Lecture 5: Consumer Surplus, Production and Supply

Session ID: DDEE

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Clicker Question
Willingness to Pay (WTP)

- Willingness to Pay is the maximum that a consumer is willing to pay for a good or service.

**Example:** WTP for Trump

- You are walking along in Kenmore Square just before the first Presidential Debate (9/26).
- In the window of the BU Bookstore you see a Donald Trump mask.
- The mask is scary, *really* scary, ...
- You think, “I really want that mask....”

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- You say to yourself...
- You think, “I’d be *willing to pay* up to $60 for that mask.”
- Then you notice a price tag on the mask. The price: $12.
- You rush in and buy the mask.
**Willingness to pay (WTP)** is the maximum you would pay.

- If WTP = $60, you would not be willing to pay $61.
- Of course, you are willing to pay $60,...
- and you would be happy to pay anything less than $60.
- In particular, you would be delighted to pay only $12.

Describing this situation, economists would say:

- Your **willingness to pay** = $60.
- The **price** = $12.
- Your **consumer surplus** = $48.

**Consumer surplus** is the monetary value of the benefit remaining to the consumer after the price is paid. \((CS = WTP – P)\)

Consumer surplus of a voluntary purchase will not be negative,...

...because the consumer **would not buy** a good that would give him a negative surplus (unless he is behaving irrationally).
The Production Process

The entire production process is a series of transformations in which the primary factors of production (or primary inputs)...

...gradually become the final goods and services used for consumption or as tools for production.

- goods are physical: apples, ...
- services are intangible: haircuts, ...
- Goods can be resold; services cannot be.

Inputs at stages of production between primary factors and final goods are called intermediate inputs.

Which inputs are the primary factors of production?
Primary Factors of Production

The *primary factors of production* are services that households provide as inputs into the productive process.

- Labor services: Productive work from human beings
- Capital Services: from productivity-increasing capital goods (tools)---in the form of physical, human and social capital.
- Land Services: from resources provided by nature

*Note: We often omit the word “services” from the names of primary factors.*

(We think of labor, capital goods and land as being owned and controlled by households.)
Availability of Primary Factors

- The availability of primary factors is determined both by economic and by noneconomic forces.
- The availability of labor depends on the working-age population and the labor-force participation rate.
  - Both are influenced by wage levels.
  - These are difficult issues, studied by demographers (experts in population) and labor economists.
- The availability of land is mainly determined by nature.
  - Exception: the Back Bay

- The availability of capital goods is the result of capital formation (the creation of tools).
- Capital formation is an economic process that occurs over time.
- The nature of capital formation is
  - sacrifice now,
  - have more later.

- Capital formation is the most important way that poor countries become rich countries.
Capital Formation Example: The Rabbit Hunter

- There was a cave woman who hunted rabbits for a living.
- When she saw a rabbit she would dive and try to grab it.
- Usually the rabbit escaped, and the hunter ended up with scrapes and bruises.

But when she caught the rabbit, she would dash its brains out on the rocks,…

…skin it, and tear off and eat the raw meat.

On the average, she caught only one rabbit a week—so she was always hungry.

She decided she could do better, …

and she engaged in the process of capital formation.
The cave woman decided to make a **sling (physical capital)**…

and become a **sling expert (human capital)** in order to hurl stones at the rabbits.

While she was **making the sling** and **learning to use it (investing)**, she couldn’t hunt much, …

…so she had to **sacrifice** some of her already low consumption (**saving**).

But when the sling was completed, she could use it **to kill one rabbit every day,**…

… so she had a lot more to eat (**returns to capital**).

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**Clicker Question**
Production and Supply

- Supply (the quantities that firms want to produce and sell at various prices) is determined by:
  - the amounts of primary factors and intermediate goods needed to produce desired quantities of output,
  - and the opportunity cost of primary factors and intermediate inputs used.

Example: Milk production by Farmer Jones

- To produce and sell milk, Farmer Jones uses:
  - Services of primary factors: farm land, farmers’ labor, farmers’ skill, dairy cows, barns, milking machinery…
  - Intermediate inputs: grain to feed cows, fuel, electricity, etc.

- The quantity of milk that Farmer Jones wants to sell at each price (his supply) is determined by:
  - the quantity of inputs he needs to produce different amounts of milk,
  - and the (opportunity) cost of those inputs.
The Supply Schedule

- The supply schedule specifies how much a firm wants to sell at various given prices.

**Example:** Farmer Jones’ supply of milk

<table>
<thead>
<tr>
<th>Price ($ )</th>
<th>Quantity (Qts/mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>10</td>
</tr>
<tr>
<td>0.40</td>
<td>20</td>
</tr>
<tr>
<td>0.60</td>
<td>40</td>
</tr>
<tr>
<td>0.80</td>
<td>60</td>
</tr>
<tr>
<td>1.00</td>
<td>80</td>
</tr>
<tr>
<td>1.20</td>
<td>120</td>
</tr>
</tbody>
</table>

Farmer Jones’ Supply Curve

**Farmer Jones Supply of Milk**

<table>
<thead>
<tr>
<th>P</th>
<th>Qs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>10</td>
</tr>
<tr>
<td>0.40</td>
<td>20</td>
</tr>
<tr>
<td>0.60</td>
<td>40</td>
</tr>
<tr>
<td>0.80</td>
<td>60</td>
</tr>
<tr>
<td>1.00</td>
<td>80</td>
</tr>
<tr>
<td>1.20</td>
<td>120</td>
</tr>
</tbody>
</table>

- How is the supply curve constructed?
Farmer Jones’ Supply curve is upward sloping:

- At a low price, he will want to sell only a small quantity of milk.
- But if he is offered a higher price, he will want to sell more milk.

Why??

Why does Farmer Jones’ supply curve slope upward?

- Why is Farmer Jones willing to supply more milk at higher prices?
- If he can earn a profit from producing milk, why doesn’t he produce the same amount at all reasonable prices?

**Answer:** Because higher prices justify using more expensive inputs to increase production.

- At $.20 per quart of milk, Farmer Jones would tell his cows to find their own food.
- At $.40 per quart of milk, he would buy food for them.
At $.80 per quart of milk, Farmer Jones would hire farm workers ...

At $1.20 per quart, he would ...

At high prices, his extra effort would yield more milk and a greater quantity would be supplied.

Also, at high milk prices, Farmer Jones might stop growing wheat to make room for more cows.

**Market Demand**

**Market demand** indicates the total quantity of a good demanded by *all buyers* in the market at any given price.

**Example:** Suppose there are 30 buyers in the market:

- 10 who are just like Emily
- and 20 who are just like Jane.
- What is their market demand?

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantities</th>
<th>Market Demand for 10 Emilys and 20 Janes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>120</td>
<td>10 x 120 + 20 x 100 = 3200</td>
</tr>
<tr>
<td>0.40</td>
<td>80</td>
<td>800 + 1200 = 2000</td>
</tr>
<tr>
<td>0.60</td>
<td>60</td>
<td>200 + 0 = 200</td>
</tr>
<tr>
<td>0.80</td>
<td>40</td>
<td>100 + 0 = 100</td>
</tr>
<tr>
<td>1.00</td>
<td>20</td>
<td>200 + 0 = 200</td>
</tr>
<tr>
<td>1.20</td>
<td>10</td>
<td>100 + 0 = 100</td>
</tr>
</tbody>
</table>
Market Demand Curve

- Market demand is graphed the same way as individual demand.

- **Price**, the independent variable, remains on the vertical axis.

- Individual quantities demanded at each price are added horizontally to find the **quantity demanded** by the entire market.

![Market Demand for Milk](image)

Market Supply

- The **market supply** is the total quantity offered by all sellers at various prices.

- **Example:** Suppose there are 30 farmers in the market who are just like Farmer Jones. What is the market supply?

<table>
<thead>
<tr>
<th>Price (p)</th>
<th>Quantity (q)</th>
<th>Market Supply for 30 Farmer Jones'</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>10</td>
<td>30 * 10 = 300</td>
</tr>
<tr>
<td>0.40</td>
<td>20</td>
<td>30 * 20 = 600</td>
</tr>
<tr>
<td>0.60</td>
<td>40</td>
<td>30 * 40 = 1200</td>
</tr>
<tr>
<td>0.80</td>
<td>60</td>
<td>30 * 60 = 1800</td>
</tr>
<tr>
<td>1.00</td>
<td>80</td>
<td>30 * 80 = 2400</td>
</tr>
<tr>
<td>1.20</td>
<td>120</td>
<td>30 * 120 = 3600</td>
</tr>
</tbody>
</table>

- The market supply curve is constructed the same way as the market demand curve is.
Clicker Question

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