Managerial Economics

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Lecture No - 13: Consumer Behaviour
Recap from last Session

- Consumer Behaviour - Assumptions
- Relationship between Total and Marginal Utility
- Law of Diminishing Marginal Utility
- Indifference Curve Analysis
Session Outline

- Budget line and Consumer equilibrium
- Law of Equi Marginal utility
- Price, income and substitution effect
- Consumer Surplus
Consumer’s Budget Line

• A **budget line** describes the limits to consumption choices and depends on a consumer’s budget and the prices of goods and services.

• Shows all possible commodity bundles that can be purchased at given prices with a fixed money income

\[ M = P_x X + P_y Y \]

or

\[ Y = \frac{M}{P_y} - \frac{P_x}{P_y} X \]
Consumer’s Budget Constraint

The slope of the budget line:

\[-\frac{P_x}{P_y}\]
Changes in the Budget Line

- Changes in Income
  - Increases lead to a parallel, outward shift in the budget line.
  - Decreases lead to a parallel, downward shift.
Changes in the Budget Line

- **Changes in Price**
  - A decrease in the price of good X rotates the budget line counter-clockwise.
  - An increase rotates the budget line clockwise.

![New Budget Line for a price decrease.](image)
Consumer Equilibrium

- A consumer behaves rationally and would always aim to maximize utility, given income and prices of goods in the consumption basket.
- Is at a point where the budget line is tangent to the highest attainable indifference curve by the consumer subject to budget constraint.
Consumer Equilibrium

• Consumer’s objective: to maximize his/her utility subject to income constraint
• 2 goods (X, Y)
• Prices Px, Py are fixed
• Consumer’s income (I) is given
Optimal Consumption

- Utility Maximization
  - Optimality requires \( \frac{P_x}{P_y} = MRS_{XY} \) (\( \frac{MU_x}{MU_y} \)).
  - Optimality requires \( \frac{MU_x}{P_x} = \frac{MU_y}{P_y} \).
The equilibrium consumption bundle is the affordable bundle that yields the highest level of satisfaction.
Consumer Equilibrium

\[
\frac{\Delta Y}{\Delta X} = -\frac{MU_X}{MU_Y}
\]
= slope of indifference curve

\[-\frac{P_X}{P_Y}
\]
= slope of the budget line

Optimal consumer’s basket

\[
\frac{MU_X}{MU_Y} = -\frac{P_X}{P_Y}
\]
Consumer Equilibrium

Consumer allocates income so that the marginal utility per rupee spent on each good is the same for all commodities purchased:

\[
\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}
\]

\[
\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}
\]

⇒ spend more on good X and less on Y
How much ice cream does Jill buy in a month?

Some facts:

• Limited income
• Opportunity cost of making a choice:
  Buying ice cream leaves Jill less money to buy other things: each dollar spent on ice cream could be spent on hamburger.
• In fact, consumers compare the (expected) utility derived from one additional dollar spent on one good to the utility derived from one additional dollar spent on another good.
More facts

- The prices of hamburger and ice cream are market-given; the consumer cannot change the price of a good.
- Jill, like any other rational consumer, wishes to maximize her utility.
More facts

- The opportunity cost of one dollar spent on ice cream is the forgone utility of one dollar that could be on hamburger.

- If the utility of one additional dollar of ice cream is greater than the utility of the last dollar spent on hamburger, Jill can increase her total utility by spending one dollar less on hamburger and one dollar more on one ice cream.
Utility Maximizing Rules

• A rational consumer would buy an additional unit of a good as long as the perceived dollar value of the utility of one additional unit of that good (say, its marginal dollar utility) is greater than its market price.

• The Two-Good Rule:

\[
\frac{MU_I}{P_I} = \frac{MU_H}{P_H}
\]
Utility Maximization under An Income constraint

- Consumers’ spending on consumer goods is constrained by their incomes:

\[ \text{Income} = P_x Q_x + P_y Q_y + P_w O_w + \ldots + P_z Q_z \]
While the consumer tries to equalize $\frac{MU_x}{P_x}$, $\frac{MU_y}{P_y}$, $\frac{MU_w}{P_w}$,........ and $\frac{MU_z}{P_z}$, to maximize her utility her total spending cannot exceed her income.

For example, with an income of $86$ Jill is trying to decide how much ice cream and how much hamburger she should buy. Jill’s income $= 5 \times 10 + 6 \times 6 = 86$
## Optimal Purchase Mix: Ice Cream and Hamburger

<table>
<thead>
<tr>
<th>Q</th>
<th>MUI</th>
<th>PI</th>
<th>MUI/PI</th>
<th>MUH</th>
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<td>10</td>
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<td>0</td>
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</table>
Income = Q_I \cdot P_I + Q_H \cdot P_H = (5 \times 10) + (6 \times 6) = 86

Slope = \frac{P_H}{P_I} = \frac{6}{10} = \frac{8.6}{14.33} = 0.6
An Optimal Change

Recall that to maximize utility a consumer would set:

\[
\frac{MU_x}{P_x} = \frac{MU_y}{P_y}
\]

If \( P_x \) increases this equality would be disturbed: \( \frac{MU_x}{P_x} < \frac{MU_y}{P_y} \)
An Optimal Change

To return to equality the consumer must adjust his/her consumption. (Have in mind that the consumer cannot change prices, and he/she has an income constraint.)

What are the consumer’s options?
\[(\text{MU}_x/\text{P}_x) < (\text{MU}_y/\text{P}_y)\]

In order to make the two sides of the above inequality equal again, given that \(\text{P}_x\) and \(\text{P}_y\) could not be changed, we would have to increase \(\text{MU}_x\) and decrease \(\text{MU}_y\). Recalling the law of diminishing marginal utility, we can increase \(\text{MU}_x\) by reducing \(\text{X}\) and decrease \(\text{MU}_y\) by increasing \(\text{Y}\).
A fall in the price of a good has two effects:

1. Consumers will tend to buy more of the good that has become cheaper and less of those goods that are now relatively more expensive.

2. Because one of the goods is now cheaper, consumers enjoy an increase in real purchasing power.
The consumer is initially at $A$, on budget line $RS$.
When the price of food falls, consumption increases by $F_1F_2$ as the consumer moves to $B$.
The substitution effect $F_1E$ (associated with a move from $A$ to $D$) changes the relative prices of food and clothing but keeps real income (satisfaction) constant.
The income effect $EF_2$ (associated with a move from $D$ to $B$) keeps relative prices constant but increases purchasing power.
Food is a normal good because the income effect $EF_2$ is positive.
Substitution Effect

- **Substitution effect**  Change in consumption of a good associated with a change in its price, with the level of utility held constant.
**Income effect**  Change in consumption of a good resulting from an increase in purchasing power, with relative prices held constant.

\[
\text{Price Effect } (F_1 F_2) = \text{Substitution Effect } (F_1 E) + \text{Income Effect } (E F_2)
\]
• When price of Y decrease from Rs 10 to Rs 5, holding the income constant, quantity demanded of Y increases from Rs 40 to 84. This change in demand is Rs 44 is price effect.

• Price effect constitutes of income and substitution effect. The substitution effects can be computed by forcing the consumer to the same utility, (100), by reducing the income suitably.

• So substitution effect is (70-40) = 30
• Now the income effect is (84-70) = 14
• Sine the income effect is positive, the good can be classified as a normal good.
CONSUMER SURPLUS

- **consumer surplus** Difference between what a consumer is willing to pay for a good and the amount actually paid.

**Consumer Surplus and Demand**

**Consumer Surplus**

Consumer surplus is the total benefit from the consumption of a product, less the total cost of purchasing it.

Here, the consumer surplus associated with six concert tickets (purchased at $14 per ticket) is given by the yellow-shaded area.
CONSUMER SURPLUS

Consumer Surplus and Demand

Consumer Surplus Generalized

For the market as a whole, consumer surplus is measured by the area under the demand curve and above the line representing the purchase price of the good.

Here, the consumer surplus is given by the yellow-shaded triangle and is equal to

\[
\frac{1}{2} \times (20 - 14) \times 6500 = 19,500.
\]

Consumer Surplus and Demand

When added over many individuals, it measures the aggregate benefit that consumers obtain from buying goods in a market.

When we combine consumer surplus with the aggregate profits that producers obtain, we can evaluate both the costs and benefits of alternative market structures and public policies.
Change in Consumer Surplus: Price Increase

Original Consumer Surplus

New Consumer Surplus

Loss in Surplus: Consumers paying more

Loss in Surplus: Consumers buying less

Price

Quantity

P₀

P₁

Q₀

Q₁

D
Calculation of Consumer Surplus

<table>
<thead>
<tr>
<th>Shirts</th>
<th>Total Benefit</th>
<th>Marginal Benefit</th>
<th>Expenditure</th>
<th>Consumer Surplus</th>
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<td>250</td>
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<td>153-49=104</td>
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Session References
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