The Production Process

- The entire production process is a series of transformations in which inputs generated by the primary factors of production…

- …gradually become the final goods and services used for consumption or as capital goods (tools).

- Inputs at stages of production between primary-factor inputs and the creation of final goods and services are called intermediate inputs.
Primary Factors of Production

- The *primary factors of production* are resources that generate the initial inputs into the productive process.

- Economists usually assign the primary factors to one of three categories:
  - labor
  - capital goods
  - land

- The primary factors exist in limited quantities for long periods of time. They aren’t used up during the productive process.

- What inputs are generated by the primary factors?
  - Labor services: Productive work from human beings
- Capital Services: the use of productivity-increasing capital goods (tools)---in the form of
  - physical capital,
  - human capital and
  - social capital.

- Land or Natural-Resource Services: the use of resources provided by nature.

Availability of Primary Factors
- The availability of labor depends on
  - the working-age population (influenced by economic and social forces affecting the previous generation),
  - and the labor-force participation rate (influenced by economic and social forces affecting the current generation).
  - These are difficult issues, studied by demographers (experts in population) and labor economists.

- The availability of capital goods is the result of capital formation (the creation of tools).
The availability of *land* is determined by nature.

- **Example:** The Great Plains (western US)
- **Exception:** the Back Bay
- The BU campus is located here
- The dry land around Boston University was…

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**Clicker Question**

Social capital is productive mainly because

a. humans are social beings.

b. it facilitates voluntary exchange.

c. people enjoy parties and other social events.

d. happy people work harder.
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 more than 25 times, 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 from year to year in advanced economies (or it may even shrink).

- Neither does the amount of land or natural resources, almost all created by nature.

- But most modern economies have some saving, investment and capital formation, …

- … so that the quantities of physical and human capital increase over time.

Clicker Question

Which country had an annual growth rate per capita of about 10% between 1980 and 2015?

a. The United States
b. France
c. Japan
d. China
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).

- 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.

How to Promote Capital Formation

- Capital formation requires saving and investment.

- Obtaining savings can be difficult, especially in poor countries.
  - Will poor people save when they need all of their income to feed themselves and their families?

- In free market economies, investment has to be motivated by sufficient demand even when savings are available.
  - Increases in demand can promote the creation of new or expanded firms.
  - Incomes from these firms can increase demand further, a virtuous circle.
Production and Supply

- Supply (the quantities that firms want to produce and sell at each possible price) 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.
  
  - The selling price must justify production costs.

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 each possible price.

**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 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 to …

At $1.20 per quart, he would …

The extra cost of producing more milk is justified by high milk prices.

Farmer Jones will produce an additional unit whenever the price he gets for that unit is greater than its opportunity cost.

---

**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 Sophie.

- **What is their market demand?**

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantities</th>
<th>Market Demand for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emily</td>
<td>Sophie</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>
**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 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 Jones</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

Which is NOT a primary factor of production?

a. Labor
b. Energy
c. Capital
d. Land

End of Lecture 5