Chapter 3:
Consumer Preferences and the Concept of Utility

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Utility Function

- Utility Function: measures the level of satisfaction that a consumer receives from any basket of goods and services.

consumer behavior:

- The study of how individuals make decisions to allocate their resources (income, time) among various goods and services to maximize their level of utility.

- Importance: Helps in understanding demand patterns and market behavior.

Utility Function (one good in utility)
Are the assumptions on preferences meet?

U(y): total utility of muffins

$U(y) = y^{.5}$

1.75 ···· C

1.5 ···· B

1.0 ···· A
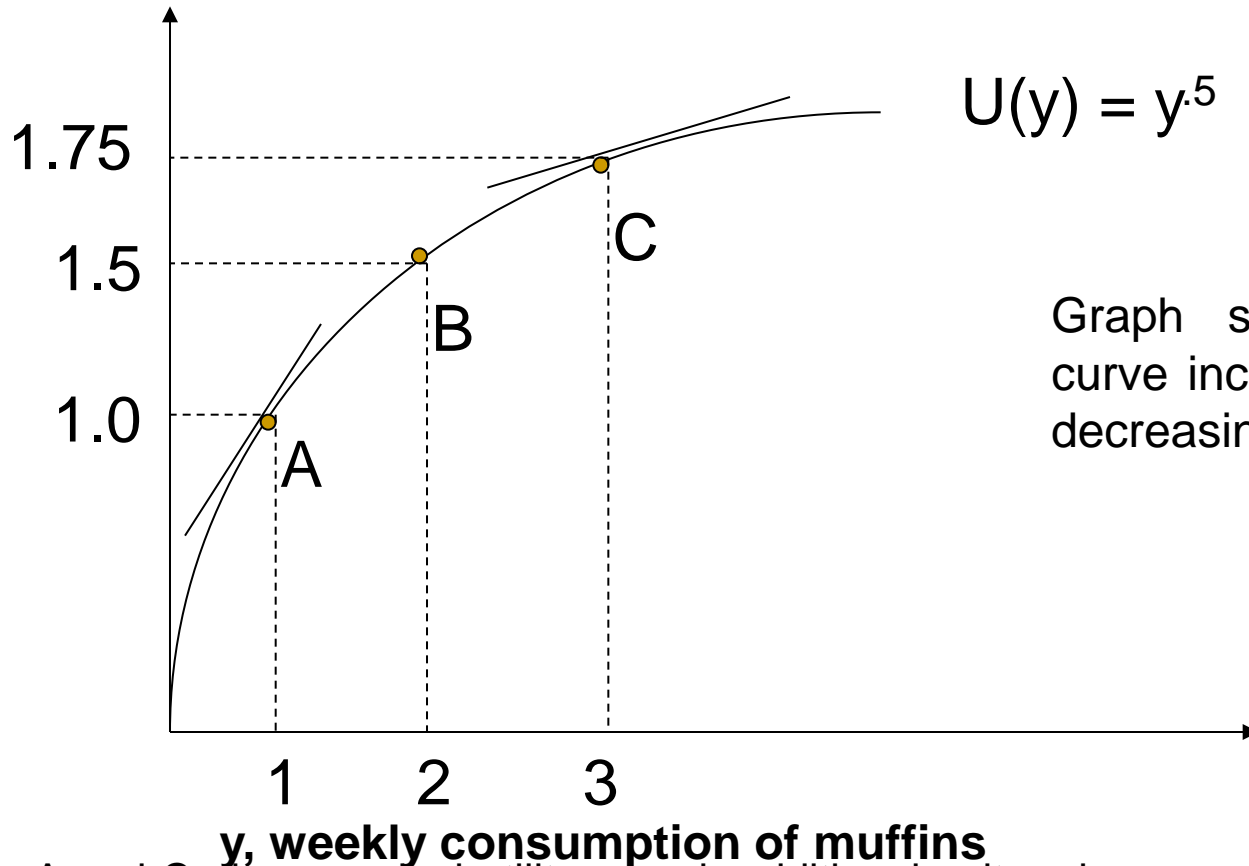
Graph showing TU curve increasing at a decreasing rate.

1   2   3

y, weekly consumption of muffins

Slopes on A and C give marginal utility – each additional unit makes person happy but by less than the previous unit that's why MU of consumption decreases with increase in consumption of additional unit of any good or service.

3

Some Definitions

Total Utility: TU

The total satisfaction a consumer gets from the consumption of all units of a good consumed within a given time period

Marginal Utility: MU

The extra satisfaction gained from consuming one extra unit of a good within a time period

Util:

An imaginary unit of satisfaction derived from the consumption fo a good

Marginal Utility

Marginal Utility: Rate at which total utility changes as the level of consumption rises by one more unit.

- Each new muffin makes you happier, but makes you happier by smaller and smaller amount.

$$MUy = \frac{\Delta U}{\Delta y} = \frac{\partial U}{\partial y} = \text{Slope of the utility curve}$$

Average Utility (AU): TU divided by the number of units of goods consumed.

$$AU = \frac{TU}{Q}$$

continued

- **Total Utility (TU):** Increases as more units are consumed but at a decreasing rate.

- **Average Utility (AU):** TU divided by quantity.

- **Law of Diminishing Marginal Utility:** As consumption of any good or services increases, its MU decreases.

TU, AU and MU Calculations

Units of Good Consumed	Total Utility (TU) in Utils	Marginal Utility (MU) in Utils	Description
1	10	10	TU is increasing and MU is positive
2	18	18-10=8	
3	24	24-18=6	
4	28	28-24=4	
5	30	30-28=2	
6	30	30-30=0	TU is maximum and stable, and MU is zero
7	28	28-30=-2	TU is decreasing and MU is negative

Indifference Curve (IC)

Clothing

A

B

C

IC_1 for U=4
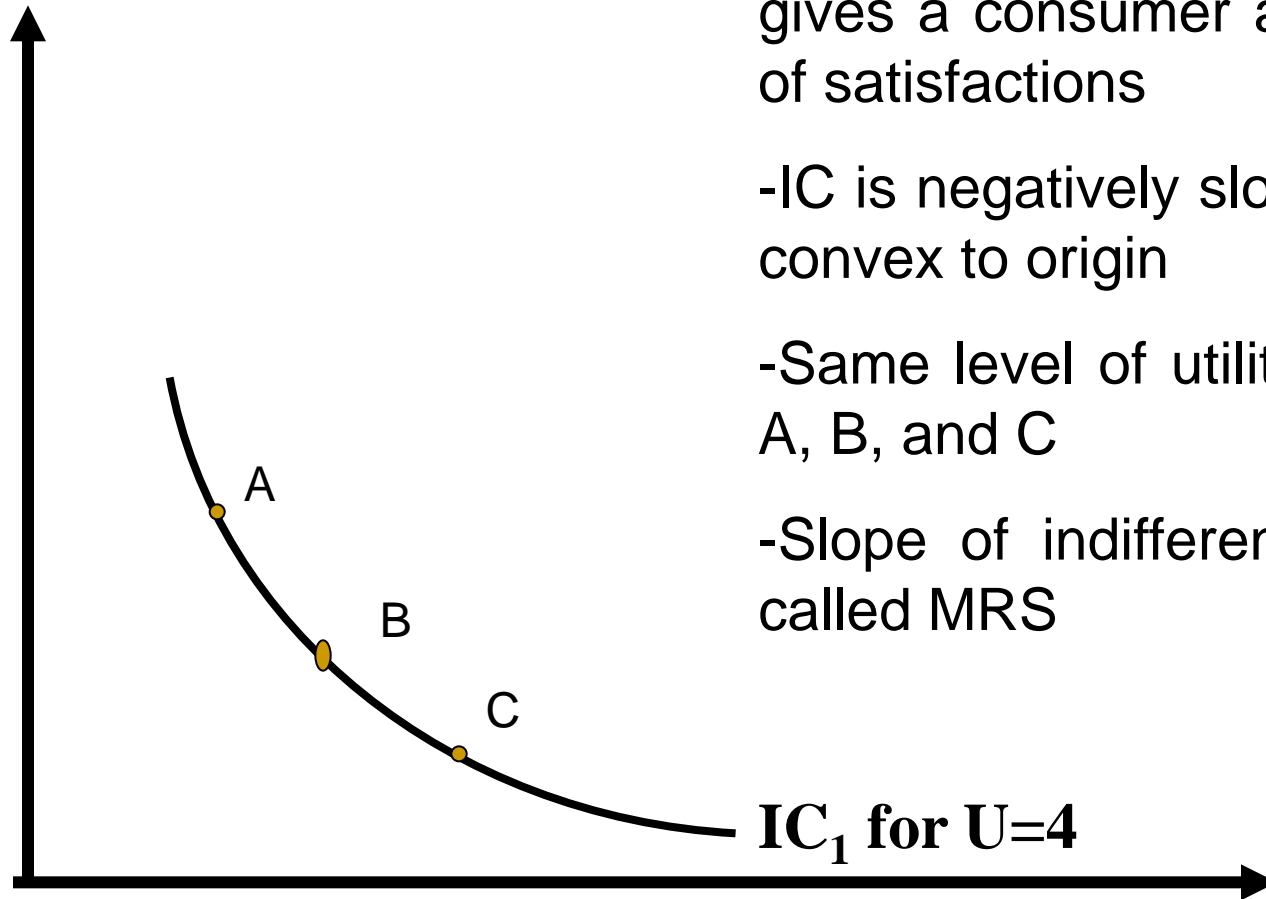
food

-IC shows different combinations of two goods that gives a consumer a same level of satisfactions

-IC is negatively sloped and it is convex to origin

-Same level of utility for bundle A, B, and C

-Slope of indifference curve is called MRS

Properties of IC

- Negatively sloped
- Convex to origin
- IC's are not thick line
- IC donot intersect or cross with each other
- A higher IC shows a higher level of satisfaction

Consumer Reaches Equilibrium Using the Marginal Utility Approach and the Indifference Curve Approach.

Consumer Equilibrium

- Consumer equilibrium refers to the situation where a consumer maximizes their total utility given their budget constraint.

- **A consumer can reach equilibrium through two main approaches**

1. The Marginal Utility Approach (Cardinal Utility Theory)

2. The Indifference Curve Approach (Ordinal Utility Theory)

- **Cardinal approach:** utility is countable or measureable in utils

- **Ordinal approach:** utility is not countable we can only define the order of our preferences

1. Consumer Equilibrium Using the Marginal Utility Approach

Assumptions: There are only two goods. Good X and Y. consumer's income (M) is fixed and the prices of good X and Y i.e. PX and PY are fixed. There is no change in tastes also.

Statement: The marginal utility per dollar spent on each good must be equal for equilibrium. Or

The law states that in order to get maximum satisfaction, a consumer should spend his limited income on different commodities in such a way that the last rupee spent on each commodity yields him equal marginal utility. MUX/PX = MUY/PY

- The consumer compares the marginal utility per dollar spent on different goods. If MU per dollar spent on one good is higher than another, the consumer shifts spending toward that good. E.g. if MUX/PX > MUY/PY Consumer will increase the consumption of good X. This continues until the MU per dollar spent is equal for all goods within the budget.

Continued..

Example:

- Suppose a consumer has \$10 and wants to buy apples (X) and bananas (Y).

- The price of apples is \$2, and the price of bananas is \$1.

- Marginal utilities:

    - $MU_X = 20, MU_Y = 10$

- Compute marginal utility per dollar:

    - $\frac{MU_X}{P_X} = \frac{20}{2} = 10$

    - $\frac{MU_Y}{P_Y} = \frac{10}{1} = 10$

- Since $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$, the consumer is in equilibrium.

2. Consumer Equilibrium Using The Indifference Curve Approach

- Consumers choose a combination of goods that provides the highest level of satisfaction given their budget.

- **Indifference Curve (IC):** A curve showing different combinations of two goods that give the consumer the same level of satisfaction.

- Slope of IC is MRS. $MRS = \frac{MUX}{MUY}$ OR $MRS = \frac{MUY}{MUX}$

- **Budget Line (BL):** Represents all possible combinations of two goods (X & Y) that can be purchased given income (m) and prices (P_x, P_Y) i.e. BL is $\mathbf{P_x x^* + P_Y Y^* = m}$.

- **Consumer Equilibrium:** The point where the budget line is tangent to the highest possible indifference curve.

$$MRS = -\frac{MUX}{MUY} = -\frac{P_X}{P_Y} = MRT$$

- **MRS (Marginal Rate of Substitution):** The rate at which a consumer is willing to trade one good for another while maintaining the same satisfaction level. MRS is the slope of IC.

- **Marginal rate of Transformation (MRT) is PX/PY:** The price ratio of the two goods and slope of BL.

$$MRS = -\frac{U_1}{U_2} = -\frac{p_1}{p_2} = MRT$$

Consumer Equilibrium

■ Consumer equilibrium is achieved when a consumer maximizes utility given their budget

■ The highest indifference curve attainable given the budget is the consumer's **optimal bundle**.

■ When the optimal bundle occurs at a point of tangency between the indifference curve and budget line, this is called an **interior solution**.

- Mathematically, $\boldsymbol{MRS} = -\dfrac{\boldsymbol{MUX}}{\boldsymbol{MUY}} = -\dfrac{\boldsymbol{P_X}}{\boldsymbol{P_Y}} = \boldsymbol{MRT}$

- Rearranging, we can see that the marginal utility per dollar is equated across goods at the optimum: $\dfrac{MUX}{P_X} = \dfrac{MUY}{P_Y}$

Rational Constrained Choice

X
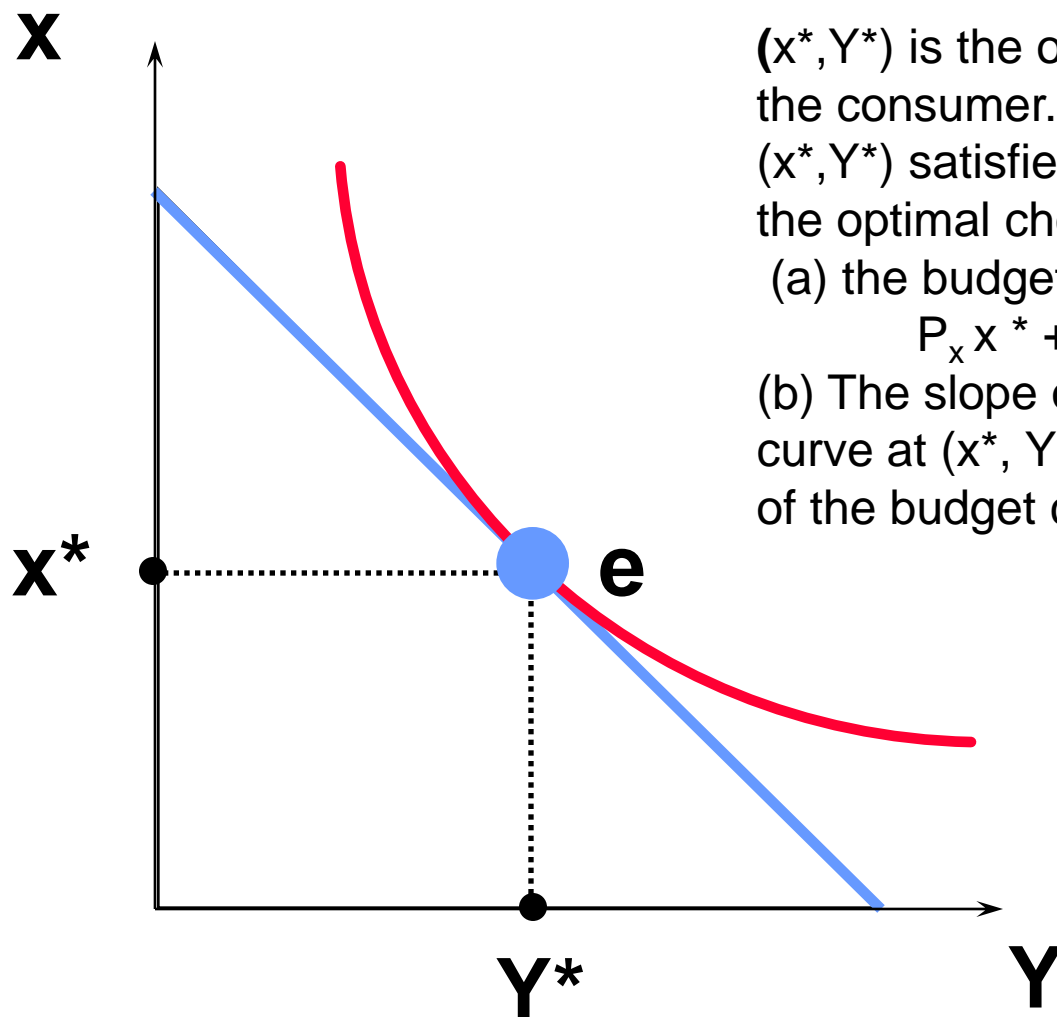
(x^*,Y*) is the optimal choice for the consumer.

(x^*,Y*) satisfies two conditions for the optimal choice i.e.

(a) the budget is exhausted;

$$P_x x^* + P_Y Y_2^* = m .$$

(b) The slope of the indifference curve at (x^*, Y*) equals the slope of the budget constraint.

x*

e

In both cases, equilibrium is reached when the consumer maximizes satisfaction given their income and the prices of goods.

Y*

Y