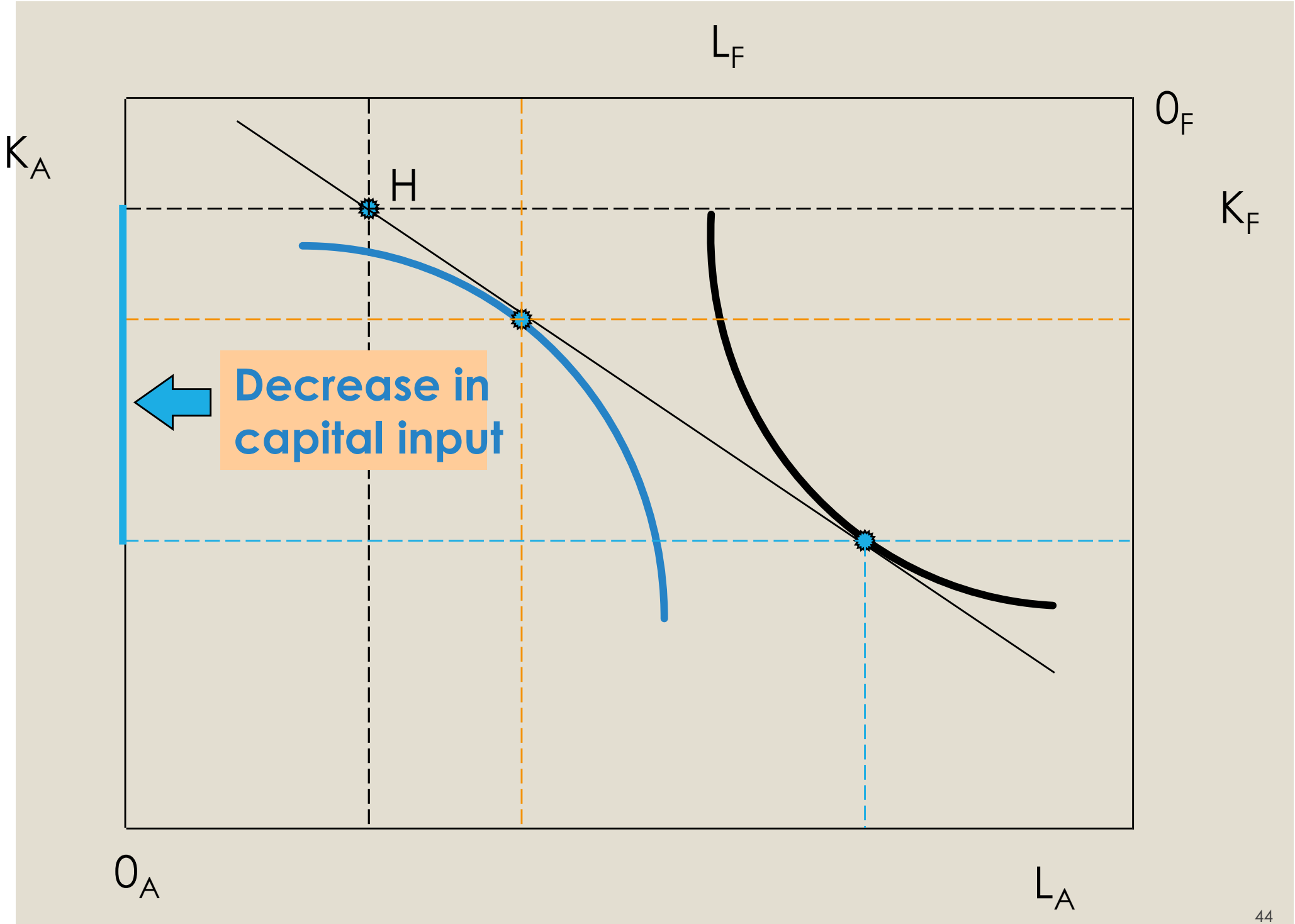

L_F
K_A
H
0_F
K_F
OUTPUT OF APPLES
OUTPUT OF FIG LEAVES
A_4
F_5
0_A
L_A

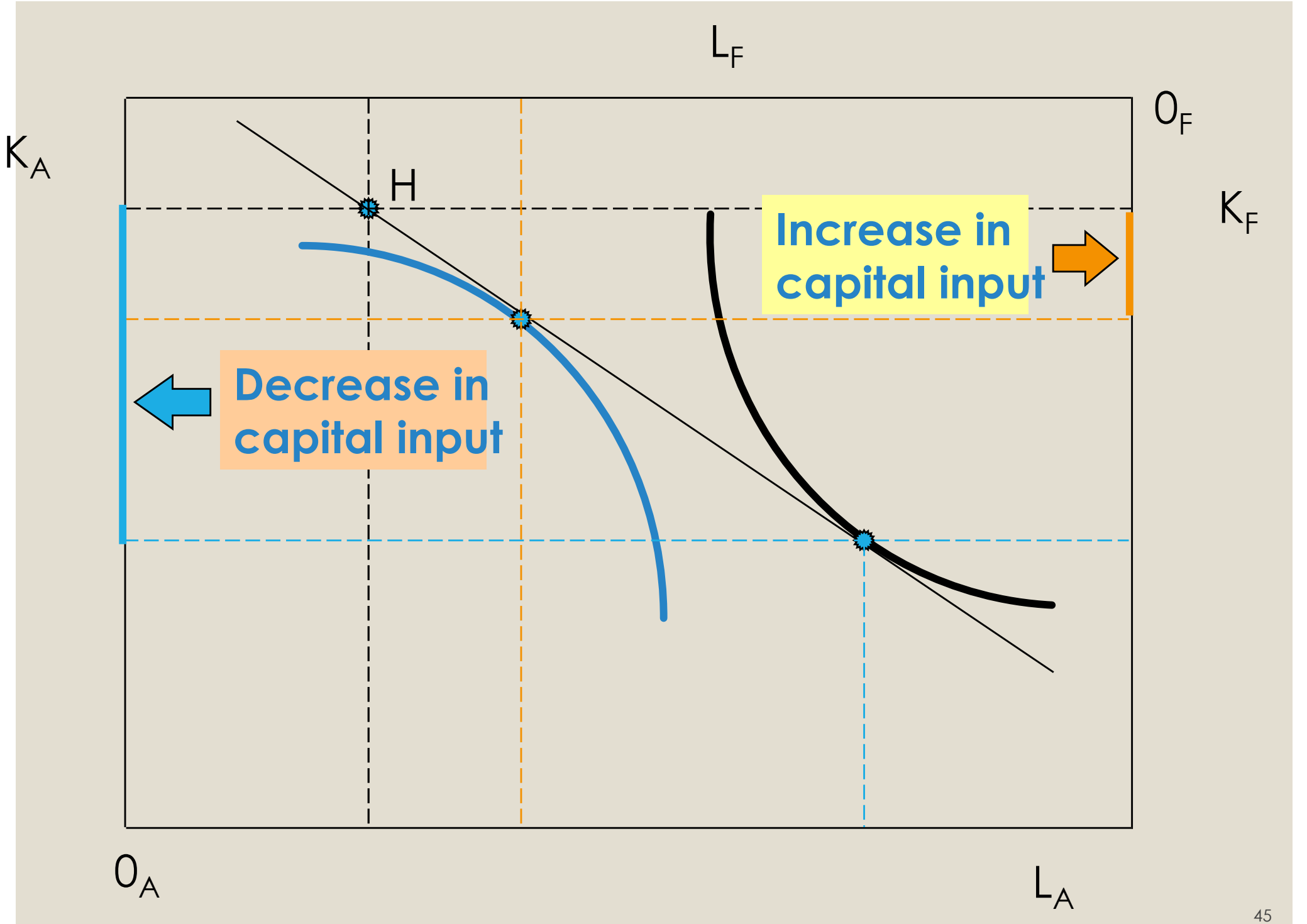

L_F
K_A
H
0_F
K_F
OUTPUT
OF APPLES
OUTPUT OF
FIG LEAVES
AREA OF PARETO
SUPERIOR POINTS
A_4
F_5
0_A
L_A

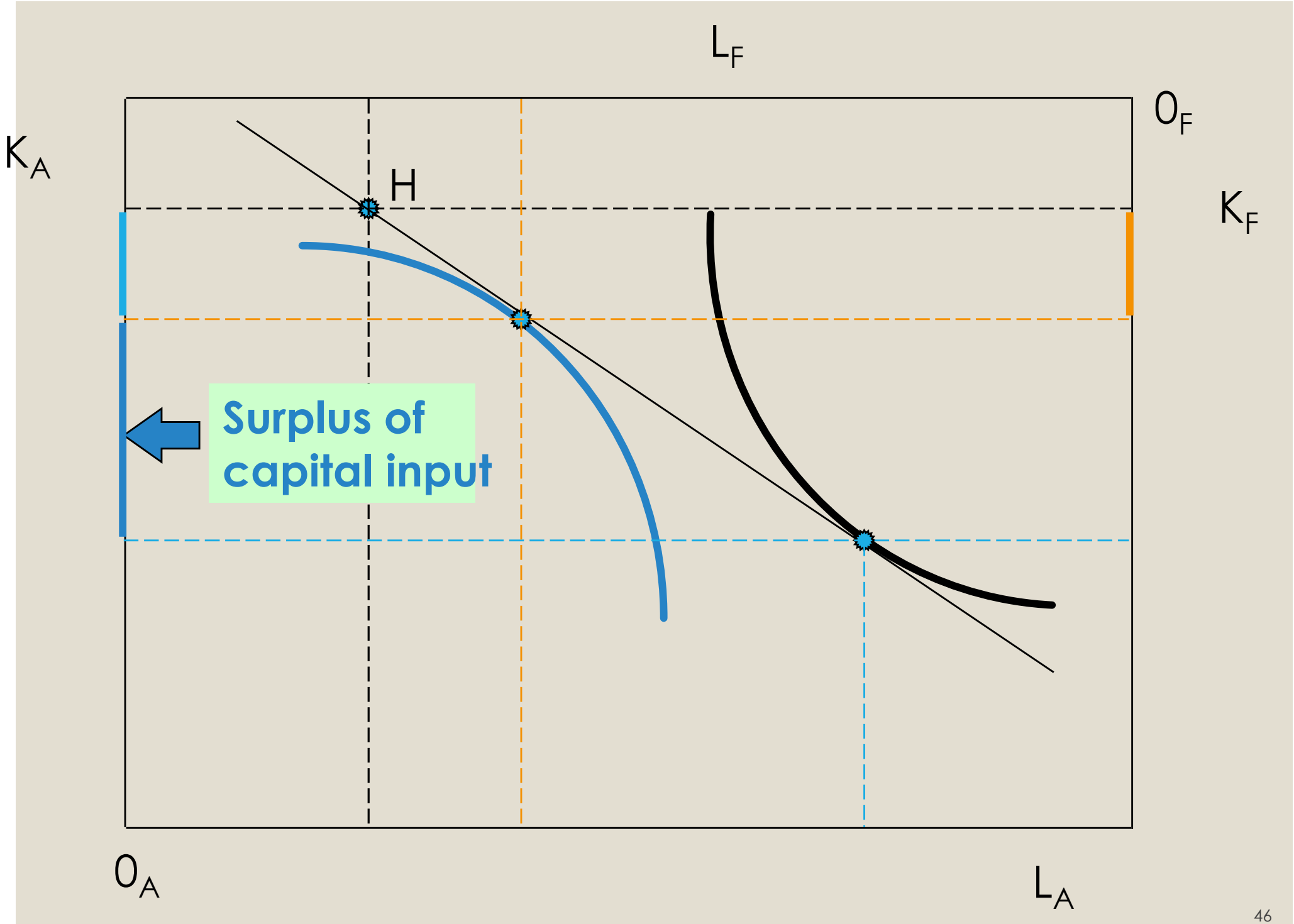
How do the producers get to the contract line from point H ?

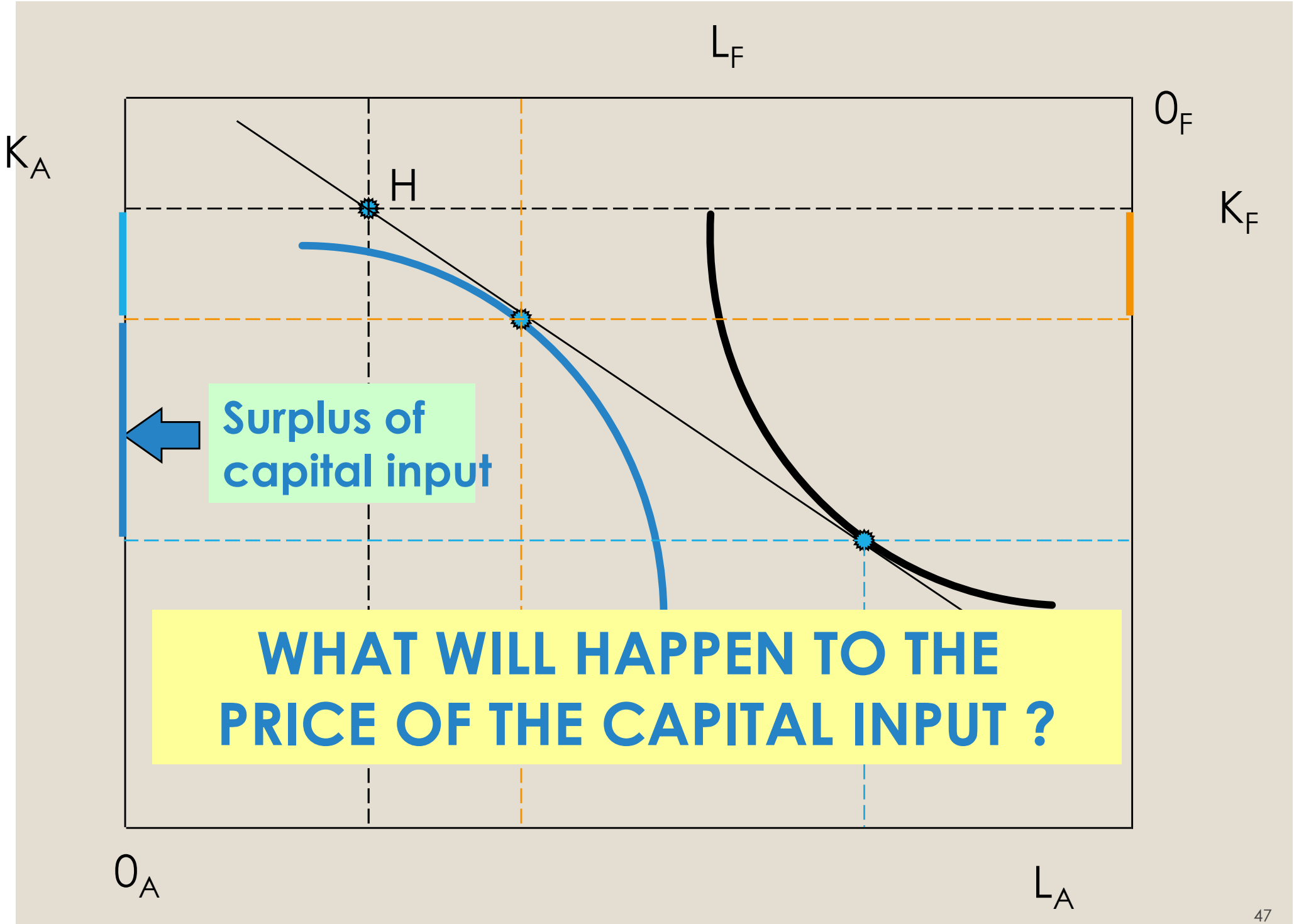

L_F
K_A
0_F
H
K_F
OUTPUT OF APPLES
OUTPUT OF FIG LEAVES
INPUT PRICES LINE
A_4
F_5
0_A
L_A

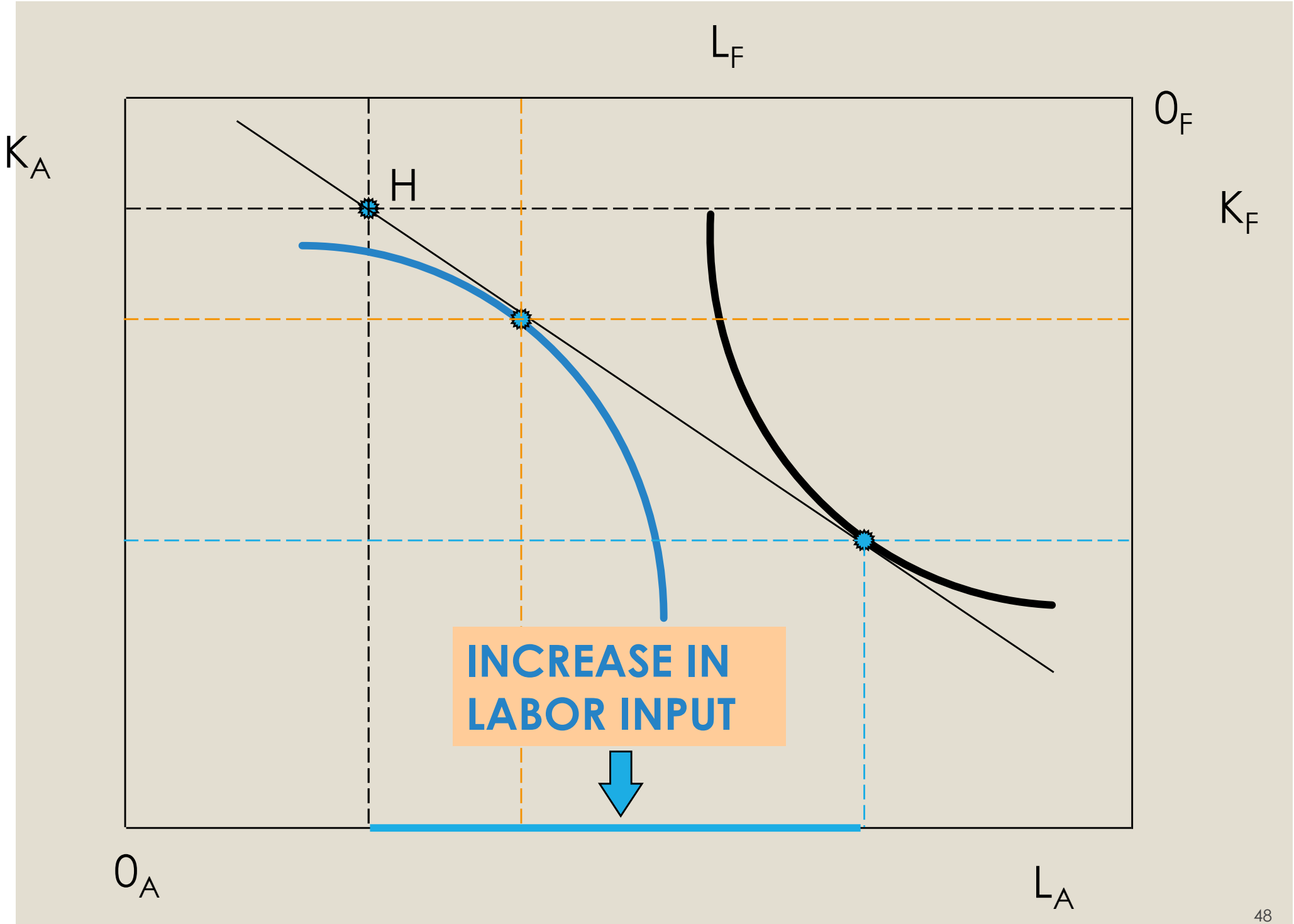

L_F
0_F
K_A
H
K_F
0_A
L_A

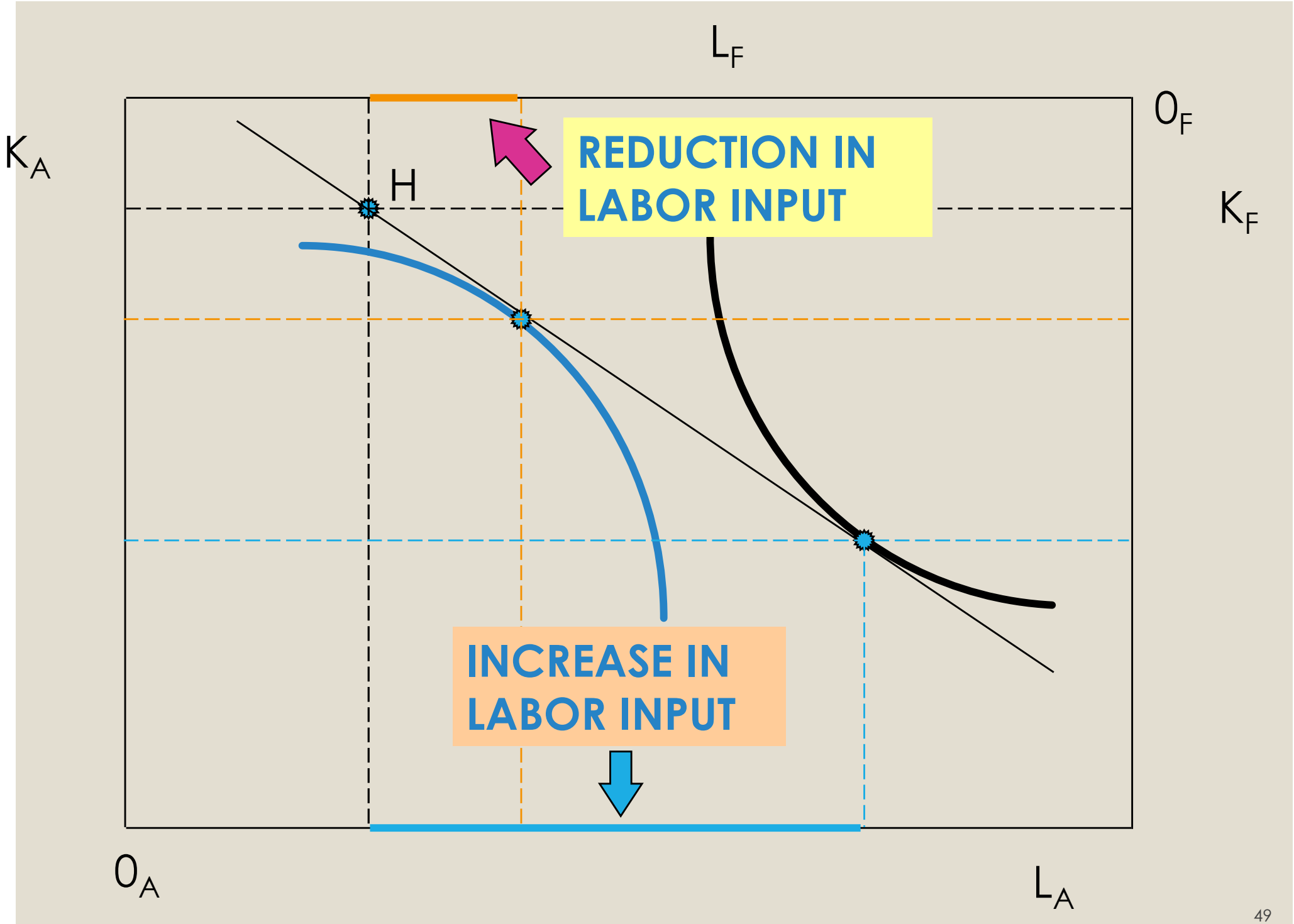

L_F
0_F
K_A
H
K_F
Decrease in capital input
0_A
L_A

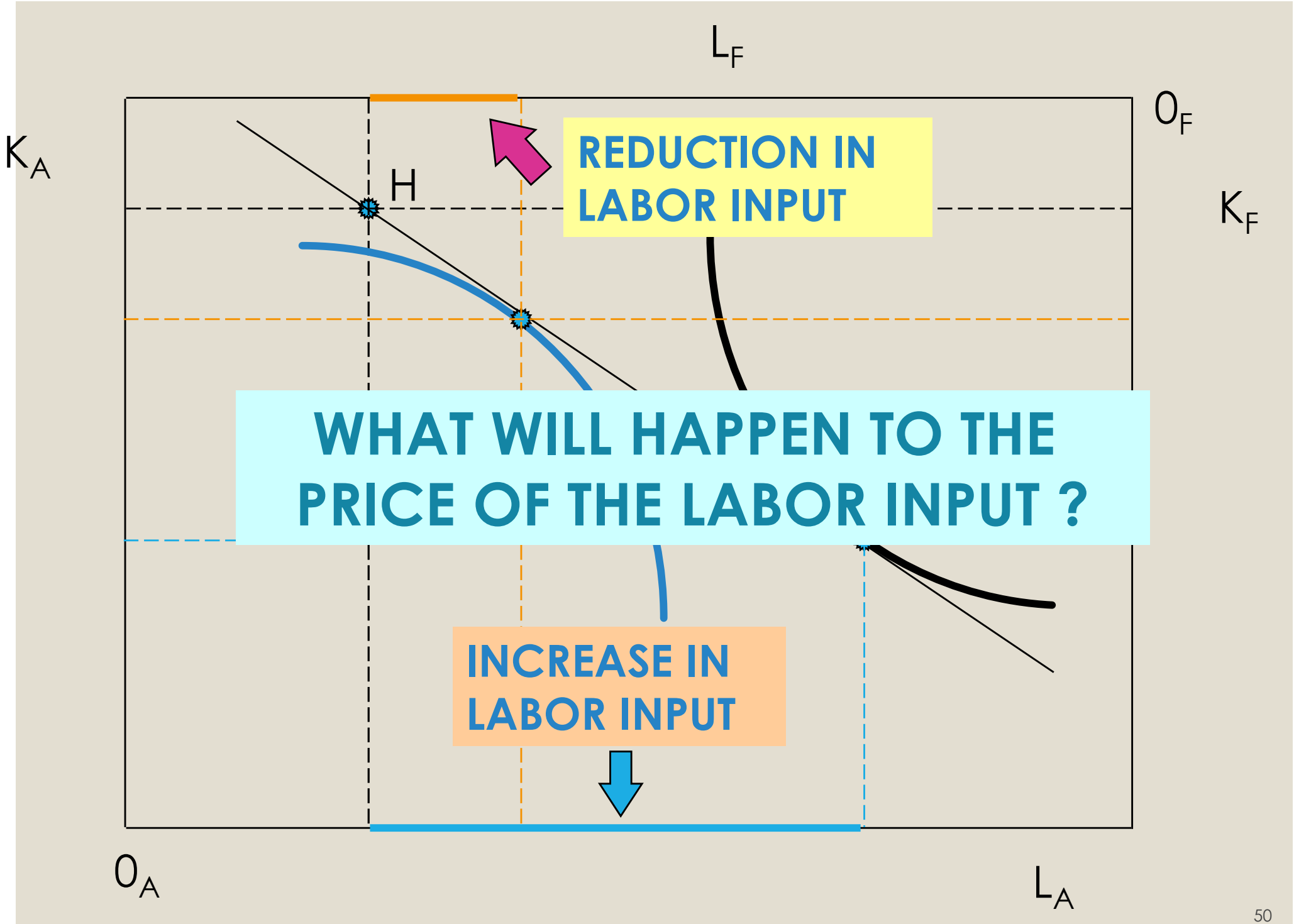

L_F
0_F
K_A
H
K_F
Increase in capital input
Decrease in capital input
0_A
L_A

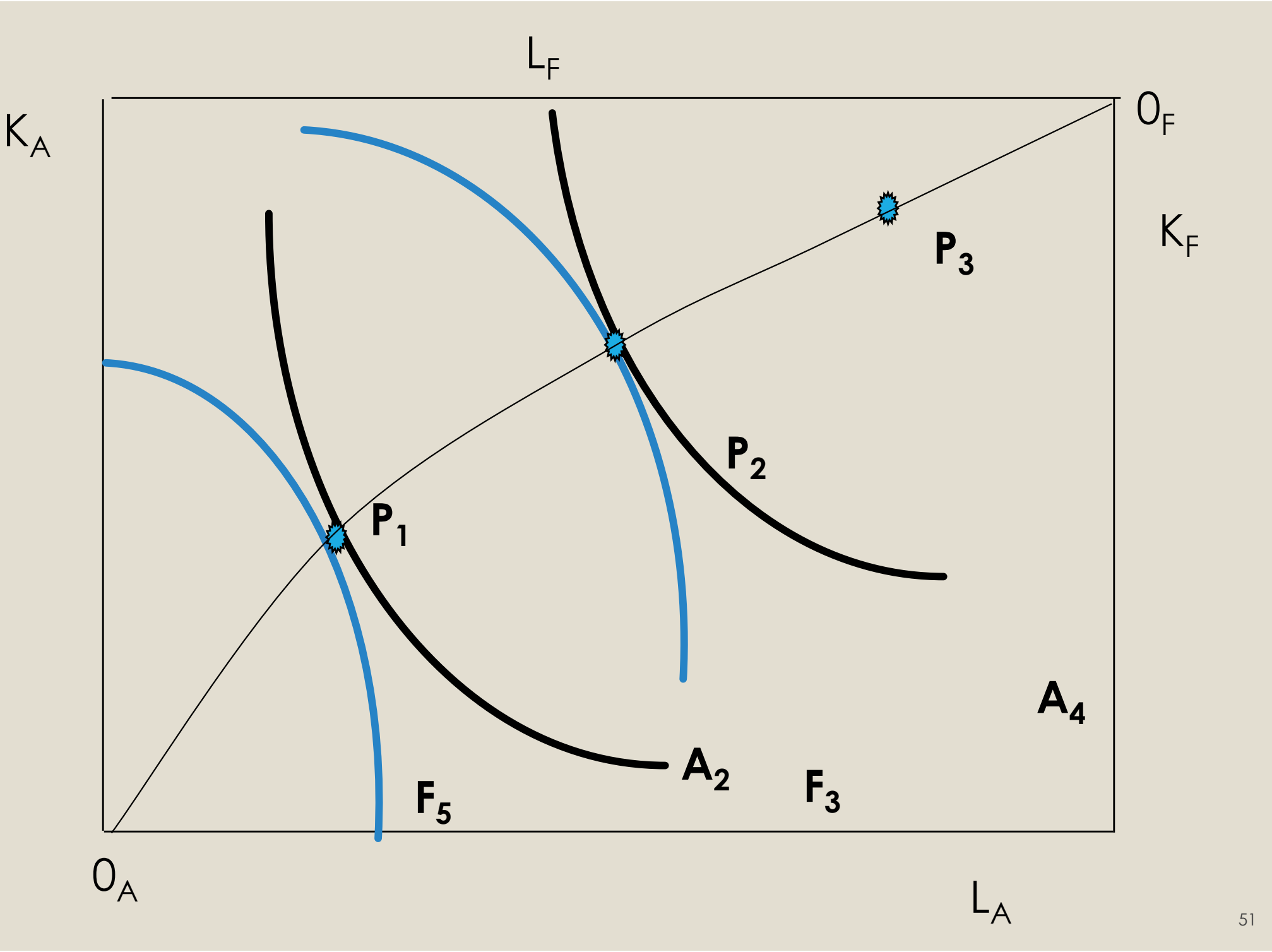

L_F
0_F
K_A
H
K_F
Surplus of capital input
0_A
L_A

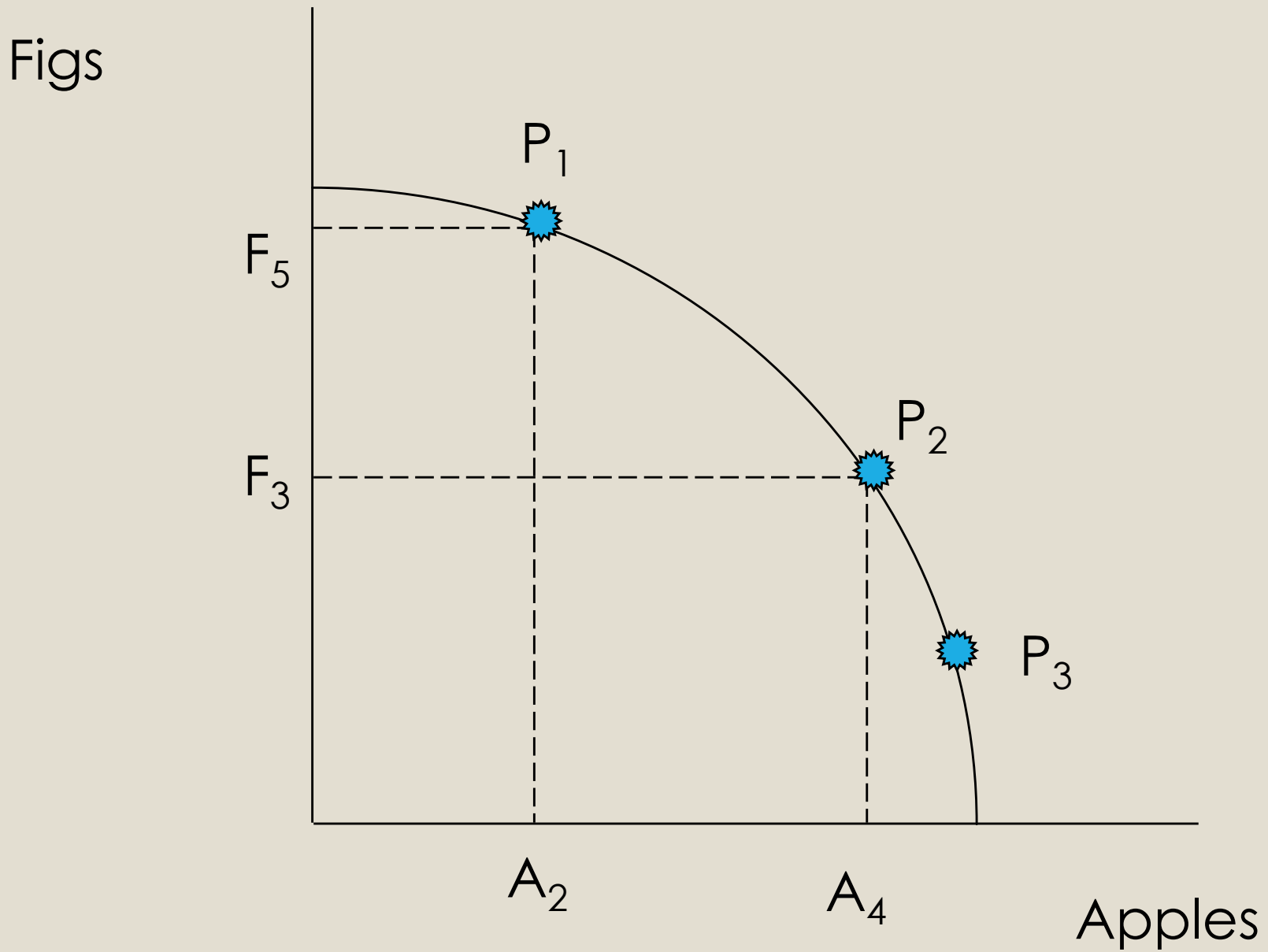

L_F
0_F
K_A
H
K_F
Surplus of capital input
WHAT WILL HAPPEN TO THE PRICE OF THE CAPITAL INPUT ?
0_A
L_A

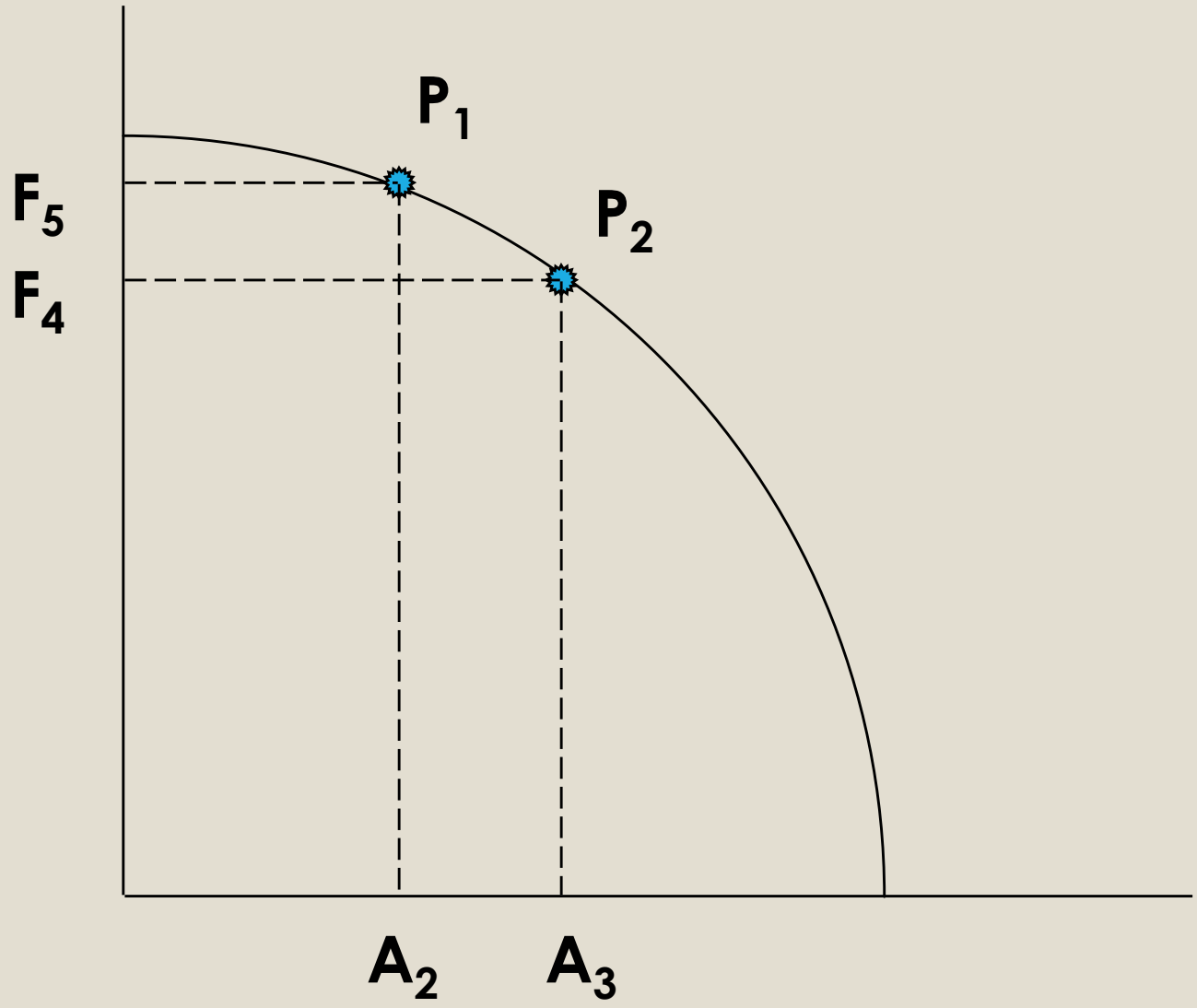

L_F
0_F
K_A
H
K_F
INCREASE IN LABOR INPUT
0_A
L_A

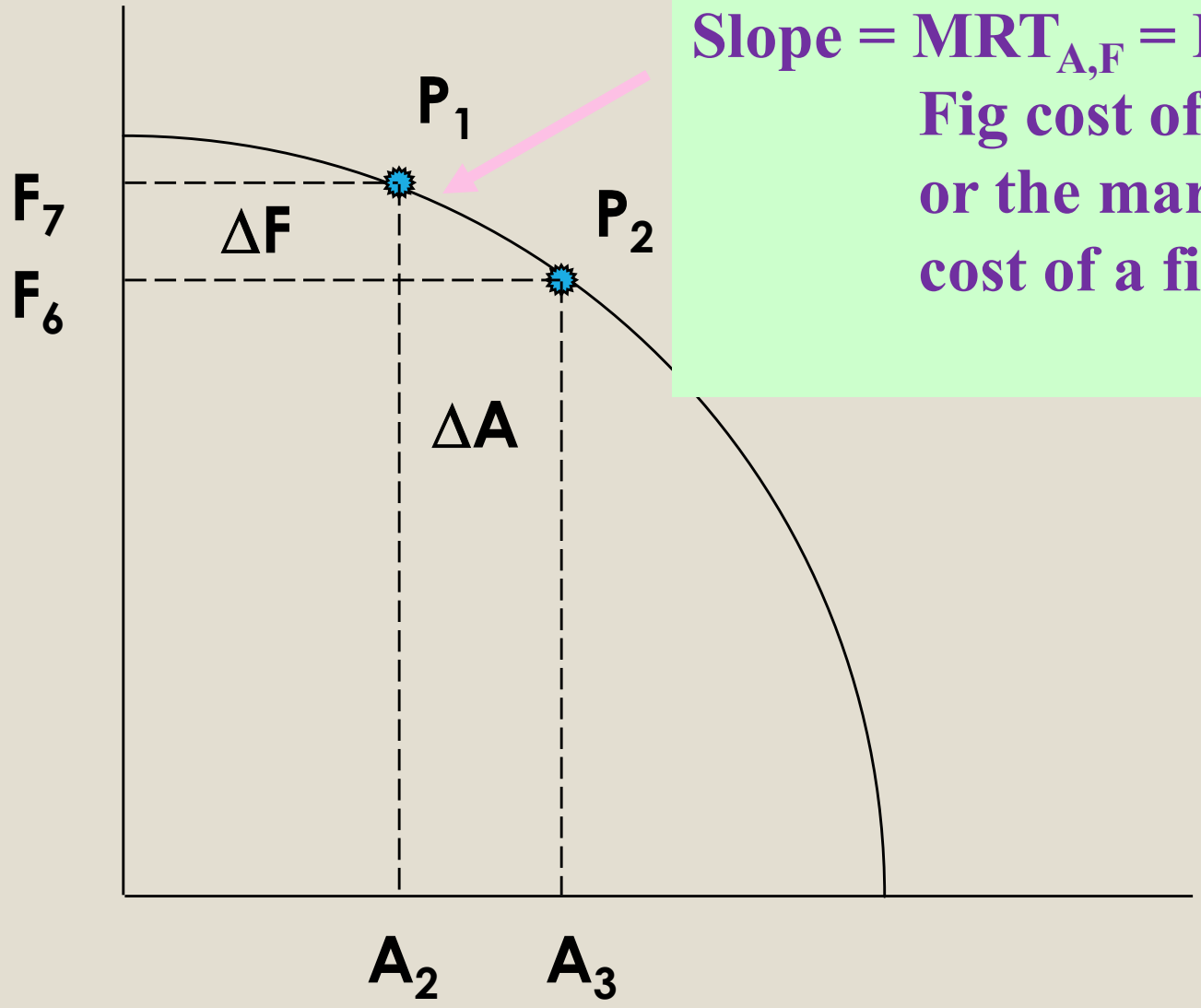

L_F
0_F
K_A
H
REDUCTION IN LABOR INPUT
K_F
INCREASE IN LABOR INPUT
0_A
L_A


L_F
0_F
K_A
H
REDUCTION IN LABOR INPUT
K_F
WHAT WILL HAPPEN TO THE PRICE OF THE LABOR INPUT ?
INCREASE IN LABOR INPUT
0_A
L_A


L_F
K_A
0_F
K_F
P_3
P_2
P_1
A_4
A_2
F_3
F_5
0_A
L_A


Figs
P1
F5
P2
F3
P3
A2
A4
Apples


P1
P2
F5
F4
A2
A3



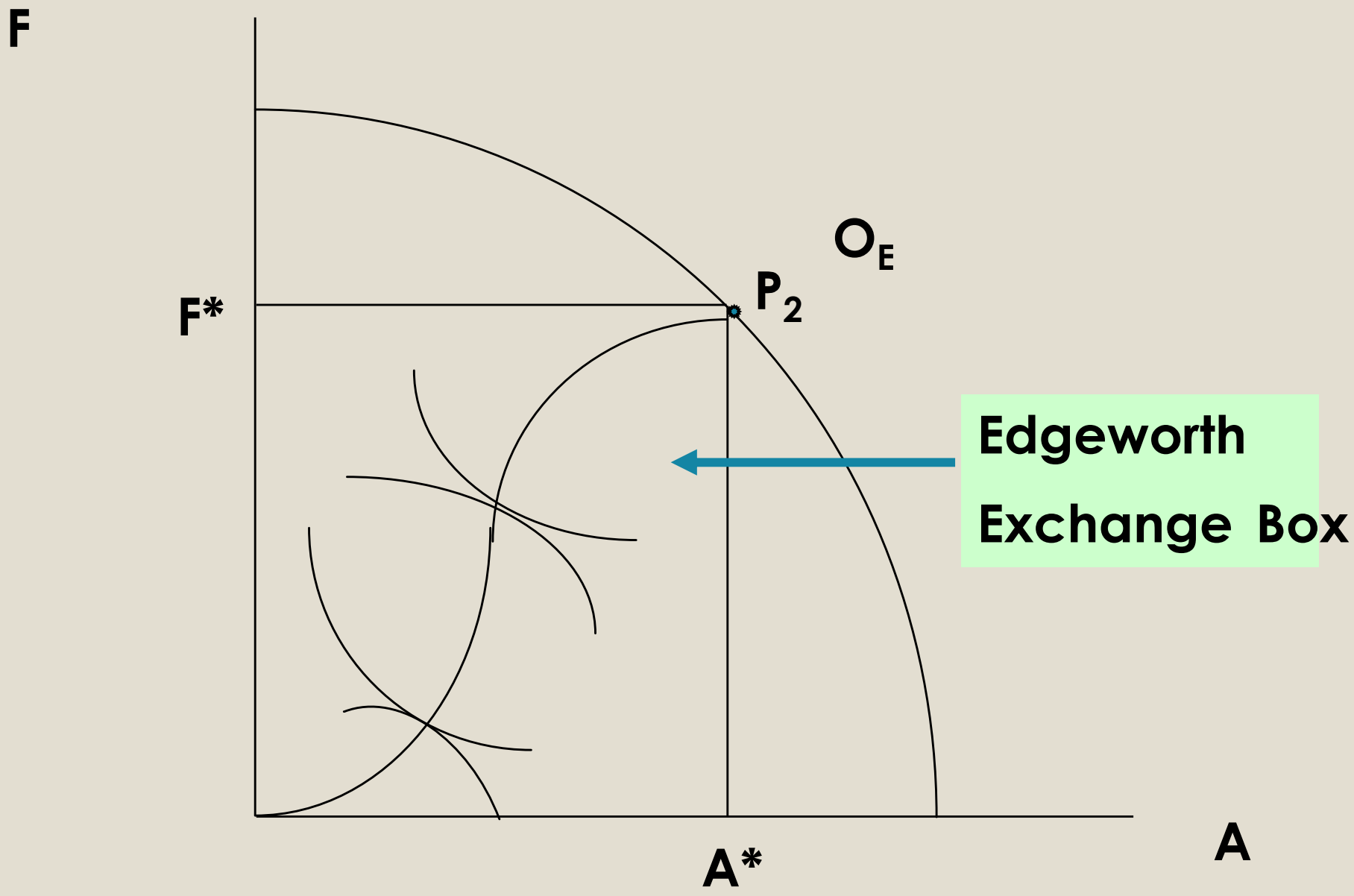
Slope = $MRT_{A,F}$ = Marginal Fig cost of an apple or the marginal apple cost of a fig leave

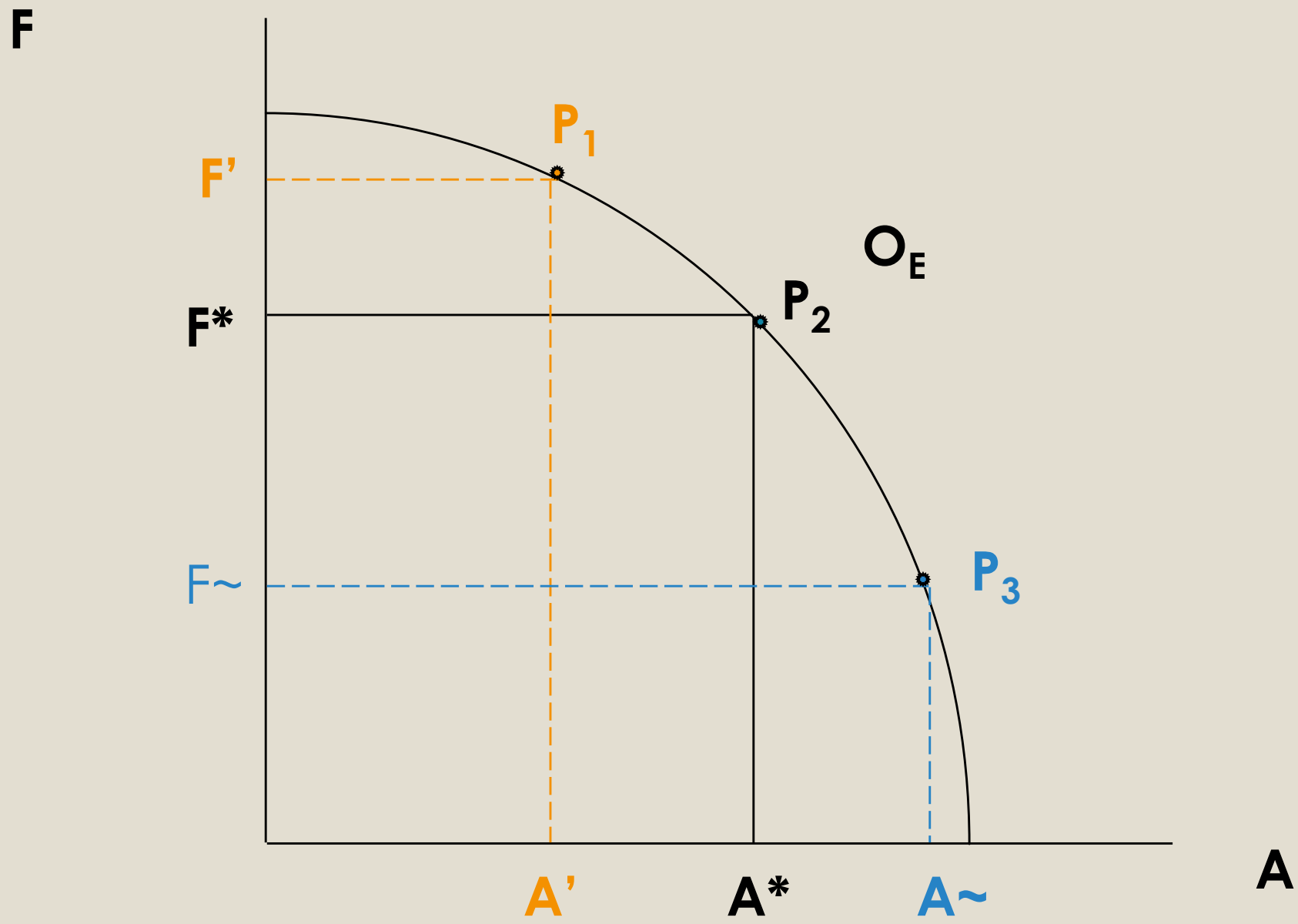
Intuitive interpretation of the $MRT_{A,F}$

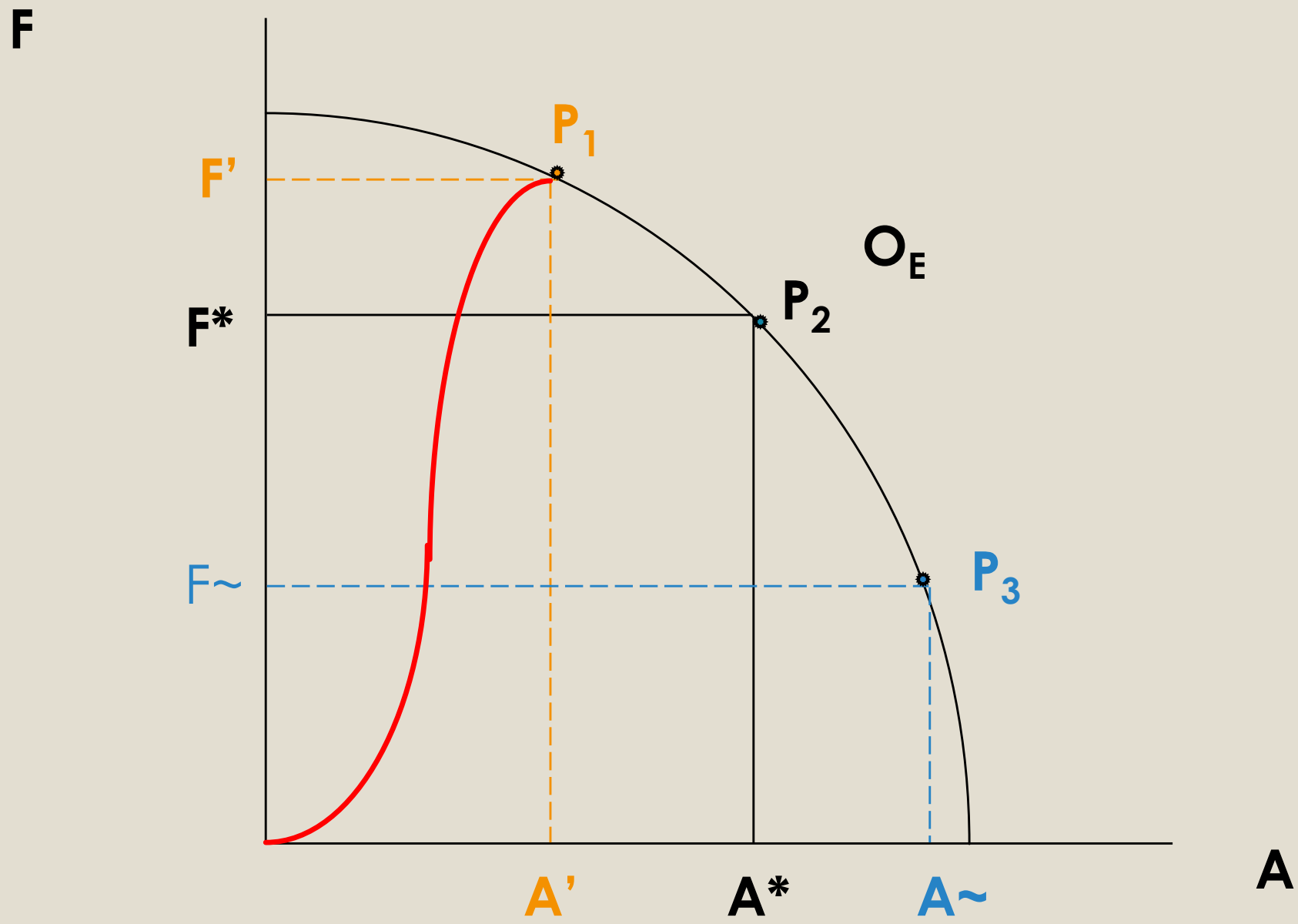
- Suppose it takes **2** labor hours to produce one more unit of **A**. Then we might say that the MC_A is equal to 2. If it takes **1** hour of labor to produce an extra **F**, MC_F is equal to 1.
- What is the $MRT_{A,F}$ in this case ?
- For $\Delta A = 1$, $MRT_{A,F} = (\Delta F / \Delta A) = 2/1$ or $\Delta F = 2 \Delta A$ and if $\Delta A = 1$, $\Delta F = 2(1) = 2$

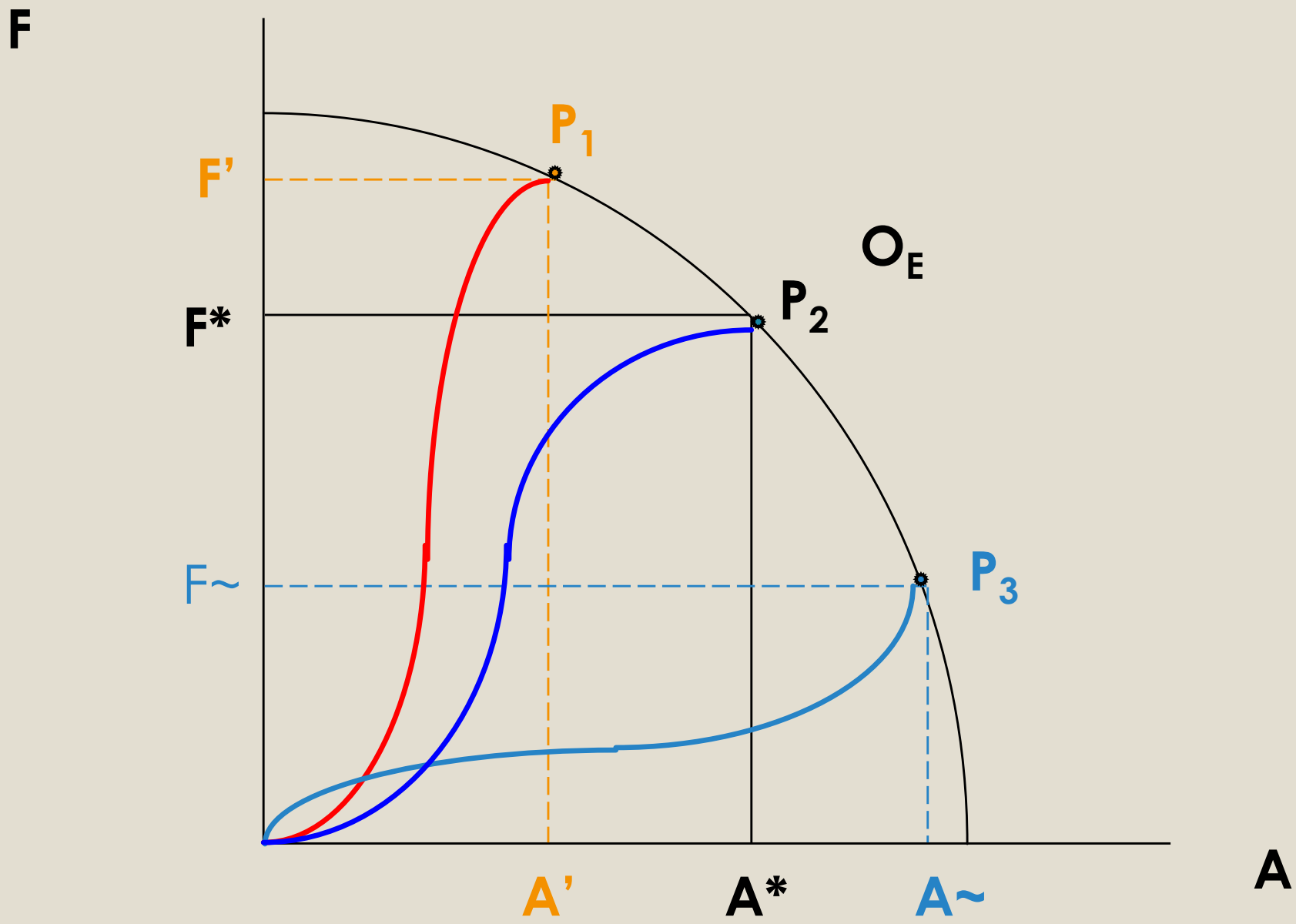
Intuitive interpretation of the $MRT_{A,F}$

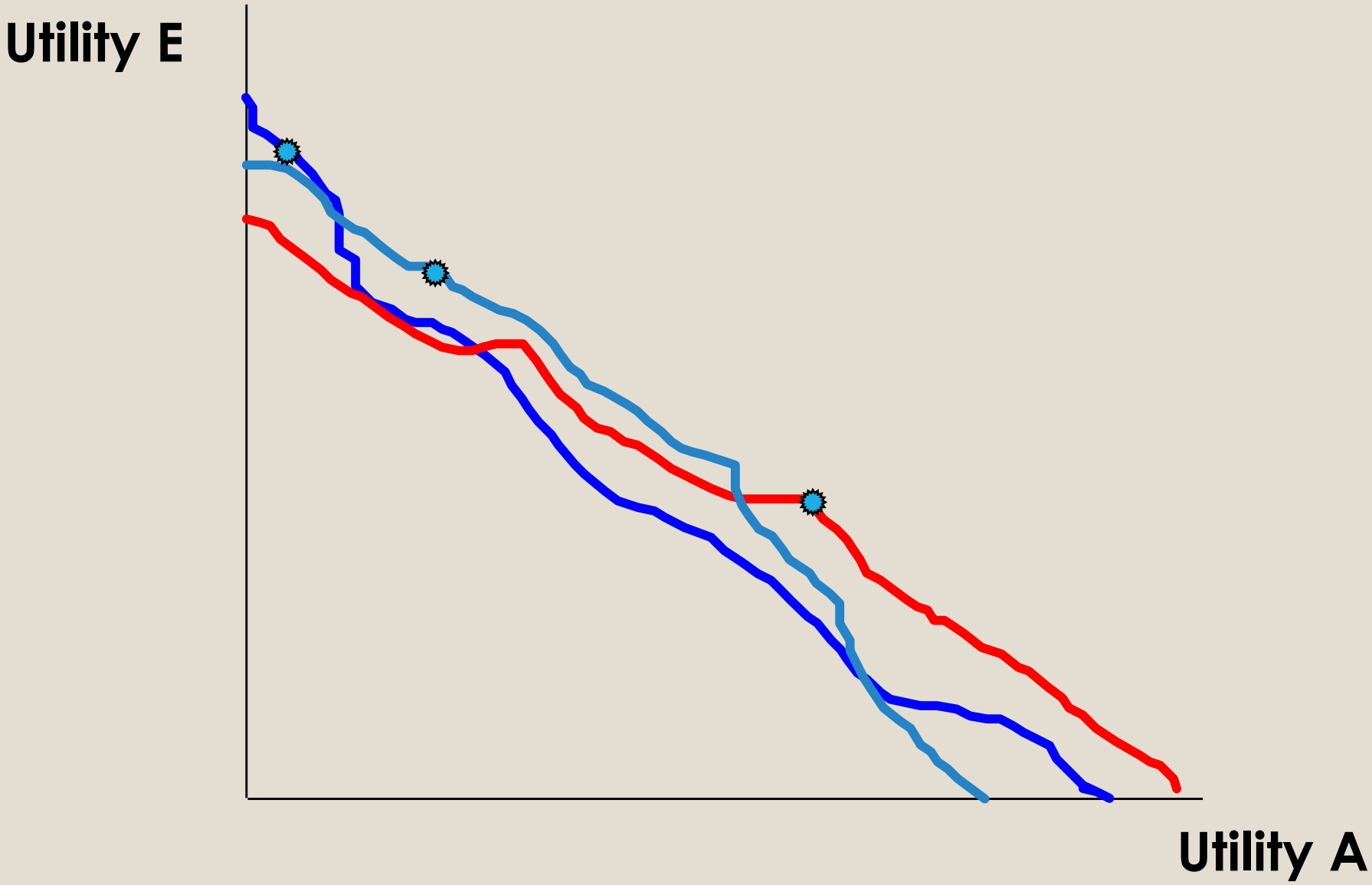
- Two units of **F** must be foregone to provide enough labor to increase **A** by one unit. Hence the $MRT_{A,F}$ is equal to the ratio of the marginal cost of the two goods.
- $MRT_{A,F} = (\Delta F / \Delta A) = (MC_A / MC_F)$

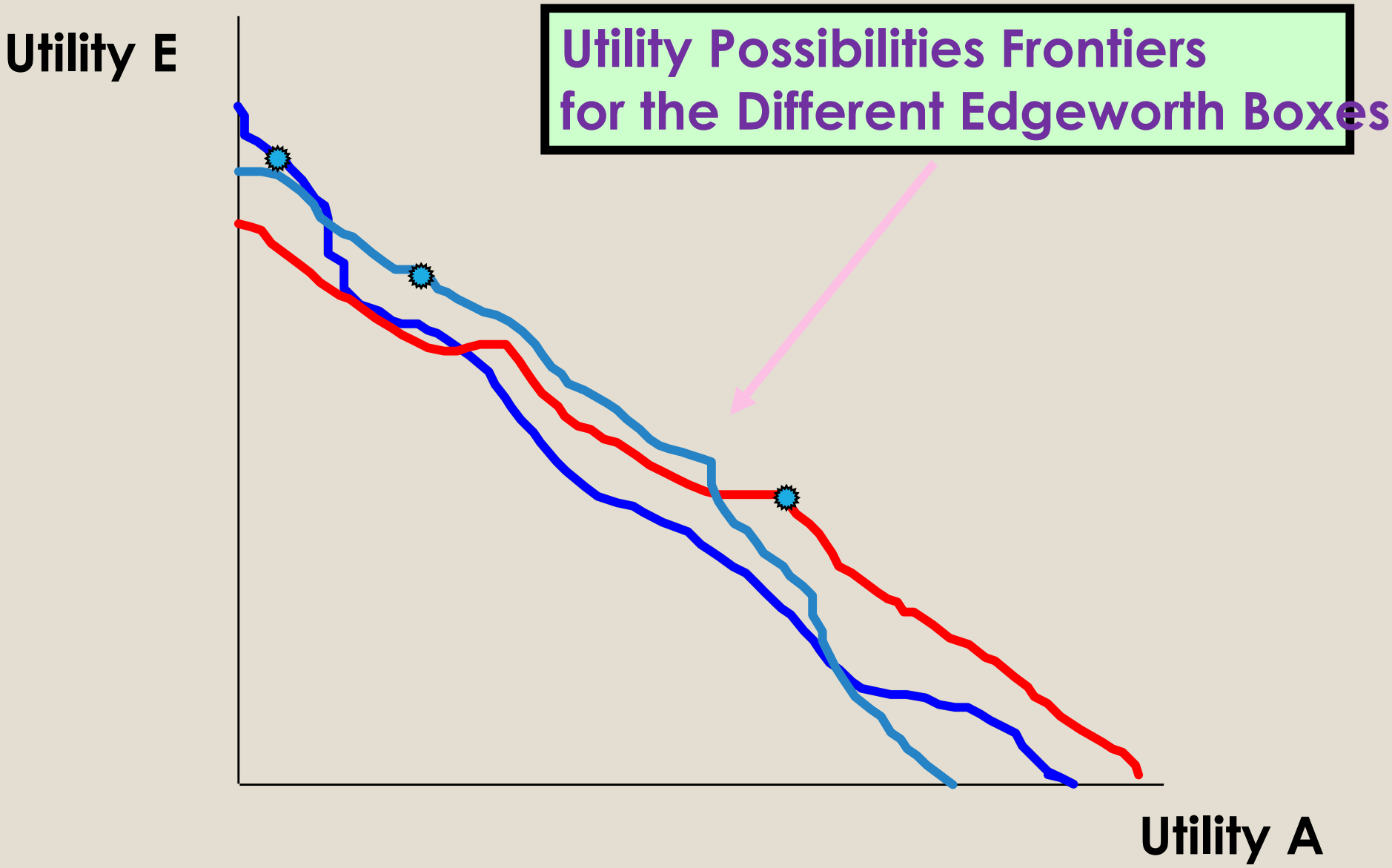

F
F*
O_E
P_2
Edgeworth
Exchange Box
A*
A

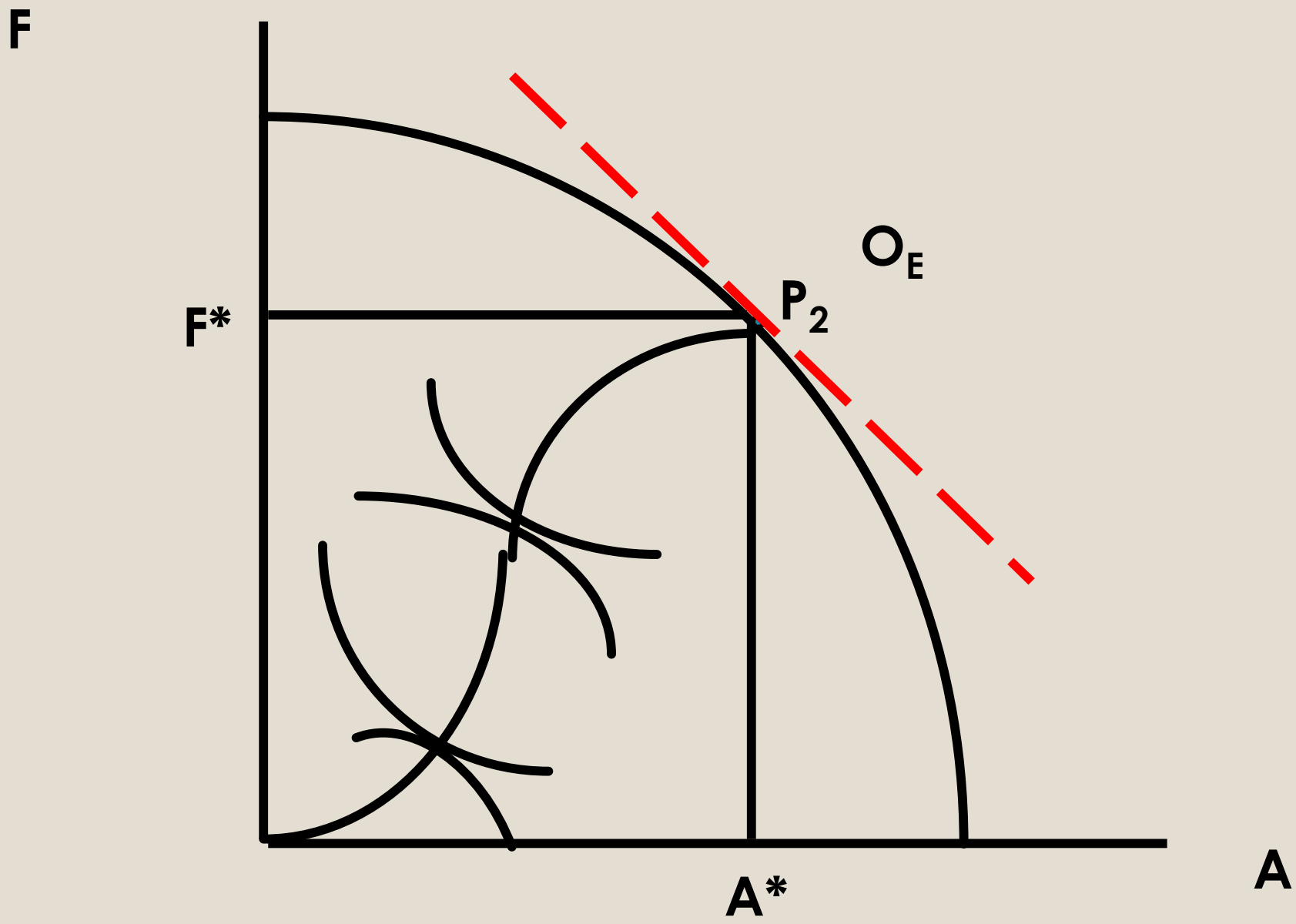

F
P1
F'
OE
P2
F*
F~
P3
A'
A*
A~
A

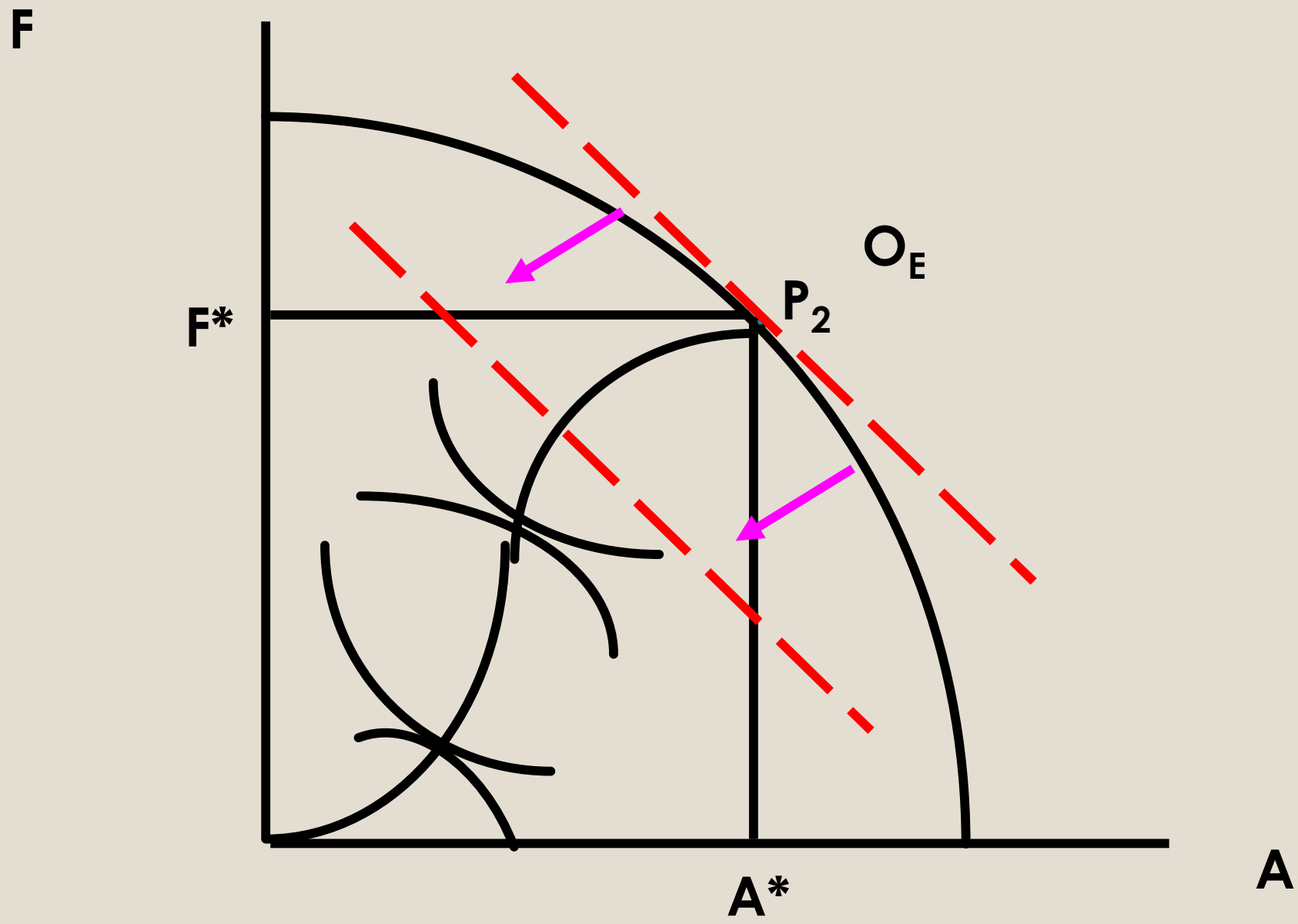

F
P1
F'
OE
P2
F*
F~
P3
A'
A*
A~
A

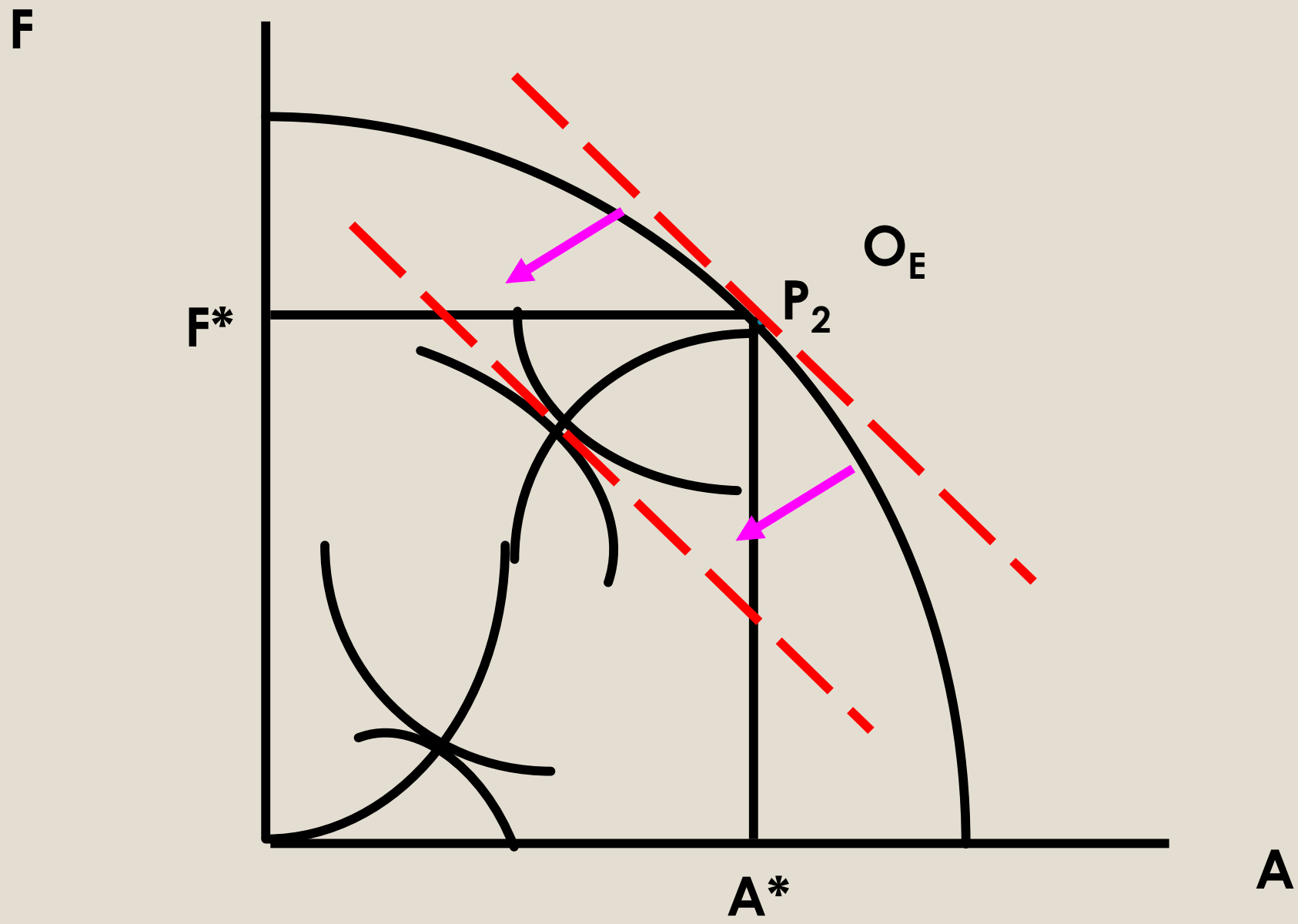

F
P1
F'
OE
P2
F*
F~
P3
A'
A*
A~
A

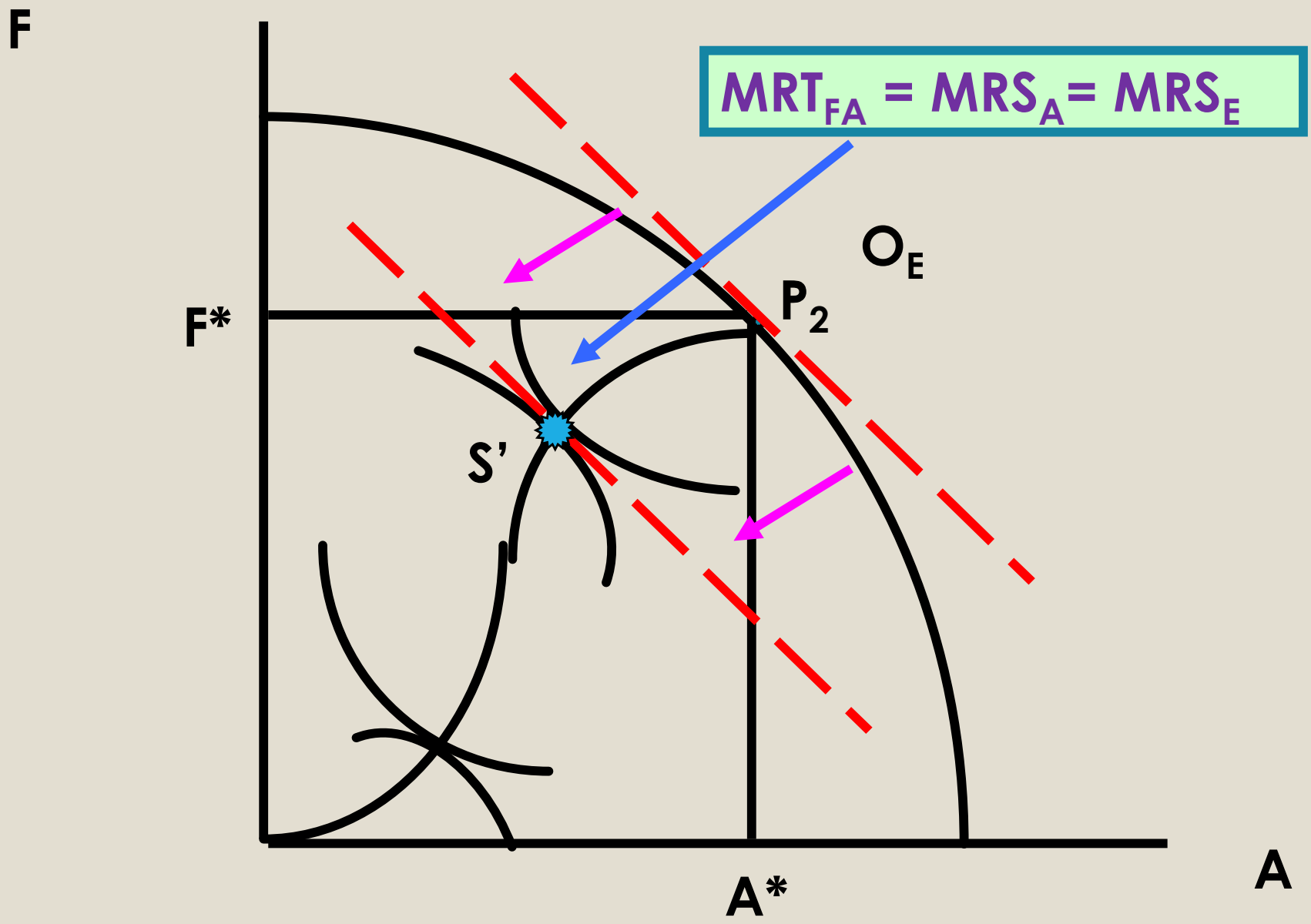

Utility E
Utility A

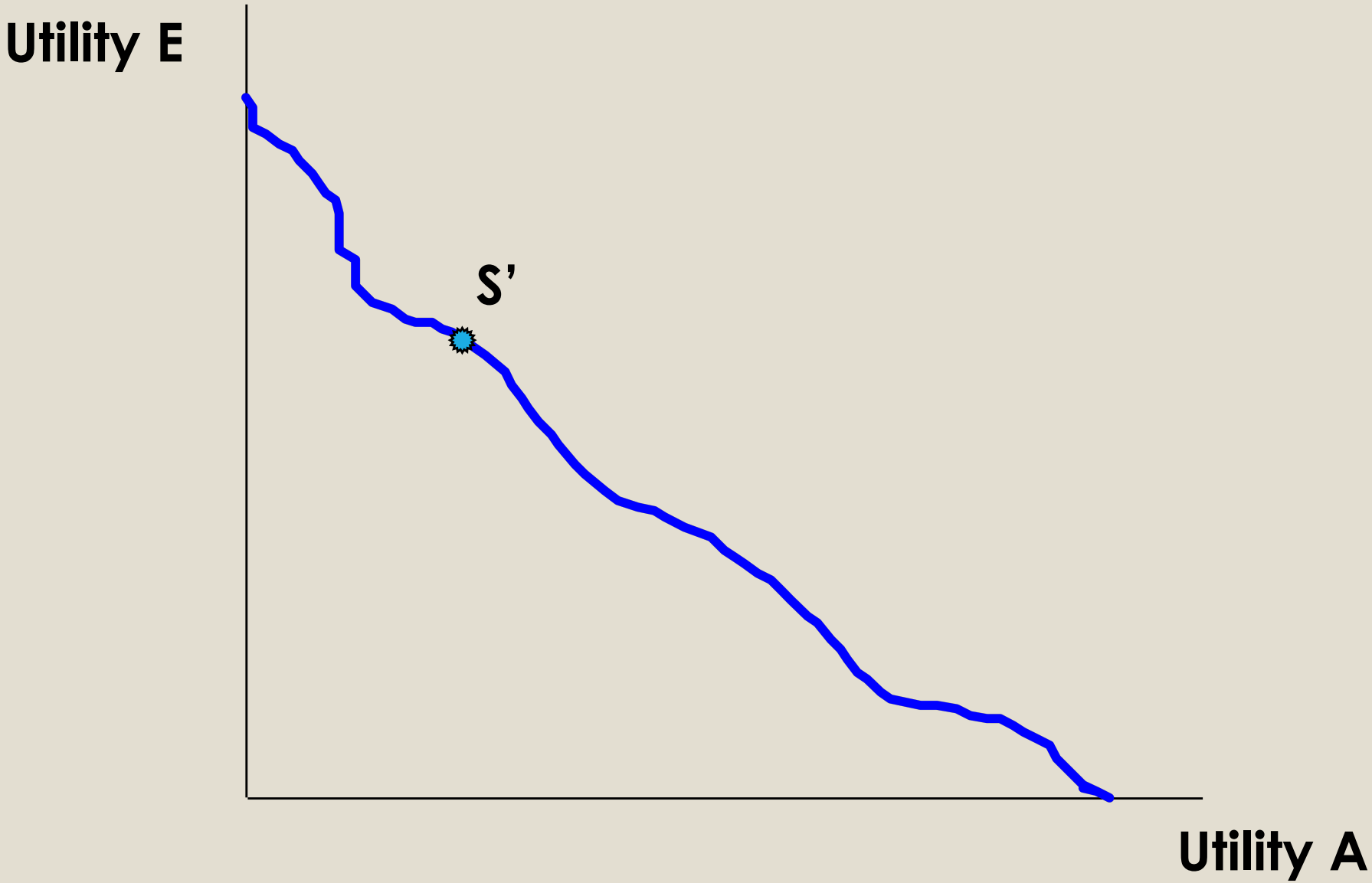

Utility E
Utility Possibilities Frontiers
for the Different Edgeworth Boxes
Utility A

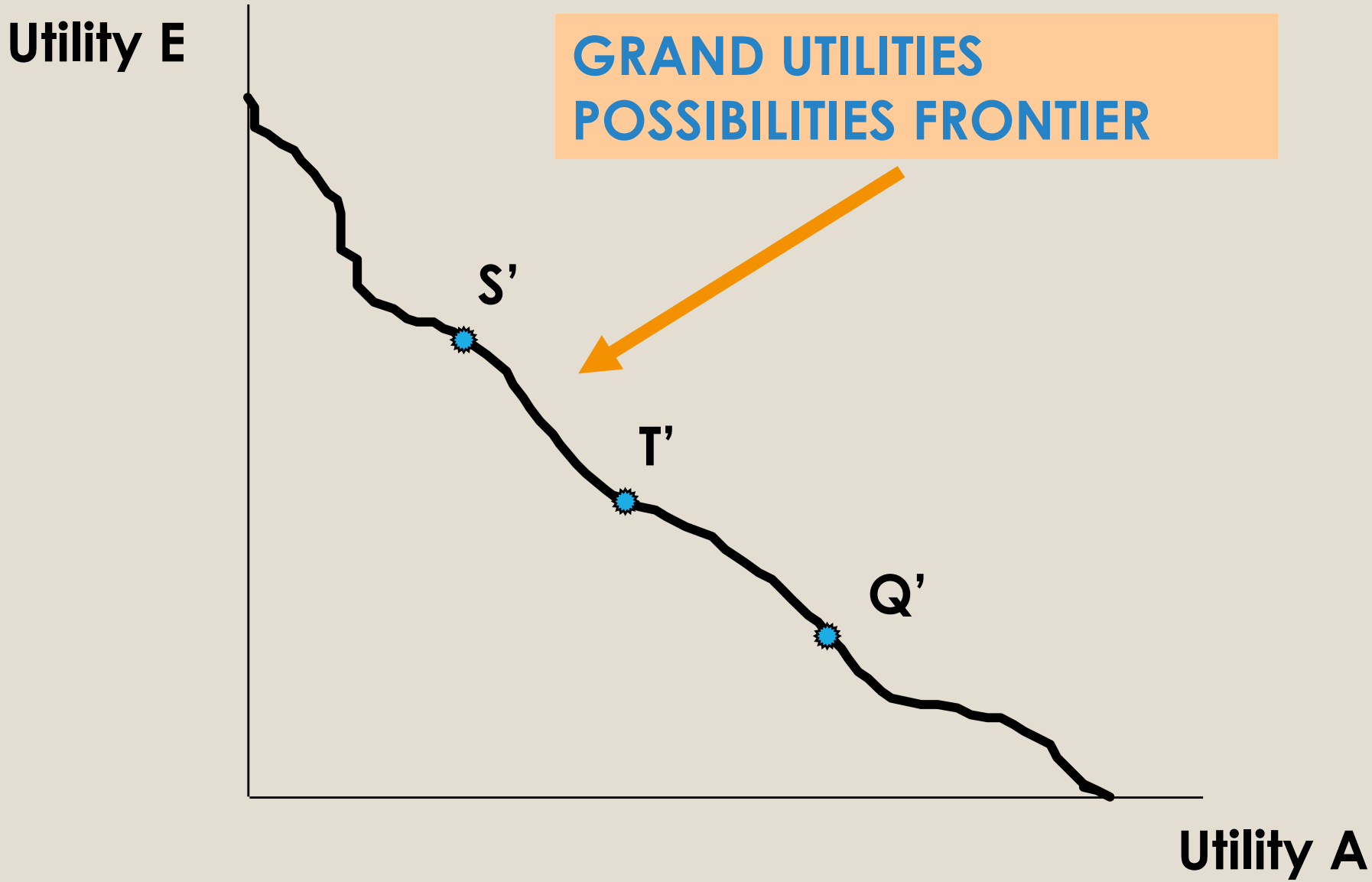

F
F*
O_E
P_2
A*
A

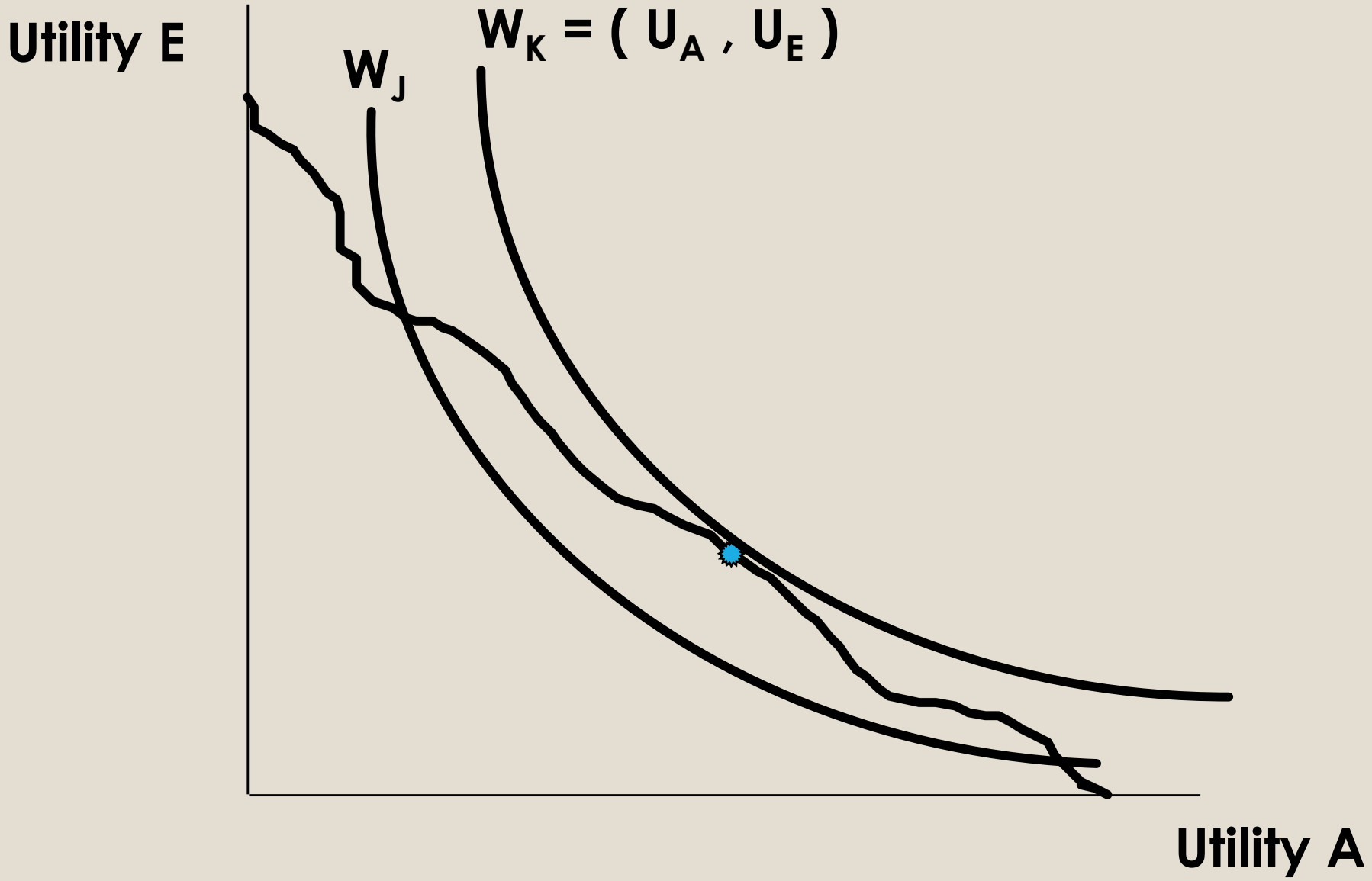

F
F*
O_E
P_2
A*
A

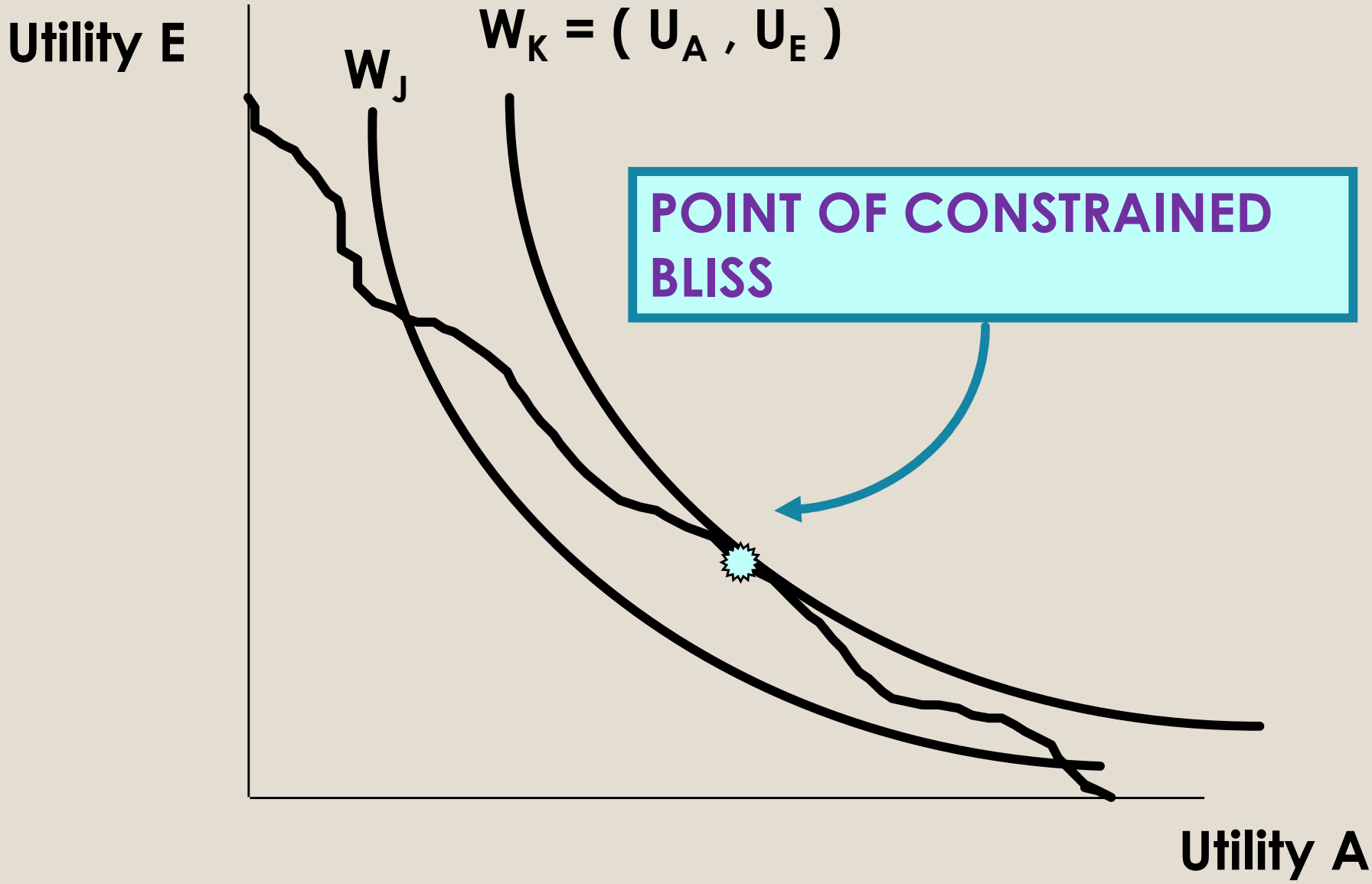

F
F*
O_E
P_2
A*
A

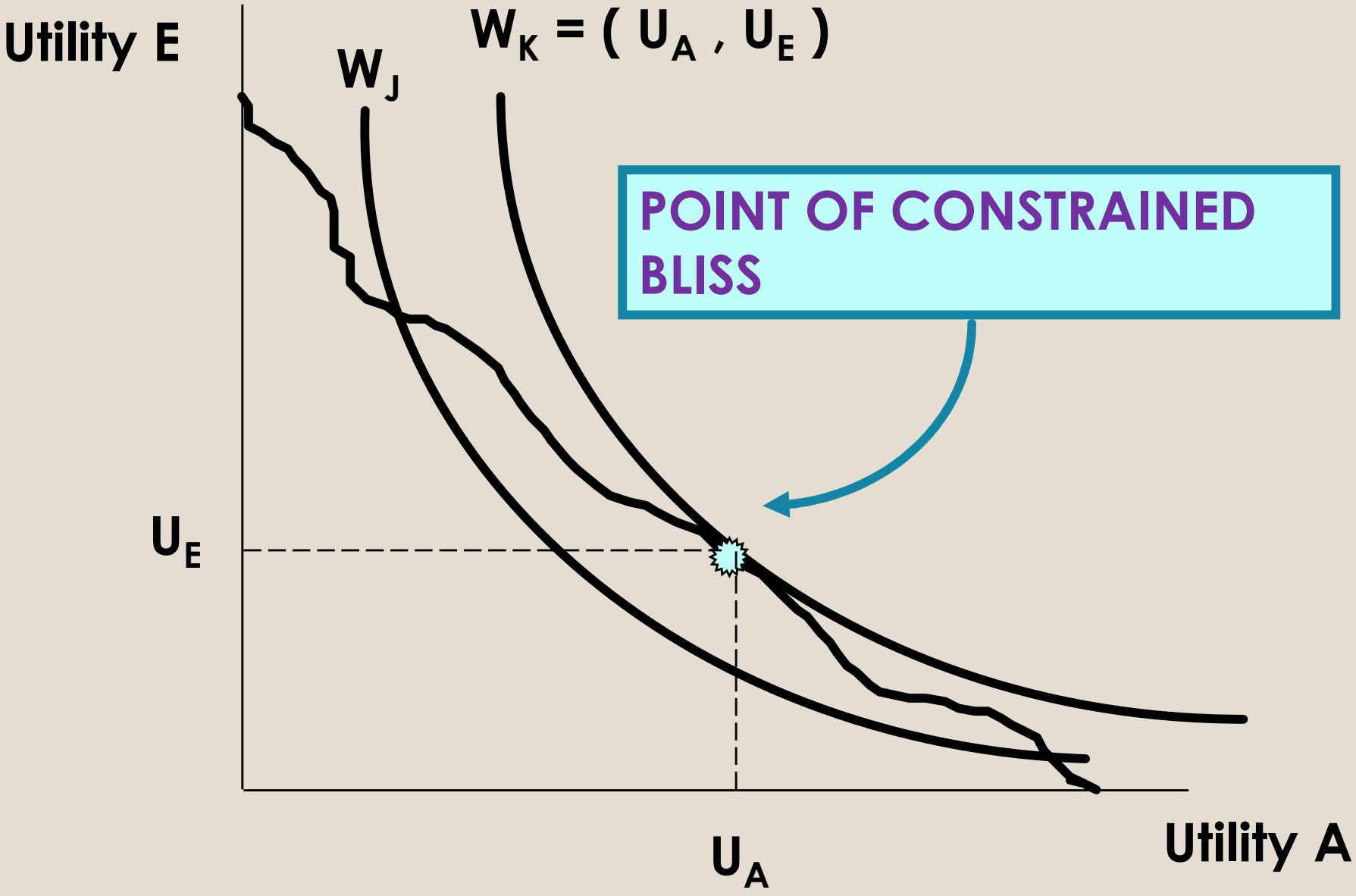

F
$MRT_{FA} = MRS_A = MRS_E$
O_E
P_2
F*
S'
A*
A


Utility E
S'
Utility A


Utility E
GRAND UTILITIES POSSIBILITIES FRONTIER
S'
T'
Q'
Utility A


Utility E
W_J
$W_K = (U_A , U_E)$
Utility A


Utility E
W_J
$W_K = (U_A , U_E)$
POINT OF CONSTRAINED BLISS
Utility A


Utility E
W_J
$W_K = (U_A , U_E)$
POINT OF CONSTRAINED BLISS
U_E
U_A
Utility A

Requirements for welfare maximization

- ***Marginal rate of substitution*** between every pair of goods must be the same for all consumers. In a pure market setting, this occurs when consumers equate the MRS's to the common market determined price ratio.

Requirements for welfare maximization

- ***Marginal rate of technical substitution*** between every pair of inputs must be the same for all producers . In a pure market setting, this occurs when producers maximize profit by equating MRTS's to the common market determined input price ratio.

Requirements for welfare maximization

- ***Marginal rate of transformation*** must be equal to the marginal rate of substitution in consumption for each pair of goods. In a pure market setting, this condition occurs when producers set marginal cost (MC) equal to the output price.

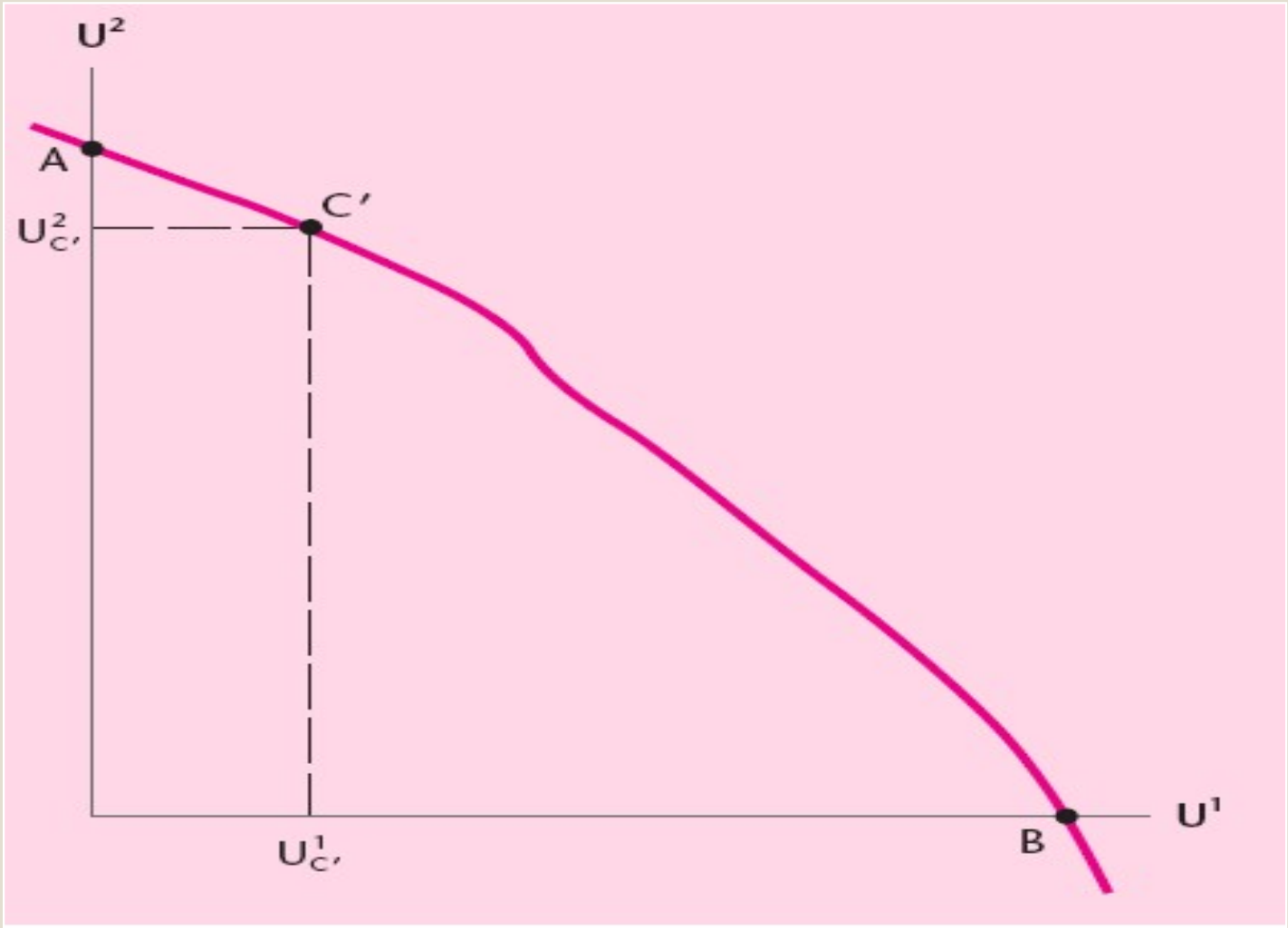
The First Fundamental Theorem of Welfare Economics

A competitive economy can achieve a Pareto optimal allocation of resources

Necessary conditions for a Pareto optimum:

1. **Consumption**: Marginal rates of substitution between X & Y must be equal for 1 & 2
2. **Production**: Marginal rates of technical substitution between K & L must be equal for production of X & Y
3. **Consumption-production**: Marginal rates of substitution between X & Y must also equal Marginal rates of transformation between X & Y

Every point on the Utility possibilities frontier is Pareto efficient



Efficiency and equity

- In the above diagram the distribution of utility is very unequal.
- If society is interested in a more equal distribution of utility can this be achieved through the free markets mechanism?
- The answer is given by the second fundamental theorem of welfare economics

The Second Fundamental Theorem of Welfare Economics

- Second welfare theorem says that a new Pareto-optimal outcome can be achieved given existing resources, without government intervention.
- Any point on the UPF can be achieved through the functioning of decentralized markets, by an appropriate initial distribution of resources.

Review Questions

- What will happen in our two goods, two-person world if **prices** do not reflect true marginal benefits and all increment costs to society are not included in **marginal costs** ?
- The market will still generate an equilibrium but it will not be Pareto optimal.
- True marginal benefits will not equal marginal costs or vice versa.
- When the market or price system gets the wrong signals we say that there has been a **market failure**.

Market failures

- Imperfect competition
- Public goods
- Externalities
- Incomplete markets
- Imperfect information
- Unemployment, inflation and other macroeconomic disturbances

Prerequisites for Pareto Optimality

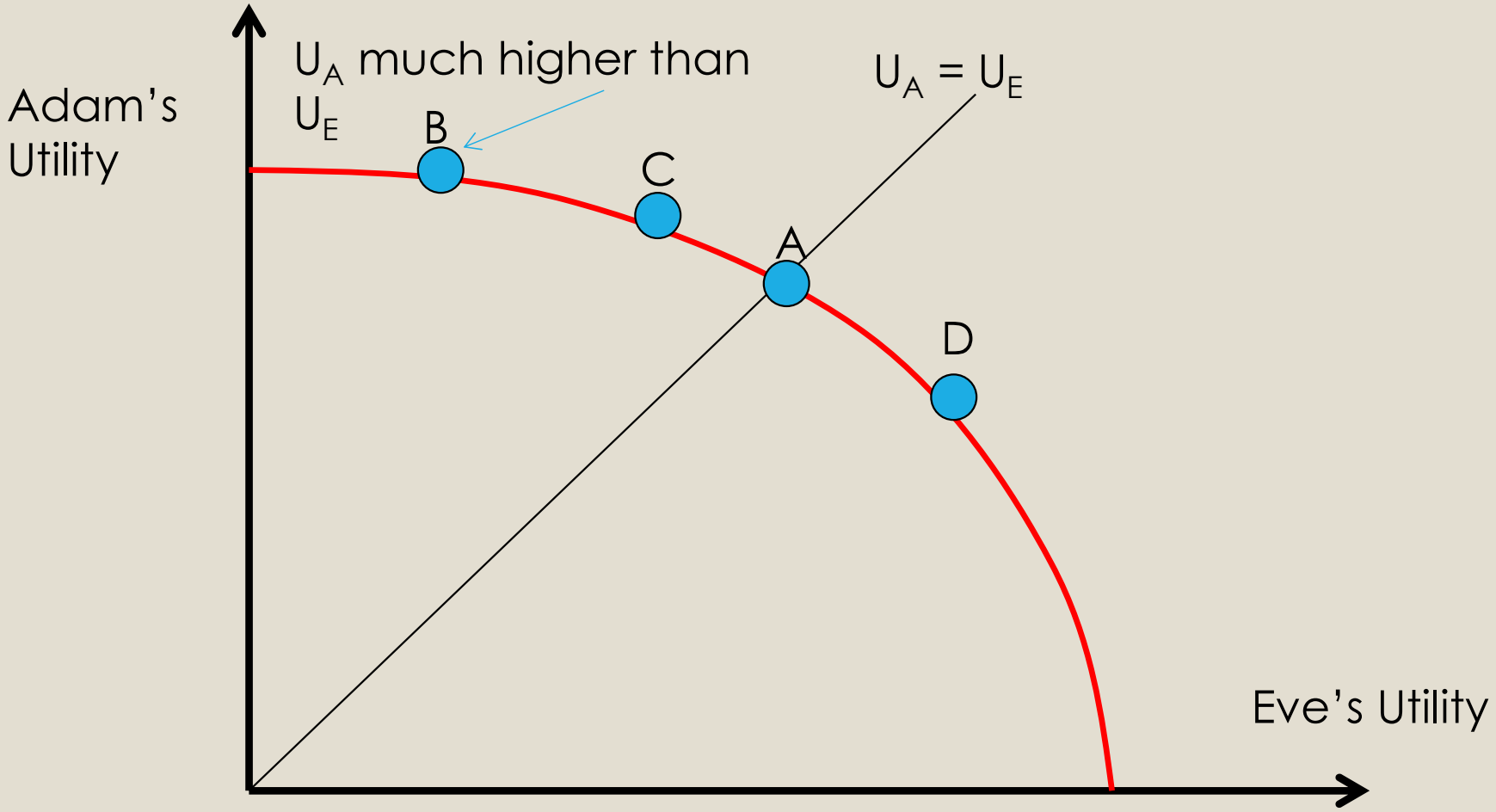
- Now that we have described the necessary conditions for Pareto efficiency, we may ask whether a given economy will achieve this apparently desirable state.
- It depends on what assumptions we make about the operations of that economy. Assume that:

1. All producers and consumers act as perfect competitors; that is, no one has any market power;
2. A market exists for each and every commodity.

Prerequisites for Pareto Optimality

- Under these assumptions, the so-called *First Fundamental Theorem of Welfare Economics* states that a Pareto efficient allocation of resources emerges.
- However, if properly functioning competitive markets allocate resources efficiently, what role does the government have to play in the economy? Only a very small government would appear to be appropriate.
  - Its main function would be to protect property rights so that markets can work. Government provides law and order, a court system, and national defense. Anything more is superfluous.
- But in reality things are much more complicated. For one thing, it has implicitly been assumed that efficiency is the only criterion for deciding if a given allocation of resources is good. It is not obvious, however, that Pareto efficiency by itself is desirable.

Prerequisites for Pareto Optimality



Prerequisites for Pareto Optimality

- Now that we have described the necessary conditions for Pareto efficiency, we may ask whether a given economy will achieve this apparently desirable state.
- It depends on what assumptions we make about the operations of that economy. Assume that:

1. All producers and consumers act as perfect competitors; that is, no one has any market power;
2. A market exists for each and every commodity.

Prerequisites for Pareto Optimality

- If markets lead to a point such as B that is not desirable by the society, does the government have to intervene directly in markets in order to move the economy to a point such A, C or D? For example, does it have to impose ceilings on the prices of commodities consumed by the poor?
- The answer is no. According to the *Second Fundamental Theorem of Welfare Economics,* society can attain any Pareto efficient allocation of resources by making a suitable assignment of initial endowments and then letting people freely trade with each other

Prerequisites for Pareto Optimality

- However, in addition to distributional issues, there is another reason why the First Welfare Theorem need not imply a minimal government.
- This relates to the fact that the certain conditions required for its validity may not be satisfied by real-world markets.
- As we now show, when these conditions are absent, the free-market allocation of resources may be inefficient as well as unfair.

Markets failures

- It is quite likely that the assumptions on which the first and second fundamental theorems are based do not hold in reality. In other words
- There may not be perfect competition in all markets, and
- In many instances markets may not exist for certain commodities and services.
- In such cases how can we achieve maximization of social welfare?

Markets failures:
Market power

- The First Welfare Theorem holds only if all consumers and firms are price takers.
- If some individuals or firms are price makers (they have the power to affect prices) then the allocation of resources is generally inefficient.
- Why?
- A firm with market power may be able to raise price above marginal cost by supplying less output than a competitor would.
- Thus, efficiency conditions are violated, and there is no maximization of social welfare.

Markets failures:
Market power

- Price-making behavior can arise in several contexts.
- An extreme case is a **monopoly,** where there is only one firm in the market, and entry is blocked.
- Even in the less extreme case of oligopoly (a few sellers), the firms in an industry may be able to increase price above marginal cost.
- Finally, some industries have many firms, but each firm has some market power because the firms produce differentiated products.
- For example, a lot of firms produce running shoes, yet many consumers view Reeboks, Nikes, and Adidas as distinct commodities.

Markets failures:
Nonexistence of Markets

- The proof behind the First Welfare Theorem assumes a market exists for every commodity.
- After all, if a market for a commodity does not exist, then we can hardly expect the market to allocate it efficiently.
- In reality, markets for certain commodities may fail to emerge.
- Consider, for instance, insurance, a very important commodity in a world of uncertainty. Despite the existence of many and large insurance firms, there are certain events for which insurance simply cannot be purchased on the private market.

Markets failures:
Nonexistence of Markets

- For example, suppose you wanted to purchase insurance against the possibility of becoming poor.
- Would a firm in a competitive market ever find it profitable to supply "poverty insurance"?
- The answer is no, because if you purchased such insurance, you might decide not to work very hard.
- To discourage such behavior, the insurance firm would have to monitor your behavior to determine whether your low income was due to bad luck or to goofing off.
- However, to perform such monitoring would be very difficult or impossible.
- Hence, there is no market for poverty insurance—it simply cannot be purchased.

Markets failures:
asymmetric information

- Basically, the problem here is **asymmetric information**
- It means that one party in a transaction has information that is not available to another.
- One rationalization for governmental income support programs is that they provide poverty insurance that is unavailable privately.
- The premium on this "insurance policy" is the taxes you pay when you are able to earn income. In the event of poverty, your benefit comes in the form of welfare payments.

Markets failures:
Nonexistence of Markets

- Another type of inefficiency that may arise due to the nonexistence of a market is an **externality**
- **Externality** is a situation in which one person's behavior affects the welfare of another in a way that is outside existing markets.
- For example, suppose your roommate begins smoking large cigars, polluting the air and making you worse off.
- The most characteristic example is pollution.

Markets failures:
Nonexistence of Markets

- Closely related to an externality is a **public good,** a commodity that is *nonrival and nonexcludable in consumption*.
- Nonrival means that the fact that one person consumes it does not prevent anyone else from doing so as well.
- Nonexcludable means that it is either very expensive or impossible to prevent anyone from consuming it.
- The classic example of a public good is a lighthouse. When the lighthouse turns on its beacon, all ships in the vicinity benefit.
- The fact that one person takes advantage of the lighthouse's services does not keep anyone else from doing so simultaneously, and it is very difficult to prevent others from using the lighthouse.