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## FUNDAMENTAL ANALYSIS: ECONOMY ANALYSIS

The primary motive of buying a share is to sell it subsequently at a higher price. In many cases, dividends are also expected. Thus, dividends and price changes constitute the return from investing in shares. Consequently, an investor would be interested to know the dividend to be paid on the share in the future as also the future price of the share. These values can only be estimated and not predicted with certainty. These values are primarily determined by the performance of the company which in turn is influenced by the performance of the industry to which the company belongs and the general economic and socio-political scenario of the country.

An investor who would like to be rational and scientific in his investment activity has to evaluate a lot of information about the past performance and the expected future performance of companies, industries and the economy as a whole before taking the investment decision. Such evaluation or analysis is called fundamental analysis.

### MEANING OF FUNDAMENTAL ANALYSIS

Fundamental analysis is really a logical and systematic approach to estimating the future dividends and share price. It is based on the basic premise that share price is determined by a number of fundamental factors relating to the economy, industry and company. Hence, the economy fundamentals, industry fundamentals and company fundamentals have to be considered while analysing a security for investment purpose. Fundamental analysis is, in other words, a detailed analysis of the fundamental factors affecting the performance of companies.

Each share is assumed to have an economic worth based on its present and future earning capacity. This is called its intrinsic value or fundamental value. The purpose of fundamental analysis is to evaluate the present and future earning capacity of a share.

based on the economy, industry and company fundamentals and thereby assess the intrinsic value of the share. The investor can then compare the intrinsic value of the share with the prevailing market price to arrive at an investment decision. If the market price of the share is lower than its intrinsic value, the investor would decide to buy the share as it is underpriced. The price of such a share is expected to move up in future to match with its intrinsic value.

On the contrary, when the market price of a share is higher than its intrinsic value, it is perceived to be overpriced. The market price of such a share is expected to come down in future and hence, the investor would decide to sell such a share. Fundamental analysis thus provides an analytical framework for rational investment decision-making. This analytical framework is known as EIC framework, or economy-industry-company analysis.

Fundamental analysis insists that no one should purchase or sell a share on the basis of tips and rumours. The fundamental approach calls upon the investor to make his buy or sell decision on the basis of a detailed analysis of the information about the company, the industry to which the company belongs, and the economy. This results in informed investing. For this, a fundamentalist makes use of the EIC framework of analysis.

## ECONOMY-INDUSTRY-COMPANY ANALYSIS FRAMEWORK

The analysis of economy, industry and company fundamentals constitute the main activity in the fundamental approach to security analysis. These can be viewed as different stages in the investment decision-making process and can be depicted graphically with three concentric circles as shown in Fig. 7.1.

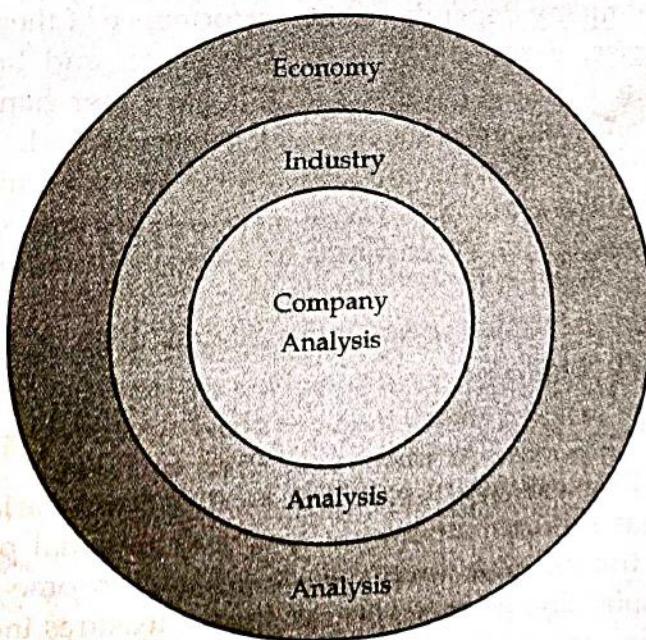


Fig. 7.1 EIC analysis framework.

In this era of globalisation we may add one more circle to the diagram to represent the international economy.

The logic of this three tier analysis is that the company performance depends not only on its own efforts, but also on the general industry and economy factors. A company belongs to an industry and the industry operates within the economy. As such, industry and economy factors affect the performance of the company. The multitude of factors affecting the performance of a company can be broadly classified as:

1. *Economy-wide factors* such as growth rate of the economy, inflation rate, foreign exchange rates, etc. which affect all companies.
2. *Industry-wide factors* such as demand-supply gap in the industry, the emergence of substitute products, changes in government policy relating to the industry, etc. These factors affect only those companies belonging to a specific industry.
3. *Company-specific factors* such as the age of its plant, the quality of management, brand image of its products, its labour-management relations, etc. These factors are likely to make a company's performance quite different from that of its competitors in the same industry.

Fundamental analysis thus involves three steps:

1. Economy Analysis
2. Industry Analysis
3. Company Analysis.

Let us see what each of these analyses implies.

## **ECONOMY ANALYSIS**

The performance of a company depends on the performance of the economy. If the economy is booming, incomes rise, demand for goods increases, and hence the industries and companies in general tend to be prosperous. On the other hand, if the economy is in recession, the performance of companies will be generally bad.

Investors are concerned with those variables in the economy which affect the performance of the company in which they intend to invest. A study of these economic variables would give an idea about future corporate earnings and the payment of dividends and interest to investors.

Let us look at some of the key economic variables that an investor must monitor as part of his fundamental analysis.

### ***Growth Rates of National Income***

The rate of growth of the national economy is an important variable to be considered by an investor. GNP (gross national product), NNP (net national product) and GDP (gross domestic product) are the different measures of the total income or total economic output of the country as a whole. The growth rates of these measures indicate the growth rate of available by the government from time to time.

The estimated growth rate of the economy would be a pointer towards the prosperity of the economy. An economy typically passes through different phases of prosperity, known as the different stages of the economic or business cycle. The four stages of an

economic cycle are depression, recovery, boom and recession. The stage of the economic cycle through which a country passes has a direct impact on the performance of industries and companies.

Depression is the worst of the four stages. During a depression, demand is low and declining. Inflation is often high and so are interest rates. Companies are forced to reduce production, shut down plant and lay off workers.

During the recovery stage, the economy begins to revive after a depression. Demand picks up leading to more investments in the economy. Production, employment and profits are on the increase.

The boom phase of the economic cycle is characterised by high demand. Investments and production are maintained at a high level to satisfy the high demand. Companies generally post higher profits. The boom phase gradually slows down. The economy slowly begins to experience a downturn in demand, production, employment, etc. The profits of companies also start to decline. This is the recession stage of the business cycle.

While analysing the growth rate of the economy, an investor would do well to determine the stage of the economic cycle through which the economy is passing and evaluate its impact on his investment decision.

### ***Inflation***

Inflation prevailing in the economy has considerable impact on the performance of companies. Higher rates of inflation upset business plans, lead to cost escalation and result in a squeeze on profit margins. On the other hand, inflation leads to erosion of purchasing power in the hands of consumers. This will result in lower demand for products. Thus, high rates of inflation in an economy are likely to affect the performance of companies adversely. Industries and companies prosper during times of low inflation.

Inflation is measured both in terms of wholesale prices through the wholesale price index (WPI) and in terms of retail prices through the consumer price index (CPI). These figures are available on weekly or monthly basis. As part of the fundamental analysis, an investor should evaluate the inflation rate prevailing in the economy currently as also the trend of inflation likely to prevail in the future.

### ***Interest Rates***

Interest rates determine the cost and availability of credit for companies operating in an economy. A low interest rate stimulates investment by making credit available easily and cheaply. Moreover, it implies lower cost of finance for companies and thereby assures higher profitability. On the contrary, higher interest rates result in higher cost of production which may lead to lower profitability and lower demand.

The interest rates in the organised financial sector of the economy are determined by the monetary policy of the government and the trends in money supply. These rates are thus controlled and vary within certain ranges. But the interest rates in the unorganised financial sector are not controlled and may fluctuate widely depending upon the demand and supply of funds in the market. Further, long-term interest rates differ from short-term interest rates.

An investor has to consider the interest rates prevailing in the different segments of the economy and evaluate their impact on the performance and profitability of companies.

### **Government Revenue, Expenditure and Deficits**

As the government is the largest investor and spender of money, the trends in government revenue, expenditure and deficits have a significant impact on the performance of industries and companies. Expenditure by the government stimulates the economy by creating jobs and generating demand. Since a major portion of demand in the economy is generated by government spending, the nature of government spending is of great importance in determining the fortunes of many an industry.

However, when government expenditure exceeds its revenue, there occurs a deficit. This deficit is known as **budget deficit**. All developing countries suffer from budget deficits as governments spend large amounts of money to build up infrastructure. But budget deficit is an important determinant of inflation, as it leads to deficit financing which fuels inflation.

The budget document contains detailed information on each item of government expenditure and revenue and the resulting deficit. An investor has to evaluate these carefully to assess their impact on his investments.

### **Exchange Rates**

The performance and profitability of industries and companies that are major importers or exporters are considerably affected by the exchange rates of the rupee against major currencies of the world. A depreciation of the rupee improves the competitive position of Indian products in foreign markets, thereby stimulating exports. But it would also make imports more expensive. A company depending heavily on imports may find devaluation of the rupee affecting its profitability adversely.

The exchange rates of the rupee are influenced by the **balance of trade deficit**, the **balance of payments deficit** and also the **foreign exchange reserves** of the country. The excess of imports over exports is called balance of trade deficit. The balance of payments deficit represents the net difference payable on account of all transactions such as trade, services and capital transactions. If these deficits increase, there is a possibility that the rupee may depreciate in value.

A country needs foreign exchange reserves to meet several commitments such as payment for imports and servicing of foreign debts. Balance of payment deficit typically leads to decline in foreign exchange reserves as the deficit has to be met from the reserve. The size of the foreign exchange reserve is a measure of the strength of the rupee on external account. Large foreign exchange reserves help to increase the value of the rupee against other currencies.

The exchange rates of the rupee against the major currencies of the world are published daily in the financial press. An investor has to keep track of the trend in exchange rates of rupee. An analysis of the balance of trade deficit, balance of payments deficit and the foreign exchange reserves will help to project the future trends in exchange rates.

### **Infrastructure**

The development of an economy depends very much on the infrastructure available. Industry needs electricity for its manufacturing activities, roads and railways to transport raw materials and finished goods, communication channels to keep in touch with suppliers and customers.

The availability of infrastructural facilities such as power, transportation and communication systems affects the performance of companies. Bad infrastructure leads to inefficiencies, lower productivity, wastage and delays. An investor should assess the status of the infrastructural facilities available in the economy before finalising his investment plans.

### *Monsoon*

The Indian economy is essentially an agrarian economy and agriculture forms a very important sector of the Indian economy. Because of the strong forward and backward linkages between agriculture and industry, performance of several industries and companies are dependent on the performance of agriculture. Moreover, as agricultural incomes rise, the demand for industrial products and services will be good and industry will prosper.

But the performance of agriculture to a very great extent depends on the monsoon. The adequacy of the monsoon determines the success or failure of the agricultural activities in India. Hence, the progress and adequacy of the monsoon becomes a matter of great concern for an investor in the Indian context.

### *Economic and Political Stability*

A stable political environment is necessary for steady and balanced growth. No industry or company can grow and prosper in the midst of political turmoil. Stable long-term economic policies are what are needed for industrial growth. Such stable policies can emanate only from stable political systems as economic and political factors are inter-linked. A stable government with clear cut long-term economic policies will be conducive to good performance of the economy.

## **ECONOMIC FORECASTING**

Economy analysis is the first stage of fundamental analysis and starts with an analysis of historical performance of the economy. But as investment is a future-oriented activity, the investor is more interested in the expected future performance of the overall economy and its various segments. For this, forecasting the future direction of the economy becomes necessary. Economic forecasting thus becomes a key activity in economy analysis.

The central theme in economic forecasting is to forecast the national income with its various components. Gross national product or GNP is a measure of the national income. It is the total value of the final output of goods and services produced in the economy. It is a measure of the total economic activities over a specified period of time and is an indicator of the level and rate of growth of economic activities. An investor would be particularly interested in forecasting the various components of the national income, especially those components that have a bearing on the particular industries and companies that he is analysing.

## **FORECASTING TECHNIQUES**

Economic forecasting may be carried out for short-term periods (up to three years), intermediate term periods (three to five years) and long-term periods (more than five years). An investor

is more concerned about short-term economic forecasts for periods ranging from a quarter to three years. Some of the techniques of short-term economic forecasting are discussed below:

### **Anticipatory Surveys**

Much of the activities in government, business, trade and industry are planned in advance and stated in the form of budgets. Consumers also plan for their major spending in advance. To the extent that institutions and people plan and budget for expenditures in advance, surveys of their intentions can provide valuable input to short-term economic forecasting.

Anticipatory surveys are the surveys of intentions of people in government, business, trade and industry regarding their construction activities, plant and machinery expenditures, level of inventory, etc. Such surveys may also include the future plans of consumers with regard to their spending on durables and non-durables. Based on the results of these surveys, the analyst can form his own forecast of the future state of the economy.

The greatest shortcoming of the anticipatory surveys is that there is no guarantee that the intentions surveyed will certainly materialise. The forecast based on anticipatory surveys or surveys of intentions will be valid only to the extent that the intentions are translated into action. Hence, the analyst cannot rely solely on these surveys.

### **Barometric or Indicator Approach**

In this approach to economic forecasting, various types of indicators are studied to find out how the economy is likely to perform in the future. These indicators are time series data of certain economic variables. The indicators are classified into leading, coincidental and lagging indicators.

The leading indicators are those time series data that reach their high points (peaks) or their low points (troughs) in advance of the high points and low points of total economic activity. The coincidental indicators reach their peaks and troughs at approximately the same time as the economy, while the lagging indicators reach their turning points after the economy has already reached its own turning points. In this method, the indicators act as barometers to indicate the future level of economic activity. However, careful examination of historical data of economic series is necessary to ascertain which economic variables have led, lagged behind or moved together with the economy.

The US Department of Commerce, through its Bureau of Economic Analysis, has prepared a short list of the different indicators. Some of them are given below for illustrative purpose.<sup>1</sup>

#### **Leading Indicators**

Average weekly hours of manufacturing production workers

Average weekly initial unemployment claims

Contracts and orders for plant and machinery

Number of new building permits issued

Index of S and P 500 stock prices

Money supply (M2)

Change in sensitive materials prices

Change in manufacturers' unfilled orders (durable goods industries)  
Index of consumer expectations

### Coincidental Indicators

Employees on non-agricultural pay rolls  
Personal income less transfer payments  
Index of industrial production  
Manufacturing and trade sales

### Lagging Indicators

Average duration of unemployment  
Ratio of manufacturing and trade inventories to sales  
Average prime rate  
Commercial and industrial loans outstanding  
Change in consumer price index for services

Of the three types of indicators, leading indicators are more useful for economic forecasting because they measure something that foreshadows a change in economic activity.

The indicator approach has its own limitations. It is useful in forecasting the direction of a change in aggregate economic activity, but it does not indicate the magnitude or duration of the change. Further, the leading indicators may give false signals. Moreover, different leading indicators may give conflicting signals. The indicator approach becomes useful for economic forecasting only if data collection and presentation are done quickly. Any delay in presentation of data defeats the purpose of the indicators.

### Econometric Model Building

This is the most precise and scientific of the different forecasting techniques. This technique makes use of Econometrics, which is a discipline that applies mathematical and statistical techniques to economic theory.

In the economic field we find complex interrelationships between the different economic variables. The precise relationships between the dependent and independent variables are specified in a formal mathematical manner in the form of equations. The system of equations is then solved to yield a forecast that is quite precise.

In applying this technique, the analyst is forced to define clearly and precisely the interrelationships between the economic variables. The accuracy of the forecast derived from this technique would depend on the validity of the assumptions made by the analyst regarding economic interrelationships and the quality of his input data.

Econometric models used for economic forecasting are generally complex. Vast amounts of data are required to be collected and processed for the solution of the model. This may cause delay in making the results available. Undue delay may render the results obsolete for purpose of forecasting.

### Opportunistic Model Building

This is one of the most widely used forecasting techniques. It is also known as GNP model building or sectoral analysis.

Initially, an analyst estimates the total demand in the economy, and based on this he estimates the total income or GNP for the forecast period. This initial estimate takes into consideration the prevailing economic environment such as the existing tax rates, interest rates, rate of inflation and other economic and fiscal policies of the government. After this initial forecast is arrived at, the analyst now begins building up a forecast of the GNP figure by estimating the levels of various components of GNP. For this, he collects the figures of consumption expenditure, gross private domestic investment, government purchase of goods and services and net exports. He adds these figures together to arrive at the GNP forecast.

The two GNP forecasts arrived at by two different methods will be compared and necessary adjustments will be made to bring the two forecasts into line with each other.

The opportunistic model building approach makes use of other forecasting techniques to build up the various components. A vast amount of judgement and ingenuity is also applied to make the overall forecast reliable.

Economic forecasting is an extremely complex and difficult process. No method is expected to give accurate results. The investor must evaluate all economic forecasts critically before making his investment decision.

Economy analysis is an important part of fundamental analysis. It gives the investor an overall picture of the expected performance of the economy in the near future. This is a valuable input to investment decision-making.

## **EXERCISES**

1. What is fundamental analysis?
2. "Fundamental analysis provides an analytical framework for rational investment decision-making." Explain.
3. Describe the key economic variables that an investor must monitor as part of his fundamental analysis.
4. Explain the impact of the following economic variables on the performance of the economy and the companies:
  - (a) Interest rates
  - (b) Government revenue, expenditure and deficits
  - (c) Infrastructure
5. What is the significance of economic forecasting in fundamental analysis?
6. Briefly describe the techniques of short-term economic forecasting.
7. Explain the barometric or indicator approach to economic forecasting.

## **REFERENCE**

1. Fischer, Donald E. and Ronald J. Jordan, 1994, *Security Analysis and Portfolio Management*, 5th ed., p. 144, Prentice-Hall of India, New Delhi.

# 8

## INDUSTRY AND COMPANY ANALYSIS

### INDUSTRY ANALYSIS

An investor ultimately invests his money in the securities of one or more specific companies. Each company can be characterised as belonging to an industry. The performance of companies would, therefore, be influenced by the fortunes of the industry to which it belongs. For this reason an analyst has to undertake an industry analysis so as to study the fundamental factors affecting the performance of different industries.

At any stage in the economy, there are some industries which are fast growing while others are stagnating or declining. If an industry is growing, the companies within the industry may also be prosperous. The performance of companies will depend, among other things, upon the state of the industry to which they belong. Industry analysis refers to an evaluation of the relative strengths and weaknesses of particular industries.

### Concept of Industry

An industry is generally described as a homogenous group of companies. We may define an industry "as a group of firms producing reasonably similar products which serve the same needs of a common set of buyers."<sup>1</sup> Industries are traditionally classified on the basis of products. According to this product-wise classification we have cement industry, steel industry, cotton textile industry, pharmaceutical industry, and so forth. However, industry classification becomes difficult when dealing with firms having a diversified product line. And such firms are now on the increase. Even though classification of industry poses practical difficulties, each country follows a standardised classification to facilitate data collection and reporting.

## Industry Life Cycle

Marketing experts believe that each product has a life cycle. They have identified four stages in the life of a product, namely introduction stage, growth stage, maturity stage and the decline stage. In the same way, an industry is also said to have a life cycle. This industry life cycle theory is generally attributed to Julius Grodinsky. According to the industry life cycle theory, the life of an industry can be segregated into the pioneering stage, the expansion stage, the stagnation stage, and the decay stage. This kind of segregation is extremely useful to an investor because the profitability of an industry depends upon its stage of growth. In fact, each development stage is unique and exhibits different characteristics.

Technological advances in one industry can effect the growth of another industry. The jute industry began to decline when alternate and cheaper packing materials came into use. The popularity of synthetic textiles can adversely affect the demand for cotton textiles, and vice versa.

The first step in industry analysis, therefore, is to determine the stage of growth through which the industry is passing.

### Pioneering Stage

This is the first stage in the industrial life cycle of a new industry where the technology as well as the product are relatively new and have not reached a state of perfection. The pioneering stage is characterised by rapid growth in demand for the output of industry. As a result there is a great opportunity for profit. Many companies compete with each other vigorously. As large number of companies attempt to capture their share of the market, there arises high business mortality rates. Weak firms are eliminated and a lesser number of firms survive the pioneering stage.

An example of the pioneering stage of an industry was the leasing industry which was establishing itself during the mid eighties. There was a mushroom growth of leasing companies in India during this period. Initially, high lease rentals were charged by these companies. But as competition increased, lease rentals were reduced. Many companies which could not operate profitably with the low levels of lease rentals were closed down. Leasing industry in India today is much pruned compared to what it was in the mideighties.

It is difficult for the analyst to identify those companies that are likely to survive and come out strongly later on. Therefore, investment in companies in an industry that is in the pioneering stage is highly risky. Industries in the pioneering stage are called **sunrise industries**. Telecommunications, computer software, information technology, etc. are examples of sunrise industries in India at present.

### Expansion Stage

Once an industry has established itself it enters the second stage of expansion or growth. The industry now includes only those companies that have survived the pioneering stage. These companies continue to become stronger. Each company finds a market for itself and develops its own strategies to sell and maintain its position in the market. The competition among the surviving companies brings about improved products at lower prices.

Companies in the expansion stage of an industry are quite attractive for investment purposes. Investors can get high returns at low risk because demand exceeds supply in this stage. Companies will earn increasing amounts of profits and pay attractive dividends.

### **Stagnation Stage**

This is the third stage in the industry life cycle. In this stage, the growth of the industry stabilises. The ability of the industry to grow appears to have been lost. Sales may be increasing but at a slower rate than that experienced by competitive industries or by the overall economy. The industry begins to stagnate. The transition of the industry from the expansion stage to the stagnation stage is often very slow. Two important reasons for this transition are change in social habits and development of improved technology.

The black and white television industry in India provides a good example of an industry which passed from the expansion stage to the stagnation stage during the eighties. Sometimes an industry may stagnate only for a short period. By the introduction of a technological innovation or a new product, it may resume a process of growth, thereby starting a new cycle. Therefore, an investor or analyst has to monitor the industry developments constantly and with diligence. An investor should dispose of his holdings in an industry which begins to pass from the expansion stage to the stagnation stage because what is to follow is the decay of the industry.

### **Decay Stage**

From the stagnation stage the industry passes to the decay stage. This occurs when the products of the industry are no longer in demand. New products and new technologies have come to the market. Customers have changed their habits, style and liking. As a result, the industry becomes obsolete and gradually ceases to exist. Thus, changes in social habits, changes in technology and declining demand are the causes of decay of an industry. An investor should get out of the industry before the onset of the decay stage.

The industry life cycle approach has important implications for the investor. It gives an insight into the apparent merits of investment in a given industry at a given time. An industry usually exhibits low profitability in the pioneering stage, high profitability in the growth or expansion stage, medium but steady profitability in the stagnation or maturity stage and declining profitability in the decay stage. The profit associated with the different stages in the life of an industry can be illustrated in the form of an inverted 'S' curve as shown in Fig. 8.1.

Even though the industry life cycle approach provides a useful framework for industry analysis by an investor, its limitations should not be overlooked. It is not always easy to detect which stage of development an industry is in at any point in time. The transition from one stage to the next is slow and unclear. It can be detected only by careful analysis. Further, the classification of industries under this approach is the general pattern. There can be exceptions to this general pattern. The life of an industry may, for instance, be extended after the stagnation and decay stage through appropriate adaptation to changes in the environment. Careful analysis is needed to detect such exceptions.

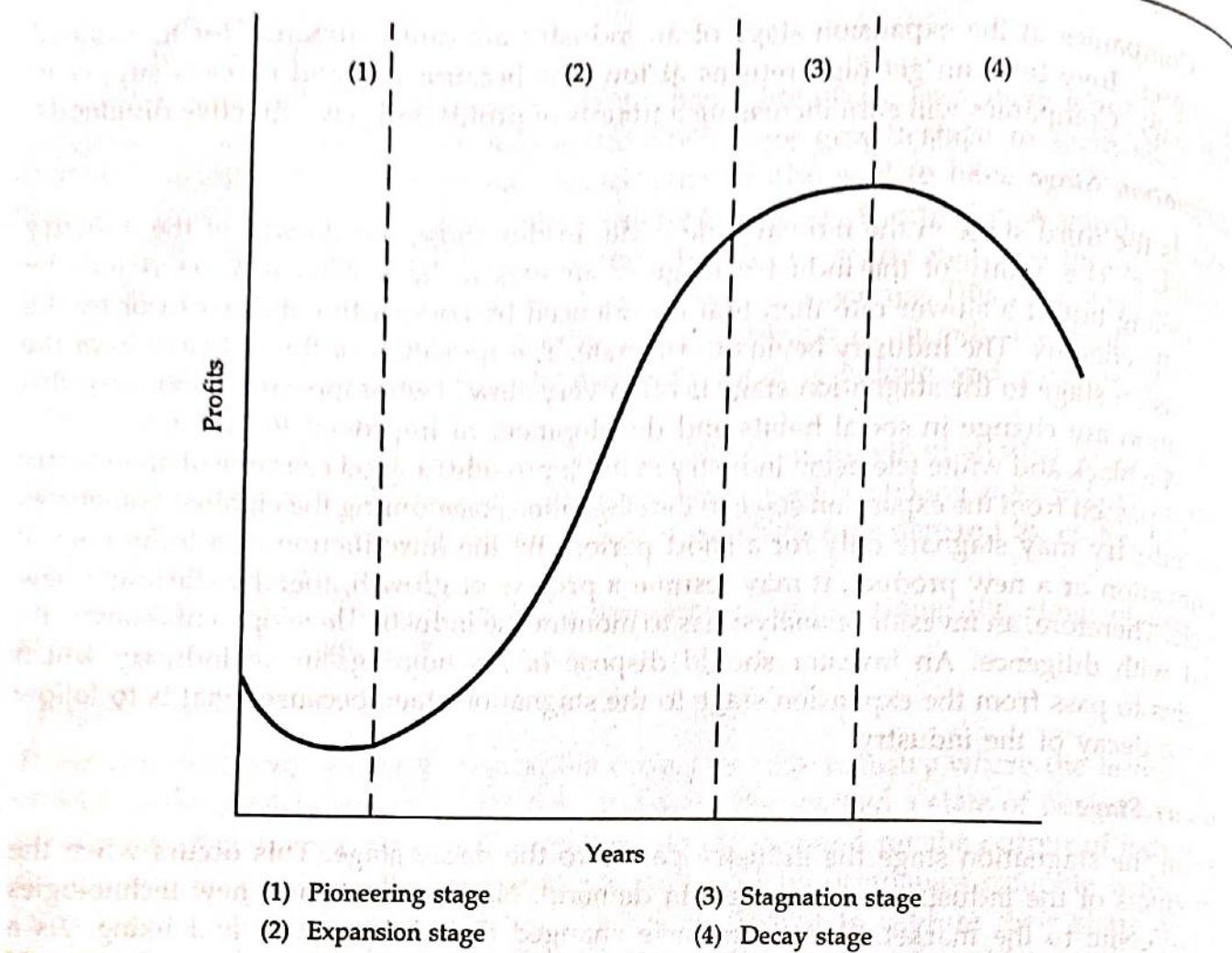


Fig. 8.1 Industry life cycle.

## Industry Characteristics

In an industry analysis, there are a number of key characteristics that should be considered by the analyst. These features broadly relate to the operational and structural aspects of the industry. They have a bearing on the prospects of the industry. Some of these are discussed below:

### Demand Supply Gap

The demand for a product usually tends to change at a steady rate, whereas the capacity to produce the product tends to change at irregular intervals, depending upon the installation of additional production capacity. As a result, an industry is likely to experience under-supply and over-supply of capacity at different times. Excess supply reduces the profitability of the industry through a decline in the unit price realisation. On the contrary, insufficient supply tends to improve the profitability through higher unit price realisation. Therefore, the gap between demand and supply in an industry is a fairly good indicator of its short-term or medium-term prospects. As part of industry analysis, an investor should estimate the demand supply gap in the industry.

### *Competitive Conditions in the Industry*

Another significant factor to be considered in industry analysis is the competitive conditions in the industry. The level of competition among various companies in an industry is determined by certain competitive forces. These competitive forces are: barriers to entry, the threat of substitution, bargaining power of the buyers, bargaining power of the suppliers and the rivalry among competitors.

New entrants to an industry increase the capacity in an industry. But these new entrants may face certain barriers to their entry. The barriers to entry may arise because of product differentiation, absolute cost advantage or economy of scale. Product differentiation refers to the preference buyers have for the products of established firms. Their products enjoy a premium in the market. Absolute cost advantage refers to the ability of established firms to produce their products at a lower cost than any new entrant. Economy of scale refers to the situation in which it is necessary to attain a fairly high level of production in order to obtain economically feasible levels of cost. In some industries it may not be economical to set up small capacities. An industry which is well protected from the inroads of new firms would be ideal for investment.

New inventions are always taking place and new and better products are replacing the existing ones. An industry that can be replaced by substitutes or is threatened by substitutes is in a weak competitive position. The prospects of such an industry cannot be considered promising.

In an industry where buyers' market prevails, the buyers have more bargaining power. They would demand better quality and better services; they would also force down the prices, eroding profitability in the industry. Thus, an industry which is dictated by buyers would be in a weak competitive position. On the contrary, an industry where the sellers have higher bargaining power is expected to do well and be in a stronger position.

Where supply exceeds demand and there are many competing firms, the rivalry among the competing firms in an industry is likely to increase. This will lead to price cuts and heavy advertising as each competing firm tries to capture a larger market share. In such a situation, the companies in the industry lose their competitive edge and their profitability gets eroded.

### *Permanence*

In this age of rapid technological change, the degree of permanence of an industry is an important consideration in industry analysis. Permanence is a phenomenon related to the products and the technology used by the industry. If an analyst feels that the need for a particular industry will vanish in a short period, or that the rapid technological changes would render the products obsolete within a short time, it would be foolish to invest in such an industry.

### *Labour Conditions*

The state of labour conditions in the industry under analysis is an important consideration in an economy such as ours where the labour unions are very powerful. If the labour in a particular industry is rebellious and is inclined to resort to strikes frequently, the prospects of that industry cannot become bright.

### **Attitude of Government**

The attitude of the government towards an industry has a significant impact on its prospects. The government may encourage the growth of certain industries and can assist such industries through favourable legislation.

On the contrary, the government may look with disfavour on certain other industries. In India, this has been the experience of alcoholic drinks and cigarette industries. The government may place different kinds of legal restrictions on its development. A prospective investor should, therefore, consider the role the government is likely to play in the industry—whether it will support the industry or will restrain the industry's development through restrictive legislation.

### **Supply of Raw Materials**

The availability of raw materials is an important factor determining the profitability of an industry. Some industries may have no difficulty in obtaining the major raw materials as they may be indigenously available in plenty. Other industries may have to depend on a few manufacturers within the country or on imports from outside the country for their raw material supply. Industry analysis must take into consideration the availability of raw materials and its impact on industry prospects.

### **Cost Structure**

Another factor to be considered in industry analysis is the cost structure of the industry, viz. the proportion of fixed costs to variable costs. The higher the fixed cost component, higher is the sales volume necessary to achieve break-even point. Conversely, the lower the proportion of fixed cost relative to variable cost, lower would be the break-even point. Lower break-even point provides higher margin of safety. An analyst would consider favourably an industry that has a lower break-even point.

An analyst must evaluate all the above factors before making an investment decision. If the above factors indicate that the industry has favourable future prospects, funds may be committed to that industry.

## **COMPANY ANALYSIS**

Company analysis is the final stage of fundamental analysis. The economy analysis provides the investor a broad outline of the prospects of growth in the economy. The industry analysis helps the investor to select the industry in which investment would be rewarding. Now he has to decide the company in which he should invest his money. Company analysis provides the answer to this question.

Company analysis deals with the estimation of return and risk of individual shares. This calls for information. Many pieces of information influence investment decisions. Information regarding companies can be broadly classified into two broad groups: internal and external. Internal information consists of data and events made public by companies concerning their operations. The internal information sources include annual reports to shareholders, public and private statements of officers of the company, the company's

financial statements, etc. External sources of information are those generated independently outside the company. These are prepared by investment services and the financial press.

In company analysis, the analyst tries to forecast the future earnings of the company because there is strong evidence that earnings have a direct and powerful effect upon share prices. The level, trend and stability of earnings of a company, however, depend upon a number of factors concerning the operations of the company.

## Financial Statements

The prosperity of a company would depend upon its profitability and financial health. The financial statements published by a company periodically help us to assess the profitability and financial health of the company. The two basic financial statements provided by a company are the **balance sheet** and the **profit and loss account**. The first gives us a picture of the company's assets and liabilities while the second gives us a picture of its earnings.

The balance sheet gives the list of assets and liabilities of a company on a specific date. The major categories of assets are fixed assets and current assets. *Fixed assets* are those assets which are intended to be used up over a period of several years. *Current assets* are those assets which are intended to be converted into cash in the near future (within one year). The major categories of liabilities are outside liabilities and liability towards share holders. The outside liabilities are categorised as short-term and long-term liabilities. The short-term liabilities which are expected to be paid off within the next one year are known as *current liabilities*. The **balance sheet** indicates the financial position of a company on a particular date, namely the last day of the accounting year.

The profit and loss account, also called **income statement**, reveals the revenue earned, the cost incurred and the resulting profit or loss of the company for one accounting year. The **profit after tax (PAT)** divided by the number of shares gives the **earnings per share (EPS)** which is a figure in which most investors are interested. The profit-and-loss account summarises the activities of a company during an accounting year.

## Analysis of Financial Statements

The financial statements of a company can be used to evaluate the financial performance of the company. Financial ratios are most extensively used for the purpose. Ratio analysis helps an investor to determine the strengths and weaknesses of a company. It also helps him to assess whether the financial performance and financial strength are improving or deteriorating. Ratios can be used for comparative analysis either with other firms in the industry through a cross sectional analysis or with the past data through a time series analysis.

Different ratios measure different aspects of a company's performance or health. Four groups of ratios may be used for analysing the performance of a company.

### **Liquidity Ratios**

These measure the company's ability to fulfil its short-term obligations and reflect its short-term financial strength or liquidity. The commonly used liquidity ratios are:

$$1. \text{ Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

2. Quick ratio (or Acid test) ratio

$$= \frac{\text{Current assets} - \text{Inventory} - \text{Prepaid expenses}}{\text{Current liabilities}}$$

A higher current ratio would enable a company to meet its short-term obligations even if the value of current assets declines. The quick ratio represents the ratio between quick assets and current liabilities. It is a more rigorous measure of liquidity. However, both these ratios are to be used together to analyse the liquidity of a company.

### Leverage Ratios

These ratios are also known as capital structure ratios. They measure the company's ability to meet its long-term debt obligations. They throw light on the long-term solvency of a company. The commonly used leverage ratios are the following:

$$1. \text{Debt-equity ratio} = \frac{\text{Long-term debt}}{\text{Shareholders' equity}}$$

$$2. \text{Total debt ratio or Debt to total assets ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

$$3. \text{Proprietary ratio} = \frac{\text{Shareholders' equity}}{\text{Total assets}}$$

$$4. \text{Interest coverage ratio} = \frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest}}$$

The first three ratios indicate the relative contribution of owners and creditors in financing the assets of the company. These ratios reflect the safety margin available to the long-term creditors. The coverage ratio measures the ability of the company to meet its interest payments arising from the debt.

### Profitability Ratios

The profitability of a company can be measured by the profitability ratios. These ratios are calculated by relating the profits either to sales, or to investment, or to the equity shares. Thus, we have three groups of profitability ratios. These are listed below.

#### 1. Profitability related to sales

$$(a) \text{Gross profit ratio} = \frac{\text{Gross profit (Sales} - \text{Cost of goods sold})}{\text{Sales}}$$

$$(b) \text{Operating profit ratio} = \frac{\text{EBIT}}{\text{Sales}}$$

$$(c) \text{ Net profit ratio} = \frac{\text{Earnings after tax (EAT)}}{\text{Sales}}$$

$$(d) \text{ Administrative expenses ratio} = \frac{\text{Administrative expenses}}{\text{Sales}}$$

$$(e) \text{ Selling expenses ratio} = \frac{\text{Selling expenses}}{\text{Sales}}$$

$$(f) \text{ Operating expenses ratio} = \frac{\text{Administrative expenses + Selling expenses}}{\text{Sales}}$$

$$(g) \text{ Operating ratio} = \frac{\text{Cost of goods sold + Operating expenses}}{\text{Sales}}$$

## 2. Profitability related to investment

$$(a) \text{ Return on assets} = \frac{\text{Earnings after tax}}{\text{Total assets}}$$

$$(b) \text{ Return on capital employed} = \frac{\text{EBIT}}{\text{Total capital employed}}$$

$$(c) \text{ Return on equity} = \frac{\text{EAT}}{\text{Shareholders' equity}}$$

## 3. Profitability related to equity shares

$$(a) \text{ Earnings per share (EPS)}$$

$$= \frac{\text{Net profit available to equity shareholders}}{\text{Number of equity shares}}$$

$$(b) \text{ Earnings yield} = \frac{\text{EPS}}{\text{Market price per share}}$$

$$(c) \text{ Dividend yield} = \frac{\text{DPS (dividend per share)}}{\text{Market price per share}}$$

$$(d) \text{ Dividend payout ratio} = \frac{\text{DPS}}{\text{EPS}}$$

$$(e) \text{ Price earnings ratio (P/E ratio)} = \frac{\text{Market price per share}}{\text{EPS}}$$

## 4. Overall profitability (or earning power)

$$\text{Return on investment (ROI)} = \frac{\text{EAT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \text{ or } \frac{\text{EAT}}{\text{Total assets}}$$

The overall profitability is measured by the return on investment, which is the product of net profit ratio and investment turnover. It is a central measure of the earning power or operating efficiency of a company.

### **Activity or Efficiency Ratios**

These are also known as turnover ratios. These ratios measure the efficiency in asset management. They express the relationship between sales and the different types of assets, showing the speed with which these assets generate sales. Important activity ratios are enumerated below.

$$1. \text{ Current assets turnover} = \frac{\text{Sales}}{\text{Current assets}}$$

$$2. \text{ Fixed assets turnover} = \frac{\text{Sales}}{\text{Fixed assets}}$$

$$3. \text{ Total assets turnover} = \frac{\text{Sales}}{\text{Total assets}}$$

$$4. \text{ Inventory turnover} = \frac{\text{Sales}}{\text{Average inventory}}$$

$$5. \text{ Debtors turnover} = \frac{\text{Sales}}{\text{Average debtors}}$$

Ratio analysis is a method of interpreting the financial statements of a company. A single ratio by itself is not of much use. A comprehensive evaluation of the financial performance of a company emerges only from a study of all the important ratios.

Ratios calculated from the financial statements reveal the performance during the past years. For an investor what is important is the future prospects of a company and not its past achievements. From an analysis of past performance, the analyst has to forecast the future prospects of the company. The investment decision would depend on such forecast.

### **Other Variables**

The future prospects of a company would also depend upon a number of other variables, some of which are given below.

1. Company's market share
2. Capacity utilisation
3. Modernisation and expansion plans
4. Order book position
5. Availability of raw materials

Some of these informations may be available in the directors' report and the chairman's speech at the annual general meeting of the company. Others may be available in financial journals and magazines.

The most important variable affecting the future prospects of a company is perhaps the quality of its management. But assessing the quality and competence of management is perhaps the most difficult task in company analysis. Some critical aspects of a company's management which every investor must consider carefully are their commitment and competence, professionalism, future orientation, image building, investor friendliness and government relation building. The future of a company depends on the quality and competence of its management to a very great extent.

### Assessment of Risk

Company analysis involves not only an estimation of future returns, but also an assessment of the variability in returns called risk. The variability in returns arises primarily because of variability in sales. The sensitivity of profits to changes in the level of sales is measured by a ratio called **degree of total leverage (DTL)**. This ratio is used as a measure of risk. It is calculated as follows:

$$DTL = \frac{\text{Contribution}}{\text{Profit before tax (PBT)}}$$

It may be noted that contribution means sales minus the variable costs.

DTL may be subdivided into two components: (a) the **degree of operating leverage (DOL)** arising from the cost structure of the company, and (b) the **degree of financial leverage (DFL)** arising from the capital structure of the company.

DOL measures the percentage change in EBIT for a one per cent change in sales and is computed as:

$$DOL = \frac{\text{Contribution}}{\text{EBIT}}$$

DFL measures the percentage change in PBT for a one per cent change in EBIT and is computed as:

$$DFL = \frac{\text{EBIT}}{\text{PBT}}$$

The degree of total leverage (DTL) is the product of DOL and DFL and measures the percentage change in PBT for a one per cent change in sales.

The investment decision is ultimately a decision to invest in the shares of one or more specific companies. Company analysis deals with an analysis of various factors affecting the performance of companies so as to forecast the future earnings of a company as also its variability better known as risk.

### EXERCISES

1. What is industry analysis?
2. Explain the concept of industry life cycle. Describe the different stages in the industry life cycle.

# 11

## TECHNICAL ANALYSIS

Prices of securities in the stock market fluctuate daily on account of continuous buying and selling. Stock prices move in trends and cycles and are never stable. An investor in the stock market is interested in buying securities at a low price and selling them at a high price so as to get a good return on his investment. He, therefore, tries to analyse the movement of share prices in the market. Two approaches are commonly used for this purpose. One of these is the fundamental analysis wherein the analyst tries to determine the true worth or intrinsic value of a share based on the current and future earning capacity of the company. He would buy the share when its market price is below its intrinsic value. The second approach to security analysis is called technical analysis. It is an alternative approach to the study of stock price behaviour.

### MEANING OF TECHNICAL ANALYSIS

A technical analyst believes that share prices are determined by the demand and supply forces operating in the market. These demand and supply forces in turn are influenced by a number of fundamental factors as well as certain psychological or emotional factors. Many of these factors cannot be quantified. The combined impact of all these factors is reflected in the share price movement. A technical analyst therefore concentrates on the movement of share prices. He claims that by examining past share price movements future share prices can be accurately predicted. Technical analysis is the name given to forecasting techniques that utilise historical share price data.

The rationale behind technical analysis is that share price behaviour repeats itself over time and analysts attempt to derive methods to predict this repetition. A technical analyst looks at the past share price data to see if he can establish any patterns. He then looks at current price data to see if any of the established patterns are applicable and, if

so, extrapolations can be made to predict the future price movements. Although past share prices are the major data used by technical analysts, other statistics such as volume of trading and stock market indices are also utilised to some extent.

The basic premise of technical analysis is that prices move in trends or waves which may be upward or downward. It is believed that the present trends are influenced by the past trends and that the projection of future trends is possible by an analysis of past price trends. A technical analyst, therefore, analyses the price and volume movements of individual securities as well as the market index. Thus, technical analysis is really a study of past or historical price and volume movements so as to predict the future stock price behaviour.

## Dow Theory

Whatever is generally being accepted today as technical analysis has its roots in the Dow theory. The theory is so called because it was formulated by Charles H. Dow who was the editor of the Wall Street Journal in U.S.A. In fact, the theory was presented in a series of editorials in the Wall Street Journal during 1900–1902.

Charles Dow formulated a hypothesis that the stock market does not move on a random basis but is influenced by three distinct cyclical trends that guide its direction. According to Dow theory, the market has three movements and these movements are simultaneous in nature. These movements are the primary movements, secondary reactions and minor movements,

The primary movement is the long range cycle that carries the entire market up or down. This is the long-term trend in the market. The secondary reactions act as a restraining force on the primary movement. These are in the opposite direction to the primary movement and last only for a short while. These are also known as corrections. For example, when the market is moving upwards continuously, this upward movement will be interrupted by downward movements of short durations. These are the secondary reactions. The third movement in the market is the minor movements which are the day-to-day fluctuations in the market. The minor movements are not significant and have no analytical value as they are of very short duration. The three movements of the market have been compared to the tides, the waves and the ripples in the ocean.

According to Dow theory, the price movements in the market can be identified by means of a line chart. In this chart, the closing prices of shares or the closing values of the market index may be plotted against the corresponding trading days. The chart would help in identifying the primary and secondary movements.

Figure 11.1 shows a line chart of the closing values of the market index. The primary trend of the market is upwards but there are secondary reactions in the opposite direction. Among the three movements in the market, the primary movement is considered to be the most important.

The primary trend is said to have three phases in it, each of which would be interrupted by a counter move or secondary reaction which would retrace about 33–66 per cent of the earlier rise or fall.

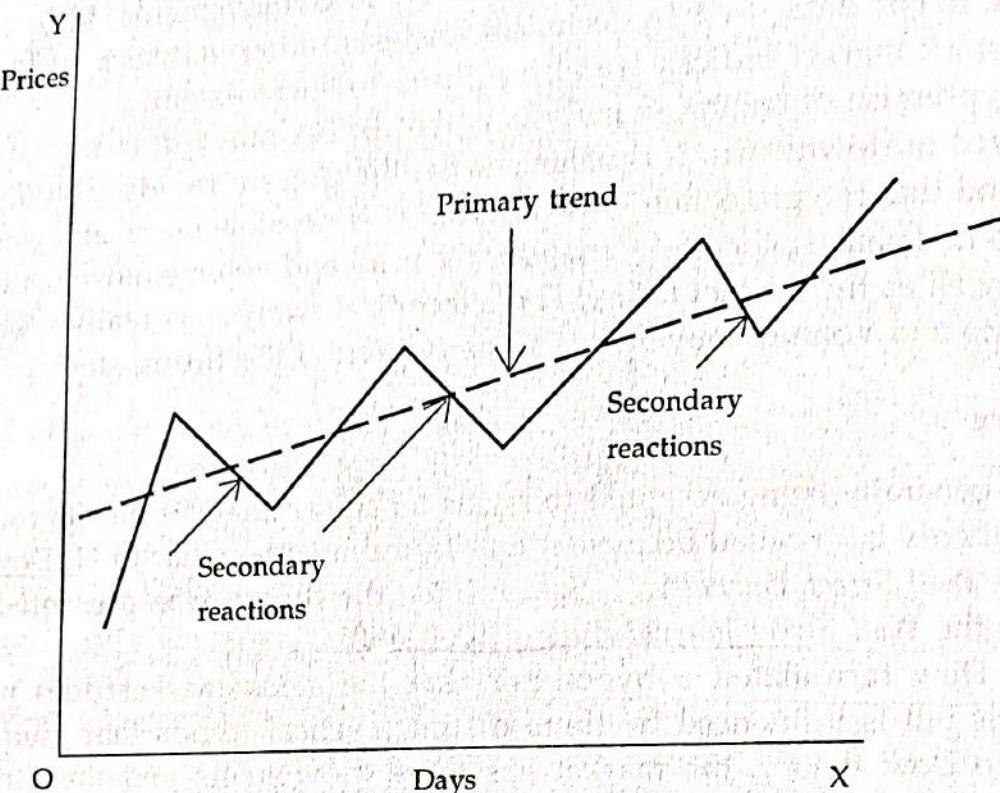


Fig. 11.1 Primary trend and secondary reactions.

### Bullish Trend

During a bull market (upward moving market), in the first phase the prices would advance with the revival of confidence in the future of business. The future prospects of business in general would be perceived to be promising. This will prompt investors to buy shares of companies. During the second phase, prices would advance due to the improvements in corporate earnings. In the third phase, prices advance due to inflation and speculation. Thus, during the bull market, the line chart would exhibit the formation of three peaks. Each peak would be followed by a bottom formed by the secondary reaction. Each peak would be higher than the previous peak, each successive bottom would be higher than the previous bottom. According to Dow theory, the formation of higher bottoms and higher tops indicates a bullish trend. The three phases of a bull market are depicted in Fig. 11.2.

### Bearish Trend

The bear market is also characterised by three phases. In the first phase, prices begin to fall due to abandonment of hopes. Investors begin to sell their shares. In the second phase, companies start reporting lower profits and lower dividends. This causes further fall in prices due to increased selling pressure. In the final phase, prices fall still further due to distress selling. A bearish market would be indicated by the formation of lower tops and lower bottoms.

The three phases of a bear market are depicted in Fig. 11.3.

The Dow theory laid emphasis on volume of transactions also. According to the theory, volume should expand along the main trend. This means that if the main trend is bullish,

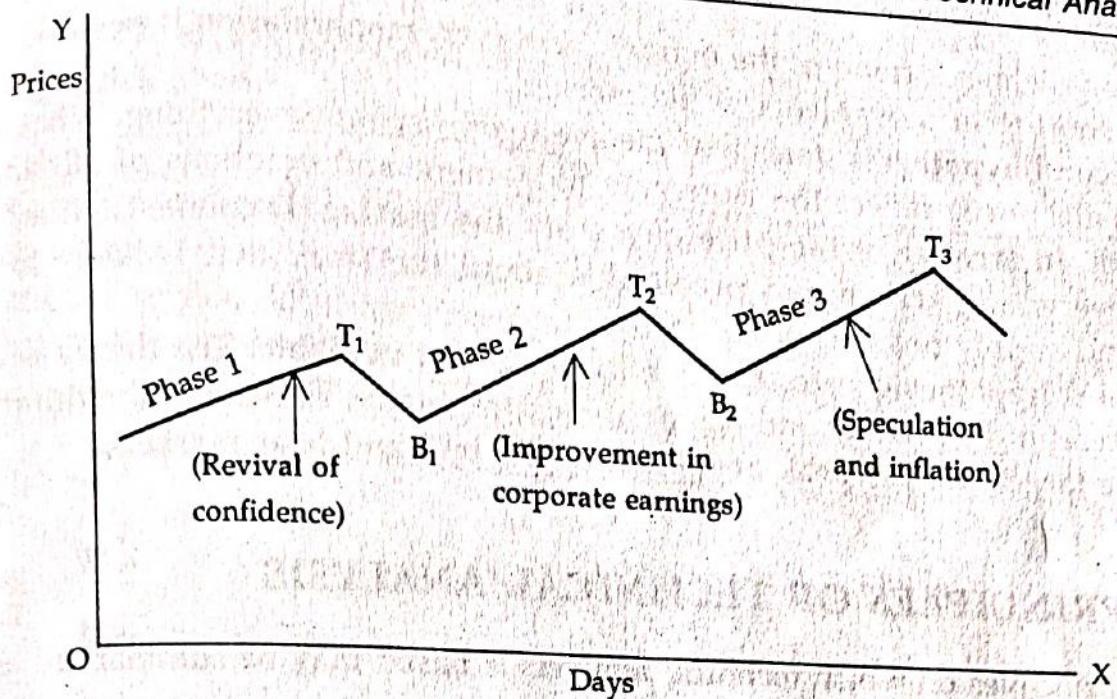


Fig. 11.2 Three phases of a bull market.

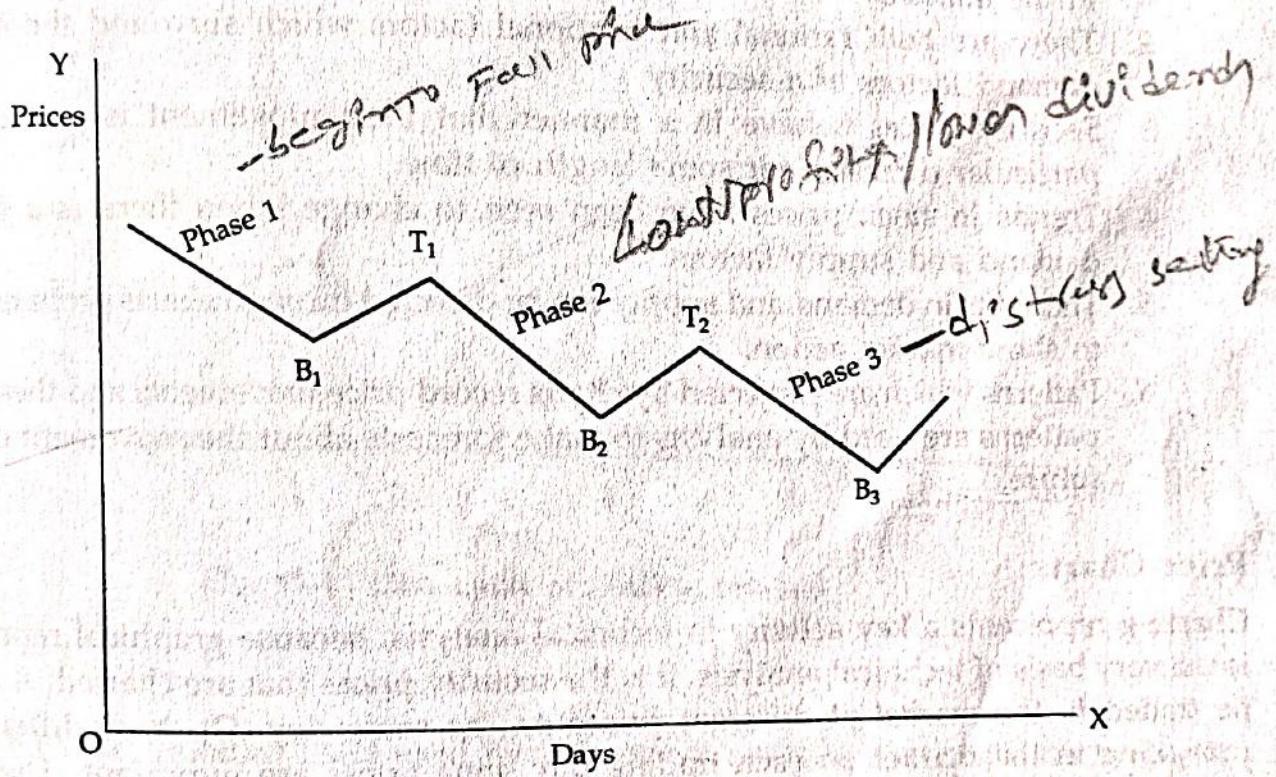


Fig. 11.3 Three phases of a bear market.

the volume should increase with the rise in prices and fall during the intermediate reactions. In a bearish market when prices are falling, the volume should increase with the fall in prices and be smaller during the intermediate reactions.

The theory also makes certain assumptions which have been referred to as the hypotheses of the theory.

The first hypothesis states that the primary trend cannot be manipulated. It means that no single individual or institution or group of individuals and institutions can exert

influence on the major trend of the market. However, manipulation is possible in the day-to-day or short-term movements in the market.

The second hypothesis states that the averages discount everything. What it means is that the daily prices reflect the aggregate judgement and emotions of all stock market participants. In arriving at the price of a stock the market discounts (that is, takes into account) everything known and predictable about the stock that is likely to affect the demand and supply position of the stock.

The third hypothesis states that the theory is not infallible. The theory is concerned with the trend of the market and has no forecasting value as regards the duration or the likely price targets for the peak or bottom of the bull and bear markets.

## BASIC PRINCIPLES OF TECHNICAL ANALYSIS

The basic principles on which technical analysis is based may be summarised as follows:

1. The market value of a security is related to demand and supply factors operating in the market.
2. There are both rational and irrational factors which surround the supply and demand factors of a security.
3. Security prices behave in a manner that their movement is continuous in a particular direction for some length of time.
4. Trends in stock prices have been seen to change when there is a shift in the demand and supply factors.
5. The shifts in demand and supply can be detected through charts prepared specially to show market action.
6. Patterns which are projected by charts record price movements and these recorded patterns are used by analysts to make forecasts about the movement of prices in future.

### Price Charts

Charting represents a key activity in technical analysis, because graphical representation is the very basis of technical analysis. It is the security prices that are charted. A share may be traded in the market at different prices on the same day. Of these different prices prevailing in the market on each trading day, four prices are important. These are the highest price of the day, the lowest price of the day, the opening price (first price of the day) and the closing price (last price of the day). Of these four prices again, the closing price is by far the most important price of the day because it is the closing price that is used in most analysis of share prices.

The price chart is the basic tool used by the technical analyst to study the share price movement. The prices are plotted on an XY graph where the X axis represents the trading days and the Y axis denotes the prices.

The oldest charting procedure was known as the point and figure (P & F) charting. It is now out of vogue. Three types of price charts are currently used by

technical analysts. These are the line chart or the closing price chart, the bar chart and the Japanese candlestick chart.

### Line Chart

It is the simplest price chart. In this chart, the closing prices of a share are plotted on the XY graph on a day to day basis. The closing price of each day would be represented by a point on the XY graph. All these points would be connected by a straight line which would indicate the trend of the market. A line chart is illustrated in Fig. 11.4.

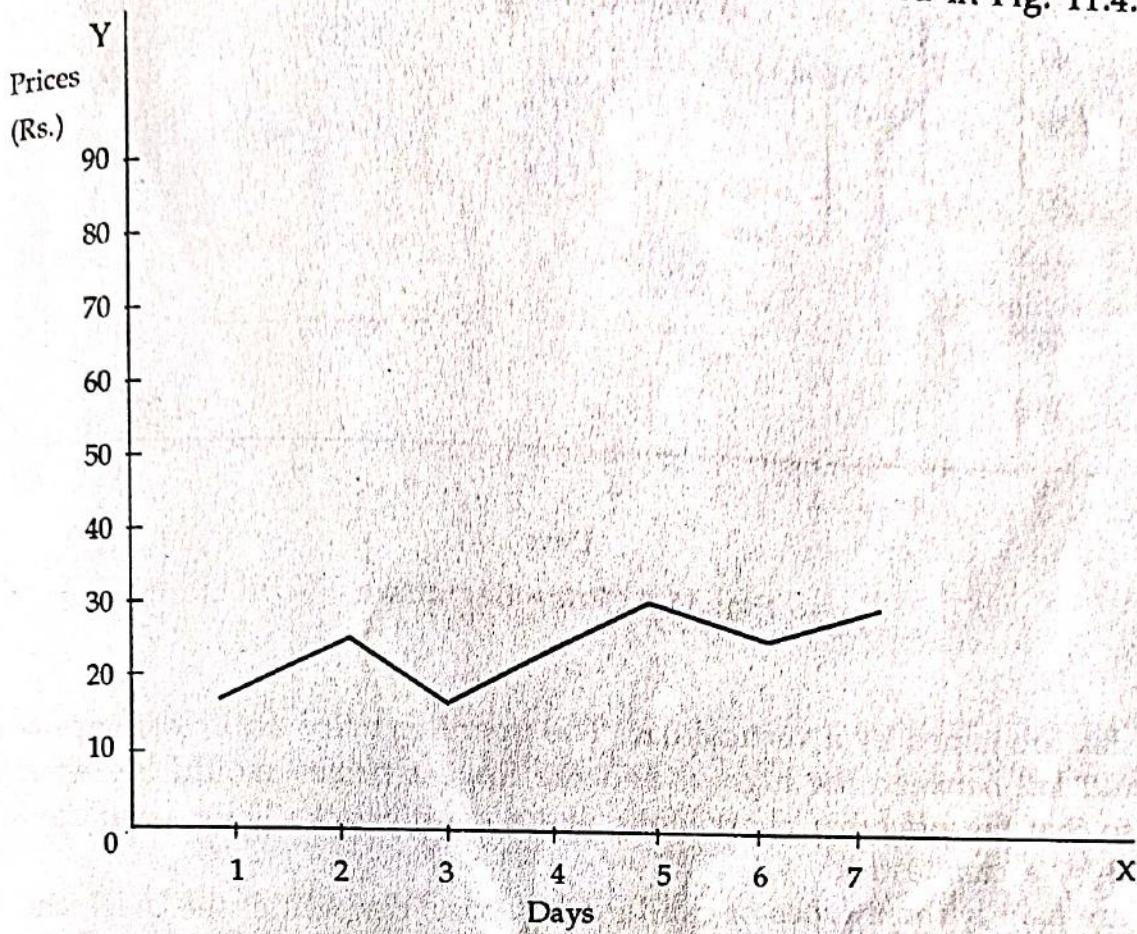


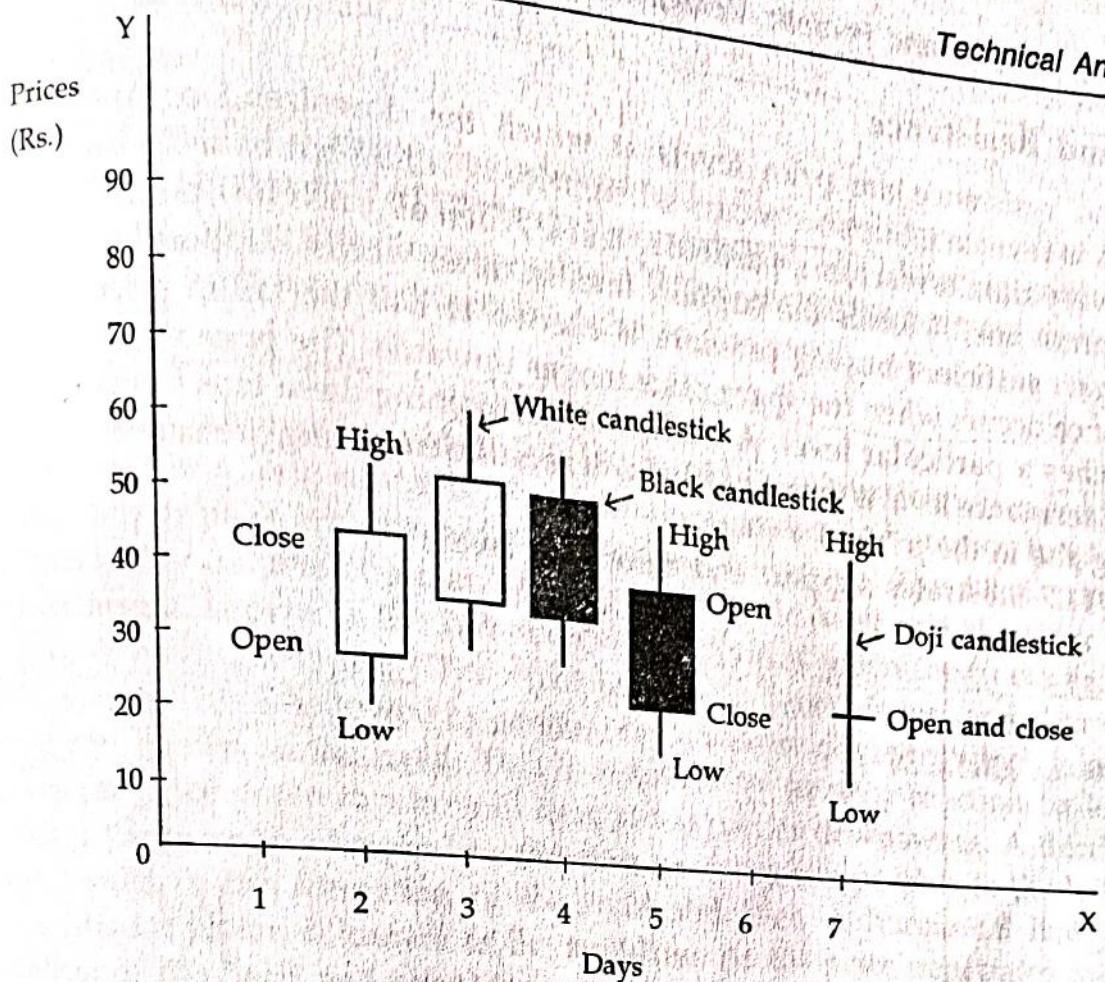
Fig. 11.4 Line chart of closing prices.

### Bar Chart

It is perhaps the most popular chart used by technical analysts. In this chart, the highest price, the lowest price and the closing price of each day are plotted on a day-to-day basis. A bar is formed by joining the highest price and the lowest price of a particular day by a vertical line. The top of the bar represents the highest price of the day, the bottom of the bar represents the lowest price of the day and a small horizontal hash on the right of the bar is used to represent the closing price of the day. Sometimes, the opening price of the day is marked as a hash on the left side of the bar. An example of a price bar chart is shown in Fig. 11.5.

### Japanese Candlestick Charts

The Japanese candlestick chart shows the highest price, the lowest price, the opening price and the closing price of shares on a day-to-day basis. The highest price and the lowest



**Fig. 11.6 Japanese candlesticks.**

giving rise to alternating tops and bottoms. The formation of higher bottoms and higher tops indicates a rising trend, while the formation of lower tops and lower bottoms indicates a falling trend.

The change in the direction of trend is referred to as trend reversal. A share that exhibits a rising trend may start to move narrowly or fall after sometime. This change in the direction of movement represents a trend reversal. The reversal from a rising trend to a falling trend is marked by the formation of a lower top and a lower bottom. In the same way, the reversal from a falling trend to a rising trend is characterised by the formation of a higher bottom and a higher top.

A technical analyst tries to identify the trend reversals at an early stage so as to trade profitably in the market. When the trend reverses and begins to rise the technical analyst would recommend purchase of the share. When the trend begins to fall, sale is indicated. During a flat trend the investor should stay away from the market.

## CHART PATTERNS

When the price bar charts of several days are drawn close together, certain patterns emerge. These patterns are used by the technical analysts to identify trend reversal and predict the future movement of prices. The chart patterns may be classified as support and resistance patterns, reversal patterns and continuation patterns.

## Support and Resistance

Support and resistance are price levels at which the downtrend or uptrend in price movements is reversed. Support occurs when price is falling but bounces back or reverses direction every time it reaches a particular level. When all these low points are connected by a horizontal line, it forms the support line. In other words, support level is the price level at which sufficient buying pressure is exerted to halt the fall in prices.

Resistance occurs when the share price moves upwards. The price may fall back every time it reaches a particular level. A horizontal line joining these tops forms the resistance level. Thus, resistance level is the price level where sufficient selling pressure is exerted to halt the ongoing rise in the price of a share.

Figure 11.7 illustrates support and resistance levels.

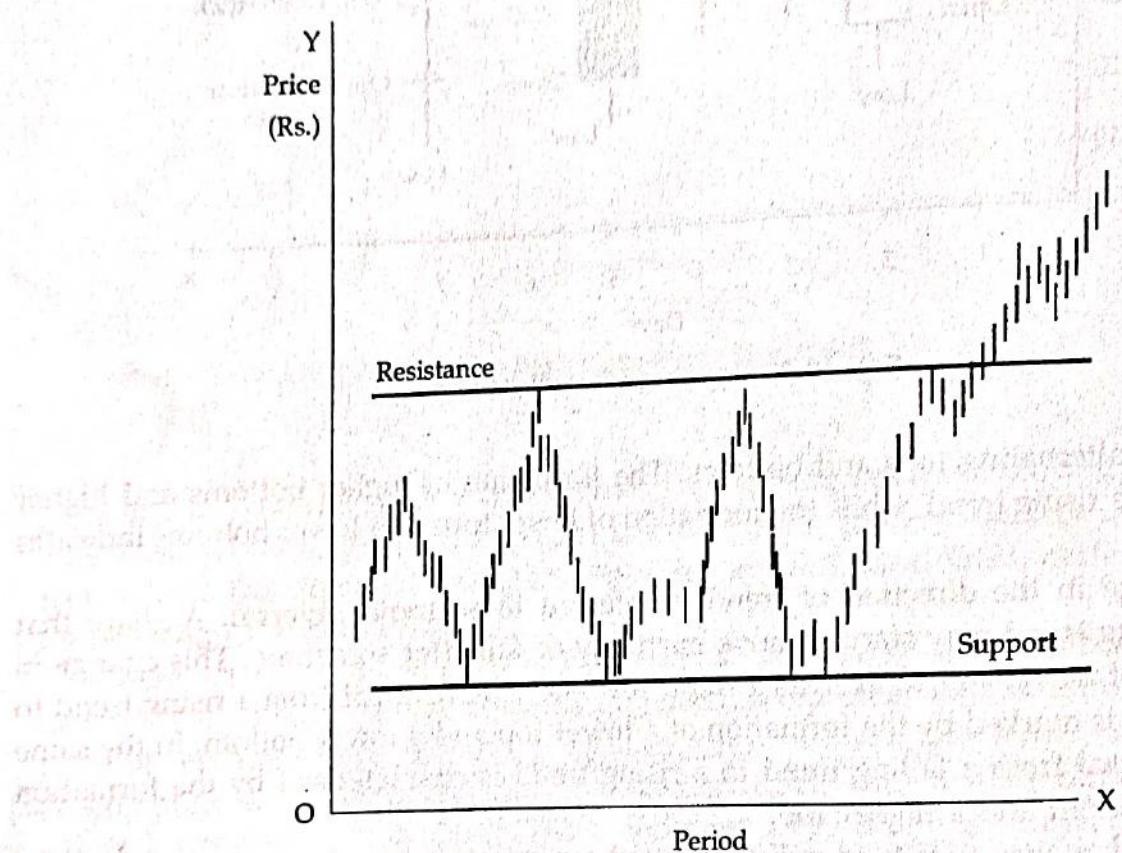


Fig. 11.7 Support and resistance levels.

If the scrip were to break the support level and move downwards, it has bearish implications signalling the possibility of a further fall in prices. Similarly, if the scrip were to penetrate the resistance level it would be indicative of a bullish trend or a further rise in prices.

Once a support level is violated, it would reverse roles and become a resistance level for any future upward movement in price. Similarly, resistance level which is violated becomes the new support level for any future downward movement in price.

## Reversal Patterns

Price movements exhibit uptrends and downtrends. The trends reverse direction after a period of time. These reversals can be identified with the help of certain chart formations that typically occur during these trend reversals. Thus, reversal patterns are chart formations that tend to signal a change in direction of the earlier trend.

### Head and Shoulder Formation

The most popular reversal pattern is the Head and Shoulder formation which usually occurs at the end of a long uptrend. This formation exhibits a hump or top followed by a still higher top or peak and then another hump or lower top. This formation resembles the head and two shoulders of a man and hence the name head and shoulder formation.

The first hump, known as the left shoulder, is formed when the prices reach the top under a strong buying impulse. Then trading volume becomes less and there is a short downward swing. This is followed by another high volume advance, which takes the price to a higher top known as the head. This is followed by another reaction on less volume which takes the price down to a bottom near to the earlier downswing. A third rally now occurs taking the price to a height less than the head but comparable to the left shoulder. This rally results in the formation of the right shoulder. A horizontal line joining the bottoms of this formation is known as the neckline. As the price penetrates this neckline, the formation of the head and shoulder pattern is completed. Figure 11.8 shows a head and shoulder formation.

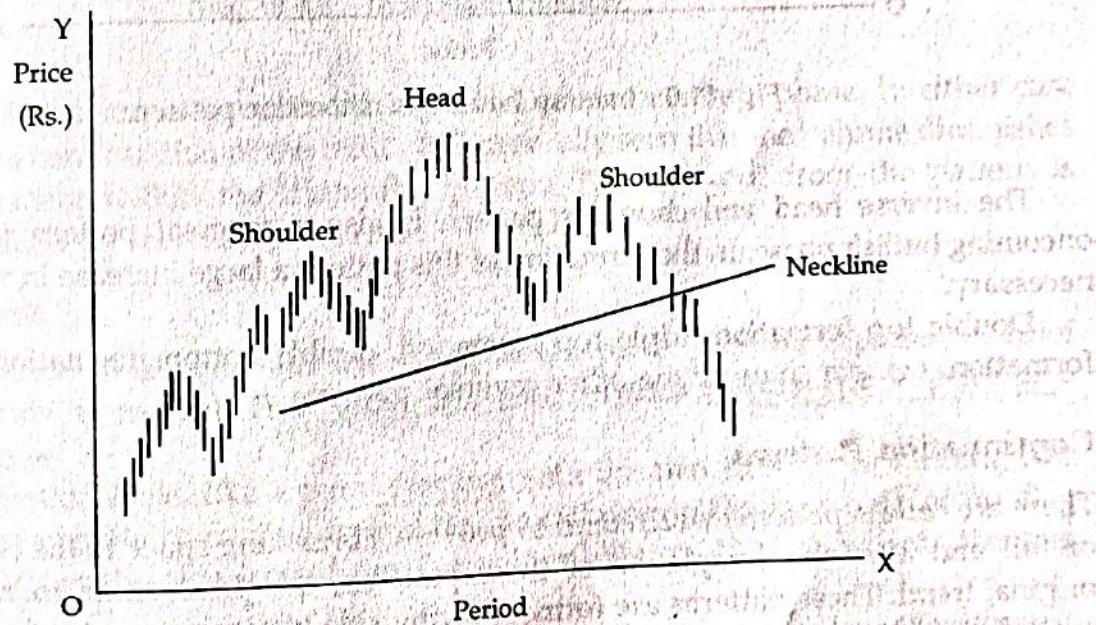


Fig. 11.8 Head and shoulder formation.

The head and shoulder formation usually occurs at the end of a bull phase and is indicative of a reversal of trend. After breaking the neckline, the price is expected to decline sharply.

### Inverse Head and Shoulder Formation

This pattern is the reverse of the head and shoulder formation described above and is really an inverted head and shoulder pattern. This occurs at the end of a bear phase and consists of three distinct bottoms. The first bottom is the left shoulder, then comes a lower bottom which forms the head, followed by a third bottom which is termed the right shoulder. The neckline is drawn by joining the tops from which the head and the right shoulder originate. When the price rises above the neckline the formation of the pattern is considered to be completed. An inverse head and shoulder formation is shown in Fig. 11.9.

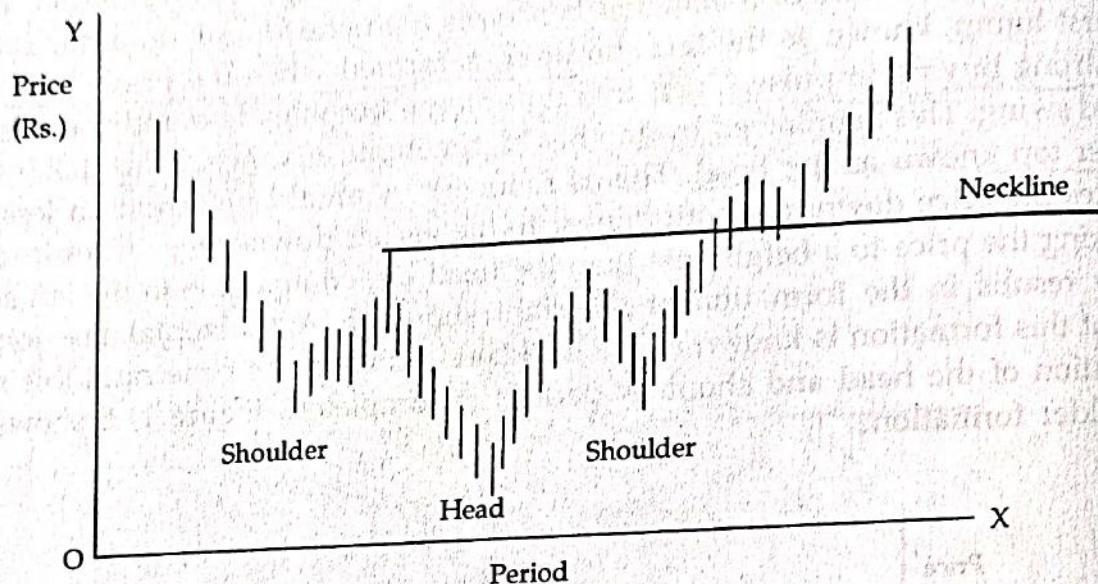


Fig. 11.9 Inverse head and shoulder pattern.

The inverse head and shoulder pattern is also a reversal pattern indicative of an oncoming bullish phase. In the formation of this pattern a large increase in volume becomes necessary.

Double top formation, triple top formation, double bottom formation, triple bottom formation, etc. are some of the other reversal patterns.

### Continuation Patterns

There are certain patterns which tend to provide a breathing space to the earlier sharp rise or fall and after the completion of these patterns, the price tends to move along the original trend. These patterns are formed during side way movements of share prices and are called **continuation patterns** because they indicate a continuation of the trend prevailing before the formation of the pattern.

#### Triangles

Triangles are the most popular among the continuation patterns. Triangles are formed when the price movements result in two or more consecutive descending tops and two or

more consecutive ascending bottoms. The triangle becomes apparent on the chart when the consecutive tops are joined by a straight line and the consecutive bottoms are joined by another straight line. The two straight lines are the upper trend line and the lower trend line respectively. A triangle is illustrated in Fig. 11.10.

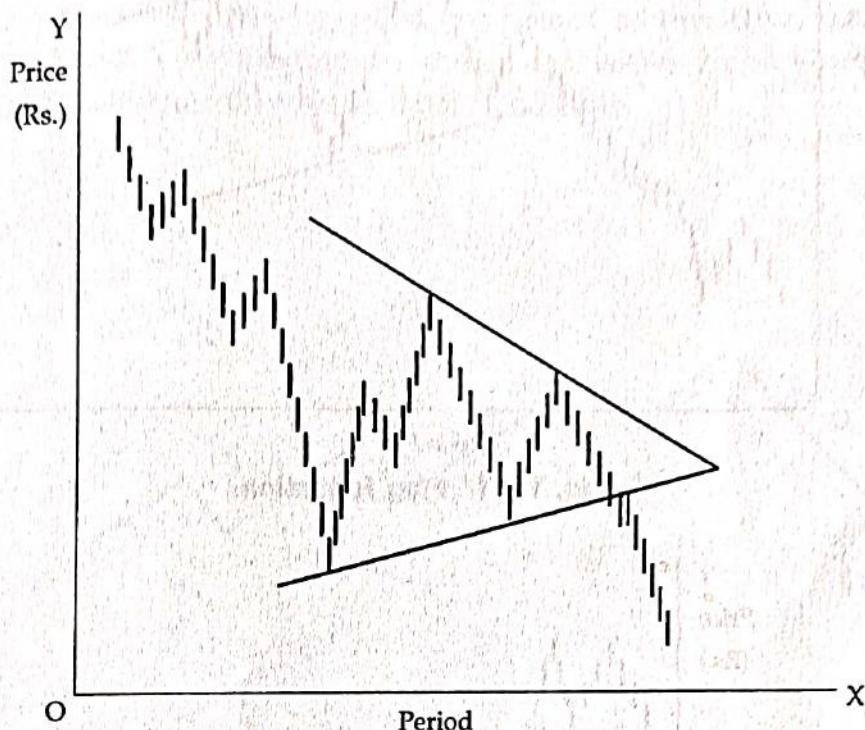


Fig. 11.10 Triangle formation.

The triangle formation may occur during a bull phase or a bear phase. In either case it would indicate a continuation of the trend. It is generally seen that the volume diminishes during the movement within the triangular pattern. The breakout from the pattern is usually accompanied by increasing volume.

#### *Flags and Pennants*

These are considered to be very reliable continuation patterns. They represent a brief pause in a fast moving market. They occur mid-way between a sharp rise in price or a steep fall in price.

The flag formation looks like a parallelogram with the two trend lines forming two parallel lines. The volume of trading is expected to fall during the formation of the flag and again pick up on breaking out from the pattern. Figure 11.11 illustrates the flag formation.

The pennant formation looks like a symmetrical triangle. The upper trendline formed by connecting the tops stoops downwards, whereas the lower trendline formed by connecting the bottoms rises upwards. A pennant formation is illustrated in Fig. 11.12.

The pennant is formed midway between either a bullish trend or a bearish trend and signals the continuation of the same trend. The break out from the pattern is marked by increased volume of trading.

## MATHEMATICAL INDICATORS

Share prices do not rise or fall in straight lines. The movements are erratic. This makes it difficult for the analyst to gauge the underlying trend. He can use the mathematical tool of moving averages to smoothen out the apparent erratic movements of share prices and highlight the underlying trend.

### Moving Averages

Moving averages are mathematical indicators of the underlying trend of the price movement. Two types of moving averages (MA) are commonly used by analysts—the simple moving average and the exponential moving average. The closing prices of shares are generally used for the calculation of moving averages.

#### *Simple Moving Average*

An average is the sum of prices of a share for a specific number of days divided by the number of days. In a simple moving average, a set of averages are calculated for a specific number of days, each average being calculated by including a new price and excluding an old price.

The calculation of a simple moving average is illustrated below:

**Calculation of Five-day Simple MA**

<i>Days</i>	<i>Closing prices</i>	<i>Total of prices of 5 days</i>	<i>Five day MA</i>
(1)	(2)	(3)	(4)
1	33	—	—
2	35	—	—
3	37.5	—	—
4	36	—	—
5	39	180.5	36.1
6	40	187.5	37.5
7	40.5	193.0	38.6
8	38.5	194.0	38.8
9	41	198.0	39.6
10	42	202.0	40.4
11	44	206.0	41.2
12	42.5	208.0	41.6
13	42	211.5	42.3
14	44	214.5	42.9
15	45	217.5	43.5

The first total of 180.5 in column 3 is obtained by adding the prices of the first five days, that is,  $(33 + 35 + 37.5 + 36 + 39)$ . The second total of 187.5 in column 3 is obtained by adding the price of the 6<sup>th</sup> day and deleting the price of the first day from the first total, that is,  $(180.5 + 40 - 33)$ . This process is continued. The moving average in column 4 is obtained by dividing the total figure in column 3 by the number of days, namely 5.

### **Exponential Moving Average**

Exponential moving average (EMA) is calculated by using the following formula:

$$\text{EMA} = (\text{Current closing price} - \text{Previous EMA}) \times \text{Factor} + \text{Previous EMA}$$

where

$$\text{Factor} = \frac{2}{n+1}$$

and  $n$  = number of days for which the average is to be calculated.

The calculation of exponential moving average is illustrated below.

#### **Calculation of Five-day EMA**

Days	Closing price	EMA
1	33	33
2	35	33.66
3	37.5	34.93
4	36	35.28
5	39	36.51
6	40	37.66
7	40.5	38.60
8	38.5	38.57
9	41	39.37
10	42	40.24

Here,

$$\text{Factor} = \frac{2}{n+1} = \frac{2}{5+1} = \frac{2}{6} = 0.33$$

The EMA for the first day is taken as the closing price of that day itself. The EMA for the second day is calculated as shown below.

$$\begin{aligned}\text{EMA} &= (\text{Closing price} - \text{Previous EMA}) \times \text{Factor} + \text{Previous EMA} \\ &= (35 - 33) \times 0.33 + 33 = 33.66\end{aligned}$$

$$\text{EMA for the third day} = (37.5 - 33.66) \times 0.33 + 33.66 = 34.93$$

If we are calculating the five day exponential moving average, the correct five day EMA will be available from the sixth day onwards.

A moving average represents the underlying trend in the share price movement. The period of the average indicates the type of trend being identified. For example, a five day or ten day average would indicate the short-term trend; a 50 day average would indicate the medium-term trend and a 200 day average would represent the long-term trend.

The moving averages are plotted on the price charts. The curved line joining these moving averages represent the trend line. When the price of the share intersects and moves above or below this trendline, it may be taken as the first sign of trend reversal.

Sometimes, two moving averages—one short-term and the other long-term—are used in combination. In this case, trend reversal is indicated by the intersection of the two moving averages.

## Oscillators

Oscillators are mathematical indicators calculated with the help of the closing price data. They help to identify overbought and oversold conditions and also the possibility of trend reversals. These indicators are called oscillators because they move across a reference point.

### Rate of Change Indicator (ROC)

It is a very popular oscillator which measures the rate of change of the current price as compared to the price a certain number of days or weeks back. To calculate a 7 day rate of change, each day's price is divided by the price which prevailed 7 days ago and then 1 is subtracted from this price ratio.

$$ROC = \frac{\text{Current price}}{\text{Price 'n' period ago}} - 1$$

The calculation of ROC is illustrated below:

**Calculation of 7 Day ROC**

Days	Closing price	Closing price 7 days ago	Price ratio	ROC = Ratio - 1
1	70	—	—	—
2	72	—	—	—
3	73	—	—	—
4	70	—	—	—
5	74	—	—	—
6	76	—	—	—
7	77	—	—	—
8	75	70	1.07	0.07
9	78	72	1.08	0.08
10	80	73	1.10	0.10
11	79✓	70	1.13	0.13
12	78	74	1.05	0.05
13	76	76	1.00	0.00
14	75	77	0.97	-0.03
15	77	75	1.03	0.03
16	78	78	1.00	0.00
17	76	80	0.95	-0.05
18	75	79	0.95	-0.05

The ROC values may be positive, negative or zero. An ROC chart is shown in Fig. 11.14 where the X axis represents the time and the Y axis represents the values of the ROC. The ROC values oscillate across the zero line. When the ROC line is above the zero line, the price is rising and when it is below the zero line, the price is falling.

Ideally, one should buy a share that is oversold and sell a share that is overbought. In the ROC chart, the overbought zone is above the zero line and the oversold zone is below the zero line. Many analysts use the zero line for identifying buying and selling opportunities. Upside crossing (from below to above the zero line) indicates a buying

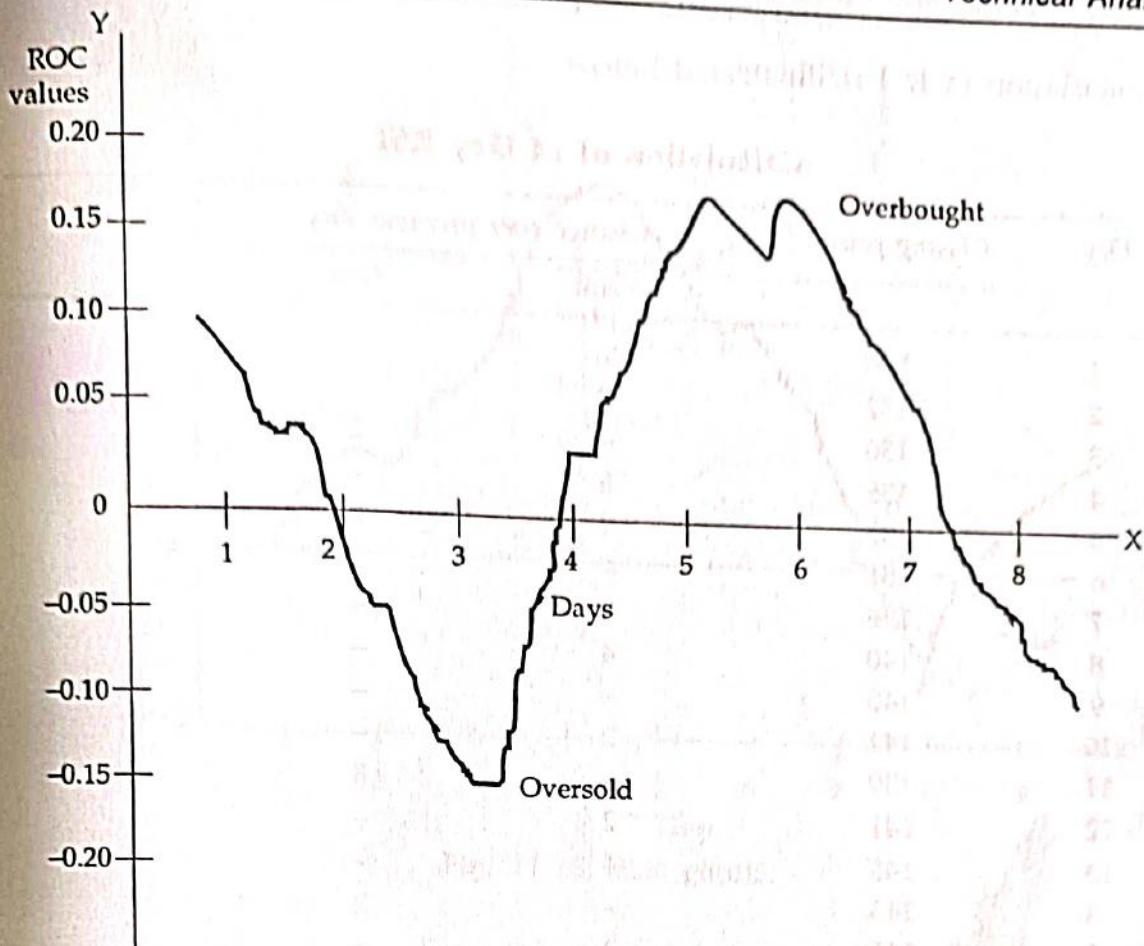


Fig. 11.14 ROC chart.

opportunity, while a downside crossing (from above to below the zero line) indicates a selling opportunity.

The ROC has to be used along with the price chart. The buying and selling signals indicated by the ROC should also be confirmed by the price chart.

#### Relative Strength Index (RSI)

This is a powerful indicator that signals buying and selling opportunities ahead of the market. RSI for a share is calculated by using the following formula.

$$RSI = 100 - [100 / (1 + RS)]$$

where

$$RS = \frac{\text{Average gain per day}}{\text{Average loss per day}}$$

The most commonly used time period for the calculation of RSI is 14 days. For the calculation a 14 day RSI, the gain per day or loss per day is arrived at by comparing the closing price of a day with that of the previous day for a period of 14 days. The gains are added up and divided by 14 to get the average gain per day. Similarly, the losses are added up and divided by 14 to get the average loss per day. The average gain per day and the average loss per day are used in the above formula for calculating the RSI for a day. In this way RSI values can be calculated for a number of days.

The calculation of RSI is illustrated below.

### Calculation of 14 Day RSI

Day	Closing price	Change over previous day	
		Gain	Loss
1	130	-	-
2	132	2	-
3	130	-	2
4	135	5	-
5	137	2	-
6	134	-	3
7	136	2	-
8	140	4	-
9	140	-	-
10	142	2	-
11	139	-	3
12	141	2	-
13	145	4	-
14	143	-	2
15	145	2	-
Total		25	10
14 Day Average		$\frac{25}{14} = 1.786$	$\frac{10}{14} = 0.714$

$$RS = \frac{1.786}{0.714} = 2.50$$

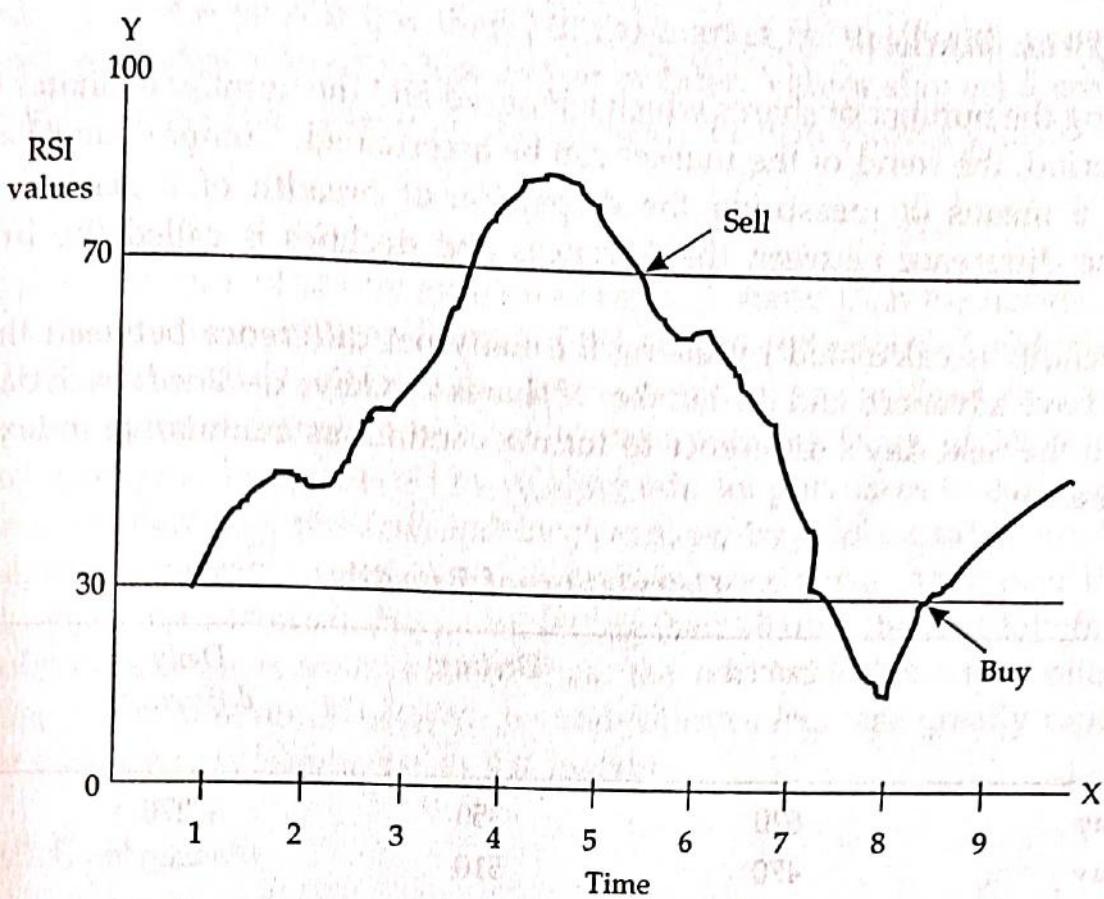
$$\begin{aligned}
 RSI &= 100 - [100/(1 + 2.50)] \\
 &= 100 - (100/3.50) \\
 &= 100 - 28.58 = 71.42
 \end{aligned}$$

This is the RSI for day 15. In this way the RSI values for the subsequent days can be calculated by taking the closing prices of 14 previous days. The RSI values range from 0 to 100. These values are then plotted on an XY graph as shown below in Fig. 11.15.

RSI values above 70 are considered to denote overbought condition and values below 30 are considered to denote oversold condition. When the RSI has crossed the 30 line from below to above and is rising, a buying opportunity is indicated. When it has crossed the 70 line from above to below and is falling, a sell signal is indicated.

### **Moving Average Convergence and Divergence (MACD)**

MACD is an oscillator that measures the convergence and divergence between two exponential moving averages. A short-term exponential moving average and a long-term



**Fig. 11.15 RSI chart.**

exponential moving average are calculated with the help of the closing price data. A 12-day and 48-day exponential moving averages constitute a popular combination. The difference between the short-term EMA and the long-term EMA represents MACD.

The MACD values for different days are derived by deducting the long-term EMA for each day from the corresponding short-term EMA for the day. These MACD values are plotted on an XY graph with MACD values on the Y axis and time periods on X axis. The MACD line would oscillate across the zero line. If the MACD line crosses the zero line from above, the trend can be considered to have turned bearish, signalling a selling opportunity. On the other hand, if the MACD line moves above the zero line from below, the trend can be said to have turned bullish and indicates a buying opportunity.

Sometimes, a simple moving average or an exponential moving average of the MACD values is superimposed over the MACD graph. Then buy and sell signals are generated by the cross over of the average line and the MACD line. When the lines are below the zero line, if the MACD line crosses the average line from below to above, it indicates a buying opportunity. When the lines are above the zero line, crossing of the MACD line from above to below the average line signals a selling opportunity.

## MARKET INDICATORS

Technical analysis focuses its attention not only on individual stock price behaviour, but also on the general trend of the market. Indicators used by technical analysts to study the trend of the market as a whole are known as market indicators. Some of these indicators are discussed below.

## Breadth of the Market

By comparing the number of shares which advanced and the number of shares that declined during a period, the trend of the market can be ascertained. Comparison of advances and declines is a means of measuring the dispersion or breadth of a general price rise or decline. The difference between the advances and declines is called the **breadth** of the market.

The breadth is calculated by taking the daily net difference between the number of shares that have advanced and the number of shares that have declined. Each day's difference is added to the next day's difference to form a continuous cumulative index as shown in the table below.

**Calculation of Breadth**

Day	Advances	Declines	Daily difference	Breadth (Cumulative difference)
Monday	620	350	+ 270	+ 270
Tuesday	470	510	-40	+ 230
Wednesday	360	610	-250	-20
Thursday	585	380	+ 205	+ 185
Friday	705	270	+ 435	+ 620

The index is plotted as a line graph and compared with the market index. Normally, breadth and market index move in unison. When they diverge, a key signal occurs. In case of divergence, the breadth line shows the true direction of the market. For instance, during a bull market if breadth declines to new lows while the market index makes new highs a peak is suggested followed by a downturn in stock prices. Breadth may also signal recovery. This happens when the breadth line begins to rise even as the market index is reaching new lows.

## Short Interest

A speculator often resorts to short selling which is selling a share that is not owned by the person. This is done when the speculator feels that the price of the stock will fall in future. He hopes to purchase the share at a later date (cover his short position) below the selling price and reap a profit.

The volume of short sales in the market can be used as a market indicator. As a technical indicator, short selling is called *short interest*. The expectation is that short sellers must eventually cover their positions. This buying activity increases the demand for stocks. Thus, short interest has significance for the market as a whole.

Monthly short selling volume is related to the average daily volume for the preceding month. Thus, monthly short selling volume is divided by average daily volume to give a ratio which indicates how many days of trading it would take to cover up the total short sales.

In general, when the ratio is less than 1.0, the market is considered to be weakening or 'overbought'. A decline should follow sooner or later. Values above 1.5 are considered to indicate that the market is 'oversold' and is likely to turn bullish shortly.

### **Odd-lot Index**

Small investors are presumed to buy smaller number of shares than the normal trading lot of 100 shares. These are known as odd lots and the buyers and sellers of odd lots are called odd lotters. Technical analysts believe that the odd lotters are inclined to do the wrong thing at critical turns in the market because of their presumed lack of sophistication.

An odd-lot index can be calculated by relating odd-lot purchases to odd-lot sales. The odd-lot index is obtained by dividing odd-lot purchases by odd-lot sales. An increase in this index suggests relatively more buying activity and vice versa. At or near the peak of a bull market, when the investors should be selling their shares, the odd lotters would be buying proportionately more than selling. Thus, the odd-lot index rises noticeably just before a decline in the market. Similarly, the odd-lot sales increase greatly causing a fall in the odd-lot index just before a rise in the market.

### **Mutual Fund Cash Ratio**

Mutual funds represent one of the most important institutional forces in the market. Mutual fund cash as a percentage of their net assets on a daily or weekly or monthly basis has been a popular market indicator. Mutual funds keep cash to take advantage of favourable market opportunities and to provide for redemption of their units by holders. The theory is that a low cash ratio of, say about five per cent, would indicate a reasonably fully invested position leaving negligible buying power in their hands. Low cash ratios are equated with market highs indicating that the market is about to decline. At market bottoms the cash ratio would be high. This is an indication of potential purchasing power which can propel a rise in prices. Thus, high mutual fund cash ratio signals a rise in prices of shares.

A few other market indicators are also being used by technical analysts to predict changes in the direction of the overall market.

### **Technical Analysis vs Fundamental Analysis**

Fundamental analysis tries to estimate the intrinsic value of a security by evaluating the fundamental factors affecting the economy, industry and company. This is a tedious process and takes a rather long time to complete the process.

Technical analysis studies the price and volume movements in the market and by carefully examining the pattern of these movements, the future price of the stock is predicted. Since the whole process involves much less time and data analysis, compared to fundamental analysis, it facilitates timely decision.

Fundamental analysis helps in identifying undervalued or overvalued securities. But technical analysis helps in identifying the best timing of an investment, i.e. the best time to buy or sell a security identified by fundamental analysis as undervalued or overvalued. Thus, technical analysis may be used as a supplement to fundamental analysis rather than

as a substitute to it. The two approaches, however, differ in terms of their databases and tools of analysis. Fundamental analysis and technical analysis are two alternative approaches to predicting stock price behaviour. Neither of them is perfect nor complete by itself.

Technical analysis has several limitations. It is not an accurate method of analysis. It is often difficult to identify the patterns underlying stock price movements. Moreover, it is not easy to interpret the meaning of patterns and their likely impact on future price movements.

## EXERCISES

1. What is technical analysis?
2. Explain the basic principles and hypotheses of Dow theory.
3. Describe the formation of bullish trend and bearish trend in the market.
4. What are price charts? Describe the different types of price charts used by technical analysts.
5. Describe the chart patterns that help to identify trend reversal.
6. "The Elliot Wave Theory is based on the principle that action is followed by reaction." Elucidate.
7. How are moving averages useful in studying trends and trend reversals?
8. Write short notes on:
  - (a) Japanese candlestick charts
  - (b) Trend reversal
  - (c) Support and resistance patterns
  - (d) Flags and pennants
  - (e) Exponential moving average
  - (f) MACD
9. What are oscillators? Explain the calculation and interpretation of any one oscillator.
10. What is RSI? Explain its calculation and interpretation.
11. Describe the important market indicators that are useful in studying the trend of the market.
12. Explain the merits and demerits of technical analysis as a tool of security analysis.