
Unit-1 □ Introduction

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1.1 Financial Statements—Meaning

Financial statements are the lens of a business. They draw a picture of the company's past financial performance and current financial position. They are designed to provide information on four primary business activities : planning, financing, investing and operating activities of a company.

The two basic features of financial statements are form and content. *Form* describes how the financial statements are organized. That is, it sketches the picture in the financial statements in order to enable the reader understand what such statements are depicting. *Content* colours the sketch. That is, it describes how various items in the financial statements such as earnings, assets and liabilities, dictated by form, are measured thereby quantifying the message.

Financial statements are published in the company's annual reports which are required to be presented before the shareholders at every annual general meeting (AGM) of the company. As per Section 166 of the Indian Companies Act, 1956, a meeting of the shareholders of the company (termed as *general meeting*) shall be held in each calendar year by every company whereat the annual reports shall be placed under Section 210 of the Act for adoption purpose. Since one, especially a commerce graduate, must be in a position to study, identify and interpret relevant information contained in the financial statements, this unit intends to orient a student regarding the meaning and objectives of financial statement analysis, sources of financial statement information, origin of

financial statement analysis, traditional vs. new approach to analysis and techniques of analysis in the sections that follow.

1.2 Sources of Financial Statement Information

The key sources of financial statement information contained in an annual report of a company are as follows :—

(i) **Balance Sheet** show the financial position of the business as on a particular date in terms of assets (i.e., investments that are expected to generate returns), liabilities (i.e., claims on the returns of the business by outside parties) and stock holders' equity (i.e., claims by the owners).

(ii) **Income Statement** or profit and loss statement shows the profit earned or loss incurred by the firm during a particular period in terms of various dimensions of profit such as gross profit, net profit after tax, operating profit, earnings per share etc.

(iii) **Cash Flow Statement** shows changes in cash balance (i.e. increase/decrease) of a company during the period in terms of cash flows from operating activities (i.e. from purchasing and selling products), investing activities (i.e., on purchasing and selling assets) and from financing activities (i.e. on generating and repaying funds required for the business).

(iv) **Schedules to Accounts** detail out the accounting principles and methods on the basis of which various items of revenues, expenses, assets and liabilities of the firm are measured and also showing the break-up of each consolidated item in the above three primary financial statements. The schedules to accounts contain supplementary information to financial statements and hence the statements can be interpreted only after a thorough reading of the schedules. The schedules are, thus, an integral part of the statements.

(v) **Financial Highlights** shows trends in various financial parameters of the business over a long period (usually a 10 year period).

(vi) **Shareholder Information** contain details of the monthly/weekly/daily high, low or closing quotes of stock prices of the company at the stock exchanges over the preceding 12 months and also showing the movement of the stock prices over the same period.

(vii) **Management Discussion and Analysis and Directors' Report** discuss the management's/ directors' views on the present as well as future business strategies, areas of operations, product portfolio, product development, marketing, manufacturing, order backlog and environmental pollution control measures undertaken by the company and also describing the regulations applicable to the firm and reviewing the factors affecting the company's business and its prospects.

The question that might arise in one's mind now is that if the financial statements, themselves, convey information about the well-being of the company, why then is the analysis of such statements required? This issue is addressed in the next section.

1.3 Need for Analysis of Financial Statements

Financial statements merely provide information on the levels of various items of income, expenses, asset acquisitions and debt occurrences of the firm. But, unless a relationship between various accounting variables is established and interpreted, such accounting numbers become meaningless to the users of financial statements. This is where financial statement analysis comes into play by helping the users read, understand and use financial statements for making better decisions. With technological advancements, the importance of expert financial statement analysis has increased even more today. Through financial statement analysis, the users can screen the vast wealth of information provided by the financial statements, in order to gain an insight into a company's current and future prospects, evaluate each and every information provided by the statements and focus attention on reliable information most relevant to their decision-making.

1.4 Meaning of Financial Statement Analysis

Financial Statement Analysis may be defined as an information—processing system designed to provide data for decision makers i.e., users of financial statement information who are concerned with :

- evaluating the present state of economic situation of the firm; and
- predicting the future course of its operations.

The information that is processed here is derived from the financial statements published in the annual report of a company.

1.5 Objectives of Financial Statement Analysis

The objectives of financial statement analysis can be derived from the information needs and the uses to which financial statements can be put by different categories of users of such statements – investors, creditors, lenders, management, auditors, customers, labour unions, regulatory agencies and researchers. Thus, the objectives of financial statement analysis in fulfilling the requirements of the parties demanding financial statement information are as follows :—

(i) To enable the *investors*, who may either be individuals with relatively limited resources or large, well-endowed financial institutions, choose a portfolio of securities that is consistent with their preferences for risk, return, dividend yield, liquidity etc. by predicting the timing, amounts and uncertainties of future cash flows of the firm on the basis of available information in the financial statements (investment focus of investors' decisions).

(ii) To enable the *investors* put a check on the attitude of the management to divert the firm's resources under its control to unprofitable uses by analyzing the past track record of the management in managing such resources from the financial statements (stewardship focus of investors' decisions).

(iii) To help the *creditors* judge the reliability, timing and stability of the firm in meeting their obligations by assessing the firm's ability to control cash flows and to maintain a sound financial base under varying economic and operating circumstances as demonstrated by the financial statements.

(iv) To enable the *lenders* i.e., long-term providers of funds determine the credit worthiness of the firm i.e., estimate its probability of default by means of projections of cash flows and evaluation of extended earning power of the company.

(v) To help *management* evaluate the operational and financial efficiency of the firm as a whole and of sub units i.e., departments and also to provide them with valuable clues to important changes in underlying operating, investing and financing activities through analysis of ratios, trends and economic relations based on financial statements so that early detection and timely action may put a check on the adverse trends.

(vi) To help the *auditor* conduct his audit of financial statements by revealing the areas of greatest change and vulnerability, material errors and irregularities and the areas to which an auditor has to direct his attention.

(vii) To provide the *customers* with information about the financial viability of the firms with which they have long-term relationships and hence help them decide on the continuance of such relationships.

(viii) To help the *labour unions* establish an economic basis for collective bargaining with the management by drawing a relationship between employee productivity and wages on the basis of financial statements.

(ix) To help the *government and regulatory agencies* in the exercise of their supervisory, revenue raising (i.e., collection of income tax, sales tax etc.) and rate determination (say, deciding the allowable rate of return that an electric utility can earn) functions and in deciding whether to provide government backed loan or guarantee to a financially distressed firm based on the firm's financial statements.

(x) To assist the *researchers* in accounting, finance, economics and business administration studies analyse firm performance over time, predict future performance and develop models for ensuring financial viability of the firm.

The above-mentioned objectives clearly indicate the importance of financial statement analysis in today's competitive environment. The analysts may thus fall in any one of the categories of users of financial statement information system as mentioned above or they may be intermediaries such as security analysts, investment advisors, credit rating agencies etc. who may cater to the needs of such users.

1.6 Origin of Financial Statement Analysis

The origin of financial statement analysis can be traced back to the second half of the 19th century in the United States. The following two major economic developments created the need for a systematic analysis of the firms' financial statements during this period :

- The emergence of the corporation as the main organizational form of business enterprises resulting in a separation of management (i.e. control) from ownership and hence requiring the owners i.e., the shareholders of the company to evaluate the company's financial statements in order to put a check on the management's tendency to deploy the firm's resources to unprofitable uses;
- and the fast increasing role of financial institutions (e.g., banks, investment and insurance companies etc.) as the major suppliers of capital for business expansion thereby requiring a formal evaluation system of borrowers' credit worthiness.

Consequently, the investors began systematically analyzing corporate financial data to evaluate the operational performance (investment analysis) of the firm and the lenders evaluated financial data to determine solvency status (credit analysis) of the firm. The credit analysis function initially dominated the development of financial statement analysis as banks began using the financial statements of prospective borrowers for credit evaluation.

The second stage in the development of financial statement analysis (i.e., the first decade of the 20th century) was characterized by a massive collection of real data and extensive use of financial ratios by analysts, credit agencies, trade associations and financial and academic institutions and proliferation of new ratios to provide a more comprehensive view of the firm's economic situation. Ratio criterias (i.e., standard norm for any particular ratio) were established by accepting the industry averages as standards of various ratios for performance evaluation. The scope of ratio analysis was further extended during this period by the use of ratios for inter-firm comparisons of performance. Though credit evaluation was still the primary function of financial statement analysis during this period, the growth of financial analyst firms providing periodic evaluation of corporate performance and statistics on industry average ratios and the formation of stock exchange commissions requiring more detailed and dependable financial data have

marked the beginning of this scientific approach (i.e., ratio analysis) to analysis of financial data. Even today, ratio analysis, in one form or the other, is the hallmark of financial statement analysis and will continue to remain so in future.

1.7 Traditional vs. New Approach to Financial Statement Analysis

Traditionally, financial statement analysis focused mainly on the use of financial ratios in evaluating the performance of the firm. But the subject was almost completely alienated from decision theories such as the micro-economic theories of investment and capital asset valuation and the finance theories of security analysis and portfolio management. A large amount of data and numerous financial ratios were available in traditional analysis, but the usefulness of the tools and techniques of analysis could not be established. To establish usefulness, research in financial analysis must involve model construction and verification i.e., systematic efforts must be made to design appropriate financial information systems and to test their usefulness for decision makers. Traditional financial statement analysis failed on this count and was hence alienated from the developments in economic and finance theories.

In contrast, the *modern* financial statement analysis is integrated with decision models' (economic and finance models) construction and verification. As for instance, in areas where formal, well-specified models exist, such as the portfolio model for investment in securities, the purpose of modern financial statement analysis is to provide data required by the model (e.g., predictions of future returns) in the most efficient (i.e., less costly) way. On the other hand, in decision areas where no formal models exist, such as bank-lending operations, the role of modern financial analysis is even broader as it must provide part or all of the information required for the construction and verification of decision models. Thus, the new approach to financial statement analysis is no longer detached from finance and economic theories and models. Besides, the new approach uses advanced statistical techniques, such as regression analysis, in developing and verifying the financial statement information required by the decision models. Also, modern financial analysis is not restricted to accounting data only. It uses unreported data such as market values of assets and management's forecasts of future earnings and non-accounting data such as security prices and bond ratings.

The major difference between the traditional and the new approach to financial statement analysis is, therefore, the framework within which analytical methods and techniques are developed. In the *traditional approach*, this framework was never defined appropriately resulting in lack of direction and progress. But as regards the *new approach*, financial statement analytical tools and techniques are developed and tested within the well-defined framework of decision theory.

1.8 Techniques of Financial Statement Analysis

In analyzing financial statements, the analysts have a variety of tools available from which to select those best suited to the specific requirements of different user groups as highlighted in Section 1.5 before. The analysts, however, need benchmarks to make judgements about a firm's performance. Such benchmarks are established either by reference to other firms usually in the same industry (cross-sectional analysis) or to the same firm's past history (time-series analysis). Thus, in *cross-sectional analysis*, a firm's performance is compared to that of other firms in the same industry by applying the techniques of *common-size analysis* and *financial ratio analysis* (i.e., *vertical analysis techniques*) whereas a firm's own performance is compared over time in *time-series analysis* by applying the technique of *comparative financial statement analysis* also known as *trend analysis* (i.e. *horizontal analysis technique*). The techniques to analyse financial statements of a firm can therefore be clubbed under two types of analysis—horizontal and vertical—as narrated below.

(i) **Horizontal analysis**—This kind of analysis involves the study of the behaviour of each of the items/entities in the financial statements i.e., its increases or decreases with the passage of time. This is a *dynamic analysis* as it shows the changes which have taken place. It involves the *right to left* or reverse movement of the eyes. Comparative financial statement analysis or trend analysis is an example of horizontal analysis technique.

Comparative financial statement analysis sets consecutive balance sheets, income statements or statements of cash flows side by side and review changes in individual categories on a year-to-year or multi-year basis. The most important revelation by comparative financial statement analysis is *trend*. A comparison of financial statements over several years reveals direction, speed and extent of trends. This sort of analysis also compares trends in related items. As for example a 15% increase in accounts receivables (i.e., debtors) but a sales increase of only 10% in comparison to last year requires investigation into the reasons for this difference in rate of increase and proper explanations.

Comparative financial statement analysis over relatively short time periods (i.e., 2 to 3 years) involves *year-to-year change analysis* whereas long-term comparisons (i.e., over periods covering more than 2 to 3 years) is done with the help of *index-number trend series analysis*. Year-to-year change analysis reveals the changes in absolute rupee value as well as the percentage changes in between two successive years over a 2-3 year period as illustrated below. But when analysis runs into more than 3 years, using year-to-year change analysis may often be cumbersome. An alternative in such a situation could be to choose a normal year with regard to business conditions as the 'base year' and assign the value 100 for all the items in the financial statement of that year. Then, recast the financial statement values of other years in terms of the base year i.e., all index numbers

for all the years of analysis are computed as a percentage of the base year. Thus, such index numbers indicate the percentage change in individual item with reference to base year. However, the percentage change in between any two successive years can be computed by expressing the difference in the index number of the latter and the former years as a percentage of the former. It must be noted that in case of both year-to-year change and index number trend series analysis, a meaningful percentage change in between two successive years cannot be computed when a negative amount appears in the previous/base year and a positive amount in the next year and vice-versa or when an item has no value in the base/previous year. But when an item has value in the base/previous year and none in the next year, percentage change can be computed and the decrease shall be taken as 100% in relation to base year.

Illustrations

Year-to-year Change Analysis

Problem (1) : Given the following Income Statements of Garments Ltd. for the years 2003 and 2004. Prepare comparative Income Statements and analyse the performance of the firm.

Income Statements of Garments Ltd. for the Year ended 31.03.....

(In Rs. 000)

Particulars	2003	2004
Net Sales	466	659
<i>Less : Cost of Goods sold</i>	(205)	(275)
Gross profit	261	384
<i>Less : Operating Expenses :</i>		
General and administrative	(23)	(35)
Sales and marketing	(58)	(81)
Research and development	(60)	(87)
Write-off of patents	(0)	(52)
	(141)	(255)
Income from Operations	120	129
<i>Add : Interest income</i>	7	12
<i>Less : Interest expense</i>	(1)	(0.8)
Income before taxes	126	140.20
<i>Less : Provision for tax</i>	(31)	(34.20)
Net Income	95	106

Solution :

Comparative Income Statements of Garments Ltd. shall comprise 4 columns—two columns with 2003 and 2004 values of each item respectively, third column for increase/decrease in rupee value of each item and the fourth column for percentage increase/decrease in each item.

Rupee change in each item is calculated as (2004 value – 2003 value) and percentage change is calculated as :—

$$\frac{(2004 \text{ value}) - (2003 \text{ value})}{2003 \text{ Value}} \times 100$$

Comparative Income Statements of Garments Ltd.*For the period 2003 – 2004*

Particulars	31.3.03 (Rs. in '000)	31.3.04 (Rs. in '000)	Change (Rs. in '000) [Increase/ (Decrease)]	Percentage change (%)
Net Sales	466	659	193	41.4
Less : Cost of Goods sold	(205)	(275)	70	34.1
Gross profit	261	384	123	47.1
Less : Operating Expenses :				
General and administrative	(23)	(35)	(12)	52.2
Sales and marketing	(58)	(81)	23	39.7
Research and development	(60)	(87)	27	45.0
Write-off of patents	(0)	(52)	52	—
	(141)	(255)	114	80.9
Income from Operations	120	129	9	7.5
Add : Interest income	7	12	5	71.4
Less : Interest expense	(1)	(0.8)	(0.20)	(20.0)
Income before taxes	126	140.20	14.20	11.27
Less : Provision for tax	(31)	(34.20)	3.20	10.32
Net Income	95	106	11	11.58

Interpretation :

It is clear from the above comparative income statement that net sales in 2004 have increased by 41.4% over 2003 while cost of goods sold has increased by only 34.1%. As

a result, there has been a 47.1% boost in gross profit in 2004. Despite this increase in gross profit, income from operations has increased only by 7.5%. The reason for such relatively small income increase could be the large amount of write-off of patents associated with the acquisition of new technology. However, for the sake of comparison, it has been assumed that accounting principles have not changed in between the two years.

Problem (2) : Prepare Comparative Balance Sheets of Magnesium Ltd. from the following two Balance Sheets for the years 2003 and 2004 respectively and interpret the financial position of the firm.

Balance sheets of Magnesium Ltd. as at 31.3.....

[Rs. in '00,000]

Particulars	2003	2004
Sources of Funds		
A) Shareholders' Fund :		
Share capital	800	800
Reserves and surplus	1100	1200
	1900	2000
B) Loan Funds :		
Secured loan	150	130
Unsecured loan	90	70
	240	200
Total (A + B)	2140	2200
Application of Funds :		
C) Fixed Assets :		
Property, plant and equipment	600	690
Intangible assets	240	228
	840	918
D) Current Assets :		
Inventories	500	450
Accounts Receivables	1100	1350
Cash and Bank	300	700
	1900	2500
<i>Less : Current Liabilities :</i>		
Account Payables	(450)	(800)
Accrued Liabilities	(250)	(480)
Net Current Assets	1200	1220
E) Deferred Expenditure	100	62
Total (C + D + E)	2140	2200

Solution :**Comparative Balance Sheets of Magnesium Ltd.***For the period 2003 – 2004*

Particulars	31.3.03 (Rs. in '00,000)	31.3.04 (Rs. in '00,000)	Change (Rs. in '00,000) (Increase/ Decrease)	Percentage change (%)
Sources of Funds				
A) Shareholders' Fund :				
Share Capital	800	800	Nil	0
Reserves and Surplus	1100	1200	100	9.09
	1900	2000	100	5.26
B) Loan Funds :				
Secured loan	150	130	(20)	(13.33)
Unsecured loan	90	70	(20)	(22.22)
	240	200	(40)	(16.67)
Total (A + B)	2140	2200	60	2.80
Application of Funds :				
C) Fixed Assets :				
Property, plant and equipment	600	690	90	15.00
Intangible assets	240	228	(12)	(5.00)
	840	918	78	9.29
D) Current Assets :				
Inventories	500	450	(50)	(10)
Accounts receivables	1100	1350	250	22.73
Cash and Bank	300	700	400	133.33
	1900	2500	600	31.58
Less : Current Liabilities :				
Accounts payables	(450)	(800)	350	77.78
Accrued liabilities	(250)	(480)	230	92.00
Net Current Assets	1200	1220	20	1.67
E) Deferred expenditure	100	62	(38)	38.00
Total (C+D+E)	2140	2200	60	2.80

Note : Absolute change and percentage change in individual items between 2003 and 2004 are calculated in the same way as in case of comparative income statement.

Interpretation :

It may be observed from the comparative balance sheet that there has been no change in share capital although reserves and surplus have increased by 9.09% thereby resulting into an increase of 5.26% in total shareholders' fund from 2003 to 2004. However, loan funds have decreased during the same period. Fixed assets, have increased between 2003 and 2004. Current assets have increased by 31.58%. But as current liabilities have also increased, there has been a meagre rise in net current assets (i.e. working capital). As regards the components of current assets, inventories have decreased but accounts receivables and cash balance have improved thereby signifying increase in sales, better credit management and stronger liquidity position of the business. Overall, the financial condition of Magnesium Ltd. has improved between 2003 and 2004.

It may be noted that year-to-year change analysis over 3 years can be done by having two sets of change columns (both absolute and percentage changes) for showing changes in between 1st and 2nd year and between 2nd and 3rd year respectively in the above comparative statements.

Index Number Trend Series Analysis :

Problems (3) : Prepare Comparative Income Statements of Zodiac Ltd. from the statements for the period 2000 to 2004. Also, interpret the comparative statement.

Income Statements of Zodiac Ltd.

For the years ended 31.3.....

[Rs. in '000]

Particulars	2004	2003	2002	2001	2000
Net Sales	1800	1500	1100	1000	800
Less : Cost of Goods sold	(700)	(600)	(420)	(400)	(300)
Gross Profit	1100	900	680	600	500
Less : Operating expenses:					
Sales and marketing	(700)	(500)	(400)	(300)	(150)
General and administration	(190)	(180)	(140)	(120)	(100)
	(890)	(680)	(540)	(420)	(250)
Income from operations	210	220	140	180	250
Less : Interest expense	(120)	(100)	(80)	(70)	(50)
Income before taxes	90	120	60	110	200
Less : Provision for tax	(30)	(30)	(30)	(30)	(40)
Net Income	60	90	30	80	160

Solution :

Comparative Income Statements on a multi-year basis, as given in the problem, can be prepared using the index number trend series analysis. To apply this technique, year 2000 is selected as the *base year* and the values of all the items in the income statement for the year 2000 is taken as 100. Thereafter, the income statements of 2001 to 2004 are recasted by expressing the values of all the items as percentages of the corresponding values in the base year.

Comparative Income Statements of Zodiac Ltd.*For the period 2000 to 2004*

[using index number trend series analysis; ase year being 2000]

Particulars	2000	2001	2002	2003	2004
Net Sales	100	125*	137.5	187.5	225
Cost of Goods sold	100	133.33	140**	200	233.33
Gross Profit	100	120	136	180	@220
Operating expenses :					
Sales and marketing	100	200	266.67	333.33	466.67
General and administration	100	120	140	180	190
	100	168	216	272	356
Income from Operations	100	72	56	88	84
Interest expenses	100	140	160	200	240
Income before taxes	100	55	30	60	45
Provision for tax	100	75	75	75	75
Net Income	100	50	18.75	56.25	37.5

* Index value of Net Sales for the year 2001 :

$$\left[\frac{\text{Net Sales of 2001}}{\text{Net Sales of 2000}} \times 100 \right] \text{ i.e., } \left[\frac{1000}{800} \times 100 \right]$$

** Index value of cost of goods sold for the year 2002 :

$$\left[\frac{\text{Cost of goods sold for 2002}}{\text{Cost of goods sold for 2000}} \times 100 \right] \text{ i.e., } \left[\frac{420}{300} \times 100 \right]$$

@ Index value of Gross Profit for the year 2004 :

$$\left[\frac{\text{Gross Profit for 2004}}{\text{Gross Profit for 2000}} \times 100 \right] \text{ i.e., } \left[\frac{1100}{500} \times 100 \right]$$

Likewise all other index values are calculated.

Interpretation :

The above index number trend series analysis shows that net sales, cost of goods sold, gross profit and operating expenses (both sales and marketing and general and administration) have increased steadily from 2000 to 2004. However, operating profit has declined between 2000 and 2002. Although it has risen temporarily in the year 2003, it has fallen again in the year 2004. Such a declining trend in operating profit may be attributed to the fact that the rate of increase in operating expenses has been far greater than the rate of increase in gross profit. Since interest expenses have also risen steadily between the period 2000 and 2004, income before and after taxes show a similar trend as that of operating profit. Thus, efforts should be made by Zodiac Ltd. to improve its sales revenue in the future.

It must be noted that year-to-year comparison of the firm's performance in index number trend series analysis can be made using index numbers as follows :—

For example, change in gross profit in between 2002 and 2003 in the above problem is

$$\frac{(180 - 136)}{136} = 0.3235 \text{ or } 32.35\%$$

A similar technique, as illustrated in problem (3), can be applied to prepare comparative balance sheet on a multi-year basis.

Trend analysis has several benefits. The most important benefit is its power to provide an insight into management's philosophies, policies and motivations (conscious or otherwise) underlying the changes revealed. The more diverse the economic environment comprising the periods of analysis, the better the picture of how a company deals with adversity and takes advantage of the opportunities.

(ii) **Vertical analysis** : This analysis involves the study of quantitative relationships existing among various items of a particular financial statement for a particular period. It is a *static* kind of analysis as it shows the proportion of a total group or sub-group an item of a financial statement represents. Vertical analysis involves up-down or reverse movement of the eyes. Vertical analysis helps to compare the financial performance of a firm with that of other firms in the same industry and of a firm's performance over time especially when the firm's size is changing continuously. Such analysis is done using two types of techniques—common size analysis and financial ratio analysis—as narrated below.

(a) **Common size Analysis** : Common size statements are prepared under this technique to standardize financial statement components by expressing them as a percentage of a relevant base. That is, in common size balance sheet, each item of asset is expressed as a percentage of total assets and each item of liability and capital is

expressed as a percentage of total of liabilities and capital (which is the same as total assets). In common size income statement, each item of income and expense from ordinary activities is expressed as a percentage of net sales. The common-size statements are also known as *100% statements* because total of assets and total of liabilities and capital in common size balance sheet and net sales in common-size income statement are taken as 100. Common-size statements standardize the scaling differences (i.e., size differences) between two or more firms for a particular period and of a particular firm over time and hence make comparison of their financial statements easier. Common-size statements help to interpret the relation of the components to the whole – as for example, the liabilities side of a common size balance sheet indicates the distribution of financing among current liabilities, non-current liabilities and equity, its assets side shows the proportionate application of funds in fixed assets, current and non-current assets while the common-size income statement reveals the proportion of net sales composed by operating and non-operating expenses and profit margin. This is illustrated below.

Illustrations

Problem (4) : Given below are the Income Statements of Sun Ltd. and Moon Ltd. for the year ended 31.3.2004. Prepare comparative income statements of the two firms and compare their financial performance over the same period.

Income Statements of Sun Ltd. and Moon Ltd.

For the year ended 31.3.2004

[Rs. in Crore]

Particulars	Sun Ltd.	Moon Ltd.
Net Sales	801.20	1220.10
Less : Cost of goods sold	(586.40)	(860.30)
Gross Profit	214.80	359.80
Less : Operating expenses :		
Selling	(105.0)	(200.10)
Administration	(45.60)	(74.30)
Total Operating Expenses	(150.60)	(274.40)
Operating Profit	64.20	85.40
Add/(Less) : Other gains/(expenses)	(11.40)	(16.4)
Income before tax	52.80	69.0
Less : Provision for tax	(33.60)	(32.40)
Net Income (after tax but before extra ordinary gain)	19.20	36.60
Add/(Less) : Gain (loss) on sale of property	1.30	83.50
Net Income (loss) from both normal and extra-ordinary activities	20.50	120.10

Solution :

Comparative Income Statements of two firms for the same period essentially involve the preparation of common size income statements as shown below.

Comparative Common-size Income Statements of Sun Ltd. and Moon Ltd.

for the year ended 31.13.2004

Particulars	Sun Ltd.		Moon Ltd.	
	Rs. in Crore	Common-size (as % of net sales)	Rs. in Crore	Common-size (as % of net sales)
Net Sales	801.20	100	1220.10	100
Less : Cost of goods sold	(586.40)	(73.2)	(860.30)	(70.5)
Gross profit	214.80	26.8	359.80	29.5
Less : Operating Expenses :				
Selling	(105.0)	(13.1)	(200.10)	(16.4)
Administration	(45.60)	(5.7)	(74.30)	(6.1)
Total operating expenses	(150.60)	(18.8)	(274.40)	(22.5)
Operating Profit	64.20	8.0	85.4	7.0
Less : Other expenses	(11.40)	(1.4)	(16.4)	(1.3)
Income before taxes	52.80	6.6	69.0	5.7
Less : Provision for tax	(33.60)	(4.2)	(32.40)	(2.7)
Net Income (after tax but before extra-ordinary items)	19.20	2.4	36.60	3.0
Add : Gain on sale of property	1.30		83.50	
Net income from both normal and extra-ordinary activities	20.50		120.10	

Interpretation :

It may be observed from the above common-size income statements of Sun Ltd. and Moon Ltd. for the year ended 31.3.2004 that Moon Ltd. has a lower proportion of cost of goods sold to net sales (i.e., 70.5%) than that of Sun Ltd. (i.e. 73.2%) thereby resulting into a higher percentage of gross margin on sales for Moon Ltd. (i.e. 29.5%) than for Sun Ltd. (i.e. 26.8%).

On the other hand, all the operating expenses' percentage on net sales of Sun Ltd. are lower than that of Moon Ltd. and have more than off-set the greater gross margin of Moon Ltd. over Sun Ltd. Thus Sun Ltd. has a higher percentage of both operating and pre-tax profit on sales than Moon Ltd. But as Sun Ltd. has a higher tax rate on sales than Moon Ltd., its after-tax profit percentage on Sales is lower than that of Moon Ltd. Thus, it may

be concluded that operating performance of Sun Ltd. has been better than that of Moon Ltd. for the year ended 31.3.2004 assuming that the accounting methods used by the two companies are similar.

(Note : Gains/losses from extra-ordinary activities cannot be stated in common-size percentage on sales as shown in the above statement).

Problem (5) : Prepare Comparative Balance Sheets of Star Ltd. and Saturn Ltd. from their Balance Sheets at 31.3.2004 as given below. Also, compare their financial position as on the said date.

Balance Sheets of Star Ltd. and Saturn Ltd.

as at 31.3.2004

[Rs. in Crore]

Particulars	Star Ltd.	Saturn Ltd.
Assets		
Current Assets :		
Cash	61.2	65.6
Marketable securities	32.8	30.4
Accounts receivables	261.2	249.1
Inventories	181.2	242.8
Other current assets	23.8	55.8
Total Current Assets	560.2	643.7
Land, plant and equipment (net of depreciation)	432.1	682.9
Other non-current assets	18.9	153.6
Total Assets	1011.2	1480.2
Liabilities and Capital		
Current Liabilities :		
Accounts payables	170.3	122.7
Notes payables	49.6	60.0
Other current liabilities	41	41.2
Total Current Liabilities	260.9	223.9
Long term liabilities	150.3	200.0
Total Liabilities (A)	411.2	423.9
Owners' Equity :		
Capital (B)	400.3	599.6
Surplus	49.6	250.2
Retained Earnings	150.1	206.5
Total Surplus (C)	199.7	456.7
Total Owners' Equity (D + B + C)	600.0	1056.3
Total Liabilities and Owner's Equity	1011.2	1480.2

Solution :

Comparative Balance Sheets of two firms at a particular date in effect involve the preparation of common size balance sheets as shown below.

Comparative Common-size Balance Sheets of Star Ltd. and Saturn Ltd.*As at 31.3.2004*

Particulars	Star Ltd.		Saturn Ltd.	
	Rs. in Crore	Common size (as % of total assets or total of liabilities and capital	Rs. in Crore	Common size (as % of total assets or total of liabilities and capital
Assets				
Current Assets :				
Cash	61.2	6.1	65.6	4.4
Marketable securities	32.8	3.2	30.4	2.1
Accounts receivables	261.2	25.8	249.1	16.8
Inventories	181.2	17.9	242.8	16.4
Other current assets	23.8	2.4	55.8	3.8
Total Current Assets	560.2	55.4	643.7	43.5
Land, plant and equipment (net of depreciation)	432.1	42.7	682.9	46.1
Other non-current assets	18.9	1.9	153.6	10.4
Total Assets	1011.2	100.0	1480.2	100.0
Liabilities and Capital				
Current Liabilities :				
Accounts payables	170.3	16.8	122.7	8.3
Notes payables	49.6	4.9	60.0	4.0
Other current liabilities	41	4.1	41.2	2.8
Total Current Liabilities	260.9	25.8	223.9	15.1
Long term liabilities	150.3	14.9	200.0	13.5
Total Liabilities (A)	411.2	40.7	423.9	28.6
Owners' Equity :				
Capital (B)	400.3	39.6	599.6	40.5
Surplus	49.6	4.9	250.2	16.9
Retained Earnings	150.1	14.8	206.5	14.0
Total Surplus (C)	199.7	19.7	456.7	30.9
Total Owner's Equity (D + B + C)	600.0	59.3	1056.3	71.4
Total Liabilities and Owner's Equity	1011.2	100.0	1480.2	100.0

Interpretation :

Assuming that the accounting methods adopted by the two companies are the same, comparison of their common-size balance sheets shows that Star Ltd. has a greater proportion of current assets to total assets (i.e., 55.4%) than Saturn Ltd. (i.e., 43.5%). As regards composition of Current Assets, it may be found that both the companies have a greater proportion of debtors (i.e. accounts receivables) followed by inventories and then cash and marketable securities. Star Ltd. also has a greater proportion of current liabilities to total of liabilities and capital (25.8%) than Saturn Ltd. (i.e. 15.1%). Similarly, long term liabilities and total liabilities as percentage of total of liabilities and capital are higher in case of Star Ltd. than Saturn Ltd. But Saturn Ltd. has a higher proportion of ownership equity than Star Ltd. thereby suggesting that Star Ltd. relies primarily on outside sources whereas Saturn Ltd. on ownership sources for financing their investments.

Note that common-size statements can also be used to compare the performance of a single company over time (i.e. in trend analysis). As for example, the performance of Zodiac Ltd. over the period 2000 to 2004 in problem (3) could have also been compared by reformulating the income statements of each such year as common size statements.

The utility of common-size statements, thus, lie in its ability to reveal the differences over time in a single firm or between firms arising due to operating, financing and investing decisions made by the management as well as external economic factors and highlight the unusual features that require further investigation.

(b) Financial Ratio Analysis : This technique of vertical analysis is among the most popular and widely used tools of financial statement analysis. A ratio expresses a mathematical relation between two quantities. To be meaningful, a ratio must refer to an economically important relation i.e., ratios should relate two matching components. As for example, there is a direct and crucial relation between an item's sale price and its cost. Accordingly, the ratio of cost of goods sold to sales is a significant one. But, there is no obvious relation between wages and salaries paid to employees and the balance of investments made in securities of other companies. So computation of a ratio between the two is meaningless.

While computation of a ratio is a simple arithmetic operation, its interpretation is far more complex. Ratios are not significant in themselves and are interpretable only in comparison with – (1) *prior ratios* i.e., performance of a ratio relative to the same ratio over a past period; or (2) *predetermined standards* which are usually the *industry average* or some alternative measure of industry central tendency such as the median of a particular ratio; or (3) *ratios of competitors* i.e., performance of a firm vis-a-vis the most successful firms in the same industry with respect to a particular ratio. However, the most frequently used ratio criteria is the *industry average* and inferences are drawn

based on the extent and direction of deviation of observed ratios from the industry averages. This technique of comparing a firm's ratios with industry-wide measures of central tendency is known as *standard ratios* technique. No matter whatever may be the basis of comparison, ratios must be interpreted with care since factors affecting the numerator can correlate with those affecting the denominator. As for example, companies can improve the ratio of operating expenses to sales by reducing costs that stimulate sales e.g., advertisement expenditure. If this cost reduction ultimately leads to long-term decline in sales or market share, a seemingly short-term improvement in profitability can significantly damage a company's future prospects and must be interpreted accordingly.

Ratios are tools that provide clues and symptoms of underlying conditions. If properly interpreted, ratios help to identify areas requiring further investigation. Besides the internal operating conditions affecting a company's ratios, economic events, industry factors, management policies and accounting methods also have an impact on firm's ratios. It must, however, be remembered that the usefulness of ratios depends on the quality of the numbers used in their computation. When a company's internal accounting controls or other governance and monitoring mechanisms are unreliable in producing credible figures, the resulting ratios are equally unreliable.

Several ratios can be computed using a company's financial statements, some of which may have general application in financial analysis, while others may be unique to specific circumstances or industries. Ratios may be useful in activity analysis (i.e., analysis of the relationship between the firm's level of operations and the assets needed to sustain that level), liquidity analysis, solvency analysis, profitability analysis and in assessing operating and financial leverages of the firm. Depending on the kind of analysis for which a ratio may be useful, financial ratios are categorized into above-mentioned analytical groups. A detailed discussion of the various categories of ratios is done in subsequent units and hence is ignored here to avoid repetition.

Thus, it may be concluded that both the types of analysis, horizontal and vertical, form the backbone of the techniques of financial statement analysis. No conflict exists between the two and both the kinds are necessary for complete analysis of financial statement information. Since ratio analysis is the most important analytical tool, we start with examining the profitability ratios in the next unit.

1.9 Select Readings

- Bernstein and Wild, *Analysis of Financial Statements*, Tata McGraw Hill, 2004.
- Lev, B., *Financial Statement Analysis : A New Approach*, Prentice Hall, 2000.
- Penman, S., *Financial Statement Analysis and Security Valuation*, McGraw Hill, 2004.

1.10 Questions

Long – Answer type :

- 1) Discuss the major objectives of analyzing financial statements.
- 2) Compare the new versus traditional approach to financial statement analysis.
- 3) Distinguish between horizontal and vertical analysis techniques.
- 4) Given the following income statements and balance sheets of Skyline Ltd. and Horizon Ltd. for the period 1.4.2003 to 31.3.2004. Prepare comparative financial statements of the two firms and compare their financial performance over the said period.

INCOME STATEMENT

[Rs. in Lakhs]		
Particulars	Skyline Ltd.	Horizon Ltd.
Net Sales	16,000	27,000
<u>Less: Cost of Goods Sold</u>	(3500)	(10800)
General Administration & Selling Exp.	(6900)	(6400)
Operating Profit	5,600	9,800
<u>Add/(Less): Other Gains/(Expenses)</u>	20	100
Profit Before Tax	5,620	9,900
<u>Less: Provision for Tax</u>	(1686)	(3465)
Net Income (after Tax but before extra-ordinary gain)	3934	6,435
<u>Add/(Less): Extra-ordinary Income/(Expenses)</u>	46	85
Net Income from both Normal & Extra-ordinary activities.	3,980	6,520

BALANCE SHEETS

[Rs. in Lakhs]		
Particulars	Skyline Ltd.	Horizon Ltd.
Assets :		
<u>Current Assets :</u>		
Cash	730	2,100
Accounts receivables	3,900	6,500
Inventories	1,800	3,900
Other current assets	650	500
Total current assets	7,080	13,000
Fixed assets (net of depreciation)	11,000	15,000
Other non-current assets	2,900	2,400
Total Assets	20,980	30,400
Liabilities & Capital :		
<u>Current Liabilities :</u>		
Accounts payables	2,900	3,300

Particulars	[Rs. in Lakhs]	
	Amount (Rs.)	Amount (Rs.)
Notes payables	1,890	2,000
Other current liabilities	2,100	2,200
Total current liabilities	6,890	7,500
Long term liabilities	2,900	4,400
Total Liabilities (A)	9,790	11,900
<u>Owner's Equity :</u>		
Share capital	5,000	10,000
Reserves & surplus	6,190	8,500
Total Owners' Equity (B)	11,190	18,500
Total Liabilities & Capital (A+ B)	20,980	30,400

Short – Answer Type :

- (5) What do you mean by Financial Statement Analysis?
- (6) What is the need for analyzing financial statements?
- (7) Discuss how the subject-financial statement analysis – has evolved over the years.

Objective Type :

- (8) Fill in the blanks :
- (a) _____ approach to financial statement analysis is integrated with decision theory.
 - (b) In _____, a firm's performance is compared to that of other firms in the same industry.
 - (c) A firm's own performance is compared over time in _____.
 - (d) _____ and _____ are the two techniques of vertical analysis.

[Hints : (8) (a) New or modern; (b) cross-sectional analysis; (c) time series or trend analysis; (d) Common size analysis and financial ratio analysis]

Unit-2 □ Profitability Analysis

Structure

- 2.1 Introduction**
- 2.2 Connotations of profit**
- 2.3 Types of profitability ratios**
- 2.4 Concept of Economic Value Added**
- 2.5 Select Reading**
- 2.6 Questions**

2.1 Introduction

Analysing a company's profitability is a major part of financial statement analysis. Profitability analysis goes beyond the accounting measures – such as sales, cost of sales, operating and non-operating expenses – to assess their sources, persistence, measurement and key economic relations. Results of such assessment enable one to estimate both the return and risk characteristics of the company in a better way. Profitability analysis also helps to distinguish between performance primarily attributed to management (like operating decisions) and those results that are less tied to management decisions (like taxes etc.). Thus, profitability analysis establishes where the firm is at present and discovers the major drivers of current and future profits of the company.

The most important financial statement in relation to profitability analysis is the income statement of a firm. This is because the income statement reports a company's operating results over a period of time which, in turn, help in determining company value, an important yardstick in evaluating corporate performance.

Profitability analysis is important for all users of financial statement information, especially the investors and the creditors of the firm. Since a firm's ability to generate, sustain and increase profits is often the single most important determinant of changes in security prices and returns to investors, measuring, analyzing and forecasting the firm's income become necessary and profitability analysis helps the investors in this regard. On the other hand, analysis of a company's income helps its creditors to assess its ability to meet their interest payments and repayment of principal on time. Besides, profitability analysis gives an indication of the current efficiency level of the business and necessitates action on the part of the company's management to enhance the same in order to withstand competition in the future. Also, analysis of a company's profit conveys

information about the company's earnings generating capacity and of the amount of tax revenue that may be raised by the government as a result.

This unit, therefore, discusses how to analyse a company's profitability with the help of accounting ratios in the sections that follow.

2.2 Connotations of Profit

Profit is defined as the difference between revenues and expenses over a reporting period (which is usually one year). Profit can be measured in various ways and hence may be defined accordingly. *Gross Profit (G.P.)* is taken as the difference between sales and manufacturing or merchandising cost of goods sold. Profit may also be computed by deducting administrative, and selling and distribution costs from gross profit and be termed as *earnings before depreciation, interest and taxes (EBDIT)*. Depreciation may be subtracted from EBDIT to arrive at *operating profit*. This measure of profit shows earnings arising directly from the commercial operations of the business without the effect of financing. When non-operating income and expenses are respectively added to and subtracted from operating profit, the measure of *earnings before interest and taxes (EBIT)* is obtained. If the firm does not have any non-operating income and expenses, EBIT is the same as operating profit. Thus, if the firm's profit has to be examined from the point of view of all investors (lenders and owners), the appropriate measure of profit is EBIT. When interest expenses i.e., debt financing costs are deducted from EBIT, *profit before tax (PBT)* is obtained. Taxes are deducted from PBT to arrive at *profit after taxes (PAT)*. PAT, also defined as *net income (NI)*, is the most common measure of profit which shows the impact of all factors on the firm's earnings. To determine profit available to equity investors, preference dividend may be deducted from PAT.

Thus, depending on the definition of the term 'profit', profitability of a firm can be measured in several differing but interrelated dimensions as has been explained in the next section.

2.3 Types of Profitability Ratios

There are two basic approaches for determining profitability ratios of a company—

- profitability in relation to sales i.e., expressing the various dimensions of profit per rupee of sales; and
- profitability in relation to a firm's investment that is required to generate them i.e., expressing the different profit measures in proportion to investment value.

Thus, the various profitability ratios falling under the above two categories have been defined and simultaneously their use in financial statement analysis have been discussed below.

(1) *Measuring Profitability in relation to sales*

Since the ability to control costs in relation to revenues enhances the company's earnings power, the following accounting ratios measure profitability in terms of the relationship between the different measures of firm's profitability and sales and between the firm's costs and sales.

(i) *Gross Profit Margin or Gross Margin Ratio :*

This ratio captures the relationship between sales and manufacturing or merchandising costs as follows :—

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit (as defined in section 2.2)}}{\text{Sales}}$$

Note that 'sales' refer to net sales i.e. gross sales less return inward.

Example (1) : Let Sales = Rs. 10,00,000 (Net)

Cost of Goods Sold = Rs. 4,00,000

Determine Gross Margin

Solution :

$$\begin{aligned}\text{Gross Profit Margin Ratio} &= \frac{\text{Gross Profit}}{\text{Sales}} \\ &= \frac{(\text{Sales} - \text{Cost of goods sold})}{\text{Sales}} \\ &= \frac{\text{Rs. } (10,00,000 - 4,00,000)}{\text{Rs. } 10,00,000} \\ &= \frac{\text{Rs. } 6,00,000}{\text{Rs. } 10,00,000} = 0.6 \text{ or } 60\%\end{aligned}$$

The gross profit margin reflects the efficiency level of the business. A higher gross margin relative to the industry average implies a lower cost of goods sold to sales ratio thereby indicating cost-efficiency in business. In the above example, gross margin of 60% means that cost of goods sold to sales is 40% (i.e., 100 – 60) and such lower cost is a sign of good management. On the other hand, a low gross margin reflects higher percentage of cost of goods sold which may be attributed to the firm's inability to purchase raw-materials or tradeable commodities at favourable terms, inefficient utilization of plant and machinery or over-investment in plant and machinery in case of

manufacturing business. The gross margin ratio may also be lower because of a fall in market prices or reduction in selling prices by the firm in order to increase the sales volume, cost of goods sold remaining unchanged. Thus, the trend of gross profit margin over a 3 to 5 year period (or more) also reveals the trend of cost line and enables the management to detect the causes of a falling gross margin and initiate action to improve the situation.

The management may improve the gross margin ratio either by : (a) raising the selling prices, cost of goods sold remaining constant (but this technique may be used only after a thorough analysis of the prevailing market conditions so that such an action does not result into a loss of market share and hence threaten the firm's survival in the future); or by (b) lowering the cost of goods sold by applying cost control techniques and keeping the sale prices constant; or by (c) increasing sale prices and reducing costs at the same time thereby widening the margin; or by (d) increasing the proportion of higher margin items (i.e., high valued items) in sales.

(ii) Contribution Margin Ratio :

An alternative to gross margin ratio is measuring profitability in terms of

$$\text{Contribution Margin} = \frac{\text{Contribution}}{\text{Sales}}$$

where contribution = (Sales – Variable Costs)

This ratio, also known as *profit – volume ratio* (i.e. *P/V ratio*) cannot be computed directly from a firm's financial statements unless the fixed and variable components of a firm's expenses are provided in such statements. However, the trend of contribution margin over a few years reveals the trend in those costs (i.e., variable costs) which vary with output and are controllable by management.

(iii) Net Profit Margin Ratio :

This ratio gives an overall measure of the firm's ability to turn each rupee of sales into a profit margin inclusive of non-operating income but net of all expenses (operating and non-operating expenses, interest and taxes). The ratio is calculated as follows :—

$$\text{Net Profit Margin} = \frac{\text{Net Income or Profit After Tax (PAT)}}{\text{Sales}}$$

Here again sales refer to net sales i.e., gross sales less return inward.

Example (2) :

Let Net Sales	= Rs. 10,00,000
Cost of goods sold	= Rs. 4,00,000
Salaries	= Rs. 1,20,000

General expenses	= Rs. 50,000
Selling expenses	= Rs. 2,00,000
Interest on loans & debentures	= Rs. 90,000
Interest earned on investments	= Rs. 10,000
Brokerage & Commission paid on transaction of securities	= Rs. 30,000
Provision for Taxes	= Rs. 20,000
Calculate Net Profit Margin.	

Solution :

Calculation of Net Income or Profit After Tax (PAT)

Net Sales	= Rs. 10,00,000
Less : Cost of goods sold	= Rs. 4,00,000
	<u>Rs. 6,00,000</u>
Gross Profit	
Less : Operating Expenses :	
Salaries = Rs. 1,20,000	
General expenses = Rs. 80,000	
Selling expenses = <u>Rs. 2,00,000</u>	= <u>Rs. 4,00,000</u>
Operating Profit	= <u>Rs. 2,00,000</u>
Add : Non-operating Income :	
Interest earned on investments	= <u>Rs. 10,000</u>
	<u>Rs. 2,10,000</u>
Less : Non-operating Expenses :	
Brokerage & Commission paid on transaction of securities	= <u>Rs. 30,000</u>
EBIT	= <u>Rs. 1,80,000</u>
Less : Interest on loans and debentures	= <u>Rs. 90,000</u>
Profit before tax (PBT)	= <u>Rs. 90,000</u>
Less : Provision for tax	= <u>Rs. 20,000</u>
∴ Net Income or Profit After Tax (PAT)	= <u>Rs. 70,000</u>

$$\therefore \text{Net Profit Margin} = \frac{\text{PAT}}{\text{Sales}} = \frac{\text{Rs. 70,000}}{\text{Rs. 10,00,000}} = 0.07 \text{ or } 7\%$$

This ratio gives an indication of the management's efficiency in supervising manufacturing, merchandising, administering and selling activities. Moreover, the ratio

indicates the firm's capacity to withstand adverse economic conditions. As for example, a firm with a high net profit margin would be in an advantageous position to survive in the event of falling sale prices, rising costs of production/purchase or declining demand for the product. It would be difficult for a low net profit margin firm to withstand these diversities. Also, a firm with a high net profit margin can make better use of favourable conditions, such as rising sale prices, falling costs of production/purchase or increasing demand for the product, and accelerate its profits at a faster rate than a firm with a low net profit margin.

An analyst should, however, evaluate both the ratios – gross and net profit margin— jointly in order to interpret the firm's profitability more meaningfully. As the difference between gross profit margin and net profit margin reveals the expense burden on the management, a high gross margin may turn into a low net margin because of heavy expense burden. If we examine the above examples (1) and (2) together (assuming that the data in both the examples pertain to the same company as the basic data of sales and cost of goods sold are the same, we will find that the gross profit margin of 60% turns into a net profit margin of only 7% because of a very high expense burden (inclusive of non-operating income and expense) of 53% [i.e., $(60-7)\%$]. Thus, if gross profit margin increases over the years but net profit margin either remains constant or declines or increases not as fast as gross margin, then it implies that the operating expenses relative to sales, besides non-operating income and expenses, have been increasing during the same period. This further necessitates analysis of operating margin ratio and operating ratio so that the increasing operating expenses could be identified and controlled. On the other hand, if the gap between gross and net profit margin narrows down over the years, then it implies that the expense burden is showing a declining trend. Again, if gross profit margin declines due to fall in sale prices or rise in cost of production/purchase, net profit margin is also expected to decrease as a result unless operating expenses decrease significantly. The above discussion, therefore, suggests that both gross and net profit margin ratios should be studied together and each item of expense should be thoroughly investigated with the help of operating margin and operating ratios (as have been discussed next) to find out the causes of decline in any or both the gross and net margin ratios.

(iv) *Operating Margin/Operating Profit Ratio :*

One limitation of the net profit margin is that the ratio is affected by the firm's financing policy. Since interest on borrowings is tax deductible, a firm which pays more interest pays less taxes. This *interest tax shield* i.e., the amount of tax saved on account of payment of interest is determined by the extent of debt – financing by the firm. The interest expenses, in turn, influence the profit after tax (PAT) figure (which excludes such expenses) used in the computation of net profit margin. Thus, comparing the

operating performance of two firms with different debt – equity ratios on the basis of net profit margin may provide a misleading picture. So, for an effective evaluation of the operating performance of a firm, the effect of financial leverage must be ignored i.e., the profit measure should exclude interest and tax expenses. The ratio which suits this purpose is—

$$\text{Operating margin} = \frac{\text{Operating Profit}}{\text{Sales}}$$

This ratio, therefore, provides information about a firm's profitability from the operations of its core business excluding the effects of—

- Non-operating income (i.e., income from investments, affiliates or asset sales etc.);
- Non-operating expenses (i.e., brokerage/commission on transaction of securities, loss on asset sales etc.);
- Interest on debt, and
- Tax expenses.

Example (3) :

Refer to example (2). Determine Operating Margin.

Solution :

With reference to example (2),

Operating Profit = Rs. 2,00,000

Net Sales = Rs. 10,00,000

$$\begin{aligned} \therefore \text{Operating Margin} &= \frac{\text{Operating Profit}}{\text{Sales}} \\ &= \frac{\text{Rs. 2,00,000}}{\text{Rs. 10,00,000}} \\ &= 0.2 \text{ i.e., } 20\% \end{aligned}$$

A comparison of operating margin over a few years reveals its trend and necessitates the analysis of operating ratios (which have been discussed next) i.e., element-wise analysis of operating expenses so that the causes of a declining trend in operating margin could be identified. The comparison of operating margin with gross margin might also explain why a high gross margin ultimately results into a low net profit margin for the firm.

(v) Operating Ratio :

Also known as *operating expense ratio*, this ratio indicates the proportion of sales that is consumed by cost of goods sold and other operating expenses of the firm and hence

reveals the proportion that is left together with non-operating income to cover non-operating expenses, interest, taxes and earnings to owners. The ratio is calculated as follows—

$$\text{Operating Ratio} = \frac{\text{Operating Expenses}}{\text{Sales}}$$

where operating expenses are the sum total of cost of goods sold, general and administrative expenses and selling and distribution expenses of the firm.

Example (4) : Refer to example (2). Determine Operating Ratio.

Solution : In example (2),

Net Sales = Rs. 10,00,000

Cost of goods Sold = Rs. 4,00,000

Salaries = Rs. 1,20,000

General expenses = Rs. 80,000

Selling expenses = Rs. 2,00,000

$$\begin{aligned}\therefore \text{Operating Expenses} &= \text{Cost of goods sold} + \text{General and administrative expenses} \\ &\quad (\text{i.e., salaries and general expenses}) + \text{Selling expenses} \\ &= \text{Rs. 4,00,000} + \text{Rs. 1,20,000} + \text{Rs. 80,000} + \text{Rs. 2,00,000} \\ &= \text{Rs. 8,00,000}\end{aligned}$$

$$\begin{aligned}\therefore \text{Operating Ratio} &= \frac{\text{Operating Expenses}}{\text{Sales}} \\ &= \frac{\text{Rs. 8,00,000}}{\text{Rs. 10,00,000}} \\ &= 0.8 \text{ i.e., } 80\%\end{aligned}$$

A higher operating ratio is unfavourable because it leaves a small amount of operating profit to meet non-operating expenses, interest, dividend etc. [since (100 – Operating Ratio) = Operating Margin or vice-versa]. In the above example, operating ratio is 80% which means that operating margin is 20% (i.e., 100-80) as indicated by example (3) before. Such a high operating ratio probably explains why both operating margin and net profit margin are as low as 20% and 7% respectively as indicated by examples (3) and (2) before although gross margin is 60%.

Trend in operating ratios over the years reveals the operating efficiency of the firm and helps to identify those factors that are responsible for variations in the ratio. The year-to-year variations in the operating ratio may occur due to :

- *external uncontrollable factors* like change in sale prices caused by market forces or change in the demand for the product thereby affecting the spending on commercial

operations of the business, rise in price level thereby enhancing the expenditure at the same operational level etc. or

● *internal factors* like change in administrative or selling expenses lying within managerial discretion due to changes in the management policy, changes in managerial efficiency and efficiency of the employees etc.

The trend in operating expense ratio indicates the variations in aggregate operating expenses over time. But it may so happen that some type of operating expenses are increasing while others are falling during the same period. So, in order to know the behaviour of specific expense items, the operating ratio needs to be decomposed into individual operating expense to sales ratio. Thus, operating ratio is usually broken down into two – *cost of goods sold to sales ratio* and *other operating expense to sales ratio*. Other operating expense ratio may further be analysed into *administrative expense to sales ratio* and *selling and distribution expense to sales ratio*. With reference to example (4) above, operating ratio of 80% can be analysed into :

$$\begin{aligned} \text{(a) Cost of goods sold ratio} &= \frac{\text{Cost of goods sold}}{\text{Sales}} \\ &= \frac{\text{Rs. 4,00,000}}{\text{Rs. 10,00,000}} \\ &= 0.4 \text{ i.e. } 40\% \\ \text{(b) Other operating expense ratio} &= \frac{\text{Other operating expenses}}{\text{Sales}} \\ &= \frac{\text{Rs. 4,00,000}}{\text{Rs. 10,00,000}} \\ &= 0.4 \text{ i.e., } 40\% \end{aligned}$$

where other operating expenses include general and administrative expenses and selling and distribution expenses.

Other operating expense ratio can be further decomposed into :

$$\begin{aligned} \text{(1) Administrative expense ratio} &= \frac{\text{General \& administrative expenses}}{\text{Sales}} \\ &= \frac{\text{Rs. (1,20,000 + 80,000)}}{\text{Rs. 10,00,000}} \\ &= 0.2 \text{ i.e., } 20\% \\ \text{(2) Selling and Distribution expense ratio} &= \frac{\text{Selling \& Distribution expenses}}{\text{Sales}} \end{aligned}$$

$$\begin{aligned}
 &= \frac{\text{Rs. 2,00,000}}{\text{Rs. 10,00,000}} \\
 &= 0.2 \text{ i.e., } 20\%
 \end{aligned}$$

Thus, cost of goods sold ratio, administrative expense ratio and selling and distribution expense ratio together constitute operating ratio.

A comparison of the above ratios of a firm on a year-to-year basis shall throw light on managerial policies and programmes. As for example, the increasing selling expenses, without a sufficient increase in sales, imply either uncontrolled sales promotional expenditure or inefficiency of the marketing department or general rise in selling expenses or introduction of better substitutes by the competitors. The expenses ratios of a firm should also be compared with the ratios of other similar firms or with industry average. This will reveal whether the firm is paying higher or lower salaries to its employees as compared to other firms; whether its capacity utilization is high or low; whether the salesmen are given enough commission; whether it is unnecessarily spending on advertisement and other sales promotional activities and so on.

(vi) *Margin Before Interest and Tax Ratio :*

The profitability ratio that is independent of both the firm's financing and tax position but which considers non-operating income and expenses is—

$$\text{Margin Before Interest \& Tax} = \frac{\text{EBIT}}{\text{Sales}}$$

This ratio indicates the proportion of sale revenue that is available for meeting tax liability and giving returns to all kinds of investors (i.e., lenders, debt holders, preference shareholders as well as owners).

(vii) *Pretax Margin Ratio :*

This ratio is calculated after debt financing costs (i.e., interest expenses) but prior to taxes as follows—

$$\text{Pretax Margin} = \frac{\text{Profit Before Tax (PBT)}}{\text{Sales}}$$

This ratio reveals the proportion of sales that may be claimed by preference and equity shareholders after meeting tax expenses.

(2) *Measuring profitability in relation to a firm's investment*

Although sales give rise to profit, the investments made to generate the same should also be taken into consideration while making an assessment of the profitability of a firm. That is, various parameters of profit may be expressed as a percentage of the relevant investment base in order to indicate the efficiency of capital employment by the firm.

Accordingly, *return on investment (ROI)* ratios have been formed to measure the relationship between a firm's profits and its investments. Diverse measures of a firm's periodic profits and investments have resulted into the following three main variants of ROI ratios.

(i) ***Return on Assets (ROA) or Return on Total Assets (ROTA) :***

This measure of ROI compares net income with total assets (which is equivalent to total of liabilities and equity). Since total assets represent the total pool of funds circulating in the business in the form of equity, debt capital and current obligations while net income or PAT denotes return to stockholders alone, it is conceptually unsound to use PAT in the numerator for calculating ROA. Thus, to make a proper match of the numerator with the denominator in calculating ROA and also to focus on operational (i.e., business) efficiency, as distinct from financial efficiency, the net income figure should be so adjusted that it includes income tax expenses but excludes interest charges and dividend. ROA may, therefore, be calculated as follows :—

$$\begin{aligned} \text{ROA or ROTA} &= \frac{\text{Earnings after tax but before interests \& dividend}}{\text{Average Total Assets}} \\ &= \frac{\text{Net Income} + \text{After Tax Interest Cost}}{\text{Average Total Assets}} \end{aligned} \quad \text{..... (1a)}$$

Since interest is tax – deductible, post-tax profit i.e., net income used in the numerator of ROA should be adjusted by adding back net-of-tax interest payments [i.e., $I(1-t)$ where I = interest payment and t = tax rate] to arrive at net income prior to cost of financing measure. Alternatively, the same figure can be derived by adjusting earnings before interest and taxes (EBIT) for the effect of taxes as follows—

$$\text{ROA} = \frac{\text{EBIT} (1 - t)}{\text{Average Total Assets}} \quad (\text{where } t = \text{tax rate}) \quad \text{..... (1b)}$$

Again, as the numerator of the ratio represents a *flow* over the entire period while the denominator reflects the *stock* of assets at a given point in time, it is better to measure total assets as the average balance outstanding—

$$\text{i.e., } \frac{\text{Total assets as per opening balance sheet} + \text{Total assets as per closing balance sheet}}{2}$$

during the period examined. However, if significant asset changes occur during the period, weighted average of the assets' balances may be used with the weights being the number of months any particular asset has been outstanding during the period.

It may be noted that the exclusion of financing charges in the computation of ROA facilitates, among other things, more appropriate inter-firm comparisons because

differences among firms in their capital structure (i.e., debt – equity proportions), reflected in different interest charges, are unlikely to affect the ratio.

ROA can also be computed on a pre-tax basis by using EBIT as the return measure in the following manner—

$$\text{ROA} = \frac{\text{EBIT}}{\text{Average Total Assets}} \quad \dots\dots (2)$$

This measure of ROA is unaffected by differences in a firm's tax position as well as financial policy.

ROA acts as an indicator of the management's ability and efficiency in using the firm's assets to generate profits. A comparison of the firm's ROA with the industry average reveals the average profitability of the firm's assets in relation to the industry. The trend in ROA over the years indicates the increase in efficiency, or otherwise, in the utilization of the firm's assets during the same period.

The ROA ratio can also be disaggregated as follows :—

$$\begin{aligned} \text{ROA} &= \frac{\text{Return}}{\text{Total Assets}} \\ &= \frac{\text{Return}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \\ &= (\text{Margin on Sales}) \times (\text{Total Asset Turnover}) \quad \dots\dots (3) \end{aligned}$$

This suggests that the ROA measure is a combination of two kinds of ratios – a *profitability* ratio (i.e., margin or sales) and an *activity* ratio (i.e, total asset turnover) – and hence can be improved by enhancing either of the two ratios. Thus, a low ROA can result from low turnover indicating poor asset management or low profit margins or a combination of both the factors or when lower turnover more than offsets the increase in profitability or vice-versa.

(ii) **Return on Capital Employed (ROCE) or Return on Net Assets (RONA) :**

Also known as return on total capital (ROTC), this ratio measures the firm's return by using net assets i.e., capital employed as the base. Net assets equal net fixed assets (i.e., fixed assets net of depreciation) plus current assets minus current liabilities and are the same as capital employed which is equal to net worth plus total debt. Net worth or total shareholders' funds or equity includes equity capital plus preference capital plus reserves and surplus minus miscellaneous expenditure while total debt includes both short (other than current obligations) and long term debt. Return is measured in this ratio on after-tax basis either by adding back net-of-tax interest payments to net income or by adjusting EBIT for the effect of taxes as in case of ROA. Thus,

$$\text{ROCE} = \frac{\text{Net Income} + \text{After Tax Interest Expense}}{\text{Average Capital Employed}} \quad \dots\dots\dots (4a)$$

$$\text{Or ROCE} = \frac{\text{EBIT} (1 - t)}{\text{Average Capital Employed}} \quad \dots\dots\dots (4b)$$

As return is a flow concept while capital employed is a stock concept, opening and ending balances of capital employed are averaged while computing ROCE.

Since taxes are not controllable by the firm's management and as firm's opportunities for availing tax incentives differ, it may be more prudent to measure ROCE on pre-tax basis by using EBIT in the numerator as follows:

$$\text{ROCE} = \frac{\text{EBIT}}{\text{Average Capital Employed}} \quad \dots\dots\dots (5)$$

ROCE measures profitability relative to all (non-trade) capital providers. That is, the ratio gives a measure of the total return accruing to all providers of capital (debt and equity), independent of the source of capital and hence indicates the management's efficiency in using the capital committed by both the stockholders and lenders. Thus, a comparison of the firm's ROCE with the industry average or trend in the firm's ROCE over the years reveals the relative efficiency or inefficiency in utilisation of capital employed in the business.

(iii) Return on Equity (ROE) or Return on Net Worth (RONW) :

The lenders and stockholders provide capital needed by the firm to acquire the assets which are to be used in the business and in exchange, they receive their share of the firm's profits. ROA and ROCE, as discussed earlier, give the measure of such returns. But ROE measures profitability of the capital supplied by the firm's stockholders alone. Since the stockholders are entitled to residual profit, a part of which is distributed as dividend while the remaining part is retained in the business, the ratio uses net income (after interest and taxes) in the numerator. In the denominator, average (on the same ground as has been explained in case of ROA and ROCE calculations) of the opening and closing end balances of net worth or equity (i.e., equity and preference capital + reserves and surplus – miscellaneous expenditure) is used as follows—

$$\text{ROE} = \frac{\text{Income}}{\text{Average Stockholders' Equity}} \quad \dots\dots\dots (6)$$

If the firm has preferred stock, ROE may also be so calculated as to focus on the return accruing to the owners of the firm i.e., common or ordinary shareholders as follows—

$$\text{ROE} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Common Equity (which excludes preferred stock)}} \quad \dots\dots\dots (7)$$

Thus, ROE indicates how well the firm has used the resources of its owners by earning a satisfactory return on their investment. Since maximisation of shareholders' wealth is the ultimate objective of the firm, this ratio is of great interest to both present and prospective shareholders and also of great concern to management as it reveals the extent to which the objective of the firm has been accomplished. A comparison of the firm's ROE over the years or with industry average indicates the relative performance and hence the strength of the firm in attracting future investments.

Like ROA, ROE can be disaggregated as follows—

$$\begin{aligned}\text{ROE} &= \frac{\text{Return}}{\text{Equity}} \\ &= \frac{\text{Return}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Equity}} \\ &= (\text{Margin on Sales}) \times (\text{Asset Turnover}) \times (\text{Capital Structure/Financial Leverage})\end{aligned}$$

Thus, ROE is a combination of three kinds of ratios – a profitability ratio (i.e., margin on sales), an *activity* ratio (i.e., asset turnover) and a *solvency* ratio (i.e., financial leverage). The analysis of the components of ROE, commonly known as the *dupont model*, enables the analyst to determine the contribution of each factor to the change in ROE. The ratio can, therefore, be improved by improving – (a) margin on sales ratio either by increasing selling prices (which is not always possible in a competitive market) or by reducing and controlling costs; or (b) asset turnover ratio either by increasing sales volume or by raising the productivity of capital invested in assets through their optimum utilization; or (c) financial leverage ratio by enhancing the extent of internal (i.e., equity) financing of assets; or (d) a combination of the above.

Besides the above two categories of profitability ratios, there are some *other profitability ratios* which are not only used in evaluating the profitability of business operations but are also used extensively in securities valuation. Such ratios are as follows—

(i) **Earnings Per Share (EPS) :**

EPS is critical to financial analysis and is probably the most widely available and commonly used corporate performance statistic for publicly traded firms in practical investment analysis. The EPS measure shows the profitability of the firm on a per-share (equity) basis. This amount of earnings allocated to one share of common (i.e., equity) stock includes both dividend distribution and retention per share. Unlike other ratios, EPS calculation is mandated by Accounting Standard – 20 (AS-20) with effect from (w.e.f.) 1.4.2001 for companies whose equity shares or potential equity shares are listed on a recognized stock exchange in India. An unlisted Indian company is also required to follow AS-20 if it decides to disclose EPS in its financial statements. However, AS-20 is predominantly based upon IAS – 33 issued in February, 1997 to govern EPS reporting under international accounting standards.

As per both IAS-33 and AS-20, two different measures of EPS – *Basic EPS* and *Diluted EPS* – should be calculated and disclosed on the face of the profit and loss statement. Basic EPS is calculated as follows—

$$\begin{aligned}\text{Basic EPS} &= \frac{\text{Earnings available for equity shareholders}}{\text{Weighted average number of equity shares outstanding during the period}} \\ &= \frac{\text{Net Income (i.e. PAT) – Preferred Dividend (if any)}}{\text{Weighted average number of equity shares Outstanding during the period}}\end{aligned}$$

The numerator in the above ratio denotes earnings available for distribution to common shareholders and hence preferred stock dividend, whether declared or cumulative, must be deducted from profit after tax (PAT). Since the number of equity shares outstanding at any point of time during the period under consideration may vary from those that were outstanding at the beginning of the period due to issue of equity shares (either as bonus issue or rights issue or as public issue) or buyback of shares, a time weighting factor is used to calculate the denominator of the above ratio. That is, the number of equity shares outstanding is multiplied by the proportion of the number of days/months for which the specific shares have remained outstanding out of the total in the period in order to determine weighted average number of shares.

However, the presence of convertible securities (i.e., convertible bonds or convertible preference shares) or options and warrants in the capital structure of a firm may result in dilution (lowering) of EPS as calculated above upon conversion of such securities into equity shares. Since such conversion is likely to increase the number of shares outstanding without a proportionate increase in income attributable to equity shareholders, the potential dilution of EPS may be measured as follows—

$$\text{Diluted EPS} = \frac{\text{Adjusted earnings available for equity shareholders}}{\text{Weighted average number of common and potential Common shares outstanding during the period}}$$

When convertible securities are converted into equity shares, interest and preferred dividend payments would no longer have to be made to those security holders and hence the income available for distribution to common shareholders will increase by the amount of dividend on convertible preference shares, after-tax interest on convertible debt and any other changes in expenses or income resulting from such conversion. However, no such adjustments to the numerator of Basic EPS are necessary in case of conversion of options/warrants into common shares. The denominator of Diluted EPS, in all the cases, shall be the sum of weighted average number of outstanding equity shares calculated for basic EPS and the weighted average number of equity shares (being

weighted in a similar manner) which would be issued on conversion of all the dilutive potential equity shares into equity shares.

Note that only the denominator of Diluted EPS is adjusted in case of options/warrants and hence the effect of their conversion into equity shares will always be dilutive. But for convertible securities, adjustments are made to both the numerator and denominator and hence the effect may not always be dilutive. Only when it is dilutive, the companies are required to disclose both Basic and Diluted EPS in their financial statements.

A comparison of the firm's EPS over the years reveals the change in the firm's earning power on per-share basis and hence indicates the improvement, or otherwise, in the well-being of common shareholders. But comparison of a firm's EPS with that of other firms or with industry average may be meaningless because two firms in the same industry may be identical in all economic respects (e.g. size, profitability, growth etc.) yet have a different number of shares outstanding (which has no economic meaning) thereby resulting into different measures of EPS.

(ii) Dividend Payout Ratio :

This ratio denotes the percentage of earnings that is distributed as dividends to equity shareholders and is calculated as follows—

$$\text{Dividend Payout Ratio} = \frac{\text{Amount of Dividend paid to Equity shareholders}}{\text{Net Income} - \text{Preferred dividend (if any)}}$$

Since earnings not distributed as dividends are retained in the business, *retention ratio* is (1 – payout ratio). Retention ratio multiplied by return on equity (ROE) [excluding preferred stock] gives the growth in owners' equity as a result of retention policy. Moreover, low dividend payout ratio indicates a growth firm as most of its earnings are retained to finance future expansion. On the other hand, more established and mature firms tend to have higher payout ratios.

(iii) Dividend yield and Earnings Yield :

These two ratios are measured as follows—

$$\text{Dividend Yield} = \frac{\text{Dividend per share (equity share)}}{\text{Market Value per share}}$$

$$\text{and Earnings Yield or Earnings – price (E/P) ratio} = \frac{\text{Earnings per Share}}{\text{Market Value per Share}}$$

Dividend per share in dividend yield is obtained by dividing the earnings distributed to common shareholders as dividend by the number of common shares outstanding (weighted in a similar manner as in case of Basic EPS). The market value per equity share in both the above ratios represents the quoted price at the stock exchange where the company's shares are traded.

The dividend yield and earnings yield evaluate the common shareholders' return in relation to the market value of the share and hence help the shareholders in their investment decision making.

(iv) **Price – Earnings (P/E) Ratio :**

The reciprocal of earnings yield is the P/E ratio. That is,

$$\text{Price-Earnings(P/E) Ratio} = \frac{\text{Market Value per Share}}{\text{Earnings per Share}}$$

The P/E ratio, thus, relates the firm's earnings to stock price in order to answer the question – how much is the investor paying for the firm's EPS.

Since stock prices, used in the calculation of P/E ratio, generally reflect the investors' expectations regarding future earnings of the firm, the P/E ratios of companies with prospects of a high earnings growth will be higher (other things remaining equal) than those of companies with lower growth prospects. Differences in P/E ratios for a given firm over time and/or across firms will therefore reflect differences in investors' expectations regarding the future earnings growth of the firm. Thus, as P/E ratio acts as an indicator of the future earnings prospects of the firm, as anticipated by the market, a declining trend in the firm's P/E ratios should be the cause of concern to the management.

(v) **Price – to – Book Value (P/B) Ratio :**

This ratio has recently attracted the attention of the security analysts worldwide. It is calculated as follows:

$$\text{Price – to – Book (P/B) Ratio} = \frac{\text{Market Value per Share}}{\text{Book Value per Share}}$$

The book value (also known as 'intrinsic value') per share is determined as the net worth or equity (excluding preferred stock) divided by the number of equity shares outstanding at the balance sheet date.

The book value per share is used as a benchmark against which market value is compared in the above ratio to determine how close market value is to book value. P/B ratio <1 indicates that as the actual returns earned by the common shareholders are lower than their expected returns, the company's shares are being traded at a price below the book value. On the contrary, when actual returns exceed expected returns of the shareholders, the firm's shares sell at a price above the book value thereby resulting into P/B ratio >1. Since management's objective is to meet the expectations of the shareholders, it is likely that firms with low P/B ratios shall have higher stock returns than firms with high P/B ratios subsequently. Thus, P/B ratio acts as a predictor of future stock returns.

(vi) **Tobin's Q Ratio :**

The ratio, developed by the Nobel prize-winning economist James Tobin, measures the relationship between the market value of the firm and its book value as follows :—

$$\text{Tobin's Q Ratio} = \frac{\text{Market Value of the Firm}}{\text{Book Value of the Firm on a replacement cost basis}}$$

This ratio differs from P/B ratio in two respects – first of all, both the numerator and the denominator of Tobin's Q ratio focus on total assets (i.e., equity and debt as denoted by the value of the firm) unlike P/B ratio which focuses only on equity excluding preferred stock; and secondly replacement cost of all the assets (i.e., the prices at which existing assets could be replaced by similar assets on the balance sheet date) is used in the denominator of Tobin's Q ratio whereas book value i.e., balance sheet value of equity measured on historical cost basis (i.e., based on past prices representing the actual cost of acquisition) is used in the denominator of P/B ratio.

Q values below 1 (i.e., market value being less than the replacement book value) indicates that the firm earns less than the required rate of return and such poor performers become prime targets for takeover or merger. Thus, investors would be willing to invest when Q is greater than 1 but would be reluctant when Q is equal to or less than 1.

The following illustration intends to make the student understand as to how different profitability ratios may be computed and compared with industry averages.

Illustration :

Problem (1) : Given the following Income Statement and Balance Sheet of Mercury Ltd.

Income Statement for the year ended 31.03.2004

Particulars	[Rs. in lakhs]	
	Amount (Rs.)	Amount (Rs.)
Net Sales		4,000
Less : Cost of Goods Sold		2,100
	Gross Profit	1,900
Less : Operating Expenses	500	
Other Expenses	200	
Interest Expenses	150	850
	Profit Before Tax (PBT)	1,050
Less : Provision for Tax (tax rate is 30%)		315
	Profit After Tax (PAT)	735
Less : Preference dividend	180	
Equity dividend	200	380
Profit retained in the business		
(Profit & Loss Appropriation Account balance)		355

Balance Sheet as at 31.03.2004

[Rs. in Lakhs]

Particulars	Amount (Rs.)	Amount (Rs.)
Assets :		
Fixed assets (net of depreciation)	4,500	
Current assets	3,095	
Other non-current assets	350	
Deferred Charges	55	
Total Assets :		<u>8,000</u>
Liabilities & Equity :		
Share Capital :		
25 lakhs equity shares of Rs.10 each (market price Rs.120 per share)	250	
10% 18 lakhs preference shares of Rs.100 each	<u>1,800</u>	2,050
Reserves & Surplus :		
Accumulated earnings	1,700	
Current profit	<u>355</u>	<u>2,055</u>
Total Shareholders' Funds		4,105
Long term debt	2,000	
Current liabilities & provisions	<u>1,895</u>	3,895
Total Liabilities & Capital		<u>8,000</u>

Additional Information :

- (a) Total Assets as at 31.3.2003 is (no deferred charges) = Rs. 7500 lakhs
- (b) Break-up of Liabilities and Equity as at 31.03.2003—
- | | |
|--|-------------------------|
| 30 lakhs equity shares of Rs. 10 each | = Rs. 300 lakhs |
| 10% 18 lakhs preference shares of Rs. 100 each | = Rs. 1800 lakhs |
| Reserves & Surplus | = Rs. <u>1750 lakhs</u> |
| Total Shareholders' Fund | = Rs. <u>3850 lakhs</u> |
| Long term debt | = Rs. 2000 lakhs |
- (c) Details of transactions in equity shares during the period 1.4.2003 to 31.3.2004
- 10 lakhs equity shares of Rs.10 each bought back on 30th June, 2003.
 - 5 lakhs equity shares of Rs.10 each issued as right shares on 1st March, 2004.

(d) Standard Ratios (industry averages)

ROA – 18%

ROE – (For common stockholders) – 20%

P/E ratio – 11.51

P/B ratio – 3.00

Determine the following ratios and analyse the profitability position of Mercury Ltd.—

- (i) Gross profit margin
- (ii) Net profit margin
- (iii) Operating margin
- (iv) Operating ratio
- (v) EBIT/Sales
- (vi) ROA
- (vii) ROCE
- (viii) RONW
- (ix) EPS
- (x) Dividend payout ratio
- (xi) P/E ratio
- (xii) P/B ratio

Solution : Computation of Profitability Ratios :

$$\begin{aligned} \text{(i) Gross profit margin} &= \frac{\text{Gross Profit}}{\text{Sales}} \\ &= \frac{(\text{Net Sales} - \text{Cost of goods sold})}{\text{Net Sales}} \\ &= \frac{\text{Rs. 1900 lakhs}}{\text{Rs. 4000 lakhs}} \\ &= 0.475 \text{ i.e., } 47.5\% \end{aligned}$$

$$\begin{aligned} \text{(ii) Net Profit Margin} &= \frac{\text{Net Income or Profit After Tax (PAT)}}{\text{Sales}} \\ &= \frac{\text{Rs. 735 lakhs}}{\text{Rs. 4000 lakhs}} \\ &= 0.1838 \text{ i.e., } 18.38\% \end{aligned}$$

$$\begin{aligned}
 \text{(iii) Operating margin} &= \frac{\text{Operating Profit}}{\text{Sales}} \\
 &= \frac{\text{Net Sales} - \left[\begin{array}{cc} \text{Cost of} & \text{Other} \\ \text{goods} & + \text{operating} \\ \text{sold} & \text{expenses} \end{array} \right]}{\text{Net Sales}} \\
 &= \frac{\text{Rs. [4000 - (2100 + 500)] lakhs}}{\text{Rs. 4000 lakhs}} \\
 &= 0.35 \text{ i.e., } 35\%
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv) Operating Ratio} &= \frac{\text{Operating Expenses}}{\text{Sales}} \\
 &= \frac{\text{Cost of goods sold + Other operating expenses}}{\text{Net Sales}} \\
 &= \frac{\text{Rs. (2100 + 500) lakhs}}{\text{Rs. 4000 lakhs}} \\
 &= 0.65 \text{ i.e., } 65\%
 \end{aligned}$$

The above operating ratio can be analysed into :

- **Cost of goods sold ratio**

$$\begin{aligned}
 &= \frac{\text{Cost of Goods Sold}}{\text{Net Sales}} \\
 &= \frac{\text{Rs. 2100 lakhs}}{\text{Rs. 4000 lakhs}} \\
 &= 0.525 \text{ i.e., } 52.5\%
 \end{aligned}$$
- **Other operating expenses ratio**

$$\begin{aligned}
 &= \frac{\text{Other operating expenses}}{\text{Net Sales}} \\
 &= \frac{\text{Rs. 500 lakhs}}{\text{Rs. 4000 lakhs}} \\
 &= 0.125 \text{ i.e., } 12.5\%
 \end{aligned}$$

$$\begin{aligned}
 \text{(v) EBIT/Sales} &= \frac{\text{Operating Profit - Non Operating Expenses + Non-Operating Income}}{\text{Net Sales}}
 \end{aligned}$$

$$= \frac{\text{Net Sales} - \left[\begin{array}{c} \text{Cost of} \\ \text{goods} \\ \text{Sold} \end{array} + \begin{array}{c} \text{Other} \\ \text{Operating} \\ \text{Expenses} \end{array} \right] - \text{Other Expenses}}{\text{Net Sales}}$$

$$= \frac{\text{Rs. [4000 - (2100 + 50) - 200] lakhs}}{\text{Rs. 4000 lakhs}}$$

$$= 0.3 \text{ i.e., } 30\%$$

(vi) Return on Assets(ROA)

$$= \frac{\text{Net Income} + \text{After Tax Interest Cost}}{\text{Average Total Assets}}$$

$$= \frac{\text{PAT} + \text{Interest (1 - Tax Rate)}}{(\text{Opening Assets} + \text{Closing Assets}) \div 2}$$

$$= \frac{\text{Rs. [735 + 150 (1 - 0.30)] lakhs}}{\text{Rs. [(7500 + 7945) \div 2] lakhs}}$$

$$= 0.1088 \text{ i.e., } 10.88\%$$

★ Total Assets excluding fictitious asset i.e., deferred charges are considered here.
Alternatively,

$$\begin{aligned} \text{ROA} &= \frac{\text{EBIT (1 - Tax Rate)}}{\text{Average Total Assets}} \\ &= \frac{\text{Rs. [1200 (1 - 0.30)] lakhs}}{\text{Rs. [(7500 + 7945) \div 2] lakhs}} \\ &= 0.1089 \text{ i.e., } 10.8\% \end{aligned}$$

$$\begin{aligned} \text{ROA (On a pre-tax basis)} &= \frac{\text{EBIT}}{\text{Average Total Assets}} \\ &= \frac{\text{Rs.1200 lakhs}}{\text{Rs. 7722.5 lakhs}} \\ &= 0.1554 \text{ i.e., } 15.54\% \end{aligned}$$

ROA (on pre-tax basis) can be disaggregated into :—

ROA= (Margin on Sales) x (Total Asset Turnover)

$$\begin{aligned} &= \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Total Assets}} \\ &= \frac{\text{Rs. 1200 lakhs}}{\text{Rs. 4000 lakhs}} \times \frac{\text{Rs. 4000 lakhs}}{\text{Rs. 7722.5 lakhs}} \end{aligned}$$

$$= (0.3) \times (0.5180) = 0.1554$$

$$\text{i.e., } (30\%) \times (51.80\%) = 15.54\%$$

$$\text{(vii) Return on Capital Employed (ROCE)} = \frac{\text{PAT} + \text{Interest} (1 - \text{Tax rate})}{\text{Average Capital Employed}}$$

$$\begin{aligned} \text{where Capital Employed} &= \text{Net Worth} + \text{Total Debt} \\ &= (\text{Equity Capital} + \text{Preference Capital} + \text{Reserves} \\ &\quad \text{\& Surplus} - \text{Deferred Charges}) + \text{Total Debt} \\ &= \text{Rs.}[(250+1800+2055 - 55) + 2000] \text{ lakhs} \\ &= \text{Rs.}6050 \text{ lakhs (Closing)} \end{aligned}$$

$$\text{Opening Capital Employed} = (\text{Shareholders' Fund} + \text{Long Term Debt}) \text{ as on } 31.3.2003$$

$$= \text{Rs. } [3850 + 2000] \text{ lakhs}$$

$$= \text{Rs.}5850 \text{ lakhs}$$

$$\therefore \text{Average Capital Employed} = \frac{\text{Opening Capital Employed} + \text{Closing Capital Employed}}{2}$$

$$= \frac{\text{Rs. } [5850 + 6050] \text{ lakhs}}{2}$$

$$= \text{Rs.}5950 \text{ lakhs}$$

$$\begin{aligned} \therefore \text{ROCE} &= \frac{\text{Rs. } [735 + 150 (1-0.30)] \text{ lakhs}}{\text{Rs. } 5950 \text{ lakhs}} \\ &= 0.1412 \text{ i.e., } 14.12\% \end{aligned}$$

Alternatively,

$$\begin{aligned} \text{ROCE} &= \frac{\text{EBIT} (1 - \text{Tax Rate})}{\text{Average Capital Employed}} \\ &= \frac{\text{Rs. } [1200 \times (1 - 0.30)] \text{ lakhs}}{\text{Rs. } 5950 \text{ lakhs}} \\ &= 0.1412 \text{ i.e., } 14.12\% \end{aligned}$$

$$\begin{aligned} \text{ROCE (on pre-tax basis)} &= \frac{\text{EBIT}}{\text{Average Capital Employed}} \\ &= \frac{\text{Rs. } 1200 \text{ lakhs}}{\text{Rs. } 5950 \text{ lakhs}} \\ &= 0.2017 \text{ i.e., } 20.17\% \end{aligned}$$

(viii) Return on Net Worth (RONW)

$$\text{or Return on Equity (ROE)} = \frac{\text{PAT}}{\text{Average Net Worth}}$$

$$\begin{aligned}\text{Closing Stockholders' Equity or Net Worth} &= \text{Rs.}[250 + 1800 + 2055 - 55] \text{ lakhs} \\ &= \text{Rs.}4050 \text{ lakhs}\end{aligned}$$

$$\text{Opening Stockholders' Equity} = \text{Rs.}3850 \text{ lakhs}$$

$$\begin{aligned}\therefore \text{Average Net Worth} &= \frac{\text{Opening Net Worth} + \text{Closing Net Worth}}{2} \\ &= \frac{\text{Rs. } [3850 + 4050] \text{ lakhs}}{2} \\ &= \text{Rs. } 3950 \text{ lakhs}\end{aligned}$$

$$\therefore \text{RONW} = \frac{\text{Rs. } 735 \text{ lakhs}}{\text{Rs. } 3950 \text{ lakhs}} = 0.1861 \text{ i.e., } 18.61\%$$

$$\begin{aligned}\text{RONW (from view point of common stockholders)} &= \frac{\text{PAT} - \text{Preferred Dividend}}{\text{Average Net Worth (excluding Preferred Stock)}} \\ &= \frac{\text{Rs. } [735 - 180] \text{ lakhs}}{\text{Rs. } 2150 \text{ lakhs}} \\ &= 0.2581 \text{ i.e., } 25.81\%\end{aligned}$$

Above RONW can be disaggregated into—

$$\text{RONW} = (\text{Margin on Sales}) \times (\text{Asset Turnover}) \times (\text{Financial Leverage})$$

$$\begin{aligned}&= \frac{\text{PAT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Total Assets}} \times \frac{\text{Average Total Assets}}{\text{Average Equity}} \\ &= \frac{\text{Rs. } 735 \text{ lakhs}}{\text{Rs. } 4000 \text{ lakhs}} \times \frac{\text{Rs. } 4000 \text{ lakhs}}{\text{Rs. } 7722.5 \text{ lakhs}} \times \frac{\text{Rs. } 7722.5 \text{ lakhs}}{\text{Rs. } 3950 \text{ lakhs}} \\ &= (0.1838) \times (0.5180) \times (1.9551) = 0.1861 \\ &= \text{i.e. } (18.38\%) \times (51.80\%) \times (195.51\%) = 18.61\%\end{aligned}$$

(ix) Since the capital structure of Mercury Ltd. does not contain any convertible securities and options and warrants, only Basic EPS needs to be calculated.

$$\begin{aligned}\text{Basic EPS} &= \frac{\text{Earnings available for equity shareholders}}{\text{Weighted Average Number of Equity Shares Outstanding during the period}} \\ &= \frac{\text{PAT} - \text{Preferred Dividend}}{\text{Weighted Average No. of Outstanding Equity Shares}}\end{aligned}$$

As per additional information (b) and (c) out of the total 30 lakhs equity shares as on opening date, 10 lakhs were bought back on 30.6.2003 (i.e. after 3 months) and 5 lakhs were issued as right shares on 1.3.2004 (i.e., the capital being employed for 1 month only during the period) thereby resulting into 25 lakhs equity shares as on closing date.

∴ Weighted average no. of outstanding equity shares

$$\begin{aligned}&= (20 \text{ lakhs} \times \frac{12 \text{ months}}{12 \text{ months}}) + (10 \text{ lakhs} \times \frac{3 \text{ months}}{12 \text{ months}}) + (5 \text{ lakhs} \times \frac{1 \text{ month}}{12 \text{ months}}) \\ &= 22.92 \text{ lakhs}\end{aligned}$$

$$\begin{aligned}\therefore \text{Basic EPS} &= \frac{\text{Rs. [735 - 180] lakhs}}{22.92 \text{ lakhs shares}} \\ &= \text{Rs. 24.21}\end{aligned}$$

$$\begin{aligned}\text{(x) Dividend Payout Ratio} &= \frac{\text{Equity Dividend}}{\text{PAT} - \text{Preferred Dividend}} \\ &= \frac{\text{Rs. 200 lakhs}}{\text{Rs. [735 - 180] lakhs}} \\ &= 0.3604 \text{ i.e. } 36.04\% \\ \text{(xi) Price-Earnings (P/E) Ratio} &= \frac{\text{Market Value per Share}}{\text{Earnings per Share}} \\ &= \frac{\text{Rs. 120}}{\text{Rs. 24.21 [as obtained from solution (ix)]}} \\ &= 4.96 \\ \text{(xii) Price-to-Book Value (P/B) ratio} &= \frac{\text{Market Value per Share}}{\text{Book Value per Share}} \\ &= \frac{\text{Net Worth} - \text{Preferred Stock}}{\text{No. of Equity Shares Outstanding on Balance Sheet Date}} \\ \text{where Book Value per share} &= \frac{\text{Rs. [4050 - 1800] lakhs}}{25 \text{ lakhs Shares}} \\ &= \text{Rs. 90.00}\end{aligned}$$

$$\therefore \text{P/B Ratio} = \frac{\text{Rs. 120}}{\text{Rs. 90}} = 1.33$$

Analysis of Profitability Position of Mercury Ltd :

On comparing the profitability ratios it may be inferred that although gross margin for the period 1.04.2003 – 31.3.2004 is 47.5%, operating margin is a low 35% because of high operating ratio of 65% to sales. Of the total operating expenses, cost of goods sold has consumed a greater proportion of sales (i.e. 52.5%) in comparison to other operating expenses (i.e., 12.5%). EBIT, however, has further reduced to 30% of sales due to the presence of non-operating expenses. But net margin is as low as 18.38% because a high amount of interest expenses and taxes have possibly eroded the 30% margin before interest and taxes.

ROA on a pre-tax basis is 15.54% for Mercury Ltd. and is below the industry average of 18% thereby signifying a lower than average assets' profitability for Mercury Ltd. The disaggregation of ROA suggests that a high asset turnover of 51.8% is more than offset by a low margin before interest and taxes (i.e., 30%). Thus, to enhance EBIT and hence ROA, Mercury Ltd. should make efforts to reduce and control costs. ROCE is 20.17% before tax and ROE is far more higher at 25.81%. ROE of Mercury Ltd. is also higher than the industry average. The lower ROA probably signals an early warning to the management that Mercury Ltd.'s profitability (including ROE) might deteriorate in near future unless steps are taken to improve ROA. Like ROA, the disaggregation of ROE suggests that as margin on sales is lower than asset turnover and financial leverage, Mercury Ltd. should control costs to enhance profit margin in the future. Mercury Ltd.'s basic EPS and dividend payout ratio do not appear satisfactory. A lower dividend payout ratio (i.e., 36.04%) implies that a major portion of the firm's earnings is retained in the business. Mercury Ltd.'s P/E ratio is significantly lower than the industry average. Since P/E multiple incorporates the market's expectations regarding a firm's future profitability, Mercury Ltd.'s lower than average P/E ratio indicates that the investors predicted a decrease in future earnings growth of the firm. Although Mercury Ltd.'s P/B ratio is slightly >1, it is lower than the industry average P/B multiple. This suggests that Mercury Ltd. is earning returns which exceed the expected returns of the shareholders and hence causes the company's shares to trade at a price higher than the book value. But a lower than the average P/B ratio indicates that the return is unsatisfactory when compared to industry average.

Thus, an overview of the profitability position of Mercury Ltd. (as analysed above) suggests that there is scope for further improvement in the company's performance in the future.

2.4 Concept of Economic Value Added

Maximisation of shareholders' wealth in terms of returns to the shareholders is the primary objective of a firm. But traditional accounting based measures of firm's performance focusing on shareholders' value creation fail to consider the cost of equity capital while arriving at the profits of the business that would cause the market prices of company's shares to soar and hence appreciate shareholder value. Profits actually accrue to the business only after the full cost of capital (i.e., debt and equity) invested in the business, like all other costs (operating and non-operating), has been covered by revenue. Traditional accounting based measures of profit take into account the costs of debt and preference capital (as interest expenses on debt and preferred dividends are deducted to arrive at accounting profit) but ignore the minimum expectations of the equity shareholders as regards the return on their investments. In order to overcome this limitation of accounting based measures of financial performance, Joel Stern, managing partner of M/S Stern Stewart & Company, USA pioneered the concept of Economic Value Added (EVA) as a measure of business performance in the 1980s. The concept of EVA has, however, made its entry into the Indian corporate environment in the year 1992.

Any surplus generated from operating activities over and above the cost of capital is termed as economic value added (EVA). Operationally,

$$\begin{aligned} \text{EVA} &= \text{NOPAT} - (\text{WACC} \times \text{TC}) \\ \text{where NOPAT} &= \text{Net Operating Profit After Tax i.e., Profits after depreciation and taxes but before interest costs} \\ &= \text{Net Income or PAT} + [\text{Interest expenses} \times (1 - \text{tax rate})] + [\text{Non-operating expenses} \times (1 - \text{tax rate})] - [\text{Non-operating income} \times (1 - \text{tax rate})] \pm \text{Stern - Stewart adjustments} \\ \text{WACC} &= \text{Weighted Average Cost of Capital (after tax)} \\ &= (K_d \cdot W_1) + (K_e \cdot W_2) + (K_p \cdot W_3) \\ \text{where } K_d &= \text{After tax cost of debt} \\ &= \frac{\text{Pre-tax debt interest} \times (1 - \text{tax rate})}{\text{Debt capital}} \\ K_e &= \text{Cost of equity capital under Capital Asset Pricing Model (CAPM)} \\ K_p &= \text{Cost of preference capital} \\ &= \frac{\text{Preferred dividend}}{\text{Preference capital}} \end{aligned}$$

and W_1 , W_2 , W_3 are the market value weights assigned to debt, equity and preference capital respectively.

TC = Total capital employed (taken as average of opening and closing book values).

Thus, $EVA = NOPAT - \text{Cost of capital employed in the business.}$

Note that cost of equity capital under CAPM is measured as the sum of risk-free rate of return (i.e., return on long term government bonds) and beta co-efficient (b) measuring market risk of security multiplied by the difference between market rate of return and risk-free rate.

Stern – Stewart adjustments made in computing NOPAT include those accounting adjustments that distort the economic profit figure significantly. Stern – Stewart has identified 164 such adjustments to GAAP based earnings, some of which involve capitalizing and amortizing research and development (R&D) costs charged as expenses under GAAP, adding back the difference between LIFO and FIFO inventory values if LIFO method is adopted to save taxes during inflationary period, capitalizing and amortizing operating leases and expenses incurred on employee training, and the like. The concept of ‘residual income’, which emerged in management accounting literature way back in 1960s, is almost similar to EVA excepting that it does not take into account the accounting adjustments identified by Stern – Stewart while computing EVA. Thus, it seems that EVA is a better performance metric and only time can confirm its dominance over traditional accounting measures of income.

To conclude this unit it may be said that the knowledge gained regarding the profitability analysis of a firm’s performance would help in the analysis of growth and sustainable earnings, which have been discussed in the next unit.

2.5 Select Readings

- Lev., B., *Financial Statement Analysis : A New Approach*, Prentice Hall, 2000.
 - Pandey, I.M., *Financial Management*, Vikas Publishing House Pvt. Ltd., 1999.
 - White, Sondhi & Fried, *The Analysis and Use of Financial Statements*, John Wiley & Sons, 2003.
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2.6 Questions

Long – Answer type :

(1) How would you compute gross margin, net margin, operating margin and operating ratio? Explain how these four ratios may be interrelated while assessing the profitability of a firm in relation to its sales?

(2) Explain the dupont model of disaggregation of return on equity (ROE). Also discuss the contribution of each component to the change in ROE over a period.

(3) Given the following Income Statement and Balance Sheet of Popcorn Ltd. Analyse its profitability position in the light of industry averages given below.

INCOME STATEMENT

Particulars	[Rs. in Lakhs]	
	Amount (Rs.)	Amount (Rs.)
Net Sales		1,600
Less : Cost of Goods Sold		500
	Gross Profit	1,100
Less : Operating Expenses	300	
Other Expenses	100	
Interest Expenses	100	500
	PBT	600
Less : Provision for tax (tax rate is 30%)		180
	PAT	420
Less : Preferred Dividend	120	
Equity Dividend	100	220
	Profit & Loss Appropriation Balance	200

BALANCE SHEET

Particulars	[Rs. in Lakhs]	
	Amount (Rs.)	Amount (Rs.)
Assets :		
Fixed Assets (net of depreciation)	5,500	
Current Assets	2,700	
Other Non-current Assets	1,100	
	Total Assets	9,300
Liabilities & Equity :		
Share Capital :		
30 lakhs Equity Shares of Rs.10 each (market price Rs.150 per share)	300	
10% 12 lakhs Preference Shares of Rs.100 each	1,200	1,500
Reserves & Surplus :		
Accumulated Earnings	3,700	
Current Profit	200	
		3,900

Total Shareholders' Fund		5,400
Long Term Debt	2,000	
Current Liabilities & Provisions	<u>1,900</u>	
		3,900
Total Liabilities & Capital		<u>9,300</u>

5 lakhs equity shares were bought back after 2 months and 10 lakhs bonus shares @ Rs.10 each were issued at the end of tenth month. Opening share capital consisted of 25 lakhs equity shares of Rs.10 each and 10% 12 lakhs preference shares of Rs.100 each.

Other Balances :

Opening total assets	=	Rs. 8000 lakhs
Opening reserves and surplus	=	Rs. 3800 lakhs
Opening long term debt	=	Rs. 2000 lakhs

Standard Ratios :

ROA	=	15%
ROE (for common stockholders)	=	8%
P/E ratio	=	8.12
P/B ratio	=	5.04
EPS	=	Rs. 35 per share

Short – Answer Type :

- (4) Explain briefly the concept of Economic Value Added (EVA).
- (5) Distinguish between P/B ratio and Tobin's Q Ratio.
- (6) When is diluted EPS computed? How would you compute the same in accordance with the provisions laid down in AS-3?

Objective Type :

- (7) Fill in the Blanks:
 - (a) Operating ratio can be decomposed into _____ and _____.
 - (b) _____ is the reciprocal of earnings yield.
 - (c) (1 – payout ratio) gives _____.
- (8) State whether the following are True/False:
 - (a) Operating ratio is the same as operating expense ratio.
 - (b) Operating profit and EBIT are the same when there are no non-operating income or expenses.
 - (c) EVA is the technical term used to define 'residual income'.

[Hints : (7) (a) cost of goods sold ratio and other operating expense ratio; (b) P/E ratio; (c) retention ratio.

(8)(a) True; (b) True; (c) False].

Unit-3 □ Analysis of Growth and Sustainable Earnings

Structure

- 3.1 Introduction**
- 3.2 Meaning of growth**
- 3.3 Meaning of sustainable earnings**
- 3.4 Analysis of changes in operations**
- 3.5 Concept of operating leverage**
- 3.6 Analysis of changes in financing of operations**
- 3.7 Analysis of growth in investments**
- 3.8 Select Reading**
- 3.9 Questions**

3.1 Introduction

The discussion on profitability analysis in the previous unit has laid down the foundation for the analysis of growth that is necessary to determine the viability of a company in the future. Just earning profit is not sufficient; a firm should be able to deliver growth to survive in today's competitive market. Analysts often talk of growth in terms of a firm's ability to grow accounting earnings. But, as highlighted while discussing the concept of economic value added in the last section of the previous unit, a firm can grow accounting earnings without adding shareholder value. So, the term 'growth' needs to be interpreted in terms of growth in shareholder value as measured by the growth in residual earnings and abnormal earnings. Thus, this unit lays out a detailed analysis of growth and other related concepts.

3.2 Meaning of Growth

The term "growth" is used with a variety of meanings. Sometimes it is used to mean growth in sales, sometimes growth in earnings and sometimes growth in assets. Viewed generally, growth represents an ability to generate value. In view of such ambiguity in defining growth, an attempt has been made in this section to give a concrete and clearer definition of the term 'growth' and hence of a 'growth firm' for which investors would be willing to pay more.

As emphasized in the previous section, earnings growth alone is not a good measure of growth because earnings growth can be created either by investments that do not add value as they fail to earn a return above the required return or by accounting methods that also do not add value. Charging accounting earnings for required earnings i.e., either required earnings on book value of equity stock (in case of which the difference shall be known as residual earnings) or required earnings on prior period's earnings (the difference in case of which shall be known as abnormal earnings), protects the investor from paying too much for earnings growth created by investments and accounting methods. Thus, growth needs to be redefined in terms of residual earnings growth and abnormal earnings growth and an attempt has been made in this regard in the paragraphs that follow.

Residual earnings may be defined as the difference between earnings and the required return on book value of common equity and can be expressed as follows :

$$\text{Residual Earnings} = [(ROE)_t - (\text{Required return on common equity i.e., cost of equity capital})_t] \times (\text{Book value of common equity})_{t-1}$$

where ROE = Return on equity (this has been explained in detail in previous unit)

The common shareholders invest in firms and the book value of their worth – invested, in turn, in the firm's assets – measures their investment. Firms use the assets in operations to add value for the shareholders. Residual earnings for a period 't' measure the value added to opening book value of common equity over that required to cover the cost of such capital employed during the period to earn profits. So, a sensible way of viewing growth that ties into value creation is in terms of growth in residual earnings. Thus, a growth firm would be one that has the ability to grow its residual earnings.

Before moving on to the concept of abnormal earnings, we need to understand the meaning of cum-dividend and ex-dividend earnings. Earnings on common equity investment may accrue from two sources – (i) earnings earned by the assets used in business operations and in which capital and profits retained in the prior period are tied up; and (ii) earnings earned by reinvesting dividends in other assets). The total earnings from an equity investment (including reinvestment of equity dividends) are referred to as cum-dividend earnings, while earnings on equity investment excluding reinvestment of dividends are termed as ex-dividend earnings. Whenever we talk of growth in terms of shareholder value creation, our focus is on cum-dividend earnings and not ex-dividend earnings. The cum-dividend earnings are expected to grow at least at a normal rate on the ground that prior period earnings, when reinvested in the business, must earn return at the required rate that is similar to the rate of return earned on investments in total assets. This leads us to the concept of normal earnings which mean the earnings that arise due to growth at the required rate. Thus, normal earnings for any period 't' can be expressed as follows :

$$\begin{aligned}(\text{Normal Earnings})_t &= (\text{Cum-dividend Earnings})_{t-1} + \text{ROA} \times (\text{Cum-dividend Earnings})_{t-1} \\ &= (1 + \text{ROA}) \times (\text{Cum Dividend Earnings})_{t-1}\end{aligned}$$

where ROA = Return on Total Assets (discussed in previous unit)

Abnormal earning is, therefore, the difference between current cum-dividend earnings and a charge for the prior period's earnings growing at the required rate (i.e., normal earnings for the current period). Notationally,

$$(\text{Abnormal Earnings})_t = (\text{Cum dividend earnings})_t - (\text{Normal Earnings})_t$$

Firms do not add shareholder value if they can grow earnings at the required rate of growth. They add value only if they can grow cum-dividend earnings at a rate greater than the required rate i.e., if they can deliver abnormal earnings growth. So another way of viewing growth that ties into shareholder value creation is in terms of the ability of a firm to deliver abnormal earnings growth.

It may be noted that the two measures of growth are just different ways of looking at the same thing. Abnormal earnings growth is equal to the change in residual earnings. If a firm has no growth in residual earnings, its abnormal earnings growth must be zero. The firm, in such a case, is referred to as a “no growth” firm. On the other hand, if a firm has residual earnings growth, it must also have abnormal earnings growth and such a firm is referred to as a “growth firm”. Thus, it may be said that abnormal earnings growth is driven by the same factors that determine residual earnings growth. Based on this consideration and also that residual earnings growth involves both balance sheet and income statement features thereby facilitating a better appreciation of the determinants of growth, we focus on growth in terms of growth in residual earnings in the remaining part of this unit.

Before uncovering the factors that may lead to growth in residual earnings, the issue that needs to be addressed is whether current earnings are a good indicator of future earnings or there are aspects of current earnings that are unlikely to be repeated in the future. This leads us to the concept of sustainable earnings which have been discussed next.

3.3 Meaning of Sustainable Earnings

Current earnings may not always be a good indicator of future earnings because it may have components caused by events that are unlikely to occur in the future. As for example, earnings temporarily depressed by a strike are not representative of future earnings. On the other hand, earnings that reflect a one-time special contract may be abnormally high. Again, earnings reduced by restructuring charges may not be a good

forecast of the future earnings that will likely benefit from the restructuring. Earnings, therefore, consist of two different components (a) non-repeating components i.e., earnings that are based on temporary factors and are technically known as unusual earnings or transitory earnings; and (b) components that are generated by repetitive business i.e., earnings that are indicative of a firm's long run earning ability and are technically called sustainable earnings or persistent earnings or core earnings or underlying earnings. Since sustainability of earnings affects forecasts of growth, it becomes necessary to distinguish sustainable earnings from transitory earnings after carefully going through the income statement, footnotes schedules and supplementary information to the statement, cash flow statement and management discussion and analysis section of the annual report of a company. Identifying core earnings is sometimes referred to as normalizing earnings because it establishes 'normal' ongoing earnings unaffected by one-time components.

It may also be noted that the unusual earnings category not only include items that won't be repeated in the future but also consider items that appear each period but can't be forecast. As for example, currency gains and losses or gains and losses from derivatives trading or gains that arise because of marking balance sheet items to market value etc. might appear as a normal feature of operations each period but may be difficult to predict and so such gains and losses need to be separated from core earnings while analysing the growth prospects of a firm. However, if the firm is in the business of currency trading or securities trading and attempts to exploit market inefficiencies or make money from its lower transaction costs, the above-mentioned gains and losses become part of sustainable earnings.

The income statement of a firm identifies some items as "extraordinary" which are of course unusual. Besides, unusual items may also appear above the extraordinary items section of the income statement. Although the list is not exhaustive, typical unusual items listed in the income statement may include the following :

- restructuring charges although recurring restructuring costs in normal circumstances are not excluded from underlying earnings;
- unrealized gains and losses on equity investments arising due to marking the holdings to market value in the balance sheet;
- research and development (R&D) expenditure when a temporary drop in R&D expenditure increases current earnings but may damage future earnings.
- advertising expenditure when its temporary reduction increases current earnings but may depress future earnings;
- changes in estimates of bad debts, warranty expenses, depreciation and accrued expenses as such changes are based on whether the previous year's estimates turn out to be correct or incorrect;

- profits and losses from asset sales which do not occur on a recurring basis;
- currency gains and losses (as have been explained before);
- gains and losses from derivatives trading and any other non-recurring items;

Thus, it may be said that total earnings minus unusual earnings (as listed above) give a measure of sustainable earnings.

If we recall the definition of residual earnings given in section 3.2, we will find that growth in residual earnings is driven by increases in return on equity (ROE) and growth in equity investment. ROE, in turn, is driven by operations and by the financing of the operations. So, the change in ROE is explained by changes in the profitability of operations and by changes in financing which have been discussed next.

3.4 Analysis of Changes in Operations

The changes in operating profitability, as indicated by return on net assets (RONA), may be analysed through the following three levels of investigation. It may be noted that the financial statement drive of changes in profitability are themselves driven by the business, so it is necessary to identify those aspects of the business that produce the changes in the financial statement drivers and influence RONA and hence ROE and residual earnings. To analyse changes in RONA, we may proceed as follows :

Level 1 : Distinguish Core and Unusual Components of RONA

As explained in section 3.3 before, total earnings of a firm comprise two components - core earnings and unusual earnings. Accordingly, changes in RONA are brought about by components of core income and by transitory income that applies to a particular period only. In order to determine the effect of each such component on RONA, we segregate RONA in the first step as follows :

RONA = Core RONA + Unusual items (UI) to Net Assets

$$= \frac{\text{Core Operating Income (Core OI)}}{\text{Net Assets}} + \frac{\text{UI}}{\text{Net Assets}}$$

It may be noted that non-operating income/expenses included in RONA measure are usually classified as unusual items. Core RONA can be further disintegrated by separating income from sales (i.e., reflecting gross margin) from other operating income (i.e., reflecting the difference between other operating earnings and general administrative, and selling and distribution expenses) as follows :

$$\text{RONA} = \frac{\text{Core OI from Sales}}{\text{Net Assets}} + \frac{\text{Core Other OI}}{\text{Net Assets}} + \frac{\text{UI}}{\text{Net Assets}}$$

To the extent RONA is driven by unusual, transitory items i.e., greater the proportion of 'unusual items to net assets', RONA is said to be of "low quality".

Level 2 : Analyse Changes in Components of RONA :

Having segregated RONA as above, the next step is to disaggregate core OI from 'sales to net assets' component into profit margin and turnover components in order to analyse the changes in individual components leading to changes in RONA. Thus,

$$\begin{aligned} &= \frac{\text{Core OI from Sales}}{\text{Net Assets}} = \frac{\text{Core OI from Sales}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Net Assets}} \\ &= \text{Core sales profit margin (PM)} \times \text{Asset turnover (ATO)} \end{aligned}$$

As a result,

$$\text{RONA} = (\text{Core sales PM} \times \text{ATO}) + \frac{\text{Core other OI}}{\text{Net Assets}} + \frac{\text{UI}}{\text{Net Assets}}$$

The 'core sales PM' uncovers a profit margin that is unaffected by unusual items, so it really gets to the core of the firm's ability to generate profits from sales.

With these distinctions, we can now explain the changes in RONA as follows :

$$\begin{aligned} \text{Change in RONA} = & \quad \text{Change in core sales PM at previous asset turnover level} & + & \quad \text{Change due to change in asset turnover} \\ & + \text{Change in core other OI to net assets} & + & \quad \text{Change in UI to net assets} \end{aligned}$$

$$\begin{aligned} \therefore \Delta \text{RONA}_t = & (\Delta \text{Core Sales PM}_t \times \text{ATO}_{t-1}) + (\text{Core Sales PM}_t \times \Delta \text{ATO}_t) \\ & + \Delta \left(\frac{\text{Core other OI}}{\text{Net Assets}} \right)_t + \Delta \left(\frac{\text{UI}}{\text{Net Assets}} \right)_t \end{aligned}$$

That is, to isolate the profit margin effect from the asset turnover effect on RONA, the first component of the change (denoted by D) in RONA at period 't' in the above equation reveals the effect due to change in core sales profit margin in period 't' holding asset turnover at previous period's (i.e., t-1) level. The second component in the above equation shows the effect due to changes in current period's asset turnover at current period's core sales profit margin. The third and fourth components are respectively the effects due to changes in core other operating income and unusual items. These component-wise analysis of changes in RONA help to identify the reasons for improvement or decline in RONA over a period through level 3 analysis.

Level 3 : Analyse Drivers of Changes in Components of RONA

The changes in core RONA can be explained by changes in the drivers of core sales profit margin and asset turnover. For instance, a decline in core RONA of a firm may be

because of both a decline in gross margin and an increase in other operating expenses. The decrease in asset turnover, reflecting unproductive assets, could be another cause of a declining core RONA. In contrast, a decrease in unusual items of expenses improves RONA.

It is worth mentioning that RONA forecasts should always be based upon core RONA for the current period rather than the overall RONA because unusual components of RONA are not permanent but transitory in nature.

In a like manner, the factors behind the deterioration of RONA can be identified and adequate steps may be taken to overcome the same and improve RONA in the near future.

3.5 Concept of Operating Leverage

Changes in core sales profit margin in DRONA equation are determined by how costs change as sales change. Some operating costs are fixed costs i.e., they don't change as sales change like depreciation, amortization and many administrative expenses. Other operating costs are variable costs as they change with the change in sales like material and labour costs in cost of goods sold. Thus, core sales profit margin in RONA equation can be rewritten as—

$$\begin{aligned}
 \text{Core Sales PM} &= \frac{\text{Sales} - \text{Variable Costs} - \text{Fixed Costs}}{\text{Sales}} \\
 &= \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} - \frac{\text{Fixed Costs}}{\text{Sales}} \\
 &= \frac{\text{Contribution Margin}}{\text{Sales}} - \frac{\text{Fixed Costs}}{\text{Sales}}
 \end{aligned}$$

The first component of core sales profit margin i.e., the contribution margin ratio denotes the amount contributed by business operations towards covering fixed costs and providing profits. It gives an indication of the change in income that might result from a change in one rupee of sales. As for example, the contribution margin ratio of 25% indicates that the firm adds Re.0.25 towards recovery of fixed costs and income for each Re.1 increase in sales. However, the fixed cost component in core sales PM do not explain changes in profit margins.

The importance of contribution margin ratio in core sales profit margin leads us to the concept of operating leverage, which measures the sensitivity of income to changes in sales. Technically, operating leverage may be defined as the ability of a firm to use its fixed operating costs so as to magnify the effects of changes in sales on its operating income. The degree of operating leverage (DOL) in the context of core sales profit margin can be measured as follows :

$$\text{DOL} = \frac{\% \text{ change in Core Operating Income from Sales}}{\% \text{ change in Core Sales}}$$

Alternatively, DOL is also measured by (although the following equation can be derived from the above).

$$\text{DOL} = \frac{\text{Core Contribution Margin}}{\text{Core Operating Income from Sales}}$$

Since contribution margin is equal to core sales minus variable operating costs (comprising components of cost of goods sold only) while core operating income is equal to core sales minus aggregate of variable and fixed operating costs of goods sold, DOL will always be greater than 1.

Thus, distinguishing fixed and variable components of operating costs is a pre-requisite to analysis of operating leverage.

3.6 Analysis of Changes in Financing of Operations

The changes in RONA partially explain the changes in ROE that drive the growth in residual earnings. The explanation can probably be completed by examining the financing of operations of the business. Like RONA analysis, changes in financing of business operations are analysed through three levels as follows :

Level 1 : Calculate Changes in Financial Leverage and Operating Spread

The difference between ROE and RONA is explained by financial leverage and operating spread because :

$$\text{Return on Equity} = \text{Return on Net Assets} + (\text{Financial Leverage} \times \text{Operating Spread})$$

i.e. $\text{ROE} = \text{RONA} + [\text{FLEV} \times (\text{RONA} - \text{NBC})]$

Financial leverage (FLEV) refers to the degree to which net assets are financed by net financial obligations (NFO) or by common shareholders' equity (CSE) and is measured as follows :

$$\text{FLEV} = \frac{\text{NFO}}{\text{CSE}}$$

Net financial obligations (NFO) is the difference between financial obligations and financial assets where financial obligations include long term and short term borrowings (like bank loans, bonds, bills payable etc.), lease obligations and preferred stock while financial assets include both short term and long term investments, bills receivable and cash equivalents. Common shareholders' equity (CSE) includes equity share capital plus reserves and surplus minus miscellaneous expenditure.

Financial leverage allows a firm to trade on equity. That is, to the extent net assets are financed by net financial obligations rather than equity, return on equity (ROE) can be increased without increasing return on net assets (RONA). This practice can be explained better with the help of operating spread as narrated below.

Operating spread is the difference between return on net assets (RONA) and the net borrowing costs (NBC). The net borrowing cost is the weighted average of the costs of different sources of net financing. Now, if a firm has zero financial leverage, the ROE equation described above says that ROE equals RONA. But if the firm has financial leverage, then its RONA will be “levered up” or “geared up” to yield a higher ROE provided that the firm earns a RONA greater than its net borrowing cost. However, if the operating spread is negative, then the leverage effect will be unfavourable. Thus, it may be said that financial leverage generates a higher return for the common shareholders if the firm earns more on its net assets than its borrowing cost, but financial leverage hurts the shareholders’ return if it doesn’t.

The change in ROE over a period ‘t’ can, thus, be explained in terms of changes in RONA, financial leverage and operating spread as follows :

Change in ROE = Change in RONA + Change in Operating

Spread at previous level of financial leverage + Change due to change in financial leverage

$$\therefore DROE_t = DRONA_t + (DSPREAD_t \times FLEV_{t-1}) + (DFLEV_t \times SPREAD_t)$$

where SPREAD is equivalent to operating spread.

As the change in RONA has already been explained in section 3.4 before, the changes in operating spread and financial leverage have been dealt with in level 2 and level 3 analysis respectively.

Level 2 : Explain Change in Net Borrowing Cost

If we recall the definition of operating spread given in level 1 analysis, we will find that the change in operating spread is driven by the change in RONA and the change in net borrowing cost. Since change in RONA has already been analysed, change in net borrowing cost is examined in this step. Like RONA, distinguish core financial expense and unusual financial expense components of net borrowing cost as follows :

Net Borrowing Cost = Core net borrowing Cost + Unusual borrowing Costs

$$\text{i.e. NBC} = \frac{\text{Core net Financial Expenses}}{\text{NFO}} + \frac{\text{Unusual Financial Expenses}}{\text{NFO}}$$

Unusual financial expenses are those that are not likely to be repeated in the future or are unpredictable like realized and unrealized gains and losses on financial items and unusual interest income or expenses. Core financial income or expense is the interest rate

at which the firm lends or borrows respectively. So changes in core borrowing cost will reflect changes in these rates and also the changes in tax rates as these interest rates are provided on after – tax basis.

Level 3 : Explain Change in Financial Leverage

In this step, the change in NFO/CSE (i.e., financial leverage) is calculated and is attributed to changes in different types of financing such as long term debt, short term debt and preferred stock changes.

It may be noted that as financial leverage typically does not change much between two periods, the change in operating spread is usually the more important aspect of the leverage effect. Similarly, change in borrowing costs is usually small and so the change in RONA becomes the main driver of the leverage effect and hence residual earnings in most circumstances. If, however, the change in leverage is not small, then the firms can create ROE by borrowing without any change in the profitability of their operations.

3.7 Analysis of Growth in Investments

A relook at the residual earnings formula given in section 3.2 would indicate that growth in residual earnings is not only driven by the growth in ROE but also by the growth in shareholders' equity. The factors driving the growth in ROE have already been explained in sections 3.4, 3.5 and 3.6 before. In this section, we focus on growth in equity investments.

The amount of equity investment required in a company is driven by the need to invest in net assets (NA). But to the extent debt i.e., net financial obligations (NFO) is used to finance net assets, the shareholders' investment i.e., common shareholders' equity (CSE) gets reduced. Thus, it may be said that :

$$DCSE = DNA - DNFO$$

$$\text{Since asset turnover (ATO)} = \frac{\text{Sales}}{\text{Net Assets (NA)}}$$

or $NA = \text{Sales} \times \frac{1}{ATO}$, the above equation can be written as:

$$DCSE = D \left[\text{Sales} \times \frac{1}{ATO} \right] - DNFO$$

Sales require investments in net assets and the inverse of asset turnover (i.e., $1/ATO$) indicates the amount of net assets in place to generate Re.1 of sales. The above equation thus suggests that the change in equity investment can be explained by three components :

- growth in sales;

- change in net assets that support each rupee of sales, and
- change in the amount of net financial obligations that is used to finance the change in net assets.

Accordingly,

Change in common shareholders' equity = Change in sales at previous level of asset turnover + Change due to change in asset turnover – Change in net financial obligations

$$\therefore DCSE_t = (D \text{ Sales}_t \times \frac{1}{ATO_{t-1}}) + (D \frac{1}{ATO_t} \times \text{Sales}_t) - DNFO_t$$

Sales growth is the primary driver of change in equity investment. But sales growth requires more investment in net assets which, in turn, is financed by either net financial obligations or equity. Thus, they together explain the changes in CSE.

To summarize, it may be said that sales are the engine of growth i.e., to create growth in order to create value, a manager grows sales. Sales require investments and investments earn through ROE and the factors that drive ROE. Together, increasing investments and ROE (through the RONA) drive residual earnings and abnormal earnings growth. Equity investments can easily be increased by issuing new shares or reducing dividends and increasing retained earnings. But the new equity might not be used wisely. It could be invested in projects with low RONA or financial assets with low returns thereby reducing ROE, residual earnings and value. That is why we focus on residual earnings and not just ROE or investments individually while analyzing growth. ROE and investments are used together in growth analysis. The company aims not only to increase investments but also to have a low investment per rupee of sales i.e., a high ATO, and a high return per rupee investment in net assets i.e., a high RONA. Thus, to maximise residual earnings, a company needs to minimise the investment per rupee of sales (1/ATO) and maximise the RONA and profit margin.

3.8 Select Readings

- Bernstein and Wild, *Analysis of Financial Statements*, Tata McGraw Hill, 2004.
- Helfert, E.A., *Techniques of Financial Analysis*, Tata McGraw Hill, 2004.
- Penman, S., *Financial Statement Analysis and Security Valuation*, McGraw Hill, 2004.

3.9 Questions

Long – Answer type :

- (1) What do we mean by “growth” of a firm? In analysing growth, should the analyst focus on growth in residual earnings or abnormal earnings or both? Explain.

(2) How would you analyse the changes in business operations to determine whether they drive the growth in residual earnings?

(3) What factors determine the growth in equity investments in a firm?

Short – Answer Type :

(4) Why should an analyst distinguish the part of earnings that is sustainable?

(5) What are transitory earnings? Give a few examples.

(6) How would you explain the difference between return on equity (ROE) and return on net assets (RONA) in terms of financial leverage and operating spread?

(7) “Return on equity and investments should be examined together in growth analysis” – Why?

Objective Type :

(8) Fill in the blanks:-

(a) A _____ has the ability to grow its residual earnings.

(b) The earnings on equity investments excluding reinvestment of dividends are termed as _____.

(c) The earnings that arise due to growth at the required rate are known as _____.

(d) If a firm has no growth in residual earnings, its abnormal earnings growth must be _____.

(e) Identifying the components of core earnings in total earnings is also referred to as _____.

(f) The sensitivity of income to changes in sales is measured by _____.

(g) Financial leverage allows a firm to _____.

(h) If a firm has zero financial leverage, then its _____ equals _____.

[Hints : (8) (a) growth firm; (b) ex-dividend earnings; (c) normal earnings; (d) zero; (e) normalizing earnings; (f) operating leverage. (g) trade on equity; (h) ROE, RONA]

Unit-4 □ Analysis of Liquidity and Solvency

Structure

- 4.1 Introduction
- 4.2 Measurement and analysis of liquidity using accounting ratios
- 4.3 Measurement and analysis of liquidity of inventory
- 4.4 Measurement and analysis of liquidity of debtors
- 4.5 Analysis of liquidity and distribution of current assets
- 4.6 Measurement and analysis of solvency using accounting ratios
- 4.7 Select Reading
- 4.8 Questions

4.1 Introduction

In this unit we will learn how accounting ratios can be used to measure and interpret the liquidity and solvency position of a firm. By *liquidity* we mean the availability of company's resources to meet its short-term obligations i.e., cash requirements. Thus, liquidity indicates the ability of a company to convert its short-term assets into cash or to obtain cash. A company's liquidity risk arises because of the unexpected differences in the timings and amounts of its cash inflows and outflows caused by changes in its prospects for future performance. Liquidity is a matter of degree. A firm should ensure that it neither suffers from lack of liquidity, nor it has excess liquidity. The failure of a company to meet its maturing obligations due to lack of sufficient liquidity signifies that the company is unable to take advantage of its profitable business opportunities. This, in turn, will result in poor creditworthiness, loss of creditors' confidence forced sale of investments and long-term assets, and even in legal battles ultimately leading to closure of the company. On the other hand, a very high degree of liquidity is also undesirable as it implies the existence of idle and unproductive assets which yield nothing. The company's funds, in such a case, will be unnecessarily tied up in short-term i.e., current assets. Thus, it is necessary to strike a proper balance between high liquidity and lack of liquidity.

While liquidity measures the short-term ability of a company to meet its dues, *solvency* refers to a company's long run financial viability i.e., its ability to cover long-term obligations. Analysing long-term solvency of a company is markedly different from analyzing short-term liquidity. In liquidity analysis, the time horizon is sufficiently short

and hence reasonably accurate forecasts of cash flows can be made. But solvency analysis is based on long-term forecasts which are less reliable because uncertainty grows as the forecasting period increases. As a result, solvency analysis uses less precise but more encompassing analytical measures. However, we refrain from discussing such analytical tools in this unit and concentrate solely on solvency analysis using accounting ratios. Since a company's solvency depends on the success in its operating, financing and investing activities, the ability of earnings to cover important and necessary company expenditures is examined in solvency analysis. Besides such earnings – coverage measures, solvency analysis also includes leverage or capital structure ratios which give an indication of a company's sources of financing and its economic attributes.

We start with examining the liquidity aspects of a firm with the help of accounting ratios in the following sections. The liquidity position of a firm can be viewed from two angles – either an overall analysis of the liquidity position of a company can be done or a component-wise liquidity analysis can be conducted. Thus, the remaining sections first deal with general liquidity analysis followed by discussions on specific liquidity analysis of inventory and debtors and then examine the solvency position of a company.

4.2 Measurement and analysis of liquidity using accounting ratios

The short-term financial strength of a company is commonly measured and analyzed on the basis of its working capital. The concept of working capital, in turn, is dependent on the classification of assets and liabilities into 'current' and 'non-current' categories. The distinction between current and non-current assets and liabilities is based on a maturity of less than one year or one operating cycle of the company (or if longer). The operating cycle of a company refers to the total number of days for which investment of one unit of money remains blocked in the normal course of operations till its recovery out of revenue. Thus, by definition, an item of current asset or current liability has a maturity (i.e., the expected date of conversion to cash in case of an asset and the expected date of liquidation for cash in case of a liability) of less than one year or one operating cycle of the company.

A company's balance sheet typically has five categories of current assets :

- Cash and cash equivalents (i.e., investments in low-yielding securities),
- marketable securities (i.e., investment securities with returns exceeding those for cash equivalents),
- accounts receivables (i.e., debtors and bills receivables),

- inventories (i.e. stock levels), and
- prepaid expenses.

Current liabilities, include short term debt, accounts payables (i.e., creditors and bills payables) and accrued liabilities. Therefore, by 'working capital' we mean the excess of current assets over current liabilities.

The popular and most commonly used measures of liquidity based on working capital concept include the following :

(i) ***Current Ratio :***

It is calculated as follows :—

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The ratio gives an indication of the availability of total rupees, worth of current assets for every one rupee of current liability. In reality, however, firms do not actually liquidate their current assets to pay off their current liabilities. A minimum level of current asset is always needed to maintain operations. If all current assets are liquidated, it would mean that the company has effectively ceased its operations. The process of accumulating inventories, collecting receivables and paying suppliers is ongoing. The current ratio, therefore, measures the *margin of safety* provided by cash based resources (i.e., current assets which are easily convertible into cash) relative to short-term maturing obligations against unexpected losses, uncertainties and random shocks to a company's cash flows. Accordingly, the higher the current ratio, the greater the margin of safety i.e., the larger the amount of current assets available in relation to current liabilities and hence the more the firm's ability to absorb shocks and meet its current obligations. Thus, a current ratio of *greater than one* is desirable so that the firm has more current assets than current liabilities.

The accepted commercial standard for this ratio is 2 : 1 which means that for every Re. 1 of current liability, current assets worth Rs. 2 should be available as a buffer. This rule is based on the logic that in a worse economic condition of the firm, even if the value of current assets becomes half, the firm will be able to meet its obligations. However, such a standard should not be blindly followed because it may not be universally applicable across all companies and all industries. There are certain factors which specifically influence the standard value of current ratio. They are :

(a) **Nature of the economy :** In a capital rich country like U.S.A., it is easier for a company to procure long-term funds. As a result, cash reserve increases thereby increasing the amount of current assets and current ratio. The opposite happens in a capital scarce country like India.

(b) **Nature of the business** : Current ratio is a test of quantity, not quality of assets. Current liabilities are fixed contractual obligations that have to be paid and are not likely to decline in value. In contrast, current assets are subject to shrinkage effect, i.e., it may consist of debtors which are doubtful, or inventories which are slow-moving and obsolete. So, if the cash composition of a firm's current assets is low or if the cash conversion rate of non-cash items of current assets is slow, the company must keep a higher margin of safety between its current assets and current liabilities i.e., its current ratio should be high e.g., wholesale business. On the contrary, if the cash composition of current assets or conversion rate is high as in case of a transport business, the company can operate with a low current ratio.

(c) **Trade Cycles** : In boom conditions of the economy, long-term funds become easily available and hence a company operates with a high current ratio. But in slump conditions, it becomes difficult to procure long-term funds and as a result the current ratio is lower.

(d) **Attitude of the management** : A conservative management, who is unlikely to take greater risks, always prefers a higher current ratio whereas an aggressive management prefers to maintain a lower current ratio.

In view of the above factors it can be said that one common norm cannot be generally applied for all companies belonging to any industry. Instead, the industry average current ratio should be taken as the standard for each specific industry. However, care must be taken in omitting *outlier observations* i.e., extremely large or extremely small observations while calculating industry average ratio.

(ii) **Quick Ratio or Acid – Test Ratio** :

This ratio establishes a relationship between quick or liquid assets and current liabilities. An asset is said to be liquid if it can be converted into cash immediately or reasonably soon without any loss of value. Of all items of current assets, cash is obviously the most liquid one. Other current assets which are considered to be relatively liquid and included in quick assets are accounts receivables, cash equivalents and marketable securities. Inventories are considered to be the least liquid of all current assets and hence are excluded from quick assets. This is because, inventories normally take some time for being realized into cash. Also, their values tend to fluctuate as more managerial discretion is involved in their valuation than required for any other current assets and as a result the extent of conversion of inventory to cash becomes less certain. Prepaid expenses are also excluded from quick assets on the ground that they can never be realized in cash as they reflect past cash outflows rather than expected inflows. Sometimes, bank overdraft is deducted from current liabilities while calculating quick ratio if such overdraft is not payable on demand. Moreover, income received in advance is also deducted from current liabilities as neither any immediate nor any deferred

payment (i.e., cash outlay) is associated with such an item of current liability. Thus, quick or acid-test ratio is calculated as follows :

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventories} - \text{Prepaid Expenses}}{\text{Current Liabilities} - \text{Bank Overdraft} - \text{Income Received (not payable on In Advance demand)}}$$

Alternatively,

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Cash Equivalents} + \text{Marketable Securities} + \text{Accounts Receivables}}{\text{Current liabilities} - \text{Bank Overdraft} - \text{Income received (not payable on in advance demand)}}$$

The acid-test ratio is a more stringent test of liquidity than current ratio because if current assets include a high slow-moving inventory figure, it may show a favourable current ratio but give a misleading picture of liquidity. However, we must be cautious in using quick ratio too because there may be inventories which are more liquid than slow-paying receivables. Thus, quick ratio should be studied alongwith current ratio and liquidity of individual components of current assets while analyzing the overall liquidity position of a firm.

The interpretation of quick ratio is similar to that of current ratio. The accepted commercial standard is 1:1 which means that for every Re. 1 of quick liability, Re. 1 of quick assets should be available. Again, as in case of current ratio, such a standard may not be universally applicable and so it is better to consider the industry average ratio as the standard for the concerned industry.

In case of banks and financial institutions, the quick ratio is modified into super quick ratio as follows :—

$$\text{Super Quick Ratio} = \frac{\text{Cash and Cash Equivalents} + \text{Bank} + \text{Marketable Securities}}{\text{Quick Liabilities}}$$

(iii) *Cash Ratio :*

Since cash is the most liquid asset of all current assets, this ratio measures the cash adequacy of a company to pay off its current obligations. Cash equivalents and marketable securities are “near-cash” assets and hence they are also included in the computation of cash ratio. Thus,

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Cash Equivalents} + \text{Marketable Securities}}{\text{Current Liabilities}}$$

This ratio is a severe test of liquidity of a firm ignoring the refunding nature of current assets and current liabilities. The importance of cash ratio lies in the fact that over the

years there have been several examples of corporate failures where the companies had sizeable non-cash assets (both current and non-current) but were unable to meet their liabilities due to inadequacy of cash.

This ratio may be supplemented by cash to current asset ratio which gives a measure of the degree of current asset liquidity. It is calculated as follows :

$$\frac{\text{Cash} + \text{Cash Equivalents} + \text{Marketable Securities}}{\text{Current Assets}}$$

The larger this ratio, the more liquid are the current assets and the lower is the risk of insufficiency of cash and its equivalents.

(iv) ***Defensive Interval :***

It compares the currently available quick/liquid sources of cash (i.e., cash and cash equivalents, marketable securities and accounts receivables) with the estimated daily cash outflows needed to operate the firm i.e., daily, projected expenditures which usually include cost of goods sold, selling and administrative and general expenses excluding depreciation and other non-cash expenditures on a daily basis. Thus, defensive interval is calculated as follows :

$$\text{Defensive Interval} = \frac{\text{Cash and cash equivalents} + \text{Marketable securities} + \text{Accounts receivables}}{\text{Projected Expenditures}} \times 365$$

The defensive interval gives an indication of the number of days that a company can maintain its current level of operations with its existing liquid resources if there is no further generation of cash resources in the future. Thus, defensive interval is the most conservative estimate of a firm's liquidity.

As mentioned before, one must also examine the liquidity of individual components of current assets while analyzing the liquidity position of a firm. Thus, we now look at the liquidity of inventory and debtors in the following sections.

4.3 Measurement and Analysis of Liquidity of Inventory

Liquidity analysis is not independent of activity analysis which evaluates the efficiency with which the firm manages and utilizes its assets. The activity ratios, also known as turnover ratios, indicate the speed with which assets needed to support a firm's level of operations are being converted or turned over into sales and hence activity ratios describe the relationship between sales and assets. The importance of examining liquidity ratios in conjunction with activity ratios lies in the fact that obsolete or slow-moving items of current assets may seriously limit the usefulness of current and quick

ratios. A combined analysis may, thus, enable one to make a near perfect assessment of liquidity of a firm.

Inventories comprise a substantial portion of current assets. They are turned over into receivables or cash through sales. In most companies, a certain level of inventory must always be maintained. If inventory is inadequate, sales volume may decline below an attainable level thereby resulting into loss of opportunities and reduced profits for the firm. Conversely, excessive inventories may enhance the storage costs, insurance and tax burden of the company, lead to obsolescence and physical deterioration and unnecessarily block capital that could be used more profitably otherwise. Due to risks in holding inventories and given that the conversion rate of inventories into cash is slower than that of receivables, inventories are normally considered to be the least liquid current asset. However, this may not always be true. There are certain items which enjoy ready markets and can usually be sold with little effort, expense or loss. Again, items such as fashion merchandise, special components or perishable items can rapidly lose value unless sold on a timely basis. As a result, inventories of such items may be fast moving compared to receivables. Thus, an evaluation of the quality and liquidity of inventories assumes significance while assessing the liquidity of a firm.

The liquidity of inventories is commonly measured by *inventory turnover ratio*. It is computed as follows :—

$$\begin{aligned}\text{Inventory Turnover : (— in value)} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} \\ \text{(— in units)} &= \frac{\text{Number of Units sold}}{\text{Average Inventory (In Units)}}\end{aligned}$$

The above formula for computation of inventory turnover ratio appears rational as both cost of goods sold in the numerator and average inventory in the denominator are valued at cost and hence are comparable. Although cost of goods sold is usually reported in income statements, there are times when the information is not readily available from the firm's published annual accounts. In such a situation, 'sales' is used in the numerator in place of 'cost of goods sold' to derive a *modified* inventory turnover ratio. Since sales include a profit margin, its use impairs the usefulness of the inventory turnover ratio. However, the modified ratio can be used for trend analysis especially if it is used consistently and the changes in profit margins are small. Average inventory is calculated by adding the opening and closing inventory balances and dividing it by 2. It is more appropriate to use the average inventory figure than the year-end balance because the average figure smooths out the fluctuations in inventory level that might occur during the year.

The inventory turnover ratio gives an indication of the company's ability to use and dispose of its inventories. That is, it measures the rapidity with which inventories are converted into receivables or cash through sales. A higher ratio signifies that the firm's inventory does not remain in warehouses or on the shelves for long but are turned over rapidly from the time of its acquisition or production to sale thereby indicating efficiency in the firm's inventory management. Thus, analysis of inventory turnover ratio may be complemented by 'days to sell inventory ratio' which measures the number of days a company takes in selling average inventory during a year and is computed as follows :

$$\frac{365 \text{ days}}{\text{Inventory Turnover}}$$

However, a decrease in inventory turnover ratio over time or a lower ratio than the industry norm suggests excessive inventory levels than warranted by production/ acquisition and sale activities or weak demand or non-saleability or slow-moving or obsolete inventory. On the other hand, too high a turnover ratio may be because of very low level of inventory and hence may result in frequent stockouts and too many small inventory replacements. Thus, too high and too low inventory turnover ratios are undesirable and need to be investigated further. It must also be remembered that inventory turnover ratio is significantly affected by alternative accounting methods of valuation of inventory and hence necessary adjustments must be made while analyzing the same.

In case a firm's sales are subject to seasonal fluctuations, the inventory turnover ratio, calculated as above, may give a wrong and misleading picture of liquidity. This limitation arises due to the method of calculating average inventory and hence can be overcome to a great extent by using opening inventory and monthly closing inventories to calculate average figure i.e.,

$$\frac{\text{Opening Inventory} + \Sigma \text{ monthly closing inventories}}{13}$$

However, the real picture may be obtained if average inventory is calculated statistically as $(1/365)\Sigma S_{cd}$ where S_{cd} is equal to the number of units of inventory per day multiplied by the number of days in a year. Thus, inventory turnover ratio may be carefully calculated and analysed while examining the liquidity of a firm.

4.4 Measurement and Analysis of Liquidity of Debtors

A company sells its products not only for cash but also on credit as a marketing strategy to enhance its market share. Credit sales generate debtors in the books of accounts of the company. Debtors are expected to be converted into cash within a short

period and hence are included in the current assets of the firm. It is obvious that the likelihood of collection of debtors without loss within the due date set by the company will have a strong bearing on the liquidity of the firm. The longer the debtors remain outstanding beyond their due date, the lower is the likelihood of their collection and the lower is their liquidity. Thus, a test of the speed in converting debtors to cash and the age of debtors indicate both the quality and liquidity of debtors of a firm. This, in turn, affects the quality of working capital and the current ratio and hence the liquidity of the firm.

The *debtors turnover*, also known as debtors velocity, is used as a measure of the liquidity of debtors of a firm. It is computed as follows :

$$\text{Debtors Turnover} = \frac{\text{Credit Sales}}{\text{Average Debtors}}$$

Average debtors can be calculated by adding the opening and closing balances of debtors for the period and dividing the sum by 2. The more sales fluctuate, the more likely that the average debtors figure will be distorted. So, using monthly or quarterly end balances of debtors may provide a more accurate estimate of average debtors. It must also be noted that only trade debtors i.e., debtors arising out of normal operating activities should be used while computing debtors velocity. Thus, debtors arising out of non-operating activities like sale of assets or investments should be excluded from debtors turnover. Moreover, credit sales are used to compute debtors velocity because cash sales do not create debtors.

However, many a times information regarding the cash and credit sales of a firm may not be readily available from its published financial statements. In such a situation, total sales may be used to compute this ratio assuming the cash sales to be insignificant. If cash sales are significant, then this ratio may be less useful in decision making. Again, if the proportion of cash sales to total sales remains relatively stable, then year to year comparisons of changes in debtors turnover computed using total sales are more relevant. The debtors turnover ratio indicates how often, on an average, debtors revolve i.e., are received and collected during the year. Generally, the higher the debtors turnover ratio, the greater the number of times debtors are turned over during the year and hence the more efficient is the credit management by the firm. Thus, debtors turnover ratio measures the efficiency and effectiveness of a firm's credit management and indicates the level of investment needed in debtors to maintain the firm's sales level.

Although the debtors turnover ratio measures the speed of collections and is useful for comparison with the industry average or for inter-firm comparisons, it is not directly comparable to the terms of credit a company extends to its customers. In order to measure the effectiveness of a firm's credit policy, the debtors turnover ratio is to be converted into days of sales tied up in debtors i.e., average number of days for which debtors remain

outstanding till they are collected in cash. Thus, average collection period for the debtors may be computed as below :

$$\text{Average Collection Period} = \frac{365 \text{ days}}{\text{Debtors Turnover}}$$

The average collection period can be compared with the credit terms allowed by the company in order to assess the extent of customers paying on time and hence judge the company's credit and collection efficiency. As for example, if usual credit terms of sale are 45 days and the company's average collection period is 60 days, then the comparison reveals that the firm's debtors are outstanding for a longer period than that warranted by the credit period. This may be because of poor collection efforts of the company or delays in customer payments due to their poor financial condition. Accordingly, corrective managerial action may be taken to improve the average collection period. Thus, it may be said that the shorter the average collection period, the better the quality of debtors since a short collection period implies prompt payment by debtors. However, a company must guard against too long or too short a collection period. An excessively long collection period implies too liberal and inefficient credit and collection performance of the firm as it results into delays in cash collection from debtors, increases the chances of bad debt losses and impairs the firm's liquidity. On the other hand, too short a collection period indicates a very restrictive credit and collection policy. Because of the fear of bad debt losses, the firm may sell only to those customers whose financial conditions are sound and who are prompt in making payments, a reflection of shorter collection period. Although such a policy may succeed in avoiding the bad debt losses, but it may severely curtail sales and hence reduce the profit potential of the firm. Therefore, a comparison of the company's debtors turnover ratio and average collection period with the industry average would help ascertain the efficiency, or otherwise, of the firm's credit management vis-à-vis that of the competitors.

4.5 Analysis of liquidity and distribution of current assets

The composition of current assets is an indicator of the liquidity of a firm. As for instance, if the proportion of inventories, considered to be the least liquid item of current asset, increases in total value of current assets from year to year, then it implies deterioration in the liquidity of the firm. The common-size percentages are calculated for each item of current asset (taking the total value of current asset as 100) in order to facilitate comparisons and evaluation of the liquidity of the firm over the years, regardless of the change in absolute values. The following illustration will explain how

common size percentages of individual current asset items help in comparative analysis of the liquidity of the firm.

Illustration :

Problem (1) : The composition of current assets of Honda Ltd. for the year ended 2004 and 2005 are given below. Analyse the liquidity position of Honda Ltd.

	<u>Year 2004</u>	<u>Year 2005</u>
Current Assets :		
Cash	40,000	30,000
Accounts Receivables	60,000	50,000
Inventories	50,000	80,000
Total Current Assets	<u>1,50,000</u>	<u>1,60,000</u>

Solution :

The common-size percentages of Honda Ltd.'s individual items of current assets for the years 2004 and 2005 are given below :

Particulars	Year 2004		Year 2005	
	Actual Value (Rs.)	Common Size (%)	Actual Value (Rs.)	Common Size (%)
Cash	40,000	26.67	30,000	18.75
Accounts Receivables	60,000	40.00	50,000	31.25
Inventories	50,000	33.33	80,000	50.00
Total Current Assets	1,50,000	100.00	1,60,000	100.00

The common size percentages of current assets, as calculated above, reveal that both cash and accounts receivables have declined by 7.92% and 8.75% respectively in 2005 relative to 2004 while inventories as percentage of total current assets have increased by 16.67% during the same period. This implies that there has been a marked deterioration in the liquidity of Honda Ltd. in the year 2005 compared to the year 2004.

Apart from the distribution of current assets, the assessment of liquidity of a firm is also aided by the use of *liquidity index*. The liquidity index of a firm is expressed in days and its computation is a weighting mechanism. Its usefulness depends on the validity of assumptions implicit in the weighting process. Increase in liquidity index from year to year signifies a deterioration in liquidity while a decrease signifies improved liquidity because liquidity index refers to the weighted average number of days taken by accounts receivables and inventories together for their conversion into cash. Computation of liquidity index is shown in the following illustration.

Illustration :

Problem (2) : Refer to the current assets' composition given in problem (1) for the years 2004 and 2005. If, in addition, it is reported that conversion of inventories into accounts receivables takes on an average 50 days and the conversion of receivables into cash takes 40 days on an average, compute the liquidity index of Honda Ltd. for the years 2004 and 2005 and analyse the liquidity position of the firm.

Solution :

Year 2004 :

Computation of Liquidity Index

Particulars	Amount (Rs.)	Days taken for conversion into cash	Product (Amount × Days)
Cash	40,000	—	—
Accounts Receivables	60,000	40 days	24,00,000
Inventories	50,000	90 days (50 + 40 days)	45,00,000
Total :	(a) 1,50,000		(b) 69,00,000

$$\therefore \text{Liquidity Index} = \frac{b}{a} = \frac{69,00,000}{1,50,000} = 46 \text{ days}$$

Year 2005 :

Particulars	Amount (Rs.)	Days taken for conversion into cash	Product (Amount × Days)
Cash	30,000	—	—
Accounts Receivables	50,000	40 days	20,00,000
Inventories	80,000	90 days (50 + 40 days)	72,00,000
Total :	(a) 1,60,000		(b) 92,00,000

$$\therefore \text{Liquidity Index} = \frac{b}{a} = \frac{92,00,000}{1,60,000} = 57.5 \text{ days}$$

Thus, it can be said that as liquidity index of Honda Ltd. has increased in the year 2005 relative to 2004, its liquidity has deteriorated over the same period. Note that this result is also consistent with the result of common-size analysis of current assets composition obtained in problem (1).

It must, however, be remembered that the liquidity index should be interpreted with caution. The index is just a number without direct meaning. It becomes meaningful only

when it is compared over the years or when the index of one company is compared with that of another. Thus, the liquidity index is best used as a measure of period – to – period change in liquidity of a company or as a company – to – company comparison of relative liquidity.

4.6 Measurement and Analysis of Solvency using Accounting Ratios

The long term financial viability (i.e., solvency) of a company is usually evaluated on the basis of an analysis of its capital structure. The capital structure of a company indicates the mix of funds provided by the owners and lenders to meet the total capital requirements of the firm. A *leveraged firm* (i.e., a firm using more of debt than equity in financing its total capital requirements) has the ability to magnify returns to its shareholders provided it earns a return on total capital employed in the business higher than the cost of debt. This practice is technically known as *trading on equity*. However, the benefits of financial leverage bring additional risks. The fundamental risk with a leveraged capital structure is the risk of inadequacy of cash under conditions of adversity. Debt involves a commitment to pay fixed charges in the form of interest and principal repayments which cannot be postponed even in times of cash shortages without adverse repercussions to the company's shareholders and creditors. The inability to meet these fixed obligations can ultimately lead to legal action by the debt holders and possible bankruptcy. Besides, a leveraged capital structure also runs the risk from loss of financing flexibility. The owners' equity is considered as a safety margin by the creditors' debtholders and so their risks increase when the equity base in the total capital structure becomes thin. Accordingly, a company's ability to raise further capital gets severely impaired when it has a highly leveraged capital structure, especially in periods of adverse market conditions. Thus, as the above discussion suggests that a leveraged capital structure may threaten the solvency of a company, capital structure ratios (i.e., leverage ratios), which relate the components of capital structure to each other or to their total, are used as a means of solvency analysis.

The various leverage ratios are as follows —

(i) **Debt – Equity (D/E) Ratio :**

It is the most widely and popularly used leverage ratio and is computed as follows :

$$\text{Debt – Equity Ratio} = \frac{\text{Debt}}{\text{Equity}}$$

Depending on the definition of debt-capital, there are two variants of this ratio which are as follows :—

$$(a) \frac{\text{Long Term Debt}}{\text{Equity}} ; \quad (b) \frac{\text{Total Debt}}{\text{Equity}}$$

Long-term debt includes items like debentures/bonds, long-term borrowings from financial institutions and banks, public deposits and any other interest bearing long-term loan. *Total debt* includes both short term and *long term debt*. *Short term debt* includes those borrowings which are repayable within one accounting year. Short term debt may also include current liabilities. But it would be better if current liabilities are excluded from short-term debt while computing D/E ratio because current liabilities are a function of the firm's operations and its business and contractual relationships to its suppliers rather than external lenders. *Equity* used in the computation of D/E ratio refers to shareholders' fund i.e., net worth of the company. There is, however, a difference of opinion as to whether preference share capital should be considered as debt or equity in computing D/E ratio although conventionally it is treated as a part of net-worth of the company. It can be argued that characteristics of debt are more reflected in preference share capital like requiring a fixed rate of dividend, redemption after a certain period of time, carrying no voting right and getting priority over equity shareholders regarding payment of capital at the time of liquidation of the company. Thus, inclusion of preference share capital as debt in D/E ratio may be more justified. The total debt to equity ratio with preference capital as part of total debt is also known as *capital gearing ratio* i.e., the ratio between fixed income bearing capital and variable income bearing capital.

The debt-equity ratio describes the relationship between lenders' contribution and owners' contribution towards financing the total capital requirement of the business. It indicates the amount of debt capital that is backed by every rupee of equity capital. The higher this ratio, the greater the proportion of debt relative to equity and hence the higher is the riskiness of the firm. Conversely, the lower this ratio, the better is the picture of solvency but it arises at the cost of trading on equity. Hence, a balance may be struck in deciding about the judicious mix of debt and equity in the capital structure of a company. Generally speaking, long-term debt-equity ratio in case of private sector companies should not exceed 2:1 while for public sector companies, it should not exceed 1:1. However, exceptions to the 2:1 norm include capital intensive projects and projects in priority sector and in backward areas and those sponsored by technical entrepreneurs.

(ii) ***Total Debt to Total Capital Ratio :***

This ratio, also known as the *total debt ratio*, measures the relationship between total debt (i.e., long term debt + short term debt including current liabilities and provisions) and total capital (i.e., total debt + stockholders' equity including preference capital) as follows :

$$\text{Total Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Capital}}$$

This ratio indicates the proportion of total capital that is financed by debt. A higher total debt ratio signifies that there is little margin of safety for lenders while a lower ratio implies that the owners contribute a larger share of the total financing of the firm. Hence, the higher this ratio, the greater the risk of insolvency.

(iii) **Proprietary Ratio :**

Also known as *proprietorship ratio or equity ratio*, this ratio is calculated as follows :—

$$\text{Proprietary Ratio} = \frac{\text{Net Worth}}{\text{Total Assets}}$$

Net worth includes stockholders' fund (i.e., equity capital + preference capital + reserves and surplus – fictitious assets) while total assets is the total of assets side of the balance sheet excluding fictitious assets.

This ratio, being converse to total debt ratio, helps to test the solvency and credit strength of the business. It shows the proportion of claim of equity holders in total assets of the business. A higher proprietary ratio indicates that the company has relied more on shareholders' funds to finance a major portion of its total assets. Moreover, as total debt ratio equals (1 – proprietary ratio), the proprietary ratio gives a measure of the credit standing of the business. Thus the higher this ratio, the better is the picture of solvency. But as a higher proprietary ratio deprives the business of the benefits of trading on equity, a balance need to be struck between proprietary and total debt ratios in financing the business' assets.

Capital structure ratios, discussed above, primarily measure the risk of a company's capital structure. The higher the proportion of debt, the larger the fixed charges of interest and debt repayment and the greater the likelihood of insolvency during periods of earnings decline or hardship. But one limitation of such capital structure ratios is their inability to focus on the availability of cash flows to service a company's debt. Yet they are useful because they serve as *screening devices* which help to decide whether risk inherent in a company's capital structure requires further analysis of a company's *earnings coverage* or earnings power to meet its interest and principal repayments. That is, should capital structure ratios reveal debt as a significant part of total capitalization, the company's coverage ratios must be examined to substantiate the solvency analysis of the firm.

The earnings coverage measures focus on the relationship between debt-related fixed charges and a company's earnings available to meet these charges. The following are the two kinds of earnings coverage ratios.

(i) Interest Coverage Ratio :

This ratio considers the interest on debt as the fixed charge needing earnings coverage and is calculated as below :—

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest}}$$

Here EBIT refers to earnings before interest and taxes. Since interest on debt is paid before tax, interest coverage is calculated in relation to before tax earnings.

The interest coverage ratio shows the number of times the interest charges are covered by funds that are ordinarily available for their payment and hence is also known as *times-interest-earned ratio*. This ratio thus indicates the extent to which a firm's earnings can decline without causing any embarrassment to the firm regarding the payment of interest on debt. That is, if (r_i) is the interest coverage ratio, then fall in earnings by ($r_i - 1$) times can be tolerated by the company. A higher interest coverage ratio is obviously desirable; but too high a ratio indicates that the firm is very conservative in using debt and that it is not using credit to the best advantage of shareholders. On the other hand, a lower interest coverage ratio indicates excessive use of debt or inefficient operations. The firm should therefore make efforts to improve the operating efficiency or to retire debt to have a comfortable interest coverage ratio.

An important limitation of interest coverage ratio is that it deals with the earnings coverage of interest only and fails to address the debtholders' fear of losing the principal value of debt. This limitation has been overcome by the following ratio.

(ii) Debt Service Coverage Ratio :

Also known as *fixed charges coverage ratio*, this ratio shows the earnings cover for both interest and principal repayment as follows :

$$\text{Debt Service Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest} + \frac{\text{Annual funds required for repayment of principal value of debt}}{(1 - t)}}$$

where 't' is the tax rate applicable to the firm. Since principal value of debt is repaid out of after-tax earnings of the firm, the funds required annually for repayment of principal is converted to before tax basis by dividing it by (1 – tax rate) in order to determine the before-tax earnings coverage of interest and principal repayment.

This ratio indicates the debt servicing ability of the business. Thus the higher this ratio, the better is the debt servicing ability of the firm and the greater is the security of the lenders. But too high a ratio indicates unused debt capacity and must be avoided.

The earnings coverage ratios, discussed above, thus provide an insight into the ability of a company to meet its fixed charges out of current earnings. There exists a high correlation between such ratios and the default rate on debt – the higher the coverage ratio, the lower the default rate.

It must however be noted that EBIT, used in the above two coverage ratios, is determined under accrual basis of accounting and hence may not always give a good measure of the cash provided by operations that is available to cover fixed charges. Since companies must pay fixed charges in cash while EBIT includes such items of income and expenses which do not generate or require immediate cash, it may be more justified if the above coverage ratios are calculated on *cash-flow basis* by using cash flows from operations (i.e., excluding interest, taxes and non-cash items of income and expenses) instead of EBIT in their numerators.

An important factor in evaluating coverage ratios is the behaviour of earnings and cash flows across time. The more stable the earnings or cash flow patterns of a company or industry, the lower is the required level of coverage. As for example, a lower coverage ratio may be accepted for a utility concern which faces little economic downturns or upswings but it may not be acceptable to cyclical companies like machinery manufacturers. To sum up it may be said that short-term liquidity and long-term solvency analysis are necessary for judging both near-term and long-term financial survival of the company. At the same time it has been perceived that cash flow position of a firm must be analysed before making any judgement about the profitability, liquidity and solvency of the business. Accordingly, the next unit discusses the cash flow analysis.

4.7 Select Readings

- Bernstein and Wild, *Analysis of Financial Statements*, Tata McGraw Hill, 2004.
- Pandey, I.M., *Financial Management*, Vikas Publishing House Pvt. Ltd., 1999.
- White, Sondhi & Fried, *The Analysis and Use of Financial Statements*, John Wiley & Sons, 2003.

4.8 Questions

Long – Answer type :

- (1) Discuss the factors which may influence the standard value of current ratio.
- (2) Why it is necessary to evaluate the quality and liquidity of inventories while assessing the liquidity of a firm?

(3) How would you assess the liquidity of inventories? Discuss.

(4) How would you compute the following:-

(a) Cash Ratio (b) Defensive Interval (c) Liquidity Index (d) Average Collection Period.

Also discuss the significance of the above measures in analyzing the liquidity of a firm.

Short – Answer Type :

(5) Which of the two measures – current ratio or acid test ratio – gives a more stringent test of liquidity of a business? Explain.

(6) Is it sufficient to evaluate the capital structure ratios only while analyzing the solvency of a firm? Give reasons.

(7) - Which of the two ratios – interest coverage or debt service coverage – is a better indicator of debt servicing ability of a firm? Give reasons.

Objective Type :

(8) State whether the following are true or false:

(a) Solvency ratios and liquidity ratios measure respectively the short term and long run financial viability of a company..

(b) The activity ratios indicate the speed with which assets are turned over into sales.

(c) Capital gearing ratio shows the relation between fixed income bearing capital and variable income bearing capital of a firm.

(d) Times interest earned is the ratio between EBIT and fixed interest charges on debt.

(e) The higher the debt service coverage, the lower the default rate on debt.

(f) Proprietary ratio is the same as total debt ratio.

[Hints : (8) (a) False; (b) True; (c) True; (d) True; (e) True; (f) False.]

Unit-5 □ Analysis of Cash Flow Statement

Structure

- 5.1 Introduction**
- 5.2 Meaning of cash flows and cash flow statement**
- 5.3 Preparation and interpretation of cash flow statement**
- 5.4 Role of cash flow statement**
- 5.5 Utility of cash flow statement**
- 5.6 Select Reading**
- 5.7 Questions**

5.1 Introduction

The nerve centre of any business is its cash reserves. It is critical to the smooth functioning of a firm. Excess of such reserves may make the firm less profitable as idle cash yields no return while shortfall in cash may eventually lead the firm to bankruptcy. So, there is a need to carry an optimum balance of cash always. That is, when cash flows into the business at a much faster pace than it is being disbursed, the company's manager must seek some temporary investment outlets for the accumulated excess cash reserves. On the other hand, in times of cash deficit the company must make arrangements for raising the required amount from outside sources. It must however be noted that the above steps can be taken by the management only if they are aware of the movement of cash of the business during the accounting period. Thus, a detailed analysis of cash flow position of a firm is necessary to equip the management with the information about cash flows during a period.

The traditional accounting statements such as income statement and balance sheet, and even fund flow statement may fail to present a clear picture of the cash flows of the business. The traditional accounting statements are prepared on accrual basis and so may consider several non-cash items of revenues (e.g. accrued income etc.) and expenses (e.g. depreciation etc.) while determining profit of the business. As a result, a situation may arise where the accounting statements say that the firm is operating profitably, yet, in reality, the firm finds it difficult to meet its commitments like payment of wages, taxes, debt interest, dividend etc. Because of the inclusion of several non-cash items in accounting profit, the actual cash surplus may be far less than the profit earned during

the period in such situations. Again, fund flow statement is incapacitated to project a firm's cash flow position because of the following reasons. Firstly, what constitutes a fund is, in itself, an ambiguous matter. There are several concepts of fund and hence the users of financial statements, who have no technical knowledge of accounts, cannot clearly understand the meaning of the term 'fund'. Secondly, of all the concepts, the working capital concept of fund has gained popularity in business. But working capital concept may give a misleading picture of cash flow position of a firm. As for example, working capital may be increased even by accumulating obsolete stock but such a practice would be detrimental to cash reserves of the firm. Thirdly, as cash is merged with working capital, fund flow statement actually obstructs the flow of information on cash resources rather than disclosing it. As a result, fund flow statement cannot provide a warning signal regarding an impending sickness of a firm. Because of the above-mentioned limitations of the traditional accounting statements, the need to prepare a separate statement focusing solely on cash flows during a particular period has arisen.

The following sections thus discuss the meaning of cash flows and cash flow statement, mode of preparing the cash flow statement, role and utility of cash flow statement in detail.

5.2 Meaning of Cash Flows and Cash Flow Statement

Cash flows of a business mean inflows and outflows of 'cash' and 'cash equivalents'. 'Cash' comprises cash in hand and at bank and demand deposits (i.e., deposits which are payable on demand). 'Cash equivalents' are short-term highly liquid investments that are readily convertible into known amounts of cash and are subject to insignificant risk of changes in value. Such cash equivalents are primarily held by a firm for the purpose of meeting its short-term cash commitments. The cash flow statement of a firm is prepared on the basis of this 'cash and cash equivalents' concept.

A *cash flow statement* shows the changes in financial position of a firm on cash basis. In other words, it shows the net effect of the various transactions of a firm during a period on cash and explains the causes of changes in the cash position of a firm between two balance sheet dates. Thus the cash flow statement analyses changes in non-current accounts as well as current accounts (other than cash) to determine the various sources (like decrease in assets, increase in liabilities, profit from operations, issue of securities etc.) and applications (like loss from operations, increase in assets, decrease in liabilities, redemption of securities etc.) of cash during a period and their net impact on the cash balance.

5.3 Preparation and Interpretation of Cash Flow Statement

In India, the Companies Act, 1956 has not mandated the preparation of cash flow statement as forming a part of financial statements of a company. But accounting standard-3 (AS-3) issued by The Institute of Chartered Accountants of India has made it compulsory for—

- (a) listed companies or companies whose shares and debentures are in the process of enlisting on a recognized stock exchange in India, and
- (b) all other commercial, industrial and business enterprises whose turnover for the accounting period exceeds Rs.50 crore.

To prepare cash flow statement for each accounting period commencing on or after 1st April, 2001. The cash flow statement, thus prepared, must also be audited for the purpose of annexing it to the financial statements.

AS-3 prescribes the format for the preparation of cash flow statement. As per the standard, a cash flow statement is to be classified into three heads i.e. cash flows from :

- (i) operating activities,
- (ii) investing activities, and
- (iii) financing activities.

Operating activities involve income-determining items i.e., revenues and expenses, and changes in current assets and current liabilities. Investing activities relate to changes in non-current assets i.e., fixed assets and investments. Financing activities relate to changes in non-current liabilities i.e., loans, debentures etc. and stockholders' equity. However, under AS-3, cash flows arising due to interest payment and receipt of interest and dividend should be classified as cash flows from operating activities in case of a financial company. But in case of other companies, interest payment should be shown under financing activities while interest and dividend received should be shown under investing activities. Dividend payment should, however, be shown under financing activities in all the cases.

The cash flow statement for an accounting period can be prepared by taking the help of opening and closing balance sheets, profit and loss account and other relevant information obtained from the accounting records of the company for that period. The starting point of the cash flow statement is net income (after taxes) as per the income statement which is determined under accrual basis of accounting. Thus net income figure is adjusted for non-cash items like depreciation etc., interest (in case of a finance company, interest paid is not deducted from net income as it is considered as a part of operating cash flows) and taxes, non-operating and extraordinary items of income (like

interest and dividend income etc. although, in case of a finance company, such interest and dividend income are considered as a part of operating cash flows) and expense (like foreign exchange loss etc.) appearing in the income statement to convert it into cash operating profit. Thereafter, adjustments are made to cash operating profit in respect of changes in current assets and current liabilities during the period and for tax paid in order to arrive at cash generated by operating activities.

Capital expenditures for long-term assets (i.e., fixed assets) like property, plant and equipment are usually the primary component of investing cash flows. Such capital expenditures are calculated net of proceeds on sale of these assets and hence investing cash flows usually denote net cash outflows from investing activities. Investing cash flows also include cash flows arising out of investments in or collection of principal value of investments in joint ventures, affiliates and other companies' securities. In case of companies other than a finance company, interest and dividend income are a part of investing cash flows of the firm.

Components of financing cash flows include inflows from additional borrowings (both short-term and long-term) and equity financing, and outflows for repayment of debt, dividend payment and equity repurchases. Other than finance companies treat interest payment on debt as a cash outflow under financing activities.

Once the cash flows under each of the three different heads have been separately computed, the next step is to find out the aggregate/net cash flows from operating, investing and financing activities. Since the three kinds of cash flows consider changes in each and every items of balance sheet excepting cash, the aggregate/net cash flows, as computed above, must equal the change in cash balance between opening and closing balance sheet dates. This identity provides a check on computations.

As per AS-3, non-cash items, whether falling under operating, investing or financing activities, should be disclosed by way of footnotes to the cash flow statement and not as a part of the statement itself. The proforma cash flow statement under AS-3 is shown below.

CASH FLOW STATEMENT OF LTD.
FOR THE PERIOD

PARTICULARS	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
Operating Cash Flows (OCF) :			
Net Income as per Profit & Loss Account		xxxx	
Add/Less: Adjustments for non-cash items, non-operating and extraordinary income and expenses :			

PARTICULARS	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
(+) Depreciation	xxxx		
(+) Foreign exchange loss	xxxx		
(+) Loss on sale of fixed assets/ investments.	xxxx		
(+) Loss/premium on redemption of capital.	xxxx		
(+) Tax paid	xxxx		
(+) Interest expense (not added back in case of a finance company)	xxxx		
(-) Profit on sale of fixed assets/ investments	(xxxx)		
(-) Profit/discount on redemption of capital	(xxxx)		
(-) Interest income (not deducted in case of a finance company)	(xxxx)		
(-) Dividend income (not deducted in case of a finance company)	(xxxx)		
		xxxx	
OCF before working capital changes		xxxx	
<u>Add/Less</u> : Adjustments for changes in working capital			
(+) Decrease in current assets (excluding cash)	xxxx		
(+) Increase in current liabilities	xxxx		
	xxxx		
(-) Increase in current assets (other than cash)	(xxxx)		
(-) Decrease in current liabilities	(xxxx)	xxxx	
OCF after working capital changes		xxxx	
(-) Tax paid		xxxx	
Net Cash Flows from Operating Activities			xxxx
<u>Add : Financing Cash Flows (FCF)</u>			
Issue of shares/debentures	xxxx		
(+) Raising of loan (short-term as well as long-term)	xxxx		
		xxxx	

PARTICULARS	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
(-) Redemption of preference shares and debentures.	xxxx		
(-) Repurchase of equity shares	xxxx		
(-) Repayment of loan	xxxx		
		(xxxx)	
		xxxx	
(-) Interest expenses on debt (in case of other than finance companies)	xxxx		
(-) Dividend paid to shareholders	xxxx		
		xxxx	
Net Cash Flows from Financing Activities			xxxx
			xxxx
<u>Less: Investing Cash Flows (ICF)</u>			
Purchase of fixed assets and investments	xxxx		
(+) Loans to other companies	xxxx		
		xxxx	
(-) Sale of fixed assets and investments	xxxx		
(-) Collection of principal value of loans to other companies	xxxx		
		xxxx	
(-) Interest and dividend income (in case of other than finance companies)		xxxx	
		(xxxx)	
Net Cash Flows from Investing Activities			(xxxx)
Net Increase/(Decrease) in cash balance			xxxx
<u>Add</u> : Cash and cash equivalents as at opening balance sheet date			xxxx
Cash and cash equivalents as at closing balance sheet date			xxxx

Notes : List of individual non-cash items under operating, financing and investing activities.

However, mere preparation of the cash flow statement as per AS-3 is not sufficient to determine the financial position of a firm. In order to find out whether – the company

can avail additional credit from its suppliers; the customers are taking more or less time in clearing their dues; the company can raise cash by selling some investments to prevent the disruption of operations; the company can support its expansion programme out of the available funds and current operations or need to raise new debt or equity for the purpose etc., the cash flow statement needs to be analysed further with the help of few ratios.

In order to interpret the cash flow statement, the following four categories of cash-flow based ratios are computed.

(a) *Coverage Ratios :*

- (i) Interest Coverage Ratio = $\frac{\text{Operating Cash Flows (OCF)}}{\text{Interest}}$
- (ii) Dividend Coverage Ratio = $\frac{\text{Operating Cash Flows (OCF)}}{\text{Dividend}}$
- (iii) Debt Coverage Ratio = $\frac{\text{OCF} - \text{Interest} - \text{Dividend}}{\text{Total Debt}}$

The above coverage ratios indicate the cash flow coverage for dividend, interest and debt paying ability of a firm as provided by its operating activities.

(b) *Quality of Income Ratios :*

These ratios indicate the percentage of total revenue or total earnings that has been realized in cash in any particular accounting period. The following two kinds of ratios may be calculated under this head—

- (i) Quality of Sales Ratio = $\frac{\text{Sales converted into cash}}{\text{Total Sales}} \times 100$
- (ii) Quality of Profit Ratio = $\frac{\text{OCF}}{\text{Operating Profit (or EBDIT)}} \times 100$

(c) *Capital Expenditure Ratios :*

These ratios measure the degree of dependence of a firm on internal and external funds for its capital expenditure as follows :

- (i) Degree of dependence on internal funds for capital expenditure = $\frac{\text{OCF} - \text{Increase in cash Balance between two Balance sheet dates}}{\text{Investing Cash Flows (ICF)}} \times 100$
- (ii) Degree of dependence on external funds for capital expenditure = $\frac{\text{Financing Cash Flows (FCF)}}{\text{Investing Cash Flows (ICF)}} \times 100$

(d) **Cash Return Ratios :**

These ratios are, in effect, cash-flow based profitability measures and are of the following types :

$$(i) \text{ Cash return on Total Assets} = \frac{\text{OCF}}{\text{Total Assets}} \times 100$$

$$(ii) \text{ Cash Return on Net Worth} = \frac{\text{OCF} - \text{Interest}}{\text{Net Worth}} \times 100$$

$$(iii) \text{ Cash Flow per Share} = \frac{\text{OCF} - \text{Interest}}{\text{Number of Shares}}$$

The following illustration will make it clear as to how to interpret a cash flow statement based on the above-mentioned ratios.

Illustration :

Problem (1) : From the following balance sheets and additional information of X Ltd., prepare a cash flow statement under AS-3 and analyse it.

BALANCE SHEETS

Liabilities	31.03.04	31.03.05	Assets	31.03.04	31.03.05
Equity Share Capital of Rs.10 each fully paid	6,00,00	9,00,000	Fixed Assets	10,00,000	12,00,000
Profit and Loss Appropriation A/c	2,00,000	4,00,000	Stock	4,00,000	3,00,000
10% Debentures	6,00,000	5,00,000	Debtors	2,00,000	3,00,000
Creditors	3,00,000	2,00,000	Cash	1,00,000	2,00,000
	17,00,000	20,00,000		17,00,000	20,00,000

Additional Information (during the period 2004-2005) :

- (i) Debentures were redeemed at 10% premium.
- (ii) Depreciation charged on fixed assets amounted to Rs. 1,00,000/-
- (iii) Equity shares issued at par for acquisition of fixed asset Rs. 50,000/-
- (iv) Fixed assets costing Rs. 10,000/-, book value Rs. 5,000/- was sold for Rs. 15,000/-
- (v) Dividend paid – Rs. 45,000/-

Solution :**CASH FLOW STATEMENT OF X LTD. (UNDER AS-3)***FOR THE PERIOD 2004-2005*

Particulars	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
<u>Operating Cash Flows (OCF) :</u>			
Net Income after dividend as per profit and loss appropriation a/c Rs. (4,00,000 – 2,00,000)		2,00,000	
<u>Add back :</u> Dividend	45,000		
Interest (Note 5)	50,000		
Depreciation	1,00,000		
Premium on redemption of 10% debentures (Note 1)	10,000		
		2,05,000	
		4,05,000	
<u>Less :</u> Profit on sale of fixed assets (Note 3)		10,000	
OCF before working capital changes		3,95,000	
<u>Add :</u> Decrease in current assets (other than cash)—			
Stock (Rs. 4,00,000 – Rs. 3,00,000)	1,00,000		
Increase in current liabilities	NIL		
		1,00,000	
		4,95,000	
<u>Less :</u> Increase in current assets—			
Debtors (Rs. 300000 – Rs. 200000)	1,00,000		
Decrease in current liabilities—			
Creditors (Rs. 300000 – Rs. 200000)	1,00,000		
		2,00,000	
<u>Net Cash Flows from Operating Activities :</u>			2,95,000
<u>Add : Financing Cash Flows (FCF)</u>			
Issue of equity shares (Note 4)	2,50,000		
<u>Less :</u> Redemption of 10% debentures (Note – 1)	1,10,000		
	1,40,000		

Particulars	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
<u>Less : Interest on 10% debentures (Note-5)</u>	50,000		
Payment of dividend [assuming that X Ltd. is not a finance company]	45,000		
		95,000	
<u>Net Cash Flows from Financing Activities</u>			45,000
			3,40,000
<u>Less : Investing Cash Flows (ICF)</u>			
Purchase of fixed assets (Note 2)		2,55,000	
<u>Less : Sale of fixed assets (Note 3)</u>		15,000	
<u>Net Cash Flows from Investing Activities</u>			2,40,000
Net Increase in Cash Balance			1,00,000
<u>Add : Opening Cash Balance</u>			1,00,000
<u>∴ Closing Cash Balance</u>			2,00,000

Footnotes :

(1) Depreciation charged on fixed assets for the period 2004-2005 is Rs. 1,00,000.

(2) Rs. 50,000/- worth equity shares issued at par for acquisition of equivalent amount of fixed assets.

Workings :

(1) Premium on redemption of debentures at 10%—

Face value of 10% debentures redeemed = Rs. 1,00,000

(Rs. 6,00,000 – Rs. 5,00,000)

∴ 10% premium thereof $(10/100 \times 1,00,000) = \text{Rs. } 10,000$

∴ Total Redemption value of debentures = Rs. $(1,00,000 + 10,000) = \text{Rs. } 1,10,000/-$

(2) **FIXED ASSETS A/C**

Dr.

Cr.

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Balance b/f	10,00,000	By Depreciation A/c	1,00,000
To Equity share capital (issue against acquisition)	50,000	By Cash A/c (book value sold Note 3)	5,000
To Cash A/c (purchase—balancing figure)	2,55,000*	By Balance c/d	12,00,000
	13,05,000		13,05,000

(3) Profit on sale of fixed assets—

Sale proceeds realized in cash	=	Rs. 15,000*
(-) Book value of fixed assets sold	=	Rs. 5,000
∴ Profit on sale of fixed assets	=	<u>Rs. 10,000</u>

(4) EQUITY SHARE CAPITAL A/C

Dr.

Cr.

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Balance c/d	9,00,000	By Balance b/f	6,00,000
		By Fixed Assets A/c	50,000
		By Cash A/c (new issue)	2,50,000*
	<u>9,00,000</u>		<u>9,00,000</u>

$$\begin{aligned} \text{(5) Interest on outstanding 10\% debentures} &= \frac{10}{100} \times (5,00,000) \\ \text{(Assuming Rs.10,000 face value of 10\% debentures has been redeemed as at 01.04.2004)} &= \text{Rs. 50,000} \end{aligned}$$

Ratios for interpretation of cash flow tatement :

(a) **Coverage Ratios :**

$$\begin{aligned} \text{(i) Interest Coverage Ratio} &= \frac{\text{OCF}}{\text{Interest}} \\ &= \frac{\text{Rs. 2,95,000}}{\text{Rs. 50,000}} = 5.9 \text{ times} \end{aligned}$$

$$\begin{aligned} \text{(ii) Dividend Coverage Ratio} &= \frac{\text{OCF} - \text{Interest}}{\text{Dividend}} \\ &= \frac{(\text{Rs. 2,95,000} - \text{Rs. 50,000})}{\text{Rs. 45,000}} \\ &= 5.4 \text{ times} \end{aligned}$$

$$\begin{aligned} \text{(iii) Debt Coverage Ratio} &= \frac{\text{OCF} - \text{Interest} - \text{Dividend}}{\text{Total Debt}} \\ &= \frac{\text{Rs. (2,95,000} - 50,000 - 45,000)}{\text{Rs. 5,00,000}} \\ &= 0.4 \text{ times} \end{aligned}$$

(b) **Quality of Income Ratios :**

$$(i) \text{ Quality of Profit Ratio} = \frac{OCF}{EBDIT} \times 100$$

where EBDIT = Earnings before depreciation, interest and taxes (and of course dividend and non-operating items)

$$= \text{Rs. } (2,00,000 + 1,00,000 + 50,000 + 45,000 + 10,000 - 10,000)$$

$$= \text{Rs. } 3,95,000$$

$$\therefore \text{ Quality of Profit Ratio} = \frac{\text{Rs. } 2,95,000}{\text{Rs. } 3,95,000} \times 100$$
$$= 74.7\%$$

(c) **Capital Expenditure Ratios :**

$$(i) \text{ Degree of dependence on internal funds for capital expenditure} = \frac{(\text{OCF} - \text{Increase in cash balance})}{ICF} \times 100$$

$$= \frac{\text{Rs. } (2,95,000 - 1,00,000)}{\text{Rs. } 2,40,000} \times 100$$

$$= 81.25\%$$

$$(ii) \text{ Degree of dependence on external funds for capital expenditure} = \frac{FCF}{ICF} \times 100$$

$$= \frac{\text{Rs. } 45,000}{\text{Rs. } 2,40,000} \times 100$$

$$= 18.75\%$$

(d) **Cash Return Ratios :**

$$(i) \text{ Cash Return on Total Assets} = \frac{OCF}{\text{Total Assets}} \times 100$$

$$= \frac{\text{Rs. } 2,95,000}{\text{Rs. } 20,00,000} \times 100$$

$$= 14.75\%$$

$$(ii) \text{ Cash Return on Net Worth} = \frac{OCF - \text{Interest}}{\text{Net Worth}} \times 100$$

where Net Worth = Equity Capital + Profit & Loss Appropriation balance

$$= \text{Rs. } (9,00,000 + 4,00,000)$$

$$= \text{Rs. } 13,00,000$$

$$\begin{aligned}
 \therefore \text{Cash return on Net Worth} &= \frac{\text{Rs. } (2,95,000 - 50,000)}{\text{Rs. } 13,00,000} \times 100 \\
 &= 18.85\% \\
 \text{(iii) Cash Flow per Share} &= \frac{\text{OCF} - \text{Interest}}{\text{No. of Shares}} \\
 &= \frac{(\text{Rs. } 2,95,000 - \text{Rs. } 50,000)}{\text{Rs. } 90,000} \\
 &= \text{Rs. } 2.72/\text{share}
 \end{aligned}$$

Interpretation of Ratios :

Interest coverage ratio of 5.9 times and dividend coverage ratio of 5.4 times appear to be comfortable and debt coverage ratio of 0.4 times signifies that 40% of total debt can be redeemed at once from the internal funds. This position also seems to be comfortable.

Quality of profit ratio of 74.7% implies that 74.7% of operating profit is realized in cash. This proportion is not very high and efforts should be made to convert operating profit into cash profit in higher proportion.

Dependence on internal funds for capital expenditure to the tune of 81.25% is quite high.

The return ratios show that cash return on net worth and cash flow per share are satisfactory at 18.85% and Rs.2.72/share respectively. However, this position can be improved if cash return on total assets, which presently stands at 14.75% is improved further.

The overall position of the company on the basis of cash flow information seems to be satisfactory. But efforts should be made to improve the quality of profit ratio and cash return on total assets. However, as information on results of other firms in the industry is not available, any definite conclusion regarding the performance of X Ltd. cannot be drawn.

5.4 Role of Cash Flow Statement

Cash flow statement supplements the information provided by the income statement and balance sheet as it links the two consecutive balance sheets. The primary purpose of a cash flow statement is to provide information on all cash receipts and payments (classified among operating, investing and financing activities) of the firm for a specified period and their impact on the ending cash balance. It also discloses that period's non-cash investing and financing activities.

The classification of cash flows among operating, financing and investing activities is essential to the analysis of cash flow data. This is because net cash flows i.e., change in cash and cash equivalents during a period has little informational content by itself; it is the classification and individual components that are informative.

The cash flow statement is thus intended to help predict the firm's ability to sustain (and increase) cash from its current operations for its long-term survival and growth and hence present a true picture of the firm's liquidity and solvency position. In doing so, the cash flow statement provides more objective information about—

- a firm's ability to generate cash out of production and sale of goods and services;
- the capacity of a firm to meet its obligations like payment of wages, expenses, interest, taxes etc. and pay dividends;
- the amount of cash used up to acquire fixed assets, investments and other businesses in order to maintain a firm's current operating capacity and to provide capacity for future growth;
- the amount of cash received from sale or disposal of fixed assets, investments as well as segments of the business;
- the cash flow consequences of the firm's financing decisions i.e., capital structure (debt-equity mix) decisions like issue of shares, repurchase of equity, incurrence and repayment of debt etc., and dividend policy decisions i.e., returns to shareholders in the form of dividends;
- trends in each of the above cash flow components;
- the extent of increase or decrease in cash during any period and hence the amount of ending cash balance, and
- the difference between net profit and net cash flows from operations.

5.5 Utility of Cash Flow Statement

The usefulness of cash flow statement to different users of published accounting data hardly needs any emphasis. The statement of cash flows gives an indication of the firm's operating, financing and investment policies followed by its management in the past. As the statement discloses the various sources and applications of cash during a period and their impact on the ending cash balance, it gives a clear picture of the causes of changes in the company's working capital or cash flow position and their resultant impact on the firm's liquidity position. The statement also reveals the non-current assets acquired by the company, the manner in which they have been financed from internal and external sources, the extent to which the firm's working capital needs have been met out of funds

generated from current operations or out of external sources of finances, the ability of the firm to pay its long term debt as per schedules and the like. Thus, the cash flow statement is a post-mortem analytical tool that helps the management to assess the company's strengths and weaknesses to withstand unexpected pressure on cash in future arising either due to a sudden fall in operations or due to an abnormal demand for cash.

However, the historical cash flow statement is not sufficient to meet the needs of the users. It must provide insights to prepare reliable cash flow (both inflows and outflows) projections for the immediate future in order to determine the availability of cash. The users base their decisions to continue their relationship with the firm on such projected cash flow statement.

A projected cash flow statement helps the *management* in the area of financial planning (both short-run and long-term) and control. The cash balance as per projected cash flow statement enables the management to match it with the firm's short-term cash needs to meet its maturing debt, interest, dividend and various expenses and hence identify the excess/shortfall of cash in the near future. This, in turn, will help the management to take short-term investment decisions in case of expected cash surplus or make arrangements for procuring the amount of shortfall from appropriate sources for meeting the expected commitments of the firm. The projected cash flow statement also aids the management in long-term planning. The estimates of working capital over a longer period, say five to ten years, help management to plan for repayment of long-term debt, acquisition of fixed assets and the like. If the firm needs working capital for expansion, which cannot be ordinarily provided from its operations, then it can plan the sources from where to procure the required funds on a long-term basis.

The cash flow statement is also useful to the *investors*. As the existing shareholders are particularly interested in the present value of future streams of cash flows in the form of dividend and capital appreciation, which, in turn, is closely related to cash flow generating capacity of a firm, the cash flow statement is expected to serve their needs. A prospective investor is more interested in projected cash flow statement not only for determining the profitability of the firm where he intends to invest but also for ensuring that his investment would earn regular return in future.

The *creditors, lenders, bankers and financial institutions*, both existing and potential, are also found to use the cash flow statement, as well as the projected one, to determine the liquidity position of the firm and its ability to pay interest regularly and repay the principal before extending their relationship with the firm.

Cash flow statement based ratios also act as good predictors of an impending failure of a company.

Thus, in conclusion it may be said that neither the statement of cash flows nor the income statement alone contains sufficient information for decision making. Income statement and balance sheet data must be combined with cash flow data for insights into the firm's ability to turn its assets into cash inflows, repay its liabilities and generate positive returns to shareholders. All the three financial statements are needed to value the firm appropriately.

5.6 Select Readings

- Banerjee, B., *Financial Policy and Management Accounting*, Prentice Hall of India Pvt. Ltd., New Delhi, 2005.
- Pandey, I.M., *Financial Management*, Vikas Publishing House Pvt. Ltd., 1999.
- White, Sondhi & Fried, *The Analysis and Use of Financial Statements*, John Wiley & Sons, 2003.

5.7 Questions

Long – Answer type :

- (1) Discuss the usefulness of cash flow statement.
- (2) How would you prepare a cash flow statement under Indian Accounting Standard – 3?
- (3) Given the following balance sheets of Y ltd.

BALANCE SHEETS

Liabilities	31.03.04	31.03.05	Assets	31.03.04	31.03.05
Share capital of Rs.10 each	80,000	60,000	Land	16,000	36,000
Retained earnings	8,400	18,800	Equipment	—	32,000
Bonds payable	—	18,000	Less : Accumulated depreciation		(3200)
Income tax payable	—	2,400	Inventory	32,000	26,000
Outstanding expenses	4,000	3,000	Sundry debtors	3,000	2,400
Sundry creditors	12,000	10,400	Prepaid expenses	1,600	1,200
			Cash and Bank	31,800	38,200
	84,400	1,32,600		84,400	1,32,600

Additional Information :

- (i) Net profit for the year 2004-2005 – Rs. 16,800.
- (ii) Dividend declared and paid for 2004-2005 – Rs. 6,400.
- (iii) Provision for tax – Rs. 7,200.

- (iv) Equipment worth Rs. 36,000 purchased at the beginning of the period. Equipment costing Rs. 4000 was sold for Rs. 3400 (book value Rs. 3,600).
- (v) Total depreciation on equipment for the period – Rs. 3,600.
- (vi) Bonds issued at par in cash.
- (vii) Shares of Rs. 20,000/- issued to acquire land.

Prepare a cash flow statement under AS-3 and comment on the performance of Y Ltd. on the basis of cash flow statement.

Short – Answer Type :

- (4) Why is it necessary to prepare a separate statement of cash flows in addition to preparing the traditional accounting statements?
- (5) What information does a cash flow statement convey?
- (6) Explain the various cash return ratios and quality of income ratios.

Objective Type :

- (7) State whether the following are true or false
 - (a) 'Cash' as per AS-3 in cash flow statement includes only cash in hand and at bank.
 - (b) The preparation of cash flow statement under AS-3 is mandatory for all companies.
 - (c) Investing cash flows relate to cash inflows and outflows arising out of changes in non-current assets while the cash flows relating to changes in non-current liabilities are termed as financing cash flows.
 - (d) Interest and dividend income are a part of OCF in case of a finance company but a part of ICF in case of other companies as per AS-3.
 - (e) Dividend payment is always considered as a part of FCF under AS-3.

[Hints : (7) (a) False; (b) False; (c) True; (d) True; (e) True]

Unit-6 □ Inter-firm Comparison

Structure

- 6.1 Introduction**
- 6.2 Meaning of inter-firm comparison**
- 6.3 Need for inter-firm comparison**
- 6.4 Tools of inter-firm comparison**
- 6.5 Steps in inter-firm comparison**
- 6.6 Select Reading**
- 6.7 Questions**

6.1 Introduction

In today's competitive environment, every firm would be interested to know its financial standing and relative position vis-à-vis its major competitors and the industry group to which it belongs. A mere analysis of the growth, profitability, liquidity, solvency and cash flow position of a firm may not throw light on the firm's ability to withstand competition and survive in the future unless its financial performance is compared with that of its rivals in the industry. Such thinking has brought the concept of inter-firm comparison into existence. Also known as cross-sectional analysis, as has been explained in unit-1 before, inter-firm comparison deals with the comparison of the financial performance of all firms in an industry at any given point of time. This unit intends to provide an insight into the theoretical basis of inter-firm comparison.

6.2 Meaning of Inter-firm Comparison

Inter-firm comparison refers to the comparison of results of similar firms by usually a neutral body entrusted for the purpose. It may be defined as the voluntary, confidential and anonymous pooling of key financial data for the purpose of providing the management of each participating firm with figures and other relevant information which would help reveal, firstly, the performance of its firm relative to that of other similar ones, and secondly, the reasons for the differences in performance, if any. Although inter-firm comparison is an effective control tool in the hands of management for comparing the performance of its own firm with those of others participating in the group, it can be rarely used by the management because of the practical infeasibility of procuring key financial

information about the rival firms. Thus, it is usually conducted by outside agencies which are in no way related to the participating firms. In India, such outside agencies include the Stock Exchange, Mumbai (BSE) [for ranking listed companies], Reserve Bank of India (RBI) [for ranking medium and large public limited companies and banking companies], Department of Public Enterprises (DPE) [for ranking central public enterprises], financial media i.e., magazines like Business India, Business World, Fortune India and dailies like Business Standard, The Economic Times, The Financial Express etc. [for evaluating the strengths and weaknesses of business enterprises in the private sector].

The following conditions are however, necessary for successfully conducting inter-firm comparison :—

- i) anonymity of the firms participating in the scheme;
- ii) the participants' full faith in the organization effecting such a comparison regarding confidentiality of business details divulged to such an organization;
- iii) voluntary supply of financial information by the participating firms to such outside agency as, without adequate disclosure of key financial information, such a comparison would lack purpose and be, merely, theoretical in nature, and
- iv) uniform accounting policies and practices being followed by participating firms as diversity in accounting principles, methods etc. obscures the comparability of data supplied by the participating firms.

Thus, given the above-mentioned conditions, inter-firm comparison is expected to reveal the order of merit of the firms in the industry.

6.3 Need for Inter-firm Comparison

As has been explained in the previous section, inter-firm comparison shows the relative position of the companies in the industry in respect of various financial parameters. It also reveals whether the industry exhibits significant variations across firms in terms of these financial dimensions. In doing so, it highlights to the management the firm's present achievements and possible weaknesses and hence necessitates suitable action by the management to overcome such weaknesses. Many a times the management is confronted with the following questions :

- is the profit of its firm adequate?
- are its sales sufficient?
- are the firm's assets being optimally used?
- is the capital structure satisfactory?

and the like. Inter-firm comparison helps the management by providing answers to such questions. Thus, the ultimate objective of inter-firm comparison is to improve managerial efficiency by way of identifying the areas of inefficiency and enabling the management to work upon it.

6.4 Tools of Inter-firm Comparison

Generally, accounting ratios and some statistical measures are used for comparing the performance of a firm with that of its immediate competitors or with the industry average. The selection of the ratios for the said purpose is, however, based upon the availability of information. Since the list of accounting ratios is quite long, it would be a cumbersome exercise to assess the relative financial standing of a firm in the industry in respect of each accounting ratio. Thus, it is advisable to follow a 'pyramid structure of ratios', as recommended by The British Federation of Master Printers, for inter-firm comparison.

The return on capital employed (ROCE), measured as (Operating Profit, Capital Employed), evaluates the overall performance of a firm and hence forms the top of the pyramid structure as *primary ratio*.

If the earning capacity i.e., the primary ratio of a firm is not satisfactory as compared to that of other similar units, then there are probably some factor or combination of factors which are not operating efficiently. These factors can be identified by carrying out a level-by-level analysis of the second, third and fourth level ratios in the pyramid structure classified as *supporting ratios*, *general explanatory ratios* and *specific explanatory ratios* respectively. The primary ratio can be disaggregated into two types of supporting ratios – operating margin on sales (i.e., Operating Profit, Sales) and capital turnover ratio (i.e. Sales, Capital employed). The operating margin on sales can be analysed into three types of general explanatory ratios like cost of goods sold ratio (i.e., cost of goods sold, sales), administrative expense ratio (i.e., administration expense, sales) and selling and distribution expense ratio (i.e., selling and distribution cost, sales). The capital turnover ratio can be decomposed into fixed assets turnover ratio (i.e., sales, fixed assets) and current assets turnover ratio (i.e., sales, current assets) as general explanatory ratios. The cost of goods sold ratio can be analysed further into percentage of material cost to sales (i.e., direct material cost, sales), labour cost ratio (i.e., direct labour cost, sales) and factory overhead ratio (i.e. factory overhead, sales) as specific explanatory ratios. The general explanatory ratio – current assets turnover can be disaggregated into materials turnover (i.e., cost of goods sold, material), work-in-progress turnover (i.e., cost of goods sold, work-in-progress), finished goods turnover (i.e., cost of goods sold, finished goods) and debtors turnover (i.e., sales, debtors) as

specific explanatory ratios. However at the lowest level, many more specific explanatory ratios may be computed depending upon the extent of analysis sought to be made than those shown in the pyramid structure. Such additional ratios could be output per worker, production cost per worker, idle time to total time, cost of scrap to material cost, cost of rejection to cost of production and the like.

Thus, the independent agency conducting the inter-firm comparison should follow the above-mentioned pyramid structure of ratios subject to a few changes to specifically suit the nature of the participating firms in such exercise.

6.5 Steps in Inter-firm Comparison

The neutral agency, which enjoys the confidence of the participating firms, may adopt the following procedure while conducting inter-firm comparison.

- (i) In the first step, the outside agency drafts the questionnaire carefully and send it, at regular intervals, to each of the participating firms for obtaining financial information on the performance of each such firm.
- (ii) After receiving the responses from the participants, the information disclosed in the questionnaires are compiled on the basis of uniform definitions of the 'terms' used in the questionnaire, and of accounting procedures, methods and accounting periods.
- (iii) The ratios as shown in the pyramid structure are then calculated to highlight the efficiency, or otherwise, of a particular firm vis-à-vis the performance of the group. These ratios are classified into
 - (a) ratios for a single firm, and
 - (b) ratios for the group of firms.
- (iv) Ratios for the single firm and the ratios for the group are compared one by one. The median and the first and third quartiles are computed for the set of figures for each ratio. The median indicates the average performance while the quartiles give indications to the management of the participating firms to find out their own positions in the range. Deviations or variances are also analysed and notified to the management in order to enable them to take suitable actions where possible.

However, it may be argued that a comparison of the individual ratios of each of the participating firms with the group may be a difficult and time-consuming exercise even though the limited number of pyramid ratios is used for the analysis. This is because in the absence of a single index, the neutral agency may have to select a 'standard' (which is usually the 'industry average') for each ratio and compare each of the participating firm's performance as regards each ratio against its standard. The ultimate standing of a firm in the industry can be obtained only after aggregating information on such

performances in respect of each ratio. The use of a composite ratio, which represents a single index made up of the weighted average of some important or representative ratios, may reduce such difficulties in inter-firm comparison. Since the composite ratio indicates the overall financial health of a firm, a comparison of the composite ratio of a participating firm with the corresponding composite ratios of other similar firms would immediately reveal its out performance, or otherwise, in relation to other firms.

Thus, in conclusion it may be said that composite ratios may be more useful for inter-firm comparison.

6.6 Select Readings

- Banerjee, B., *Financial Policy and Management Accounting*, Prentice Hall of India Pvt. Ltd., New Delhi, 2005.
- Pandey, I.M., *Financial Management*, Vikas Publishing House Pvt. Ltd., 1999.

6.7 Questions

Long – Answer type :

- (1) Why is inter-firm comparison necessary?
- (2) Discuss the pyramid structure of ratios used for inter-firm comparison.
- (3) Discuss the procedure for inter-firm comparison.

Short – Answer Type :

- (4) Define 'inter-firm comparison'.
- (5) What are the pre-requisites for successful inter-firm comparison?
- (6) Why are composite ratios more useful for inter-firm comparison?

Objective Type :

- (7) Fill in the blanks:
 - (a) Inter-firm comparison is also referred to as _____.
 - (b) The four levels of 'pyramid structure of ratios' from top to down are _____, _____, _____ and _____.
 - (c) ROCE is the _____ in the pyramid structure.
 - (d) The two supporting ratios in the pyramid structure are _____ and _____.

[Hints : (7)(a) cross-sectional analysis; (b) primary ratios, supporting ratios, general explanatory ratios and specific explanatory ratios; (c) primary ratio; (d) operating margin on sales and capital turnover ratio.]

Unit-7 □ Concept of Stock Market Efficiency

Structure

- 7.1 Introduction**
- 7.2 Meaning of efficient stock market**
- 7.3 Random walk and market efficiency**
- 7.4 Different forms of market efficiency**
- 7.5 Anomalies of market efficiency**
- 7.6 Role of financial analyst in an efficient market**
- 7.7 Select Reading**
- 7.8 Questions**

7.1 Introduction

The capital market acts as one of the long-term sources of funds for business enterprises. It discharges the important function of transfer of savings, especially of the household sector to companies, government and public sector bodies. The capital market has two wings – primary or new issue market where securities are first floated and secondary or stock market where existing securities are traded. The role of the stock market towards economic development of a country is quite significant. It imparts liquidity to the securities held by the investors, provides price continuity to the securities traded and reflects the intrinsic worth of a firm through the market prices of its securities. The prices of a company's securities, as quoted by the stock market, serve as important benchmark for the investors, lenders, customers and suppliers in deciding about their future relationship with the company. That is, a favourable price movement helps the company in procuring further capital easily, obtaining credit facilities from lenders and hence running its business smoothly. Thus, the importance of the secondary market i.e., the stock market cannot be ignored. The concept of capital market efficiency is typically related to the stock market. In the following sections, the conceptual basis of stock market efficiency has been discussed in detail.

7.2 Meaning of Efficient Stock Market

An efficient stock market is defined as one in which security prices always fully reflect all available information concerning the securities traded. That is, in an efficient

stock market, security prices adjust instantaneously and in an unbiased manner to any new information becoming known to the market. Such a market is termed efficient because it properly fulfils the primary role of a stock market that of providing accurate signals for investor choices and decisions of lenders, suppliers, customers and other stakeholders by way of reflecting all available information in security prices.

Stock market is termed efficient if security prices 'fully reflect' the information available. By 'fully reflecting' we mean that knowledge of such information does not allow anyone to speculate and earn profit from it because security prices already incorporate such information. Thus, if it is found that the security prices in any particular stock market behave in such a way that speculation based on any price related information is not successful, then such a stock market can be identified as an efficient one. It may however be noted that since it is not possible to test market efficiency as regards every possible type of information in each stock market around the world, it is common to accept the stock markets as efficient provided the contrary evidences of inefficiency are few in number.

7.3 Random Walk and Market Efficiency

Until recently, the stock market participants widely believed that the past series of security price movement in any stock market contain useful information for the prediction of future movement of security prices because general patterns keep repeating at regular intervals. Charts and diagrams of stock price behaviour of any company also seem to support their belief because they exhibit systematic trends and patterns thereby suggesting that knowledge of past price behaviour can be used to predict the future.

H.V. Roberts first questioned the existence of systematic patterns in stock prices in his article entitled "Stock market patterns and financial analysis: methodological suggestions" published in March, 1959 issue of *The Journal of Finance*. He demonstrated that although the actual stock price series might exhibit some systematic patterns, no pattern can be observed in successive stock price changes. Thus emerged the concept of *random walk hypothesis* which says that stock price changes behave in a random manner i.e., pattern-less manner as the successive changes are practically independent over time. The random or pattern less behaviour of stock price changes naturally implies that efforts to predict future security prices based on historical price information would be a fruitless exercise. Accordingly, the various chartist methods and mechanical trading rules based on the belief in systematic stock price patterns can be of no use if random walk hypothesis holds good. Subsequent to *H.V. Roberts*, several other researchers have found substantial empirical support for random walk hypothesis.

The efficient stock market theory provides an explanation for the random walk hypothesis. According to efficient market theory, the stock market is considered efficient if it rapidly and instantaneously incorporates into security prices, in an unbiased manner, the value implications of any information released to the market. In such a case, stock price changes will behave in a random, rapid and instantaneous manner and, as a result, no pattern can be observed in such changes. If, however, the stock market is inefficient i.e., there is a delayed or gradual incorporation of the impact of new information into security prices, some sort of pattern may well be observed in stock price changes. Thus, efficiency in stock market automatically ensures that random walk hypothesis holds.

7.4 Different forms of Market Efficiency

Since the definition of efficient stock market emphasizes upon full reflection of available information into security prices, efficient stock markets can be classified into the following three forms depending on the information set that is fully reflected in security prices—

- (i) Weak form of efficiency where the available information set is the past sequence of security prices;
- (ii) *Semi-strong form* of efficiency where the information set available is all publicly available information such as financial statements, company press releases, government reports, industry reports and analysis etc., and
- (iii) *Strong form* of efficiency where the available information set includes all information including privately held (inside) information.

In order to identify whether weak form or semi-strong form or strong form of efficiency prevails in the stock market, it becomes necessary to examine the particular subsets of information that is fully reflected in the security prices of that market. Thus, the following empirical tests may be conducted to determine the form of efficiency in any particular stock market.

(a) Weak form Tests : Since random walk hypothesis holds good in the stock market, it shall not be possible to predict the future movement in stock prices based on series of past security prices in a weak form of efficient capital market where the information available is only historical price data. Thus, evidences of random walk phenomena generally confirm the existence of weak form of efficiency in stock market. Accordingly, the following two issues may be examined to determine whether a particular stock market has weak form of efficiency or not—

(1) extent of dependence in successive stock price changes – such dependency should be negligible in a weak form of efficient stock market so that stock price series could well be approximated by a random walk; and

(2) profitability of trading systems— such trading systems should not be at all profitable in weak form of efficiency because negligible price dependencies do not result in large price increases being followed by further increases thereby eliminating the possibility of earning abnormal returns by buying the stock after first increase and selling them after subsequent increases.

(b) **Semi-strong form tests** : These kind of tests are primarily concerned with whether current security prices fully reflect all publicly available information i.e., such tests focus on the speed of price adjustment to any new information revealed by the company or to a specific kind of event like annual earnings announcements, issue of stock etc. If the results of such tests indicate a quick price adjustment process, then it would imply a semi-strong form of efficient stock market. It naturally follows from the semi-strong form tests that – (1) financial statements are not the only source of information for making investment decisions as investors are found to use other sources of publicly available information too, and (2) no trading advantages accrue to the investors because the information released to the market is instantaneously incorporated into security prices at the time of its release.

(c) **Strong form tests** : Tests of the strong form of stock market efficiency characterized by inside information subset should seek answer to the question whether there are individuals who have access to such information that is not generally available and hence not fully reflected in security prices. That is, such tests should examine whether there are individuals who have monopoly power on information relevant for formation of security prices. The theory points to the existence of such individuals like corporate executives referred to as corporate insiders, large stock brokers and fund managers of mutual funds who have monopolistic access to information about the firm. But as evidences suggest that corporate insiders are prohibited from dealing in inside information, the number of large stock brokers is limited and fund managers do not usually use inside information for the benefit of fund's shareholders, the practical impact of monopolistic power of these individuals is rather limited.

Thus, the above discussion on tests of the various forms of market efficiency suggests that the stock markets the world over are either of weak form or semi-strong form, but not quite of strong nature.

7.5 Anomalies of Market Efficiency

In an efficient stock market, security prices will adjust instantaneously to any new information when it is placed in the public domain and it shall not be possible to develop trading strategies, based on publicly available information, that yield abnormal returns.

But a sizeable number of research studies, based primarily on U.S. and other stock markets of the West, have reported results inconsistent with the efficient market model. Such results have been labeled as *efficient stock market anomalies*. The important anomalies, which may occur in Indian stock market conditions, have been discussed in brief below.

(i) **January effect** : A common empirical finding across many stock exchanges of the world is that the stock markets perform relatively well during the month of January in comparison to the remaining 11 calendar months i.e., the average returns in January exceed those in each of the other 11 months. Such a finding seems to be a violation of the weak form of efficient market model because knowledge of this pattern can result into abnormal returns by buying stock in end December and selling them in January next year. The January effect in security returns, as documented in several research studies, appears concentrated in the smallest firm size categories.

(ii) **Monday/Weekend effect** : Evidences also exist of a second form of seasonality, a particular day of the week seasonal pattern. The study on U.S. stock returns from the close of the prior trading day to the close of the current trading day for each trading day of each week have showed that it is only Mondays, among the five trading days of the week, which exhibit strong and persistent lower average returns. However, it has also been observed that, as U.S. stock markets have a worldwide effect, European and North American stock markets exhibit lower average returns on Monday itself due to their geographical proximity with U.S. whereas Far Eastern stock markets, being located on diametrically opposite side of the globe, experience lower average returns on Tuesdays. Like January effect, Monday effect also seems to be more prominent for small firm size categories.

As the Monday effect indicates that market prices of securities tend to open at lower levels on Mondays after the weekend, it provides an opportunity for the speculators to earn profit by selling stock at Friday close and buying them on Monday morning. This is clearly inconsistent with efficient market theory.

(iii) **Post Announcement Drift** : The efficient market hypothesis implies that once earnings information are announced, it shall not be possible to develop a profitable trading strategy based on the magnitude of earnings because security prices instantaneously incorporate such earnings figure on its release. But empirical evidence suggests that the price adjustment is not instantaneous and it takes some time for the security prices to reflect full value of the released information. It has been found that stock price changes persist for atleast 3 months subsequent to the release of earnings information, which, in effect, is a contravention of efficient market theory. Research studies have also established that post announcement drift is more pronounced for small size firms.

(iv) **Price-to-Earnings (P/D) Ratio Anomaly** : Stock market efficiency implies that a publicly observable variable cannot be used to discriminate between securities in respect of differential abnormal returns arising subsequent to the release of information on such variable. But research studies report results inconsistent with such implications of efficient market theory. It has been found in many studies that securities of firms with low P/E ratios outperform those with high P/E ratios and also the market subsequent to the release of earnings figure used to compute the P/E ratio. This naturally suggests that investing in a portfolio of firms with low P/E ratios would be a profitable investment strategy thereby casting a doubt on the efficient market model.

(v) **Firm-size effect** : Being first observed in U.S. stock markets and then in the stock markets of several other countries, smaller firms, as measured by total assets or total market capitalization (i.e., no. of outstanding shares x market price per share), tend to outperform larger firms and also the market. This implies that investing in a portfolio of small-sized firms would be a sound investment strategy. But such an observation is clearly in contravention of efficient market theory because it should not have been possible to discriminate between securities of different firms based on their sizes and earn abnormal gains had the stock markets been efficient in nature.

The firm size effect is inter-linked with other anomalies. As smaller firms yield abnormal returns meaning thereby that current market prices of such firms' securities are unable to capture earnings information properly, such firms have typically low P/E ratios. Also, January effect, Monday effect and post announcement drift are more pronounced for small firms' stocks.

As possible explanations of the firm size effect it has been cited that—

(a) as fewer security analysts follow smaller companies than larger ones, not all information available about these companies are immediately incorporated in stock prices thereby leaving scope for abnormal returns to be earned by those who trade on uncaptured information early enough. The excess returns on small firms' stocks may thus represent compensation for the cost and difficulty of analyzing under followed companies;

(b) as smaller firms are less liquid than larger ones, delay may be experienced when investors wish to effect a trade based on market information. As a result, security prices shall not instantaneously react on release of information and give opportunities to the firms' investors to earn abnormal returns;

(c) as smaller firms have a grater likelihood of becoming bankrupt than larger ones, the additional returns on small firms' stocks may represent compensation for the additional risk of bankruptcy assumed by the investors of such stocks.

(vi) **Book-to-market ratio effect** : The book value per share refers to the intrinsic worth of each share of a firm. A number of research studies have found that firms with

higher book-to-market ratios yield higher average monthly returns than the firms with lower book-to-market ratios thereby suggesting that investing in firms with high book-to-market ratios would be a sound investment strategy. This is inconsistent with efficient market theory.

(vii) **Over reactive markets: Contrarian strategy** : It has been found in a research study that if stocks are ranked by their performance over the previous five year period (referred to as the base period) then the firms with the worst base period investment performance outperform those firms with the best base period performance over the next three years. This suggests that the markets overreact and a contrarian investment strategy of buying the recent losers and avoiding the recent winners will be successful. This kind of result is again inconsistent with efficient market theory.

The market overreaction argument can be extended to explain the book-to-market ratio phenomena. It may be argued that when a firm's earnings decline, the market overreacts driving the prices down sharply and hence book-to-market ratio up. Similarly, when a firm reports good earnings, the market chases the stock prices up and hence the book-to-market ratio down. Over time, the extent of overreaction becomes clear and the prices reverse thereby yielding above average returns for high book-to-market ratio firms and below average returns for low book-to-market ratio firms.

In spite of the above-mentioned anomalies, efficient market theory is accepted because several non-market inefficiency explanations exist for such anomalous evidences.

7.6 Role of Financial Analyst in an Efficient Market

Efficiency shall prevail in the stock market only if the investors act upon any publicly available relevant information to adjust security prices instantaneously to such information. So, the pertinent question that needs to be answered before discussing the role of a financial analyst in an efficient stock market is whether investors at all use financial statement information for investment decision making. Several research studies, the noted ones being Ball and Brown (1968) study, Beaver (1968) study and Ou (1990) study, had been conducted to determine the extent of use of financial data by the investors for their investment decisions.

By using a sample of 261 New York Stock Exchange (NYSE) listed firms between the period 1957-1965 and segregating the sample firms into 'good news' (i.e., where actual earnings change was greater than expected earnings change) and 'bad news' (i.e., where actual earnings change was lower than expected earnings change) portfolios, Ball and Brown found that stock prices of 'good news' portfolio had increased while that of 'bad news' portfolio had decreased over a period of 12 months prior to the income

announcement month and 2 months subsequent to it. This suggests that if reported income number conveys new information that has not been expected by the market and hence not already incorporated in stock prices, the market reacts to the released income number and adjusts security prices to the new and relevant information.

Unlike Ball and Brown study which examined only the stock price reaction to new releases, Beaver examined both the stock price and trading volume reaction to new information disclosed by the firms. Using a sample of 143 firms mainly in the food processing and textile industries in the U.S. over the period 1961-1965, Beaver compared the volume of transactions in the vicinity of the release date with the volume for the rest of the year and also the variability of security returns for the announcement period with that of non-announcement period. Beaver observed both increased trading volume and increased security return variability in the earnings announcement week as compared to the non-announcement period thereby suggesting that financial statement information is useful to investors.

Unlike the previous two studies, Ou tried to examine whether security prices react only to changes in current earnings or also to changes in expected earnings. For the said purpose, Ou partitioned the selected firms into 'good news' and 'bad news' categories based on both current year's earnings and a forecast for the next year's earnings. This resulted into the formation of four different portfolios – good news for both current and next years, bad news for both current and next years, good news for current year but bad news predicted for next year and bad news for current year but good news predicted for next year. As expected, Ou observed a continuous stock price increase for portfolios showing good news current year and a continuous price decrease for portfolios showing bad news current year upto end December. From January onwards, good news forecast for next year showed an upward stock price movement while bad news forecast for next year showed a downward movement thereby indicating that the market reacts to both current changes in earnings and changes in expected future earnings and hence stock prices can be used to forecast future earnings. Thus, all the three research studies had confirmed that investors use published financial statement information for investment decision making.

Given that the investors use financial data, the next question that must be addressed before examining the role of financial analyst is whether the firm can use earnings management techniques available under Generally Accepted Accounting Principles (GAAP) to inflate stock prices and fool the investors in an efficient stock market. Several research studies examining the effect of alternative depreciation, inventory valuation and inter-corporate investment methods etc. on investor decisions had suggested that investors do not blindly accept the financial information at face value, but adjust the financial statements for the effect of alternative accounting methods and react only to real

economic changes. In this backdrop, the role of financial analyst in an efficient stock market can be effectively discussed.

Since stock price changes behave randomly in an efficient market, the various chartist methods and mechanical trading rules and other tools of technical analysis based on the assumption of dependencies in successive stock price time series cannot be used to systematically earn abnormal returns and hence are useless in an efficient stock market. This, however, does not imply uselessness of security analysis in an efficient market because efficiency can be achieved only by analysing relevant information promptly and perceptively. *Fundamental analysis* might be financially rewarding in an efficient market if the analyst focuses on development and use of prediction models to systematically uncover inside information and successfully predict future financial results on which to base the intrinsic value of a security and hence determine whether such value is likely to deviate from market prices. The knowledge of such deviations will enable the investor to earn above-average gains by buying when the prevailing market prices are lower than intrinsic value and selling when the market prices are above intrinsic value. As it is illegal to trade on inside information obtained from corporate insiders, the focus in fundamental analysis is on creating privately held inside information from publicly available data by use of extremely advanced and sophisticated analytical, statistical and computer techniques that are inaccessible to general market participants. However, it must be noted that as market prices incorporate all publicly available information in an efficient market, extensive use of the prediction model in investment decisions will soon result in market prices reflecting the value of the predictions and make the analytical tools useless over time. That is, the analytical tools are self destructive in an efficient stock market unless kept secret and even then their useful life are relatively short and hence efforts should be continuously made to design new and original tools and techniques and obtain access to new information sources. Moreover, as the investors may not be rewarded with above-average gains if the cost of processing publicly available information into inside information exceeds the expected benefits, another important role of financial analyst in an efficient stock market is to reduce such information processing costs to the extent possible.

Thus, the major conditions for successful financial analysis in an efficient stock market are a profound understanding of the impact of firm and economy wide events on stock prices, ingenuity, originality and secrecy in developing analytical tools and alertness in using them.

7.7 Select Readings

- Foster, G., *Financial Statement Analysis*, Pearson Education, 2000.

- Lev, B., *Financial Statement Analysis : A New Approach*, Prentice Hall, 2000.
- White, Sondhi & Fried, *The Analysis and Use of Financial Statements*, John Wiley & Sons, 2003.

7.7 Questions

Long – Answer type :

- (1) Discuss the various forms of efficient stock market. Also elaborate the empirical tests that may be conducted to determine the form of efficiency in any particular stock market.
- (2) Discuss briefly the anomalies of efficient stock market.
- (3) Explain the role of financial analyst in an efficient stock market.

Short – Answer Type :

- (4) Define an efficient stock market.
- (5) Explain how efficient market theory provides an explanation for random walk hypothesis.
- (6) “Investors use published financial statement information for their investment decision making” – What empirical evidences do we have in support of this observation?

Objective Type :

- (7) Match the following :—
- | | |
|--|---|
| (i) Efficient stock market | (v) Over reactive market theory |
| (ii) January effect | (a) Average returns are higher in comparison to the rest of the year |
| (iii) Conditions for successful financial analysis in efficient stock market | (b) Buy the recent losers and avoid the recent winners |
| (iv) Random walk hypothesis | (c) Stock prices instantaneously and fully reflect all available information |
| | (d) Stock price changes behave in a patternless manner |
| | (e) Ingenuity, originality and secrecy in developing analytical tools and alertness in using them |

[Hints : (7) (i) – (c); (ii) – (a); (iii) – (e); (iv) – (d); (v) – (b)]

Unit-8 □ Corporate Sickness

Structure

- 8.1 Introduction
- 8.2 Meaning of corporate sickness
- 8.3 Causes of corporate sickness
- 8.4 Symptoms of sickness
- 8.5 Suggested measures for revival of sick companies
- 8.6 Select Reading
- 8.7 Questions

8.1 Introduction

Incidence of corporate sickness is a matter of grave concern because of its far reaching implications for the entire economy and the industry in particular. The phenomenon of corporate sickness tends to aggravate the problem of unemployment, renders the capital investment as a wasteful expenditure and creates adverse climate for industrial growth. That is, it has a crippling effect on the economic development of any nation. The incidence of corporate sickness has been on the rise in India. Thus, this unit has been undertaken to discuss the meaning of corporate sickness, causes of sickness, symptoms of sickness and measures for revival of sick companies in Indian context.

8.2 Meaning of Corporate Sickness

The terms 'failure', 'bankruptcy' and 'sickness' are often used interchangeably. *Failure* may be defined as default in payment of either bond interest or preference dividend. That is, the test of failure is the inability of the firm to meet its maturing obligations. However, such failure may either be in the nature of temporary liquidity embarrassment in case of which it is known as *technical insolvency*, or, in the extreme case, may be an irretrievable state of solvency wherein the liabilities of the firm exceed the fair value of its assets, which is known as *real insolvency*. *Bankruptcy* is a specific legal event taking place at a definite point of time as a result of which the firm ceases its operations voluntarily or involuntarily. Bankruptcy is the conclusive evidence of the firm having failed. Thus failure, in economic sense, may start several years prior to bankruptcy proceedings. The term 'sickness' is usually used to mean failure of a firm.

India appears to have coined her own terminology of 'corporate sickness'. According to *State Bank of India's* observations on Small Scale Industries in the year 1975, a 'sick unit' is one which fails to generate internal surplus on a continuous basis, and depends for its survival on frequent infusion of external funds. The *Reserve Bank of India* (RBI) has set three objective criteria for determining sickness in industry. These are – (a) cash losses i.e., losses before charging depreciation for three consecutive years (i.e., previous year, current year and next year), (b) current ratio falling below 1 (i.e., indicating negative working capital), and (c) deterioration in debt to equity ratio (i.e., total outside liabilities/net worth). The Sick Industrial Companies (Special Provisions) Act, 1985 (SICA), as amended in 1993, provides for the following two different stages of sickness of an industrial company in India :—

(i) *Incipient sickness* – this refers to a situation when 50% or more of the company's peak net worth during the preceding four year period has been eroded by cash losses, and

(ii) *Sickness* - when it has been firmly established – this occurs when the company has been in operation for atleast five years, and its accumulated losses either equal or exceed the entire net worth.

Thus, having made the definition of corporate sickness clear to the readers, the next task is to examine the factors that are responsible for such sickness. This is done in the next section.

8.3 Causes of Corporate Sickness

There are numerous causes for corporate sickness, the noted ones being lack of planning and imperfect project formulation, choice of a product without analysing the market, improper site selection, tardy implementation of the project, sudden change in government policy leading to lifting of economic protection on certain classes of industries, over spending on essentials, absence of control on borrowings, dishonest practices on the part of the management etc. The causes for sickness may vary from one company to the other. But the various common causes may be grouped under two categories – (a) internal, and (b) external. The Tiwari Committee (constituted by Reserve Bank of India to suggest remedial measures for reviving sickness in India), in its report submitted in 1983, had classified the various causes of sickness into several heads under each of the above categories as detailed below.

A. *Internal Causes*

1. Planning

(a) ***Technical feasibility*** : Inadequate technical know how, locational disadvantage, out-dated production process.

(b) **Economic viability** : High cost of inputs, too high break-even point, uneconomic size of project, under-estimation of financial requirements, unduly large investment in fixed assets, over-estimation of demand.

(c) **Financial management** : Poor resource management and financial planning, faulty costing, liberal dividend policy, general financial indiscipline and application of funds for unauthorized purposes, deficiency of funds, over-trading, unfavourable gearing or maintaining adverse debt-equity ratio, inadequate working capital, absence of cost consciousness, lack of effective collection machinery.

2. **Implementation** : Cost overruns resulting from delays in getting licenses/sanctions etc., inadequate mobilisation of finance.

3. **Production**

(a) **Production management** : Inappropriate product mix, poor quality control, high cost of production, poor inventory management, inadequate maintenance and replacement, lack of timely and adequate modernization etc., high wastage, poor capacity utilization.

(b) **Labour management** : Excessively high wage structure, inefficient handling of labour problems, excessive manpower, poor labour productivity, poor labour relations, lack of trained/skilled component personnel.

(c) **Marketing management** : Dependence on a single customer or a limited number of customers/single or a limited number of products, poor sales realization, defective pricing policy, booking of large orders at fixed prices in an inflationary market, weak market organization, lack of market feedback and market research, lack of knowledge of marketing techniques, unscrupulous sales/purchase practices.

(d) **Financial management** : The same causes as those appear under the sub-head 'financial management' of the head 'planning' are listed here by the Tiwari Committee.

(e) **Administration Management** : Over-centralisation, lack of professionalism, lack of feedback to management i.e., lack of effective management information system, lack of controls, lack of timely diversification, excessive expenditure on research and development, dividend loyalties (i.e., where the promoters of limited companies, who also own private companies, tend to look after the interests of the latter at the cost of the former), dissent within the management, incompetent management, dishonest management.

B. **External Causes** :

(a) **Infrastructural bottlenecks** : Non-availability/irregular supply of critical raw materials or other inputs, chronic power shortage, transport bottlenecks.

(b) **Financial bottlenecks** : Non-availability of adequate finance at the right time.

(c) **Government controls and policies etc.** : Government price controls, fiscal duties, abrupt changes in government policies affecting costs/prices/ imports/exports/ licensing,

procedural delays on the part of the financial/ licensing/other controlling or regulating authorities like banks, RBI, financial institutions, government departments, licensing authorities, Monopolies and Restrictive Trade Practices (MRTP) board etc.

(d) **Market constraints** : Market saturation, revolutionary technological advances rendering the products obsolete, recession – fall in domestic/ export demand.

(e) **Extraneous factors** : Natural calamities, political turmoil (both domestic and international), strikes and multiplicity of labour unions.

It may be noted that the above-mentioned causes have been adapted from Tiwari Committee Report. In reality, a combination of above factors would normally be responsible for sickness in any company and hence attributing sickness to one particular cause may not be correct.

8.4 Symptoms of Sickness

The most critical issue regarding corporate sickness is identifying those events which should serve as early warning signals of an impending sickness in order to enable the management to take corrective measures for avoiding the same. That is, it is necessary to identify the various symptoms of sickness (or the indicators of the existence of sickness) as the study of these symptoms is the key to correct diagnosis of sickness.

The Tiwari Committee had identified the following symptoms which would help in the detection of corporate sickness at the beginning or incipient stage.

- (i) Continuous irregularity in cash credit accounts.
- (ii) Low capacity utilization.
- (iii) Profit fluctuations, downward trends in sales and stagnation, or fall in profits followed by contraction in the share of the market.
- (iv) Higher rate of rejection of goods manufactured.
- (v) Reduction in credit summations (i.e., whenever the companies are in financial difficulty, they open a separate account with another bank and deposit all collections therein).
- (vi) Failure to pay statutory liabilities.
- (vii) Larger and longer outstandings in the bill accounts.
- (viii) Longer period of credit allowed on sale documents negotiated through the bank and frequent returns by customers of the same.
- (ix) Constant utilization of cash credit facilities to the maximum and failure to pay timely instalment of principal and interest on term loans and instalment credits.

- (x) Non-submission of periodical financial data/stock statement, etc. in time.
- (xi) Financing capital expenditure out of funds provided for working capital purposes.
- (xii) Decrease in working capital on account of:
 - (a) increase in non-paying debtors and particularly irrecoverable dues from selling agents,
 - (b) increase in creditors, and
 - (c) increase in inventories which may include large number of slow or non-moving items.
- (xiii) A general decline in that particular industry combined with many failures.
- (xiv) Rapid turnover of key personnel.
- (xv) Existence of a large number of law suits against the company.
- (xvi) Rapid expansion and too much diversification within a short time.
- (xvii) Sudden/frequent changes in management – whether professional or otherwise, and/or the management being dominated by one man or a few individuals.
- (xviii) Diversion of funds for purposes other than running the unit.
- (xix) Any major changes in the shareholders.

Thus, as can be seen from above, the Tiwari Committee had enlisted as many as 19 common symptoms of corporate sickness in its report. Yet, the list may not be exhaustive. There may be several other symptoms of corporate sickness which could be identified with more experience in this regard.

8.5 Suggested Measures for Revival of Sick Companies

The necessity of revival of sick industrial companies needs no special mention as it is crucial for economic development of any country. The provisions of SICA i.e., Sick Industrial Companies (Special Provisions) Act, 1985, as amended subsequently in 1993, are worth mentioning in this regard. Based on the recommendations of Tiwari Committee, the Government of India had enacted SICA in the year 1985 to secure timely detection of 'sick' and 'potentially sick' companies owning industrial undertakings so that speedy action for their revival and rehabilitation may be undertaken by a body of experts. SICA has also recognized the need for closing down non-viable sick industrial companies so as to salvage their productive assets and realize from them the amounts due to creditors, lenders, banks and financial institutions. Thus, SICA is based on the principles of conservation of scarce resources and their optimal use for common good.

SICA seeks to monitor corporate sickness in India through the instrumentality of the Board for Industrial and Financial Reconstruction (BIFR), a quasi-judicial apex authority

formed under the Act, and vested with wide ranging and overriding powers in the area of finance, management and hence revival of sick Indian companies. The step by step procedure that is involved in monitoring and revival of corporate sickness by BIFR is as follows :—

(i) The Act provides for two different stages at which the companies are to report to BIFR (also referred to as the 'Board'). The first is at the 'early warning' or *incipient stage* and the second is at the stage when sickness has been firmly established. Note that the meanings of incipient sickness and sickness have already been explained in section 8.2 before. The fact of sickness, whether incipient or otherwise, can be easily detected from the audited accounts of the company.

(ii) Thereafter, sickness has to be reported to BIFR by the company's board of directors within 60 days from the date of finalisation of audited accounts of the company for that financial year at the end of which incipient sickness or sickness has been detected. The board of directors of the sick company has also been empowered to report sickness on its own accord even before the audited accounts are finalized provided it forms a collective opinion that the company has become sick within the meaning of the Act. Alternatively, the Central Government, any State Government, the RBI, or any public financial institution like ICICI, IFCI, IDBI, IRBI etc., state level institutions, viz., SFCs, and any other financial institutions or scheduled banks having a financial stake in the company, can also refer the matter of sickness to BIFR.

(iii) On such reference being made by the sick company, the BIFR may require any 'operating agency' to enquire fully into the matter of sickness. Operating agencies are the public financial institutions like ICICI, IFCI, IDBI and 'such other institutions' as the Central Government may, by notification, specify. There is, however, the reservation that no institution will be designated as an operating agency unless it has been established by a Central Act, or no less than 51% of its paid-up share capital is held or controlled by the Central Government and/or by any of the above noted institutions, jointly or severally. The operating agency must complete the enquiry within 60 days, but this period may be extended for reasons to be recorded in writing. The Act does not, however, prescribe any overall limit in case the extension of time is granted.

(iv) After receiving the enquiry report from the operating agency, BIFR shall make necessary scrutiny of the same and undertake any of the following actions :—

(a) If BIFR is satisfied that the company will be able to make its net worth positive 'within a reasonable time', it shall allow the company a specified period of time for improving its performance subject to such restrictions and conditions as are considered necessary (the measures that may be adopted by the management to revive its sick company will be narrated following this discussion on revival measures undertaken by BIFR).

(b) If BIFR feels that the company will not be able to rehabilitate itself but there is scope for revival, it will ask the operating agency to prepare, within 90 days, a scheme providing for one or more of the following :—

- reconstruction, revival or rehabilitation of the sick industrial company;
- proper management of the sick industrial company by a change in or takeover of management of the company;
- amalgamation with any other industrial company;
- sale or lease of a part or whole of any industrial undertaking of the sick company;
- such other preventive, ameliorative and remedial measures as may be appropriate, and
- such incidental, consequential or supplemental measures as may be necessary or expedient for the measures specified above.

After the scheme is prepared by the operating agency, BIFR shall forward a draft copy of the scheme to the sick company concerned, the operating agency which has framed the scheme and the transferee industrial company, if any, for their objections and suggestions. The draft scheme, thereafter, shall be sanctioned by BIFR with or without the modifications suggested and then implemented.

As a matter of administrative convenience, the Act provides that from the time the enquiry is initiated by BIFR till the time the scheme is implemented, no proceeding for winding up or enforcement of execution of any decree against the company will be allowed. Also, where there has been a change in the management of the sick company, neither shareholders nor any other person can nominate or appoint any one to be a director of the company and all resolutions passed by the company shall be subject to the approval of BIFR.

(c) If BIFR feels that there is no scope for revival of the sick company in the foreseeable future or if the company fails to rehabilitate itself inspite of being given the opportunity by BIFR [i.e., under option (a)], the BIFR shall refer the matter to the High Court for compulsory winding up of the sick company.

When asked by BIFR to revive the sick units [under option (a)], the management of the sick company should conceive of a strategy that includes both short term measures to improve profitability and cash position, and long term measures for future development. A successful revival scheme designed by the management must aim at reducing operating losses gradually, operating at break-even level and producing surplus sufficient to convert negative net worth to positive one. Thus, any such revival scheme must begin with a 'diagnostic study' or preparation of revival scheme which involves identifying four "R's" – reasons, rationale, risks and requirements - as follows :—

(1) *Reasons for Sickness* : the 'real reasons', as compared to the 'apparent reasons' for sickness should be identified first. That is, misdirected efforts and resources arising from wrong diagnosis should be avoided.

(2) *Rationale for Revival* : establishing the justification for revival is very important as it helps in the identification of viable and non-viable units.

(3) *Risks* : the risks inherent in the revival should be evaluated because the revival operation of a sick company, even if found to be potentially viable, is an onerous task as it is more likely to fail than succeed.

(4) *Requirements* : after the diagnostic study, there is a need to identify the requirements for revival in terms of resources, technology, government help, management skills and approaches, productivity etc. and prioritise the 'thrust areas' for successful implementation of revival program. It should, however, be noted that the revival scheme might fail if there is any mismatch between the requirements and their availability. A few common requirements for revival of sick companies are listed below.

(a) *Redeployment of surplus labour or redundancy payment*: This is necessary to avoid political or social unrest.

(b) *Productivity* : Work culture, work ethos and motivation of personnel must be maintained, grievances should be sorted out as fast as possible, discipline should be introduced and administered, fair and impartial deals should be encouraged and incentive wage schemes should be introduced to enhance productivity.

(c) *Capacity utilisation* : Attempts are to be made to increase capacity utilisation through technology upgradation, better product-market compatibility and other such measures.

(d) *Modernisation and technology upgradation* : This is to be done in the most cost-effective manner and under a time-bound programme.

(e) *Sound Financial Management* : This involves improvement in effectiveness of inventory management, credit management and management of losses.

(f) *Product – market compatibility* : Through proper market research and surveys, the product portfolio should be re-arranged so as to make it oriented towards the changed and emerging needs. This necessitates introduction of the 'marketing concept' and a 'marketing oriented culture' across all levels and all functional areas of management.

(g) *Following the principle of 'Quality', 'Cost', 'Delivery' and 'Technology' (QCDT) in sequential order* : This means that efforts should be made so that high quality of the product is maintained, the product is produced at a competitive cost, the delivery schedule is strictly adhered to and change in technology is taken care of.

(h) *Streamlining management* : This means bringing about a total reform in the management system in order to improve its effectiveness and hence rebuild the company's shattered image.

(i) *Change in government policy measures* : The government can also provide considerable help to revive sick companies by way of speeding up licence issues, issue of permits and supply of controlled inputs, and also by reducing the burden of indirect taxes like excise duties in order to reduce selling prices of the products and hence increase their demand and help the companies to overcome sickness.

(i) *Instilling an effective monitoring system* : Ensuring a performance monitoring system and an effective information system are also necessary for successful revival of a sick company.

To conclude it may be said that prevention is always better than cure. So, more emphasis should be laid on preventing sickness rather than curing the same when it has already occurred. Corporate sickness may be prevented if adequate measures such as keeping pace with the change in technology to meet customers' changing demands or tastes, conducting constant market research and surveys to adjust product design, product quality and product mix accordingly, facilitating better industrial relations and productivity, promoting effective utilisation of financial resources etc. are undertaken to maintain good health of the firm.

8.6 Select Readings

- Banerjee, B., *Financial Policy and Management Accounting*, Prentice Hall of India Pvt. Ltd., New Delhi, 2005.
- Lev., B., *Financial Statement Analysis: A New Approach*, Prentice Hall, 2000.
- *Sick Industrial Companies (Special Provisions) Act, 1985*.

8.7 Questions

Long answer type :

- (1) What, according to Tiwari Committee, are the common causes of corporate sickness?
- (2) Discuss the provisions of SICA regarding revival of sick industrial companies in India.
- (3) What measures may be taken by the management to rehabilitate its sick company?

Short – Answer Type :

- (4) Define 'Corporate Sickness'.
- (5) What could be the symptoms of sickness?

(6) When and in which areas can the operating agency prepare a scheme for revival of a sick company?

Objective Type :

(7) State whether the following are true or false:

(a) Bankruptcy is the conclusive evidence of failure of a firm.

(b) Incipient sickness occurs when accumulated losses of the company over the past 5 years of operations either equal or exceed the net worth.

(c) BIFR is constituted to identify incipient sickness among companies in India.

(d) Any public financial institutions or such other institutions, as may be notified by the Central Government, are entitled to act as 'operating agencies'.

[Hints : (7)(a) True; (b) False; (c) False; (d) True.]

Unit-9 □ Prediction of Bond Risk and Credit Rating

Structure

- 9.1 Introduction
- 9.2 Types of risks in holding corporate bonds
- 9.3 Meaning of bond risk premium
- 9.4 Model for prediction of bond risk premium
- 9.5 Utility of forecasting bond risk premium
- 9.6 Meaning of credit rating
- 9.7 Model on forecasting credit rating
- 9.8 Credit rating and accounting ratios
- 9.9 Cash flows and credit rating
- 9.10 Select Reading
- 9.11 Questions

9.1 Introduction

‘Risk’ may be defined as a situation where each action of the decision maker leads to one of a set of possible specific outcomes each occurring with a known probability. That is, a risky situation exists when a realized (ex post) outcome differs from an expected (ex ante) outcome. The possibility of future investment outcomes deviating from expectations thus constitutes the risk associated with holding such investments. The larger the possible deviation, the higher the risk. The dispersion of future probability distributions of investment outcomes, such as standard deviation, indicating the extent of possible deviation of actual from expected values is, therefore, a natural measure of risk of an investment in equity or bonds. In this unit we focus on various aspects of risk associated with bond holding.

9.2 Types of Risks in holding Corporate Bonds

The following are the four kinds of risks involved in holding corporate bonds :—

- (i) **Default Risk** : It refers to the possibility that the firm’s future resources will be insufficient to meet part or all of the bond interest and principal payments. This happens

when unexpected negative change in earnings of the firm is large and persistent over time thereby forcing the firm to default on its bonds. However, the extent of probable losses in the event of such default could well be reduced by the firm by incorporating certain specific provisions in the terms of the bond issue which would result in enhancing bondholders' security like pledging the bonds on assets (i.e., mortgage bonds), restricting the creation of additional debt or excessive payment of dividend till the dues of the bond under consideration are met etc. It may be noted that default risk is negligible for high grades and non-existent for government bonds.

(ii) **Interest Rate Risk** : This risk arises when unexpected changes in prevailing interest rates induced by changes in monetary policy of a nation affect the opportunity cost of holding fixed interest bonds which, in turn, inversely affect the market value of bonds. This happens because the bond's coupon rate of interest remains fixed while the market interest rate changes thereby affecting the bond yield. That is, when market interest rates increase unexpectedly, the current bond yields would no longer be sufficient to induce the bondholders to hold them and consequently a new equilibrium will be reached as bond prices would decrease (caused by selling pressure) to the level where the higher yield equals the new interest rates. Thus, the possible capital losses to the current bondholders resulting from such unexpected price decreases constitute the expected interest rate risk associated with bondholding.

Interest rate risk is a function of the bond's term to maturity i.e., the length of time from its creation until its liquidation by the firm. The longer the term to maturity i.e., the longer the duration of fixed coupon commitment, the stronger the effect of market interest changes on bond prices and the larger the unexpected bond price changes and hence the higher the risk. The prices of long term bonds are thus more vulnerable to unexpected interest rate changes than short term bonds. Moreover, interest rate risk factor applies to all bonds including government and high grade bonds.

(iii) **Purchasing power risk** : It refers to the loss in real terms sustained by bondholders during inflationary periods when the purchasing power of money decreases. A clear understanding of the difference between nominal and real interest rates is necessary to explain the nature of this risk. *Nominal interest rate* refers to the interest stated in terms of money whereas *real interest rate* refers to interest payments in terms of their command over commodities i.e., in terms of the purchasing power of money. Thus, when the general price level increases (decreases) i.e., there is inflation or deflation, the real rate of interest will be lower (higher) than the nominal interest rate. This will cause bond prices and yields to vary until bondholders obtain a nominal interest rate sufficiently high to insure the desired real rate of interest. Such unexpected changes in bond prices and consequently in bondholders' wealth thus constitute the purchasing

power risk in bondholding. As with interest rate risk, high grade and government bonds are also susceptible to purchasing power risk.

(iv) **Marketability risk** : It refers to the ease in disposing of the bond. That is, marketability risk is associated with the possible loss sustained on sale of the bond because of either small size of the issue or small number of traders thereby forcing the bondholder to sell the bond at lower bargain price, or higher transaction costs etc., especially when the bondholder is pressed for time. The degree of marketability risk is, therefore, a function of the individual properties of the bond (like size of issue) as well as of the imperfections in the market in which it is traded (like small number of traders, high transaction cost etc.). As a result, marketability risk is relatively low for large and dispersed issues traded in well organized markets but is higher for small issues and those traded over the counter. Like default risk, marketability risk is negligible for high grades and non-existent for government bonds.

Thus, the above discussion indicates that no bond is risk-free. The *lowest risk security* is probably a short-term (i.e., a week or two term to maturity) government bond for which default and marketability risks are non-existent, and because of the short term to maturity, the interest rate and purchasing power risks are negligible.

9.3 Meaning of Bond Risk Premium

It is generally observed that the capital markets, whether equity or bond markets, are dominated by risk-aversers i.e., by investors who demand a higher yield as a compensation for an increased risk. This attitude towards risk underlies the concept of *bond risk premium*, which refers to that portion of the bond's yield compensating the bondholder for the risk bearing.

L. Fisher, who developed a model for predicting bond risk premium, had technically defined bond risk premium as the difference between its market yield to maturity and the corresponding pure rate of interest. *Market yield* is defined as the rate of interest at which the principal and interest payments specified in the bond contract must be discounted if their present value is to equal the current market price of the bond. The corresponding *pure rate of interest* is defined as market yield on a risk-less bond maturing on the same day as the bond under consideration. Since no bond is risk-less (as has been indicated by the discussion in the previous section), the pure rate of interest refers to market yield on investments that are free of default and marketability risks i.e. government bonds. Thus, risk premium on a bond reflects the default and marketability risk factors and the greater the riskiness of the bond, the higher should be the extent of risk premium.

9.4 Model for Prediction of Bond Risk Premium

Using his own definition of bond risk premium (as given in section 9.3), Fisher investigated the determinants of default and marketability risks associated with bonds on the basis of a sample of 366 U.S. industrial corporate bonds. Fisher hypothesized that default risk on a bond can be estimated by the following three variables—

(i) **Measures of the variability of the firm's past earnings :** The implicit assumption in using this measure is that the time series of a firm's earnings may be treated as a random sample from a normally distributed population of potential future earnings. As a result, the variation of historical earning series can be taken as an estimate of the future variations in the underlying population. Therefore, other things equal, a firm with a low variation of earnings is less likely to default than a firm experiencing a high variation. Fisher measured earnings variability by the coefficient of variation of the firm's *net income after taxes* over 9 years and denoted this variable by x_1 .

(ii) **Measures showing how reliable the firm has been in meeting its obligations :** The firm's reliability in meeting obligations was one of the additional explanatory variables in Fisher's model. Other things equal, the longer a firm does not require its creditors to incur a loss, the less likely it is that the actual earnings will deviate from expected one. A firm's reliability in meeting obligations, denoted by the variable X_2 , was measured by Fisher as the length of time since the latest of the following events occurred :—

- (a) the firm was founded or incorporated;
- (b) the firm emerged from bankruptcy, or
- (c) a compromise was made in which creditors settled for less than 100% of their claims.

(iii) **Measures depending on the firm's capital structure :** The firm's capital structure or leverage was another explanatory variable considered in Fisher's model. Capital structure indicates how much the firm's assets can decline in value before they become smaller than the liabilities, in which case the firm becomes insolvent. The equity/debt ratio, denoted by the variable X_3 , was chosen to measure this aspect of default risk. By 'equity' Fisher meant the total market value of all shares or stock outstanding, rather than its book value.

Fisher chose the total market value of the firm's bonds as the measure for marketability risk on a bond and denoted this variable by X_4 . The use of this variable is justified by the assumption that the smaller the amount of bonds outstanding, the less frequently they would be traded and hence 'thinner' and less perfect will be their market and the greater will be the bond's marketability risk.

In order to examine the explanatory power of his four variable model with respect to bond risk premium, Fisher made various least-squares regressions to run cross-sectionally on the 366 available observations, applying a logarithmic transformation to all the variables. Resultantly, Fisher developed the following regression equation as having the best explanatory power—

$$X_0 = 0.987 + 0.307X_1 - 0.253X_2 - 0.537X_3 - 0.275X_4 \quad [R^2 = 0.75]$$

$$(0.032) \quad (0.036) \quad (0.031) \quad (0.021)$$

where X_0 is the logarithm of average bond risk premium; X_1 to X_4 are the logarithms of the four variables measuring default and marketability risks as defined above; the numbers in brackets are the estimated standard errors of the co-efficient, and R^2 is the co-efficient of multiple determination.

As can be observed from the above regression equation, all the co-efficients of the variables measuring bond risk have their expected signs. Fisher further found that all such co-efficients were statistically significant at 1% confidence level or lower and were stable over time. $R^2 = 0.75$ indicates that the logarithms of the four risk variables accounted for 75% of the variance in the logarithm of risk premium thereby indicating a reasonably good explanatory power of the model. However, one limitation of the Fisher's model is that its predictive power was indirectly inferred from the relative stability of the estimated regression co-efficients over time. No direct tests of the model's predictive power on an independent sample was reported by Fisher. Nevertheless, it can be concluded that the four variables – earnings variability, the firm's reliability in meeting financial obligations, firm's capital structure and bond's marketability – adequately reflect the major determinants of risk premium on corporate bonds.

9.5 Utility of forecasting Bond Risk Premium

The prediction of bond risk premium using a model such as Fisher's model (as discussed in the previous section) may be of immense importance to the firm's financial managers as well as to its investors. With respect to a prospective bond issue, the model provides a prediction of risk premium, which, when added to the riskless interest rate, gives an estimate of the bond yield required by the market and hence of the effective cost of debt to the firm. Knowledge of this cost element is essential to management for such financial decisions as whether to finance investments by borrowed capital or equity capital or retained earnings, or a combination of these sources.

A bond risk premium prediction model –may also be used by the bondholders (i.e., investors both existing and potential) and bond portfolio managers to assess the riskiness of bonds; by bank credit managers to evaluate the credit worthiness of prospective borrowers; and by underwriters to examine the potential of a prospective bond issue.

9.6 Meaning of Credit Rating

Credit rating or *bond rating* refers to ranking bond issues in ascending order of their default probability after making a comprehensive analysis of the financial position of the issuing company in whatever industry it is in. Thus, a higher bond rating corresponds to a lower default risk and vice-versa. Note that some weight is also given to marketability risk in bond rating.

Bond ratings are assigned by world renowned rating agencies like Standard and Poor's, and Moody's based in U.S.A. Standard and Poor's use 12 ratings system starting from AAA bonds with negligible default risk to AA, A, BBB, BB, B, CCC, CC, C, and DDD, DD and D being bonds in default. Moody's use a 9 ratings system from AAA to C, being similar in interpretation to that of Standard and Poor's. In India, bond ratings are done by Credit Rating Information Services of India Ltd. (CRISIL), Investment Information and Credit Rating Agency of India Ltd. (ICRA) and Credit Analysis and Research Ltd. (CARE). CRISIL's rating symbols are similar to those employed by Standard and Poor's, but are classified into three broad categories like high investment grades (comprising AAA and AA bonds), investment grades (i.e., A and BBB bonds) and speculative grades (i.e., BB, B, C and D bonds). The rating agencies are, however, engaged in a continuous process of reviewing and reconsidering their ratings and they change the bond ratings when circumstances warrant.

9.7 Model of Forecasting Credit Rating

Bond/credit rating is done on the basis of various quantifiable financial and operating factors relating to the rated bond and the issuing company, besides involving certain judgemental and non-quantifiable factors relating to the rating agencies. *J.O. Horrigan* was probably the first to develop a model for the prediction of bond ratings. Horrigan's *initial sample* was comprised of firms whose bond ratings did not change during 1959-1964. Resultantly, 201 such firms rated by Moody's and 151 firms rated by Standard and Poor's, of which 137 firms were rated by both the agencies, could be identified. The *two subsequent samples*, on which the results obtained from the initial sample were tested, comprised of – (a) 130 firms which obtained new ratings during the period 1961 – 1964, and (b) 85 firms whose previously assigned ratings were changed during 1961-1964.

The regression equation with the estimated regression coefficients for the prediction of bond ratings was developed by running multiple linear regressions on the initial sample with various combinations of financial ratios as the independent variables.

Horrigan found that the estimated regression equation with the highest explanatory power included the following variables—

- i) total assets,
- ii) working capital to sales,
- iii) net worth to total debt,
- iv) sales to net worth, and
- v) net operating profit to sales.

Of these five variables, size of firm (i.e., total assets) was found to be the most important variable in terms of explanatory power and net worth to total debt (i.e., a capital structure measure) was the most important ratio. Such observations confirm the well known and documented phenomenon that default risk, reflected in bond ratings, is highly correlated with the firm size and degree of leverage, the latter variable indicating the firm's financial risk. The coefficient of multiple determination, R^2 , of the regression equation developed by Horrigan was slightly below 0.50 thereby indicating that nearly 50% of the cross-sectional variation in bond ratings was explained by his five variable model.

The estimated regression coefficients derived from the initial sample were then used by Horrigan to develop indexes for predicting new sets of ratings as well as changes in the ratings for his respective subsequent samples. Such predictions were made on the basis of each firm's financial data for one and two years prior to the new rating or the change in rating and were then compared with the actual ratings. Horrigan found that approximately 58% and 52% of Moody's and Standard and Poor's new ratings respectively were correctly predicted and most of the remaining predictions were within one rating of the actual ones. With respect to rating changes, approximately 54% of Moody's and 57% of Standard and Poor's were correctly predicted.

Based on the above findings, Horrigan concluded that the main utility of his model for analysts, financial managers and underwriters lies in its ability to predict the value of a new rating. However, with respect to bond rating changes, the model is less important because it failed to predict the timing of such changes although it performed well with a new set of data.

9.8 Credit Rating and Accounting Ratios

The relationship between financial performance as measured by accounting ratios and credit rating have been clearly demonstrated in the previous section. Out of the five variables that are used in Horrigan's model (as discussed in the preceding section) to

predict bond ratings, four are accounting ratios. This indicates the significance of accounting ratios in the rating process.

Two key issues that arise while using accounting ratios in bond rating are that, as several such ratios are available in finance literature, there is a need to first determine which specific ratios shall be used in prediction of bond ratings and then summarize the information they provide as a whole. The first issue calls for the use of a specific methodology to select the appropriate number of best fit ratios. The process starts with first selecting a set of accounting ratios from the broad ratio groups like profitability, liquidity, solvency and leverage ratios. This original set is then scaled down, using techniques such as factor analysis, to a subset of ratios capturing the information contained in the full set. The final set of variables then chosen is the subset that provides the best fit in the model's classification equation (i.e., regression equation etc.). These best-fit ratios are explanatory in nature because they are based on the same sample companies that were used to develop the model. Accordingly, it has been observed that liquidity, solvency, activity and leverage ratios feature prominently in the model for prediction of credit rating. A few noted ones being interest coverage ratio, free operating cash flows to total debt, working capital to sales, debt to equity, total debt to capital etc. In addition, as bondholders are primarily interested in receiving a steady stream of interest and principal payments, ratios related to the stability of the firm's earnings like operating income to sales, return on capital etc. are included in the prediction model.

Given that the appropriate number of ratios have been selected, there is a need to develop a *composite credit score* that would summarize the information conveyed by the individual ratios in combination with others. This is necessary because a low interest coverage but a high current ratio may have different implications for credit standing than a low interest coverage and a low current ratio. The bond ratings published by rating agencies like Standard and Poor's and Moody's etc. are in the nature of a composite score. The composite credit score is obtained by combining a set of ratios that pertain to default as follows :—

$$\text{Credit Score} = (W_1 \times \text{Ratio}_1) + (W_2 \times \text{Ratio}_2) + (W_3 \times \text{Ratio}_3) + \dots + (W_n \times \text{Ratio}_n)$$

As can be observed from the above credit score equation, weighted ratios are aggregated with the weights of individual ratios being determined using various statistical techniques. Thus, this is how accounting ratios find extensive application in credit rating.

9.9 Cash Flows and Credit Rating

Credit rating using accounting ratios derived from the published financial statements may be limited by its short sightedness in projecting the firm's future cash flow

generating ability to meet the contractual payments on its bonds. This is because, the financial parameters used in calculation of accounting ratios are accounted for on accrual basis instead of cash basis. As a result, it may so happen that a firm defaults on a bond that has obtained a higher credit rating using accounting ratios. To overcome such a problem, *proforma analysis* may be used to forecast future liquidity, solvency and operational ratios that are likely to result in default rather than using current financial statement based accounting ratios to forecast default. In short, the firm's capacity in generating future cash flows needs to be assessed in credit rating.

Proforma analysis for credit evaluation focuses on forecasting cash availability for future debt service. In the process it captures full information available about a particular firm. It is based on the notion that default occurs when cash available for debt service is less than the debt service requirement. The cash available for debt service is equivalent to free cash flows minus dividends net of new equity financing while debt service requirement is the aggregate of required interest and preferred dividend payments, lease payments and required net principal repayments (i.e., debt repayments minus debt issued). This implies that default can be avoided if cash is raised from equity issues or from new debt issues. Thus, credit analysis based on a profile of cash availability for debt service may involve the following steps :—

- (i) As debt has to be serviced each year, generate profiles of cash available for debt service for each year ahead, with particular attention to those years where large amounts of debt are to mature.
- (ii) Establish the debt service requirements for those years in respect of which cash flow profiles have been generated.
- (iii) Identify the default point(s) where cash available for debt service is likely to fall short of the debt service requirement.
- (iv) Assess the probability of each default point.
- (v) Assign a credit rating based on the expected value of the default point(s).

To sum up, it may be said that, in comparison to accounting ratios based credit rating, cash flow based ratings would serve as important benchmarks of the credit standing of a firm.

9.10 Select Readings

- Lev, B., *Financial Statement Analysis : A New Approach*, Prentice Hall, 2000.
- Penman, S., *Financial Statement Analysis and Security Valuation*, McGraw Hill, 2004.
- White, Sondhi & Fried, *The Analysis and Use of Financial Statements*, John Wiley & Sons, 2003.

9.11 Questions

Long – Answer type :

- (1) Give a brief account of the various types of risks associated with bond holding.
- (2) Discuss the model for prediction of bond risk premium.
- (3) Briefly explain J.O. Horrigan's model for forecasting credit rating.

Short – Answer Type :

- (4) Define bond risk premium.
- (5) Why is it necessary to predict bond risk premium?
- (6) What do you mean by credit rating?

Objective Type :

- (7) Fill in the blanks :

- (a) _____ and _____ risks are absent in case of government bonds.
- (b) L. Fisher measured default risk on a bond by _____, _____ and _____.
- (c) Default and marketability risk factors are reflected in _____ on a bond.
- (d) _____ for credit evaluation focuses on forecasting cash availability for future debt service.

[Hints : 7. (a) Default and marketability; (b) variability of firm's past earnings, firm's reliability in meeting its obligations and firm's capital structure; (c) risk premium; (d) proforma analysis].

Unit-10 □ Analysis of Merger

Structure

10.1 Introduction

10.2 Forms of merger

10.3 Benefits of merger

10.4 Evaluation of prospective merger proposals and post merger performance

10.5 Select Reading

10.6 Questions

10.1 Introduction

Merger is a form of business combination that has become a vital business strategy these days to bring about structural changes in modus operandi of the business and hence withstand stiff competition in the market. Although the phenomenon has long been popular in the West, it has gained importance in recent years in India.

‘Merger’ is popularly understood to be a *fusion* of two or more companies. The fusion may take place either between existing and new companies or between existing companies themselves. The terms *merger* and *amalgamation* are often used interchangeably in India. Section 2(1A) of the Indian Income Tax Act, 1961 defines amalgamation as the merger of one or more existing companies with another existing company (in case of which the amalgamation/ merger is of *absorption* variety) or the merger of two or more existing companies, known as the *amalgamating* company or companies as the case may be, to form a new company called the *amalgamated* company (in this case the merger is of *consolidation* variety). The Act further says that the combination takes place in such a way that the combining i.e., transferor companies lose their separate legal identities and all of their assets and liabilities are transferred to the transferee company unless disposed of by the transferor companies. Moreover, all the shareholders of the transferor company or companies become or **have** the right of becoming the members of the transferee company in a merger. Thus, merger through absorption is a combination of two or more companies into an existing company whereby all companies excepting the acquiring company lose their identity. But merger through consolidation is a combination of two or more companies into a new company whereby all companies are legally dissolved and a new entity is created.

At times, merger is confused with acquisition or takeover. But there is a fundamental difference between the two. An important characteristic of merger (whether through absorption or consolidation) is that the acquiring/transferee company (existing or new) takes over the ownership of other existing companies and combine their operations with its own operations. Acquisition or takeover, on the other hand, may be defined as an act of acquiring effective control by one company over the assets or management of another company without any combination of companies. That is, in an acquisition, two or more companies may remain as independent and separate legal entities although there may be a change in control of companies.

Thus, in order to have a clear understanding of merger, the following sections discuss elaborately the different forms of corporate merger, benefits of merger and the evaluation of prospective merger proposals and post merger performance.

10.2 Forms of Merger

Mergers may be broadly classified into the following types :—

(i) **Horizontal merger** : A horizontal merger is one which takes place between two or more companies which are essentially operating and/or competing in the same kind of product or market or line of business. As for example, merger of two book publishers or merger of a T.V. manufacturing company with a company manufacturing washing machines (in this case both the companies are in the market for consumer durables) etc. Thus, it is not necessary for firms to manufacture identical products or render same service in order to merge horizontally. This form of merger helps to achieve optimum size, increase market share, curb competition, or use unutilized capacities, gain economies of scale, increase competitiveness and reduce competition.

(ii) **Vertical merger** : A vertical merger refers to a combination of two or more firms engaged in production or distribution of a particular product at different stages of the business process. For example, merger of a T.V. manufacturing company with a T.V. marketing company or of a spinning company with a weaving company. Vertical merger helps in achieving operating efficiencies through reliability of imports and better management control, gaining competitive advantage through controlling input prices and creating entry barriers in terms of market and technology. Vertical merger may take either of the following two forms :—

(a) **Backward merger** : This form of vertical merger refers to merging of a firm with another engaged in earlier stages of production. As for example, when a firm combines with the supplier of materials required for the production process, it is referred to as backward merger.

(b) **Forward merger** : It refers to the merger of a firm with another engaged in subsequent stages of production. As for example, if a cement manufacturing company merges with a company engaged in civil construction, it will be a case of vertical merger with forward linkage.

(iii) **Conglomerate merger** : Also known as concentric merger, this form of merger is a combination of firms engaged in totally unrelated lines of business or markets or products. As for example, merger of cement manufacturing and fertilizer producing companies or investment and advertising agencies etc. Since adverse fluctuations in sales and profit arising due to trade cycles may not hit uniformly all the industries at the same time, this type of merger is expected to bring about stability in income and profits as the merged firms belong to different industries.

No matter whatever may be the form of merger, there is a need to look into the reasons why merger should at all take place. This is done in the next section.

10.3 Benefits of Merger

Mergers have recently become quite popular primarily because of the enhanced competition, breaking of trade barriers and free flow of capital across countries aftermath the deregulation of the economies through liberalization and integration among economies through globalization. A number of motives have been cited for the occurrence of merger. These motives or benefits are outlined below

- Enhancing profitability through efficient and optimum utilization of resources (human, physical as well as managerial skills) and cost reduction resulting from economies of scale, operating efficiency and synergy.
- Accelerating a company's growth especially when the internal growth is constrained due to inadequacy of resources and paucity of time needed for internal development.
- Diversifying the risk associated with cash flow streams of a company by way of merging with a business whose income streams are not correlated.
- Reducing tax liability by setting-off accumulated losses and unabsorbed depreciation of one firm against the profits of another.
- Achieving financial benefits by way of eliminating financial constraints, deploying surplus cash, enhancing debt capacity and lowering financing costs.
- Limiting the severity of competition by increasing the company's market power.
- Displacing the existing ineffective management of merging firms.
- Allowing the investors to reap speculative gains by enhancing the P/E (price/earning) ratio.

- Creating an image of aggressiveness, strategic opportunism and empire building and amassing vast economic powers for the merged entity.

Some of these major motives are explained in detail as follows :—

(i) **Enhanced profitability** : Merger may result in an increase in average profitability of the merged firm because of the following reasons :—

(a) **Economies of scale** : When two or more companies merge, the larger volume of operations of the merged entity may bring about substantial economies of scale. Since resources (human, physical and managerial skills), functions or facilities of the merging firms may remain under – utilized while operating independently, their combination can result in economies because of more intensive utilization of combined production capacities, purchasing set up, distribution channels, research and development (R&D) facilities, data processing systems, etc. Such economies of scale lead to reduction in the cost of production per unit and hence increase profitability of the merged firm. This is because, merger helps to expand volume of production without a corresponding increase in fixed costs thereby causing the fixed costs to be distributed over the large production volume and hence the unit cost of production to decline. It has been found that economies of scale are more pre-dominant in horizontal mergers as the same kind of resources are available in the merging companies which can be utilized intensively by the merged firm. In vertical mergers, the principal economies are increased efficiency and control over the production process, better coordination of activities, lower inventory levels and greater marketing strength. Even conglomerate mergers may result in economies due to reduction of overhead expenses.

(b) **Operating economies** : Merger also helps to avoid or reduce overlapping functions and facilities and consolidate management functions such as manufacturing, marketing, research and development etc., and hence reduce operating costs and increase profitability of the merged entity. As for example, in horizontal mergers, the merged firm may eliminate duplicate channels of distribution, or create a centralized training centre, or introduce an integrated planning and control system to reduce costs and increase profit. By way of combining with the suppliers of inputs (i.e., backward integration) and/or with the customers (i.e., forward integration), vertical merger facilitates better coordination and administration of the different stages of business operations (like purchasing, manufacturing and marketing), eliminates the need for bargaining with suppliers and/or customers, minimises uncertainty in supply of inputs and demand for output and saves costs of communication and hence enhance profit.

(c) **Synergy** : This implies a situation where the merged firm is more valuable than the sum of independent values of the individual combining firms. That is, if A and B are the two merging firms, then

$$V(AB) > V(A) + V(B)$$

where

$V(AB)$ = Value of the merged entity

$V(A)$ = Independent value of firm A

$V(B)$ = Independent value of firm B

Apart from operating economies, synergy may also arise from enhanced managerial capabilities, creativity and innovativeness, R&D and market coverage capacity due to complementarity of resources and skills and a widened horizon of opportunities. For example, if there are two pharmaceutical companies one of which is strong in its marketing set up while the other in research and development and product innovation, then merger of these two companies will result in sales and profitability of the combined company being much higher than the sum of their individual sales. It has been observed that there is a greater likelihood of synergistic gains from a horizontal merger since duplicate facilities may be eliminated.

(ii) **Accelerated growth** : Growth is essential for sustaining the viability, dynamism and value – enhancing capability of a company. A growth oriented company is not only able to attract the most talented executives, but is also able to retain them as it provides opportunities for their job enrichment and rapid career development. As growth leads to higher profits and increase in shareholders' value, a company always strive to achieve growth either by expanding its existing operations in terms of assets, sales and profit or by entering into new lines of business. A company may grow either internally or externally. If a company cannot grow internally due to lack of physical and managerial resources and shortage of time required for internal development of facilities for growth, it can acquire production facilities as well as other resources from outside and grow externally by combining its operations with other companies through merger. That is, if a company lacks technical and managerial skills, research capabilities, special marketing skills and/or a wide distribution network to access different segments of market and expand its operations in either the same or different lines of business, it can merge with existing companies with requisite infrastructure and skills and grow quickly. Thus, merger enables a firm to leap-frog several stages in the process of expansion.

(iii) **Diversification of risk** : Merger may help to reduce risks associated with the cash flow streams of a seasonal business provided that the cyclicity of operations of the combining firms are negatively correlated. That is, merger of firms may reduce the variability of earnings and diversify total risk because the combination of management and other systems may strengthen the capacity of the merged firm to withstand the severity of the unforeseen economic factors which could otherwise endanger the survival of individual merging firms.

(iv) **Tax savings** : In a number of countries, a company is allowed to carry forward its accumulated losses to set-off against its future earnings for calculating its tax liability.

A loss-making or a sick company may not be in a position to earn sufficient profits in future to take advantage of the carry forward provision. But if it combines with a profitable company, the merged company can utilize the carry forward loss and save taxes. The tax laws in India allow a profitable company to merge with a sick company in order to set-off against its profits the accumulated loss and unabsorbed depreciation on manufacturing capacities of sick company provided the merger fulfils certain conditions. The tax savings thus accruing to the merged firm may then be used to revive the sick unit's operations like paying off the existing creditors of the sick firm to make it a debt-clean unit.

(v) **Financial benefits** : A merger may result into the following financial benefits:-

(a) **Removing financial constraints** : A company may be constrained to grow through internal development due to lack of sufficient funds. A merger with other companies having highly liquid assets and low debts may improve the fund raising capacity of the company to meet its increasing financial requirements for expansion, diversification and modernization.

(b) **Deployment of surplus funds** : A different situation may arise when a cash rich company lacks adequate investment opportunities to deploy its surplus cash profitably. In such situations, the company may either distribute its surplus cash to its shareholders in case of which the shareholders would have to pay tax at ordinary income tax rate, or use the excess funds to merge with some other company which may, in turn, increase shareholders' wealth through an increase in the market value of shares.

(c) **Increase in debt capacity** : A merger of two firms with fluctuating and even negatively correlated cash flows can bring about stability in the cash flows of the merged firm. This, in turn, would reduce the risk of insolvency and enhance the capacity of the merged firm to service a large amount of debt. Thus, a company can enhance its borrowing capacity significantly through merger and such increased debt capacity can result in higher interest tax shield and add to the value of the firm.

(d) **Reducing financing cost** : The larger size and greater earning stability of the merged firm may help to reduce its financing costs. As flotation costs (like brokerage, commission etc.) of new issues, whether equity, preference or debenture issues, decrease with the increase in the size of the issue, merger may enable the combined entity to lower such costs on future issues. Moreover, lower probability of insolvency of the merged firm due to its financial stability and increased protection to lenders and creditors of the merged firm by the combined equity of the merging firms may enable the merged entity to borrow at a lower rate of interest.

(vi) **Increased market power** : Merger enables a firm to avoid unhealthy competition in situations where too many players aim at a limited market thereby resulting in fierce

competition, severe price war and increased marketing costs. That is, by merging with competitors, the merged entity would be able to limit competition, improve its market share and consolidate its position in the industry. A merger also enhances the bargaining power of the combined entity vis-a-vis its workers, suppliers and buyers. It also enables the combined firm to exploit technological breakthroughs against obsolescence as it is a relatively easy way of acquiring valuable patent rights, technical know how, established brand names etc.

Thus, in view of the above benefits, merger is frequently occurring in the business world today.

10.4 Evaluation of Prospective Merger Proposals and Post Merger Performance

In a merger, the merged or acquiring firm buys the business of the merging or target firm(s) and hence needs to know the value of the target firm(s) that must be paid for in the acquisition. Only if the expected economic gains from the merger exceed the value that must be paid for it, the acquiring firm goes ahead with the merger proposal. So, the first and foremost task in evaluating a prospective merger proposal is to establish the value of the target firm(s) and then determine whether the merger is attractive or not. In short, the following steps are involved in evaluation of a merger proposal—

- identify the profitability and growth prospects of the target firm(s) in order to estimate the magnitudes and timings of its cash flows, estimate the cost of capital or discount rate of the target firm(s) and hence determine the value of the target firm(s);
- decide whether the merger is to be financed by cash or through exchange of shares, and
- evaluate the impact of merger on earnings per share (EPS) and price-earnings (P/E) ratio of the merged firm.

At first, the relevant time horizon (of say 10 to 15 years) over which the benefits of merger are expected to accrue must be fixed. The cash flows of the target firm(s) over the horizon period shall be estimated based on the earnings. Since merger enables the combined entity to improve overall management, use the distribution system of merging firms more effectively for increasing sales, consolidate its operations, systems and functions for facilitating operating economies and cost reduction, the economic gains from merger usually arise in the form of higher sales growth and improved profitability due to reduction in cost of goods sold and the selling and distribution expenses. Thus, projection of sales growth and decline in cost of goods sold and selling and administrative expenses of the target firm(s) over the horizon period are necessary for estimating its cash

flows. The cash flows of the target firm(s) shall also include adjustments for depreciation, capital expenditure and changes in working capital. To the free cash flows of the last year in the horizon period, salvage value (i.e., cash flows capitalized at the discount rate) and amount of released net working capital of the target firm(s) for that year shall be added.

After estimating the cash flows of the target firm(s), the next step is to determine the appropriate discount rate for discounting such cash flows to their present values. Since the cash flows are expected to be generated from the target firm(s)' operations, the average cost of capital of the target firm(s) is used as the discount rate. The summation of the present values of cash flows for each year of the horizon period shall give the total value of the target firm(s). The current value of debt of the target firm(s) may be deducted from such aggregate value to obtain the value of equity of the target firm(s). The value of equity may be divided by the existing number of shares of the target firm(s) to determine the value per share required to be paid by the combined entity on merger. This may be compared with the current market price of the target firm(s)' shares to reveal the extent of premium, if any, to be paid on merger.

After the value of the target firm(s) that must be paid for in merger has been established, the next task is to determine whether merger is to be financed by cash or exchange of shares or a combination of cash, shares and debt. Since the means of financing may change the debt – equity mix of the merged firm, its choice may be influenced by its impact on the merged firm's capital structure, financial condition and liquidity position, the capital market conditions, availability of long term debt etc. In *cash offer*, the existing shareholders of the target firm(s) receive cash for selling their shares to the merged firm. This is the simplest means of financing a merger as it does not cause any dilution in EPS and ownership of existing shareholders of the merged firm, nor does it lead to wide fluctuations in share prices of the merged firm excepting that it may involve tax liability for the shareholders of the merging firms on the cash received from the merged firm. A *share exchange offer* results into sharing of ownership of the merged firm, as well as its earnings and benefits of merger, between the existing shareholders of the merged firm and merging/target firm(s). Unlike in a cash offer, the receiving shareholders of the merging firms are not required to pay any ordinary income tax but shall bear capital gains tax in case they decide to sell their holdings in merged firm. The capacity of the combined firm to finance a merger by *debt* shall depend on its target debt ratio. Given the target debt ratio, the total debt capacity of the merged firm may be determined based on its combined equity i.e., the aggregate of pre-merger equity of both merging and merged companies. The difference between total debt capacity and the existing combined debt of merged and target firm(s) shall reveal the unutilized debt capacity and hence indicate the extent to which the merged firm can borrow to finance the merger.

The following illustration will help explain how share exchange offer works out in a merger and its impact on EPS, market value and P/E ratio.

Illustration (1) : Company A is considering buying company B in exchange for shares. The details of the two companies are given below. Work out the share exchange ratio merger gains and show the impact of merger on EPS, P/E ratio and market capitalization of the merged firm.

	Company A	Company B
Profit after tax (Rs.)	10,00,000	2,00,000
Number of Shares	5,00,000	1,00,000
EPS (Rs.)	2.00	2.00
Market value per share (Rs.)	40	30
P/E ratio (times)	20	15
Total market capitalization (Rs. in lakhs)	200	30
Present value of target firm B (Rs. in lakhs)	—	35
Market value per share of company A after merger (Rs.)	40	—

Solution :

Present value of the target firm B = Rs. 35 lakhs

Market value per share of the acquiring firm A = Rs. 40

$$\therefore \text{Number of shares of firm A offered to shareholders of target firm} = \frac{\text{Rs. 35 lakhs}}{\text{Rs. 40}} = 87,500$$

This means that company A offered 87,500 shares for 1 lakh outstanding shares of company B.

$$\therefore \text{Share exchange ratio} = \frac{87,500}{1,00,000} = 0.875$$

Computation of merger gains :

(a) *To shareholders of target firm B :*

Value (i.e. total market capitalization) received from acquiring firm A after merger (Rs. in lakh)	=	35
Less : Total market capitalization of firm B's shareholders before merger (1 lakh × Rs. 30) [Rs. in lakh]	=	30
\therefore Net gain to firm B's shareholders (Rs. in lakh)	=	5

(b) *To shareholders of acquiring firm A :*

Since the market value per share of firm A after merger remains the same as that before merger (i.e., Rs. 40), there is *no gain* to the existing shareholders of acquiring firm A.

It may be noted that after merger, company A would have 5,87,500 shares outstanding (comprising of 5,00,000 shares of existing shareholders of firm A and 87,500 shares of company A issued to shareholders of target firm B on merger). Thus, the post-merger value of the combined firm would be Rs. 235 lakh (5,87,500 shares \times Rs. 40 share), the post-merger market price being Rs. 40 per share. The sum of the pre-merger market capitalizations of individual firms is Rs. 230 lakh [i.e., Rs. (200 + 30) lakh]. This indicates that total market capitalization of the combined firm has increased by Rs. 5 Lakh [i.e., Rs. (235 – 230) lakh]. However, this increased wealth does not benefit the shareholders of acquiring firm A since it is entirely transferred to target firm B's shareholders as shown above.

The reason why shareholders of acquiring firm A do not receive any share of the economic gain from merger in above situation is that its post-merger and pre-merger market price per share remain the same. Had the post-merger price risen relative to that of pre-merger, the shareholders of acquiring firm could also have shared the increased wealth from merger. This is explained below.

Let us suppose that the market price of company A's shares rises to Rs. 45 after merger. The total merger gain i.e., the difference between post-merger market capitalization of the combined firm [i.e., Rs. 264,375 thousand (5,87,500 shares \times Rs. 45/share)] and sum of pre-merger market capitalization of individual firms [i.e., Rs. 23,000 thousand (Rs. 200 lakh + Rs. 30 lakh)] is Rs. 34,37,500. This increase in wealth is shared by the shareholders of both the acquiring firm A and target firm B as follows :—

Gain to acquiring firm A's shareholders [5,00,000 shares \times Rs. (45-40) per share]	=	Rs. 25,00,000
Gain to target firm B's shareholders [(87,500 shares \times Rs. 45) – Rs. 30 lakh]	=	Rs. 9,37,500
\therefore Total merger gain	=	<u>Rs. 34,37,500</u>

Note that when market price rises after merger, gain to target firm's shareholders also increases.

Impact of merger on EPS, P/E ratio and market capitalization of combined firm :

The impact of merger between company A and company B may be shown as below :—

Particulars	Before merger		Company A (after merger)
	Acquiring Company A	Target Company B	
1. Profit after tax (Rs.)	10,00,000	2,00,000	12,00,000
2. Number of shares	5,00,000	1,00,000	5,87,500
3. EPS (Rs.) [$1 \div 2$]	2.00	2.00	2.04
4. Market value per share (Rs.)	40	30	40
5. Total market capitalization (Rs. in lakh)	200	30	235
6. P/E ratio (times) [$4 \div 3$]	20	15	19.61

Thus, it can be observed from the above table that EPS of firm A has improved after merger. This may be attributed to acquisition of a firm having lower P/E multiple than that of acquiring firm (i.e., P/E ratio of target firm B is 15 while that of acquiring firm A is 20). However, the post-merger P/E ratio has declined as can be observed from the above table. This happens because the market value of acquiring firm's shares remains unchanged after merger while its EPS rises post merger. So the obvious question that arises now is what happens when a firm acquires another firm having a higher P/E multiple than its own. This issue has been addressed below.

Let us assume that company A also has the option to buy company C whose details are as follows :— profit after tax – Rs. 2,00,000; number of shares – 2,00,000; EPS – Re. 1.00; market value per share – Rs. 25.00; total market capitalization – Rs. 50,00,000; P/E ratio – 25; present value of the firm to be paid for on merger – Rs. 60,00,000. The number of shares of acquiring company A to be issued to shareholders of target company C at prevailing market price of firm A's shares works out as 1,50,000 [i.e., (Rs. 60,00,000 \div Rs. 40/share)]. The share exchange ratio is thus 0.75 (i.e., 1,50,000 \div 2,00,000). The impact of merger with company C on EPS, P/E ratio and market capitalization of company A is as follows :

Particulars	Before merger		Company A (after merger)
	Acquiring Company A	Target Company B	
1. Profit after tax (Rs.)	10,00,000	2,00,000	12,00,000
2. Number of shares	5,00,000	1,00,000	6,50,000
3. EPS (Rs.) [$1 \div 2$]	2.00	1.00	1.85
4. Market value per share (Rs.)	40	25	40
5. Total market capitalization (Rs. in lakh)	200	50	260
6. P/E ratio (times) [$4 \div 3$]	20	25	21.62

It can be observed from the above table that the effect of buying a firm having a higher P/E multiple than the acquiring firm is just the opposite of buying a firm having a lower P/E multiple. That is, company A's EPS has been diluted from Rs. 2.00 to Rs. 1.85, although its P/E ratio has improved from 20 times to 21.62 times, on account of merging with company C which has a higher pre-merger P/E ratio than company A. Since a decline in EPS may have an adverse impact on stock prices and result in depletion of shareholders' wealth, acquiring firms do not usually go for merger where it is likely to lead to dilution of its current EPS unless they see a possibility of increased earnings growth of the merged firm more than offsetting the adverse impact of diluted EPS on stock prices. In order to maintain its EPS at pre-merger level i.e., Rs. 2.00, company A need to issue 1,00,000 shares [(Earnings of merged firm i.e., Rs. 12,00,000 / Required EPS of merged firm i.e., Rs. 2.00) – Pre-merger number of shares of firm A i.e., 5,00,000] to shareholders of target firm B at an exchange ratio of 0.50 (i.e., 1,00,000 / 2,00,000). But at prevailing market price of Rs. 40 per share of company A, share exchange ratio is 0.75. So, company A need to issue shares to shareholders of target firm B at a price of Rs. 60/share (Rs. 60,00,000 ÷ 1,00,000 shares) i.e., at a significant premium over its prevailing market price of Rs. 40 share in order to attain a share exchange ratio of 0.50 and hence maintain its pre-merger EPS.

Thus, based on the above analysis of post-merger performance it may be concluded that an acquiring firm should always select that prospective merger proposal where the target firm's P/E ratio is lower than its own P/E ratio as it would enable the acquiring firm to improve its pre-merger EPS after merger.

10.5 Select Readings

- Brealey, R., and Myers, S., *Principles of Corporate Finance*, Prentice Hall, 1984.
- Hampton, J.J., *Financial Decision Making*, Prentice Hall of India Pvt. Ltd., 1983.
- Pandey, I.M., *Financial Management*, Vikas Publishing House Pvt. Ltd., 1999.

10.6 Questions

Long – Answer type :

- (1) Discuss briefly the benefits of merger.
- (2) Discuss the steps that must be followed while evaluating a prospective merger proposal.
- (3) XYZ company is considering acquisition of either ABC company or PQR company, the details of which are given below. Explain which merger proposal should XYZ company go for and why?

Particulars	XYZ	ABC	PQR
Profit after tax (Rs. in lakh)	150	30	48
Number of shares (lakh)	25	8	12
Earnings per share (Rs.)	6.00	3.75	4.0
Market price per share (Rs.)	30	20	15
Price – earning ratio (times)	5	5.33	3.75
Total market capitalization (Rs. in lakh)	750	160	180
Present value of the firm to be paid for on merger (Rs. in lakh)	—	180	210
Expected market price of XYZ company's shares after merger = Rs. 30 per share.			

Short – Answer Type :

- (4) Define 'merger'. How does it differ from acquisition or takeover?
- (5) What are the various forms of merger? Explain.
- (6) How does cash offer compare with a share exchange offer as the means of financing a merger?

Objective Type :

- (7) Fill in the blanks :
 - (a) The merger of two or more existing companies into a new company is known as _____ while the merger of one or more existing companies with another existing company is called _____.
 - (b) The merger of a firm with another engaged in earlier stages of production is called _____ while the merger with another firm involved in subsequent stages of productions is known as _____.
 - (c) Conglomerate mergers are also known as _____.
 - (d) The phenomenon that the merged firm is more valuable than the sum of independent values of the individual combining firms is known as _____.

[Hints : (7) (a) consolidation, absorption; (b) backward merger, forward merger; (c) concentric mergers; (d) synergy.]

Unit-11 □ Corporate Financial Reporting in India

Structure

11.1 Introduction

11.2 Current financial reporting practices in India

11.3 Emerging issues in Indian financial reporting

11.4 Select Reading

11.5 Questions

11.1 Introduction

The various changes in the provisions of the Companies Act, 1956, issue of many new accounting standards by The Institute of Chartered Accountants of India (ICAI) in 1990's, and a complete transformation in business, social, political and economic environment (both domestic and international) as a result of globalisation and liberalization in early 1990s have significantly changed the nature of corporate financial reporting in India. This has necessitated a comprehensive discussion on current practices and emerging issues in the area of corporate financial reporting in India in order to examine the extent to which such disclosures are coping with the changing needs of the economy and the society.

Several research studies have examined the corporate reporting practices in India, the noted ones being Dasgupta (1977), ICAI (1981 and 1985), Lal (1985), Banerjee (1994 and 2002) and Chakravorty (1994). "Financial reporting in India" by Dasgupta (1977) is a pioneering work in this field. He dealt with the structure, theory, objectives and history of Indian financial reporting and the influence of British law and practice on the then financial reporting practices, and examined the trends in financial reporting in India and abroad (like U.S.A., Australia, U.K., France etc.) He concluded that most of the companies publish the bare minimum financial information, and, in some cases, they even violate the provisions of the law. He, therefore, suggested several techniques for improvement in financial reporting and enhancing its usefulness to various sections of the society including the government and the public at large.

The ICAI makes periodic publications on prevailing corporate reporting practices in India. In its 1981 publication, ICAI opined that most Indian companies or a great majority of them provide only that much information as are necessary under the law and such information usually pertain to the method of valuation of inventories, changes in the

basis of accounting and the like. This apart, a separate disclosure of accounting policies figured nowhere in the financial statements. In the year 1985, ICAI observed that the contents of the profit and loss account and the sequence in which they appeared varied widely from company to company. This was attributed to the fact that the then legal provision merely prescribed the information to be given in the profit and loss account without prescribing a form for the purpose. Another striking observation was that the companies which adopted the 'T' form' gave much more detailed information in the profit and loss account itself than the companies that adopted vertical or single column form.

Both Lal (1985) and Banerjee (1994 and 2002) examined the theory and practice of corporate financial reporting in India and analysed the impact of accounting concepts and methods, and accounting regulations on financial disclosures. Chakravorty (1994) made a comparative study of the provisions of the Companies Acts of 1882, 1913, 1936 and 1956 relating to accounting and reporting in order to show the evolutionary nature of the development in accounting and reporting in India. He found that, by and large, Indian companies complied with statutory disclosure requirements. But, as regards disclosure of additional information on human resources, social responsibility of the business etc., public sector companies fared better than the private sector companies. He, therefore, offered some suggestions for improvement in the accounting and reporting scenario in India.

In the light of the above studies, it has become necessary to examine whether there has been any improvement in the present financial reporting scenario as compared to the earlier accounting and reporting practices in India. Thus, the discussion on current reporting practices in India follows next.

11.2 Current Financial Reporting Practices in India

The analysis of corporate financial reporting practices should involve an examination of the degree of compliance with the provisions of the Companies Act and with the accounting standards issued by the ICAI. In accordance with the regulatory provisions, the following segments are usually found in an Indian company's annual report (i.e., financial statement).

- Balance Sheet
- Profit and Loss Account or Income Statement
- Accounting Policies and Notes on Balance Sheet and Profit & Loss Account
- Cash Flow Statement
- Director's Report

- Corporate Governance Report
- Management Discussion and Analysis (MD&A) Statement
- Financial Highlights
- Consolidated accounts
- Balance Sheet Abstract and Company's General Business Profile

The preparation of profit and loss account and balance sheet are compulsory under Sections 210 and 211 of the Companies Act, 1956. Schedule VI to the said Act prescribes the form and contents of the two statements. Of the two forms of balance sheet-horizontal and vertical – almost all the companies follow the vertical form of presentation. It is also mandatory to annex notes to the financial statements disclosing the accounting policies and explaining the treatment of certain items that appear in the profit and loss account and balance sheet like depreciation, research and development expenditure, foreign currency translations, earnings per share, revenue recognition, fixed assets, investments etc. This helps in understanding the basis of preparation of financial statements and interpreting the accounting numbers correctly.

In order to examine the liquidity position of the reporting entities more accurately, accounting standard – 3 (AS –3) issued by ICAI has made the preparation of Cash Flow Statement compulsory for listed companies and enterprises whose turnover for the accounting period exceeds Rs.50 crore w.e.f. 1.4.2001. As per the standard, the entities must report cash flows under three heads – cash flows from operating activities, cash flows from financing activities and cash flows from investing activities. Operating activities involve income determining items i.e., revenues and expenses and also changes in current assets and current liabilities. Financing activities relate to changes in non-current liabilities and shareholders' equity. Investing activities relate to changes in non-current assets i.e., fixed assets and investments. Although the Companies Act's provisions do not bind the Indian companies to include a cash flow statement as part of financial statements, most Indian companies are found to prepare the statement and get it audited as per the requirements of AS-3 and Securities and Exchange Board of India (SEBI) guidelines.

Director's Report is to include particulars relating to conservation of energy, technology absorption, and foreign exchange earnings and outgo under Section 217(1)(e) of the Companies Act, 1956. Only manufacturing companies belonging to 21 industry groups are required to furnish information in form A and B under the said section. Further, director's report must respectively disclose information relating to employees and the extent of managerial responsibility regarding compliance with the regulatory provisions in preparation of the financial statements and true and fair presentation of the same as per Sections 217(2A) and 217(2AA) of the Companies (Amendment) Act, 2000.

Corporate governance refers to the systematic process by which vast quantum of societal resources employed in companies are directed, managed and controlled to enhance their wealth generating capacity and hence meet the stakeholders' aspirations and societal expectations. Two core principles of corporate governance are managerial freedom to drive the enterprise forward without undue restraints and exercise of managerial freedom within a framework of effective accountability. This leads us to the cornerstones of governance philosophy which are trusteeship, transparency, empowerment and accountability, and control and ethical corporate citizenship. Thus, a corporate governance report must provide information on key areas of management of the companies which would help assess as to whether or not such companies are managed in the best possible way to meet the expectations of various sections of the society. Clause 49 of the Listing Agreement of SEBI requires inclusion of an audited corporate governance report as part of financial statements detailing out the following :—

- company's philosophy on code of governance;
- composition and functioning of board of directors including the number of meetings held etc.;
- terms of reference, composition and meetings of audit committee and remuneration committee;
- functioning of the shareholders' committee as regards complaints received, actions taken, pending share transfers etc.;
- information regarding general body meetings;
- disclosures relating to related party transactions with the company's promoters, directors or management, imposition of penalties, fines etc. by SEBI or stock exchange authorities or any other statutory authority for non-compliance with the provisions;
- selection of means of communication like newspapers, websites etc. for publication of half-yearly and quarterly results, and
- general shareholders' information.

Most Indian companies now include corporate governance report as part of their financial statements.

MD&A is prepared in compliance with the corporate governance requirement prescribed in the Listing Agreement. It describes the company's objectives, projections, estimates and expectations that may be 'forward – looking statements' within the meaning of applicable laws and guidelines. But such statements involve risks and uncertainties as actual results might differ materially from those expressed or implied. The common contents of MD&A amongst Indian companies are information relating to business review, internal control and systems, environment management, capital investment, joint ventures, R&D technology achievements, industrial relations and

human resource management etc. The inclusion of MD&A in the annual reports makes the financial statements of Indian companies internationally competitive as both in USA and UK such statements form part of annual reports.

Financial highlights segment of the annual report depicts the trends in various financial parameters and hence facilitates inter- and intra-firm comparisons. This statement is usually found in the annual reports of Indian companies. There is no requirement to prepare consolidated financial statement (CFS) under the Companies Act, 1956. However, AS-21 has made it obligatory upon parent Indian companies to prepare CFS for a group of enterprises under its control in addition to its separate financial statement w.e.f. 1.4.2001. Accordingly, CFS now form part of financial statements of parent Indian companies. As per the standard, CFS should consolidate all subsidiaries, domestic as well as foreign, on a line by line basis by adding together like items of assets, liabilities, income and expenses and eliminating in full all intra-group balances and transactions and the resulting unrealized profits. Finally, balance sheet abstract and company's general business profile provides information on registration number of the company, generic name of the product manufactured by the company, balance sheet total etc. as per the requirements of Companies Act, 1956.

The compliance with the above-mentioned statutory disclosure requirements is a general phenomenon among Indian companies. However, many Indian companies have taken the initiative to disclose some additional information keeping in view the diversified needs of the users. These new and emerging corporate reporting practices have been examined in the next section.

11.3 Emerging Issues in Indian Financial Reporting

The analysis of corporate financial reporting practices shall make it clear that some Indian companies disclose more information than those required by legal and professional norms. In order to explain why companies disclose additional information voluntarily, several research studies have been undertaken in the past. These studies have found that a variety of considerations like stock market consideration (i.e., the incentive that additional information provided to the public may influence stock prices), political costs consideration (i.e., fines, penalties, potential public hostility towards the company etc. that may arise in the absence of adequate disclosure of social and environmental information on a voluntary basis), users' needs consideration (i.e., the dependence of voluntary disclosure of information on the stakeholders' demand for such information and how their needs are perceived by the management of companies), and ideological goal consideration (i.e., voluntary disclosures being guided by companies' agenda,

ideologies and goals which are likely to be different for different companies even within the same industry) motivate the management of a company to disclose information voluntarily and not wait for mandatory requirements. The following are the most common disclosures made on a voluntary basis by the Indian companies.

(i) ***Providing information on basic and diluted earnings per share (EPS)*** : EPS is widely used by the shareholders, both existing and potential, in evaluating the performance of a firm for taking investment decisions. But disclosure of EPS, spitted into basic and diluted ones, is compulsory for listed companies on and from 1.4.2001 as per AS-20. That is, disclosure of EPS in case of companies other than listed companies is voluntary in nature.

According to the standard, basic EPS is calculated as earnings attributable to equity shareholders divided by weighted average number of equity shares outstanding during the period while diluted EPS is determined as basic EPS adjusted for dilutive effects of potential dilutive securities like convertible bonds, convertible preference shares and options and warrants on earnings and number of shares outstanding during the period. Today, most Indian companies which are not listed also disclose information on basic and diluted EPS in their financial statements.

(ii) ***Disclosure of information on economic value added (EVA)*** : EVA is defined as net operating profit after taxes (NOPAT) minus the weighted average cost of capital employed in the firm. That is, EVA measures the value added to the shareholders by generating operating profits in excess of cost of total capital employed on an average basis. Since EVA recognizes surplus only after full cost of capital (i.e., not only cost of debt but also cost of equity capital) has been covered, it is regarded as a better performance metric than accounting based measures including EPS. But, as there is no specific disclosure requirement regarding EVA either in the Companies Act or in the accounting standards issued by ICAI, disclosure of EVA information by Indian companies is made on a voluntary basis.

(iii) ***Mission and value creation statement*** : This statement is prepared voluntarily by some Indian companies. The report elaborates the efforts made or are expected to be made by the company toward enhancing the wealth generating capability of the firm in a globalized environment, and delivering superior and sustainable stakeholder value. It also clarifies the meaning of 'value addition' in terms of creation and capture of value for the Indian economy, contribution to the virtuous economic cycle of investment, creation of jobs and related demand and the generation and redeployment of surpluses for economic growth.

(iv) ***Value chain statement and analysis of competitive advantage*** : The value chain approach is an integral part of strategic cost management that explicitly highlights strategic issues and concerns. In this approach, each of the business functions is treated

as an essential and valued contributor and is constantly analysed to enhance customer value in the product/service relative to the cost incurred. Through systematic analysis of critical success factors, a firm can identify and develop competitive advantage over its rivals. Thus, information on value chain of the firm in its annual report is an important piece of information to the users of accounts. But, in the absence of any mandatory requirement, this statement is prepared and disclosed voluntarily by some Indian companies.

(v) **Operations review** : Some Indian companies provide sales information product-wise as well as on domestic sales and export sales basis, and market information classified into various geographical segments such as India, Europe, U.S.A. Rest of Asia etc. This is voluntarily disclosed by the companies.

(vi) **Statement on utilization of human resources** : Information on human capital in terms of department-wise strength, organization age profile, organization qualification profile and distribution by categories are provided voluntarily by the Indian companies.

(vii) **Segment Reporting** : It has long been debated by the users of financial statements that the consolidated statement of an entire group of companies are not sufficient to convey all the relevant information required by the users—when they need, in addition, is the disclosure of segmented information. Many large companies either operate in a number of countries or in a number of different industries or both. Many companies are so diversified that domestic operations account for only a small amount of total sales and no one industrial sector predominates. In these situations, information about each of these separate segments would give more insight to the users of accounts in assessing and evaluating the position and performance of the company.

Realising this need of the users of accounts and also for keeping pace with international developments, The Institute of Chartered Accountants of India (ICAI) published Accounting Standard 17 on 'Segment Reporting' which came into effect in respect of accounting periods commencing on or after 1.4.2001. ICAI made this standard mandatory for united companies and for any other commercial, industrial and business enterprise whose turnover for the accounting period exceeds Rs. 50 crores.

(viii) **Reconciliation with US Generally Accepted Accounting Principles (GAAP)** : For the purpose of enlisting on the US stock exchanges, either the financial statements are to be prepared under US GAAP or when financial statements are prepared following the GAAP of a particular country, such statements are to be reconciled with US GAAP in respect of stockholders' equity, net income and EPS. Accordingly, it has been observed that the Indian companies, desiring to enlist their shares on US stock exchanges, voluntarily disclose such reconciliation statement together with Independent Auditor's Report and Notes to Reconciliations.

A striking observation regarding disclosure of additional information voluntarily by the Indian companies (as discussed above) is that private sector companies have outmatched the companies in the public sector unlike the findings of some earlier studies such as Chakravorty (1994).

In conclusion it may be said that, although the quantity and quality of information provided in the financial statements by the Indian companies have improved significantly over the years, there is still some diversity in their reporting practices. Thus, more efforts should be put in to bring unexplored areas of accounting and reporting within the network of statutory requirement with a view to reducing the diversity and ambiguity in their disclosure and hence enhancing the quality, reliability and comprehensibility of accounting information.

11.4 Select Readings

- Agarwal, S., *Manual of Accounting Standards*, Snow White, 2000.
- Banerjee, B., *Regulation of Corporate Accounting and Reporting in India*, World Press, 2002.
- Ghosh, T P., *Accounting Standards and Corporate Accounting Practices*, Taxman, 2001.
- Chakravorty, D. K. *Development of Corporate Accounting in India*, Venus Publishing House, New Delhi, 1994.
- Das Gupta, N., *Financial Reporting in India*, Sultan Chand & Sons, 1977.
- Lal, I., *Corporate Annual Reports—Theory and Practice*. Sterling Publishers, 1985.
- Sen, S., *Segment Reporting in India*, Iyotsna Publishing House, Kolkata, 2005.

11.5 Questions

Long – Answer type :

- (1) Examine the findings of a few research studies regarding the financial reporting practices among Indian companies.
- (2) Discuss the statutory requirements for disclosure of financial information by Indian companies.
- (3) What are the new areas where information are voluntarily disclosed by the Indian companies?

Short – Answer Type :

- (4) What are the contents of corporate governance report?

(5) What information does a value chain statement convey? Is it obligatory upon all Indian companies to include such a statement as a part of financial statements?

(6) What factors drive voluntary disclosure of information?

Objective Type :

(7) State whether the following are true or false :—

(a) Notes to financial statements disclose accounting policies relating to treatment of various items appearing in profit and loss account and balance sheet.

(b) Consolidated financial statements form part of annual reports of listed Indian companies only.

(c) The preparation of fund flow statement is made mandatory by AS-3.

(d) All Indian companies must disclose basic and diluted EPS in accordance with AS-20.

[Hints : (7) (a) True; (b) False; (c) False; (d) False.]