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SKU: 9781259030772-SOLUTIONS

Chapter 2

1.

a. In this particular insurance market, one would not expect asymmetric information to be much of a problem – the probability of a hurricane is common knowledge. Moral hazard could be an issue – people are more likely to build near a beach if they have hurricane insurance. Still, one would expect the market for hurricane insurance to operate fairly efficiently.

b. There is substantial asymmetric information in the markets for medical insurance for consumers and also malpractice insurance for physicians. For efficient consumption, the price must be equal to the marginal cost, and the effect of insurance may be to reduce the perceived price of medical care consumption. That would lead to consumption above the efficient level. Because of the roles of regulation, insurance, taxes, and the shifting of costs from the uninsured to the insured, there is little reason to expect the market to be efficient.

c. In the stock market, there is good information and thousands of buyers and sellers. We expect, in general, efficient outcomes.

d. From a national standpoint, there is a good deal of competition and information with regards to MP3 players and music. The outcome will likely be efficient for MP3 players and music. However, some firms might exercise some market power through high brand awareness and proprietary downloading systems.

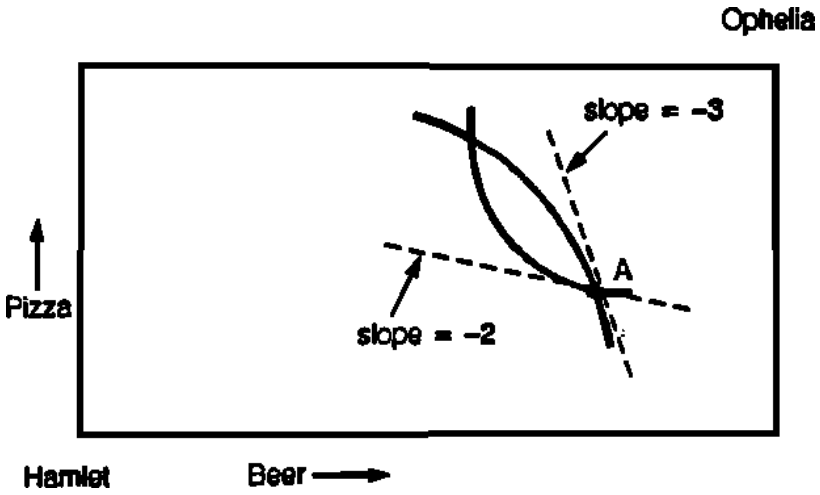
e. The private market allocation is likely inefficient without government intervention. Student loan markets may suffer from asymmetric information – the student knows better than the lender whether he will repay the loan or default on it, a form of adverse selection. Government intervention does not "solve" the adverse selection problem in this case (because participation in the student loan program is not compulsory), but it may create a market that would not exist without intervention.

f. The market for housing is likely to be relatively efficient. Some inefficiencies may exist, such as asymmetric information—the seller knows more about the house than the buyer—and differentiated products. But, the market has developed to mitigate these inefficiencies. For example, a buyer can employ a home inspector to help him understand more about the quality of the home. Also, a large number of homes on the market increases competition.

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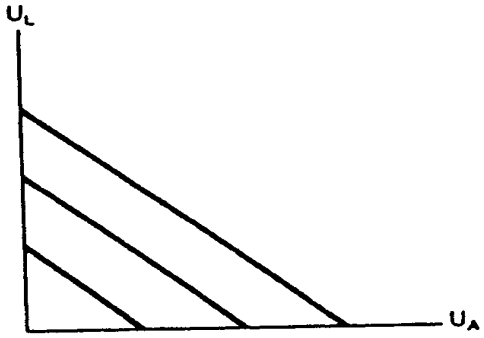
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2. No. The marginal rate of substitution of beer for pizza (MRS) is 2 for Hamlet and 3 for Ophelia. This violates the necessary condition for a Pareto efficient allocation.



3.

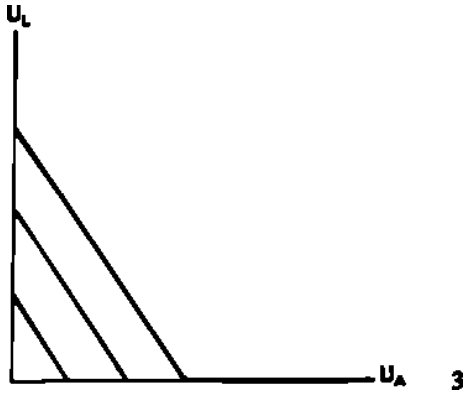
a. Social indifference curves are straight lines with slope of –1. As far as society is concerned a "util" to Augustus is equivalent to a "util" to Livia.



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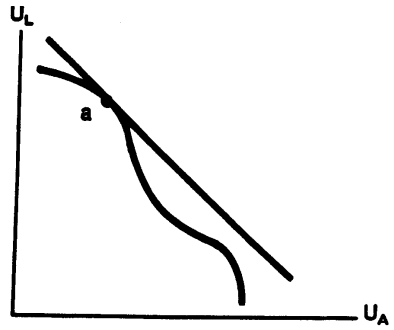
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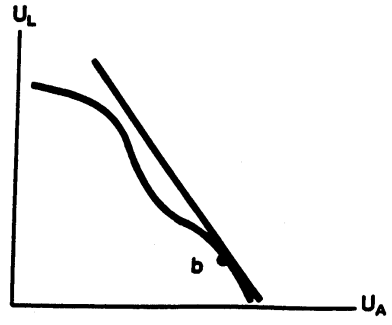
b. Social indifferences are straight lines with slope of –2. This reflects the fact that society values a "util" to Augustus twice as much as a "util" to Livia.



3

c.

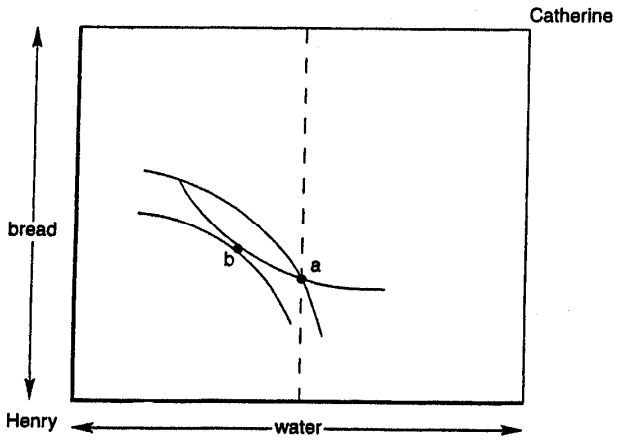




4. Point a represents an equal allocation of water, but it is not efficient because there is no tangency. Point b is an efficient allocation (but not the only one).

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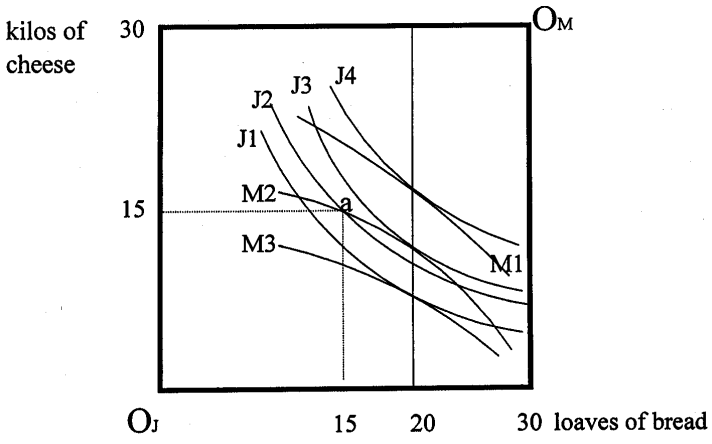
AD: 1) the dashed line is positioned at the halfway point on the horizontal axis.
2) point b is a tangency

If Americans have a higher MRS_{wb} than Canadians, then there are gains for residents of both countries if Canada exports water to the U.S. in exchange for bread.

5. The marginal rate of transformation between foreign and domestic movies depends on the ratio of their prices before taxes and subsidies. Because of the wedge created by the taxes and subsidies, the two price ratios are different. Therefore, the marginal rate of substitution and marginal rate of transformation are not equal, and the allocation of resources is inefficient.

6. a. If John had one loaf of bread, he would be willing to give up 10 kilos of cheese for an additional loaf of bread. If Marsha had one loaf of bread, she would be willing to give up 5 kilos of cheese for an additional loaf of bread.

   b. The initial allocation at point a in the Edgeworth box is not Pareto efficient because John is willing to given up 2/3 of a kilo of cheese for an extra loaf of bread while Marsha would be willing to accept 1/3 of a kilo of cheese for a loaf of bread. Marsha



should give John some bread in exchange for cheese.

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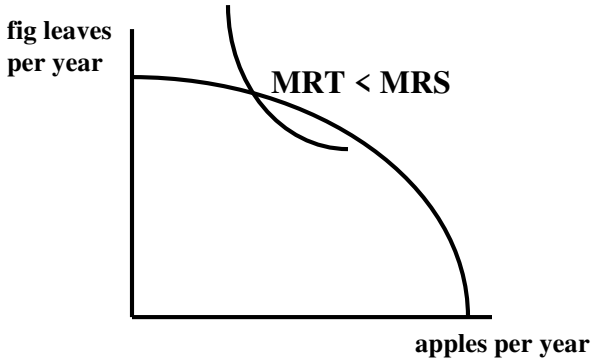
c. Along the contract curve:

$$MRS_{bc}^{J} = \frac{10}{x_b^J} = \frac{5}{x_b^M} = MRS_{bc}^{M} \text{ or } x_b^J = 2x_b^M.$$

Since $x_b^J + x_b^M = 30, x_b^M = 10$ *and* $x_b^J = 20$ along the contract curve. The contract curve is a vertical line at $x_b^J = 20$.

7. In this case, the "Edgeworth Box" is actually a line because there is only one good on the island. The set of possible allocations is a straight line, 100 units long. Every allocation is Pareto efficient, because the only way to make one person better off is to make another person worse off. There is no theory in the text to help us decide whether an allocation is fair. Although splitting the peanuts even between the people may be fair, it may not be fair if the calorie "needs" of the people are different. With a social welfare function, we can make assessments on whether redistribution for society as a whole is a good thing.

8. Although the economy is operating on the production possibilities frontier, the MRT will be less than the MRS because the quota causes the apples market to clear at a price exceeding the marginal cost. We can represent this situation with the following diagram.



9. If individuals are not permitted to substitute apples for fig leaves by trading or selling, then the MRS of individuals who like apples a lot will exceed the MRS of those liking apples little. If trade were permitted, the first type of individuals would acquire apples from the second type, and consequently the MRS of the first type would decline while the MRS of the second type would rise. This process would continue until the MRS is the same across individuals.

10. Social welfare is maximized when Mark's marginal utility of income is equal to Judy's marginal utility of income. Taking the derivative of Mark's utility function to find his marginal utility function yields $MU_M = 50/(I_M^{1/2})$ and taking the derivative of Judy's utility function yields $MU_J = 100/(I_J^{1/2})$. If we set MU_M equal to MU_J, the condition for maximization becomes $I_J = 4I_M$ and, since the fixed amount of income is \$300, this means that Mark should have \$60 and Judy should have \$240 if the goal is to maximize social welfare = $U_M + U_J$.

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11.

a. If the food is evenly distributed between Tang and Wilson, Tang will have 14.14 units of utility and Wilson will have 7.07 units of utility.

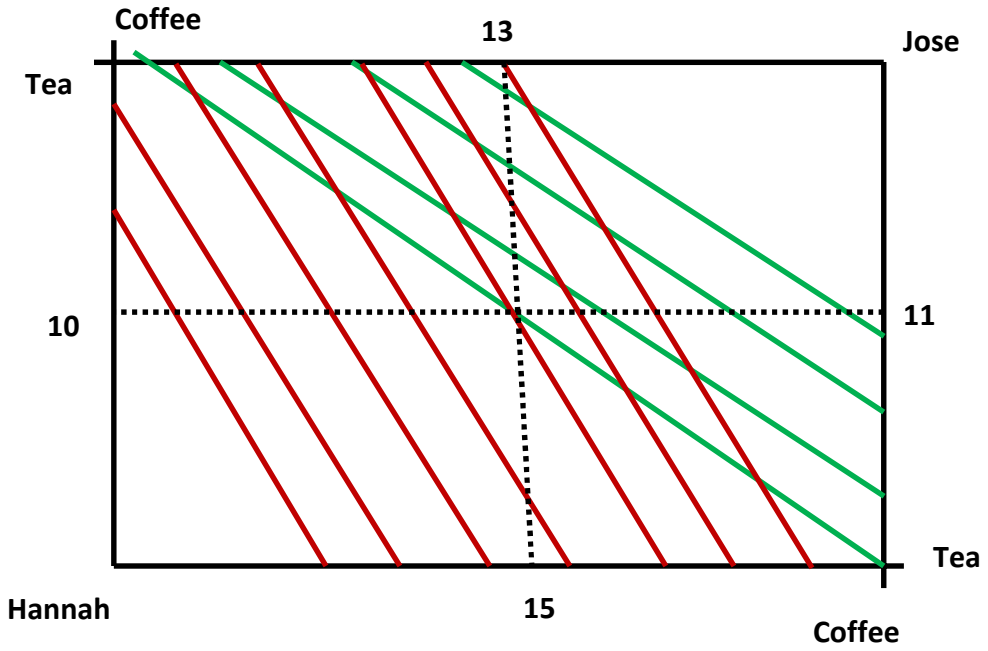
b. If the social welfare function is U_T+U_W, then the marginal utilities of both should be equal to maximize social welfare. Equate $MU_T=1/(2F_T^{1/2})$ to $MU_W=1/(4F_W^{1/2})$ and substitute $F_T=400-F_W$. Therefore, $F_T=320$ and $F_W=80$.

c. If the utility of both Tang and Wilson must be equal, then set $U_T=U_W$ and substitute $F_T=400-F_W$ and solve. Therefore, $F_T=80$ and $F_W=320$.

12.

a. The marginal rates of substitution for coffee and for tea are constant for both Hannah and Jose. Hannah would trade ¼ pound of coffee for 1/3 pound of tea to remain equally satisfied. Similarly, Jose would trade ¼ pound of tea for 1/3 pound of coffee to remain equally satisfied. The constant MRS means linear indifference curves

b. Green indifference curves are Jose's and red indifference curves are Hannah's.



c. The contract curve follows the bottom and right borders of the Edgeworth Box. At any interior point in the box, the parties will find it in their interest to trade until they reach these borders. This is because Hannah would only choose to consume tea once she has consumed all the coffee in the economy.

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Likewise, Jose would only choose to consume coffee once he has consumed all the tea in the economy.

d. The initial allocation is not Pareto efficient. It is possible to make one better off without making the other worse off.

13.

a. False. As shown in the text, equality of the marginal rates of substitution is a necessary, but not sufficient, condition. The MRS for each individual must also equal the MRT.

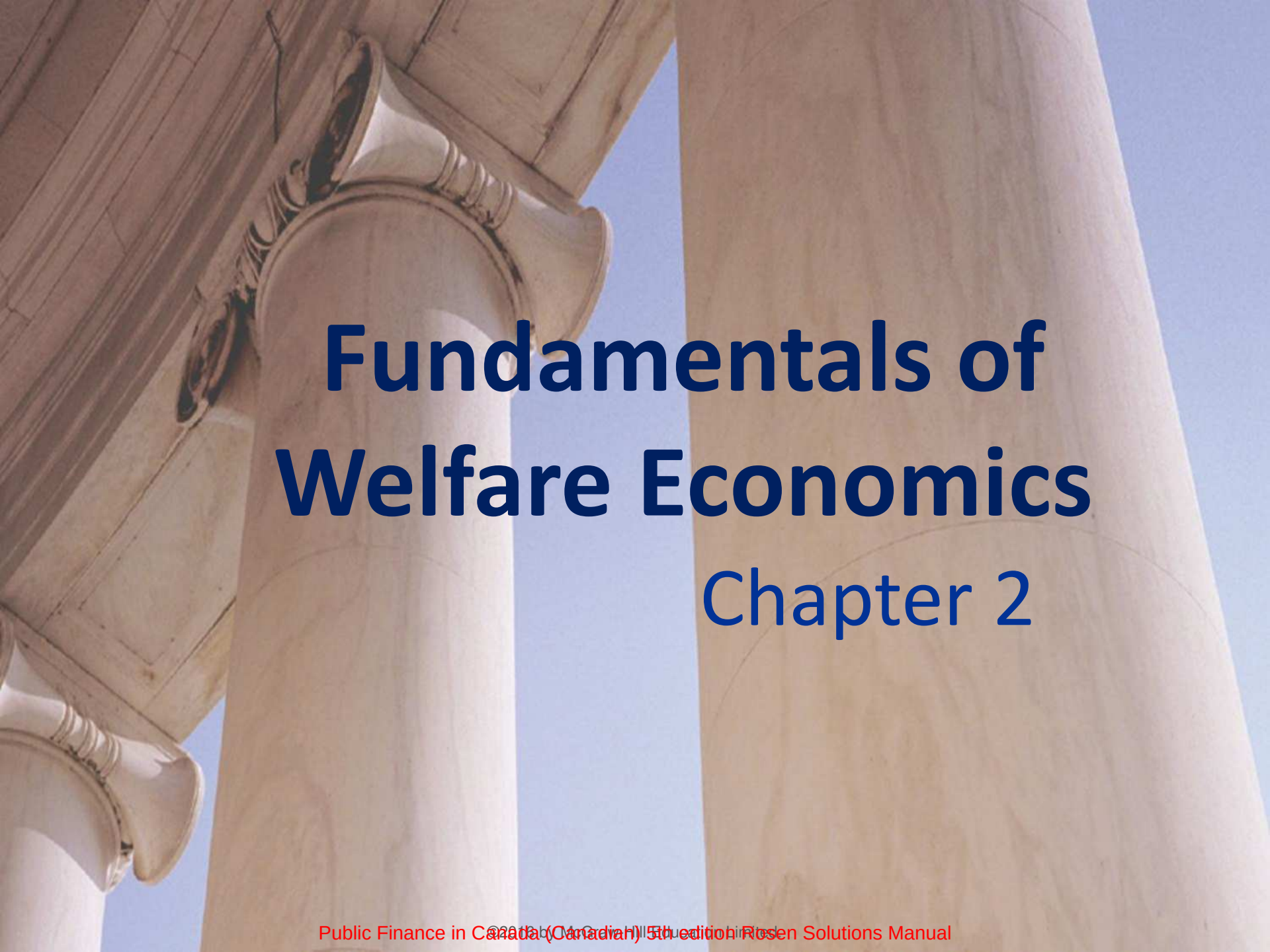
b. Uncertain. As long as the allocation is an interior solution in the Edgeworth box, the marginal rates of substitution must be equal across individuals. This need not be true, however, at the corners where one consumer has all the goods in the economy.

c. False. A policy that leads to a Pareto improvement results in greater efficiency, but social welfare depends on equity as well as efficiency. A policy that improves efficiency but creates a loss in equity might reduce social welfare.

d. False. Moving to a point on the utility possibilities curve may not result in a Pareto improvement because one party may receive less utility on the curve than they received at the interior point.

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Fundamentals of Welfare Economics

Chapter 2

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Learning Objectives

1. Draw the contract curve in an Edgeworth Box diagram.
2. Define a Pareto improvement in the allocation of resources.
3. Explain the efficiency conditions for an economy with variable production.
4. State the First Fundamental Theorem of Welfare Economics.
5. State the Second Fundamental Theory of Welfare Economics.

Learning Objectives (cont.)

6. Identify which condition for efficiency is violated when producers have monopoly power.
7. Provide examples of the nonexistence of markets.
8. Identify the allocation that maximizes social welfare.
9. Describe two controversial assumptions of welfare economics.

Welfare Economics

Concerned with the social desirability of alternative economic states.

Pure Exchange Economy

- **Edgeworth Box -** an analytical device used to model welfare economic theory
  - Depicts distribution of goods in a 2-good/2-person economy
- **Pareto Efficiency** – an allocation of resources such that no person can be made better off without making another person worse off
- **Pareto Improvement** – a reallocation of resources that makes at least one person better off without making anyone else worse off

Edgeworth Box
2 person / 2 good economy

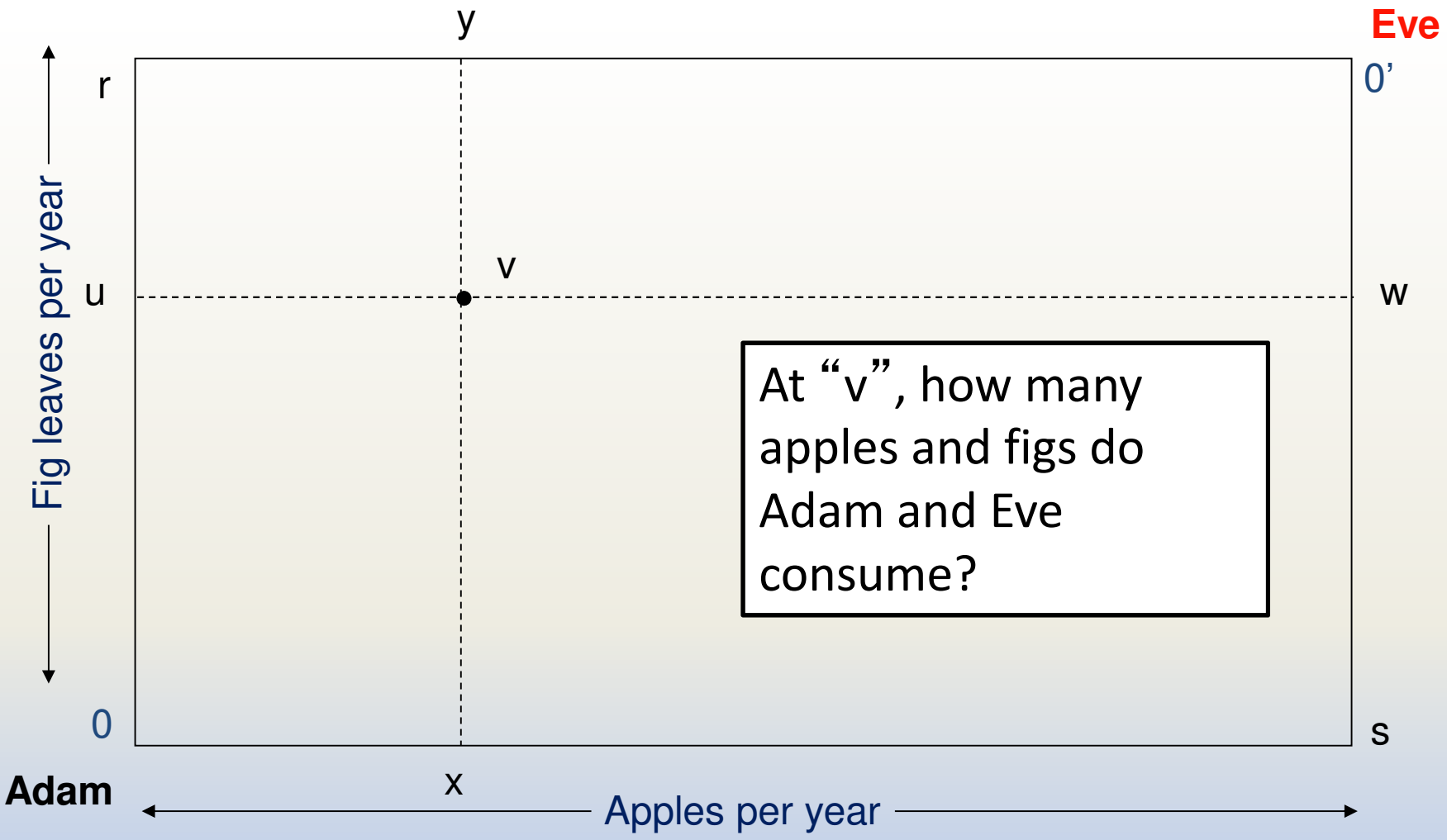


Figure 2.1

Indifference curves in Edgeworth Box

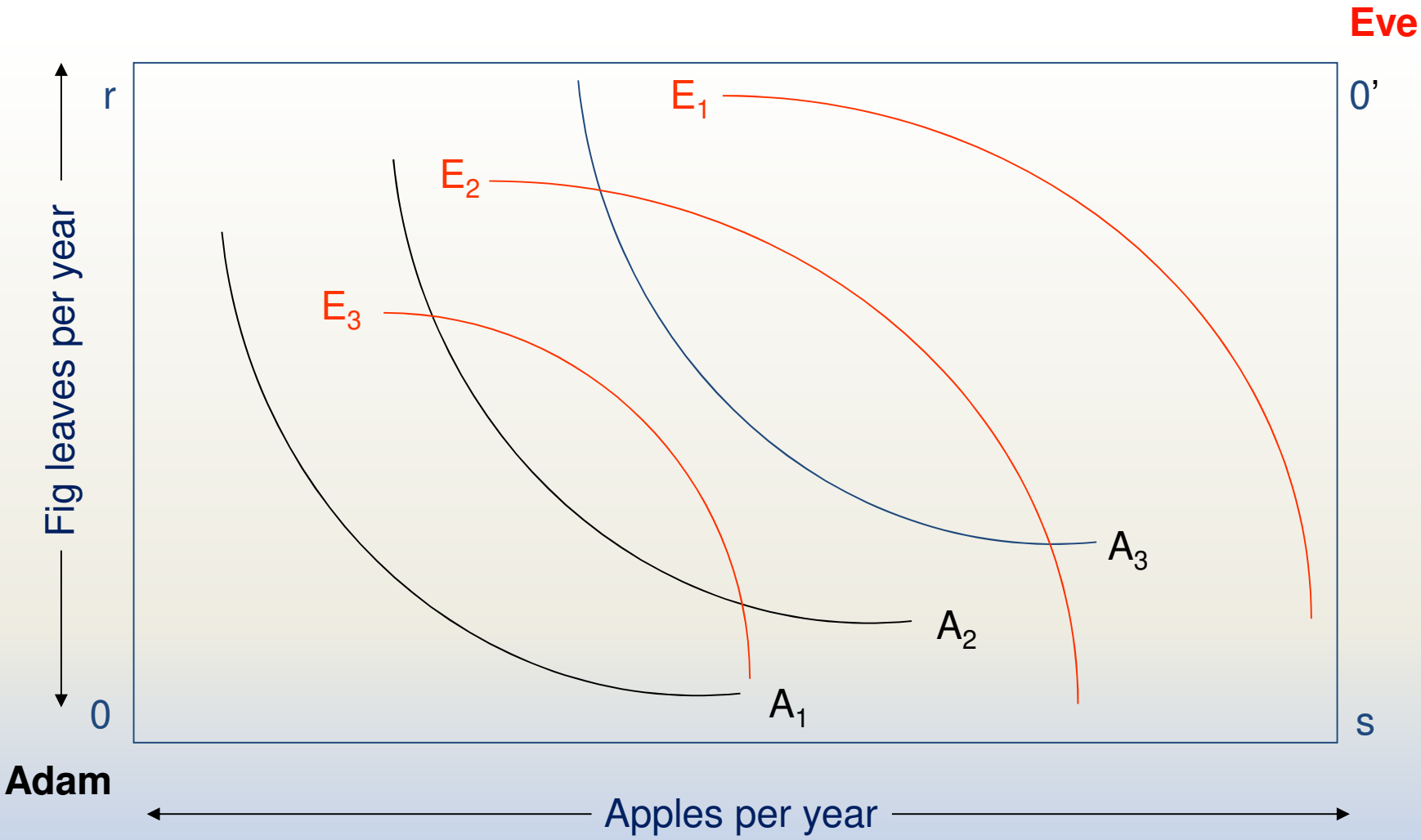


Figure 2.2

Beginning at Point g, how to make Adam better off without Eve becoming worse off

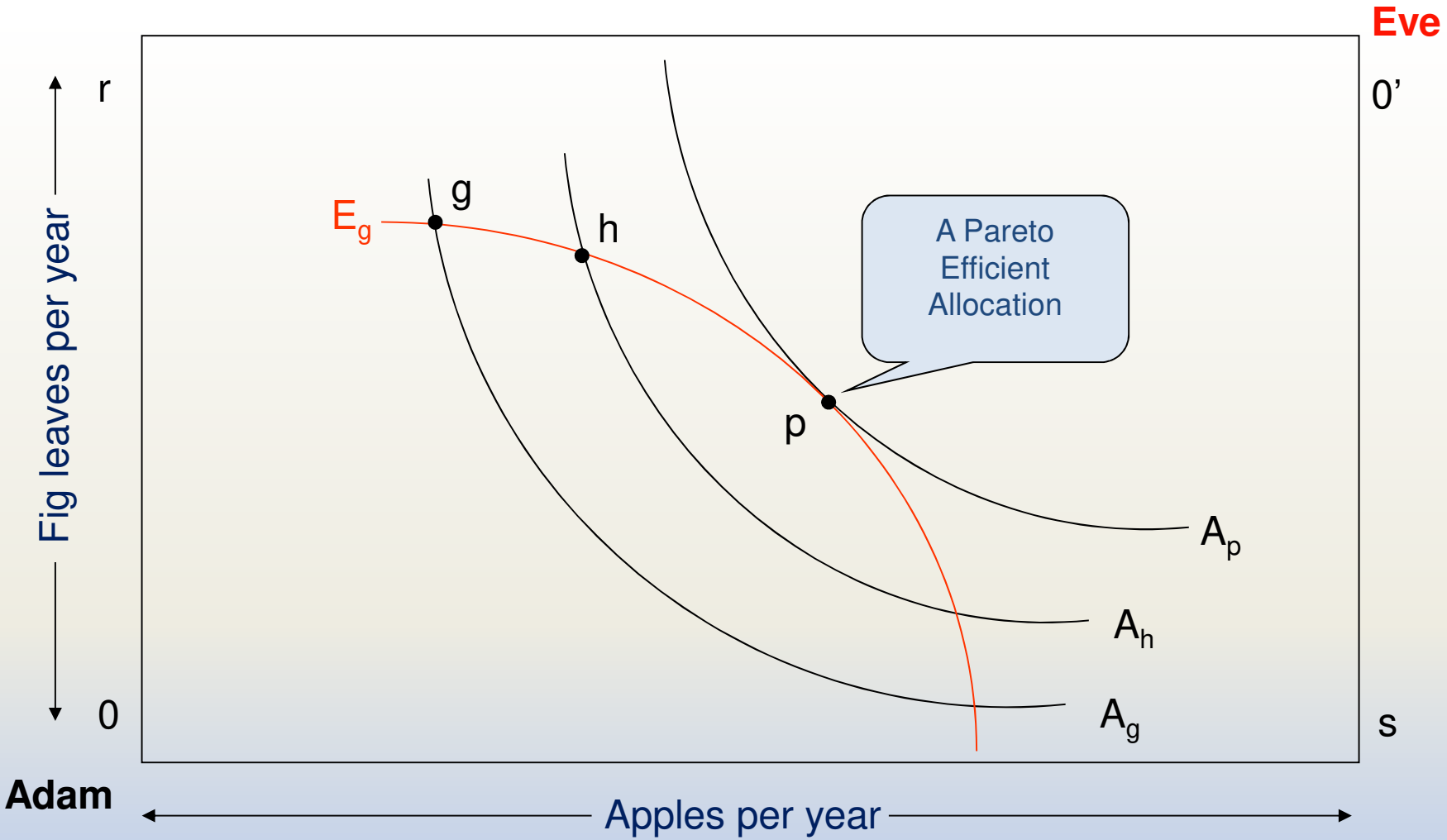


Figure 2.3

Beginning at Point g, how to make Eve better off without Adam becoming worse off

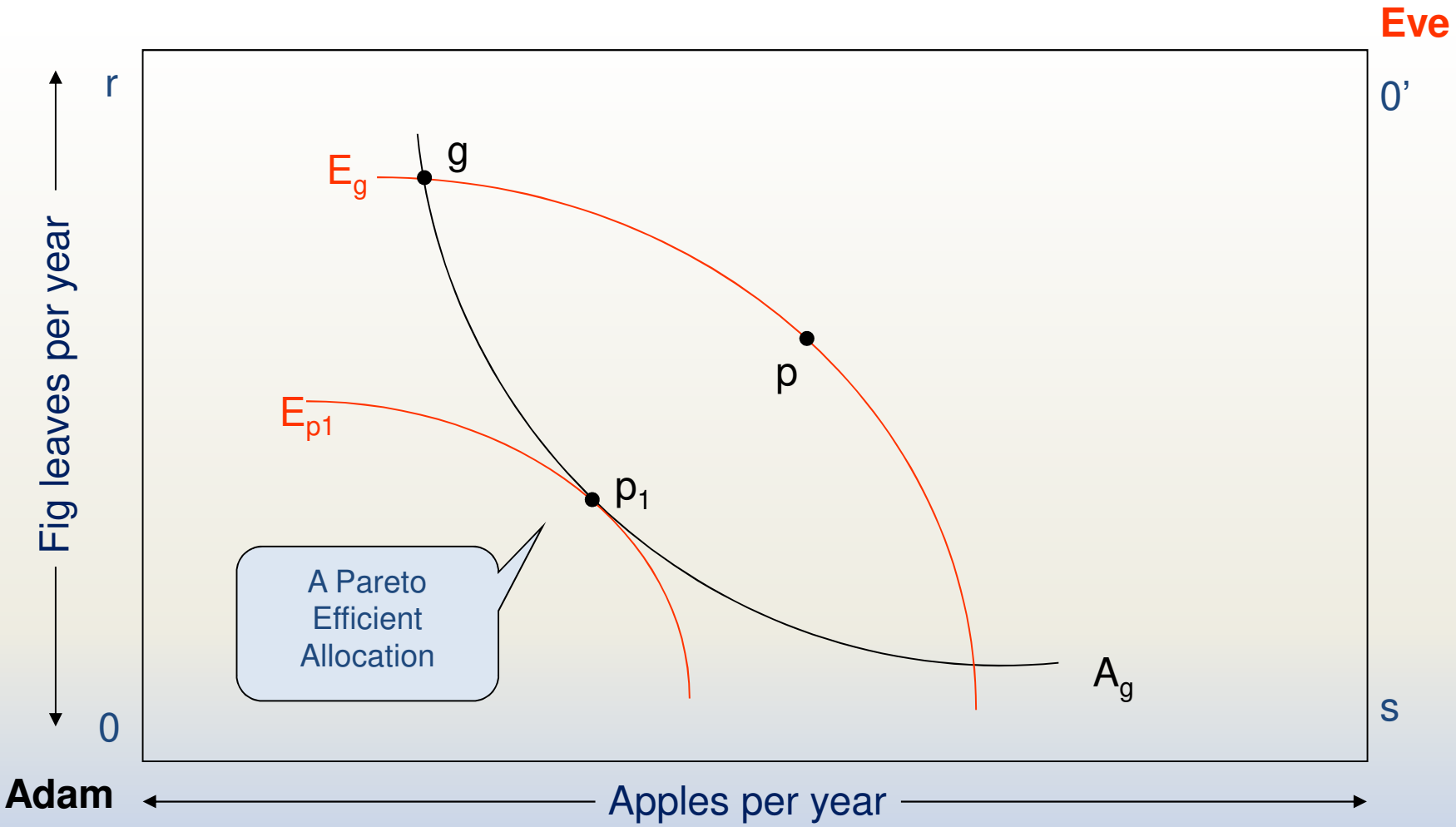


Figure 2.4

Beginning at Point g how to make both Adam and Eve better off

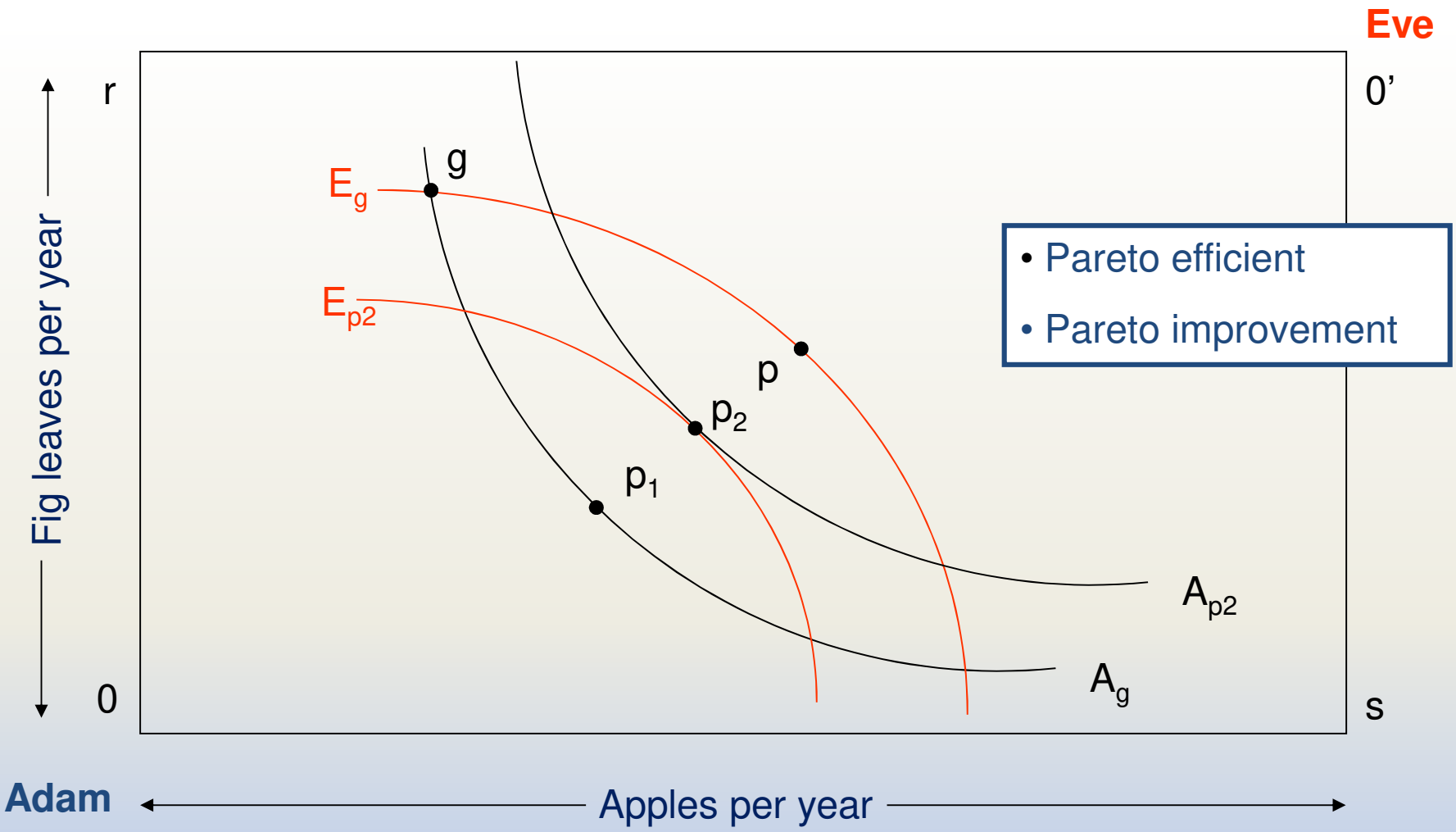


Figure 2.5

Starting from a different initial point: Point k

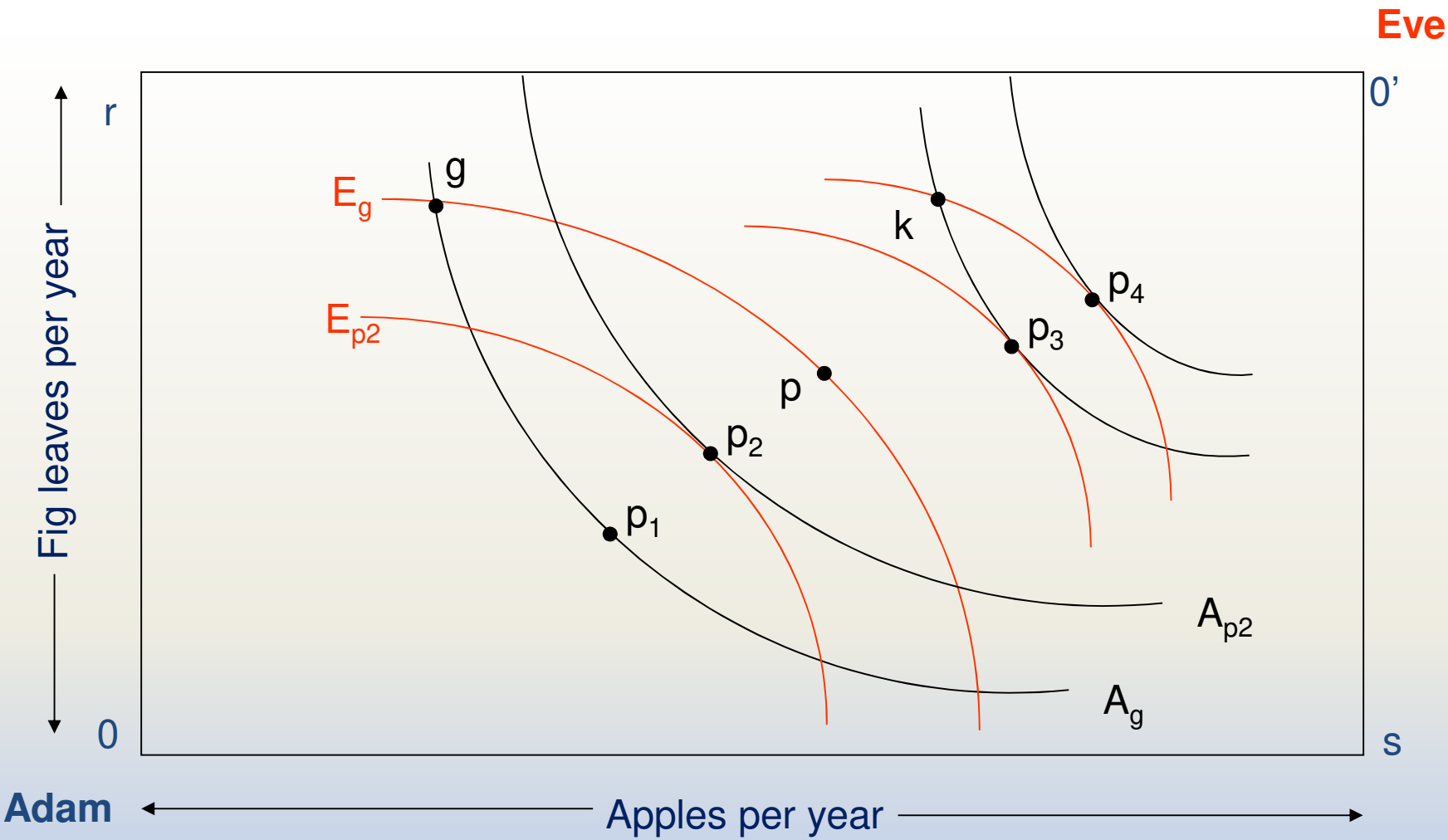


Figure 2.6

The Contract Curve

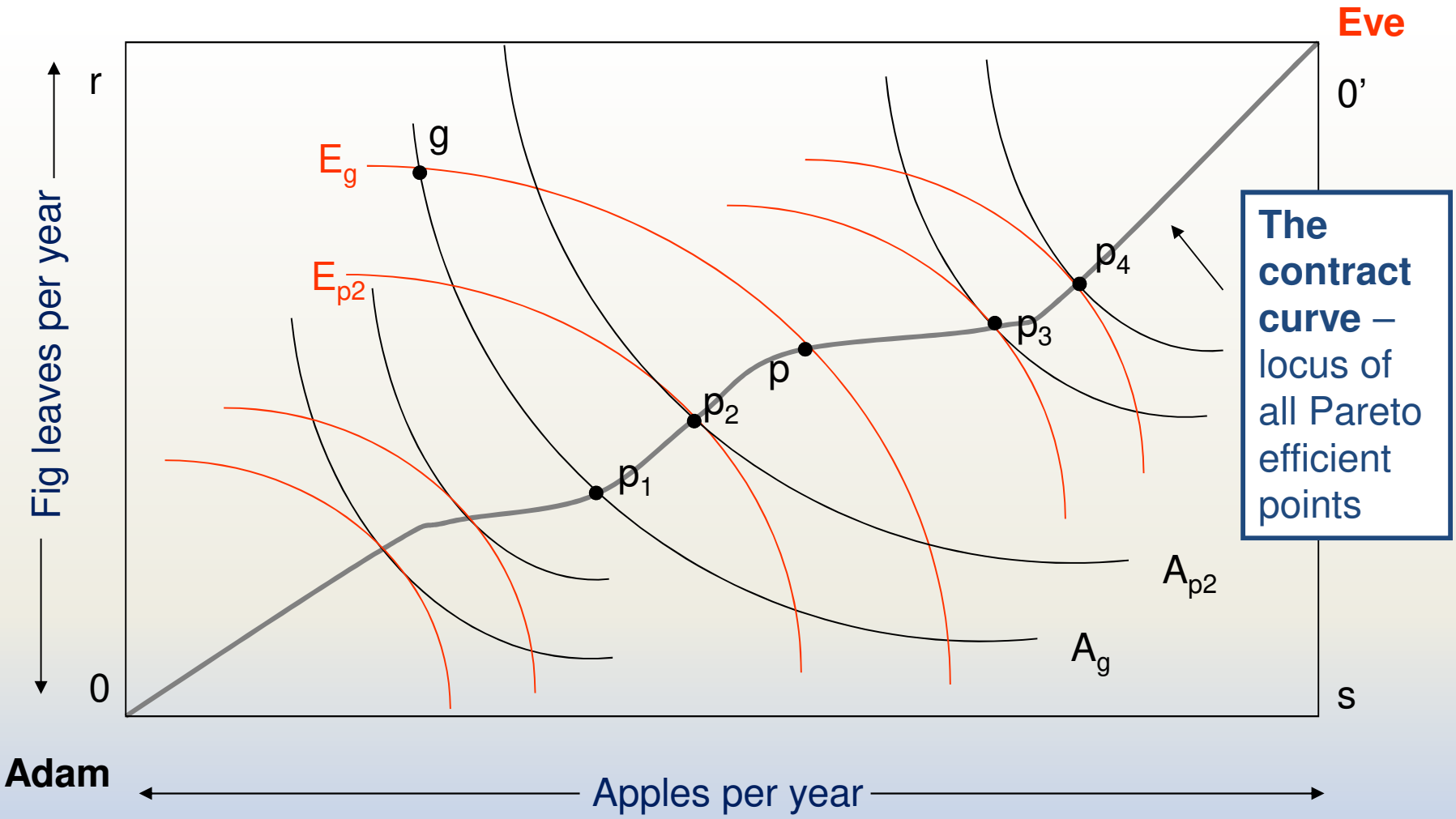


Figure 2.7

Pareto Efficiency in Consumption

$$MRS_{af}^{Adam} = MRS_{af}^{Eve}$$

Where the marginal rate of substitution (MRS):

-is the rate at which an individual is willing to trade one good for another

-is the absolute value of the slope of an indifference curve

An Economy with Production

- Analysis when supplies of 2 goods (applies and figs) are variable rather than fixed
- Production Possibilities Curve
  - Graph to model production economy
  - Maximum quantity of one output that can be produced given the amount of the other output

Production Possibilities Curve

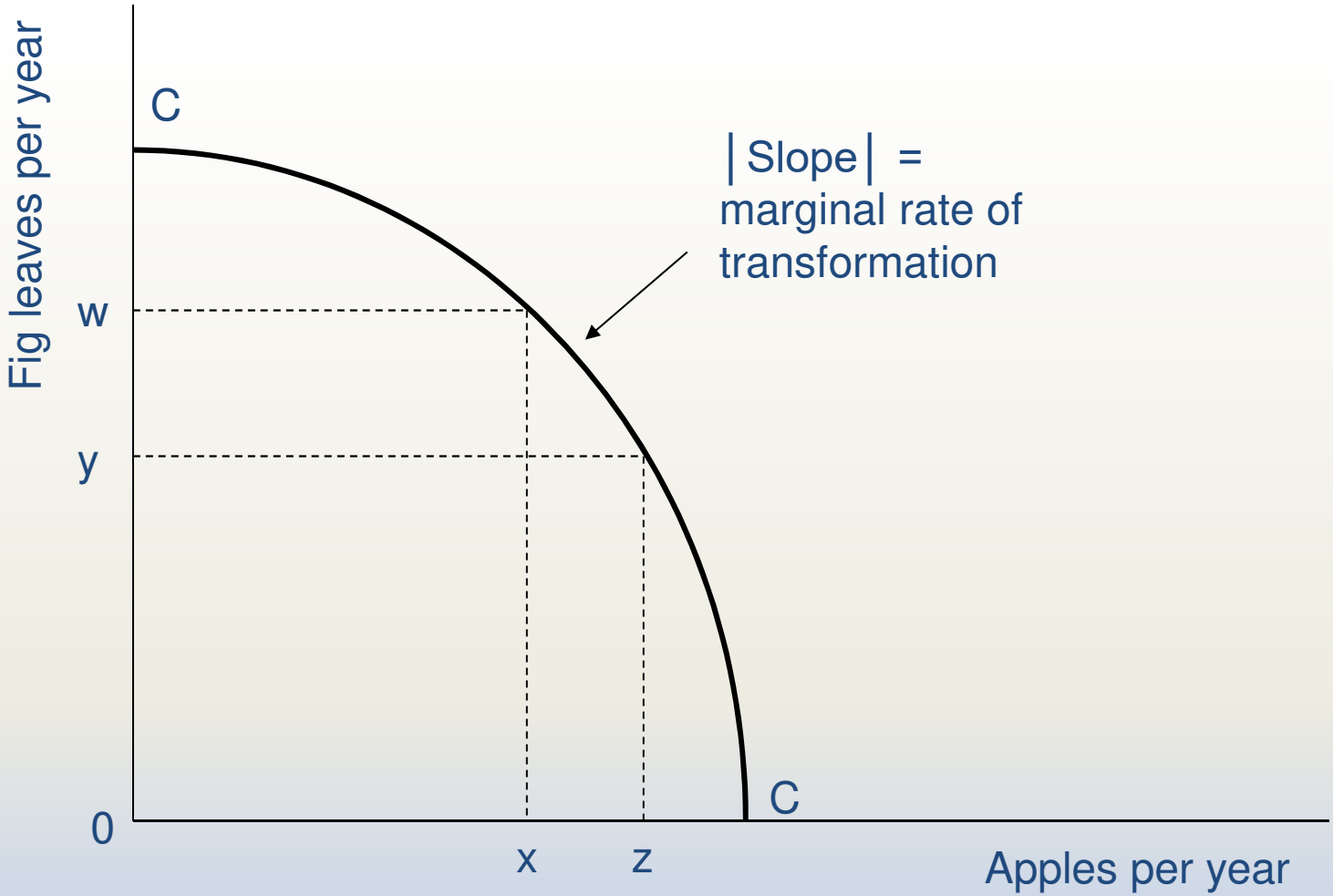


Figure 2.8

Marginal Rate of Transformation

- MRT_{af} = Marginal rate of transformation of apples for fig leaves
- MRT_{af} = rate at which the economy can transform one good into another
- MRT_{af} = Absolute value of slope of Production Possibilities Frontier
- $MRT_{af} = MC_a/MC_f$

Pareto Efficiency Conditions with Variable Production

- $MRT_{af} = MRS_{af}^{Adam} = MRS_{af}^{Eve}$
- $MC_a/MC_f = MRS_{af}^{Adam} = MRS_{af}^{Eve}$

The First Fundamental Theorem of Welfare Economics

- Given:
  - All producers and consumers act as perfect competitors; no one has any market power
  - A market exists for each and every commodity
- The First Fundamental Theorem of Welfare Economics states that a Pareto Efficient allocation of resources emerges
  - A competitive economy "automatically" allocates resources efficiently without any need for centralized direction

The First Fundamental Theorem of Welfare Economics

- $MRS_{af}^{Adam} = P_a/P_f$ ⇒ Consumption Side
- $MRS_{af}^{Eve} = P_a/P_f$
- **$MRS_{af}^{Adam} = MRS_{af}^{Eve}$**
- $MC_a/MC_f = P_a/P_f$ ⇒ Production Side
- $MRT_{af} = P_a/P_f$
- **$P_a/P_f = MC_a/MC_f$**

Fairness and Second Fundamental Theory of Welfare Economics

- Addresses equity concerns in allocations of goods
- Second Fundamental Theory of Welfare Economics states that society can attain any Pareto efficient allocation of resources – one that is more equitable – by making a suitable assignment of initial endowments and then letting people freely trade with each other
- Equity can be achieved without inhibiting efficiency

Efficiency versus Equity

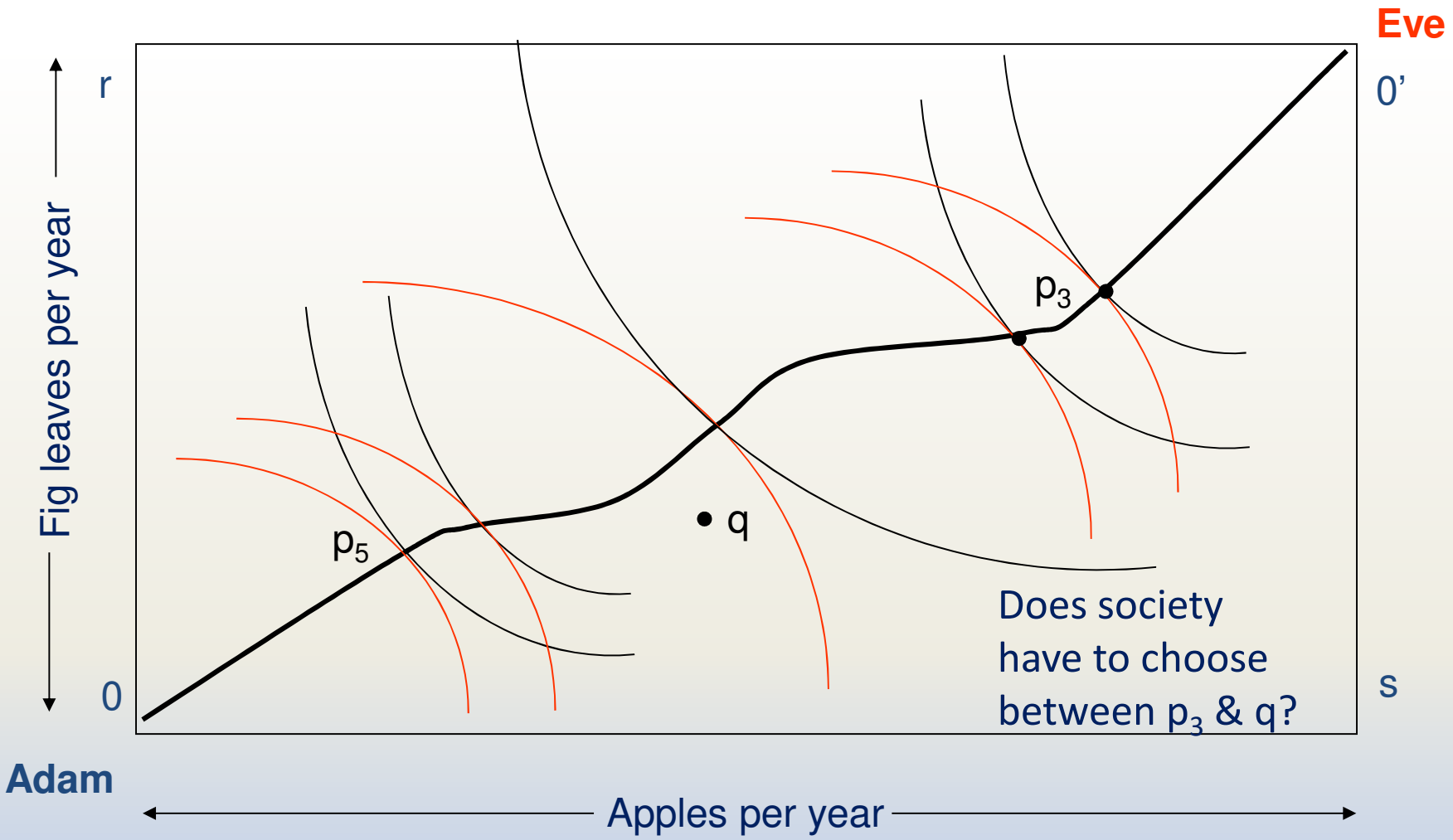


Figure 2.9

Utility Possibilities Curve

Maximum amount of one person's utility given each level of another person's utility

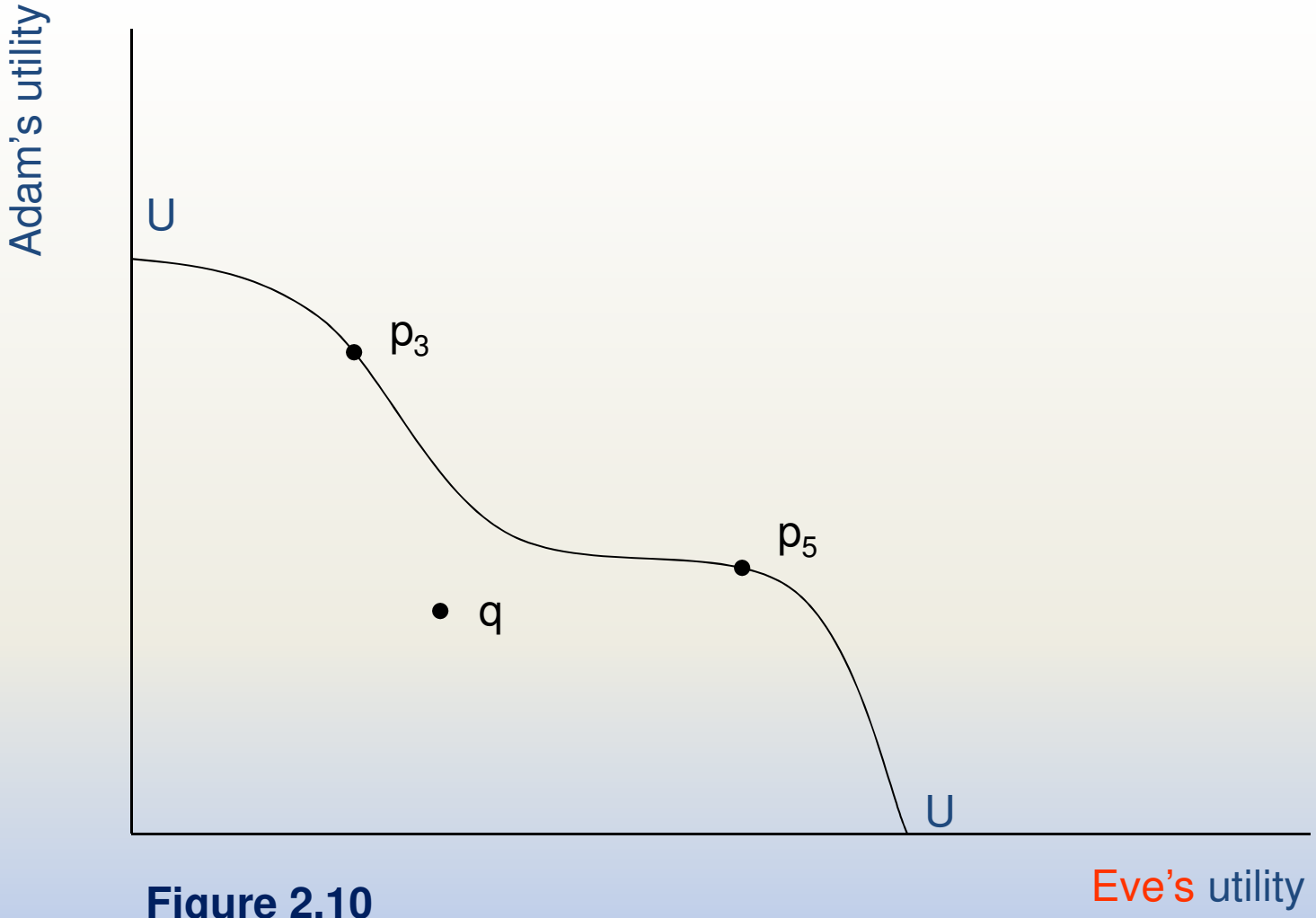


Figure 2.10

Social Indifference Curve

Society's willingness to trade off one person's utility for another's

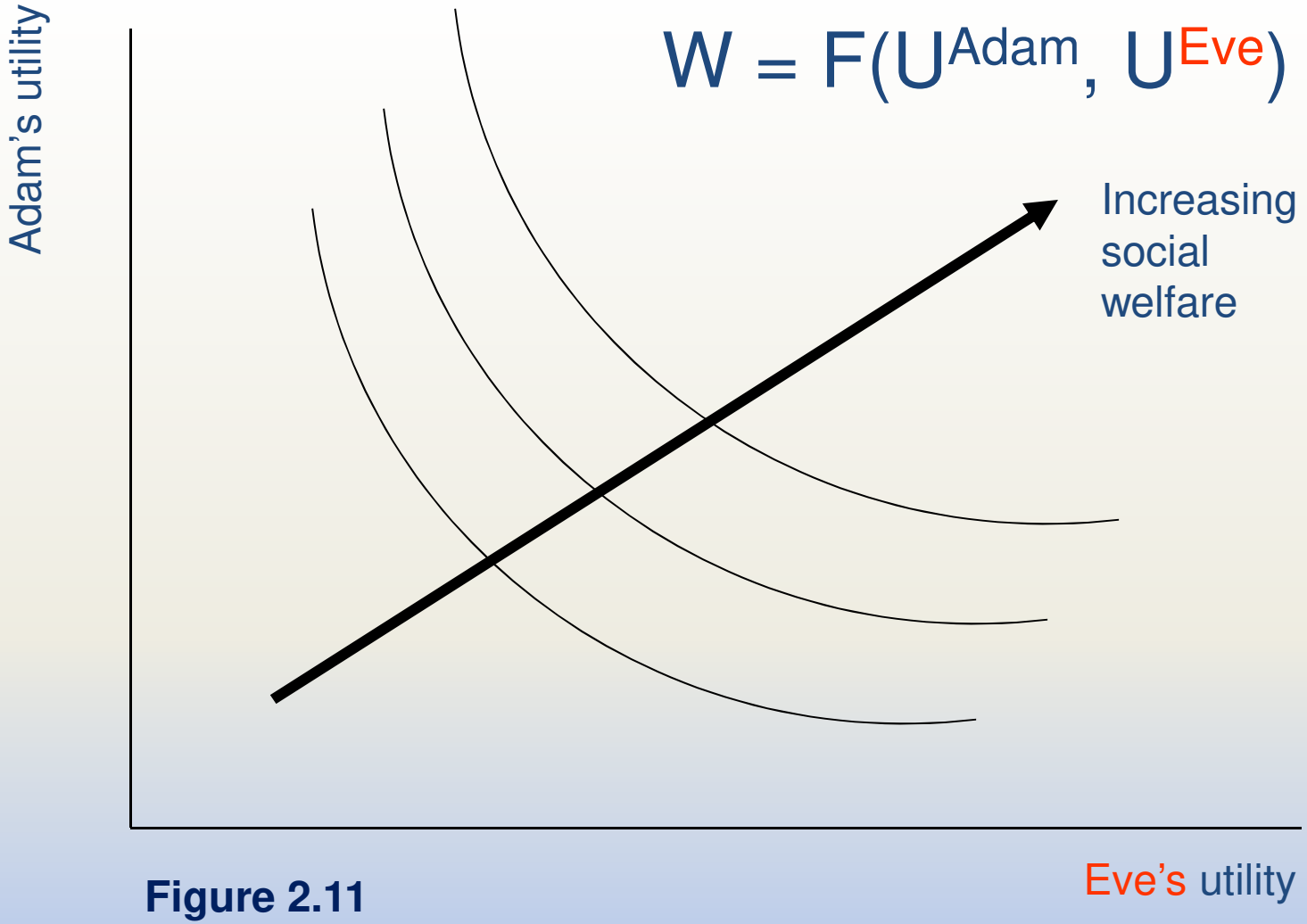
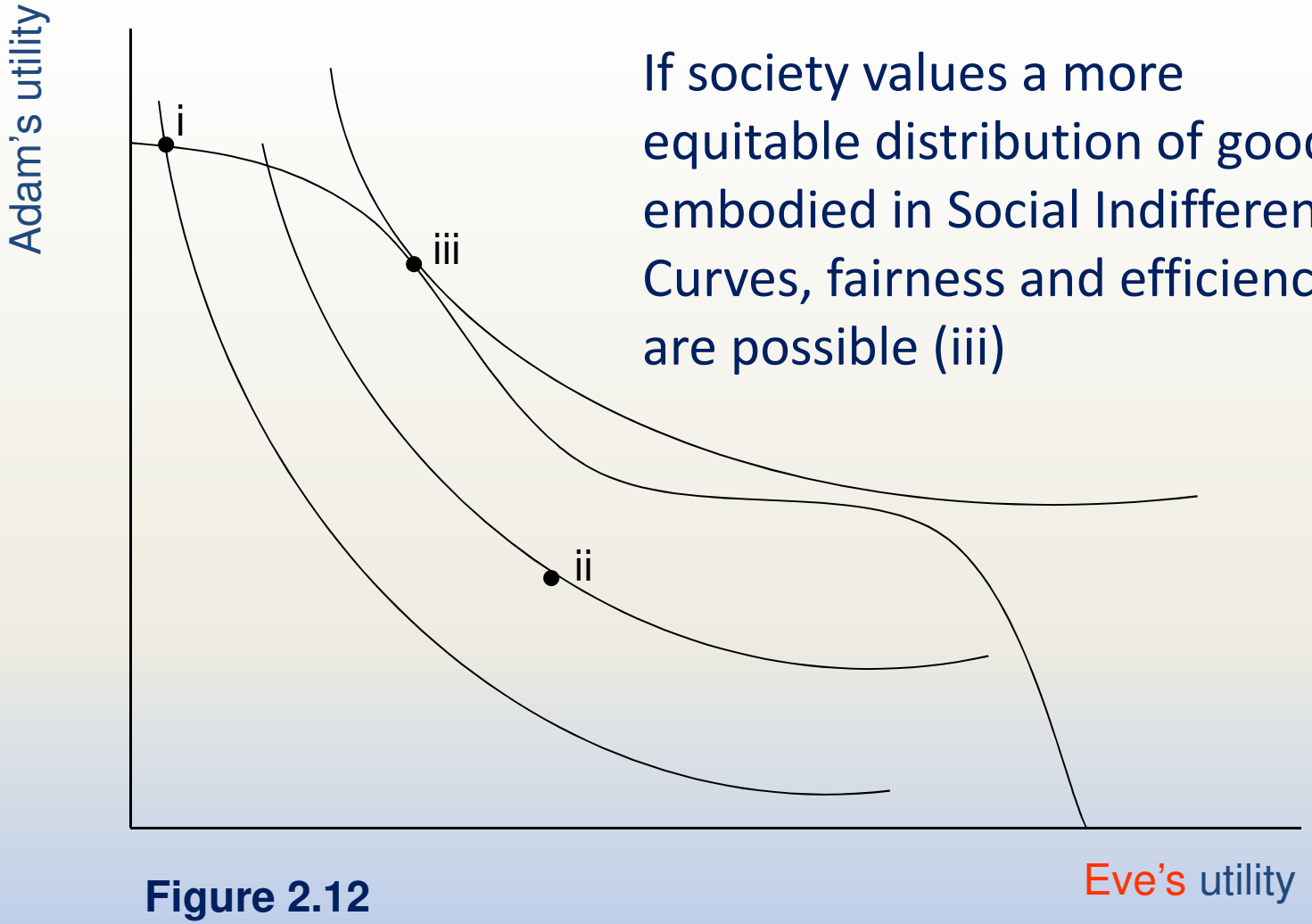


Figure 2.11

Maximizing Social Welfare



If society values a more equitable distribution of goods - embodied in Social Indifference Curves, fairness and efficiency are possible (iii)

Figure 2.12

Market Failures
Causes of Inefficiency

- Market Power
  - Monopoly
- Nonexistence of Markets
  - Asymmetric information
  - Externality
  - Public good

Buying into Welfare Economics
The Controversies

- Underlying outlook is individualistic
  - Merit goods: commodities that output to be provided even if people do not demand it.
- Results orientation rather than the process used to arrive at the results
- However, coherent framework for analyzing policy
  - Will it have desirable distributional consequences?
  - Will it enhance efficiency?
  - Can it be done at a reasonable cost?

Chapter 2 Summary

- Welfare economics is the study of the desirability of different economic states.
- Pareto efficiency occurs when no person can be made better off without making another person worse off.
  - $MRS^{i}_{xy} = MRT_{xy}$ i=persons i….n
- First Fundamental Theory of Welfare Economics: under certain conditions, competitive markets result in Pareto efficiency.
- Second Fundamental Theory of Welfare Economics: Society can attain any Pareto Efficient outcome by making a suitable assignment of initial endowments and free trade.

Chapter 2 Summary (cont)

- A social welfare function summarizes society's preferences concerning the utility of each of its members and it may be used to find the allocation of resources that maximizes social welfare.
- A possible justification for government intervention is market failure, which may occur in the presence of market power or when some markets do not exist.
- The fact that the market does not allocate resources perfectly does not necessarily mean that the government can do better.
- Welfare economics provides a coherent and useful framework for analyzing policy, but is controversial does not pay much attention to the processes used to achieve results.