

COURSE 6

BLOCK 2

UNIT-1

RATIO ANALYSIS AND TREND ANALYSIS

Learning Objectives

After reading this chapter, students should be able to:

- explain the meaning and objectives of accounting ratios
- Identify the various types of ratios commonly used
- Calculate various ratios to assess solvency, liquidity, efficiency and profitability of the firm
- Elaborate the use of trend analysis in analyzing financial statement

Structure

- 1.1 Introduction
- 1.2 Meaning of financial ratios
- 1.3 Procedure for computation of ratios
- 1.4 Objectives of ratio analysis
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1.1 Introduction

Ratio analysis refers to the analysis and interpretation of the figures appearing in the financial statements (i.e., Profit and Loss Account, Balance Sheet and Fund Flow statement etc.).

It is a process of comparison of one figure against another. It enables the users like shareholders, investors, creditors, Government, and analysts etc. to get better understanding of financial statements.

Ratio analysis is a very powerful analytical tool useful for measuring performance of an organisation. Accounting ratios may just be used as symptom like blood pressure, pulse rate, body temperature etc. The physician analyses these information to know the causes of illness. Similarly, the financial analyst should also analyse the accounting ratios to diagnose the financial health of an enterprise.

1.2 Meaning of financial ratios

As stated earlier, accounting ratios are an important tool of financial statements analysis. A ratio is a mathematical number calculated as a reference to relationship of two or more numbers and can be expressed as a fraction, proportion, percentage and a number of times. When the number is calculated by referring to two accounting numbers derived from the financial statements, it is termed as accounting ratio.

It needs to be observed that accounting ratios exhibit relationship, if any, between accounting numbers extracted from financial statements. Ratios are essentially derived numbers and their efficacy depends a great deal upon the basic numbers from which they are calculated. Hence, if the financial statements contain some errors, the derived numbers in terms of ratio analysis would also present an erroneous scenario. Further, a ratio must be calculated using numbers which are meaningfully correlated. A ratio calculated by using two unrelated numbers would hardly serve any purpose. For example, the furniture of the business is Rs. 1,00,000 and Purchases are Rs. 3,00,000. The ratio of purchases to furniture is 3 (3,00,000/1,00,000) but it hardly has any relevance. The reason is that there is no relationship between these two aspects.

Metcalf and Tigard have defined financial statement analysis and interpretations as a process of evaluating the relationship between component parts of a financial statement to obtain a better understanding of a firm's position and performance.

Khan and Jain define the term ratio analysis as “the systematic use of ratios to interpret the financial statements so that the strengths and weaknesses of a firm as well as its historical performance and current financial conditions can be determined.”

1.3 Procedure for computation of ratios

Generally, ratio analysis involves four steps:

- (i) Collection of relevant accounting data from financial statements.
- (ii) Constructing ratios of related accounting figures.
- (iii) Comparing the ratios thus constructed with the standard ratios which may be the corresponding past ratios of the firm or industry average ratios of the firm or ratios of competitors.
- (iv) Interpretation of ratios to arrive at valid conclusions.

1.4 Objectives of ratio analysis

Ratio analysis is indispensable part of interpretation of results revealed by the financial statements. It provides users with crucial financial information and points out the areas which require investigation. Ratio analysis is a technique which involves regrouping of data by application of arithmetical relationships, though its interpretation is a complex matter. It requires a fine understanding of the way and the rules used for preparing financial statements. Once done effectively, it provides a lot of information which helps the analyst:

1. To know the areas of the business which need more attention;
2. To know about the potential areas which can be improved with the effort in the desired direction;
3. To provide a deeper analysis of the profitability, liquidity, solvency and efficiency levels in the business;
4. To provide information for making cross-sectional analysis by comparing the performance with the best industry standards; and
5. To provide information derived from financial statements useful for making projections and estimates for the future.

1.5 Types of ratios

There is a two way classification of ratios: (1) traditional classification, and (2) functional classification. The traditional classification has been on the basis of financial statements to which the determinants of ratios belong. On this basis the ratios are classified as follows:

(i) 'Statement of Profit and Loss Ratios: A ratio of two variables from the statement of profit and loss is known as statement of profit and loss ratio. For example, ratio of gross profit to revenue from operations is known as gross profit ratio. It is calculated using both figures from the statement of profit and loss.

(ii) Balance Sheet Ratios: In case both variables are from the balance sheet, it is classified as balance sheet ratios. For example, ratio of current assets to current liabilities known as current ratio. It is calculated using both figures from balance sheet.

(iii) Composite Ratios: If a ratio is computed with one variable from the statement of profit and loss and another variable from the balance sheet, it is called composite ratio. For example, ratio of credit revenue from operations to trade receivables (known as trade receivables turnover ratio) is calculated using one figure from the statement of profit and loss (credit revenue from operations) and another figure (trade receivables) from the balance sheet.

Although accounting ratios are calculated by taking data from financial statements but classification of ratios on the basis of financial statements is rarely used in practice. It must be recalled that basic purpose of accounting is to throw light on the financial performance (profitability) and financial position (its capacity to raise money and invest them wisely) as well as changes occurring in financial position (possible explanation of changes in the activity level). As such, the alternative classification (functional classification) based on the purpose for which a ratio is computed, is the most commonly used classification which is as follows:

A. Profitability Ratios

B. Liquidity Ratios

C. Activity (or Turnover) Ratios

D. Solvency Ratios

1.6 Profitability ratios

Profit is the primary objective of all businesses. All businesses need a consistent improvement in profit to survive and prosper. A business that continually suffers losses cannot survive for a long period.

Profitability ratios measure the efficiency of management in the employment of business resources to earn profits. These ratios indicate the success or failure of a business enterprise for a particular period of time. Profitability ratios are used by almost all the parties connected with the business. A strong profitability position ensures common stockholders a higher dividend income and appreciation in the value of the common stock in future. Creditors, financial institutions and preferred stockholders expect a prompt payment of interest and fixed dividend income if the business has good profitability position.

Management needs higher profits to pay dividends and reinvest a portion in the business to increase the production capacity and strengthen the overall financial position of the company.

Some important profitability ratios are given below:

- (i) Net profit (NP) ratio
- (ii) Gross profit (GP) ratio
- (iii) Price earnings ratio (P/E ratio)
- (iv) Operating ratio
- (v) Expense ratio
- (vi) Dividend yield ratio
- (vii) Dividend payout ratio
- (viii) Return on capital employed ratio
- (ix) Earnings per share (EPS) ratio
- (x) Return on shareholder's investment/Return on equity
- (xi) Return on common stockholders' equity ratio

(i) **Net profit ratio (NP ratio)** is a popular profitability ratio that shows relationship between net profit after tax and net sales. It is computed by dividing the net profit (after tax) by net sales.

$$\text{Net profit (NP) ratio} = \frac{\text{Net profit after tax}}{\text{Net sales}}$$

For the purpose of this ratio, net profit is equal to gross profit minus operating expenses and income tax. All non-operating revenues and expenses are not taken into account because the purpose of this ratio is to evaluate the profitability of the business from its primary operations.

Net profit (NP) ratio is a useful tool to measure the overall profitability of the business. A high ratio indicates the efficient management of the affairs of business.

(ii) **Gross profit ratio (GP ratio)** is a profitability ratio that shows the relationship between gross profit and total net sales revenue. It is a popular tool to evaluate the operational performance of the business. The ratio is computed by dividing the gross profit figure by net sales.

The following formula/equation is used to compute gross profit ratio:

$$\text{Gross profit Ratio} = \frac{\text{Gross profit}}{\text{Net sales}}$$

When gross profit ratio is expressed in percentage form, it is known as gross profit margin or gross profit percentage. The formula of gross profit margin or percentage is given below:

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Net sales}} \times 100$$

The basic components of the formula of **gross profit ratio (GP ratio)** are gross profit and net sales. Gross profit is equal to net sales minus cost of goods sold. Net sales are equal to total gross sales less returns inwards and discount allowed. The information about gross profit and net sales is normally available from income statement of the company.

(iii) **Price earnings ratios (P/E ratio)** measures how many times the earnings per share (EPS) has been covered by current market price of an ordinary share. It is computed by dividing the current market price of an ordinary share by earnings per share.

The formula of price earnings ratio is given below:

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

A higher P/E ratio is the indication of strong position of the company in the market and a fall in ratio should be investigated.

(iv) **Operating ratio** is computed by dividing operating expenses by net sales. It is expressed in percentage.

Operating ratio is computed as follows:

$$\text{Operating ratio} = \frac{\text{Operating cost}}{\text{Net sales}} \times 100$$

The basic components of the formula are operating cost and net sales. Operating cost is equal to cost of goods sold plus operating expenses. Non-operating expenses such as interest charges, taxes etc., are excluded from the computations.

This ratio is used to measure the operational efficiency of the management. It shows whether the cost component in the sales figure is within normal range. A low operating ratio means high net profit ratio i.e., more operating profit.

The ratio should be compared: (1) with the company's past years ratio, (2) with the ratio of other companies in the same industry. An increase in the ratio should be investigated and brought to attention of management. The operating ratio varies from industry to industry.

(v) **Expense ratio** (expense to sales ratio) is computed to show the relationship between an individual expense or group of expenses and sales. It is computed by dividing a particular expense or group of expenses by net sales. Expense ratio is expressed in percentage.

$$\text{Expense ratio} = \frac{\text{Particular expense}}{\text{Net sales}} \times 100$$

The numerator may be an individual expense or a group of expenses such as administrative expenses, sales expenses or cost of goods sold.

Expense ratio shows what percentage of sales is an individual expense or a group of expenses. A lower ratio means more profitability and a higher ratio means less profitability.

(vi) **Return on shareholders' investment ratio** is a measure of overall profitability of the business and is computed by dividing the *net income after interest and tax* by average stockholders' equity. It is also known as return on equity (ROE) ratio and return on net worth ratio. The ratio is usually expressed in percentage.

$$\begin{array}{l} \text{Return on shareholders' investment} \\ \text{or} \\ \text{return on equity ratio} \end{array} = \frac{\text{Net income after interest and tax}}{\text{Average stockholders' equity}} \times 100$$

The numerator consists of net income after interest and tax because it is the amount of income available for common and preference stockholders. The denominator is the average of stockholders' equity (preference and common stock). The information about net income after interest and tax is normally available from income statement and the information about preference and common stock is available from balance sheet.

Return on equity (ROE) is widely used to measure the overall profitability of the company from preference and common stockholders' view point. The ratio also indicates the efficiency of the management in using the resources of the business.

(vii) **Return on common stockholders' equity ratio** measures the success of a company in generating income for the benefit of common stockholders. It is computed by dividing the net income available for common stockholders by common stockholders' equity. The ratio is usually expressed in percentage.

$$\text{Return on common stockholders' equity} = \frac{\text{Net income} - \text{Preferred dividend}}{\text{Average common stockholders' equity}} \times 100$$

The numerator in the above formula consists of net income available for common stockholders which are equal to net income less dividend on preferred stock. The denominator consists of average common stockholders' equity which is equal to average total stockholders' equity less average preferred stockholders equity. If preferred stock is not present, the net income is simply divided by the average common stockholders' equity to compute the common stock equity ratio. Like return on equity (ROE) ratio, a higher common stock equity ratio indicates high profitability and strong financial position of the company and can convert potential investors into actual common stockholders.

(viii) **Earnings per share (EPS) ratio** measures how many dollars of net income have been earned by each share of common stock. It is computed by dividing net income less preferred dividend by the number of shares of common stock outstanding during the period. It is a popular measure of overall profitability of the company and is usually expressed in dollars. Earnings per share ratio (EPS ratio) is computed by the following formula:

$$\text{Earnings per share (EPS) ratio} = \frac{\text{Net income} - \text{Preferred dividend}}{\text{Weighted average number of shares outstanding}}$$

The numerator is the net income available for common stockholders' (net income less preferred dividend) and the denominator is the average number of shares of common stock outstanding during the year.

The formula of EPS ratio is similar to the formula of return on common stockholders' equity ratio except the denominator of EPS ratio formula is the number of average shares of common stock outstanding rather than the average common stockholders' equity. The higher the EPS figure, the better it is. A higher EPS is the sign of higher earnings, strong financial position and, therefore, a reliable company to invest money.

(ix) **Return on capital employed ratio** is computed by dividing the net income before interest and tax by capital employed. It measures the success of a business in generating satisfactory profit on capital invested. The ratio is expressed in percentage.

Formula:

$$\text{Return on capital employed ratio} = \frac{\text{Net income before interest and tax}}{\text{Capital employed}} \times 100$$

The basic components of the formula of return on capital employed ratio are net income before interest and tax and capital employed.

Net income before the deduction of interest and tax expenses is frequently referred to as operating income. Here, interest means interest on long term loans. If company pays interest expenses on short-term borrowings, that is deducted to arrive at operating income.

Return on capital employed ratio measures the efficiency with which the investment made by shareholders and creditors is used in the business. Managers use this ratio for various financial decisions. It is a ratio of overall profitability and a higher ratio is, therefore, better.

(x) **Dividend yield ratio** shows what percentage of the market price of a share a company annually pays to its stockholders in the form of dividends. It is calculated by dividing the *annual dividend per share* by *market value per share*. The ratio is generally expressed in percentage form and is sometimes called *dividend yield percentage*.

Since dividend yield ratio is used to measure the relationship between the annual amount of dividend per share and the current market price of a share, it is mostly used by investors looking for dividend income on continuous basis.

Formula:

The following formula is used to calculate dividend yield ratio:

$$\text{Dividend yield ratio} = \frac{\text{Dividend per share}}{\text{Market value per share}} \times 100$$

(xi) **Dividend payout ratio** discloses what portion of the current earnings the company is paying to its stockholders in the form of dividend and what portion the company is ploughing back in the business for growth in future. It is computed by dividing the dividend per share by the earnings per share (EPS) for a specific period. The formula of dividend payout ratio is given below:

$$\text{Dividend payout ratio} = \frac{\text{Dividend per share}}{\text{Earnings per share}}$$

The numerator in the above formula is the dividend per share paid to common stockholders only. It does not include any dividend paid to preferred stockholders.

Example on Profitability Ratios

Following is the Profit and Loss Account of Samir Auto Ltd., for the year ended 31st March, 2016.

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Particulars	Amount in Rs.	Particulars	Amount in Rs.
To Opening Stock	1,00,000	By Sales	5,60,000
To Purchases	3,50,000	By Closing Stock	1,00,000
To Wages	9,000		
To Gross Profit/d	<u>2,01,000</u>		
	<u>6,60,000</u>		<u>6,60,000</u>
To Administrative Expenses		By Gross Profit b/d	2,01,000
To Selling and Distribution Expenses	20,000	By Interest on Investments	
To Non-Operating Expenses	89,000	By Profit on sale of Assets	10,000
To Net Profit Transferred to Capital	30,000		8,000
	<u>80,000</u>		
	<u>2,19,000</u>		<u>2,19,000</u>

You are required to calculate:

- (i) Gross Profit Ratio
- (ii) Net Profit Ratio
- (iii) Operating Ratio
- (iv) Operating Profit Ratio
- (v) Administrative Expenses Ratio

Solution:

$$(i) \quad \textbf{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$$

$$= \frac{2,01,000}{5,60,000} \times 100 = 35.9\%$$

$$(ii) \quad \textbf{Net Profit Ratio} = \frac{\text{Net Profit After Tax}}{\text{Net Sales}} \times 100$$

$$= \frac{80,000}{5,60,000} \times 100 = 14.3\%$$

$$(iii) \quad \textbf{Operating Ratio} = \frac{\text{Cost of Goods Sold} + \text{Operating Exp.}}{\text{Net Sales}}$$

$$\text{Cost of Goods Sold} = \text{Op. Stock} + \text{Purchases} + \text{Wages} - \text{Closing Stock}$$

$$= 1,00,000 + 3,50,000 + 9,000 - 1,00,000 = \text{Rs. } 3,59,000$$

$$\text{Operating Expenses} = \text{Administrative Exp.} + \text{Selling and Distribution Exp.} = \text{Rs. } 20,000 + \text{Rs. } 89,000 = \text{Rs. } 1,09,000$$

$$\text{Operating Ratio} = \frac{3,59,000 + 1,09,000}{5,60,000} \times 100 = 83.6\%$$

$$(iv) \quad \textbf{Operating Profit Ratio} = 100 - \text{Operating Ratio} = 16.4\%$$

$$(v) \quad \textbf{Administrative Expense Ratio} = \frac{\text{Administrative Exp}}{\text{Net Sales}} \times 100$$

$$= \frac{20,000}{5,60,000} \times 100 = 3.6\%$$

1.7 Liquidity ratios

Liquidity ratios measure the adequacy of current and liquid assets and help evaluate the ability of the business to pay its short-term debts. The ability of a business to pay its short-term debts is frequently referred to as short-term solvency position or liquidity position of the business.

Generally a business with sufficient current and liquid assets to pay its current liabilities as and when they become due is considered to have a strong liquidity

position and a businesses with insufficient current and liquid assets is considered to have weak liquidity position.

Short-term creditors like suppliers of goods and commercial banks use liquidity ratios to know whether the business has adequate current and liquid assets to meet its current obligations. Financial institutions hesitate to offer short-term loans to businesses with weak short-term solvency position.

Three commonly used liquidity ratios are given below:

- (i) Current ratio or working capital ratio
- (ii) Quick ratio or acid test ratio
- (iii) Absolute liquid ratio

(i) **Current ratio** (also known as **working capital ratio**) is a popular tool to evaluate short-term solvency position of a business. Short-term solvency refers to the ability of a business to pay its short-term obligations when they become due. Short term obligations (also known as current liabilities) are the liabilities payable within a short period of time, usually one year.

Current ratio is computed by dividing total current assets by total current liabilities of the business. This relationship can be expressed in the form of following formula or equation:

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

Above formula comprises of two components i.e., current assets and current liabilities. Both the components are available from the balance sheet of the company. Some examples of current assets and current liabilities are given below:

Current assets

Cash

Marketable securities

Accounts receivables /
debtors

Inventories / stock

Prepaid expenses

Current liabilities

Accounts payable /
creditors

Accrued payable

Bonds payable

(ii) **Quick ratio** (also known as “acid test ratio” and “liquid ratio”) is used to test the ability of a business to pay its short-term debts. It measures the relationship between liquid assets and current liabilities. Liquid assets are equal to total current assets minus inventories and prepaid expenses.

The formula for the calculation of quick ratio is given below:

$$\text{Quick ratio} = \frac{\text{Liquid assets}}{\text{Current liabilities}}$$

Quick ratio is considered a more reliable test of short-term solvency than current ratio because it shows the ability of the business to pay short term debts immediately.

Inventories and prepaid expenses are excluded from current assets for the purpose of computing quick ratio because inventories may take long period of time to be converted into cash and prepaid expenses cannot be used to pay current liabilities.

(iii) **Absolute Liquid ratio**-some analysts also compute **absolute liquid ratio** to test the liquidity of the business. Absolute liquid ratio is computed by dividing the absolute liquid assets by current liabilities.

The formula to compute this ratio is given below:

$$\text{Absolute liquid ratio} = \frac{\text{Absolute liquid assets}}{\text{Current liabilities}}$$

Absolute liquid assets are equal to liquid assets minus accounts receivables (including bills receivables). Some examples of absolute liquid assets are cash, bank balance and marketable securities etc.

Example on Liquidity Ratios:

The following is the Balance Sheet of Samir Auto. Ltd., for the year ending 31st March, 2016.

Liabilities	Amount in Rs.	Assets	Amount in Rs.
10% preference Share capital	5,00,000	Goodwill	1,00,000
Equity Share Capital	10,00,000	Land and Building	6,50,000
9% Debentures	2,00,000	Plant	8,00,000
Long-term Loan	1,00,000	Furniture and Fixtures	1,50,000
Bills Payable	60,000	Bills Receivables	70,000
Sundry Creditors	70,000	Sundry Debtors	90,000
Bank Overdraft	30,000	Bank Balance	45,000
Outstanding Expenses	5,000	Short-term Investments	25,000
		Prepaid Expenses	5,000
		Stock	30,000
	19,65,000		19,65,000

From the balance sheet calculate:

- (i) Current ratio
- (ii) Acid test ratio
- (iii) Absolute liquid ratio
- (iv) Comment on these ratios

Solution

(i) **Current Ratio** = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Current Liabilities

$$\text{Current Assets} = \text{Rs.}70,000 + \text{Rs.}45,000 + \text{Rs.}25,000 + \text{Rs.}5,000 + \text{Rs.}30,000 \\ = \text{Rs.}2,65,000$$

$$\text{Current Liabilities} = \text{Rs.}60,000 + \text{Rs.}70,000 + \text{Rs.}30,000 + \text{Rs.}5,000 = \\ \text{Rs.}1,65,000$$

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{\text{Rs.}2,65,000}{\text{Rs.}1,65,000} = 1.61$$

Current Liabilities Rs.1,65,000

(ii) **Acid test ratio** = $\frac{\text{Liquid Assets}}{\text{Current Liabilities}}$

Current Liabilities

$$\text{Liquid Assets} = \text{Current Assets} - (\text{Stock} + \text{Prepaid Expenses}) = \text{Rs.}2,30,000$$

$$\text{Acid test ratio} = \frac{\text{Liquid Assets}}{\text{Current Liabilities}} = \frac{\text{Rs.}2,30,000}{\text{Rs.}1,65,000} = 1.39$$

Current Liabilities Rs. 1,65,000

(iii) **Absolute liquid ratio** = $\frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}}$

Current Liabilities

Absolute Liquid Assets = Rs.45,000 + Rs.25,000 = Rs.70,000

Absolute liquid ratio = $\frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}} = \frac{70,000}{1,65,000} = 0.42$

Current Liabilities 1,65,000

(iv) **Comments:** Current ratio of the company is not satisfactory because the ratio (1.61) is below the generally accepted standard of 2:1. Acid-Test ratio, on the other hand, is more than normal standard of 1:1. Liquid assets are quite sufficient to provide a cover to the current liabilities. The absolute liquid ratio is 0.42 which is slightly less than the accepted standard of 0.5.

1.8 Activity ratios

Activity ratios (also known as turnover ratios) measure the efficiency of a firm or company in generating revenues by converting its production into cash or sales. Generally a fast conversion increases revenues and profits.

Activity ratios show how frequently the assets are converted into cash or sales and, therefore, are frequently used in conjunction with liquidity ratios for a deep analysis of liquidity.

Some important activity ratios are:

- (i) Inventory turnover ratio
- (ii) Receivables turnover ratio
- (iii) Average collection period
- (iv) Accounts payable turnover ratio
- (v) Average payment period
- (vi) Asset turnover ratio
- (vii) Working capital turnover ratio
- (viii) Fixed assets turnover ratio

(i) **Inventory turnover ratio (ITR)** is an activity ratio is a tool to evaluate the liquidity of inventory. It measures how many times a company has sold and replaced its inventory during a certain period of time.

Inventory turnover ratio is computed by dividing the cost of goods sold by average inventory at cost. The formula/equation is given below:

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory at cost}}$$

Two components of the formula of inventory turnover ratio are cost of goods sold and average inventory at cost. Cost of goods sold is equal to cost of goods manufactured (purchases for trading company) plus opening inventory less closing inventory. Average inventory is equal to opening balance of inventory plus closing balance of inventory divided by two.

Inventory turnover ratio varies significantly among industries. A high ratio indicates fast moving inventories and a low ratio, on the other hand, indicates slow moving or obsolete inventories in stock. A low ratio may also be the result of maintaining excessive inventories needlessly. Maintaining excessive inventories unnecessarily indicates poor inventory management because it involves tying up funds that could have been used in other business operations.

(ii) Receivables turnover ratio (also known as **debtors turnover ratio**) is computed by dividing the net credit sales during a period by average receivables. Accounts receivable turnover ratio simply measures how many times the receivables are collected during a particular period. It is a helpful tool to evaluate the liquidity of receivables.

$$\text{Accounts receivable turnover ratio} = \frac{\text{Net credit sales}}{\text{Average trade receivables (net)}}$$

Two components of the formula are “net credit sales” and “average trade accounts receivable”. It is clearly mentioned in the formula that the numerator should include only credit sales. But in examination questions, this information may not be given. In that case, the total sales should be used as numerator assuming all the sales are made on credit.

Average receivables are equal to opening receivables (including notes receivables) plus closing receivables (including notes receivables) divided by two. But sometimes opening receivables may not be given in the examination questions. In that case closing balance of receivables should be used as denominator.

(iii) **Average collection period** is computed by dividing the number of working days for a given period (usually an accounting year) by receivables turnover ratio. It is expressed in days and is an indication of the quality of receivables.

The formula is given below:

$$\text{Average collection period} = \frac{\text{Number of working days}}{\text{Debtors turnover ratio}}$$

A short collection period means prompt collection and better management of receivables. A longer collection period may negatively effect the short-term debt paying ability of the business in the eyes of analysts.

(iv) **Accounts payable turnover ratio** (also known as creditors turnover ratio or creditors' velocity) is computed by dividing the net credit purchases by average accounts payable. It measures the number of times, on average, the accounts payable are paid during a period. Like receivables turnover ratio, it is expressed in times.

$$\text{Accounts payable turnover ratio} = \frac{\text{Net credit purchases}}{\text{Average accounts payable}}$$

In above formula, numerator includes only credit purchases. But if credit purchases are not known, the total net purchases should be used.

Average accounts payable are computed by adding opening and closing balances of accounts payable (including notes payable) and dividing by two. If opening balance of accounts payable is not given, the closing balance (including notes payable) should be used.

Accounts payable turnover ratio indicates the creditworthiness of the company. A high ratio means prompt payment to suppliers for the goods purchased on credit and a low ratio may be a sign of delayed payment. Accounts payable turnover ratio also depends on the credit terms allowed by suppliers. Companies who enjoy longer credit periods allowed by creditors usually have low ratio as compared to others.

(v) **Average payment period** means the average period taken by the company in making payments to its creditors. It is computed by dividing the number of working days in a year by creditors turnover ratio. Some other formulas for its computation are given below:

Formula:

This ratio may be computed in a number of ways:

$$1. \text{ Average accounts payables} = \frac{\text{Accounts payables (including notes payable)}}{\text{Average daily credit purchase}^*}$$

$$^* \text{Average daily credit purchases} = \frac{\text{Credit purchases}}{\text{Number of working days in a year}}$$

$$2. \text{ Average payment period} = \frac{(\text{Accounts payable} \times \text{Number of working days})}{\text{Net credit purchases}}$$

$$3. \text{ Average payment period} = \frac{\text{Number of working days}}{\text{Payables turnover ratio}}$$

Any of the above formulas may be used to compute average payment period. If credit purchases are unknown, the total purchases may be used. A shorter payment period indicates prompt payments to creditors. Like accounts payable turnover ratio, average payment period also indicates the creditworthiness of the company. But a very short payment period may be an indication that the company is not taking full advantage of the credit terms allowed by suppliers.

(vii) Working capital turnover ratio is computed by dividing the cost of goods sold by net working capital. It represents how many times the working capital has been turned over during the period.

$$\text{Working capital turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Net working capital}}$$

The formula consists of two components – cost of goods sold and net working capital. If the cost of goods sold figure is not available or cannot be computed from the available information, the total net sales can be used as numerator. Net working capital is equal to current assets minus current liabilities. This information is available from the balance sheet.

Generally, a high working capital turnover ratio is better. A low ratio indicates inefficient utilization of working capital. The ratio should be carefully interpreted because a very high ratio may also be a sign of insufficient working capital.

(viii) Fixed assets turnover ratio (also known as sales to fixed assets ratio) is a commonly used activity ratio that measures the efficiency with which a company uses its fixed assets to generate its sales revenue. It is computed by dividing net sales by average fixed assets.

$$\text{Fixed assets turnover ratio} = \frac{\text{Net sales}}{\text{Average fixed assets}}$$

Generally, a high fixed assets turnover ratio indicates better utilization of fixed assets and a low ratio means inefficient or under-utilization of fixed assets. The usefulness of this ratio can be increased by comparing it with the ratio of other companies, industry standards and past years.

Example of Activity Ratios

<u>From Balance Sheet</u>		<u>From Income Statement</u>	
CURRENT ASSETS		REVENUE	
Cash	Rs 2,550	Sales	Rs. 112,500
Marketable securities	Rs. 2,000	Cost of Goods Sold (COGS)	Rs. 85,040
Account Receivable (Net)	Rs. 16,675	Gross Margin	Rs. 27,460
Inventories	Rs. 26,470		
Total Current Assets	Rs. 47,695		

Opening Inventory = Rs. 22,500

Using the above figures, we can calculate the average collection period ratio.

Average Collection Period	=	$\frac{\text{Accounts Receivable} \times 360 \text{ days}}{\text{Sales}}$
	=	$\frac{\text{Rs. } 16,675 \times 360}{\text{Sales}}$

		Rs.112,500
	=	53.36 or 54 days (rounded up to the nearest day)

Inventory Turnover	<u>Cost of Goods Sold</u> Average Inventory *	=	<u>Rs.85,040</u> (Rs.22,500 + Rs.26,470) / (2)
		=	3.5 times

1.9 Solvency ratios

Solvency ratios (also known as long-term solvency ratios) measure the ability of a business to survive for a long period of time. These ratios are very important for stockholders and creditors.

Solvency ratios are normally used to:

- Analyze the capital structure of the company
- Evaluate the ability of the company to pay interest on long term borrowings
- Evaluate the ability of the the company to repay principal amount of the long term loans (debentures, bonds, medium and long term loans etc.).
- Evaluate whether the internal equities (stockholders' funds) and external equities (creditors' funds) are in right proportion.

Some frequently used long-term solvency ratios are given below:

- (i) Debt to equity ratio
- (ii) Proprietary ratio
- (iii) Fixed assets to equity ratio
- (iv) Capital gearing ratio

(i) **Debt to equity ratio** is a long term solvency ratio that indicates the soundness of long-term financial policies of a company. It shows the relation between the portion of assets financed by creditors and the portion of assets financed by stockholders. As the debt to equity ratio expresses the relationship between external equity (liabilities) and internal equity (stockholder's equity), it is also known as "external-internal equity ratio".

Debt to equity ratio is calculated by dividing total liabilities by stockholder's equity.

$$\text{Debt to equity ratio} = \frac{\text{Total liabilities}}{\text{Stockholder's equity}}$$

The numerator consists of the total of current and long term liabilities and the denominator consists of the total stockholders' equity including preferred stock. Both the elements of the formula are obtained from company's balance sheet.

A ratio of 1 (or 1: 1) means that creditors and stockholders equally contribute to the assets of the business. A less than 1 ratio indicates that the portion of assets provided by stockholders is greater than the portion of assets provided by creditors and a greater than 1 ratio indicates that the portion of assets provided by creditors is greater than the portion of assets provided by stockholders.

Creditors usually like a low debt to equity ratio because a low ratio (less than 1) is the indication of greater protection to their money. But stockholders like to get benefit from the funds provided by the creditors therefore they would like a high debt to equity ratio.

(ii) **The proprietary ratio** (also known as net worth ratio or equity ratio) is used to evaluate the soundness of the capital structure of a company. It is computed by dividing the stockholders' equity by total assets.

Formula:

$$\text{Proprietary ratio} = \frac{\text{Stockholders' equity}}{\text{Total assets}} \times 100$$

The proprietary ratio shows the contribution of stockholders' in total capital of the company. A high proprietary ratio, therefore, indicates a strong financial position of the company and greater security for creditors. A low ratio indicates that the

company is already heavily depending on debts for its operations. A large portion of debts in the total capital may reduce creditors interest, increase interest expenses and also the risk of bankruptcy.

(iii) **Fixed assets to equity ratio** measures the contribution of stockholders and the contribution of debt sources in the fixed assets of the company. It is computed by dividing the fixed assets by the stockholders' equity.

Other names of this ratio are *fixed assets to net worth ratio* and *fixed assets to proprietors fund ratio*.

Formula:

$$\text{Fixed assets to stockholders' equity ratio} = \frac{\text{Fixed assets}}{\text{Stockholders' equity}}$$

The numerator in the above formula is the book value of fixed assets (fixed assets less depreciation) and the denominator is the stockholders' equity that consists of common stock, preferred stock, paid in capital and retained earnings. Information about fixed assets and stockholders' equity is available from balance sheet.

(iv) **Capital gearing ratio** is a useful tool to analyze the capital structure of a company and is computed by dividing the common stockholders' equity by fixed interest or dividend bearing funds.

Analyzing capital structure means measuring the relationship between the funds provided by common stockholders and the funds provided by those who receive a periodic interest or dividend at a fixed rate.

A company is said to be low geared if the larger portion of the capital is composed of common stockholders' equity. On the other hand, the company is said to be highly geared if the larger portion of the capital is composed of fixed interest/dividend bearing funds.

Formula:

$$\text{Capital gearing ratio} = \frac{\text{Common stockholders' equity}}{\text{Fixed interest bearing funds}}$$

Or

$$\text{Capital gearing ratio} = \text{Common stockholders' equity} : \text{Fixed interest bearing funds}$$

In the above formula, the numerator consists of common stockholders' equity that is equal to total stockholders' equity less preferred stock and the denominator consists of fixed interest or dividend bearing funds that usually include long term loans, bonds, debentures and preferred stock etc. All the information required to compute capital gearing ratio is available from the balance sheet.

Example on Solvency Ratios

From the following Balance Sheet Calculate Debt-Equity Ratio.

Liabilities	Amount in Rs.	Assets	Amount in Rs.
3,000 Equity shares of Rs.100 each	3,00,000	Fixed Assets	6,00,000
2,000 10% Preference shares of Rs.100 each	2,00,000	Current Assets	2,00,000
1,000 11% Debentures of Rs.100 each	1,00,000		
General Reserves	50,000		
Reserves for contingencies			
Current Liabilities	50,000		
	<u>1,00,000</u>		
	<u>8,00,000</u>		<u>8,00,000</u>

Solution:

- (i) Debt-Equity Ratio= $\frac{\text{Outsiders' Funds}}{\text{Shareholders' fund}}$
- $$= \frac{1,00,000 \text{ (Debentures)} + 1,00,000 \text{ (Current Liabilities)}}{3,00,000 + 2,00,000 + 50,000 + 50,000}$$
- $$= \text{Rs.}2,00,000 / \text{Rs.}6,00,000 = 1:3$$
- (ii) Debt-Equity Ratio (excluding current liabilities)
- $$= \frac{\text{Long-term Debt}}{\text{Shareholders' funds}} = \text{Rs.}1,00,000 / \text{Rs.}6,00,000 = 1:6$$

1.10 Advantages of Ratio analysis

Ratio analysis is widely used as a powerful tool of financial statement analysis. It establishes the numerical or quantitative relationship between two figures of a financial statement to ascertain strengths and weaknesses of a firm as well as its current financial position and historical performance. It helps various interested parties to make an evaluation of certain aspect of a firm's performance.

The following are the principal advantages of ratio analysis:

(i) Forecasting and Planning:

The trend in costs, sales, profits and other facts can be known by computing ratios of relevant accounting figures of last few years. This trend analysis with the help of ratios may be useful for forecasting and planning future business activities.

(ii) Budgeting:

Budget is an estimate of future activities on the basis of past experience. Accounting ratios help to estimate budgeted figures. For example, sales budget may be prepared with the help of analysis of past sales.

(iii) Measurement of Operating Efficiency:

Ratio analysis indicates the degree of efficiency in the management and utilisation of its assets. Different activity ratios indicate the operational efficiency. In fact, solvency of a firm depends upon the sales revenues generated by utilizing its assets.

(iv) Communication:

Ratios are effective means of communication and play a vital role in informing the position of and progress made by the business concern to the owners or other parties.

(v) Control of Performance and Cost:

Ratios may also be used for control of performances of the different divisions or departments of an undertaking as well as control of costs.

(vi) Inter-firm Comparison:

Comparison of performance of two or more firms reveals efficient and inefficient firms, thereby enabling the inefficient firms to adopt suitable measures for improving their efficiency. The best way of inter-firm comparison is to compare the relevant ratios of the organisation with the average ratios of the industry.

(vii) Indication of Liquidity Position:

Ratio analysis helps to assess the liquidity position i.e., short-term debt paying ability of a firm. Liquidity ratios indicate the ability of the firm to pay and help in credit analysis by banks, creditors and other suppliers of short-term loans.

(viii) Indication of Long-term Solvency Position:

Ratio analysis is also used to assess the long-term debt-paying capacity of a firm. Long-term solvency position of a borrower is a prime concern to the long-term creditors, security analysts and the present and potential owners of a business. It is measured by the leverage/capital structure and profitability ratios which indicate the earning power and operating efficiency. Ratio analysis shows the strength and weakness of a firm in this respect.

(ix) Indication of Overall Profitability:

The management is always concerned with the overall profitability of the firm. They want to know whether the firm has the ability to meet its short-term as well as long-term obligations to its creditors, to ensure a reasonable return to its owners and secure optimum utilisation of the assets of the firm. This is possible if all the ratios are considered together.

(x) Signal of Corporate Sickness:

A company is sick when it fails to generate profit on a continuous basis and suffers a severe liquidity crisis. Proper ratio analysis can give signal of corporate sickness in advance so that timely measures can be taken to prevent the occurrence of such sickness.

(xi) Aid to Decision-making:

Ratio analysis helps to take decisions like whether to supply goods on credit to a firm, whether bank loans will be made available etc.

(xii) Simplification of Financial Statements:

Ratio analysis makes it easy to grasp the relationship between various items and helps in understanding the financial statements.

1.11 Limitations of Ratio analysis

The technique of ratio analysis is a very useful device for making a study of the financial health of a firm. But it has some limitations which must not be lost sight of before undertaking such analysis.

Some of these limitations are:

i. Limitations of Financial Statements:

Ratios are calculated from the information recorded in the financial statements. But financial statements suffer from a number of limitations and may, therefore, affect the quality of ratio analysis.

ii. Historical Information:

Financial statements provide historical information. They do not reflect current conditions. Hence, it is not useful in predicting the future.

iii. Different Accounting Policies:

Different accounting policies regarding valuation of inventories, charging depreciation etc. make the accounting data and accounting ratios of two firms non-comparable.

iv. Lack of Standard of Comparison:

No fixed standards can be laid down for ideal ratios. For example, current ratio is said to be ideal if current assets are twice the current liabilities. But this conclusion may not be justifiable in case of those concerns which have adequate arrangements with their bankers for providing funds when they require, it may be perfectly ideal if current assets are equal to or slightly more than current liabilities.

v. Quantitative Analysis:

Ratios are tools of quantitative analysis only and qualitative factors are ignored while computing the ratios. For example, a high current ratio may not necessarily mean sound liquid position when current assets include a large inventory consisting of mostly obsolete items.

vi. Window-Dressing:

The term 'window-dressing' means presenting the financial statements in such a way to show a better position than what it actually is. If, for instance, low rate of depreciation is charged, an item of revenue expense is treated as capital expenditure etc. the position of the concern may be made to appear in the balance sheet much better than what it is. Ratios computed from such balance sheet cannot be used for scanning the financial position of the business.

vii. Changes in Price Level:

Fixed assets show the position statement at cost only. Hence, it does not reflect the changes in price level. Thus, it makes comparison difficult.

viii. Causal Relationship Must:

Proper care should be taken to study only such figures as have a cause-and-effect relationship; otherwise ratios will only be misleading.

ix. Ratios Account for one Variable:

Since ratios account for only one variable, they cannot always give correct picture since several other variables such Government policy, economic conditions, availability of resources etc. should be kept in mind while interpreting ratios.

x. Seasonal Factors Affect Financial Data:

Proper care must be taken when interpreting accounting ratios calculated for seasonal business. For example, an umbrella company maintains high inventory during rainy season and for the rest of year its inventory level becomes 25% of the seasonal inventory level. Hence, liquidity ratios and inventory turnover ratio will give biased picture.

1.12 Trend Analysis

Trend analysis involves the collection of information from multiple time periods and plotting the information on a horizontal line for further review. The intent of this analysis is to spot actionable patterns in the presented information.

Revenue and cost information from a company's income statements can be arranged on a trend line for multiple reporting periods and examined for trends and inconsistencies. For example, a sudden spike in expense in one period followed by a sharp decline in the next period can indicate that an expense was booked twice in the first month. Thus, trend analysis is quite useful for examining preliminary financial statements for inaccuracies, to see if adjustments should be made before the statements are released for general use.

When used internally (the revenue and cost analysis function), trend analysis is one of the most useful management tools available. The following are examples of this type of usage:

- Examine revenue patterns to see if sales are declining for certain products, customers, or sales regions.
- Examine expense report claims for evidence of fraudulent claims.

- Examine expense line items to see if there are any unusual expenditure in a reporting period that require additional investigation.
- Extend revenue and expense line items into the future for budgeting purposes, to estimate future results.

When trend analysis is being used to predict the future, keep in mind that the factors formerly impacting a data point may no longer be doing so to the same extent. This means that an extrapolation of a historical time series will not necessarily yield a valid prediction of the future. Thus, a considerable amount of additional research should accompany trend analysis when using it to make predictions.

Procedure for Calculating Trends:

- (i) One year is taken as a base year. Generally, the first or the last is taken as base year.
- (ii) The figures of base year are taken as 100.
- (iii) Trend percentages are calculated in relation to base year. If a figure in other year is less than the figure in base year the trend percentage will be less than 100 and it will be more than 100 if figure is more than base year figure. Each year's figure is divided by the base year's figure.

The interpretation of trend analysis involves a cautious study. The mere increase or decrease in trend percentage may give misleading results if studied in isolation. An increase of 20% in current assets may be treated favorable. If this increase in current assets is accompanied by an equivalent increase in current liabilities, then this increase will be unsatisfactory. The increase in sales may not increase profits if the cost of production has also gone up.

The base period should be carefully selected. The base period should be a normal period. The price level changes in subsequent years may reduce the utility of trend ratios. If the figure of the base period is very small, then the ratios calculated on this basis may not give a true idea about the financial data. The accounting

procedures and conventions used for collecting data and preparation of financial statements should be similar otherwise the figures will not be comparable.

Example on Trend Analysis

Calculate the trend percentages from the following figures of Samir Auto Ltd.

Taking 2010 as the base and interpret them:

Year	Sales (Rs.in Thousand)	Profit After tax (Rs.in Thousand)
2010	1,000	150
2011	1,200	185
2012	1,500	210
2013	2,000	220
2014	2,900	240

Solution:

Trend Percentages

(Base year 2010 as 100)

Year	Sales	Trend percentage	PAT	Trend Percentage
2010	1,000	100	150	100
2011	1,200	120	185	123.33
2012	1,500	150	210	140
2013	2,000	200	220	146.67
2014	2,900	290	240	160

Interpretation:

- (i) The sales have continuously increased in all the years upto 2014. The percentage in 2014 is 290 compared to 100 of base year. The increase in sales is quite satisfactory.
- (ii) The figures of profit have also increased over the years.
- (iii) But if critically examined, it can be concluded that profit has not soared in the same manner as of sales. This may be because of increase in cost of production.

1.13 Let's sum-up

Ratios are a powerful tool in the interpretation of the accounts and can discover issues and problems not immediately evident from the accounts and financial information provided in the annual report. They can provide the basis for inter-firm comparisons allowing managers to benchmark the performance and efficiency of the firm against its competitors. Trends can then be examined and analysed. Stakeholders may use ratios to support their decision making. Employees, for example may use profit ratios to support pay claims and creditors can use liquidity ratios to evaluate whether debts will be repaid.

1.14 Key terms

- Budgeting
- Window-dressing
- Profitability ratios
- Liquidity ratios
- Activity ratios
- Solvency ratios
- Trend analysis

1.15 Self-Assessment Questions

- (i) What is meant by ratio analysis? Discuss its objectives and limitations.

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- (ii) What are liquidity ratios? Discuss their significance.
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1.16 Further Readings

- (i) Gupta S.K and Sharma R.K, Management Accounting, Kalyani Publishers, 2nd Edition, New Delhi
- (ii) Rao P.M., Financial Statement Analysis and Reporting, PHI, 1st Edition, New Delhi
- (iii) Arora, M.N, Cost and Management Accounting, Himalaya Publishing House, 3rd Edition, Mumbai

1.17 Model Questions

- (i) “Ratio analysis is a tool to examine the health of business with a view to make financial results more intelligible.” Explain.
- (ii) What do you mean by ratio analysis? Narrate the advantages of ratio analysis.

Problem 4. The Balance sheet of Naronath & Co. as on 31.12.2000 shows as follows:

Liabilities	Amount in Rs.	Assets	Amount in Rs.
Equity capital	1,00,000	Fixed Assets	1,80,000
15% Preference shares	50,000	Stores	25,000
12% Debentures	20,000	Debtors	55,000
Retained Earnings	<u>45,000</u>	Bills Receivable	3,000
Creditors	<u>2,65,000</u>	Bank	<u>2,000</u>
			<u>2,65,000</u>

Comment on the financial position of the Company i. e., Debt – Equity Ratio, Fixed Assets Ratio, Current Ratio, and liquid ratio.

