ECONOMICS MODULE 1

Recent Development in Demand Theory:

Pragmatic approach to demand analysis

- There are several economists who question the worth of various theories of consumer behaviour.
- Many economists have understood that the various approaches to utility are theoretically impressive. But it is very difficult for economists to relate this theoretic approach to elucidate the intricacy of the real world.
- Thus in order to keep away from this problem, many economists have used a pragmatic/practical approach to the theory of demand. The economists have acknowledged the law of demand which states that there exists a negative relationship between price and quantity demanded.
- It implies that as price rises, quantity demanded decreases and vice versa. The economists using law of demand formulated the demand functions directly on the basis of market data.
- They have formulated the demand functions without considering utility theory and the behaviour of the individual consumer.
- Individual demand function shows the functional relationship between the demand for a commodity by an individual and its determinants.
- These determinants are the price of the goods,the prices of related goods, the consumer's income, the consumer's taste & preference, the environmental factors and the expectations.

Individual demand function is represented as

$Q^d = f(Px, Pr, Y, T, S, E)$ where

Px = price of good

Pr= price of relatedgood

Y= consumer income

T=consumer taste and preference

S=Environmental Factor

E= Expectation

Qx stands for the quantity that consumer demands of good X. It is determined by many factors i.e. a multivariate relationship.

Demand function being a multivariate function is estimated using econometric methods. Such demand functions show the market behaviour of the consumers i.e. it is the behaviour of all consumers as a group and not the behaviour of single individuals. In most cases, the demand function refers to a group of commodities i.e. demand for food, demand for consumer durables, demand for commodity etc.

Economists face serious difficulties while estimating demand functions.

The aggregation of individual demand makes the use of index numbers inevitable. The problems with the usage of index numbers are numerous. Beside this, there are several estimation problems which impair the reliability of the demand functions estimated statistically.

One of the major difficulties arises when all the determinants of demand change simultaneously making it extremely difficult to assess the influence of each factor separately. There has been continuous improvement in econometrics technique and demand functions are easily estimated using these techniques.

The Constant Elasticity Demand Function:

The constant elasticity demand functions are the functions that are widely used in applied research and have constant elasticity. It can be written in functional form as:

$$Q_x = a.P_x^b.P_r^c.Y^d.e^{ft}$$

Where Qx is the quantity demanded of commodity X

$Px$is the Price of commodity X

Pr is the price of other related commodities.

Y is aggregate consumer income

eft is a trend factor for tastes where e is the natural logarithms

b is the price elasticity of demand

c is the cross price elasticity of demand

d is the income elasticity of demand

This demand function is known as constant elasticity of demand function because in this functional form the coefficients b,c and d are the price, cross and income elasticity of demand which is assumed to remain constant.

Let us prove that elasticity of demand remains unchanged under constant elasticity of demand function.

Proof

Let us first prove that b is the price elasticity of demand which remains constant.In order to prove this first express the above functional form in logarithmic form and then partially differentiate the function.

$$Q_x = a.P_x^b.P_r^c.Y^d.e^{ft}$$

Taking logarithm both sides, we obtain

$$\log Qx = \log a + b\ \log Px + c\ \log Pr + d \log Y$$

(For simplicity we are ignoring the term trend)

In order to calculate elasticity of demand, let us partially differentiate the function with respect to Px. We obtain

$$\frac{\partial \log Q_x}{\partial \log P_x} = b \ldots\ldots (1)$$

We know from the basic property of logarithm that the change of the logarithm of a variable is equal to the proportionate change of the variable. Let us apply this above property to the partial derivative of function with respect to price of commodity X, we obtain:

∂ logQx = ∂Qx /Qx and ∂ logPx = ∂Px/ Px .....(2)

By substituting (2) in (1) we get,

(∂Qx/ Qx)/ (∂Px/ Px)= b

$Qx = b\ Px^{b}/\ P\ b\ .\ Pr^{c}/\ P\ c\ .\ Y^{d}/\ P$

where P is the general price level

Here it is obvious that if prices and income are changing by the same proportion, say by t percent. This change in income and price will not affect the quantity demanded as it will appear in both numerator and denominator of the real income and relative price and thus cancel out. There is no change in quantity demanded. It implies that there is no money illusion in the consumer behaviour.

Distributed Lag Models of Demand:

- Dynamic version of Demand Functions: The dynamic version of demand function is shown with distributed lag models of demand.
- A current development in demand theory is the expression of demand function in dynamic form.
- The reason behind inclusion of lagged variables is that current purchasing decisions are influenced by past behaviour of individuals.
- Dynamic demand functions include lagged values of income & quantity demanded as a separate variable influencing the demand in any particular period. In order to express the demand function in dynamic form we must assume a particular relation between the past and the present.
- One of the most vital relationships is that current purchasing behaviour depends upon past level of demand and past level of income.
- We can classify this as demand for durable goods & non-durable goods. If the commodity is durable then past purchases represent the stock of this commodity which clearly affects the current and future purchases of the product.

- On the other hand, if the commodity is non-durable then past purchases represent the habit of the consumer which is acquired by purchasing and consuming the commodity in the past.
- Thus, this clearly affects current and
- future purchases of the product. These are the factors that are incorporated in the demand function to make it dynamic. Another major assumption is that the past level of income or demand has a greater influence on present consumption patterns than the more remote ones.
- The demand functions which include lagged values of demand or of income are called distributed lagged models. The distributed lagged function can be expressed as:

$$Qx(t) = f\{Px(t), Px(t-1), \ldots\ldots\ldots, Qx(t-1), Qx(t-2), \ldots\ldots\ldots, Y(t), Y(t-1), \ldots\ldots\}$$

Nerlove's Stock Adjustment Principle:

Nerlove has developed a model which is based on the stock adjustment principle. It is also known as the partial adjustment model. The partial adjustment model with constant speed of adjustment was suggested by Nerlove to justify the specification of distributed lags in his work on demand analysis for agriculture and other commodities.This model is used extensively in demand functions as well as investment functions.

This model is based on some behavioural assumption:

(i) There exists a desired level of capital stock which an entrepreneur requires to have a smooth production process.

(ii) The desired level of capital stock is determined by the variables that are controlling output such as price and cost.

(iii) The model of desired capital stock cannot be estimated because it is unobservable.

The demand function when the Nerlove's stock adjustment model is applied to consumer durables can be written in the form:

$$Q(t) = a.Y(t) + b.Q(t-1)$$

Derivation of model:

There is a desired level of durable goods which is given as $Qt*$
. This desired level of
durable goods are determined by current level of income. This can be written as
$Qt* = c.Y(t)$ .....(1)
It is very difficult for the consumer to acquire the desired level of durables immediately due to limited income, limited credits etc. Thus, the consumers acquire only a part of the desired level in each period. The acquisition of the desired level of durables by the consumers is gradual. So, in each period we come closer to $Qt*$
.In each period, the consumer purchase a certain quantity $Q(t)$
.The quantity that is purchased by the consumer in the previous period is denoted by $Q(t-1)$ The actual change in the quantity from the previous period is the difference $Q(t) - Q(t-1)$ This change in actual purchases
is only a fraction K of the desired change, $Qt* - Q(t-1)$
Thus, actual change is a fraction of desired change can be written as

$$Actual\ change = K(Desired\ Change)$$
$[Q(t) - Q(t-1)] = k[Qt* - Q(t-1)]$.....(2)

Rearranging the terms, we get
$Q(t) = (kc)Y(t) + (1 - k)\ Q(t-1)$
Now assume kc=a and (1-k)=b, we obtain the stock adjustment in its final form as:
$Q(t) = a.Y(t) + b.Q(t-1)$

Houthakkar's and Taylor's Dynamic Model:

The models of Houthakkar and Taylor are based on Nerlove's formula. They have extended the analysis of stock adjustment to non durable goods. The current demand for durable goods depends on the stock of such commodities. On the other hand, the current demand for non-durables goods depends upon the purchases of the commodities in the past. This is so because if the commodity is nondurable then past purchases represent the habit of the consumer which is acquired by
purchasing and consuming the commodity in the past. Thus, this clearly affects current and future purchases of the product. This would lead to a habit formation process. The demand function in case of non durable good can be written as:

$$Qt = a + b.Pt + c.\Delta Pt + d.Yt + e.\Delta Yt + f.Qt{-}1$$

Where Q is quantity demanded in period t
Pt **is the price in period t**
ΔPt **is the change in price between period t and t-1.**
Yt **is the income in period t**
ΔYt **is the change in income between period t and t-1.**

The demand function can be derived in following steps. Let us proceed with demand for a product in a particular period. Demand for a product in a particular period depends upon three factors-price of a product, stock of the commodity and on the current level of income. This can be expressed as:

$$Qt = g + h.Pt + i.St + j.Yt$$

Where Qt
is the demand for the product in period t
Pt **is the price in period t**
Yt **is the income in period t**
St is the stock of durable, if the demand function refers to durable goods

St is the stock of non-durable, if the demand function refers to non durable goods
The sign of the coefficient of S can be negative or positive.
The coefficient of S in case of durables will be negative. This is so because the more the quantity the consumer has, the lesser is the demand for such commodities.
The more wooden products, electronic gadgets we have, the less demand for these products. Thus, in the case of durables, the sign of S is negative
i.e. possessing a negative relationship. The coefficient of S in case of durables will be positive. This is because of our habits. The higher our purchases of non-durable goods, the stronger our habit becomes. Thus, in case of non-durables, the sign of S is positive i.e. possessing a positive relationship.
The stock, S cannot be measured. This is because of two reasons. First, the stock of durable goods are composed of various heterogeneous items. They may be of various ages.
For example, the gazette is not of the same age as any electronic equipment. Some products may be so old and need replacement. Some products are new. Some need to be scrapped etc. It is very difficult to measure stock because of this heterogeneity. We want to have stocks which are the sum of depreciated inventories of durable goods. But the appropriate depreciation rates are not known. Second, the stock of non durables i.e. the stock of habits is a psychological variable and cannot be quantified.

Linear expenditure system

- Linear expenditure system is a model which deals with groups of commodities rather than individual commodities.
- Addition of all such groups yields total consumer expenditure.
- Linear expenditure systems are widely used in aggregate econometric models where they provide disaggregation of the consumption function as desirable.

- One of the earliest models of the linear expenditure system was suggested by Richard Stone in1954.
- The linear expenditure system was formulated on the basis of utility function. The demand function under this model is derived by maximising the utility function subject to budget constraint.
- The approach of this model is same like approach of indifference
- curve. Indifference curve approach is basically used for handling commodities which are substitutes.
- On the other hand, linear expenditure system is applied to group of commodities between which substitution is not possible.
- The utility function is additive, showing that the total utility is the sum of utilities derived from various groups of commodities.
- Additivity implies that the utilities of various groups are independent.

Consumer Behaviour under Uncertainty and Risk

A person is given the choice between two scenarios: one with a guaranteed payoff, and one with a risky payoff with the same average value. In the former scenario, the person receives $50. In the uncertain scenario, a coin is flipped to decide whether the person receives $100 or nothing. The expected payoff for both scenarios is $50, meaning that an individual who was insensitive to risk would not care whether they took the guaranteed payment or the gamble. However, individuals may have different risk attitudes.A person is said to be:

- **risk averse (or risk avoiding)** - if they would accept a certain payment of less than $50 (for example, $40), rather than taking the gamble and possibly receiving nothing.
- **risk neutral** – if they are indifferent between the bet and a certain $50 payment.
- **risk loving (or risk seeking)** – if they would accept the bet even when the guaranteed payment is more than $50 (for example, $60).

The average payoff of the gamble, known as its **expected value** , is $50. The smallest dollar amount that an individual would be indifferent to spending on a gamble or guarantee is called the **certainty equivalent**, which is also used as a measure of risk aversion. An individual that is risk averse has a certainty equivalent that is smaller than the prediction of uncertain gains. The **risk premium** is the difference between the expected value and the certainty equivalent. For risk-averse individuals, the risk premium is positive, for risk-neutral persons it is zero, and for risk-loving individuals their risk premium is negative.

St. Petersburg Paradox

A coin is flipped until a head appears on the nth flip, at which the player is paid Rs. 2". If Xi represents the prize awarded when the first head turns up on the ith trial, then

$$X_1 = \text{Rs.}2,\ X_2 = \text{Rs.}4,\ X_3 = \text{Rs. } 6,\ \ldots\ldots X_n = 2^n.$$

The probability of getting a head for the first time on the ith trial , is (i)'. see that it is the probability of getting (i - 1) tails and then a head. Hence, the probabilities of prizes,

$$\pi_1 = \frac{1}{2}, \pi_2 = \frac{1}{4}, \pi_3 = \frac{1}{8}, \ldots\ldots\ldots \pi_n = \frac{1}{2^n}.$$

The expected value of the game is

$$\sum_{i=1}^{\infty} \pi_i X_i = \sum_{i=1}^{\infty} 2^i \frac{1}{2^i}$$

$$= 1 + 1 + 1 + \ldots\ldots\ldots + 1 + \ldots\ldots = \infty.$$

Since the expected value of the game is m, how much would you be willing to pay to play this game? Perhaps, not more than a few rupees. Thus, the game in this sense is not worth its large expected value (no taker to enter it).
As a solution to this paradox, it was argued that individuals attached negative **'utility value' to expected 'monetary value'.**

Because utility may rise less rapidly than the monetary value of the prizes, the utility value of the game will fall short of its monetary value. Thus, uncertain prospects are worth less in utility terms than certain ones, even when expected tangible payoffs are the same.

Neuman-Morgenstern utility Index

To begin, suppose that there are n possible prizes that an individual might win by participating in a lottery. Let these prizes be denoted by x1, x2, ..., xn and assume that these have been arranged in order of ascending desirability. Therefore, x1 is the least preferred prize for the individual and xn is the most preferred prize. Now assign arbitrary utility numbers to these two extreme prizes. For example, it is convenient to assign

U (x1) = 0,

U (xn) = 1,

But any other pair of numbers would do equally well.7 Using these two values of utility, the point of the von Neumann–Morgenstern theorem is to show that a reasonable way exists to assign specific utility numbers to the other prizes available. Suppose that we choose any other prize, say, xi. Consider the following experiment. Ask the individual to state the probability, say, πi, at which he or she would be indifferent between xi with certainty, and a gamble offering prizes of xn with probability πi and x1 with probability ð1 πiÞ. It seems reasonable (although this is the most problematic assumption in the von Neumann–Morgenstern approach) that such a probability will exist:

The individual will always be indifferent between a gamble and a sure thing, provided that a high enough probability of winning the best prize is offered. It also seems likely that πi will be higher the more desirable xi is; the better xi is, the better the chance of winning xn must be to get the individual to gamble. The probability πi therefore measures how desirable the prize xi is. In fact, the von Neumann–Morgenstern technique is to define the utility of xi as the expected utility of the gamble that the individual considers equally desirable to xi:

U (xi) =πi · U (xn) (1- πi) · U (x1).

Because of our choice of scale in Equation, we have

U (xi) =πi · 1 +(1 − πi) · 0 =πi.

By judiciously choosing the utility numbers to be assigned to the best and worst prizes, we have been able to devise a scale under which the utility number attached to any other prize is simply the probability of winning the top prize in a gamble the individual regards as equivalent to the prize in question. This choice of utility numbers is arbitrary. Any other two numbers could have been used to construct this utility scale, but our initial choice is a particularly convenient one

Friedman-Savage Hypothesis

Under the relative income hypothesis, current consumption depends on current income relative to previous peak income.

Consequently, current consumption depends on more than current income.This is also true in the case of the permanent income hypothesis developed by Milton Friedman.

Under the permanent income hypothesis, current consumption depends on current income and anticipated future income. This view is intuitively plausible. For example, if a household receives current income which is appreciably less than it anticipates in the future, the household is likely to consume more than is suggested by the level of its current income.

Friedman's permanent income hypothesis is based on three fundamental propositions. (I), a household's actual income, v, and consumption, c, in a particular period may be separated into permanent and transitory components. In other words,

$y = y_p + y_t$

and

$c = c_p + c_t$

where the subscripts p and t stand for permanent and transitory, respectively.

According to Friedman, permanent income is the amount a household can consume while keeping its wealth intact. By wealth, Friedman means the present value of the income expected to accrue to the household in the future. Since permanent income is, in part, based on the household's anticipated future income, it is a long run concept.

Since permanent income depends on future income, it cannot be measured directly. In his empirical work, Friedman regards permanent income as a weighted average of current and past incomes, with the current year weighted more heavily and prior years weighted less and less heavily, it is less variable than current income.

Transitory income may be interpreted as unanticipated income; it may be either positive or negative. For example, farmers may receive more income than anticipated because of unusually good weather, or they may receive less income because of exceptionally bad weather. Similarly, an individual may earn less than anticipated because of illness.

If a household's transitory income is positive, its actual income exceeds its permanent income. On the other hand, if its transitory income is negative, the reverse is true. By its nature, transitory income is regarded as temporary.

According to Friedman, a household's actual consumption may also be divided into **permanent and transitory components**.

Permanent consumption is consumption determined by permanent income. **Transitory consumption** may be interpreted as unanticipated consumption, such as unexpected doctor bills, unusually high (or low) heating bills, and the like.

Transitory consumption, like transitory income, may be either positive or negative. If it is positive, a household's actual consumption is greater than its permanent consumption. If it is negative, the opposite is true. Like transitory income, transitory consumption is regarded as temporary. Friedman assumes that permanent consumption is a constant proportion, n, of permanent income.

In equation form,

$$c_p = n\, y_p \ (0 < n < 1).$$

Although n is independent of the absolute level of permanent income, it depends on the interest rate and a number of other variables.

Friedman assumes that there is no relationship between transitory and permanent income, between transitory and permanent consumption, and between transitory consumption and transitory income.

The first assumption implies that transitory income is random with respect to permanent income; the second implies that transitory consumption is independent of permanent consumption.

The last assumption—that transitory consumption is random with respect to transitory income—implies that the marginal propensity to consume from transitory income is zero. This means that a household fortunate enough to receive positive transitory income will not alter its consumption .

Instead, the household will save the additional income. Similarly, if a household is unlucky enough to receive negative transitory income, it will not reduce its consumption. Rather, it will reduce its savings.

Based on the three propositions, a household is assumed to plan its consumption on the basis of its permanent income with permanent consumption equal to a constant proportion, n, of its permanent income. Consequently, under the permanent income hypothesis, the basic relationship between consumption and income is denoted by the long-run consumption function.

Risk-Return Tradeoff

The risk-return tradeoff is the trading principle that links high risk with high reward. The appropriate risk-return tradeoff depends on a variety of factors including an investor's risk tolerance, the investor's years to retirement and the potential to replace lost funds. **Time also plays an essential role in determining a portfolio with the appropriate levels of risk and reward.**

For example, if an investor has the ability to invest in equities over the long term, that provides the investor with the potential to recover from the risks of bear markets and participate in bull markets, while if an investor can only invest in a short time frame, the same equities have a higher risk proposition.

Investors use the risk-return tradeoff as one of the essential components of each investment decision, as well as to assess their portfolios as a whole. At the portfolio level, the risk-return tradeoff can include assessments of the concentration or the diversity of holdings and whether the mix presents too much risk or a lower-than-desired potential for returns.

Bandwagon effect

- The existence of positive network externalities gives rise to the Bandwagon effect.
- Bandwagon effect refers to the desire or demand for a good by a person who wants to be in style because possession of a good is in fashion and therefore many others have it.
- It may be noted that this bandwagon effect is the important objective of marketing and advertising strategies of several manufacturing

companies who appeal to go in for a good as people of style are buying it.

- This is illustrated in Figure on whose X-axis we measure the number of units of a good in question.
- Suppose consumers think that only 10 thousand people in Delhi have purchased the goods.
- This is a relatively small number of people compared to the total population of Delhi.
- So the other people have little incentive to buy the goods to satisfy their instinct of living in style.
- However, some people may still purchase it because it has an intrinsic value for them. In this case the demand for the good is given by the demand curve D10.
- Now suppose that they think that 20 thousand people have purchased the goods. This increases the attractiveness of the good for them.
- As a result, they are induced to buy more of the goods to keep themselves to live in fashion or style.
- This leads to the increase in the demand for the good which causes the demand curve for the good to shift to the right, say to D20.
- If the people believe that 30 thousand people have purchased the good in question, this further raises the attractiveness of the good and as a result people's demand curve for the good further shifts to the right, say to D30.
- Thus, more the number of people the consumers find have bought the goods, the greater the demand for the good in question and further to the right demand curve for the good lies. This is a bandwagon effect.
- Thus, a bandwagon effect is an example of a positive network externality in which the quantity demanded of a good that an individual buys increases in response to the increase in the quantity purchased by other individuals.

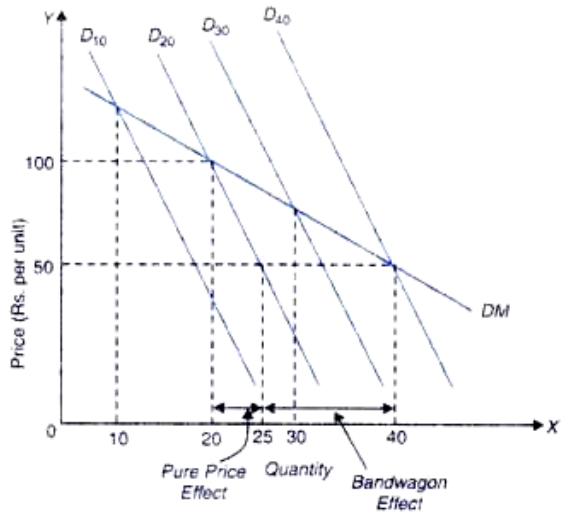


Fig. 6.4. Bandwagon Effect

- In due course of time people come to know how many people actually buy the goods. However, in addition to the bandwagon effect, the quantity demanded of the good depends on the price of the good.
- If the price of the good in question is Rs. 100, and at it 20 thousand people buy 20 thousand units of the good, the relevant demand curve is D20.
- Now, if the price of the good falls to Rs. 50, 40 thousand people buys 40 thousand units of the good and the relevant demand curve is D40.
- Thus, actual market demand curve DM incorporating the Bandwagon effect is obtained by joining the points on the demand curves D10, D20, D30, D40 that correspond to the quantities 10 thousand, 20 thousand, 30 thousand and 40 thousand units of the good.
- It should be noted that the movement along the demand curves D10, D20, D30, and D40 individually represent how much quantity of a commodity is demanded at various prices if no bandwagon effect is operating.
- Thus, if the price of a good falls from Rs. 100 to Rs. 50 per unit, the quantity demanded of the good will increase to 25 units of the good along a given demand curve D20 as a result of pure price effect when no bandwagon effect is working.
- However, actually as a result of fall in price and resultant increase in the quantity purchased of the good by others has created a bandwagon

effect and as a result at price of Rs. 50 per unit, quantity bought of the good increases to 40 thousand units.

- Thus, the 15 thousand units increase in the quantity demanded is the result of the bandwagon effect. It is also evident from this analysis that the bandwagon effect makes the demand curve more elastic.
- It will be seen that the demand curve DM which incorporates the bandwagon effect is more elastic than the demand curves D10, D20, D30, and D40.

Snob Effect:

The snob effect occurs when the demand curve is positive. That is, when the relationship between price and demand is positive. The curiosity of the snob effect is that if the price increases, the demand increases. And vice versa, if the price falls, the demand falls. Unlike normal goods .

The term snob refers to those people who imitate the behaviours of those people whom they consider superior or distinguished in some area. The etymology of the name from Latin clarifies the true meaning of the term. Words that in **Latin meant 'no nobility'.** Therefore, the snob effect is the effect that is produced thanks to this type of behaviour. People who are not distinguished, but who acquire exclusive or differentiated goods as if they were truly distinguished.

Snob effect is illustrated in Figure where on the X-axis we measure the quantity demanded of a snob good and on the y-axis price of the good in lakhs (Rs.).**Negative Externality and Snob Effect**

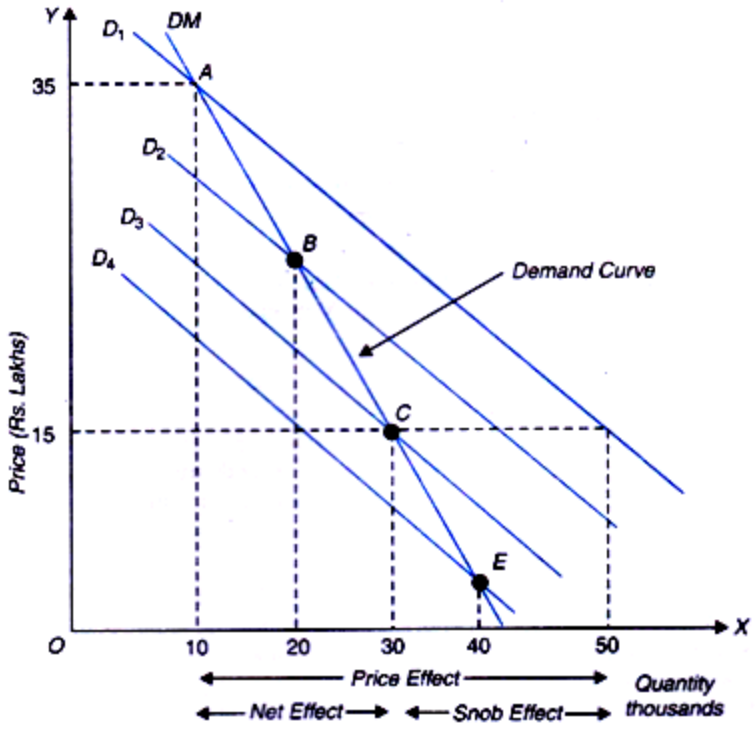


Fig. 6.5. *Negative Externality and Snob Effect*

Suppose D1 is the relevant demand curve when people think that one thousand people own the commodity having a snob value. Now suppose that people think that 20 thousand people are having this good, its snob-value is lowered and as a result demand for the good decreases and demand curve shifts to the left to D2 position.

Again, if people believe that 30 thousand people happen to own the commodity, its snob value or prestige value is further reduced. As a result, desire or demand for it is further reduced and the demand curve further shifts to the left. Further, if it is thought that 40 thousand people possess the goods, the relevant demand curve is D4.

Example of snobbish effect

Below we will present a series of examples on products that are usually considered exclusive.

- **Wines:**It is usually considered that the higher the price of a wine, the higher its quality. In certain strata wines are consumed, the more expensive the better. The prestigious wine tasters can affect the price and demand of a wine.
- **Brand clothing**:There are certain brands, the price of which does not correspond to the materials used. A wool sweater without a brand will be much cheaper than a wool sweater from the Lacoste brand. If Lacoste lowered the price of its products, in the long term it would lose demand. Why? Because the appeal of brands like Lacoste, regardless of the quality of their products, is their exclusivity. It is not carried by everyone, because it is not affordable. If the price fell, I would lose that appeal.
- **Luxury cars:**The speed allowed on the roads is limited, so no matter how powerful a car is, it will not be able to fulfil its transport function faster. To a certain extent, due to reliability, safety, mechanics and comfort, the price increase makes sense. However, there are luxury cars characterised by their power and elements in great detail. People buy those cars because it is the way to make sure that few people will take them. The more expensive and exclusive the more people of that class will want it.

The snob effect is a rich source of studies concerning consumer choice. A consumer does not always buy the optimum economically speaking. Which explains that we are not always totally rational.

ENTRI

THE VEBLEN EFFECT

- Although the theory of conspicuous consumption as developed by veblen and others is quite a complex and subtle sociological construct
- We can, for our purposes, quite legitimately abstract from the psychological and sociological elements and address our attention exclusively to the effects that conspicuous consumption has on the demand function.
- The essential economic characteristic with which we are concerned is the fact that the utility derived from a unit of a commodity employed for purposes of conspicuous consumption depends not only on the inherent qualities of that unit, but also on the price paid for it.
- It may, therefore, be helpful to divide the price of a commodity into two categories; the real price and the conspicuous price.
- By the real price we refer to the price the consumer paid for the commodity in terms of 'The conspicuous price is the price other people think the consumer paid for the commodity' and which therefore determines its conspicuous consumption utility.
- These two prices would probably be identical in highly organised markets where price information is common knowledge.
- In other markets, where some can get "bargains" or special discounts the real price or conspicuous price need not be identical. In any case, the quantity demanded by a consumer will be a function of both the real price and the conspicuous price.

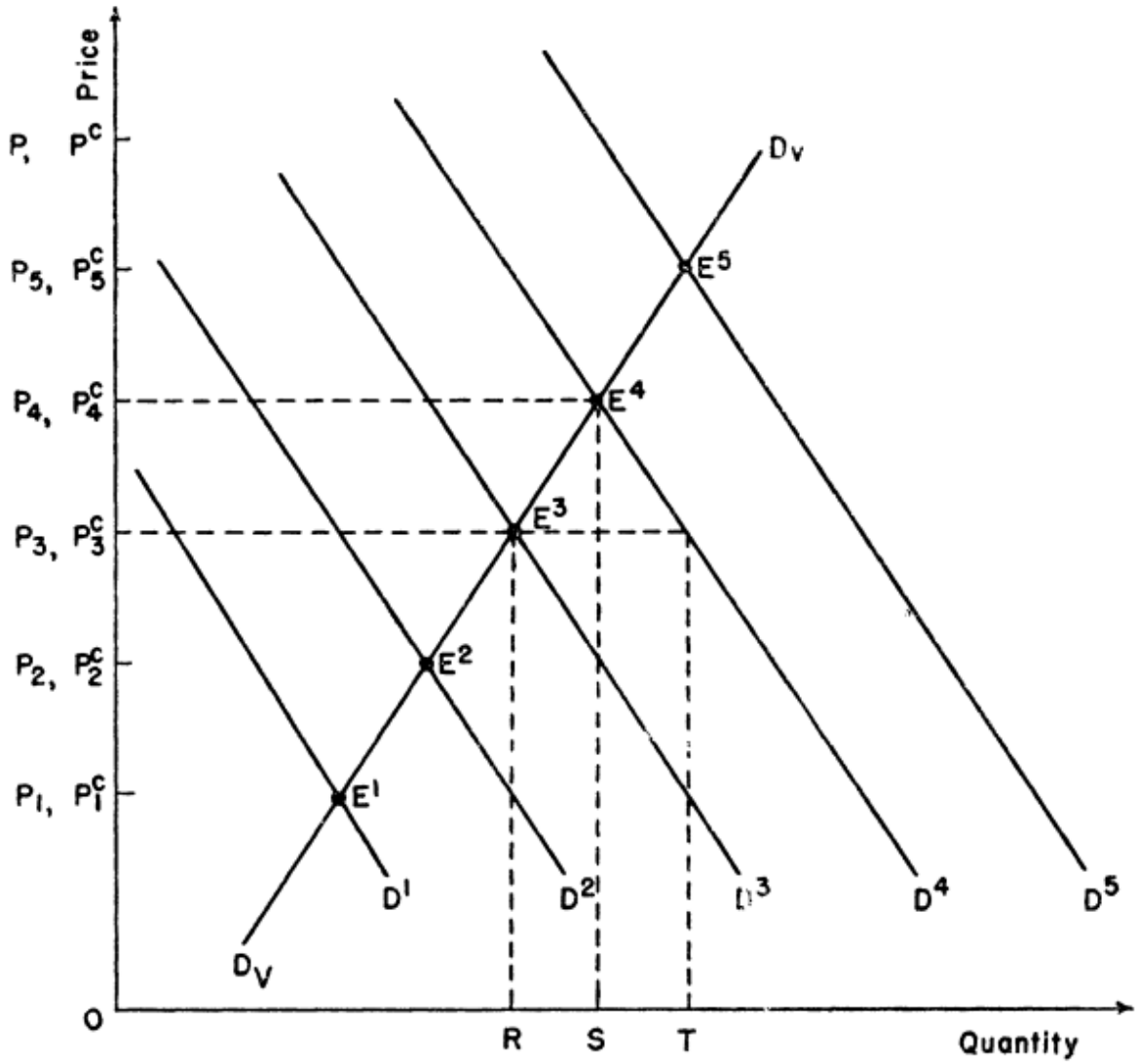


FIGURE 4

Price effect = ST
Veblen effect = − TR
Net effect = − SR

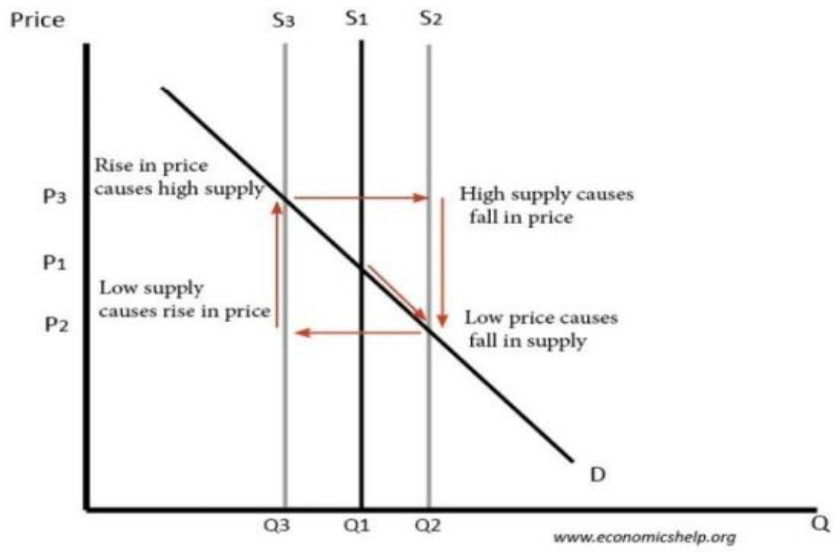
Cobweb theorem

Nicholas kaldor analysed the model in 1934, coining the term "cobweb theorem",citing previous analyses in German by Henry Schultz and Umberto Ricci.

Cobweb theory is the idea that price fluctuation can lead to fluctuations in supply which cause a cycle of raising and falling prices.
In a simple cobweb model, we assume there is an agricultural market where supply can vary due to variable factors,such as the weather.

Assumptions:

● In an agricultural market, farmers have to decide how much to produce a year in advance - before they know what the market price will be (supply is price inelastic in the short run).
● A key determinant of supply will be the price from the previous year.
● A low price will mean some farmers go out of business. Also,a low price will discourage Farmers from growing that crop in the next year.
● Demand for agricultural goods is usually price inelastic (a fall in price only causes a smaller percentage increase in demand).

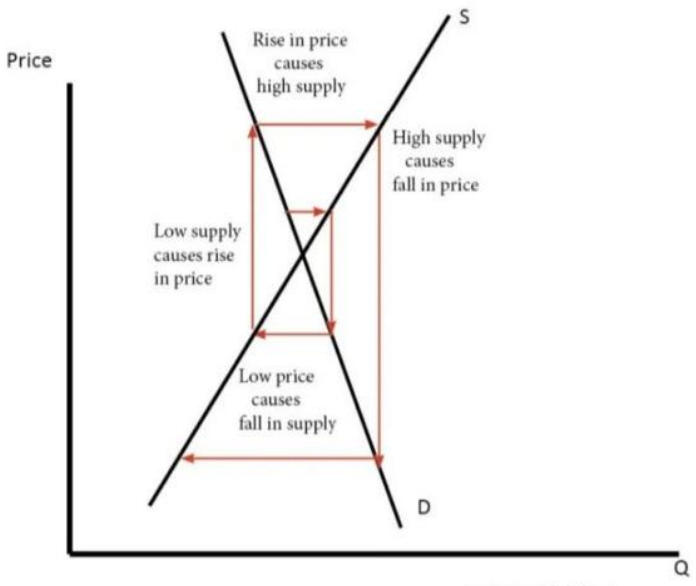


- 1. If there is a very good harvest, then supply will be greater than expected and this will cause a fall in price.

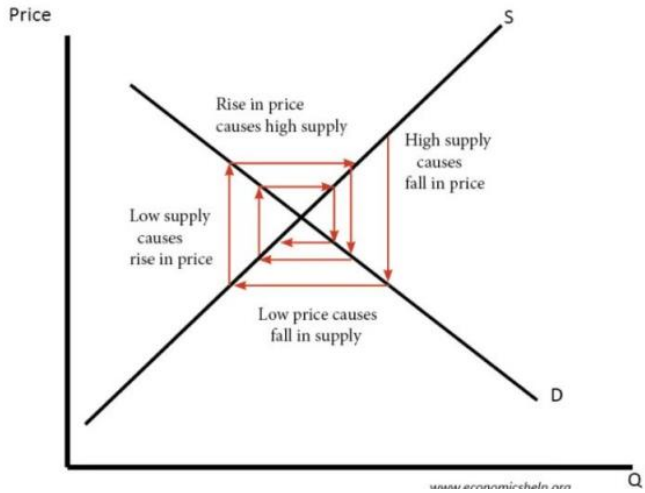
- However, this fall in price may cause some farmers to go out of business. Next year farmers may be put off by the low price and produce something else. The consequence is that if we have one year of low prices, next year farmers reduce the supply.
- If supply is reduced, then this will cause the price to rise.
- If farmers see high prices (and high profits), the next year they are inclined to increase supply because that product is more profitable. In this theory, the market could fluctuate between high price and low price as suppliers respond to past prices.

Price divergence:

If the slope of the supply curve is less than the demand curve, then the price changes could become magnified and the market more unstable.



Price convergence:



At the equilibrium point, if the demand curve is more elastic than supply curve, we get the price volatility falling, and the price will converge on the equilibrium.

Limitations:

Rational expectations:

The model assumes farmers base next year's supply purely on the previous price and assume that next year's price will be the same as last year (adaptive expectations).However, that really applies in the real world. Farmers are more likely to see it as a "good "year or "bad" year and learn price volatility.

Price divergence is unrealistic and not empirically seen:

The idea that farmers only base supply on last year's price means, in theory, prices could increasingly diverge, but farmers would learn from this and pre-empty changes in price.

It may not be easy or desirable to switch supply:

A potato grower may concentrate on potatoes because that is his speciality. It is not easy to give up potatoes and take to aubergines.

Other factors affecting price:

There are many other factors affecting price than a farmer's decision to supply. In global markets, supply fluctuation will be minimised by the role of importing from abroad. Also, demand may vary. Also, supply can vary due to weather factors.

Buffer stock schemes:

Governments Or producers could band together to limit price volatility by buying surplus.

Theory of Production and Costs

The concept of **production function** is the subject matter of producers` behaviour who play an important role in the production of goods and service by establishing physical relationship between input and output.

Short run production function

Short-run is a period in which the output can be increased by increasing the input of some variable factor. In the short run, the fixed factor remains constant and variable factors change with change in output.

For this, When one factor is a fixed factor and the other is variable, then the function can be expressed as:

$$Qx = f(L, \bar{K})$$

Here,
Qx = Output of commodity-X
L = Labour, a variable factor
K = Capital, a fixed factor

In this, the output can only be increased by increasing the application of variable factors i.e. labour.

Long run Production Function

Long Run is a period in which the output can be increased by increasing all the inputs. In the long run, all the factors are variable and change with change in output.

For this, When both factors are variable, then the production function can be expressed as:

Qx = f(L, K)

Here,
Qx = Output of commodity-X
L = Labour, a variable factor
K = Capital, a variable factor

In the long-run function, the output can be increased by increasing the application of variable factors i.e. labour and capital.

ENTRI

Difference between Short Run and Long Run Production Function

Basis of Difference	Short-Run Production Function	Long-Run Production Function
Meaning	It defines the functional relationship between inputs and output of a commodity for a short period of time.	It defines the functional relationship between inputs and output of a commodity for a longer period of time.
Also known as	It is also known as Variable proportion type of production function.	It is also known as a fixed proportion type of production function.
Capital-Labour Ratio	In this, the capital-labour ratio changes with the change in output.	In this, the capital-labour ratio doesn't change with the change in output.
Related Law	The law of returns to a factor is applied for this function.	The law of returns to a scale is applied for this function.
Curve	The curve of the short-run production function is parallel to the horizontal axis.	The curve of the long-run production function is upward sloping.
Fixed and Variable Factors	Here, the capital is assumed as the fixed factor and labour as a variable factor.	Here, all the factors of production are variable factors.
Scale of Production	There is no change in the scale of production in the short run.	Here, The scale of production is always changed with a change in output.
Entry and Exit of Firms	In this, there are barriers for firms to enter and to shut down but cant exit.	In this, the firms are free to enter and exit the market.

Homogeneous production function

A production function is homogeneous of degree n if when inputs are multiplied by some constant, say, α, the resulting output is a multiple of a2 times the original output. That is, for a production function:

$Q = f(K, L)$ then if and only if. $Q = f(\alpha K, \alpha L) = \alpha n f(K, L)$

Linear Homogeneous Production Function

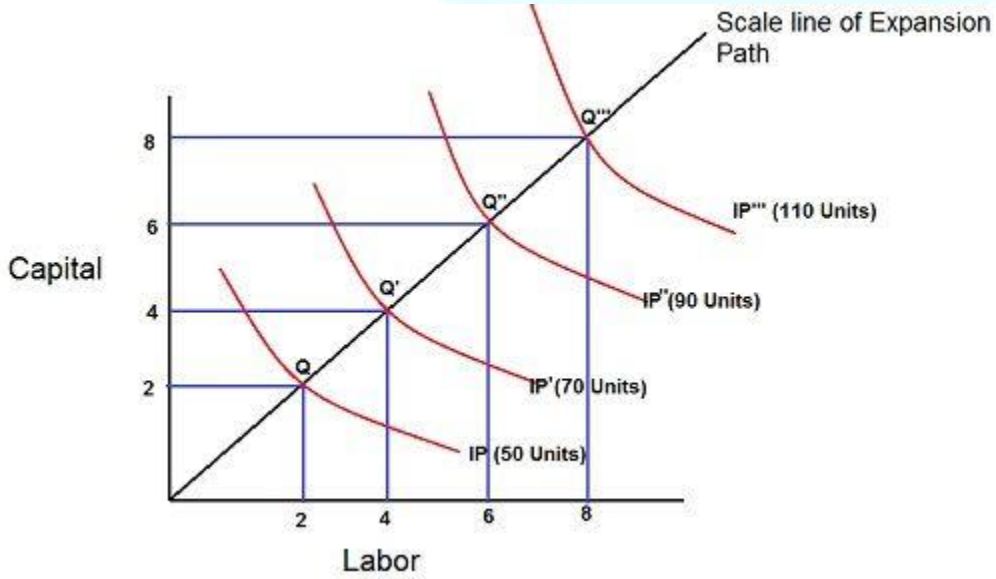
Homogeneous Production Function implies that with the proportionate change in all the factors of production, the output also increases in the same proportion. Such as, if the input factors are doubled the output also gets doubled. This is also known as constant returns to a scale.

The production function is said to be homogeneous when the elasticity of substitution is equal to one. The linear homogeneous production function can be used in the empirical studies because it can be handled wisely. That is why it is widely used in linear programming and input-output analysis. This production function can be shown symbolically:

nP = f(nK, nL)

Where, n = number of times
nP = number of times the output is increased
nK= number of times the capital is increased
nL = number of times the labour is increased

Thus, with the increase in labour and capital by "n" times the output also increases in the same proportion. The concept of linear homogeneous production function can be further comprehended through the illustration given below:



In the case of a linear homogeneous production function, the expansion is always a straight line through the origin, as shown in the figure. This means that the proportions between the factors used will always be the same irrespective of the output levels, provided the factor prices remain constant.

CES production function

The constant elasticity of substitution production functions dominates in applied research. The parametric structure is

(1) $$\mathbf{Y = A\,[\,q(a_K K)^{g} + (1-q)\,(a_N N)^{g}\,]^{1/g}.}$$

Here $0 < q < 1$ is the share parameter and g determines the degree of substitutability of the inputs. The parameters A, a_K, and a_N depend upon the units in which the output and inputs are measured and play no important role. The value of g is less than or equal to 1 and can be -¥. The two extreme cases are when g = 1 or g = -¥.

The Case of Perfect Substitution (g = 1): The function is

(2) $$\mathbf{Y = A\,[\,q\,a_K K + (1-q)\,a_N\,N\,].}$$

The isoquants are straight lines for this production function.

The Case of no Substitution (g = -¥): The function is

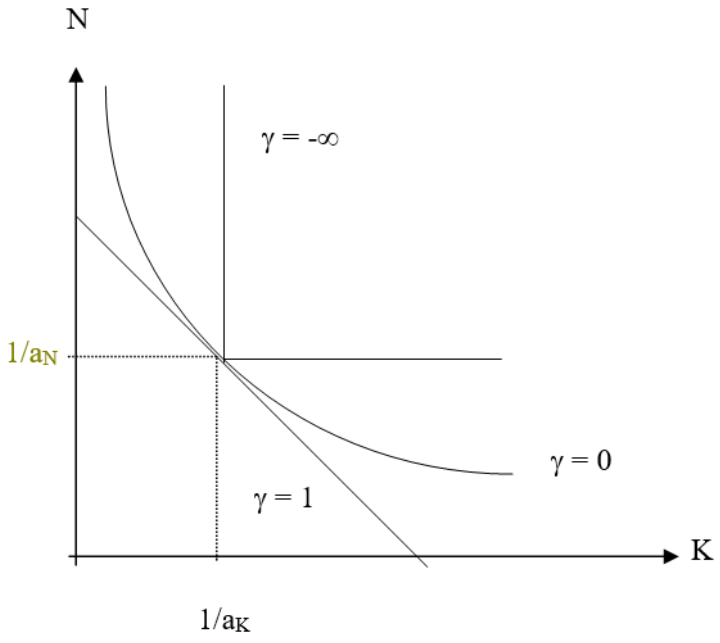
(3) $$\mathbf{Y = A\,\min\{\,a_K K,\, a_N N\,\}.}$$

The isoquants are at right angles. Factors are used in fixed proportions

The Case of Unit Elasticity of Substitution (g = 0): The function is

(4) $$Y = A K^{q} N^{(1-q)}.$$

Figure 1: CES Production Function Isoquants



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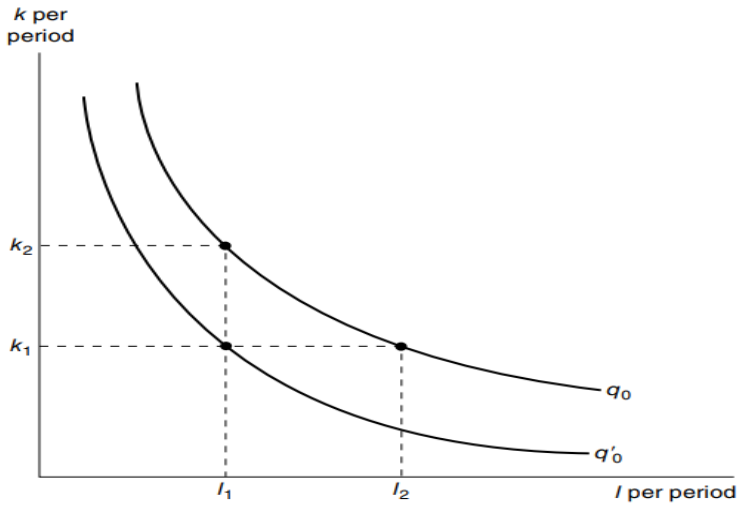
Technical progress

The first observation to be made about technical progress is that historically the rate of growth of output over time has exceeded the growth rate that can be attributed to the growth in conventionally defined inputs. Suppose that we let

$$q = A(t)f(k, l)$$

be the production function for some good (or perhaps for society's output as a whole). The term A(t) in the function represents all the influences that go into determining q other than k (machine-hours) and l (labour-hours). Changes in A over time represent technical progress

Technical progress shifts the q0 isoquant toward the origin. The new q0 isoquant, q0 , shows that a given level of output can now be produced with less input. For example, with k1 units of capital it now only takes $l_1$units of labour to produce q0, whereas before the technical advance it took $l_2$units of labour



Differentiating Equation gives

$$G_q = G_A + \frac{\partial f}{\partial k} \cdot \frac{k}{f(k,l)} \cdot G_k + \frac{\partial f}{\partial l} \cdot \frac{l}{f(k,l)} \cdot G_l,$$

but

$$\frac{\partial f}{\partial k} \cdot \frac{k}{f(k,l)} = \frac{\partial q}{\partial k} \cdot \frac{k}{q} = \text{elasticity of output with respect to capital inp}$$
$$= e_{q,k}$$

and

$$\frac{\partial f}{\partial l} \cdot \frac{l}{f(k,l)} = \frac{\partial q}{\partial l} \cdot \frac{l}{q} = \text{elasticity of output with respect to labor inpu}$$

Capital-deepening technical progress:

Technical progress is capital-deepening (or capital-using) if, along a line on which the **K/L ratio is constant**, the **MRS_{LK}** Increases. This implies that technical progress increases the marginal product of capital by more than the marginal product of labour. The ratio of marginal products decreases in absolute value; but taking into account that the slope of the isoquant is negative, this sort of technical progress increases the**MRS_{LK}**. The slope of the shifting isoquant becomes less steep along any given radius. The capital-deepening technical progress is shown in figure

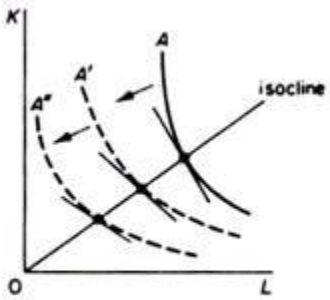


Figure 3.29 Capital-deepening technical progress

Labour-deepening technical progress:

Technical progress is labour-deepening if, along a radius through the origin (with **constant K/L ratio), the MRS_{LK} increases.** This implies that the technical progress increases the MP_L **faster than the** MP_k. Thus the $MRS_{L,K}$being the ratio of the marginal products $[(\partial X/\partial L)]/[(\partial X/\partial K)]$, increases in absolute value (but decreases if the minus sign is taken into account).

The downwards-shifting isoquant becomes steeper along any given radius through the origin. This is shown in figure

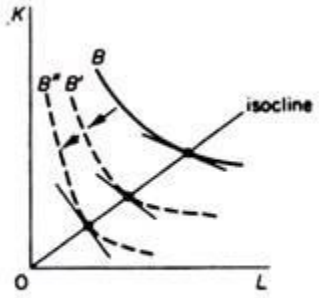


Figure 3.30 Labour-deepening technical progress

Neutral-technical progress:

Technical progress is neutral if it increases the marginal product of both factors by the same percentage, so that the $MRS_{L\,K}$ (along any radius) remains constant. The isoquant shifts downwards parallel to itself. This is shown in figure

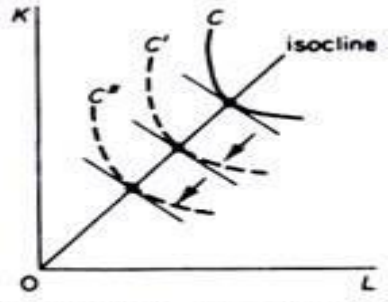


Figure 3.31 Neutral technical progress

Cost function

The relationship between output and costs is expressed in terms of cost function. By incorporating prices of inputs into the production function, one obtains the cost function since cost function is derived from production function. However, the nature of cost function depends on the time horizon. In microeconomic theory, we deal with short run and long run time.

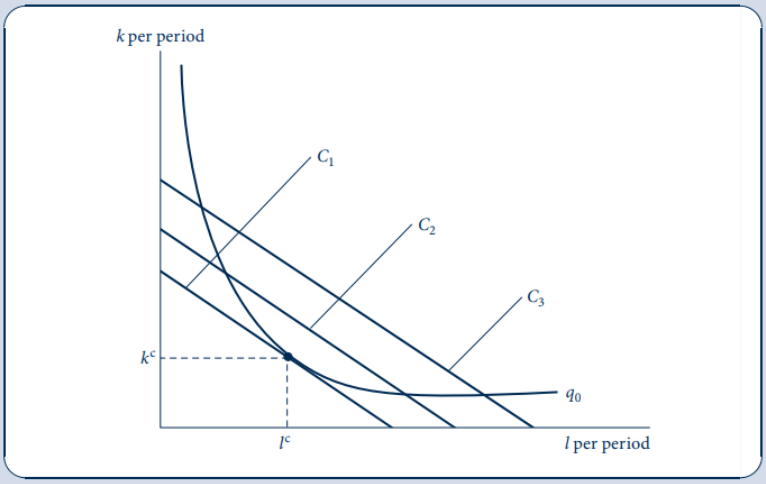
Cq = f(Qf Pf)

Where Cq is the total production cost,
Qf is the quantities of inputs employed by the firm, and
Pf is the price of relevant inputs.
This cost equation says that cost of production depends on prices of inputs and quantities of inputs used by the firm.

Cost-Minimising Input Choices

Mathematically, this is a constrained minimization problem. But before proceeding with a rigorous solution, it is useful to state the result to be derived with an intuitive argument. To minimise the cost of producing a given level of output, a firm should choose that point on the q0 isoquant at which the rate of technical substitution of l for k is equal to the ratio w/v: It should equate the rate at which k can be traded for l in production to the rate at which they can be traded in the marketplace. Suppose that this was not true. In particular, suppose that the firm were producing output level q0 using k = 10, l = 10,
and assume that the RTS were 2 at this point. Assume also that w =$1, v = $1, and hence that w/v =1 (which is unequal to 2). At this input combination, the cost of producing q0is $20. It is easy to show this is not the minimal input cost. For example, q0 can also be produced using k =8 and l =11; we can give up two units of k and keep output constant at q0 by adding one unit of l. But at this input combination, the cost of producing q0 is $19, and hence the initial input combination was not optimal. A contradiction similar to this one can be demonstrated whenever the RTS and the ratio of the input costs differ.

A firm is assumed to choose k and l to minimize total costs. The condition for this minimization is that the rate at which k and l can be traded technically (while keeping $q = q_0$) should be equal to the rate at which these inputs can be traded in the market. In other words, the *RTS* (of l for k) should be set equal to the price ratio w/v. This tangency is shown in the figure; costs are minimized at C_1 by choosing inputs k^c and l^c.



Cost minimization. To minimise the cost of any given level of output (q0), the firm should produce at that point on the q0 isoquant for which the RTS (of l for k) is equal to the ratio of the inputs' rental prices (w/v).

Properties of cost functions

1) **Cost function is non-decreasing in factor prices**, that is, considering two factor price vectors W′ and W, so that W′ ≥ W, then C (W′, Q) ≥ C (W, Q). Also, the function is strictly increasing in at least one factor price.
2) **Cost function is non-decreasing in output**. That is, Q′ ≥ Q, then C (W, Q′) ≥ C (W, Q) for W > 0. That is, increasing production increases the cost of production.
3) **Cost function is homogeneous of degree 1 in factor prices**. That is, a simultaneous change in all factor prices by a certain proportion (let say by λ, where λ > 0), changes the cost of production by the same proportion (λ). Symbolically, C (λ W, Q) = λ C (W, Q) for W, Q, λ > 0
Similarly it can be shown that the conditional factor demand functions (L and K) are homogeneous of degree zero.
4) **Cost function is concave in factor prices**.

Symbolically, C (t W + (1 – t) W, Q) ≥ t C (W, Q) + (1 – t) C (W, Q) for t ∈[0,1]

5) **Shephard's Lemma:** If a cost function C (W, Q) is differentiable at (W, Q) and wi > 0 for i = 1,2,..,n, then a conditional factor demand function for factor i, that is, xi (W, Q) is given by

$$x_i\,(W, Q) = \frac{\partial C(W,Q)}{\partial w_i}$$

This lemma allows us to obtain conditional factor demand functions as partial derivatives of the cost function.

Economies of Scale of Production:

The term scale of production refers to the size of a firm. A small-sized firm yields lower output compared to a large-sized firm. This is because in the small-sized firm smaller amounts of resources are combined while in a large-sized firm's larger amount of resources, huge finance and modern technologies are employed to obtain larger output.

Economies of Scale—Internal and External:

1. Internal Economies of Scale

This refers to economies that are unique to a firm. For instance, a firm may hold a patent over a mass production machine, which allows it to lower its average cost of production more than other firms in the industry.

2. External Economies of Scale

These refer to economies of scale enjoyed by an entire industry. For instance, suppose the government wants to increase steel production. In order to do so, the government announces that all steel producers who employ more than 10,000 workers will be given a 20% tax break. Thus, firms employing less than 10,000 workers can potentially lower their average cost of production by employing more workers. This is an example of an external economy of scale – one that affects an entire industry or sector of the economy.

Sources of Economies of Scale

1. Purchasing

Firms might be able to lower average costs by buying the inputs required for the production process in bulk or from special wholesalers.

2. Managerial

Firms might be able to lower average costs by improving the management structure within the firm. The firm might hire better skilled or more experienced managers.

3. Technological

A technological advancement might drastically change the production process. For instance, fracking completely changed the oil industry a few years ago. However, only large oil firms that could afford to invest in expensive fracking equipment could take advantage of the new technology.

Learning Curve

The learning curve is an important modern concept according to which cumulative experience in the production of a product over time increases efficiency in the use of inputs such as labour and raw materials and thereby lowers cost per unit of output. K.J. Arrow, one of the pioneers in putting forward this concept calls it "Learning by doing".

- According to Arrow, as a firm or its manager produces successive lots of output over various periods of time, it learns to pro-duce more with a given quantity of re-sources or it is capable of producing a given output by using lesser quantities of inputs or resources than before.

- Thus, either with the increase in efficiency of resources or with saving in resources such as labour and raw materials, cost per unit of output declines. This learning curve effect mostly occurs in the reduc-tion of labour requirements per unit of output.
- A number of factors bring this learn-ing curve effect. As cumulative volume of output over successive periods of time increases, labour and supervisors become more familiar with the work methods or the production process, which leads to the reduction in the amount of scrap and other types of wastes.
- Besides, raw materials cost per unit of output may also decline as cumulative volume of output in successive periods over time increases and as a result a firm gains more experi-ence in doing a production process repeatedly over successive time periods.
- The learning curve is graphically shown in where on the X-axis cumulative total output over successive periods of time and on the F-axis cost per unit of output are measured. It will be seen from FIG That the learning curve shows downward which shows declining cost per unit of output as cumulative output increases over time and the firm learns from its work experience.

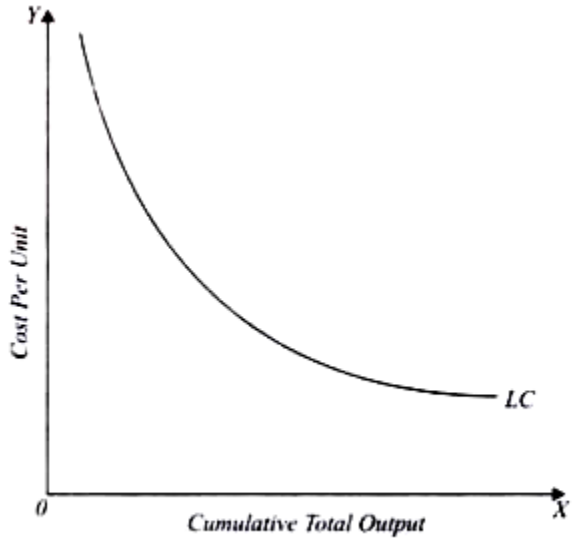


Fig. 19.16. *The Learning Curve*

The learning curve effect is usually expressed as a constant percentage. This percentage repre-sents the proportion by which cost per unit of output declines with the increase in cumulative output in each successive time period.

Market Structure

Basically, when we hear the word market, we think of a place where goods are being bought and sold.In economics, market is a place where buyers and sellers are exchanging goods and services with the following considerations such as:

- **Types of goods and services being traded**
- **The number and size of buyers and sellers in the market**
- **The degree to which information can flow freely**

PERFECT Market

Perfect Market is a market situation which consists of a very large number of buyers and sellers offering a homogeneous product. Under such condition, no firm can affect the market price. Price is determined through the market demand and supply of the particular product, since no single buyer or seller has any control over the price.

Perfect Competition is built on two critical Assumptions:

The behaviour of an individual firm

The nature of the industry in which it operates

Price-taking behaviour often can be better explained with the help of an example. Let us assume the probable situations faced by a wheat farmer and a car manufacturer.The latter is aware of the market power it has got and knows that if it raises the Various Forms of Market prices of cars will decline.

On the other hand, it may reduce the price of the cars to attract more customers from its rivals in the market. Thus, the car manufacturing firm is not a price-taker

A homogenous product: Contrary to car manufacturers who sell differentiated products, a wheat farmer has no such choice. A particular variety of wheat is indistinguishable whether produced by one farmer or another. Therefore, we can say that wheat farmers sell homogeneous products. The buyers will shift to the other farmers if one of them raises the price of wheat. Note that Price taking behaviour requires that firms sell a homogeneous product

Well-informed buyers: A necessary condition for price taking behaviour is that buyers are well informed and that they do not ~knowingly pay more than is necessary for their purchases.

Large number of sellers: An important distinction between the car and the wheat industries is in terms of the number of sellers. A wheat farmer's share in the total production of wheat is very small. It has no effect on price. The farmer will therefore, face a horizontal demand curve.

- The firm is assumed to be a price taker
- The industry is characterised by freedom of entry and exit

Characteristics of Perfect competition

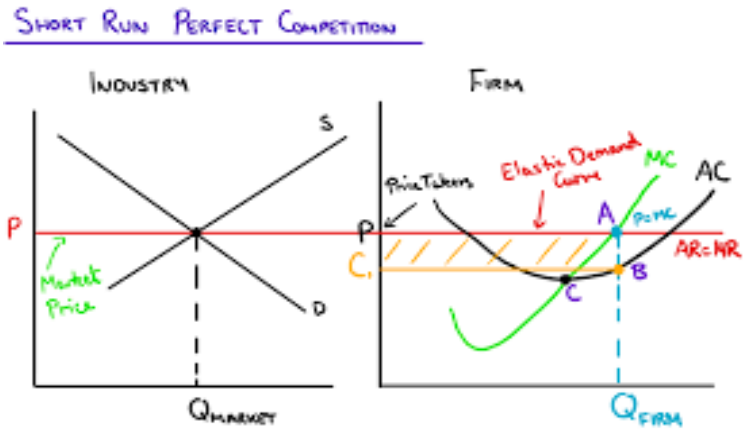
- There are very many small firms
- All producers of a good sell the same product
- There are no barriers to enter the market
- All consumers and producers have 'perfect information'
- Firms sell all they produce, but they cannot set a price.

PERFECT COMPETITION cannot be found in the real world. For such to exist, the following conditions must be observed and required:
A large number of sellers Selling a homogenous product
No artificial restrictions placed upon price or quantity
Easy entry and exit All buyers and sellers have perfect knowledge of

market conditions and of any changes that occur in the market **Firms are "price takers**

Short run analysis under perfect competition

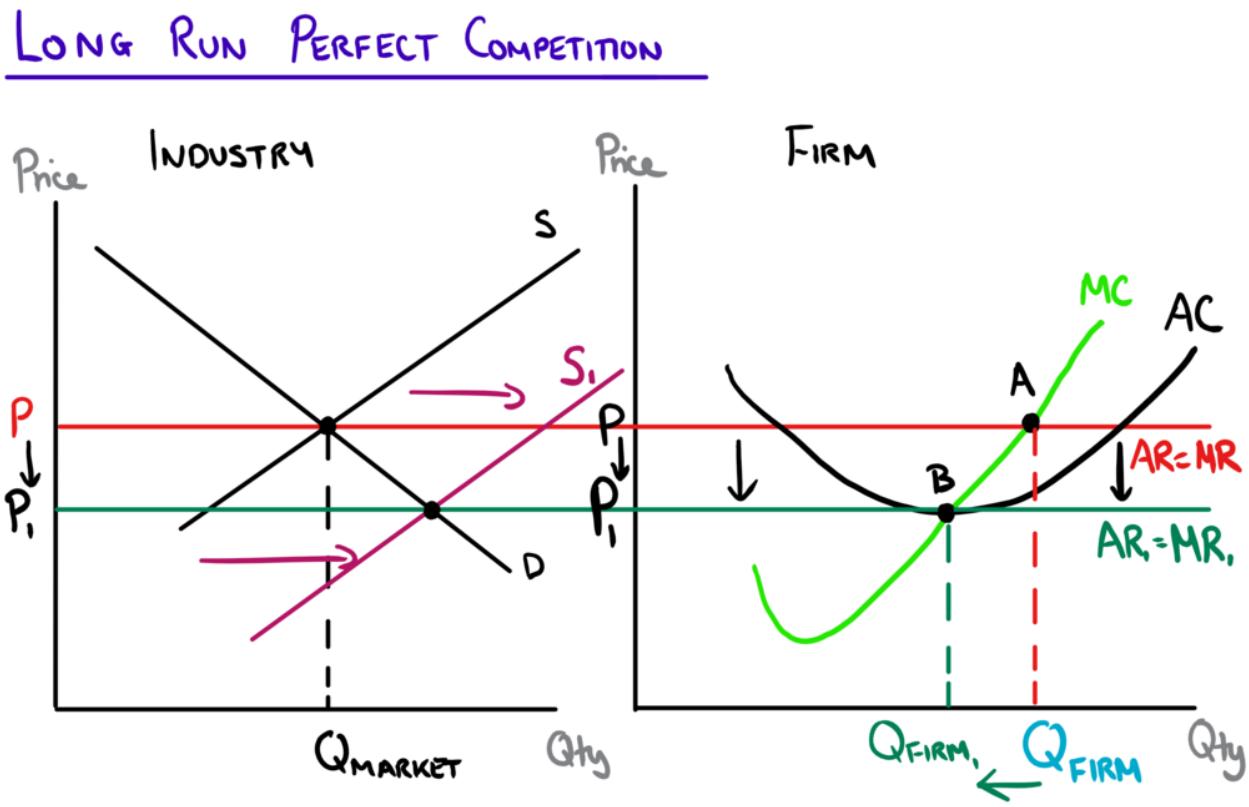
The firm's objective is to produce the level of output that will maximise profit Some inputs are variable and therefore fixed costs arise regardless whether the firm is operating or not Since the firm is a price taker, it has no control on the price of a product



Long Run Analysis of Perfect Competition

- All inputs and costs of production are variable
- The firm can build most appropriate scale of plant to
- produce the optimum level of output

ENTRI



Imperfect Market structure

In economic theory, imperfect competition is a type of market structure showing some but not all features of competitive markets.

Forms of imperfect competition include:

1. **Monopoly**
2. **Oligopoly**
3. **Monopolistic competition**

Monopoly

This is a structure in which there is only one (dominant) seller. Products offered by this entity have no substitutes. These markets have high barriers to entry and a single seller who sets the prices on goods and services. Prices can change without notice to consumers.

comes from a Greek word ‘monos’ which means ‘one’ and ‘polein’ means to ‘sell’ There is only one seller of goods or services A monopoly should be distinguished from a cartel.

A monopoly market is a form of market where the whole supply of a product is controlled by a single seller.

There are three essential conditions to be met to categorise a market as a monopoly market.

- **There is a Single Producer** - The product must have a single producer or seller. That seller could be either an individual, a joint-stock company, or a firm of partners. This condition has to be met to eliminate any competition.

- **There are No Close Substitutes** - There will be a competition if other firms are selling similar kinds of products. Hence in a monopoly market, there must be no close substitute for the product.
- **Restrictions on the Entry of any New Firm** - There needs to be a strict barrier for new firms to enter the market or produce similar products.

Sources of Monopoly

- There is only one producer or seller of goods and only one provider of services in the market.
- New firms find extreme difficulty in entering the market. The existing monopolist is considered giant in its field or industry.
- There are no available substitute goods or services so that it is considered unique.
- It controls the total supply of raw materials in the industry and has no control over price.
- It owns a patent or copyright.

- Its operations are under economies of scale.

Monopolies are classified according to circumstances they arise from, that is, cost structure of the industry, possibly the result of law, or by other means.

Natural Monopoly is a market situation where a single firm can supply the entire market due to the fundamental cost structure of the industry.

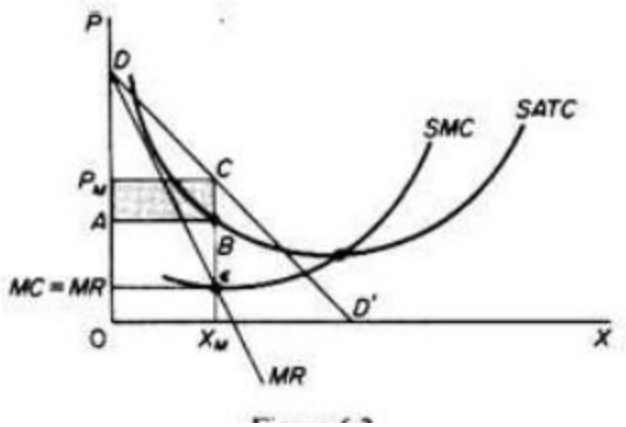
Legal Monopoly is sometimes called as de jure monopoly, a form of monopoly which the government grants to a private individual or firm over the product or services.

Coercive Monopoly is a form of monopoly whose existence as the sole producer and distributor of goods and services is by means of coercion (legal or illegal), so that most of the time it violates the principle of free market just to avoid competition.

Short run analysis of monopoly

The monopolist maximises his short-run profits if the following two conditions are fulfilled Firstly, the MC is equal to the MR.

Secondly, the slope of MC is greater than the slope of the MR at the point of intersection.In figure the equilibrium of the monopolist is defined by point ε, at which theMC intersects the MR curve from below. Thus both conditions for equilibrium are fulfilled. Price is PM and the quantity is XM. The monopolist realises excess profits equal to the shaded area APM CB. Note that the price is higher than the MR.



In pure competition the firm is a price-taker, so that its only decision is output determination. The monopolist is faced by two decisions: setting his price and his output. However, given the downward-sloping demand curve, the two decisions are interdependent.

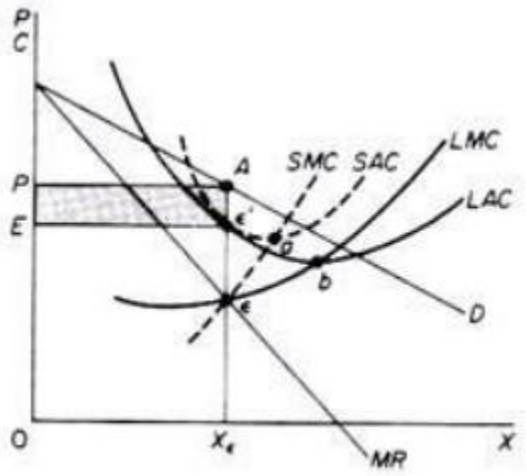
The monopolist will either set his price and sell the amount that the market will take at it, or he will produce the output defined by the intersection of MC and MR, which will be sold at the corresponding price, P. The monopolist cannot decide independently both the quantity and the price at which he wants to sell it. The a crucial condition for the maximisation of the monopolist's profit is the equality of his MC and the MR, provided that the MC cuts the MR from below.

Long-run equilibrium:

In the long run the monopolist has the time to expand his plant, or to use his existing plant at any level which will maximise his profit. With entry blocked, However, it is not necessary for the monopolist to reach an optimal scale (that is, to build up his plant until he reaches the minimum point of the LAC). Neither is there any guarantee that he will use his existing plant at optimum capacity. What is certain is that the monopolist will not stay in business if he makes losses in the long run.

He will most probably continue to earn supernormal profits even in the long run, given that entry is barred. However, the size of his plant and the degree of

utilisation of any given plant size depend entirely on the market demand. He may reach the optimal scale (minimum point of LAC) or remain at suboptimal scale (falling part of his LAC) or surpass the optimal scale (expand beyond the minimum LAC) depending on the market conditions.



we depict the case in which the market size does not permit the monopolist to expand to the minimum point of LAC. In this case not only is his plant of suboptimal size (in the sense that the full economies of scale are not exhausted) but also the existing plant is underutilised. This is because to the left of the minimum point of the LAC the SRAC is tangent to the LAC at its falling part, and also because the short-run MC must be equal to the LRMC. This occurs at e, while the minimum LAC is at b and the optimal use of the existing plant is at a. Since it is utilised at the level e', there is excess capacity.

Monopolistic Competition

In monopolistic competition, the market has features of both perfect competition and monopoly. A monopolistic competition is more common than pure competition or pure monopoly. In this article, we will understand monopolistic competition and look at the features, price-output determination, and conditions for equilibrium.

Features of Monopolistic Competition

1. Large number of sellers: In a market with monopolistic competition, there

are a large number of sellers who have a small share of the market.

2. Product differentiation: In monopolistic competition, all brands try to create product differentiation to add an element of monopoly over the competing products. This ensures that the product offered by the brand does not have a perfect substitute. Therefore, the manufacturer can raise the price of the product without having to worry about losing all its customers to other brands. However, in such a market, while all brands are not perfect substitutes, they are close substitutes for each other. Hence, the seller might lose at least some customers to his competitors.

3. Freedom of entry or exit: Like in perfect competition, firms can enter and exit the market freely.

4. Non-price competition: In monopolistic competition, sellers compete on factors other than price. These factors include aggressive advertising, product development, better distribution, after sale services, etc. Sellers don't cut the price of their products but incur high costs for the promotion of their goods. If the firms indulge in price-wars, which is the possibility under perfect competition, some firms might get thrown out of the market.

Short run analysis of Monopolistic Market

The conditions for price-output determination and equilibrium of an individual firm are as follows:

1. MC = MR

2. The MC curve cuts the MR curve from below.

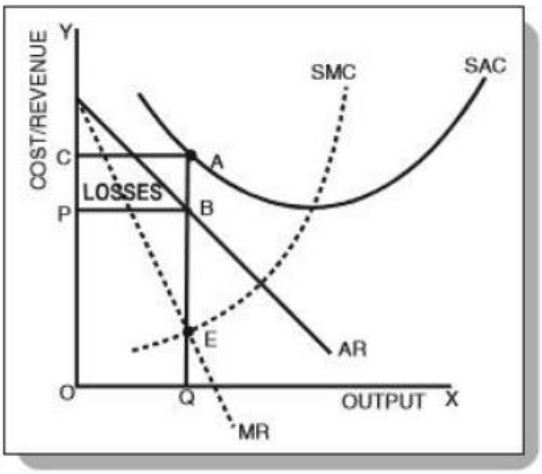
In Fig. we can see that the MC curve cuts the MR curve at point E. At this point,

- Equilibrium price = OP and
- Equilibrium output = OQ

Now, since the per unit cost is BQ, we have

Per unit super-normal profit (price-cost) = AB or PC.

Total super-normal profit = APCB



we can see that the per unit cost is higher than the price of the firm.

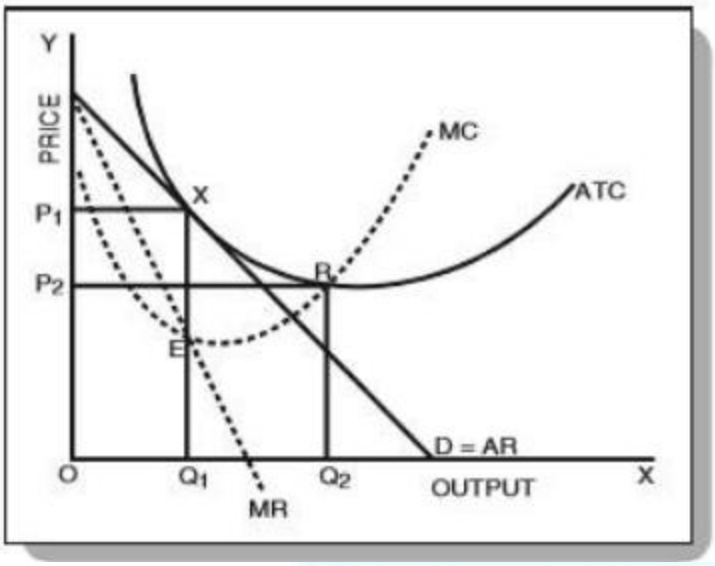
Therefore,

AQ > OP (or BQ)

Loss per unit = AQ – BQ = AB

Total losses = ACPB

Long run Analysis of Monopolistic Market



If firms in a monopolistic competition earn supernormal profits in the short-run, then new firms will have an incentive to enter the industry. As these firms enter, the profits per firm decrease as the total demand gets shared between a larger number of firms. This continues until all firms earn only normal profits. Therefore, in the long-run, firms, in such a market, earn only normal profits.

Oligopoly market

An Oligopoly market situation is also called 'competition among the few'. An oligopoly is an industry which is dominated by a few firms. In this market, there are a few firms which sell homogeneous or differentiated products. Also, as there are few sellers in the market, every seller influences the behaviour of the other firms and other firms influence it. Oligopoly is either perfect or imperfect/differentiated. In India, some examples of an oligopolistic market are automobiles, cement, steel, aluminium, etc.

Characteristics of Oligopoly

Now that the Oligopoly definition is clear, it's time to look at the characteristics of **Oligopoly:**

Few firms Under Oligopoly, there are a few large firms although the exact number of firms is undefined. Also, there is severe competition since each firm produces a significant portion of the total output.

Barriers to Entry

Under Oligopoly, a firm can earn supernormal profits in the long run as there are barriers to entry like patents, licences, control over crucial raw materials, etc. These barriers prevent the entry of new firms into the industry.

Non-Price Competition

Firms try to avoid price competition due to the fear of price wars in Oligopoly and hence depend on non-price methods like advertising, after sales services, warranties, etc. This ensures that firms can influence demand and build brand recognition.

Interdependence

Under Oligopoly, since a few firms hold a significant share in the total output of the industry, each firm is affected by the price and output decisions of rival firms. Therefore, there is a lot of interdependence among firms in an oligopoly. Hence, a firm takes into account the action and reaction of its competing firms while determining its price and output levels.

Nature of the Product

Under oligopoly, the products of the firms are either homogeneous or differentiated.

Selling Costs

Since firms try to avoid price competition and there is a huge interdependence among firms, selling costs are highly important for competing against rival firms for a larger market share.

No unique pattern of pricing behaviour

Under Oligopoly, firms want to act independently and earn maximum profits on one hand and cooperate with rivals to remove uncertainty on the other

hand. Depending on their motives, situations in real-life can vary making predicting the pattern of pricing behaviour among firms impossible. The firms can compete or collude with other firms which can lead to different pricing situations.

Indeterminateness of the Demand Curve

Unlike other market structures, under Oligopoly, it is not possible to determine the demand curve of a firm. This is because on one hand, there is a huge interdependence among rivals. And on the other hand there is uncertainty regarding the reaction of the rivals. The rivals can react in different ways when a firm changes its price and that makes the demand curve indeterminate.

Firms behaviour under Oligopoly

Based on the objectives of the firms, the magnitude of barriers to entry and the nature of government regulation, there are different possible outcomes in relation to a firm's behaviour under Oligopoly. These are:

1. Stable prices

2. Price wars

3. Collusion for higher prices

Further, Oligopoly can either be collusive or non-collusive. Collusive oligopoly is a market situation wherein the firms cooperate with each other in determining price or output or both. A non-collusive oligopoly refers to a market situation where the firms compete with each other rather than cooperating.

Non-Collusive Oligopoly: Sweezy's Kinked Demand Curve Model:

In an oligopolistic market situation, due to rivalry among the firms, any one

lowering the price is interpreted by others as an attempt to eliminate their profit. Therefore, other firms also respond by cutting their prices as well. This A chain of price cuts is called a price war. In the model by Sweezy, we would analyse what happens when the firms behave in the manner described above.

Each firm in an oligopolistic market faces two demand curves D1D1 and D2D2 as shown in Figure. D1D1 is the demand curve that a particular oligopolist faces on the assumption that others do not change their prices and D2D2 has been drawn on the assumption that if one firm changes the price, then all others also change theirs.

Suppose A is the current position of the firm with price P0 and quantity produced Q0.If the firm raises price, the rivals will not follow a similar course, since they stand to gain by capturing the sales of this firm. However, if it reduces price, others respond by matching the price reduction. Thus, the demand curve that the firm faces is given by the segment D1D1 to the left of A and the segment of D2D2 to the right of A. The relevant demand curve is given by D1AD2, which has a kink at A.

See that there is some range within which changes in the firm's marginal cost will not result in changes in price and quantity. This is shown in Figure 10. 11. Note that both for MC1 and MC2, the price and quantity given by the equilibrium conditions MC = MR are the same. Hence, the price is "sticky", and the model is also known as the "sticky price model".

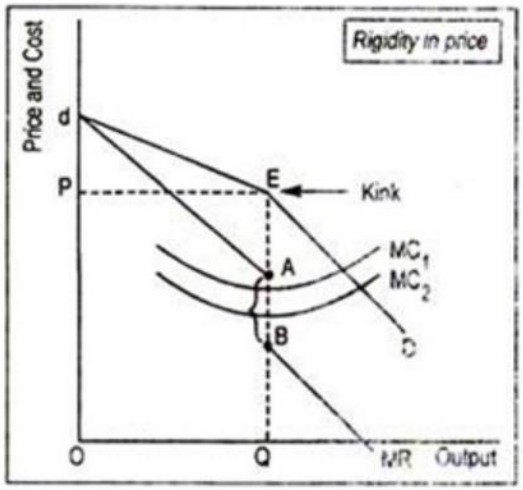


Fig. 5.19: Kinked Demand Curve and Oligopoly Equilibrium

Chamberlin's Oligopoly Model

Chamberlin suggested that a stable equilibrium can be reached in an oligopolistic market if the firms charge monopoly price. This will be possible if the firms recognise their interdependence, unlike in the Cournot model where they act on the naïve assumption of rival marinating its previous period's price or output level.

Let us study the model on the basis of the following diagram. Let DQ be the linear market demand curve. Suppose firm A enters first in the market and sells OQ1 units at the price OP1 on the basis of (MR = MC), thereby reaping monopoly profit given by the area OQ1CP1.

Let us now consider firm B's entry into the market. Given that firm A produces OQ1, CQ becomes firm B's relevant market demand curve. Therefore, the best B can do acting on the basis of (MR = MC) is to market Q1Q2. As a result, price falls to OP2 and the total profit accruing to both is given by the area OQ2FP2.

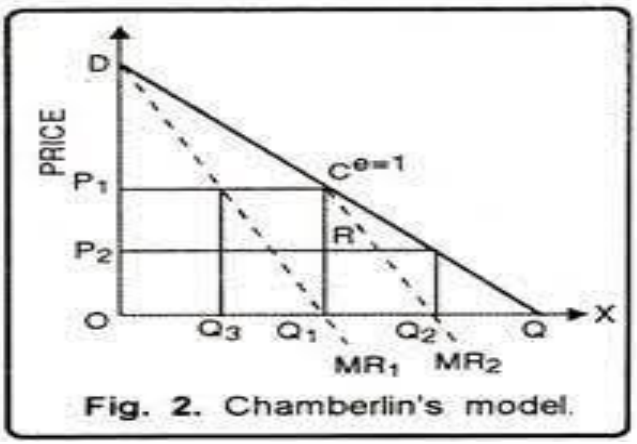


Fig. 2. Chamberlin's model.

- According to Chamberlin, firm A will survey the market situation after B's Non-Collusive Oligopoly Entry and will figure out that sharing the profit level OQ1CP1 is the best for either of them.
- Therefore, firm A would reduce it's output level from OQ1 to OQ3 and firm B would stick to the output level Q1Q2 = Q3Q1.
- With this arrangement, the firms together produce OQ1 and the price level is retained at OP1.
- Thus, we see that firm A produces OQ3 = ½ OQ1 and B Q3Q1 = ½ OQ1. The total output is OQ1 to be sold at a price OP1 with firms A and B sharing the monopoly profit equally.
- Firms, in this kind of an agreement, produce more than in the Cournot case, where each one produces one-third of the total market demand.

Bertrand Model of Duopoly

Bertrand model of duopoly examines the price setting behaviour of a firm by taking price as is the strategic variable. The assumptions in it are the same as in Cournot model except that the firms have identical cost functions with constant marginal cost. To arrive at the equilibrium, let us consider two firms A and B.

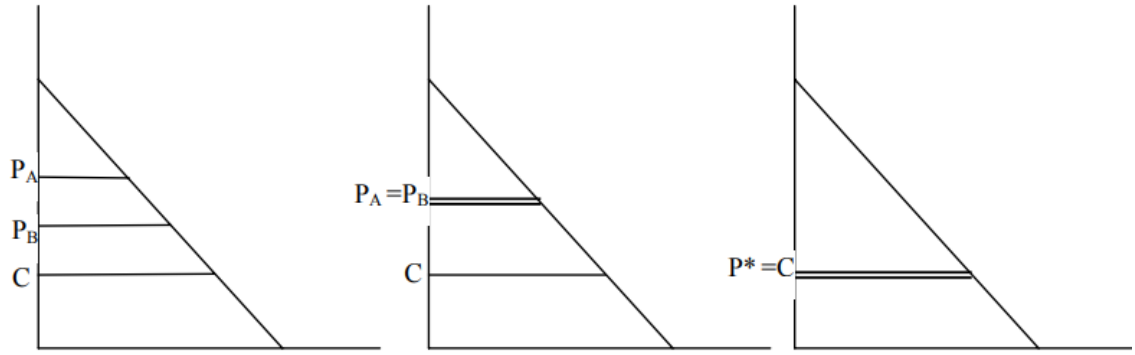
Given any price PB, set by firm B, firm A has 3 options:

1) To set a price PA > PB

2) To set a price PA = PB

3) To set a price PA < PB

In option 1, firm A loses the whole market. In 3, firm A captures the whole market and in 2, the market would be shared equally by them. Firm A will undercut B so long as MCA ≤ PA .The same logic applies to firm B as well. This process will continue till P = MCA = MCB



As in the Bertrand model **P* = MC,** the solution is a competitive one and therefore output will be produced at the competitive level (unlike in the Cournot model where output produced by each duopolist was equal to one third of the total market demand).

Cournot Model of Duopoly

The model by Augustin Cournot deals with two profit maximising firms. Let The two firms are A and B.

Assumptions

1) Each of the firms faces a linear market demand curve

2) Both sell identical products. In Counot's model, the two are assumed to sell mineral water.

3) The cost functions are identical and the marginal cost (MC) of each firm is zero.

4) Each firm assumes that the other would continue to produce the same output as in the last period.

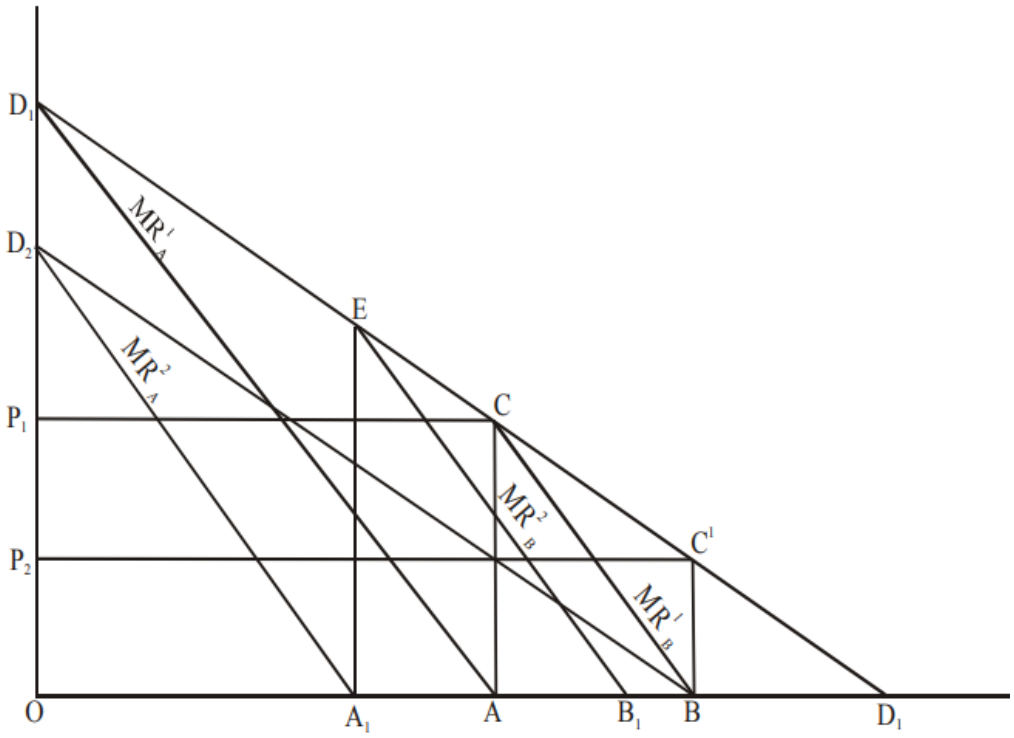


Fig. 10. 1: Demand Analysis of Cournot Equilibrium

Stackelberg Model

In the Stackelberg model, quantity is the strategic variable of the firms. We would analyse the model in terms of iso-profit curves. Let us assume that there are two profit maximising duopolistic firms A and B. An iso-profit curve shows the alternative combinations of output qA (quantity of output of firm A) and qB (quantity of output of firm B) that would yield the same profit. Let us suppose the following:

- **Demand function faced by both the firms are p = p (q), where q = qA+qB , the aggregate output produced by both the firms.**
- **Cost function Ci = Ci (qi) where i = A,B**

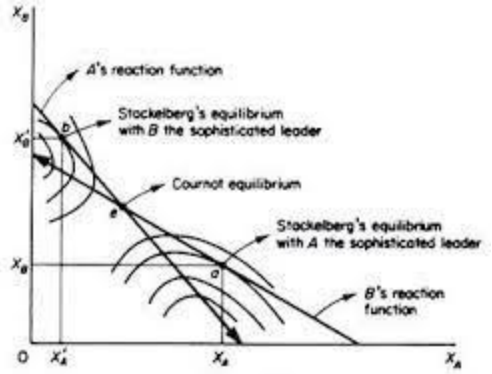


Figure 9.20

The Stackelberg model of oligopoly deals with the leadership of a firm. Let firm A be the leader which implies that it will make a conjecture that firm B will accept A's output as a datum while making a output plan and B will actually behave in this manner. In other words, firm A will incorporate this in the profit maximising objective of firm B. For this reason, which the conjectural variation of firm B is zero, it is non-zero for firm A.

Basically, firm B operates on the naïve Cournot conjecture. In other words, firm A being the leader can perceive the reaction function of firm B and would know beforehand the strategy firm B is going to adopt.
Firm A incorporates this knowledge in its profit maximising exercise in the sense that it k reaction function of B. Given the iso-profit curves of A and the reaction function of B, firm A can find out from the tangency between the two. This is
illustrated in the following diagram. In the diagram, point E gives the Stackelberg equilibrium. Firm B being on its reaction function would have no incentive to deviate from E. In addition, as firm A is maximising its profit, it has no incentive to deviate. Hence, this equilibrium is stable.

Collusive Oligopoly

Sometimes, firms may try to remove uncertainty related to acting independently and enter into price agreements with each other. This is collusion. Collusion is either formal or informal. It can take the form **of cartel or price leadership**.

A cartel is an association of independent firms within the same industry which follow the common policies relating to price, output, sale, profit maximisation, and the distribution of products.
Price leadership is based on informed collusion. Under price leadership, one firm is a large or dominant firm and acts as the price leader who fixes the price for the products while the other firms allow it.

Theory of Games

A game is an abstract model of a strategic situation. Even the most basic games have three essential elements: players, strategies, and payoffs. In complicated settings, it is sometimes also necessary to specify additional elements such as the sequence of moves and the information that players have when they move (who knows what when) to describe the game fully.
Each decision maker in a game is called a player. These players may be individuals (as in poker games), firms (as in markets with few firms), or entire nations (as in military conflicts). A player is characterised as having the ability to choose from among a set of possible actions. Usually, the number of players is fixed throughout the “play” of the game. Games are sometimes characterised by the number of players involved (two-player, three-player, or n-player games). As does much of the economic literature, this chapter often focuses on two-player games because this is the simplest strategic setting.

Strategies

Each course of action open to a player during the game is called a strategy. Depending on the game being examined, a strategy may be a simple action or a complex plan of action that may be contingent on earlier play in the

game . Many aspects of game theory can be illustrated in games in which players choose between just two possible actions.

We will label the players with numbers, so in a two-player game we will have players 1 and 2. In an n-player game we will have players 1, 2, ..., n, with the generic player labelled i

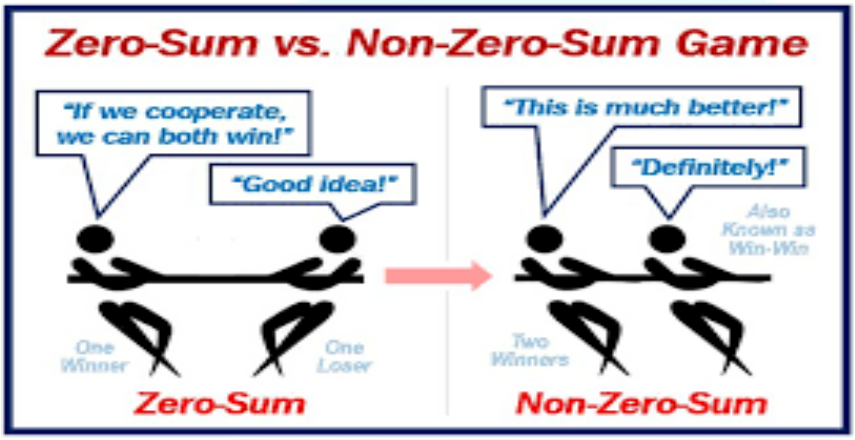
Let S1 denote the set of strategies open to player 1, S2 the set open to player 2, and (more generally) Si the set open to player i. Let s1 2 S1 be a particular strategy chosen by player 1 from the set of possibilities, s 2 2 S2 the particular strategy chosen by player 2, and s i 2 Si for player i. A strategy profile will refer to a listing of particular strategies chosen by each of a group of players.

Zero-sum Game and non-Zero-sum Game

- **Zero-sum game** is a mathematical representation in game theory and economic theory of a situation which involves two sides, where the result is an advantage for one side and an equivalent loss for the other.
- In other words, player one's gain is equivalent to player two's loss, therefore the net improvement in benefit of the game is zero.
-
- If the total gains of the participants are added up, and the total losses are subtracted, they will sum to zero.
- Thus, cutting a cake, where taking a more significant piece reduces the amount of cake available for others as much as it increases the amount available for that taker, is a zero-sum game if all participants value each unit of cake equally.
- Other examples of zero-sum games in daily life include games like poker, chess, and bridge where one person gains and another person loses, which results in a zero-net benefit for every player.[3] In the

markets and financial instruments, futures contracts and options are zero-sum games as well.

- In contrast, **non-zero-sum** describes a situation in which the interacting parties' aggregate gains and losses can be less than or more than zero. A zero-sum game is also called a strictly competitive game, while non-zero-sum games can be either competitive or non-competitive.
- Zero-sum games are most often solved with the minimax theorem which is closely related to linear programming duality, or with Nash equilibrium. Prisoner's Dilemma is a classical non-zero-sum game.



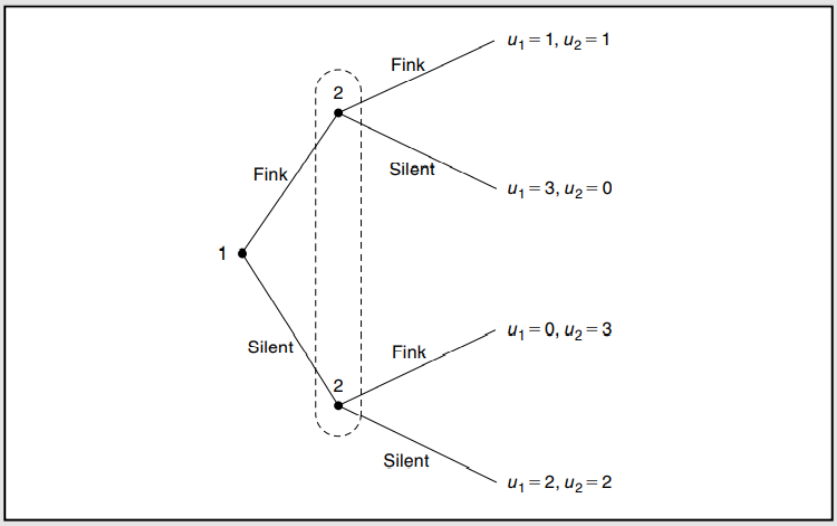
Prisoner's Dilemma

- The Prisoners' Dilemma, introduced by A. W. Tucker in the 1940s, is one of the most famous games studied in game theory and will serve here as a nice example to illustrate all the notation just introduced.
- The title stems from the following situation. Two suspects are arrested for a crime. The district attorney has little evidence in the case and is eager to extract a confession.

- She separates the suspects and tells each: “If you fink on your companion but your companion doesn’t fink on you, I can promise you a reduced (one-year) sentence, whereas your companion will get four years. If you both fink on each other, you will each get a three-year sentence.
- ” Each suspect also knows that if neither of them finks then the lack of evidence will result in being tried for a lesser crime for which the punishment is a two-year sentence.

Extensive Form for the Prisoners’ Dilemma

In this game, player 1 chooses to fink or be silent, and player 2 has the same choice. The oval surrounding 2’s nodes indicates that they share the same (lack of) information: 2 does not know what strategy 1 has chosen because the district attorney approaches each player in secret. Payoffs are listed at the right.



Normal Form for the Prisoners' Dilemma

		Suspect 2: Fink	Suspect 2: Silent
Suspect 1	Fink	$u_1 = 1,\ u_2 = 1$	$u_1 = 3,\ u_2 = 0$
Suspect 1	Silent	$u_1 = 0,\ u_2 = 3$	$u_1 = 2,\ u_2 = 2$

Normal form

Although the extensive form in Figure 8.1 offers a useful visual presentation of the complete structure of the game, sometimes it is more convenient to represent games in matrix form, called the normal form of the game; this is shown for the Prisoners' Dilemma in TablePlayer 1 is the row player, and 2 is the column player. Each entry in the matrix lists the payoffs first for player 1 and then for 2.

Nash equilibrium

- In the economic theory of markets, the concept of equilibrium is developed to indicate a situation in which both suppliers and demanders are content with the market outcome. Given the equilibrium price and quantity, no market participant has an incentive to change his or her behaviour.
- In the strategic setting of game theory, we will adopt a related notion of equilibrium, formalised by John Nash in the 1950s, called Nash equilibrium.
- 1 Nash equilibrium involves strategic choices that, once made, provide no incentives for the players to alter their behaviour further. A Nash equilibrium is a strategy for each player that is the best choice for each player given the others' equilibrium strategies.

Nash equilibrium in the Prisoners' Dilemma

- Let's apply the concepts of best response and Nash equilibrium to the example of the Prisoners' Dilemma. Our educated guess was that both players will end up finking. We will show that both finking is a Nash equilibrium of the game. To do this, we need to show that Finking is the best response to the other players' finking.
- Refer to the payoff matrix in Table If player 2 finks, we are in the first column of the matrix. If player 1 also finks, his payoff is 1; if he is silent, his payoff is 0. Since he earns the most from finking given player 2 finks, finking is
- player 1's best response to player 2's finking. Since players are symmetric, the same logic implies that player 2's finking is the best response to player 1's finking. Therefore, both finking is indeed a Nash equilibrium.
- We can show more: that both finking is the only Nash equilibrium. To do so, we need to rule out the other three outcomes. Consider the outcome in which player 1 finks and 2 is silent, abbreviated (fink, silent), the upper right corner of the matrix. This is not a Nash equilibrium. Given that player 1 finks, as we have already said, player 2's best response is to fink, not to be silent.
- Symmetrically, the outcome in which player 1 is silent and 2 finks in the lower left corner of the matrix is not a Nash equilibrium. That leaves the outcome in which both are silent.
- Given that player 2 is silent, we focus our attention on the second column of the matrix: the two rows in that column show that player 1's payoff is 2 from being silent and 3 from finking. Therefore, silence is not the best response to fink and so both being silent cannot be a Nash equilibrium.
- To rule out a Nash equilibrium, it is enough to find just one player who is not playing a best response and so would want to deviate to some other strategy.

- Considering the outcome (fink, silent), although player 1 would not deviate from this outcome (he earns 3, which is the most possible), player 2 would prefer to deviate from silent to fink. Symmetrically, considering the outcome (silent, fink), although player 2 does not want to deviate, player 1 prefers to deviate from silent to fink, so this is not a Nash equilibrium.
- Considering the outcome (silent, silent), both players prefer to deviate to another strategy. Having two players prefer to deviate is more than enough to rule out a Nash equilibrium.

Information Economics:

Asymmetric Information

- Transactions can involve a considerable amount of uncertainty.
- The value of a snow shovel will depend on how much snow falls during the winter season.
- The value of a hybrid car will depend on how much gasoline prices rise in the future.
- By itself, uncertainty need not introduce inefficiencies. Buyers and sellers can handle uncertainty by exchanging contingent commodities.
- For example, rather than buying a snow shovel outright, a consumer could buy the services of the shovel during the month of January conditional on snowfall of 10 inches or more. With markets for such commodities covering every possible future contingency, the same results that ensured the efficiency of perfect competition under perfect certainty would also hold under uncertainty.

Asymmetric information can lead to inefficiencies. Insurance companies may offer less insurance and charge higher premiums than if they could observe the health of potential clients and could require customers to obey strict health regimens. The whole market may unravel as consumers who expect their health expenditures to be lower than the average insured consumer withdraw from the market in successive stages, leaving only the few worst health risks as consumers. With appliance repair, the repairer may pad his or her bill by replacing parts that still function and may take longer than needed—a waste of resources.

The market for Lemons

- Nobel laureate George Akerlof (1940–) examined the market for used cars and considered a situation known as the market for lemons, where the sellers are better informed than the buyers.
- Markets for used goods raise an interesting possibility for signaling. Cars are a leading example: having driven the car over a long period of time, the seller has much better information about its reliability and performance than a buyer, who can take only a short test drive.
- Yet even the mere act of offering the car for sale can be taken as a signal of car quality by the market. The signal is not positive: the quality of the good must be below the threshold that would have induced the seller to keep it. As George Akerlof showed in the
- article for which he won the Nobel Prize in economics, the market may unravel in equilibrium so that only the lowest-quality goods, the "lemons," are sold.To gain more insight into this result, consider the used-car market. Suppose there is a continuum of qualities from low-quality lemons to high-quality gems and that only the

- the owner of a car knows its type. Because buyers cannot differentiate between lemons and gems, all used cars will sell for the same price, which is a function of the average car quality.
- A car's owner will choose to keep it if the car is at the upper end of the quality spectrum (since a good car is worth more than the prevailing market price) but will sell the car if it is at the low end (since these are worth less than the market price). This reduction in average quality of cars offered for sale will reduce market price, leading would-be sellers of the highest-quality remaining cars to withdraw from the market. The market continues to unravel until only the worst-quality lemons are offered for sale.
- The lemon problem leads the market for used cars to be much less efficient than it would be under the standard competitive model in which quality is known. Whole segments of the market disappear—along with the gains from trade in these segments—because higher-quality items are no longer traded.
- In the extreme, the market can simply break down with nothing (or perhaps just a few of the worst items) being sold. The lemon problem can be mitigated by trustworthy used-car dealers, by development of car-buying expertise by the general public, by sellers providing proof that their cars are trouble-free, and by sellers offering money-back guarantees. But anyone who has ever shopped for a used car knows that the problem of potential lemons is a real one.

The Principal Agent Problem

➢ We start with the situations of asymmetric information in which one agent knows something that another does not prior to contracting. One person, the principal, wants to delegate a task to another, the agent, to undertake some action, which is costly to her (the agent). See that the principal's welfare depends on what the agent does.

- What we observe in the principal-agent problems is
  - there is a contract between the principal and the agent;
- information gap exists between the principal and the agent; and
  - such a gap has implications for the decision of the contract they sign.
- Note that a contract is an agreement between the two parties to act in some specified way. The agent is willing to undertake the task as long as her net utility from performing it is at least as large as she can earn from her next best opportunity. The agent, if hired, has to decide whether to work hard or not.
- Hard work involves incurring disutility for the agent. So all other things equal, she would prefer not to work hard. As a result, the value of the work would be lower and the principal will get very little from the deal. In order to ensure that the contract results in gainful trade, the principal must make provisions, maybe by providing incentives (like bonus), so that the agent puts in her best efforts.
- Implicit in signing of a contract is the fact that it is enforceable. Without such a provision no one will enter a contract. Courts are entrusted with the task of enforcing it. To avoid its no-enforceability or even to minimise the chance of court cases, which are expensive and time consuming, attempts are made to design contracts in such a way that each party chooses to adhere to its terms and conditions. In order words, contracts are designed to be self-enforcing.
- Once we limit ourselves to a self-enforcing contract, the principal-agent framework reduces to one of principal offering the agent a contract, which is either accepted or rejected by the agent.
-
-

Moral Hazard

In a moral hazard situation, one party entering into the agreement provides misleading information or changes their behaviour after the agreement has been made because they believe that they won't face any consequences for their actions. When a person or an entity does not bear the full cost of a risk, they may have an incentive to increase their exposure to risk. This decision is based on what will provide them with the highest level of benefit.

There is always the risk that one party has not entered into a contract in good faith, and they may do this by providing false information about their assets, liabilities, or credit capacity. This can occur in the financial industry in contracts between a borrower and a lender. Moral hazard is also common in the insurance industry.

Example of Moral Hazard

For example, assume a homeowner does not have homeowner's insurance or flood insurance but lives in a flood zone. The homeowner is very careful and subscribes to a home security system that helps prevent burglaries. When there are storms, they prepare for floods by clearing the drains and moving furniture to prevent damage.

However, the homeowner is tired of always having to worry about potential burglaries and preparing for floods, so they purchase home and flood insurance. After their house is insured, their behaviour changes. They cancel their home security system subscription and they do less to prepare for potential flooding. The insurance company is now at a greater risk of having a claim filed against them as the result of damage from flooding or loss of property.

Adverse Selection

It describes a situation in which one party in a deal has more accurate and different information than the other party. The party with less information is at a disadvantage to the party with more information. This asymmetry causes a lack of efficiency in the price and the number of goods and services provided. Most information in a market economy is transferred through prices, which means that adverse selection tends to result from ineffective price signals.

Example of Adverse Selection

For example, assume there are two sets of people in the population: those who smoke and do not exercise, and those who do not smoke and who exercise. It is common knowledge that those who smoke and don't exercise have shorter life expectancies than those who don't smoke and choose to exercise.

Suppose there are two individuals who are looking to buy life insurance, one who smokes and does not exercise, and one who doesn't smoke and exercises daily. The insurance company, without further information, cannot differentiate between the individual who smokes and doesn't exercise and the other person.

The insurance company asks the individuals to fill out questionnaires to identify themselves. However, the individual that smokes and doesn't exercise knows that by answering truthfully, they will incur higher insurance premiums. This individual decides to lie and says they don't smoke and exercises daily.

This leads to adverse selection; the life insurance company will charge the same premium to both individuals. However, insurance is more valuable to

the non-exercising smoker than the exercising non-smoker. The non-exercising smoker will require more health insurance and will ultimately benefit from the lower premium.

Signalling and Screening

When we consider the consequences of asymmetric information we see the following problem: In the lemons model the problem was that sellers of high quality products did not know the quality when products of both high and low quality are marketed side by side. A solution to the problem suggested was that if sellers of a high-quality product could find some activity that was less costly for them than for sellers of a lower-quality product, then it might pay them to undertake this activity as a signal of higher quality. The buyers, too, would learn that the signal was associated with higher quality.

In the insurance example, we have discussed a form of signalling. An individual with low risk is more willing to construe than an individual with a high risk. Thus, the level of coinsurance was used as a potential signal of risk level. Another application considered was in education. Since education increases productivity it can act as a signal of high productivity if workers with high productivity can acquire it at a lower cost than workers with low productivity.

In economics signalling is what sellers do to indicate that their product or service is of high quality, whereas screening is what buyers do to ensure that they don’t end up with a lemon. We have used the concept of

signalling and screening to refer to different roles of qualifications in the labour market.

Theory of distribution

Factor Prices

Factor prices are the prices paid to the factors of production and these determine the distribution of the national income. Factor prices are set by supply and demand but in the long run we are assuming capital and labour to be fixed and hence the factor supply curve will be vertical.

Marginal Product of Labour and Capital

In this analysis we are going to assume that firms in the economy are competitive. If this is the case then firms' profit can be given as:

Profit = P*F(K,L) – WL – RK

Where P=price of goods, W=wage, L=amount of labour per unit of time, R=rent cost, K=capital used per unit of time.

This is because: Profit = Revenue – Costs

Revenue = Price * Quantity Produced

The amount a firm can produce is, like the national output, given as the production function [Y=F(K,L)].

Therefore Revenue = P*F(K,L)

The costs involved are labour costs and capital costs (we will treat raw material costs as capital, since they are being used to produce something else).

Therefore Cost = (wage*labour + rent*capital)

Hence substituting back in we get the formula for Profit as shown above.

We assume firms are competitive because this means that firms are relatively small within their respective markets and therefore can't significantly affect the market price. Hence P (the price of the good) is fixed because no one firm can influence the price. This is the case with wages and rent, if a firm offers a higher wage than competitors then it will become uncompetitive. It won't be able to offer a lower wage because this would result in the firm losing labour to competitors. Simultaneously, if a firm paid higher rent than the market price it would be uncompetitive. It wouldn't be able to purchase capital for a lower rent than the going market rate.

Thus the profits of a firm are dependent on the amount of labour and capital that a firm utilises since P, W and R are taken as given. So how much labour and capital does a firm employ? Well that depends on the marginal product of labour and capital.

Marginal product of labour (MPL) is the amount of extra output a firm receives by employing one additional unit of labour, keeping the amount of capital fixed. This can be expressed as:

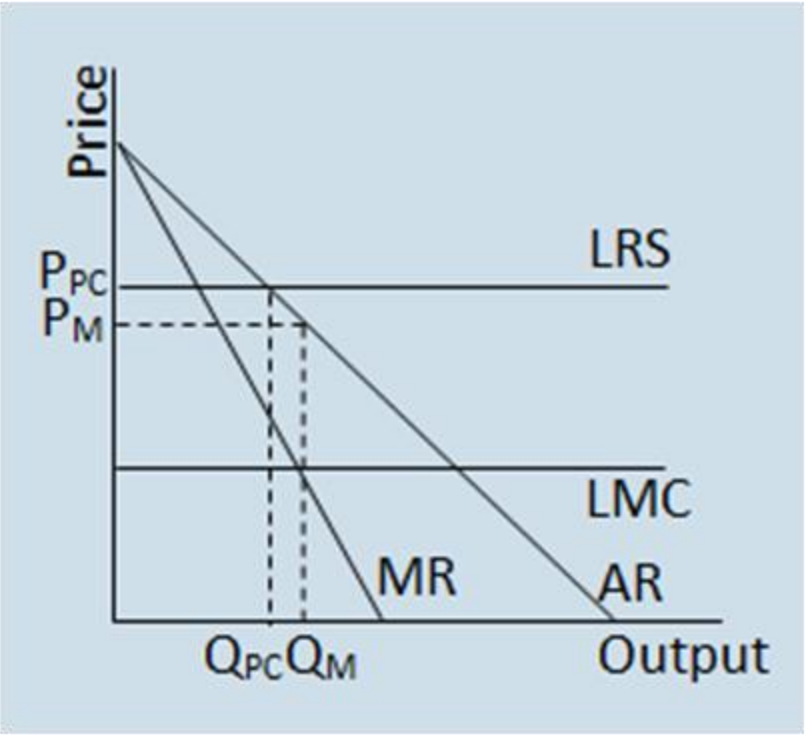
MPL = F(K, L+1) – F(K,L)

This formula states that the MPL equals the amount that the total plus an additional worker produces subtracted by the total amount produced. Don't forget that diminishing marginal returns (see Micro) is likely to occur.

Now that we understand about the MPL we can work out how much labour a competitive profit maximising firm will employ. A firm will continue to hire workers so long as the MPL is greater than the real wage. The real wage is the wage of labour expressed in units of output as opposed to monetary terms and is given as W/P. Suppose the wage rate at a clothes producing firm is £6 per hour and that the price of the goods (clothes) is £2 per item. The real wage is 3 items of clothing per hour. In this case the clothes firm would continue to hire so long as the marginal product of labour is greater than 3 items of clothing per hour.

Another way of saying this is that P*MPL tells us the marginal revenue the marginal worker brings in for the firm. If marginal revenue exceeds the marginal wage then a firm will hire the worker because he/she makes more money than they cost the firm. Hence a firm will continue to hire as long as P*MPL ≥ W.

We can express this information graphically. The MPL curve slopes downwards because of the law of diminishing marginal returns. Firms will hire QDL which is the point where MPL = real wage. This graph shows the firm's labour demand curve (i.e. the MPL curve = firm's labour demand curve.



The firm makes a similar decision when deciding how much capital to employ. Marginal product of capital (MPK) is the amount of extra output a firm receives by employing an additional unit of capital, keeping labour fixed, expressed as: MPK = F(K+1, L) – F(K,L). Capital is also subject to the law of diminishing marginal product.

The amount of capital a firm will rent is determined by the real rental price of capital. The additional revenue a firm makes from utilising an extra unit of capital is P*MPK. The cost is the rent, R. Ergo, the additional profit equals (P*MPK)-R.

$\Delta\pi = (P*MPK) - R$

The real rental price of capital is equal to R/P. Firms continue to hire until MPK = R/P; that is until the marginal product of capital equals the real wage. Another way of saying this is that firms continue to hire whilst P*MPK≥R.

What determines the value of the marginal products? The answer is the quantity and quality of the factors of production. Quality takes the form of education and training for workers and technological ability for capital. If the labour force is better educated and well trained for the industry in which they are working then they will be able to produce more output and hence the MPL will be higher. In fact the health of the labour force is also important; for example if workers are malnourished then their MPL may be lower if they have less energy to work. For capital the better the technology and the quality of the product then the higher the marginal product, for example, a higher quality piece of machinery may be able to produce more goods in a given time (and hence there will be a higher MPK) than a lower quality piece.

Distribution

Under the assumption that all firms within the economy are profit maximising and competitive then each factor of product is paid by its marginal product. The total real wages (don't forget this is W/P) paid to labour are MPL*L and the total real rent (R/P) paid to capital owners is MPK*K. Economic profit is the amount of money left over after rent and wages have been paid.

Economic Profit = Y – (MPL*L + MPK*K)

If there are constant returns to scale then economic profit must be zero because all revenues go to the factors of production. This is called product exhaustion and follows from Euler's theorem.

We can conclude that total output is distributed to labour and capital owners depending on the marginal productivities of labour and capital. The higher the MPL or MPK then the higher the returns to this group.

If we have just said that economic profit is zero then how can firms make a profit? This is because firms are often capital owners themselves and any profit they make will come from their ownership of capital. Firms may also make profit if they are operating in a market which doesn't follow our assumptions of profit maximisation and perfect competition.

Criticisms of this model

As always with models there are a number of criticisms. Firstly, it can be extremely difficult to calculate the marginal product of a factor of production because it assumes that all workers can work independently which is obviously not true. It is also very hard to measure output in the services industry for certain sectors such as doctors and teachers. We are making the assumption of perfect competition but in the real world there are few markets which operate under complete perfect competition.

Marginal productivity theory:

Karl Marx and some other socialist thinkers were of the view that in a capitalist system, labour was not paid all that it produced. The surplus was retained by the capitalist and it constituted his profit. This was such an indictment of capitalism that the system looked unethical. Some economists did not agree with Man and attempted to prove that in a capitalistic system of production there was no exploitation of workers. In doing so they developed the marginal productivity theory of distribution in the particular context of wage

labour. Later on, this theory was used to explain the determination of rewards to other factors of production also. Among the exponents of the marginal productivity theory J.B. Clark was the foremost. In The Distribution of Wealth, he attempted to identify the objective basis of distribution and in the process he developed the marginal productivity theory of distribution. Later on Jevons, Wicksteed, Walras and Marshall also made their contributions by way of making certain refinements in this theory. It is, however, to be noted that whereas for J.B. Clark the marginal productivity theory is essentially a theory of distribution, for Marshall it is a theory of demand for the factors of production.

Assumptions of the Theory:

The marginal productivity theory of distribution is based on the following assumptions:

(i) It assumes that all units of a factor are homogeneous.

(ii) They can be substituted for each other.

(iii) There is perfect mobility of factors between different places and employment.

(iv) There is perfect competition in the factor market.

(v) There is perfect competition in the product market.

(vi) There is full employment of factors and resources.

(vii) The various units of the different factors are divisible.

(viii) One factor is variable and other factors are constant.

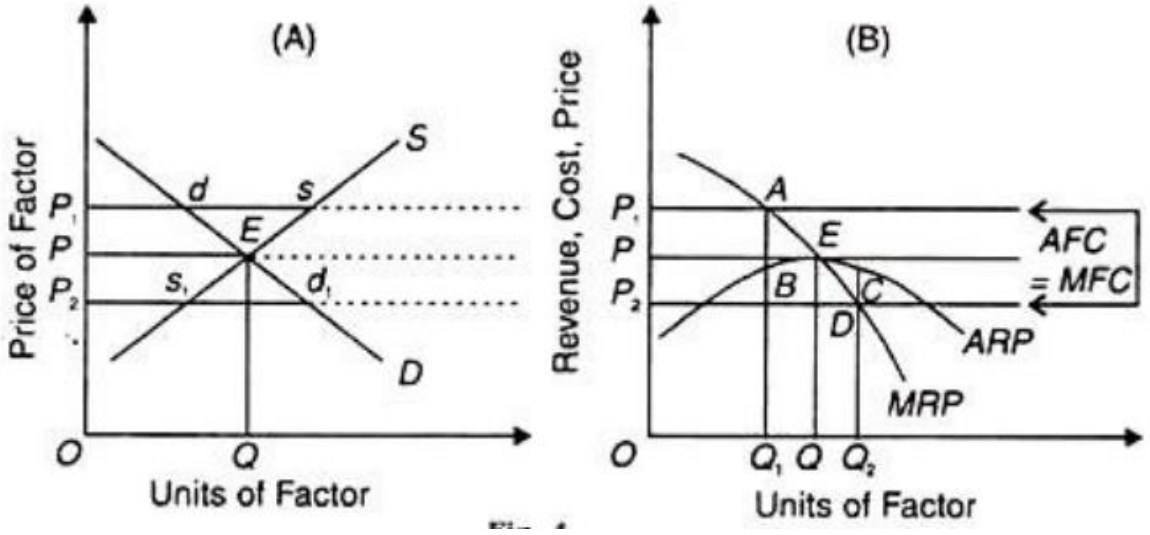
(ix) Techniques of production are given and constant.

(x) The entrepreneurs are motivated by profit maximisation.

(xi) The theory is applicable in the long-run.

(xii) It is based on the Law of Variable Proportions.

Given these assumptions, first we explain the determination of the price of a factor in an industry in terms of its demand and supply. In Fig. 4(A), the demand curve D of industry intersects its supply curve S at point E which determines OP price and OQ quantity demanded and supplied.
Thus all units of the factor (say, labour) in the industry are paid the same price (wage), OP.



There being perfect competition, a firm will pay the same price (wage) to each unit of the factor (labour) as paid by the industry. Therefore, for the firm, the supply of this factor at that price will be perfectly elastic. It means that the supply curve of this factor at the given price OP is horizontal curve, shown as AFC = MFC in Panel (B) of the figure. AFC and MFC are the average and marginal factor costs

of the firm at which it employs the factor units. The number of factor units the firm will employ depends upon its demand for that factor. And the demand for the factor depends on its MRP. For equilibrium, it is essential that the price which the firm pays to the factor must equal its MRP. ARP and MFC, that is, Price of the Factor Unit = AFC = MFC = MRP = ARP. This is shown in Panel (B) where E is the equilibrium point for the firm when ARP = MRP = MFC = AFC and it pays OP price for OQ units of the factor.

Suppose the factor-price rises to OP1.

At this price, the firms will be incurring AB per unit loss, as the price Q1 Being paid to factor units is greater than Q1B, their ARP. This will induce some firms to leave the industry. As a result, the supply of factors will increase by ds, as in Panel (A), and the factor price will fall again to OP where equilibrium will be re-established at point E in both (A) and (B) Panels.

On the other hand, if the factor-price falls to OP2 firms will be earning DC per unit profit because the price Q2D being paid to factor units are less than Q2C, their ARP. Attracted by the profit, some firms will enter the industry. This will raise the factor-demand by s1d1 in the industry and the price will again increase to OP. These price changes are only possible in the short-run. In the long-run, equilibrium will stay on at point E,

where OP = ARP = MRP = MFC = AFC.

Product Exhaustion Theorem

The product exhaustion theorem states that since factors of production are rewarded equal to their marginal product, they will exhaust the total product. The adding-up problem states that in a competitive factor market when every factor employed in the production process is paid a price equal to the value of its marginal product, then payments to the factors exhaust the total value of the product.

It can be shown numerically as under:

Q = (MPL) L + (MPc) C

where Q is total output, MP is marginal product, L is labour and K is capital. To find out the value of output, multiply through P (price). Thus

PxQ = (MPL x P) L + (MPC x P) C

(MPL x p) — VMP, and (MPc x P) = VMPC

PO = VMPL x VMPC

Where VMP, is the value of marginal product of labour and VMPc is the value of marginal product of capital.

EULER'S PRODUCT EXHAUSTION THEOREM

One of the earlier proofs to the distribution of national income according to marginal productivity of production factors was provided by the Swiss mathematician. Leonard Euler (1701–83), which is known as Euler Theorem. **Euler Theorem demonstrates that if production function is homogeneous of degree one (which exhibits constant returns to scale)** It is thus proved that if each factor is paid a sum equal to itsVMP, the total value of the Neo-Classical Approach of product is exhausted. This is Euler's product exhaustion theorem.

$$Q = \frac{\partial Q}{\partial L} \cdot L + \frac{\partial Q}{\partial K} \cdot K$$

ASSUMPTIONS

- An economy consists of n identical firms,
- Each firm employs the same number of homogeneous labour
- The marginal physical product of labour is given by the curve MPL
- Each firm employs an OL number of workers.

IMPORTANCE OF PRODUCT EXHAUSTION THEOREM

Euler's theorem plays an important role in the theory of distribution. The total product is produced by combining different factors of production. The

The question that arises is how the total output should be distributed among the factors of production?

If the production function is homogeneous of degree one, then Euler's theorem can solve this question. It provides the solution to the producer's long-run problem of allocation of total product to each factor and the distribution of the total outlay among the different inputs.

The theorem also suggests how a firm should employ the various inputs. It tells us that the firm should employ its inputs to that extent at which the reward to the factor equals its marginal revenue product.

ADDING-UP CONTROVERSY

When the marginal productivity theory first gained acceptance by the end of the 19th century,a controversy arose whether distribution of national income among the various factors of production according to their marginal productivity was morally justifiable.In the course of the debate, another question came up, i.e., whether the sum of total labour income and of capital income equals the total

product.

In other words, the controversy was, if each factor is paid the value of its marginal product(VMP), does this mean that the entire output is exhausted and nothing is left that falls into the hands of exploiting capitalists?

It can be shown numerically as under:

Q = (MPL) L + (MPc) C

where Q is total output, MP is marginal product, L is labour and K is capital. To find out the value of output, multiply through P (price). Thus

PxQ = (MPL x P) L + (MPC x P) C

(MPL x p) — VMP, and (MPc x P) = VMPc

PO = VMPL x VMPc

Where VMP, is the value of marginal product of labour and VMPc is the value of marginal product of capital.

However, Prof. Watson questions the existence of constant returns to scale in the economy.

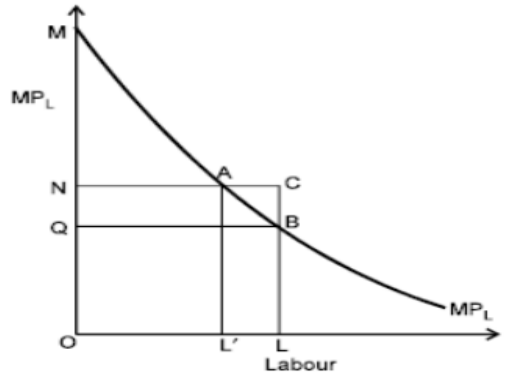
CLARK-WICKSTEED-WALRAS PRODUCT EXHAUSTION THEOREM

Euler's product exhaustion theorem assumes a homogeneous production function, i.e., constant returns to scale.

Clark, Wicksteed and Walras have, however, shown that the assumption of homogeneous production function is not necessary for the product exhaustion theorem. It holds for all types of production Functions. That is, according to Clark-Wicksteed-Walras Theorem, if each factor is paid its VMP, then the total factor payments will exhaust the value of total output.

A graphical proof of Clark-Wicksteed Walras theorem of product exhaustion is given in Figure

- The total output of each firm will then be represented by the area OMBL. Suppose also that eachlabour is paid a real wage of OQ= BL and that the total wages equal the area OQBL.
- That is, the share of labour in total output OMBL is OQBL. The total output OMBL is OQBL. Theresidual (OMBL – OQBL = QMB)goes to land as rent. The rent so computed is merely a residual.But, Clark and others proved thatQMB is not merely a residual: it is also the marginal physical product of land.
- By proving this, they had established the product exhaustion theorem. Note that,given n firms, the total output of the industry is n × OMBL.



Now suppose that the number of firms increases to n + 1, the number of workers remaining the same, i.e., **n ×OL**. The new firm gets its labour supply from the old firms. Suppose that **n × OL** workers are so distributed between n + 1 farms that each farm again has the same number of workers, say OL′. Note that number of workers employed by each firm decreases from OL to OL′ so that **(n +1) QL′ = n·OL**

Keynesian vs. Neo-Keynesian Economics: An Overview

Classical economic theory presumed that if demand for a commodity or service was raised, then prices would rise correspondingly and companies

would increase output to meet public demand. The classical theory did not differentiate between microeconomics and macroeconomics.

However, during the Great Depression of the 1930s, the macroeconomy was in evident disequilibrium. This led John Maynard Keynes to write "The General Theory of Employment, Interest, and Money" in 1936, which played a large role in distinguishing the field of macroeconomics as distinct from microeconomics. The theory centres on the total spending of an economy and the implications of this on output and inflation.

Keynesian theory does not see the market as being able to naturally restore itself. Neo-Keynesian theory focuses on economic growth and stability rather than full employment. Neo-Keynesian theory identifies the market as not self-regulating.

Keynesianism

One point of departure from neoclassical economics in Keynesian theory was that it did not see the market as possessing the capacity to restore itself to equilibrium naturally. For this reason, government regulations were to be imposed on capitalist enterprises.

Keynesian theory, however, only proposes fiscal intervention to push the system towards full employment or to provide stimulus out of a recession or downturn. Once stabilised, these measures should be tapered and removed.

Neo-Keynesian

Just as Keynes posited his theory in response to gaps in classical economic analysis, Neo-Keynesianism derives from observed differences between Keynes's theoretical postulations and real economic phenomena. The Neo-Keynesian theory was articulated and developed mainly in the U.S. during the post-war period.

Neo-Keynesians did not place as heavy an emphasis on the concept of full employment but instead focused on economic growth and stability.

Kaldor- modified model of Pasinetti

It has been seen that the original Harrod-Domar model (hereafter, mentioned as H-D Model) is rigid, light, one sector and specific with respect to three parameters.
A constant proportion of income is assumed to be saved (St/Yt). The full capacity condition means a constant capital output ratio (C/O) and further the condition that on full employment the demand for labour (associated with full capacity output) must grow at the constant rate (n).

Introduction:

It has been seen that the original Harrod-Domar model (hereafter, mentioned as H-D Model) is rigid, light, one sector and specific with respect to three parameters.
A constant proportion of income is assumed to be saved (St/Yt). The full capacity condition means a constant capital output ratio (C/O) and further the condition that on full employment the demand for labour (associated with full capacity output) must grow at the constant rate (n).

Thus, on account of constant saving-income ratio, constant capital-output ratio and constant demand for labour on full employment, the H-D model becomes too rigid to be of much use. But the H-D model becomes very useful if these conditions are relaxed. The parameters (constant variables) may be allowed to vary. We may vary the supply of labour and treat it as more flexible on full employment—this has been done by Mrs. Joan Robinson and her colleagues in Cambridge.
Her 'Golden Age Model' is discussed further. Again, we can take a varying band of values for capital-output ratio, thereby increasing the possibility of Gw being equal to Gn. This is the position of Neo-classical models developed by R.M. Solow,

T.S. Swan, J.E. Meade, Samuelson, H.G. Johanson, and others. Lastly, we may allow the saving-income ratio to vary according to the distribution of income between wages and profits (Y = W + P). This is the approach adopted by Kaldor and, therefore, we discuss his basic model first of all.

Assumptions:

1. There are two factors of production capital and labour (K and L) and thus only two types of income: profits and wages (P and W). All profits are saved and all wages are consumed.

2. There are constant returns to scale and production function remains unchanged over time. Capital and labour are complementary.

3. There is perfect competition as such the rates of wages and profits are the same over different places.

4. The marginal propensity to consume workers is greater than that of capitalists.

5. The investment-income (output) into (I/Y) is an independent variable.

6. There is a state of full employment so that total output or income (Y) is given.

7. There is an unlimited supply of labour at a constant wage in terms of wage goods.

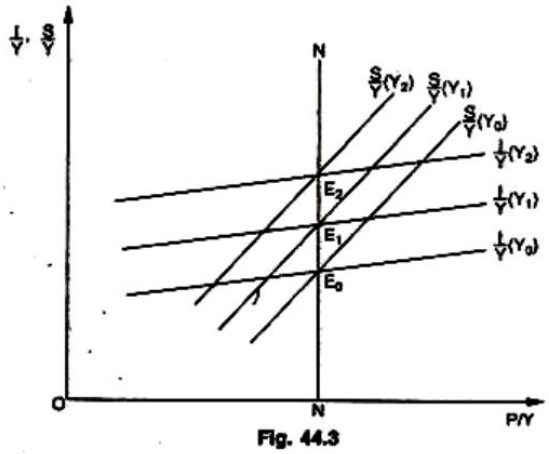


Fig. 44.3

THE CLASSICAL THEORY OF DISTRIBUTION

The earliest systematic discussion on distribution of income is found in the writings of the classical economists. Adam Smith and Ricardo were the most prominent economists of the classical school. These economists attempted to explain the prices of products in terms of so-called "natural rates" of reward for labour, land and capital. These natural rates of reward were explained by special theories. Interestingly, even the leading classical economists did not wholly agree among themselves in explaining rent, wages, interest and profit and in some cases their differences were on substantial points. We shall confine here only to what are considered the representative theories of the classical school. For explaining rent Ricardo's theory is considered most authentic. There are two theories to explain wages.

Adam Smith and David Ricardo developed the subsistence wage theory. Some other classical economists, including J.S. Mill advocated the wages-fund theory for explaining wage rates. Interest has been explained in terms of demand for and the supply of savings. Although the classical economists used the concept of profit in their writings, they failed to develop a consistent theory of profit.

Rent

As stated above on rent, the most authentic theory in the classical framework has been provided by David Ricardo who is considered one of the foremost economists of the classical school.

According to Ricardo, rent is that portion of the produce of earth which is paid to the landlord for the original and indestructible powers of the soil. In his opinion, rent is not earned by the landlord by making certain improvements on land. It is a surplus left after the costs of cultivation as represented. by payments to labour and capital have been met

Wages

The subsistence theory of wage determination assumes that labour is purchased- and sold in the market like any other commodity and its value is determined like the values of other commodities. Since the classical economists argue that in the long run the value of any commodity is equal to its production cost, therefore the value of labour should also be equal to the cost of producing it, which in essence is the amount required for maintaining the worker and his dependents at the subsistence level. The subsistence wage theory asserts that workers in the long run earn only the subsistence wage irrespective of their productivity levels. In the short run, however, actual wage rate can be at variance from the subsistence wage, but in the long term through adjustments in the supply of labour the actual wage rate will tend to be equal to the subsistence wage. Ricardo was of the view that the subsistence level of wages will be rigidly fixed for all times.

Interest

J.S. Mill is the chief exponent of the classical theory of interest. In his opinion, the rate of interest is determined by the interaction of demand for and the supply of cap He marked that "the rate of interest ... depends essentially and permanently on the comparative amount of real capital offered and demanded

in the way of loan", and thus "fluctuations in the rate of interest arise from variations either in the demand for loans or in the supply" .

Profit

The classical economists did not provide any coherent theory of profit. It was difficult for them because they had relied on labour theory of value for explaining the values of commodities. According to this theory, the value of a commodity depends on the amount of labour embodied in it. This might have been true in the earli~r societies when labour was the sol6 producer of commodities. Even in his times, Adam Smith noted that employers used their own capital along with the hired labour for producing commodities.

The Ricardian model

Ricardo presented his view on Economic Development in an unsystematic manner in his book The Principles of Political Economy and Taxation. Like Smith, Ricardo never propounded any theory of development; he simply discussed the theory of distribution. However, Smith's model of growth remained the predominant model of David Ricardo (1817) modified it by including diminishing returns to land.

Assumptions

The assumptions of his model included:

a) all land is used for production of corn,

b)law of diminishing returns operates,

c) supply of land is fixed,

d) demand for corn is perfectly is elastic,

e) labour and capital are variable inputs,

f) state of technical knowledge is given,

g) all workers are paid a subsistence wage,

h) supply price and labour is given and constant

, i) demand for labour depends upon accumulations,

j)capital accumulation results from profit and

k) there is perfect competition.

Main Features

The Ricardian model is based on the interrelation of three groups in the economy. They are landlords, capitalists and labourers among whom the entire produce of land is distributed.

Rent, Profit and Wages –

(a) rent is that portion of the produce of earth which is paid to the landlord for the use of original and indestructible powers of the soil. It is the difference between average and marginal products. If all the land had the same properties of unlimited supply and uniform in quality, no charge would make for its use.

(b) The wage rate is determined by the wage fund divided by the number of workers employed at the subsistence level. According to the model, out of the total corn produced rent has the first right and the residual is distributed between wage and profit while interest is included in profit.

Capital Accumulation – According to Ricardo capital accumulation is the outcome of profit because profit leads to saving of wealth which is used for capital formations.

Capital formation depends upon will to save and capacity to save which is more important. The larger the surplus i.e. profit, the larger will be capacity to save.

i) The Profit Rate - The rate of profit is equal to the ratio of profit to capital employed. But since capital consists of only working capital, it is equal to the wage bill. So long as the rate of profit is positive, capital

accumulation will take place. In reality, profits depend upon wages, wages on the price of corn and the price of corn depends upon the fertility of the marginal land. So there is an inverse relation between wages and profits. When due to improvement in agriculture, production increases, the price of corn falls and subsistence wages also fall and profits will increase leading to capital accumulation. This will raise demand for labourers raising wage rate and reducing profits.

ii) Increase in Wages – The wage rate increases when the prices of commodities forming the subsistence of the workers increase. As the demand for food increases, less fertile land is brought under control and more labourers are needed raising the wage rate. Thus wages would rise with the increase in the price of corn. In a situation rent also increases, with the decline of capitalists' profit capital accumulation also declines.

iii) Declining profits in other industries – The profits of the farmer regulate the profits of all other trades. Therefore the money rate of profit earned on capital must be equal both in agriculture and industry. If the profit rate declines in the agricultural sector it will also decline in the manufacturing industry.

Other Sources of Capital Accumulation: According to Ricardo economic development depends upon the difference between production and consumption. Capital may be increased by an increased production or by a diminished unproductive consumption. However, the productivity of labour may be increased through technological changes and better organisation. It is in this way that capital accumulation can be increased. But the use of more machines employs less workers leading to unemployment. So Ricardo regards technological conditions as given and constant.

Theories of Development

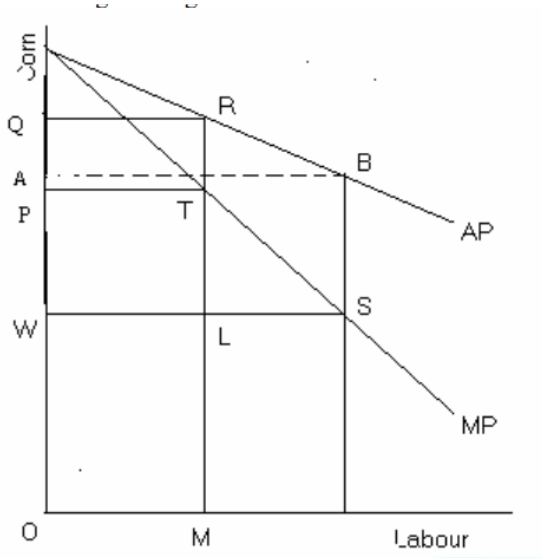
a) Taxes:- Taxes are a source of capital accumulation in the hands of the government.

According to Ricardo, taxes are to be levied to reduce conspicuous consumption. Otherwise the imposition of taxes on capitalists landlords and labourers will transfer resources from these groups to the government, adversely affecting investment. So he does not favour the imposition of taxes.

b) Free Trade:- Ricardo is in favour of free trade. The profit rate can be saved from declining by importing corn. The capital accumulation therefore continues to be high. In this way the resources of the world can be used more efficiently through trade.

Stationary State: According to Ricardo there is a natural tendency for the rate of profit to fall in the economy so that the country ultimately reaches the stationary state. When capital accumulation rises, with increase in profits, production increases which raises the wage fund, population increases, which raises the demand for corn and its price. Inferior grades of land are cultivated. Rents on superior land increase and reduce the share of the capitalists and labourers. Profits decline and wages fall to subsistence. The process of rising rents and falling profits continues till the output from the marginal land just covers the wages of labour employed and profits are zero.

There is no accumulation of capital, no increase in population and wage rate but rent is extremely high and there is economic stagnation.



In figure AP and MP represents average product and marginal wage bill is OWLM at the subsistence level. Total profits are WPTL.
product OM labour is employed OQRM corn is produced. Share of rent is PQRT and Total output increases with economic development. This leads to an increase in the wage fund leading to an increase in the amount of labour. Demand for corn goes up raising the price of corn. OM1 labour is employed, total output is OABM1, and there are no profits. The share rent has increased.

MARXIAN THEORY OF ECONOMIC DEVELOPMENT

Karl Marx (1867-1894) modified the classical picture once again. For "modern"growth theory, Marx's achievement was critical because he not only provided, through his famous "reproduction" schema, , but he did so in a multi-sectoral context and, in the process, contributed critical ingredients such as the concept of a "steady state" growth equilibrium. He explains how a particular capitalist economic system functions.

Marx's theory differed from the earlier classical economists in many ways. Firstly, unlike Smith or Ricardo, Marx did not believe that labour

supply was endogenous to the wage. As a result, Marx had wages determined not by necessity or "natural/cultural" factors but rather by bargaining between capitalists and workers.

This process however was considered to be influenced by the amount of unemployed labourers in the economy (the "reserve army of labour", as he put it). Marx also argued profits as the determinants of savings and capital accumulation.

Organic Composition of Capital, and Surplus Value

Like the classical economists, Marx believed there was a declining rate of profit over the long-term. The long-run tendency for the rate of profit to decline is brought about not by competition increasing wages (as in Smith), nor by the diminishing marginal productivity of land (as in Ricardo), but rather by the "rising organic composition of capital".

Marx defined the "organic composition of capital" as the ratio of what he called constant capital to variable capital. It is important to realise that constant capital is not what we today call fixed capital, but rather circulating capital such as raw materials. Marx's "variable capital" is defined as advances to labour, i.e. total wage payments, or heuristically,

v = wL (where w is wages and L is labour employed). Thus according to Marx, total value of output is

y = c + v + s

where y is output, 'c' constant capital, 'v' variable capital and 's' surplus value.

The rate of profits, Marx claimed, is defined as:

r = s/(v +c)

where r is the rate of profit, s is the surplus, and (v+c) are total advances (constant and variable). Surplus, s, is the amount of total output produced above total

advances, or

s = y - (v+c),

where y is total output. It is important to note that for Marx only labour produces surplus value. This was to become a sore point of debate between the Neo-Ricardians like Sraffa, Pasinetti and Garegnani and the Neo-Marxians like Baran, Sweezy, Mandel, Amin, Frank, Levine, Prebisch, and Furtado, in later years. Marx called the ratio of surplus to variable capital, s/v, the "exploitation rate"

(surplus produced for every dollar spent on labour).

Marx referred to the ratio of constant to variable capital, c/v, as the organic composition of capital (which can be viewed as a sort of capital-labour ratio). Notice that dividing numerator and denominator of r by v we obtain: r = (s/v)(v/(v+c)))

so the rate of profit can be expressed as a positive function of the exploitation rate (s/v) and a negative function of the organic composition of capital (c/v)).

Modern Theory of Distribution:

Meaning:

The modern theory of factor pricing provides a satisfactory explanation of the problem of distribution.

It is known as the demand and supply theory of distribution. According to the modem theory of factor pricing, the equilibrium factor prices can be explained by the forces of demand and supply.

Prices paid for productive services are like any other price and they are basically determined by demand and supply conditions. Incomes are received as payments for the services of factors of production. Wages are payments for the services rendered by labour.

Rents are payments for the services of land and interest is payment for the services of capital. In this way most incomes are remunerations or prices paid for services rendered by factors of production in the process of production. This theory is superior to the marginal productivity theory, because it takes into account both the forces of demand and supply in the determination of factor prices. Marshall held the view that no separate theory is required to explain factor prices. The principles which govern commodity pricing also govern factor-pricing. The following paragraphs touch upon the salient aspects of the theory.

"The theory of factor prices is just a special case of the theory of price. We first develop a theory of the demand for factors, then a theory of the supply of factors and finally combine them into a theory of determination of equilibrium price and quantities." Lipsey and Stonier

Assumptions:

1. Every producer tries to get maximum profit.

2. Producers have perfect knowledge of the MRP

3. Active competition exists in the factor market.

4. There is active competition among the different units of factors.

5. The state does not intervene to equate the prices of the factor service.

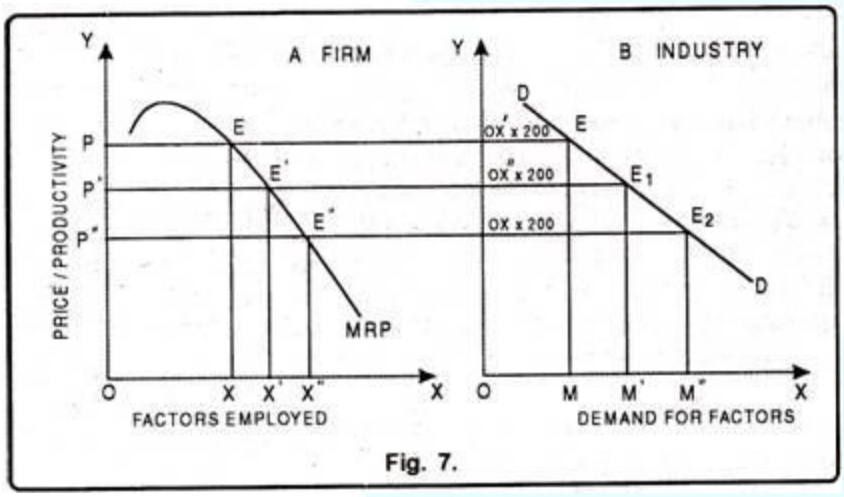


Fig. 7.

Kalecki's Theory of Distribution

He believed that the relative share of profits and wages in the national outputs depends on the **degree of monopoly** in the economy. The formula to measure the degree of monopoly is = (P-MC)/P.

Wherein, P represents the price and MC represents Marginal cost.
According to Kalecki, the marginal cost includes the cost of raw material and the cost of labor (only wages). Also, in the short run, MC = AC.

Assumptions by Kalecki

1. Vertically Integrated Industry

The industry under consideration is fully vertically integrated so that only costs are labour costs.
All workers are directly productive labour.
Costs are constant.
Until we reach the full level of employment, MC=AC
Kalecki believes that in the model of the vertically integrated industry, the gross profit of the industry is equal to total revenue minus total cost.
Here, Total Cost is exclusively wage costs. He further says that the income distribution in such an industry depends completely on the ability of the firms to charge a markup on their product. Kalecki says that, here, the monopoly power and the share of profits are directly proportional.

This means, the higher the monopoly power, the higher the share of profits.

2. Non – Vertically Integrated Industry

Labour costs are only of the directly productive labour workers minus the overheads.

Costs are constant.

Output rises for both the labour and the raw materials such that MC=AC.
In this case, Kalecki's degree of monopoly is equal to (P-MC)/P or (P-AC)/P, because MC=AC. And P – AC is the difference between the price of its products and the Average Cost of producing the said good.

If we integrate over the whole economy to get the total profit in the economy, it is equal to Σ x.p.u = Σ x (p – ac) and the total output of a firm is x.p. However, the total output of the economy is not equal to national income.

The reason being, here intermediate costs are included, but in national income, the cost of the final good is taken.

If the total national income is NI and the total wage bill in the economy is W. And NI – W gives us the total profit in the economy. It must be noted that as the monopoly power of the firms in the economy rises, the share of the wages in the national income falls.
And not to forget, the share of raw material in the AC is zero in case of a non vertically integrated industry.

Theories of Wages

As mentioned earlier, the classical economists had developed two different theories of wage determination. Adam Smith and David Ricardo are considered the chief exponents of the subsistence wage theory. T.R. Malthus and J.S. Mill propounded the wages fed theory.

- **The subsistence theory of wage** determination assumes that labour is purchased- and sold in the market like any other commodity and its value is determined like the values of other commodities.
- Since the classical economists argue that in the long run the value of any commodity is equal to its production cost, therefore the value of labour should also be equal to the cost of producing it, which in essence is the amount required for maintaining the worker and his dependents at the subsistence level.
- The subsistence wage theory asserts that workers in the long run earn only the subsistence wage irrespective of their productivity levels. In the short run, however, actual wage rate can be at variance from the subsistence wage, but in the long term through

adjustments in the supply of labour the actual wage rate will tend to be equal to the subsistence wage.

- Ricardo was of the view that the subsistence level of wages will be rigidly fixed for all times.
- J.S. Milt had propounded wages fund theory in the most cogent form. According to him, the wage rate depends on the ratio of the workforce to the amount of working capital which is meant to be spent directly on the purchase of labour.
- The wages fund, that is, the amount of working capital provided for obtaining the services of labour is not in practice any fund set aside for paying the wages.
- The producers only have an estimate of it in their minds. The aggregate of these individual producers' estimates make the national estimate of wages fund which ordinarily remains fixed over time.
- Therefore, any change in the wage rate that may occur will be due to a change in the number of workers willing to work for wages.
- The wages fund theory does not suggest that in the long run wage rate should remain stable at a certain level.
- It admits that over time wage rate may rise either due to an increase in the wages fund resulting from higher savings or the decrease in the workforce. The possibility of both the factors operating simultaneously also exists.

Theories of profit

- ProfitThe classical economists did not provide any coherent theory of profit. It was difficult for them because they had relied on labour theory of value for explaining the values of commodities.
- According to this theory, the value of a commodity depends on the amount of labour embodied in it.
- This might have been true in the earlier societies when labour was the sole producer of commodities. Even in his times, Adam Smith noted that employers used their own capital along with the hired labour for producing
  '
- commodities. He therefore Ged that when goods are sold they must fetch not only enough to cover the wages of workers but they must also bring in something by way of profit for their employers,
- Smith did not believe that profits may be a special type of wages, the reward for labour of inspection or supervision. In his opinion, profits bear relation to only the size of the capital stock of the employers.
- Ricardo, who also relied on labour theory of.value, failed to adequately explain the origin of capitalist's profit.
- He argued that the value of commodities depends on both present and past . In this way he incorporated capital ima his-system and found an explanation for profit.
- To sum up, the classical theories which explain rent, wages, interest, and profit provide some insight into the distribution process but they are not entirely correct and, therefore,have been abandoned.
- Modern economists now assert that land alone does not earn rent, It can accrue to any factor of -tion.
- This approach you will lm later in are determined neither by the subsistence level of workers nor by the wages fund.
- It is the marginal productivity of workers that decisively determines the wage rate.
- Since neither the saving, nor investment are interest elastic, the basic premise of the classical theory of interest is.incorrect. Finally, the classical theory fails to explain why profits arise

Theory of Interest

J.S. Mill is the chief exponent of the classical theory of interest. In his opinion, the rate of interest is determined by the interaction of demand for and the supply of capital.

He marked that "the rate of interest ... depends essentially and permanently on the comparative amount of real capital offered demanded in the way of loan", and thus "fluctuations in the rate of interest arise from variations either in the demand for loans or in the supply"

The social theory of interest suggests that the source of supply of capital is that part of income which is withheld from consumption. This is called saving.

In classical theory saving is functionally related to interest and varies directly with it. The demand for capital is ,'

made for investment purposes only and is interest-elastic. It implies that the demand for capital rises as the rate of interest decreases and it diminishes with the rise in the rate of interest.

To be brief, the demand for capital varies inversely with rite of interest. The demand for and supply of capital are equal at a rate of interest which is obtained by the intersection of the demand and supply schedules.