The Theory of 
Consumer Behavior

ZURONI MD JUSOH
DEPT OF RESOURCE MANAGEMENT & CONSUMER STUDIES
FACULTY OF HUMAN ECOLOGY
UPM
The Theory of Consumer Behavior

The principle assumption upon which the theory of consumer behavior and demand is built is: a consumer attempts to allocate his/her limited money income among available goods and services so as to maximize his/her utility (satisfaction).
Theory of Consumer Behavior

- Useful for understanding the demand side of the market.

- Utility - amount of satisfaction derived from the consumption of a commodity ....measurement units ⇒ utils
Theories of Consumer Choice

♦ Utility Concepts:

– The Cardinal Utility Theory (TUC)
  • Utility is measurable in a cardinal sense
  • *cardinal utility* - assumes that we can assign values for utility, (Jevons, Walras, and Marshall). E.g., derive 100 utils from eating a slice of pizza

– The Ordinal Utility Theory (TUO)
  • Utility is measurable in an ordinal sense
  • *ordinal utility approach* - does not assign values, instead works with a ranking of preferences. (Pareto, Hicks, Slutsky)
The Cardinal Approach

Nineteenth century economists, such as Jevons, Menger and Walras, assumed that utility was measurable in a cardinal sense, which means that the difference between two measurement is itself numerically significant.

\[ U_X = f(X), \quad U_Y = f(Y), \quad \ldots \]

Utility is maximized when:

\[ \frac{MU_X}{MU_Y} = \frac{P_X}{P_Y} \]
The Cardinal Approach

- **Total utility (TU)** - the overall level of satisfaction derived from consuming a good or service.

- **Marginal utility (MU)** additional satisfaction that an individual derives from consuming an additional unit of a good or service.

  Formula:

  \[
  MU = \frac{\text{Change in total utility}}{\text{Change in quantity}} = \frac{\Delta TU}{\Delta Q}
  \]
The Cardinal Approach

♦ Law of Diminishing Marginal Utility (Return) = As more and more of a good are consumed, the process of consumption will (at some point) yield smaller and smaller additions to utility

♦ When the total utility maximum, marginal utility = 0

♦ When the total utility begins to decrease, the marginal utility = negative (-ve)
### EXAMPLE

<table>
<thead>
<tr>
<th>Number Purchased</th>
<th>Total Utility</th>
<th>Marginal Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>-1</td>
</tr>
</tbody>
</table>
TU, in general, increases with Q
At some point, TU can start falling with Q (see Q = 5)
If TU is increasing, MU > 0
From Q = 1 onwards, MU is declining ⇒ principle of diminishing marginal utility
⇒ As more and more of a good are consumed, the process of consumption will (at some point) yield smaller and smaller additions to utility
Consumer Equilibrium

♦ So far, we have assumed that any amount of goods and services are always available for consumption

♦ In reality, consumers face constraints (income and prices):
  – Limited consumers income or budget
  – Goods can be obtained at a price
Some simplifying assumptions

- 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
Consumer Equilibrium

- *Marginal utility per price* $\Rightarrow$ additional utility derived from spending the next price (RM) on the good

- $\mu_	ext{per RM} = \frac{\mu}{p}$
Consumer Equilibrium

- Optimizing condition:
  \[
  \frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}
  \]

- If
  \[
  \frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}
  \]
  \(\Rightarrow\) spend more on good X and less of Y
### Numerical Illustration

<table>
<thead>
<tr>
<th>$Q_x$</th>
<th>$TU_x$</th>
<th>$MU_x$</th>
<th>$\frac{MU_x}{P_x}$</th>
<th>$Q_y$</th>
<th>$TU_y$</th>
<th>$MU_y$</th>
<th>$\frac{MU_y}{P_y}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>30</td>
<td>15</td>
<td>1</td>
<td>50</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>9</td>
<td>4.5</td>
<td>2</td>
<td>105</td>
<td>55</td>
<td>5.5</td>
</tr>
<tr>
<td>3</td>
<td>45</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>148</td>
<td>43</td>
<td>4.3</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>5</td>
<td>2.5</td>
<td>4</td>
<td>178</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>198</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>56</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>213</td>
<td>15</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Suppose: \[ X = \text{fishball} \]
\[ Y = \text{fishcake} \]

Assume: \[ P_X = 2 \]
\[ P_Y = 10 \]
2 potential optimum positions

Combination A: \( X = 3 \) and \( Y = 4 \)
- \( TU = TU_x + TU_y = 45 + 178 = 223 \)

Combination B: \( X = 5 \) and \( Y = 5 \)
- \( TU = TU_x + TU_y = 54 + 198 = 252 \)
Presence of 2 potential equilibrium positions suggests that we need to consider income. To do so let us examine how much each consumer spends for each combination.

Expenditure per combination

- Total expenditure = $P_X X + P_Y Y$
- Combination A: $3(2) + 4(10) = 46$
- Combination B: $5(2) + 5(10) = 60$
Scenarios:

- If consumer’s income = 46, then the optimum is given by combination A. Combination B is not affordable.
- If the consumer’s income = 60, then the optimum is given by Combination B. Combination A is affordable but it yields a lower level of utility.
Economists following the lead of Hicks, Slutsky and Pareto believe that utility is measurable in an ordinal sense—the utility derived from consuming a good, such as $X$, is a function of the quantities of $X$ and $Y$ consumed by a consumer.

$$U = f( X, Y )$$
Ordinal Utility Theory (TUUO)

- Can be measured in qualitative, not quantitative, but only lists the main options (indifference curves & budget line).

Rational human beings will choose to maximize the utility by selecting the highest utility.

Difference consumers, difference utilities.
INDIFFERENCE CURVE (IC)

- Curve where the points represent a combination of items when the consumer at indifference situation (satisfaction).
- Axes: both axes refer to the quantity of goods.
- For the combination that produces a higher level of satisfaction, the curves shift to the right (IC$_2$) from the first curve (IC$_1$).
- In contrast, the curves shift to the left (IC$_{-1}$).
INDIFFERENCE CURVE
PROPERTIES OF INDIFFERENCE CURVE

♦ Downward sloping from left to right: This shows an increase in quantity of certain good.

♦ Convex to the origin: the marginal rate of substitution (MRS) decreased
  - \( MRS = \) quantity of goods Y willing to substitute to obtain one unit of goods X & this substitution is to maintain its position at the same level of satisfaction

♦ Do not cross (intersect): consumer preferences transitive
  - Eg: Quantities X and Y for the combination of \( A \succ \) a combination of \( B; \Rightarrow \) utility \( A \succ B \) *
  
  When cross = C, so the utility \( A = C \& B = C; \Rightarrow \) utility \( A = B = C. \) This is not transitive as above *

♦ Different ICs show different level of satisfaction. Far from the origin, the higher the satisfaction.
IC curves can not intersect
Budget line (BL)

- Line showing all combinations of items can be purchased for a particular level of income ($M$);

\[ M = P_x Q_x + P_y Q_y \]

- The slope depends on the prices of goods $X$ and $Y$, the slope $= \frac{P_x}{P_y}$

- Slope -ve: to use more goods $X$, $Y$ should reduce & vice versa

- In the $X$-axis, when the quantity $Y = 0$, all $M$ used to purchase $X$; $M = P_x Q_x \Rightarrow Q_x = \frac{M}{P_x}$

- At the $Y$ axis, when the quantity $X = 0$, all $M$ used to purchase $Y$; $M = P_y Q_y \Rightarrow Q_y = \frac{M}{P_y}$
FACTORS SHIFT THE BUDGET LINE

• Changes in prices of goods X
EFFECTS OF PRICE CHANGES ON THE BUDGET LINE

- When the price of good X increases, the quantity of good X is reduced (by maintaining the quantity of Y) & vice versa.
  ⇒ Points on the X axis shifted to the left (a small quantity of X)

- When the price of Y increases, the quantity Y is reduced (by maintaining the quantity of X) & vice versa.
  ⇒ Point on Y axis move to the bottom (small quantity in Y)
FACTORS SHIFT THE BUDGET LINE

- Changes in the price of goods $Y$
FACTORS SHIFT THE BUDGET LINE

- Changes in income
EFFECTS OF INCOME CHANGES ON THE BUDGET LINE

- When $M$ increases, $Q_X$ and $Q_Y$ can be bought even more, a point on the X axis shifted to the right & a point on the Y axis move on; & vice versa when $M$ decreases.
CONSUMER EQUILIBRIUM

- With income ($M$) some combination of goods that consumers choose the highest satisfaction.
- Satisfied the same curves and budget lines are connected.
- The point where the curve IC and BL tangent.
- Slope IC = BL.
- Consumer choice influenced by income.
- Increased income, increased consumer equilibrium point.
MAXIMIZE CONSUMER SATISFACTION

Indifference Curves (IC)

Budget line (BL)
Price Consumption Curve (PCC)

- changes in $P_x$

$PCC = \text{Line connecting the equilibrium points, } E \text{ the event of changes to the prices of goods.}$
Formation of Demand Curve

 Outcome of PCC

\[ P_x \]  \[ D_d \]  \[ \text{Qty X} \]
Demand Curve for Normal Goods and Inferior Goods

- X axis, Y axis of the quantity of goods, the price of goods

Normal goods

Inferior goods

Normal goods: $P \uparrow$, $D_d \downarrow$

Inferior goods: $P \downarrow$, $D_d \uparrow$
If a fixed price and income increases, the budget line shifts to the right, thus shifting the equilibrium point higher.

Equilibrium point some income items associated with the line - can be income consumption curve (ICC).

ICC shows the points for the combination of goods that can be purchased when income change and fixed in price.
INCOME CONSUMPTION CURVE (ICC)
Engel curve for x
ENGEL CURVE

- Relationship of income to the quantity of an item
- Retrieved from ICC
- Get a quantity of goods X or Y that can be purchased goods with an income
- Plot the quantity of X or Y against income
- Linking income changes with changes in demand for goods at a fixed price
Engel curve for luxury goods and normal goods
Conclusion

ToCB showing how it provides users a combination of sources of income for many goods/services.

- There are two types of utility theory:
  - Cardinal ⇒ TU and MU
  - Ordinal ⇒ curve IC and BL

- Equilibrium and utility maximization can be either TUC or TUO
- Equilibrium points of connection to produce PCC (change IN PRICE) and ICC (change in income)
- Displaying Publication = PCC curve DD & ICC = Engel curve (EC)
- The types of goods obtained displaying income or price changes.
Thank You