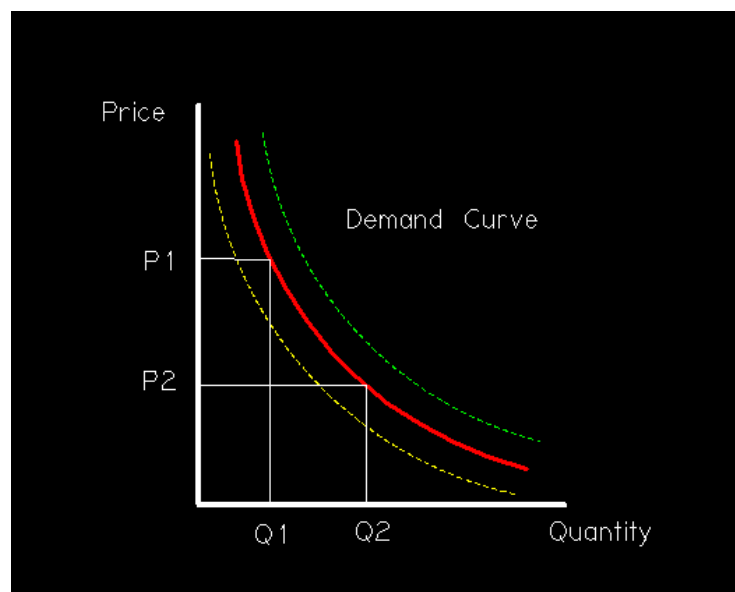


Lecture note#1: Demand and Supply Charts.

1-1 Demand Curve:



Each demand curve represents an income group, where the quantity Q increases relative to the decrease in the price P ; which implies a diverse affordability of the target groups. The price for Q_1 will be more than P_1 , if the red demand curve moved upwards to the green position, and the opposite will occur if it moved downwards to the yellow position. The equation of the demand curve could be in the following form: $P = T * Q^{-E}$, where T & E are constants. It is the power equation [$Y=T * X^{-E}$] of a fitting curve; we will discuss it in the coming lectures.

(See chapters #3&4, Paul A. Samuelson *et al*, Economics, 19e, McGraw Hill, NY, 2010, p.45 & p.65).



1-2 The fitting line of the demand curve (data).

It is based on assuming that the demand curve is the nearest fitting-line that represents the collected data of prices and the corresponding demanded quantities. Its ends intersect with Y and X axes at P_o and Q_o , respectively; where,

P_o , is the price above the affordability of the target group, i.e., $Q = \text{zero}$; and

Q_o , is the maximum demanded quantity, even if $P = \text{zero}$.



The slope of the straight line P_o-Q_o is Tan the angle Fi (ϕ), which is dividing the rise P_o over the run Q_o .

$$Tan \phi = P_o/Q_o = (P_o - P_1)/Q_1$$

$$Q_1 = Q_o [(P_o - P_1)/P_o]$$

Q_1 is the quantity for the price P_1 ; and Q_2 is the quantity for the price P_2 . To get the additional quantity for P_2 , one should subtract Q_2 from Q_1 , and so on in order to get the additional quantity for P_3 , etc.

General Equation: $Q_n = Q_o [(P_o - P_n)/P_o]$,

Where P_n is the diverse price/rent: P_1, P_2, P_3, P_4 , etc.; and Q_n is the corresponding demanded quantity of each price.

The general equation could be written as: $P_n = P_o - [(P_o/Q_o) * Q_n]$. Knowing that P_o/Q_o is the slope of the demand fitting-line; and both P_o and Q_o are constants for each demand fitting-line; and P_n is on the Y axis and Q_n is on the X axis; the last equation is similar to: $Y = a - b X$, where $a = P_o$ and $b = tan \phi = P_o/Q_o$.



1-3 Application:

The given information:

- Four different incomes in SR: 1500, 2800, 4200, and 5800
- Housing-rent represents 25% of the monthly income.
- **P_o = 3000 SR** [inaffordable rent] and **Q_o = 4500** [maximum housing-units].

Reckon the following, in Excel Spreadsheet.

- The affordable rent for each monthly income, and
- The quantity of houses for each monthly income.

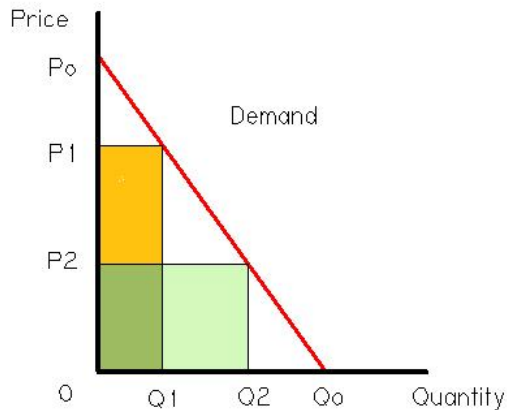
Solution:

P _o	3000
Q _o	4500

General Equation

$$Q_n = Q_o [(P_o - P_n)/P_o]$$

Income in SR	[P= 25% of monthly income] The affordable rent in SR		Quantities of Houses		Quantity of houses for each income	
5800	p1	1450	q1	2325	q1	2325
4200	p2	1050	q2	2925	q2-q1	600
2800	p3	700	q3	3450	q3-q2	525
1500	p4	375	q4	3937.5	q4-q3	487.5



Revenue is the product of multiplying the price P by the quantity Q ; in the above figure, revenue is represented by the area of a rectangle. For example:

- * At P_1 , revenue = $P_1 * Q_1$
- * At P_2 , revenue = $P_2 * Q_2$

The change of the revenue implies the **Price elasticity of demand (E)**, where E is the product of dividing the rate of increase in Q by the rate of decrease in P .

$$E = [2(Q_2 - Q_1)/(Q_1 + Q_2)] / [2(P_1 - P_2)/(P_1 + P_2)]$$

If $E > 1$, it means elastic demand (reducing the price increases the revenue);
If $E = 1$, it means neutrally elastic demand (revenue do not change); and
If $E < 1$, it means inelastic demand (reducing the price, reduces the revenue).

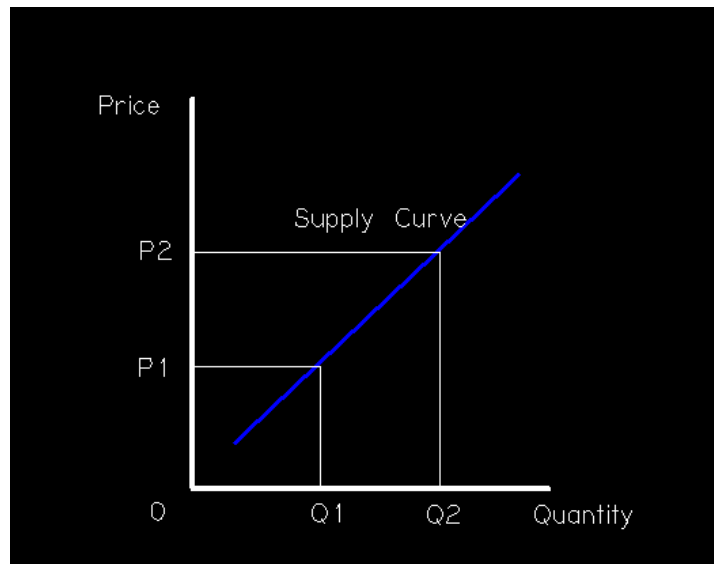
There are other forms of elasticity: (i) a perfectly elastic demand means the quantity increases while price do not change, as in infrastructure fees; and (ii) a perfectly inelastic demand means the price increases while quantity do not change, as the rent of valuable historic houses in conservation areas, i.e., in the protected inner city historic core. The revenue increases in the first case, and it is not likely to be the same in the other.

The following is an example of reckoning E , using the numbers of the above demand curve for houses.

$$\begin{aligned} \text{Elasticity } (P_1 \text{ to } P_2) &= [2(2925 - 2325)/(2325 + 2925)] / [2(1450 - 1050)/(1450 + 1050)] \\ &= [1200/5250] / [800/2500] \\ &= 0.2285.. / 0.32 \\ &= 0.71.. \text{ (inelastic demand).} \end{aligned}$$



1-4 Supply Curve [fitting line].



The supply curve is the opposite of the demand curve, where suppliers increase the production quantity relative to the increase of their revenues and profits.

1-5 Market Equilibrium.



Market equilibrium is a theoretical notion and represents a national aim; but although it occurs in reality, it might not last for a long period in some economies.