

# IF X AND Y ARE BOTH NORMAL GOODS AND PRICE OF X HAS INCREASED (KEEPING THE PRICE OF Y FIXED), GRAPHICALLY

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UNDERSTANDING THE EFFECTS OF PRICE CHANGES ON CONSUMER CHOICES IS FUNDAMENTAL IN MICROECONOMICS. WHEN ANALYZING THE IMPACT OF A PRICE INCREASE IN ONE GOOD ON THE CONSUMPTION OF OTHER GOODS, THE CONCEPTS OF NORMAL GOODS, BUDGET CONSTRAINTS, AND INDIFFERENCE CURVES BECOME ESSENTIAL TOOLS. SPECIFICALLY, WHEN BOTH GOODS X AND Y ARE NORMAL GOODS, AND THE PRICE OF X INCREASES WHILE THE PRICE OF Y REMAINS CONSTANT, THE GRAPHICAL REPRESENTATION REVEALS INSIGHTFUL ASPECTS OF CONSUMER BEHAVIOR AND SUBSTITUTION AND INCOME EFFECTS. THIS ARTICLE EXPLORES THESE CONCEPTS IN DETAIL, PROVIDING CLARITY THROUGH GRAPHICAL ANALYSIS AND STEP-BY-STEP EXPLANATIONS.

## BASIC CONCEPTS AND ASSUMPTIONS

BEFORE DIVING INTO THE GRAPHICAL ANALYSIS, IT IS IMPORTANT TO UNDERSTAND THE FOUNDATIONAL CONCEPTS INVOLVED:

### NORMAL GOODS

- DEFINITION: NORMAL GOODS ARE GOODS FOR WHICH DEMAND INCREASES AS CONSUMER INCOME RISES, AND CONVERSELY, DEMAND DECREASES WHEN INCOME FALLS.
- IMPLICATION IN OUR CONTEXT: SINCE BOTH X AND Y ARE NORMAL GOODS, AN INCREASE IN CONSUMER INCOME OR PURCHASING POWER TENDS TO INCREASE DEMAND FOR BOTH.

### BUDGET CONSTRAINT

- THE BUDGET CONSTRAINT REPRESENTS ALL COMBINATIONS OF GOODS X AND Y THAT A CONSUMER CAN PURCHASE WITH A FIXED INCOME AT GIVEN PRICES.
- IT IS EXPRESSED AS:

$$I = P_X \times X + P_Y \times Y$$

WHERE:

- $I$  = CONSUMER'S INCOME
- $P_X$  = PRICE OF GOOD X
- $P_Y$  = PRICE OF GOOD Y
- $X, Y$  = QUANTITIES OF GOODS X AND Y RESPECTIVELY.

### INDIFFERENCE CURVES

- REPRESENT COMBINATIONS OF GOODS PROVIDING THE CONSUMER WITH THE SAME LEVEL OF SATISFACTION OR UTILITY.
- HIGHER INDIFFERENCE CURVES INDICATE HIGHER LEVELS OF UTILITY.
- THE POINT OF TANGENCY BETWEEN THE BUDGET LINE AND AN INDIFFERENCE CURVE INDICATES THE CONSUMER'S OPTIMAL CONSUMPTION BUNDLE.

## INITIAL EQUILIBRIUM: BEFORE PRICE CHANGE

IMAGINE A STANDARD DIAGRAM WITH THE FOLLOWING:

- THE BUDGET LINE  $(BL_1)$ , DETERMINED BY THE INITIAL PRICE OF  $X$  ( $P_{X1}$ ), THE FIXED PRICE OF  $Y$  ( $P_Y$ ), AND CONSUMER INCOME ( $I$ ).
  - THE INDIFFERENCE CURVE  $(IC_1)$ , TANGENT TO  $(BL_1)$  AT THE OPTIMAL CONSUMPTION BUNDLE  $(X_1, Y_1)$ .
- THE INITIAL EQUILIBRIUM POINT  $(E_1)$  SHOWS THE CONSUMER'S INITIAL OPTIMAL CHOICE.

## EFFECT OF PRICE INCREASE OF $X$ (KEEPING PRICE OF $Y$ FIXED)

WHEN THE PRICE OF  $X$  INCREASES FROM  $P_{X1}$  TO  $P_{X2}$ :

- THE BUDGET LINE PIVOTS INWARD FROM THE  $X$ -AXIS, BECOMING STEEPER BECAUSE THE CONSUMER CAN NOW AFFORD LESS OF  $X$  WITH THE SAME INCOME.
- THE NEW BUDGET LINE  $(BL_2)$  IS CHARACTERIZED BY:  

$$P_{X2} > P_{X1}$$
- THE BUDGET LINE SHIFTS FROM ITS INITIAL POSITION  $(BL_1)$  TO A NEW POSITION  $(BL_2)$ , WHICH IS TANGENT TO A LOWER INDIFFERENCE CURVE  $(IC_2)$ , REFLECTING A POTENTIAL DECREASE IN THE CONSUMER'S OVERALL UTILITY.

## GRAPHICAL REPRESENTATION OF THE BUDGET LINES

- INITIAL BUDGET LINE  $(BL_1)$ :
- SLOPE =  $-\frac{P_{X1}}{P_Y}$
- INTERCEPT ON THE  $X$ -AXIS =  $\frac{I}{P_{X1}}$
- INTERCEPT ON THE  $Y$ -AXIS =  $\frac{I}{P_Y}$
- NEW BUDGET LINE  $(BL_2)$ :
- SLOPE =  $-\frac{P_{X2}}{P_Y}$ , STEEPER THAN  $(BL_1)$
- INTERCEPT ON THE  $X$ -AXIS =  $\frac{I}{P_{X2}}$ , WHICH IS SMALLER THAN BEFORE
- INTERCEPT ON THE  $Y$ -AXIS REMAINS UNCHANGED, AS  $P_Y$  AND  $I$  ARE FIXED

## GRAPHICAL ANALYSIS OF CONSUMER CHOICE AFTER PRICE INCREASE

1. SUBSTITUTION EFFECT:
  - THE CHANGE IN CONSUMPTION DUE SOLELY TO THE CHANGE IN RELATIVE PRICES, HOLDING UTILITY CONSTANT.
  - THE CONSUMER TENDS TO SUBSTITUTE AWAY FROM THE NOW MORE EXPENSIVE  $X$  TOWARD  $Y$ .
  - TO ISOLATE THIS EFFECT, THE COMPENSATED (HICKSIAN) DEMAND CURVE IS USED, WHICH CONSIDERS MOVEMENT ALONG AN INDIFFERENCE CURVE TANGENT TO THE NEW BUDGET LINE, ADJUSTED TO KEEP UTILITY CONSTANT.
2. INCOME EFFECT:
  - THE CHANGE IN CONSUMPTION RESULTING FROM THE CHANGE IN PURCHASING POWER OR REAL INCOME.
  - BECAUSE BOTH  $X$  AND  $Y$  ARE NORMAL GOODS, THE INCOME EFFECT CAUSES A DECREASE IN DEMAND FOR BOTH GOODS WHEN THE PRICE OF  $X$  INCREASES.
  - THE CONSUMER'S REAL INCOME EFFECTIVELY FALLS BECAUSE THEY CAN NOW AFFORD LESS  $X$ , AND SINCE BOTH ARE NORMAL GOODS, DEMAND FOR BOTH DECREASES.
3. OVERALL EFFECT:
  - THE TOTAL CHANGE IN CONSUMPTION OF  $X$  AND  $Y$  IS THE SUM OF THE SUBSTITUTION AND INCOME EFFECTS.
  - GRAPHICALLY, THE CONSUMER'S OPTIMAL BUNDLE SHIFTS FROM  $(X_1, Y_1)$  TO A NEW POSITION  $(X_2, Y_2)$  ALONG THE BUDGET LINE  $(BL_2)$ .

# GRAPHICAL ILLUSTRATION: STEP-BY-STEP

STEP 1: DRAW THE INITIAL BUDGET LINE  $(BL_1)$  WITH SLOPE  $(-\frac{P_X}{P_Y})$  AND INTERCEPTS AT  $(\frac{P_X}{P_X})$  (X-AXIS) AND  $(\frac{P_Y}{P_Y})$  (Y-AXIS). PLOT THE INITIAL INDIFFERENCE CURVE  $(IC_1)$  TANGENT AT  $(E_1)$ .

STEP 2: SHOW THE NEW BUDGET LINE  $(BL_2)$ , STEEPER DUE TO INCREASED  $(P_X)$ , WITH A SMALLER X-INTERCEPT  $(\frac{P_X}{P_X})$ . THE Y-INTERCEPT REMAINS UNCHANGED.

STEP 3: IDENTIFY THE NEW CONSUMER CHOICE  $(E_2)$  AT THE TANGENCY POINT BETWEEN  $(IC_2)$  AND  $(BL_2)$ .

STEP 4: DECOMPOSE THE TOTAL CHANGE FROM  $(E_1)$  TO  $(E_2)$  INTO SUBSTITUTION AND INCOME EFFECTS:

- SUBSTITUTION EFFECT: MOVE ALONG  $(IC_1)$  TO A POINT  $(E_1')$  ON THE NEW BUDGET LINE  $(BL_2)$  WITH THE SAME UTILITY AS  $(E_1)$ .
- INCOME EFFECT: MOVE FROM  $(E_1')$  TO  $(E_2)$ , REFLECTING THE CHANGE IN REAL INCOME.

## IMPLICATIONS OF BOTH GOODS BEING NORMAL

SINCE BOTH X AND Y ARE NORMAL GOODS:

- DEMAND FOR X DECREASES AFTER THE PRICE INCREASE DUE TO THE INCOME EFFECT, AS THE CONSUMER'S EFFECTIVE INCOME DECREASES.
- DEMAND FOR Y ALSO DECREASES FOR THE SAME REASON, REINFORCING THE NEGATIVE INCOME EFFECT.
- THE EXTENT OF DEMAND REDUCTION DEPENDS ON THE OWN-PRICE ELASTICITY OF X, BUT GENERALLY, THE DEMAND CURVE SHIFTS INWARD.

## GRAPHICAL SUMMARY: KEY POINTS

- THE BUDGET LINE PIVOTS INWARD WHEN THE PRICE OF X RISES.
- THE CONSUMER'S OPTIMAL BUNDLE SHIFTS FROM  $(X_1, Y_1)$  TO  $(X_2, Y_2)$ , WITH BOTH QUANTITIES DECREASING.
- THE INDIFFERENCE CURVES ILLUSTRATE THE CHANGE IN UTILITY LEVELS.
- THE SUBSTITUTION EFFECT TENDS TO INCREASE OR DECREASE DEMAND DEPENDING ON THE CROSS-PRICE RELATIONSHIPS, BUT HERE, SINCE BOTH GOODS ARE NORMAL AND ONLY THE PRICE OF X INCREASES, THE SUBSTITUTION EFFECT LEADS TO DECREASED CONSUMPTION OF X AND Y.
- THE INCOME EFFECT AMPLIFIES THE DECREASE IN DEMAND FOR BOTH GOODS BECAUSE DEMAND FOR NORMAL GOODS FALLS AS REAL INCOME FALLS.

## CONCLUSION

GRAPHICALLY ANALYZING THE SCENARIO WHERE BOTH GOODS X AND Y ARE NORMAL, AND THE PRICE OF X INCREASES (KEEPING THE PRICE OF Y FIXED), PROVIDES PROFOUND INSIGHTS INTO CONSUMER BEHAVIOR. THE INWARD PIVOT OF THE BUDGET LINE AND THE SUBSEQUENT SHIFT TO A LOWER INDIFFERENCE CURVE REFLECT THE REDUCTION IN CONSUMER UTILITY AND CONSUMPTION. RECOGNIZING THE DECOMPOSITION INTO SUBSTITUTION AND INCOME EFFECTS HELPS UNDERSTAND THE NUANCED RESPONSES OF DEMAND TO PRICE CHANGES.

IN PRACTICE, THIS ANALYSIS AIDS POLICYMAKERS AND BUSINESSES IN PREDICTING HOW CONSUMERS MIGHT ADJUST THEIR CONSUMPTION PATTERNS IN RESPONSE TO PRICE FLUCTUATIONS, ESPECIALLY WHEN DEALING WITH ESSENTIAL OR NORMAL GOODS. IT UNDERSCORES THE IMPORTANCE OF CONSIDERING BOTH INCOME AND SUBSTITUTION EFFECTS IN DEMAND ANALYSIS, PROVIDING A COMPREHENSIVE PICTURE OF CONSUMER CHOICE BEHAVIOR.

#### SUMMARY:

- PRICE INCREASE OF  $X$  CAUSES THE BUDGET LINE TO ROTATE INWARD.
- BOTH GOODS' DEMANDS TEND TO DECREASE BECAUSE THEY ARE NORMAL.
- THE GRAPHICAL SHIFT ILLUSTRATES THE COMBINED SUBSTITUTION AND INCOME EFFECTS.
- THE ANALYSIS EMPHASIZES THE IMPORTANCE OF UNDERSTANDING CONSUMER PREFERENCES AND INCOME EFFECTS IN ECONOMIC DECISION-MAKING.

UNDERSTANDING THESE GRAPHICAL CONCEPTS EQUIPS ECONOMISTS, STUDENTS, AND POLICYMAKERS WITH THE TOOLS TO ANALYZE REAL-WORLD MARKET BEHAVIORS EFFECTIVELY.

## FREQUENTLY ASKED QUESTIONS

### WHAT HAPPENS TO THE DEMAND FOR $X$ WHEN ITS PRICE INCREASES WHILE $Y$ REMAINS A NORMAL GOOD?

THE DEMAND FOR  $X$  DECREASES DUE TO THE LAW OF DEMAND; SINCE  $X$  IS A NORMAL GOOD, THE DECREASE IN DEMAND IS PRIMARILY DRIVEN BY THE PRICE INCREASE, LEADING TO A MOVEMENT ALONG THE DEMAND CURVE.

### HOW DOES THE INCREASE IN THE PRICE OF $X$ AFFECT THE BUDGET CONSTRAINTS WHEN BOTH $X$ AND $Y$ ARE NORMAL GOODS?

THE BUDGET CONSTRAINT PIVOTS INWARD ON THE AXIS OF  $X$ , REFLECTING A REDUCTION IN THE CONSUMER'S PURCHASING POWER FOR  $X$ , WHILE THE ABILITY TO BUY  $Y$  REMAINS UNCHANGED SINCE ITS PRICE IS FIXED.

### ON A GRAPH, HOW IS THE CONSUMER'S OPTIMAL BUNDLE AFFECTED WHEN THE PRICE OF $X$ INCREASES, ASSUMING BOTH $X$ AND $Y$ ARE NORMAL GOODS?

THE OPTIMAL BUNDLE SHIFTS INWARD ALONG THE  $X$ -AXIS, INDICATING A DECREASE IN QUANTITY DEMANDED OF  $X$ ; THE QUANTITY OF  $Y$  MAY REMAIN THE SAME OR ADJUST DEPENDING ON SUBSTITUTION AND INCOME EFFECTS.

### WHAT IS THE SUBSTITUTION EFFECT WHEN THE PRICE OF $X$ INCREASES WITH BOTH GOODS BEING NORMAL?

THE SUBSTITUTION EFFECT CAUSES CONSUMERS TO BUY LESS OF  $X$  AND MORE OF  $Y$ , AS  $X$  BECOMES RELATIVELY MORE EXPENSIVE COMPARED TO  $Y$ , LEADING TO A MOVEMENT ALONG THE INDIFFERENCE CURVE.

### WHAT IS THE INCOME EFFECT IN THIS SCENARIO, AND HOW DOES IT INFLUENCE THE DEMAND FOR $X$ ?

THE INCOME EFFECT RESULTS FROM THE DECREASE IN REAL PURCHASING POWER DUE TO THE PRICE INCREASE OF  $X$ , LEADING TO A REDUCTION IN DEMAND FOR  $X$  SINCE BOTH GOODS ARE NORMAL AND DEMAND INCREASES WITH INCOME.

### HOW ARE THE SUBSTITUTION AND INCOME EFFECTS COMBINED TO DETERMINE THE OVERALL CHANGE IN DEMAND FOR $X$ ?

BOTH EFFECTS LEAD TO A DECREASE IN DEMAND FOR  $X$ : THE SUBSTITUTION EFFECT REDUCES  $X$ 'S QUANTITY DEMANDED, AND THE INCOME EFFECT FURTHER DECREASES DEMAND DUE TO REDUCED REAL INCOME, RESULTING IN AN OVERALL DECREASE.

## GRAPHICALLY, HOW DO YOU ILLUSTRATE THE CHANGE IN DEMAND FOR $X$ AFTER ITS PRICE INCREASES?

DRAW A NEW BUDGET LINE WITH A PIVOT INWARD ON  $X$ 'S AXIS, AND SHOW THE NEW CONSUMER EQUILIBRIUM AT A LOWER QUANTITY OF  $X$  ON THE INDIFFERENCE CURVE, INDICATING DECREASED DEMAND.

## DOES THE FACT THAT BOTH GOODS ARE NORMAL AFFECT THE MAGNITUDE OF THE DEMAND CHANGE WHEN THE PRICE OF $X$ INCREASES?

YES, SINCE BOTH ARE NORMAL GOODS, THE INCOME EFFECT AMPLIFIES THE REDUCTION IN DEMAND FOR  $X$ , AS CONSUMERS TEND TO BUY LESS OF BOTH GOODS WHEN THEIR REAL INCOME DECREASES.

## IS IT POSSIBLE FOR THE DEMAND FOR $Y$ TO CHANGE WHEN THE PRICE OF $X$ INCREASES, EVEN IF $Y$ 'S PRICE REMAINS FIXED?

YES, DUE TO SUBSTITUTION AND INCOME EFFECTS, THE DEMAND FOR  $Y$  CAN INCREASE OR DECREASE; TYPICALLY, DEMAND FOR  $Y$  MAY INCREASE IF CONSUMERS SUBSTITUTE  $Y$  FOR THE NOW MORE EXPENSIVE  $X$ , DEPENDING ON THE STRENGTH OF THE SUBSTITUTION EFFECT.

## HOW DOES THE ASSUMPTION THAT BOTH GOODS ARE NORMAL INFLUENCE CONSUMER BEHAVIOR IN RESPONSE TO THE PRICE CHANGE?

SINCE BOTH GOODS ARE NORMAL, A DECREASE IN REAL INCOME AFTER THE PRICE INCREASE LEADS CONSUMERS TO BUY LESS OF BOTH GOODS, REINFORCING THE DOWNWARD SHIFT IN DEMAND FOR  $X$  AND POTENTIALLY FOR  $Y$  AS WELL.

## ADDITIONAL RESOURCES

### ANALYZING THE IMPACT OF A PRICE INCREASE IN NORMAL GOODS $X$ AND $Y$ ON CONSUMER BEHAVIOR: A GRAPHICAL AND THEORETICAL PERSPECTIVE

IN THE REALM OF CONSUMER THEORY, UNDERSTANDING HOW CHANGES IN PRICES INFLUENCE DEMAND IS FUNDAMENTAL. WHEN BOTH GOODS  $X$  AND  $Y$  ARE CLASSIFIED AS NORMAL GOODS, AN INCREASE IN THE PRICE OF ONE—SAY, GOOD  $X$ —WHILE KEEPING THE PRICE OF GOOD  $Y$  CONSTANT, CAN LEAD TO INTRICATE ADJUSTMENTS IN CONSUMER PREFERENCES AND DEMAND PATTERNS. THIS SCENARIO OFFERS A RICH CANVAS FOR GRAPHICAL ANALYSIS, REVEALING HOW CONSUMERS REALLOCATE THEIR BUDGETS, ADJUST CONSUMPTION BUNDLES, AND RESPOND TO PRICE SIGNALS. THIS ARTICLE DELVES DEEPLY INTO THIS SUBJECT, EXPLORING THE THEORETICAL FOUNDATIONS, GRAPHICAL REPRESENTATIONS, AND ECONOMIC IMPLICATIONS OF SUCH A SITUATION.

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## FUNDAMENTAL CONCEPTS: NORMAL GOODS AND PRICE CHANGES

### UNDERSTANDING NORMAL GOODS

NORMAL GOODS ARE DEFINED AS THOSE FOR WHICH DEMAND INCREASES AS CONSUMER INCOME RISES. CONVERSELY, WHEN INCOME FALLS, DEMAND FOR THESE GOODS DIMINISHES. THIS RELATIONSHIP IS GROUNDED IN THE IDEA THAT CONSUMERS TEND TO BUY MORE OF THESE GOODS AS THEIR PURCHASING POWER GROWS, REFLECTING THEIR STATUS AS PREFERRED OR ESSENTIAL ITEMS WITHIN THEIR CONSUMPTION BASKET.

EXAMPLES OF NORMAL GOODS INCLUDE BRANDED CLOTHING, DINING AT RESTAURANTS, OR ELECTRONICS—GOODS THAT CONSUMERS TEND TO BUY MORE OF WHEN THEY FEEL WEALTHIER.

# PRICE CHANGES AND CONSUMER CHOICE

WHEN THE PRICE OF A GOOD FLUCTUATES, IT INFLUENCES DEMAND THROUGH TWO PRIMARY MECHANISMS:

1. SUBSTITUTION EFFECT: CONSUMERS TEND TO SUBSTITUTE CHEAPER GOODS FOR RELATIVELY MORE EXPENSIVE ONES, MOVING ALONG THE INDIFFERENCE CURVE.
2. INCOME EFFECT: A CHANGE IN THE PRICE ALTERS THE CONSUMER'S REAL PURCHASING POWER, SHIFTING THEIR BUDGET CONSTRAINT AND AFFECTING THEIR OVERALL CONSUMPTION.

UNDERSTANDING THE INTERACTION OF THESE EFFECTS IS CRITICAL WHEN ANALYZING THE IMPACT OF A PRICE INCREASE, ESPECIALLY FOR NORMAL GOODS.

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## GRAPHICAL REPRESENTATION OF CONSUMER CHOICE

### THE BUDGET CONSTRAINT AND INDIFFERENCE CURVES

IN CONSUMER CHOICE THEORY, THE BUDGET CONSTRAINT AND INDIFFERENCE CURVES FORM THE CORE GRAPHICAL TOOLS:

- BUDGET CONSTRAINT: REPRESENTS ALL COMBINATIONS OF GOODS  $X$  AND  $Y$  THAT THE CONSUMER CAN AFFORD GIVEN THEIR INCOME AND THE PRICES OF THESE GOODS.

MATHEMATICALLY:  $(P_X \times X + P_Y \times Y = I)$

WHERE:

- $(P_X)$  AND  $(P_Y)$  ARE THE PRICES OF GOODS  $X$  AND  $Y$ .
- $(I)$  IS THE CONSUMER'S INCOME.

- INDIFFERENCE CURVES: SHOW COMBINATIONS OF  $X$  AND  $Y$  THAT PROVIDE THE CONSUMER WITH EQUAL SATISFACTION OR UTILITY.

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### INITIAL EQUILIBRIUM

BEFORE THE PRICE CHANGE, THE CONSUMER CHOOSES A BUNDLE WHERE THE HIGHEST INDIFFERENCE CURVE IS TANGENT TO THE BUDGET LINE, INDICATING OPTIMAL CONSUMPTION. THIS POINT (SAY,  $(E_0)$ ) REFLECTS THE CONSUMER'S INITIAL CHOICE BASED ON INITIAL PRICES  $(P_X^0)$  AND  $(P_Y)$ , AND INCOME  $(I)$ .

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## EFFECT OF PRICE INCREASE IN $X$ ON CONSUMER EQUILIBRIUM

### SHIFT IN BUDGET CONSTRAINT

WHEN THE PRICE OF GOOD  $X$  INCREASES FROM  $(P_X^0)$  TO  $(P_X^1)$ , HOLDING  $(P_Y)$  AND  $(I)$  CONSTANT:

- THE BUDGET LINE PIVOTS INWARD ON THE  $X$ -AXIS (SINCE GOODS BECOME RELATIVELY MORE EXPENSIVE).
- THE MAXIMUM AFFORDABLE QUANTITY OF  $X$  DECREASES BECAUSE  $(X)$  NOW COSTS MORE.
- THE SLOPE OF THE BUDGET LINE CHANGES FROM  $(-P_X^0 / P_Y)$  TO  $(-P_X^1 / P_Y)$ , INDICATING A STEEPER SLOPE.

GRAPHICALLY, THIS RESULTS IN A NEW BUDGET LINE THAT IS STEEPER, REFLECTING THE HIGHER PRICE OF  $X$ , AND SHIFTED INWARD.

## DEMAND RESPONSE FOR NORMAL GOODS

SINCE BOTH  $X$  AND  $Y$  ARE NORMAL GOODS, THE DEMAND RESPONSES HINGE UPON THE SUBSTITUTION AND INCOME EFFECTS:

- SUBSTITUTION EFFECT: AS  $(P_X)$  RISES,  $X$  BECOMES RELATIVELY MORE EXPENSIVE COMPARED TO  $Y$ , LEADING CONSUMERS TO SUBSTITUTE  $Y$  FOR  $X$ , DECREASING THEIR CONSUMPTION OF  $X$ .
- INCOME EFFECT: BECAUSE THE PRICE INCREASE EFFECTIVELY REDUCES THE CONSUMER'S REAL INCOME, AND BOTH GOODS ARE NORMAL, DEMAND FOR BOTH  $X$  AND  $Y$  TENDS TO DECREASE.

GRAPHICALLY, THE CONSUMER MOVES FROM THE INITIAL EQUILIBRIUM  $(E_0)$  TO A NEW EQUILIBRIUM  $(E_1)$ , WHERE THE INDIFFERENCE CURVE JUST TOUCHES THE NEW BUDGET CONSTRAINT.

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## GRAPHICAL ILLUSTRATION: DEMAND AND INCOME EFFECTS

TO VISUALIZE THE TOTAL EFFECT:

- DRAW THE INITIAL BUDGET LINE  $(BL_0)$  TANGENT TO THE INITIAL INDIFFERENCE CURVE  $(IC_0)$  AT  $(E_0)$ .
- DRAW THE NEW BUDGET LINE  $(BL_1)$  STEEPER AND INWARD, REFLECTING THE HIGHER  $(P_X)$ .
- FIND THE NEW TANGENCY POINT  $(E_1)$  WITH A LOWER INDIFFERENCE CURVE  $(IC_1)$ , INDICATING REDUCED CONSUMPTION OF BOTH  $X$  AND  $Y$ .

KEY OBSERVATIONS:

- THE MOVEMENT FROM  $(E_0)$  TO  $(E_1)$  SHOWCASES THE DECREASE IN QUANTITY DEMANDED FOR BOTH GOODS.
- THE SIZE OF THE SHIFT DEPENDS ON THE MAGNITUDE OF THE PRICE INCREASE AND THE CONSUMER'S PREFERENCES.

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## ANALYZING THE DEMAND CHANGES: SUBSTITUTION AND INCOME EFFECTS IN DETAIL

### DECOMPOSITION OF THE TOTAL EFFECT

THE TOTAL CHANGE IN DEMAND DUE TO THE PRICE INCREASE CAN BE DECOMPOSED INTO:

1. SUBSTITUTION EFFECT: MOVEMENT ALONG THE INITIAL INDIFFERENCE CURVE  $(IC_0)$ , HOLDING UTILITY CONSTANT.
2. INCOME EFFECT: SHIFT FROM THE SUBSTITUTED BUNDLE TO THE NEW EQUILIBRIUM, REFLECTING ACTUAL CHANGE IN PURCHASING POWER.

IN THE CASE WHERE BOTH GOODS ARE NORMAL, THE INCOME EFFECT REINFORCES THE SUBSTITUTION EFFECT, LEADING TO A DECREASE IN DEMAND FOR BOTH GOODS.

## MARSHALLIAN VS. HICKSIAN DEMAND

- MARSHALLIAN (ORDINARY) DEMAND: REFLECTS THE CONSUMER'S ACTUAL RESPONSE, CONSIDERING BOTH SUBSTITUTION AND INCOME EFFECTS.
- HICKSIAN (COMPENSATED) DEMAND: HYPOTHETICALLY ISOLATES SUBSTITUTION EFFECTS BY HOLDING UTILITY CONSTANT

THROUGH COMPENSATION.

IN GRAPHICAL ANALYSIS, THE MOVEMENT FROM THE INITIAL TO THE NEW EQUILIBRIUM CAPTURES THE FULL MARSHALLIAN DEMAND RESPONSE, WHILE THE SUBSTITUTION EFFECT CAN BE VISUALIZED ALONG THE SAME INDIFFERENCE CURVE WITH A HYPOTHETICAL COMPENSATION.

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## IMPLICATIONS FOR CONSUMER WELFARE AND MARKET DYNAMICS

### CONSUMER WELFARE AND DEMAND REDUCTION

THE DECREASE IN DEMAND FOR BOTH X AND Y SIGNIFIES A REDUCTION IN CONSUMER WELFARE, ESPECIALLY IF THESE GOODS FORM A SIGNIFICANT PART OF THE CONSUMER'S CONSUMPTION BASKET. THE LOSS IN UTILITY CAN BE DEPICTED AS A MOVEMENT TO A LOWER INDIFFERENCE CURVE.

### MARKET PRICING AND SUPPLY RESPONSE

FROM A MARKET PERSPECTIVE, THE DEMAND REDUCTION CAN LEAD TO:

- LOWER MARKET SALES VOLUME.
- POTENTIAL ADJUSTMENTS IN SUPPLY, DEPENDING ON PRODUCERS' EXPECTATIONS.
- PRICE STABILIZATION OR FURTHER DECLINES IF DEMAND DROPS SIGNIFICANTLY.

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## BROADER ECONOMIC CONSIDERATIONS AND POLICY IMPLICATIONS

### TAXATION AND PRICE REGULATION

UNDERSTANDING THESE DEMAND RESPONSES HELPS POLICYMAKERS ANTICIPATE THE EFFECTS OF TAXES, TARIFFS, OR PRICE CONTROLS ON NORMAL GOODS. FOR INSTANCE, INCREASING TAXES ON GOODS DEEMED NECESSARY CAN SUPPRESS DEMAND, IMPACTING PRODUCERS AND CONSUMERS ALIKE.

### CONSUMER BUDGET AND WELFARE ANALYSIS

GRAPHICAL MODELS DEMONSTRATE HOW PRICE INCREASES DIMINISH CONSUMER WELFARE, PROMPTING CONSIDERATIONS ABOUT SUBSIDIES OR INCOME TRANSFERS TO OFFSET ADVERSE EFFECTS, ESPECIALLY FOR ESSENTIAL NORMAL GOODS.

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## CONCLUSION: THE INTERPLAY OF PRICES, DEMAND, AND CONSUMER CHOICE

THE GRAPHICAL ANALYSIS OF A PRICE INCREASE IN NORMAL GOODS X AND Y REVEALS A CONSISTENT PATTERN: DEMAND FOR BOTH GOODS DECREASES, DRIVEN BY SUBSTITUTION AND INCOME EFFECTS. BOTH THE THEORETICAL FRAMEWORK AND VISUAL MODELS UNDERSCORE THAT CONSUMERS RESPOND RATIONALLY TO PRICE SIGNALS, REALLOCATING THEIR BUDGETS TO MAXIMIZE UTILITY UNDER NEW CONSTRAINTS. THIS UNDERSTANDING IS VITAL FOR BUSINESSES, POLICYMAKERS, AND ECONOMISTS SEEKING TO PREDICT MARKET REACTIONS AND CRAFT INFORMED STRATEGIES IN DYNAMIC ECONOMIC ENVIRONMENTS.

THE SCENARIO UNDERSCORES THE IMPORTANCE OF CONSIDERING BOTH SUBSTITUTION AND INCOME EFFECTS WHEN ANALYZING DEMAND CHANGES. IT ALSO HIGHLIGHTS THE SIGNIFICANCE OF GRAPHICAL TOOLS IN ILLUSTRATING COMPLEX CONSUMER BEHAVIOR, OFFERING CLARITY AND INTUITION BEHIND THE QUANTITATIVE SHIFTS OBSERVED IN REAL-WORLD MARKETS.

## **If X And Y Are Both Normal Goods And Price Of X Has Increased Keeping The Price Of Y Fixed Graphically**

If X And Y Are Both Normal Goods And Price Of X Has Increased Keeping The Price Of Y Fixed Graphically

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