Econ 1A. Handout: Chapter 4. Market: Demand (DD) and Supply (SS).

1. Economics is about the choices that people make to cope with scarcity ⇒ These choices are guided by Benefit and Cost, and are coordinated through Goods and Factors of Production (Resources) Markets. ⇒ To understand how markets work, we study Demand (DD) and Supply (SS) and explain how Prices are determined and make prediction about prices change.

2. Market: Any arrangement that brings buyers (demanders) and sellers (suppliers) together and enables them to get information, make rational decision, and do business together.

3. Competitive Market: A market has so many buyers and sellers that no single buyer or seller can influence the price.

4.1. The behavior of buyers (DD)

Demand (DD)

4. Demand (DD): The negative relationship between quantity demanded (Q_d) and price (p) when all other influences on buying plans (i.e., prices of related goods, incomes, expected future prices, number of buyers, preferences) remain the same during a given time period.

5. DD can be specified as:

\[ Q_d = f(p; p', \text{exp}, \text{l, exl, n, t}), \]

where \( Q_d \) = quantity demanded, \( p = \) price, \( p' = \) the prices of related goods, \( \text{exp} = \) expected future prices, \( \text{l} = \) income, \( \text{exl} = \) expected income and credit, \( n = \) number of buyers, \( t = \) preferences.

6. Quantity demanded (\( Q_d \)): the amount of any good, service, or resource that people are willing and able to buy during a specified period at a specified price, i.e., one quantity at one price.

7. Demand (DD) is a list of quantities at different prices illustrated by a demand schedule and a demand curve.

8. Assumptions

(1) The law of demand: other things remaining the same, the higher the price of a good, the smaller is the quantity demanded, i.e., the relationship between \( p \) and \( Q_d \) is negative and the demand curve is downward sloping.

(2) Other influences (things) remain the same.
   (a) the prices of related goods (\( p' \)); (b) expected future prices (\( \text{exp} \)) (c) income (\( \text{l} \)); (d) expected future income and credit (\( \text{exl} \)); (e) number of buyers (\( n \)); (e) preferences (\( t \)).
9. Change in $Q_d$ (quantity demanded) vs Change in DD (demand)

(1) When the price of the good changes and other influences on buying plans do not change, there is a movement along the demand curve (DD), i.e., there is a change in quantity demanded ($Q_d$).

(2) When other influences on buying plans changes, there is a shift of demand curve, i.e., there is a change in demand (DD).

10. If a change in one of other influences increases (decreases) demand, the demand curve will shift rightward (leftward) $\rightarrow$ DD$\uparrow$($\downarrow$).
4.2. The behavior of sellers (SS)
Supply (SS)

11. Supply (SS): The positive relationship between the quantity supplied (Qₜ) and the price (p) when all other influences on selling plans (the prices of related goods, the prices of resources and other inputs, expected future prices, number of sellers, productivity) remain the same during a given time period.

12. SS can be specified as:

\[ Qₜ = f(p; p', pr, exp, n', T) \]

where \( Qₜ \) = quantity supplied, \( p \) = the price, \( p' \) = prices of related goods, \( pr \) = prices of resources and other inputs, \( exp \) = expected future prices, \( n' \) = number of sellers, \( T \) = productivity (technology or weather).

13. Quantity supplied (Qₜ): the amount of any good, service, or resource that people are willing and able sell during a specified period at a specified price, i.e., one quantity at one price.

14. Supply (SS) is a list of quantities at different prices illustrated by a supply schedule and a supply curve.

15. Assumptions:
(1). The law of supply: Other influences (things) remaining the same, if the price of a good rises (falls), the quantity supplied of that good increases (decreases), i.e., the relationship between \( p \) and \( Qₜ \) is positive and the supply curve is upward sloping. This is due to the increasing opportunity cost.
(2). Other influences (things) remain the same.
(a) the prices of related goods; (b) the prices of resources; (c) expectations; (d) the number of sellers; (e) productivity.

<table>
<thead>
<tr>
<th>Price (dollars per bottle)</th>
<th>Quantity supplied (millions of bottles per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.00</td>
</tr>
<tr>
<td>B</td>
<td>1.50</td>
</tr>
<tr>
<td>C</td>
<td>1.00</td>
</tr>
<tr>
<td>D</td>
<td>0.50</td>
</tr>
</tbody>
</table>

The table shows a supply schedule that lists the quantity of water supplied at each price if all other influences on selling plans remain the same. At a price of $1.50 a bottle, the quantity supplied is 11 million bottles a day.

The supply curve shows the relationship between the quantity supplied and price, other things remaining the same. The upward-sloping supply curve illustrates the law of supply. When the price rises, the quantity supplied increases; and when the price falls, the quantity supplied decreases.
16. **Change in \( Q_s \) (quantity supplied) vs Change in SS (supply)**

(1) When the price of the good changes and other influences on selling plans remain the same, there is a **movement along the supply curve** (SS), i.e., there is a change in quantity supplied (\( Q_s \)).

(2) When any other influences on selling plans change, there is a **shift of supply curve**, i.e., there is a **change in supply** (SS).

17. **If a change in one of other influences increases (decreases) supply, the supply curve will shift rightward (leftward) \( \rightarrow SS \uparrow (\downarrow) \)**

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A. Smith’s “Wealth of Nations” (1776)

(a) Resources are owned by citizen because there is the private property system.

(b) The economy is harmonious and requires the minimum of government interference.

(c) Each individual was motivated by **self-interest**, they each act for the good of the whole, guided by **invisible hand** and made possible by the free play of competition.

(d) **Free competition** was the essential ingredient of the efficient economy.
4.3. Economic Model: Market
18. Assumptions

a. Other influences (things) remain the same
DD: the prices of related goods (p'), expected future price (exp), income (I), expected income and credit (exI), number of buyers (n), preferences (t).
SS: the price of related goods (p'), prices of resources and other inputs (pr), expected future prices (exp), the number of sellers (n'), productivity (T) (technology or weather).
b. Given a time period
c. The laws of demand and supply hold.

19. DD, SS and market

<table>
<thead>
<tr>
<th>p</th>
<th>Qd</th>
<th>Qs</th>
<th>shortage (-)</th>
<th>pressure on P or surplus (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>8.5</td>
<td>11.5</td>
<td>3</td>
<td>↓</td>
</tr>
<tr>
<td>1.5</td>
<td>9.0</td>
<td>11.0</td>
<td>2</td>
<td>↓</td>
</tr>
<tr>
<td>1.0</td>
<td>10.0</td>
<td>10.0</td>
<td>0</td>
<td>→</td>
</tr>
<tr>
<td>0.5</td>
<td>12.0</td>
<td>8.0</td>
<td>-4</td>
<td>↑</td>
</tr>
</tbody>
</table>

1. Shortage (excess demand) = Q_s - Q_d <= 0 at a particular price.
2. Surplus (excess supply) = Q_s - Q_d > 0 at a particular price.
3. Q_s - Q_d = 0, i.e., Q_s = Q_d = equilibrium quantity, P = equilibrium price.
4. Equilibrium is a situation in which opposing forces balance each other.

Market equilibrium occurs where Q_s = Q_d.
5. Equilibrium Price: The price at which Q_d = Q_s. Equilibrium Quantity: The quantity at which Q_d = Q_s. At equilibrium, p = 1.0 and Q = 10.
6. Price (p) is a market’s automatic regulator.

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1. Market equilibrium occurs at the intersection of the demand curve and the supply curve.
2. The equilibrium price is $1.00 a bottle.
3. At the equilibrium price, the quantity demanded and the quantity supplied are 10 million bottles a day, which is the equilibrium quantity.
Predicting changes in equilibrium price and quantity

*Effects of changes in Demand (DD)*

20. An increase (A decrease) in demand (DD) raises (lowers) price (p) and raises (lowers) quantity supplied (Qs) and equilibrium quantity. *[Please read Figure 4.7 on p.96 carefully].*

(a) An increase in DD

**Cause:** Tap water is unsafe =>
Demand for bottled water increases
=> DD↑. SS→.
**Effect:** p↑, Q↑.

(b) A decrease in DD

**Cause:**
The price of a zero calorie sport drink falls (p'↓) =>
Demand for bottled water decreases
=> DD↓, SS→.
**Effect:** p↓, Q↓.
Effects of change in Supply (SS)
21. An increase (A decrease) in supply (SS) lowers (raises) price (p) and raises (lowers) quantity demanded (Qd) and equilibrium quantity. [Please read Figure 4.8 p.98 carefully]

(a) An increase in SS
   Cause: European water bottlers buy springs and open new plants in U.S.
   =>
   Supply of bottled water increases
   => SS↑, DD→.
   Effect: p↓, Q↑.

(b) A decrease in SS
   Cause: A drought dry up some springs =>
   Supply of bottled water decreases
   => SS↓, DD→.
   Effect: p↑, Q↓.
Effect of changes in Both Demand (DD) and Supply (SS) (Please read Figure 4.9 on p. 100 and Figure 4.10 on p. 101 carefully)

22. Both DD and SS change in the same direction

(a) Both DD and SS increase and by the same amount

Cause: DD↑ and SS↑
Effect: p→, Q↑

(b) Both DD and SS decrease and by the same amount

Cause: DD↓ and SS↓
Effect: p→, Q↓
23. Both DD and SS change in opposite direction

(c) DD increases and SS decreases by the same amount

Cause: DD↑ and SS↓
Effect: p↑, Q→

(b) Increase in demand and decrease in supply

1. An increase in demand shifts the demand curve rightward to D₁ and a decrease in supply shifts the supply curve leftward to S₁.
2. The price rises, but the quantity might increase or decrease.

(d) DD decreases and SS increases by the same amount

Cause: DD↓ and SS↑
Effect: p↓, Q→

(a) Decrease in demand and increase in supply

1. A decrease in demand shifts the demand curve leftward to D₁ and an increase in supply shifts the supply curve rightward to S₁.
2. The price falls, but the quantity might increase or decrease.
4.4. Price Rigidities

There are three possibilities that the price in a market does not adjust. (1) Price floor; (2) Price ceiling or price cap; (3) sticky price.

24. A price floor is a government regulation that places a lower limit on the price at which a particular good, service, or factor of production may be traded.

Example:
A minimum wage law is a government regulation that makes hiring labor for less than a specified illegal.

A Market for Fast-Food Servers

No regulation
(a) Equilibrium Price (wage rate) = $5 per hour.
(b) Equilibrium Quantity of fast-food servers = $5 = $5 = 5 (thousand) workers.

\[ W = \text{Wage rate (dollars per hour)} \]
\[ L = \text{Quantity (thousands of workers)} \]

Government introduces a minimum wage
(a) \( w_m = \$7 > w_o = \$5 \).
(b) \( L_s = 7 > L_d = 3 \). \( L_s - L_d = 7 - 3 = \text{unemployment} \).

Thus a minimum wage creates unemployment.

A minimum wage is introduced above the equilibrium wage rate. In this example, the minimum wage is $7 an hour.

1. The quantity of labor demanded decreases to 3,000 workers.
2. The quantity of labor supplied increases to 7,000 workers
3. 4,000 people are unemployed.
25. A **price ceiling** or **price cap** is a government regulation that places an *upper limit* on the price at which a particular good, service, or factor of production may be traded.

Example:

**A Market for Campus Parking Spaces**

*No regulation*
(a) Equilibrium Price = $p_o = $80 per month
(b) Equilibrium Quantity = $Q_o = 2$ (thousands of parking spaces).

1. Market equilibrium is determined by the demand for parking spaces and the supply of parking spaces.
2. The equilibrium price is $80 a month.
3. At the equilibrium price, 2,000 parking spaces are demanded and supplied.

**College administration introduces a price cap**
(a) $p_c = $40 < $p_o = $80.
(b) $Q_c = 1 < Q_d = 3$. $Q_c - Q_d = 1 - 3 = -2 = $shortage.
Thus a price cap creates a shortage.

The college administration caps the price of parking at $40 a month.
1. The number of parking spaces supplied is 1,000 spaces.
2. The number of parking spaces demanded is 3,000.
3. There is a shortage of 2,000 parking spaces.
26. Sticky Price

In most markets, a law or regulation does not restrict the price. However in some markets, the buyer and the seller agree on a price for a fixed period; and in the others, the seller sets a price that changes infrequently.

For examples:

(a) In some labor markets, firms sign long-term contracts with labor unions that fix wage rates for at least one year and often for as many as three years.
(b) Borrowers and lenders often agree on an interest rate that is fixed for the term of a loan, which could be for as long as 30 years.
(c) Many goods such as sugar, oil, and coal are traded in long-term with a fixed price.