Lecture 5: Consumer Surplus, Production and Supply

If you haven’t registered your clicker and subscription, do so later today. It isn’t too late. For instructions, see the course-website announcements.

Clicker Question
Emily’s demand curve for milk is downward sloping, because…
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 after studying economics all night.
  - In the window of the BU Bookstore you see a Donald Trump mask.
  - The mask is really scary.
  - You think, “I really want that mask. I absolutely must have it.”

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).
Clicker Question
If the willingness to pay is $120 and the price is $140, then how much ...

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, sewing machines,…
  - services are intangible: haircuts, university lectures,…
  - 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

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

- Capital Services: from productivity-increasing capital goods (tools)---in the form of physical capital, human capital and social capital.

- Land Services: provided by nature, sometimes called “natural resources”

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

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 determined by nature.
- Exception: Boston’s Back Bay

The availability of capital goods is the result of capital formation (the creation of tools).

Economic Growth

Many societies have become accustomed to annual growth in economic output (GDP).

In societies with low population growth, increases in economic output often imply increases in output per person.
- Between 1980 and 2015, real income per capita in China increased by a factor of more than 25, an annual growth rate of almost 10%.
- 750 million Chinese were lifted out of poverty.
- During the same period, real income per capita in the United States grew at an annual rate of less than 2%,…
- …and much of the increase in the US went to people who were relatively wealthy.
Sources of Economic Growth

- Economies grow because of
  - growth in the quantity of primary inputs, and
  - the use of new, more productive technologies.

- Growth in the amount of primary inputs
  - Labor input doesn’t grow much in advanced economies (or it may even shrink).
  - Neither does the amount of land, almost all created by nature.
  - But because of capital formation, the quantities of physical and human capital increase over time.

Capital Formation and Technological Change

- Experts estimate that in the last 70 years, 50% - 70% of economic growth comes from capital formation,…

- and the rest comes from new technologies (technological change).

- But new technology was the key to the Industrial Revolution.

- Look at Britain’s takeoff in the 18th century, the start of “capitalism.”

- Not much change in the other countries during that period.
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

- 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 let his cows 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 more farm workers...

At $1.20 per quart,…

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 Emlys and 20 Janes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emily</td>
<td>Jane</td>
</tr>
<tr>
<td>0.20</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>0.40</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>0.60</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>0.80</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>1.00</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>1.20</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

---

*EC101 DD & EE / Manove  Supply & Demand>Supply Curve>Upward Sloping>Why?*
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</th>
<th>Quantity</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></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

...a primary factor of production?