Chapter 4: The Market Forces of Supply and Demand

What is a market?

A group of buyers and sellers of a particular good or service.

They don't have to actually meet! (think about buyers and sellers of ice cream).

We will start by studying the forces of S and D in competitive markets.

A competitive market is a market in which:

There are many buyers and sellers so that each has a negligible impact on the market price.
Competition

1. Characteristics of a perfectly competitive market:
   a. The goods being offered for sale are all the same.
   b. The buyers and sellers are so numerous that none can influence the market price.

2. Because buyers and sellers must accept the market price as given, they are often called “price takers.”

   Agricultural markets provide good examples of perfect competition.

3. A market with only one seller is called a monopoly market.

4. A market with only a few sellers is called an oligopoly.

5. A market with a large number of sellers, each selling a product that is slightly different from its competitors’ products, is called monopolistic competition.

We will start by assuming perfect competition.
DEMAND

What determines the quantity demanded of ice cream?

Note: The quantity demanded is measured as an amount per unit of time.

<table>
<thead>
<tr>
<th>Price of ice-cream cones</th>
<th>Quantity demanded (in hundreds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Qd</td>
</tr>
<tr>
<td>$1.00</td>
<td>9</td>
</tr>
<tr>
<td>$2.00</td>
<td>6</td>
</tr>
<tr>
<td>$3.00</td>
<td>4</td>
</tr>
<tr>
<td>$4.00</td>
<td>3</td>
</tr>
<tr>
<td>$5.00</td>
<td>2</td>
</tr>
</tbody>
</table>

Demand curve

- Shows how many ice cream cones are demanded by “market” at different prices.

- If price is $2.00 per cone, then 6 hundred cones will be demanded.

Note: The slope is negative. As \( P \uparrow \Rightarrow Qd \downarrow \)
**LAW OF DEMAND:** Other things remaining the same (ceteris paribus), the higher the price of a good, the smaller is the quantity demanded.

Note: As prices change we go from one point on the curve to another. We move ALONG the demand curve. We get a change in the quantity demanded.

“A movement along the demand curve” gives “a change in the quantity demanded”

Note: *Ceteris paribus* means "other things being equal."

The demand curve is drawn assuming other things (prices of related goods, income, etc.) are being held equal.

When doing analysis it is important to keep in mind what is being held constant.
Other things that affect demand --- income

<table>
<thead>
<tr>
<th>P</th>
<th>Low income Qd (in hundreds)</th>
<th>High income Qd (in hundreds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.00</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>$2.00</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>$3.00</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>$4.00</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>$5.00</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

The demand curve has shifted.

“A shift in demand curve” means “change in demand”

“A movement along the demand curve” gives “a change in the quantity demanded”

*Change in demand* refers to entire demand curve.

*Change in quantity demanded* refers to movement along demand curve.
Factors that SHIFT demand curve

1. **Income**
   - NORMAL: income ↑ ⇒ D ↑ (R)
     income ↓ ⇒ D ↓ (L)
   - INFERIOR: income ↑ ⇒ D ↓ (L)
     income ↓ ⇒ D ↑ (R)

2. **Prices Of Related Products**
   - SUBSTITUTE: Ps↑ ⇒ D↑ (R)
     Ps↓ ⇒ D↓ (L)
   - COMPLEMENT: Pc↑ ⇒ D↓ (L)
     Pc↓ ⇒ D↑ (R)

3. **Tastes**
   - LIKE↑ ⇒ D↑ (R)
   - LIKE↓ ⇒ D↓ (L)

4. **Expected future prices**
   - Expect price to ↑ ⇒ D today ↑ (R)
   - Expect price to ↓ ⇒ D today ↓ (L)
Market Demand

To analyze how markets work need to look at total demand for ice cream.

Market demand = horizontal sum of everyone's demand

Market demand when price is $1.00 = my demand when P=$1.00 + your demand when P=$1.00 + your sister's demand when P=$1.00 +……

Market demand when price is $2.00 = my demand when P=$2.00 + your demand when P=$2.00 + your sister's demand when P=$2.00 +……

Assume there are only two individuals:

<table>
<thead>
<tr>
<th>P</th>
<th>Leo Qd (in hundreds)</th>
<th>Lola Qd (in hundreds)</th>
<th>Market demand Qd (in hundreds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.00</td>
<td>9 + 13 = 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$2.00</td>
<td>6 + 10 = 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.00</td>
<td>4 + 8 = 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$4.00</td>
<td>3 + 7 = 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5.00</td>
<td>2 + 6 = 8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CASE STUDY: Reducing Smoking

Consider two ways for public policymakers to reduce the quantity of smoking demanded.

1. Shift the D curve for cigarettes and other tobacco products.

Public service announcements, mandatory health warnings on cigarette packages, prohibition of cigarette advertising on television.

2. Try to raise the price of cigarettes.

Taxes.

**Question:** How much do smokers respond when price of cigarettes changes?
- a 10 percent increase in the price causes a 4 percent reduction in the quantity demanded.
- a 10 percent increase in the price causes a 12 percent drop in teenage smoking.

**Question:** How does the price of cigarettes affect the demand for illicit drugs, such as marijuana?
- Most studies of the data find that lower cigarette prices are associated with greater use of marijuana (appear to be complements not substitutes).
SUPPLY

<table>
<thead>
<tr>
<th>Price of ice-cream cones</th>
<th>Quantity supplied (in hundreds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.00</td>
<td>0</td>
</tr>
<tr>
<td>$2.00</td>
<td>3</td>
</tr>
<tr>
<td>$3.00</td>
<td>4</td>
</tr>
<tr>
<td>$4.00</td>
<td>5</td>
</tr>
<tr>
<td>$5.00</td>
<td>6</td>
</tr>
</tbody>
</table>

This is a supply curve.

Note: The slope is positive \( P^{\uparrow} \Rightarrow Q_{s}^{\uparrow} \)

LAW OF SUPPLY
Other things remaining the same, the higher the price of a good, the greater is the quantity supplied.

- As with demand, a change in the price of the good causes a movement along the curve.
- Any other factor that affects supply will shift the curve and cause a change in supply.
Factors that SHIFT the supply curve

1. Prices of productive resources (input prices)
   
   Input price ↑ ⇒ S↓ (L)
   Input price ↓ ⇒ S↑ (R)

2. Technology (for turning inputs into ice cream)
   
   Technology ↑ ⇒ S↑ (R)

3. Expectations concerning future prices
   
   Expect price to ↑ ⇒ S today↓ (L)
   Expect price to ↓ ⇒ S today↑ (R)

Market Supply

Just like market demand

Shows how the total quantity supplied varies as the price of the good varies

Horizontal sum of supply curves for all producers

Market supply when price is $1.00 = what my firm will supply to the market at P=$1 + what your firm will supply to the market at P=$1 + what your sister’s firm will supply to the market when P=$1.00 + ....
SUPPLY AND DEMAND TOGETHER

Factors that shift demand curve
1. Income
2. Price of related goods
3. Preferences
4. Expectations

Factors that shift supply curve
1. Costs
2. Technology
3. Expectations

EQUILIBRIUM

An equilibrium is a situation in which opposing forces balance each other.

Definition: A situation in which supply and demand have been brought into balance.

At the equilibrium price, the quantity of the good that buyers are willing and able to buy exactly balances the quantity that sellers are willing and able to sell.

Equilibrium price – price at which there is no automatic tendency for change.

Definition: The price that balances supply and demand
The actions of buyers and sellers naturally move markets toward the equilibrium.

Why?

<table>
<thead>
<tr>
<th>Price (dollars per cone)</th>
<th>Quantity demanded (hundreds of cones per month)</th>
<th>Quantity Supplied (hundreds of cones per month)</th>
<th>Shortage (-) or surplus (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>0</td>
<td>-9</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>3</td>
<td>-3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>5</td>
<td>+2</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>6</td>
<td>+4</td>
</tr>
</tbody>
</table>

*Suppose market price is above equilibrium price.*

Market price = 4 ⇒ Qs = 5 and Qd = 3 ⇒ Excess supply --- a surplus.

A surplus is a situation in which quantity supplied is greater than quantity demanded.

*There is an automatic tendency for the companies to lower their price.*

*Suppose market price is below equilibrium price.*

Market price = 2 ⇒ Qd = 6 and Qs = 3 ⇒ Excess demand --- a shortage.

A shortage is a situation in which quantity demanded is greater than quantity supplied.

*Automatic tendency for price to increase.*
Three steps to analyzing changes in equilibrium

1. Decide whether event shifts S curve, D curve, or both.
   (Start by drawing S and D curve and labeling the curves and the original equilibrium)

2. Decide whether the curve shifts to left or right.
   (After curve shifts the old curve is no longer relevant – it disappears.)

3. Use S and D diagram to examine how the shift effects equilibrium price and quantity.
Example: A change in demand
Suppose that one summer the weather is very hot.
How does this affect market for ice cream?

First two predictions:
• When $D$ increases (shifts out), both the equilibrium price and quantity increase.
• When $D$ decreases (shifts in), both the equilibrium price and quantity decrease.

Example: A change in supply
Suppose that, during another summer an earthquake destroys several ice-cream factories.
How does this affect market for ice cream?

Two more predictions:
• When $S$ increases (shifts out), the equilibrium price falls and the equilibrium quantity increases.
• When $S$ decreases (shifts in), the equilibrium price rises and the equilibrium quantity decreases.
Example: A change in both supply and demand
Earthquake and hot weather in same summer.
How does this affect market for ice cream?

Two possible outcomes.
\( a. \) Demand increases a lot while supply falls just a little
\( b. \) Supply falls substantially but demand increases just a little.

What happens to price and quantity when supply and demand shifts?

<table>
<thead>
<tr>
<th></th>
<th>An increase in supply</th>
<th>A decrease in supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>An increase in demand</td>
<td>( P ) ambiguous ( Q \uparrow )</td>
<td>( P \uparrow ) ( Q ) ambiguous</td>
</tr>
<tr>
<td>A decrease in demand</td>
<td>( P \downarrow ) ( Q ) ambiguous</td>
<td>( P ) ambiguous ( Q \downarrow )</td>
</tr>
</tbody>
</table>
Conclusions:

- One of the ten principles of economics we discussed is that markets are a good way to organize economic activity.

- Although it is too early to judge whether market outcomes are good or bad, we have begun to see how markets work.

- Prices are signals that guide economic decisions and thereby allocate scarce resources.

- Price ensures that S and D are in balance.