

INTERMEDIATE MICROECONOMICS LECTURE 2 – REVIEW OF DEMAND, SUPPLY AND THE MARKET

In a market-oriented economy, the majority of price and output decisions are determined in the market through the forces of Demand and Supply.

A. DEMAND

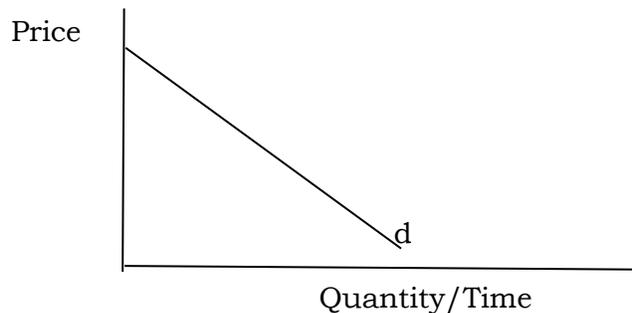
QUANTITY DEMANDED is the amount of a good that consumers are willing to purchase at each price per unit of time. The number of bottles of soda, for example, that an individual will buy per month is Q_d , or the quantity demanded of bottles of soda.

The amount of a good that consumers are willing to buy will depend on factors such as price of the good itself, the income level of the consumer, tastes or preferences for the good, price of substitute good (ex. coffee versus tea) or price of complements (cameras and film), number of buyers, etc.

The demand function is generally expressed as:

$$Q_d = Q_d (\text{Price, Income, Tastes or Preferences, Price of Substitutes and Complements, Number of Consumers})$$

Demand Curve for Bottles of Soda



The demand curve above shows the different quantities of bottles of soda that will be purchased at various prices per time period, holding the other factors that effect demand constant (*ceteris paribus*).

Notice that as the price of the good falls, more of the good will be purchased (*ceteris paribus*).

SUMMARIZING:

LAW OF DEMAND: As the price of the good rises ($P \uparrow$), the quantity demanded of the good falls ($Q_d \downarrow$) and as the price of the good falls ($P \downarrow$), the quantity demanded of the good rises ($Q_d \uparrow$), holding all other factors constant or *ceteris paribus*.

An easy way of writing the law of demand is:

$$\text{As } P \uparrow \Rightarrow Q_d \downarrow \text{ and as } P \downarrow \Rightarrow Q_d \uparrow, \text{ ceteris paribus}$$

We have specifically noted that various factors other than the price of the good itself will also determine the amount of a good demanded. For a given demand curve the movement along a demand results from a change in the price of the good and assumes other factor remain constant. However, if one of the other factors change, more or less of the quantity of a good will be demanded at a given price. Thus, a change in one of these factors will cause a shift of the demand curve either left or right, rather than a movement along the demand curve.

CHANGE IN QUANTITY DEMANDED - The movement along the demand curve resulting from a change in the price of the good. This holds all other factors constant.

CHANGE IN DEMAND - A shift in the demand curve resulting from a change in a factor other than the price of the good itself.

Major factors that shift the demand curve or cause a **Change in Demand** include:

1). Change in Income

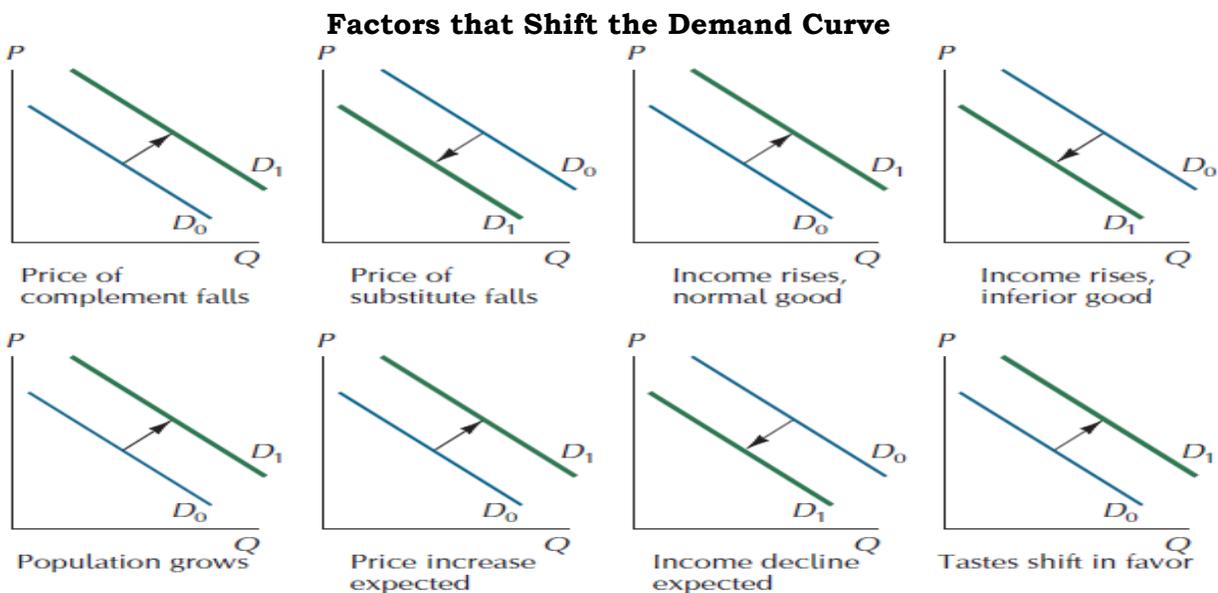
a). Normal Good - $I \uparrow \Rightarrow D \uparrow$ b). Inferior Good - $I \uparrow \Rightarrow D \downarrow$

2). Changes in Tastes or preferences

$T \uparrow \Rightarrow D \uparrow$ and $T \downarrow \Rightarrow D \downarrow$

3). Substitutes - Price of substitute good rises - Demand for good rises.
Price of substitute good falls - Demand for good falls

4). Complements - Price of complementary good rises - Demand for good falls.
Price of complementary falls - Demand for good rises.

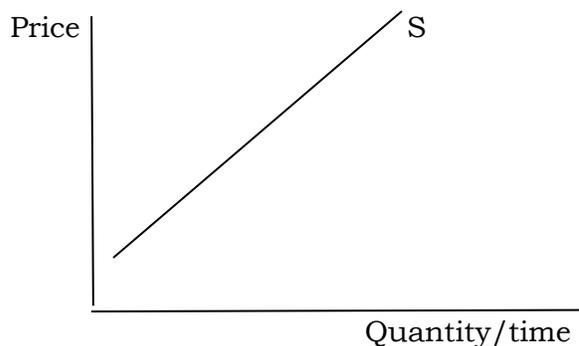


B. SUPPLY

QUANTITY SUPPLIED is the amount of a good that firms want to produce at each price per unit of time. The number of bottles of soda, for example, that the beverage manufacturer will produce per month is Q_s , or the quantity supplied of bottles of soda. The amount of a good that firms will produce will depend on such factors as the price of the good itself, the price of inputs used to produce the good, the level of technology, and the number of firms.

The supply function is generally expressed as: $Q_s = Q_s(\text{Price}, \text{Price of Inputs}, \text{Technology}, \text{Number of firms})$

Supply Curve for Bottles of Soda



The supply curve above shows the different quantities of bottles of soda that will be produced or made available for sale at various prices per time period, holding the other factors that effect supply constant (*ceteris paribus*).

Notice that as the price of the good rises, more of the good will be produced (*ceteris paribus*).

SUMMARIZING:

LAW OF SUPPLY: As the price of the good rises ($P \uparrow$), the quantity supplied of the good rises ($Q_s \uparrow$) and as the price of the good falls ($P \downarrow$), the quantity supplied of the good falls ($Q_s \downarrow$), holding all other factors constant or *ceteris paribus*.

An easy way of writing the law of supply is:

As $P \uparrow \Rightarrow Q_s \uparrow$ and as $P \downarrow \Rightarrow Q_s \downarrow$, *ceteris paribus*

Just as there was a difference between a change in quantity demanded and a change in demand, we can distinguish between a change in quantity supplied and a change in supply.

CHANGE IN QUANTITY SUPPLIED - The movement along the supply curve resulting from a change in the price of the good. This holds all other factors constant.

CHANGE IN SUPPLY - A shift in the supply curve resulting from a change in a factor other than the price of the good itself.

Major factors that shift the supply curve or cause a **Change in Supply** include:

1). Price of Inputs

Price of Inputs $\uparrow \Rightarrow S \downarrow$

Price of Inputs $\downarrow \Rightarrow S \uparrow$

2). Technology

Tech $\uparrow \Rightarrow S \uparrow$

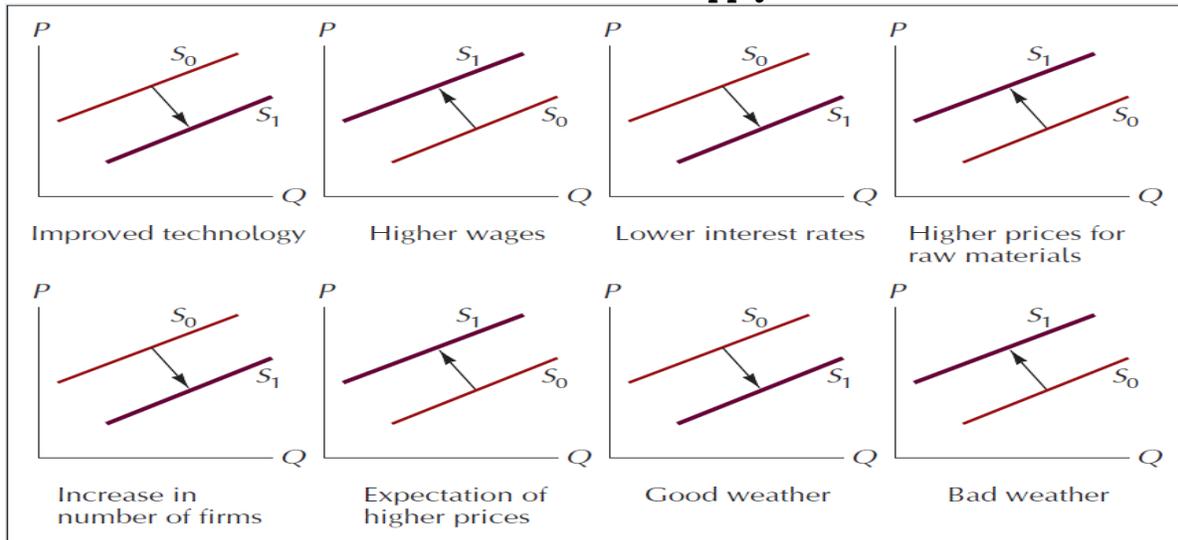
Tech $\downarrow \Rightarrow S \downarrow$

3). Number of Firms

Number of Firms $\uparrow \Rightarrow S \uparrow$

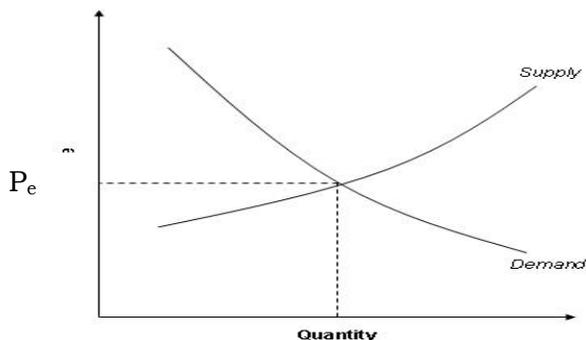
Number of Firms $\downarrow \Rightarrow S \downarrow$

Factors that Shift the Supply Curve



C. SYNTHESIS OF DEMAND AND SUPPLY

The two forces of supply and demand determine equilibrium price and quantity.



At P_e $Q_d = Q_s$

If $P < P_e$ $Q_d > Q_s$ Shortage

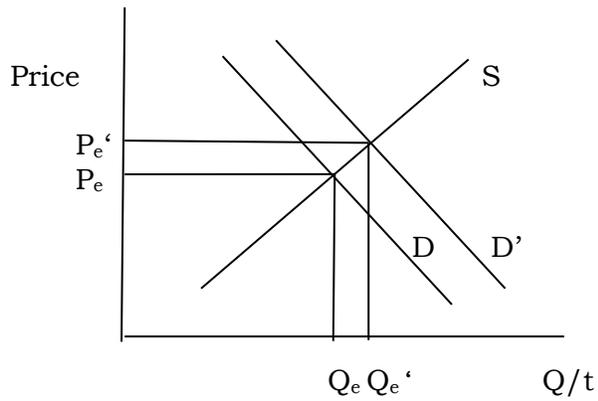
If $P > P_e$ $Q_s > Q_d$ Surplus

There is no guarantee that market prices will always be at equilibrium level. Actual or markets prices may differ.

Once the market is in equilibrium, there is no tendency for prices to change, unless a factor affecting the demand or supply curve changes. Should such a change occur, the market moves to a new equilibrium price and quantity.

Looking at Changes in Demand and Supply

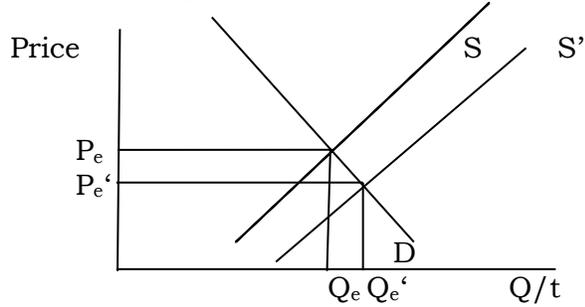
Figure 1



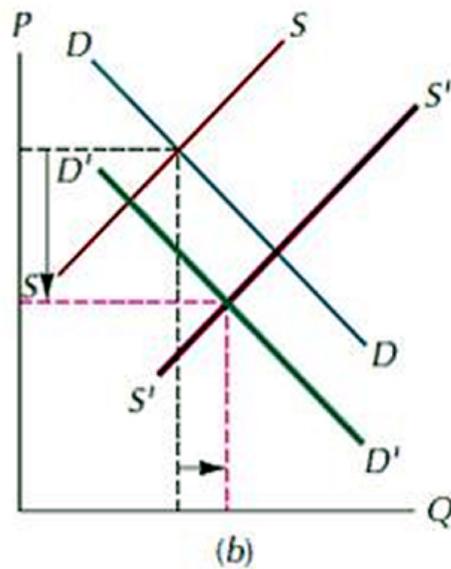
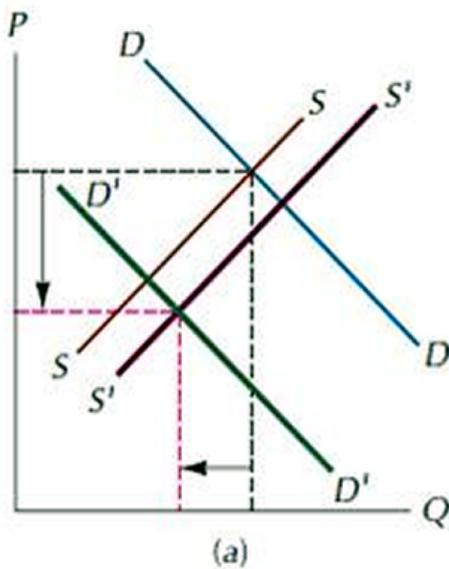
SUMMARIZING:

Increase in demand: $D \uparrow \Rightarrow P_e \uparrow$ and $Q_e \uparrow$
 Decrease in demand: $D \downarrow \Rightarrow P_e \downarrow$ and $Q_e \downarrow$
 Increase in supply: $S \uparrow \Rightarrow P_e \downarrow$ and $Q_e \uparrow$
 Decrease in supply: $S \downarrow \Rightarrow P_e \uparrow$ and $Q_e \downarrow$

Figure 2



You can give examples of changes in both Supply and Demand at the same time.



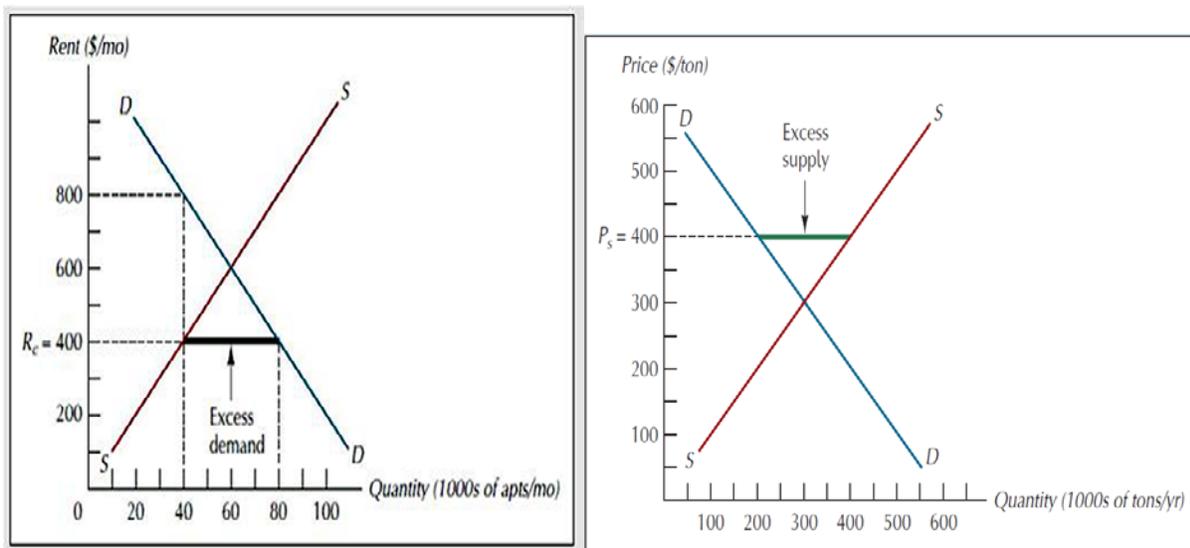
Effects of Government Intervention

Price Ceiling - The maximum price that can be charged in the markets

Without a price ceiling the market goes to equilibrium at P_e and Q_e . If a price ceiling of P_c is imposed, quantity supplied falls to A_1 and Quantity demanded rises to A_2 . A shortage of the good develops.

Price Floor or Price Support - The minimum price that can be charged in the markets

Without a price floor the market goes to equilibrium at P_e and Q_e . If a price floor of P_f is imposed, quantity supplied rise to Q_2 and Quantity demand falls to Q_1 (You can show these values). A surplus of the good develops.



Rationing function of price: the process whereby price directs existing supplies of a product to the users who value it most highly.

Allocative function of price: the process whereby price acts as a signal that guides resources away from the production of goods whose prices lie below cost toward the production of goods whose prices exceed cost.

Supply and Demand - A Mathematical Approach (We can use Q or q)

Supply-Demand Equilibrium Example:

$$Q_d = 1000 - 100P \qquad Q_s = -125 + 125P$$

$$\text{Equilibrium} \Rightarrow Q_d = Q_s \quad 1000 - 100P = -125 + 125P \quad \text{or} \quad 225P = 1125$$

$$P^* = 5 \qquad Q^* = 500$$

Shifts in Supply-Demand Equilibrium Example

What happens to the equilibrium price if either demand or supply shift?

A shift in demand will lead to a new equilibrium:

Original Supply and Demand

$$Q_d = 1000 - 100P \qquad Q_s = -125 + 125P$$

New Demand

$$Q'_d = 1450 - 100P \qquad Q'_d = 1450 - 100P = Q_s = -125 + 125P$$

$$\text{or } 225P = 1575$$

$$P^* = 7$$

$$Q^* = 750$$

Sometime we use the inverse demand and supply functions. That is, Price= f(Q).

Suppose we have the demand curve $Q_d = 20 - P$

The inverse demand function is $P = 20 - Q_d$

Suppose we have the supply curve $Q_s = -8 + P$

The inverse supply function is $P = 8 + Q_s$

If we solve original equations, in equilibrium we know that $Q_d = Q_s$, we arrive at:

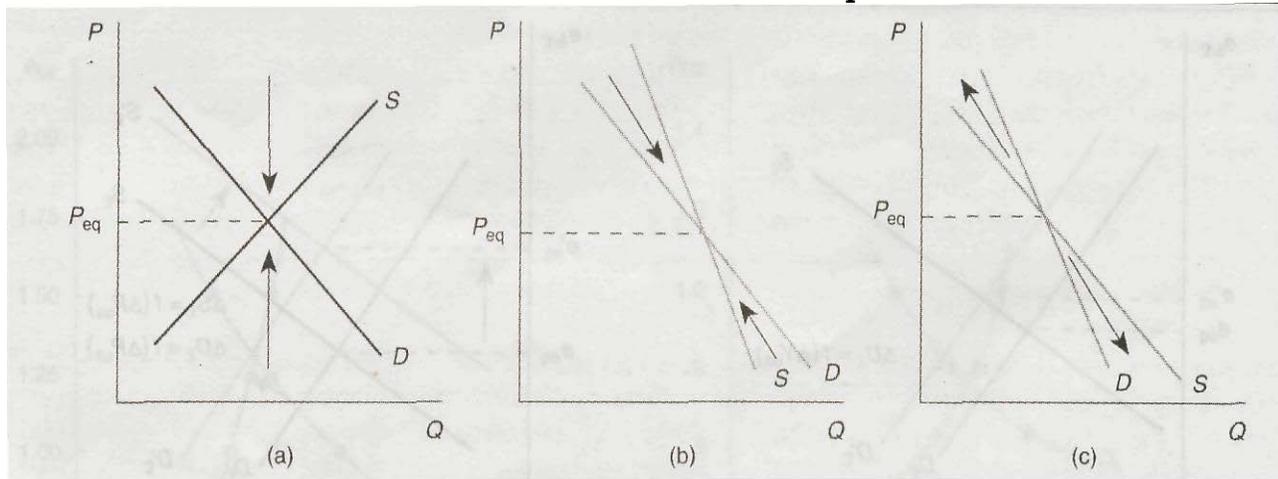
$$20 - P = -8 + P \quad \text{or } 2P = 28 \quad \text{or } P^* = 14$$

Substituting this back into either the supply or demand equation gives the equilibrium quantity of $Q^* = 6$

Solving using the inverse functions: $20 - Q_d = 8 + Q_s$ Since $Q_d = Q_s$

$$2Q = 12 \quad \text{or } Q^* = 6 \quad \text{and solving for P, } P^* = 14.$$

We Can Look at Stable and Unstable Equilibrium



More on Demand Functions

A demand curve for X can be written as follows, $Q_d = f(P_x, P_{other\ goods}, I, T)$ where I is for income and T is other facts such as tastes. This simply states that the quantity demanded is a function of the variables in the brackets.

So for a typical demand curve, all these other variables are constant -- only P_x changes along the curve.

$$Q_d = 800 - 6P_x - 5P_y + 10I$$

The following equation could be a demand curve:

How do we interpret this? **What does the “negative sign” tell us?**

Well it tells us the slope and that this is indeed a demand curve because the law of demand says there is an inverse relationship between quantity demanded and price.

What does the negative sign in front of P_y tell us?

It means that if the price of a related good goes up then the demand for X goes down. Therefore, this good must be a **complement** (like beer and peanuts. If it was a positive then the goods would be substitutes (like different kinds of beer).

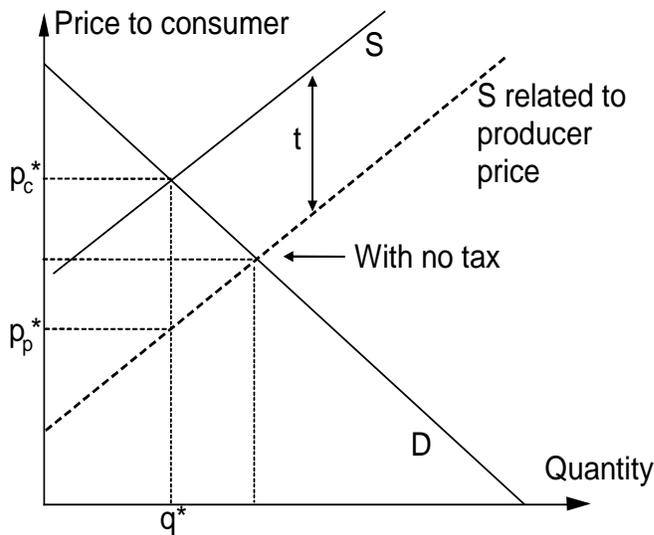
What does the positive sign in front of income tell us?

It means that if income goes up, then demand for X goes up -- therefore it is a normal good. If it were negative then it would be an inferior good.

We can also show supply functions in a similar way. **Give some examples.**

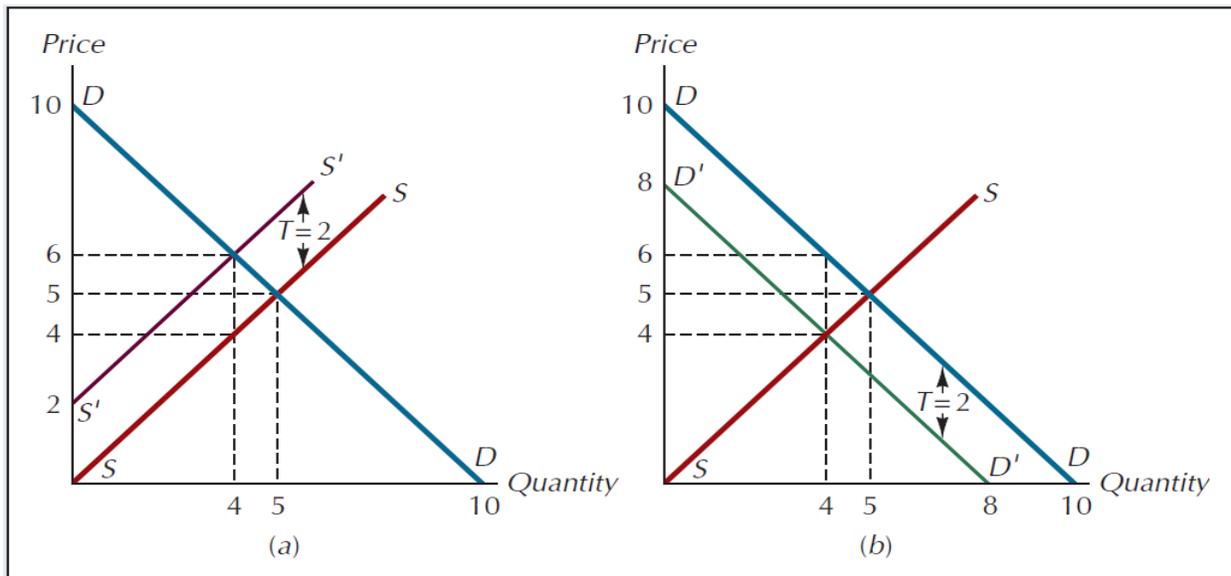
Applications of Demand and Supply Analysis

I. Tax incidence (who pays?)



Indirect tax: tax on sales of a particular good
 gap between what buyer pays (p_c)/what seller gets (p_p)
Per-unit tax: t per unit
 $Q_D = D(p_c)$
 $Q_S = D(p_p)$
 $Q_D = Q_S$
 $p_c = p_p + t$

A Tax on the Buyer Leads to the Same Outcome as a Tax on the Seller

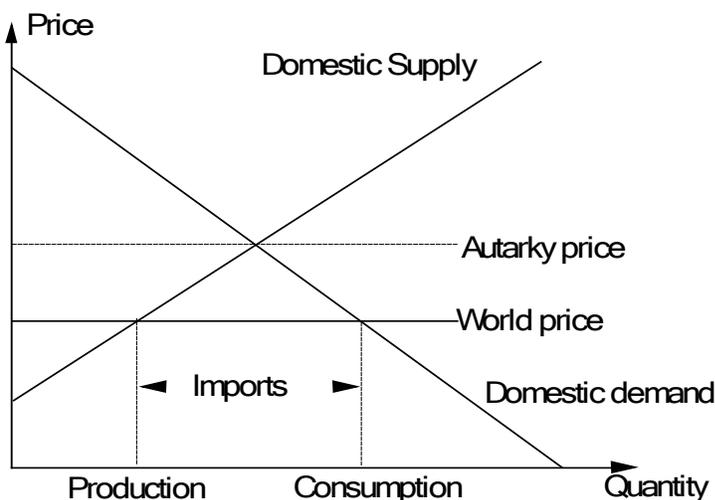


Note:

- (i) doesn't matter who formally pays
- (ii) incidence depends on slopes and elasticity – we will address later the concept of elasticity
- (iii) allocation: less produced and consumed

II. Effect on allocation due to imposition of tariff.

Small open economy



small = no effect on world price,
open = open to trade
partial equilibrium = look at single industry
Autarky price = price without trade

$$Q_D = D(p)$$

$$Q_S = S(p)$$

$$P = P_w$$

$$\text{Net imports} = Q_D - Q_S$$

Illustrating the J-Curve

J-curve - The pattern of change in the balance of trade after currency devaluation. The balance deteriorates initially as the local currency value of imports rises and export revenue falls. However, this is followed by an improved trend, as demand for imports falls owing to their costliness, while exports become more attractive due to their low price.

CASE I - Upward sloping supply curve of foreign exchange

1\$ = ¥200

Japan exports computers, USA exports wheat

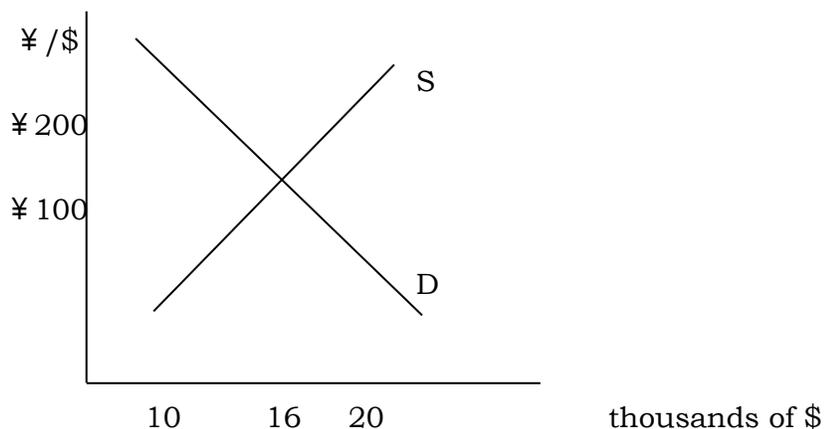
Forex	¥ Price	\$ Price	Demand
Japan Export (X) \$20,000 (Supply)	¥200,000	\$1000	20
Japan Imports (M) \$10,000 (Demand)	¥200,000	\$1000	10

$X - M = \$10,000$ Japan has trade surplus, USA has trade deficit

1\$ = ¥100

Forex	¥ Price	\$ Price	Demand
Japan Export (X) \$16,000 (Supply)	¥200,000	\$2000	8
Japan Imports (M) \$16,000 (Demand)	¥100,000	\$1000	16

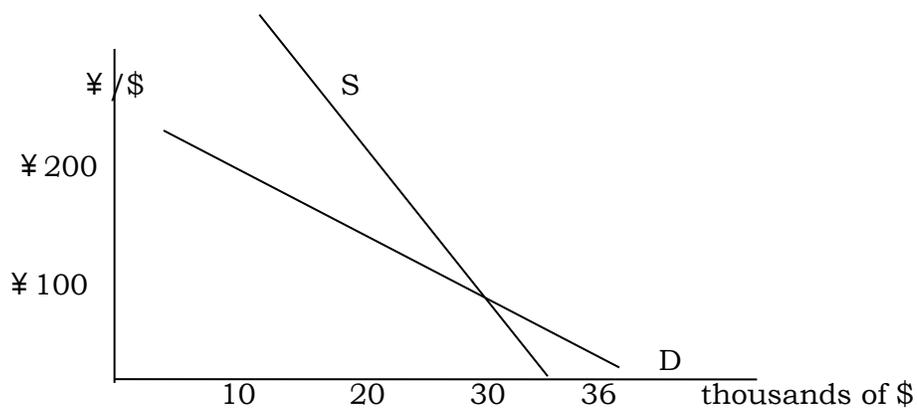
$X - M = \$0$ Balance of Trade

Draw the Supply and Demand Curves**CASE II - Downward sloping supply curve of foreign exchange (stable)****1\$ = ¥200****Japan exports computers, USA exports wheat**

<u>Forex</u>	<u>¥ Price</u>	<u>\$ Price</u>	<u>Demand</u>
Japan Export (X) \$20,000 (Supply)	¥200,000	\$1000	20
Japan Imports (M) \$10,000 (Demand)	¥200,000	\$1000	10

X - M = \$10,000 Japan has trade surplus, USA has trade deficit**1\$ = ¥100**

<u>Forex</u>	<u>¥ Price</u>	<u>\$ Price</u>	<u>Demand</u>
Japan Export (X) \$30,000 (Supply)	¥200,000	\$2000	15
Japan Imports (M) \$30,000 (Demand)	¥100,000	\$1000	30

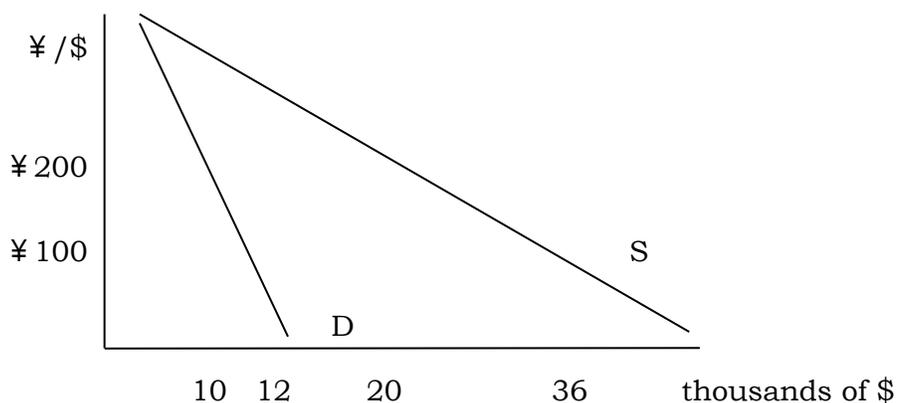
X - M = \$0 Balance of Trade**Draw the Supply and Demand Curves**

CASE III - Downward sloping supply curve of foreign exchange (unstable)**1\$ = ¥200****Japan exports computers, USA exports wheat**

<u>Forex</u>	<u>¥ Price</u>	<u>\$ Price</u>	<u>Demand</u>
Japan Export (X) \$20,000 (Supply)	¥200,000	\$1000	20
Japan Imports (M) \$10,000 (Demand)	¥200,000	\$1000	10

X - M = \$10,000 Japan has trade surplus, USA has trade deficit**1\$ = ¥100**

<u>Forex</u>	<u>¥ Price</u>	<u>\$ Price</u>	<u>Demand</u>
Japan Export (X) \$36,000 (Supply)	¥200,000	\$2000	18
Japan Imports (M) \$12,000 (Demand)	¥100,000	\$1000	12

X - M = \$24,000 Japan has trade surplus, USA has trade deficit**Draw the Supply and Demand Curves**

In case III, depreciation of the dollar is not effective in correcting a nation's trade balance. This is called elasticity pessimism. The Marshall-Lerner condition states that the sum of the elasticities of imports and exports with respect to the exchange rate must be greater than one for depreciation to cure a deficit.

$$E_x + E_m > 1$$