



UNIT-8

Ratio Analysis

Learning Outcomes

By the end of this unit the learner will be able to:

- ✓ Analyse a board classification of ratios
- ✓ identify ratios which are appropriate for control of activities
- ✓ Understand a system of ratios which responds to the needs of control by management.

Unit 8

Ratio Analysis

Introduction

Our previous units about financial statements have already familiarised you with the concept of financial ratios and their importance in analysing a business' performance. Financial media, which includes magazines, such as, Fortune, Economic Times, and Forbes, etc., use financial ratios to assess the strengths and weaknesses of large business organisations. Stock Exchanges undertake an exhaustive effort to evaluate large companies' financial positions with the help of these ratios.

Usually, financial magazines rank organisations based on five basic parameters, which includes, sales, assets, net income, stockholders' equity, and the number of employees. A total of nine measures are further derived for rating companies. These include, but are not limited to, change in sales, change in profits, net income as a percentage of sales, net income as a percentage of stockholders' equity, growth in earnings per share over a period of ten years, assets per employee, sales per employee, and a ten year average of total return to investors.

The ratios mentioned above are a party of a growing list, which is used by companies individually to summarize their financial information. These ratios have various uses for the parties who are interested in them and there are numerous ratios that can emerge out of a company's financial statements.

Classification

Ratios are classified on the basis of the following criteria:

Primacy Criterion: This ratio is of the most universal kind as it is applicable to businesses of all kinds and sizes, unlike other ratios that are not as universally applicable. It is called the primary ratio, or the return on investment (ROI) ratio. The other category of ratios is the secondary measures, which includes all other ratios that vary from business to business. The British Institute of Management uses the following classification to conduct inter-firm comparisons.

Ratio Classification: Ratios are classified based on the interest group they are targeting. According to this classification, management is considered to be different from owners.

- a) Management;
- b) Owners; and
- c) Lenders

Management and Operational Control: Management will be interested in ratios concerning the cost of goods sold, gross margin analysis, profit or net income analysis, contribution analysis, working capital analysis, and operating income analysis.

Owner's Viewpoint: The owners will be concerned with ratios dealing with net profit and net worth, the net profit available and equity share capital, cash flow per share, equity per share, earnings per share, and dividends per share.

Lenders' perspective: The important ratios according to the lenders' perspective include; current assets as a ratio of current liabilities, quick assets to current liabilities, total debt to total assets, long-term debt to net assets, total debt to net worth, long-term debt to net assets, long-term debt to net worth and net profit before interest and tax (NBIT) to interest.

Fundamental Classification: According to this system of classification, ratios are categorised according to their function in the financial analysis.

Four functional groups are identified below:

- a) **Liquidity Ratios:** These ratios deal with the ability of the firm to fulfill its short-term debt obligations. The current ratio and quick ratio fall under this category and indicate a firm's liquidity position.
- b) **Leverage Ratios:** They are used to measure how much of a company's operations are financed by debt. Leverage Ratios measure the debt to total assets, coverage ratio, and the number of times interest is earned. Creditors consider a company's equity as their margin of safety, while owners try to make a profit on borrowed funds, which is more than the interest that they have to pay on their loans.
- c) **Activity Ratios:** They measure the company's ability to use and allocate its limited resources effectively. Inventory turnover, average collection period, fixed asset turnover and total asset turnover are examples of activity ratios.
- d) **Profitability Ratios:** These assess the profitability of a company as indicated by returns on sale and investment. These ratios include; net profit to total assets, gross (or net) profit margin, and net profit after tax to net worth.

Usually, there is another class of ratios that is added to the four that have been discussed above. It is called the Market Value group of ratios. These are mostly concerned with an investor's expectation of the company's future in light of its present financial situation and performance. Price- Earnings (PE) and the Market/ Book- Value Ratios are part of this class. The fundamental classification of ratios is the mostly widely used for the financial analysis of firms.

The Norms for Evaluation

The ratios, which are selected in order to analyse financial statements and control financial activities, show a relationship between essential financial elements at a particular time. A benchmark is selected, which is considered “normal” or “healthy” and ratios are compared against it. Any deviation from this benchmark warrants an investigation into the reasons underlying it and a course of action is developed to correct the deviation. Take the ABC Textile Mills, for example. It holds 89 days of inventory on an average against net sales during 2012. In order to evaluate whether it is healthy to hold inventory for 89 days, the company can compare this figure against the following:

Trend over time: The following data may have been retrieved from ABC Textile Mills:

Year	Average No. of days of inventory*
2008	90
2009	118
2010	115
2011	107
2012	98

*Average No. of days= $\frac{\text{Net sales} \div \text{Opening inventory} + \text{Closing inventory}}{2/365}$

- a) **Against an average of some past period:** the average number of days, or a mean, for ABC Textile Mills can be calculated and used as a benchmark. $(90 + 118 + 115 + 107 + 89)/5 = 519/5 = 104$ days approximately.
- b) **Against an industry average:** the industry average can be taken as a benchmark, by randomly choosing a few firms that operate in the textile industry. The type and size of the chosen firms should be similar to ABC Textile Mills and their average number of days should be taken for the period that the ratio is being calculated for.
- c) **Against an average of a cross-section sample:** financial statistics of companies across the corporate sector can also serve as a point of comparison. For example, the Reserve bank of India’s sample for the period 1998-99 and 2000-01 included a list of 1927 public limited companies and their year0wise averages were calculated. Similarly, relevant financial figures and averages of various companies in the public and private corporate sectors are available against which a company can evaluate its ratios.

Computation and Purpose

The table below provides a list of Activity ratios that fall under “management” category and describes their uses.

Activity Ratios (Secondary Group)

Ratio	Computation Method		Purpose(s)
I	Cost of Goods Sold and Gross Margin Analysis		
1.	Cost of Goods sold	$\text{Cost of Goods sold} / \text{Net Sales}$	Measures gross margin, which provides a relationship between prices, volume and costs.
2.	Gross Margin		$\text{Net Sales} - \text{Cost of goods sold} / \text{Net Sales}$
II	Profit Analysis		
3.	Net Margin	$\text{Net Profit} / \text{Net Sales}$	Deals with the management's ability to conduct business operations, settle all expenses and liabilities (including interest, taxes and depreciation) and compensate the owners.
4.	Operating Margin	$\text{Net operating Income before Interest and Taxes} / \text{Net Sales}$	Indicates the ability of a company to run effective operations.
5.	Post-tax Margin	$\text{Net Profit after tax but before Interest}^* / \text{Net Sales}$	Indicates the profit left for owners and lenders after tax has been paid.

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- Net Profit after Tax and before Interest is calculated by adding back to net profit the cost of interest on debt after tax, which is calculated as pre-tax interest times (1-tax rate).

Ratio	Computation Method		Purpose(s)
III	Expense Analysis		
6	Operating Ratio	$\text{Operating expenses} / \text{Net sales}$	Shows the operating expenses as a proportion of net sales. Operating expenses are defined depending on the costing system

adopted by the company.

IV Contribution Analysis

7	Total contribution	$\text{Net sales} - \text{directly variable costs} / \text{Net Sales}$	Measures the margin earned through operations that goes towards fixed costs and profit for the year.
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V Management of Capital

8	Gross Assets	$\text{Net Sales} / \text{Total assets}$	Measures the profitability of current and non-current assets.
9	Net Assets turnover	$\text{Net Sales} / \text{Total assets} - \text{current liabilities}$	Indicates the effectiveness of assets and assumes that liabilities are easily available to the company, which will reduce the burden on assets.
10	Inventory turnover	$\text{Net Sales or Cost of Goods Sold} / \text{Average Inventories}$	Measures the number of times that a company needs to renew its inventory during a particular period to achieve the required level of sales.
11	Receivables turnover	$\text{Net Sales} / \text{average receivables}$	Measures the amount of credit that the company allows in a given accounting period to achieve the required level of sales.
12	Average collection period	$(\text{Average Receivables} \times 365) / \text{Net Sales}$	Indicates the effectiveness of credit period granted by the company to its debtors.

Managerial Uses of The Primary Ratio

The return on Investment Ratio is regarded as the primary ratio for managerial purposes because it is one single measure of the effectiveness of a business' operations. In other words, it links the net profit earned by the company to the capital it employs. It is especially relevant to investors, who have invested their money into the company's capital, as it indicates whether the business as performed according to

their expectations. In order to get an idea of the division wise return on investment and performance of the organization, it is usually disaggregated into different divisions.

The Return on Investment (ROI) does not have a uniform implication, because both the factors that are used to calculate this ratio i.e. return and capital mean different things to different companies. These terms do not have standard definitions, therefore, the ROI varies from one business to another and is often called the Return on Assets Ratio, as well. These variations will be explained in detail further in the unit.

Du Pont was the pioneer of the ROI ratio, which is a combination of other ratios. This is why this particular ratio is also known as the Du Pont System of Financial Control.

Figure 10.1 shows the Du Pont Chart, which shows various elements that come together to form the ROI Ratio. The right-hand side of the chart lists all the investments made into assets while the left-hand side lists all the earnings and costs flowing through the organization as a result of the utilization of these assets. The Net Income and Net Assets figures are, then, linked to the Net Sales, which gives the figure for the Return on Investment.

Current Assets, such as, Cash, Accounts Receivable, Marketable Securities, and Inventory are listed on the right side, which are, then, added to fixed assets on the left side. We calculate the Total Assets by summing up fixed and current assets and this figure is divided into sales on the right side to give us a ratio known as Total Asset Turnover or **Total Asset Utilization**.

We calculate a similar figure for income on the left-hand side. The four slots at the bottom on the left add up interest, taxes, depreciation and other operating costs as Total Costs and this figure is deducted from sales on the right-hand side to give us Net Income. This Net Income is divided by Sales on the left side to give us the **Net Margin**. These two ratios that we have calculated i.e. Total Asset Utilization and Net Margin, are multiplied together to give us the Return on Investment Ratio, shown at the top of the table.

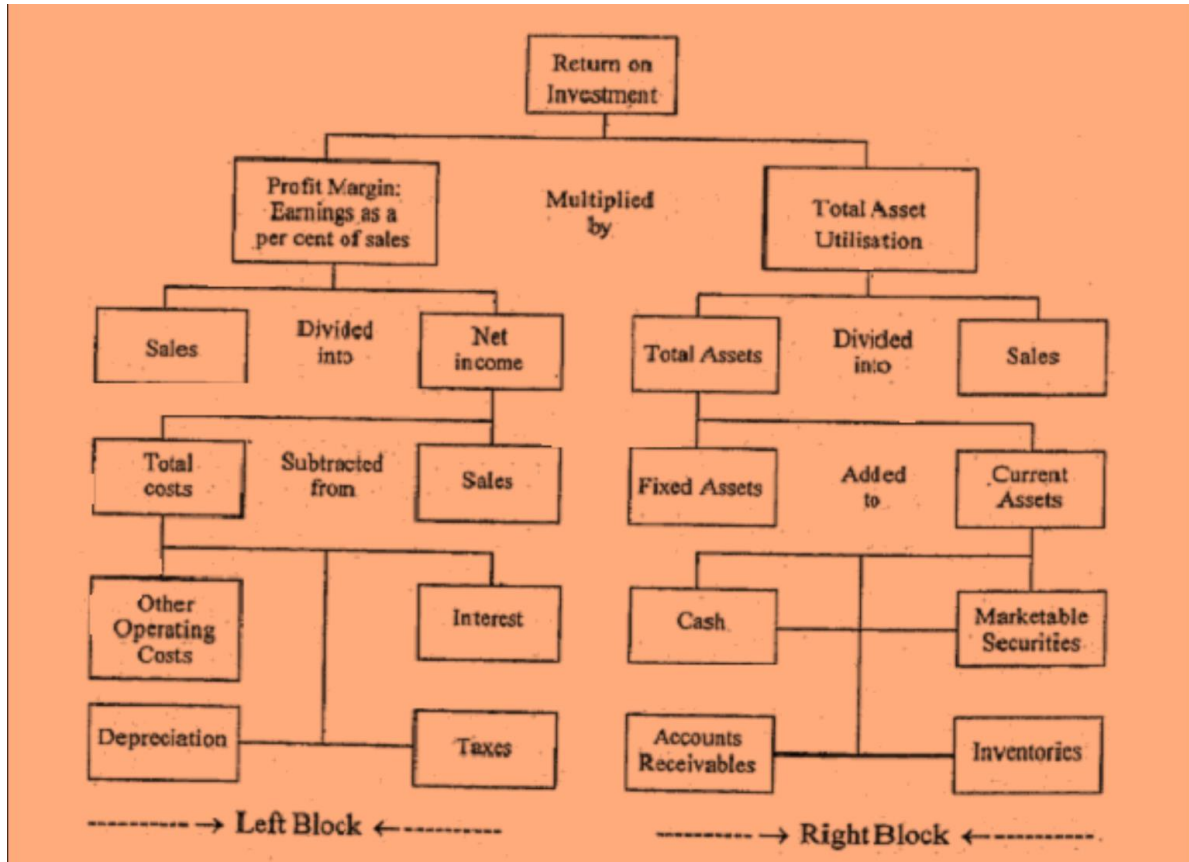


Fig. 8.1

The Return on Investment may be expressed as a relationship in the following formula:

$$\text{ROI} = \text{Total Asset Turnover} \times \text{Net Margin}$$

$$\text{Or } \frac{\text{Net Income}}{\text{Total Assets}} = \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Net Income}}{\text{Sales}}$$

Total assets can be financed by owner's funds, also known as equity, in addition to borrowings from lenders, also known as debt. Another ratio called the Return on Equity (ROE) can also be calculated from the ROI, which measures the proportion of equity-financed assets.

This is denoted by:

$$\text{ROE} = \text{ROI} / \text{Proportion of Total Assets financed by Equity}$$

$$= \text{ROI} \div \frac{\text{Equity}}{\text{Total Assets}}$$

$$= \text{ROI} \times \frac{\text{Total Assets}}{\text{Equity}}$$

Total Assets / Equity is also called the Equity Multiplier; therefore, the ROE is equal to ROI times the equity multiplier.

Versions of ROI

The definition of ROI varies depending on how a company defines its investments and return. The list below shows the various definitions of Investment.

1. Gross capital employed Net fixed assets + total current assets + other assets;
2. Net capital employed Net fixed assets + net current assets + other assets;
3. Proprietors' net capital Total assets - (Current liabilities + long-term employed borrowing + any other outside funds) ; and
4. Average capital employed Opening + closing balances of capital, reserves, accumulated depreciation, and borrowings/2

Similarly, Return can be defined in the following ways:

1. Gross profit;
2. Profits before Depreciation, Interest, and Taxes (PBDIT);
3. Profits before Depreciation, Interest, and Taxes (excluding capital and extraordinary profits): PBDIT;
4. Profits before Tax (PBT); and
5. Profits before Tax (excluding capital and extraordinary profits): PBT*

The following list gives various definitions for ROI:

1. Gross Return on Investment = Gross Profit/Total Net Assets
2. Net Return on Investment = Net Profit/Total Net Assets
3. Return on Capital Employed = Profit before tax + Interest/Net Worth (ROCE)+ Interest bearing debt.
4. ROI (based on PBDIT) Employed = PBDIT as percent of average capital
5. ROI (based on PBT) = PBT average of capital and

As a percentage of reserves.

Further Reading:

- ✓ *Bhattacharyya Debarshi, (2011), Financial Statement Analysis.*
- ✓ *GokulSinha, (2009), Financial Statement Analysis.*
- ✓ *Pamela Peterson Drake, Frank J. Fabozzi, (2013), Analysis of Financial Statements.*
- ✓ *Axel Tracy, (2012), Ratio Analysis Fundamentals*
- ✓ *M. F. Morley, (1994), Ratio Analysis*