Household Responses to Change
Intermediate Microeconomics

The Household’s (or Consumer’s) Budget Constraint

If \( X \) and \( Y \) are the only goods purchased in this budget, and the price of \( X \) is \( p_x \), the price of \( Y \) is \( p_y \), and the “income” or amount budgeted is \( I \), then budget constraint is:

\[
I = p_x X + p_y Y
\]

or

\[
Y = \frac{I}{p_y} - \frac{p_x}{p_y} X
\]

When Prices Fall (Example: Cellular Phone Service)

Problem:

- Suppose the average person in the cellular phone service market earns about $3000.
- After allocating 2/3 of her income for taking care of basic living expenses, she has $1000 remaining for “non-essentials”.
- She allocates the budget for non-essential items between cellular phone service and other non-essentials.
  - Assume the price of non-essentials is $10.
  - The price of cell phone service was about 20 cents per minute three years ago. It has fallen to about 10 cents per minute.
- How does the price change affect consumers’ budget constraint and optimal bundle of “non-essentials”?
When Prices Fall
(Set-up: Cellular Phone Service)

- Budget of $1000 for “non-essentials” allocated between cellular phone service \(x\) and other non-essential items \(y\).
- Prices:
  - \(p_x = $10\) per unit.
  - \(p_y = 20\) cents per minute, ex ante; 10 cents per minute, ex post.
- How does the price change affect the average consumers’ budget constraint?
- How does the price change affect consumers’ optimal bundle of “non-essentials”?
- Reason through it using only the standard preference and indifference properties.
- Add diminishing MRS and we get the standard indifference curves.

How to Find the Consumer’s Optimal Consumer Choice (given her budget constraint)

Example:
For this preference ordering, for any \(X\) and \(Y\),
\[
\text{MRS} = \frac{Y}{X}
\]
Suppose
\[
p_x = 20
\]
\[
p_y = 10
\]
and this consumer’s income is
\[
I = 800
\]
What is this consumer’s optimal choice?

Price change

Queries:
- Which price changed?
- Did it rise or fall?
Substitution & Income Effects

The effects of a price change are separated into two conceptual components:
- the (pure) substitution effect
- the (real) price effect

Demand Relationships – Price Effects

- "Own-price" Relationship
  - Quantity demanded is inversely related to its own price.
- "Cross-price" Relationships
  - Substitutes – Quantity demanded is positively related to the prices of substitutes (Distinguish gross and net substitutes)
  - Complements – Quantity demanded is inversely related to the prices of complements (Distinguish gross and net complements)
- Some limitations of the two-good choice model for illustrating cross-price relationships.

“A diamond is forever.” – De Beers

- What is the relationship between a household’s income and its demand for diamonds?
- What other income relationships could we describe?
Demand Relationships – Income Effects

- A good is __ if:
  - Normal – quantity demanded is positively related to income.
  - Inferior – quantity demanded is inversely related to income.
  - Luxury – an increase in income results in a more-than-proportionate increase in quantity demanded.
    - or, as income rises, a greater share of total expenditures is spent on that good.
  - Non-luxury – an increase in income results in a less-than-proportionate increase in quantity demanded.
    - if, as income rises, a smaller share of total expenditures is spent on that good.
- Consumption paths (price- or income-consumption curves) and Engel curves
  - their shapes differ with each of the above classifications.

How would you classify the following? Imagine its income-consumption path.

- Limousine service
- Taxi service
- A subway ride
- Idaho potatoes
- Fresh salmon
- Chinese take-out
- Cellular phone service
- A house in the suburbs
- A rented efficiency apartment
- Granulated sugar

Consider the income-demand relationship for household sugar purchases.
Would you expect this relationship to vary from country-to-country? Why?

What do the expansion curves for sugar in the UK and India look like? How are they different? Why?

How would you classify these items? (Taken from Example 4.1 of Mansfield & Yohe, p. 94)
How would you classify the income effects of these items?
(Taken from Table 4.1 of Mansfield & Yohe, p. 102)

<table>
<thead>
<tr>
<th>Good or service</th>
<th>% change in consumption from a 1% increase in income</th>
<th>% change in consumption from a 1% increase in price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor vehicles</td>
<td>1.08</td>
<td>-0.25</td>
</tr>
<tr>
<td>Furniture and appliances</td>
<td>1.38</td>
<td>-0.72</td>
</tr>
<tr>
<td>Purchased meals</td>
<td>1.15</td>
<td>-0.34</td>
</tr>
<tr>
<td>Alcoholic beverages</td>
<td>0.12</td>
<td>-0.60</td>
</tr>
<tr>
<td>Clothing &amp; shoes</td>
<td>0.86</td>
<td>-0.45</td>
</tr>
<tr>
<td>Gasoline</td>
<td>0.60</td>
<td>-0.39</td>
</tr>
<tr>
<td>Telephone service</td>
<td>0.36</td>
<td>-0.34</td>
</tr>
<tr>
<td>Airline service</td>
<td>1.63</td>
<td>-0.21</td>
</tr>
</tbody>
</table>

Summary: Main Concepts

◆ How to find the consumer’s optimal choice
◆ Analyzing individual responses to change:
  - Price & income changes
  - Substitution and income effects
◆ Classifying goods as:
  - Substitutes, Complements, Normal, Inferior, Luxuries & Non-luxuries.
◆ Identifying some new features in the model:
  - Price- and income-consumption paths, Engel curve, revealed preference