

ECONOMIC ANALYSIS *(Theory & Practical)*

CHAKRA B. KHADKA, PhD

Institute of Science and Technology

School of Mathematical Sciences

Master's Degree Course in Data Science

Tribhuvan University

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Basic Concept

Economic Models And Recent Historical Applications

Relevance of economics to the world of business:

- opportunity cost and scarcity and their relevance to economic choice,
- economic concepts involved in choices made by businesses relevant to the selection of outputs, inputs, technology, location, and competition,
- microeconomics and macroeconomics.

Relevance of economics

- Economics looks at the production, consumption and sale of goods and services, both at the level of individual products, firms and consumers and at the level of the total production and consumption by countries.

Opportunity cost and scarcity

- **Scarcity**

The resources we use to produce goods and services are limited.

- **Economics**

- The study of choices when there is scarcity.
- Here are some examples of scarcity and the trade-offs associated with making choices:
 - You have a limited amount of time. If you take a full-time job, each hour on the job means one less hour for study or play.

Opportunity cost and scarcity

- Kathmandu City has a limited amount of land. If the city uses an acre of land for a park, it has one less acre for housing, retailers, or industry.
- You have limited income this year. If you spend Rs.1000 on K-95 (face mask), that's Rs.1000 less you have to spend on other products or to save.

Scarcity and choice

Factors of production: The resources used to produce goods and services; also known as *production inputs*.

- **Natural resources/Land:** Resources provided by nature and used to produce goods and services.
- **Labor:** The physical and mental effort people use to produce goods and services.
- **Human capital:** The knowledge and skills acquired by a worker through education and experience.
- **Physical capital & Financial Capital:** The stock of equipment, machines, structures, and infrastructure that is used to produce goods and services. Input of funds
- **Entrepreneurship:** The effort used to coordinate the factors of production—natural resources, labor, physical capital, and human capital—to produce and sell products.

ANALYSIS OF ECONOMICS: Positive Versus Normative Analysis

- **positive analysis** Answers the question “What is?” or “*What will be?*”
- **normative analysis** Answers the question “What ought/should/could/would to be?”

Table 1.1 COMPARING POSITIVE AND NORMATIVE QUESTIONS

Positive Questions

- If the government increases the minimum wage, how many workers will lose their jobs?
- If two commercial banks merge, will the rate of interest increase?
- How does a college education affect a person’s productivity and earnings?
- How do consumers respond to a cut in income taxes?
- If a nation restricts drug imports, who benefits and who bears the cost?

Normative Questions

- Should the government increase the minimum wage?
- Should the government block the merger of two commercial banks?
- Should the government subsidize a college education?
- Should the government cut taxes to stimulate the economy?
- Should the government restrict imports?

MICROECONOMICS AND MACROECONOMICS

▪ **Microeconomics:** The study of how households and businesses make choices, how they interact in markets, and how the government attempts to influence their choices. Microeconomics with binoculars.

▪ **Macroeconomics:** The study of the economy as a whole, including topics such as inflation, unemployment, economic growth National income, etc. Macroeconomics without the binoculars.

WHY ECONOMICS?

- Two logical reasoning:
- Deductive
- Inductive

WHY IS ECONOMICS IMPORTANT?

Economics provides you with the knowledge and insight necessary to:-

- Understand the impact of developments in business, society, and the world economy
- Enables you to understand the decisions of households, firms, and governments based on human behavior, beliefs, structure, constraints, and needs.

Production Possibility Curve/Frontier

- The country produces Good X and Good Y only. The table gives maximum production possibilities for Goods X and Y. The following are four key assumptions:
- Only two goods can be produced
- Full employment of Resources
- Fixed Resources (*ceteris pluribus*)
- Fixed Technology

PPC

- *Point Units of Good X Units of Good Y*

	X	Y
A	0	15
B	1	13
C	2	10
D	3	6
E	4	0

- *Illustration of tabulated value.*

PPC

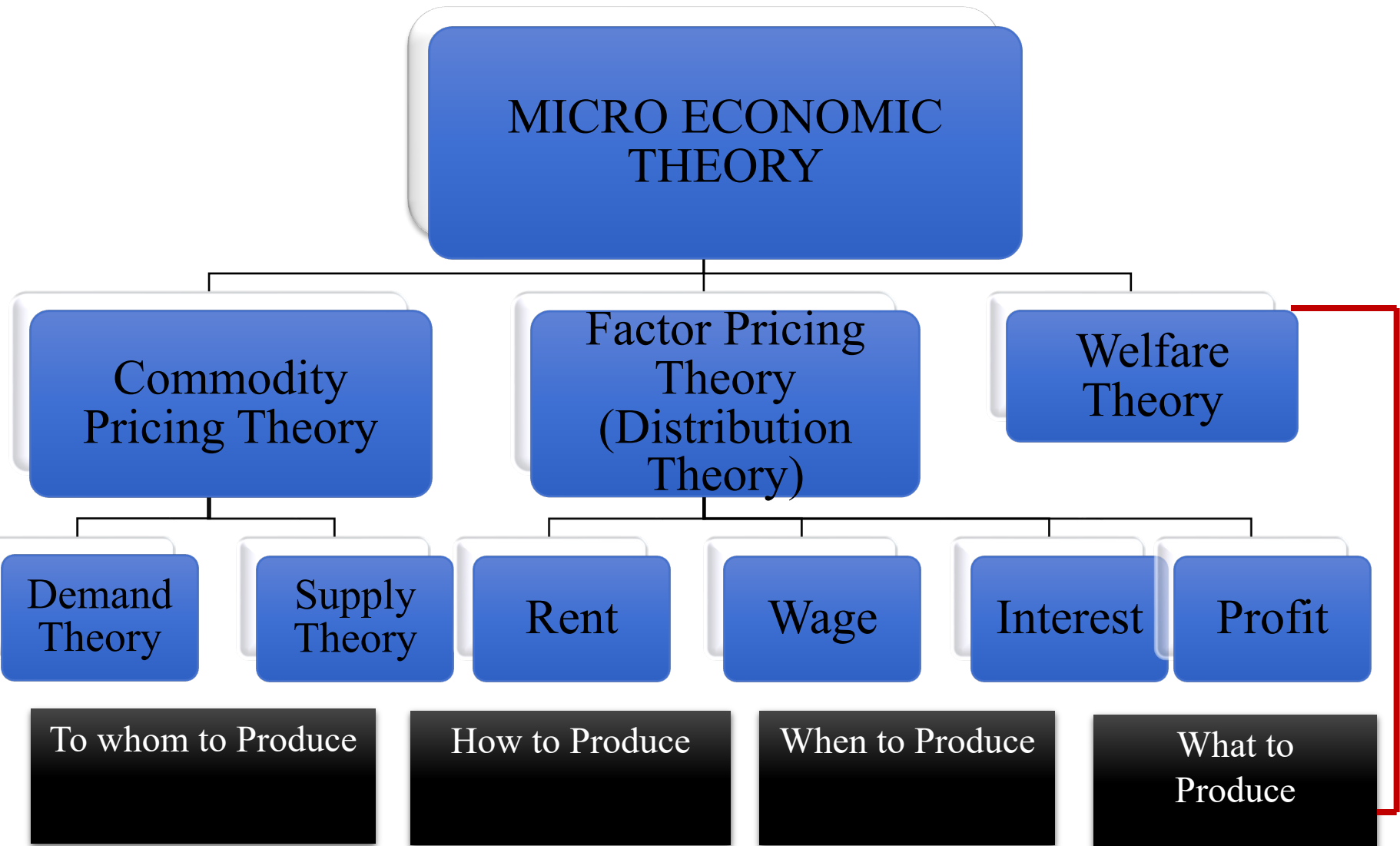
- (i) Draw a production possibility curve marking points A, B, C, D, and E.
- (ii) Calculate the opportunity cost of increasing the output of Good X from 2 to 3 units.
- (iii) Explain how and why the opportunity cost of producing higher levels of output of Good X
- (iv) Describe the situation that must exist if the economy produces a combination of 2 units of Good X and 8 units of Good Y.

DEFINITIONS OF ECONOMICS

There are four well-known definitions of economics. These are:

- The classical view of economics: Wealth of Nation-Adam Smith
- Neo-classical view of economics: Welfare Definition-Marshall
- Modern view of economics: Scarcity Definition-Robbins
- Growth movement: Definition- P.A. Samuelson

MICROECONOMICS PERSPECTIVES



Importance and Uses of Microeconomics

- Microeconomics deals with questions about economic variables that describe a sub-national entity, typically individual economic agents, such as households and firms.
- 1. Individual Behavior Analysis**
 - 2. Resource Allocation**
 - 3. Price Mechanization**
 - 4. Economic Policy**
 - 5. Free Enterprise Economy**
 - 6. Social Welfare**
 - 7. Foreign Trade**
 - 8. Public Finance**

UNIT I:

Theory of Consumer Behavior (6 Hours)

- Total and Marginal Utility. Consumer Equilibrium. Indifference Curves.
- The Marginal Rate of Substitution. Characteristics of Indifference Curves.
- The Budget Constraint Line. Consumer Equilibrium. The Price-Consumption Curve and the consumer-demand curve.
- Separation of the Substitution and Income Effects.
- Theory of revealed preference, Consumer Surplus, and Elasticity of Demand.
- The problem of choice in situations involving Risk and Uncertainty (attitude towards risk and insurance).

Understanding Utility

- **Utility** = Satisfaction/Happiness/Pleasure one gets from consuming a good.
- Utility and usefulness are NOT the same in economics.
- Utility is difficult to quantify, as it differs between people and situations
 - *ie. A jacket to a person living in Jumla vs. a person living in Nepaljung.*
- Measured in “**utils**” (a personal measure)
- **Usefulness** is associated with those goods and services that are useful and are related to the betterment of human beings.

Understanding Utility

- **Total Utility (TU)**

- The total amount of satisfaction or pleasure a person derives from consuming a given quantity of that product

- **Marginal Utility (MU)**

- The extra satisfaction a consumer derives from one additional unit of that product.
- In other words, the change in Total Utility that results from the consumption of one more unit

Law of Diminishing Marginal Utility

- Other things held constant/things are remaining the same diminishing marginal utility explains that the more of a good a person gets, the less utility he gets from each additional unit.
- Consumer wants in general are wanting, but wants for particular items can be satisfied for a time.
 - Example: Durable goods such as an automobile

First is the Best

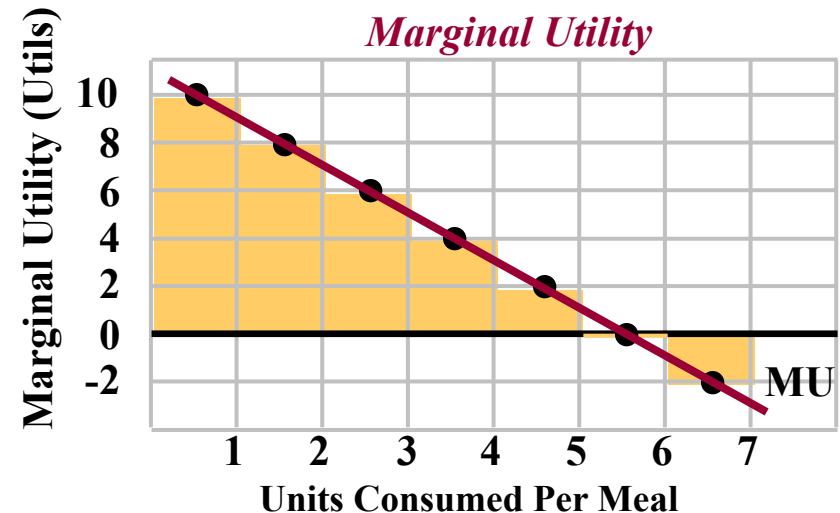
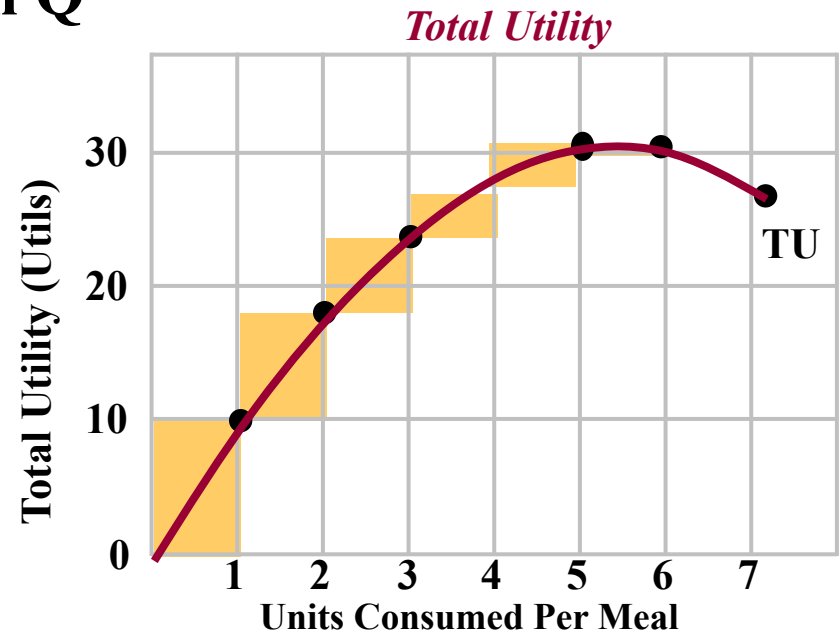
- It is important to note that your marginal utility begins to fall after the very first unit you consume.
- While you may enjoy your second unit, it doesn't bring as much utility as the first
- At some point, your MU becomes negative. (takes away from your total satisfaction).

Law of Diminishing Marginal Utility

$$MU = \text{Change in TU} / \text{Change in } Q$$

(1) Tacos Consumed Per Meal	(2) Total Utility, Utils	(3) Marginal Utility, Utils
--------------------------------------	-----------------------------------	--------------------------------------

0	0	10
1	10	8
2	18	6
3	24	4
4	28	2
5	30	0
6	30	-2
7	28	



Marginal can be defined midway or mid half between to condition

2. Utility Maximization

- Explains how consumers allocate their money incomes among the many goods and services available for purchase
- You will face problems that provide you with a consumer's MU or TU derived from purchasing 2 goods. You will be expected to show how many of each a rational consumer would buy.

Theory of Consumer Behavior

Numerical Example:

Find the Utility-Maximizing Combination of **A** and **B**, if you have an **Income of Rs.10**

(1) Unit of Product	(2) Product A: Price = Rs.1		(3) Product B: Price = Rs.2	
	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)
First	10	10	24	12
Second	8	8	20	10
Third	7	7	18	9
Fourth	6	6	16	8
Fifth	5	5	12	6
Sixth	4	4	6	3
Seventh	3	3	4	2

Theory of Consumer Behavior

Numerical Example:

Utility-Maximizing Combination of Products **A** and **B** Obtainable with an **Income of Rs.10**

(1) Unit of Product	(2) Product A: Price = Rs.1		(3) Product B: Price = Rs.2	
	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)
First	10	10	24	12 ✓

Compare Marginal Utilities

Then Compare Per Dollar - MU/Price

Choose the Highest

Check Budget - Proceed to Next Item

Theory of Consumer Behavior

Numerical Example:

Utility-Maximizing Combination of Products **A** and **B** Obtainable with an **Income of \$10**

(1) Unit of Product	(2) Product A: Price = \$1		(3) Product B: Price = \$2	
	(a) Marginal Utility, Utils	(b) Marginal Utility Per Dollar (MU/Price)	(a) Marginal Utility, Utils	(b) Marginal Utility Per Dollar (MU/Price)
First	10	10 ✓	24	12 ✓
Second			20	10 ✓

Again, Compare Per Dollar - MU/Price

Choose the Highest

Buy One of Each – Budget Has \$5 Left

Proceed to Next Item

Theory of Consumer Behavior

Numerical Example:

Utility-Maximizing Combination of Products **A** and **B** Obtainable with an **Income of Rs.10**

(1) Unit of Product	(2) Product A: Price = Rs.1		(3) Product B: Price = Rs.2	
	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)
First	10	10 ✓	24	12 ✓
Second	8	8 ✓	20	10 ✓
Third			18	9 ✓

Again, Compare Per Rs. - MU/Price

Buy One More B – Budget Has Rs.3 Left

Proceed to Next Item

Theory of Consumer Behavior

Numerical Example:

Utility-Maximizing Combination of Products **A** and **B** Obtainable with an **Income of Rs.10**

(1) Unit of Product	(2) Product A: Price = Rs.1		(3) Product B: Price = Rs.2	
	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)	(a) Marginal Utility, Utils	(b) Marginal Utility Per Rs. (MU/Price)
First	10	10 ✓	24	12 ✓
Second	8	8 ✓	20	10 ✓
Third	7	7	18	9 ✓
Fourth			16	8 ✓

Again, Compare Per Rs. - MU/Price

Buy One of Each – Budget Exhausted

Theory of Consumer Behavior

Numerical Example:

Utility-Maximizing Combination of Products **A** and **B** Obtainable with an **Income of \$10**

(1) Unit of Product	(2) Product A: Price = \$1		(3) Product B: Price = \$2	
	(a) Marginal Utility, Utils	(b) Marginal Utility Per Dollar (MU/Price)	(a) Marginal Utility, Utils	(b) Marginal Utility Per Dollar (MU/Price)
First	10	10 ✓	24	12 ✓
Second	8	8 ✓	20	10 ✓
Third	7	7	18	9 ✓
Fourth			16	8 ✓

**Final Result – At These Prices,
Purchase **2 of Item A** and **4 of B****

Theory of Consumer Behavior

Algebraic Restatement:

$$\frac{\text{MU of Product A}}{\text{Price of A}} = \frac{\text{MU of Product B}}{\text{Price of B}}$$

$$\frac{8 \text{ Utils}}{\text{Rs.1}} = \frac{16 \text{ Utils}}{\text{Rs.2}}$$

Optimum Achieved - *Money Income is Allocated so that the Last Rs. Spent on Each Good Yields the Same Extra or Marginal Utility*

Two-Good Practice Problem

Given MU, and an income/budget constraint of Rs.20... find the **Utility-Maximizing Combination of A and B**

(2)
Product A:
Price = Rs.2

(3)
Product B:
Price = Rs.5

<u>Unit</u>	<u>MU</u>		<u>Unit</u>	<u>MU</u>	
1	20		1	30	
2	10		2	20	
3	6		3	15	
4	3		4	5	
5	1		5	-5	

Two-Good Practice Problem

Given TU, and an income/budget constraint of Rs.9... find the **Utility-Maximizing Combination** of **A** and **B**

(2)
Product A:
Price = Rs.2

(3)
Product B:
Price = Rs.1

<u>Unit</u>	<u>TU</u>		<u>Unit</u>	<u>TU</u>	
1	22		1	10	
2	32		2	16	
3	40		3	20	
4	46		4	22	
5	48		5	20	

From 'Utils' to 'Benefit'

- Because Utils cannot be compared between people, and cannot be compared to Rs... economists must measure satisfaction with **Benefits**.
 - Benefit is the same concept as utility, but it is measured in Rs. (according to the consumer's **WILLINGNESS TO PAY**).
 - Total Benefit (Rs.), Marginal Benefit (Rs.)

Golden Rule of Consumption

- A rational consumer will continue to purchase until...

$$\text{MB} = \text{MC}$$

To consume one more would mean your marginal cost is greater than your marginal benefit

Individual and Market Demand Curves

- Start with an **individual** consumer
 - maybe you, or me, but could be anyone
- Derive the demand curve for that **individual**
 - focus on marginal utility or marginal benefit
- Add up demand curves for **many** such individuals to get a **market** demand curve

Assumption about consumer behavior

- General economic principle

- People
- make purposeful choices
- with limited resources

- When applied to the behavior of consumers

- People
- maximize utility
- subject to a budget constraint

Individual and Market Demand Curves

- Consider all consumers in the market
- Add up the quantity demanded by all individuals at each price to get market demand
- Add horizontally to create a **market demand curve**

THE THEORY OF CONSUMER CHOICE

The theory of consumer choice addresses the following questions:

- Do all demand curves slope downward?
- How do wages affect labor supply?
- How do interest rates affect household saving?

THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

The *budget constraint* illustrates the limit on the consumption “bundles” that a consumer can afford.

- People consume less than they desire because their spending is constrained, or limited, by their income.

THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

The budget constraint shows the various combinations of goods the consumer can afford given his or her income and the prices of the two goods.

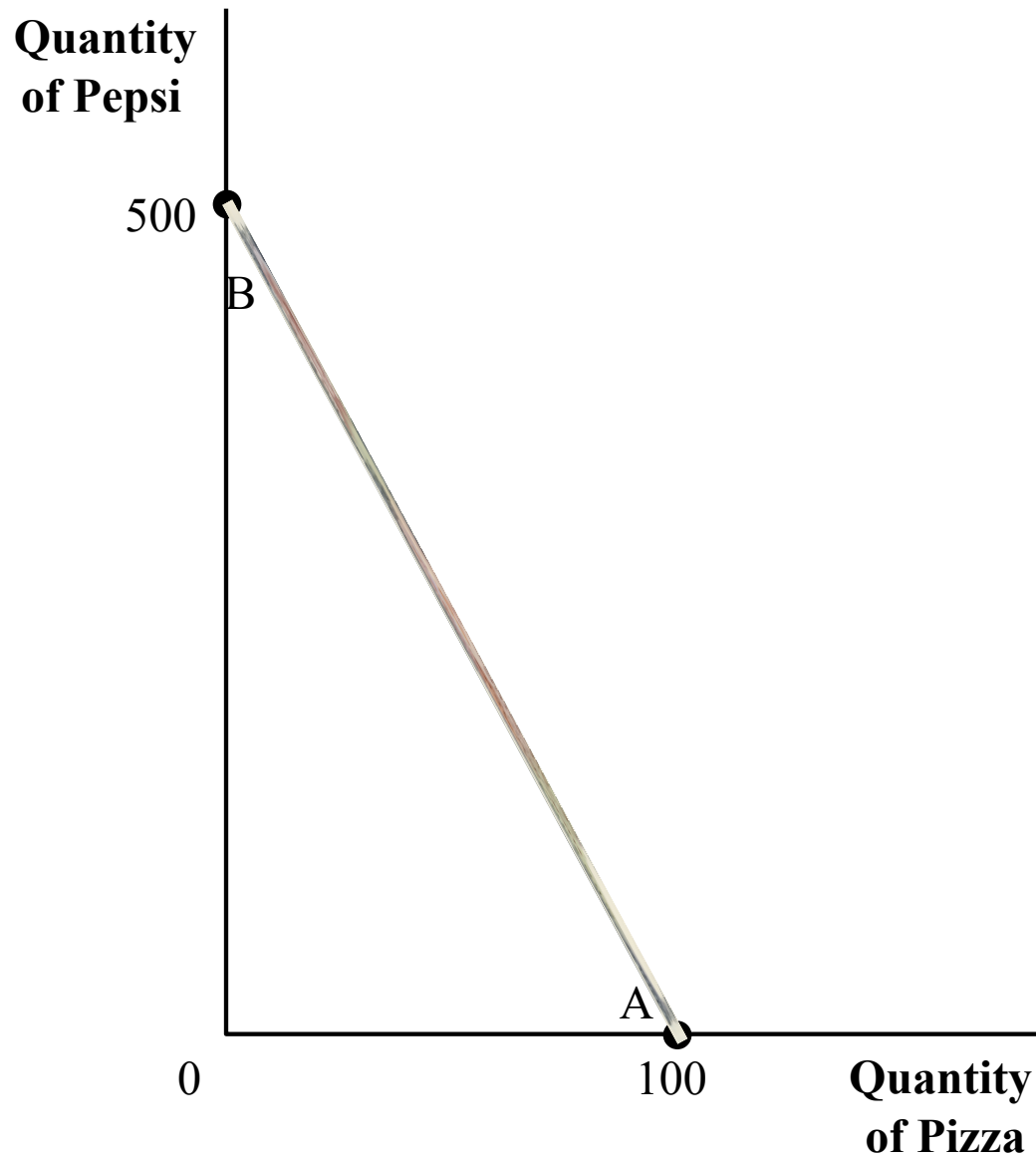
Figure 1 The Consumer's Budget Constraint

Pints of Pepsi	Number of Pizzas	Spending on Pepsi Rs.	Spending on Pizza Rs.	Total Spending Rs.
0	100	0	1000	1000
50	90	100	900	1000
100	80	200	800	1000
150	70	300	700	1000
200	60	400	600	1000
250	50	500	500	1000
300	40	600	400	1000
350	30	700	300	1000
400	20	800	200	1000
450	10	900	100	1000
500	0	1000	0	1000

THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

- The Consumer's Budget Constraint
 - Any point on the budget constraint line indicates the consumer's combination or trade-off between two goods.
 - For example, if the consumer buys no pizzas, s/he can afford 500 pints of Pepsi (point B). If s/he buys no Pepsi, s/he can afford 100 pizzas (point A).

The Consumer's Budget Constraint

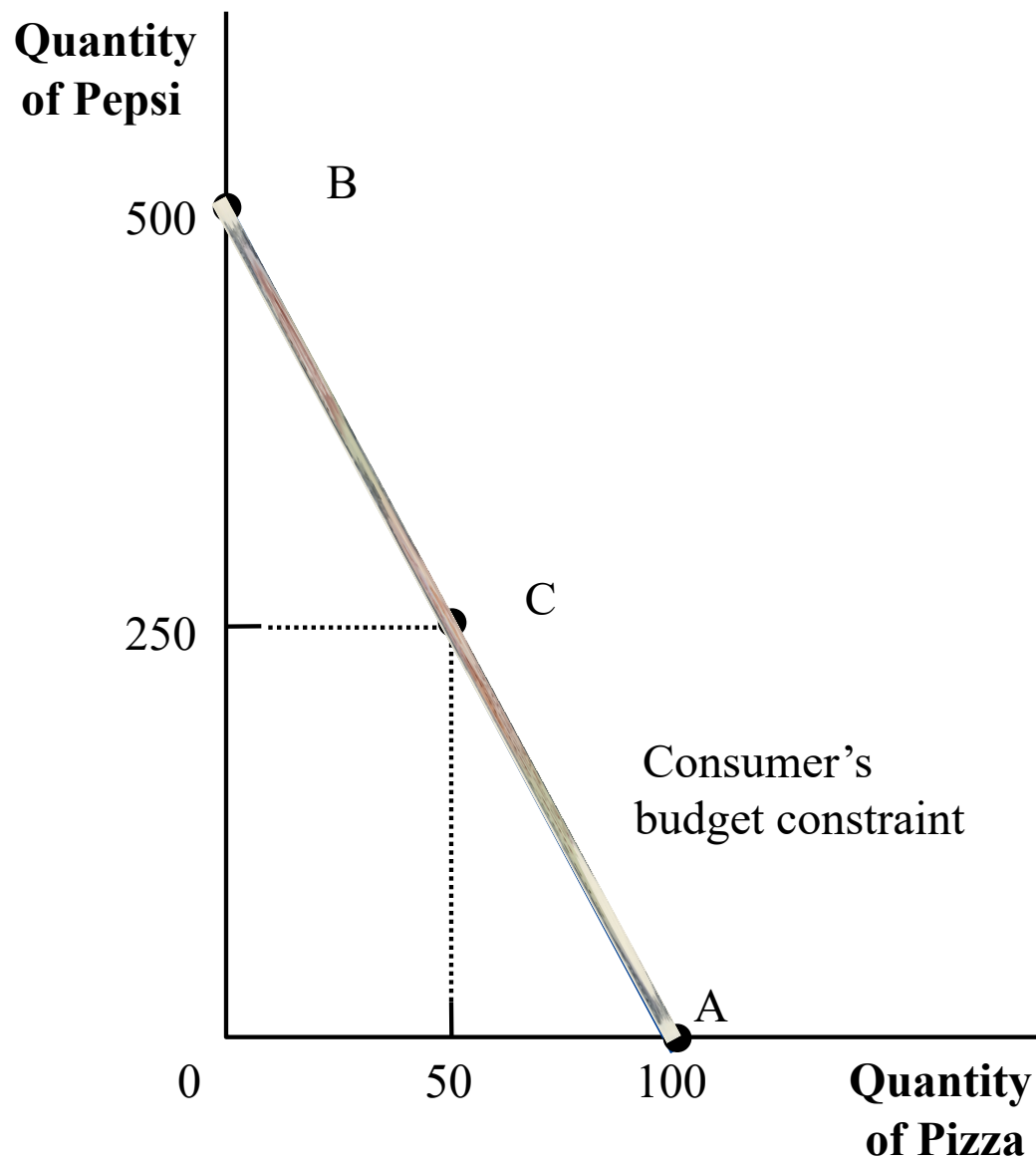


THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

The Consumer's Budget Constraint

- Alternately, the consumer can buy 50 pizzas and 250 pints of Pepsi.

The Consumer's Budget Constraint



THE BUDGET CONSTRAINT: WHAT THE CONSUMER CAN AFFORD

- The *slope* of the budget constraint line equals the relative price of the two goods, that is, *the price of one good compared to the price of the other*.
- It measures the rate at which the consumer can trade one good for the other.

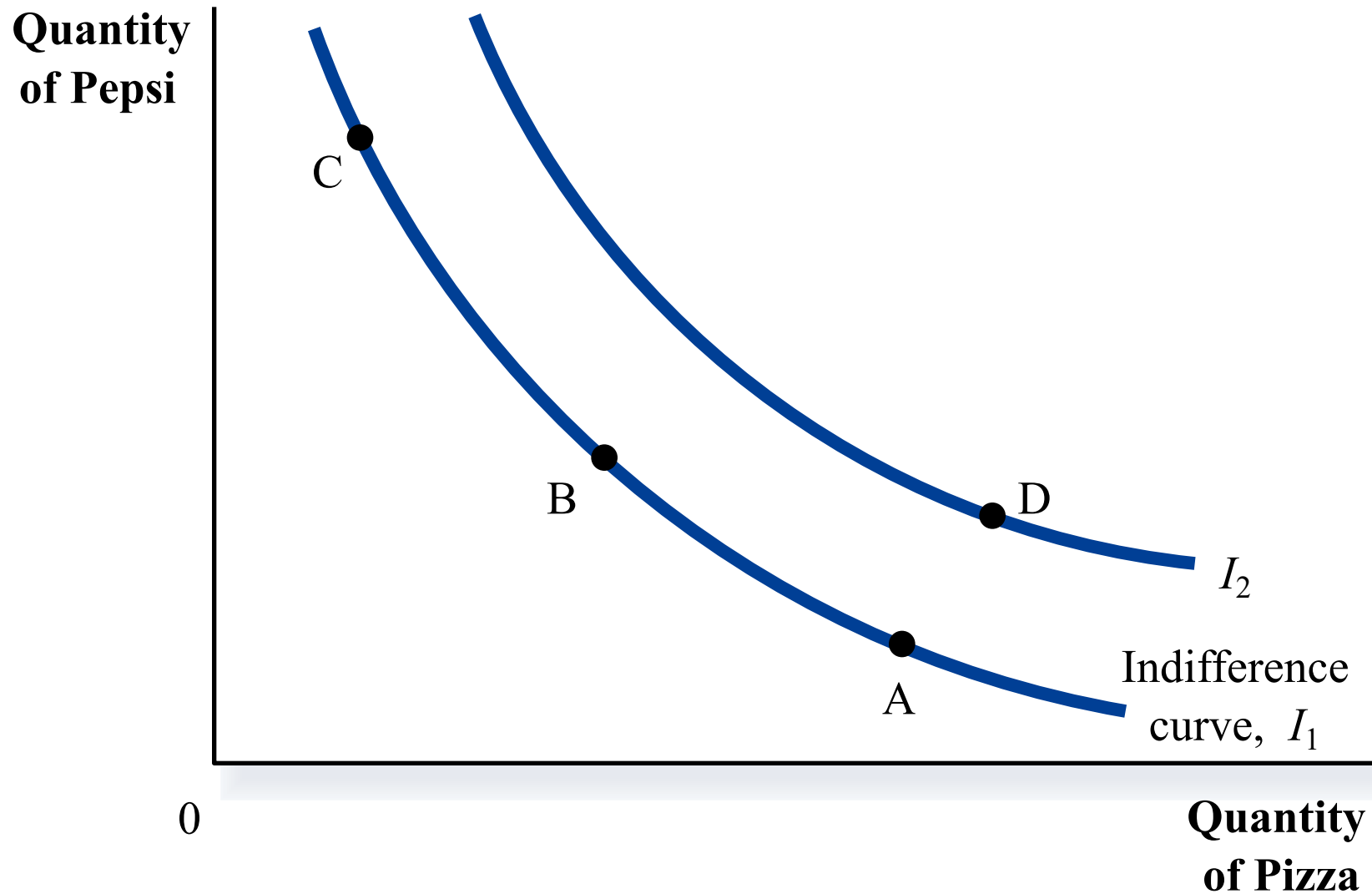
PREFERENCES: WHAT THE CONSUMER WANTS/CHOICE

A consumer's preference among consumption bundles may be illustrated with indifference curves.

Representing Preferences with Indifference Curves

An *indifference curve* is a curve that shows consumption bundles that give the consumer the same level of satisfaction.

The Consumer's Preferences



Indifference curves are convex to the origin

- IC are convex to the origin because they follow the law of $DMRS_{xy}$ (Diminishing marginal rate of substitution).

REPRESENTING PREFERENCES WITH INDIFFERENCE CURVES

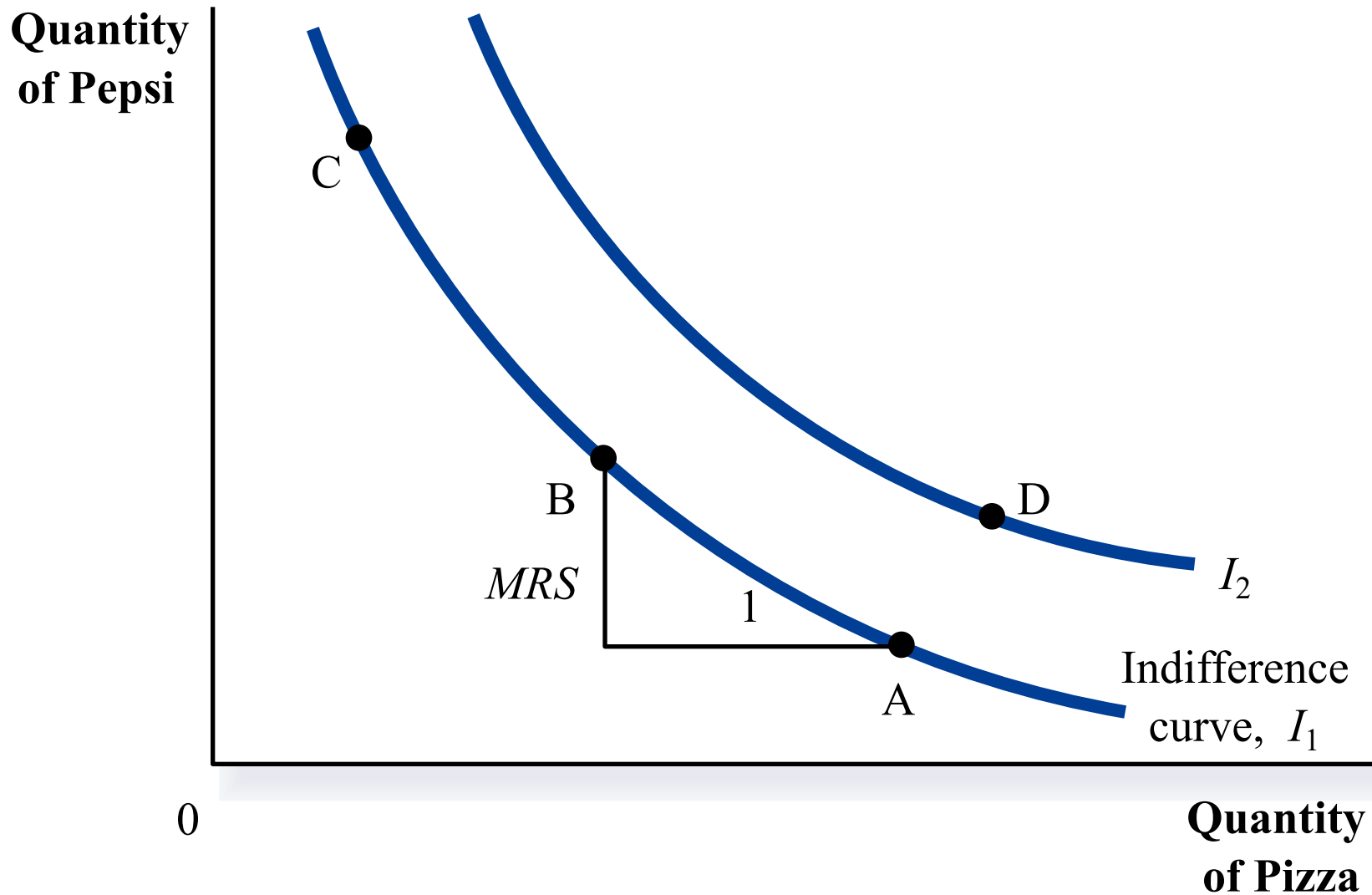
➤ The Consumer's Preferences

- The consumer is indifferent, or equally happy, with the combinations shown at points A, B, and C because they are all on the same curve.

➤ The Marginal Rate of Substitution

- The slope at any point on an indifference curve is the *marginal rate of substitution*.
 - It is the rate at which a consumer is willing to trade one good for another.
 - It is the amount of one good that a consumer requires as compensation to give up one unit of the other good.

The Consumer's Preferences



FOUR PROPERTIES OF INDIFFERENCE CURVES

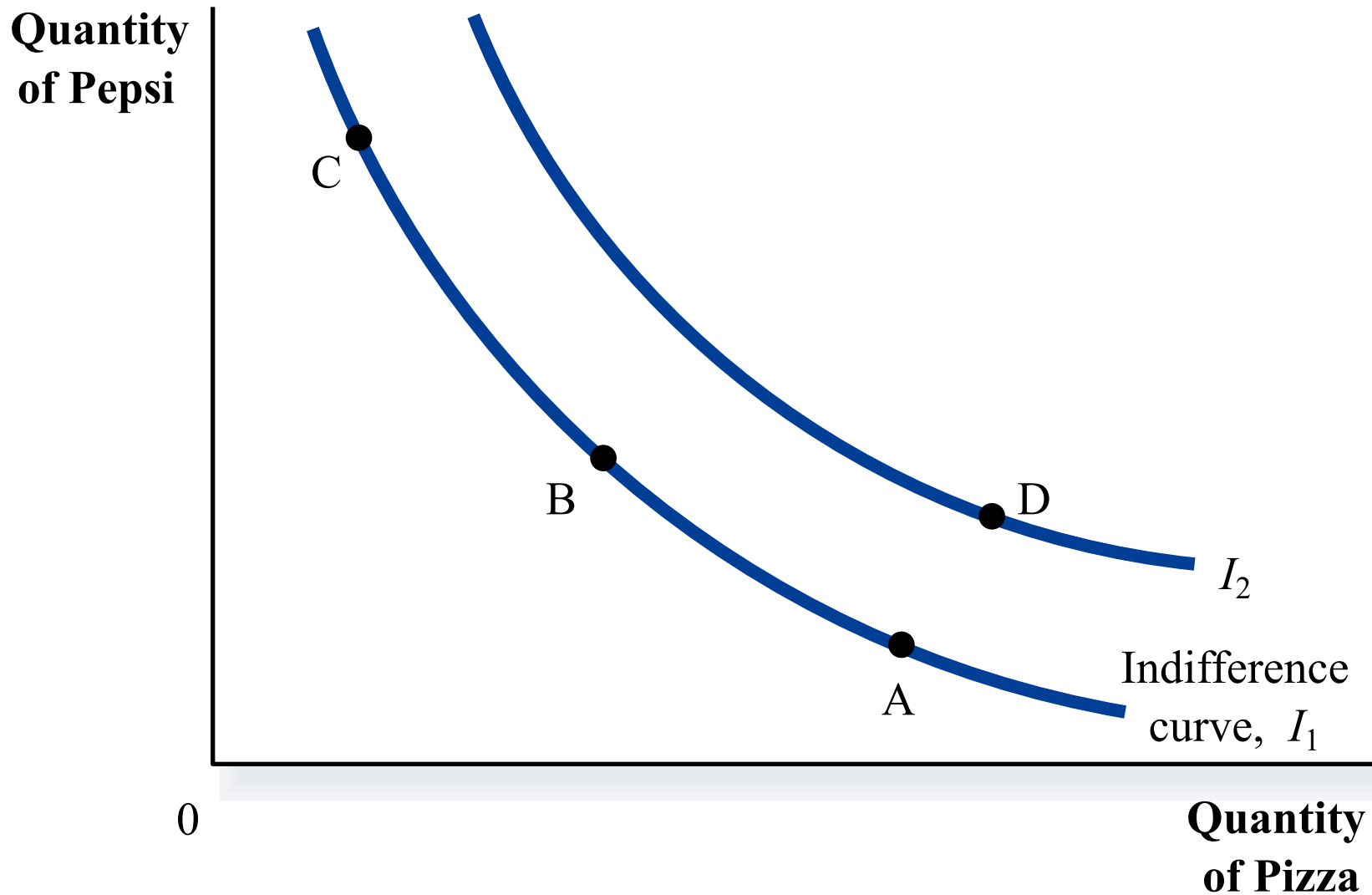
- Higher indifference curves are preferred to lower ones.
- Indifference curves are downward sloping.
- Indifference curves do not cross.
- Indifference curves are bowed inward.

FOUR PROPERTIES OF INDIFFERENCE CURVES

Property 1: Higher indifference curves are preferred to lower ones.

- Consumers usually prefer more of something to less of it.
- Higher indifference curves represent larger quantities of goods than do lower indifference curves.

The Consumer's Preferences

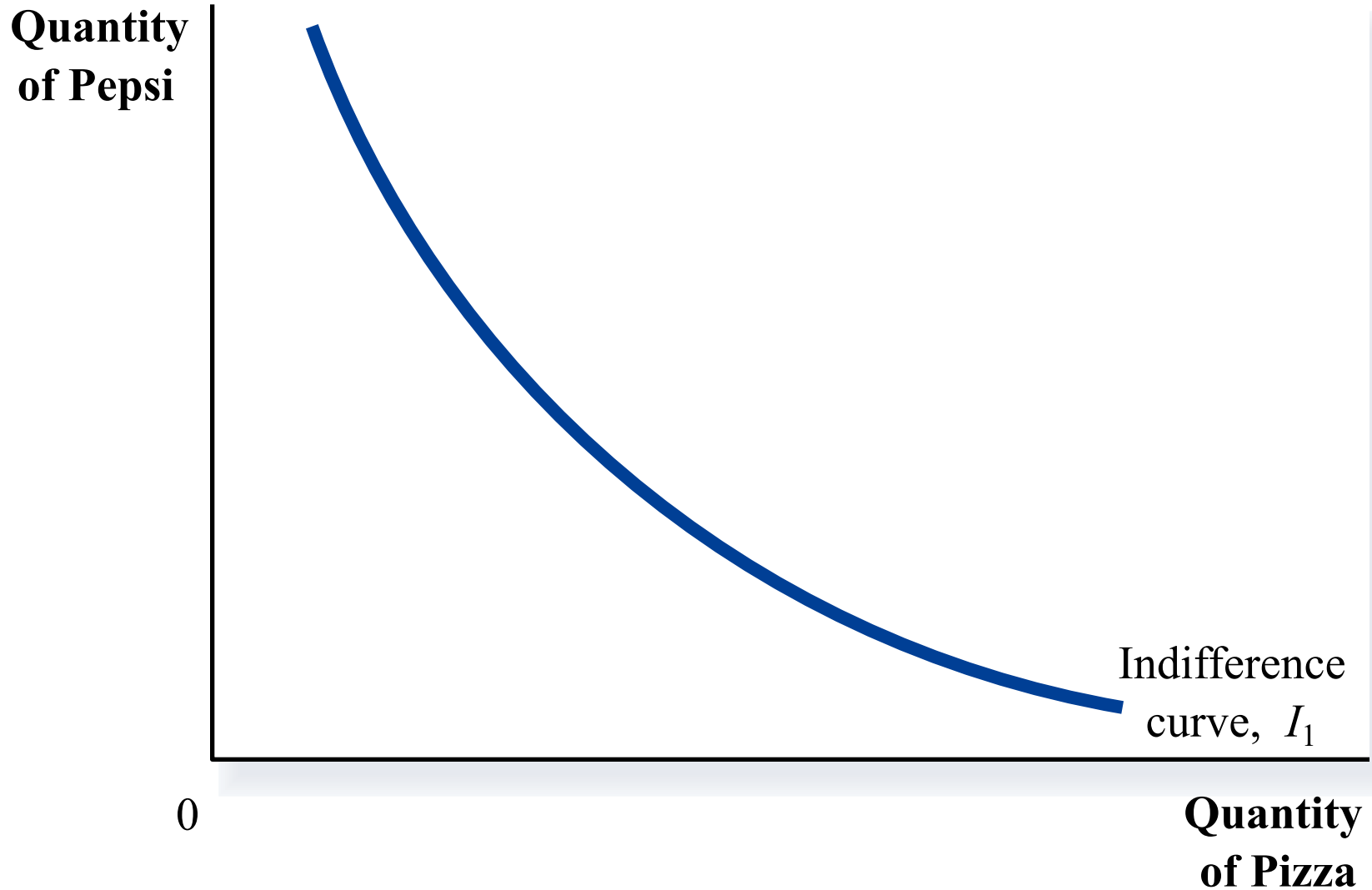


FOUR PROPERTIES OF INDIFFERENCE CURVES

Property 2: Indifference curves are downward sloping.

- A consumer is willing to give up one good only if he or she gets more of the other good in order to remain equally happy.
- If the quantity of one good is reduced, the quantity of the other good must increase to keep the consumer equally happy.
- For this reason, most indifference curves slope downward.

The Consumer's Preferences



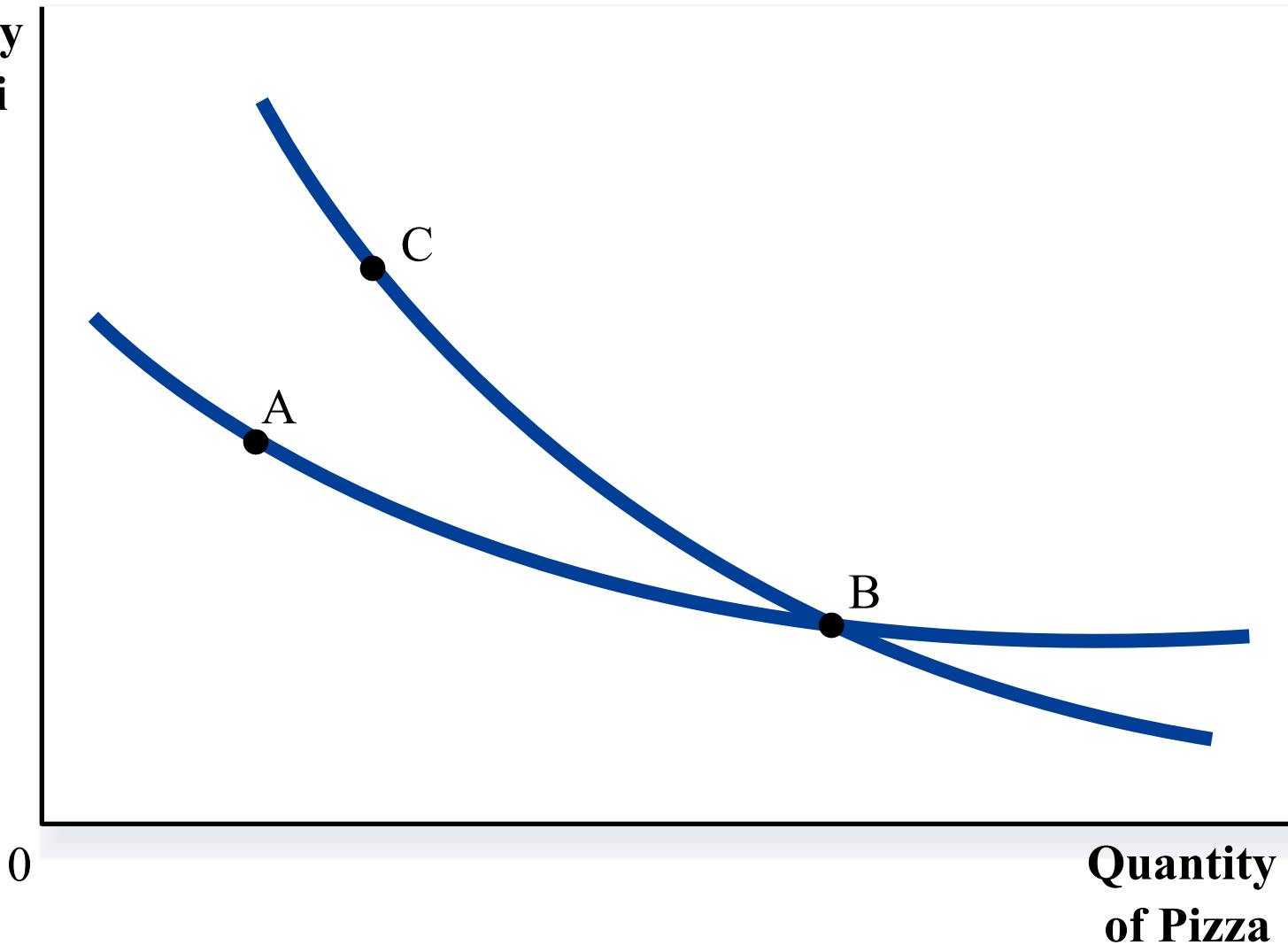
FOUR PROPERTIES OF INDIFFERENCE CURVES

Property 3: Indifference curves do not cross.

- Points A and B should make the consumer equally happy.
- Points B and C should make the consumer equally happy.
- This implies that A and C would make the consumer equally happy.
- But C has more of both goods compared to A.

The Impossibility of Intersecting Indifference Curves

Quantity
of Pepsi

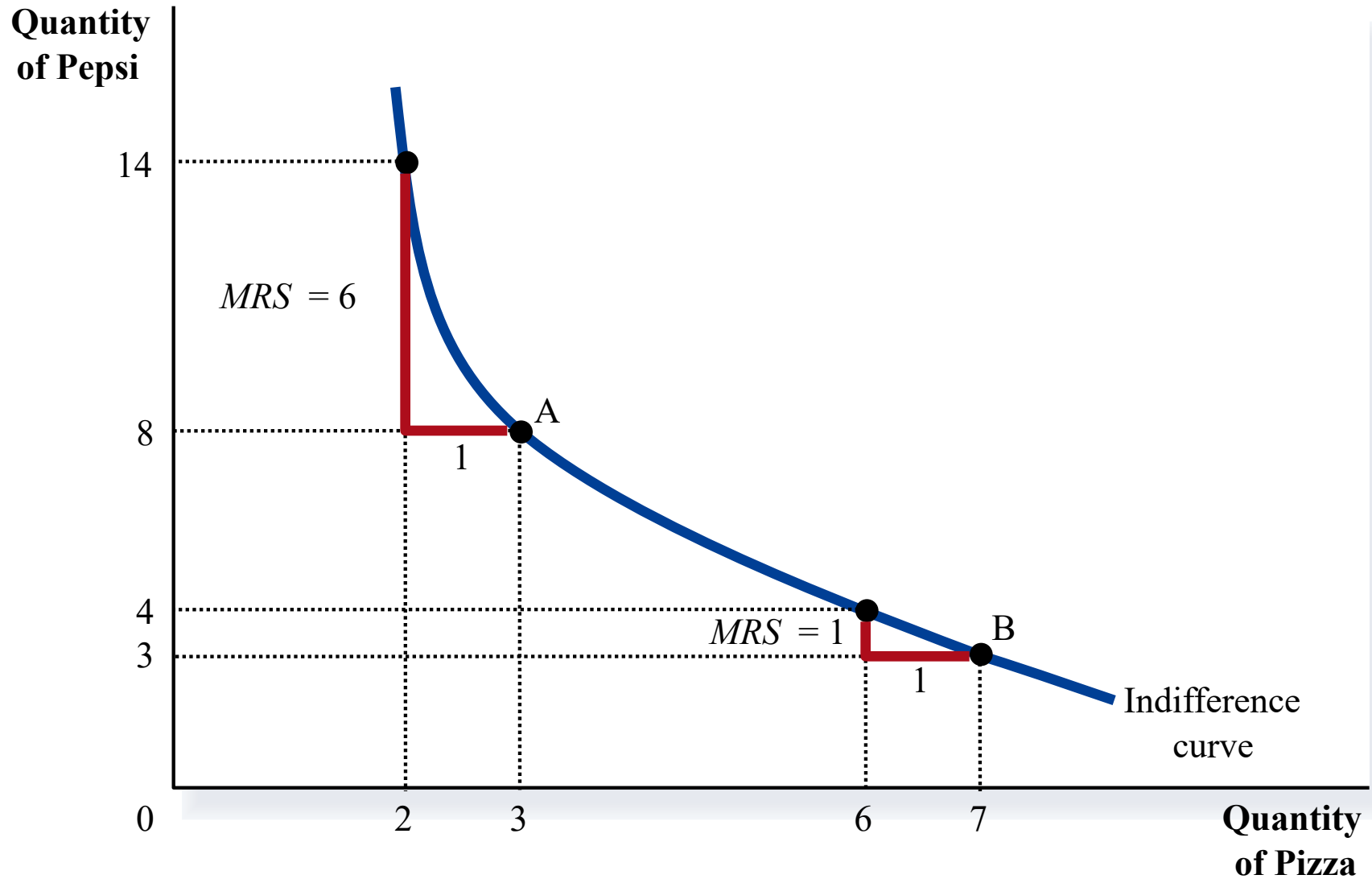


FOUR PROPERTIES OF INDIFFERENCE CURVES

Property 4: Indifference curves are bowed inward.

- People are more willing to trade away goods that they have in abundance and less willing to trade away goods of which they have little.
- These differences in a consumer's marginal substitution rates cause his or her indifference curve to bow inward.

Bowed Indifference Curves



TWO EXTREME EXAMPLES OF INDIFFERENCE CURVES

- Perfect substitutes
- Perfect complements

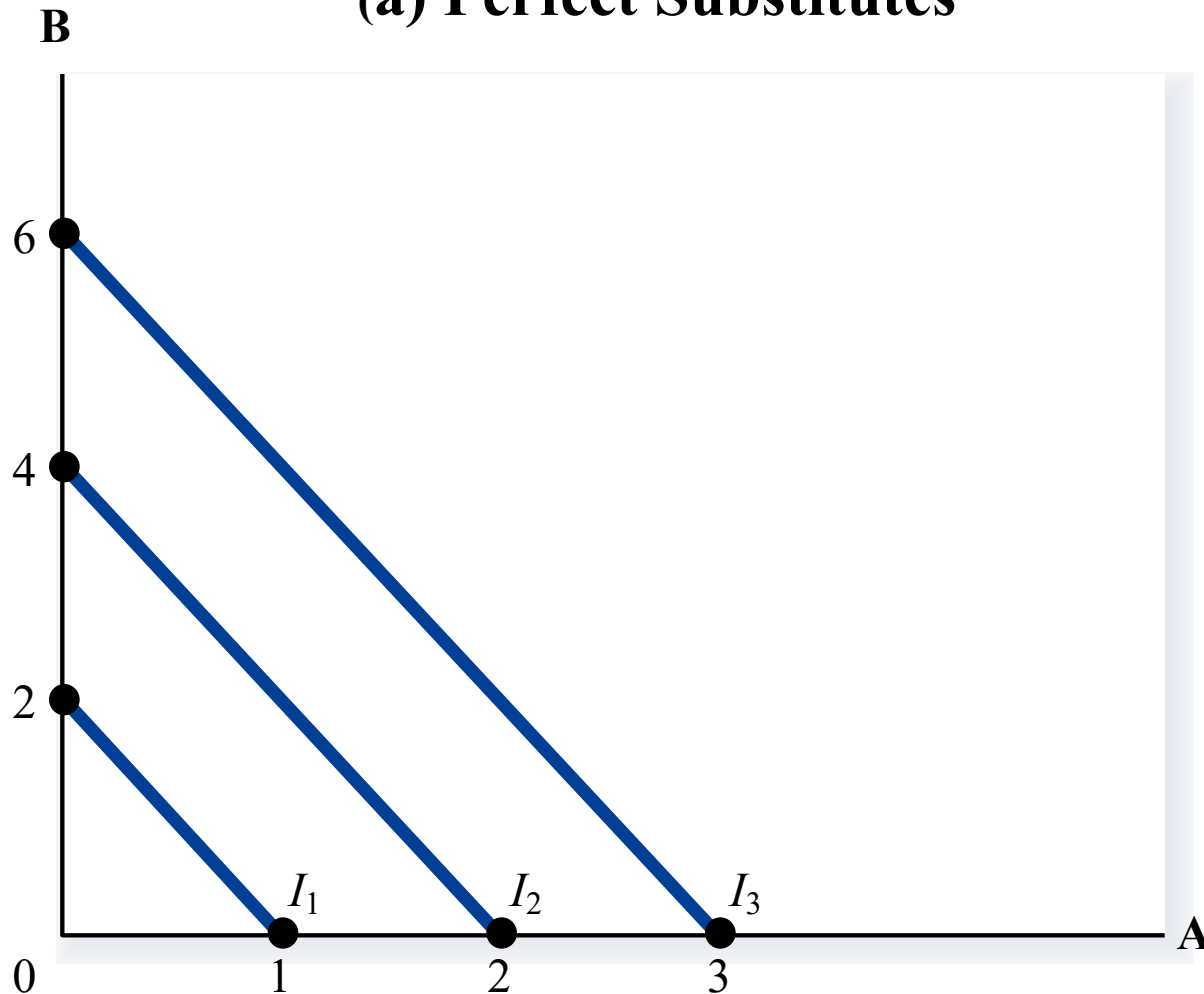
TWO EXTREME EXAMPLES OF INDIFFERENCE CURVES

Perfect Substitutes

- Two goods with straight-line indifference curves are *perfect substitutes*.
- The marginal rate of substitution is a fixed number.

Perfect Substitutes and Perfect Complements

(a) Perfect Substitutes



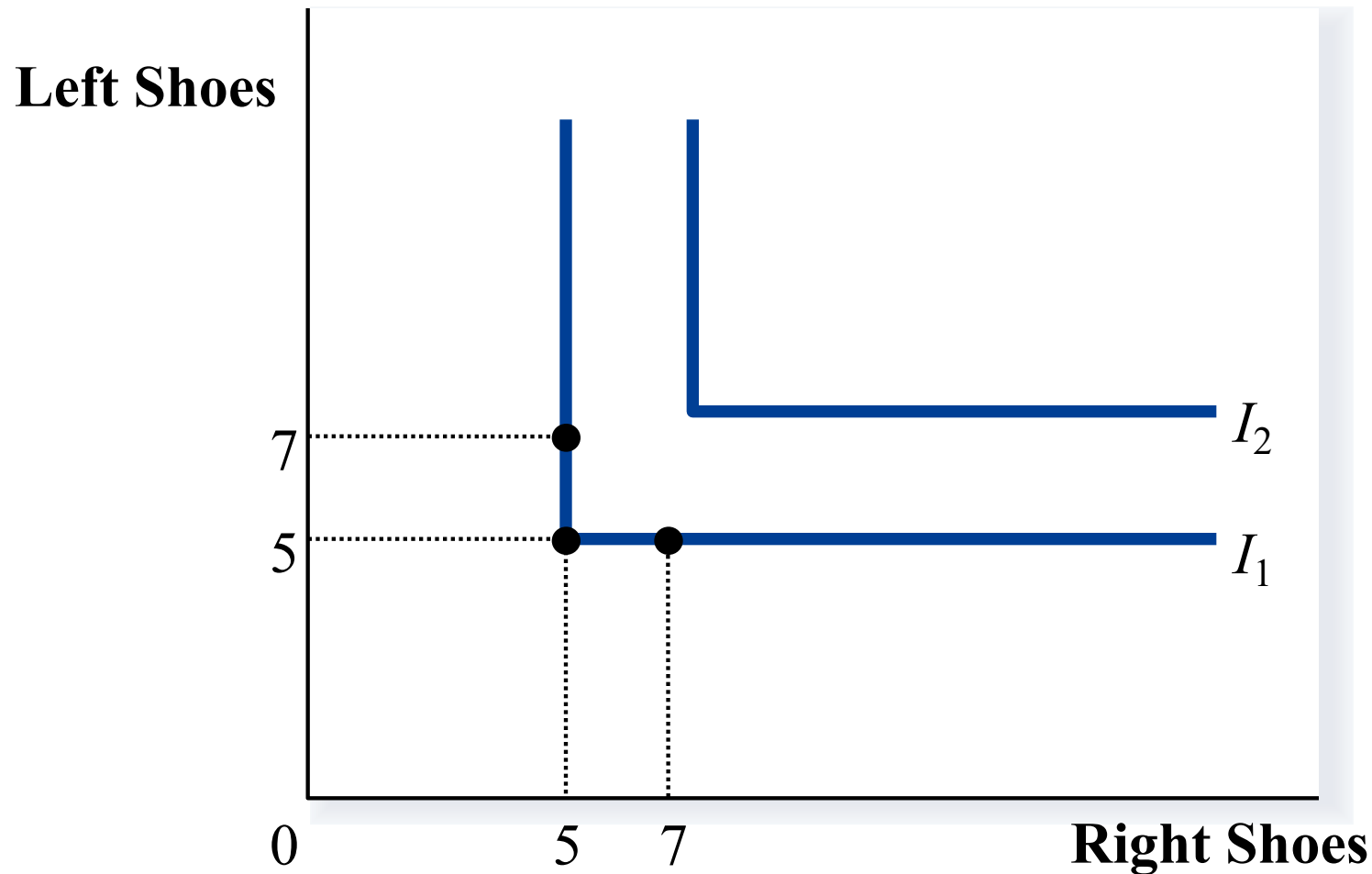
TWO EXTREME EXAMPLES OF INDIFFERENCE CURVES

Perfect Complements

- Two goods with right-angle indifference curves are *perfect complements*.
- Since these goods are always used together, extra units of one good, outside the desired consumption ratio, add no additional satisfaction.

Perfect Substitutes and Perfect Complements

(b) Perfect Complements



OPTIMIZATION: WHAT THE CONSUMER CHOOSES

- Consumers want to get the combination of goods on the highest possible indifference curve.
- However, the consumer must also end up on or below her budget constraint.

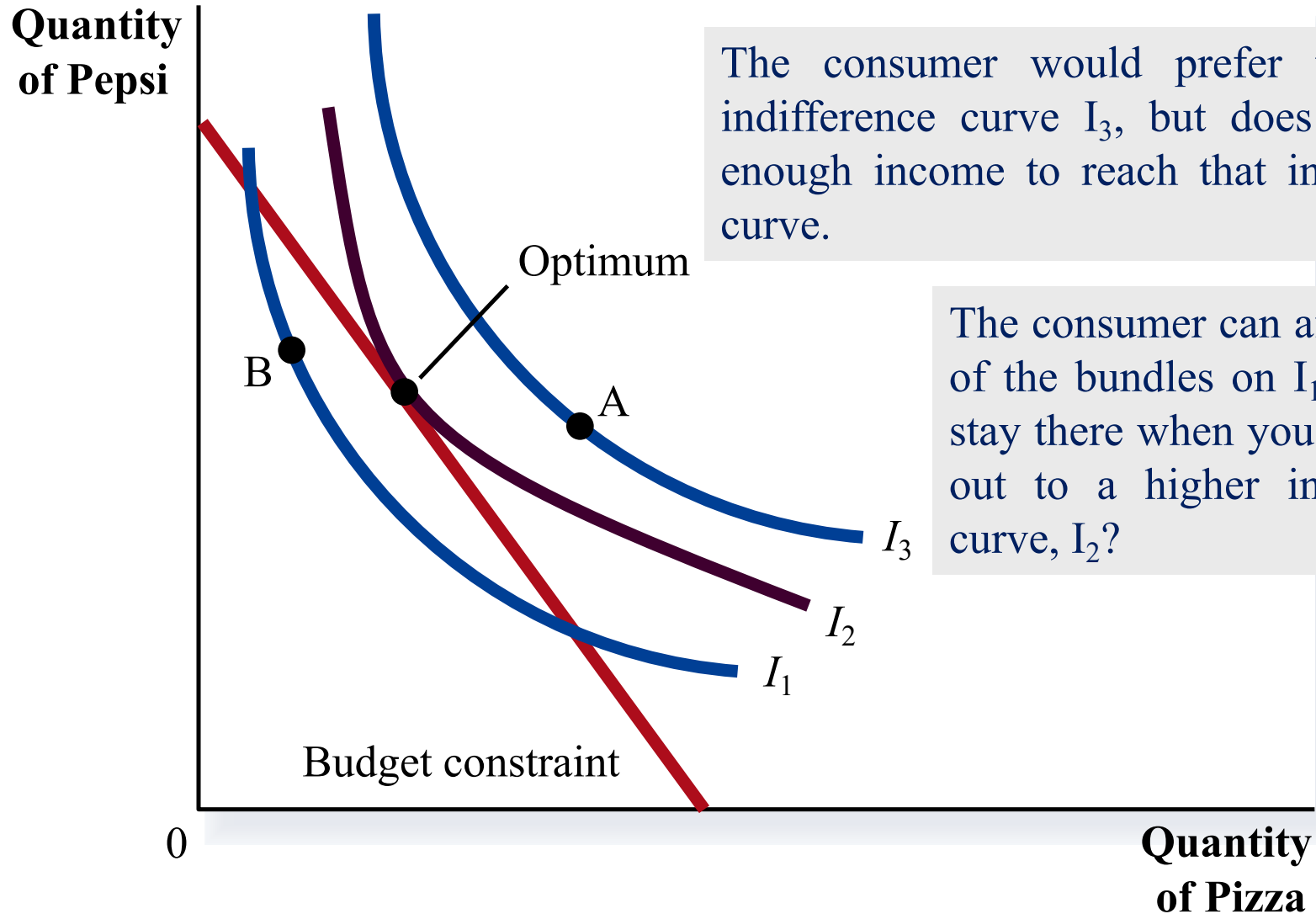
THE CONSUMER'S OPTIMAL CHOICES

- Combining the indifference curve and the budget constraint determines the consumer's optimal choice.
- Consumer optimum occurs at the point where the highest indifference curve and the budget constraint are tangent.

THE CONSUMER'S OPTIMAL CHOICE

- The consumer chooses consumption of the two goods so that the *marginal rate of substitution equals the relative price*.
- At the consumer's optimum, the consumer's valuation of the two goods equals the market's valuation.

The Consumer's Optimum



The consumer would prefer to be on indifference curve I_3 , but does not have enough income to reach that indifference curve.

The consumer can afford most of the bundles on I_1 , but why stay there when you can move out to a higher indifference curve, I_2 ?

HOW CHANGES IN INCOME AFFECT THE CONSUMER'S CHOICES

An increase in income shifts the budget constraint outward.

- The consumer is able to choose a better combination of goods on a higher indifference curve.

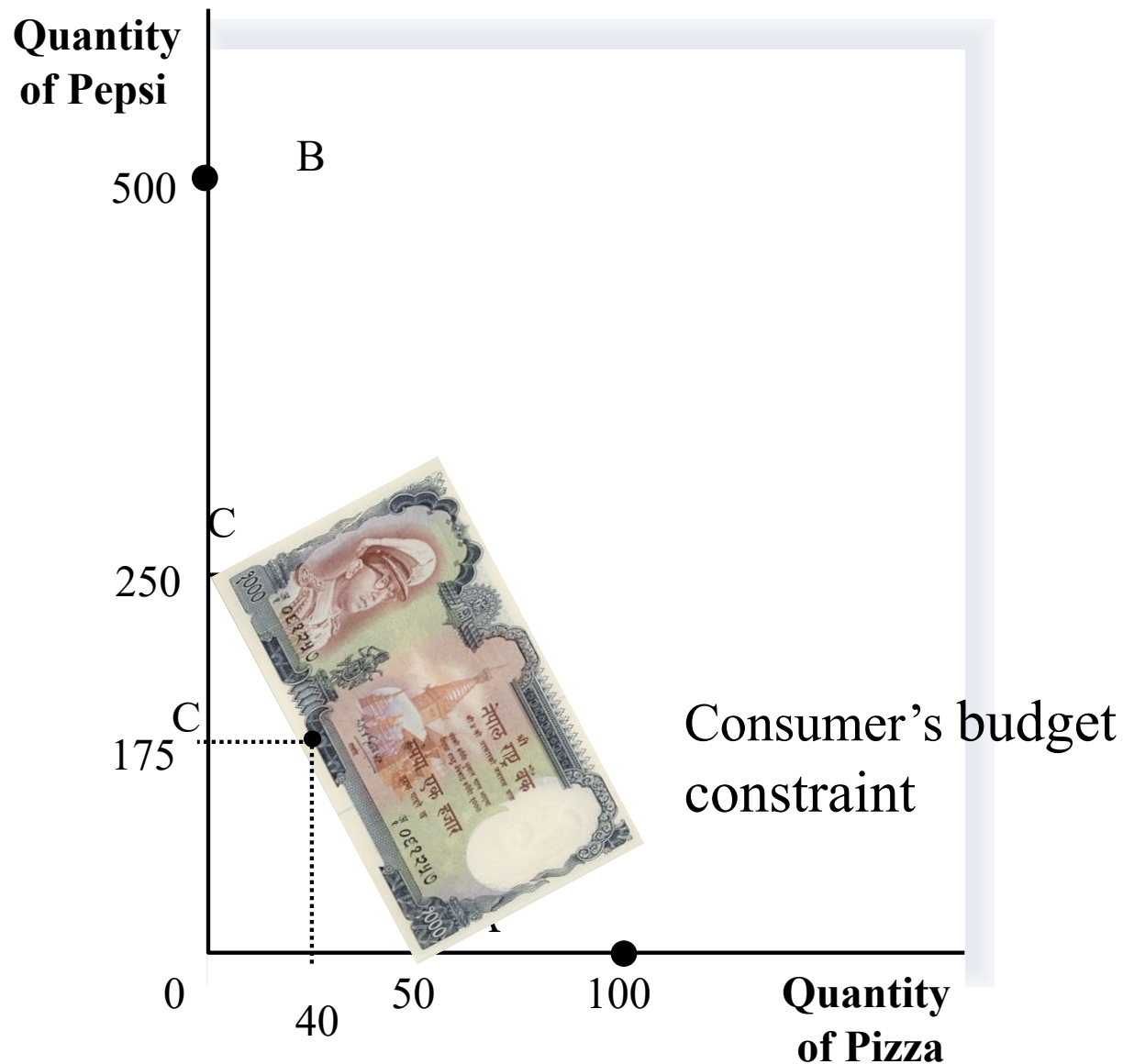
Consumer Equilibrium

- Consumers' equilibrium means a state of maximum satisfaction.
- A situation where a consumer spends his given income purchasing one or more commodities so that he gets maximum satisfaction and has no urge to change this level of consumption, given the prices of commodities, is known as the consumers' equilibrium.

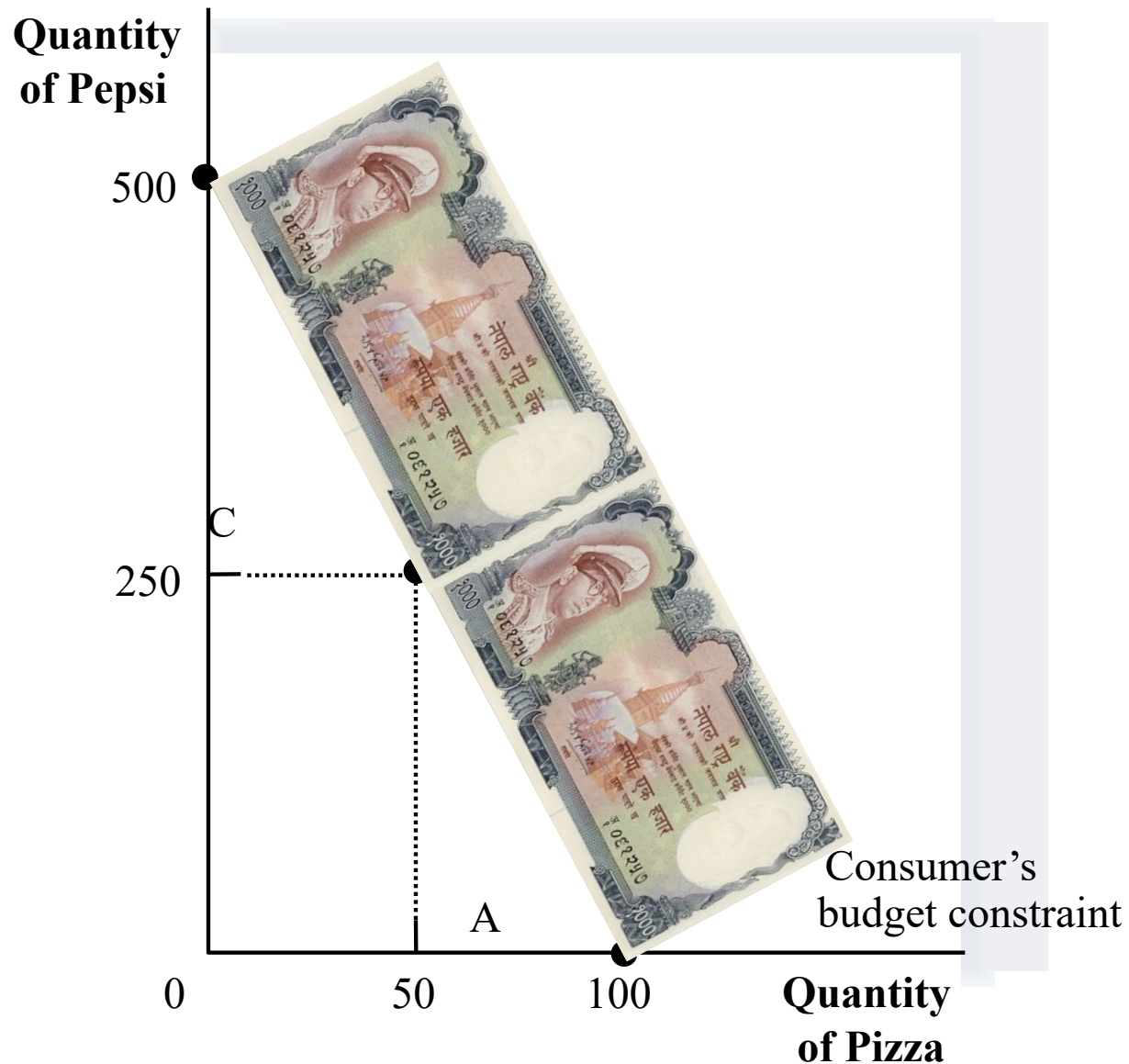
INCREASING INCOME

- How does an increase in income influence the consumer's budget constraint?
- If we double our consumer's Rs.1000 income, how much Pepsi can she buy if no pizza?
- How much pizza if no Pepsi?

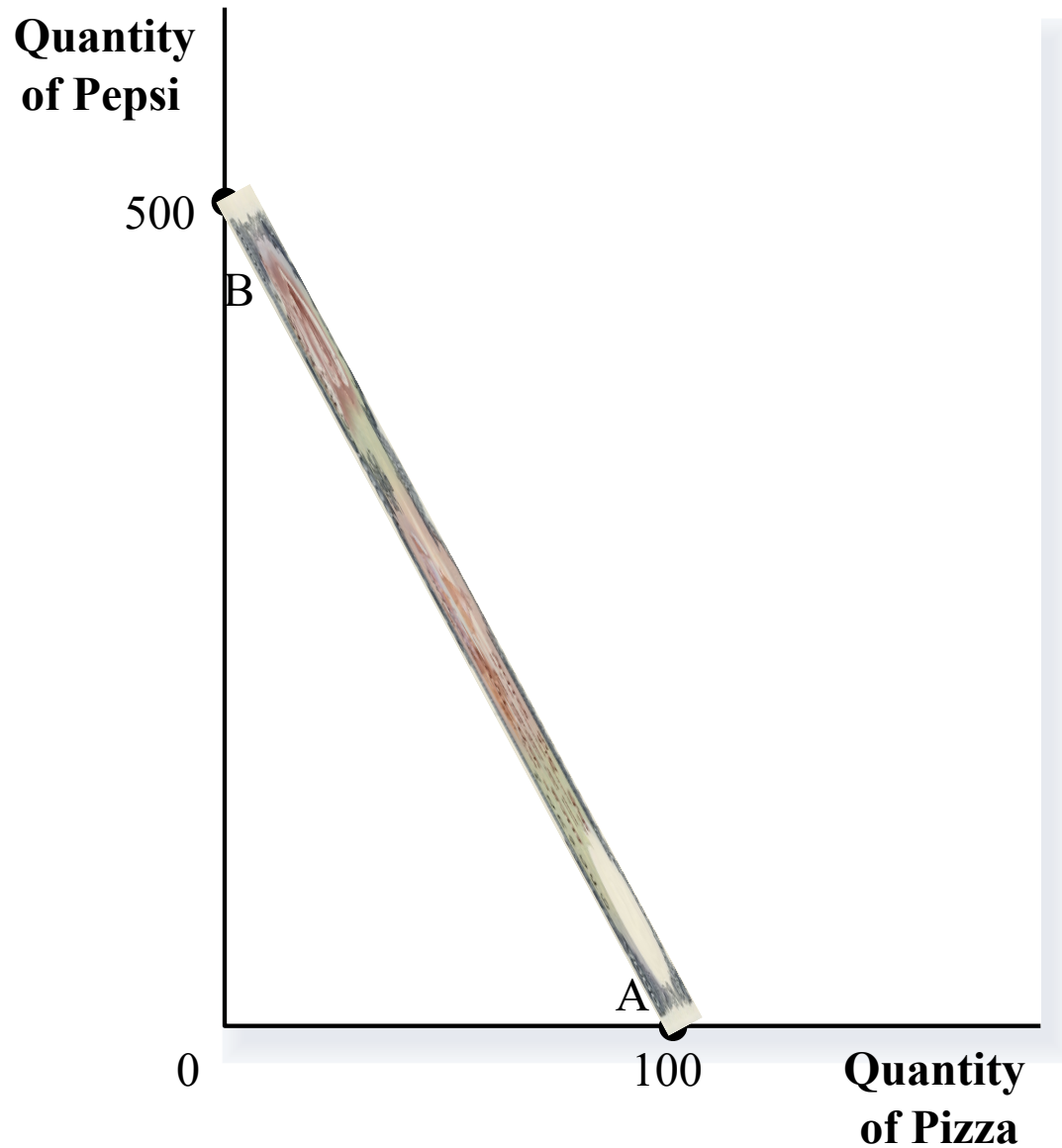
The Consumer's Income Increase



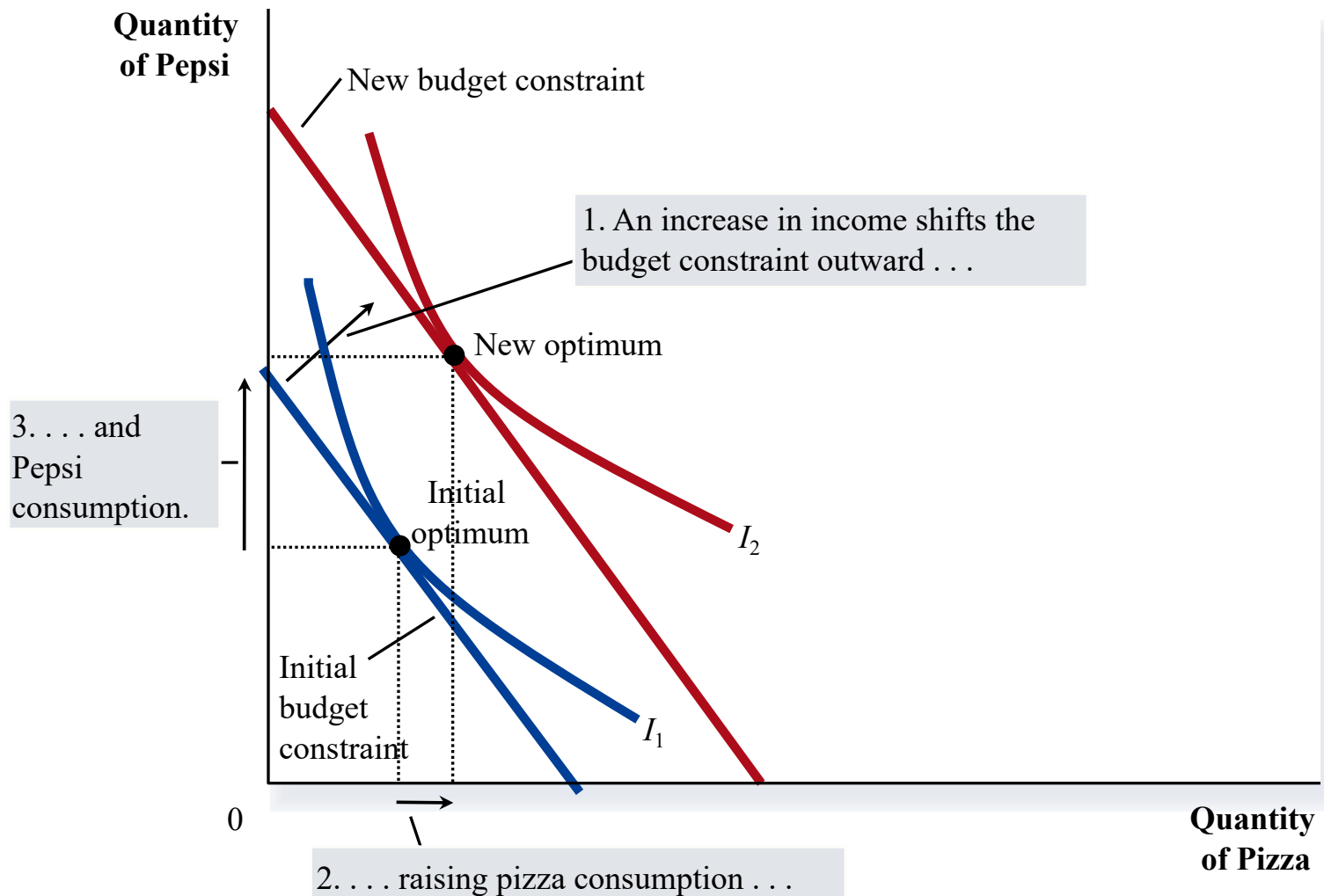
The Consumer's Income Increase



The Consumer's Income Increase



An Increase in Income

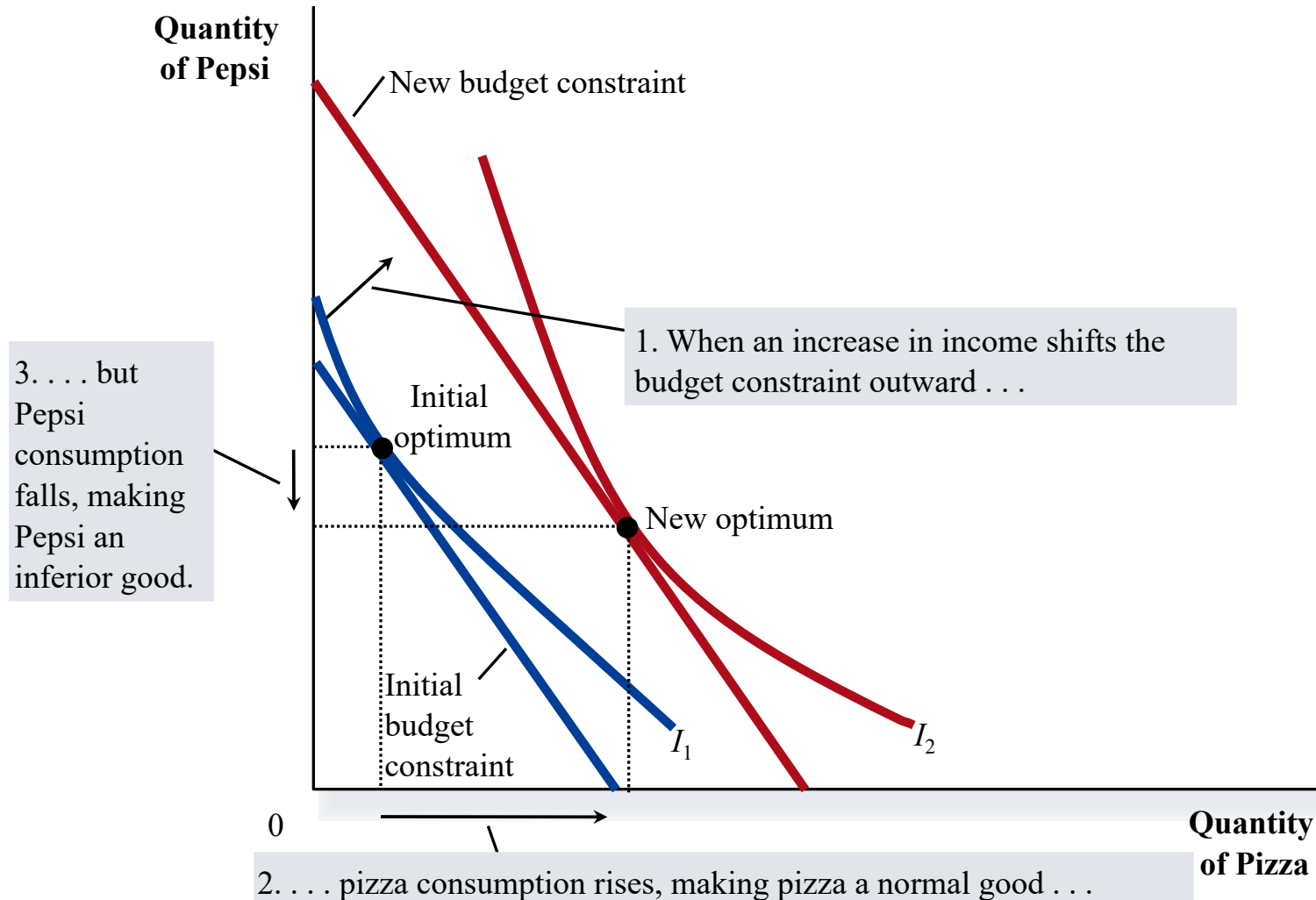


HOW CHANGES IN INCOME AFFECT THE CONSUMER'S CHOICES

Normal versus Inferior Goods

- If a consumer buys more of a good when his or her income rises, the good is called a *normal good*.
- If a consumer buys less of a good when his or her income rises, the good is called an *inferior good*.

An Inferior Good



INFERIOR GOODS

- Is Pepsi really an inferior good for you? For most people? Is pizza a normal good or an inferior good for you?
- What are some examples of inferior goods?

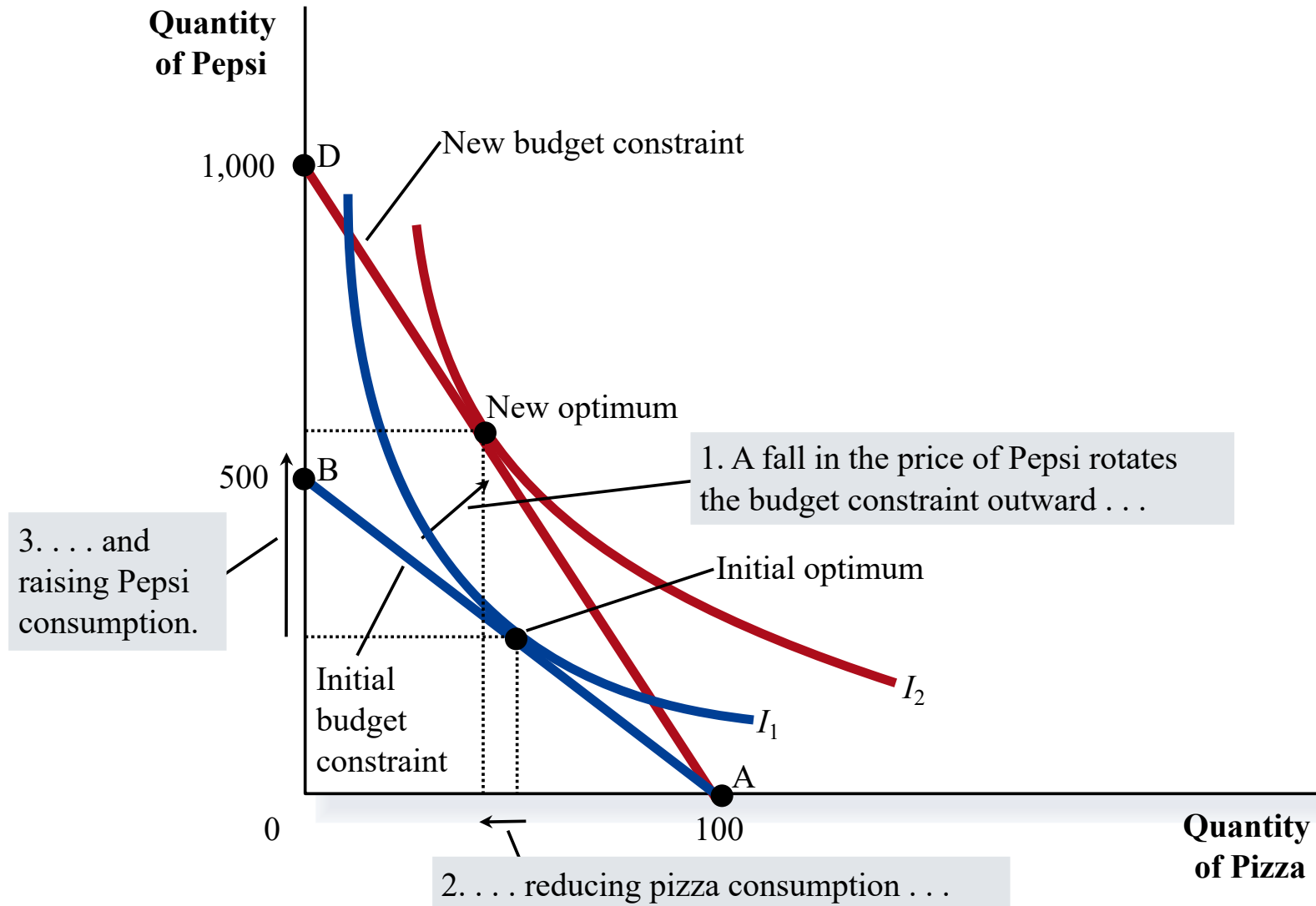
HOW CHANGES IN PRICES AFFECT CONSUMER'S CHOICES

How does a decrease in the price of Pepsi from Rs.2 to Rs.1 per liter change the budget constraint for our consumer?

HOW CHANGES IN PRICES AFFECT CONSUMER'S CHOICES

A fall in the price of any good rotates the budget constraint outward and changes the slope of the budget constraint.

A Change in Price



INCOME AND SUBSTITUTION EFFECTS

A price change has two effects on consumption.

- An income effect

- A substitution effect

INCOME AND SUBSTITUTION EFFECTS

The Income Effect

- The *income effect* is the change in consumption that results when a price change moves the consumer to a higher or lower indifference curve.

The Substitution Effect

- The *substitution effect* is the change in consumption that results when a price change moves the consumer along an indifference curve to a point with a different marginal rate of substitution.

INCOME AND SUBSTITUTION EFFECTS

A Change in Price: Substitution Effect

➤ A price change first causes the consumer to move from one point on an indifference curve to another on the same curve.

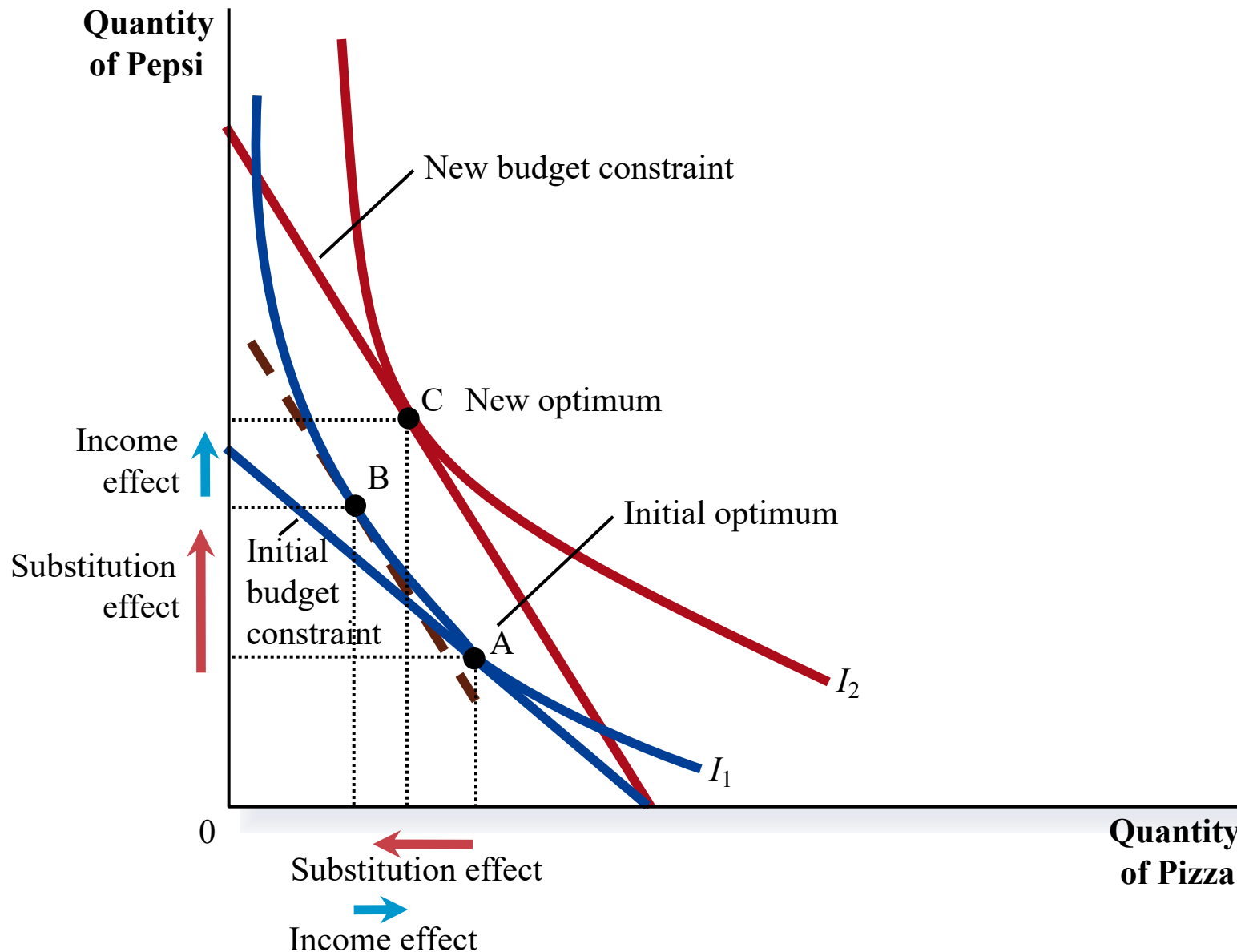
- Illustrated by movement from point A to point B.

➤ A Change in Price: Income Effect

- After moving from one point to another on the same curve, the consumer will move to another indifference curve.

- Illustrated by movement from point B to point C.

Figure 10 Income and Substitution Effects



Income and Substitution Effects When the Price of Pepsi Falls

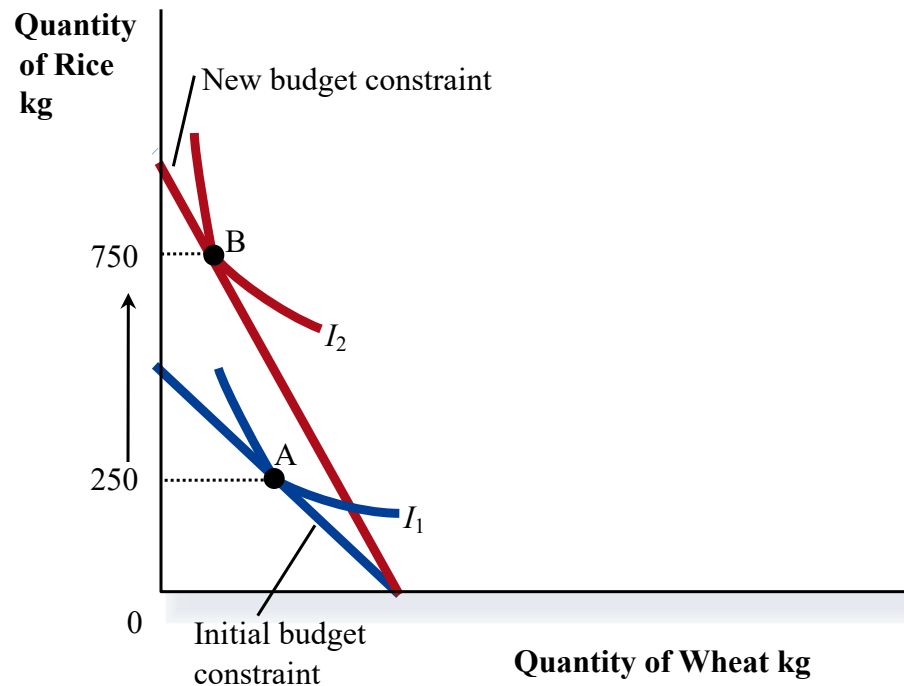
Good	Income Effect	Substitution Effect	Total Effect
Pepsi	Consumer is richer, so he buys more Pepsi.	Pepsi is relatively cheaper, so consumer buys more Pepsi.	Income and substitution effects act in same direction, so consumer buys more Pepsi.
Pizza	Consumer is richer, so he buys more pizza.	Pizza is relatively more expensive, so consumer buys less pizza.	Income and substitution effects act in opposite directions, so the total effect on pizza consumption is ambiguous.

DERIVING THE DEMAND CURVE

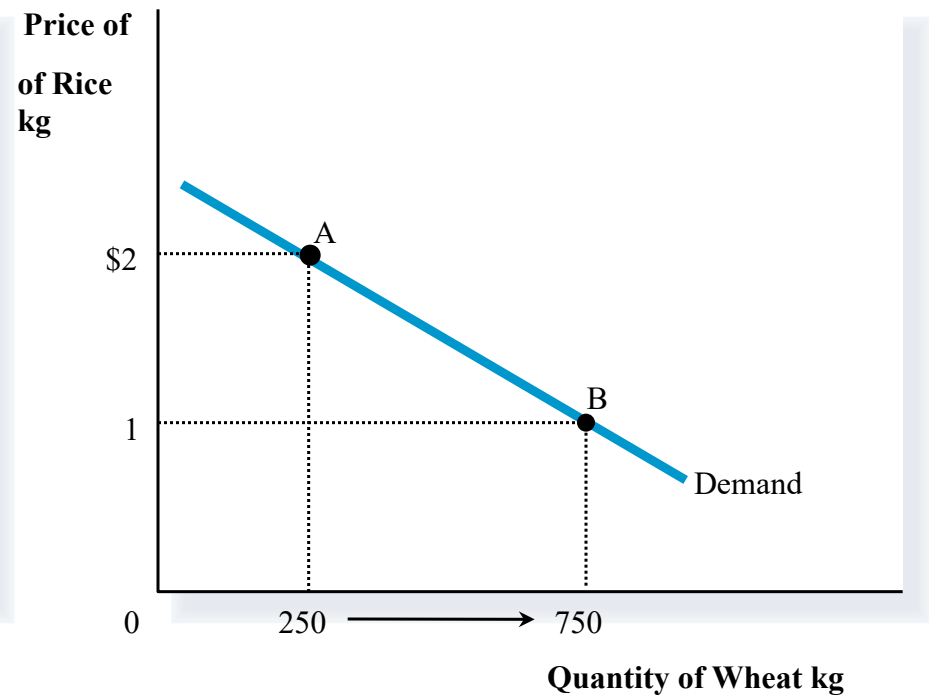
A consumer's demand curve can be viewed as a summary of the optimal decisions that arise from his or her budget constraint and indifference curves.

Deriving the Demand Curve

(a) The Consumer's Optimum



(b) The Demand Curve for Pepsi



Revealed preference theory

- **Revealed preference theory**, introduced in economics, by the American economist Paul Anthony Samuelson in 1938, clamps that consumers' preferences can be shown by what they purchase under different circumstances, particularly under other income and price circumstances.
- The theory entails that if a consumer purchases a specific bundle of goods, then that bundle is “revealed (tell) preferred,” given constant income and prices, to any other bundle that the consumer could afford.

Assumptions

1. Rationality: The consumer is assumed to behave rationally, in that he prefers bundles of goods that include more quantities of the commodities.
2. Consistency: The consumer behaves consistently, that is if he chooses bundle A in a situation in which bundle B was also available to him he will not choose B in any other situation in which A is also available.
Symbolically if $A > B$, then $B \text{ not } > A$
3. Transitivity: If in any particular situation $A > B$ and $B > C$, then $A > C$.

Assumptions

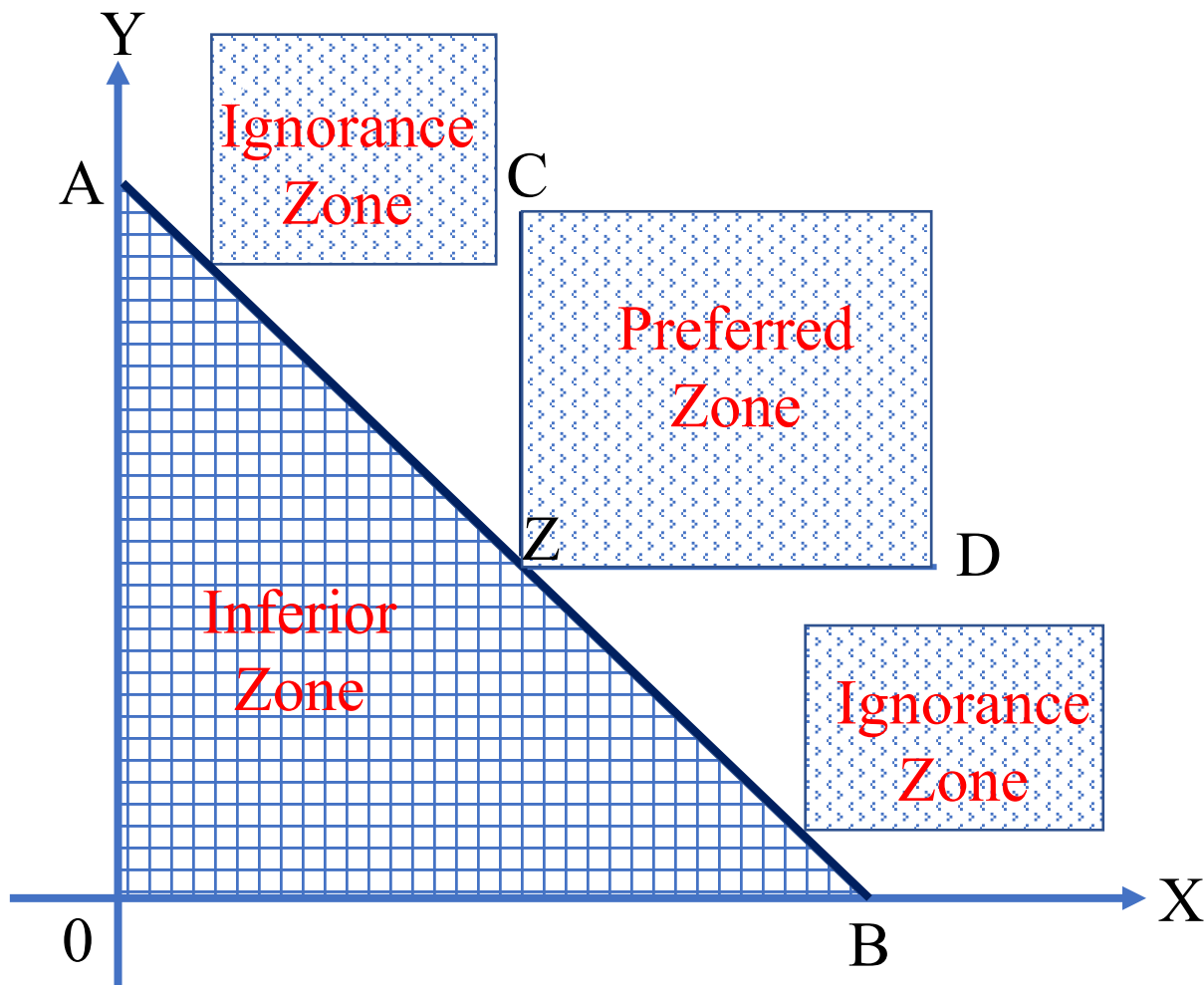
4. The revealed preference axiom (Saying): The consumer, by choosing a collection of goods in any one budget situation, reveals his preference for that particular collection.

- The chosen bundle is revealed to be preferred among all other alternative bundles available under the budget constraint.
- The chosen ‘basket of goods’ maximizes the utility of the consumer.
- The revealed preference for a particular collection of goods implies (axiomatically) the maximization of the utility of the consumer.

Derivation of the indifference curves

- The revealed preference permits us to construct the indifference map of the consumer just by observing his behavior (his choice) at various market prices, provided that:
 - (a) his choice is consistent,
 - (b) his tastes are independent of his choices over time and do not change,
 - (c) that the consumer is rational in the Pareto sense, that is, he prefers more goods to less.

Derivation of the indifference curves



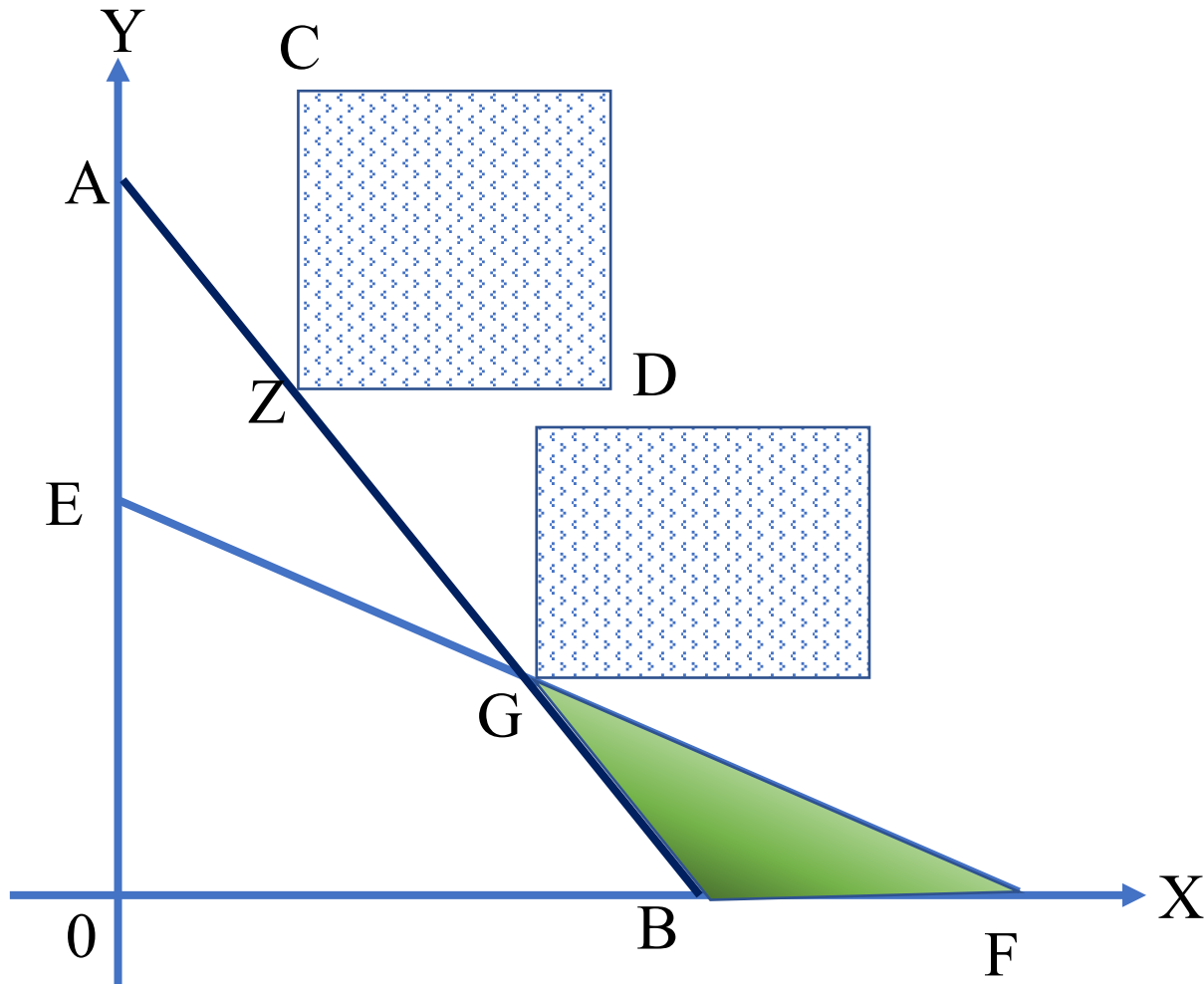
Derivation

- Assume that the initial budget line of the consumer is AB in figure 2.16 and he chooses batch Z.
- All the other points on the budget line and below it denote inferior batches to Z. If we draw perpendiculars through Z, CZ, and ZD, all the batches on these lines, and in the area defined by them to the right of Z, are preferred to Z because they contain more quantity of at least one commodity.

Derivation

- Batches of goods in the remaining area (below CZD and above the budget line) are still not ordered. However, we may rank them relative to Z by adopting the following procedure.

Let the price of x falls so that the new budget line EF passes below Z (figure).



Derivation

- The consumer will choose either G or a point to the right of G (on GF), since points on EG would imply inconsistent choice, being below the original budget line and hence inferior to G . Assume that the consumer chooses G . Using the transitivity assumption we have:

Hence,

- $Z \succ G \succ (GBF) \implies Z \succ (GBF)$
- (in the original situation) (in

Derivation

- In this way, we managed to rank all the batches in GBF relative to Z .
- We may repeat this procedure by drawing budget lines below Z and defining gradually all the batches of the 'lower ignorance zone' that are inferior to Z .

Two Axioms of Revealed Preference

To apply revealed preference analysis, choices must satisfy two criteria:

- **Weak Axioms of Revealed Preference**
- **Strong Axioms of Revealed Preference**

Strong and Weak Axioms of Revealed Preference

- As revealed preference theory developed, three primary axioms (principle) were identified: the weak, strong, and generalized axioms of revealed preference.
- The weak axiom indicates that, at given prices and incomes, if one good is purchased rather than another, then the consumer will always make the same choice.

Strong and Weak Axioms of Revealed Preference

- Less abstractly, the weak axiom argues that if a consumer purchases one particular type of good, then the consumer will never purchase a different brand or good unless it provides more benefits by being less expensive, having better quality, or providing increased convenience.
- Even more directly, the weak axiom indicates that consumers will purchase what they prefer and will make consistent choices.

Strong and Weak Axioms

- The strong axiom essentially generalizes the weak axiom to cover multiple goods and rules out certain inconsistent chains of choices.
- In a two-dimensional world (a world with only two goods between which consumers choose), the weak and strong axioms can be shown to be equivalent.

Strong and Weak Axioms

- While the strong axiom characterizes the implications of utility maximization (*see* expected utility), it does not address all the implications namely, there may not be a unique maximum.
- The generalized axiom covers the case when, for a given price level and income, more than one consumption bundle satisfies the same level of benefit. Expressed in utility terms, the generalized axiom accounts for circumstances where there is no unique bundle that maximizes utility.

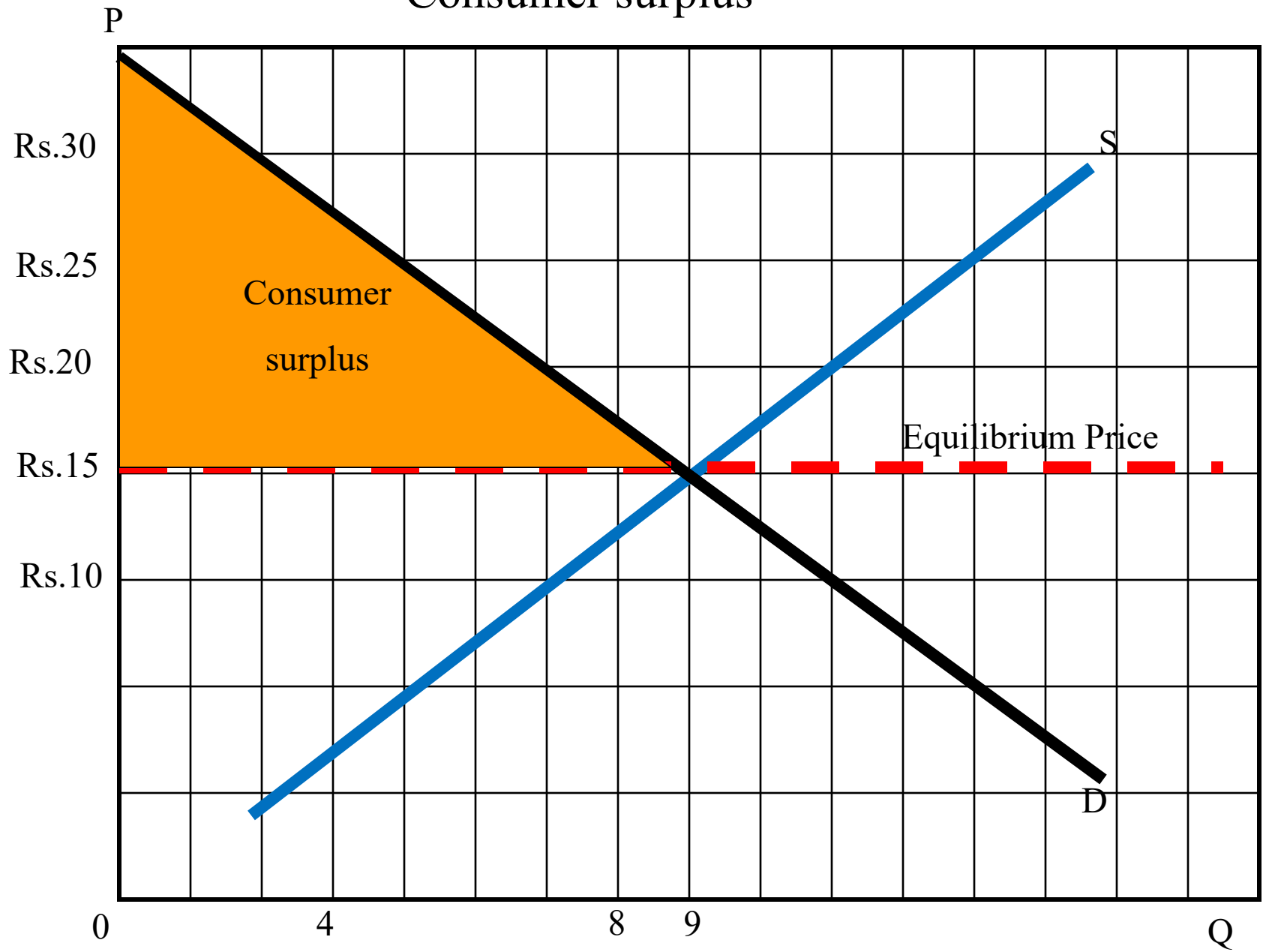
Strong and Weak Axioms

- The two most-distinguishing characteristics of revealed preference theory are as follows:
 - 1) it offers a theoretical framework for explaining consumer behavior predicated on little more than the assumption that consumers are rational, that they will make choices that advance their own purposes most efficiently, and
 - 2) it provides necessary and sufficient conditions, which can be empirically tested, for observed choices to be consistent with utility maximization.

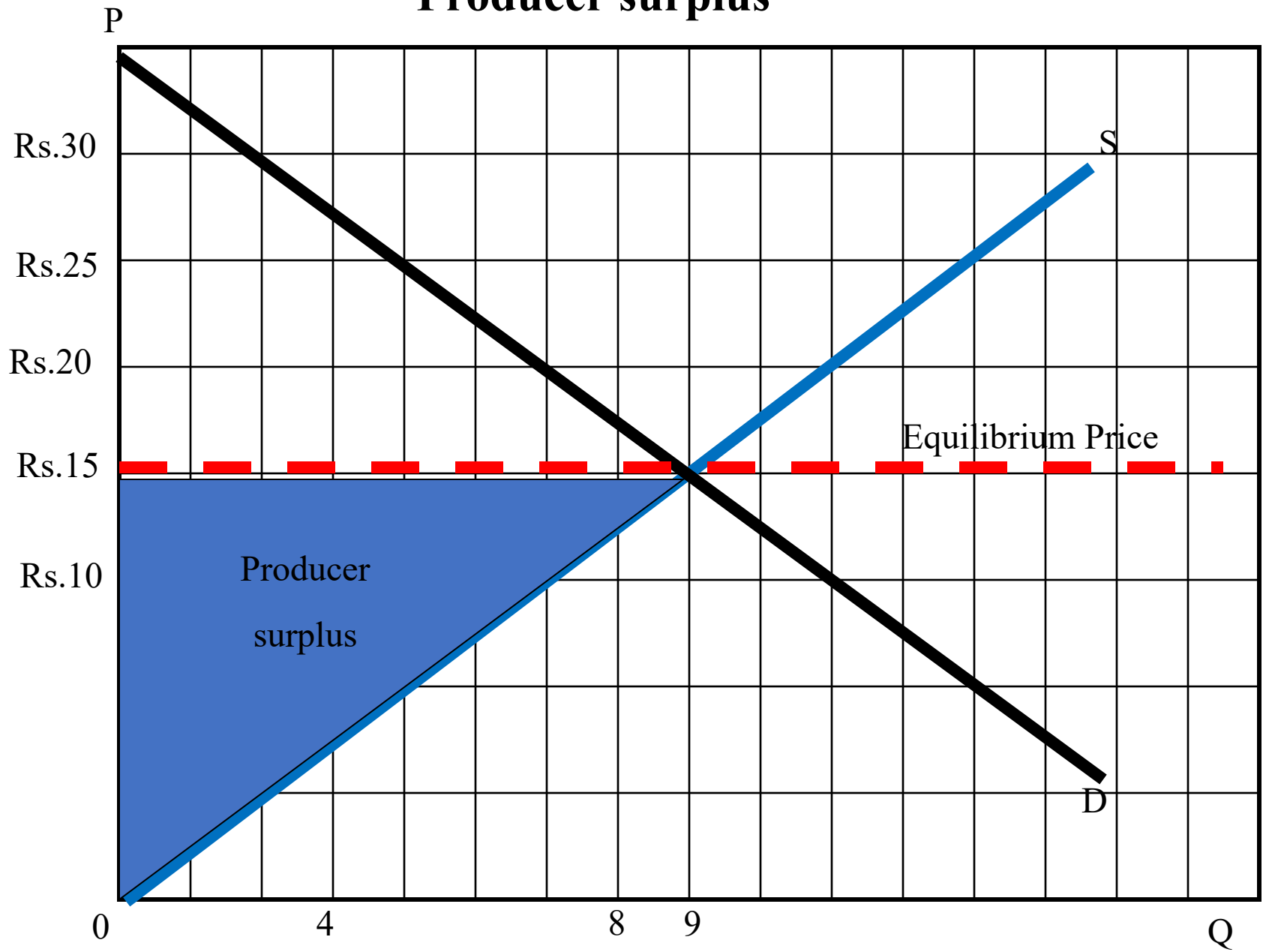
Consumer and Producer Surplus

- **Consumer Surplus** is the monetary gain obtained by consumers when they are able to purchase goods and services at a discounted rate compared to the price they are willing to pay, and therefore the money that they have saved becomes their surplus.
- **Producer Surplus** consists of the amount that producers sell their goods at a market price that is **higher** than the **least** they would sell it for.

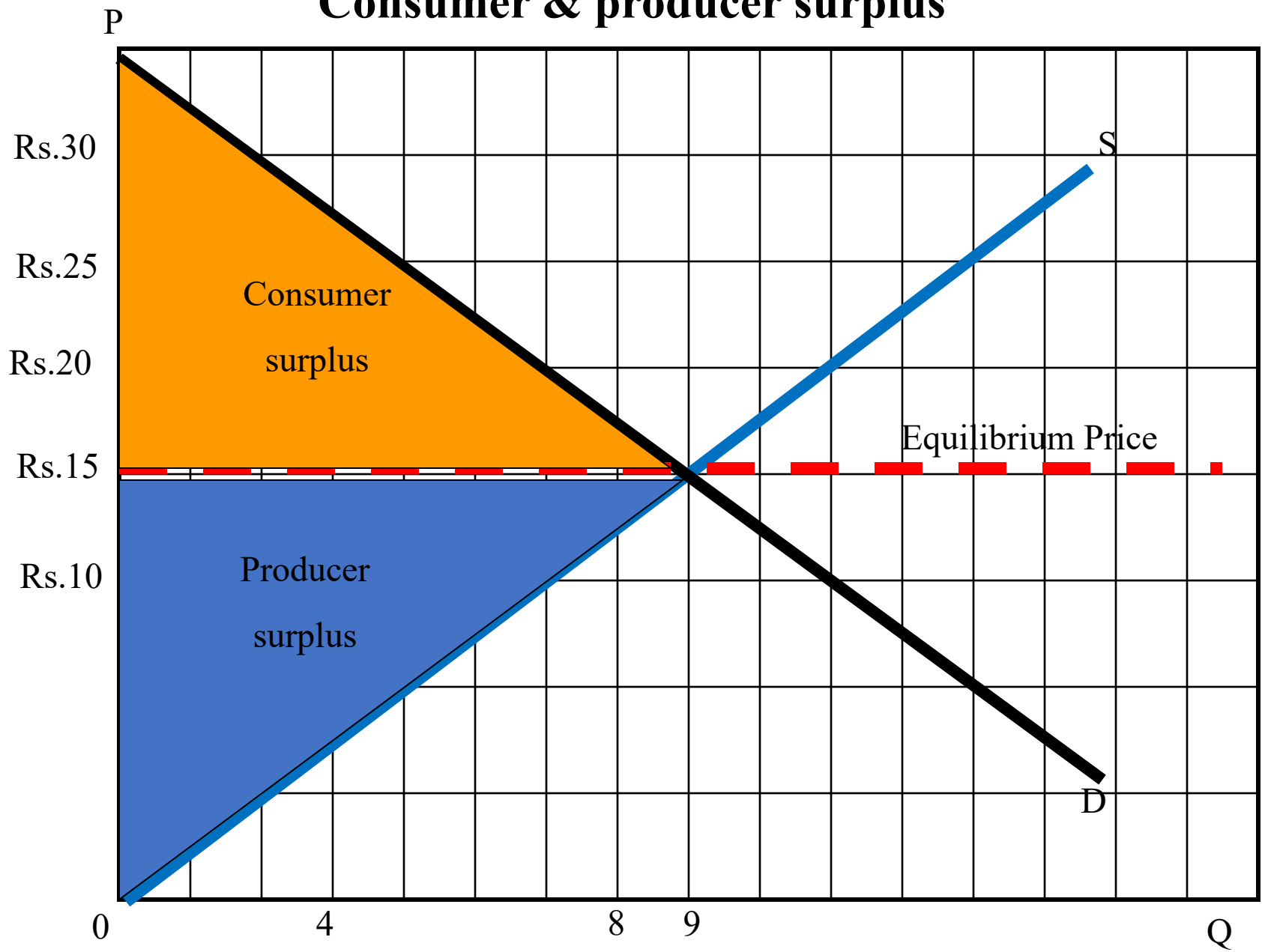
Consumer surplus



Producer surplus



Consumer & producer surplus



Consumer & producer surplus

Any intervention with the equilibrium price in perfectly competitive markets will reduce the total consumer and producer surplus

ELASTICITY

PRICE ELASTICITY OF DEMAND

- The coefficient of price elasticity of demand (e) measures the percentage change in the quantity of a commodity demanded per unit of time resulting from a given percentage change in the price of the commodity.
- Since price and quantity are inversely related, the coefficient of price elasticity of demand is a negative number.
- To avoid dealing with negative values, a minus sign is often introduced into the formula for e . Letting ΔQ represent the change in the quantity demanded of a commodity resulting from a given change in its price (ΔP), we have

formula for example:

$$e = - \frac{\Delta Q / Q}{\Delta P / P} = - \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

- Demand is said to be elastic if $e > 1$, inelastic if $e < 1$, and unitary elastic if $e = 1$.

EXAMPLE

Given the market demand schedule in the Table below and the market demand curve in Fig, we can find elasticity for a movement from point B to point D and from D to B, as follows:

Table and Figure

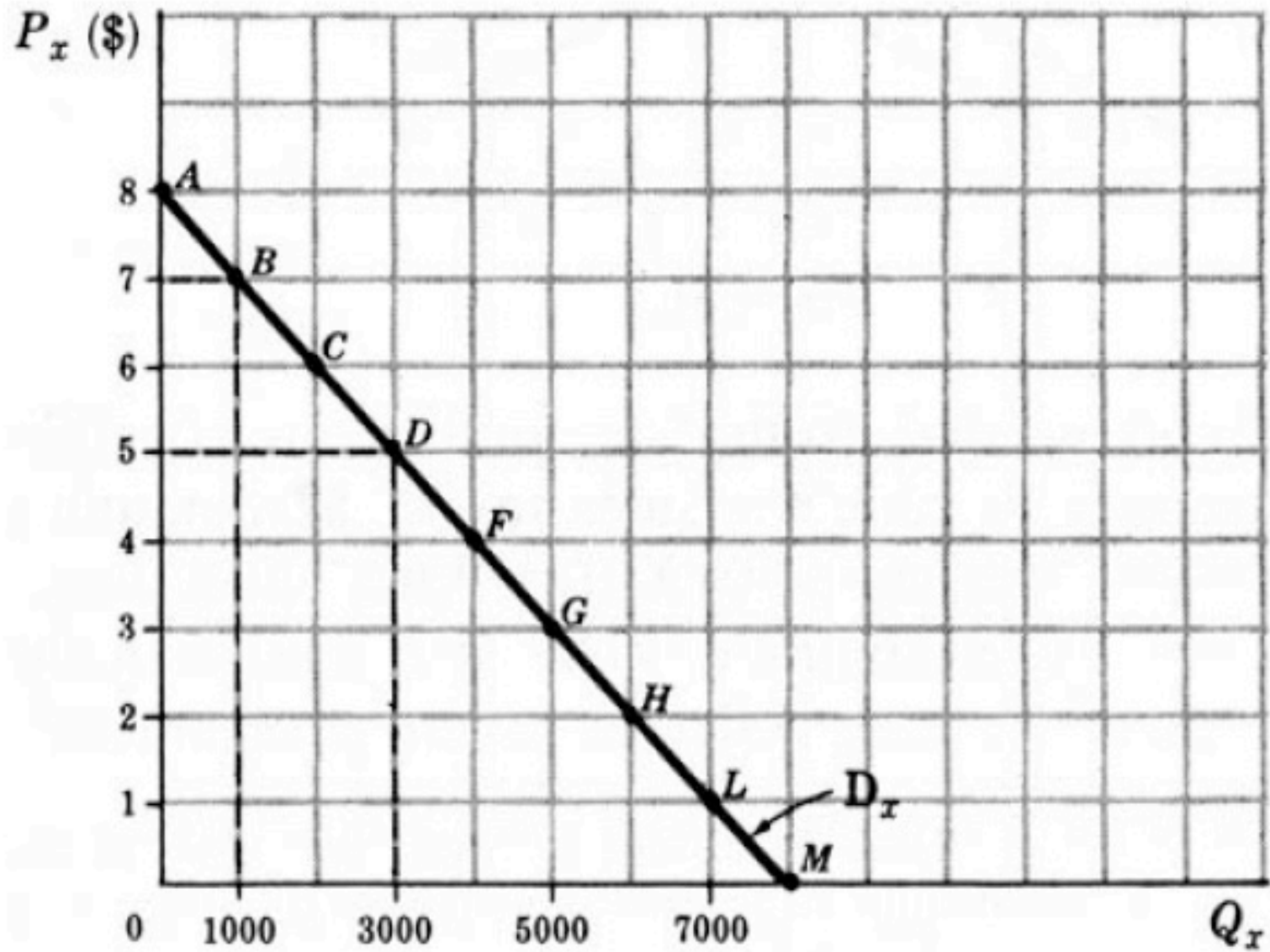
Point	P _x (Rs.)	Q _x
A	8	0
B	7	1000
C	6	2000
D	5	3000
F	4	4000
G	3	5000
H	2	6000
L	1	7000
M	0	8000

From B to D and From D to B

PRICE ELASTICITY

- From B to D
- From D to B

Figure



Movement from point B to point D and from D to B

From B to D ,

$$e = \frac{Q_D - Q_B}{P_D - P_B} \cdot \frac{P_B}{Q_B} = -\left(\frac{2000}{-2}\right)\left(\frac{7}{1000}\right) = 7$$

From D to B ,

$$e = \frac{Q_B - Q_D}{P_B - P_D} \cdot \frac{P_D}{Q_D} = -\left(\frac{-2000}{2}\right)\left(\frac{5}{3000}\right) \cong 1.67$$

Movement

- (The symbol \cong means approximately equal to.) Thus, we get a different value for e if we move from B to D than if we move from D to B.
- This difference results because we used a different base in computing the percentage changes in each case.
- We can avoid getting different results by using the average of the two prices $[(PB + PD)/2]$ and the average of the two quantities $[(QB + QD)/2]$ instead of either PB and QB or PD and QD in the formula to find e . Thus,

The formula to find e . thus,

$$e = -\frac{\Delta Q}{\Delta P} \cdot \frac{(P_B + P_D)/2}{(Q_B + Q_D)/2} = -\frac{\Delta Q}{\Delta P} \cdot \frac{P_B + P_D}{Q_B + Q_D}$$

The formula

- Applying this modified formula to find e either for a movement from B to D or for a movement from D to B, we get

$$e = -\left(-\frac{2000}{2}\right)\left(\frac{12}{4000}\right) = 3$$

This is the equivalent of finding e at the point midway between B and D (i.e., at point C).

ARC AND POINT ELASTICITY

- The coefficient of price elasticity of demand between two points on a demand curve is called arc elasticity.
- Thus, in Examples, we found arc elasticity. Later we will see that the coefficient of price elasticity of demand in general differs at every point along a demand curve. Arc elasticity is, therefore, only an estimate.
- This estimate improves as the arc becomes smaller and approaches a point in the limit.
- Point elasticity of demand can be found geometrically as shown in Examples

ARC

- We can find the elasticity of the demand curve in Example 1 at point C geometrically as follows.
- (For easy reference, Fig., with some modifications, is repeated here as Fig.) Since we want to measure elasticity at point C, we have only a single price and a single quantity.

Expressing each of the values in the formula for elasticity in terms of distances, we get:

$$\begin{aligned} e &= -\frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} \\ &= \frac{NM}{NC} \cdot \frac{NC}{ON} \\ &= \frac{NM}{ON} = \frac{6000}{2000} = 3 \end{aligned}$$

POINT ELASTICITY AND TOTAL EXPENDITURES

- A straight-line demand curve (extended to both axes) is elastic above its midpoint, has unitary elasticity at the midpoint, and is inelastic below its midpoint.
- There are no such generalizations for curvilinear demand curves. In the special case when a demand curve takes the shape of a rectangular hyperbola, $e = 1$ at every point on it.
- Regardless of the shape of the demand curve, as the price of a commodity falls, the total expenditures of consumers on the commodity (P times Q) rise when $e = >1$, remain unchanged when $e = 1$, and fall when $e , <1$

POINT ELASTICITY

- In Table 3.3, we find e at points B, C, D, F, G, H, and L for the demand curve of Example 1 and
- can observe what happens to total expenditures on commodity X as P_x falls. At point B, $e = TM/OT = 7000/1000 = 7$
- The coefficient of price elasticity of D_x at other points is found similarly. As we approach point A, e approaches infinity. As we approach point M, e approaches zero.

POINT

Table 3.3

Point	P_x (\$)	Q_x	Total Expenditures (\$)	e
<i>A</i>	8	0	0	
<i>B</i>	7	1,000	7,000	7
<i>C</i>	6	2,000	12,000	3
<i>D</i>	5	3,000	15,000	$5/3$
<i>F</i>	4	4,000	16,000	1
<i>G</i>	3	5,000	15,000	$3/5$
<i>H</i>	2	6,000	12,000	$1/3$
<i>L</i>	1	7,000	7,000	$1/7$
<i>M</i>	0	8,000	0	

INCOME ELASTICITY OF DEMAND

- The coefficient of income elasticity of demand (e_M) measures the percentage change in the amount of a commodity purchased per unit time ($\Delta Q/Q$) resulting from a given percentage change in a consumer's income ($\Delta M/M$). Thus;

$$e_M = \frac{\Delta Q/Q}{\Delta M/M} = \frac{\Delta Q}{\Delta M} \cdot \frac{M}{Q}$$

INCOME ELASTICITY

- When e_M is negative, the good is inferior. If e_M is positive, the good is normal.
- A normal good is usually a luxury if it's $e_M > 1$, otherwise, it is a necessity.
- Depending on the level of the consumer's income, e_M for a good is likely to vary considerably.
- Thus a good may be a luxury at “low” levels of income, a necessity at “intermediate” levels of income, and an inferior good at “high” levels of income.

CROSS ELASTICITY OF DEMAND

- The coefficient of cross elasticity of demand of commodity X concerning commodity Y (e_{xy}) measures the percentage change in the amount of X purchased per unit of time ($\Delta Q_x/Q_x$) resulting from a given percentage change in the price of Y ($\Delta P_y/P_y$). Thus;

$$e_{xy} = \frac{\Delta Q_x / Q_x}{\Delta P_y / P_y} = \frac{\Delta Q_x}{\Delta P_y} \cdot \frac{P_y}{Q_x}$$

Price Elasticity of Demand

- Measures buyers' responsiveness to price changes
- Elastic demand
 - Sensitive to price changes
 - Large change in quantity
- Inelastic demand
 - Insensitive to price changes
 - Small change in quantity

Elasticity of Demand Formula

- Formula for price elasticity of demand

$$E_d = \frac{\text{Percentage Change in **Quantity Demanded** of Product X}}{\text{Percentage Change in **Price** of Product X}}$$

Elasticity of Demand Formula

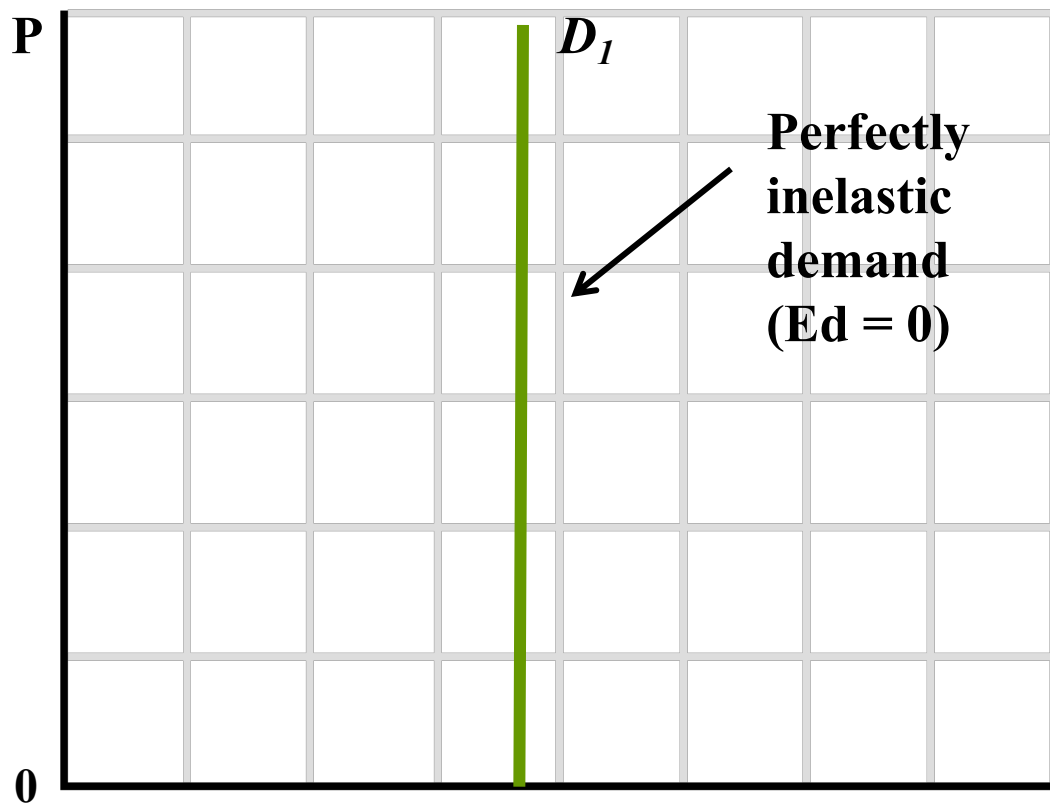
- Use the midpoint formula
- Ensures consistent results

$$E_d = \frac{\text{Change in quantity}}{\text{Sum of quantities} / 2} \div \frac{\text{Change in price}}{\text{Sum of prices} / 2}$$

Interpretation of Elasticity of Demand

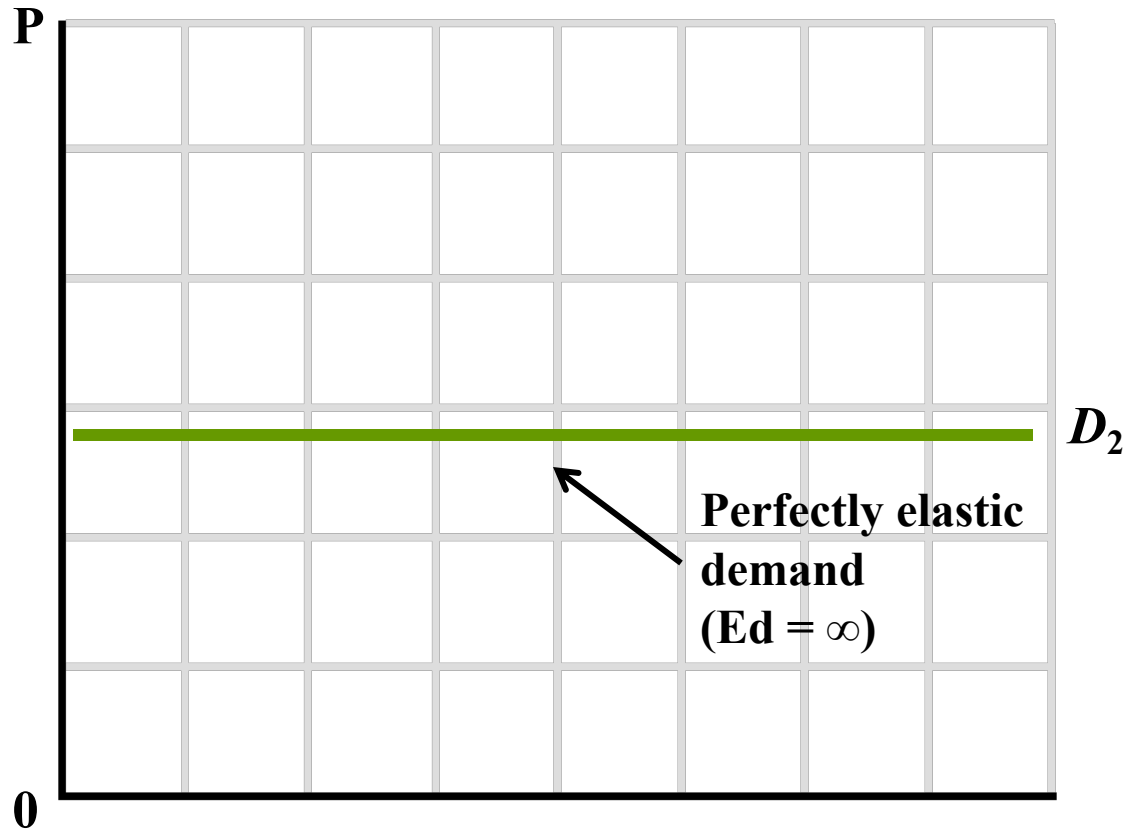
- $E_d > 1$ demand is elastic
- $E_d = 1$ demand is unit elastic
- $E_d < 1$ demand is inelastic
- Extreme cases
 - Perfectly inelastic
 - Perfectly elastic

Extreme Cases



Perfectly inelastic demand

Extreme Cases



Perfectly elastic demand

Total Revenue Test

- Total Revenue = Price x Quantity
- Inelastic demand
 - P and TR move in the same direction
- Elastic demand
 - P and TR move in opposite directions

Summary of Price Elasticity of Demand

Price Elasticity of Demand: A Summary

Absolute Value of Elasticity Coefficient	Demand Is	Description	Impact on Total Revenue of a:	
			Price Increase	Price Decrease
Greater than 1 ($E_d > 1$)	Elastic or relatively elastic	Q_d changes by a larger percentage than does price	Total revenue decreases	Total revenue increases
Equal to 1 ($E_d = 1$)	Unit or unitary elastic	Q_d changes by the same percentage as does price	Total revenue is unchanged	Total revenue is unchanged
Less than 1 ($E_d < 1$)	Inelastic or relatively inelastic	Q_d changes by a smaller percentage than does price	Total revenue increases	Total revenue decreases

Determinants of Elasticity of Demand

- Substitutability
 - More substitutes, demand is more elastic
- Proportion of Income
 - Higher proportion of income, demand is more elastic
- Luxuries vs. Necessities
 - Luxury goods, demand is more elastic
- Time
 - More time available, demand is more elastic

Price Elasticity of Supply

- The coefficient of price elasticity of supply (e_s) measures the percentage change in the quantity supplied of a commodity per unit of time ($\Delta Q=Q$) resulting from a given percentage change in the price of the commodity ($\Delta P=P$). Thus;

Price Elasticity of Supply

$$e_s = \frac{\Delta Q/Q}{\Delta P/P} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

Price Elasticity of Supply

- When the supply curve is positively sloped (the usual case), price and quantity move in the same direction and $e_s > 0$.
- The supply curve is said to be elastic if $e_s > 1$, inelastic if $e_s < 1$, and unitary elastic if $e_s = 1$.
- Arc and point e_s can be found in the same way as arc and point e . When the supply curve is a positively sloped straight line, then, all along the line, $e_s > 1$, if the line crosses the price axis; $e_s < 1$, if it crosses the quantity axis; and $e_s = 1$, if it goes through the origin.

EXAMPLE

- To find ex for a movement from point A to point C, from C to A and midway between A and C (i.e., at point B) and midway between C and F (i.e., at point D) for the values of Table, we proceed as follows:

EXAMPLE

Point	P_x (Rs.)	Q_x
A	6	800
B	5	600
C	4	400
D	3	200
F	2	0

EXAMPLE

From A to C ,

$$e_s = \frac{\Delta P}{\Delta P} \cdot \frac{P_A}{Q_A} = \left(\frac{-4000}{-2} \right) \left(\frac{6}{8000} \right) = 1.5$$

From C to A ,

$$e_s = \left(\frac{4000}{2} \right) \left(\frac{4}{4000} \right) = 2$$

At point B ,

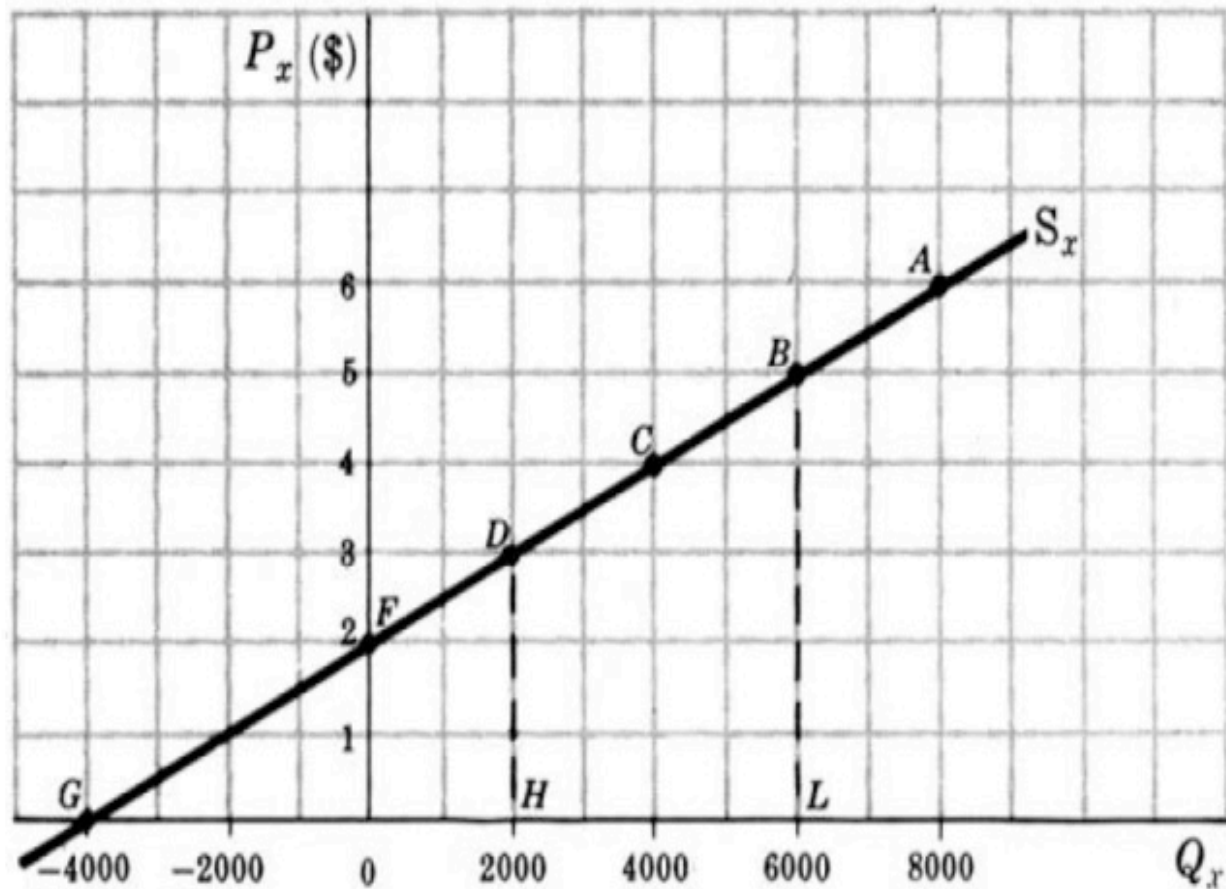
$$e_s = \frac{\Delta Q}{\Delta P} \cdot \frac{P_A + P_C}{Q_A + Q_C} = \left(\frac{4000}{2} \right) \left(\frac{10}{12,000} \right) \cong 1.67$$

At point D ,

$$e_s = \frac{\Delta Q}{\Delta P} \cdot \frac{P_C + P_F}{Q_C + Q_F} = \left(\frac{4000}{2} \right) \left(\frac{6}{4000} \right) = 3$$

EXAMPLE

- We can find ϵ_s at points B and D geometrically from



EXAMPLE

At Point B,

$$e_s = \frac{\Delta Q}{\Delta P} \cdot \frac{P_B}{Q_B} = \frac{GL}{LB} \cdot \frac{LB}{OL} = \frac{GL}{OL} = \frac{10,000}{6000} \cong 1.67$$

At point D,

$$e_s = \frac{GH}{OH} = \frac{6000}{2000} = 3$$

To find point es, for a curvilinear supply curve, we draw a tangent to the supply curve at the point and then proceed as above.

Price Elasticity of Supply

- Formula to compute elasticity
- $E_s > 1$ supply is elastic
- $E_s < 1$ supply is inelastic

$$E_s = \frac{\text{Percentage Change in **Quantity Supplied** of Product **X**}}{\text{Percentage Change in **Price** of Product **X**}}$$

SR Versus LR Elasticities

Price Elasticity of Demand

- Price elasticity of demand be different with the amount of time consumers have to respond to a price.
- Most goods and services:
 - Short-run elasticity is less than long-run elasticity (e.g. gasoline). People tend to drive lesser and more fuel efficient cars in the long-run
- Other Goods (durables):
 - Short-run elasticity is greater than long-run elasticity (e.g. automobiles). People may put off immediate consumption, but ultimately older cars must be replaced.

SR Versus LR Elasticities

Income Elasticities

- Most goods and services:
 - Income elasticity is greater in the long-run than in the short run. For example, higher incomes may be converted into bigger cars so the income elasticity of demand for gasoline increases with time.
- Other Goods (durables):
 - Income elasticity is less in the long-run than in the short-run. For example, consumers will initially want to hold more cars. Later, purchases will only be to replace old cars.

SR Versus LR Elasticities

Price Elasticity of Supply

- Most goods and services:
 - Long-run price elasticity of supply is greater than short-run price elasticity of supply. Due to limited capacity, firms are output constrained in the short-run. In the long-run, they can expand.
- Other Goods (durables, recyclables):
 - Long-run price elasticity of supply is less than short-run price elasticity of supply. For example, consider the secondary copper market. Copper price increases provide an incentive to convert row copper into new supply. In the long-run, this stock of row copper begins to fall.

Demand under conditions of risk and uncertainty

- The problem of imperfect information
- Attitudes towards risk
- Diminishing marginal utility and attitudes to risk
- Insurance: a way of removing risks
- Problems for irresponsible insurance companies

Risk and Uncertainty

- The risk is defined as the situation of winning or losing something worthy.
- Uncertainty is a condition where there is no knowledge about the future events.
- Risk can be measured and quantified, through theoretical models.
- Conversely, it is not possible to measure uncertainty in quantitative terms, as the future events are unpredictable.
- The potential outcomes are known in risk,
- whereas in the case of uncertainty, the outcomes are unknown.

Risk and Uncertainty

- Risk can be controlled if proper measures are taken to control it.
- On the other hand, uncertainty is beyond the control of the person or enterprise, as the future is uncertain.
- Minimization of risk can be done, by taking necessary precautions.
- As opposed to the uncertainty that cannot be minimized.
- In risk, probabilities are assigned to a set of circumstances which is not possible in case of uncertainty.

Risk and Uncertainty

BASIS FOR COMPARISON	RISK	UNCERTAINTY
Meaning	The probability of winning or losing something worthy is known as risk.	Uncertainty implies a situation where the future events are not known.
Certainty	It can be measured	It cannot be measured.
Outcome	Chances of outcomes are known.	The outcome is unknown.
Control	Controllable	Uncontrollable
Minimization	Yes	No
Probabilities	Assigned	Not assigned

THANK YOU

NEXT UNIT II