

FINANCIAL ANALYSIS AND CONTROL



Of the various tools and techniques of financial management, financial analysis and control techniques are very important. This is because of the fact that through the use of the techniques of the financial analysis and control, the financial performances of the firms are assessed. Therefore, the techniques of financial analysis and control mainly include the following, presented in **UNIT # TWO:**

1. Financial Ratio Analysis : Theoretical Background (Lesson : 1)
2. Measurement and Interpretation of Financial Ratios (Lesson: 2)
3. Application of Financial Ratio Analysis and DuPont System ((Lesson : 3)
4. Cash Flow Analysis (Lesson : 4)
5. Fund Flow Analysis(Lesson : 5)
6. Cash Budgeting and (Lesson : 6)
7. Proforma Statements and Sustainable Growth Model (Lesson:7)

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Lesson-1: Financial Ratio Analysis: Theoretical Background

After carefully studying the lesson 1, you should be able :

- To know the concepts of financial ratio and its analysis;
- To get useful information from financial statements;
- To identify the users of financial ratio analysis;
- To understand the significance of financial ratio analysis;
- To identify the various types of financial ratios;
- To show the application of financial ratios and
- To understand the limitations of financial ratios.

Concepts of Financial Ratio and Its Analysis

Financial ratio embraces the relationship between two financial data. These financial data are available in profit and loss account or income statement and balance sheet of a firm. The analysis of financial statements can be best done when financial data are expressed as ratios or percentages. Ratio analysis is certainly a very admirable device because it is simple and has a predictive value.

Financial ratio embraces the relationship between two financial data.

Financial analysis is the interpretation of the financial statements of a firm. Financial analysis offers a system of appraisal and evaluation of a firm's performance. The financial statements mainly include : (i) profit and loss account or income statement; (ii) balance sheet or statement of affairs; (iii) Statement of retained earnings; (iv) Cash flow statement and (v) fund flow statement.

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Useful Information of Financial Statements for Financial Ratios

Financial statements are those, which provide useful financial information of a firm. They are usually prepared at the end of a particular period, normally say, a year. The financial statements provide useful information regarding the financial position of the enterprises. The proper analyses of these statements provide valuable insight into the financial conditions and operations of an enterprise. That is, these statements help financial management of the enterprises in measuring the efficiency or otherwise of their financial policies and decisions. The income statement or profit and loss account indicates earning capacity i.e. profitability of an enterprise. That is, whether a firm is making profit or incurring loss in a particular financial year is reflected in the income statement. The balance sheet of a firm shows the financial position at the end of a financial period. The nature as well as the composition of assets and liabilities, properties and capital is also reflected in the balance sheet. Statement of retained earnings reflects the changes in the firm's retained earnings as a result of the income generated and retained during the year. Cash flow statement shows the various sources and uses of cash; whereas the fund flow statement shows the various sources and uses of funds.

Financial statements help financial management of the enterprises in measuring the efficiency or otherwise of their financial policies and decisions.

Users of Financial Ratios

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Financial ratios are used by the owners and financial management of a firm in order to evaluate the financial strengths and weakness of the firm. Financial ratios can also be used by parties outside the firms viz. creditors, investors and others. The nature of analysis will differ depending on the purpose of the users. However, the following internal as well as external parties may use financial ratios:

- (i) **Owners :** The owners of a firm are mainly interested in the firm's profitability, liquidity and hence survival. Therefore, they need financial ratios to test all these parameters of the firm.
- (ii) **Financial managers :** The financial managers of a firm regularly use the financial ratio analysis in order to evaluate the financial policies and decisions of the firm. It is the overall responsibilities of the financial managers to see that the financial resources of the firm are used most effectively and efficiently and that the financial positions of the firms are sound.
- (iii) **Investors :** Investors who have invested their funds in the firm are mostly concerned about the firm's earnings.
- (iv) **Creditors :** They are interested in a firm's ability to meet their claims over a short period of time say one year. Hence, they use financial ratio analysis in order to evaluate the firm's liquidity position.
- (v) **Financiers of Long-term Funds :** They are concerned with the firm's long-term solvency and survival; since they provide long-term funds to firm. They analyze the firm's profitability over time, its ability to generate cash to be able to pay interest and repay the principal amount. They do not analyze the historical financial statements; but they put emphasis on the firm's projected or proforma financial statements to test its future solvency and profitability.
- (vi) **Government :** Government also analyze the financial position of an enterprise, especially its net income, in order to see whether the taxable income determined by the enterprise is correct or not. Government also analyze its sales position in order to see correctness of the same for imposing and collecting vat.

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Significance of Financial Ratio Analysis

Ratio is a powerful test of financial analysis . In financial analysis, ratios are helpful as a benchmark for evaluating the financial position and performance of a firm. The absolute financial figures reported in the financial statements do not provide a meaningful understanding of the performance of financial position of a firm. Therefore, a financial figure when related to another figure conveys a meaningful understanding. As for example, 5 million net profit earned in a financial year look impressive and also sound well; but do not bear testimony to the good

financial condition. But, if net profit is related to sales or investment; only then the firm's profitability can be predicted as good or bad as compared to the previous year profitability. Financial ratios help summarizing large quantities of financial data and to make qualitative judgment about the financial performance, based on quantitative judgment.. As for example, consider the case of current ratio of a firm during particular financial year. Current ratio expresses the quantified relationship between the current assets and current liabilities of that firm in that financial year. This relationship is an index or yardstick which allows a qualitative judgment to be formed about the firm's liquidity and hence ability to meet its current obligations. It measures the firm's liquidity. The greater the ratio, the greater the firm's liquidity and vice-versa. Therefore, the point to note here that a financial ratio expresses a quantitative relationship; but also helps forming qualitative judgment. Such is the nature of all the financial ratios as will be discussed in the next section 9.5.

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Types of Financial Ratios

Having regards to the specific interests of the relevant parties, internal and external; the financial ratios can be grouped into various classes. As mentioned the main parties interested in financial ratios are short and long-term creditors, owners, management, investors etc. Each of these parties may require different financial ratios namely: (i) short-term creditors' main interest is in the liquidity position or short-term solvency of the firm; (ii) long-term creditors' main interest lies in the profitability and long-term solvency of the firm; (iii) owners' main interest lies in the profitability and financial position of the firm; (iv) investors' main interest is in the every aspect of the firm's financial performance. Management will have to protect the interest of all other parties and see that the firm grows profitably. Therefore, in view of the requirement of the various users of financial ratios, they may be classified into the following important categories:

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- (ii) Debt or leverage ratios;
- (iii) Coverage Ratios;
- (iv) Profitability ratios;
- (v) Activity Ratios / Asset Management Ratios and
- (vi) Market value ratios.

Each of the above type of financial ratios is discussed in the following sub-sections :

Liquidity Ratios

Liquidity ratios are those which measure the liquidity and hence the short-term financial ability of a firm to meet its short-term financial obligations. These are : (i) current ratio; (ii) quick ratio; (iii) ratio of net working capital to total assets and (iv) cash ratio. The following paragraphs deal with each of these ratios.

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- (i) **Current Ratio** : This ratio is the relationship between current assets and current liabilities of a firm. The current assets include: cash in hand and in bank; debtors or accounts receivables; bill receivables; inventory and marketable securities and prepaid revenue expenses. On the other hand, current liabilities include: sundry creditors, bills payable, bank over-drafts, short-term bank and other loans. This ratio measures the extent of the current liabilities to current assets.
- (ii) **Quick Ratio** : This is also known as acid test ratio which expresses the relationship between quick assets and current liabilities. Quick assets are current assets as reduced by inventories. This ratio is the variation of the current ratio. This ratio measures the extent of the current liabilities to quick assets.
- (iii) **Ratio of Networking Capital to Total Assets** : This ratio is the relationship between networking capital and total assets of a firm. Net working capital means current assets as reduced by current liabilities. Total assets represent all the real assets, current and fixed having market values. So, fictitious assets, having no market value, like preliminary expenses, discount on issue of shares, profit and loss account debit balance etc. are not included in total assets. This ratio measures the extent of net working capital to total assets.
- (iv) **Cash Ratio** : It is the relationship between cash bank balances and current liabilities of a firm. This measures the adequacy or inadequacy of cash resources in order to meet the current obligations of a firm.

Debt or Leverage Ratios

Debt or Leverage ratios are those which measure the long-term solvency of a firm. That is whether a firm has enough financial solvency to meet its long-term obligations is measured by debt or leverage ratios. These are : (i) debt equity ratio; (ii) debt ratio; (iii) ratio of cash flow to total capitalization; (iv) ratio of capital employed to net worth and (v) equity multiplier.

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- (i) **Debt Equity Ratio** : This ratio is the relationship between the long-term debt and equity of a firm. Long-term debts are those whose maturity period is more than one year. These include: debentures, bonds etc. Equity represents the ordinary or equity share capital or stock of a firm. This ratio measures the contribution of long-term creditors as well as that of the owners. So, it describes the long-term lenders' contribution for each Taka/Dollar of the owners' contribution.
- (ii) **Debt Ratio** : This ratio is the relationship between total debts both long-term and short-term to total assets of a firm. This ratio measures the percentage or extent of the firm's total assets financed by total creditors (borrowings). This ratio tells us the relative importance of total debts in the asset structure of a firm.

- (iii) **Ratio of Cash Flow to Total Capitalization :** This ratio is the relationship between net cash flows and total capitalization of a firm. Net cash flow is the excess of cash in-flows over cash outflows during a particular year plus opening cash and bank balances. Total capitalization refers to the total capital, both working and fixed and long-term and short-term debts. It is a measure of the ability of a firm to service its debts. This ratio is useful in assessing the credit-worthiness of a firm seeking debt funds.
- (iv) **Ratio of Capital Employed to Net-worth :** This ratio is the relationship between capital employed and net worth of firm. Capital employed refers to the sum of net working capital and real fixed assets as reduced by accumulated depreciation. Net-worth refers to shareholders' equity, which is composed of equity share capital or equity stock, retained earnings and general reserves. This ratio measures how much funds are being contributed together by the lenders and owners for each Taka/ Dollar of the owners' contribution.
- (v) **Equity multiplier :** It is the relationship between total assets and total equity. Total equity represents the equity share capital, retained earnings and general reserves and surplus which are due to owners of the company. This ratio measures how much owned funds are invested in total assets.

Coverage Ratios

Coverage ratios measure the ability to service debts of a firm. That is, coverage ratios are designed to relate the financial charges of a firm to its ability to service them. The various coverage ratios are : (i) Interest coverage ratio; (ii) Cash flow coverage ratio and (iii) fixed charge coverage ratio. The following paragraphs follow the discussion on each of the coverage ratio.

- (i) **Interest Coverage Ratio :** This ratio is the relationship between interest charges or financial charges and earnings before interest and taxes of a firm. This ratio is also known as time interest earned ratio. This ratio measure the extent to which the operating income (EBIT) can decline before the firm is unable to meet its interest obligations. This ratio, therefore, stresses on a firm's meeting all fixed financial charges (interests), regardless of seniority of the claim.
- (ii) **Cash Flow Coverage Ratio :** This ratio is the relationship between net cash flows and the principal loan amount plus interest of a firm during a particular period. So, this ratio involves the relations of earnings before interest, taxes, depreciation and amortization (EBITDA) to interest and plus principal payments. This ratio measures a firm's ability to service its interest payments on a loan.

Coverage ratios measure the ability to service debts of a firm. That is, coverage ratios are designed to relate the financial charges of a firm to its ability to service them. The various coverage ratios are: (i) Interest coverage ratio; (ii) Cash flow coverage ratio and (iii) fixed charge coverage ratio.

- (iii) **Fixed Charge Coverage Ratio** : This ratio is the relationship between fixed charges and EBIT plus lease installment payments. Fixed charges include interest charges, annual lease payments and sinking funds payments. This ratio expands the Interest Coverage Ratio to include the firm's annual lease payments and sinking funds payments. This ratio measures the firm's ability to pay all interest charges including annual lease and sinking fund payments.

Profitability Ratios

This ratio helps measuring earning capacity of a firm. These ratios mainly include : (i) Gross profit margin; (ii) Net profit margin; (iii) Return on investment; (iv) Return on equity and (v) Earning per share.

Profitability refers to the expression of profits in relation to sales, investment and equity of a firm. Here, profits may be gross profits, net profits before and after interest and taxes. Whenever profits are related to any one of these parameters; then we get profitability ratio. This ratio helps measuring earning capacity of a firm. These ratios mainly include : (i) Gross profit margin; (ii) Net profit margin; (iii) Return on investment; (iv) Return on equity and (v) Earning per share. The following paragraphs deal with each of these ratios.

- (i) **Gross Profit Margin** : This ratio is the relationship between gross profits and sales of a firm. Gross profit is the sales reduced by variable expenses i.e. cost of goods sold. This ratio is also known as contribution ratio. This ratio reflects the efficiency with which the management produces each unit of product.
- (ii) **Net Profit Margin** : This ratio is the relationship between net profits and sales of a firm. Net profit refers to gross profits as reduced by fixed expenses. Net profits are also known as earnings after interest and taxes (EAIT). This ratio indicates management's efficiency in manufacturing, administering and selling and distributing the products. It measures the earning capacity of a firm.
- (iii) **Return on Investment (ROI)** : This ratio is the relationship of EAIT with investment, either total or net. Total investment refers to the sum total of all the real assets; whereas net investment refers to net assets i.e. total real assets as reduced by current liabilities. This ratio measures the extent of a firm's earnings in relation to its investment, total or net.
- (iv) **Return on Equity (ROE)** : This ratio is the relationship between EAIT and equity of a firm. Here, equity means shareholders' equity. This ratio measures the extent of firm's earnings in relation to shareholders' equity. ROE indicates how well the firm has used the owners' resources.
- (v) **Earnings Per Share (EPS)** : The profitability of the equity or ordinary or common shareholders' investment can also be measured in determining EPS. This also indicates the earning capacity of a firm. EPS found out over years indicates whether or not the firm's earnings power on the per-share basis has changed over that period.

Activity Ratios/ Asset Management Ratios

Asset management ratios are those which measure how effectively a firm is managing its assets. That is, they reflect the assets turnover through which the performances of the assets are measured. These ratios include : (i) Inventory Turnover; (ii) Receivables Turnover; (iii) Fixed Assets Turnover; (iv) Working Capital Turnover and (v) Total Assets Turnover. Each of these ratios is discussed in the following paragraphs:

Asset management ratios are those which measure how effectively a firm is managing its assets.

Inventory Turnover : It shows the relationship between cost of goods sold and inventories of a firm. Here, inventory refers to the average of opening and closing inventories. This ratio indicates the efficiency of the firm in producing and selling its products. This turnover shows how rapidly the inventory is turning into sales.

These ratios include : (i) Inventory Turnover; (ii) Receivables Turnover; (iii) Fixed Assets Turnover; (iv) Working Capital Turnover and (v) Total Assets Turnover.

- (i) **Receivables Turnover :** It shows the relationship between credit sales and debtors or accounts receivables. When a year is divided by receivables turnover, it is known as “Average Collection Period” or “ Days Sales Outstanding”. It measures the quantity of debtors since it indicates the speed of their collection. Thus, receivables turnover evaluates the credit policy of a firm.
- (ii) **Fixed assets Turnover :** This is the relation between the sales and fixed assets of a firm. This turnover measures the firm’s efficiency in utilizing its fixed assets. Here, fixed assets refer to net fixed assets (gross fixed assets as reduced by accumulated depreciation). It indicates the firm’s ability to produce a value of sales for a given amount of net fixed assets.
- (iii) **Working Capital Turnover:** This turnover expresses the relationship between working capital or current assets and sales. It is also known as current assets turnover. It measures how efficiently the firm uses its current assets. It indicates the firm’s ability to produce a volume of sales for a given amount of current assets.
- (iv) **Total assets Turnover:** This turnover expresses the relationship between total assets, both net fixed and current and sales. This is the final asset management ratio, which measures how efficiently the firm uses its total assets. It indicates the firm’s ability to produce a volume of sales for a given amount of total assets.

Market Value Ratios

Market value ratios represent a set of ratios that relate the firm’s stock price to its earnings and book value per share. These ratios give management an indication of what investors think of the firm’s past performance and future prospects. The market value ratios of a firm depend on its liquidity, debt management and asset management ratios, coverage ratios and profitability ratios. If these ratios are satisfactory; then the market value ratios are also satisfactory and vice-versa. The market value ratios include : (i)price-earning ratio ; (ii) dividend yield

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and (iii) market-to-book ratio. The following paragraphs deal with each of these ratios :

The market value ratios include :
(i) price-earning ratio ; (ii) dividend yield and (iii) market-to-book

- (i) **Price-earning Ratio:** This ratio expresses the relationship between market price per share and earnings per share. This ratio shows how much the investors are willing to pay per Taka/ Dollar of reported profits. It gives an indication of the relative valuation of a stock/ share of a firm. It reflects investors' expectation about the growth in the firm's earnings.
- (ii) **Dividend Yield :** Dividend yield for a stock relates the annual dividend to share/ stock price. Dividend yield evaluates the shareholders' returns in relation to the market value of the share/ stock.
- (iii) **Market-to-Book Ratio:** This ratio expresses relationship between market price per share and book value per share. Book value per share is the value of per common share/ outstanding. This ratio gives an indication of how investors regard the firm. That is, this market- to book value ratio is a relative measure of how the growth option for a firm is being valued vis-a vis its physical assets

They are used by the managers and outside parties for assessing the liquidity position, long-term solvency, operating efficiency, overall financial performance, inter-firm comparison, trend analysis and proforma analysis

Application of Financial Ratios

As the tool of financial analysis, financial ratios are applied by the owners/ shareholders, financial managers, production, marketing and human resource managers of a corporate firm for taking various decisions. Financial ratios are also applied by the creditors, investors, long-term financiers in assessing the financial performance of the firm in which they have vested interests. They are applied by the managers and outside parties for assessing the performances of the firm in respect of the following aspects :

- a) **Liquidity Position :** Liquidity of a firm is of crucial significance by the credit analysts of banks and other providers of the short-term loans to that firm. Both the deficit and surplus liquidity are harmful for a firm. Shortage of liquidity hampers the ability of the firm to meet its short-term financial obligations; while the surplus liquidity adversely affects the profitability of the firm in the sense that it creates idle liquidity, leading to blockage of the funds into the various current assets. Therefore, to examine whether a firm has deficit or surplus liquidity, analysis of liquidity ratios is very much helpful.
- b) **Long-term Solvency :** Long-term solvency of a firm is of crucial importance to the long-term creditors, security analysts and the existing as well as potential owners of that firm. These parties are interested in order to examine whether the firm is able to meet its long-term financial obligations. The long-term solvency is measured by the debt or leverage ratios and profitability ratios, which focus on earning power. Analysis of these ratios reveals the strength and weakness of a firm in this respect. For example, the leverage ratios will indicate whether a firm has a reasonable

proportion of various sources of finance in its capital structure; or whether its capital structure is heavily burdened with debt in which case the firm's solvency is exposed to serious strain. Similarly, the various profitability ratios would reveal whether or not the firm is able to offer adequate return to its owners consistent with the risk involved.

- (c) **Operating Efficiency :** Operating efficiency is a must for a firm for survival. Such operating efficiency is dependent on the efficient and effective utilization of its assets, both fixed and current. In order to measure operating efficiency, asset management or activity ratios are helpful. The analysis of these ratios throws light on the degree of efficiency in the management and utilization of its assets. In fact, the solvency of a firm is, in the ultimate analysis, dependent on the sales revenues generated by the use of its assets total as well as its components.
- d) **Overall Financial Performance :** Unlike the outside parties like the creditors, owners, investors, financiers etc. who are interested in any one aspect of the financial position of a firm, the management of the firm is constantly concerned about the overall financial performance of the firm. That is, the management is concerned about the ability of a firm to meet its short-term as well as long-term financial obligations to its creditors; to ensure a reasonable return to its owners and ensure an optimum utilization of the assets of the firm. This is possible if an integrated view is taken on all the financial ratios.
- (e) **Inter-firm Comparison:** Ratio analysis not only throws light on the financial position of a firm but also serves as a stepping stone to remedial measures. This is made possible due to inter-firm comparison with industry averages. A single value of a particular ratio is meaningless unless it is related to some standard or norm. One of the popular techniques is to compare the ratios of a firm with the industry average. It should be reasonably expected that the performance of a firm should be in broad conformity with that of the industry to which it belongs. An inter-firm comparison of the ratios would demonstrate the relative position vis-a vis its competitors. If the value of any ratio differs from the industry average or from that of the competitors; the firm can enquire into the probable reasons thereafter and in that light and take remedial measures.
- (f) **Trend Analysis :** Trend analysis or time series analysis of the ratios is of crucial importance to a firm; since the analysis takes into consideration the time dimension. Trend analysis of the ratios enables to know whether the financial position of a firm is improving or deteriorating or has remained constant over the years. The significance of a trend analysis lies in the fact that the analyst can know the direction of movement/ change i.e. whether the movement/ change is favorable or unfavorable. The analyst should

also identify the reasons for unfavorable change in the ratios so that corrective measures may be initiated.

- (g) **Proforma Analysis** : Proforma ratio analysis is the analysis of future ratios of a firm. The future ratios are sometimes used as the standard of comparison. The future ratios can be developed from the projected or proforma financial statements. The comparison of the current or past ratios with the future ratios shows the firm's relative strengths and weakness in the past and the future. If the future ratios indicate weak financial position, the firm should initiate corrective measures as early as possible.

Limitations of Financial Ratio

These limitations are – impact of inflation, conceptual diversity and window dressing technique.

Although ratio analysis is a widely used tool of financial analysis; yet it suffers from various limitations. These limitations are highlighted below:

Difficulty in Comparison

Inter-firm comparison is one of the main techniques of comparative analysis of ratios. But, each inter-firm comparison faces the following main difficulties :

- (i) Difference arisen in the basis of inventory valuation e.g. last in first out, first in first out, average cost and cost;
- (ii) Differences arisen in the methods of depreciation like straight line, reducing balance, accelerated etc.;
- (iii) Differences arisen in estimating working life of fixed assets like plant and machinery and equipment etc.;
- (iv) Differences arisen in amortization of intangible assets like goodwill, patents etc.;
- (v) Differences arisen in amortization of deferred revenue expenditures like preliminary expenses, discount on issue of shares etc.;
- (vi) Differences arisen in capitalization of lease and
- (vii) Differences arisen in the treatment of extra-ordinary items of income and expenditure.

Impact of Inflation

Ratio analysis i.e. determination of the various financial ratios ignores the impact of inflation i.e. price level changes. This is because of the fact that the traditional financial statements are based on historical costs and hence financial ratios are also based on historical costs. Assets acquired at different periods are, in effect, shown at different prices in the balance sheet and these are not adjusted for changes in the price level. As a result, the ratio analysis will not yield strictly comparable and therefore, dependable results. Therefore, that the financial ratios ignore the impact of inflation is one of the main limitations of this tool of financial analysis.

Conceptual Diversity

Another limitation of financial ratio analysis is that it suffers from diversified concept which affects its usefulness. There is a scope for diversity of concepts amongst the various analysts as to what constitutes shareholders' equity, net worth, debt, assets, profits and so on. Different financial analysts may use these terms in different senses.

Window Dressing Technique

Through employing an "window dressing technique" a firm can make their financial statements look stronger than its real position. The technique used by a firm to make its financial statements look better than they actually are, known as window dressing of financial statements. Suppose, you as the Financial Manager of Tata Ltd. borrowed an amount of Tk. 2 lacs on 2-year basis on December 28, 2000; held the loan proceeds as cash for a few days and then paid off the loan ahead of time of maturity. This improved the company's current and quick ratios and made his year-end-2000 Balance Sheet look good. But, this is a window dressing of Tata Ltd's Balance Sheet only.

Because of the above-mentioned limitations of financial ratio analysis; although ratio analysis is very useful, yet the financial analysts should be full aware of these limitations and make necessary adjustments. Ratio analysis conducted in a mechanical and unwise manner is dangerous; but used intelligently and with good judgment; it can provide useful insight into a firm's operations. Therefore, probably the most important and most difficult input to successful ratio analysis is the judgment used when interpreting the results to reach an overall conclusion about a firm's financial position.

Review Questions

A. Short Questions

1. What do you understand by ratio analysis ?
2. What do you mean by financial statement ? What are the main financial statements ?
3. What useful information are provided by the various financial statements ?
4. Who are the main users of financial ratio analysis ? Why they are to use financial ratios ? Explain.
5. Explain the significance of financial ratio analysis in the context of corporate firms.
6. Explain the window dressing technique as applied in the financial statements.
7. What are the difficulties usually faced inter-firm comparison as applied in ratio analysis ? Explain.
8. “Financial analysis conducted in a mechanical way is dangerous; but used intelligently is praise worthy” – Explain.
9. How does the quick ratio differ from the current ratio ?
10. Is there any relationship between total assets turnover and return on total assets ? Explain.
11. Two companies have the same amount of working capital. But, the current debt paying of one company is much weaker than that of the other. Explain how could this happen ?
12. How would you measure the liquidity of a firm ? Explain.
13. How would you measure the long-term solvency of a firm ? Explain.
14. How would you measure the profitability of a firm ? Explain.
15. How would you measure the leverage of a firm ? Explain.
16. How would you ensure the efficiency or otherwise in asset management of a firm ? Explain.
17. How would you examine the utilization of fixed assets ? Explain.
18. How would you examine the efficiency of debt management ? Explain.
19. What do you mean by market value ratios ? Explain each of such ratios.
20. What is coverage ratio ? What are its measure ? Explain.

B. Broad Questions

21. In which categories the financial ratios can be grouped ? Explain each of these groups.
22. What is meant by liquidity ratio ? How can you measure the liquidity of a firm ? Explain.
23. What is meant by profitability ratio ? Explain the various measures of profitability.
24. What is meant by debt ratio ? What are its components ? Explain each of them.
25. Discuss the problems involved in ratio analysis.
26. Explain the major usefulness of the financial ratios.
27. Explain the significance and limitations of ratio analysis.

28. Which of the financial ratios would you most likely refer to in each of the following situations :
- (i) The company asks you to sell goods on credit.
 - (ii) You are thinking of investing in a company's stock.
 - (iii) You are thinking of investing in a company's debenture.
 - (iv) You are willing to grant short-term bank loan to a customer.
 - (v) You are willing to grant long-term bank loan to a customer.
29. Name four types of users of financial ratios. What type of ratios does each group emphasize?

Lesson–2: Measurement and Interpretation of Financial Ratios

After successful completion of this lesson 2, you should be able :

- To know the techniques used in measuring the financial ratios;
- To understand the process of interpreting the financial ratios and
- To identify the diagnostic role of the financial ratios;

Techniques of Measuring Financial Ratios

Different types of financial ratios demand different techniques in order to measure them. The following sub-sections deal with each of the technique.

Measuring Liquidity Ratios

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

$$(ii) \text{ Quick Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

$$(iii) \text{ Ratio of Net Working capital to total assets} = \frac{\text{Net total Assets}}{\text{Total assets}}$$

$$(iv) \text{ Cash Ratio} = \frac{\text{Cash \& Bank Balances}}{\text{Current Liabilities}}$$

Measuring Leverage or Debt Ratios

$$(i) \text{ Debt Equity Ratio} = \frac{\text{Long-term debts}}{\text{Equity capital}}$$

$$(ii) \text{ Debt Ratio} = \frac{\text{Total debts}}{\text{Total assets}}$$

$$(iii) \text{ Ratio of Cash Flows to Total Capitalization} = \frac{\text{Net Cash Flows}}{\text{Total assets}}$$

$$(iv) \text{ Ratio of Capital Employed to Net Worth} = \frac{\text{Capital Employed}}{\text{Net Worth}}$$

$$(v) \text{ Equity Multiplier} = \frac{\text{Total Assets}}{\text{Total Equity}}$$

Measuring Coverage Ratio

$$(i) \text{ Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest Charges}}$$

$$(ii) \text{ Cash Flow Coverage Ratio} = \frac{\text{EBITDA}}{\text{Annual Interest Payments}}$$

$$(iii) \text{ Fixed Charge Coverage Ratio} = \frac{\text{EBIT} + \text{Lease Payments}}{\text{Interest Charges} + \text{Lease Payments} + \text{Sinking Fund Payments}}$$

Measuring Profitability Ratios

$$(i) \text{ Gross Profit Margin} = \frac{\text{Gross Profit/ Contribution}}{\text{Sales}} \times 100$$

$$(ii) \text{ Net Profit Margin} = \frac{\text{Net Profits / EAIT}}{\text{Sales}} \times 100$$

$$(iii) \text{ Return on Investment} = \frac{\text{Net Profits / EAIT}}{\text{Total Investment / Total assets}} \times 100$$

$$(iv) \text{ Return on Equity} = \frac{\text{EAIT}}{\text{Shareholders' Equity}}$$

$$(v) \text{ Earnings Per Share} = \frac{\text{Net Profits available to Common Stockholders}}{\text{Number of Common Shares Outstanding}}$$

Measuring Activity/ Asset Management Ratios

$$(i) \text{ Inventory Turnover} = \frac{\text{Sales / Cost of Goods Sold}}{\text{Average Inventory}}$$

$$(ii) \text{ Receivables Turnover} = \frac{\text{Credit Sales}}{\text{Accounts Receivables}}$$

$$(iii) \text{ Average Collection Period/Days Sales Outstanding} = \frac{365}{\text{Receivables Turnover}}$$

$$(iv) \text{ Fixed assets Turnover} = \frac{\text{Sales}}{\text{Net Fixed assets}}$$

$$(v) \text{ Working Capital Turnover} = \frac{\text{Sales}}{\text{Working Capital / Current assets}}$$

$$(vi) \text{ Total assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

Measuring Market Value Ratios

$$(i) \text{ Price Earning Ratio} = \frac{\text{Market Price Per Share}}{\text{Earnings Per Share}}$$

$$(ii) \text{ Dividend Yield} = \frac{\text{Dividend Per Share}}{\text{Share Price}}$$

$$(iii) \text{ Market Book Ratio} = \frac{\text{Market Price Per Share}}{\text{Book Value Per Share}}$$

$$\text{Where : Book Value Per Share} = \frac{\text{Common Equity}}{\text{No. of Common Shares Outstanding}}$$

Interpretation of Financial Ratios

Simply the determination of the various financial ratios is not enough for financial analysis. Hence, the interpretation of the financial ratios is a must for any meaningful financial analysis. By interpretation of the ratios, we mean the comparison of the value of the specific ratio with some standard norm or industry norm and then make inference on that particular ratio. The following paragraphs deal with the interpretation of the various financial ratios.

The authors of the Financial Management, Corporate Finance and Financial Analysis recognize the current ratio of 2 : 1 as satisfactory.

(i) **Current Ratio:** The authors of the Financial Management, Corporate Finance and Financial Analysis recognize the current ratio of 2 : 1 as satisfactory. But, the current ratio below this standard norm is considered unsatisfactory. Since the current ratio represents a margin of safety of the short-term creditors; the higher the current ratio, the larger the amount of current assets in relation to current liabilities, the more the firm's ability to meet its current obligations. However, an arbitrary standard of 2 : 1 should not be blindly followed. The current ratio of the industry average to which the firm belongs should also be considered. Because, current ratio is a test of quantity; but fails to measure the quality of assets. Liabilities are not subject to any fall in value, they have to be paid. But, current assets can decline in value. If the current asset of firm consists of doubtful and slow-paying debtors or slow-moving and obsolete stock of goods; then the firm's ability to pay bills is impaired, its short-term solvency or liquidity is threatened. Therefore, further investigation about the quality of the items of current assets is imperative.

A quick ratio of 1 : 1 of a firm represents a satisfactory liquidity position of a firm.

(ii) **Quick Ratio :** The concerned authors recognize the quick ratio of 1 : 1 as the standard norm. Hence, a quick ratio of 1 : 1 of a firm represents a satisfactory liquidity position of a firm. But, this standard norm does not necessarily imply sound liquidity position in all the situations. In case of a firm whose debtors are of doubtful, slow-paying and a long duration outstanding debtors; its (firm) quick ratio of 1 : 1 fails to represent satisfactory liquidity position of the firm. Hence, the quality of quick assets is of crucial significance. Therefore, along with the standard norm, industry average needs to be considered.

(iii) **Ratio of Net Working Capital to Total Assets:** To know the extent of NWC in relation to total assets helps to have an idea

about the liquidity position of a firm. Generally, the more this ratio, the better the liquidity position and vice-versa. That is, the firm having the larger NWC has the greater ability to meet its current obligations. In the literature of finance, there is no standard norm of this ratio. Hence, this ratio of a firm may be compared with the industry average to which the firm belongs. But, a note of caution may be raised in case of this ratio. This ratio may mislead the liquidity position since current assets and current liabilities can change quickly. Its utility may become more doubtful for firms with seasonal business.

This ratio of a firm may be compared with the industry average to which the firm belongs.

- (iv) **Cash Ratio** : This ratio measures the extent of liquid cash to the current liabilities of a firm. Since cash is a non-productive or non-earning asset, too much cash ratio implies blocking of cash. Hence, too much of this ratio is bad. On the other hand, too low cash ratio implies the shortage of cash for meeting immediate obligations of the firm. Therefore, a firm should maintain a reasonable cash ratio. In the literature, there is no standard norm of this ratio. So, firm's industry average may be taken as the standard norm

Firm's industry average may be taken as the standard norm

- (v) **Debt Equity Ratio** : In Bangladesh as well as in India, the Government have prescribed 50 : 50 debt-equity ratio in cases of the public sector industrial enterprises. The professional financial managers as well as financiers (bankers) have prescribed 60 : 40 to 75 : 25 debt equity ratio under the private sector as satisfactory debt-equity ratio. That is, their financing mix is satisfactory. But, a high debt-equity ratio signifies that the claims of the long-term creditors are greater than those of the owners. Therefore, a high level long-term debt introduces inflexibility in the firm's operations due to the increasing interference and pressures from the debt-holders i.e. creditors. A highly debt-oriented firm may have to borrow its working capital on highly unfavorable terms, thereby getting entangled in a debt-trap.

Debt-equity ratio of 50 : 50 and 60 : 40 to 75 : 25 is considered standard norm for public and private industries respectively.

- (vi) **Debt Ratio** : Since debt ratio measures the extent of total debts in terms of total assets of a firm; hence its proper interpretation is imperative. A heavy debt ratio implies that debt occupies the lion's share in financing the assets. The heavy use of debt in financing assets involves heavy interest payments which reduces the profits. Therefore, debts should be used reasonably which is not become heavy in case of a firm. There is no standard norm as regards this debt ratio. So, the actual debt ratio of a firm should be compared with the industry average to which the firm belongs. However, interpretation of debt-ratio needs caution.

The actual debt ratio of a firm should be compared with the industry average to which the firm belongs.

- (vii) **Ratio of Cash Flows to Total Capitalization**: This ratio measures the extent of net cash flows to total capital, both debt and equity and preferred capital and total debts of a firm. The net cash flows during a particular period must be sufficient relating to total capital to meet the operating, financing and investing activities of a firm. If the cash flows are not sufficient enough, these activities of a firm will be hampered which in turn will affect the financial

The net cash flows during a particular period must be sufficient relating to total capital to meet the operating, financing and investing activities of a firm.

solvency of a firm. Since there is no standard norm of this ratio, so the ratio of a particular firm may be compared to the industry average, to which the firm belongs.

A high ratio implies the lesser financial solvency of that firm.

(viii) Ratio of Capital Employed to Net Worth : This ratio measures the extent of capital employed (fixed capital plus net working capital) to the net worth (shareholders' equity). That is, how much funds are being contributed together by lenders and owners for each Taka of the owners' contribution are known from this ratio. A high ratio implies the lesser financial solvency of that firm. Since there is no standard norm of this ratio, so the ratio of a particular firm may be compared to the industry average, to which the firm belongs.

A ratio of 8 times is considered as the standard norm, by some authors.

(ix) Interest Coverage Ratio : This ratio is also known as "time interest earned ratio". This ratio measures the debt servicing capacity of a firm in so far as fixed interest charge on loan is concerned. This ratio, as the name suggests, shows how many times the interest charges are covered by EBIT out of which they will be paid. From the creditors' view point, the larger the interest coverage, the greater the ability of the firm to handle fixed charge liabilities and the more assured the payment of interest to the creditors. However, too high a ratio may imply unusual debt capacity. In contrast, a low ratio is a danger signal that the firm is using excessive debt and does not have the ability to offer assured payment of interest to the creditors. However, a ratio of 8 times is considered as the standard norm, by some authors. The interest coverage ratio of a particular firm may be compared with this standard norm in order to examine whether such ratio of the said firm is satisfactory or not. This ratio may also be compared with the industry average in order to evaluate the same.

Even for a highly levered firm, lenders desire a coverage ratio of above 2 as comfortable.

(x) Cash Flow Coverage Ratio : This ratio is very helpful in determining if a borrower is able to service interest payments or loans. Even for a highly levered firm, lenders desire a coverage ratio of above 2 as comfortable. This cash flow coverage ratio is highly correlated with bond ratings and the market assessment of risk. This coverage ratio of a specific firm may also be compared with the industry average, to which the firm belongs.

The higher coverage ratio indicates the better ability; whereas, the lower coverage ratio indicates the worse ability.

(xi) Fixed Charge Coverage Ratio : In addition to fixed interests on loans, fixed charges also include lease payments and sinking fund payments. So, fixed charge coverage ratio measures the coverage of fixed charges by the EBIT and lease payments. Since, the EBIT figure represents the firm's operating income, net of lease payments; so the lease payments must be added back with EBIT. This ratio measures the overall ability of a firm to service its outside liabilities. There is no standard norm of this ratio. But, the higher coverage ratio indicates the better ability; whereas, the lower coverage ratio indicates the worse ability. This ratio of a specific firm may, however, be compared with the industry average to which the firm belongs.

(xii) Gross Profit Margin : Gross profit margin reflects the efficiency with which management produces each unit of products. This ratio indicates the average spread between cost of goods sold and the sales revenue. A high gross profit margin is a sign of efficient management since it implies that cost of production of the firm is relatively low. It may also be an indication of a higher sales price without a corresponding increase in the cost of goods sold. A relatively low gross profit margin is danger signal, warranting a careful and detailed analysis of the factors responsible for the same. However, firm should have a reasonable gross profit margin to ensure adequate coverage of operating express and sufficient return to the owners, which is reflected in the net profit margin. Since there is no standard norm of this ratio, so it may be compared with the industry average to assess the same.

A high gross profit margin is a sign of efficient management since it implies that cost of production of the firm is relatively low.

(xiii) Net Profit Margin : Net profit margin is an indication of management's ability to operate the business with adequate success not only to cover from sales revenues of the period, the cost of merchandise or services, the expenses of operating the business and the cost of borrowed funds; but also to leave a margin of reasonable compensation to the owners for providing their capital at risk. This ratio expresses the cost price effectiveness of the operation. A high net profit margin would ensure adequate return to the owners as well as to enable a firm to withstand adverse economic conditions when selling price is declining, cost of production is rising and the demand for the product is falling. However, a net profit margin of 4 percent to 6 percent has been considered as a standard norm by some authors for the purpose of comparison and control. Moreover, this margin of a specific firm may be compared with the industry average to which it belongs.

A net profit margin of 4 percent to 6 percent has been considered as a standard norm by some authors for the purpose of comparison and control.

(xiv) Return on Investment (ROI) : This ratio is a measure of the extent of the earnings after interest and taxes (net profits) to the investment i.e. total assets of a firm. A firm should earn adequate return on investment in order to show its higher earning power. Therefore, a higher ROI indicates higher earning power; whereas a lower ROI indicates lower earning power of a firm. However, some authors consider 10 percent to 12 percent rate of return on investment as a standard norm for the purpose of comparison and control. A firm having ROI, ranging from 10-12 percent may be considered earning satisfactory financial performance. But, the financial performance of a firm may be considered unsatisfactory if its ROI falls much below 10 percent. Moreover, ROI of a particular firm may be compared with the industry average, to which the same belongs in order to evaluate its financial performance.

Some authors consider 10 percent to 12 percent rate of return on investment as a standard norm for the purpose of comparison and control.

(xv) Return on Equity : This ratio reveals how equity capital have been utilized by the firm. The earning of a satisfactory return is the most desirable objective of a business. The return on equity i.e. the ratio of net profits to owners' equity reflects the extent to which this objective has been accomplished. Hence, the ratio is of great

This ratio reveals how equity capital have been utilized by the firm.

interest to the existing as well as the prospective shareholders. This ratio is also of great concern to the financial management which has the responsibility of maximizing the shareholders' wealth. There is no standard norm of this ratio. So, a comparison of this ratio with that of the similar firms and with the industry average will throw light on the relative performance and strength of the firm.

The profitability of a firm, from the view point of the equity or ordinary shareholders is the earnings available to the equity-holders on a per share basis.

(xvi) Earning Per Share (EPS) : The profitability of a firm, from the view point of the equity or ordinary shareholders is the earnings available to the equity-holders on a per share basis i.e. the amount of earnings that they can get on every share held. EPS does not recognize the effect of increase in equity capital as a result of retention of earnings. Moreover, EPS does not reveal how much is paid to the owners as dividends nor how much of the earnings are retained in the business. It only shows how much of the earnings theoretically belongs to the ordinary shareholders. Since, there is no standard norm of this ratio; so it may be compared with that of the other similar firms as well as with the industry average in order to evaluate the profitability ratio of the firm.

Some authors consider 8 times to 9 times inventory turnover as the standard norm for the purpose of comparison and control.

(xvii) Inventory Turnover: The inventory turnover measures how quickly inventory is sold during a particular financial year. It is a test of efficient inventory management. Generally, a high inventory turnover is better than low inventory turnover. A high turnover implies good inventory turnover. Yet, a very high ratio calls for a careful analysis. It may be an indicative of underinvestment in, or a very low level of inventory. On the other hand, a very low level of inventory has serious implications in the sense that it will adversely affect the ability of a firm to meet its customers' demands. However, some authors consider 8 times to 9 times inventory turnover as the standard norm for the purpose of comparison and control. Hence, for the purpose of assessing the efficiency of inventory management of a firm, its inventory turnover may be compared with this standard norm. Moreover, this turnover may be compared with that of other similar firms and also with the industry average.

The higher the turnover, the better the trade credit management and also the better the liquidity of debtors.

(xviii) Receivables Turnover and Average Collection Period : Receivables turnover is a test of the liquidity of the debtors of a firm. This turnover indicates the speed with which accounts receivables are being collected. It is an indicative of the efficiency of trade credit management. The higher the turnover, the better the trade credit management and also the better the liquidity of debtors. On the other hand, the lower the turnover the worse the trade credit management and also the worse the liquidity of debtors. Therefore, in general, high turnover ratio is preferable. Some authors consider 8 times to 9 times receivable turnover as the standard norm. Hence, comparing with these standard norm as well as that of the similar firms and industry average, a firm's receivable turnover can be assessed.

Average collection period, in fact, is interrelated with also dependent on the receivables turnover. There is an inverse relationship between receivables turnover and average collection period. The higher the receivables turnover, the shorter the average collection period and vice-versa. The shorter average collection period indicates the efficient trade credit management. On the other hand, the long collection period reflects that payments by debtors are delayed. Hence, it is an indication of poor trade credit management. Some authors consider 30 days to 45 days average collection period as the standard norm for the purpose of comparison and control. Hence, for the purpose of judging the efficiency or otherwise of trade credit management of a firm, its average collection period may be compared with this standard norm. This can also be compared with that of other similar firm as well as the industry average.

The shorter average collection period indicates the efficient trade credit management.

- (xix) Fixed Assets Turnover :** The fixed assets turnover measures the efficiency of a firm in managing and utilizing its fixed assets. The higher the turnover, the more efficient the management and utilization of the fixed assets. On the other hand, a low fixed assets turnover is an indicative of underutilization of the fixed assets and presence of ideal capacity. One author considers 3 times fixed assets turnover as the standard norm for the purpose of comparison and control. Therefore, for judging the efficiency and utilization of fixed assets turnover may be compared with this standard norm as well as with that of the similar firms and the industry average.

The higher the turnover, the more efficient the management and utilization of the fixed assets.

- (xx) Working Capital Turnover :** Working capital turnover or current assets turnover is a test of working capital management as well as utilization of working capital. A high working capital turnover indicates the efficient of working capital management and utilization of current assets. On the other hand, low working capital turnover is an indication of inefficient utilization of current assets. Some authors consider 6 times to 7 times working capital turnover ratio as the standard norm for the purpose of comparison and control. Therefore, the working capital turnover of a particular firm may be compared with this standard norm. This turnover may also be compared with that of the other similar firms as well as the industry average.

A high working capital turnover indicates the efficient of working capital management and utilization of current assets.

- (xxi) Total assets Turnover :** This turnover measures the efficiency of a firm in managing and utilizing total assets, net fixed assets and current assets. A high total assets turnover indicates the efficient management and utilization of total assets. On the hand, a low total assets turnover is an indicative of underutilization of available resources and the presence of idle capacity. In operational terms, it implies that the firm can expand its activity level, in terms of production and sales, without requiring capital investments. Some authors consider 2 times of total assets turnover as the standard norm for the purpose of comparison and control. Hence, the total assets turnover of a particular firm may be compared with this standard norm in order to assess the same. Moreover, this turnover

A high total assets turnover indicates the efficient management and utilization of total assets.

of a firm may be compared with that of the other similar firms and industry average to which the firm belongs.

Generally, the higher the P/E ratio, the better it is for the owners.

(xxii) Price-earning Ratio (P/E Ratio) : The P/E ratio reflects the price currently being paid by the market for each taka of currently reported EPS. In other words, the P/E ratio measures the investors' expectations and the market appraisal of the performance of a firm. Generally, the higher the P/E ratio, the better it is for the owners. On the other hand, the lower P/E ratio indicates the worse picture for the owners. This ratio is widely used by the security analysts to value the firm's performances as expected by the investors. This ratio also reflects investors' expectations about the growth in the firm's earnings. The higher the P/E ratio, the better for the investors. On the other hand, the lower the P/E ratio, the worse for the investors. Since, there is no standard norm of this ratio; hence this ratio of a particular firm may be compared with that of the other similar companies and the industry average.

A high dividend yield therefore, ensures high payout ratio to the shareholders.

(xxiii) Dividend Yield : The dividend yield evaluates the shareholders' return in relation to the market value of the share. The firms with good growth potential retains a high proportion of earnings and have a low dividend yield; whereas, firms in more mature industries payout a high proportion of their earnings and have a relatively high dividend yield. A high dividend yield therefore, ensures high payout ratio to the shareholders. On the other hand, a low dividend yield ensures low payout ratio to the shareholders. Since, there is no standard norm of dividend yield; so, the dividend of a specific firm may be compared with that of the other similar firms and the industry average to which the firm belongs in order to assess such dividend yield of the firm.

A high market book ratio implies that the firm's rate of return on equity capital is generally high.

(xxiv) Market Book Ratio : This ratio helps comparing market price per share with the book value per share. As compared to the book value of a share, whether the market price of the share has increased or decreased is indicated by this ratio. A high market book ratio implies that the firm's rate of return on equity capital is generally high. On the other hand, a low market ratio signifies that the firm's rate of return on equity is low. So, a high market book ratio is desirable as to low market book ratio. However, some authors opine that the market book ratio should be 10 times to 15 times; hence 10-15 times market book ratio is considered as the standard norm. The firm's having 10-15 times of market book ratio may be considered successful; whereas the firm having much less than this standard norm may be considered unsuccessful. The market book ratio of a specific firm may be compared with that of the other similar firm and the industry average in order to assess the ratio.

Ratio analysis is a very useful analytical technique to raise pertinent questions on a number of managerial issues.

Diagnostic Role of Financial Ratios in Financial Management

The essence of financial soundness of a firm lies in balancing its goals, commercial strategies, product-market choices and the resultant financial

needs. The firm should have financial ability and flexible to pursue its commercial strategies. Ratio analysis is a very useful analytical technique to raise pertinent questions on a number of managerial issues. It provides the bases or clues to investigate such issues in detail. However, the proper diagnostic role of the financial ratios in assessing the financial health of the firm lies in answering the following vital questions as regards the main financial aspects of the firm.

A. Profitability

1. How profitable is the firm ? What accounting policies and practices are followed by the firm ? Are they consistent ?
2. Is ROI of the firm high/ low/ average ? Is it mainly due to :
 - * Profit margin
 - * Assets utilization
 - * Non-operating income
 - * Window dressing of accounts
 - * Change in accounting policy
 - * Inflationary condition
3. Is ROE high/ low/ average ? Is it mainly due to :
 - * Return on investment
 - * Financing mix
 - * Capitalization of reserves ?
4. What is the trend in profitability ? Is it improving or deteriorating ? Why ?
5. What is the impact of cyclical factors, if any, on profitability trend?
6. Can the firm sustain its existing impressive profitability under given competitive and other environmental situations ?

B. Liquidity

1. What is the level of current assets relative to current liabilities ? Is it reasonable or not given the nature of the firm's business ? If not, why ?
2. What is the composition of current assets ? Is the proportion of slow moving inventories high ? Is the proportion of long-period accounts receivable high ?
3. What is the current and quick ratios of the firm during the given period ? Are they reasonable ? If not, why ?
4. How promptly does the firm pays its creditors ?
5. What is the inventory turnover of the firm during the given period? Is it reasonable ? If not, why ?
6. How efficiently and frequently does the firm convert its current assets into cash ?
7. What is the level of cash relative to current assets ? Is it reasonable ? If not why ?
8. Does the firm faces working capital surplus or shortage during the given period ? If so, why ? What is the impact of surplus or shortage during the given period ?

C. Debt Management

1. Give the firm's riskiness and future financial needs, how soundly is it financed ?
 - * What is the debt-equity mix ? Is it reasonable ? If not, why ?

- * What is the terms and condition of debt financing ?
- * What is the maturity structure of debt ? Is the firm faced with large debt payment in the near future ?
- 2. Is the debt service capacity of the firm adequate ? If not, why ?
- 3. Does the firm generate enough cash flows to service its debts adequately ? If not, why ?
- 4. Is the debt ratio of the firm is adequate during the given period ? If not, why ?
- 5. Does the firm have lease commitments not disclosed in its balance sheet ?
- 6. Can the firm raise equity funds ? Would capital market respond favorably ? To whom and at what prices, shares would be issued ?
- 7. Can the firm raise debt capital ? From whom ? On what terms and conditions ? How quickly ?
- 8. What is the level of cash flows in the total capitalization ? Is it reasonable ? If not, why ?
- 9. What is the ratio of capital employed to net worth ? Is it reasonable? If not, why ?
- 10. Whether interest coverage and fixed charge coverage ratios are adequate ? If not why ?

D. Assets Management and Utilization

1. How effectively does a firm manage and utilize its assets, fixed and current in generate sales ?
2. Are the levels of accounts receivables and inventories relative to sales reasonable, given the firm's competitive and operating features ?
3. What are the trends in collection period, inventory turnover, fixed assets turnover, current assets turnover and total assets turnover ? If not positive, why ?
4. Is the improvement in fixed assets turnover due to :
 - * Depreciated book value of fixed assets
 - * Sale of some fixed assets.

E. Stock Price and Market Price

1. What the inventory think of the firm's past performances and future prospects ? If investors' attitude are unfavorable ? why ?
2. Are P/E ratio and market book ratio of a firm during the given period reasonable ? If not, why ?
3. What is the past trend of P/E ratio and market book ratio ? If not favorable, why ?

F. Strategic Analysis

A number of other pertinent questions relating to commercial strategic of a firm go beyond the scope of ratio analysis. They however, need to be answered while assessing the financial health of a firm. These questions are as follows :

1. What are the goals, missions and strategies of the firm ?
2. How successfully has the firm achieved its goals, missions and strategies ? Are nay changes in them warranted ? Product-market choices,

3. Are the firm's goals, missions, strategies, product-market choices, investment requirements, financing needs and financing capabilities in balance ?
4. What would happen to these balances if the firm has to face an adverse situation ?
5. If the firm is stuck by adversity:
 - * What kinds of competitive, operating and environmental risks would occur ?
 - * How would management respond in strategic and operating terms ?
 - * What kinds of financial pressures would be faced ?
 - * Would it be able to raise requisite funds on acceptable terms and conditions ?
 - * Would it be able to use its reserve resources ? In what sequence would these resources be used ?

Review Questions

Short Questions

1. How would you ensure that the various assets, both fixed and current of a firm are utilized fully or not ? Explain.
2. How would you evaluate whether debt management of a firm is efficient or not ? Explain.

Broad Questions

3. How would you measure the various ratios relative to the following financial aspects of corporate firm :
 - a) Liquidity;
 - b) Leverage or Debt management;
 - c) Profitability;
 - d) Assets Management and
 - e) Market Value ?
4. How would you interpret the various (a) liquidity ratios; (b) leverage or debt ratios; (c) coverage ratios; (d) profitability ratios; (e) asset management ratios and (f) market value ratios ?
5. Examine the diagnostic role of the financial ratios in the following major financial aspects of a firm :
 - a) Profitability;
 - b) Liquidity;
 - c) debt management;
 - d) assets management and utilization;
 - e) Stock price and
 - f) Strategic analysis.

Lesson–3: Application of Ratio Analysis and DuPont System

After attentively studying this lesson 3, you should be able –

- To apply the predictive power of financial ratios;
- To indicate the relationship between ratio analysis and DuPont system to explain trends, common size and index analysis and
- To know the practical application of financial ratios and DuPont system.

Predictive Power of Financial Ratios

Through the financial ratios, the financial soundness or otherwise of a firm can be predicted. So, the financial ratios have predictive power also. A number of empirical studies have tested the predictive power of the financial ratios. In many of these studies financial ratios were used to predict business failure. Other studies were also used the financial ratios to predict corporate bond ratings. Of the various financial ratios; debt-equity, cash flow to debt, net profit margin, debt coverage, ROI working capital to total assets, retained earnings to debts, EBIT to total assets and market value of equity to book value of total liabilities and total assets turnover are used for predicting the financial soundness or failure of a firm.

Altman's Model of Predicting Financial Distress

Professor Edward I. Altman developed a model, known as Altman's model to predict the financial distress of a firm. He employed multiple discriminant analysis to predict the bankruptcy, using the various financial ratios. He found that the five financial ratios namely : working capital to total assets, retained earnings to debt, EBIT to total assets, market value of equity to book value of total liabilities and total assets turnover. He found that these five financial ratios are able to discriminate between the bankrupt and non-bankrupt companies. According to Altman, the Z-score model is as follows :

$$Z = 1.2X_1 + 1.4 X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Where, X1 = Working Capital to Total Assets;

X2 = Cumulative Retained Earnings to Total assets;

X3 = EBIT to Total Assets;

X4 = Market Value of Equity to Book Value of Total Liabilities and

X5 = Total Assets Turnover.

The Z score is the overall index of the multiple discriminant function Altman found that the companies with X scores below 1.81 already went bankrupt; whereas, Z scores above 2.99 presented healthy firms. Firm with Z scores in between are sometimes misclassified, so this represents an area of gray. On the basis of these cut-offs, Altman suggests that one can predict if or not a firm is likely to go bankrupt in the near future.

Application of Altman Model

With the help of the problem and its solution given below, the application of Altman Model to predict financial condition becomes clear.

Problem - 1

The following two corporate firms belong to the pharmaceutical group. They have the following financial pictures during 2003 – 04.

(In thousand Taka)

	Beximco Pharma	IBN-SINA Pharma
Working Capital	21,00	(3,000)
Total assets	1,00,000	42,000
Total Liabilities	44,000	26,000
Equity Value (market)	76,000	10,200
Retained Earnings	38,000	6,000
Sales	1,72,000	56,000
EBIT	24,000	1,500

Using Altman’s Model, determine the financial health of these two companies. Whether any of the company is likely to go to bankruptcy ? Why ?

Solution :

Using Altman’s Z score Model; we see that -

$$Z = 1.2 X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0 X_5$$

Hence calculations of the values of X₁, X₂, X₃, X₄ and X₅ are as under :

Items	Beximco Pharma	IBN Sina Pharma
Working Capital X ₁ = -----	21,000 ----- = 0.21	(3,000) ----- = (0.07)
Total Assets	1,00,000	42,000
Retained earnings X ₂ = -----	38,000 ----- = 0.38	6,000 ----- = 0.14
Total assets	1,00,000	42,000
EBIT X ₃ = -----	24,000 ----- =0.24	1,500 ----- = 0.04
Total assets	1,00,000	42,000
Market Value of Equity X ₄ = -----	76,000 ----- = 1.73	10,200 ----- = 0.39
Book Value of Total Liabilities	44,000	26,000
Sales X ₅ = -----	1,72,000 ----- = 1.72	56,000 ----- = 1.33
Total Assets	1,00,000	42,000

In case of Beximco :

$$\begin{aligned} Z &= 1.2 X_1 + 1.4 X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5 \\ &= 1.2 (0.21) + 1.4 (0.38) + 3.3 (0.24) + 0.6 (1.73) + 1.0 (1.72) \\ &= 0.25 + 0.53 + 0.79 + 1.04 + 1.72 \\ &= \underline{4.33} \end{aligned}$$

In case of IBN-SINA :

$$\begin{aligned} Z &= 1.2 X_1 + 1.4 X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5 \\ &= 1.2 (-0.07) + (1.4 (0.14) + 3.3 (0.04) + 0.6 (0.39) + 1.0 (1.33) \\ &= -0.08 + 0.20 + 0.13 + 0.23 + 1.33 \\ &= \underline{1.81} \end{aligned}$$

Comment on Financial Health

Z score in case of Beximco Pharma calculated to be 4.33; whereas, Z score in case of IBN-SINA Pharma found to be 1.81. Since the Z score in case of Beximco was above 2.99; the company found to be financially healthy. On the other hand, since Z score in case of IBN-SINA found to be just 1.81; the company is likely to go to bankruptcy in the near future.

Relationship between Financial Ratio Analysis and DuPont System

The Du Pont system is one which helps determining in what area a company is having difficulty when the ROI of the company is less than satisfactory. Conversely, it can also identify the areas where the company is successful. In the Dupont system, ROE is broken down into the following three components :

$$\text{ROE} = (\text{Net Profit Margin}) \times (\text{Total Assets Turnover}) \times (\text{Financial Leverage Multiplier})$$

Where : Financial Leverage Multiplier is equal to Total Assets divided by Common Stock Equity.

From the above relationship of the three components of ROE, we can infer that ROE would be increased by:

- Increasing margin on sales (Net Profit Margin)
- Increasing total asset turnover by such actions as improving customer collections, reducing inventories and selling off surplus assets, if any and
- Increasing financial leverage, in general by increasing the proportion of capital provided by the borrowers.

Under Du Pont system, Dupont equation and Dupont chart can be developed. Dupont equation is a formula that gives the rate of return on assets by multiplying the profit margin by the total assets turnover. So, Dupont equation can be expressed as follows :

The Du Pont system is one which helps determining in what area a company is having difficulty when the ROI of the company is less than satisfactory.

Dupont equation is a formula that gives the rate of return on assets by multiplying the profit margin by the total assets turnover.

$$\text{ROA} = \text{Net Profit Margin} \times \text{Total assets Turnover} = \frac{\text{EAIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

Dupont chart is a chart designed to show the relationships amongst return on investment, total assets turnover, the net profit margin. Dupont chart is shown in the figure – 1.

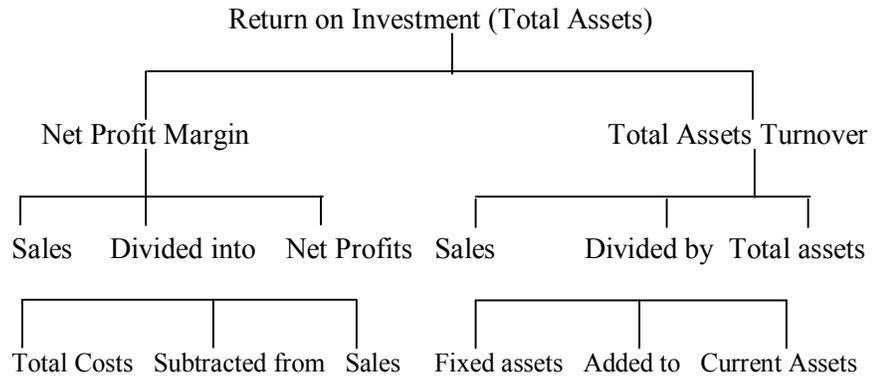


Figure – 1 : Du Pont Chart

The left side of the Dupont Chart develops the net profit margin on sales. Net profits have been found out subtracting total costs from sales. The right side of the chart develops the total assets turnover, which is computed by dividing sales by total assets. Total assets are the sum total of fixed assets and current assets.

In the following sub-section, the various problems and their solutions are depicted, highlighting the application of the ratio analysis and Dupont system to explain trends common size and index analysis in company’s financial performances.

Application of Financial Ratios and DuPont System

Problem - 1

The Balance Sheets and Profit and Loss accounts of Beximco Pharma Ltd during 1996-2000 are presented below. During the period the company undertook a major expansion program. You are required to compute the important ratios for the 5 years and assess the financial health of the company, indicating the trend analysis in its financial performances.

Beximco Pharma Ltd.					
(In Taka)	Balance				Sheets
	1996	1997	1998	1999	2000
Liabilities and Equity					
Creditors for goods	22,000	25,000	19,000	23,000	28,000
Creditors for expenses	6,200	7,200	6,700	7,100	6,900
Short-term bank loan	11,500	10,900	12,700	13,200	11,700
Debenture	2,50,000	2,20,000	2,60,000	2,71,000	2,43,000
Equity Share Capital	5,00,000	5,00,000	5,09,000	5,00,000	5,00,000
General Reserves	2,00,000	2,10,000	1,90,000	2,05,000	2,15,000
Taxation Reserve	50,000	40,000	65,000	52,000	55,000
Total	10,39,700	10,13,100	10,53,000	10,71,300	10,59,600
Assets and Properties					
Cash in hand	8,900	9,200	8,400	8,100	9,500
Cash at bank	17,100	16,800	12,700	15,200	55,000
Accounts Receivables	91,000	88,000	75,000	85,000	90,000
Bills Receivables	11,500	10,500	9,600	9,900	11,800
Inventory	1,95,000	1,88,000	1,76,000	2,10,000	2,01,000
Fixed Assets (Net)	7,16,200	7,00,600	7,71,300	7,43,100	7,30,800
Total	10,39,700	10,13,100	10,53,000	10,71,300	10,59,600

Profit and Loss Accounts

	1996	1997	1998	1999	2000
Sales (Credit sales)	3,00,000	4,50,000	6,00,000	7,50,000	9,50,000
Cost of goods sold*	1,00,000	1,50,000	2,00,000	2,50,000	3,50,000
Gross Profit	2,00,000	3,00,000	4,00,000	5,00,000	6,00,000
Operating expenses	27,000	35,000	40,000	50,000	57,000
EBIT	1,73,000	2,65,000	3,60,000	4,50,000	5,43,000
Interest	22,000	40,000	48,000	65,000	72,000
Earnings before tax	1,51,000	2,25,000	3,12,000	3,85,000	4,71,000
Tax @ 30%	45,300	67,500	93,600	1,15,000	1,41,000
EAIT (Net profit)	<u>1,06,700</u>	<u>1,57,500</u>	<u>2,18,400</u>	<u>2,69,500</u>	<u>3,30,700</u>
No. of shares	50,000	50,000	50,000	50,000	50,000
*Includes Depreciation	21,100	20,900	22,700	22,100	20,900

Solution

Computation of Various Important Ratios

Ratios	1996	1997	1998	1999	2000
A. Liquidity Ratios					
(i) Current Ratio :					
Current Assets (1)	3,23,500	3,12,500	2,81,700	3,28,200	3,28,800
Current Liabilities (2)	89,700	83,100	1,03,400	95,300	1,01,600
	= 3.60	= 3.76	= 2.72	= 3.45	= 3.24
(ii) Quick Ratio :					
Quick assets (3)	1,28,500	1,24,500	1,05,700	1,18,200	1,27,800
Current Liabilities	89,700	83,100	1,03,400	95,300	1,01,600
	= 1.43	= 1.50	= 1.02	= 1.24	= 1.26
B. Debt Management Ratios					
(iii) Debt-equity Ratio :					
Long-term Debt	2,50,000	2,20,000	2,60,000	2,71,000	2,43,000
Equity Capital	5,00,000	5,00,000	5,00,000	5,00,000	5,00,000
	= 0.50	= 0.44	= 0.52	= 0.54	= 0.49
(iv) Debt Ratio :					
Total Debts	2,61,500	2,30,900	2,72,700	2,84,200	2,54,700
Total assets	10,39,700	10,13,100	10,53,000	10,71,300	10,59,600
(v) Ratio of Cash flows to Capitalization :					
EAITDA (4)	1,94,100	2,85,900	3,82,700	4,72,100	5,63,900
Total Capitalization	10,39,700	10,13,100	10,53,000	10,71,300	10,59,600
	= 0.19	= 0.28	= 0.36	= 0.44	= 0.53
(vi) Ratio of Capital Employed to Net Worth:					
Capital Employed (5)	9,50,000	9,30,000	9,49,600	9,76,000	9,58,000
Net Worth (6)	7,00,000	7,10,000	6,90,000	7,00,500	7,15,000
	= 1.36	= 1.31	= 1.38	= 1.39	= 1.34
(vii) Interest Coverage Ratio					
EBIT	1,73,000	2,65,000	3,60,000	4,50,000	5,43,000
Interest Charges	22,000	40,000	48,000	65,000	72,000
	= 7.86	= 6.63	= 7.50	= 6.92	= 7.54
(viii) Cash Flow Coverage					
EBITDA	1,94,100	2,85,900	3,82,700	4,72,100	5,63,900
Annual Interest Payments	22,000	40,000	48,000	65,000	72,000
	= 8.82	= 7.14	= 7.97	= 7.26	= 7.83

C. Profitability Ratios

Ratios	1996	1997	1998	1999	2000
(ix) GP Margin	$\frac{2,00,000}{3,00,000} \times 100$ = 66.67%	Error! Not a valid link. = 66.67%	$\frac{4,00,000}{6,00,000} \times 100$ = 66.67%	$\frac{5,00,000}{7,50,000} \times 100$ = 66.67%	$\frac{6,00,000}{9,50,000} \times 100$ = 63.16%
(x) NP Margin	$\frac{1,06,700}{3,00,000} \times 100$ = 35.57%	$\frac{1,57,500}{4,50,000} \times 100$ Error! Not a valid link. = 35.00%	$\frac{2,18,400}{6,00,000} \times 100$ = 36.40%	$\frac{2,69,500}{7,50,000} \times 100$ = 35.93%	$\frac{3,30,700}{9,50,000} \times 100$ = 34.80%
(xi) ROI	Error! Not a valid link. = 10.27%	$\frac{1,57,500}{10,13,100} \times 100$ = 15.55%	$\frac{2,18,400}{10,53,000} \times 100$ = 20.74%	$\frac{2,69,500}{10,71,300} \times 100$ = 25.16%	$\frac{3,30,700}{10,59,600} \times 100$ = 31.21%
(xii) ROE	$\frac{1,06,700}{7,00,000} \times 100$ Error! Not a valid link. = 15.24%	$\frac{1,57,500}{7,10,000} \times 100$ = 22.18%	$\frac{2,18,400}{6,90,000} \times 100$ = 31.65%	$\frac{2,69,500}{7,00,500} \times 100$ = 38.47%	$\frac{3,30,700}{7,15,000} \times 100$ = 46.36%
(xiii) EPS	Error! Not a valid link. Error! Not a valid link. Tk. = 2.13%	$\frac{1,57,500}{50,000} \times 100$ Tk. = 3.15%	$\frac{2,18,400}{50,000} \times 100$ Tk. = 4.37%	$\frac{2,69,500}{50,500} \times 100$ Tk. = 5.37%	$\frac{3,30,700}{50,000} \times 100$ Tk. = 6.61

D. Asset Management Ratio

Ratios	1996	1997	1998	1999	2000
(xiv) Inventory Turnover					
$\frac{\text{Sales}}{\text{Average Inventory}}$	$\frac{3,00,000}{1,95,000} = 1.54$	$\frac{4,50,000}{1,91,500} = 2.35$	$\frac{6,00,000}{1,82,000} = 3.30$	$\frac{7,50,000}{1,93,000} = 3.89$	$\frac{9,50,000}{2,05,000} = 4.63$
(xv) Average Collection Period					
$\frac{\text{Accounts Receivable}}{\text{Average Sales Per Day}}$	$\frac{91,000}{3,00,000/360} = 109 \text{ days}$	$\frac{88,000}{4,50,000/360} = 70 \text{ days}$	$\frac{75,000}{6,00,000/360} = 45 \text{ days}$	$\frac{85,000}{7,50,000/360} = 41 \text{ days}$	$\frac{90,000}{9,50,000/360} = 34 \text{ days}$
(xvi) Fixed assets Turnover					
$\frac{\text{Sales}}{\text{Fixed Assets}}$	$\frac{7,16,200}{3,00,000} = 0.42$	$\frac{7,00,600}{4,50,000} = 0.64$	$\frac{7,71,300}{6,00,000} = 0.78$	$\frac{7,43,100}{7,50,000} = 1.01$	$\frac{7,30,800}{9,50,000} = 1.30$
(xvii) Working Capital Turnover					
$\frac{\text{Sales}}{\text{Current Assets}}$	$\frac{3,23,500}{3,00,000} = 0.93$	$\frac{3,12,500}{4,50,000} = 1.44$	$\frac{2,81,700}{6,00,000} = 2.13$	$\frac{3,28,200}{7,50,000} = 2.29$	$\frac{3,28,800}{9,50,000} = 2.89$

Notes :

- (1) Current Assets = Cash in hand + Cash at Bank, Accounts Receivables – Bills Receivable + Inventory
- (2) Current Liabilities = Creditors for goods + Creditors for expenses + Short-term bank loans+ Taxation Reserve.
- (3) Quick Assets = Current Assets – Inventory.
- (4) EBITDA = Earnings before Interest, Taxes, Depreciation and Amortization,
- (5) Capital Employed = Fixed Assets + (Current assets – Current Liabilities).
- (6) Net Worth = Equity Share Capital + General Reserve.
- (7) (Opening Inventory + Closing Inventory)/ 2.

Assessing Financial Health of the Company indicating Trend Analysis

A. Liquidity Position : The current ratio, ranging from 2.72 to 3.76 times and the quick ratio, ranging from 1.02 to 1.50 times indicate that as compared to the standard norm of 2 : 1 of current ratio and 1 : 1 of quick ratio; the liquidity position of the company during the five year period ranging from 1996 to 2000 was satisfactory. The trend analysis over the period indicates both the current and quick ratios showed no regular trend.

B. Debt Management Position : The analysis of debt-equity ratio indicates that as compared to the standard norm of 50 : 50 of the ratio; the debt-equity ratio of the company was satisfactory during the study period. The analysis of the debt ratio ranging from 0.23 time to 0.27 time over the study period implies that the total assets of the company were not financed heavily by the total debts; rather such financing was reasonable. The trend analysis indicates that these two ratios showed no regular trend over the period. The ratio of cash flows to total capitalization reveals that although the cash flows had not been adequate during the period; the ratio showed a steady increasing trend over the period in the sense that it had increased to 0.53 time in 2000 as compared to 0.19 time in 1996. The ratio of capital employed to net worth varied from 1.31 times to 1.39 times during the period. The ratio had been satisfactory during the period, since capital employed exceeded the net worth in all the years. But, the ratio showed no regular trend over the study period.

The debt service capacity of the company had been more or less satisfactory during the study period in the sense that its interest coverage ratio had been nearer to standard norm of 8 times in most of the years. Moreover, its cash flow coverage ratio had also been high during the period, ranging form 7.26 times to 8.82 times. But, both the coverage ratios showed no regular trend over the study period.

C. Profitability Position: The gross profit margin was the same in the first four years of the study equivalent to 66.67%. But, in the last year, it had reduced to 63.13 percent. However, the gross profit margin was highly satisfactory in all the years. The net profit margin varied from 34.81% to 36.40% during the study period, indicating a highly satisfactory position of net profit margin. This margin was almost 6 times

to 8 times higher than the standard norm of 4% to 6% in each year. But, both of these margins showed no regular trend over the study period. The return on investment varied from 10.27% to 31.21% during the period, indicating a steady increasing trend over the period. As compared to the standard norm of 10% to 12% the ROI of the company had been highly satisfactory in all the years. So is the case with the return on shareholders' equity. This return on shareholders' equity varied within 15.24% and 46.26% during the period, showing an increasing trend over the period. This return had also been highly satisfactory in all the years under review. Earning share of the company varied within Tk. 2.13 and 6.61 showing an increasing trend over the period. So EPS had also been highly satisfactory in all the years.

D. Assets Management Position: Inventory turnover varied within 1.54 times to 4.63 times only, lagging behind the standard norm of 8 to 9 times turnover. Thus, the inventory turnover had been unsatisfactory in all the years under review. But, one good sign is that the same had shown an increasing trend over the study period. Average collection period (ACP) varied within 34 days and 109 days during the period, indicating a decreasing trend over the period. As compared to the standard norm of 30 days to 45 days, ACP was satisfactory in the years 1198 and 2000 and in the rest of the years the same had been highly unsatisfactory.

Both fixed assets and working capital (current assets) turnover had been low in all the years; but it is a good sign that these showed an increasing trend over the study period. Fixed assets turnover varied within 0.42 time to 1.30 times; whereas, working capital turnover varied within 0.93 time to 2.89 times during the period. As compared to the standard norm 3 times fixed assets turnover, the same had been far from satisfactory in the years. As compared to the standard norm of 5 to 7 times of working capital turnover, the same had also been far from satisfactory in all the years. Therefore, the analysis of the asset management ratios reveal that there had been inefficient asset management coupled with underutilization of both the fixed and current assets in all the years under review.

E. Overall Financial Health : From the interpretations made so far, it can be said that the liquidity position of the company had been satisfactory during the study period. The debt management position of the company had been more or less satisfactory in the sense that its debt-equity ratio and ratio of capital employed to net worth had been somewhat reasonable; although its cash flows had not been adequate. Moreover, the company had been debt service capacity in the sense that its coverage ratios were somewhat reasonable. The profitability position of the company had been highly satisfactory in all the years under review. Hence, the overall financial condition of the company had been satisfactory during the period under study. But, the company showed its inefficiency in managing and utilizing its assets, both the fixed and current. Therefore, the financial management of the should take immediate steps in order to improve its asset management policy.

Problem - 2

The following information are available on the Partex Corporation. Assuming sales and production are steady throughout the year; complete the Balance Sheet and Income Statement for the corporation.

Balance Sheet

As on 31st December, 2004

(In thousand Taka)

Cash and marketable securities – 500	Accounts payable -----	400
Accounts receivable ----- ?	Bank loan -----	?
Inventories ----- ?	Accruals -----	200
Current assets ----- ?	Current Liabilities -----	?
Net Fixed Assets -----?	Long-term debt -----	?
Total Assets -----?	Common stock and	
	Retained earnings -----	3,750
	Total liabilities & equity---	?

Income Statement

For the year ended 31st December, 2004

(In thousand Taka)

Credit sales -----	8,000
Cost of goods sold -----	<u>?</u>
Gross profit -----	?
Selling and Administrative expenses ----	?
Interest expense -----	<u>400</u>
Profit before tax -----	?
Tax @ 44% -----	<u>?</u>
Profit after tax -----	?

Other information :

- (i) Current ratio ----- 3 : 1
- (ii) Depreciation ----- Tk. 500
- (iii) Gross profit and depreciation to long-term debt ----- 0.80
- (iv) Net profit margin ----- 7%

(v) Total liabilities to net worth ----- 1 : 1

(vi) Average collection period ----- 45 days

(vii) Inventory turnover -----3 : 1

Solution :

Workings :

(i) Accounts Receivables

$$\text{Average Collection Period} = \frac{\text{Accounts Receivables}}{\text{Credit sales per day}}$$

$$45 = \frac{\text{Accounts Receivables}}{8000 / 36} = \frac{\text{Accounts Receivables}}{22.22}$$

Hence, Accounts Receivables = 45 x 22.22 = Tk. 1,000

(2) Inventory :

$$\text{Inventory Turnover} = \frac{\text{Sales}}{\text{Inventory}} = \frac{8,00}{\text{Inventory}}$$

$$3 = \frac{8,00}{\text{Inventory}}$$

$$\therefore \text{Inventory} = \frac{8,000}{3} = \underline{2,666.67}$$

(3) Current assets :

$$\begin{aligned} \text{Current assets} &= \text{Cash and marketable securities} + \text{Accounts receivables} + \text{Inventory} \\ &= 500 + 1,000 + 2,666.67 \\ &= \underline{4,166.67} \end{aligned}$$

(4) Current Liabilities

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

$$\text{or, } 3 = \frac{4166.67}{\text{Current Liabilities}}$$

$$\therefore \text{, Current Liabilities} = \frac{4,166.67}{3} = \underline{1,388.89}$$

(5) Bank Loan

$$\begin{aligned} \text{Current Liabilities} &= \text{Accounts payable} + \text{Bank loan} + \text{Accruals} \\ \text{or, } 1,388.89 &= 400 + \text{Bank loan} + 200 = 600 + \text{Bank loan} \\ \therefore \text{Bank loan} &= 1,388.89 - 600 = 788.89 \end{aligned}$$

(6) Long-term debt

$$\begin{aligned} \text{Total Liabilities to Net Worth} &= \frac{\text{Total debts}}{\text{Net Worth}} = \frac{\text{Total debts}}{3,750} \\ \text{or, } 1 &= \frac{\text{Total debts}}{3,750} \\ \text{Total debts} &= \underline{3,750} \end{aligned}$$

$$\begin{aligned} \therefore \text{Long-term debt} &= \text{Total debts} - \text{Short-term debt (Bank loan)} - \\ &\text{Accounts payable} - \text{Accruals} \\ &= 3,750 - 788.89 - 400 - 200 \\ &= 2,361.11 \end{aligned}$$

(7) Net Fixed Assets

$$\begin{aligned} \text{Total Assets} &= \text{Net fixed assets} + \text{equity} \\ &= 3,750 + 3,750 = 7,500 \\ \therefore \text{Total assets} &= \text{Net fixed assets} + \text{Current assets} \\ 7,500 &= \text{Net fixed assets} + 4,166.67 \\ \therefore \text{Net fixed assets} &= 7,500 - 4,166.67 \\ &= \underline{3,333.33} \end{aligned}$$

(8) Net Profit :

$$\begin{aligned} \text{Net Profit Margin} &= \frac{\text{Net profits}}{\text{Sales}} \\ 0.07 &= \frac{\text{Net profits}}{8,000} \\ \therefore \text{Net profits} &= \underline{560} \end{aligned}$$

(9) Tax and Profit before tax :

$$\begin{aligned} \text{Tax} &= 44\% \text{ of the profit before tax} = \text{Tk } 100 \\ \therefore \text{Profit after tax} &= 100 - 44 = 56 \\ \therefore \text{Profit after tax } 56; \text{ tax is } 44 \\ &\quad \frac{1}{560} \quad \frac{44}{56} \\ &\quad 560 \quad 44 \times 560/56 = 440 \\ \therefore \text{Profit before tax} &= 560 + 440 = \underline{1,000} \end{aligned}$$

(10) Gross profit :

$$\begin{aligned} \text{Gross profit and depreciation to long-term debt} &= 0.40 \\ &\text{Gross profit + Depreciation} \\ \text{Gross profit and depreciation to long-term debt} &= \frac{\text{Long-term debt}}{\text{GP} + 500} \\ &= \frac{2,361.11}{2,361.11} \end{aligned}$$

$$\begin{aligned} \therefore \text{GP} + 500 &= 2,361.11 \\ \therefore \text{GP} &= 2,361.11 - 500 = \underline{1861.11} \end{aligned}$$

(11) Selling and administrative expenses :

Profits before tax = Gross profit – (Selling and Administrative expenses + Interest expense)

$$1,000 = 1861.11 - (\text{Selling and Administrative expenses} + 400)$$

$$1,000 = 1861.11 - 400 - \text{Selling and administrative expenses}$$

$$1,000 = 1,461.11 - \text{Selling and administrative expenses}$$

$$\therefore \text{Selling and administrative expenses} = 1,461.11 - 1,000 = \underline{461.11}$$

Completed Income Statement

for the year ended 31st December, 2004

(In thousand Taka)

Credit Sales	8,000.00
Cost of goods sold (Balancing figure)	(6,138.89)
Gross profit	<u>1,861.11</u>
Selling and administrative expenses	(461.11)
Interest expenses	(400)
Profit before tax	<u>1,000</u>
Tax @ 44%	440
Net profit after tax	<u>560</u>

Completed Balance Sheet

As on 31st December, 2004

(In thousand Taka)

Liabilities and Equities		Assets and Properties	
Accounts payable	400.00	Cash and marketable securities	500.00
Bank loan	788.89	Accounts Receivable	1,000.00
Accruals	<u>200.00</u>	Inventory	<u>2,666.67</u>
Current Liabilities	1,388.89	Total current assets	4,166.67
Long-term debt	2,361.11	Net fixed assets	<u>3,333.33</u>
Common stock and Retained earnings	<u>3,750.00</u>		
	7,500.00		7,500.00

Review Questions

Short Questions

1. Examine the pros and cons of Altman's Model of Discriminating Analysis.
2. Apply ratio analysis and Dupont relationship to explain trends in company financial performance.

Broad questions

3. What are Dupont Equation and Dupont Chart ? Explain the various components of Dupont Equation. Draw a Dupont Chart using imaginary figures.
4. Examine the role of the financial ratios in predicting the financial health of a company.

Review Problems

Problem – 1

The following three firms have the following financial data during 2002–03:

(In thousand Taka)

Items	Firm A	Firm B	Firm C
Current Assets	31,500	(4,800)	21,000
Total assets	1,55,000	63,000	78,000
Total Liabilities	69,000	39,000	63,000
Market Value of Equity	1,14,000	21,300	15,000
Retained Earnings	12,000	12,000	48,200
57,000			
Sales	2,55,000	75,000	45,600
EBIT	36,000	4,500	27,900

Applying the Altman's Z-Score Model, predict the financial conditions of those companies for the 2002 – 2003. Do you think any or more of these companies are likely to face bankruptcy in the near future ? If, so, why ?

Problem - 2

Complete the balance sheet and sales information in the table that follows for Isberg Industries using the following financial data :

Debt ratio : 50%

Quick ratio : 0.80 X

Total assets turnover : 1.5 X

Days sales outstanding : 36 days

Gross profit margin on sales : (Sales – Cost of goods sold)/ Sales = 25%

Inventory turnover ratio : 5 X

BALANCE SHEET

Cash -----	Accounts payable -----
Accounts receivable -----	Long-term debt \$ 75,000
Inventories -----	Common stock -----
Fixed assets -----	Retained earnings \$60,000
Total assets \$ <u>300,000</u>	Total liabilities and equity -----
Sales -----	Cost of goods sold -----

CASE STUDY

Problem - 1

Donna Jamison was recently hired as a financial analyst by Computron Industries, a manufacturer of electronic components. Her first task was to conduct a financial analysis of the firm covering the last two years. To begin, she gathered the following financial statements and other data.

BALANCE SHEETS

<i>Assets</i>	2000	1999
Cash	\$ 52,000	\$ 57,600
Accounts receivable	402,000	351,200
Inventories	<u>836,000</u>	<u>715,200</u>
Total current assets	\$1,290,000	\$ 1,124,000
Gross fixed assets	527,000	491,000
Less accumulated depreciation	<u>166,200</u>	<u>146,200</u>
Net fixed assets	<u>360,800</u>	\$ <u>344,800</u>
Total assets	\$1, <u>650,000</u>	\$1, <u>468,800</u>
<i>Liabilities and Equity</i>		
Accounts payable	\$ 175,200	\$ 145,600
Notes payable	225,000	200,000
Accruals	<u>140,000</u>	<u>136,000</u>
Total current liabilities	\$ 540,200	481,600
Long-term debt	424,612	323,432
Common stock (100,000 shares)	460,000	460,000
Retained earnings	<u>225,988</u>	<u>203,768</u>
Total equity	\$ <u>685,988</u>	\$ 663,768
Total liabilities and equity	\$ <u>1,650,800</u>	\$ <u>1,468,800</u>

INCOME STATEMENT

Sales	\$ 3,850,000	\$ 3,432,000
Cost of goods sold	(3,250,000)	(2,864,000)
Other expenses	(430,300)	(340,000)
Depreciation	20,000	(18,900)
Total operating costs	\$ <u>3,700,300</u>	\$ <u>3,222,900</u>
EBIT	\$ 149,700	\$ 209,100
Interest expense	(76,000)	(62,500)
EBT	\$ 73,700	\$ 146,600
Taxes (40)	(29,480)	(58,640)
Net income	\$ <u>44,220</u>	\$ <u>87,960</u>
EPS	0.442	0.880

STATEMENT OF CASH

FLOWS (2000) :

Operating Activities

Net income \$ 44,220

Other additions (sources of cash)

Depreciation 20,000

Increase in accounts payable 29,600

Increase in accruals 4,000

Subtractions (uses of cash)

Increase in accounts receivables (50,800)

Increase in inventories (120,800)

Net cash flow from operations (\$ 73,780)

Long-term Investing Activities

Investment in fixed assets (\$36,000)

Financing Activities

Increase in notes payable 25,000

Increase in long-term debt 101,180

Payment of cash dividends (22,000)

Net cash flow from financing 104,180

Net reduction in cash account (\$ 5,600)

Cash at beginning of year 57,600

Cash at end of year \$ 52,000

OTHER DATA

	2000	1999
December 31 stock price	\$ 6.00	\$8.50
Number of shares	100,000	100,000
Dividends per share	\$ 0.22	\$0.22
Lease payments	\$40,000	\$40,000

Industry average data for 2000 :

RATIO	INDUSTRY AVERAGE
Current	2.7 X
Quick	1.0 X
Inventory turnover	6.0 X
Days sales outstanding (DSO)	32.0 days
Fixed assets turnover	10.7 X
Total assets turnover	2.6 X
Debt ratio	50.0%
TIE	2.5 X
Fixed charge coverage	2.1 X
Profit margin	3.5%
ROA	9.1%
ROE	18.2%
Price/earnings	14.2 X
Market/ book	1.4 X

Required :

- i) Calculate the desired ratios and interpret the same;
- ii) Use the Dupont equation to provide a summary and overview of the company's financial health;
- iii) Draw a Dupont Chart using the desired ratios.

Lesson– 4: Cash Flow Analysis

After successfully completing the lesson 4, you should be able –

- To grasp the concept of the cash flow statement as the important tool of financial analysis;
- To understand the pros and cons of cash flow cycle and
- To know the techniques of preparing cash flow statement;

Concepts of Cash Flow Statement

Cash flow of a firm consists of cash inflows and cash outflows. Cash inflows mean what comes in a business in the forms of cash or cheques during a financial year. On the other hand, cash outflows mean what goes out from the business in the form of cash or cheque during the particular financial year. Cash inflows are also known as cash receipts, whereas, cash outflows denote cash disbursements. An analysis of cash flows is useful for short term planning. A firm needs enough cash to pay its debts maturing in the near future; to pay interest and other expenses and pay dividends to the shareholders. The firm can make projections of cash inflows and outflows for the near future in order to determine the availability of cash. This cash and bank balance can be matched with the firm's need for total cash during the period and accordingly, arrangements can be made to meet the cash deficit or invest the surplus cash temporarily. A historical analysis of cash flows provides insight to prepare reliable cash flow projects for the near future.

Cash flow of a firm consists of cash inflows and cash outflows.

A cash flow statement refers to the statement of changes in the financial position of a firm during a particular financial year on cash basis. It summarizes the causes of changes in cash position between the dates of two Balance Sheets. It indicates the sources and uses of cash. This statement analyses changes in non-current accounts as well as current accounts (other than cash) in order to determine the flow of cash.

A cash flow statement refers to the statement of changes in the financial position of a firm during a particular financial year on cash basis.

Concepts of Cash Flow Cycle

Before understanding the concept of cash flow cycle, we are to know the meaning of accounting income, cash flow and their distinction. Accounting profits which are simply reported to profit and loss A/c or Income Statement of a firm are known as accounting income. Accounting income are important to the accountant for distribution of profits to the shareholders. Shareholders are interested in dividends which are paid out of accounting income. On the other hand, cash flows represent the cash receipts and cash disbursements, generated by a firm during some specified period. Cash flows are important to the financial executives in order to examine the liquidity as well as the financial solvency of the firm. A firm's ability to pay dividends to shareholders depends on its cash flows. Cash flows are generally related to accounting income. Investors are also concerned with the cash flow projections as well as income projections.

Cash flows are divided into two classes, namely, operating cash flows and other cash flows. Operating cash flows are those that arise from the normal operations and they are, in essence, the difference between cash receipts and cash payments, including taxes paid. Other cash flows arise from borrowings, sale of fixed assets and from the repurchase of common stock. Operating cash flows differ from accounting income for two primary reasons.

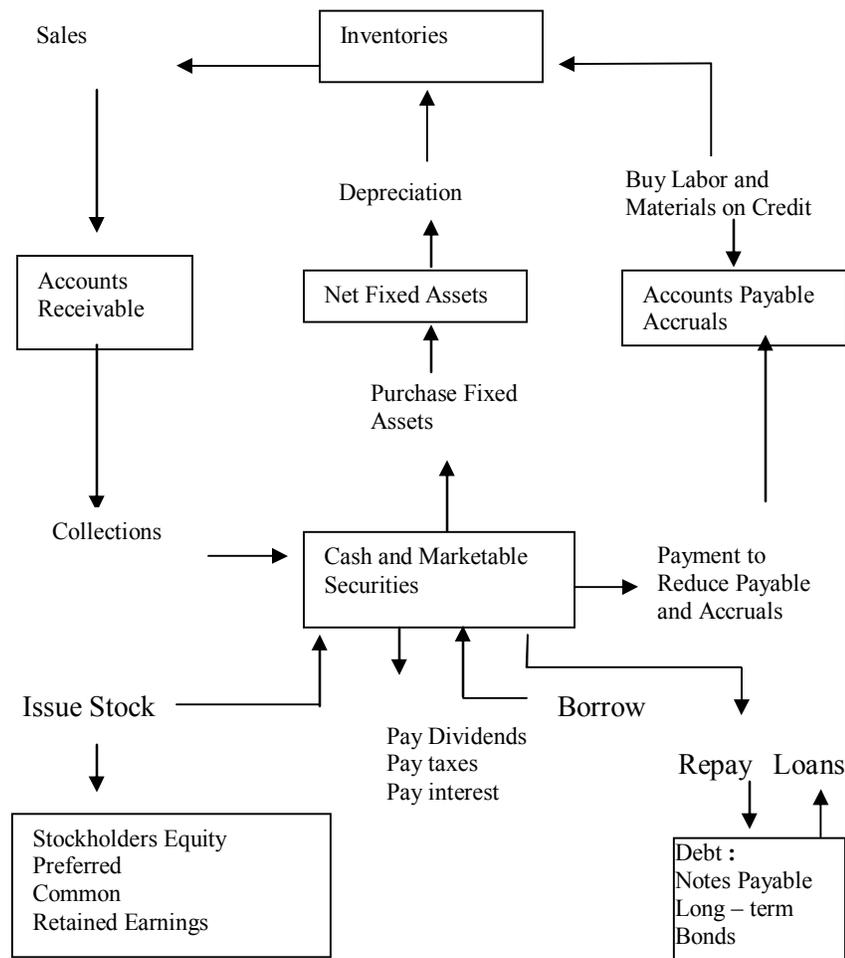
- i) All the taxes reported on the Income Statement might not have to be paid in the current year; or under certain circumstances, cash payments for taxes might exceed the tax figure deducted from the sales to calculate net income and
- ii) Sales, might be on credit, hence do not represent cash and some of the expenses (or costs) deducted from sales to determine income might not be cash expenses. Most important is that depreciation is a non – cash expense.

Thus, operating cash flows could be larger or smaller than accounting income during any given period.

Now, the time has come to explain the meaning of cash flow cycle. The way in which actual net cash, as opposed to accounting net income, flows into or out of the firm during some specified period is known as Cash flow cycle. To understand how timing influences the financial statements, one must understand the cash flow cycle. The cash flow cycle is shown in Figure – 12.1

The way in which actual net cash, as opposed to accounting net income, flows into or out of the firm during some specified period is known as Cash flow cycle.

Figure – 12.1 Cash and Materials Flows within the Firm



In the Figure 12.1, rectangles represent Balance Sheet items—assets and claims against assets; whereas circles represent income items and cash flow activities that affect the Balance Sheet items. Each rectangle can be thought of as a reservoir, and there is a certain amount of the asset or liability in the reservoir (account) on such balance sheet date. The various transactions cause changes in the accounts, just as adding and subtracting water changes the level in a reservoir. The direction of the changes in each reservoir is indicated by the direction of the arrow(s) connected to that reservoir. For example, because collecting account receivables reduces the receivables reservoir, but increases the cash reservoir; an arrow goes from the accounts receivable reservoir to the collection circle, then from the collections circle to the cash and marketable securities reservoir.

A statement reporting the impact of a firm's operating, investing and financing activities on cash flows over an accounting period is known as cash flow statement.

The cash account is the focal point of the figure. Certain transactions viz; collecting accounts receivable or borrowing money from banks will cause the cash account to increase; while the payments of taxes, interest, dividends and accounts payable will cause it to decline. Similar

comments could be made about all the balance sheet items - their balances rise, fall or remain constant depending on the transactions that occur during the period under study.

Techniques of Presenting Cash Flow Statement

The graphic cash flow cycle as presented in figure 12.1 is converted into numerical form and reported in annual reports as the statement of cash flows. This statement is designed to show how the firm's operations have affected its cash position by examining the investment (uses of cash) and financing decisions (sources of cash) of the firm. Therefore, a statement reporting the impact of a firm's operating, investing and financing activities on cash flows over an accounting period is known as cash flow statement.

The information contained in the statement of cash flows can help answering the following main questions:

- i) Is the firm generating the cash required by additional fixed assets for growth and expansion of the same?
- ii) Does the firm have excess cash flows that can be used to repay debt or to invest in new products?
- iii) Does the firm suffer from shortage of cash?

All the above information are useful for the financial managers and investors. The preparation of this statement is relatively easy as compared to the preparation of fund flow statement. Firstly, to some extent, the cash flow effects of a firm's operation are shown in its Income Statement or Profit and Loss A/C. For most firms, however, some of the reported revenues might not have been paid at the time of preparing Income Statement. To adjust the estimate of cash flows obtained from the Income Statement and to account for cash flows not reflected in the Income Statement, it is essential to examine the impact of changes in the Balance Sheet items during the year under review. Looking at the changes in the Balance Sheet items from the beginning to the end of the year; it is necessary to identify which items provide cash (sources/& which items use cash (use) during the year. To determine whether a change in Balance Sheet items is a source or use of cash, the following simple rules can be followed:

Sources of Cash

Uses of Cash

Increase in a Liability or Equity Account: Decrease in a Liability or Equity Account

Borrowing funds or selling/issuing stocks provides cash	Paying off loans or buying back stocks uses cash
---------------------------------------------------------	--------------------------------------------------

Decrease in Asset Account

Increase in Asset Account

Selling inventory or collecting receivables Provides cash	Buying fixed assets or buying more inventory uses cash
-----------------------------------------------------------	--------------------------------------------------------

There are two methods of preparing cash flow statement namely – direct method and indirect method.

Methods of Preparing Cash Flow Statement

There are two methods of preparing cash flow statement namely – indirect method and direct method. Both the methods will produce the same result, and both are accepted by the Financial Accounting Standards Board. The following para deals with the methods.

- i) Indirect Method:** Under indirect method, cash flows from operations are found out by starting with the net income/net profit, adding back non – cash expenses i.e. expenses not paid in cash and subtracting revenues that do not provide cash.
- ii) Direct Method:** Under direct method, operating cash flows are found out by summing all revenues that provide cash and then subtracting all expenses that are paid in cash.

However, in case of the manufacturing industrial enterprises in Bangladesh, indirect method is widely followed while preparing and presenting their cash flow statements whose proforma is given in the next Table.

Table

Proforma of Cash Flow Statement for the period ending -----

	Particulars	Amount	Amount
A.	Cash Flows From Operating Activities:	X	
	Net Income/ Net Profit		
	Additions to Net Income:	X	
	Depreciation	X	
	Increase in current liabilities (other than sources of finance)	X	
	Decrease in current assets	(X)	
	Subtractions from Net Income:	(X)	
	Increase in current assets		
	Decrease in current liabilities		X
	Net Cash Flows from operations		X
B.	Cash Flows from Long term Investing Activities:	(X)	
	Acquisition or purchase of fixed assets	X	
	Sale of fixed assets		X
	Net Cash flows from Investments		X
C.	Cash flows from Financing Activities:		
	Increase in Notes Payable	X	
	Increase in Bonds	X	
	Issue of shares / stock	X	
	Borrowings	X	
	Loan repayment	(X)	
	Decrease in Notes Payable	(X)	
	Decrease in Bonds	(X)	
	Dividend Payment	(X)	
	Change in other liabilities	X/(X)	
	Net Cash Flows from Financing		X
	∴ Net Change in cash (A+B+C)		X/(X)
	Add cash at the beginning of the year		X
∴ Cash at the end of the year		<u><u>X</u></u>	

Note : First bracket implies uses of cash.

Problems and Solutions:

Problem – 1

The consolidated balance sheets for the Lloyd Lumber Company at the beginning and end of 2000 follow. The company bought \$50 million worth of fixed assets. The change for depreciation in 2000 was \$10 million. Net income was \$33 million, and the company paid out %5 million in dividends.

- a) Fill in the amount of the source or use in the appropriate column.
Lloyd Lumber Company:

Balance Sheets at Beginning and End of 2000 (millions of dollar)

	January - 1	December- 31	Change	
			Source	Use
Cash	\$ 7	\$ 15		
Marketable Securities	0	11		
Net receivables	30	22		
Inventories	<u>53</u>	<u>75</u>		
Total Current Assets	\$ 90	\$ 123		
Gross fixed assets	75	125		
Less accumulated depreciation	<u>25</u>	<u>35</u>		
Net fixed assets	<u>\$ 50</u>	<u>\$ 90</u>		
Total Assets	<u>\$ 140</u>	<u>\$ 213</u>		
Accounts payable	\$ 18	\$ 15		
Notes payable	3	15		
Other current liabilities	15	7		
Long – term debt	8	24		
Common stock	29	57		
Retained earnings	<u>67</u>	<u>95</u>		
Total liabilities and equity	<u>\$ 140</u>	<u>\$ 213</u>		

Note : Total sources must equal total assets.

- b) Prepare a statement of cash flows.
c) Briefly summarize your findings.

Solution : a)

(In Million of dollars)

	January-1	December- 31	Change	
			Source	Use
Cash	\$ 7	\$ 15	--	8
Marketable Securities	0	11	--	11
Net receivables	30	22	8	--
Inventories	53	75	--	22
Gross fixed assets	75	125	--	50
Less accumulated depreciation	25	35	10	--
	<u>\$ 18</u>	<u>\$ 15</u>	--	3
Accounts payable	3	15	12	--
Notes payable	15	7	--	8
Other current liabilities	8	24	16	--
Long – term debt	29	57	28	--
Common stock	67	95	28	--
Retained earnings				
Total			<u>102</u>	<u>102</u>

b) Lloyd Lumber Company:

Cash Flow Statement for the period ending December, 31, 2000

(In Million of dollars)

	Particulars		
A.	Cash Flows From Operating Activities:		
	Net Income/ Net Profit	33	
	Additions to Net Income:	10	
	Decrease in Depreciation	8	
	Decrease in net receivables		
	Subtractions from Net Income:	(3)	
	Decrease in Accounts Payable	(11)	
	Increase in Marketable Securities	(22)	
	Increase in Inventories		15
	Net Cash Flows operations		
B.	Cash Flows from Long term Investing Activities:		
	Purchase of Fixed Assets		(50)
C.	Cash flows from Financing Activities:		
	Increase in Notes Payable	12	
	Decrease in other current liabilities	(8)	
	Increase in Long-term debts	16	
	Increase in Common Stock	28	
	Dividend Payment	(5)	
	Net Cash Flows from financing		43
	∴ Net Change in cash (A+B+C)		8
	Add cash at the beginning of the year		7
	∴ Cash at the end of the year		15

c) Summary:

Total Sources of Cash \$102

Total Uses of Cash \$102

Net changes in Cash Flows \$8

Review Questions:

Short Questions

1. Define cash flow statement. Discuss its significance.
2. What are the sources and uses of cash?

Broad questions

3. What is a cash flow cycle? Show various aspects of a cash flow cycle with the help of a flow chart.
4. Discuss the techniques of preparing cash flow statement.
5. Give a proforma statement of cash flows with imaginary figures.
6. Discuss the methods of preparing cash flow statement.

Review Problems

Problem – 1

The chief manager of Beximco Chemicals Ltd. is surprised to find that although his company incurred a loss during the year ended 31th June 2002; the cash has increased by Tk 450 during the period. He was further puzzled to find that there was an increase in stock and decrease in debtors collections. The financial statements of the company are given below:

Profit and Loss Account

Particulars	TK.	TK.
Sales		5,600
Cost of goods sold		3,250
Gross Profit		2350
Operating expenses:		
Office and administrative	1700	
Selling and distribution	550	
Depreciation	600	
Amortization of Goodwill	250	3100
Net Loss		<u>750</u>

Comparative Balance Sheet

Items	2002	2001
Cash	1400	950
Debtors	800	550
Stock	1000	800
Advance Insurance	100	120
Land	1500	1500
Plant (Net)	4400	6000
Goodwill	<u>750</u>	<u>1000</u>
Total assets	<u>9950</u>	<u>10920</u>
Creditors	600	900
Bills payable	100	50
Interest payable	100	90
Accrued wages	200	180
Debentures	2450	2450
Share Capital	6000	6000
Reserves and surplus	<u>500</u>	<u>1250</u>
Total Funds	<u>9950</u>	<u>10920</u>

Required:

- a) Calculating cash flows from operations
- b) Preparing a statement of sources and uses of cash

Lesson–5: Fund Flow Analysis

On successful completion of the lesson 5, you should be able:

- To grasp the concepts of fund and fund flow statement and realize the significance of fund flow statement;
- To know the concept of working capital flow and
- To understand the techniques of presenting fund flow statement

Concepts of Fund and Fund Flow Statement

Before defining fund flow statement, we are to know what is meant by the term “fund”. Fund may be used in two senses viz; narrow sense and broad sense. In narrow sense, fund means changes either in cash or in working capital (the difference between current assets and current liabilities). In broad sense, fund means changes in financial resources, arising from changes in working capital items and from financing and investing activities of the firms which may involve only non – current assets. Funds flow statement refers to the statement of changes in financial position, prepared to determine only the sources and uses of working capital.

Funds flow statement refers to the statement of changes in financial position, prepared to determine only the sources and uses of working capital.

As historical analysis, the statement of changes in working capital reveals to management the way in which the working capital was obtained and used. With this insight, management can prepare the estimates of the working capital flows. A statement reporting the changes in working capital is useful in addition to the financial statements. A Projected statement of changes in working capital is immensely useful in the firm’s long – term planning. Management, for example, wants to anticipate the working capital flows in order to plan the repayment schedules of its long – term debts. For the quick growth and expansion, a firm needs large amount of working capital. Therefore, estimates of working capital on a long-term basis are also required to determine whether or not adequate working capital will be generated to meet the firm’s growth and expansion. If not, the firm can make arrangements in advance to procure funds from the outside sources to meet its needs.

Concepts of Working Capital Flow

In the working capital flow a fund arises when the net effect of a transaction is to increase or decrease the amount of working capital. Normally, a firm will have some transactions that will change net working capital and some transactional that will cause no change in net working capital. Transactions which change net working capital include most of the items of the profit and loss account and those business events which simultaneously affect both current and non – current balance sheet items. On the other hand, transactions which do not increase or decrease working capital include those which affect only current accounts or only non – current accounts.

We may conclude that a transaction will cause net flow of working capital only when one of the accounts affected is a current account (current asset or current liability) and another account is a non-current account (long – term asset or long – term liability). The concept of working capital flow may be summarized below:

- The net working capital increases or decreases when a transaction involves a current account and a non – current account.
- The net working capital remains unaffected when a transaction involves only current accounts.
- The net working capital remains unaffected when a transaction involves only non - current accounts.

The concept of the flow of working capital is further illustrated in the following Figure:

Decrease ↓	Increase →	Current Account	Non-current Account
Current Account	No Impact	Impact	
Non – current Account	Impact	No Impact	

Techniques of Presenting Fund Flow Statement

Fund flow statement can be prepared on the basis of working capital where working capital refers to net working capital (current assets minus current liabilities). That is, net working capital (NWC) is the amount which its current assets (CA) exceeds its current liabilities (CL). Working capital may be viewed as funds available for acquisition of non – current assets as well as to repay non – current liabilities. Any transaction that results in an increase in working capital is a source of fund; any transaction that causes a decrease in working capital is an application of fund.

General Rules for Ascertaining “Increase” or “Decrease” in Working Capital

For the preparation of fund flow statement, ascertaining transactions affecting working capital changes is a must.

Symbolically :

$$NWC = CA - CL.$$

From this equation, the following matters may be deduced –

Any transaction that results in an increase in working capital is a source of fund; any transaction that causes a decrease in working capital is an application of fund.

a) Transactions affecting WC

- i) An increase in CA causes an increase in WC;
- ii) A decrease in CA causes a decrease in WC;
- iii) An increase in CL causes a decrease in WC;
- iv) A decrease in CL causes an increase in WC

b) Transactions not affecting WC

- i) An increase in CA and a decrease in CL and
- ii) A decrease in CA and a decrease in CL.

Sources and Uses of WC

The following Table shows the major sources and uses of working capital:

Sources of WC	Uses of WC
i) Funds from business operations,	i) Loss from business operations
ii) Other income,	ii) Purchase of non – current assets,
iii) Sale of non – current assets	iii) Redemption of debentures/ preference shares,
iv) Long – term borrowings,	iv) Dividends paid to shareholders.
v) Issue of equity and preference share.	

Determination of Funds from Business Operations

The Income Statement or Profit and Loss Account of a firm contains a variety of write offs and other adjustments, which do not involve any corresponding movement of funds. Therefore, proper adjustments are to be made to the net income or net profit disclosed by income statement or profit and loss account to arrive at the funds from business operations. For this purpose, the following matters should be kept in mind –

- i) All such expenses which have been deducted from revenues but do not reduce working capital are to be added back;
- ii) Such income items which have been added to revenues but have not contributed to working capital are to be deducted and
- iii) All such revenues which are not directly caused by business operations should also be deducted and shown separately in the statement.

However, the items requiring adjustments to the net income / net profits are shown in the Exhibit – 1:

Exhibit – 1:

Necessary Adjustments to Net Income / Net Profits

A.	Net Income (or loss) as shown by Income Statement/ Profit and Loss A/C
B.	Add :
i)	Depreciation expenses;
ii)	Amortization of goodwill, patents and other intangible assets;
iii)	Amortization of discount on shares/debentures;
iv)	Amortization of debentures/share issue expenses;
v)	Amortization of extraordinary losses incurred in previous years and
vi)	Loss on sale of non – current assets.
C.	Less:
i)	Amortization of premium received on shares/debentures;
ii)	Profit on sale of non – current assets;
iii)	Profit on revaluation of non – current assets;
iv)	Dividend and interests on investments.
	Hence, Funds From Business Operations = (A+B-C)

Problems and Solutions:

Problem – 1

Financial statements for the Sennet Corporation follow:

Sennet Corporation Balance Sheet, December 31, (in millions)

	20x1	20x2		20x1	20x2
Cash	\$ 4	\$ 5	Accounts payable	\$ 8	\$ 10
Accounts receivable	7	10	Notes payable	5	5
Inventory	<u>12</u>	<u>15</u>	Accrued wages	2	3
Current Assets	\$ 23	\$ 30	Accrued taxes	<u>3</u>	<u>2</u>
Net Plant	<u>40</u>	<u>40</u>	Current liabilities	\$ 18	\$
			Long – term debt	20	20
			Common Stock	10	20
			Retained earnings	15	10
					20
			Total liabilities and equity	<u>\$ 63</u>	
Total Assets	<u>\$ 63</u>	<u>\$ 70</u>			\$70

Sennet Corporation Income Statement, 20x2, (in millions)

Sales		\$ 95
Cost of Goods Sold	\$ 50	
Selling, general, and administrative expenses	15	
Depreciation	3	
Interest	<u>2</u>	70
Net income before taxes		\$ 25
Taxes		<u>10</u>
Net Income		<u>\$ 15</u>

- Prepare a sources and uses of funds statement,
- Prepare a source and use of working capital statement.

Solution

a) Statement of Sources and Uses of Funds for the Sennet Corporations

Sources of Funds:	\$
Funds from operations:	
Net Income	15
Add Depreciation expense;	3
	18
Increase in Current liabilities (\$20 - \$18)	2
Total Sources of Funds	20
Uses of Funds	
Increase in Current Assets (\$30 - \$23)	7
Dividend paid (RE 2001 + NI – RE2002) ie. (\$15+\$15 - \$20)	10
Previous income tax paid	3
Total uses of funds	20

b) Statement of Sources and Uses of Working Capital for the Sennet Corporation

Items	Previous year (2001) \$	Current year (2002) \$	Sources \$	Uses \$
Current Assets				
Cash	4	5	1	-
Accounts Receivable	7	10	3	-
Inventory	12	15	3	-
	23	30	7	
Current Liabilities				
Accounts Payable	8	10	--	2
Notes Payable	5	5	--	--
Accrual	2	3	--	1
Wages	3	2	1	--
	18	20	8	3
Taxes	5	10		
	5	--		
	10	10		
NWC (CA-CL)				
Increase in NWC				

Problem – 2

From the following data of Jahan Company, prepare (a) a statement of sources and uses of working capital (funds), b) a schedule of changes in working capital, and c) a statement of sources and uses of cash.

Balance Sheet

for the year ended on 31 December

(TK)

	19X2	19X1
Assets		
Cash	1,26,000	1,14,000
Short-term investment	42,400	20,000
Debtors	60,000	50,000
Stock	38,000	28,000
Long-term investment	28,000	44,000
Machinery	2,00,000	1,40,000
Buildings	2,40,000	80,000
Land	14,000	14,000
Total	<u>7,48,400</u>	<u>4,90,000</u>
Liabilities and equity		
Accumulated Depreciation	1,10,000	60,000
Creditors	40,000	30,000
Bills payable	20,000	10,000
Secured	2,00,000	1,00,000
Share capital	2,20,000	1,60,000
Share premium	24,000	--
Reserve and surplus	1,34,000	1,30,000
Total	<u>7,48,000</u>	<u>4,90,000</u>

Income Statement

for the year ended on 31 December, 19X2

(TK)

Sales		2,40,000
Less cost of goods sold		1,34,000
Gross profit		1,05,200
Less: Operating expenses.		
Depreciation—Machinery	20,000	
Depreciation – Buildings	32,000	
Other Expenses	40,000	92,000
Net profit from operations		13,200
Gain on sale of long-term investment		<u>4,800</u>
Total		18,000
Loss on sale of machinery		<u>2,000</u>
Net Profit		<u>16,000</u>
Note: The proceeds from the sale of machinery were Tk. 6,000		

Solution

(a)

JALAN COMPANY

Statement of Sources and Uses of Working Capital

for the year ended on 31 December, 19X2

(Tk)

Sources

Working capital from operations.....	65,200	
Sale of long-term investment	20,800	
Sale of machinery	6,000	
Secured loan.....	1,00,000	
Share capital.....	60,000	
Share premium	<u>24,000</u>	<u>2,76,000</u>

Uses

Purchase of machinery`	70,000	
Purchase of building	1,60,000	
Payment of dividend.....	<u>11,600</u>	<u>2,41,600</u>

Increase in Working Capital..... 34,400

Note: Working capital from operations is found as follows:

	Rs	Rs
Net profit	16,000	
Add:		
Depreciation		
Machinery	20,000	
Buildings	32,000	
Loss on sale of machinery	2,000	70,000
Less:Gain on sale of long-term investment		<u>4,800</u>
Working Capital from operations		<u>65,200</u>

(b) Table showing Company's Schedule of Working Capital Changes

(Tk)

	Increase	Decrease
Current Assets		
Cash	12000	
Short – term investment	22400	
Debtors	10000	
Stocks	10000	
Current liabilities		
Creditors		10000
Bill payable		10000
Increase in working capital		34,400
	<u>54400</u>	<u>54400</u>

(c)

Jahan Company

Statement of Sources and Uses of Cash

for the year ended 31 December, 19X2

(Tk)

<u>Sources</u>		
Cash from operations	65,200	
Sale of long-term investment	20,800	
Sale of machinery	6,000	
Secured loan	1,00,000	
Share capital	60,000	
Share premium	24,000	2,76,000
<u>Uses</u>		
Purchase of machinery	70,000	
Purchase of building	1,60,000	
Payment of dividend	11,600	
Purchase of marketable securities	22400	
		2,64,000
Increase in cash		<u>12,000</u>

Cash from operations is found as follows:		
		Tk
Net profit		16,000
Add:		
Depreciation		
Machinery	20,000	
Buildings	32,000	
Loss on sale of machinery	2,000	
Increase in creditors	10000	
Increase in bills payable	10000	
Less: Gain on sale of long-term investment	4,800	
Increase in debtors	10000	
Increase in stock	10000	
		<u>24,800</u>
Cash from operations		<u>65,200</u>

Review Questions:

Short Questions

1. Define fund and fund flow statement.
2. Discuss the significance of fund flow statement.
3. What is working capital flow? Explain.

Broad questions

4. Discuss the techniques of preparing fund flow statement.
5. Examine the general rules for ascertaining changes in working capital.
6. How funds from business operations are determined? Explain.

Review Problems:

Problem – 1

From the following Balance Sheet of Alfa Ltd. prepare:

- i) Statement of changes in working capital
- ii) Fund flow statement.

Liabilities	2001 TK.	2002 TK.	Assets	2001 TK.	2002 TK.
Equity share capital	300	400	Goodwill	100	80
Preference share capital	150	100	Land and building	200	170
General reserve	40	70	Plant	80	200
P/L account	30	48	Investments	20	30
Proposed dividend	42	50	Debtors	140	170
Sundry creditors	25	47	Stock	77	109
Bills payable	20	16	B/R	20	30
Liabilities for expenses	30	36	Cash in hand	15	10
Provision for taxation	40	50	Cash at Bank	10	8
Total	667	817	Preliminary expenses	15	10
			Total	677	817

Additional Data:

- i) A piece of land has been sold in 2002 and the profit on sale has been carried to general reserve.
- ii) A machine has been sold for Tk. 10. The written down value of the machine was Tk. 12. Depreciation of Tk. 10 is charged on plant in 2002.
- iii) The investments are trade investments and
- iv) An interim dividend of Tk. 20 has been paid in 2002.

Problem – 2

From the Problem – 1 given in Lesson–5, you are required -

- a) Determining funds from operations.
- b) Preparing a fund flow statement.

Case Study:

Nitol Motor Ltd. Tables–1 and 2 contain comparative Balance Sheet and Profit and Loss A/C for the years 1998 and 1999. Answer the questions that follow:

Nitol Motor ltd.

Balance Sheet as on 31st December

(Tk)

		1999	1998
1. Shareholders' Fund			
Capital	796		796
Reserves & Surplus	13287		9,914
		14082	10710
2. Loan Funds			
Secured loans		288	448
Unsecured loans		<u>1763</u>	<u>1559</u>
Total		<u>16134</u>	<u>12717</u>
3. Fixed Assets:			
Gross		11860	9142
Depreciation		(6585)	(5174)
Capital work in progress		323	78
Technical know how		12	--
Investments		<u>6801</u>	<u>4402</u>
4. Current Assets:			
Inventories		2193	2584
Debtors		1108	995
Cash and Bank		546	1342
Loans and advances		8310	6026
Other		163	99
5. Current liabilities and provisions:			
Liabilities		(3125)	(2362)
Provisions		(5173)	(3629)
Net current assets		3723	4969
Total		<u>16134</u>	<u>12717</u>

Profit and Loss Account

Items	1999	1998
Sales and other income	24997	19300
Expenditure:		
Materials	13403	10424
Other Expenses	4905	3764
Interest	99	115
Depreciation	638	490
Total Expenses	19046	14813
Profit before taxation	5951	4487
Provision for taxation	1770	1435
Net profit	4181	3052
Adjustment for tax	11	50
Debits written to earlier years	24	6
Profit after adjustment	4168	3096
Proposed dividend	796	616
Debenture redemption reserve	12	12
General reserve	3360	2468

Questions:

- a) How has the company managed its cash resources to make the requisite investments?
- b) Show the sources and uses of funds of the company for the year 1999.

Lesson–6: Cash Budgeting

On successful completion of this lesson 6, you should be able :

- To have an idea of the concepts of cash budget and cash budgeting
- To understand the purposes of cash budgeting
- To identify the elements of cash budget and
- To know the methods of preparing cash budgeting

Concepts of Cash Budget and Cash Budgeting

Cash budget is a schedule of estimated cash receipts, cash disbursements and cash balances of a firm over specified period of time. It is an important technique of cash planning and control. The task of preparing cash budget is known as cash budgeting. The net cash position, surplus or deficiency of a firm as it moves from one budgeting sub – period to another is highlighted by the cash budget. Therefore, the financial management of a firm should project the future cash receipts, cash disbursements with various cash balances, subtract the disbursements from the receipts to determine net cash flows and then select that cash balance which maximizes the present value of the net cash flows. Such projection of cash receipts (cash inflows) and cash disbursements (cash outflows) is known as cash budgeting.

Cash budget is a schedule of estimated cash receipts, cash disbursements and cash balances of a firm over specified period of time.

Purposes of Cash Budget

The main purpose of a cash budget is to determine the requirements of cash in advance for a particular period of time in order to smooth running of a firm. To achieve the main purpose the following specific purposes should be considered :

- i) To coordinate the timings of cash needs,
- ii) To pin point the period(s) when there is likely to be excess cash,
- iii) To enable a firm having sufficient cash to take advantage of cash discount on its accounts payable
- iv) To help arrange requisite funds on the most favorable terms and prevent the accumulation of excess funds.

The main purpose of a cash budget is to determine the requirements of cash in advance for a particular period of time.

Elements of Cash Budget

The following are the main elements of cash budgeting system:

- i) Selection of time period to be covered by the budget. It is known as planning horizon. It should be determined in the light of the circumstances and requirements of a particular case.
- ii) Selection of the factors that have a bearing on cash flows.

Cash flows may be two types, which are presented below:

Operating Cash Flows:

Inflows	Outflows
1. Cash sales of Inventories	1. Accounts Payable
2. Collection of Accounts Receivables	2. Purchase of Raw Materials
3. Disposal of Fixed Assets	3. Payroll
	4. Overhead Expenses
	5. Maintenance Expenses
	6. Purchase of Fixed Assets

Financial Cash Flows

Inflows	Outflows
1. Loans	1. Tax Payments
2. Sale of Securities	2. Repayment of Loan
3. Interest Receipts	3. Repurchase of share
4. Dividend Receipts	4. Interest Paid
5. Rent Receipts,	5. Dividend Paid
6. Refund of tax	6. Rent Paid

Preparation of Cash Budget and Format for a Cash Budget

After the time span of the cash budget has been decided and the pertinent operating and financial cash flows have been identified, the final step is the preparation of cash budget. While preparing cash budget one has to consider the following main points:

- i) Target or minimum cash balance which a firm desires to maintain in order to run its business smoothly,
- ii) Net cash flows, which is determined by estimating the cash disbursements and cash receipts expected to be generated each period.

The following figure presents the Format for a Cash Budget

Particulars	Months					
A. Cash Inflows						
1. Cash sales of Inventories						
2. Collection of Accounts Receivables						
3. Disposal of Fixed Assets						
4. Loans						
5. Sale of Securities						
6. Interest Receipts						
7. Dividend Receipts						
8. Rent Receipts,						
9. Refund of tax						
B Cash Outflows						
1. Accounts Payable						
2. Purchase of Raw Materials						
3. Payroll						
4. Overhead Expenses						
5. Maintenance Expenses						
6. Purchase of Fixed Assets						
7. Tax Payments						
8. Repayment of Loan						
9. Repurchase of share						
10. Interest Paid						
11. Dividend Paid						
12. Rent Paid						
C Net Cash Flows (A- B)						
D Beginning Cash Balance						
E... Ending Cash Balance						
F. Target/Minimum Cash Balance						
G. Surplus (deficit) Cash (E – F)						

Methods

There are three methods of preparation of cash budget namely : i) Maintaining Target/Minimum Cash Balance, ii) Scheduling of Receipts and Disbursement Method and iii) Combination of (i) and (ii). The following paragraphs follow discussion on each of the methods:

i) **Maintaining Target/Minimum Cash Balance:** Under this method, the firm desires to maintain a target or minimum cash balance in order to conduct its business without interruption. As a result, if the net cash flows and the beginning cash balance together which comprise the ending cash balance exceeds the target cash balance, that exceeding amount is treated as surplus cash balance. On the other hand, if the ending cash balance is lower than the target cash balance that shortfall amount is considered as deficit cash balance.

Under this method, the firm desires to maintain a target or minimum cash balance.

ii) **Scheduling of Receipts and Disbursements Method :** Under this method, the net cash flow is determined by deducting total cash disbursements from total cash receipts. Whenever the total receipts exceed the total disbursement, the exceeding balance is called positive net cash flow. On the other hand, when total cash disbursement exceed the total receipts the exceeding balance is termed as negative cash flow which is unexpected for a firm.

Under this method, the net cash flow is determined by deducting total cash disbursements from total cash receipts.

- iii) **Combination of (i) and (ii) methods** : Under this method, both the target method and scheduling method are followed simultaneously. This method is regarded as the best one since it considers both the target and scheduling methods.

Problems and Solutions

Unilever Ltd. wants to prepare a cash budget for the months of September through December. From the following information prepare the cash budget and state if the company will need to invest excess funds or borrow funds during these months :

1. Sales were \$50,000 in June and \$60,000 in July. Sales have been forecasted to be \$65,000, 72,000, \$63,000, \$59,000 and \$56,000 for the months of August, September, October, November and December respectively. In the past, 10% of sales were on cash basis and the collections were 50% in the first month, 30% in the second month and 10% in the third month following the sales.
2. Every 4 months 500 of dividends from investments are expected. The first dividend payment was received in January.
3. Purchases are 60% of sales, 15% of which are paid in cash, 65% are paid 1 month later and the rest is paid 2 months after purchase.
4. \$8,000 dividends are paid twice a year in March and September.
5. Monthly rent is \$2,000.
6. Taxes are paid \$6,500 payable in December.
7. A new equipment will be purchased in October for \$2,300.
8. \$1,500 interest will be paid in November.
9. \$1,000 loan payments are paid every month.
10. Wages and salaries are \$1,000 + 5% of sales in each month.
11. August's ending cash balance is \$3,000.
12. The company would like to maintain a minimum cash balance of \$10,000.

Solution

Unilever Ltd.

Cash Budget for the Months of September to December

(In Dollar)

Particulars	September	October	November	December
A. Cash Receipts/Inflows:				
Cash sale (10% of sales)	7,200	6,300	5,900	5,600
Collections of Accounts Receivables ⁽ⁱ⁾				
50% in the 1st month following sales	32,500	36,000	31,500	29,500
30% in the second month following sales	18,000	19,500	21,600	18,900
10% in the 3 rd month following sales	5,000	6,000	6,500	7,200
Cash Dividend (3 rd Installment)	500	-	-	-
Total Cash Receipts	63,200	67,800	65,500	61,200
B. Cash Disbursements/Outflows				
15% cash purchases ⁽ⁱⁱ⁾	6,480	5,670	5,310	5,040
65% are paid one month later	28,080	24,570	23,010	21,840
20% are paid two months after	8,640	7,560	7,080	6,720
Dividend payment	8,000	-	-	-
Rent	2,000	2,000	2,000	2,000
Taxes	-	-	-	6,500
Purchase of Equipment	-	2,300	-	-
Interest	-	-	1,500	-
Loan repayment	1,000	1,000	1,000	1,000
Wages and Salaries	4,600	4,150	3,950	3,800
Total Cash Disbursement	58,800	47,260	43,850	46,900
C. Net Cash Flows (A -B)	4,400	20,540	21,650	14,300
D. Beginning Cash Balance⁽ⁱⁱⁱ⁾	3,000	7,400	27,940	49,590
E. Ending Cash Balance	7,400	27,940	49,590	63,890
F. Minimum Cash Balance	10,000	10,000	10,000	10,000
G. Surplus (Deficit) Cash (E- F)	(2,600)	17,940	39,590	53,890

Summary :

The company will need to invest surplus funds during October, November and December. But it will need to borrow fund during September in order to meet its deficit cash.

Notes :

- (i) a. In September, 50% are collected from August's sale and so on for other months.
 - b. In September 30% are collected from July's sales and so on for other months.
 - c. In September 10% are collected from June's sales and so on for other months.
- (ii) Total purchases for September, October November and December are 60% of the sales of the respective months i.e., \$43,200, 37,800, 35,400 and 33,600.
- (iii) August's ending cash balance is the beginning balance for September and so on for other months

Review Questions

Short Questions

1. Define cash budget and cash budgeting.
2. What are the purposes of cash budget? Explain.
3. Discuss the elements of cash budget.
4. Show the format for a cash budget.

Broad Questions

1. What are the methods of preparation of cash budget? Explain in detail.
2. Describe the main elements of cash budget.
3. How do you prepare a cash budget?

Review Problem

Problem – 1

Consider the balance sheet of Beximco Textile Ltd. The company has received a large order and anticipates the need to go to its Bank to increase its borrowing. As a result, it has to forecasts its cash requirements for January, February and March. The company collects 20% of its sales in the month of sale, 70% in subsequent month and 10% in the second month after sale. All sales are on credit.

(in '000)

	Tk.		Tk.
Cash	50	Accounts Payable	360
Accounts Receivable	530	Bank Loan	400
Inventories	545	Accruals	212
Net Fixed Assets	1836	Long – term debt	450
		Common Stock	100
Total	2961	Retained Earnings	1439
		Total	2961

Purchases of raw materials are made in the month prior to the sale an amount to 60% of sales in subsequent month. Payments for these purchases occur in the month after the purchase. Labor costs are expected to be 1,50,000 in January, 2,00,000 in February and 1,60,000 in March. Other expenses are expected to be 1,00,000 par month. Actual sale are as follows (in '000):

November 500, December 600, January 600, February 1,000, March 650, April 750.

Required :

- a) Preparation of cash budget for the month of January, February and March.
- b) Determine the amount of additional bank borrowings necessary to maintain a minimum cash balance of 50,000 taka.

Lesson-7: Pro Forma Statements and Sustainable Growth Models

After attentively reading this lesson 7, you should be able

- To understand the meaning of pro forma statements and their significance
- To know how to prepare pro forma income statement
- To know how to prepare pro forma balance sheet and
- To understand the sustainable growth modeling

Meaning, Significance and Preparation of Pro forma Statements

Pro forma financial statements also known as projected financial statements are the forecasted financial requirements based on estimated financial statements. These statements include i) pro forma income statement and ii) pro forma balance sheet.

Pro forma Income Statement

The pro forma income statement is a projection of income and expenses for a particular period of time in the future. Like the cash budget, the sales forecast is the key to scheduling production and estimating production costs. A detailed analysis of purchases and factory overheads is likely to produce the most accurate forecasts. However, sometimes cost of goods sold are estimated on the basis of the past ratios of the elements of costs of goods sold. Selling, general office and administration expenses are estimated next. Because these expenses are usually budgeted in advance, estimates of them are fairly accurate. Next, other income and expenses are estimated. Income taxes are then computed and deducted to obtain net income. All of these estimates of income and expenses are then combined into an income statement, known as pro forma income statement.

Preparation of Pro forma Income Statement

There are two methods of preparing Pro forma Income Statements namely : i) percentage of sales method and ii) past ratios of the elements of costs of goods sold. The following paragraphs follow the explanation of the methods:

- Percentage of Sales Method:** A very simple method of preparing a Pro forma Income Statement is to base all items of income and expenditures a percentage of sales. This would involve using the prior year Income Statement and calculate what each item is as a percentage of total sales. You would then use the computed percentages to estimate your future items of income and expenses.
- Past Ratios Method:** This is also very simple method of preparing a profroma Income Statement. Under this method, every item of income and expenses of the future year are based on the ratios of

Pro forma financial statements also known as projected financial statements are the forecasted financial requirements based on estimated financial statements.

these items prior to that year. By first estimating a sales level, one can multiply historical ratios of the costs of goods sold and various expenses items by the level in order to prepare the statement.

Pro forma Balance Sheet

The pro forma balance sheet is a projection of all the properties and assets and capital and liabilities for a particular period of time in the future. The preparation of such a balance sheet gives an indication as to the probable picture of financial condition of a firm.

Preparation of a Pro forma Balance Sheet

For the preparation of a Pro Forma Balance Sheet, a judgmental approach is used whereby each item on the balance sheet is assessed individually rather than a blanket approach applied to all items. For preparing a Proforma Balance Sheet, ratios are used frequently in order to make financial forecasts. However, the following guidelines are followed while estimating Balance Sheet:

- i) **Cash:** Estimate using cash budget or stated desire cash balance;
- ii) **Accounts Receivable:** Estimate using historical accounts receivable turn over ratios.
- iii) **Inventory:** Estimate using historical inventory turn over ratios.
- iv) **Capital Assets:** Estimate based on strategic plans. You would also deduct an estimate of amortization and any assets expected to be sold or scrapped;
- v) **Accounts Payable:** Estimate using purchase information and accounts payable turn over ratio;
- vi) **Taxes Payable:** Estimate based on normal payment of installment and final tax payments schedules;
- vii) **Notes and Long – term debt:** Estimate based on loan agreements;
- viii) **Retained Earnings:** Calculate as beginning retained earnings plus projected net income minus projected dividends;
- ix) **Capital Stock:** Estimate based on current balances plus any proceeds from proposed new issue of stock less any stock repurchase;

If you do not have information required for individual estimates, you can use the percentage of sales method to estimate some of those items. Since historical data and ratios are not always an indication of what the future will hold, therefore, when preparing financial forecasts you should assess the impact of expected future events on the historical results before simply applying the historical ratios.

Problems and Solutions

Problem – 1

The following Income Statement and Balance Sheet relate to Bata Ltd. during 2004

Income Statement

(in million Tk.)

Particulars	Tk.
Net Sales	15,000
Less cost of goods sold	<u>12,300</u>
Gross Profit	2,700
Less Fixed operating costs except depreciation	900
Less Depreciation	<u>500</u>
EBIT	1,300
Less Interest	<u>400</u>
EBT	900
Less Taxes @ 40%	<u>360</u>
Net Income	540
Less Dividends	<u>290</u>
Addition to Retained Earnings	250

Balance Sheet

	Tk.		Tk.
Accounts Payable	300	Cash	150
Accruals	600	Accounts Receivables	1800
Notes Payable	400	Inventories	2700
Long – term Bond	3000	Net Plant and Equipment	3800
Common Stock	1300	Total	8450
Retained Earnings	2850		
Total	8450		

Additional Information:

- i) Assume that the sales and operating costs will be 10% higher in 2005 than in 2004;
- ii) Further assume that the company currently operates at full capacity, so it will need to expand its plant capacity in 2005 to handle the additional operations.

Required :

- a) Prepare pro forma income statement for 2005,
- b) Prepare pro forma balance sheet for 2005.

Solution

Bata Ltd.

Pro forma Income Statement, during the year 2005, (in million Tk.)

Particulars	2004, Results,	2005, forecasts basis	2005, forecasts
Net Sales	15,000	X 1.10	16,500
Less cost of goods sold	12,300	X 1.10	13,530
Gross Profit	2,700	--	2,970
Less Fixed operating costs except depreciation	900	X 1.10	990
Less Depreciation	500	X 1.10	550
EBIT	1,300	--	1430
Less Interest	400	--	400*
EBT	900	--	1030
Less Taxes @ 40%	360	--	412
Net Income	540	--	618
Less Dividends	290	--	290**
Addition to Retained Earnings	250	--	328

* Indicates the 2004 figure carried over for the preliminary forecast

** Indicates dividend for the 2004 and it is assumed same for 2005.

Bata Ltd.

Proforma Balance Sheet

As at December 31, 2005

(In million Taka)

Items	2004 Results	2005 Forecast Basis	2005 Forecasts
Cash	150	x 1.10	165
Accounts Receivable	1800	x 1.10	1980
Inventories	2700	x 1.10	2970
Total current assets	4650	--	5115
Net plant and equipment	3800	x 1.10	4180
Total assets	8450	--	9295
Accounts payable	300	x 1.10	330
Accruals	600	x 1.10	660
Note payables	400	--	400 (a)
Total current liabilities	1300	--	1390
Common stock	1300	--	1300 (b)
Long-term Bonds	3000	--	3000 (c)
Retained Earnings	2850	+328 (d)	3178
Additional funds needed	--	--	427 (e)
Total liabilities and equities	8450	--	9295

Notes:

- a) Indicates 2004 figure carried over 2005,
- b) Indicates 2004 figure carried over 2005,
- c) Indicates 2004 figure carried over 2005,
- d) Represents the additions to retained earnings from 2004 Income Statement,
- e) Calculated by deducting total liabilities from total assets.

Sustainable Growth Modeling

Sustainable growth modeling situation is one where the sustainable growth rate (SGR) is the maximum annual percent increase in sales that is possible, given a set of target financial and operating ratios. The management responsible for the growth of a firm requires careful balancing of the sales objectives of the firm with its operating and financial resources. If actual growth exceeds the SGR, something must give, and frequently it is the debt ratio. By modeling the process of growth, one is able to make intelligent trade-offs. In case where a firm over-reaches itself financially at the alter of growth; sustainable growth modeling is a powerful planning tool. Here, the trick is to determine what sales growth rate is consistent with the realities of the firm and of the financial market - place.

Various Types of Sustainable Growth Model

There are two types of sustainable growth model namely: i) Steady - State Model, and ii) Changing Model.

- i) **Steady-State Model :** In steady-State Model, the future is treated exactly like the past with respect to balance sheet and performance ratios. In this model, it is also assumed that the firm engages in no external equity financing; the equity account is built only through earning retention

Variables under Steady-State Model:

In the Steady State Model, the following variables are essential to determine SGR:

- A/S = Total Assets to Sales Ratio
- NP/S = Net Profit to Sales Ratio
- D/E = Debt – Equity Ratio
- S_0 = Most recent Annual Sales (beginning sales)
- ΔS = Absolute Change in Sales from the beginning Sales
- b = Retention Rate of Earnings ($1 - b$ is the dividend payout ratio)

The first four variables are target variables. The total assets to sales ratio is a measure of operating efficiency. The lower the ratio the more efficient the utilization of assets. In turn, this ratio is composite of receivable management, inventory management, fixed assets management and liquidity management.

The total assets to sales ratio is a measure of operating efficiency.

The net profit margin is a relative measure of operating efficiency. The earnings retention rate and the debt ratio should be determined in keeping with dividend and capital structure theory and practice.

Formula for SGR

$$\Delta S \left(\frac{A}{S} \right) = b \left(\frac{NP}{S} \right) (S_0 + \Delta S) + \left[b \left(\frac{NP}{S} \right) (S_0 + \Delta S) \right] \frac{D}{Eq.}$$

Asset increase *Retained earnings increase* *Increase in debt*

By rearrangement, this equation can be expressed as follows

$$\frac{\Delta S}{S_0} \text{ or } SGR = \frac{b \left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq.} \right)}{\left(\frac{A}{S} \right) - \left[b \left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq.} \right) \right]}$$

(ii) Changing Model

In situations where the ratios and growth change from year to year, Steady-State Model can not be used. In those situations year-by-year modeling is in order. In effect, the sales at the previous year and equity at the previous year end serve as foundation on which to build year-by-year modeling. Also, we express dividend in terms of the absolute amount as opposed to payout ratio. Finally, we allow for the sale of common stock in a given year, though this can be specified as zero.

In effect, the sales at the previous year and equity at the previous year end serve as foundation on which to build year-by-year modeling.

With these variables, the sustainable growth rate in sales for the next year, SGR in decimal form goes as follows :

$$SGR = \frac{(Eq.0 + NewEq. - Div.) \left(1 + \frac{D}{Eq.} \right) \left(\frac{S}{A} \right)}{1 - \left[\left(\frac{NP}{S} \right) \left(1 + \frac{D}{Eq.} \right) \left(\frac{S}{A} \right) \right]} \left[\frac{1}{S_0} \right] - 1$$

Problems and Solutions

Problem - 1

Tata Industries has \$ 40 million in shareholders equity and sales of \$150 million last year.

- Its target ratios are : assets to sales ratio .40; net profit margin .07; debt-equity ratio .50 and earnings retention .60. If these ratios correspond to Steady-State Model, what is its SGR ?
- If instead of these ratios, what would be the SGR next year if the company moved from Steady-State and had the following targets ? Assets to sales ratio .42; net profit margin .06; debt-equity ratio .50; dividend of \$5 million and no new equity financing.

Solution

a) By putting the values in SGR formula in case of Steady-State Model; we get -

$$\text{SGR} = \frac{(.60 \times .07) (1 + .5)}{.40 - [.60 (.07) (1 + .50)]} = \frac{.063}{.337} = 18.69\%$$

b) By putting the values in SGR formula in case of Changing Model, we get -

$$\begin{aligned} \text{SGR} &= \left[\frac{(40 + 0 - 5)(1 + .5) \left(\frac{1}{.40}\right)}{1 - \left[(.07)(1 + .50) \left(\frac{1}{.40}\right) \right]} \right] \left(\frac{1}{150} \right) - 1 \\ &= \left[\frac{131.25}{.2625} (0.00667) \right] - 1 = 1.1865 - 1 = .1865 = 18.65\% \end{aligned}$$

Problem – 2

Zippo Industries has equity capital of Tk. 12 million, total debt of Tk. 8 million and sales last year of Tk. 30 million.

- It has target assets – to sales ratio of .6667, a target net profit margin of .04, a target debt –equity ratio of .6667 and a target earnings retention rate of .75. In Steady – State, what is its sustainable growth rate?
- Suppose, now, the company has established for next year a target assets to sales ratio of .62, a target net profit margin of .05, and a target debt – equity ratio of .80. It wishes to pay an annual dividend of Tk. .3 million and raise Tk. 1 million in equity capital

next year. What is its sustainable growth rate for next year? Why does it differ from that in part (a) ?

Solution:

a) By putting the values in SGR formula in case of Steady-State Model, we get -

$$\text{SGR} = \frac{.75 (.04)(1.6667)}{.6667 - [.75 (.04) (1.6667)]} = 8.11\%$$

b) By putting the values in SGR formula in case of Changing Model we get -

$$\left[\frac{A}{S} \right] = .62 \quad \therefore \frac{S}{A} = \frac{1}{.62} = 1.6129$$

$$\text{SGR} = \left[\frac{(12 + 1 - 0.3)(1.80)(1.6129)}{1 - [(0.05)(1 + .80)(1.6129)]} \right] \left(\frac{1}{300} \right) - 1 = 43.77\%$$

The company has moved from Steady-State with higher target operating efficiency, a higher debt ratio, and the sale of common stock. All of these things permit a high rate of growth in sales next year. Unless further changes in this direction occur, the SGR will decline in future years.

Review Questions

Short Question

1. What do you mean pro forma financial statements?
2. What is pro forma income statement?
3. Define sustainable growth modeling and sustainable growth rate.
4. What are the pertinent variables involved in Steady State growth model?
5. What are the variables involved in changing growth model?

Broad Questions

6. Explain the methods of preparation of pro forma income statement and pro forma balance sheet.
7. What are the various types of sustainable growth model? Explain.
8. Explain how would you find out sustainable growth rate under:
 - a) Steady Growth Model,
 - b) Changing Growth Model.

Review Problems

Problem – 1

The following Income Statement and Balance Sheet relate to Tata Ltd. during 2001.

Income Statement

Particulars	Tk.
Net Sales	28,200
Less cost of goods sold	17,200
Gross Profit	11,000
Less Fixed operating costs except depreciation	7,800
Less Depreciation	600
EBIT	2,600
Less Interest	440
EBT	2,160
Less Taxes @ 40%	864
Net Income	1296
Less Dividends	516
Addition to Retained Earnings	780

Balance Sheet, as 31st December, 2001

	Tk.		Tk.
Accounts Payable	660	Cash	1120
Accruals	500	Accounts Receivables	1680
Notes Payable	1040	Inventories	11270
Bank Loan	8900	Prepaid Expenses	130
Long – term Bond	4930	Net Plant and Equipment	11490
Common Stock	8000	Total	25690
Retained Earnings	1660		
Total	25690		

Additional Information:

- iii) Assume that the sales and operating costs will be 15% higher in 2002 than in 2001;
- iv) Further assume that the company currently operates at full capacity, so it will need to expand its plant capacity in 2002 to handle the additional operations.

Required :

- c) Prepare pro forma income statement for 2002,
- d) Prepare pro forma balance sheet for 2002.

Problem – 2

Apex Ltd. had equity capital of \$1 million, debt of \$80 million and sales of last year \$300 million. The company has the following target ratios during 2003. $D/E = .80$, $A/S = .60$, Profit margin $.06$, $b = .70$. Furthermore, the company has a new equity of \$25 million and paid dividend of 10 million during 2003.

Calculate sustainable growth rate for the company for 2003.

Problem – 3

Phonex Ltd. has equity capital of \$120 million, total debt of \$80 million and sales last year of \$230 million.

- a) It has a target assets to sales ratio of $.64$; target net profit margin of $.07$; target debt equity of $.65$ and target earning retention ratio of $.72$. In Steady State Model, what is SGR?
- b) The company has established the following target ratio for the next year:

A/S ratio $.75$, net profit margin $.05$, and D/E ratio $.60$. The company desires to pay an annual dividend of \$5 million and raise \$15 million in equity capital during next year. What is SGR in next year? Why does it differ?