

THE THEORY OF CONSUMER DEMAND AND UTILITY

AEM 102 / AEFM

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Topic Outline

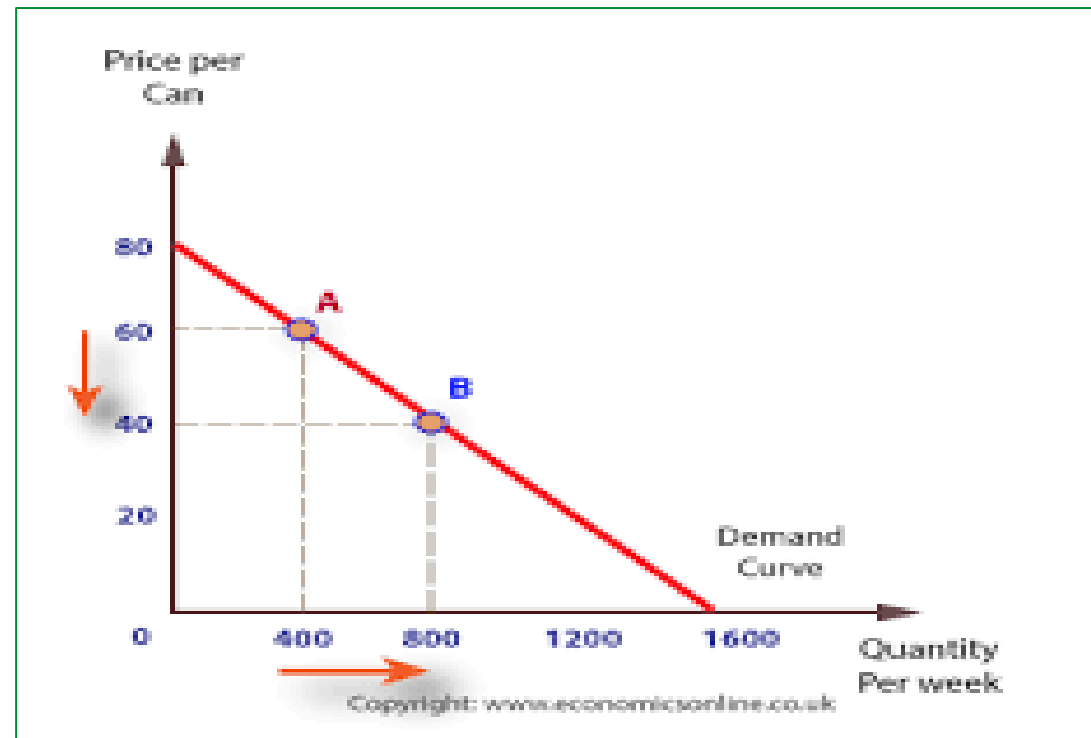
Description

Outline

- Substitution and income effects and the downward sloping demand curve
- The law of diminishing marginal utility
- Derivation of individual demand curve
- Utility maximization and consumer equilibrium
- Consumer surplus

Substitution and income effects and the downward sloping demand curve

- The market demand for a commodity is derived by adding the individuals' demand curves for the commodity
- Each individual's demand and the market demand curve for a commodity is **downward sloping** because of the **substitution** and **income effects**



Substitution and income effects and the downward sloping demand curve

- The substitution effect refers to the fact that as price of a commodity falls, consumers use it to replace similar commodities in consumption. **i.e. as price falls, an individual purchases more of this good to replace others whose price has remained unchanged.**
- The income effect refers to the fact that as the price of a commodity falls, a given money income allows the consumer to buy more of the and other commodities because his or her purchasing power has increased

Example

- When the price of coffee falls, consumers substitute coffee for tea in consumption.
- In addition, when the price of coffee falls, a consumer can buy more coffee and other commodities with a given money income
- Thus the consumer's demand and market demand for coffee is downward sloping because of the substitution and income effects
- The better and the greater the number of substitutes available for the commodity, the more elastic is its demand curve

Law of Diminishing Marginal Utility

- A complimentary explanation of the law of downward- sloping demand rests on the law of diminishing marginal utility. **Marginal utility is the addition to the total utility that is attributable to consuming one more unit of a good**
- An individual demands a particular commodity because of the satisfaction, or utility he receives from consuming it. The more units of a commodity the individual consumes per unit of time, the greater is the total utility he receives
- Although total utility increases, the extra or marginal utility received from consuming each additional unit of the commodity decreases. This is referred to as the law of diminishing marginal utility

Illustration

- Lets assume that satisfaction can actually be measured in terms of units of utility called UTILS
- The first 2 columns give an individual's hypothetical total utility TU schedule from consuming various quantities of commodity X, per unit time
- Note that as the individual consumes more units of X, TU increases
- Column 3 gives the individual's marginal utility MU schedule for commodity X. Each value of column 3 is obtained by subtracting two successive values of column 2.

Illustration (contd)

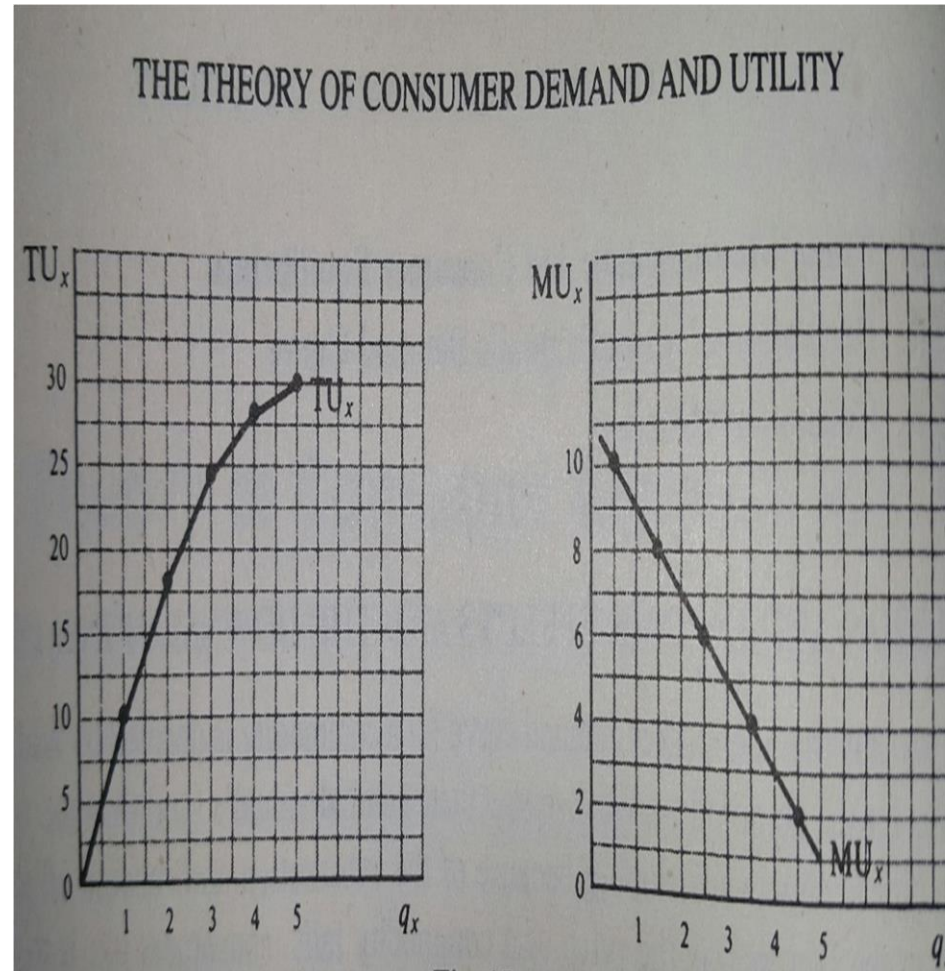
- For example, if the individuals consumption of X goes from zero units to 1, TU goes from 0 utils to 10 utils, and the MU of the first unit of X is 10 utils.
- Similarly, if consumption of X rises from 1 unit to 2 units, TU rises from 10 to 18 and the MU of the second unit of X is 8

(1) q_x	(2) TU_x	(3) MU_x
0	0	10
1	10	8
2	18	6
3	24	4
4	28	2
5	30	

Total and Marginal Utility Schedules

- The total and marginal utility schedules give the total and marginal utility curves.
- Since marginal utility is defined as the change in total utility from a one unit change in consumption, each value of MU is recorded midway between the 2 levels of consumption.
- The falling MU_x curve illustrates the law of diminishing marginal utility

Total And Marginal Utility Curves



Utility Maximization And Consumer Equilibrium

- A consumer maximizes the total utility or satisfaction obtained from spending his or her income and is said to be in equilibrium when the MU of the last naira spent on each commodity is the same.
- This equilibrium condition for utility maximization can be restated as follows;
- $MU_x/P_x = MU_y/P_y = \dots = \text{common MU of the last N spent on each commodity}$

Table showing MU that an individual receives from consuming various units of X and Y per unit of time

Units of the Commodity	MU _x	MU _y
1	10	6
2	8	5
3	6	4
4	4	3
5	2	2

Suppose that the consumer has ₦7 to spend on X and Y and $P_x = ₦2$ and $P_y = ₦1$

- The consumer maximizes total utility and is in equilibrium by spending ₦4 of his ₦7 to buy 2X and the remaining ₦3 to purchase 3Y.
- At this point,

$$\begin{aligned} MU_x \text{ of 8 utils} / P_x \text{ of } ₦2 &= MU_y \text{ of 4 utils} / P_y \text{ of } ₦1 \\ &= MU \text{ of 4 utils from the last } ₦1 \text{ spent on X and Y.} \end{aligned}$$

- By purchasing 2X and 3Y, $TU_x = 18$ (10+8), $TU_y = 15$ (6+5+4) and TU from both is 33(18+15)
- If this consumer spent his ₦7 in any other way, his TU would be less

DERIVATION OF AN INDIVIDUAL'S DEMAND CURVE

- Starting with a consumer in equilibrium, we get one point of his or her demand curve.
- At a lower price, the consumer must purchase more of the commodity to be in equilibrium, and so we get another point on the demand curve.
- From these and other points of consumer equilibrium, we can derive a downward sloping demand curve because of diminishing MU
- In the example, we saw that the consumer was in equilibrium when he spent his income of N7 to purchase 2X and 3Y, at $P_x=2$ and $P_y=N1$. Thus, $P_x=2$ and $q_x=2$ is one point of consumer demand for X.

DERIVATION (Contd)

- From the table we see that at $P_x = N1$, this consumer would be in equilibrium by purchasing 4X and 3Y because at that point;

$$\begin{aligned} MU_x \text{ of 4 utils} / P_x \text{ of N1} &= MU_y \text{ of 4 utils} / P_y \text{ of N1} \\ &= MU \text{ of 4 utils from the last N spent on X and Y.} \end{aligned}$$

- Two points on the consumers demand schedule for commodity X are:

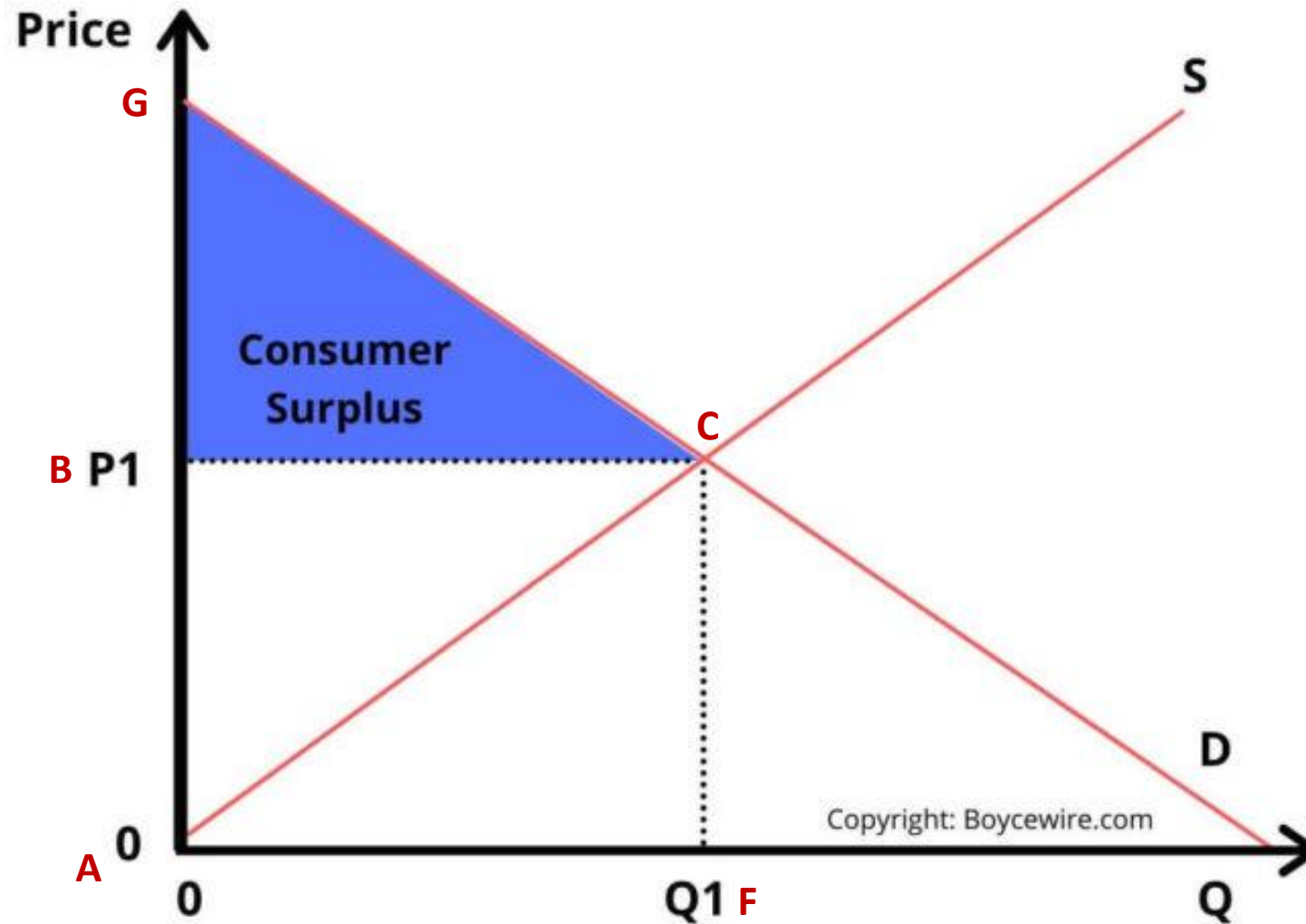
P_x	N2	N1
Q_x	2	4

- Other points could be similarly obtained
- Note that because MU declines, P_x must fall to induce the individual consumer to buy more of X. Thus a downward demand curve can be explained in terms of diminishing MU.

CONSUMER SURPLUS

- Consumer's surplus refers to the difference between what the consumer would be willing to pay to purchase a given number of units of a commodity and what he or she actually pays for them.
- It arises because the consumer pays for all units of the commodity the price he or she is willing to pay for the last unit purchased, even though the MU on earlier units is greater
- Consumer surplus can be measured by the area under the consumer's demand curve and above the commodity price

CONSUMER SURPLUS



GRAPH EXPLANATION

- Consumer purchases AF units of the commodity at price AB and spends AB times AF (the area of the rectangle $ABCF$) on the commodity.
- However this consumer would have been willing to pay a higher price for all but the last unit of this commodity purchased (as indicated by the height of her demand curve) because these previous units give her greater MU than the last unit purchased.
- The difference between what she will be willing to pay for AF units (the area of $AGCF$) and what she actually pays for them (the area of $ABCF$) is an estimate of this consumer's surplus (the area of triangle BGC)

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