

# 1. WHEN PRICES ARE $(p_1, p_2) = (1, 2)$ A CONSUMER DEMANDS $(x_1, x_2) = (1, 2)$ , AND WHEN PRICES ARE $(q_1, q_2)$

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UNDERSTANDING CONSUMER DEMAND IN RESPONSE TO CHANGING PRICES IS A FUNDAMENTAL ASPECT OF MICROECONOMICS. WHEN ANALYZING HOW CONSUMERS ALLOCATE THEIR INCOME AMONG DIFFERENT GOODS, ECONOMISTS OFTEN EXAMINE HOW CHANGES IN PRICE INFLUENCE THE QUANTITY DEMANDED. THIS ARTICLE EXPLORES THE SCENARIO WHERE A CONSUMER'S DEMAND IS KNOWN AT SPECIFIC PRICES, AND HOW DEMAND ADJUSTS WHEN PRICES CHANGE TO NEW LEVELS. WE WILL SYSTEMATICALLY ANALYZE THE DEMAND BEHAVIOR AT THE INITIAL PRICES  $(p_1, p_2) = (1, 2)$ , THE CONSUMER'S DEMAND  $(x_1, x_2) = (1, 2)$ , AND THEN EXTEND THE DISCUSSION TO THE CASE WHEN PRICES SHIFT TO  $(q_1, q_2)$ .

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## UNDERSTANDING CONSUMER DEMAND AND PRICE CHANGES

BEFORE DIVING INTO SPECIFIC SCENARIOS, IT IS IMPORTANT TO UNDERSTAND THE CORE CONCEPTS THAT UNDERPIN CONSUMER DEMAND:

### BUDGET CONSTRAINTS

A CONSUMER'S BUDGET CONSTRAINT REPRESENTS ALL THE COMBINATIONS OF GOODS THEY CAN PURCHASE GIVEN THEIR INCOME AND THE PRICES OF GOODS. MATHEMATICALLY, FOR INCOME  $(I)$ , PRICES  $(p_1, p_2)$ , AND QUANTITIES  $(x_1, x_2)$ :

- $(p_1 x_1 + p_2 x_2 = I)$

### DEMAND FUNCTIONS

DEMAND FUNCTIONS DESCRIBE THE RELATIONSHIP BETWEEN THE PRICE OF GOODS AND THE QUANTITIES DEMANDED. THEY ARE DERIVED FROM CONSUMERS MAXIMIZING UTILITY SUBJECT TO THEIR BUDGET CONSTRAINT.

### SUBSTITUTION AND INCOME EFFECTS

WHEN PRICES CHANGE, TWO EFFECTS INFLUENCE DEMAND:

- THE SUBSTITUTION EFFECT: HOW THE CONSUMER SUBSTITUTES ONE GOOD FOR ANOTHER DUE TO RELATIVE PRICE CHANGES.
- THE INCOME EFFECT: HOW THE CHANGE IN THE CONSUMER'S PURCHASING POWER AFFECTS DEMAND.

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## INITIAL SCENARIO: PRICES AND DEMANDS

SUPPOSE THE INITIAL PRICES ARE:

- $(p_1 = 1)$
- $(p_2 = 2)$

AND AT THESE PRICES, THE CONSUMER DEMANDS:

- $(x_1 = 1)$
- $(x_2 = 2)$

ASSUMING THE CONSUMER HAS AN INCOME  $(I)$ , THEIR BUDGET CONSTRAINT IS:

$$-(1 \times x_1 + 2 \times x_2 = I)$$

GIVEN THE DEMAND QUANTITIES, THE INCOME CAN BE CALCULATED AS:

$$-(I = 1 \times 1 + 2 \times 2 = 1 + 4 = 5)$$

THIS MEANS THE CONSUMER'S INCOME IS 5 UNITS OF CURRENCY, AND THEY ALLOCATE IT AS PER THEIR PREFERENCES AT THE GIVEN PRICES.

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## ANALYZING DEMAND AT INITIAL PRICES

AT THESE PRICES, THE CONSUMER CHOOSES  $(x_1, x_2) = (1, 2)$ , WHICH SUGGESTS PREFERENCES OR UTILITY MAXIMIZATION STRATEGIES. THE DEMAND PATTERN INDICATES THAT THE CONSUMER VALUES GOOD 2 MORE HEAVILY, GIVEN THEIR DEMAND FOR 2 UNITS AT A HIGHER PRICE POINT.

KEY OBSERVATIONS:

- THE CONSUMER IS WILLING TO BUY TWICE AS MUCH OF GOOD 2 COMPARED TO GOOD 1, POSSIBLY INDICATING A PREFERENCE OR HIGHER UTILITY DERIVED FROM GOOD 2.
- THE TOTAL EXPENDITURE AT THESE DEMANDS IS:
- $(p_1 \times x_1 + p_2 \times x_2 = 1 \times 1 + 2 \times 2 = 5)$ , MATCHING THE INCOME.

THIS CONSISTENCY SUGGESTS THE CONSUMER IS OPTIMIZING THEIR UTILITY GIVEN THEIR INCOME AND THE PRICES.

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## TRANSITION TO NEW PRICES: $(Q_1, Q_2)$

NOW, CONSIDER THAT THE PRICES CHANGE TO NEW LEVELS:

- $(Q_1)$  FOR GOOD 1
- $(Q_2)$  FOR GOOD 2

THE QUESTION ARISES: HOW DOES THE CONSUMER'S DEMAND CHANGE WHEN PRICES SHIFT FROM  $(p_1, p_2) = (1, 2)$  TO  $(Q_1, Q_2)$ ?

THE ANALYSIS DEPENDS ON THE SPECIFIC VALUES OF  $(Q_1)$  AND  $(Q_2)$ , BUT THE GENERAL FRAMEWORK INVOLVES UNDERSTANDING THE SUBSTITUTION AND INCOME EFFECTS RELATIVE TO THE INITIAL DEMAND.

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## POSSIBLE PRICE SCENARIOS AND DEMAND RESPONSES

LET'S EXPLORE TYPICAL CASES:

- **CASE 1: BOTH PRICES DECREASE** — E.G.,  $(Q_1 < 1)$ ,  $(Q_2 < 2)$
- **CASE 2: BOTH PRICES INCREASE** — E.G.,  $(Q_1 > 1)$ ,  $(Q_2 > 2)$
- **CASE 3: ONE GOOD'S PRICE DECREASES, THE OTHER'S INCREASES** — E.G.,  $(Q_1 < 1)$ ,  $(Q_2 > 2)$

EACH CASE RESULTS IN DIFFERENT DEMAND ADJUSTMENTS, INFLUENCED BY THE SUBSTITUTION AND INCOME EFFECTS.

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## CASE STUDY 1: PRICE DECREASE FOR BOTH GOODS

SUPPOSE:

- $(Q_1 = 0.5)$
- $(Q_2 = 1.5)$

THE PRICES ARE NOW:

- Good 1: 0.5
- Good 2: 1.5

ASSUMING THE CONSUMER'S INCOME REMAINS UNCHANGED AT 5 UNITS, THE NEW BUDGET CONSTRAINT IS:

- $(0.5 x_1 + 1.5 x_2 = 5)$

EXPECTED DEMAND RESPONSE:

- SINCE PRICES HAVE DECREASED, THE CONSUMER CAN AFFORD MORE OF BOTH GOODS.
- THE DEMAND FOR BOTH GOODS SHOULD INCREASE, SUBJECT TO THEIR PREFERENCES.

ESTIMATING NEW DEMANDS:

- IF THE CONSUMER'S UTILITY MAXIMIZATION REMAINS CONSISTENT, THEY MIGHT ALLOCATE THEIR INCOME PROPORTIONALLY OR ACCORDING TO THEIR PREFERENCES.
- FOR EXAMPLE, IF THE CONSUMER STILL VALUES GOOD 2 MORE, DEMAND MIGHT SHIFT TO HIGHER  $(x_2)$ , BUT THE EXACT QUANTITIES DEPEND ON THE UTILITY FUNCTION.

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## CASE STUDY 2: PRICE INCREASE FOR BOTH GOODS

SUPPOSE:

- $(Q_1 = 2)$
- $(Q_2 = 4)$

NOW, THE BUDGET CONSTRAINT BECOMES:

- $(2 x_1 + 4 x_2 = 5)$

BECAUSE THE PRICES ARE HIGHER, THE CONSUMER'S REAL PURCHASING POWER DECREASES, LEADING TO A LIKELY REDUCTION IN QUANTITIES DEMANDED, ESPECIALLY IF THE CONSUMER IS PRICE-SENSITIVE.

DEMAND ADJUSTMENTS:

- THE CONSUMER MIGHT PURCHASE LESS OF BOTH GOODS.
- THE DEMAND FOR GOOD 1 AND GOOD 2 WOULD DECREASE RELATIVE TO INITIAL LEVELS, DEPENDING ON THEIR SUBSTITUTION POSSIBILITIES.

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## CASE STUDY 3: MIXED PRICE CHANGES

SUPPOSE:

- $(Q_1 = 0.8)$

-  $(Q_2 = 2.5)$

IN THIS SCENARIO:

- GOOD 1 BECOMES CHEAPER, INCENTIVIZING MORE CONSUMPTION.
- GOOD 2 BECOMES MORE EXPENSIVE, POTENTIALLY REDUCING DEMAND FOR IT.

THE DEMAND RESPONSE WOULD DEPEND HEAVILY ON THE CONSUMER'S PREFERENCES:

- IF THE CONSUMER PREFERS GOOD 2 STRONGLY, THEY MIGHT STILL BUY A SUBSTANTIAL AMOUNT DESPITE HIGHER PRICES.
- IF THEY ARE MORE PRICE-SENSITIVE, THE DEMAND FOR GOOD 2 MIGHT DECREASE SIGNIFICANTLY.

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## IMPLICATIONS OF PRICE CHANGES ON DEMAND

THE ANALYSIS ABOVE DEMONSTRATES THAT DEMAND IS SENSITIVE TO PRICE FLUCTUATIONS, AND THE MAGNITUDE AND DIRECTION DEPEND ON VARIOUS FACTORS:

### ELASTICITY OF DEMAND

- PRICE ELASTIC DEMAND INDICATES THAT A SMALL PRICE CHANGE CAUSES A SIGNIFICANT CHANGE IN QUANTITY DEMANDED.
- INELASTIC DEMAND SUGGESTS THAT CONSUMERS ARE LESS RESPONSIVE TO PRICE CHANGES.

### SUBSTITUTION EFFECT

- WHEN THE PRICE OF A GOOD RISES, CONSUMERS TEND TO SUBSTITUTE AWAY FROM IT TOWARD RELATIVELY CHEAPER ALTERNATIVES.
- CONVERSELY, A PRICE DECREASE MAKES A GOOD MORE ATTRACTIVE.

### INCOME EFFECT

- A PRICE DROP EFFECTIVELY INCREASES THE CONSUMER'S REAL INCOME, POTENTIALLY INCREASING DEMAND.
- A PRICE INCREASE REDUCES REAL INCOME, POSSIBLY DECREASING DEMAND.

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## CONCLUSION: STRATEGIC INSIGHTS FOR BUSINESSES AND POLICYMAKERS

UNDERSTANDING HOW CONSUMERS RESPOND TO PRICE CHANGES IS CRUCIAL FOR BUSINESSES SETTING PRICES AND POLICYMAKERS DESIGNING TAXATION OR SUBSIDY SCHEMES. THE INITIAL SCENARIO WHERE PRICES ARE  $(1, 2)$  AND DEMANDS ARE  $(1, 2)$  PROVIDES A BASELINE FOR ANALYZING THE IMPACT OF SUBSEQUENT PRICE CHANGES  $(Q_1, Q_2)$ .

KEY TAKEAWAYS:

- PRICE REDUCTIONS GENERALLY INCREASE DEMAND, BUT THE EXTENT DEPENDS ON DEMAND ELASTICITY.
- PRICE INCREASES TEND TO DECREASE DEMAND, ESPECIALLY IF DEMAND IS ELASTIC.
- THE CONSUMER'S INCOME LEVEL AND PREFERENCES SIGNIFICANTLY INFLUENCE DEMAND RESPONSES.
- ANALYZING SUBSTITUTION AND INCOME EFFECTS HELPS PREDICT HOW DEMAND SHIFTS WITH PRICE CHANGES.

BY UNDERSTANDING THESE DYNAMICS, STAKEHOLDERS CAN BETTER ANTICIPATE MARKET BEHAVIOR, OPTIMIZE PRICING STRATEGIES, AND FORMULATE POLICIES THAT CONSIDER CONSUMER RESPONSES.

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IN SUMMARY, ANALYZING DEMAND WHEN PRICES CHANGE FROM INITIAL LEVELS TO NEW ONES INVOLVES CONSIDERING THE INITIAL DEMAND, THE NATURE OF PREFERENCES, AND THE ELASTICITY OF DEMAND. WHETHER PRICES RISE OR FALL, THE FUNDAMENTAL ECONOMIC PRINCIPLES OF SUBSTITUTION AND INCOME EFFECTS GUIDE THE EXPECTED ADJUSTMENTS IN CONSUMER BEHAVIOR. THIS COMPREHENSIVE UNDERSTANDING IS INVALUABLE FOR MAKING INFORMED DECISIONS IN BOTH BUSINESS STRATEGY AND ECONOMIC POLICY.

## FREQUENTLY ASKED QUESTIONS

### WHAT HAPPENS TO CONSUMER DEMAND WHEN PRICES ARE $(p_1, p_2) = (1, 2)$ AND THE CONSUMER DEMANDS $(x_1, x_2) = (1, 2)$ ?

THE CONSUMER'S DEMAND MATCHES THEIR CONSUMPTION BUNDLE OF 1 UNIT OF GOOD 1 AND 2 UNITS OF GOOD 2, GIVEN THE PRICES  $(1, 2)$ . THIS SUGGESTS THEIR PREFERENCES AND BUDGET CONSTRAINTS ARE SATISFIED AT THESE PRICES.

### HOW DOES A CHANGE IN PRICES FROM $(p_1, p_2) = (1, 2)$ TO $(q_1, q_2)$ AFFECT CONSUMER DEMAND?

A CHANGE IN PRICES ALTERS THE CONSUMER'S BUDGET CONSTRAINT, LEADING TO A DIFFERENT OPTIMAL CONSUMPTION BUNDLE. THE DEMAND WILL ADJUST BASED ON THE NEW PRICES, POTENTIALLY CHANGING THE QUANTITIES DEMANDED OF EACH GOOD.

### IF THE PRICES CHANGE TO $(q_1, q_2)$ , WHAT FACTORS DETERMINE THE NEW DEMAND LEVELS?

THE NEW DEMAND LEVELS DEPEND ON THE CONSUMER'S PREFERENCES, THE RELATIVE PRICES  $(q_1, q_2)$ , AND THEIR BUDGET CONSTRAINT. THEIR UTILITY MAXIMIZATION WILL GUIDE THE NEW OPTIMAL CONSUMPTION BUNDLE.

### ARE THE DEMAND FUNCTIONS FOR GOODS 1 AND 2 TYPICALLY LINEAR IN THIS CONTEXT?

DEMAND FUNCTIONS CAN BE LINEAR OR NONLINEAR DEPENDING ON THE UTILITY FUNCTION AND THE NATURE OF PREFERENCES. IN SIMPLE CASES WITH LINEAR PREFERENCES, DEMAND MAY BE LINEAR, BUT MORE COMPLEX PREFERENCES CAN LEAD TO NONLINEAR DEMAND FUNCTIONS.

### WHAT ROLE DOES THE INITIAL DEMAND $(x_1, x_2) = (1, 2)$ PLAY IN PREDICTING FUTURE DEMAND WHEN PRICES CHANGE?

THE INITIAL DEMAND PROVIDES A BASELINE FOR UNDERSTANDING CONSUMER PREFERENCES AND HOW SENSITIVE THEIR CHOICES ARE TO PRICE CHANGES. IT HELPS IN ANALYZING DEMAND ELASTICITY AND PREDICTING RESPONSES TO PRICE FLUCTUATIONS.

### HOW CAN CONSUMER THEORY BE USED TO ANALYZE THE IMPACT OF CHANGING PRICES FROM $(p_1, p_2)$ TO $(q_1, q_2)$ ?

CONSUMER THEORY USES UTILITY MAXIMIZATION AND BUDGET CONSTRAINTS TO DETERMINE HOW DEMAND SHIFTS WITH PRICE CHANGES. BY EXAMINING THE SUBSTITUTION AND INCOME EFFECTS, WE CAN PREDICT HOW QUANTITIES DEMANDED WILL RESPOND TO NEW PRICES.

### WHAT ASSUMPTIONS ARE NECESSARY FOR DEMAND TO REMAIN STABLE WHEN PRICES CHANGE FROM $(p_1, p_2)$ TO $(q_1, q_2)$ ?

ASSUMPTIONS INCLUDE STABLE PREFERENCES, NO INCOME EFFECTS THAT OUTWEIGH SUBSTITUTION EFFECTS, AND THE ABSENCE OF EXTERNAL SHOCKS. UNDER THESE CONDITIONS, DEMAND MAY SHIFT PREDICTABLY IN RESPONSE TO PRICE CHANGES.

# ADDITIONAL RESOURCES

## 1. WHEN PRICES ARE $(P_1, P_2) = (1, 2)$ A CONSUMER DEMANDS $(x_1, x_2) = (1, 2)$ , AND WHEN PRICES ARE $(Q_1, Q_2)$

UNDERSTANDING CONSUMER DEMAND IN RESPONSE TO CHANGING PRICES IS A FUNDAMENTAL ASPECT OF MICROECONOMICS. WHEN PRICES SHIFT, SO DO CONSUMER CHOICES, REVEALING INSIGHTS INTO PREFERENCES, SUBSTITUTION EFFECTS, AND INCOME EFFECTS. THIS ARTICLE EXPLORES A SPECIFIC SCENARIO: INITIALLY, PRICES ARE SET AT  $(P_1, P_2) = (1, 2)$  WITH CONSUMER DEMAND AT  $(x_1, x_2) = (1, 2)$ . THEN, WE ANALYZE WHAT HAPPENS WHEN PRICES CHANGE TO  $(Q_1, Q_2)$ . THROUGH THIS LENS, WE WILL EXAMINE HOW DEMAND ADJUSTS, WHAT FACTORS INFLUENCE THESE CHANGES, AND THE BROADER IMPLICATIONS FOR CONSUMERS AND BUSINESSES ALIKE.

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### UNDERSTANDING THE INITIAL SCENARIO: PRICES AND DEMANDS

#### THE INITIAL PRICE AND DEMAND SETTING

AT THE OUTSET, CONSUMERS FACE PRICES OF:

- Good 1:  $P_1 = 1$
- Good 2:  $P_2 = 2$

CORRESPONDINGLY, THE CONSUMER'S DEMAND IS:

- Good 1:  $x_1 = 1$
- Good 2:  $x_2 = 2$

THIS INITIAL EQUILIBRIUM PROVIDES A BASELINE FOR ANALYZING HOW DEMAND RESPONDS TO SUBSEQUENT PRICE CHANGES. IT REFLECTS THE CONSUMER'S PREFERENCES, BUDGET CONSTRAINT, AND THE RELATIVE ATTRACTIVENESS OF EACH GOOD AT THESE PRICES.

#### BUDGET CONSTRAINT AND UTILITY MAXIMIZATION

THE CONSUMER'S BUDGET CONSTRAINT AT THE INITIAL PRICES IS:

$$[P_1 x_1 + P_2 x_2 = M]$$

ASSUMING THE CONSUMER HAS A FIXED INCOME  $(M)$ , THE CONSTRAINT BECOMES:

$$[1 \times x_1 + 2 \times x_2 = M]$$

GIVEN DEMAND LEVELS OF  $(1, 2)$ , THE TOTAL EXPENDITURE IS:

$$[(1)(1) + (2)(2) = 1 + 4 = 5]$$

THIS INDICATES THAT THE CONSUMER'S INCOME  $(M)$  AT THIS INITIAL STAGE IS AT LEAST 5, ALLOWING THEM TO PURCHASE THESE QUANTITIES.

THE DEMAND BUNDLE  $(1, 2)$  SUGGESTS THAT THE CONSUMER VALUES GOOD 2 RELATIVELY MORE, OR THAT THEIR UTILITY FUNCTION YIELDS THIS DEMAND WHEN PRICES ARE AS SPECIFIED.

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### THE TRANSITION: CHANGING PRICES TO $(Q_1, Q_2)$

#### THE NEW PRICE SCENARIO

SUPPOSE THE PRICES CHANGE TO:

- Good 1:  $Q_1$
- Good 2:  $Q_2$

THE KEY QUESTION IS: HOW DOES THE CONSUMER'S DEMAND ADJUST IN RESPONSE TO THESE NEW PRICES?

THE ANALYSIS DEPENDS HEAVILY ON THE SPECIFIC VALUES OF  $(Q_1, Q_2)$ . FOR ILLUSTRATION, WE CONSIDER A FEW POSSIBLE CASES:

- CASE A: PRICE OF GOOD 1 DECREASES, E.G.,  $Q_1 < 1$
- CASE B: PRICE OF GOOD 2 DECREASES OR INCREASES, E.G.,  $Q_2$  VARIES AROUND 2
- CASE C: BOTH PRICES CHANGE SIMULTANEOUSLY

EACH SCENARIO AFFECTS THE CONSUMER'S CHOICES DIFFERENTLY, DRIVEN BY SUBSTITUTION EFFECTS (REPLACING MORE EXPENSIVE GOODS WITH CHEAPER ALTERNATIVES) AND INCOME EFFECTS (CHANGES IN PURCHASING POWER).

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## DEMAND RESPONSE TO PRICE CHANGES: KEY CONCEPTS

### SUBSTITUTION EFFECT

THE SUBSTITUTION EFFECT PERTAINS TO HOW CONSUMERS REALLOCATE THEIR CONSUMPTION WHEN RELATIVE PRICES SHIFT. IF THE PRICE OF GOOD 1 DROPS, IT BECOMES RELATIVELY CHEAPER COMPARED TO GOOD 2, PROMPTING CONSUMERS TO SUBSTITUTE TOWARD GOOD 1.

FOR EXAMPLE, IF  $(Q_1 < 1)$ , THE CONSUMER MIGHT DEMAND MORE OF GOOD 1 AND LESS OF GOOD 2, HOLDING UTILITY CONSTANT.

### INCOME EFFECT

THE INCOME EFFECT REFLECTS HOW A CHANGE IN PRICES EFFECTIVELY ALTERS THE CONSUMER'S PURCHASING POWER. WHEN A GOOD'S PRICE DROPS, THE CONSUMER CAN BUY MORE OF BOTH GOODS WITH THE SAME INCOME, POTENTIALLY INCREASING OVERALL DEMAND.

IF PRICES INCREASE, THE CONSUMER'S REAL INCOME DIMINISHES, POSSIBLY REDUCING DEMAND.

### THE SLUTSKY EQUATION

TO ANALYZE DEMAND CHANGES COMPREHENSIVELY, ECONOMISTS OFTEN DECOMPOSE TOTAL EFFECTS INTO SUBSTITUTION AND INCOME EFFECTS USING THE SLUTSKY EQUATION. THIS HELPS UNDERSTAND WHETHER DEMAND RESPONDS MAINLY DUE TO RELATIVE PRICE CHANGES OR CHANGES IN REAL PURCHASING POWER.

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## MODELING DEMAND: ASSUMPTIONS AND UTILITY FUNCTIONS

### CHOOSING A UTILITY FRAMEWORK

THE SPECIFIC FORM OF THE CONSUMER'S UTILITY FUNCTION SIGNIFICANTLY INFLUENCES DEMAND BEHAVIOR. COMMON MODELS INCLUDE:

- COBB-DOUGLAS UTILITY:  $(U(x_1, x_2) = x_1^{\alpha} x_2^{\beta})$ , WHICH TYPICALLY YIELDS PROPORTIONAL DEMAND RESPONSES.
- PERFECT SUBSTITUTES:  $(U(x_1, x_2) = a x_1 + b x_2)$ , WHERE DEMAND DEPENDS SOLELY ON RELATIVE PRICES.
- PERFECT COMPLEMENTS:  $(U(x_1, x_2) = \min\{a x_1, b x_2\})$ , LEADING TO FIXED CONSUMPTION RATIOS.

SUPPOSE, FOR SIMPLICITY, THE CONSUMER MAXIMIZES A COBB-DOUGLAS UTILITY:

$$[U(x_1, x_2) = x_1^{0.5} x_2^{0.5}]$$

UNDER THIS UTILITY, DEMAND FUNCTIONS ARE:

$$\begin{aligned}x_1 &= \frac{0.5}{P_1} M \\x_2 &= \frac{0.5}{P_2} M\end{aligned}$$

GIVEN INITIAL PRICES  $(1, 2)$  AND  $(M = 5)$ , DEMAND IS:

$$\begin{aligned}x_1 &= \frac{0.5}{1} 5 = 2.5 \\x_2 &= \frac{0.5}{2} 5 = 1.25\end{aligned}$$

BUT OUR INITIAL DEMAND WAS  $(1, 2)$ , INDICATING THAT THE CONSUMER'S ACTUAL PREFERENCES OR INCOME DIFFER FROM THIS SIMPLIFIED MODEL, OR THAT THEY HAVE SPECIFIC TARGET CONSUMPTION BUNDLES.

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#### ANALYZING PRICE CHANGES: NUMERICAL EXAMPLES

##### EXAMPLE 1: PRICE OF GOOD 1 DROPS TO 0.5

SUPPOSE  $(Q_1 = 0.5)$ , AND  $(Q_2 = 2)$  REMAINS UNCHANGED.

- INITIAL EXPENDITURE:  $(P_1 x_1 + P_2 x_2 = 1 \times 1 + 2 \times 2 = 5)$ .
- NEW BUDGET CONSTRAINT:  $(0.5 x_1 + 2 x_2 = M)$ .

ASSUMING THE CONSUMER'S INCOME REMAINS AT 5, THE BUDGET ALLOWS:

$$0.5 x_1 + 2 x_2 = 5$$

THE CONSUMER MIGHT NOW SUBSTITUTE TOWARD GOOD 1 DUE TO ITS LOWER PRICE, INCREASING  $(x_1)$  AND POSSIBLY DECREASING  $(x_2)$ .

USING THE COBB-DOUGLAS DEMAND:

$$\begin{aligned}x_1 &= \frac{0.5}{0.5} 5 = 5 \\x_2 &= \frac{0.5}{2} 5 = 1.25\end{aligned}$$

THIS INDICATES A SIGNIFICANT INCREASE IN DEMAND FOR GOOD 1, FROM 1 TO 5 UNITS, ILLUSTRATING THE SUBSTITUTION EFFECT. THE DEMAND FOR GOOD 2 DECREASES FROM 2 TO 1.25, REFLECTING THE CONSUMER'S REALLOCATION.

##### EXAMPLE 2: PRICE OF GOOD 2 DECREASES TO 1

SUPPOSE  $(Q_2 = 1)$ , WITH  $(Q_1 = 1)$ . THE INITIAL DEMAND WAS  $(1, 2)$ , WITH EXPENDITURE 5.

- NEW EXPENDITURE:  $(1 \times 1 + 1 \times 2 = 3)$ , SO WITH INCOME  $(M = 5)$ , THE CONSUMER CAN NOW BUY MORE OF BOTH GOODS.

USING THE COBB-DOUGLAS DEMAND:

$$\begin{aligned}x_1 &= \frac{0.5}{1} 5 = 2.5 \\x_2 &= \frac{0.5}{1} 5 = 2.5\end{aligned}$$

DEMAND FOR GOOD 2 INCREASES FROM 2 TO 2.5 UNITS, SHOWING AN INCOME EFFECT DUE TO THE PRICE DECREASE.

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#### BROADER IMPLICATIONS AND CONSUMER BEHAVIOR INSIGHTS

##### PRICE ELASTICITY OF DEMAND

THE DEGREE TO WHICH DEMAND RESPONDS TO PRICE CHANGES DEPENDS ON THE PRICE ELASTICITY OF DEMAND:

- ELASTIC DEMAND: CONSUMERS ARE HIGHLY RESPONSIVE; SMALL PRICE CHANGES LEAD TO LARGE DEMAND SHIFTS.
- INELASTIC DEMAND: CONSUMERS CHANGE CONSUMPTION LITTLE DESPITE PRICE FLUCTUATIONS.

IN OUR SCENARIOS, DEMAND FOR GOOD 1 APPEARS ELASTIC WHEN ITS PRICE DROPS SIGNIFICANTLY, WHILE DEMAND FOR GOOD 2 MAY BE RELATIVELY INELASTIC IF IT FORMS A SMALLER PORTION OF TOTAL EXPENDITURE.

#### CROSS-PRICE EFFECTS AND SUBSTITUTION

CHANGES IN ONE GOOD'S PRICE INFLUENCE THE DEMAND FOR THE OTHER, KNOWN AS CROSS-PRICE ELASTICITY. FOR EXAMPLE:

- A DROP IN  $(P_1)$  TENDS TO INCREASE  $(X_1)$  WHILE DECREASING  $(X_2)$ .
- CONVERSELY, IF  $(P_2)$  INCREASES, DEMAND FOR  $(X_2)$  DROPS, AND CONSUMERS MIGHT SWITCH TO GOOD 1 IF SUBSTITUTES ARE AVAILABLE.

#### CONSUMER SURPLUS AND WELFARE

PRICE CHANGES IMPACT CONSUMER WELFARE, OFTEN MEASURED THROUGH CONSUMER SURPLUS—THE DIFFERENCE BETWEEN WHAT CONSUMERS ARE WILLING TO PAY AND WHAT THEY ACTUALLY PAY. LOWER PRICES GENERALLY INCREASE CONSUMER SURPLUS, ENHANCING OVERALL WELFARE.

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#### REAL-WORLD APPLICATIONS

##### MARKET PRICING STRATEGIES

BUSINESSES LEVERAGE DEMAND ELASTICITY INSIGHTS TO SET OPTIMAL PRICES. FOR INSTANCE, IF DEMAND FOR A PRODUCT IS HIGHLY ELASTIC, LOWERING PRICES CAN SIGNIFICANTLY BOOST SALES VOLUME, POTENTIALLY INCREASING REVENUE AND MARKET SHARE.

##### POLICY AND REGULATION

REGULATORS MONITOR HOW PRICE ADJUSTMENTS—SUCH AS TAXES OR SUBSIDIES—AFFECT CONSUMER DEMAND

## 1 When Prices Are $P_1$ $P_2$ A Consumer Demands $X_1$ $X_2$ And When Prices Are $Q_1$ $Q_2$

1 When Prices Are  $P_1$   $P_2$  A Consumer Demands  $X_1$   $X_2$  And When Prices Are  $Q_1$   $Q_2$

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