

### THEORY OF CONSUMER BEHAVIOUR

#### INTRODUCTION

The Theory of Consumer Behavior studies how a consumer spends his income so as to attain the highest satisfaction or utility. Utility maximization behavior of the consumer is subject to the constraint imposed by his limited income and the prices of the various commodities he desires to consume. The consumer compares the different “bundles of goods” that he can consume given his income and the prices of the goods in the bundles. And in the process, he attempts to determine the bundle that will give him the maximum satisfaction.

#### CONSUMERS

Consumers are the end users who seek products to consume and satisfy their needs. From consuming products, they derive utility or satisfaction. However, a consumer is limited with funds available and therefore she has to maximize her satisfaction while not spending more than she has.

The limitation of total funds available to an individual defines the **budget constraint**.

#### UTILITY

This is the satisfaction one gets from consuming a commodity. Utility is difficult to quantify since it is a psychological feeling. It is subjective and its perception varies from one individual to another. The satisfaction MARY derives from eating a mango is different from the satisfaction MICHAEL derives from eating a similar mango.

#### *Important points to note under utility*

1. A commodity does not need to be useful for all consumers in order to have utility e.g., alcohol, cigarettes
2. A commodity does not need to have the same utility for the same consumer at different points of time, at different levels of consumption and at different moods of a consumer.
3. Total utility – assuming utility is measurable, total utility refers to the sum of the utilities derived by a consumer from the various units of goods and services he consumes e.g., suppose a consumer consumes three units of a commodity Y at a time and derives utility as  $U_1$ ,  $U_2$  &  $U_3$  Total utility from Y ( $TU_y$ ) =  $U_1+U_2+U_3$
4. Marginal utility-This is a change in TU utility resulting from the consumption of an extra unit of a commodity.

### Utility measurement

This is the quantification of the satisfaction of wants and needs achieved through the consumption of goods and services. In principle, utility measurement can take one of two forms:

1. **Cardinal Approach, which is based on numerical values (1, 2, 3, etc.) and;**
2. **Ordinal Approach, which is based on rankings (first, second, third, etc.).**

### Cardinal Utility

Cardinal utility Approach was put forward by the neo-classical economists like Alfred Marshall, Pigou and others and is based on the measurement of satisfaction in numerical values (1, 2, 3, etc.) in units known as utils. If a consumer imagines that good X has 3 utils and good Y has 2 utils, then good X is found to provide more satisfaction to the consumer.

However, the subjective nature of utility makes cardinal measurement unlikely and thus some economists have suggested that utility is measured in monetary units by the amount of money offered for a commodity. This implies that utility of a commodity is equal to the money a consumer is willing to pay for it, marginal utility of money remains constant, and one util is equal to one unit of money.

#### Assumptions of cardinal utility approach

The consumer is *rational*. This means that he aims at maximizing utility given his income and the prices of the commodities purchased by him.

**Utility is measurable;** that the utility/ level of satisfaction derived from a commodity is measurable, the most convenient measure being money. The cardinalists assumed that one util=1 unit of money. Utility therefore is denoted by the monetary units that the consumer is willing to pay for another unit of the commodity.

**Constant Marginal Utility of money;** this approach assumes that the MU of money remains constant whatever the level of a consumer's income. This is important because if money is to be used as a measure of utility, it should be a standard value in order to yield meaningful results. The essential feature of a standard measure is that it should be constant e.g., a meter, mile etc.

**Diminishing MU;** utility gained from successive units of a commodity diminishes i.e., the MU diminishes as the consumer acquires larger and larger quantities of it.

**The law of diminishing marginal utility states that “as more and more of a single commodity is consumed, each additional unit consumed provides the consumer with less additional satisfaction than the preceding unit such that total utility will increase up to a maximum level then it will fall when marginal utility becomes negative.**

The maximum point of total utility is called the point of **satiety**. At maximum total utility, marginal utility is **zero**. This implies that any additional unit consumed does not add any utility to the consumer. After the point of satiety the TU curve will start falling, and any additional unit consumed will result into **disutility or negative utility**.

**Utility is additive;** cardinalists believe that utility derived from various goods and services consumed by a consumer can be added together to get the total utility.

The consumer's decision to consume is not influenced by other consumers but depends entirely on personal preferences i.e., the consumers utility function is independent of other consumers' utility functions

The theory assumes consumption of only one commodity

It also assumes that all commodities available to the consumer are perfectly divisible into smaller units.

### **Total utility (TU)**

This is the total amount of satisfaction or pleasure a person derives from consuming a given quantity of that product. Or it is the sum or cumulative satisfaction derived by an individual from all the units of a single commodity consumed.

For example, if a consumer consumes 5 units (cones) of a commodity (ice cream) and derives  $U_1, U_2, U_3, U_4$  and  $U_5$  utils from those five cones eaten, then  $TU = U_1 + U_2 + U_3 + U_4 + U_5$ . The general total utility function is given by;  $TU = U_1 + U_2 + U_3 + \dots + U_n$



A consumer will get total utility from consuming these four cones of ice cream.

Total utility increases as consumption increase BUT up to a point and then it declines.

### **Total utility curve (illustration)**

### **Marginal Utility (MU)**

This is the extra satisfaction a consumer derives from one additional unit of a given commodity consumed. In other words, it is the change in Total Utility that results from the consumption of one more unit. MU is given as a change in total utility divided by a change in the amount of the commodity consumed. That is;

$$MU = \frac{\Delta TU}{\Delta Q}$$

Where  $\Delta TU$  = change in total utility and  $\Delta Q$  = change in quantity of a commodity consumed thus giving us change in consumption by one unit.

Change in TU from zero cones of ice cream to one cone is the MU of the first cone. Change in TU from the first cone to the second cone is the MU of the second cone and from the second to the third is the MU of the third etc.

Every successive unit of a commodity gives a consumer less and less additional satisfaction, that is MU keeps on falling for every additional unit of a commodity that one consumes.



That is:  $MU_1 > MU_2 > MU_3 > MU_4 > MU_n$

Note: MU is also the slope of the TU curve at any point of the TU curve

### **Relationship between total utility and marginal utility**

Marginal utility is the change in total utility due to consumption of one extra unit of a commodity. It therefore refers to the extra satisfaction derived from the consumption of an additional unit of a commodity. Marginal utility is equal to the slope of the total utility function. The marginal utility is positive up to the point when total utility is maximum. Marginal utility is zero at this point. Beyond this, marginal utility becomes negative and total utility falls.

### **Calculation of TU and MU**

No. of ice cream	Total utility (utils)	Marginal utility

cones		
0	0	
1	10	
2	19	
3	26	
4	31	
5	34	
6	35	
7	35	
8	34	
9	31	

From the table above, the relationship between TU and MU can be illustrated graphically as below:  
**illustration**

From the Illustration above we can note that

- When TU is rising, MU is positive
- When TU reaches maximum, MU reaches zero
- When TU is diminishing, MU is negative
- The highest point of the TU curve is known as the point of satiety.

The slope of the TU and MU curves is due to ***the law of diminishing MU***. This law states that as the quantity consumed of a commodity increases per unit of time, the utility derived by the consumer from the successive units goes on decreasing, provided the consumption of all other goods remains constant.

## **EQUILIBRIUM OF THE CONSUMER**

How to maximize utility or how does a consumer achieve the highest satisfaction.

### **For a single commodity**

Marginal utility shows the value a consumer places on each unit of the product and this value is reflected by the price a consumer is willing to pay for a unit of a commodity. A utility maximizing consumer will adjust his purchases of a commodity until the marginal utility of the last unit purchased (measured in money units) is equal to the price of a unit of that product.

$$MU_X = P_X$$

The additional utility from an extra apple must be equal to the price of the apple.

### **Equilibrium for two commodities (apples and bananas)**

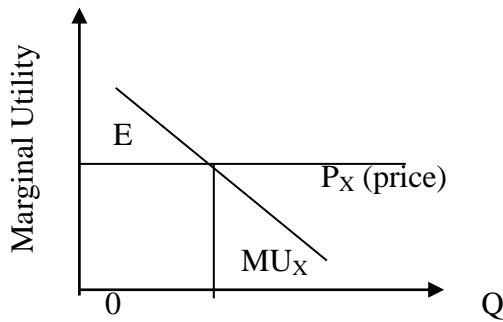
The consumer will allocate his expenditure until the utility gained from the last shilling spent on each commodity is equal.

$$\frac{MU_X(\text{apples})}{P_X(\text{of apples})} = \frac{MU_Y(\text{bananas})}{P_Y(\text{of bananas})}$$

If there are many commodities then we have;

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = \dots = \frac{MU_n}{P_n}$$

### **Illustration: Consumer's equilibrium**



## **DERIVATION OF THE DEMAND CURVE UNDER CARDINAL APPROACH**

The derivation of the demand curve under this approach is guided by the following assumptions;

- A single commodity is consumed
- Utility is measurable in monetary terms
- The consumers income is fixed

- Diminishing marginal utility
- The commodity is a normal good
- Tastes and preferences do not change.

Considering a single commodity (X), according to cardinal utility approach as stated above, a consumer reaches his equilibrium where  $MU_X = P_X (MU_M)$

**Diagram**

From the diagram when more units of the commodity are consumed, TU increases from  $TU_1, TU_2, TU_3$  up to the maximum point D. (Graph 1). Also, marginal utilities keep on diminishing from  $MU_1, MU_2$  and  $MU_3$  at points A<sup>1</sup>, B<sup>1</sup> and C<sup>1</sup> respectively. Since the consumer pays the price equal to the marginal utility derived from the extra unit consumed, points A<sup>1</sup>, B<sup>1</sup> and C<sup>1</sup> correspond to their respective prices P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> respectively in graph III. Joining points a, b and c give rise to the demand curve. It can be seen that a consumer is always willing to pay less as marginal utility from the consumption of an extra unit declines. At point D on graph 1, TU reaches maximum, MU is zero and the consumer is only willing to pay zero price for the 4<sup>th</sup> unit of the commodity consumed.

### LIMITATIONS OF CARDINAL UTILITY APPROACH

Although cardinal utility approach provides a sound basis for analyzing consumer behavior, economists have pointed out the drawbacks of this approach.

- The basic limitation of the approach is that utility can be measured numerically. Satisfaction is psychological in nature, which makes it impossible to measure.
- The consumer's utility function is not independent of the utility functions of other consumers. A consumer may consume under the influence of other consumers.

- The assumption of diminishing marginal utility is also not a must for all commodities. For some commodities, the consumer may derive more satisfaction as he consumes more and therefore, he may be willing to pay more.
- Commodities are not perfectly divisible as the theory assumes.
- The theory assumes consumption of one commodity, which is not always the case.
- Money is also not a good measure of utility because it changes value over time. Marginal utility of money is also not constant. Poor people get more utility from a unit of shilling compared to rich people.
- Rationality – that a consumer satisfies his wants in order of preference i.e. begins with a commodity with the highest utility.

### **Ordinal Utility Approach (OUA)/Indifference Curve Approach**

Modern economists e.g., Hicks have used this approach to analyze consumer behavior.

They argued that it may not be possible for a consumer to express his utility in quantitative terms but it is always possible for him to tell which of any two goods he prefers.

A consumer can list all the commodities he consumes in the order of his preference (scale of preference).

### **Assumptions**

**Rationality;** the consumer is assumed to be rational- he aims at maximization of his utility, given his income and market prices. It is assumed that he has full knowledge of all relevant information

**Utility is ordinal;** it is taken that the consumer can rank his preferences according to satisfaction of each basket of goods.

**Diminishing marginal rate of substitution;** this is the slope of an indifference curve. It's the rate at which one commodity is substituted for another and it diminishes as more of one good and less of the other are consumed.

**Transitivity and consistency;** the consumer's choices are assumed to be transitive. Transitivity means that if a consumer prefers A to B and B to C, he must prefer A to C, or, if he treats A=B and B=C, he must treat A=C. consistency on the other hand means that if he prefers A to B in one period, he will not prefer B to A in another period or even treat them as equal.

At least two commodities are consumed.

**Non-satiety;** a consumer is never satisfied, always prefers more to less.

### **INDIFFERENCE CURVES**

An indifference curve is a locus of two commodity combinations that yield the same level/ amount of satisfaction to the consumer.

### ***Illustration***

The slope of an indifference curve is known as the marginal rate of substitution (MRS). The MRS is measures the rate at which one commodity is substituted for another for a consumer to maintain the same level of satisfaction. Thus, MRS gives the number of units of commodity y that must be given up in order to get an extra unit of commodity x so that the consumer remains at the same level of satisfaction

### **Properties of indifference curves (illustrations to be done in class)**

- An IC has a negative slope, which implies that as the quantity of one commodity (y) decreases; the quantity of the other (x) must increase, if the consumer is to remain on the same level of satisfaction.
- An IC higher and to the right of another represents a higher level of satisfaction
- ICs are convex to the origin which implies a diminishing marginal rate of substitution
- IC's do not touch either of the axes
- Between any two points on an IC, there exist many other points
- Between any two IC's there are several other IC's
- A collection of IC's forms an indifference map
- Indifference curves do not intersect, if they did, their point of intersection would imply two different levels of satisfaction which is impossible, this would also violate the assumptions of transitivity and consistency as illustrated below

### **THE BUDGET LINE.**

This is a locus of points of two commodity combinations that exhaust the consumer's income; and a budget schedule is a table that shows two commodity combinations that exhaust a consumer's income.

A rational consumer would like to reach the highest possible indifference curve on his indifference map but she/he is limited by income, which acts as a constraint to maximizing utility. The income constraint/budget line for two commodities x and y can be written as

$$M = P_X X + P_Y Y$$

Where  $P_X$  and  $P_Y$  are the prices of X and Y respectively, and X and Y are their respective quantities; M is the consumer's income.

### ***Illustration***

### Shifts and tilts in the budget line

The BL can shift outwards, inwards or tilt due to changes in the consumer's income or price of one of the commodities.

If the income of the consumer increases, with prices remaining constant, the BL shifts upwards to the right of the original BL remaining parallel to it as shown below

#### Illustration

With the consumer's income and price of Y remaining constant, if the price of X falls, the BL will tilt in such a way that  $Q_X$  will increase as shown below

#### Illustration

### Rotations in the budget line

#### Assumptions

- The consumer's income remains constant
- The price of one commodity changes
- The price of the other commodity remains constant
- The law of demand is assumed

When the price for commodity X reduces leaving that of Y and consumers income unchanged, the budget line will rotate outwards.

#### Illustration;

This means that disposable income available for commodity X has increased giving him/her an opportunity to buy more of X. When the price increases, the line rotates inwards.

***Illustration;***

### **Consumers Equilibrium**

A consumer is in equilibrium when he maximizes his total utility given his income and market prices for goods and services he purchases. Under ordinal utility approach, the consumer is in equilibrium when his highest indifference curve is tangent to his budget line.

***Illustration***

### **THE INCOME CONSUMPTION CURVE**

An YCC is a locus of equilibrium points showing a combination of commodity X & Y a consumer may purchase when his or her income changes while the commodity prices remain constant.

***Diagram***

The slope of the income consumption curve depends upon the nature of the commodities X & Y. i.e. Inferior or Normal good.

YCC when X is an inferior good and Y a normal good

**Illustration;**

YCC when Y is inferior good and X a normal good

**Illustration;**

### THE ENGEL CURVE

The Engel curve shows the relationship between change in the income of the consumer and resultant change in quantity demanded of a given commodity. It is constructed for the income consumption curve.

### THE PRICE CONSUMPTION CURVE

The PCC is a locus of points showing different equilibrium positions of the consumer when the price of one commodity remains constant (Y) while that of the other changes (X).

#### Assumptions

- The price of one commodity remains constant (Y)
- The price of the other commodity changes or falls (X)
- The consumer's equilibrium is assumed

**Illustration;**

The slope of the P.C.C determines the relationship between the two commodities. I.e. substitutes or complements. Derive the P.C.C when the two commodities in question are substitutes.

**Illustration;**

### **DERIVING THE DEMAND OF A NORMAL GOOD UNDER THE ORDINAL UTILITY APPROACH**

An individual's demand curve for a particular good is derived from the individual's budget line and the indifference curve. In other words, it derived from the price consumption curve. The law of demand states that, *ceteris paribus*, the quantity of a product demanded will vary inversely to the price of that product.

**Illustration;**

### **INCOME EFFECTS AND SUBSTITUTION EFFECTS OF PRICE CHANGE**

**Assumptions;**

1. Price of Y remains constant.
2. 2 commodities X and Y are consumed
3. Consumer's income, tastes and preferences remain constant.
4. Price of X reduces.

The income and substitution effect of price change occurs whenever there is fall in the price of a given commodity while the price of the other remains constant. A fall in the price of a commodity gives rise to the ***total price effect***. This effect can be broken down into two components and these include.

- The substitution effects
- The income effect.

The substitution effect arises when the consumer buys more units of a commodity whose price has reduced and less quantities of the other commodity whose price has remained constant. I.e. The consumer substitutes the expensive commodity (Y) with the less expensive one (X)

Also, a fall in the price of a given commodity implies that the consumer's real income increases (**purchasing power**). If the commodity is a normal good, there will be increase in its quantity demanded.

### ***Illustration***